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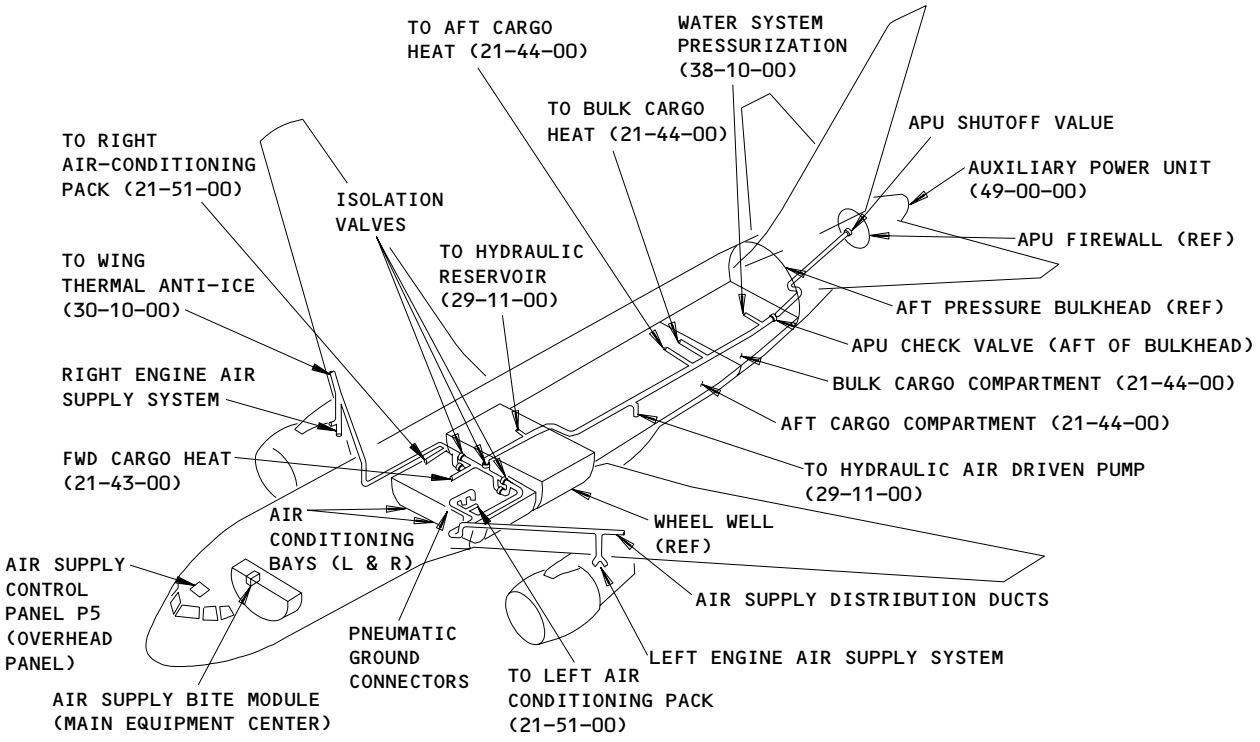
PNEUMATIC - GENERAL - DESCRIPTION/OPERATION

1. General (Fig. 1)
   A. The pneumatic or air supply system supplies pressure and temperature regulated air to airplane user systems. The air is used as a system power source, working fluid or for system pressurization. The pneumatic system consists of the Air Supply Distribution System (AMM 36-10-00/001) and several indicating systems (AMM 36-20-00/001).
   B. Distribution Ducting
      (1) The air supply system is primarily an air distribution system. It channels air through ducts from one of several sources to various user systems. The air pressurizes the hydraulic reservoir, powers the air driven pump, and pressurizes the potable water system. In addition, it heats the forward, aft, and bulk cargo compartments, heats the total air temperature probes, powers the air conditioning packs, and provides wing thermal anti-ice protection. The distribution ducting allows engine starting using air power supplied by the auxiliary power unit (APU), the opposite airplane engine or a pneumatic ground cart.



Pneumatic Distribution System
Figure 1

C. Engine Air Supply

(1) The airplane engines are the main source of pneumatic system air. Used primarily as an inflight air source, a small amount of air is bled off from the engine compressor section. This air is pressure and temperature regulated, and distributed to user systems.

D. APU Air Supply

(1) The auxiliary power unit (APU) normally provides system air when the airplane is on the ground and the engines are not running. The APU can also provide inflight backup in case of engine failure or an engine bleed air system malfunction.

E. Ground Air Supply

(1) As an alternate to the APU, a pneumatic ground cart can supply air to the airplane whenever it is parked. Connection between the ground cart and the pneumatic system is through two ground air connectors.

F. Indicating

(1) System indicating is provided by the Air Supply Pressure Indication and the Air Supply Temperature Indication Systems. Inflight and on-ground pneumatic system monitoring and fault isolation is provided by the Air Supply BITE System.

PNEUMATIC - GENERAL - MAINTENANCE PRACTICES

1. General
   A. This section has the standard procedures to apply pressure or remove the pressure from the pneumatic system when you use a ground air source, operate the auxiliary power unit, or operate one or both the engines.
      (1) The Pneumatic System supplies air to the systems that follow:
         (a) Aircraft pressurization/System (AMM 21-31-00)
         (b) Air Conditioning System (AMM 21-00-00, 21-51-00)
         (c) Wing Leading Edge and Cowl Anti-Icing (AMM 30-10-00, 30-20-00)
         (d) Engine Starting (AMM 80-10-00)
         (e) Forward and Aft Cargo Heating (AMM 21-43-00, 21-44-00)
         (f) Air Driven Hydraulic Pump (AMM 29-11-03)
         (g) Hydraulic Reservoir Pressurization (AMM 29-11-19, 29-11-20)
         (h) Total Air Temperature Heat
         (i) Potable Water Tank Pressurization

TASK 36-00-00-862-001

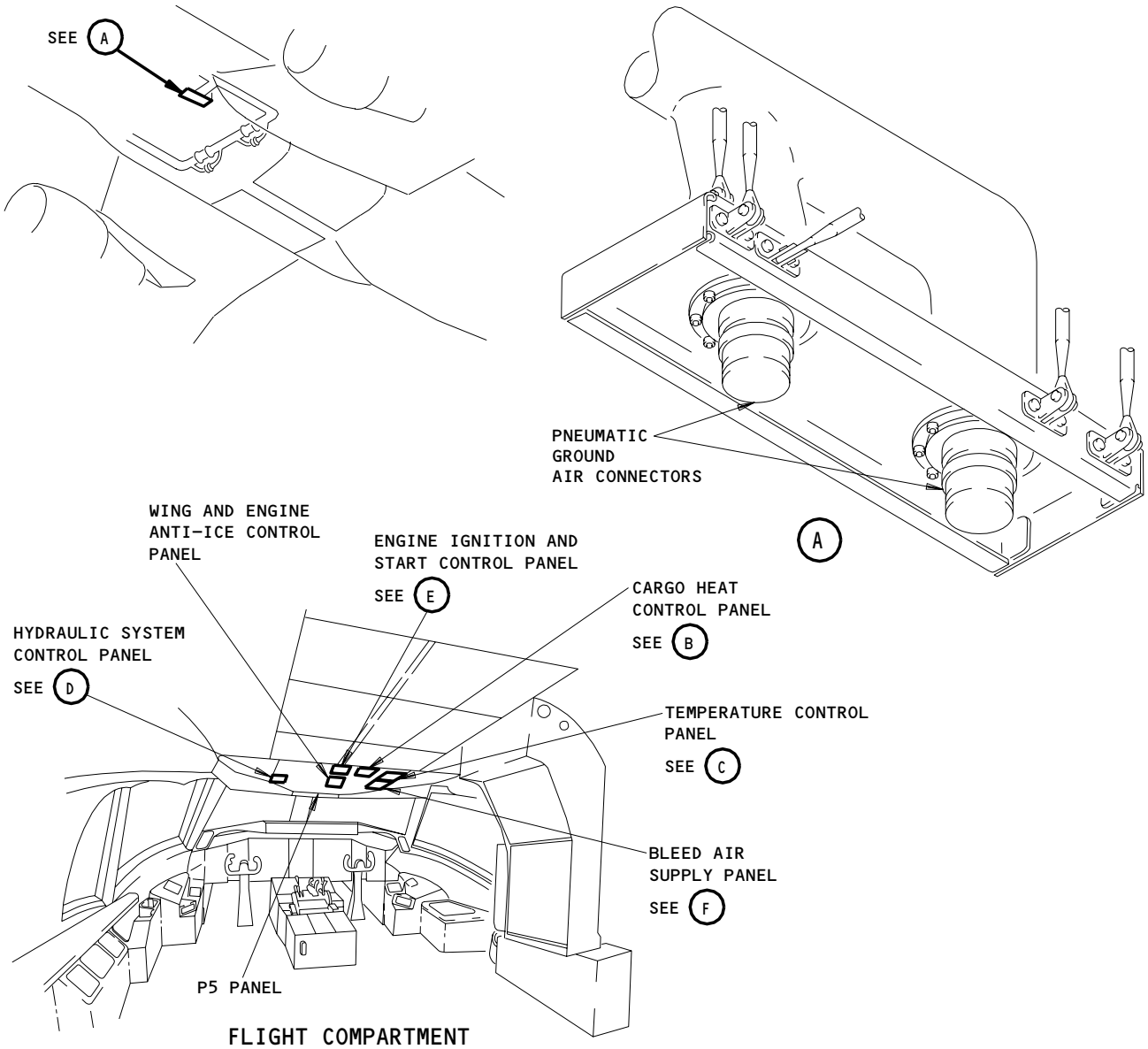
2. Pressurize Pneumatic System Using Ground Air Source (Fig. 201)
   A. References
      (1) AMM 06-41-00/201, Section 45 Access Doors and Panels.
      (2) AMM 20-41-00/201, Static Grounding
      (3) AMM 24-22-00/201, Electric Power Control

   B. Access
      (1) Location Zones
         193 Forward Lower Half (Left)
         194 Forward Lower Half (Right)

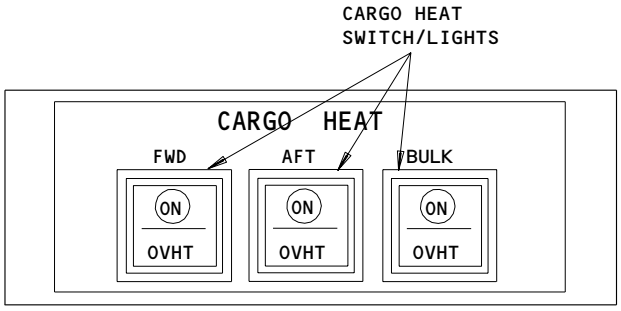
   C. Procedure to Pressurize the Pneumatic System

      S 862-002
      (1) Electrically ground the airplane to an approved grounding connection (AMM 20-41-00/201).

      S 012-003
      (2) Open the pneumatic ground connection access door 193LL (AMM 06-41-00/201).



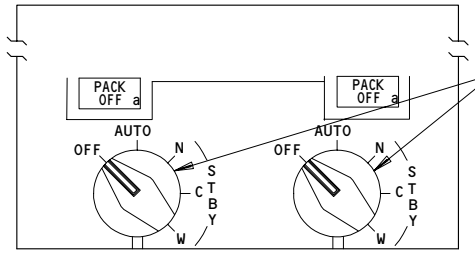
FLIGHT COMPARTMENT



CARGO HEAT CONTROL PANEL

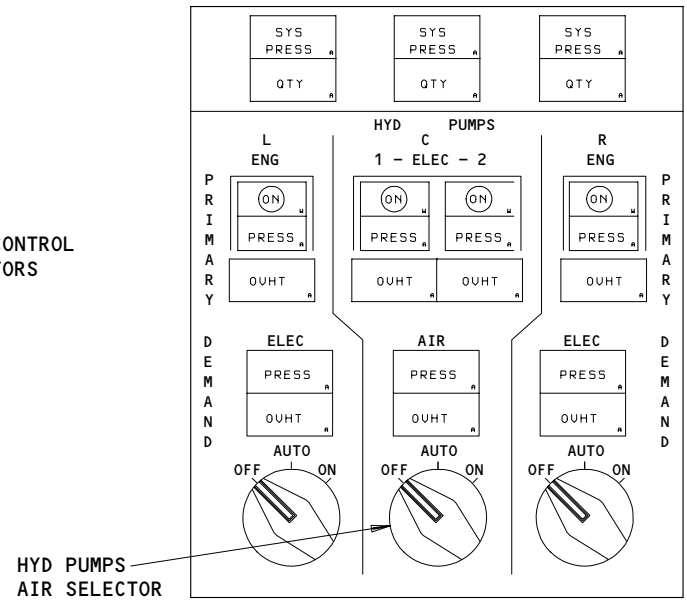
B

Pneumatic General Maintenance Practices
Figure 201 (Sheet 1)



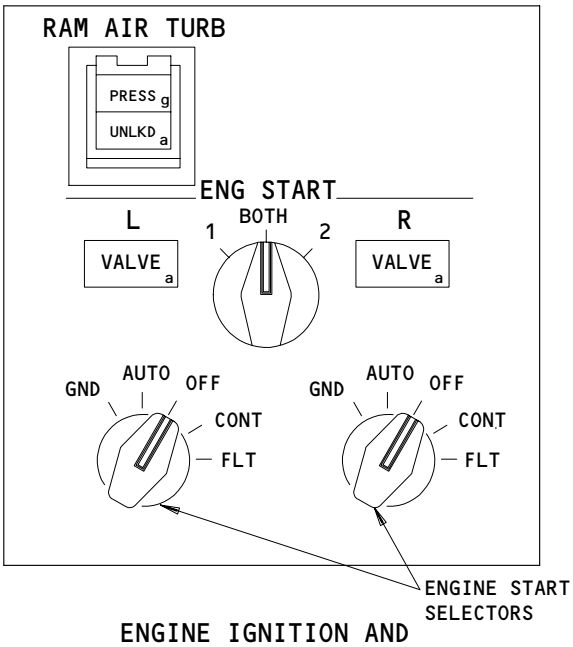
TEMPERATURE CONTROL PANEL

C



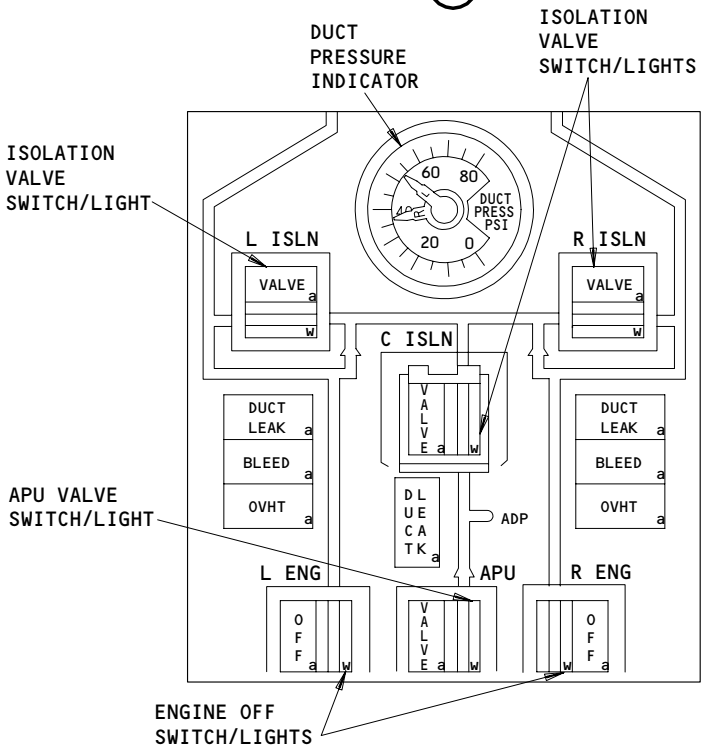
HYDRAULIC SYSTEM
CONTROL PANEL

D



ENGINE IGNITION AND
START CONTROL PANEL

E



BLEED AIR SUPPLY PANEL

F

Pneumatic General Maintenance Practices
Figure 201 (Sheet 2)

S 862-005

(3) Connect the ground pneumatic source to the ground pneumatic connectors.

S 862-075

CAUTION: TO PREVENT DAMAGE TO AIR CONDITIONING SYSTEM COMPONENTS, APPLY ELECTRICAL POWER BEFORE YOU APPLY PNEUMATIC POWER AND REMOVE PNEUMATIC POWER BEFORE YOU REMOVE ELECTRICAL POWER.

(4) Supply electrical power (AMM 24-22-00/201).

S 862-008

(5) Put both the pack control selectors on the pilots overhead P5 panel to OFF. Make sure the PACK OFF lights come on.

S 862-011

(6) Push the CARGO HEAT AFT switch/light to off position. Make sure both the cargo heat aft ON and OVHT lights on P5 panel are off.

S 862-012

(7) Push the CARGO HEAT BULK switch/light to off position. Make sure both the cargo heat bulk ON and OVHT lights on the P5 panel are off.

S 862-014

(8) Push the CARGO HEAT FWD switch/light to the off position. Make sure both the cargo heat fwd ON and OVHT lights on P5 panel are off.

S 862-016

(9) Put the HYD PUMPS AIR selector on the P5 panel in OFF.

S 862-017

(10) Make sure the L and R ENGINE START selector is in OFF. Make sure the L and R amber VALVE light on the overhead P5 panel is off.

S 862-018

(11) Put the WING ANTI-ICE switch on the P5 panel to the OFF position. The amber VALVE lights are off.

S 862-021

(12) Push the L, C and R ISLN VALVE switch/lights on P5 panel to open position. Make sure the white flowbar lights are on and the amber VALVE lights come on and then go off.

S 862-077

(13) Make sure the L and R ENG OFF switch-lights are in the "OFF" position.

S 862-074

WARNING: DO NOT SUPPLY GREATER THAN 45 PSI TO THE PNEUMATIC SYSTEM. IF YOU SUPPLY TOO MUCH PRESSURE DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

(14) Start the ground pneumatic source and do not supply more than 45 psig.

S 862-024

(15) Look at the duct pressure (DUCT PRESS) indicator on the P5 panel. Compare the manifold pressure shown by both the pointers. The pressure seen on the indicator will be different for each source used.

TASK 36-00-00-862-025

3. Pressurize Pneumatic System Using Auxiliary Power Unit (Fig. 201)

A. References

(1) AMM 06-41-00/201, Section 45 Access Doors and Panels.

(2) AMM 24-22-00/201, Electric Power Control

(3) AMM 49-11-00/201, Auxiliary Power Unit (APU)

B. Procedure to Pressurize the Pneumatic System

S 862-026

CAUTION: TO PREVENT DAMAGE TO AIR CONDITIONING SYSTEM COMPONENTS, APPLY ELECTRICAL POWER BEFORE YOU APPLY PNEUMATIC POWER AND REMOVE PNEUMATIC POWER BEFORE YOU REMOVE ELECTRICAL POWER.

(1) Supply the electrical power (AMM 24-22-00/201).

S 862-028

(2) Put both the pack control selectors on the pilots overhead P5 panel to OFF. Make sure the PACK OFF light comes on.

S 862-031

(3) Push the CARGO HEAT AFT switch/light on P5 panel to off position. Make sure both the cargo heat aft ON and OVHT lights are off.

S 862-032

(4) Push the CARGO HEAT BULK switch/light on P5 panels to off position. Make sure the cargo heat bulk ON and OVHT lights are off.

S 862-034

(5) Push the CARGO HEAT FWD switch/light on the P5 panel to off position. Make sure both the cargo heat fwd ON and OVHT lights on the P5 panel are off.

S 862-036

(6) Put the HYD PUMPS AIR selector on the P5 panel in OFF.

S 862-037

(7) Make sure the L and R ENGINE START selector is in OFF. Make sure the amber VALVE light on the overhead P5 panel is off.

S 862-038

(8) Put the WING ANTI-ICE switch on P5 panel to the OFF position. The amber VALVE lights are off.

S 862-041

(9) Push the L, R and C ISLN VALVE switch/lights on the P5 panel to the open position. Make sure the white flow bar lights are on and the amber VALVE light comes on and then goes off.

S 862-078

(10) Make sure the L and R ENG OFF switch-lights are in the "OFF" position.

S 862-042

(11) Start the auxiliary power unit (AMM 49-11-00/201) and let the unit become stable at the governed speed.

S 862-044

(12) Push the APU VALVE switch/light on P5 panel to open position. Make sure the white flowbar light is on and amber VALVE light comes on then goes off.

S 212-046

(13) See the duct pressure (DUCT PRESS) indicator on the P5 panel. Make sure the manifold pressure indicated by both the pointers to be between 20 and 35 psi.

TASK 36-00-00-862-047

4. Pressurize Pneumatic System Using One or Both Engines (Fig. 201)

A. References

(1) AMM 24-22-00/201, Electric Power Control

(2) AMM 71-00-00/201, Power Plant-General

B. Procedure to Pressurize the Pneumatic System

S 862-076

CAUTION: TO PREVENT DAMAGE TO AIR CONDITIONING SYSTEM COMPONENTS, APPLY ELECTRICAL POWER BEFORE YOU APPLY PNEUMATIC POWER AND REMOVE PNEUMATIC POWER BEFORE YOU REMOVE ELECTRICAL POWER.

(1) Supply the electrical power (AMM 24-22-00/201).

S 862-047

(2) Put both the pack control selectors on the pilots overhead P5 panel to OFF. Make sure the PACK OFF light comes on.

S 862-050
(3) Push the CARGO HEAT AFT valve switch/light on P5 panel to off position. Make sure both the cargo heat aft ON and OVHT lights are off.

S 862-051
(4) Push the CARGO HEAT BULK valve switch-light on the P5 panel to off position. Make sure both the cargo heat bulk ON and OVHT lights are off.

S 862-053
(5) Push the CARGO HEAT FWD valve switch-light on P5 panel to off position. Make sure both the cargo heat fwd ON and OVHT lights are off.

S 862-055
(6) Put the HYD PUMPS AIR selector on the P5 panel in OFF.

S 862-056
(7) Make sure the L and R ENGINE START selector is in OFF. Make sure the amber VALVE light on the P5 panel is off.

S 862-057
(8) Put the WING ANTI-ICE switch on the P5 panel to the OFF position. The amber VALVE lights are off.

S 862-060
(9) Push the L, R and C ISLN VALVE switch-lights on the P5 panel to the open position. Make sure the white flowbar lights are on and the amber VALVE light comes on then goes off.

S 862-061
(10) Prepare and start the engine as specified for the normal operation (AMM 71-00-00/201).

S 862-062
(11) Push the applicable L or R ENG OFF switch-lights on air supply module on the P5 panel to the open position. Make sure the white flowbar comes on and the OFF light goes off.

S 212-066
(12) See the duct pressure (DUCT PRESS) indicator on the P5 panel. Make sure the manifold pressure shown by both the pointers is 18 psi or greater.

TASK 36-00-00-862-067

5. Depressurize the Pneumatic System (Fig. 201)
   A. References
      (1) AMM 06-41-00/201, Section 45 Access Doors and Panels.

(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 49-11-00/201, Auxiliary Power Unit (APU)
(4) AMM 71-00-00/201, Power Plant-General

B. Access
(1) Location Zones
193 Forward Lower Half (Left)
194 Forward Lower Half (Right)

C. Procedure to Depressurize the Pneumatic System

S 862-068

WARNING: TURN OFF THE PNEUMATIC SOURCE AND MAKE SURE THE PRESSURE IN THE SYSTEM IS RELEASED. IF THE PRESSURE IS NOT RELEASED, IT WILL CAUSE INJURY TO PERSONNEL AND EQUIPMENT WHEN YOU DO THE MAINTENANCE PERFORMANCE.

(1) Shutdown ground pneumatic source, auxiliary power unit (AMM 49-11-00/201), or engines, (AMM 71-00-00/201), as applicable.

S 862-069
(2) Supply the electrical power (AMM 24-22-00/201).

S 862-070
(3) Remove the pressure from the pneumatic system.
(a) Remove the ground pneumatic air by disconnecting ground cart at the ground air connectors.
(b) Close the pneumatic ground connection access door 193LL (AMM 06-41-00/201).
(c) Close the isolation valve.
1) Push the applicable L or R ISLN VALVE switch-light on the pilots overhead P5 panel to closed position. Attach a DO-NOT-OPERATE tag to switch.
2) Make sure white flowbar light and amber VALVE light go off.

S 862-071
(4) Push the applicable L or R ENG OFF switch-lights on the P5 panel to the closed position if open. Make sure the white flowbar goes off and OFF light comes on.

WARNING: MAKE SURE THAT ALL PERSONS ARE REMOVED FROM THE WING LEADING EDGES. HIGH TEMPERATURE WING ANTI-ICE AIR WILL CAUSE PERSONAL INJURY.

(a) Push and hold the anti-ice test switch on the right side P61 panel in WING ANTI-ICE.
(b) Look at the Bleed Air dual duct pressure indicator on the P5 panel. Make sure that the L and R indicator arms shows zero. Release the anti-ice test switch.

WARNING: MAKE SURE THAT ALL THE PERSONNEL ARE REMOVED FROM THE APPLICABLE ENGINE COWLING AREA. RELEASE OF HIGH TEMPERATURE ANTI-ICE AIR WILL CAUSE PERSONAL INJURY.

(c) Put the applicable L or R ENGINE ANTI-ICE switch on the P5 panel to the ON position. Make sure the amber VALVE light comes on and then goes off.

PNEUMATICS - GENERAL - DDG MAINTENANCE PROCEDURES

1. General
   A. This procedure has the following maintenance tasks which prepare the airplane for flight operations with inoperative pneumatic system components, and maintenance tasks which restore the airplane back to its usual condition:
      (1) Air Supply Distribution system (ATA 36-10)
         (a) DDG 36-11-1, Preparation - Engine Bleed Pressure Regulating and Shutoff Valves (PRSOV) Inoperative
         (b) DDG 36-11-1, Restoration - Engine Bleed Pressure Regulating and Shutoff Valves (PRSOV) Inoperative
         (c) DDG 36-11-2, Preparation - Engine High Pressure Shutoff Valves (HPSOV) Inoperative
         (d) DDG 36-11-2, Restoration - Engine High Pressure Shutoff Valves (HPSOV) Inoperative
         (e) DDG 36-11-3, Preparation - Intermediate Pressure Check Valves (Low Pressure) Inoperative
         (f) DDG 36-11-3, Restoration - Intermediate Pressure Check Valves (Low Pressure) Inoperative
         (g) DDG 36-11-4, Preparation - APU Bleed Air Supply Shutoff Valve Inoperative
         (h) DDG 36-11-4, Restoration - APU Bleed Air Supply Shutoff Valve Inoperative
         (i) DDG 36-11-6, Preparation - Left and Right Bleed Isolation Valves Inoperative
         (j) DDG 36-11-6, Restoration - Left and Right Bleed Isolation Valves Inoperative
         (k) DDG 36-11-7, Preparation - Center Bleed Isolation Valve Inoperative
         (l) DDG 36-11-7, Restoration - Center Bleed Isolation Valve Inoperative
         (m) DDG 36-11-8, Preparation - Engine Pressure Regulating Valves (PRV) Inoperative (GE CF6-80C2, PW 4000)
         (n) DDG 36-11-8, Restoration - Engine Pressure Regulating Valves (PRV) Inoperative (GE CF6-80C2, PW 4000)
         (o) DDG 36-12-1, Preparation - Precoolers Damaged (PW JT9D, PW 4000, GE CF6-80A, GE CF6-80C2)

(p) DDG 36-12-1, Restoration - Precoolers Damaged (PW JT9D, PW 4000, GE CF6-80A, GE CF6-80C2)
(q) DDG 36-12-2, Preparation - Fan Air (Precoolers) Control Systems Inoperative
(r) DDG 36-12-2, Restoration - Fan Air (Precoolers) Control Systems Inoperative

(2) Air Temperature Indicating Systems (ATA 36-20)
(a) DDG 36-22-1, Preparation - BLEED Lights Inoperative (-200/-300)
(b) DDG 36-22-1, Restoration - BLEED Lights Inoperative (-200/-300)
(c) DDG 36-22-3, Preparation - OVHT Lights Inoperative (GE CF6-80C2, PW 4000, RR RB211-524)
(d) DDG 36-22-3, Restoration - OVHT Lights Inoperative (GE CF6-80C2, PW 4000, RR RB211-524)

TASK 36-00-00-049-214

2. DDG 36-11-1, Preparation - Engine Bleed Pressure Regulating and Shutoff Valves (PRSOV) Inoperative

A. General

(1) This task has instructions to prepare the airplane for flight operations with an inoperative (left/right) air supply pressure regulating and shutoff valve (PRSOV) (except for extended range (ER) flight operations beyond 120-minutes).

(2) The Forward Cargo Air Conditioning system (if installed) will be disabled after the inoperative PRSOV is deactivated (locked closed).

B. Access

(1) Location Zones

430	No. 1 Nacelle Strut (Left)
440	No. 2 Nacelle Strut (Right)

(2) Access Panels

434AL	Strut Pressure Relief Door (Left strut)
444AL	Strut Pressure Relief Door (Right strut)

C. Procedure

S 869-139

(1) Tell dispatch that airplane operation, procedures and flight operations could be affected, and that only one air conditioning pack will be used.

S 869-140

(2) Push the associated (L/R) ENG switch-light on the Air Supply control panel (P5) to the OFF position, and install an INOP placard.

(a) Make sure the amber OFF light is on, and the white flow bar light is off.

S 869-141

(3) Do not deactivate (open/collar) the ENG BLEED circuit breakers for the inoperative PRSOV on the P11 overhead circuit breaker panel.

NOTE: Engine start logic for pneumatic system will be affected.

S 049-316

(4) Deactivate the inoperative (left/right) PRSOV in the LOCKED CLOSED position:

(a) Open the associated strut pressure relief door (434AL/444AL) to get access to the inoperative (left/right) PRSOV.

(b) Make sure that the visual position indicator on the inoperative (left/right) PRSOV is in the LOCKED CLOSED position.

1) If the PRSOV is not in the LOCKED CLOSED position, use a wrench to turn the manual override nut on the PRSOV to move the visual position indicator to the LOCKED CLOSED position.

CAUTION: REMOVE THE DEACTIVATION BOLT FROM THE STOWED POSITION ON THE PRSOV FOR PROPER VENTILATION OF THE PRSOV. IF THE BOLT IS NOT REMOVED, DAMAGE TO THE PRSOV CAN OCCUR.

(c) Remove the deactivation bolt from it's stowed position on the PRSOV.

(d) Align the deactivation arm with the threaded hole in the valve body.

(e) Install the deactivation bolt through the deactivation arm into the valve body.

(f) Close the associated strut pressure relief door (434AL/444AL).

(g) AIRPLANES WITH PW 4000 ENGINES;
AIRPLANES WITH GE CF6-80C2 ENGINES;
Lock the Fan Air Modulating Valve (FAMV) on the associated (left/right) engine in the intermediate position per the DDG 36-12-2 Preparation task, or allow the FAMV to stay in the fully open position.

TASK 36-00-00-449-317

3. DDG 36-11-1, Restoration - Engine Bleed Pressure Regulating and Shutoff Valves (PRSOV) Inoperative

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative (left/right) pressure regulating and shutoff valve (PRSOV).

B. References

(1) AMM 36-11-09/201, Air Supply Pressure Regulating and Shutoff Valve

C. Procedure

S 449-318

(1) Replace the inoperative (left/right) pressure regulating and shutoff valve (PRSOV) (AMM 36-11-09/201).

S 449-319

(2) Remove the INOP placard from the associated (L/R) ENG switch-light on the Air Supply control panel (P5).

S 449-320

(3) AIRPLANES WITH PW 4000 ENGINES;
AIRPLANES WITH GE CF6-80C2 ENGINES;
Unlock the Fan Air Modulating Valve (FAMV) on the associated (left/right) engine if it was locked in the intermediate position per DDG 36-12-2 Restoration task.

TASK 36-00-00-049-270

4. DDG 36-11-2, Preparation - Engine High Pressure Shutoff Valves (HPSOV) Inoperative

A. General

(1) This task has instructions to prepare the airplane for flight operations with an inoperative (left/right) high pressure shutoff valve (HPSOV).

B. References

(1) AMM 71-11-04/201, Fan Cowl Panel
(2) AMM 71-11-06/201, Core Cowl Panel
(3) AMM 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

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

(2) Access Panels (PW 4000 ENGINES)

413AL	Left Fan Cowl (Left engine)
415AL	Left Thrust Reverser (Left engine)
417AL	Left Core Cowl (Left engine)
423AL	Left Fan Cowl (Right engine)
425AL	Left Thrust Reverser (Right engine)
427AL	Left Core Cowl (Right engine)

D. Prepare for HPSOV Deactivation

S 869-149

(1) Tell dispatch that flight operations could be affected.

S 019-332

(2) AIRPLANES WITH PW 4000 ENGINES;
Get access to the inoperative High Pressure Shutoff Valve (HPSOV) on the left side of the associated (left/right) engine:

WARNING: DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSERS. THE ACCIDENTAL OPERATION OF THE THRUST REVERSERS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Do the deactivation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).

(b) Open the associated left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(c) Open the associated left core cowl panel (417AL/427AL) (AMM 71-11-06/201).

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.

(d) Open the associated left thrust reverser (415AL/425AL) (AMM 78-31-00/201).

E. HPSOV Deactivation (LOCKED CLOSED)

S 049-327

CAUTION: REMOVE THE LOCKING PIN FROM THE STOWED POSITION ON THE HPSOV FOR PROPER VENTILATION OF THE HPSOV. IF THE LOCKING PIN IS NOT REMOVED, DAMAGE TO THE HPSOV CAN OCCUR.

(1) Remove the locking pin from the HPSOV actuator.

S 049-328
(2) Use a wrench to turn the manual override nut on the HPSOV to move the visual position indicator to the LOCKED CLOSED position.

S 049-329
(3) Install the locking pin into the HPSOV bellcrank arm, and tighten.

F. Put the Airplane Back to Its Usual Condition

S 419-335
(1) AIRPLANES WITH PW 4000 ENGINES;
Close up the access to the HPSOV on the left side of the associated (left/right) engine:

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Close the left thrust reverser (415AL/425AL) (AMM 78-31-00/201).
(b) Close the left core cowl panel (417AL/427AL) (AMM 71-11-06/201).
(c) Close the left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(d) Do the activation procedure for the thrust reversers (AMM 78-31-00/201).

TASK 36-00-00-449-338

5. DDG 36-11-2, Restoration - Engine High Pressure Shutoff Valves (HPSOV) Inoperative

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative (left/right) high pressure shutoff valve (HPSOV).

B. References

(1) AMM 36-11-07/401, High Pressure Shutoff Valve

C. Procedure

S 449-340

(1) Replace the inoperative (left/right) High Pressure Shutoff Valve (HPSOV) (AMM 36-11-07/401).

TASK 36-00-00-049-217

6. DDG 36-11-3, Preparation - Intermediate Pressure Check Valves Inoperative

A. General

(1) This task has instructions to prepare the airplane for flight operations with an inoperative (open) intermediate pressure check valve.

B. Procedure

S 049-298

(1) Tell dispatch that flight operations could be affected.

S 049-153

(2) Lock the High Pressure Shutoff Valve (HPSOV) on the associated (left/right) engine in the CLOSED position per the DDG 36-11-2 Preparation task.

TASK 36-00-00-449-294

7. DDG 36-11-3, Restoration - Intermediate Pressure Check Valves Inoperative

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative (open) intermediate pressure check valve.

B. References

(1) AMM 36-11-06/401, Air Supply Intermediate Pressure Check Valve

C. Procedure

S 449-295

(1) Replace the inoperative intermediate pressure check valve (AMM 36-11-06/401).

S 449-297

(2) Unlock the High Pressure Shutoff Valve (HPSOV) on the associated (left/right) engine from the CLOSED position per the DDG 36-11-2 Restoration task.

TASK 36-00-00-049-218

8. DDG 36-11-4, Preparation - APU Bleed Air Supply Shutoff Valve Inoperative

A. General

(1) This task has instructions to prepare the airplane for flight operations with an inoperative APU bleed air supply shutoff valve (deactivated closed).

B. Equipment

(1) Lock - Circuit Breaker, Approved for flight (commercially available)

C. Access

(1) Location Zone

313 Stabilizer Torsion Box Compartment (Left)

(2) Access Panel

313AL Elevator Mechanical Linkages

D. Procedure

S 869-156

(1) Push the APU VALVE switch, on the Air Supply control panel (P5), to the off position and install an INOP placard.

(a) Make sure the white flow bar light and the amber VALVE light are off.

(b) If the amber VALVE light is on, manually close the APU bleed air supply shutoff valve as follows:

1) Open the elevator mechanical linkages access door, 313AL, to get access to the APU bleed air supply shutoff valve.

2) Set the manual override/visual position indicator on the APU bleed air supply shutoff valve to the CLOSE position.

3) Close the elevator mechanical linkages access door, 313AL.

S 869-157

(2) Open this circuit breaker on the P11 overhead circuit breaker panel, and install a circuit breaker lock (collar):

(a) 11S23, APU BLEED PWR

TASK 36-00-00-449-299

9. DDG 36-11-4, Restoration - APU Bleed Air Supply Shutoff Valve Inoperative

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative APU bleed air supply shutoff valve (deactivated closed).

B. References

(1) AMM 36-11-10/401, APU Bleed Air Supply Shutoff Valve

C. Procedure

S 449-301

(1) Replace the inoperative APU bleed air supply shutoff valve (AMM 36-11-10/401).

S 869-300

(2) Remove the circuit breaker lock (collar), and close this circuit breaker on the P11 overhead circuit breaker panel:
(a) 11S23, APU BLEED PWR

S 049-302

(3) Remove the INOP placard from the APU VALVE switch on the Air Supply control panel (P5).

TASK 36-00-00-049-219

10. DDG 36-11-6, Preparation - Left and Right Bleed Isolation Valves Inoperative

A. General

(1) This task has instructions to prepare the airplane for flight operations with an inoperative (left/right) bleed isolation valve (except for extended range (ER) operations beyond 120 minutes and flight operations in known or forecast icing conditions).

(2) The inoperative (left/right) isolation valve must be manually opened before the associated (left/right) engine is started. After engine start, the inoperative isolation valve must then be manually closed before departure.

B. Equipment

(1) Lock - Circuit Breaker, Approved for flight (commercially available)

C. Access

(1) Location Zones

135	Environmental Control System Bay (Left)
136	Environmental Control System Bay (Right)

(2) Access Panels

193NL	Environmental Control Systems (ECS) Bay (Left)
194LR	Environmental Control Systems (ECS) Bay (Right)

D. Procedure

S 049-159

(1) Install an INOP placard to the associated (L/R) ISLN VALVE switch-light on the Air Supply control panel (P5).

S 869-160

(2) Open the associated (left/right) isolation valve circuit breaker, on the P11 overhead circuit breaker, and install a circuit breaker lock (collar):
(a) 11S12, L AIR SUPPLY ISLN VLV PWR
(b) 11S21, R AIR SUPPLY ISLN VLV PWR

S 049-303

(3) Before engine start, do these steps:
(a) Open the (left/right) ECS bay access door (193NL/194LR) to get access to the inoperative isolation valve.
(b) Set the manual override/visual position indicator on the inoperative isolation valve to the OPEN position.

S 049-304

(4) After engine start, do these steps:
(a) Set the manual override/visual position indicator on the inoperative isolation valve back to the CLOSE position.
(b) Close the (left/right) ECS bay access door (193NL/194LR).

TASK 36-00-00-449-305

11. DDG 36-11-6, Restoration - Left and Right Bleed Isolation Valves Inoperative

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative (left/right) isolation valve.

B. References

(1) AMM 36-11-04/401, Isolation Valves

C. Procedure

S 449-306

(1) Replace the inoperative (left/right) isolation valve (AMM 36-11-04/401).

S 869-307

(2) Remove the circuit breaker lock (collar), and close the associated (left/right) isolation valve circuit breaker on the P11 overhead circuit breaker panel:
(a) 11S12, L AIR SUPPLY ISLN VLV PWR
(b) 11S21, R AIR SUPPLY ISLN VLV PWR

S 449-308

(3) Remove the INOP placard from the associated (L/R) ISLN VALVE switch-light on the Air Supply control panel (P5).

TASK 36-00-00-049-220

12. DDG 36-11-7, Preparation - Center Bleed Isolation Valve Inoperative

A. General

(1) This task has instructions to prepare the airplane for flight operations with an inoperative center bleed isolation valve.

(2) The center isolation valve must be manually opened before an engine is started when using the APU. After engine start, the center isolation valve must then be manually closed before departure.

B. Access

(1) Location Zones

143 Main Landing Gear Wheel Well (Left)

C. Procedure

S 049-309

(1) Install an INOP placard to the C ISLN VALVE switch-light on the Air Supply control panel (P5).

S 869-166

(2) Open this circuit breaker on the P11 overhead circuit breaker panel, and install a circuit breaker lock (collar):

(a) 11S14, C AIR SUPPLY ISLN VLV PWR

S 049-312

(3) Before engine start with the APU, do these steps:

(a) Get access to the inoperative center isolation valve in the left main landing gear wheel well.

(b) Set the manual override/visual position indicator on the center isolation valve to the OPEN position.

S 049-311

(4) After engine start with the APU, do this step:

(a) Set the manual override/visual position indicator on the center isolation valve back to the CLOSE position.

TASK 36-00-00-449-313

13. DDG 36-11-7, Restoration - Center Bleed Isolation Valve Inoperative

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative center isolation valve.

B. References

(1) AMM 36-11-04/401, Isolation Valves

C. Procedure

S 449-314

(1) Replace the inoperative center isolation valve (AMM 36-11-04/401).

S 869-315

(2) Remove the circuit breaker lock (collar), and close this circuit breaker on the P11 overhead circuit breaker panel:
(a) 11S14, C AIR SUPPLY ISLN VLV PWR

S 049-322

(3) Remove the INOP placard from the C ISLN VALVE switch-light on the Air Supply control panel (P5).

TASK 36-00-00-049-221

14. DDG 36-11-8, Preparation - Engine Pressure Regulating Valve (PRV) Inoperative (PW 4000, GE CF6-80C2)

A. General

(1) This task has two procedures to prepare the airplane for flight operations with an inoperative pressure regulating valve (PRV) on the associated (left/right) engine (except for extended range (ER) operations beyond 120-minutes):

(a) Procedure 1 - Dispatch with an Inoperative PRV LOCKED CLOSED

(b) Procedure 2 - Dispatch with an Inoperative PRV fully OPEN

B. References

(1) AMM 36-11-09/201, Pressure Regulating and Shutoff Valve (PRSOV)

(2) AMM 36-21-03/201, Overpressure Switch

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

(4) AMM 71-11-06/201, Core Cowl Panel

(5) AMM 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

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

(2) Access Panels (PW 4000 ENGINES)

413AL	Left Fan Cowl (Left engine)
415AL	Left Thrust Reverser (Left engine)
417AL	Left Core Cowl (Left engine)
423AL	Left Fan Cowl (Right engine)
425AL	Left Thrust Reverser (Right engine)
427AL	Left Core Cowl (Right engine)
434AL	Left Strut Pressure Relief Door (Left engine)
444AL	Left Strut Pressure Relief Door (Right engine)

D. Procedure 1 - Dispatch with an Inoperative PRV LOCKED CLOSED

S 049-345

(1) Tell dispatch that flight operations, procedures, and flight planning could be affected.

S 019-341

(2) AIRPLANES WITH PW 4000 ENGINES;
Get access to the inoperative Pressure Regulating Valve (PRV) on the left side of the associated (left/right) engine:

WARNING: DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSERS. THE ACCIDENTAL OPERATION OF THE THRUST REVERSERS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Do the deactivation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).

(b) Open the associated left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(c) Open the associated left core cowl panel (417AL/427AL) (AMM 71-11-06/201).

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.

(d) Open the associated left thrust reverser (415AL/425AL) (AMM 78-31-00/201).

S 049-343
(3) Deactivate the PRV in the LOCKED CLOSED position:

CAUTION: REMOVE THE LOCKING PIN FROM THE STOWED POSITION ON THE PRV FOR PROPER VENTILATION OF THE PRV. IF THE LOCKING PIN IS NOT REMOVED, DAMAGE TO THE PRV CAN OCCUR.

(a) Remove the locking pin from the PRV actuator.
(b) Use a wrench to turn the manual override nut on the PRV to move the visual position indicator to the LOCKED CLOSED position.
(c) Install the locking pin into the PRV bellcrank arm, and tighten.

S 049-344
(4) Lock the Fan Air Modulating Valve (FAMV) on the associated (left/right) engine in the intermediate position or full open position per the DDG 36-12-2 Preparation task.

S 869-348
(5) Push the associated (L/R) ENG switch-light on the Air Supply control panel (P5) to the OFF position, and install an INOP placard.
(a) Make sure the amber OFF light is on, and the white flow bar light is off.

S 419-347
(6) AIRPLANES WITH PW 4000 ENGINES;
Close up the access to the PRV on the left side of the associated (left/right) engine:

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Close the left thrust reverser (415AL/425AL) (AMM 78-31-00/201).
(b) Close the left core cowl panel (417AL/427AL) (AMM 71-11-06/201).
(c) Close the left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).

(d) Do the activation procedure for the thrust reversers (AMM 78-31-00/201).

E. Procedure 2 - Dispatch with an Inoperative PRV fully open

S 049-349

(1) Deactivate the High Pressure Shutoff Valve (HPSOV) on the associated (left/right) in the LOCKED CLOSED position per the DDG 36-11-2 Preparation task.

S 869-350

(2) Push the associated (L/R) ENG switch-light on the Air Supply control panel (P5) to the OFF position.
(a) Make sure the amber OFF light is on, and the white flow bar light is off.

S 019-351

(3) Open the left strut pressure relief door (434AL/444AL) on the associated (left/right) engine to get access to the Pressure Regulating and Shutoff Valve (PRSOV).

S 869-352

(4) Manually open the PRSOV while you pressurize the pneumatic manifold using a ground air cart or APU to supply pneumatic pressure to the PRV (AMM 36-11-09/201).
(a) Release the PRSOV and make sure it stays open by the pneumatic pressure.

S 019-361

(5) AIRPLANES WITH PW 4000 ENGINES;
Get access to the inoperative Pressure Regulating Valve (PRV) on the left side of the associated (left/right) engine:

WARNING: DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSERS. THE ACCIDENTAL OPERATION OF THE THRUST REVERSERS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Do the deactivation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).
(b) Open the associated left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(c) Open the associated left core cowl panel (417AL/427AL) (AMM 71-11-06/201).

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.

(d) Open the associated left thrust reverser (415AL/425AL) (AMM 78-31-00/201).

S 049-358
(6) Do a check to make sure the PRV opens fully with pneumatic pressure:
(a) Use a wrench to manually turn the manual override nut on the PRV towards a partial OPEN position until the PRV moves fully open by itself under pneumatic pressure.
(b) Make sure the visual position indicator on the PRV is at the fully OPEN position.

S 869-356
(7) Remove the pneumatic pressure supplied by the ground cart or APU.

S 049-357
(8) Get access to the associated (left/right) engine air supply overpressure switch, then disconnect, cap and stow its' electrical connectors (AMM 36-21-03/201).

S 419-363
(9) Close the left strut pressure relief door (434AL/444AL) on the associated (left/right) engine you opened to access the PRSOV.

S 419-359
(10) AIRPLANES WITH PW 4000 ENGINES;
Close up the access to the PRV on the left side of the associated (left/right) engine:

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Close the left thrust reverser (415AL/425AL) (AMM 78-31-00/201).
(b) Close the left core cowl panel (417AL/427AL) (AMM 71-11-06/201).
(c) Close the left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(d) Do the activation procedure for the thrust reversers (AMM 78-31-00/201).

TASK 36-00-00-009-227

15. DDG 36-11-8, Restoration - Engine Pressure Regulating Valve (PRV) Inoperative (PW 4000, GE CF6-80C2)

A. General

(1) This task has two procedures to restore the airplane back to its usual condition after flight operations with an inoperative (left/right) engine pressure regulating valve (PRV).
(a) Procedure 1 - Inoperative PRV LOCKED CLOSED Restoration
(b) Procedure 2 - Inoperative PRV fully OPEN Restoration

B. References

(1) AMM 36-11-18/401, Pressure Regulating Valve (PRV)
(2) AMM 36-21-03/201, Overpressure Switch

C. Access

(1) Location Zones

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

(2) Access Panels (PW 4000 ENGINES)

413AL	Left Fan Cowl (Left engine)
415AL	Left Thrust Reverser (Left engine)
417AL	Left Core Cowl (Left engine)
423AL	Left Fan Cowl (Right engine)
425AL	Left Thrust Reverser (Right engine)
427AL	Left Core Cowl (Right engine)
434AL	Left Strut Pressure Relief Door (Left engine)
444AL	Left Strut Pressure Relief Door (Right engine)

D. Procedure 1 - Inoperative PRV LOCKED CLOSED Restoration

S 449-364
(1) Replace the inoperative pressure regulating valve (PRV) on the associated (left/right) engine (AMM 36-11-18/401).

S 449-365
(2) Unlock the Fan Air Modulating Valve (FAMV) on the associated (left/right) engine from the intermediate position per the DDG 36-12-2 Restoration task.

E. Procedure 2 - Inoperative PRV fully OPEN Restoration

S 449-367
(1) Replace the inoperative pressure regulating valve (PRV) on the associated (left/right) engine (AMM 36-11-18/401).

S 449-368
(2) Unlock the High Pressure Shutoff Valve (HPSOV) on the associated (left/right) engine from the LOCKED CLOSED position per the DDG 36-11-2 Restoration task.

S 449-369

(3) Get access to the air supply overpressure switch on the associated (left/right) engine, and reconnect its electrical connector (AMM 36-21-03/201).

TASK 36-00-00-009-226

16. DDG 36-12-1, Preparation - Precoolers Damaged (PW JT9D, PW 4000, GE CF6-80A, GE CF6-80C2)

A. General

(1) This task has instructions to prepare the airplane for flight operations with a damaged precooler and associated ducting between the pressure regulating valve (PRV) and pressure regulating and shutoff valve (PRSOV) on the associated (left/right) engine (except for extended range (ER) operations beyond 120-minutes).

B. Access

(1) Location Zones

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

(2) Access Panels (PW 4000 ENGINES)

413AL	Left Fan Cowl (Left engine)
415AL	Left Thrust Reverser (Left engine)
417AL	Left Core Cowl (Left engine)
423AL	Left Fan Cowl (Right engine)
425AL	Left Thrust Reverser (Right engine)
427AL	Left Core Cowl (Right engine)
434AL	Left Strut Pressure Relief Door (Left engine)
444AL	Left Strut Pressure Relief Door (Right engine)

C. Procedure (PW 4000, GE CF6-80C2)

S 719-256

(1) Tell dispatch that flight operations, procedures and flight planning could be affected.

S 049-371

(2) Lock the pressure regulating valve (PRV) on the associated (left/right) engine in the LOCKED CLOSED position per the DDG 36-11-8 Preparation task (Procedure 1).

S 049-406

(3) Lock the pressure regulating and shutoff valve (PRSOV) on the associated (left/right) engine in the LOCKED CLOSED position per the DDG 36-11-1 Preparation task.

S 049-372

(4) Lock the fan air modulating valve (FAMV) on the associated (left/right) engine in the intermediate position or full open position per the DDG 36-12-2 Preparation task.

TASK 36-00-00-449-373

17. DDG 36-12-1, Restoration - Precoolers Damaged (PW JT9D, PW 4000, GE CF6-80A, GE CF6-80C2)

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with a damaged precooler on the associated (left/right) engine.

B. References

(1) AMM 36-11-01/401, Pneumatic Duct

(2) AMM 36-11-15/401, Air Supply Precooler

C. Access

(1) Location Zones

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

(2) Access Panels (PW 4000 ENGINES)

413AL	Left Fan Cowl (Left engine)
415AL	Left Thrust Reverser (Left engine)
417AL	Left Core Cowl (Left engine)
423AL	Left Fan Cowl (Right engine)
425AL	Left Thrust Reverser (Right engine)
427AL	Left Core Cowl (Right engine)
434AL	Left Strut Pressure Relief Door (Left engine)
444AL	Left Strut Pressure Relief Door (Right engine)

D. Procedure (PW 4000, GE CF6-80C2)

S 449-374

(1) Replace the damaged air supply precooler on the associated (left/right) engine (AMM 36-11-15/401).

S 449-378

(2) Replace the damaged ducting between the precooler and PRV and PRSOV on the associated (left/right) engine (AMM 36-11-01/401).

S 449-375

(3) Unlock the fan air modulating valve (FAMV) on the associated (left/right) engine from the intermediate position or full open position per the DDG 36-12-2 Restoration task.

S 449-376

(4) Unlock the pressure regulating and shutoff valve (PRSOV) on the associated (left/right) engine from the LOCKED CLOSED position per the DDG 36-11-1 Restoration task.

S 449-377

(5) Unlock the pressure regulating valve (PRV) on the associated (left/right) engine from the LOCKED CLOSED position per the DDG 36-11-8 Restoration task.

SAS
SAS TASK 36-00-00-719-267
SAS 18. DDG 36-12-1, Preparation - Precoolers Damaged
SAS A. General
SAS (1) 36-12-1, Precoolers
SAS (2) Put a placard "VLV INOP" at the applicable engine bleed switch.
SAS B. Procedure
SAS
SAS S 029-268
SAS (1) Do these steps to isolate the precooler and the related duct:
SAS (a) Tell dispatch these items are changed:
SAS 1) Airplane operation
SAS 2) Airplane procedures
SAS 3) Flight planning
SAS 4) Only one air conditioning pack will be used.
SAS (b) Use the procedure in the AMM 36-00-00/901 item 36-11-1, to lock
SAS the PRSOV in the closed position.
SAS (c) Use the procedure in the AMM 36-00-00/901 item 36-11-8, to lock
SAS the PRV in the closed position.

TASK 36-00-00-009-225

19. DDG 36-12-2, Preparation - Fan Air (Precooler) Control System Inoperative

A. General

(1) This task has two procedures to prepare the airplane for flight operations with an inoperative fan air modulating valve (FAMV) on the associated (left/right) engine (except for extended range (ER) operations beyond 120-minutes):

(a) Procedure 1 - Inoperative FAMV locked in Intermediate Position

(b) Procedure 2 - Inoperative FAMV locked in fully OPEN position

B. References

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

(2) AMM 71-11-06/201, Core Cowl Panel

(3) AMM 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

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

(2) Access Panels (PW 4000 ENGINES)

414AR	Right Fan Cowl (Left engine)
416AR	Right Thrust Reverser (Left engine)
418AR	Right Core Cowl (Left engine)
424AR	Right Fan Cowl (Right engine)
426AR	Right Thrust Reverser (Right engine)
428AR	Right Core Cowl (Right engine)

D. Prepare for FAMV Deactivation

S 719-391

(1) Tell dispatch that flight operations, procedures, and flight planning could be affected.

S 019-392

(2) AIRPLANES WITH PW 4000 ENGINES;
AIRPLANES WITH PW JT9D ENGINES;
Get access to the inoperative Fan Air Modulating Valve (FAMV) on the right side of the associated (left/right) engine:

WARNING: DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSERS. THE ACCIDENTAL OPERATION OF THE THRUST REVERSERS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Do the deactivation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).
(b) Open the associated right fan cowl panel (414AR/424AR) (AMM 71-11-04/201).
(c) Open the associated right core cowl panel (418AR/428AR) (AMM 71-11-06/201).

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.

(d) Open the associated right thrust reverser (416AR/426AR) (AMM 78-31-00/201).

E. Procedure 1 - Inoperative FAMV locked in Intermediate Position

S 049-399
(1) Remove the locking pin (positioning screw) from the FAMV actuator.
(a) Remove and discard the O-ring from the FAMV locking pin.

S 049-400
(2) Use a wrench to turn the manual override nut on the FAMV to move the visual position indicator to the intermediate position (align with locking pin slot).

S 049-401
(3) Install the locking pin into the FAMV bellcrank arm, and tighten.

F. Procedure 2 - Inoperative FAMV locked in fully OPEN position

S 049-402
(1) Disconnect, cap and secure the FAMV control pressure line for the Fan Air Temperature Sensor (FATS) on the associated (left/right) engine.

S 049-403
(2) Make sure the visual position indicator on the FAMV is in the fully OPEN position.
(a) If the FAMV is not fully open, use a wrench to turn the manual override nut on the FAMV to move the visual position indicator to the fully OPEN position.

G. Put the Airplane Back to Its Usual Condition

S 419-396

(1) AIRPLANES WITH PW 4000 ENGINES;
AIRPLANES WITH PW JT9D ENGINES;
Close up the access to the FAMV on the right side of the associated (left/right) engine:

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Close the right thrust reverser (416AR/426AR) (AMM 78-31-00/201).
(b) Close the right core cowl panel (418AR/428AR) (AMM 71-11-06/201).
(c) Close the right fan cowl panel (414AR/424AR) (AMM 71-11-04/201).
(d) Do the activation procedure for the thrust reversers (AMM 78-31-00/201).

TASK 36-00-00-449-404

20. DDG 36-12-2, Restoration - Fan Air (Precooler) Control System Inoperative

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative fan air modulating valve (FAMV).

B. References

(1) AMM 36-11-16/401, Fan Air Modulating Valve (FAMV)

C. Access

(1) Location Zones

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

D. Procedure

S 449-405

(1) Replace the inoperative fan air modulating valve (FAMV) on the associated (left/right) engine (AMM 36-11-16/401).

(a) Prior to removal, unlock the FAMV from the Intermediate locked position or the fully OPEN locked position.

TASK 36-00-00-719-244

21. DDG 36-22-1, Preparation - BLEED Lights Inoperative (-200/-300)

A. General

(1) This task has instructions to prepare the airplane for flight operations with an inoperative BLEED light on the Air Supply control panel (P5).

B. Procedure

S 049-286

(1) Tell dispatch that flight operations could be affected.

S 049-287

(2) Lock the High Pressure Shutoff Valve (HPSOV) on the associated (left/right) engine in the CLOSED position per the DDG 36-11-2 Preparation task.

TASK 36-00-00-449-289

22. DDG 36-22-1, Restoration - BLEED Lights Inoperative (-200/-300)

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative BLEED light on the Air Supply control panel (P5).

B. Procedure

S 449-290

(1) Replace the inoperative BLEED light.

S 449-291

(2) Unlock the High Pressure Shutoff Valve (HPSOV) on the associated (left/right) engine from the CLOSED position per the DDG 36-11-2 Restoration task.

TASK 36-00-00-009-224

23. DDG 36-22-3, Preparation - OVHT Lights Inoperative (GE CF6-80C2, PW 4000, RR RB211-524)

A. General

(1) This task has instructions to prepare the airplane for flight operations with an inoperative OVHT light on the Air Supply control panel (P5).

B. Procedure

S 049-259

(1) Tell dispatch that flight operations could be affected.

S 049-271

(2) Lock the High Pressure Shutoff Valve (HPSOV) on the associated (left/right) engine in the CLOSED position per the DDG 36-11-2 Preparation task.

TASK 36-00-00-449-273

24. DDG 36-22-3, Restoration - OVHT Lights Inoperative (GE CF6-80C2, PW 4000, RR RB211-524)

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative OVHT light on the Air Supply control panel (P5).

B. Procedure

S 049-277

(1) Replace the inoperative OVHT light.

S 449-275

(2) Unlock the High Pressure Shutoff Valve (HPSOV) on the associated (left/right) engine from the CLOSED position per the DDG 36-11-2 Restoration task.

PNEUMATIC SYSTEM HEALTH CHECK (PW 4000) - ADJUSTMENT/TEST

1. General
   A. This procedure uses the Pneumatic Health Check Test Box to do a check of the pneumatic system components for correct operation.

      NOTE: If you replace a component you can continue the test from that location or start the test again.

   B. This procedure will do a check of the power supply, the sense lines (to and from the component) and opening/closing pressures for these components:
      (1) High Pressure Shutoff Valve (HPSOV)
      (2) High Pressure Shutoff Valve Controller (HP controller)
      (3) Pressure Regulating Valve (PRV)
      (4) Pressure Regulating Valve Controller (PRV controller)
      (5) Pressure Regulating Shutoff Valve (PRSOV)
      (6) Fan Air Modulating Valve (FAMV)
      (7) Fan Air Temperature Sensor (FATS)
   C. The pneumatic system health check contains these five tests:
      (1) BITE Test
      (2) HPSOV/PRV "Thumb" Test
      (3) High Pressure Shutoff Valve (HPSOV) and HP Controller Test
      (4) Pressure Regulating Valve (PRV) and PRV Controller Test
      (5) Pressure Regulating Shutoff Valve (PRSOV) Test
      (6) Fan Air Modulating Valve (FAMV) Test

TASK 36-00-22-705-001

2. Pneumatic System Health Check - Operational Test
   A. General
      (1) This test assumes these initial conditions:
         (a) The test box is hooked up to a air/nitrogen source regulated to 200 psig.
         (b) All gauges are turned full CCW.
         (c) The airplane pneumatic system is depressurized (AMM 36-00-00/201).

(d) ARINC 429 Data Analyzer.
(e) Air Supply Monitor Software with one of the following:
1) Laptop computer Laptop computer (PC) with an ARINC 429 interface card.
2) Portable Maintenance Access Terminal (PMAT).

B. Equipment
(1) Air or Nitrogen Source (0-200 PSI is required)
(2) Analog Multimeter, standard shop supply
(3) ARINC 429 Data Bus Analyzer - DT400H, 429EB, 429EBP (preferred)
JcAIR Test Systems
400 New Century Parkway
New Century, KS 66031
(4) ARINC 429 Data Bus Analyser - 429A (optional)
Interface Technology
300 S. Lemon Creek Dr., Suite A
San Dimas, CA 91773
(5) Pneumatic Health Check Test Kit (or equivalent)
(a) Test Box, Pneumatic Health Check, G36035-36 (or equivalent)
(b) GE & PW Fittings Box, G36035-36 (or equivalent)

NOTE: The fittings box consists of these items:

1) Connection hoses:
a) Red hose for supply pressure, G36035-11
b) Blue hose for reference pressure, G36035-12
c) Yellow hose regulated pressure, G36035-13
2) Test Fittings:

NOTE: These are recommended fittings. The straight fitting, 45 degree, and 90 degree fittings are interchangeable and depending upon access you can use any type or size necessary to do the test.

a) 45-degree fitting, G36035-18
b) 90-degree fitting, G36035-25
c) Straight fitting, G36035-21
d) Actuator fitting, G36035-38
e) PRSOV Fitting, G36035-34
f) PRSOV/FATS filter fitting, G36035-37
g) Tee fitting (with quick-disconnect), G36035-23
h) Tee fitting (without quick-disconnect), G36035-40
i) Short fitting, G36035-30
j) Adapter assembly, G36035-32

(6) 80000, Portable Maintenance Access Terminal (PMAT) 2000
Demosystems LLC
379 Science Drive
Moorpark, CA 93021
805-529-1800
(a) 80062-3, ASM Interface Cable 50 ft. (preferred)
Demosystems LLC
379 Science Drive
Moorpark, CA 93021
805-529-1800
(b) 80062-2, ASM Interface Cable 25 ft. (optional)
Demosystems LLC
379 Science Drive
Moorpark, CA 93021
805-529-1800

(7) Laptop computer with the following minimum requirements and additional hardware:
- 128 Mb RAM
- Intel PIII CPU, 300 Mhz
- PCMCIA Type III Slot

(a) A36021, Air Supply System BITE Module Adapter Cable
(b) CM429-1/2R1T, ARINC 429 PCMCIA Databus Interface Card with External Adapter Cable
Ballard Technology
3229A Pine Street
Everett, WA 98201
1-800-829-1553

(8) Software (if you use a laptop computer or the PMAT)
(a) Air Supply Monitor Software CD, P/N D220W116-24(NOSRC)
(b) Ballard Technology Drivers (provided with CM429-1 Card)
(c) Operating System: MS Windows 98 or higher
(d) Internet browser: MS Internet Explorer or Netscape Navigator

C. Consumable Materials
(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)
(2) D00019, Grease-lubricating (silicone), MIL-L-15719
(3) G50380, Compound - Thin Film Bubble Testing Solution - Leak Tec 16-0X Leak Detector (MIL-PRF-25567)

D. References
(1) AMM 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
(2) AMM 20-30-07/201, Miscellaneous Materials
(3) AMM 24-22-00/201, Manual Control
(4) AMM 25-52-01/401, Sidewall Lining
(5) AMM 36-00-00/201, Pneumatic - General
(6) AMM 36-11-07/401, High Pressure Shutoff Valve
(7) AMM 36-11-08/401, High Pressure Controller
(8) AMM 36-11-09/201, Pressure Regulating and Shutoff Valve
(9) AMM 36-11-12/401, Air Supply Control Card Assembly
(10) AMM 36-11-16/401, Fan Air Modulation Valve
(11) AMM 36-11-17/401, Fan Air Temperature Sensor
(12) AMM 36-11-18/401, Pressure Regulating Valve
(13) AMM 36-11-19/401, Pressure Regulating Valve Controller
(14) AMM 71-11-04/201, Fan Cowl Panels
(15) AMM 71-11-06/201, Core Cowl Panels
(16) AMM 78-31-00/201, Thrust Reverser System

E. Access
(1) Location Zones

410	No. 1 Power Plant
420	No. 2 Power Plant
430	No. 1 Nacelle Strut (Left Strut)
440	No. 2 Nacelle Strut (Right Strut)

(2) Access Panels

413AL	Left Fan Cowl Panel, Left Engine
415AL	Left Thrust Reverser, Left Engine
417AL	Left Core Cowl Panel, Left Engine
423AL	Left Fan Cowl Panel, Right Engine
425AL	Left Thrust Reverser, Right Engine
427AL	Left Core Cowl Panel, Right Engine
434AL	Left Strut Pressure Relief Door
444AL	Right Strut Pressure Relief Door

F. Prepare for the Test

S 865-033
(1) Make sure the FIRE handle is in the NORMAL position.

S 865-002
(2) For the left engine, make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11S10, LEFT ENG BLEED IND
(b) 11S11, LEFT ENG BLEED CONT

S 865-003
(3) For the right engine, make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11S19, RIGHT ENG BLEED IND
(b) 11S20, RIGHT ENG BLEED CONT

S 865-004
(4) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
(a) 36L7 or 36K7, AIR SUPPLY BITE

S 865-049
(5) Put the BLEED switches on the P5 panel to the OFF position.

S 865-050
(6) Make sure the OFF lights come on.
(a) If the OFF lights are not on, select cowl thermal anti-ice on and make sure the OFF light comes on.
(b) If the OFF light does not come on after selecting cowl thermal anti-ice, do a check of the bulb or the wiring to the switch.

S 015-058
(7) Open the forward cargo door, 821.

S 015-059
(8) Remove the sidewall lining in the forward cargo compartment to find terminal block 130 on the E1-2 shelf (AMM 25-52-01/401).

S 865-005

(9) Do the steps that follow for the applicable test equipment that you will use.

NOTE: The ARINC 429 portion of this test can only be done on BITE modules with part numbers S210T120-67 and above. These BITE modules have an ARINC 429 test port that will let you monitor real time data from pneumatic component switches/sensors.

(a) If you use the ARINC 429 Data Analyzer, do these steps:

1) Install a low speed ARINC 429 monitor to pins FA56 and FC56 of the terminal block 130 on the E1-2 shelf (Fig. 506).

NOTE: The next 2 steps may not be applicable to your data analyzer. Follow the set-up instructions for your analyzer to configure it to display labels and bits for the tests that follow. For example, your analyzer may read ON instead of 1 or OFF instead of 0 as called out in this test.

2) The left channel data is shown on the source/destination identifier (SDI) 01 and the right channel data is on (SDI) 10. These are BIT 10 and BIT 9 as shown on the ARINC 429 monitor.

3) Set the equipment ID number to 002.

(b) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 506 and Fig. 507):

1) Connect the ground wire (alligator clip) of the A36021(laptop) or 80062-3(PMAT) cable to any Burndy ground block.

2) Connect the red wire of the A36021(laptop) or 80062-3(PMAT) cable to pin FA56 of terminal block TB130 (WDM 36-23-21).

3) Connect the blue wire of the A36021(laptop) or 80062-3(PMAT) cable to pin FC56 of terminal block TB130 (WDM 36-23-21).

4) For the laptop computer, connect the A36021 cable to the External Adapter Cable of the ARINC 429 Interface Card.
5) For the laptop computer, connect the ARINC 429 Interface Card to the laptop computer.
6) For the PMAT, connect the ASM Interface Cable to the PMAT.
7) Supply power to the laptop computer or PMAT.
8) Start the Air Supply Monitor software application.
9) To record data, do this step:
   a) Select "Record" from the Air Supply Monitor display.

      NOTE: After pressing the Record button, it may take several seconds for the data to display. If the data does not display within 1 minute, exit the Air Supply Monitor application. Make sure that the cable is attached correctly.

S 045-043

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.

(10) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).

S 015-035
(11) Open the fan cowl panel (AMM 71-11-04/201).

S 015-044
(12) Open the core cowl panel (AMM 71-11-06/201).

S 015-036

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.

(13) Open the thrust reverser (AMM 78-31-00/201).

G. BITE Test

NOTE: This test procedure is designed for airplane maintenance personnel to do a quick electrical (without pneumatics) check of the bleed system at the BITE module. It is recommended that this test be done before you do the pneumatic portion of this test.

NOTE: You can ignore any BITE messages that show during the BITE test for any inoperative components that have been previously deactivated (locked open/closed) per the Dispatch Deviation Procedures Guide (DDPG) manual or equivalent methods.

S 215-006

(1) Look for ATA 36 (pneumatic system) EICAS messages.
  (a) Look at the EICAS for any ATA 36 (pneumatic system) messages
  (b) Write down any existing ATA 36 (pneumatic system) messages.
  (c) Clear these messages before running this test.

S 715-007

(2) Do the test:
  (a) Supply electrical power (AMM 24-22-00/201).
  (b) Push the PRESS TEST button on the BITE module.
  (c) Make sure all the lights are on.
  (d) Push the VERIFY button. Continue to push the VERIFY button until the NO FAULT light comes on or no lights are on.
    1) Keep a record of all the faults.
    2) If any fault messages are present, go to the FIM to find the corrective action.
  (e) Push the BITE STEP button. Continue to push the BITE STEP button until the NO FAULT light comes on or no lights are on.
    1) Keep a record of all the faults.
    2) If any fault messages are present, go to the FIM to find the corrective action.

H. HPSOV/PRV "Thumb" Test

S 725-046

(1) Do these steps to do a thumb test of the HPSOV or the PRV:
  (a) Remove the servo pressure sense line at the applicable valve.
  (b) Manually open the valve.
  (c) Put your thumb, a cap or plug (AN814 or equivalent) with suitable O-ring on the valve actuator fitting.

(d) Let the valve close.
1) Make sure the valve does not bind and goes to the fully closed position. If the valve binds or does not go to the fully closed position replace the valve (AMM 36-11-07/401 or AMM 36-11-18/401).
(e) Measure how long (in seconds) it takes for the valve to close.

NOTE: The valve may not close if it is completely "leak free". If the valve does not close, make sure that the valve did not bind then continue the test.

(f) Did the valve close in less than 20 seconds?
1) YES, replace the valve (AMM 36-11-07/401 or AMM 36-11-18/401).
2) NO, the valve is satisfactory.
(g) Remove the cap or plug.
(h) Apply antiseize compound to the actuator fitting and install the sense line.

I. High Pressure Shutoff Valve (HPSOV) and High Pressure Controller (HP Controller) Test (Fig. 502)

S 215-009
(1) Make sure the HPSOV is closed.
(a) Make sure the HPSOV is closed by visually inspecting the position switch on the HPSOV.
1) If the HPSOV is not fully closed, then replace the HPSOV (AMM 36-11-07/401).
(b) If you use the ARINC 429 Data Analyzer, do these steps:
1) Make sure the ARINC 429 Data Analyzer octal label 351 shows these indications:
a) BIT 14=1
b) BIT 15=1
2) If the HPSOV is closed and either BIT 14 or BIT 15 or both show 0, then troubleshoot the position switches and wiring.
(c) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
1) Select "View" from the ASM display window.

2) Select "Left HPSOV" or "Right HPSOV".
3) Make sure the ASM display for the Left(Right) High Pressure Shutoff Valve shows these indications:
   a) Closed Position Switch= "Valve Closed"
   b) Open Position Switch= "Valve Not Open"
4) If the HPSOV is closed, and these indications do not show, then troubleshoot the position switches and wiring.

S 715-010

(2) Do a test of the HPSOV and HP Controller operation.
   (a) Disconnect the supply pressure line at the HPC and install the 90 degree fitting to the high stage port on the HP Controller.
   (b) Remove the locking pin from the HPSOV actuator and install the actuator fitting to the HPSOV actuator.
   (c) Connect one end of the supply pressure (red) hose to the supply port on the test box and the other end to the 90 degree fitting in the HP Controller.
   (d) Connect one end of the reference pressure (blue) hose to the reference pressure port on the test box and the other end to the actuator fitting in the HPSOV.

Bite Module ARINC 429 Outputs For HPSOV/HPC Data Signals
Table 501

OCTAL LABEL	BIT	SIGNAL DESCRIPTION	STATUS
351	11	HPC ENABLED COMMAND	HPC ENABLED: BIT=1
	11	HPC CLOSED COMMAND	HPC CLOSED: BIT=0
	14	HPSOV CLOSED POSITION SWITCH	HPSOV CLOSED: BIT=1
	15	HPSOV OPEN POSITION SWITCH	HPSOV NOT OPEN: BIT=1
	16	HPC HIGH PRESSURE SWITCH (PHH)	PRESSURE < 127 psig: BIT=1
	17	HPC LOW PRESSURE SWITCH (PHL)	PRESSURE < 62 psig: BIT=1
	18	HPC SERVO PRESSURE SWITCH (PC)	PRESSURE < 14 psig: BIT=1
	19	HPC DIFFERENTIAL PRESSURE SWITCH (PH - PC)	PRESSURE < 20 psig: BIT=1

Left channel SDI=01; Right channel SDI=10

S 715-031

(3) Do a test of the HP Controller PHH, PHL, PH-PC and PC pressure switch operation with an ARINC 429 Data Analyzer.

(a) If you use the ARINC 429 Data Analyzer, do these steps:

1) Make sure the supply pressure is zero.
2) Make sure the ARINC 429 Data Analyzer octal label 351 shows these indications:
   a) BIT 16 (PHH switch) = 1
   b) BIT 17 (PHL switch) = 1
   c) BIT 18 (PC switch) = 1
   d) BIT 19 (PH-PC switch) = 1
3) Select the engine bleed switch on the overhead panel to ON.
4) Increase the supply pressure to 8 psig.
5) Continue to increase the supply pressure until BIT 18 changes from 1 to 0.
   a) Make sure BIT 18 changes to 0 between 10-18 psig.
   b) If BIT 18 does not change to 0 within this range, replace the HP Controller (AMM 36-11-08/401).
6) Select the engine bleed switch on the overhead panel to OFF.
7) Continue to increase the supply pressure until BIT 19 changes from 1 to 0.
   a) Make sure BIT 19 changed to 0 between 17-23 psig.
   b) If BIT 19 does not change to 0 within this range, replace the HP Controller (AMM 36-11-08/401).
8) Select the engine bleed switch on the overhead panel to ON.
9) Increase the supply pressure to 45 psig.
10) Continue to increase the supply pressure until BIT 17 changes from 1 to 0.
   a) Make sure BIT 17 changes to 0 between 52-72 psig.
   b) If BIT 17 does not change to 0 within this range, replace the HP Controller (AMM 36-11-08/401).
11) Use the HIGH PRESSURE SUPPLY gage on the box.
12) Increase the supply pressure to 115 psig.
13) Continue to increase the supply pressure until BIT 16 changes from 1 to 0.
   a) Make sure BIT 16 changes to 0 between 117-140 psig.

b) If BIT 16 does not change to 0 within this range, replace the HP Controller (AMM 36-11-08/401).

14) Increase the supply pressure to 150 psig.

15) Decrease the supply pressure until BIT 16 changes from 0 to 1.
   a) Make sure BIT 16 changes to 1 between 117-140 psig.
   b) If BIT 16 does not change to 1 within this range, replace the HP Controller (AMM 36-11-08/401).

16) Use the LOW PRESSURE SUPPLY gage on the box.

17) Decrease the supply pressure until BIT 17 changes from 0 to 1.
   a) Make sure BIT 17 changes to 1 between 52-72 psig.
   b) If BIT 17 does not change to 1 within this range, replace the HP Controller (AMM 36-11-08/401).

18) Select the engine bleed switch on the overhead panel to OFF.

19) Decrease the supply pressure until BIT 19 changes from 0 to 1.
   a) Make sure BIT 19 changes to 1 between 17-23 psig.
   b) If BIT 19 does not change to 1 within this range, replace the HP Controller (AMM 36-11-08/401).

20) Select the engine bleed switch on the overhead panel to ON.

21) Decrease the supply pressure until BIT 18 changes from 0 to 1.
   a) Make sure BIT 18 changes to 1 between 10-18 psig.
   b) If BIT 18 does not change to 1 within this range, replace the HP Controller (AMM 36-11-08/401).

22) Decrease the supply pressure to zero.

(b) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):

1) Make sure the supply pressure is zero.

2) Make sure the Left(Right) High Pressure Shutoff Valve monitor window shows these indications:
   a) High Pressure Switch= "< 127 psig"
   b) Low Pressure Switch= "< 62 psig"

c) Control Pressure Switch= "< 14 psig"
d) Differential Pressure Switch= "< 20 psid"

3) Select the engine bleed switch on the overhead panel to ON.
4) Increase the supply pressure to 8 psig.
5) Continue to increase the supply pressure until the "Control Pressure Switch=" indication changes to ">14 psig"
   a) Make sure that ">14 psig" shows between 10-18 psig.
   b) If ">14 psig" does not show within this range, replace the HP Controller (AMM 36-11-08/401).
6) Select the engine bleed switch on the overhead panel to OFF.
7) Continue to increase the supply pressure until the "Differential Pressure Switch=" indication changes to ">20 psig"
   a) Make sure that ">20 psig" shows between 17-23 psig.
   b) If ">20 psig" does not show within this range, replace the HP Controller (AMM 36-11-08/401).
8) Select the engine bleed switch on the overhead panel to ON.
9) Increase the supply pressure to 45 psig.
10) Continue to increase the supply pressure until the "Low Pressure Switch=" indication changes to ">62 psig"
   a) Make sure that ">62 psig" shows between 52-72 psig.
   b) If ">62 psig" does not show within this range, replace the HP Controller (AMM 36-11-08/401).
11) Use the HIGH PRESSURE SUPPLY gage on the box.
12) Increase the supply pressure to 115 psig.
13) Continue to increase the supply pressure until the "High Pressure Switch=" indication changes to ">127 psig"
   a) Make sure that ">127 psig" shows between 117-140 psig.
   b) If ">127 psig" does not show within this range, replace the HP Controller (AMM 36-11-08/401).
14) Increase the supply pressure to 150 psig.
15) Decrease the supply pressure until the "High Pressure Switch=" indication changes to "<127 psig"
   a) Make sure that "<127 psig" shows between 117-140 psig.
   b) If "<127 psig" does not show within this range, replace the HP Controller (AMM 36-11-08/401).
16) Use the LOW PRESSURE SUPPLY gage on the box.
17) Decrease the supply pressure until the "Low Pressure Switch=" indication changes to "<62 psig"
   a) Make sure that "<62 psig" shows between 52-72 psig.
   b) If "<62 psig" does not show within this range, replace the HP Controller (AMM 36-11-08/401).
18) Select the engine bleed switch on the overhead panel to OFF.
19) Decrease the supply pressure until the "Differential Pressure Switch=" indication changes to "<20 psig"
   a) Make sure that "<20 psig" shows between 17-23 psig.
   b) If "<20 psig" does not show within this range, replace the HP Controller (AMM 36-11-08/401).

20) Select the engine bleed switch on the overhead panel to ON.
21) Decrease the supply pressure until the "Control Pressure Switch=" indication changes to "<14 psig"
a) Make sure that "<14 psig" shows between 10-18 psig.
b) If "<14 psig" does not show within this range, replace the HP Controller (AMM 36-11-08/401).
22) Decrease the supply pressure to zero.

S 715-045

(4) Test the mechanical operation of the HPSOV and HPC
(a) Slowly increase the supply pressure to 15 psig.
(b) Make sure the HPSOV is fully open by 15 psig.
1) Make sure the HPSOV is open by visually inspecting the position switch on the HPSOV.
(c) If you use the ARINC 429 Data Analyzer, do these steps:
1) Make sure the ARINC 429 Data Analyzer octal label 351 shows these indications (Tabel 501):
a) BIT 14=0
b) BIT 15=0
2) If the HPSOV fully opened but does not show BIT 14=0 or BIT 15=0, troubleshoot the position switches and wiring.
(d) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
1) Make sure the ASM display for the Left(Right) High Pressure Shutoff Valve shows these indications:
a) Closed Position Switch= "Valve Not Closed"
b) Open Position Switch= "Valve Open"
2) If the HPSOV is fully open, and these indications do not show, then troubleshoot the position switches and wiring.
(e) Make sure the reference pressure is equal to or more than 12 psig.
1) If the reference pressure is less than 12 psig, then do these steps:
a) Examine the fittings and tubing between the HPSOV and HP Controller for leaks with a soap solution and repair as necessary.

b) If no leaks are found, do these steps:
1. Increase the supply pressure to 20 psig.
2. If the reference pressure is still under 12 psig, replace the HP Controller (AMM 36-11-08/401).

(f) If the HPSOV did not fully open, do these steps:
1) Examine the fittings and tubing between the HPSOV and HP Controller for leaks with a soap solution and repair as necessary.
2) If a leak is suspected, check the inner tube of the flexible line in a system by removing the line and performing a pressure check using pressure equivalent to normal system operating pressure.
3) If no leaks are found, do these steps:
a) Increase the supply pressure up to a maximum of 20 psig or until the reference pressure reaches 12 psig.
b) If the HPSOV is still not open with the reference pressure at 12 psig, replace the HPSOV (AMM 36-11-07/401).
c) If the supply pressure is increased to 20 psig and the reference pressure never reaches 12 psig, replace the HP controller (AMM 36-11-08/401).

(g) Use the HIGH PRESSURE SUPPLY gage on the box.

(h) Increase the supply pressure to 95 psig and then slowly up to 110 psig.

NOTE: When the supply pressure becomes near 100 psig, the actuator pressure from the HPC to the HPSOV starts to flow out of a vent on the HPC. To compensate for the HPC venting, it may be necessary to increase the supply pressure of the air/nitrogen source.

Secondly, the HPC will stop the flow of HPSOV actuator pressure when the supply pressure is at 105 +/- 5 psig. This will cause a temporary pressure surge in the HPC supply pressure indication which is normal.

(i) Make sure that the HPSOV is fully closed by 110 psig.
1) Make sure the HPSOV is closed by visually inspecting the position switch on the valve.
2) If you use the ARINC 429 Data Analyzer, do these steps:
a) Make sure BIT 14=1 and BIT 15=1.
b) If the HPSOV is closed but does not indicate BIT 14=1 or BIT 15=1, troubleshoot the position switches and wiring.
3) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
a) Make sure the ASM display for the Left(Right) High Pressure Shutoff Valve shows these indications:
1. Closed Position Switch= "Valve Closed"
2. Open Position Switch= "Valve Not Open"
b) If the HPSOV is closed, and these indications do not show, then troubleshoot the position switches and wiring.
(j) Make sure the reference pressure is 2 psig or less.
1) If the reference pressure is more than 2 psig, then replace the HP controller (AMM 36-11-08/401).
(k) If the HPSOV did not close, do these steps:
1) If the reference pressure is equal to or less than 2 psig, replace the HPSOV (AMM 36-11-07/401).
2) If the reference pressure is more than 2 psig, replace the HP Controller (AMM 36-11-08/401).
(l) Decrease the supply pressure to zero.

S 715-012

(5) Do a test of the HP Controller shutoff solenoid.
(a) Increase the supply pressure to 50 psig.
(b) Make sure the HPSOV opens.
(c) Select the bleed switch on the overhead panel to OFF.
(d) Make sure the HPSOV closes.
(e) If the HPSOV does not close, do these steps:
1) Remove the electrical connector from the HP Controller.
a) Measure the voltage across pins 7 and 8 while the bleed switch is changed to the OFF position.

NOTE: A 28VDC "pulse" can only be measured while the switch is changed from ON to OFF. You should use an analog meter to see the pulse.

b) If the voltage is 28VDC, then replace the HP Controller (AMM 36-11-08/401).
c) If the voltage is not 28VDC, then troubleshoot the wiring from the connector to the Air Supply Control Card, P50.

d) If the wiring is satisfactory, replace the Air Supply Control Card, P50 (AMM 36-11-12/401).

(f) Decrease the supply pressure to zero.

S 845-013

(6) Return the Airplane to Its Usual Condition.

(a) Remove the fittings and replace connections.

NOTE: Make sure antiseize compound Never-Seez, Pure Nickel Special is applied to all male threads before connecting the pneumatic control/supply lines.

(b) Visually inspect all pneumatic lines and fittings to and from the HP Controller and HPSOV.

(c) If a leak is suspected, check the inner tube of the flexible line in a system by removing the line and performing a pressure check using pressure equivalent to normal system operating pressure.

1) If any pneumatic lines or fittings are loose or damaged, then repair or replace as necessary.

J. Pressure Regulating Valve (PRV) and Pressure Regulating Valve Controller (PRV Controller) Test (Fig. 503)

S 215-015

(1) Make sure the PRV is closed.

(a) Make sure the PRV is closed by visually checking the position switch.

1) If the PRV is open, then replace the PRV (AMM 36-11-18/401).

(b) If you use the ARINC 429 Data Analyzer, do these steps:

1) Make sure the ARINC 429 Data Analyzer octal label 351 shows these indications (Table 502):

a) BIT 20=1

b) BIT 21=1

2) If the PRV is closed and either BIT 20 or BIT 21 or both show 0, then troubleshoot the position switches and wiring.

(c) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
1) Select "View" from the ASM display window.
2) Select "Left PRV + PRSOV" or "Right PRV + PRSOV".
3) Make sure the ASM display for the Left(Right) PRV and PRSOV, Pressure Regulating Valve, shows these indications:
a) Closed Position Switch= "Valve Closed"
b) Open Position Switch= "Valve Not Open"
4) If the PRV is closed, and these indications do not show, then troubleshoot the position switches and wiring.

S 715-016
(2) Do a check of the PRV and PRV Controller operation.
(a) Disconnect the supply pressure tube and install the short fitting to the PRV Controller supply pressure port.
(b) Disconnect the PRV Controller downstream line and install the 45 degree fitting to the PRV Controller regulated pressure port.
(c) Remove the locking pin from the PRV actuator and install the actuator fitting to the PRV actuator. As an alternative, remove the signal pressure sense line at the actuator and install a tee fitting between the actuator and sense line.
(d) Connect one end of the supply pressure (red) hose to the supply port on the test box and the other end to the short fitting on the PRV Controller supply pressure port.
(e) Connect one end of the regulated pressure (yellow) hose to the regulated pressure port on the test box and the other end to the 45 degree fitting on the PRV Controller regulated pressure port.
(f) Connect one end of the reference pressure (blue) hose to the reference pressure port on the test box and the other end to the PRV actuator fitting or tee fitting.

Bite Module ARINC 429 Outputs For PRVC/PRV Data Signals
Table 502

OCTAL LABEL	BIT	SIGNAL DESCRIPTION	STATUS
351	12	PRVC ENABLED COMMAND	PRVC ENABLED: BIT=1
	12	PRVC CLOSED COMMAND	PRVC CLOSED: BIT=0
	20	PRV CLOSED POSITION SWITCH	PRV CLOSED: BIT=1
	21	PRV OPEN POSITION SWITCH	PRV NOT OPEN: BIT=1

Left channel SDI=01; Right channel SDI=10

(g) Make sure the engine bleed switch on the overhead panel is ON.
(h) Slowly increase the supply pressure to 15 psig.
(i) Make sure the PRV is fully open by 15 psig.
    1) Make sure the PRV is open by visually inspecting the position switch.
    2) If you use the ARINC 429 Data Analyzer, do these steps:
        a) Make sure BIT 20=0 and BIT 21=0.
        b) If the PRV fully opened but does not indicate BIT 20=0 or BIT 21=0, troubleshoot the position switches and wiring.
    3) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
        a) Make sure the ASM display for the Left(Right) PRV and PRSOV, Pressure Regulating Valve, shows these indications:
            1. Closed Position Switch= "Valve Not Closed"
            2. Open Position Switch= "Valve Open"
        b) If the PRV is fully open, and these indications do not show, then troubleshoot the position switches and wiring.
    4) Make sure the reference pressure is equal to or more than 12 psig.
    5) If the reference pressure is less than 12 psig, then do these steps:
        a) Examine the fittings and tubing between the PRV and PRV Controller for leaks with a soap solution and repair as necessary.
        b) If a leak is suspected, check the inner tube of the flexible line in a system by removing the line and performing a pressure check using pressure equivalent to normal system operating pressure.
        c) If no leaks are found, then do these steps:
            1. Increase the supply pressure to 20 psig.
            2. If the reference pressure is still less than 12 psig, replace the PRV Controller (AMM 36-11-19/401).

(j) If the PRV did not fully open, do these steps:
1) Examine the fittings and tubing between the PRV and PRV Controller for leaks with a soap solution and repair as necessary.
2) If no leaks are found, do these steps:
a) Increase the supply pressure to 20 psig or until the reference pressure reaches 12 psig.
b) If the PRV is still not open with the reference pressure at 12 psig, replace the PRV (AMM 36-11-18/401).
c) If the supply pressure is increased to 20 psig and the reference pressure never reaches 12 psig, replace the PRV Controller (AMM 36-11-19/401).
(k) Decrease the supply pressure and reference pressure to zero.

S 715-017
(3) Do a test of the PRV Controller shutoff solenoid.
(a) Increase the supply pressure to 50 psig.
(b) Make sure the PRV opens.
(c) Select the bleed switch on the overhead panel OFF.
(d) Make sure the PRV closes.
1) If the PRV does not close, do these steps:
a) Remove the connector on the PRV Controller.
b) Measure the voltage across pins 1 and 2 while the switch is changed to the OFF position.

NOTE: A 28 VDC "pulse" can only be measured while the switch is changed from ON to OFF. You should use an analog meter to see the pulse.

c) If the voltage is 28 VDC, then replace the PRV Controller (AMM 36-11-19/401).
d) If the voltage is not 28 VDC, then troubleshoot the wiring from the connector to the Air Supply Control Card, P50.
e) If the wiring is satisfactory, replace the Air Supply Control Card, P50 (AMM 36-11-12/401).
(e) After the PRV closes, select the engine bleed switch on the overhead panel to the ON position.
(f) Decrease the supply pressure to zero.

S 715-032
(4) Test the PRV controller operation.
(a) Disconnect the reference pressure (blue) hose from the actuator fitting or tee fitting.
(b) Remove the actuator fitting and install the locking pin or remove the tee fitting and install the signal pressure sense line.
(c) Disconnect the PRV pressure port from the PRV Controller.
(d) Connect the straight fitting to the actuator pressure port on the PRV controller.

(e) Connect the reference pressure (blue) hose to the straight fitting in the actuator pressure port.
(f) Use the 'HIGH PRESSURE SUPPLY' gage on the test box.
(g) Set the regulated pressure to 90+/-5 psig.
(h) Set the supply pressure to 100+/-5 psig without overshooting.
(i) Decrease the regulated pressure to 40+/-5 psig and then increase the regulated pressure back to 90+/-5 psig five (5) times.
(j) Decrease the supply pressure to 40+/-5 psig and then slowly increase the supply pressure back to 100+/-0.5 psig without overshooting.
(k) Slowly decrease the regulated pressure to 64+/-0.5 psig without overshooting.
    1) Allow the PRV controller to stabilize for approximately one (1) minute.
    2) Make sure the reference pressure (PRVC actuator) is 31+/-2 psig.
(l) Continue to slowly decrease the regulated pressure to 55+/-1 psig without overshooting.
    1) Make sure the reference pressure (PRVC actuator) is within the limits listed in Table 503.
(m) Slowly increase the regulated pressure to each of the values listed in Table 503 without overshooting the regulated pressure at each listed value.

    NOTE: You may have to adjust the supply pressure to maintain 100 psig.

    1) Make sure for each regulated pressure value, the reference pressure is within the limits listed in Table 503.
(n) Slowly decrease the regulated pressure to each of the values listed in Table 503 without overshooting the regulated pressure at each listed value.

    NOTE: You may have to adjust the supply pressure to maintain 100 psig.

    1) Make sure for each regulated pressure value, the reference pressure is within the limits listed in Table 503.

PRV and PRV Controller Operation Table 503		
SUPPLY PRESSURE	REGULATED PRESSURE	REFERENCE PRESSURE
100 psig	55 psig	53-79 psig
100 psig	60 psig	38-59 psig
100 psig	65 psig	27-43 psig
100 psig	70 psig	20-29 psig
100 psig	75 psig	16-21 psig

(o) If the reference pressure is not within these limits, then replace the PRV Controller (AMM 36-11-19/401).
(p) Decrease the supply pressure and regulated pressure to zero.

S 845-018
(5) Put the airplane back to its usual condition.
(a) Remove the test fittings and replace connections.

NOTE: Make sure antiseize compound Never-Seez, Pure Nickel Special is applied to all male threads before connecting the pneumatic control/supply lines.

(b) Visually inspect all the pneumatic control/supply lines and fittings to and from the PRV Controller and PRV.
(c) If a leak is suspected, check the inner tube of the flexible line in a system by removing the line and performing a pressure check using pressure equivalent to normal system operating pressure.
1) If any of the fittings or sense lines are loose or damaged, then repair or replace as necessary.

K. Pressure Regulating Shutoff Valve (PRSOV) Test (Fig. 504)

S 865-019
(1) Open the pressure relief door on the left side of the strut, 434AL or 444AL (AMM 06-43-00/201).

S 215-020
(2) Make sure the PRSOV is closed.
(a) Make sure the PRSOV is closed by visually inspecting the position switch on the valve.
1) If the PRSOV is open, replace the PRSOV (AMM 36-11-09/201).

(b) If you use the ARINC 429 Data Analyzer, do these steps:
1) Make sure the ARINC 429 Data Analyzer octal label 352 shows these indications:
a) BIT 26=1
b) BIT 27=1
2) If the PRSOV is closed and either BIT 26 or BIT 27 or both show 0, then troubleshoot the position switches and wiring.
(c) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
1) Select "View" from the ASM display window.
2) Select "Left PRV + PRSOV" or "Right PRV + PRSOV".
3) Make sure the ASM display for Left(Right) PRV and PRSOV, Pressure Regulating and Shutoff Valve, shows these indications:
a) Closed Position Switch= "Valve Closed"
b) Open Position Switch= "Valve Not Open"
4) If the PRSOV is closed, and these indications do not show, then troubleshoot the position switches and wiring.

S 715-021
(3) Do a test of the PRSOV operation.
(a) Remove the air filter and spring on the PRSOV (AMM 36-11-09/201).
(b) Put a very small quantity of lubricant on the O-ring on the PRSOV/FATS filter fitting.
(c) Install the PRSOV/FATS filter fitting in the air filter port on the PRSOV.
(d) Disconnect the downstream pressure sense tube from the bottom side of the PRSOV and install the 90 degree fitting to the PRSOV.
(e) Remove the PRSOV locking pin and install the actuator fitting into the locking pin port.
(f) Connect one end of the supply pressure (red) hose to the supply port of the test box and the other end to the PRSOV/FATS filter fitting.

(g) Connect one end of the regulated pressure (yellow) hose to the regulated pressure port of the test box and the other end to the 90 degree fitting in the downstream port of the PRSOV.
(h) Connect one end of the reference pressure (blue) hose to the reference pressure port of the test box and the other end to the actuator fitting in the PRSOV.

Bite Module ARINC 429 Outputs For PRSOV Data Signal
Table 504

OCTAL LABEL	BIT	SIGNAL DESCRIPTION	STATUS
351	13	PRSOV ENABLED COMMAND	PRSOV ENABLED: BIT=1
	13	PRSOV CLOSED COMMAND	PRSOV CLOSED: BIT=0
352	26	PRSOV CLOSED POSITION SWITCH	PRSOV CLOSED: BIT=1
	27	PRSOV OPEN POSITION SWITCH	PRSOV NOT OPEN: BIT=1
	28	PRSOV HIGH PRESSURE SWITCH (PRH SWITCH)	PRESSURE < 58 psig: BIT=1
	29	PRSOV LOW PRESSURE SWITCH (PRL SWITCH)	PRESSURE < 20 psig: BIT=1

Left channel SDI=01; Right channel SDI=10

(i) Make sure the bleed switch on the overhead panel is ON.
(j) Slowly increase the supply pressure to 15 psig.
(k) Make sure the PRSOV is fully open by 15 psig.
1) Make sure the PRSOV is open by visually inspecting the position switch on the PRSOV.
a) If the PRSOV does not fully open by 15 psig, then replace the PRSOV (AMM 36-11-09/201).

2) If you use the ARINC 429 Data Analyzer, do these steps:
   a) Make sure BIT 26=0 and BIT 27=0.
   b) If the PRSOV fully opened but does not show BIT 26=0 or BIT 27=0, troubleshoot the position switches and wiring.
3) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
   a) Make sure the ASM display for Left(Right) PRV and PRSOV, Pressure Regulating and Shutoff Valve, shows these indications:
      1. Closed Position Switch= "Valve Not Closed"
      2. Open Position Switch= "Valve Open"
   b) If the PRSOV is fully open, and these indications do not show, then troubleshoot the position switches and wiring.

(l) Increase the supply pressure to 80 psig.

NOTE: Adjust the regulator as necessary to maintain the supply pressure at 80 psig throughout this test.

(m) Increase the regulated pressure to 25 psig.
(n) Continue to increase the regulated pressure in 1 psig increments and monitor the reference pressure.
(o) Make sure the reference pressure goes to between 34-46 psig at or before the regulated pressure reaches 36 psig.
   1) If the reference pressure is not within the limits listed above, then replace the PRSOV (AMM 36-11-09/201).
(p) Increase the regulated pressure to 40 psig.
(q) Make sure the reference pressure goes to between 25-35 psig.
   1) If the reference pressure is not within the limits listed above, then replace the PRSOV (AMM 36-11-09/201).
(r) Increase the regulated pressure to 60 psig.
(s) Make sure the reference pressure goes to between 0-5 psig.
   1) If the reference pressure is not within the limits listed above, then replace the PRSOV (AMM 36-11-09/201).

(t) Make sure the reference pressure goes to between 0-12 psig and that the PRSOV switch shows the valve is fully closed.
1) If the reference pressure is not within the limits listed above, or the PRSOV switch does not indicate the valve is fully closed when the reference pressure is between 0-12 psig, then replace the PRSOV (AMM 36-11-09/201).
(u) Decrease the regulated pressure and supply pressure to zero.

S 715-022
(4) Do a test of the PRSOV PRH and PRL pressure switch operation.
(a) Make sure the supply pressure and regulated pressure are zero.
(b) If you use the ARINC 429 Data Analyzer, do these steps:
1) Make sure the ARINC 429 Data Analyzer shows these indications:
a) BIT 28 (PRH switch) = 1
b) BIT 29 (PRL switch) = 1
2) Increase the regulated pressure to 10 psig.
3) Continue to increase the regulated pressure until BIT 29 changes to 0.
a) Make sure BIT 29 changes to 0 from 15-25 psig.
b) If BIT 29 does not change to 0 within this range, replace the PRSOV (AMM 36-11-09/201).
4) Increase the regulated pressure to 45 psig.
5) Continue to increase the regulated pressure until BIT 28 changes to 0.
a) Make sure BIT 28 changes to 0 from 50-70 psig.
b) If BIT 28 does not change to 0 within this range, replace the PRSOV (AMM 36-11-09/201).
6) Increase the regulated pressure to 80 psig.
7) Decrease the regulated pressure until BIT 28 changes back to 1.
a) Make sure BIT 28 changes to 1 from 50-70 psig.
b) If BIT 28 does not change to 1 within this range, replace the PRSOV (AMM 36-11-09/201).
8) Decrease the regulated pressure until BIT 29 changes back to 1.
a) Make sure BIT 29 changes to 1 from 15-25 psig.
b) If BIT 29 does not change to 1 within this range, replace the PRSOV (AMM 36-11-09/201).
9) Reduce regulated pressure to zero.

(c) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
1) Make sure the ASM display for Left(Right) PRV and PRSOV, Pressure Regulating and Shutoff Valve, shows these indications:
a) High Pressure Switch= "<58 psig"
b) Low Pressure Switch= "<20 psig"
2) Increase the regulated pressure to 10 psig.
3) Continue to increase the regulated pressure until the "Low Pressure Switch=" indication changes to ">20 psig"
a) Make sure that ">20 psig" shows between 15-25 psig.
b) If ">20 psig" does not show within this range, replace the PRSOV (AMM 36-11-09/201).
4) Increase the regulated pressure to 45 psig.
5) Continue to increase the regulated pressure until the "High Pressure Switch=" indication changes to ">58 psig"
a) Make sure that ">58 psig" shows between 50-75 psig.
b) If ">58 psig" does not show within this range, replace the PRSOV (AMM 36-11-09/201).
6) Increase the regulated pressure to 80 psig.
7) Decrease the regulated pressure until the "High Pressure Switch=" indication changes to "<58 psig"
a) Make sure that "<58 psig" shows between 50-70 psig.
b) If "<58 psig" does not show within this range, replace the PRSOV (AMM 36-11-09/201).
8) Decrease the regulated pressure until the "Low Pressure Switch=" indication changes to "<20 psig"
a) Make sure that "<20 psig" shows between 15-25 psig.
b) If "<20 psig" does not show within this range, replace the PRSOV (AMM 36-11-09/201).
9) Reduce regulated pressure to zero.

S 845-023
(5) Put the Airplane Back to Its Usual Condition.
(a) Remove the test fittings and replace connections.

NOTE: Make sure antiseize compound Never-Seez, Pure Nickel Special is applied to all male threads before connecting the pneumatic control/supply lines.

(b) Visually inspect all the pneumatic control/supply lines and fittings to and from the PRSOV.
1) If any of the fittings or sense lines are loose or damaged, then repair or replace as necessary.
2) If a leak is suspected, check the inner tube of the flexible line in a system by removing the line and performing a pressure check using pressure equivalent to normal system operating pressure.

L. Fan Air Modulating Valve (FAMV) Test (Fig. 505)

S 865-025
(1) Open the pressure relief door on the right side of the strut (434AR or 444AR) to access the FATS (AMM 06-43-00/201).

BITE Module ARINC 429 Outputs for FAMV/FATS Data Signals
Table 506

OCTAL LABEL	BIT	SIGNAL DESCRIPTION	STATUS
351	22	FAMV OPEN POSITION SWITCH	FAMV OPEN: BIT=1
	23	FAMV CLOSED POSITION SWITCH	FAMV IS NOT CLOSED: BIT=1
	24	FATS LOW PRESSURE SWITCH (PC)	PRESSURE < 2.25 psig: BIT=1 (FATS commands FAMV open)
	25	FATS HIGH PRESSURE SWITCH (PC)	PRESSURE < 9.25 psig: BIT=1 (FATS commands FAS to the not closed position)

Left channel SDI=01; Right channel SDI=10

S 215-026
(2) Make sure the FAMV is fully open.
(a) Make sure the FAMV is fully open by visually inspecting the butterfly on the FAMV.
1) If the FAMV is not fully open, replace the FAMV (AMM 36-11-16/401).

(b) If you use the ARINC 429 Data Analyzer, do these steps:
1) Make sure the ARINC 429 Data Analyzer octal label 351 shows these indications:
a) BIT 22=1
b) BIT 23=1
2) If the FAMV is fully open and either BIT 22 or BIT 23 or both show 0, then troubleshoot the position switches and wiring.

(c) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
1) Select "View" from the ASM display window.
2) Select "Left FAMV" or "Right FAMV".
3) Make sure the ASM display for the Left(Right) Fan Air Modulating Valve shows these indications:
a) Open Position Switch= "Valve Open"
b) Closed Position Switch= "Valve Not Closed"
4) If the FAMV is fully open, and these indications do not show, then troubleshoot the position switches and wiring.

S 715-060

(3) Do a test of the FAMV operaton.

NOTE: There are three options for testing the FAMV.
The first tests the FAMV on the airplane. The second requires access to the Fan Air Temperature Sensor (FATS).
The third tests the FAMV after it has been removed from the airplane.
The second and third option could be used when it is not possible to attach the test equipment to the FAMV on the airplane.

(a) If you access the FAMV on the airplane, do these steps:
1) Connect the 45 degree fitting to the supply port.
2) Connect the 90 degree fitting to the temperature port.
3) Connect one end of the supply pressure (red) hose to the supply port on the pneumatic test box and the other end to the 45 degree fitting in the supply port.
4) Connect one end of the regulated pressure (yellow) hose to the regulated pressure port of the test box and the other end to the 90 degree fitting in the temperature port.
5) Increase the supply pressure to 20 psig.
6) Slowly increase the regulated pressure to 15 psig.
7) Make sure the FAMV is fully closed by visually inspecting the butterfly inside the FAMV.
8) If you use the ARINC 429 Data Analyzer, do these steps:
a) Make sure BIT 22=0 and BIT 23=0.
b) If the FAMV is fully closed but does not indicate BIT 22=0 or BIT 23=0, then troubleshoot the position switches and wiring.

9) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
   a) Make sure the FAMV is fully closed by visually inspecting the butterfly inside the FAMV.
   b) Make sure the ASM display for the Left(Right) Fan Air Modulating Valve shows these indications:
      1. Open Position Switch= "Valve Not Open"
      2. Closed Position Switch= "Valve Closed"
   c) If the FAMV is fully closed, and these indications do not show, then troubleshoot the position switches and wiring.
10) If the FAMV is not closed, replace the FAMV (AMM 36-11-16/401).
11) Decrease the supply pressure and regulated pressure to zero.

(b) If you access the Fan Air Temperature Sensor (FATS), do these steps:
1) Get access to the FATS through the access panel in the strut (AMM 36-11-17/401).
2) Remove the air filter and spring from the FATS (AMM 36-11-17/401).
3) Put a very small amount of lubricant on the O-ring on the PRSOV/FATS filter fitting.
4) Install the PRSOV/FATS Filter fitting in the FATS filter cavity.
5) Remove the locking pin from the FAMV, and install the actuator fitting in the locking pin port.
6) Connect one end of the supply pressure (red) hose to the supply port on the test box and the other end to the actuator fitting on the FAMV.
7) Connect one end of the regulated pressure (yellow) hose to the regulated port on the test box and the other end to the PRSOV/FATS filter fitting on the FATS.
8) Slowly increase supply pressure to 20 psig.
9) Slowly increase regulated pressure to 15 psig.
10) Make sure the FAMV is fully closed by visually inspecting the butterfly on the FAMV.
11) If you are using the ARINC 429 Data Analyzer, do these steps:
   a) Make sure BIT 22=0 and BIT 23=0.
   b) If the FAMV is fully closed but does not indicate BIT 22=0 or BIT 23=0, then troubleshoot the position switches and wiring.
12) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):
   a) Make sure the ASM display for the Left(Right) Fan Air Modulating Valve shows these indications:

1. Open Position Switch= "Valve Not Open"
2. Closed Position Switch= "Valve Closed"

b) If the FAMV is fully closed, and these indications do not show, then troubleshoot the position switches and wiring.

13) If the FAMV is not fully closed, do these steps:
a) Using a soap solution, check the lines and connections for leaks.
b) If a leak is suspected, check the inner tube of the flexible line in a system by removing the line and performing a pressure check using pressure equivalent to normal system operating pressure.
c) Decrease the supply pressure and regulated pressure to zero.
d) If no leaks were found, then continue with the steps that follow.

(c) If you remove the FAMV from the airplane, do these steps:
1) Remove the FAMV from the airplane (AMM 36-11-16/401).
2) Connect the 45 degree fitting to the supply port.
3) Connect the 90 degree fitting to the temperature port.
4) Connect one end of the supply pressure (red) hose to the supply port on the pneumatic test box and the other end to the 45 degree fitting in the supply port.
5) Connect one end of the regulated pressure (yellow) hose to the regulated pressure port of the test box and the other end to the 90 degree fitting in the temperature port.
6) Increase the supply pressure to 20 psig.
7) Slowly increase the regulated pressure to 15 psig.
8) Make sure the FAMV is fully closed.
9) If the FAMV does not close, replace the FAMV (AMM 36-11-16/401).
10) If the FAMV closes, replace the Fan Air Temperature Sensor (AMM 36-11-17/401).
11) Decrease the supply pressure and regulated pressure to zero.

S 845-028

(4) Put the airplane back to its usual condition.

(a) Do the following steps to remove the pneumatic system monitoring equipment:

1) If you use the ASM Software with a laptop computer or PMAT, do these steps (Fig. 507):

a) Select "Stop" on the Air Supply Monitor display.

b) Exit the Air Supply Monitor software application.

2) Remove the power from the ARINC 429 Data Analyzer, laptop computer, or PMAT.

3) Remove the ASM Interface Cable, A36021 Cable, or ARINC Analyzer cable from pins FA56 and FC56 at terminal block TB130 (Fig. 507).

4) Install the sidewall lining in the forward cargo compartment (AMM 25-52-01/401).

5) Close the forward cargo door, 821.

(b) Remove the test fittings and restore connections.

NOTE: Make sure antiseize compound Never-Seez, Pure Nickel Special is applied to all male threads before you connect the pneumatic control/supply lines.

(c) Visually inspect all the pneumatic control/supply lines and fittings to and from the FAMV.

1) If any of the fittings or sense lines are loose or damaged, then repair or replace as necessary.

2) If a leak is suspected, check the inner tube of the flexible line in a system by removing the line and performing a pressure check using pressure equivalent to normal system operating pressure.

M. Pneumatic System Leak Check

S 795-034

(1) Do a leak check of the HPSOV and the HPC:

(a) Apply the leak detector solution to the flanges of the HPSOV and all pneumatic line connections of the HPSOV and HPC.

(b) Dry motor the engine (AMM 71-00-00/201).

(c) Examine the HPSOV and HPC for leakage:

1) If bubbles come slowly into view, the quantity of leakage is satisfactory.

2) If bubbles come quickly into view, or if jet blast leakage occurs, you must repair the cause of the leakage.

(d) Stop the engine (AMM 71-00-00/201).

S 795-047

(2) Do a leak check of the PRSOV, PRV, PRV controller, FAMV, and FATS:

(a) Apply the leak detector solution to all locations that will be examined for leaks.

(b) Pressurize the pneumatic system using a ground air source, the APU or engine (AMM 36-00-00/201).

(c) Manually wrench open the PRSOV to supply pneumatic pressure upstream of the PRSOV.

WARNING: USE A RATCHET WRENCH TO TURN THE PRV MANUAL OVERRIDE DRIVE. THE PRV CAN OPEN SUDDENLY WHEN YOU TURN THE MANUAL OVERRIDE DRIVE. THE MANUAL OVERRIDE DRIVE COULD PULL THE WRENCH OUT OF YOUR HANDS AND CAN CAUSE INJURY TO PERSONS OR EQUIPMENT.

(d) To do a leak check of the PRV and the PRV controller, manually wrench open the PRV to supply pneumatic pressure upstream of the PRV.

(e) Examine the PRSOV, PRV, PRV controller, FAMV, and FATS for leakage.

1) If bubbles come slowly into view, the quantity of leakage is satisfactory.

2) If bubbles come quickly into view, or if jet blast leakage occurs, you must repair the cause of the leakage.

(f) Disengage the wrenches from the PRV and PRSOV.

N. Put the Airplane Back to Its Usual Condition

S 845-051

(1) Depressurize the pneumatic system (AMM 36-00-00/201).

S 815-052

(2) If there are any Chapter 36 EICAS messages shown, do the applicable fault isolation procedure for the EICAS message (FIM 36-EICAS MESSAGES).

S 415-053

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.

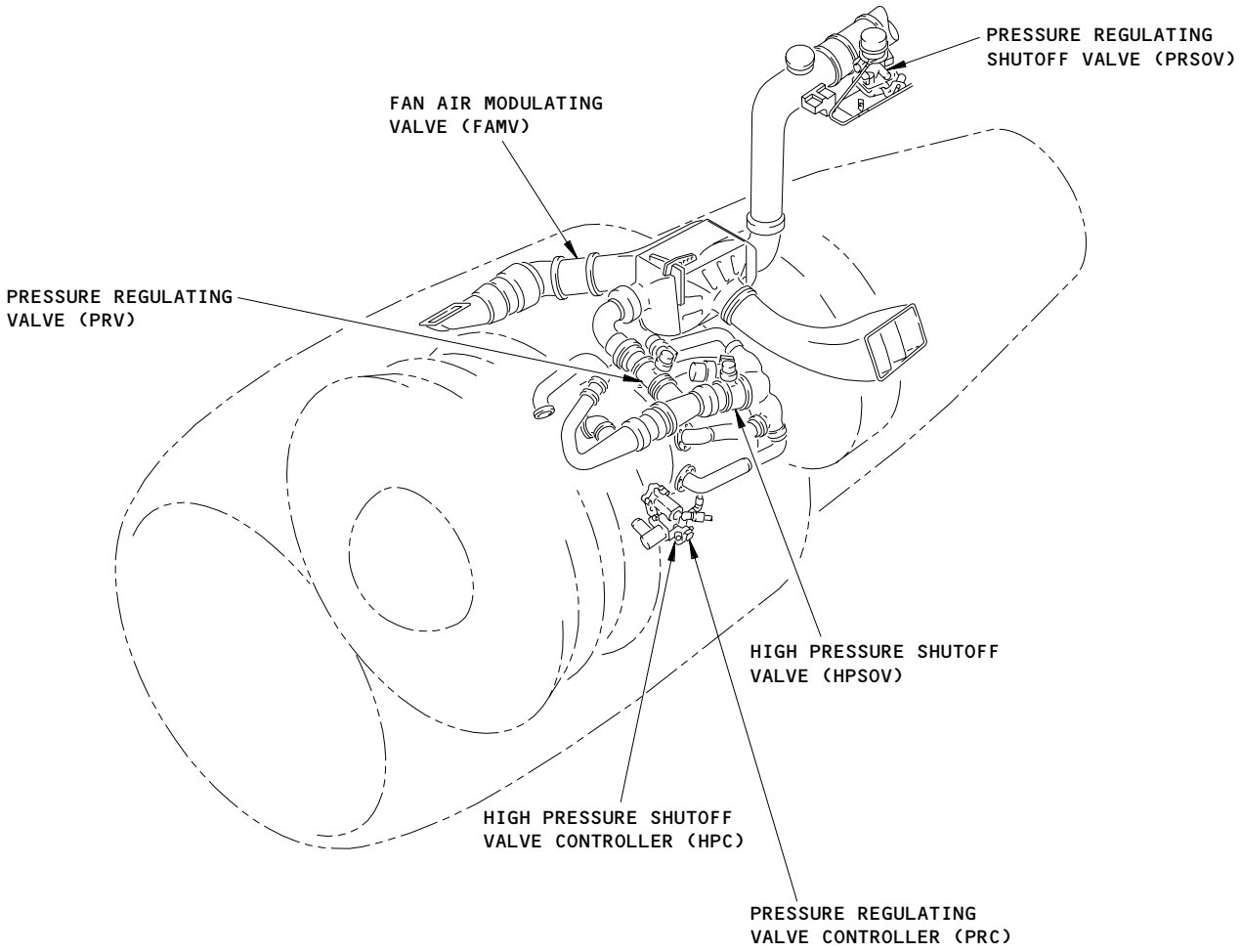
(3) Close the thrust reverser (AMM 78-31-00/201).

S 415-055

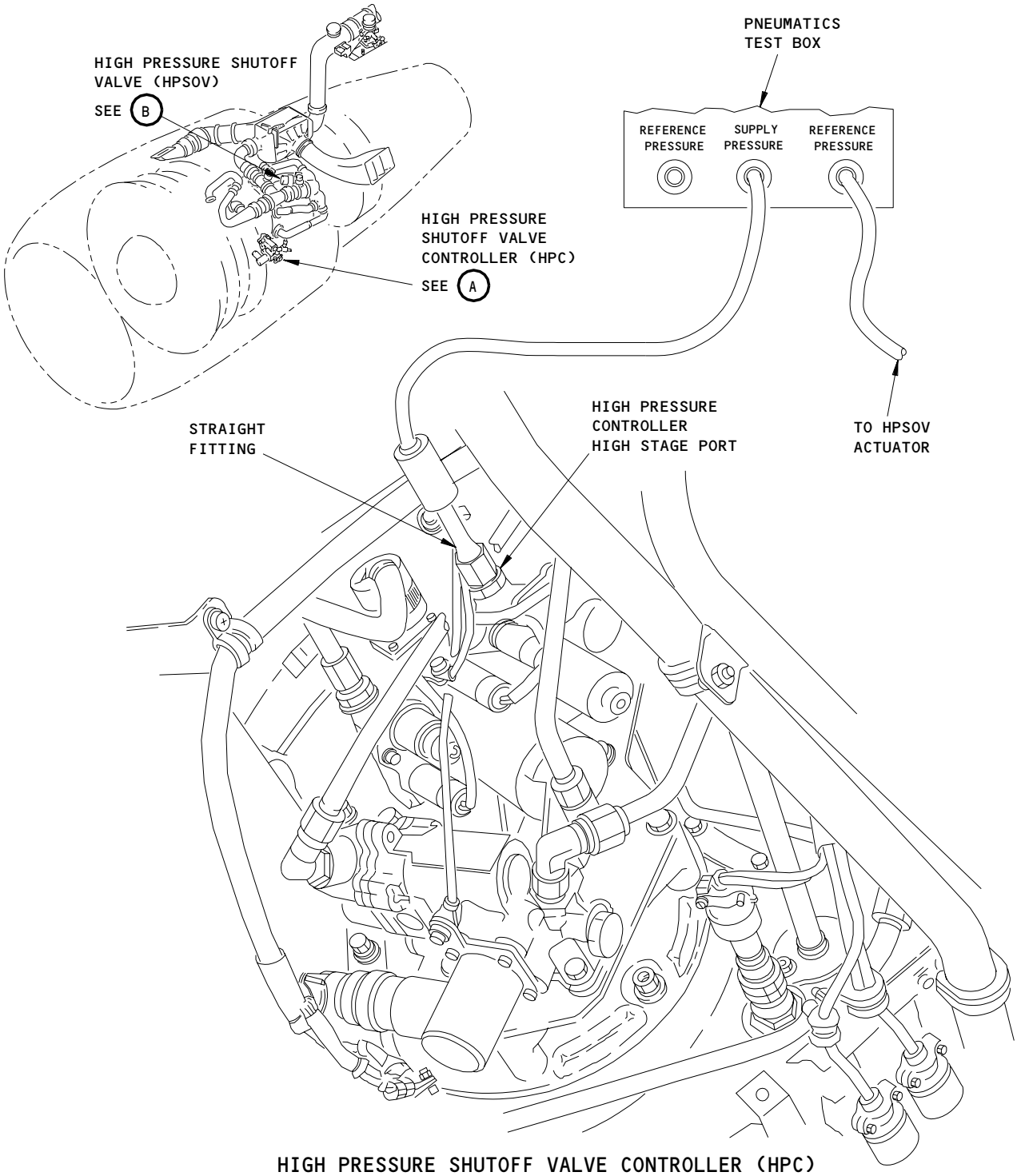
(4) Close the core cowl panel (AMM 71-11-06/201).

S 415-056
(5) Close the fan cowl panel (AMM 71-11-04/201).

S 445-057
(6) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).



Pneumatic Health Check
Figure 501

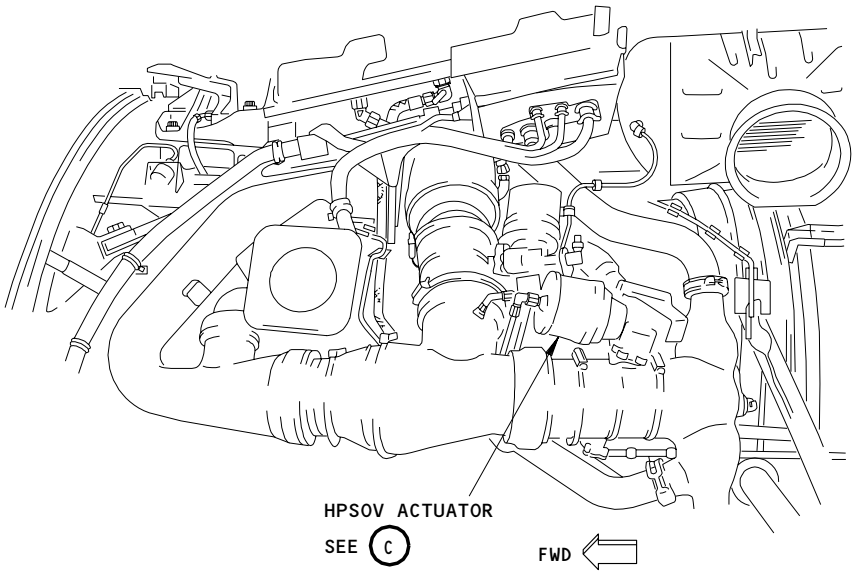


HIGH PRESSURE SHUTOFF VALVE CONTROLLER (HPC)

A

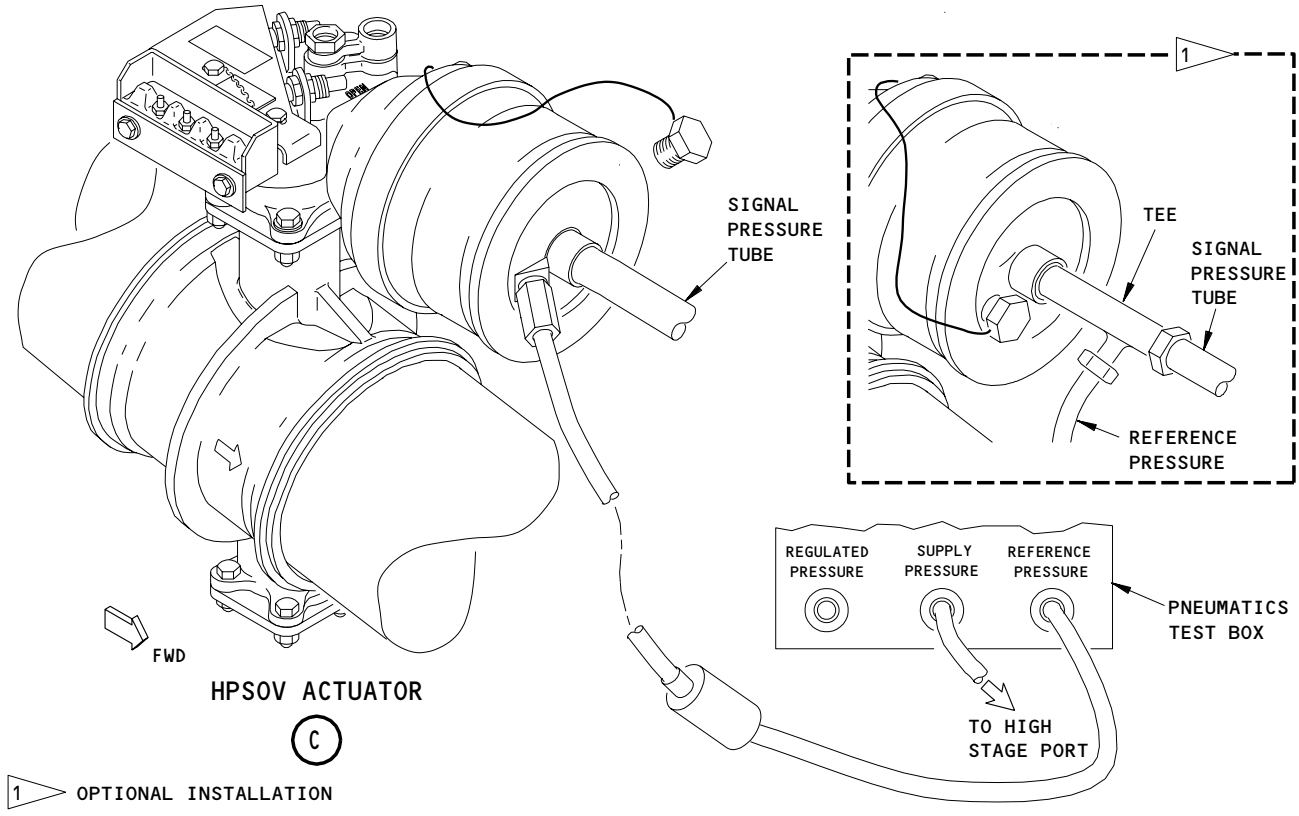
High Pressure Shutoff Valve and Controller
Figure 502 (Sheet 1)

K93975



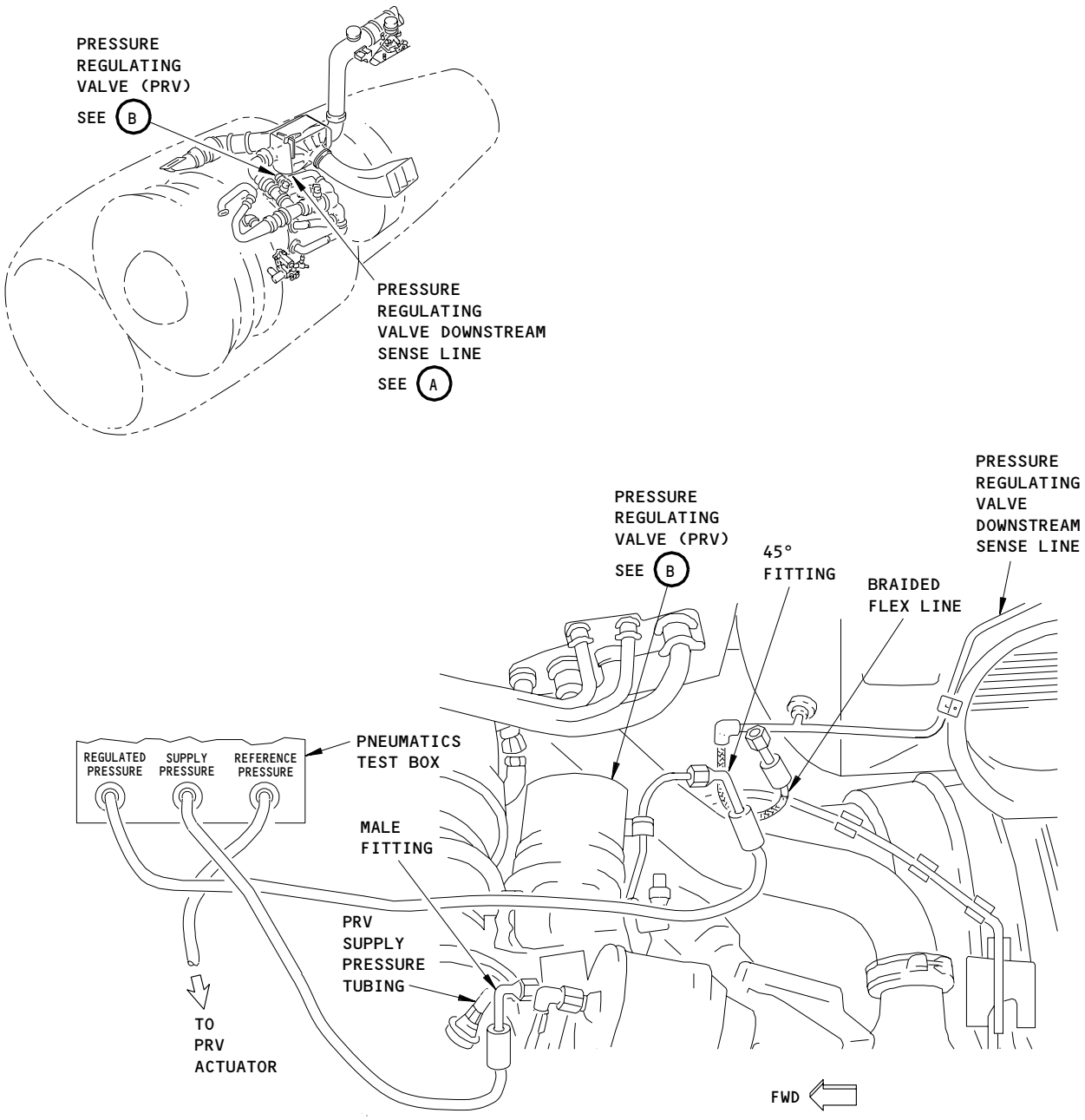
HIGH PRESSURE SHUTOFF VALVE (HPSOV)

B



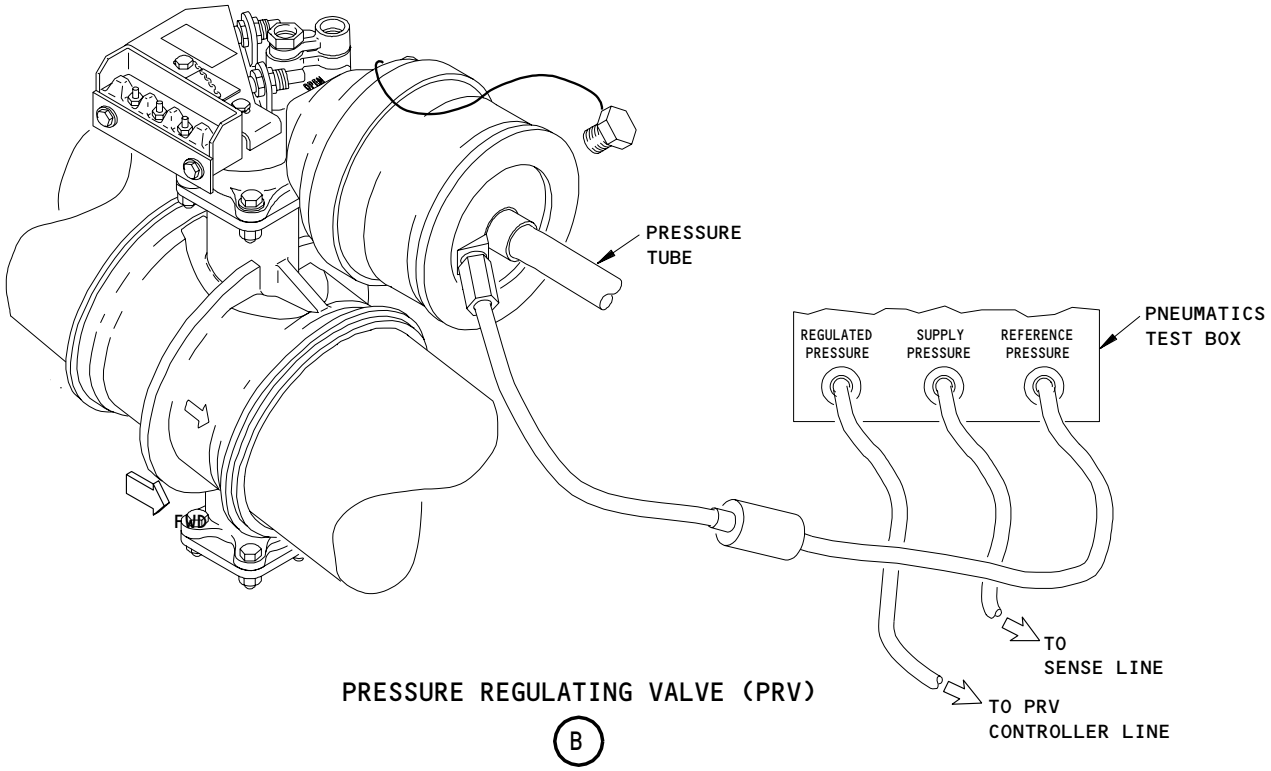
High Pressure Shutoff Valve and Controller
Figure 502 (Sheet 2)

K95386



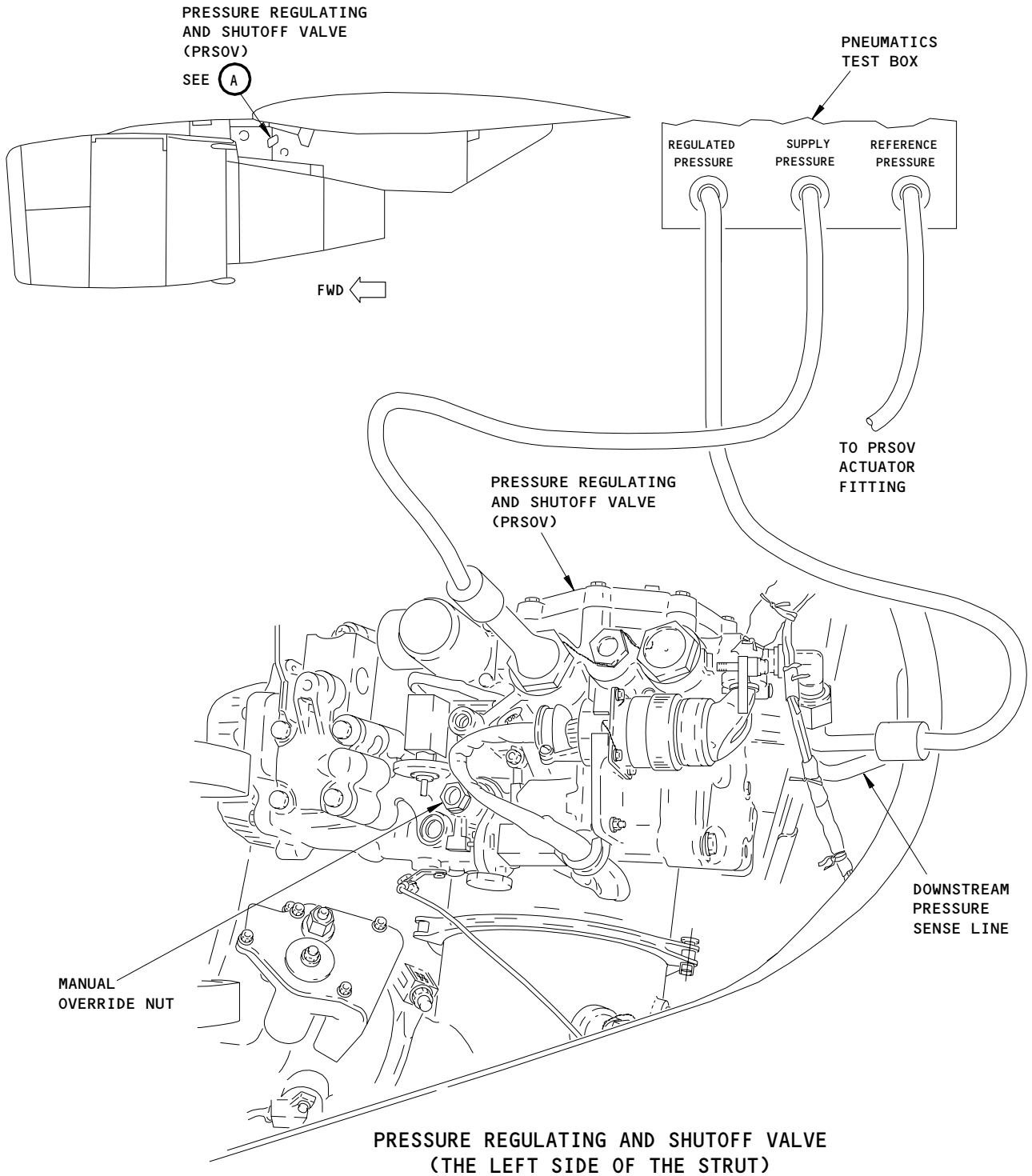
PRESSURE REGULATING VALVE
DOWNSTREAM SENSE LINE
A

Pressure Regulating Valve (PRV)
Figure 503 (Sheet 1)



1 OPTIONAL INSTALLATION

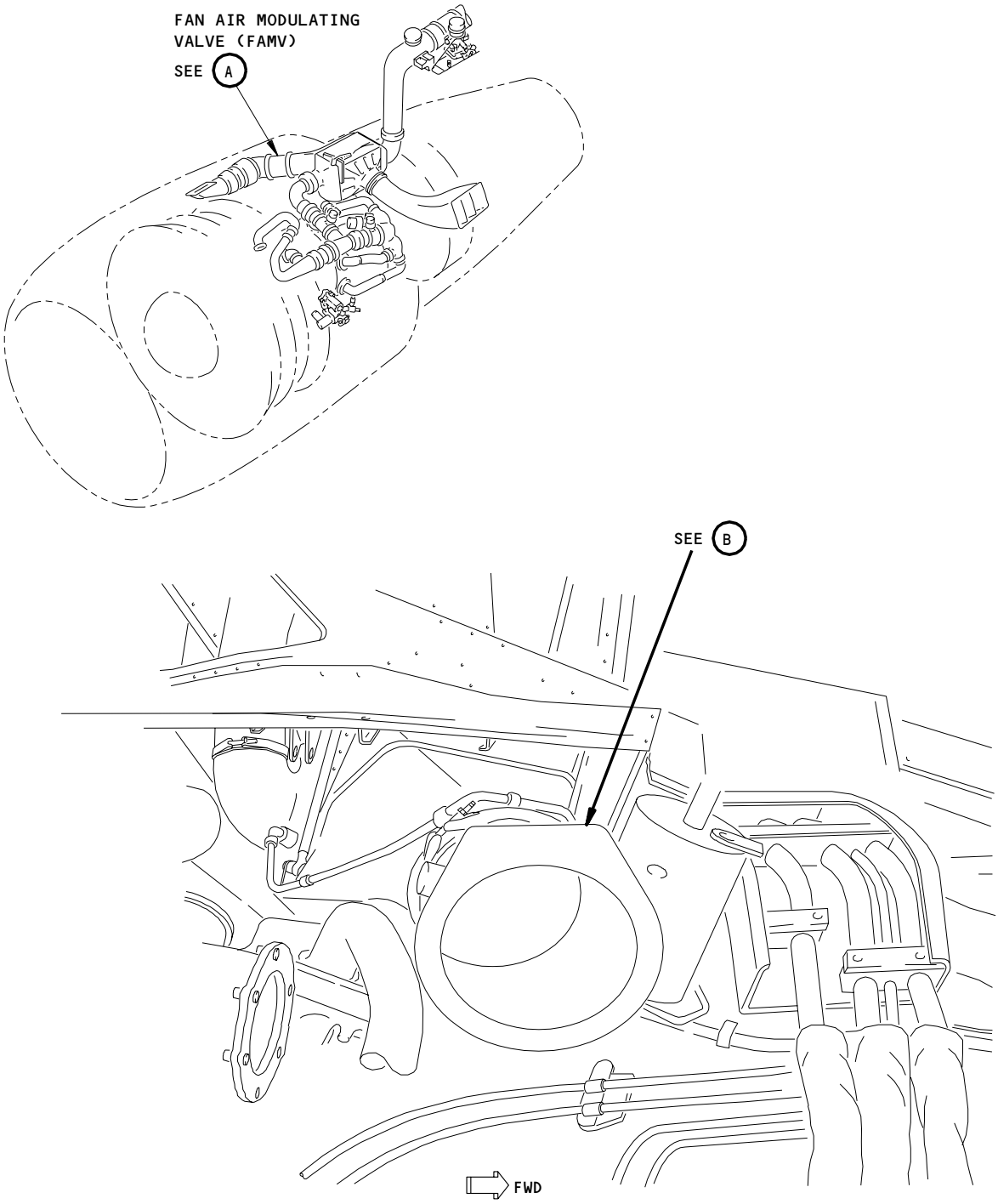
Pressure Regulating Valve (PRV)
Figure 503 (Sheet 2)



PRESSURE REGULATING AND SHUTOFF VALVE
(THE LEFT SIDE OF THE STRUT)
A

Pressure Regulating and Shutoff Valve
Figure 504

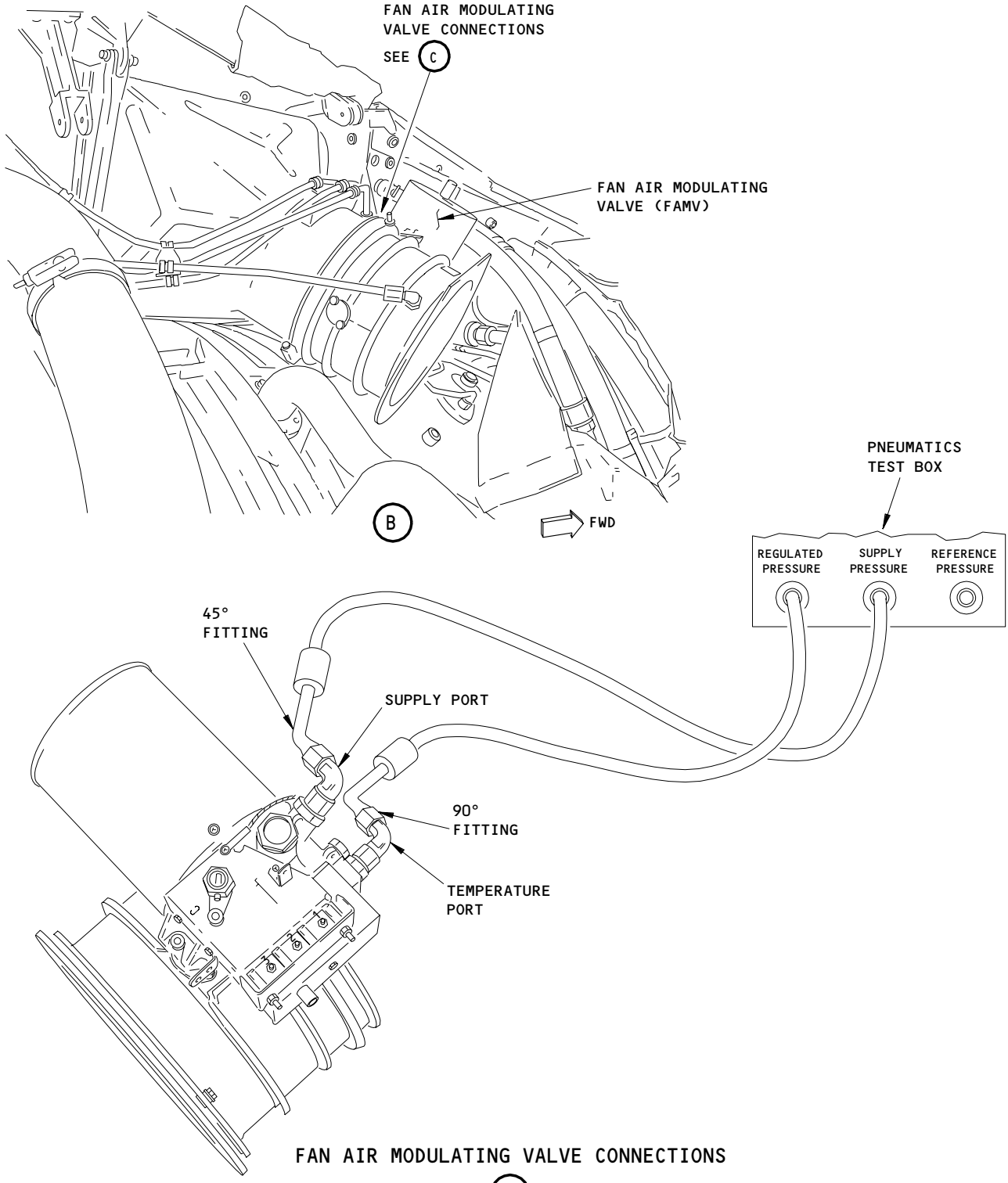
K93981



FAN AIR MODULATING VALVE (FAMV)

A

Fan Air Modulating Valve (FAMV)
Figure 505 (Sheet 1)

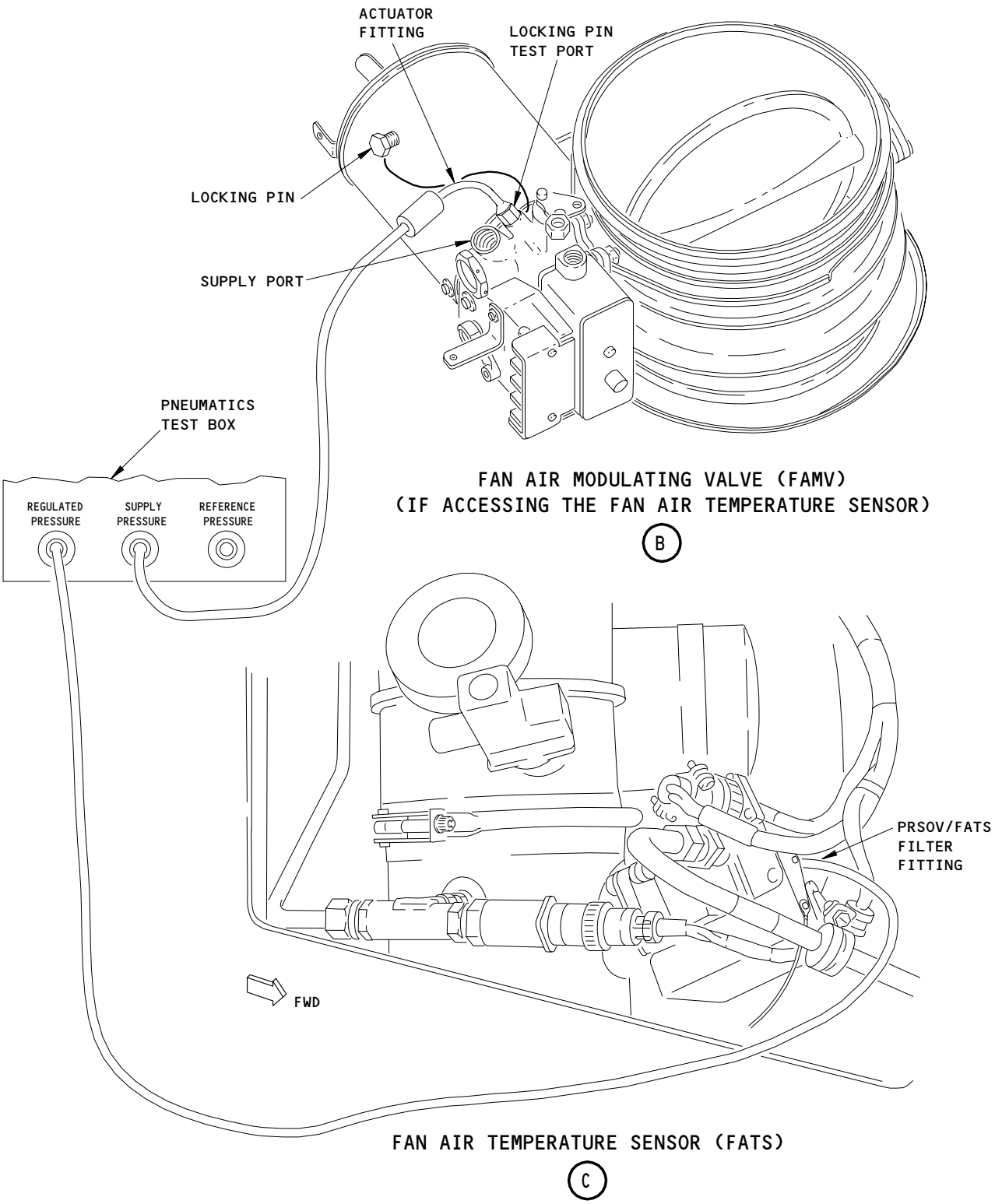


FAN AIR MODULATING VALVE CONNECTIONS

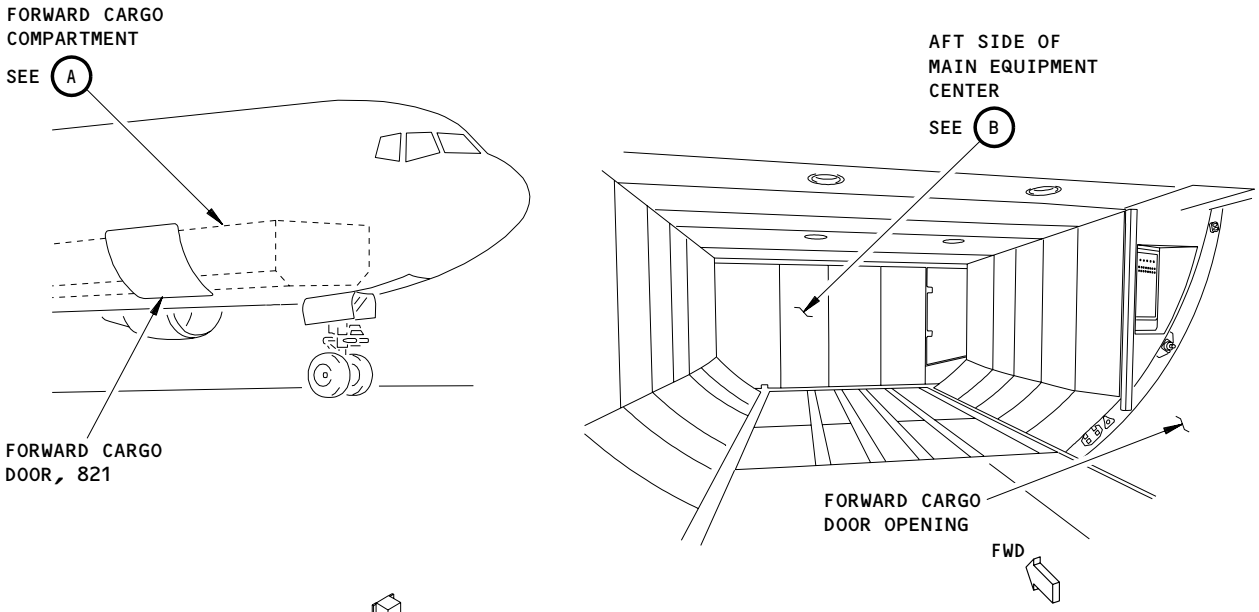
C

NOTE: IT MAY BE NECESSARY TO REMOVE THE FAMV FROM THE AIRPLANE BEFORE TESTING

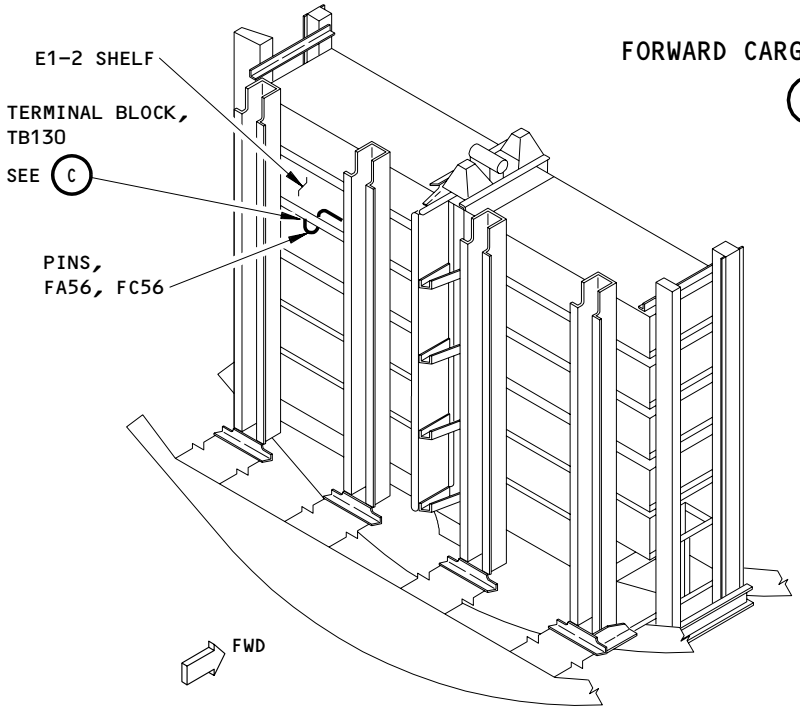
Fan Air Modulating Valve (FAMV)
Figure 505 (Sheet 2)



Fan Air Modulating Valve (FAMV)
Figure 505 (Sheet 3)

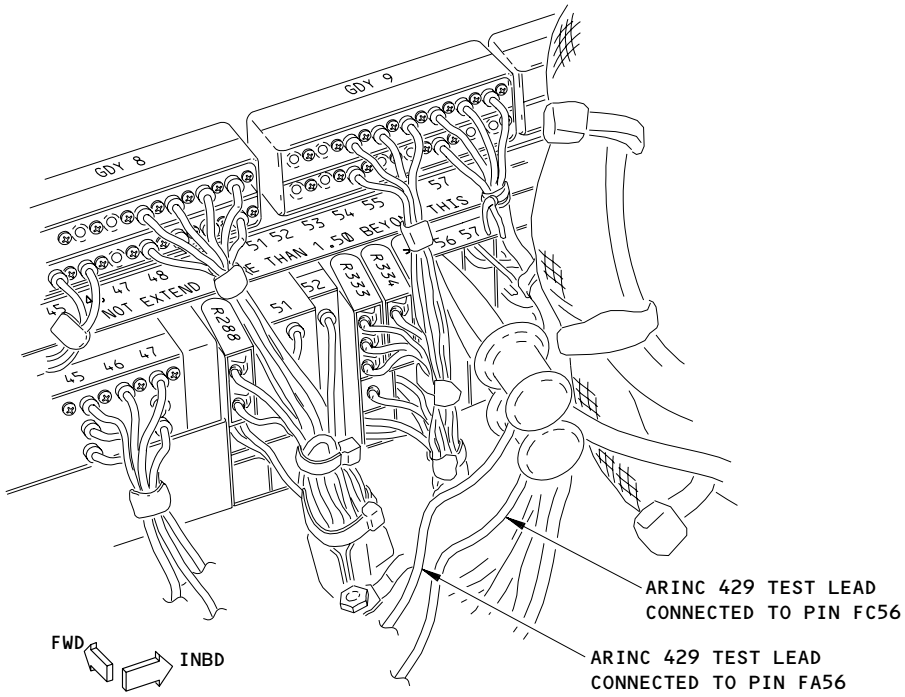


FORWARD CARGO COMPARTMENT
A

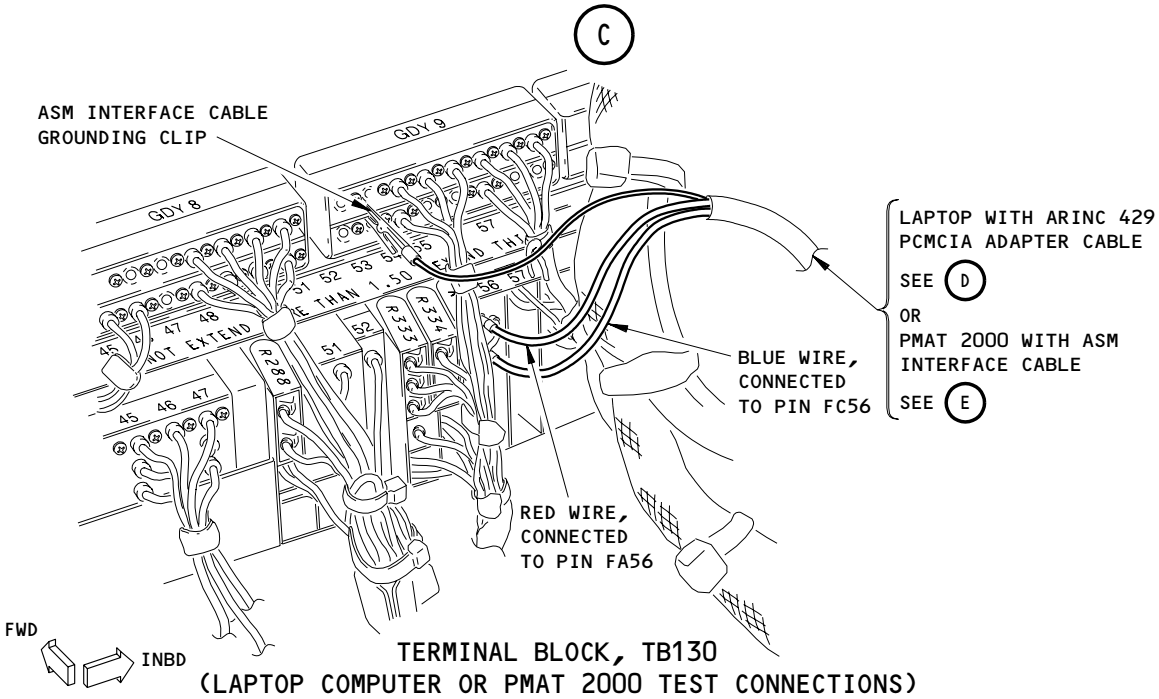


AFT SIDE OF MAIN EQUIPMENT CENTER
(FORWARD WALL OF THE FORWARD CARGO COMPARTMENT IS REMOVED)
B

Air Supply BITE Module Test Points
Figure 506 (Sheet 1)

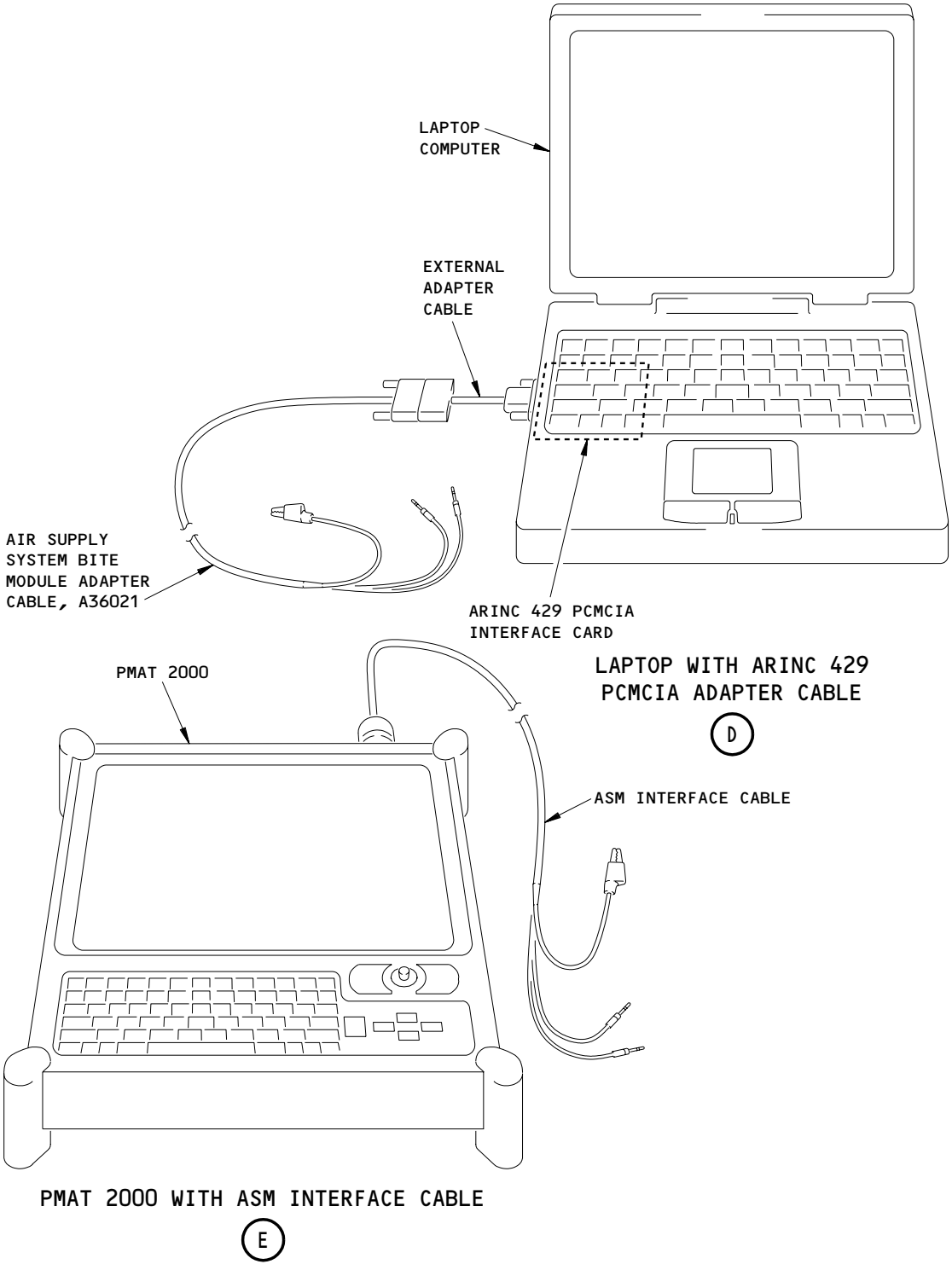


TERMINAL BLOCK, TB130
(ARINC 429 DATA BUS ANALYZER TEST CONNECTIONS)

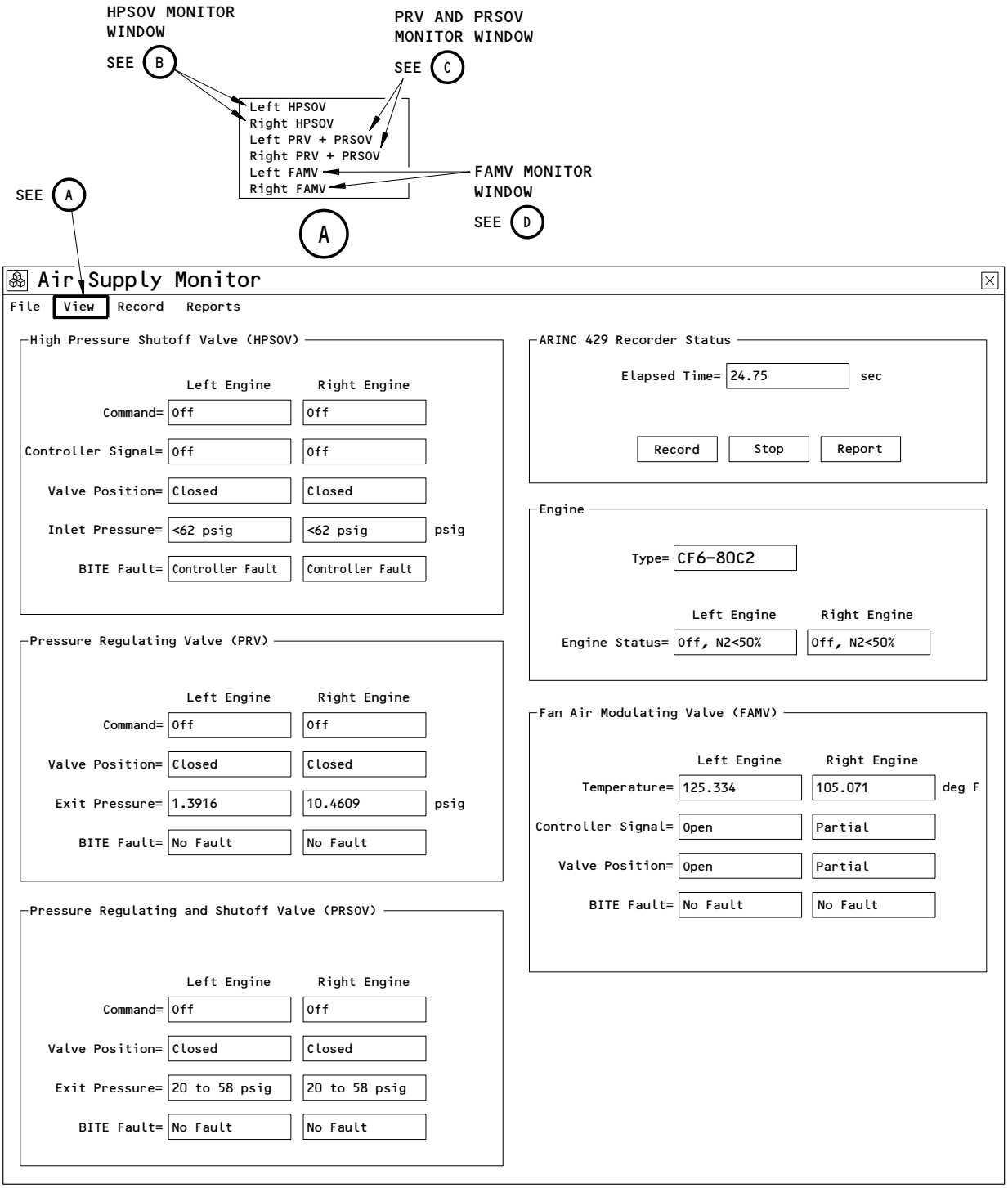


TERMINAL BLOCK, TB130
(LAPTOP COMPUTER OR PMAT 2000 TEST CONNECTIONS)

Air Supply BITE Module Test Points
Figure 506 (Sheet 2)

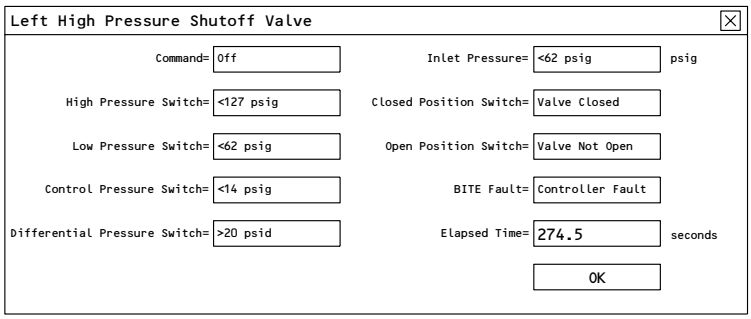


Air Supply BITE Module Test Points
Figure 506 (Sheet 3)



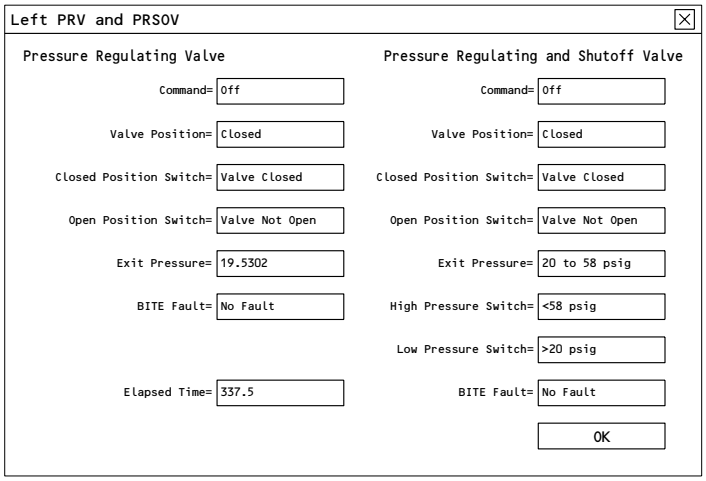
AIR SUPPLY MONITOR APPLICATION DISPLAY

Air Supply Monitor Software Interface
Figure 507 (Sheet 1)



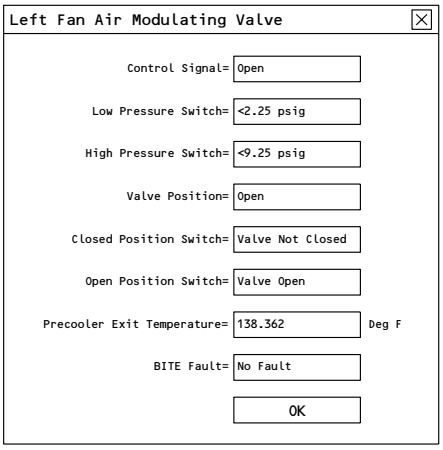
HPSOV MONITOR WINDOW

B



PRV AND PRSOV MONITOR WINDOW

C



FAMV MONITOR WINDOW

D

Air Supply Monitor Software Interface
Figure 507 (Sheet 2)

AIR SUPPLY MONITOR TEST - MAINTENANCE PRACTICES

1. General
   A. To perform the air supply monitor test, the Air Supply BITE Module (ASBM) S210T120-67 or later must be installed (SB 36-29/PRR B11937-1) with ASBM test point wiring installed between the E1-2 and E3-1 shelfs (SB 36-39).
   B. This procedure uses an Air Supply Monitor (ASM) software application and a Portable Maintenance Access Terminal (PMAT) or a laptop computer (PC) with an ARINC 429 PCMCIA databus interface card and an external adapter cable which connects to the ASBM test point wiring on the E1-2 shelf.
   C. The test will check the operation of these pneumatic system components:
      (1) High Pressure Shutoff Valve (HPSOV)
      (2) High Pressure Shutoff Valve Controller (HP controller)
      (3) Pressure Regulating Valve (PRV)
      (4) Pressure Regulating Valve Controller (PRV controller)
      (5) Pressure Regulating and Shutoff Valve (PRSOV)
      (6) Fan Air Modulating Valve (FAMV)
      (7) Fan Air Temperature Sensor (FATS)
      (8) Air Supply Control Card Assembly
      (9) All interface wiring
   D. The Air Supply Monitor software records data from the airplane on the ground while both engines are running and makes a summary of faults and operational data. This information is displayed in real-time while diagnostic tests are automatically performed.
   E. This ground test requires the engines to be operated and can be completed in about 15 minutes. A partial test is possible if the engines are not running. However, sections of the diagnostic test will be excluded from the fault summary report and warning faults can occur if you do not do all of the steps in this procedure.
   F. Nine output files are generated. The fault summary file lists sensor calibration test results and a summary of detected faults. It will list the elapsed time from the start of the recording that a fault was initially detected.
   G. The other output files will list conditions during the test for each valve, controller, or sensor. This data may help isolate specific conditions which resulted in fault detection. These files contain time history data for position, pressure, command, engine on/off, and temperature. Samples are recorded every 2.25 seconds.

H. The file descriptions are as follows:
   (1) Faults.html - A summary of failure and warning messages, and calibration results for sensors and controllers.
   (2) LHpv.txt - Left HPSOV and HPSOV controller position, pressure, command, differential pressure switch, and engine data.
   (3) RHpv.txt - Right HPSOV and HPSOV controller position, pressure, command, differential pressure switch, and engine data.
   (4) LPrv.txt - Left PRV and PRV controller position and pressure data.
   (5) RPrv.txt - Right PRV and PRV controller position and pressure data.
   (6) LFav.txt - Left FAMV and FATS position, pressure, and temperature data.
   (7) RFav.txt - Right FAMV and FATS position, pressure, and temperature data.
   (8) LPrsov.txt - Left PRSOV position and pressure data.
   (9) RPrsov.txt - Right PRSOV position and pressure data.

TASK 36-00-30-702-020

2. Air Supply Monitor Test (Figs. 201-204)

A. General

(1) This procedure requires the use of either a Portable Maintenance Access Terminal (PMAT) or a laptop computer with an ARINC 429 interface card.

B. Equipment

(1) 80000, Portable Maintenance Access Terminal (PMAT) 2000
Demosystems LLC
379 Science Drive
Moorpark, CA 93021
805-529-1800

(a) 80062-2, ASM Interface Cable 25 ft. (Recommended)
Demosystems LLC
379 Science Drive
Moorpark, CA 93021
805-529-1800

(b) 80062-3, ASM Interface Cable 50 ft. (Alternative)
Demosystems LLC
379 Science Drive
Moorpark, CA 93021
805-529-1800

(2) Laptop computer with the following minimum requirements and additional hardware:
- 128 Mb RAM
- Intel PIII CPU, 300 Mhz
- PCMCIA Type III Slot

(a) A36021, Air Supply System BITE Module Adapter Cable

(b) CM429-1/2R1T, ARINC 429 PCMCIA Databus Interface Card with External Adapter Cable
Ballard Technology
3229A Pine Street
Everett, WA 98201
1-800-829-1553

(3) Software

(a) Air Supply Monitor Software CD, P/N D220W116-24(NOSRC)

(b) Ballard Technology Drivers (provided with CM429-1 Card)

(c) MS Windows 98 or MS Windows 2000 Operating System

(d) Internet browser: MS Internet Explorer or Netscape Navigator

C. References

(1) AMM 24-22-00/201, Manual Control

(2) AMM 25-52-01/401, Sidewall Lining

(3) AMM 31-41-00/201, Engine Indication and Crew Alerting Systems

(4) AMM 71-00-00/201, Power Plant-General
(5) AMM 78-31-00/501, Thrust Reverser System-Adjustment/Test
(6) SWPM 20-20-11, Assembly of Burndy Ground Block Modules

D. Access

(1) Location Zone

119	Main Equipment Center
121/122	Forward Cargo Compartment
211/212	Control Cabin
221	Passenger Cabin - Section 41

(2) Access Panels

119AL	Main Equipment Center
221DF	EE Bay Main Deck Access Panel
821	Forward Cargo Door

E. Prepare for the Test

S 012-002
(1) Open the forward cargo door, 821.

S 012-003
(2) Remove the sidewall lining from the forward endwall of the forward cargo compartment to find terminal block 130 on the E1-2 shelf (AMM 25-52-01/401).

S 012-021
(3) Open the EE Bay Main Deck Access Panel, 221DF.

S 012-038
(4) Open the access door for the main equipment center, 119AL.

S 482-004
(5) Do the following steps to set up to monitor the pneumatic system.
(a) If you are using the PMAT, do the following steps:
1) Put the PMAT on the flight deck.
2) Connect the ASM interface cable to the PMAT.
(b) If you are using a laptop computer, do the following steps:
1) Make sure the ARINC 429 interface card is installed in the laptop computer.
2) Put the laptop computer on the flight deck.
3) Connect the air supply system BITE module adapter cable to the external adapter cable from the ARINC 429 interface card.
(c) Put the cable through the EE Bay Main Deck Access Panel opening into the Main Equipment Center.
(d) Put the cable through the E1-2 shelf near terminal block TB130.

(e) Connect the ground wire (alligator clip) of the cable to any Burndy ground block.
(f) Connect the red wire of the cable to pin FA56 of terminal block TB130 (WDM 36-23-21).
(g) Connect the blue wire of the cable to pin FC56 of terminal block TB130 (WDM 36-23-21).

S 862-028
(6) Supply electrical power (AMM 24-22-00/201).

S 862-022
(7) Push the APU valve switchlight on P5 bleed air supply panel to close the valve.
(a) Make sure the white flowbar does not show and amber VALVE light comes on and goes off.

S 862-023
(8) Push the C ISLN valve switchlight on the P5 bleed air supply panel to open the valve.
(a) Make sure the white flowbar shows and the amber VALVE light comes on and goes off.

S 862-024
(9) Push the L and R ISLN valve switchlights on the P5 bleed air supply panel to close the valves.
(a) Make sure the white flowbar does not show and the amber VALVE light comes on then goes off.

S 862-025
(10) Push the L and R ENG switchlights on the P5 bleed air supply panel to open the valve.
(a) Make sure the white flowbars show and the OFF lights come on.

S 862-026
(11) Make sure the L and R manifold duct pressure is 0 psi on the P5 bleed air supply panel duct pressure indicator.

S 862-045

(12) Make sure that the WING ANTI-ICE switch and the ENGINE ANTI-ICE switch are in the OFF position.

S 972-027

(13) Supply power to the PMAT or laptop.

S 972-040

(14) Start the Air Supply Monitor software application.

F. Air Supply Monitor Test

S 972-013

(1) Do the following steps to record data with the engines off.

(a) Select "Record" from the Air Supply Monitor display.

NOTE: After pressing the Record button, it may take several seconds for the data to display. If the data does not display within 1 minute, exit the Air Supply Monitor application. Make sure that the cable is attached correctly.

(b) Record data for one minute.

NOTE: This will satisfy the zero pressure tests in the software.

S 862-035

(2) Do the following steps to start the engines while recording data.

(a) Push the L and R ISLN switchlights on the P5 bleed air supply panel to open the valves.

1) Make sure the white flowbar shows and the amber VALVE light comes on then goes off.

(b) Start the left and right engines (AMM 71-00-00/201).

S 862-007

(3) Do the following steps to operate both engines at minimum idle with the bleed switches on while recording data.

(a) Put the throttle lever for both engines in the idle position.

(b) Push the L and R ISLN switchlights on the P5 bleed air supply panel to close the valves.

1) Make sure the white flowbars do not show and the amber VALVE lights come on then go off.

(c) Make sure C ISLN valve is open.

1) Make sure the white flowbar shows and the amber VALVE light is off.

(d) Put the L and R PACK selectors, on the pilots'overhead panel P5, to AUTO.

(e) Make sure ground pneumatic power is removed (AMM 36-00-00/201).

(f) Make sure APU pneumatic power is removed on the P5 bleed air supply panel.
1) Make sure the APU valve indicator white flowbar does not show and amber VALVE light is off.
(g) Make sure the L and R BLEED OFF EICAS messages do not show (AMM 31-41-00/201).
(h) Make sure the P5 bleed air supply panel duct pressure indicator is 34 +/-5 psi.
(i) Make sure the P5 bleed air supply panel L and R ENG switchlights do not show OFF.
(j) Record data for one minute.

S 972-031
(4) Do the following steps to operate both engines at minimum idle with the bleed switches off while recording data.
(a) Push the L and R ENG switchlights on the P5 bleed air supply panel to close the valves.
1) Make sure the white flowbar does not show and the OFF light comes on.
(b) Record data for one minute.

S 972-033
(5) Do the following steps to record data for intermediate/high stage switchover and PRV regulation.
(a) Push the L and R ENG switchlights on the P5 bleed air supply panel to the open the valves.
1) Make sure the white flowbar shows and the OFF light goes off.
(b) Make sure both engines are at minimum idle.
(c) Make sure the L and R ISLN valves are closed on the P5 bleed air supply panel.
(d) Make sure the C ISLN valve shows open on the P5 bleed air supply panel.
(e) Make sure APU pneumatic power is removed on the P5 bleed air supply panel.
(f) Make sure the L and R PACK selectors are in AUTO on the pilots'overhead panel P5.
(g) Slowly increase the L engine speed until the L HPSOV shows CLOSED on the Air Supply Monitor display and hold this condition for a minimum of 10 seconds.

NOTE: N2 should be approximately 80-86% when switchover from high to intermediate stage occurs (FADEC only: PS3 should be approximately 118-125 psig).

(h) Increase the L engine speed until the L PRV shows PARTIAL on the Air Supply Monitor display and hold this condition for a minimum of 10 seconds.

NOTE: The PRV Exit Pressure should be regulating to 92-102 psig for CF6-80C2 engines and 59-69 psig for PW4000 engines.

(i) Decrease L engine speed to minimum idle.

NOTE: Switchover from intermediate to high stage should occur around N2 of 78-82% (FADEC only: PS3 should be approximately 110-115 psig).

(j) Slowly increase the R engine speed until the R HPSOV shows CLOSED on the Air Supply Monitor display and hold this condition for a minimum of 10 seconds.

NOTE: N2 should be approximately 80-86% when switchover from high to intermediate stage occurs (FADEC only: PS3 should be approximately 118-125 psig).

(k) Increase the R engine speed until the R PRV shows PARTIAL on the Air Supply Monitor display and hold this condition for a minimum of 10 seconds.

NOTE: The PRV Exit Pressure should be regulating to 92-102 psig for CF6-80C2 engines and 59-69 psig for PW4000 engines.

NOTE: For CF6-80C2 engines, the PRV should be regulating when N2 is between 80.8% and 83.4% on a standard day and when N2 is between 85.7% and 88.5% on a hot day (when N1 is between 44.5% and 50.2% on a standard day and when N1 is between 47.6% and 53.6% on hot day).

(l) Decrease R engine speed to minimum idle.

NOTE: Switchover from intermediate to high stage should occur around N2 of 78-82% (FADEC only: PS3 of 110-115 psig.

S 972-014

(6) Do the following steps to stop recording and to save the data.
  (a) Select "Stop" on the Air Supply Monitor display.
  (b) Select "File/Save File" from the main menu.
  (c) Select a folder.

    NOTE: A common folder, such as "C:/Air Supply Monitor Data", is recommended. The default folder in Windows 2000 is "C:/Documents and Settings/username/My Documents". This folder is different for each user and may be password protected.

  (d) Select a filename and select "Save".

    NOTE: The recommended format for the filename is LNtttxx (ttt=airplane tail number or line number) (x=test number). The file extension ".dat" will be added to the filename (for example, LN8701.dat would be Line Number 870, Test 1).

S 972-036

(7) Do the following steps to save the reports.
  (a) Select "Reports/Save all Reports" from the main menu or select "Reports" from the main display.
  (b) Choose a filename for the report.

    NOTE: It is recommended that the report filename contain the same filename as the data file and be saved in the same folder.

  (c) Select "Save" to save the reports.

S 862-037

(8) Do the following steps to shut down the engines.
  (a) Put the L and R PACK selectors, on the pilots'overhead panel P5, to OFF.

(b) Push the L and R ENG switchlights on the P5 bleed air supply panel to close the valves.
1) Make sure the white flowbar does not show and the OFF light comes on.
(c) Stop the left and right engines (AMM 71-00-00/201).
(d) Make sure the L and R manifold duct pressure is <5 psi on the P5 bleed air supply panel duct pressure indicator.
(e) Make sure the P5 bleed air supply panel L and R ENG switchlights show ON.
(f) Make sure the L and R BLEED OFF EICAS messages show (AMM 31-41-00/201).

S 212-015
(9) Do the following steps to review the report summary.

NOTE: All reports have been saved and can be reviewed at a later time.

(a) Open the filename "LNtttx_fault.htm" and check for faults.

NOTE: If a fault was found, click on the fault in the report and a troubleshooting guide will open.

G. Put the airplane back to its usual condition

S 012-016
(1) Do the following steps to remove the pneumatic system monitoring equipment.
(a) Exit the Air Supply Monitor software application.
(b) Remove power from the PMAT or laptop computer.
(c) Remove the ASM interface cable or adapter cable from pins FA56 and FC56 at terminal block TB130 (WDM 36-23-21).

NOTE: To release the ASM interface cable wires or adapter cable wires from the terminal block, a contact removal tool can be used to disengage the lock spring that holds the contact in position (SWPM 20-20-11).

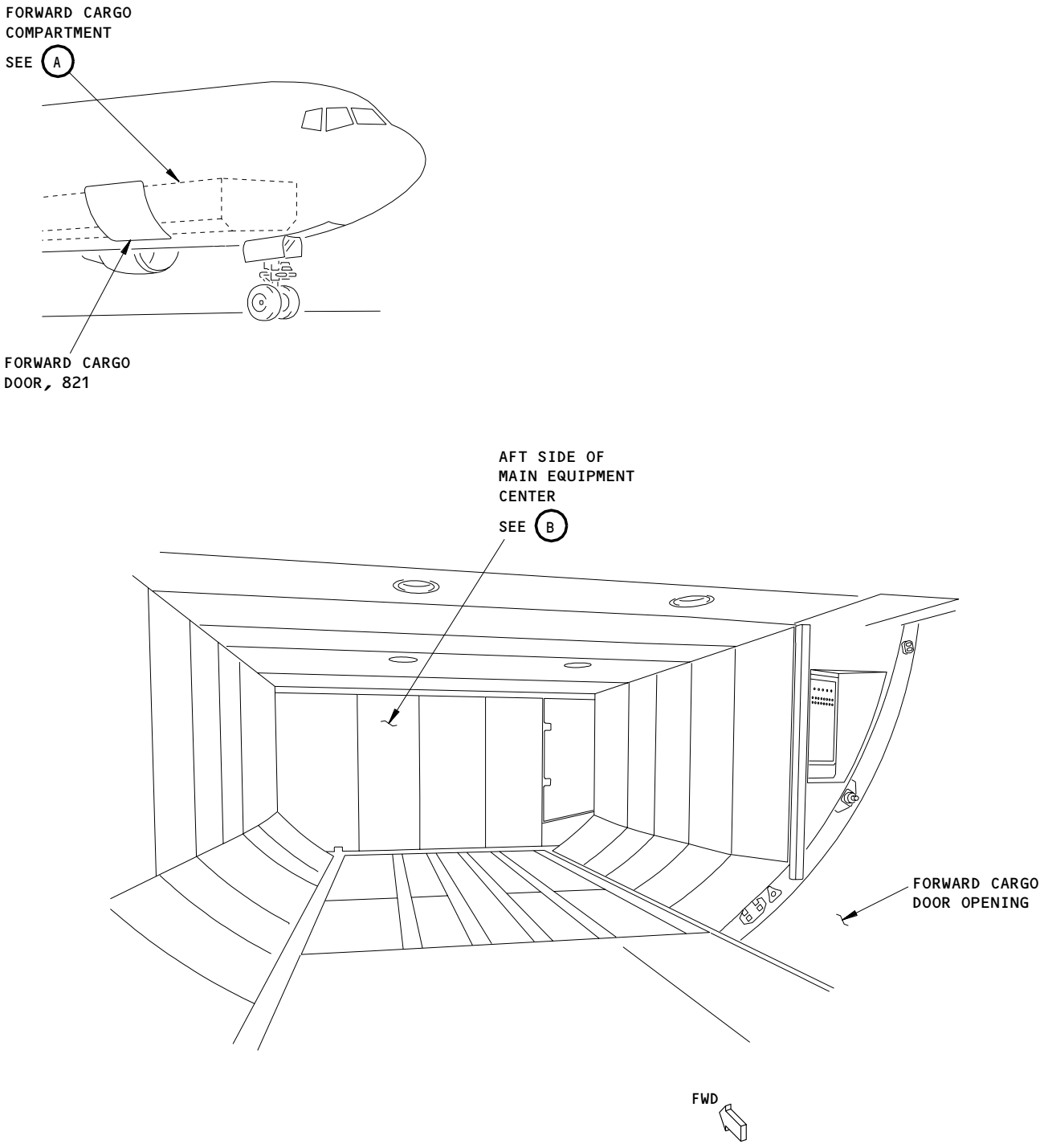
S 412-017
(2) Install the sidewall lining in the forward cargo compartment (AMM 25-52-01/401).

S 412-018
(3) Close the forward cargo door, 821.

S 412-039
(4) Close the access door for the main equipment center, 119AL.

S 412-041
(5) Close the EE Bay Main Deck Access Panel, 221DF.

S 862-019
(6) Remove electrical power,if it is not necessary (AMM 24-22-00/201).

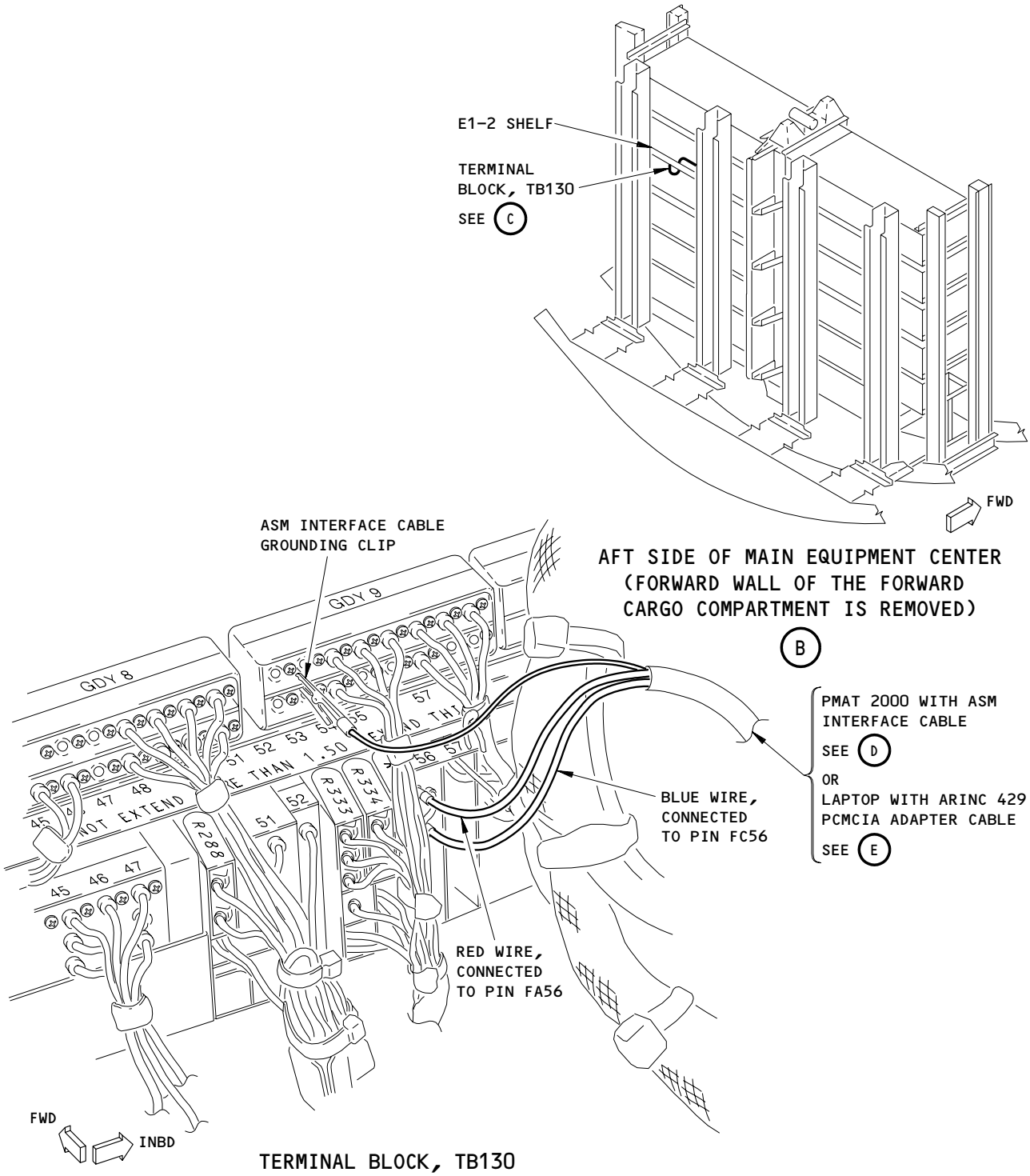


FORWARD CARGO COMPARTMENT

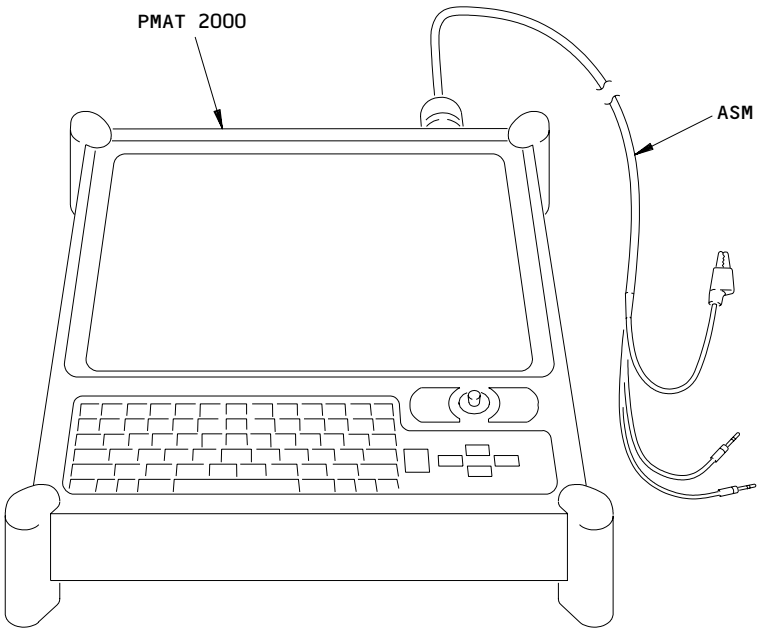
A

Pneumatic Air Supply Monitor Setup
Figure 201 (Sheet 1)

N74338

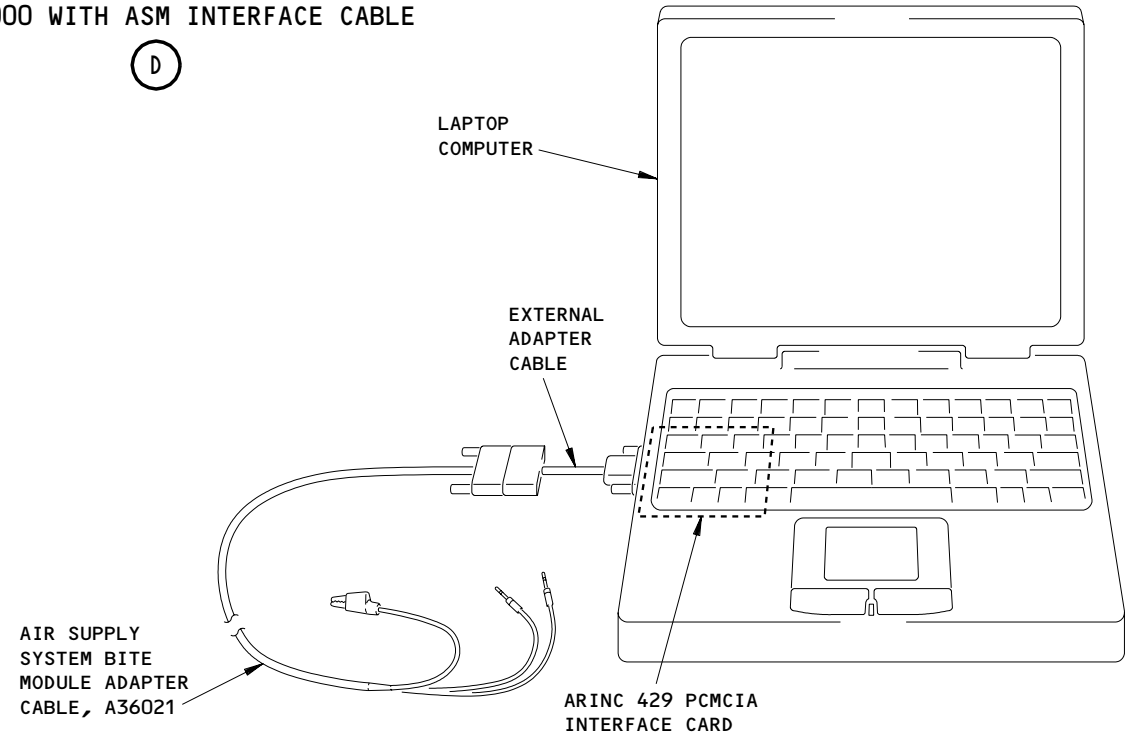


Pneumatic Air Supply Monitor Setup
Figure 201 (Sheet 2)



PMAT 2000 WITH ASM INTERFACE CABLE

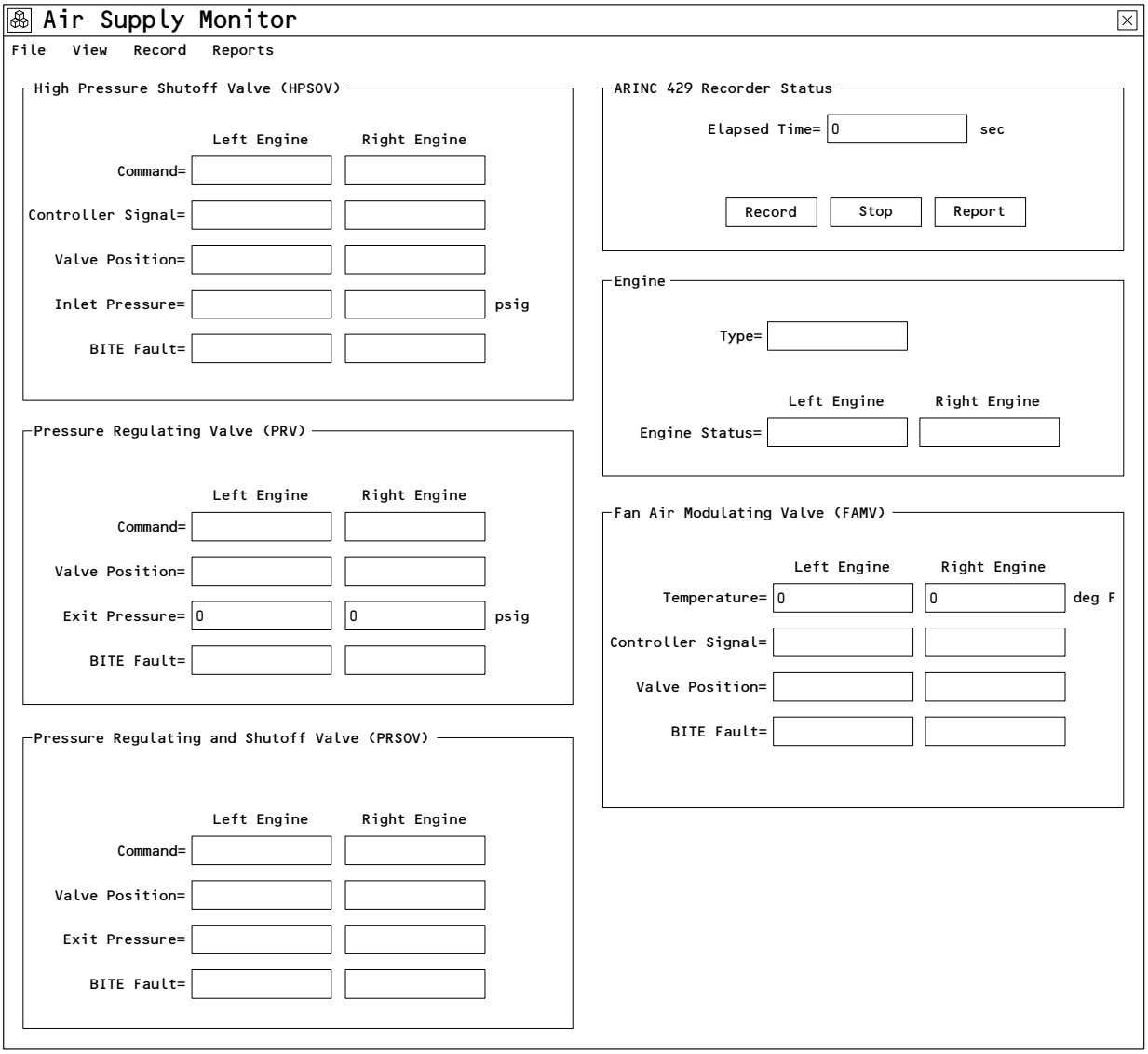
(D)



LAPTOP WITH ARINC 429
PCMCIA ADAPTER CABLE

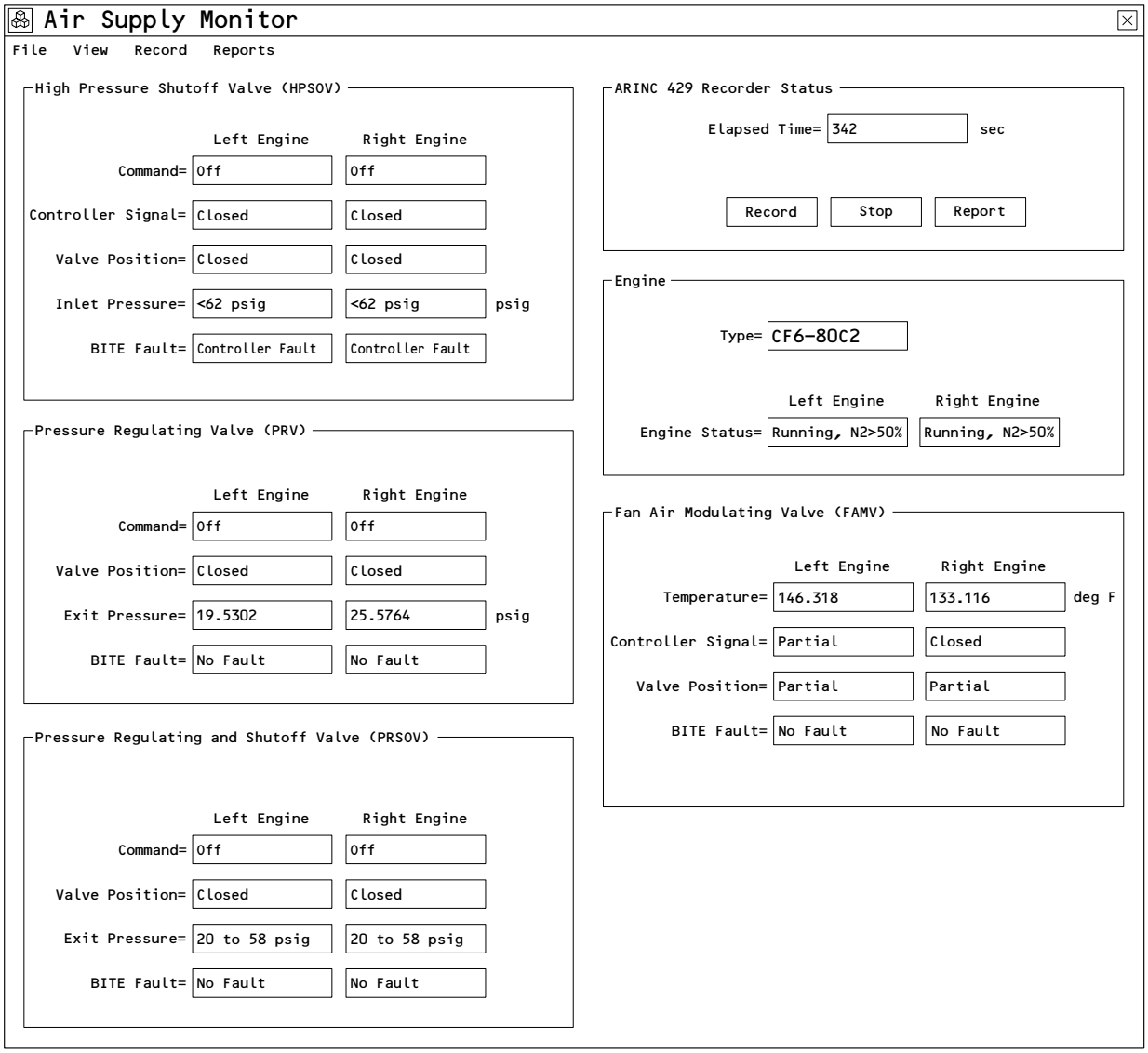
(E)

Pneumatic Air Supply Monitor Setup
Figure 201 (Sheet 3)



AIR SUPPLY MONITOR APPLICATION DISPLAY
(NO DATA)

Air Supply Monitor Software Interface
Figure 202 (Sheet 1)

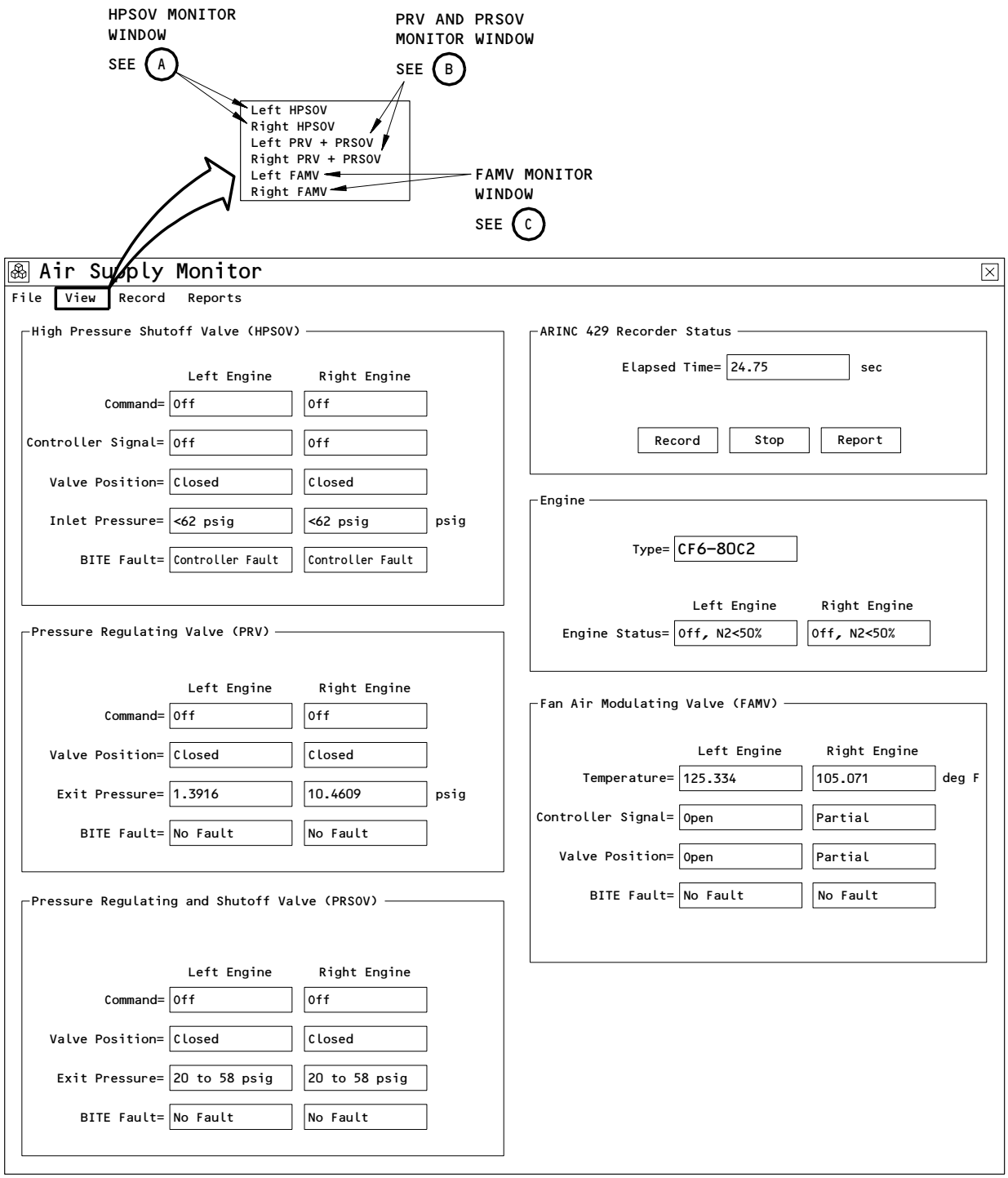


AIR SUPPLY MONITOR APPLICATION DISPLAY
(WITH DATA)

Air Supply Monitor Software Interface
Figure 202 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH GE CF6-80C2 OR PW 4000;
AIRPLANES WITH S210T120-67 ASBM OR LATER
(POST-SB 36-29/PRR B11937-1) AND WITH
ASBM TEST POINT WIRING (POST-SB 36-39)

N75554

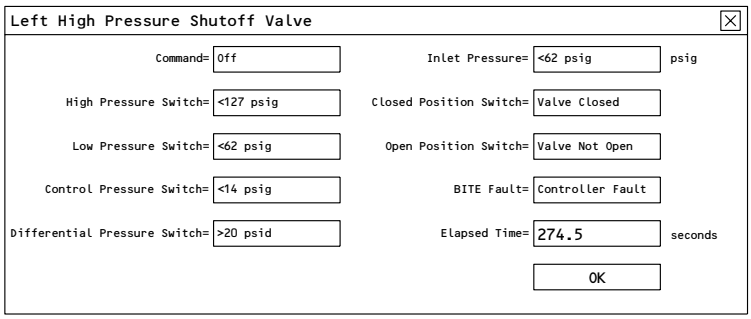


AIR SUPPLY MONITOR APPLICATION DISPLAY

Air Supply Monitor Software Interface
Figure 202 (Sheet 3)

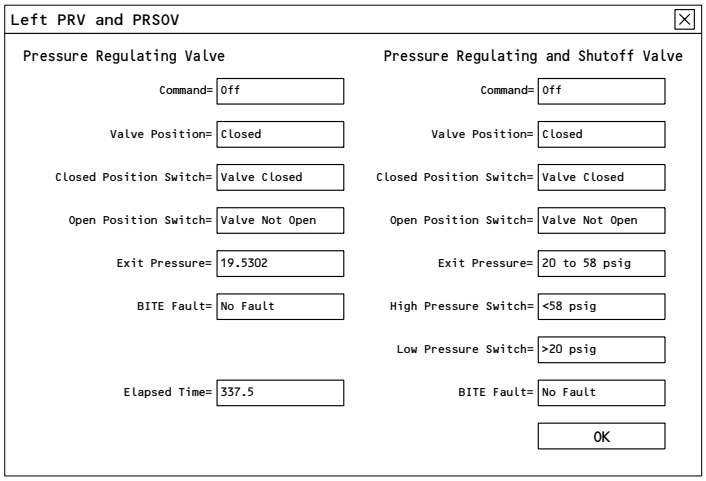
EFFECTIVITY
AIRPLANES WITH GE CF6-80C2 OR PW 4000;
AIRPLANES WITH S210T120-67 ASBM OR LATER
(POST-SB 36-29/PRR B11937-1) AND WITH
ASBM TEST POINT WIRING (POST-SB 36-39)

N75560



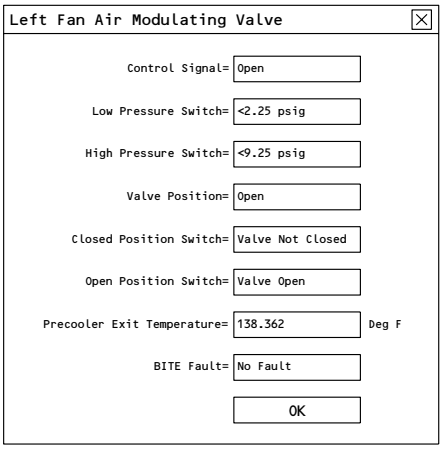
HPSOV MONITOR WINDOW

A



PRV AND PRSOV MONITOR WINDOW

B



FAMV MONITOR WINDOW

C

Air Supply Monitor Software Interface
Figure 202 (Sheet 4)

FAILURE
DEFINITION
LINK
SEE (A)

767 Air Supply System Fault Summary

Test Condition

Filename: 360 eng run_Faults_Faults.htm
Engine Type: CF6-80C

Left System Fault Summary

Failure, The Left FATS does not command the FAMV closed
Message initially set at time = 1162.56, Count = 519

Right System Fault Summary

Failure, Right Pressure Sensor output is high
Message initially set at time = 58.24, Count = 26

Failure, The Right FAMV does not close when commanded
Message initially set at time = 1113.28, Count = 497

Analog Sensor Calibration Information

Sensor	Samples	Minimum	Average	Maximum
Left Intermediate Stage Pressure at Switchover	15	34.6457 psig		
Left PRV Pressure Sensor Zero Pressure Calibration Test	50	-0.6238 psig	-0.11995 psig	0.3839 psig
Left PRV Control Pressure Calibration Test	0	0 psig	0 psig	0 spig
Left PC Exit Temperature Sensor Zero Calibration Test	24	120.202 deg F	121.699 deg F	125.334 deg F
Left FAMV Control Temperature	44	283.162 deg F	320.619 deg F	351.042 deg F
Left PRSOV Control Pressure (Inlet Pressure when valve starts to regulate)	31	25.5764 psig		
Right Intermediate Stage Pressure at Switchover	2	33.638 psig		
Right PRV Pressure Sensor Zero Pressure Calibration Test	50	-0.6238 psig	3.50777 psig	7.4378 psig
Right PRV Control Pressure Calibration Test	0	0 psig	0 psig	0 psig
Right PC Exit Temperature Sensor Zero Calibration Test	24	102.587 deg F	103.622 deg F	105.071 deg F
Right FAMV Control Temperature	36	350.156 deg F	366.406 deg F	389.317 deg F
Right PRSOV Control Pressure (Inlet Pressure when valve starts to regulate)	10	34.6457 psig		

Air Supply Monitor Software Fault Reporting
(Using Internet Browser Window)
Figure 203 (Sheet 1)

Fault: Failure, Left (or Right) FATS does not command the FAMV closed

Description

Precooler exit temperature is less than 340 deg F and the FAMV is not commanded closed by the Fan Air Temperature Sensor. Fault detection will only occur when the engine is running and the PRSOV inlet pressure is greater than 12 psig.

Flight Deck Effect

High fuel consumption
Degraded Cowl and Wing Anti-Ice Protection

BITE Module Fault

FATS - BITE Step Test

Possible Causes

FATS supply or control tube leak.

FATS calibration error or internal leak.

FAILURE DEFINITION PAGE

(A)

Air Supply Monitor Software Fault Reporting
(Using Internet Browser Window)
Figure 203 (Sheet 2)

Left HPSOV and HPC data

ARINC429 Data Filename: 360 eng run_LHpv.txt

Time (sec)	Commanded Position	Valve Position	Inlet Pressure	HPC Command	DPS	Eng
0.00	Closed	Closed	<62	No Pres	<20	Off
177.75	Closed	Closed	<62	Closed	>20	On
639.00	Closed	Closed	62 to 127	Closed	>20	On
641.25	Closed	Closed	>127	Closed	>20	On
643.50	Closed	Closed	62 to 127	Closed	>20	On
645.75	Closed	Closed	<62	Closed	>20	On
670.50	Closed	Closed	62 to 1270	Closed	>20	On
675.00	Closed	Closed	>127	Closed	>20	On
715.50	Closed	Closed	62 to 1270	Closed	>20	On
722.25	Closed	Closed	<62	Closed	>20	On
774.00	Closed	Closed	62 to 127	Closed	>20	On
803.25	Closed	Closed	<62	Closed	>20	On
819.00	Closed	Closed	>127	Closed	>20	On
821.25	Closed	Closed	62 to 127	Closed	>20	On
857.25	Closed	Closed	<62	Closed	>20	On
868.50	Closed	Closed	62 to 127	Closed	>20	On
913.50	Closed	Closed	<62	Closed	>20	On
996.75	Closed	Closed	62 to 127	Closed	>20	On
1003.50	Closed	Closed	>127	Closed	>20	On
1075.50	Closed	Closed	62 to 127	Closed	>20	On
1080.00	Closed	Closed	<62	Closed	>20	On
1104.75	Enabled	Open	<62	Open	<20	On
1138.50	Enabled	Open	62 to 127	Open	<20	On
1145.25	Enabled	Partial	62 to 127	Open	>20	On
1147.50	Enabled	Closed	62 to 127	Closed	>20	On
1152.00	Enabled	Closed	>127	Closed	>20	On
1154.25	Enabled	Closed	62 to 127	Closed	>20	On
1183.50	Enabled	Closed	62 to 127	Open	>20	On
1185.75	Enabled	Open	62 to 127	Open	<20	On
1188.00	Enabled	Open	<62	Open	<20	On
1235.25	Enabled	Partial	<62	Closed	>20	On
1237.50	Closed	Closed	<62	Closed	>20	On
1323.00	Closed	Closed	<62	No Pres	<20	On
1327.50	Closed	Closed	<62	No Pres	<20	Off

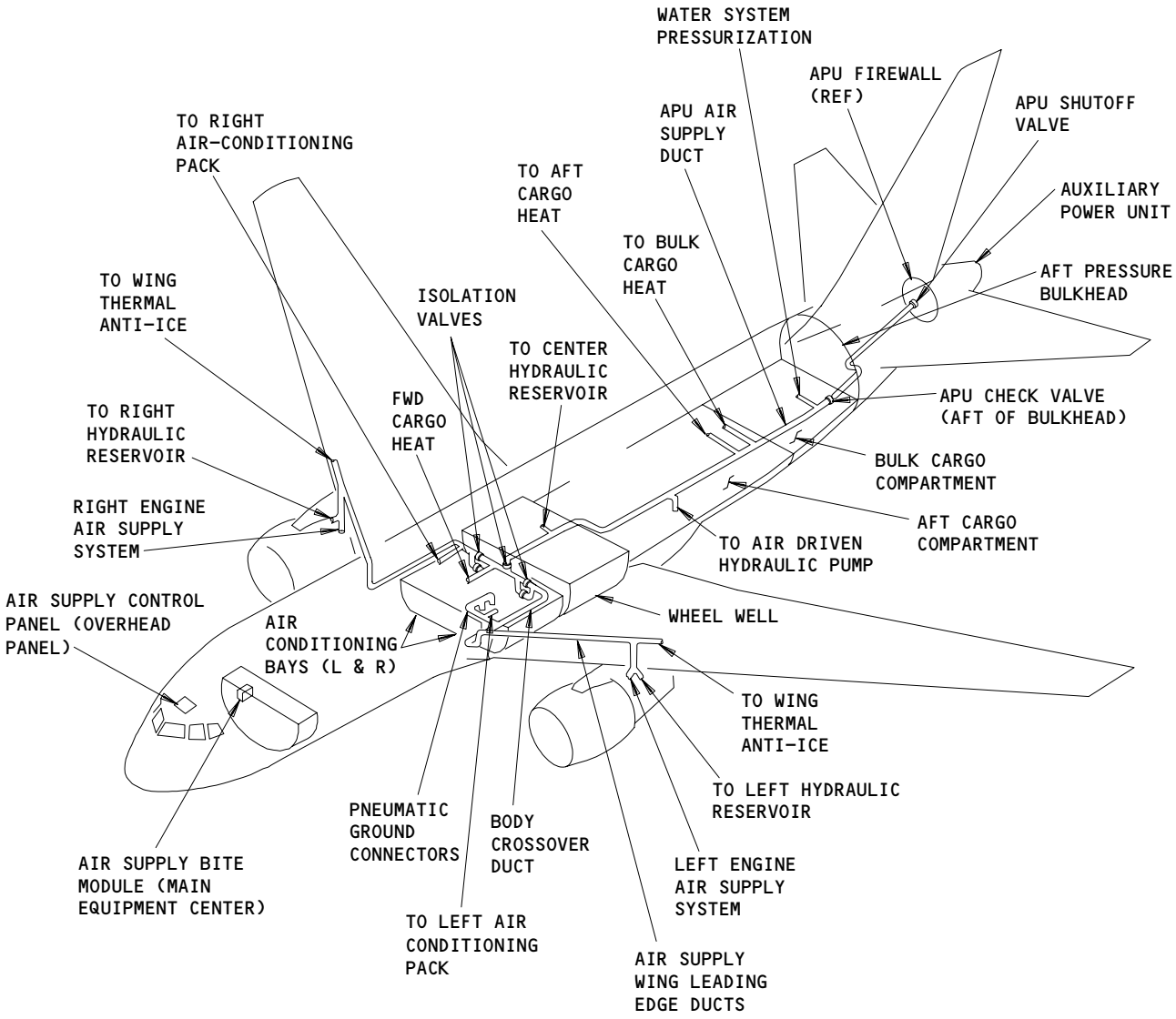
LEFT HPSOV DATA
(REF)

NOTE: A TIME HISTORY DATA TEXT FILE IS RECORDED FOR THE LEFT AND RIGHT HPSOV, PRSOV, PRV, AND FAMV.

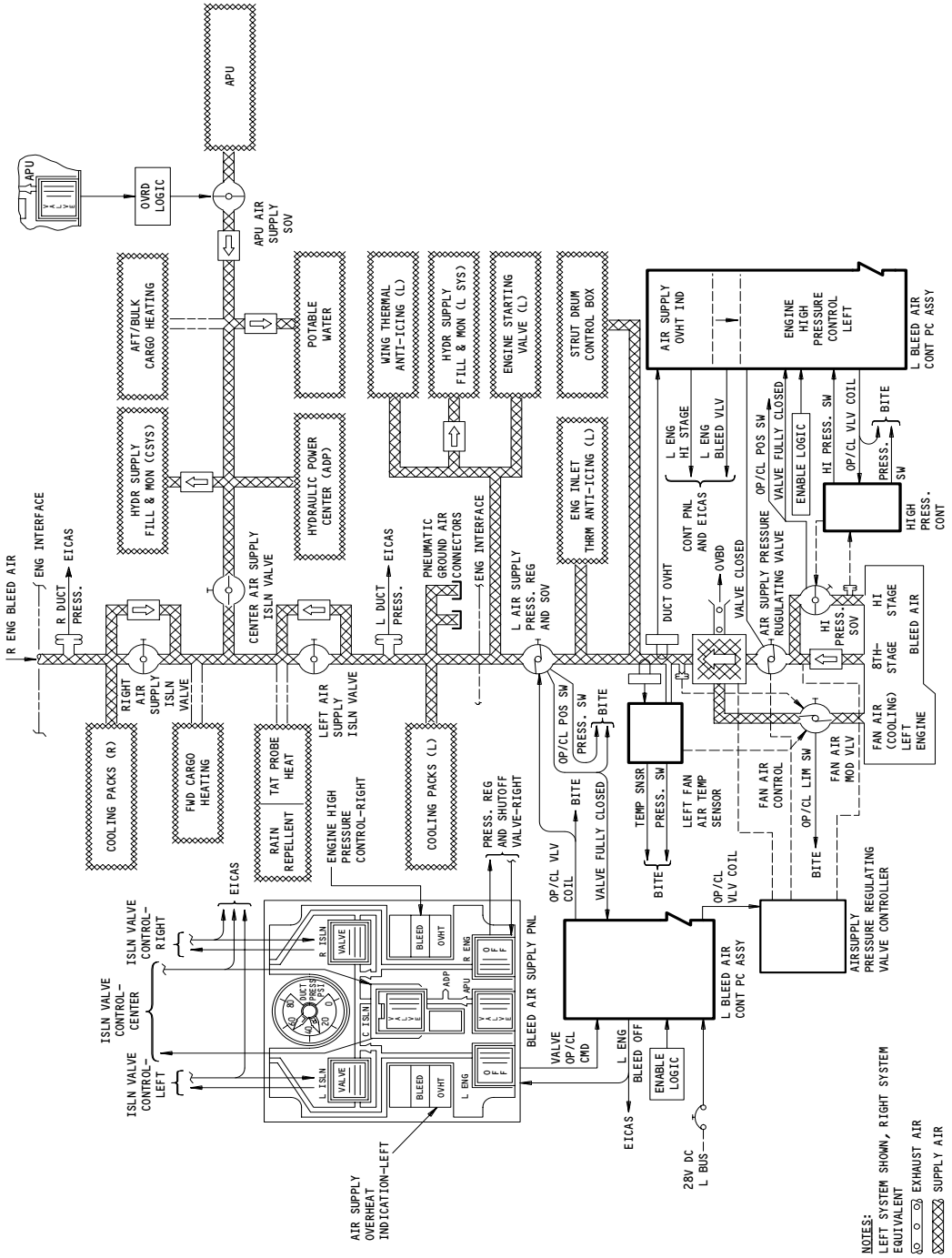
Air Supply Monitor Software Time History Data
Figure 204

AIR SUPPLY DISTRIBUTION SYSTEM - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. The air supply distribution system controls the temperature and pressure of supply air from the engines. It also moves supply air from the pneumatic sources (engines, auxiliary power unit, and ground air connectors) to the the systems that use the air in the airplane.
   B. Pneumatic Air Sources
      (1) The primary source of air for the pneumatic system is air from the engine compressors. Air is removed from the left and right engines at intermediate and high stage compressor section connections.
      (2) Two other sources are the auxiliary-power unit (APU) and ground air supplied to the airplane through its ground-air connectors. The APU supplies compressed air to the airplane systems on the ground or as a secondary source in flight. The ground-air-supply connectors supply compressed air to the airplane systems from a ground pneumatic cart. The ground connectors are on the bottom left side of the fuselage. They connect to the air-supply-body-crossover duct.
   C. Pneumatic Air Requirements
      (1) The pneumatic system supplies air for these airplane systems:
         (a) Airplane pressurization and air conditioning
         (b) Wing leading edge and engine-cowl-thermal-anti-ice protection
         (c) Forward and aft cargo area heat systems
         (d) Windshield-rain repellent system for pressurization
         (e) Air-driven-hydraulic-pump operation and reservoir pressurization
         (f) Potable-water tank pressurization
         (g) Total-air-temperature-probe heat.
   D. Air Supply Distribution
      (1) The air-supply-distribution ducts move supply air to the airplane systems that use the air. Engine ducts , pressure, and temperature control components, provide pressure and temperature controled air from the engine to the main supply ducts.
   E. Air Supply Control
      (1) Switch/lights on the pilots'-overhead panel P5 control the APU shutoff valve, isolation valves (left, right, and center) and engine-air-control valves. The air-supply-control card supplies power and logic circuitry for control of engine-air-control valves.
   F. Engine Air Supply System (Fig. 2)
      (1) Each engine-air-supply system includes these components:
         (a) Pneumatic ducts
         (b) Intermediate-pressure-check valve
         (c) High-pressure-shutoff valve (HPSOV)
         (d) High-pressure-shutoff-valve controller (HPC)
         (e) Pressure-regulating valve (PRV)



Air Supply Distribution System
Figure 1 (Sheet 1)



Air Supply Distribution Schematic
Figure 1 (Sheet 2)

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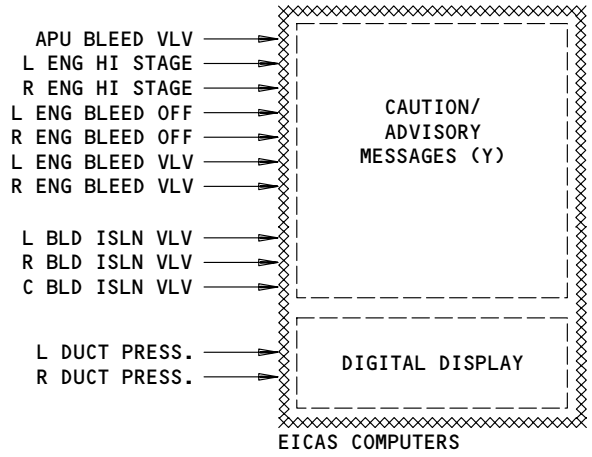
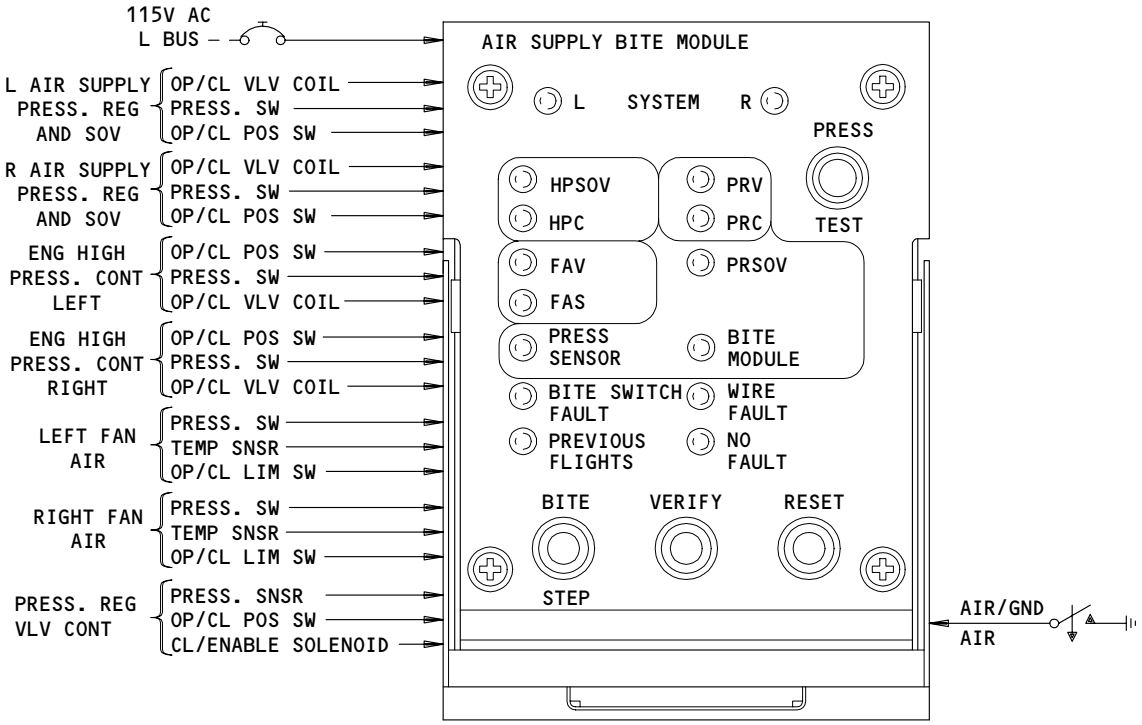
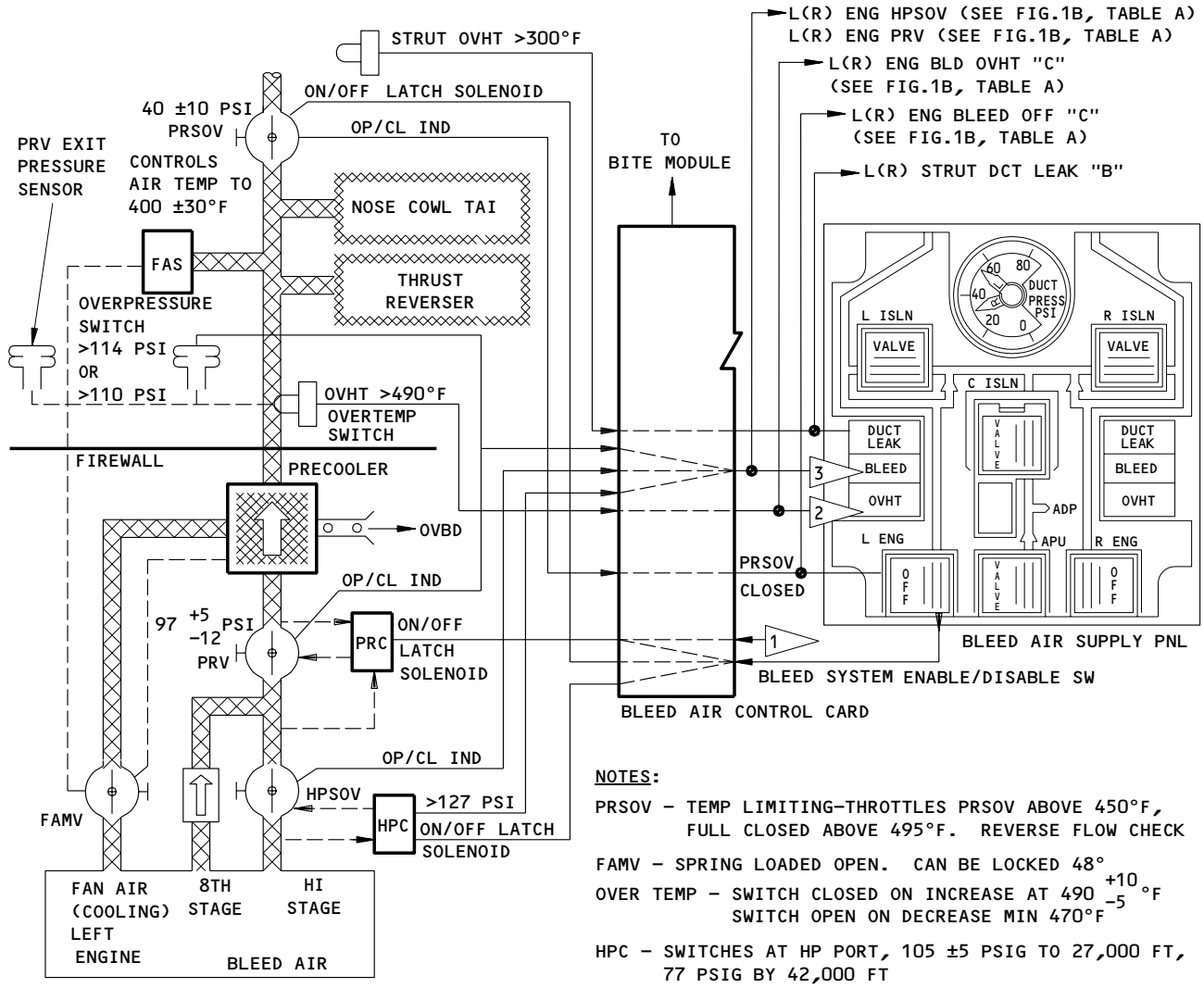




AIR SUPPLY BITE MODULE

Air Supply Distribution Schematic
Figure 1 (Sheet 3)



NOTES:

PRSOV – TEMP LIMITING–THROTTLES PRSOV ABOVE 450°F, FULL CLOSED ABOVE 495°F. REVERSE FLOW CHECK

FAMV – SPRING LOADED OPEN. CAN BE LOCKED 48°

OVER TEMP – SWITCH CLOSED ON INCREASE AT 490 $^{+10}_{-5}$ °F
SWITCH OPEN ON DECREASE MIN 470°F

HPC – SWITCHES AT HP PORT, 105 ±5 PSIG TO 27,000 FT, 77 PSIG BY 42,000 FT

1 THE NOSE COWL TAI SYSTEM CAN ENABLE THE PRV CONTROLLER (PRC)

2 PRECOOLER OUT TEMP >490°F

3 PRV OR HPSOV OPEN WHEN COMMANDED CLOSED OR PRESSURE >127 PSI

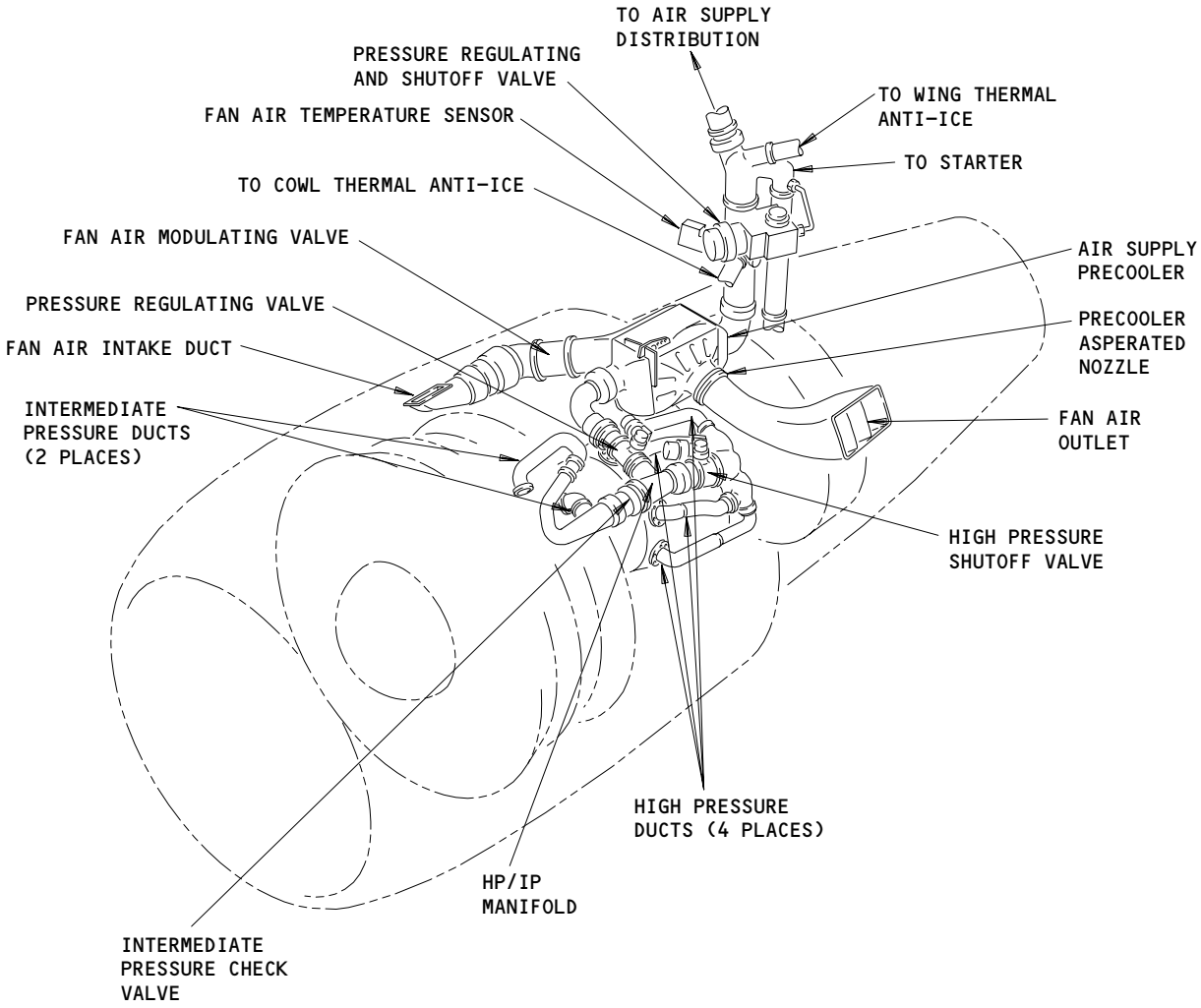
Pneumatic System Operation
Figure 1A

MESSAGE	LEVEL	LIGHT	DESCRIPTION	AFFECTED LRU
L(R) ENG BLD OVHT	C	OVHT	OVERHEAT CONDITION (>490°F) PRV IS CLOSED	FAS, FAMV, OVER-TEMP SW, PRECOOL
L(R) ENG BLEED OFF	C	"OFF" ILLUM	PRSOV IS CLOSED WITH THE ENGINE RUNNING (MESSAGE NOT SHOWN IF ENGINE IS NOT RUNNING)	PRSOV, PRV, PRC, HPSOV, HPC, SENSE LINES
L(R) ENG HPSOV	B 1 C,S,M 2	BLEED	HPSOV IS NOT CLOSED WHEN IT HAS BEEN COMMANDED CLOSED	HPSOV, HPC
L(R) ENG PRV	B 1 C,S,M 2	BLEED	PRV IS NOT CLOSED WHEN IT HAS BEEN COMMANDED CLOSED OR A PRV FAILURE RESULTING IN AN OVERPRESSURE CONDITION	PRV, PRC, OVERPRESS SW
NONE	NA	NONE	"OFF" NOT ILLUMINATED	HPSOV, (PANEL BULB)
NONE	NA	NONE	LOW DUCT PRESSURE	HPSOV, HPC, PRSOV, SENSE LINES
NONE	NA	NONE	FLUCTUATING DUCT PRESSURE	PRSOV, SENSE LINE

EICAS MESSAGE/FLIGHT DECK INDICATIONS
TABLE A

1 AIRPLANES WITH EICAS-005 SOFTWARE OR LESS.
2 AIRPLANES WITH EICAS-006 SOFTWARE OR LATER.

EICAS Message/Flight Deck Indications
Figure 1B



Engine Air Supply System
Figure 2

(f) Pressure-regulating-valve controller (PRVC)
(g) Air-supply precooler
(h) Fan-air-modulating valve
(i) Fan-air-temperature sensor
(j) Pressure-regulating-and-shutoff valve (PRSOV)
(k) A printed circuit card to give electrical power and control logic.

(2) The engine-air-supply system controls the pressure, temperature and flow of engine bleed air. Air is removed from the engine at three 15th-stage-bleed connections and at two 8th-stage-bleed connections.

(3) At low engine power levels, the 15th-stage-engine compressors supply engine bleed air. At high power levels, 8th stage engine (120 psi) bleed air is used. At low power levels, when air is bled off the 15th stage connections, the intermediate-pressure-check valve keeps air out of the 8th-stage-engine connections. When engine high stage pressure increases to 105±5 psi, the HPC closes the HPSOV.

(4) Eight stage air then passes through the check valve and supplies necessary air. Eighth stage and 15th stage air moves to the HP/IP manifold. The HP/IP manifold takes air from The 15th and the 8th stage ducts and sends it out in one duct. This duct will let air move through the ducts to the PRV which keeps air pressure to 64±5 psi. Engine air next will pass through the air-supply precooler. The precooler is an air-to-air heat exchanger which uses fan air for cooling.

(5) The fan air temperature sensor, found in the strut PRSOV compartment, looks at precooler-output-air temperature. The sensor controls the fan-air-modulating valve which in turn controls the amount of cooling air to the precooler. The fan-air-temperature-sensor works to keep precooler-output temperature at 204°C±17°C (400°F±30°F).

(6) Air from the precooler flows through pneumatic ducts to the PRSOV. The duct that is below the PRSOV has a device in it to mix the air. The air is mixed to make sure that the temperature is the same in all parts of the duct.

(7) The PRSOV contains a temperature controller which keeps bleed air temperature to less than 252°C (485°F). At 232°C±4°C (442°F±7°F) the valve moves toward the closed position, and at 255°C±4°C (499°F±7°F) the valve fully closes. The valve also contains a pressure controller which keeps downstream pressure at 40±10 psi.

(8) After leaving the PRSOV, supply air takes one of three paths. Bleed air may enter the strut hydraulic reservoirs. It may move outboard along the wing leading edge anti-ice ducts. Or it may move inboard through the wing leading edge ducts. Air that goes inboard enters the air-supply-body-crossover duct. Isolation valves in the body crossover duct stay closed during normal flow.

(9) Usually both engines supply air to the system. Air from each engine flows through an isolation-bypass-check valve and meets at the joint of the APU air supply duct and the body crossover duct. It then flows aft through the center-isolation valve and the APU air supply duct. The air is then used by the hydraulic reservoir, aft cargo heat, bulk cargo heat and potable water system. Air also flows from the body crossover duct for air conditioning purposes (Ref 21-51-00).

(10) The APU check valve keeps engine air from entering the APU.

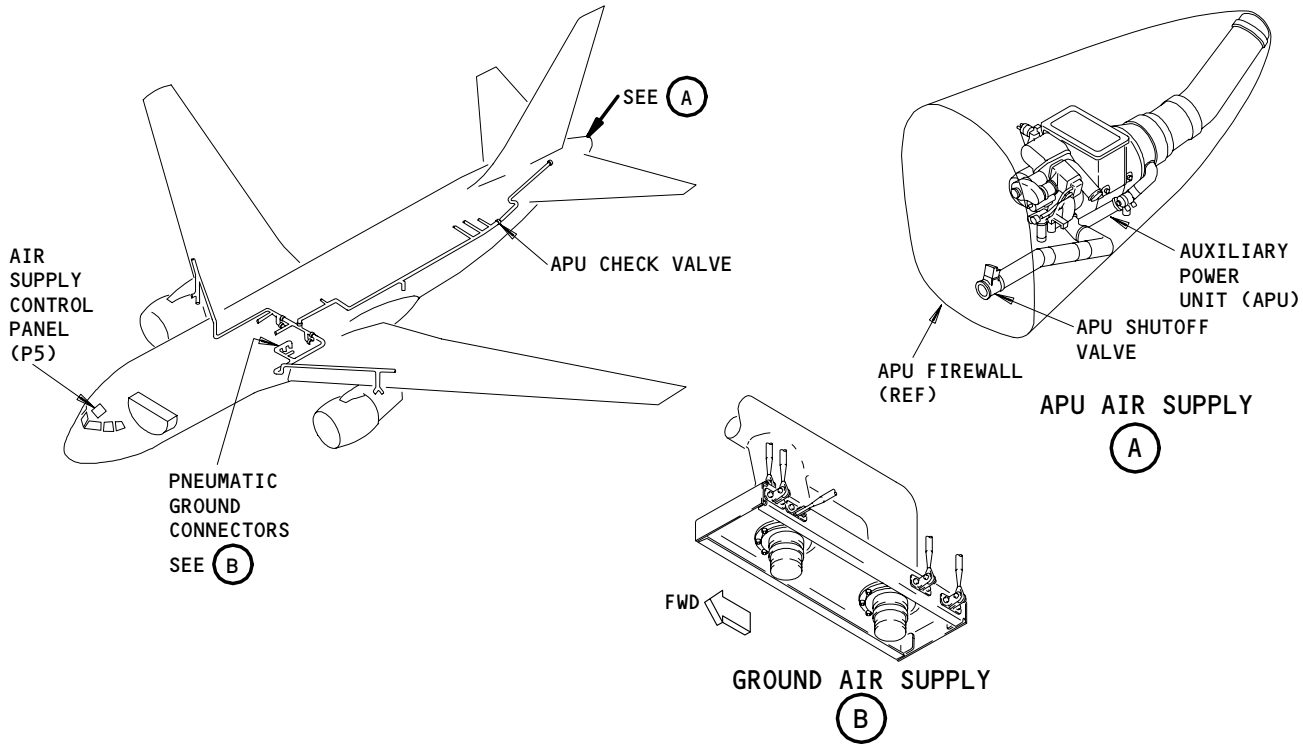
(11) One source (one engine, APU or ground cart) can supply all the pneumatic air needs. If only one source is available, the isolation valves are opened and air flows to all the systems.

G. APU Air Supply (Fig. 3)

(1) An auxiliary power unit (APU) is located in the aft most portion of the airplane. It can provide supply air for on-ground operations or for inflight operations if the engine air system fails.

(2) On the ground, the APU can supply compressed air for these systems:
(a) When an engine is started
(b) The air-driven pump
(c) Air-conditioning-pack operation
(d) Cargo compartment heat while the airplane is on the ground.

(3) The APU can supply compressed air to the pneumatic system in flight if the engines are not able to supply enough air.



APU and Ground Air Supply Systems
Figure 3

(4) Compressed air from the APU goes into the APU air supply ducts and goes through the APU shutoff valve and the APU check valve. It then goes into the distribution system at the body-crossover duct.

H. APU Reverse Flow Protection

(1) The APU shutoff valve interlock circuit prevents reverse flow of bleed air into the APU or engines during engine start. The interlock circuit is controlled by the left/right bleed air control card assembly and relay logic commanding the PRSOVs and APU shutoff valve.

(a) During first engine start on the ground with the APU running and C/L(R) isolation valves open, the bleed air control card assembly disables both PRSOVs and then relay logic enables the APU shutoff valve to supply air to start the first engine. Once the first engine has started (N2>50%), the APU shutoff valve is disabled by relay logic and the PRSOVs are enabled via the bleed air control card assembly.

(b) During second engine start on the ground with the APU running and C/R(L) isolation valves open, the bleed air control card assembly disables both PRSOVs and then relay logic enables the APU shutoff valve to supply air to start the second engine. Once the second engine has started (N2>50%), the APU shutoff valve is disabled by relay logic unless the center isolation valve is commanded closed, or both PRSOVs are closed. The APU shutoff valve is also disabled if the APU is shutdown, or the APU shutoff valve is commanded closed via the pilots' overhead panel, or the APU Fire switch is armed.

(c) For inflight operation with APU running, the APU shutoff valve is normally disabled, and is only enabled during engine restart to allow air to the applicable starter. The APU shutoff valve is disabled unless the center isolation valve is closed or both PRSOVs are closed. The APU shutoff valve is also disabled if the APU is shutdown, or the APU shutoff valve is commanded closed via the pilots' overhead panel, or the APU Fire switch is armed.

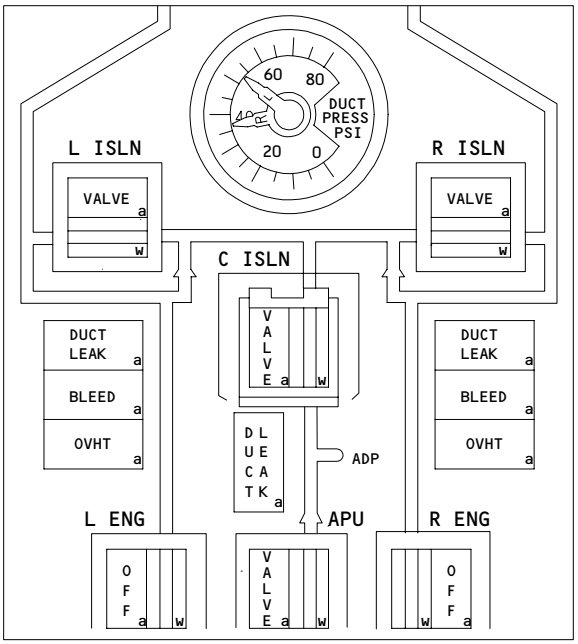
(d) The APU shutoff valve interlock circuit is enabled (APU shutoff valve is commanded closed) for the following conditions:

1) APU is shutdown (not running)
2) APU shutoff valve is commanded closed from flight deck
3) APU Fire switch is armed
4) Either left or right engine is running (N2>50%)
5) Center isolation valve is open
6) Either left or right PRSOV is commanded open from the flight deck
7) Neither engine is being started

(2) The APU check valve also provides reverse flow protection for the APU.

I. Ground Air Supply
   (1) With the airplane on the ground, a pneumatic-ground cart can supply air for the user systems. The ground cart supplies compressed air through two 3-inch diameter connectors on the left side of the lower fuselage. The connectors are inboard and aft of the wing-leading edge. Air enters through the connectors and then moves into the air supply body crossover duct.

J. Control (Fig. 4)
   (1) Switch/lights on the pilots' overhead P5 panel give system control and indication. A white bar light comes on to show system selection. This occurs when switch/light is pushed to the on position. The C ISLN switch/light is guarded open. The amber VALVE light on the R ISLN, L ISLN, and C ISLN, switch/lights are disagreement lights. They light when the valves selected position and its actual position do not agree. With normal operation, the amber light comes on after the switch is pressed. The amber light will go off when the valve reaches the correct position. The R ENG and L ENG OFF lights come on whenever the PRSOV is in the closed position. The white flowbar light comes on when system is in operation. When both lights are on at the same time, disagreement is indicated.
   (2) The air-supply-control-card assembly contains the power and logic circuitry to control the engine air supply valves. It also gives the electrical connections for the air supply BITE module and logic for OVHT and BLEED indicators.



P5 PILOTS' OVERHEAD PANEL

Air Supply Control Panel
Figure 4

(3) The OVHT light and applicable L (R) ENG BLD OVHT EICAS message will appear whenever bleed-air-supply temperature is above 254°C+5°C/-3°C (489°F+9°F/-5°F).

(4) AIRPLANES WITH EICAS -005 SOFTWARE OR LESS;
Whenever the HPSOV is open when it should be closed these indications occur:
(a) L(R) BLEED light illuminates
(b) EICAS message L(R) ENG HPSOV (Caution) shows
(c) Master Caution light illuminates
(d) An owl aural warning tone sounds

(5) AIRPLANES WITH EICAS -006 SOFTWARE OR LATER;
Whenever the HPSOV is open when it should be closed these indications occur:
(a) L(R) BLEED light illuminates
(b) EICAS message L(R) ENG HPSOV (Advisory) shows
(c) EICAS message L(R) ENG HPSOV (Status/Maintenance) shows

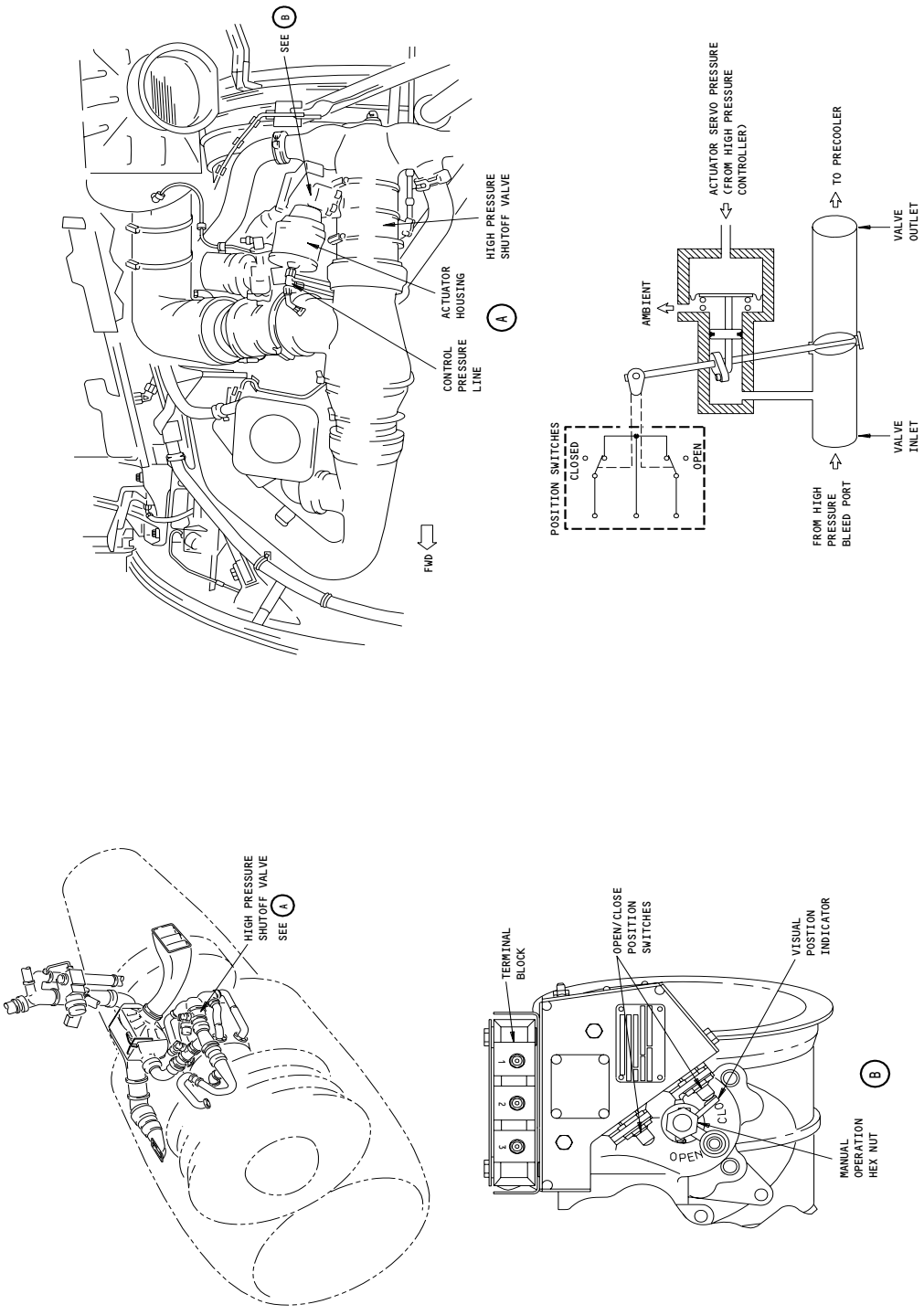
2. Component Details

A. High-Pressure-Shutoff Valve (HPSOV) (Fig. 5)

(1) The HPSOV is a 5.5 inch butterfly valve. A one-half-area-pneumatic actuator controls valve position. A piston-type actuator drives the butterfly valve through a link and crank. The valve contains two plunger-type position switches. Both the open and closed position switches are used for BITE indication. The close switch also provides an input to the air supply control card.
A valve shaft extension lets the valve be positioned with the use of a wrench. The valve actuator case is equipped with a lockpin that can be removed. If the valve must be locked open, the lockpin is removed from the actuator case. This lets valve control pressure go to ambient. The pin is installed through the valves' manual control linkage into a threaded hole locking the valve in the closed position.

(2) The valve housing is marked OPEN, CLOSED. This will give visual indication of valve position when used with the manual override nut lever.

(3) The HPSOV opens and closes because of pneumatic servo pressure from the HPC. This pressure enters the valve actuator and acts against a spring and inlet pressure loaded piston. Sufficient servo pressure (10 psi minimum) from the HPC moves the actuator piston and attached links and cranks to open the valve. The valve is spring loaded to fully close if servo pressure is lost.



High Pressure Shutoff Valve
Figure 5

298636

B. High Pressure Controller (HPC) (Fig. 6)

(1) The HPC opens and closes the HPSOV. It is found on the bottom left side of engine approximatly two feet aft of the fan cowl. The HPCs location avoids the harmful affects of high temperatures and vibration from the 14th-stage-engine compressors.

(2) The HPC has these components:

(a) A cast-aluminum-controller body

(b) An altitude-biased-pneumatic switch

(c) An internal sensing diaphragm

(d) A shutoff solenoid

(e) Four BITE pressure switches

(f) A high-stage-pressure port

(g) A signal-pressure port to the HPSOV.

(3) The valve control lever moves when high-stage-servo pressure acts on the servo-pressure-sensing diaphragm. A preset spring adjusts the lever to move when high-stage-engine pressure is 105 ± 5 psi at or below 27,000 ± 1,000 ft. Above 27,000 ft, an evacuated bellows expands to contact the control lever. This changes the switchover pressure linearly from 105 psig at 27,000 ft to 77 psig at 42,000 ft. The valve-control poppet controls the servo pressure to the HPSOV. At high power levels, the servo pressure bleeds to ambient. At low power levels, servo pressure ports to the HPSOV. The latching solenoid allows an override to the pneumatic switching. When power is supplied to the solenoid it shuts off the high-stage pressure and bleeds servo pressure to ambient. The HPSOV then closes.

C. Intermediate-Pressure-Check Valve (Fig. 7)

(1) The intermediate-pressure-check valve is an in-line check valve. The valve is made up of these components:

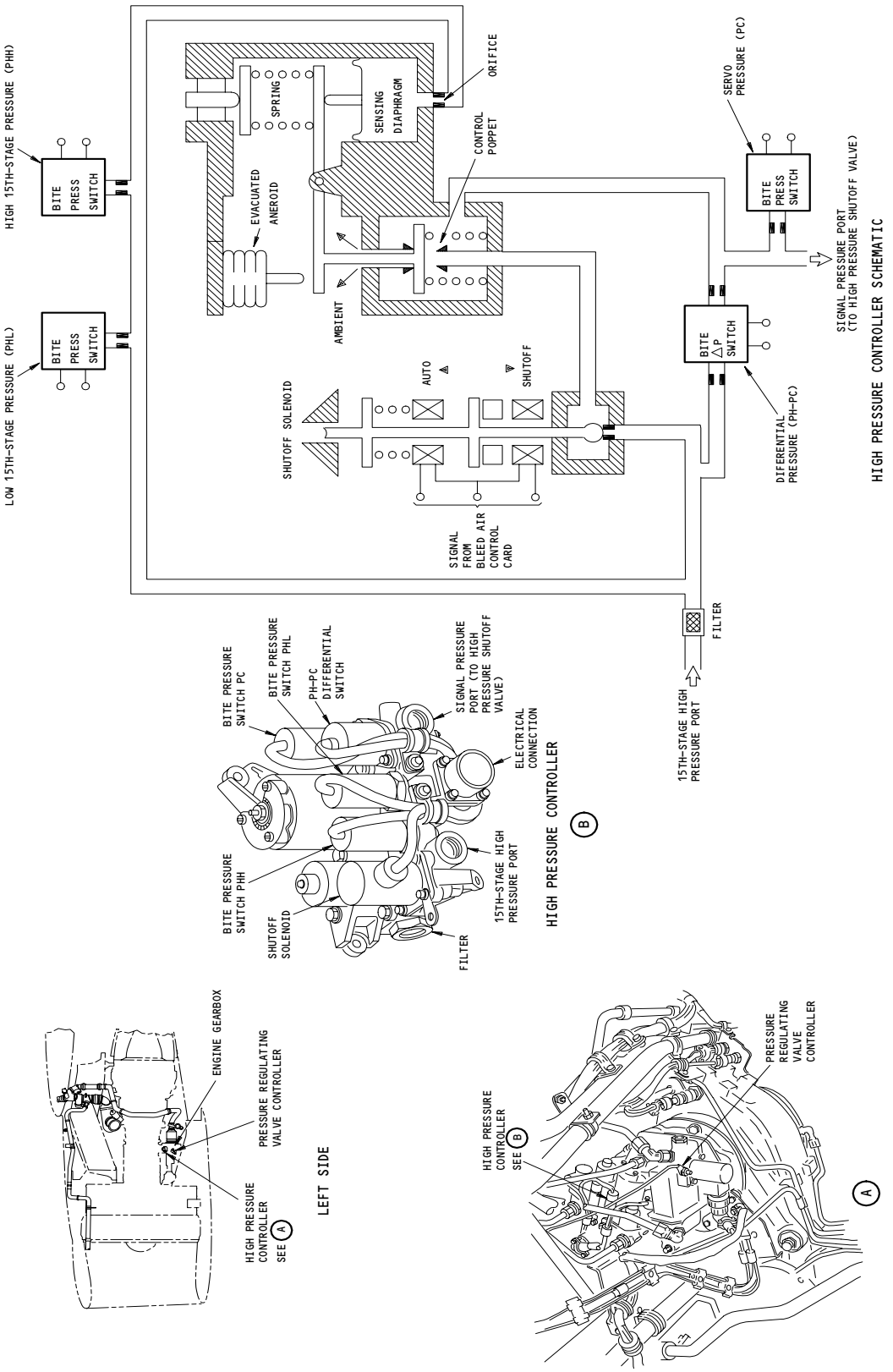
(a) An outer shell

(b) Inner shell with strut supports

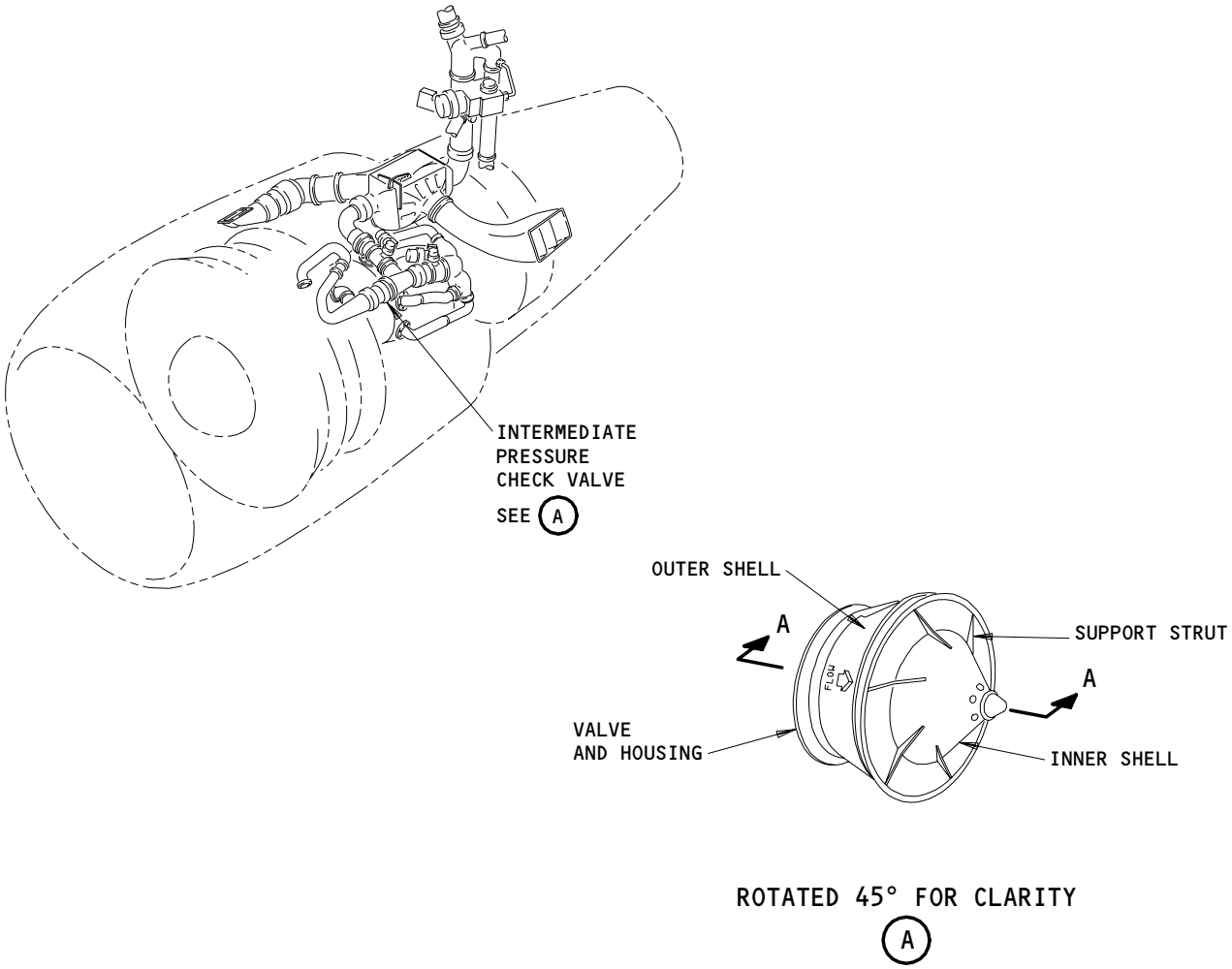
(c) Tube guide

(d) A sliding tube/valve plate assembly.

(2) The valve is installed between the intermediate-pressure manifold and the HP/IP manifold. The valve is found halfway up the right side of the engine. The valve outlet flange is larger than the valve inlet flange. This prevents installation in the wrong direction. An arrow on the body of the valve indicates direction of flow.



High Pressure Controller
Figure 6



Intermediate Pressure Check Valve
Figure 7

(3) When the pressure upstream of the intermediate-check valve becomes greater than that downstream the valve poppet assembly slides open. The tube guide in the inner shell guides the poppet assembly when moving. When the pressure upstream of the intermediate-pressure check valve becomes less than the downstream pressure, the poppet assembly slides closed. This prevents reverse flow through the valve.

D. Pressure Regulating Valve (PRV) (Fig. 8)

(1) The PRV is a 5.5 inch butterfly valve. A one-half area pneumatic actuator controls valve position. A piston-type actuator drives the butterfly valve through a link and crank. The PRV contains two plunger-type position switches. Both the open and closed position switches are used for BITE indication. The close switch also provides an input to the air-supply-control card.
A valve shaft extension lets the valve be positioned with the use of a wrench. The PRV actuator case is equipped with a lockpin that can be removed. If the valve must be locked open, the lockpin is removed from the actuator case. This lets valve control pressure go to ambient. The pin is installed through the valves' manual control linkage into a threaded hole locking the valve in the closed position.

(2) The valve housing is marked OPEN, CLOSED. This will give visual indication of PRV position when used with the manual override nut lever.

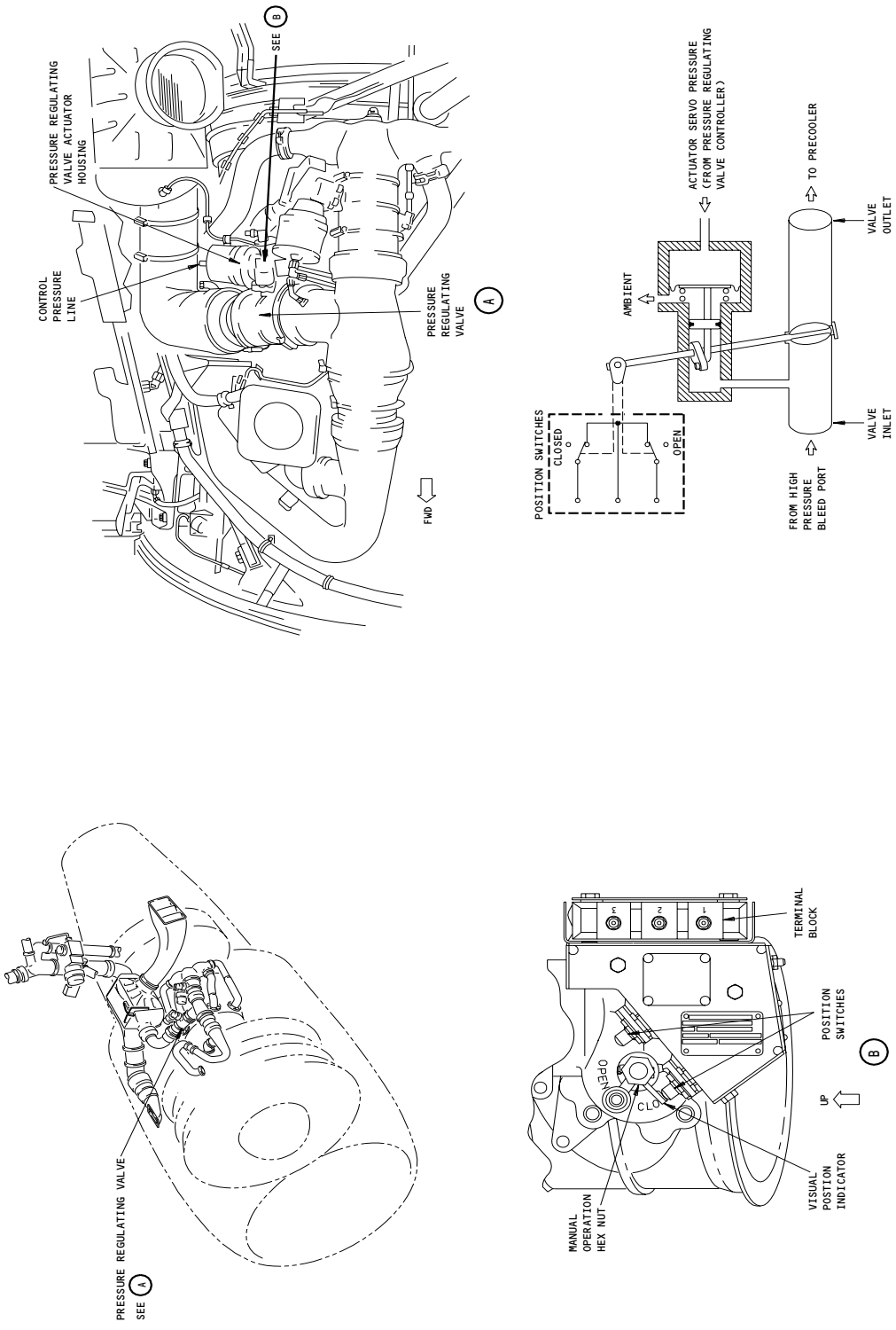
(3) The PRV opens and closes because of control pressure from the PRVC. Control pressure enters the valve actuator and pushs against a spring and inlet pressure-loaded piston. Sufficient control pressure (10 psi minimum) from the PRVC moves the actuator piston to open the PRV. The PRV is spring-loaded to close if control pressure is lost.

E. Pressure-Regulating-Valve Controller (PRVC) (Fig. 9)

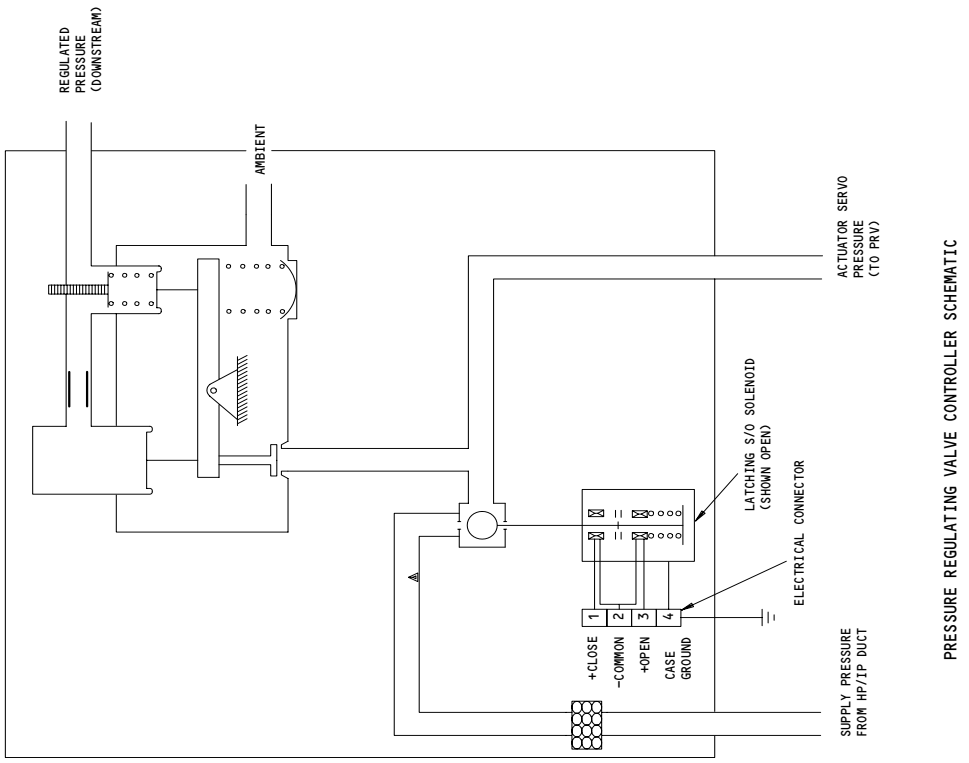
(1) The PRVC provides servo pressure to open and close the PRV. The PRVC is installed on the left side of the engine case. The PRVC is installed 2 feet aft of the fan cowl and 1.5 feet above the lower centerline of the engine case. The PRVC location avoids the effects of high temperature and vibration present near the engine-high-stage-compressor sections.

(2) The PRVC has a cast-aluminum body with an internal-sensing diaphragm, and shutoff solenoid.

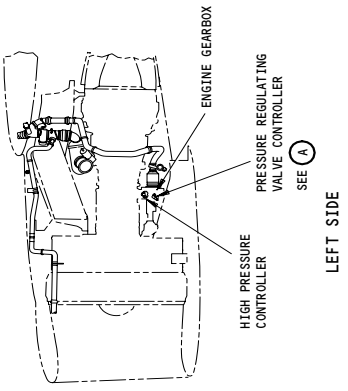
(3) The PRVC has three ports. These ports are used as follows:
(a) Supply air from upstream of the PRV
(b) Sensed, regulated pressure from down stream of the PRV
(c) Actuation control air pressure to the PRV.



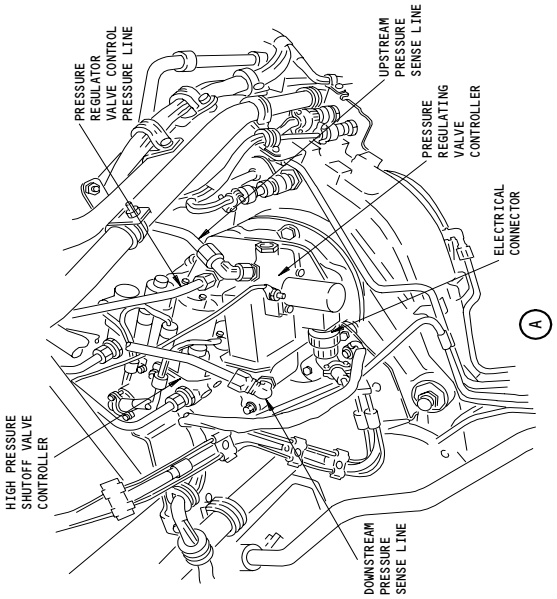
Pressure Regulating Valve
Figure 8



PRESSURE REGULATING VALVE CONTROLLER SCHEMATIC



LEFT SIDE



Pressure Regulating Valve Controller
Figure 9

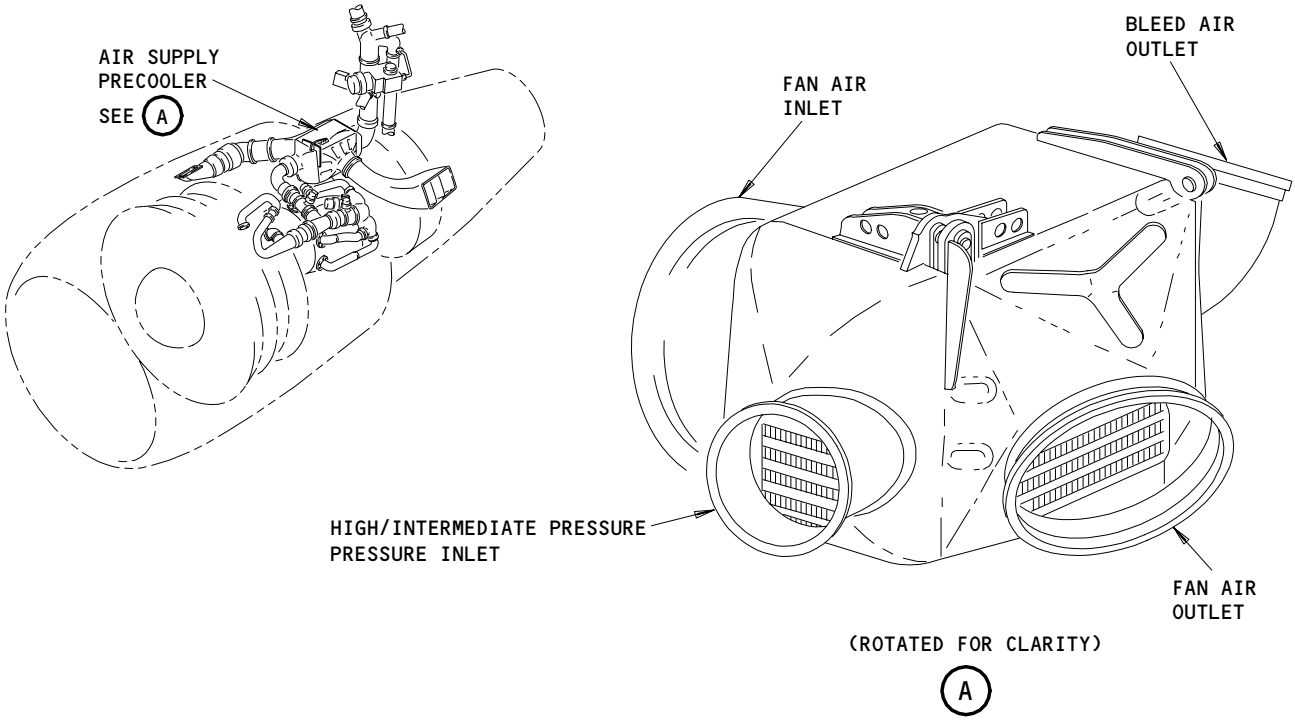
(4) The PRVC adjusts PRV-servo-air pressure when PRV downstream pressure changes. This controls PRV position. PRV downstream air is pressure regulated to maintain precooler inlet pressure at 64 ±5 psi. If an overpressure condition (76 ±4 psi) is found at the precooler inlet, the PRVC bleeds control pressure to ambient. This closes the PRV.

F. Air Supply Precooler (Fig. 10)

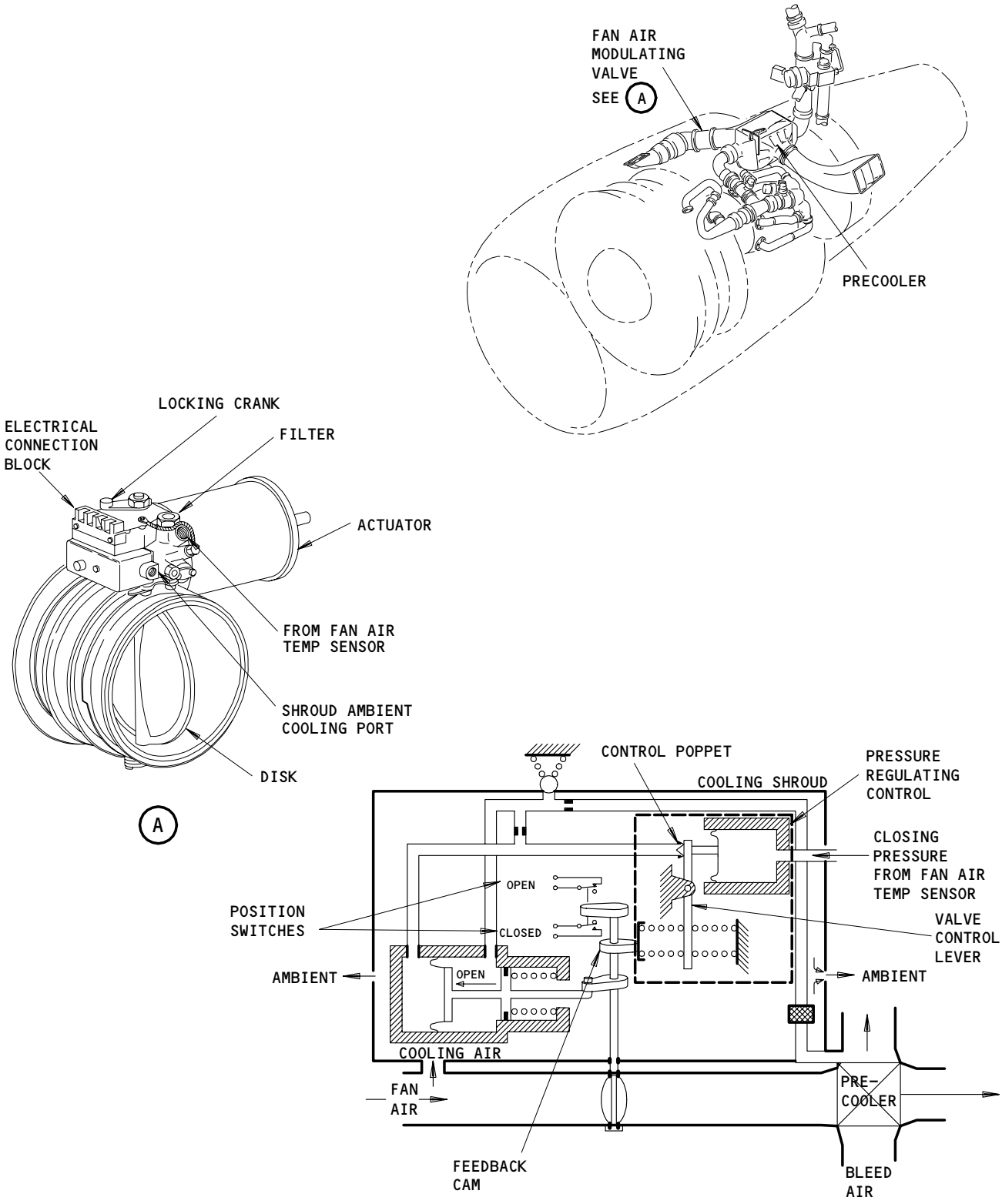
(1) The air-supply precooler is an air-to-air heat exchanger of crossflow type. The unit consists of layers of fins separated by parting plates and closure bars. Bleed air from the HP/IP manifold enters through the inlet duct. The fan-air inlet and outlet are single connections, one on each side of the precooler. A pressure-sense port on the precooler-outlet header gives servo pressure to fan air valve. A second sense connection found on the precooler-inlet header gives a duct-pressure reference for the PRVC. The approximate weight of the precooler is 130 pounds.

(2) Bleed air and fan air flow at approximately 90 degree angles to each other separated by the fin-plate arrangement. The cooler fan air soaks up heat from the bleed air through the fins and cooling plates. Bleed air is cooled this way to 204±17°C. The cooled bleed air leaves the precooler into the precooler-outlet duct.

G. Fan-Air-Modulating Valve (Fig. 11)



Air Supply Precooler
Figure 10



Fan Air Modulating Valve
Figure 11

(1) The fan-air-modulating valve is a nine-inch diameter pneumatic-air-actuated-butterfly valve. The valve mounts on the fan-air inlet of the precooler. The valve is made of these components:
   (a) A spring-loaded open half-area actuator
   (b) A cast-aluminum body
   (c) A cooling shroud covers sensitive valve components. The shroud lets cooling air pass over the components to prevent overheating.

(2) An extension arm on the valve shaft operates two position-limit switches. These switches give information to the BITE module.
   (a) A locking crank on the actuator lets the valve be locked by hand 48 ±4 degrees from the valve closed position.

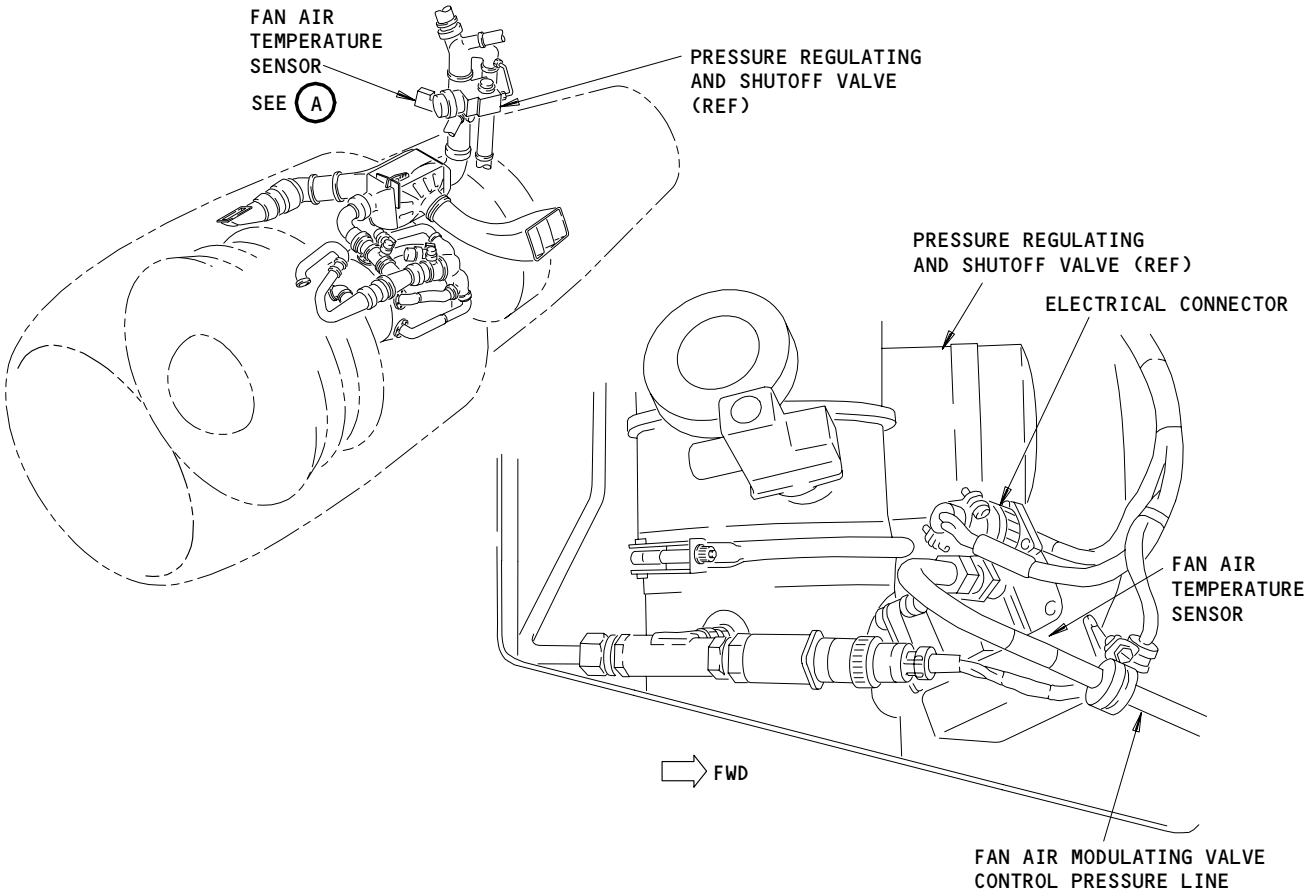
(3) The fan-air-modulating valve position is the result of pressure signals from the fan-air-temperature sensor. The diaphragm, attached to the valve control lever, monitors signal pressure. The valve shaft (includes a spring and feedback cam), provides a balancing feedback force on the lever. Movement of the control lever because of changes in pressure signals and feedback forces moves a servo poppet. Movement of the servo poppet controls the closing force on the actuator piston.

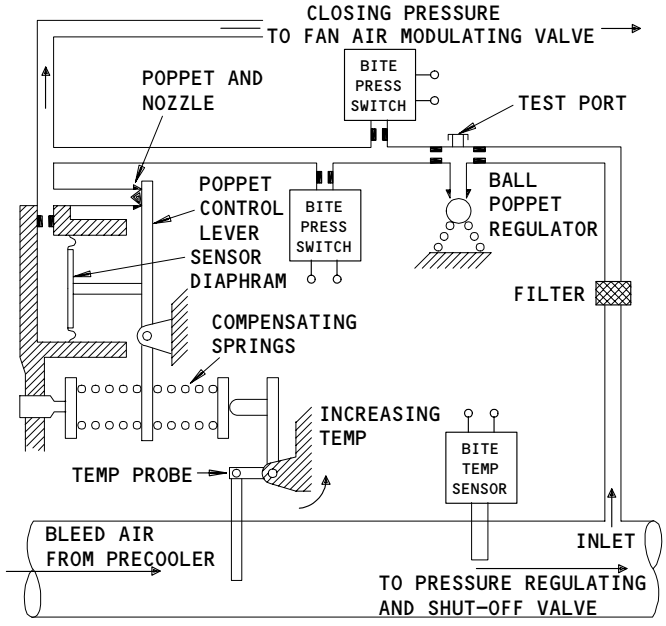
(4) The actuator moves the disk to keep a bleed outlet air temperature at 204°C ±17°C (399°F±31°F). The valve begins to open at 187°C (369°F) and is fully open at 221°C (430°F).

H. Fan-Air-Temperature Sensor (Fig. 12)

(1) The fan-air-temperature sensor is found on the duct below the PRSOV on the right side of the duct. The sensor body contains a lever and crank operated by a bimetallic-temperature probe. The temperature probe extends into the duct. Two pressure switches and a temperature sensor provide information to the BITE system.

(2) The fan-air-temperature sensor controls the servo pressure that controls the fan air valve. The bimetallic-temperature probe in the pneumatic duct connects the compensating springs to the control lever. Temperature variations in the duct cause the temperature probe to produces force changes on the control lever. The movement of the control lever causes the poppet to open or close. The poppet movement adjusts the amount of control air bled to ambient. This will changes the pressure signal to the fan-air-modulating valve. Servo pressure also flows through a restrictor onto a sensor diaphragm. This diaphragm is connected to the control lever and keeps the lever in balance.





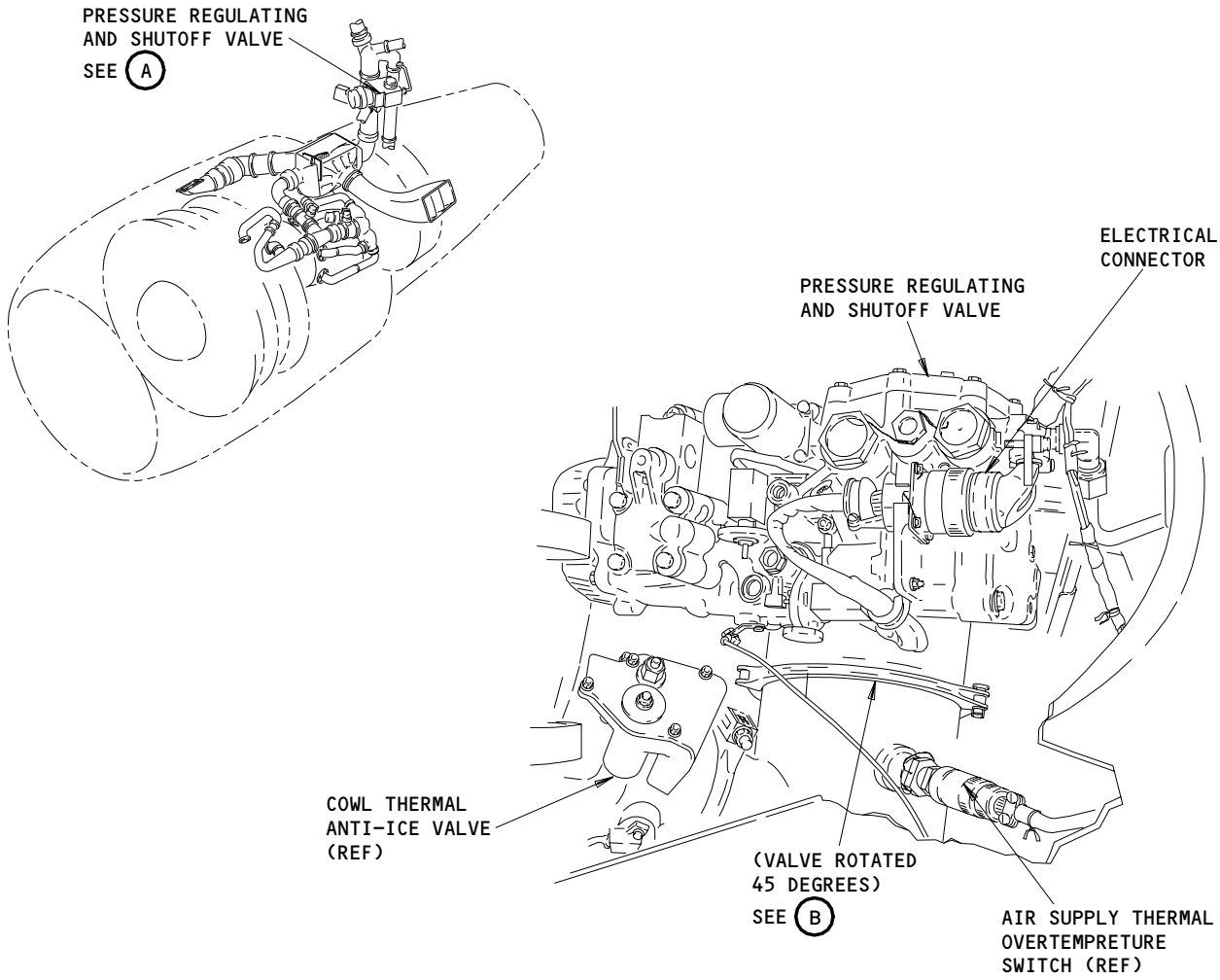
VIEW FROM RIGHT SIDE OF
ENGINE INTO STRUT ACCESS DOOR
A

Fan Air Temperature Sensor
Figure 12

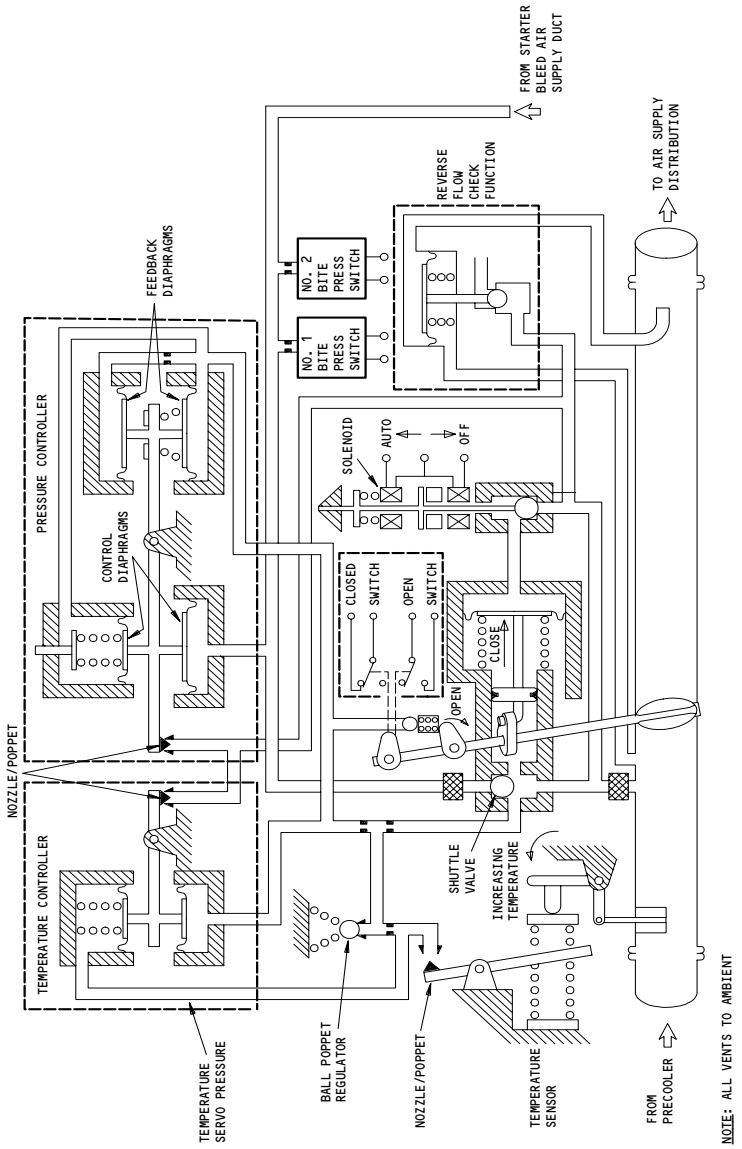
(3) When the temperature goes up the poppet will open, servo pressure Will vent and the fan-air-modulating valve opens. Below 187°C (369°F), the fan air valve is closed and all temperature control is removed. At 221°C (430°F) or higher the fan air valve is full open A ball poppet in the pressure supply line bleeds off excess pressure. This gives a regulated air supply to the sensor and decreases supply pressure variations.

I. Pressure-Regulating-and-Shutoff Valve (PRSOV) (Fig. 13)
   (1) The PRSOV is a six-inch butterfly valve. The valve mounts in the pneumatic-strut duct immediately downstream of the precooler.
   (2) The PRSOV is made up of these components:
      (a) A six inch butterfly valve
      (b) An actuator assembly
      (c) A pressure control assembly
      (d) A reverse flow prevention system
      (e) An overtemperature control system
      (f) Two-pressure switches to give signals to BITE
      (g) An open position switch to give signals to BITE
      (h) A closed position switches to give signals to EICAS
      (i) A control system latching solenoid
      (j) A hex on the valve shaft lets the valve be moved to a position by hand. O (open) and S (shut) markings on the actuator give visual position indication. The position switches inside the valve are operated by an arm on the valve manual operation hex. The valve may be locked closed when the valve is moved closed and the lockout pin installed.

J. PRSOV Operation (Fig. 14)
   (1) When the OFF/AUTO solenoid latches in OFF, servo pressure will bleed to ambient. With no servo pressure, the valve close spring will close the valve.
   (2) When OFF/AUTO solenoid latches in AUTO, the valve can be opened by pneumatic air. The valve opens when opening pressure overcomes the spring force. This causes the one-half area pneumatic actuator to open the valve. Opening the valve requires a minimum pressure of 10 psi. Valve servo pressure is controlled by these three functions:
      (a) Pressure control



Pressure Regulating and Shutoff Valve
Figure 13



Pressure Regulating and Shutoff Valve Operation
Figure 14

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(b) Temperature control
(c) Reverse flow check control.

(3) The pressure control portion of the valve keeps downstream pressure between 30 and 50 psi. The pressure control part of the valve is made up of these components:
(a) Two control diaphragms (one influenced by preset spring tension)
(b) Two feedback diaphragms (one influenced by spring tension)
(c) A poppet control lever.
1) The control diaphragms control the movement of the poppet. The poppet lets servo pressure bleed to ambient or to move the piston. When downstream pressure pushes on the control diaphragm, the poppet opens, servo pressure bleeds to ambient and the valve to closes. Downstream pressure pushes against preset spring tension to close the poppet. This lets servo pressure to push on the actuating piston which will move the valve open.
2) The feedback diaphragms control the valve movement speed. As the valve closes, the valve shaft increases the feedback pressure to the pressure controller. This pushes on a diaphragm which applies closing forces in proportion to the speed of the valve onto the controller poppet. This decreases the speed of the valve. A second diaphragm supplied with the same feedback pressure through a restrictor, will balance the forces that close the valve.

(4) The temperature control part of the valve starts to close the valve when the duct temperature is 232°C ±4°C (450°F±7°F). It fully closes the valve when the duct temperature is above 247°C ±4°C (477°F±7°F).
(a) The control diapragms and a control lever with a poppet make up the PRSOV temperature control. Pressure on the diaphragms is controlled by a temperature sensor, crank, spring, and lever, all located just upstream of the valve. The temperature sensor gives a force on the lever through the crank and spring. Lever force change is balanced by signal pressure change on the lever nozzle. At 232°C (450°F), the lever moves to increase pressure on the diaphragm. The control lever will then open the poppet and bleed off servo pressure. The valve then moves toward the closed position. At 247°C (470°F), the valve is fully closed.
(b) Temperature is measured by a probe which extends into the valve duct. The temperature probe is protected by a thin metal tube which is easily damaged and will not support heavy loads.

(5) A spring diapragm and ball poppet make up the reverse flow check part of the PRSOV. Upstream pressure is compared with downstream pressure through the diaphragm. If downstream pressure exceeds upstream pressure by 0.13 psi, the poppet moves down and servo pressure is released to ambient. The valve then closes.

K. Isolation Valves (Fig. 15)

(1) There are three isolation valves in the air supply system. The left and right isolation valves are located in the air supply body crossover duct. The left and right isolation valves are normally closed. The center isolation valve is in the APU air supply duct just aft of the crossover duct. The center isolation valve is normally open.

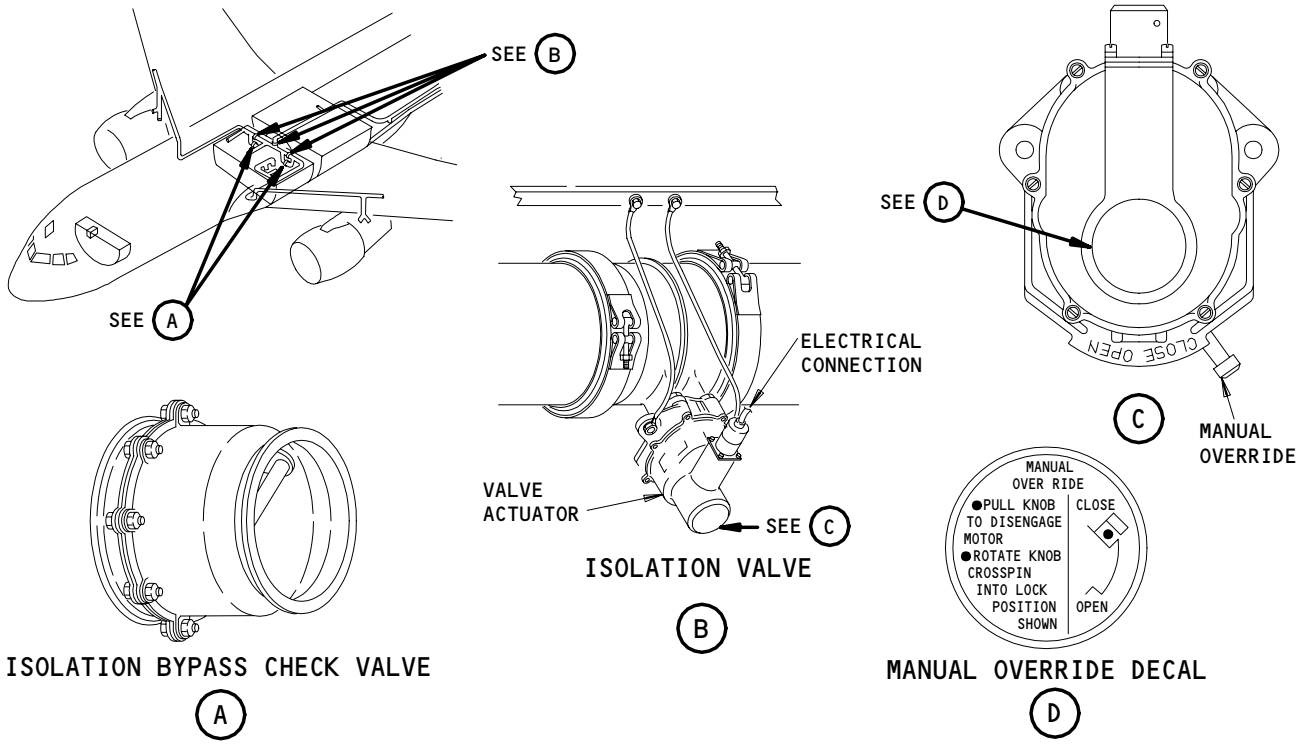
(2) All three isolation valves are 6-inch diameter butterfly valves. The valves are powered by a 115v ac actuator. The actuator causes a 90° shaft rotation to fully open or fully close the valve. A lever, normally engaged with the motor drive, releases to let the butterfly be positioned by hand.

L. Isolation-Bypass-Check Valves (Fig. 15)

(1) An isolation-bypass-check valve is mounted under the left and right isolation valves. The check valves are flapper type valves with a 5-inch diameter inlet and a 4.5 inch-diameter outlet. The check valves is made up of two spring loaded closed, semi-circular flappers on the check valve hinge pin. The hinge pin goes through the center of the valve body.

(2) When engine bleed airflow is greater than the spring force, the flappers open. When engine bleed airflow decreases or is towards the engine the spring closes the valve.

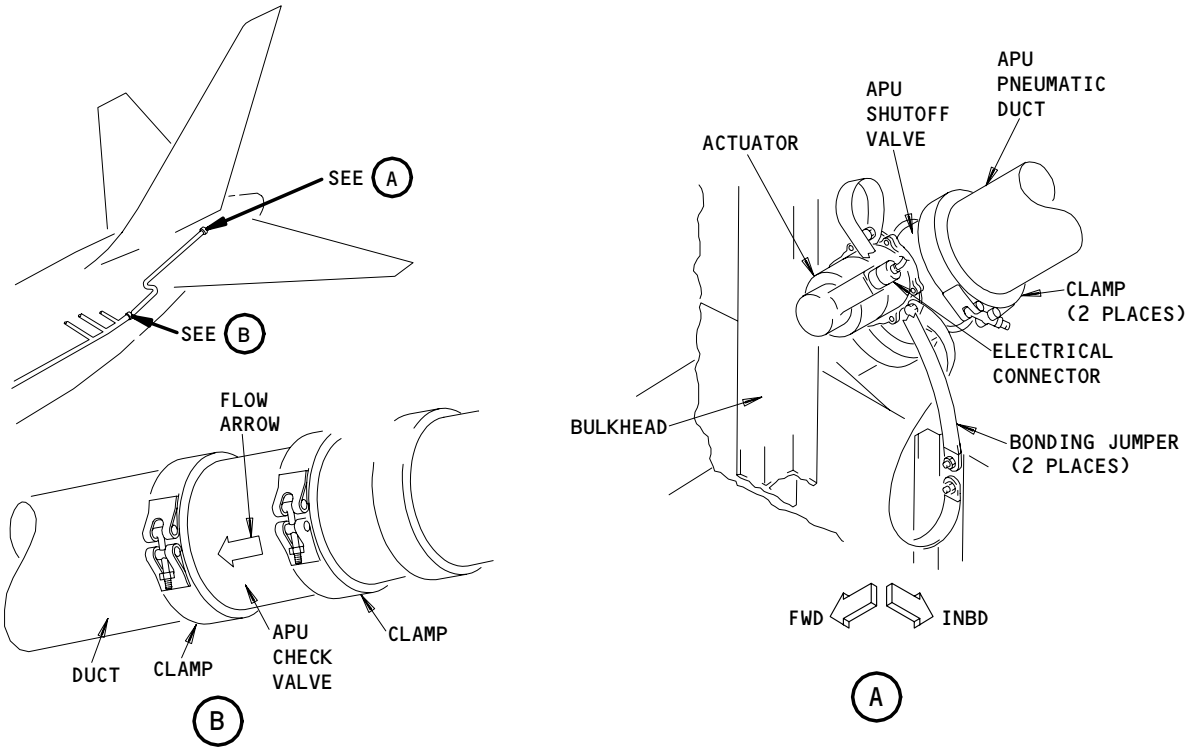
M. APU Shutoff Valve (Fig. 16)



Isolation and Isolation Bypass Check Valves
Figure 15

(1) The APU shutoff valve is a 4.5 inch diameter butterfly valve. It is located in the APU air supply duct just forward of the APU. It opens or closes to control supply air from the APU to the air supply distribution system.
(2) A 115V AC motor drives the valve.
(3) The valve is made up of these components:
    (a) An electrical actuator
    (b) A body and butterfly vane assembly
    (c) A manual override assembly connected into the actuator assembly.
(4) The vane assembly may be opened or closed by the electrical actuator or the manual override. The valve can be locked open or closed.
(5) The vane assembly turns on a shaft in the body. One end of the shaft is attached to the output shaft of the actuator. Actuator position controls the position of the vane.

N. APU Check Valve (Fig. 16)
(1) The APU check valve is a 6-inch duct-mounted dual flapper type check valve. It mounts in the APU air supply duct forward of the APU shutoff valve. The valve will not let air flow from the engines or ground air connector into the APU.
(2) The check valve is made up of two semi-circular flappers hinged about a pin. The hinge pin runs through the center of the valve body through the flappers.



APU Shutoff and Check Valves
Figure 16

(3) Airflow (away from APU) is stronger than the helical torsion spring force and will drive the check valve flappers open until contact is made with the check valve stop pin. The flappers will close to prevent airflow back into the APU.

3. Operation

A. Pneumatic Operation During Engine Start (Fig 16A)

(1) During the right engine start, as soon as the start switch is put to the GND position, these events occur:

(a) After less than 300 milliseconds (relay response and EICAS sample rate), the EICAS software initiates an inhibit to new messages until 6 seconds after the engine N2 rotor speed achieves 52%.

(b) The bleed air card receives the engine start signal and it issues a close command to the Pressure Regulating and Shutoff Valve (PRSOV) and the Pressure Regulating Valve Controller (PRC), which controls the Pressure Regulating Valve (PRV) on the left and right engines.

(c) The APU controller will go to the engine start mode and increase air supply pressure to the engines. The APU valve will be open with both engines N2 less than 50%.

(d) The starter valve will open and the starter will engage and begin to turn the N2 spool.

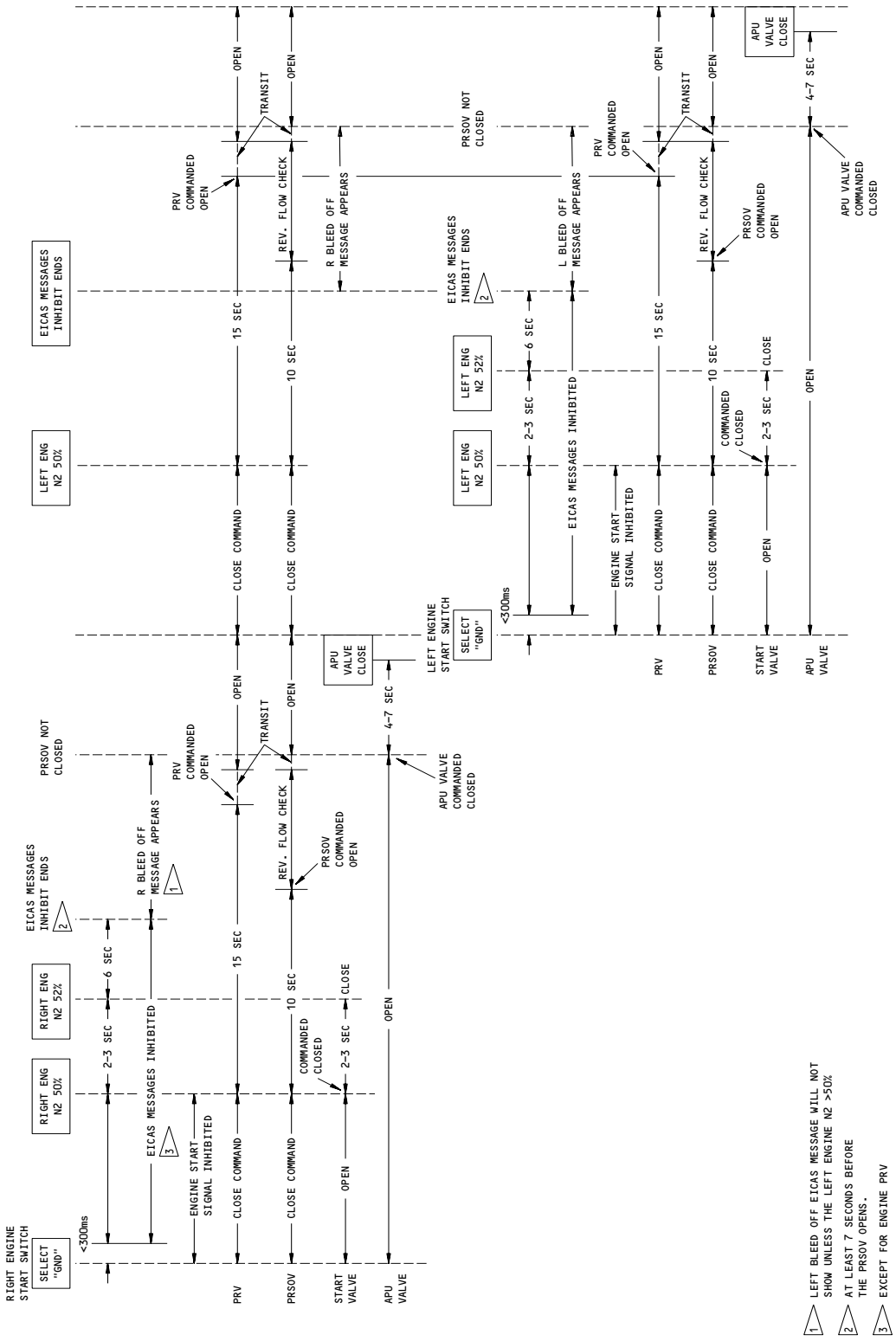
(e) When the N2 achieves 50%, starter cutout occurs.

1) The start valve is commanded closed and 2-3 seconds later the start valve will be closed.

2) The APU supply pressure will be reduced.

3) The bleed card engine start signal is lost and after 10 seconds it commands the left and right PRSOVs open. However, each PRSOV will stay closed because pressure on the APU side of the PRSOVs is higher and the reverse flow check feature of the PRSOVs are active.

4) After an additional 5 seconds, the bleed card will command the left and right PRCs open. The right PRV will open and allow engine pressure on the engine side of the PRSOV. When this pressure exceeds the pressure on the APU side of the PRSOV, the reverse flow check feature of the PRSOV will be inactivated and the right PRSOV will open. The left PRSOV and PRV will remain closed because there is no left engine pressure to open the PRV and the reverse flow feature of the left PRSOV will prevent it from opening.



Pneumatic Operation During Engine Start
Figure 16A

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(f) When the right PRSOV closed position switch indicates the PRSOV is not closed, the APU shutoff valve will be commanded closed and 4-7 seconds later the APU shutoff valve will be closed.

(2) The EICAS message inhibit will expire at least 7 seconds before the PRSOV opens and therefore the EICAS message R BLEED OFF will be displayed. The left engine EICAS message L BLEED OFF will NOT be displayed because it requires the left engine N2 to be greater than 50%.

(3) When the left engine GND start position is selected these events will occur:

(a) The APU shutoff valve will open.

(b) The same sequence of events will occur for the left engine as happened for the right engine except:

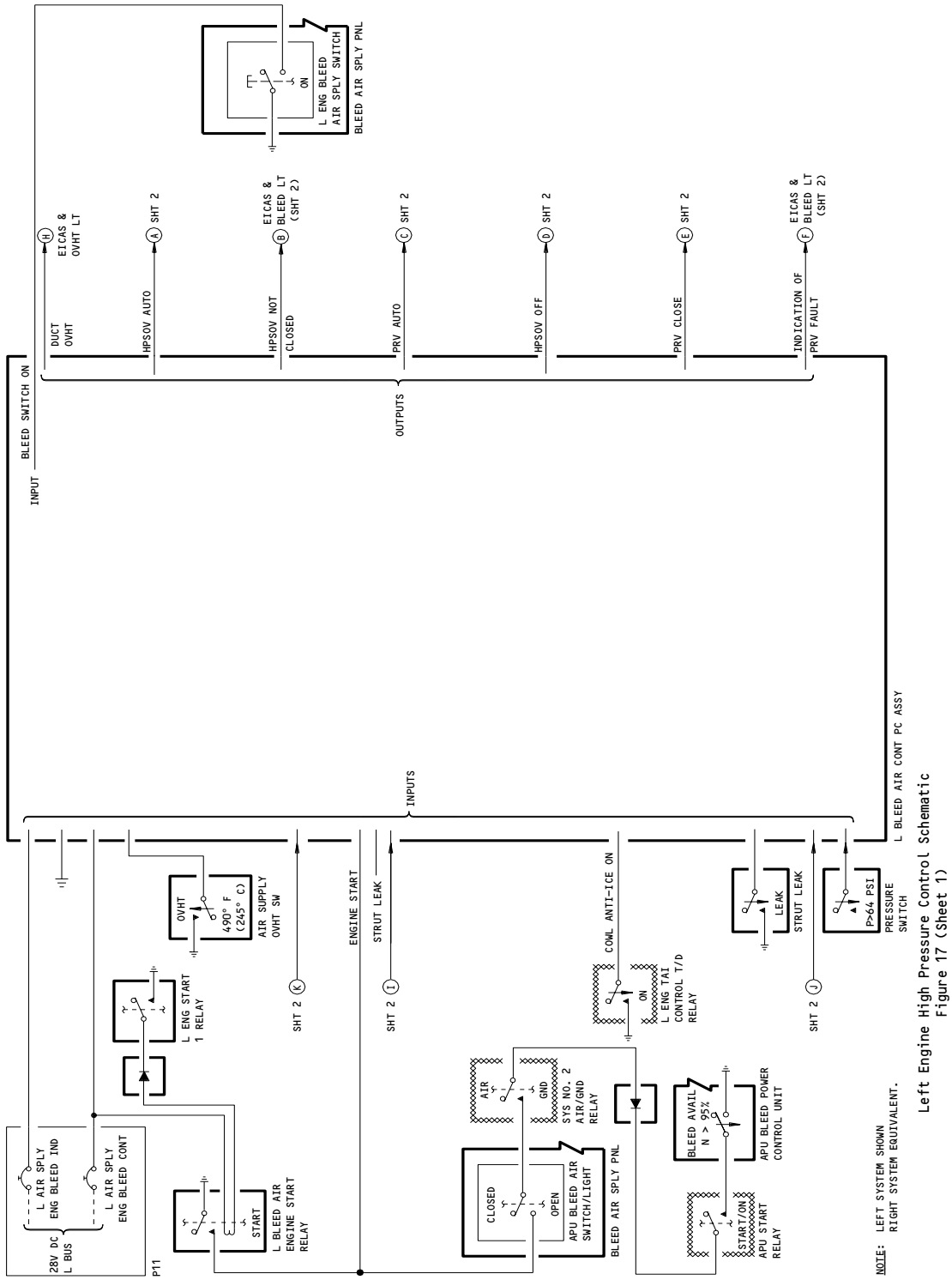
1) As soon as the EICAS inhibit expires, L BLEED OFF and R BLEED OFF message will be displayed, then will extinguish when the respective PRSOV closed position switches indicate the PRSOVs are not closed.

B. Functional Description

(1) HPC/PRVC Operation (Fig. 17)

(a) The necessary power for the HPC and PRVC is 28v dc power. The HPC and PRVC use pneumatic air to control the position of the high pressure shutoff valve (HPSOV) and pressure regulating valve. The HPC and PRVC are controlled by the air supply control card.

(b) Engine bleed air is controlled by the two alternate action switch/lights on the pilots' overhead panel P5. With the ENG switchlight in the ON position, the air supply control card will give a signal to open the valves. The control card will send a 28v dc pulse to the AUTO mode of the HPC, PRVC, and the PRSOV. When the switch/light is depressed to the OFF position, the card will give a signal to close the valves. the control card will send a 28v dc pulse to the OFF mode of each solenoid. If the ENG switch/light is OFF and ENGINE ANTI-ICE is set to ON, the card moves the PRVC to auto. This lets cowl ANTI-ICE operate with the bleed air system in OFF.



Left Engine High Pressure Control Schematic
Figure 17 (Sheet 1)

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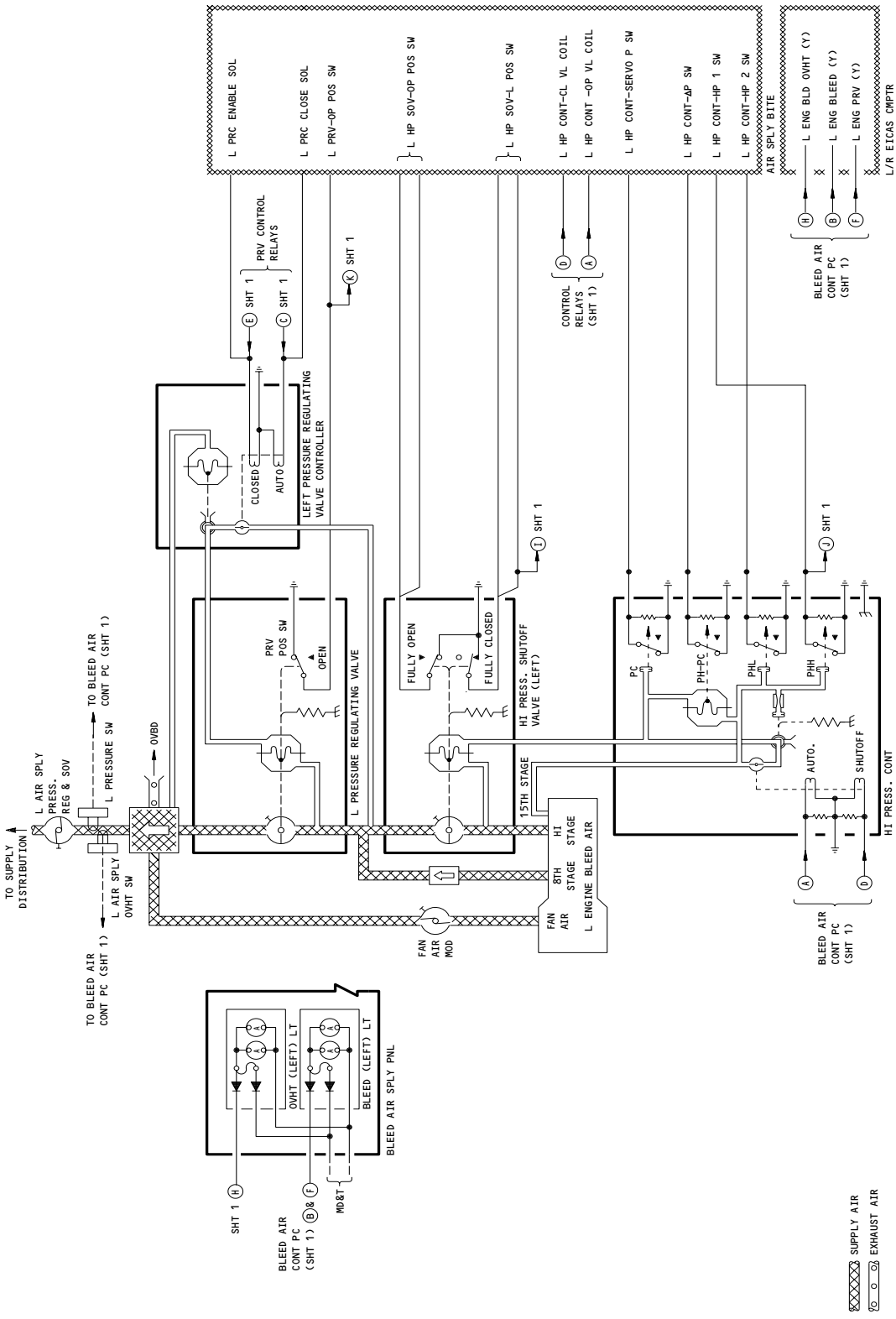

Left Engine High Pressure Control Schematic
Figure 17 (Sheet 2)

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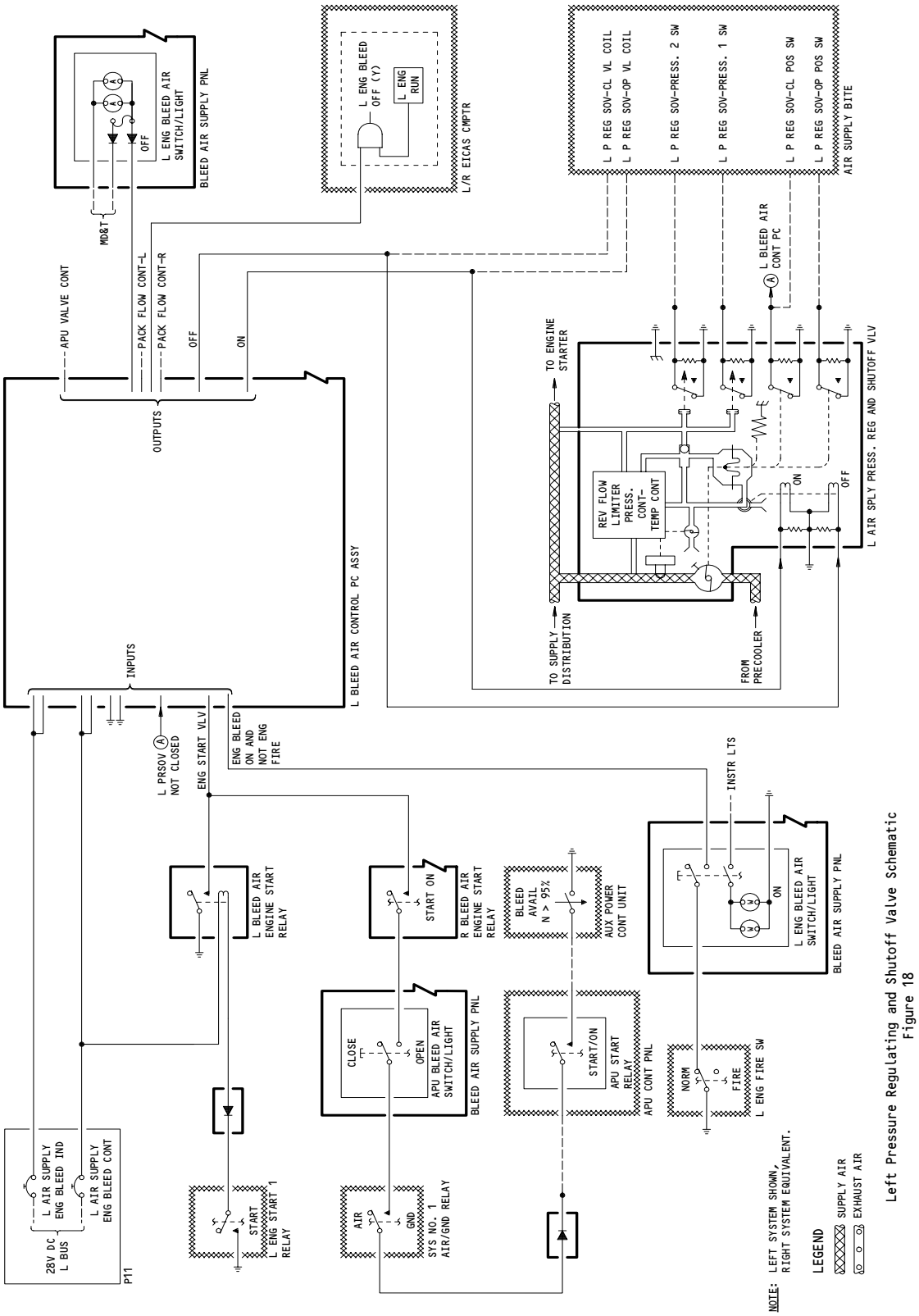
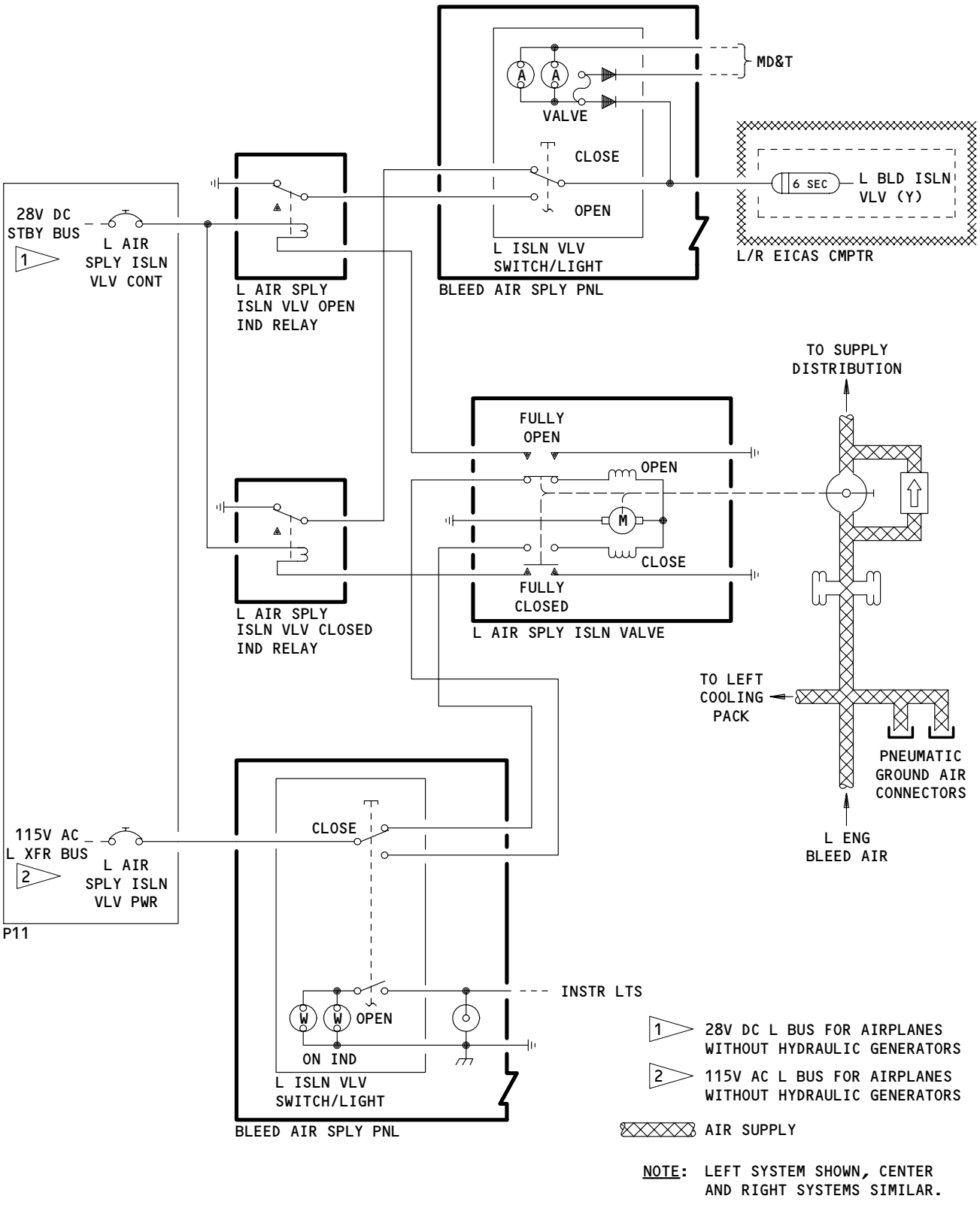
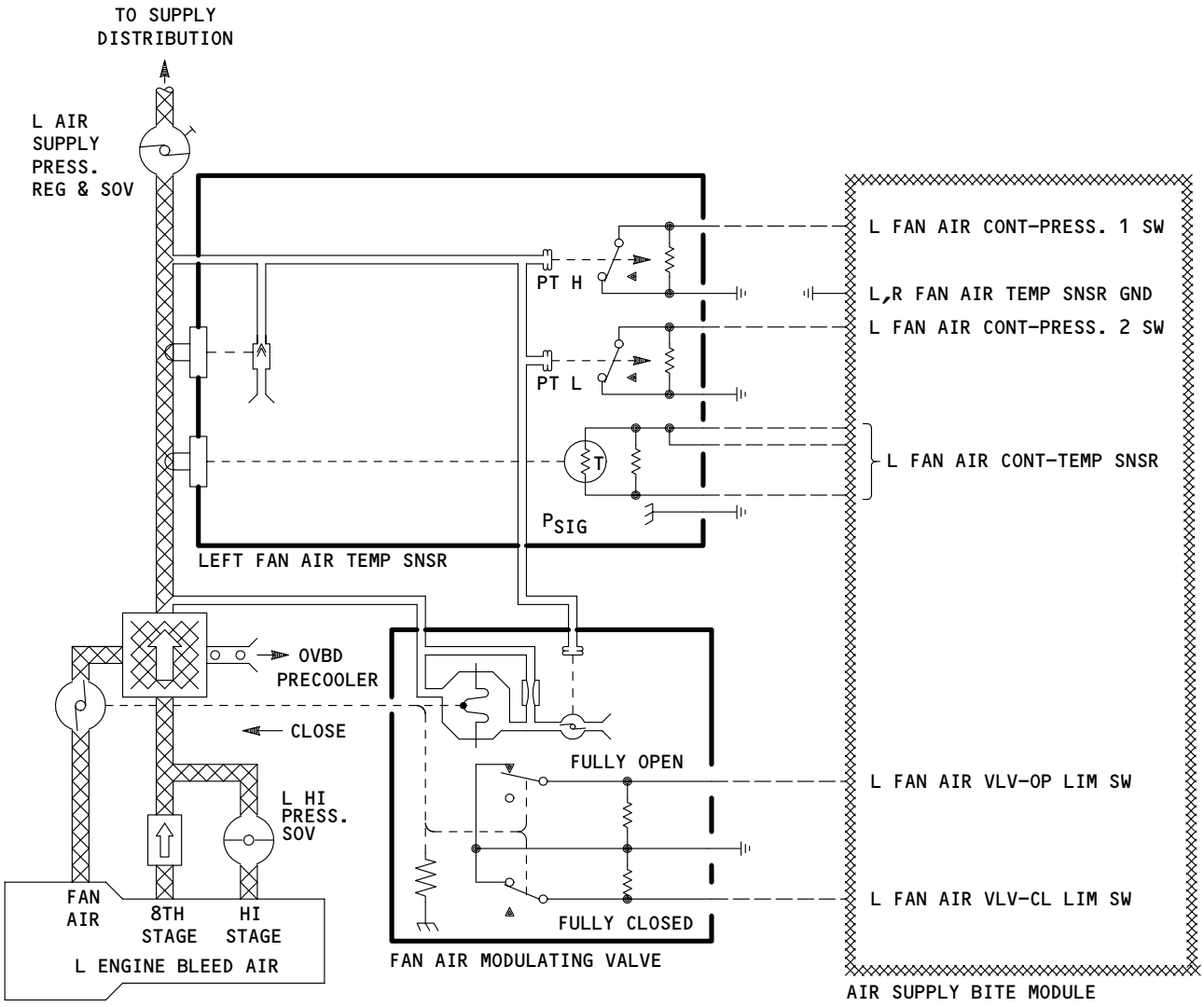


Left Pressure Regulating and Shutoff Valve Schematic
Figure 18

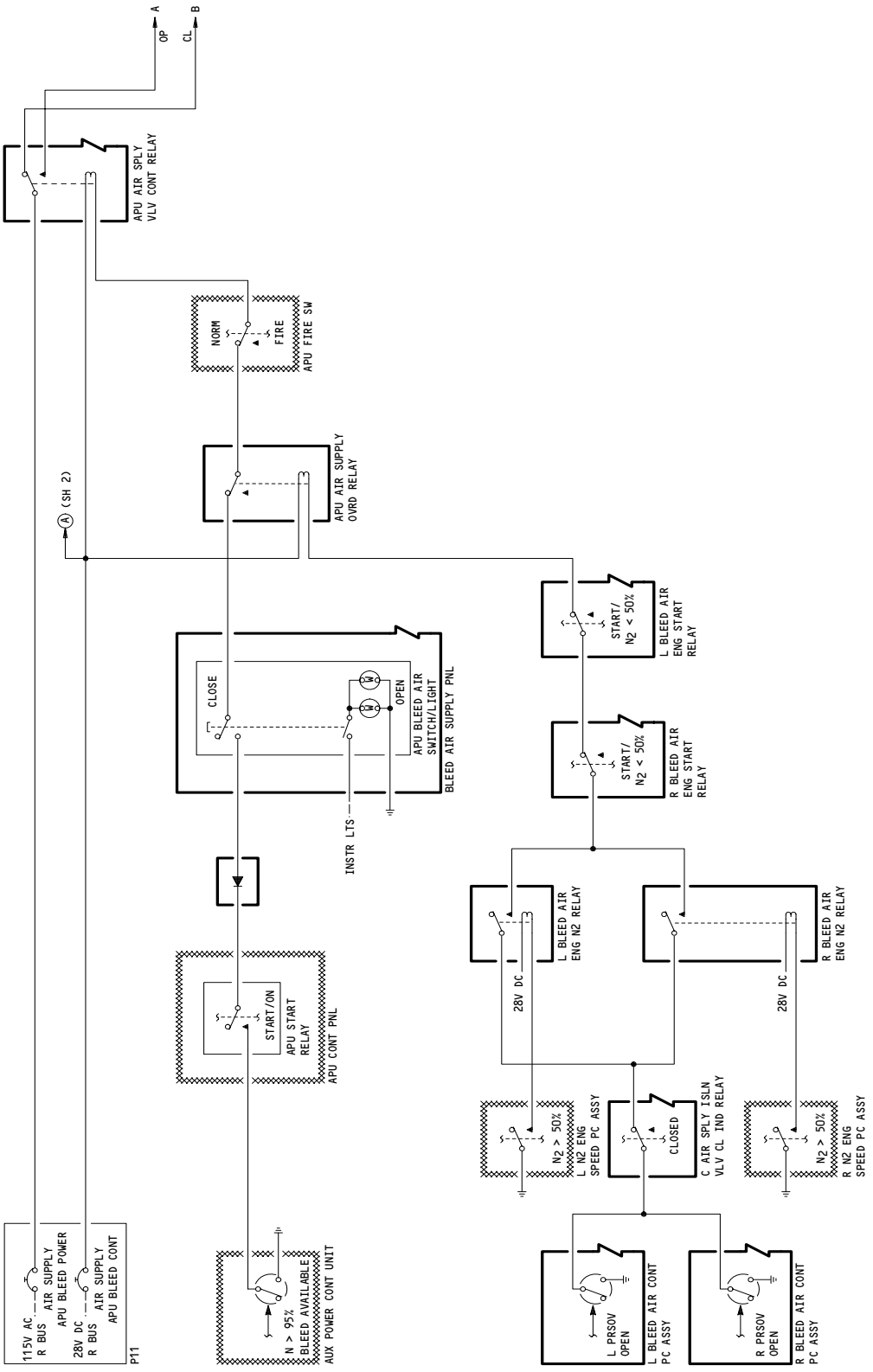


Isolation Valve Control Schematic
Figure 19



NOTE: LEFT SYSTEM SHOWN
RIGHT SYSTEM SIMILAR

Fan Air Valve Control Schematic
Figure 20



APU Valve Control Schematic
Figure 21 (Sheet 1)

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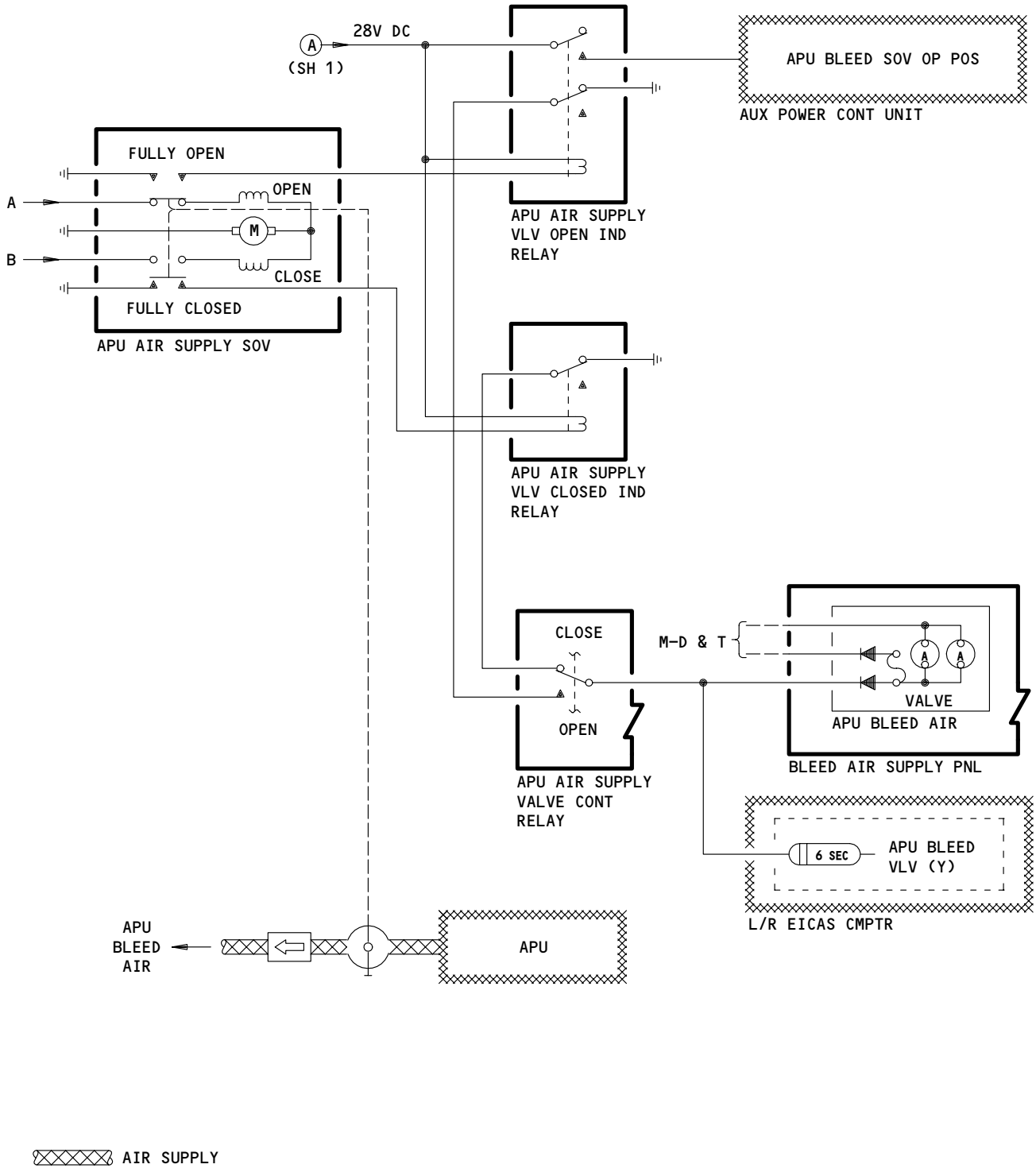


APU Valve Control Schematic
Figure 21 (Sheet 2)

NOTE: If the ENG switch/light is OFF, the high pressure controller is not commanded on when selecting the engine ANTI-ICE switch on. Since the HPSOV does not open, the duct pressure available from the 8th stage (intermediate pressure) section is approximately 5 PSIG. This duct pressure may not be enough to open the PRV or the anti-ice valve. The engine ANTI-ICE system will appear to have a problem, when it may be operating properly. If engine anti-ice is necessary, you must maintain a minimum 55% N1 below 10,000 MSL (70% N1 above 10,0000 MSL) to make sure there is duct pressure to open the cowl anti-ice valve"

(c) When the engines are started the control card commands the PRV, and the PRSOV closed.
1) AIRPLANES WITH EICAS -005 SOFTWARE OR LESS;
If the PRV is not closed after engine start is set, these indications appear:
a) L(R) BLEED light illuminates
b) EICAS message L(R) ENG PRV (Caution) shows
c) Master Caution light illuminates
d) An owl aural warning tone sounds
2) AIRPLANES WITH EICAS -006 SOFTWARE OR LATER;
If the PRV is not closed after engine start is set, these indications appear:
a) L(R) BLEED light illuminates
b) EICAS message L(R) ENG PRV (Advisory) shows
c) EICAS message L(R) ENG PRV (Status/Maintenance) shows

(d) The HPC will close the HPSOV before high stage engine pressure reaches 105 psig.
1) AIRPLANES WITH EICAS -005 SOFTWARE OR LESS;
If the HPSOV does not close and high stage engine pressure is greater than 127±10 psig, these indications will appear:
a) L(R) BLEED light illuminates
b) EICAS message L(R) ENG HPSOV (Caution) shows

c) Master Caution light illuminates
d) An owl aural warning tone sounds

2) AIRPLANES WITH EICAS -006 SOFTWARE OR LATER;
If the HPSOV does not close and high stage engine pressure is greater than 127±10 psig, these indications will appear:
a) L(R) BLEED light illuminates
b) EICAS message L(R) ENG HPSOV (Advisory) shows
c) EICAS message L(R) ENG HPSOV (Status/Maintenance) sbows

(e) The indications will extinguish if the valve closes or the pressure is less than 127±10 psig.

(f) A BLEED indicator light for each engine is found on the pilot's overhead P5 panel above the ENG switch/light . The indication light logic is in the air supply control card. The BLEED light will come on when any of these conditions occur:
1) L(R) engine HPSOV does not close after it is given the signal to do so
2) L(R) engine PRV stays open with an overpressure condition (78±2 psig) present for more than 5 seconds
3) L(R) engine PRV does not close after it is given the signal to do so.

(g) The ENG switch/light OFF signal or a bleed air overheat condition (overtemperature sensor) will cause the HPSOV and PRV to close. The air supply control card will cancel the close command if:
1) Cowl anti-ice set to ON and
2) A strut overheat condition (caused by a strut leak) is not found.

(h) The HPSOV and PRV are closed when the strut overtemperature switches are operated by a strut leak condition for more than 5±1 seconds. operation of the overtemperature switches will give these indications:
1) The DUCT LEAK light, on the pilot's overhead P5 panel, will illuminate
2) The level B EICAS message L(R) STRUT DUCT LEAK
3) An OWL aural warning.

(i) The strut duct leak condition will set an electrical latch. The latch will keep the PRV and HPSOV closed even if the temperature decreases. The latch will be released when the L(R) ENG OFF switch/light is moved from on to OFF to on.

(j) AIRPLANES WITH EICAS -005 SOFTWARE OR LESS;
The PRSOV, PRV, and HPSOV are closed by the L(R) ENG OFF switch/light on the pilot's overhead P5 panel. If the PRV or HPSOV does not close in 5±1 seconds after the signal to do so is given the BLEED light will illuminate. If the PRV did not close the Caution level EICAS message L(R) ENG PRV will appear. If the HPSOV did not close, the Caution level EICAS message L(R) ENG HPSOV will appear. The EICAS messages will also be accompanied by an owl aural warning tone and illumination of the Master Caution light.

(k) AIRPLANES WITH EICAS -006 SOFTWARE OR LATER;
The PRSOV, PRV, and HPSOV are closed by the L(R) ENG OFF switch/light on the pilot's overhead P5 panel. If the PRV or HPSOV does not close in 5±1 seconds after the signal to do so is given the BLEED light will illuminate. If the PRV did not close, the Advisory and Status/Maintenance level EICAS messages L(R) ENG PRV will show. If the HPSOV did not close, the Advisory and Status/Maintenance level EICAS messages L(R) ENG HPSOV will show. The EICAS messages will 'not' be accompanied by an owl aural warning tone or the illumination of the Master Caution light.

(l) The HPSOV and PRV will close when the air supply thermal overtemperature switch finds an overheat condition. The overtemperature switch, found just upstream of the PRSOV in the strut, operates if temperaure goes above 255°C (491°F). If the HPSOV and the PRV do not close within 5±1 seconds these things will happen:
1) The level C EICAS message L(R) ENG BLD OVHT
2) The OVHT light found on the pilots' overhead P5 panel will come on
3) An electrical latch will be set to keep the valve closed. The latch may be removed if the L(R) ENG OFF switch/light is moved from on to OFF to on. If the overtemperature sensor still finds an overheat condition the latch will be set again.

(m) The controllers for both the HPSOV and the HPSOV contain filters to prevent dirt from entering the controller metering orifice. if these filters become clogged, the controllers may not be able to supply enough air to operate the valve.

(2) PRSOV Operation (Fig. 18)

(a) The PRSOV controls the flow of engine air to the air supply distribution system.

(b) The power necessary for valve operation includes 28v dc power for solenoid and relay control, 28v dc for amber off light, and 5 V ac power for white flowbar light.

(c) To open the PRSOV the ENG switch/light is pushed to the on position. The bleed air control card will then send a 28v dc pulse to set the valve to the AUTO mode. This lets the valve operate pneumatically.

(d) To close the PRSOV the ENG switch/light is pushed to the OFF position. The bleed air control card will then send a 28v dc pulse to set the valve to the OFF mode. A 28v dc pulse is also sent to set the valve to OFF if any of these conditions are found:
1) An overheat condition of 255°C (491°F) exists
2) The fire switch is operated
3) During an engine start. After the engine is started the control card will set the valve to the AUTO mode.

(e) The amber OFF light is on when the PRSOV is in the closed position. The white flow bar can be seen when the system is on. If both lights are on, the valve was told to open but is closed. The EICAS advisory message L (R) ENG BLEED OFF will come on when EICAS finds all of these conditions:
1) The PRSOV is fully closed
2) Engine N2 speed at or above idle (as seen by the engine speed card)
3) Fuel cutoff levers in RUN
4) The fire extinguisher switch is disarmed.

(f) Normally, the L/R ENG 'OFF' light illuminates when the PRSOV is closed with L/R ENG bleed switch selected on (white flowbar shown), with no engines running, APU bleed air on, and A/C packs selected off or on. Normally, the L/R ENG 'OFF' light extinguishes and the PRSOV opens when the upstream bleed pressure is above 10 psi and the L/R ENG bleed switch is selected on (white flowbar shown). The PRSOV will be closed as long as the pressure downstream of the PRSOV is at least 5-inches H2O (0.18 psi) greater than the pressure upstream of the PRSOV due to the reverse flow check function of the PRSOV. However, it is possible the L/R ENG 'OFF' light may extinguish due to a buildup of pressure upstream (<13 psi) of the PRSOV caused by a leaky PRSOV. In this scenario, if an A/C pack is then selected on, this will cause a decrease in the pressure downstream of the PRSOV enough to allow the PRSOV to open and cause the L/R ENG 'OFF' light to extinguish (767 MT 36-013).

(g) When the airplane is on the ground with the engines off, the PRSOV can open on its own in this way.
1) If the APU is operating or a ground cart is connected the pneumatic ducts downstream of the PRSOV will be pressurized.
2) If there is enough leakage past the valve the upstream duct may pressurize enough to allow the valve to open.

(3) Isolation Valve Operation (Fig. 19)

(a) The power necessary for valve operation includes 115v ac power for operation, 28v dc power for the switch/lights and relays, and 5v ac power for white bar illumination.

(b) There is a separate switch/light for each valve (left, right, and center). The C ISLN switch/light is guarded open. When the switch/light is pressed to the open position, the actuator moves the valve open. When the valve switch/light is pressed to the close position, the actuator moves the valve closed.

(c) Valve disagreement light logic relays and amber disagreement lights are supplied with 28v dc power. The amber VALVE light is on when the valve moves and off when valve reaches its necessary position. Valve position is determined by the limit switches on each valve. If the amber light remains on, a disagreement between valve position and necessary valve position is shown.

(4) Fan Air Modulating Valve Operation
  (a) The fan air modulating valve is opened and closed by air pressure from the fan air temperature sensor. The pressure is felt by a diaphragm attached to the valve control lever. A balancing feedback force is given on the lever by a spring and feedback cam on the valve shaft. Movement of the control lever because of pressure changes and feedback forces moves a servo poppet to control the actuator piston.
  (b) The valve is spring loaded open. If either bleed air supply or signal pressure is lost from the fan air temperature sensors the valve moves open.
(5) APU Shutoff Valve Operation (Fig. 21)
  (a) The necessary Power for the APU shutoff valve operation includes 115v ac power for valve operation, 28v dc for relay control, 28v dc for switchlights, and 5v ac for white flowbar lights.
  (b) When the APU VALVE switch/light is pushed to the on position, 115v ac power to the valve actuator moves the valve open. For the valve to open, the control relay must be energized. These conditions must occur for the control relay to be energized:
    1) The APU VALVE switch/light ON
    2) The APU override relay not energized
    3) The APU fire switch in the OFF position
    4) The APU start relay energized (ON or START selected)
    5) The APU is at more than 95% capacity as read by the APU controller.
  (c) The control relay will not energize and the APU shutoff valve will close if any of these occur:
    1) The APU VALVE switch/light is moved to OFF
    2) The APU is shut off (start relay not energized)
    3) The APU runs at less than 95% capacity
    4) The APU fire switch is pushed to open
    5) Override relay is energized.
  (d) The override relay will not operate if any of these occur:
    1) Either engine is in the engine start mode
    2) The center isolation valve is closed
    3) If the left and right engine N2 are at less than 50%
    4) Either PRSOV is open.
  (e) 28v dc power is used to set the VALVE switch/light disagreement light. The light comes on when the valve is not in the necessary position.

C. Control

(1) To operate the pneumatic system, provide electrical power (Ref 24-22-00). The following circuit breakers on the overhead circuit breaker P11 panel must be closed:

ISOL VALVE PWR L	ISOL VALVE CONT L
ISOL VALVE PWR R	ISOL VALVE CONT R
ISOL VALVE PWR C	ISOL VALVE CONT C
APU BLEED PWR	APU BLEED CONT
L ENG BLEED CONT	L ENG BLEED IND
R ENG BLEED CONT	R ENG BLEED IND
DUCT PRESS IND PWR	DUCT PRESS IND L
DUCT PRESS IND R	

(2) Supply air pressure from the APU (AMM 49-41-00/001), an engine (AMM 74-00-00/001), or the pneumatic ground connection. The duct pressure indicator on the pilots' overhead panel P5 will show the pressure in the supply ducts. Switch/lights on the pilots' overhead panel P5 will give indication of the air system operation.

PNEUMATIC DISTRIBUTION

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ASSEMBLY - AIR SUPPLY CONTROL CARD	8	2	119AL, MAIN EQUIP CTR, P50	36-11-12
CIRCUIT BREAKER -			FLT COMPT, P11	
CONT, AIR SUPPLY APU BLEED, C1333		1	11S24	*
CONT, C AIR SUPPLY ISLN VLV, C1338		1	11S15	*
CONT, L AIR SUPPLY ENG BLEED, C1339		1	11S11	*
CONT, L AIR SUPPLY ISLN VLV, C1334		1	11A14	*
CONT, R AIR SUPPLY ENG BLEED, C1340		1	11S20	*
CONT, R AIR SUPPLY ISLN VLV, C1335		1	11S22	*
CONT, R AIR SUPPLY ISLN VLV ALT, C1345		1	11A27	*
IND, L AIR SUPPLY DUCT PRESS, C1332		1	11S16	*
IND, L AIR SUPPLY ENG BLEED, C1343		1	11S10	*
IND, R AIR SUPPLY ENG BLEED, C1344		1	11S19	*
IND, R AIR SUPPLY DUCT PRESS, C1342		1	11S25	*
POWER, AIR SUPPLY APU BLEED, C1336		1	11S23	*
PWR, AIR SUPPLY DUCT PRESS, C4241		1	11S17	*
PWR, C AIR SUPPLY ISLN VLV, C1337		1	11S14	*
PWR, L AIR SUPPLY ISLN VLV, C1330		1	11S12	*
PWR, R AIR SUPPLY ISLN VLV, C1331		1	11S21	*
CIRCUIT BREAKER -			119AL, MAIN EQUIP CTR, P36	
BITE, AIR SUPPLY, C1341		1	36L7	*
CONNECTOR - PNEUMATIC GROUND AIR	7	2	193LL	36-11-03
CONTROLLER - HIGH PRESSURE, M7191	5	2	415AL,425AL	36-11-08
CONTROLLER - PRESSURE REGULATING VALVE, M7200	5	2	415AL,425AL	36-11-19
MODULE - BLEED AIR SUPPLY, M15		1	FLT COMPT, P5	36-23-01
PRECOOLER - AIR SUPPLY	4	2	414AR,424AR,418AR,428AR,416AR, 426AR,417AL,427AL,436BR,446BR	36-11-15
RELAY - (FIM 31-01-06/101)				
START, LEFT ENG 1, K665				
START, RIGHT ENG 1, K666				
RELAY - (FIM 31-01-33/101)				
START, LEFT BLEED AIR ENGINE, K494				
N2, LEFT BLEED AIR ENGINE, K777				
RELAY - (FIM 31-01-36/101)				
INDICATION, C AIR SUPPLY ISLN VLV, CLOSED, K21				
INDICATION, C AIR SUPPLY ISLN VLV, OPEN, K22				
INDICATION, L AIR SUPPLY ISLN VLV, CLOSED, K10				
INDICATION, L AIR SUPPLY ISLN VLV, OPEN, K16				
VALVE, L T/R PNEUMATIC, K1021				

* SEE THE WDM EQUIPMENT LIST

Pneumatic Distribution - Component Index
Figure 101 (Sheet 1)

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY - (FIM 31-01-37/101)				
CONT, RIGHT ENG TAI T/D, K649				
INDICATION R, AIR SUPPLY ISLN VLV, CLOSED, K19				
INDICATION R, AIR SUPPLY ISLN VLV, OPEN, K18				
N2, RIGHT ENG, K778				
START, RIGHT BLEED AIR ENGINE, K495				
VALVE, RIGHT T/R PNEUMATIC, K1022				
RELAY - (FIM 31-01-49/101)				
CONTROL, APU AIR SUPPLY VLV, K23				
INDICATION, APU AIR SUPPLY, CLOSED, K24				
INDICATION, APU AIR SUPPLY, OPEN K25				
SENSOR - FAN AIR TEMPERATURE, TS101	4	2	434AR,444AR	36-11-17
SWITCH - LEFT ENGINE FIRE, S37		1	AFT EQUIPMENT PANEL, P8	
SWITCH - RIGHT ENGINE FIRE, S38		1	AFT EQUIPMENT PANEL, P8	
SWITCH-LIGHT - BLEED AIR SUPPLY				
OFF, L ENG, YCZS4		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
OFF, R ENG, YCZS6		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
VALVE, APU, YCZS5		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
VALVE, C ISLN, YCZS2		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
VALVE, L ISLN, YCZS1		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
VALVE, R ISLN, YCZS3		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
VALVE - APU AIR SUPPLY CHECK	6	1	312AR	36-11-11
VALVE - APU AIR SUPPLY SHUTOFF, V47	6	1	313AL	36-11-10
VALVE - FAN AIR MODULATING, V112	4	2	414AR,424AR,418AR,428AR,416AR, 426AR	36-11-16
VALVE - HIGH PRESSURE SHUTOFF, V347	3	2	413AL,423AL,415AL,425AL,417AL, 427AL	36-11-07
VALVE - INTERMEDIATE PRESSURE CHECK	3	2	413AL,423AL,415AL,425AL,417AL, 427AL	36-11-06
VALVE - ISOLATION BYPASS CHECK	7	3	193NL,194LR	36-11-05
VALVE - LEFT, CENTER, RIGHT ISOLATION, V44, V45,V46	7	3	193NL,194LR	36-11-04
VALVE - LEFT, RIGHT, AIR SUPPLY PRESSURE REGULATING AND SHUTOFF, V42,V43	3,4	2	434AR,434AL,444AR,444AL	36-11-09
VALVE - PRESSURE REGULATING, V352	5	2	413AL,423AL,415AL,425AL,417AL, 427AL	36-11-18

* SEE THE WDM EQUIPMENT LIST

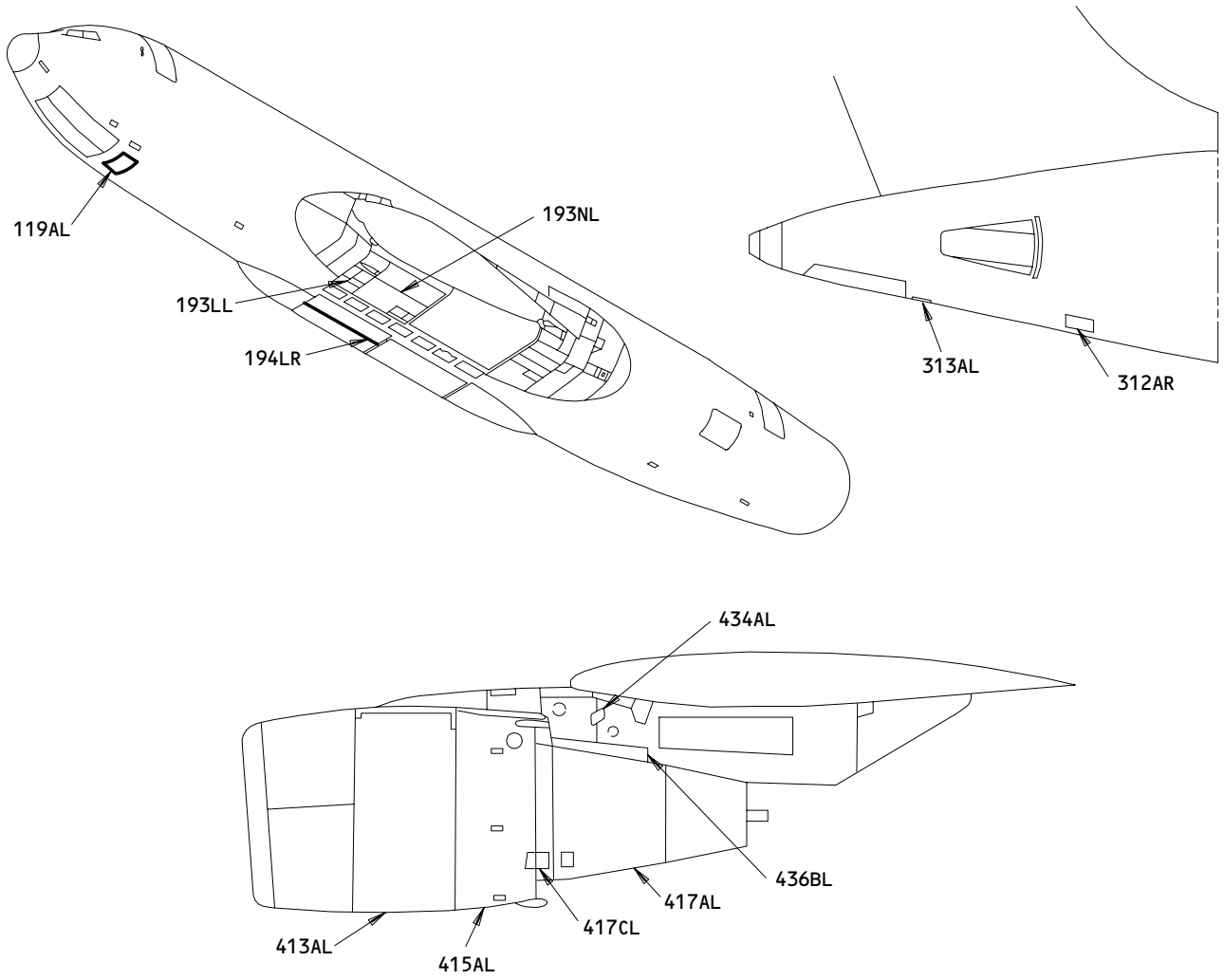
Pneumatic Distribution - Component Index
Figure 101 (Sheet 2)

C10443

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
SENSOR – FAN AIR TEMPERATURE, TS101	4	2	434AR,444AR	36-11-17
SWITCH – LEFT ENGINE FIRE, S37		1	AFT EQUIPMENT PANEL, P8	
SWITCH – RIGHT ENGINE FIRE, S38		1	AFT EQUIPMENT PANEL, P8	
SWITCH–LIGHTS – BLEED AIR SUPPLY				
OFF, L ENG, YCZS4		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
OFF, R ENG, YCZS6		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
VALVE, APU, YCZS5		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
VALVE, C ISLN, YCZS2		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
VALVE, L ISLN, YCZS1		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
VALVE, R ISLN, YCZS3		1	FLT COMPT, P5, BLEED AIR SUPPLY MODULE, M15	*
VALVE – APU AIR SUPPLY CHECK	6	1	312AR	36-11-11
VALVE – APU AIR SUPPLY SHUTOFF, V47	6	1	313AL	36-11-10
VALVE – FAN AIR MODULATING, V112	4	2	414AR,424AR,418AR,428AR,416AR, 426AR	36-11-16
VALVE – HIGH PRESSURE SHUTOFF, V347	3	2	413AL,423AL,415AL,425AL,417AL, 427AL	36-11-07
VALVE – INTERMEDIATE PRESSURE CHECK	3	2	413AL,423AL,415AL,425AL,417AL, 427AL	36-11-06
VALVE – ISOLATION BYPASS CHECK	7	3	193NL,194LR	36-11-05
VALVE – LEFT, CENTER, RIGHT ISOLATION, V44, V45,V46	7	3	193NL,194LR	36-11-04
VALVE – LEFT, RIGHT, AIR SUPPLY PRESSURE REGULATING AND SHUTOFF, V42,V43	3,4	2	434AR,434AL,444AR,444AL	36-11-09
VALVE – PRESSURE REGULATING, V352	5	2	413AL,423AL,415AL,425AL,417AL, 427AL	36-11-18

* SEE THE WDM EQUIPMENT LIST

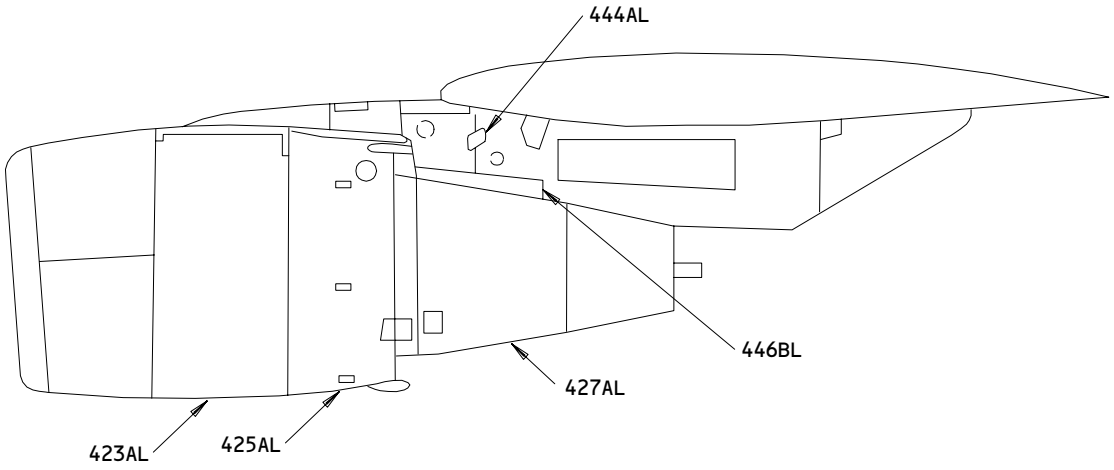
Pneumatic Distribution – Component Index
Figure 101 (Sheet 3)



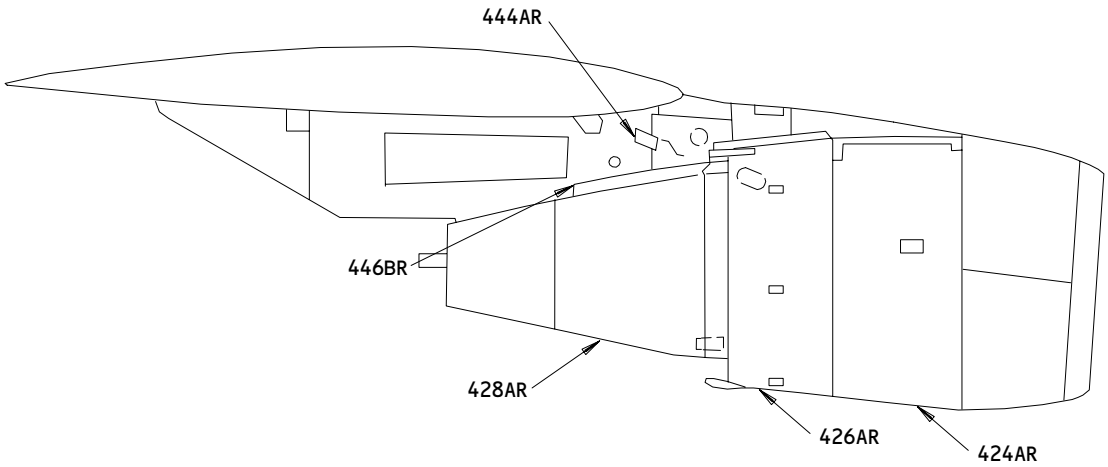
NO. 1 ENGINE
LEFT SIDE

NO. 1 ENGINE
RIGHT SIDE

Pneumatic Distribution - Component Location
Figure 102 (Sheet 1)



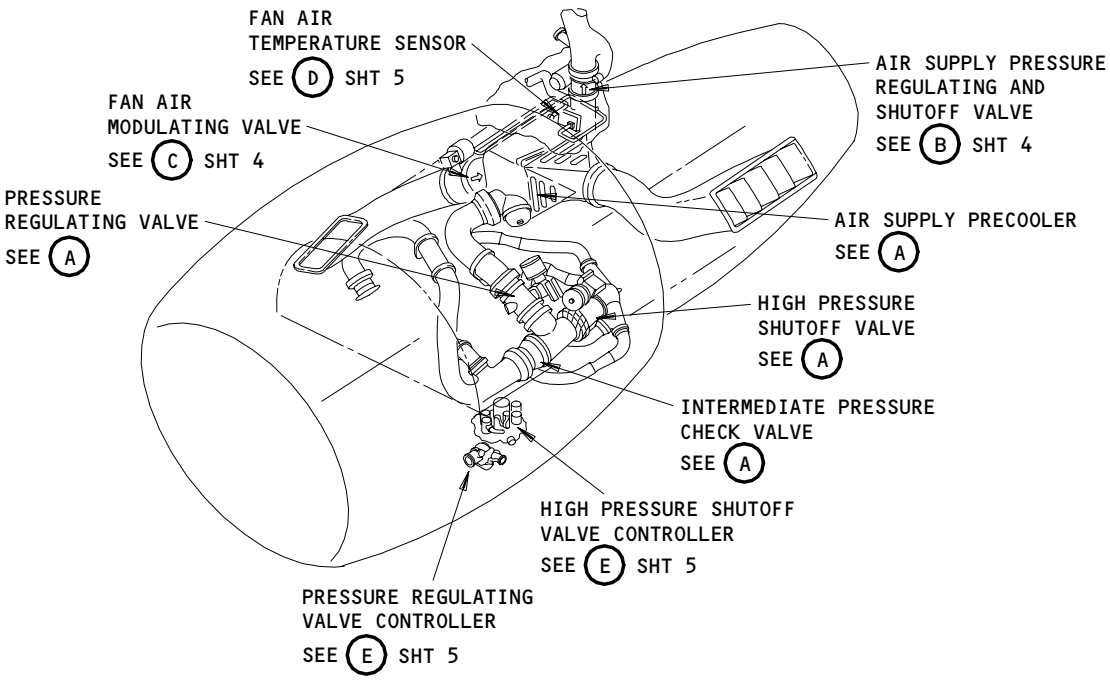
NO. 2 ENGINE
LEFT SIDE

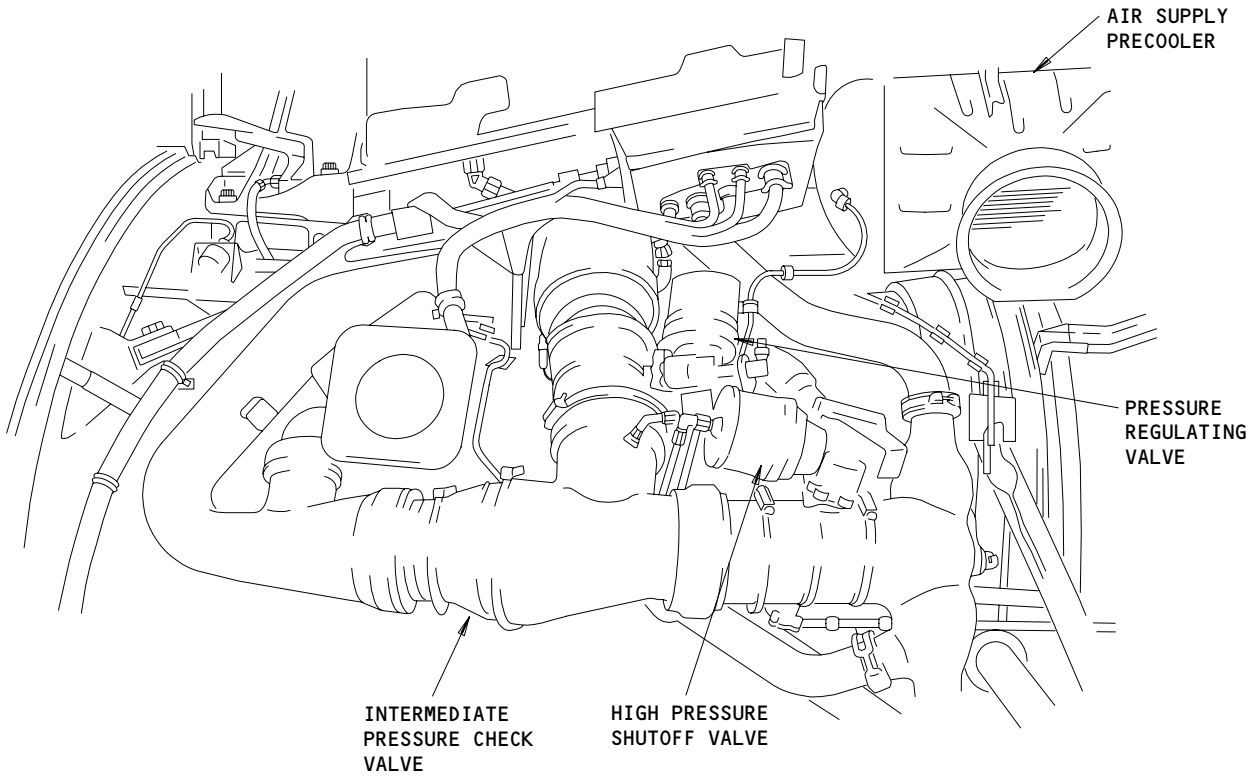


NO. 2 ENGINE
RIGHT SIDE

Pneumatic Distribution - Component Location
Figure 102 (Sheet 2)

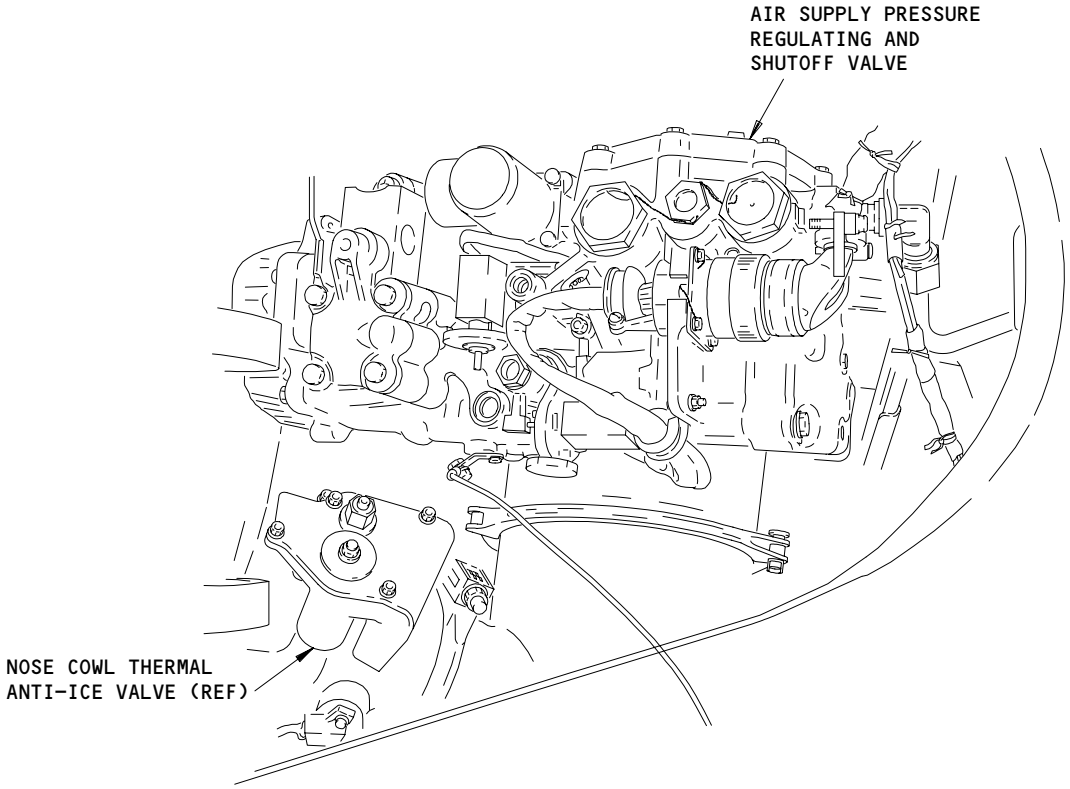
E88986





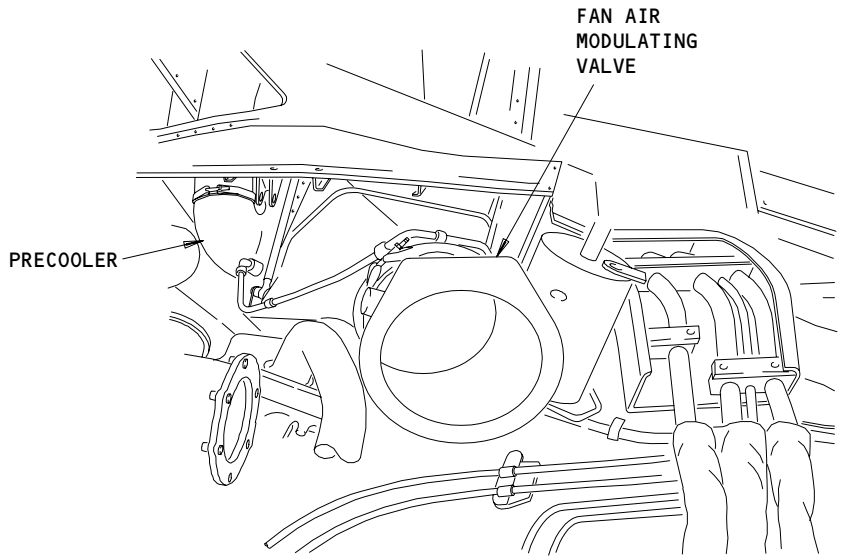
A

Pneumatic Distribution - Component Location
Figure 102 (Sheet 3)



AIR SUPPLY PRESSURE REGULATING AND SHUTOFF VALVE

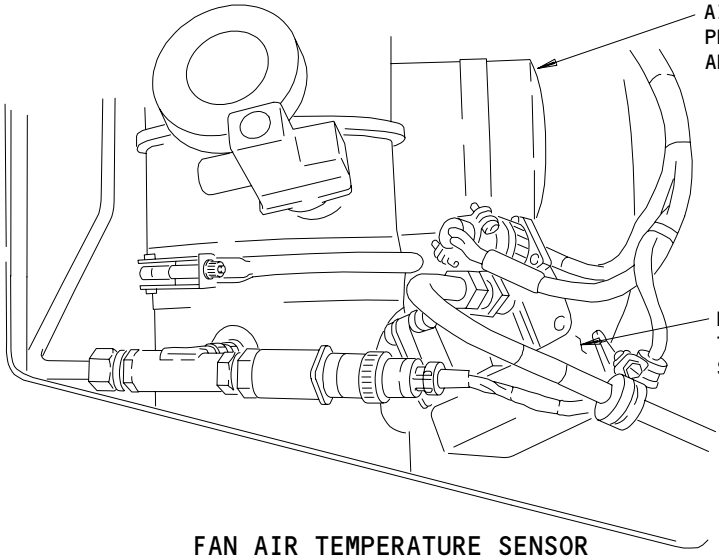
B



FAN AIR MODULATING VALVE

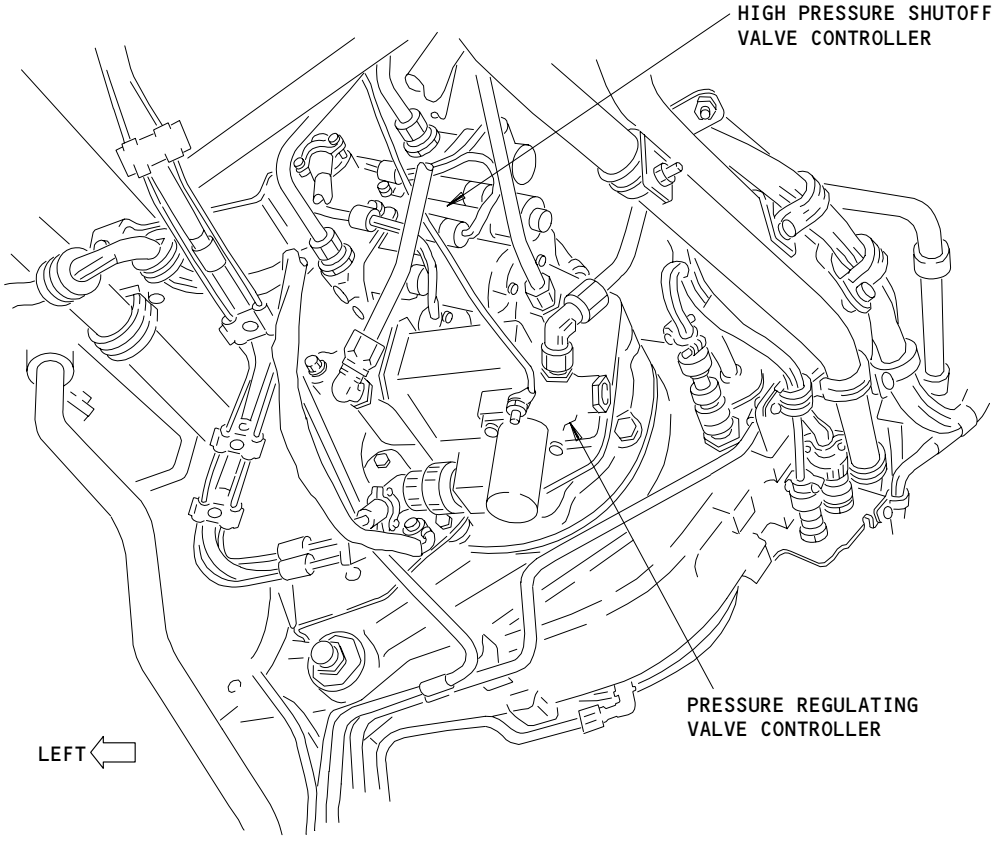
C

Pneumatic Distribution - Component Location (Details from Sht 3)
Figure 102 (Sheet 4)



FAN AIR TEMPERATURE SENSOR

(D)



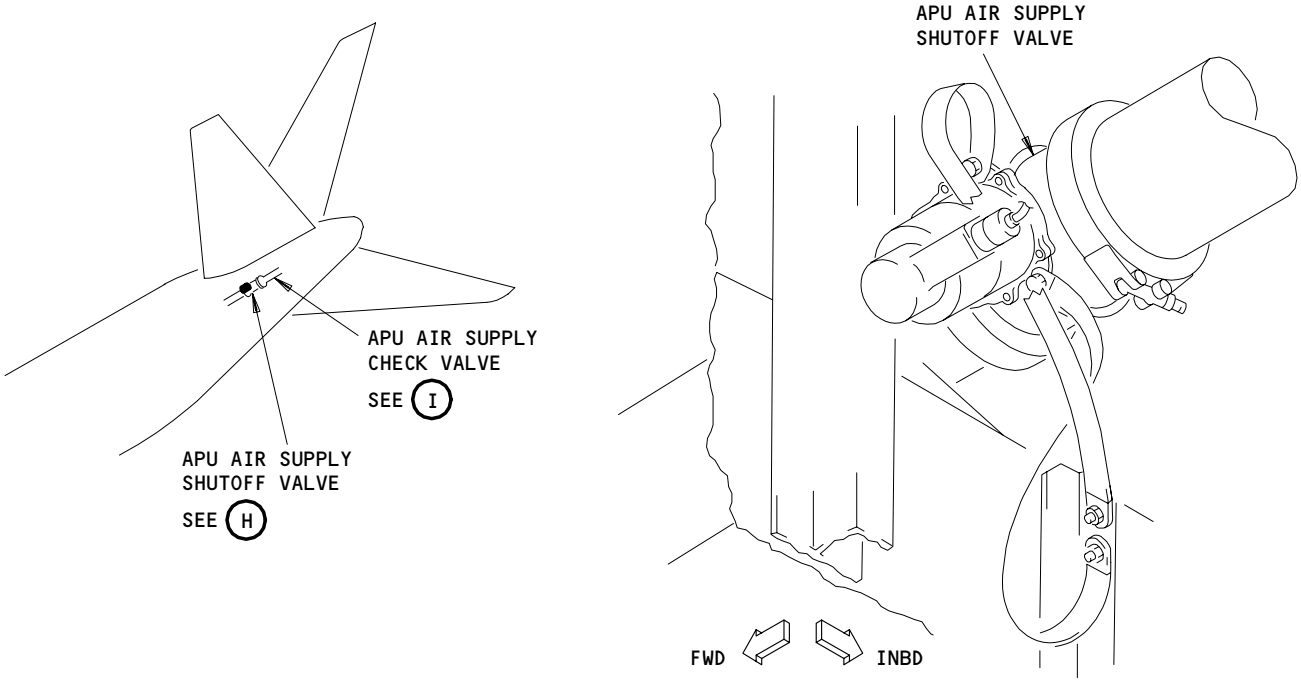
PRESSURE REGULATING VALVE CONTROLLER

(E)

NOT USED

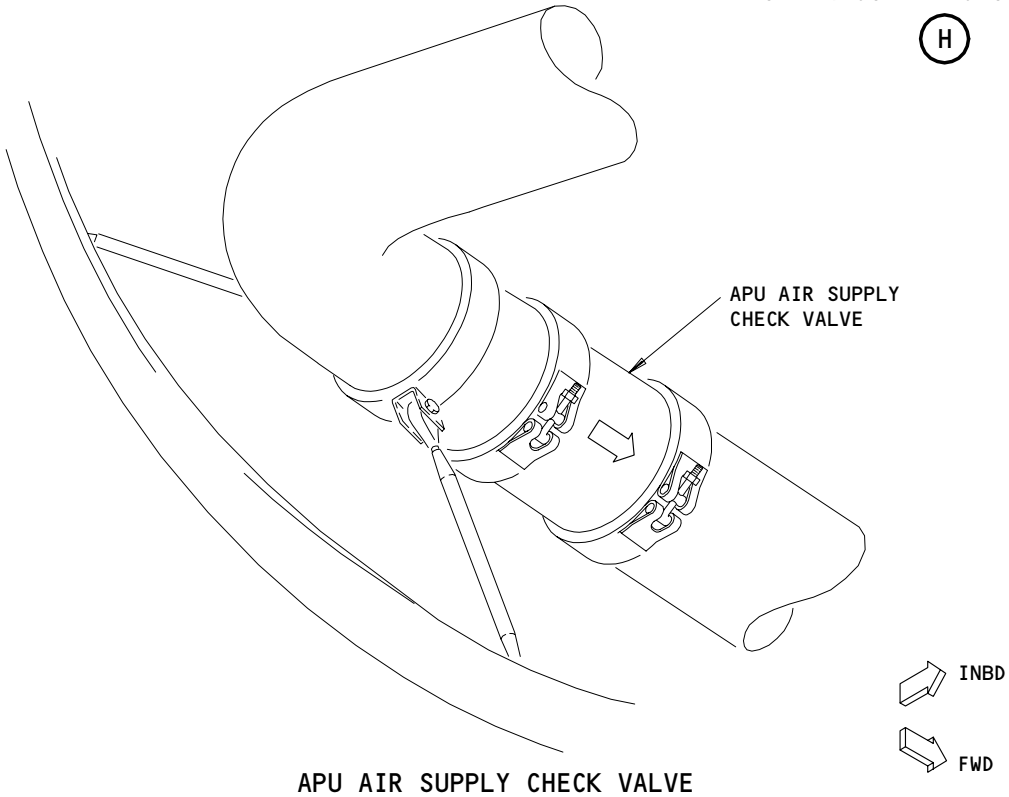
(G)

Pneumatic Distribution – Component Location (Details from Sht 3)
Figure 102 (Sheet 5)



APU AIR SUPPLY SHUTOFF VALVE

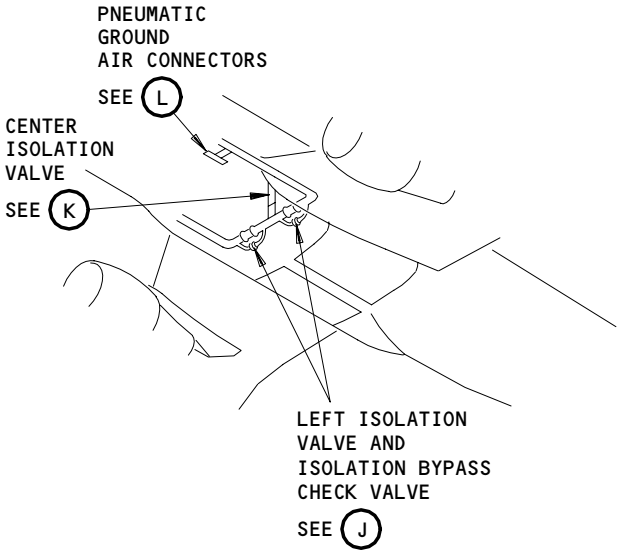
H

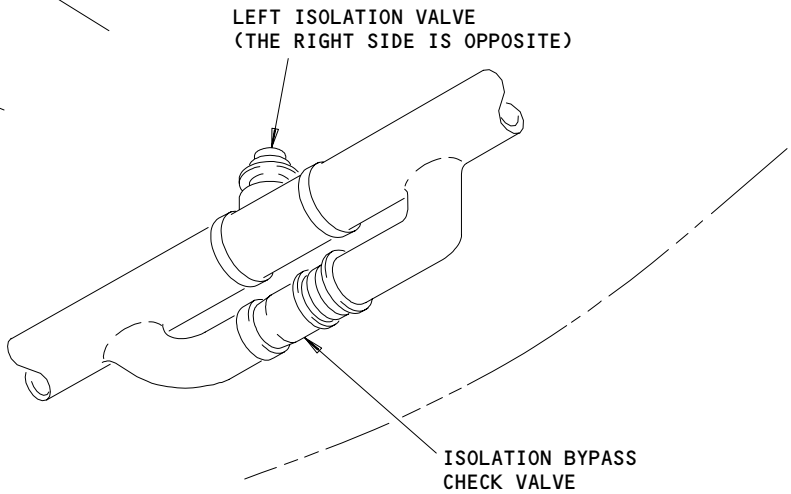


APU AIR SUPPLY CHECK VALVE

I

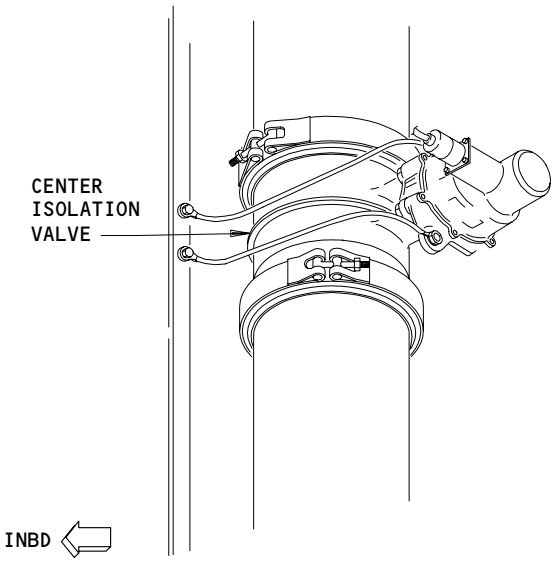
Pneumatic Distribution – Component Location
Figure 102 (Sheet 6)





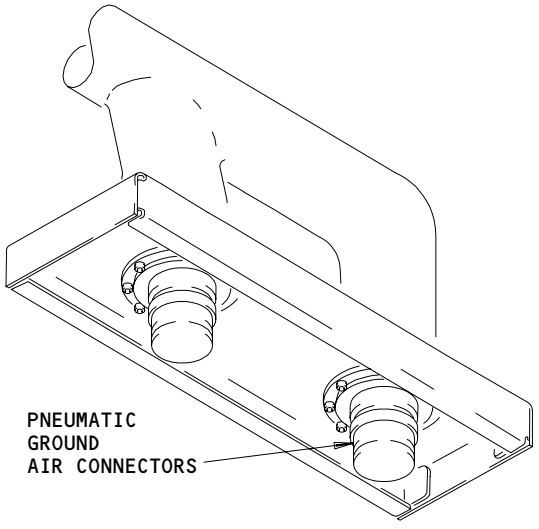
LEFT ISOLATION VALVE AND ISOLATION BYPASS CHECK VALVE

J



CENTER ISOLATION VALVE

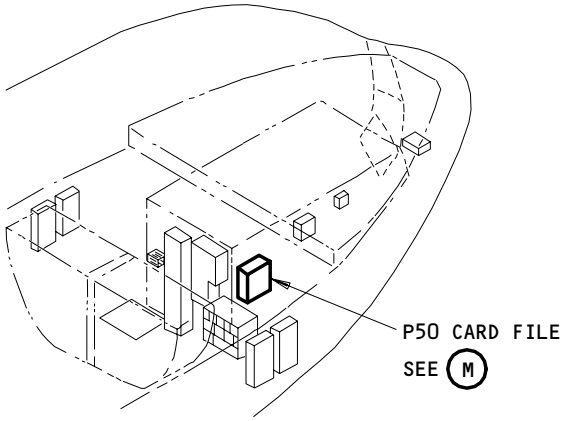
K

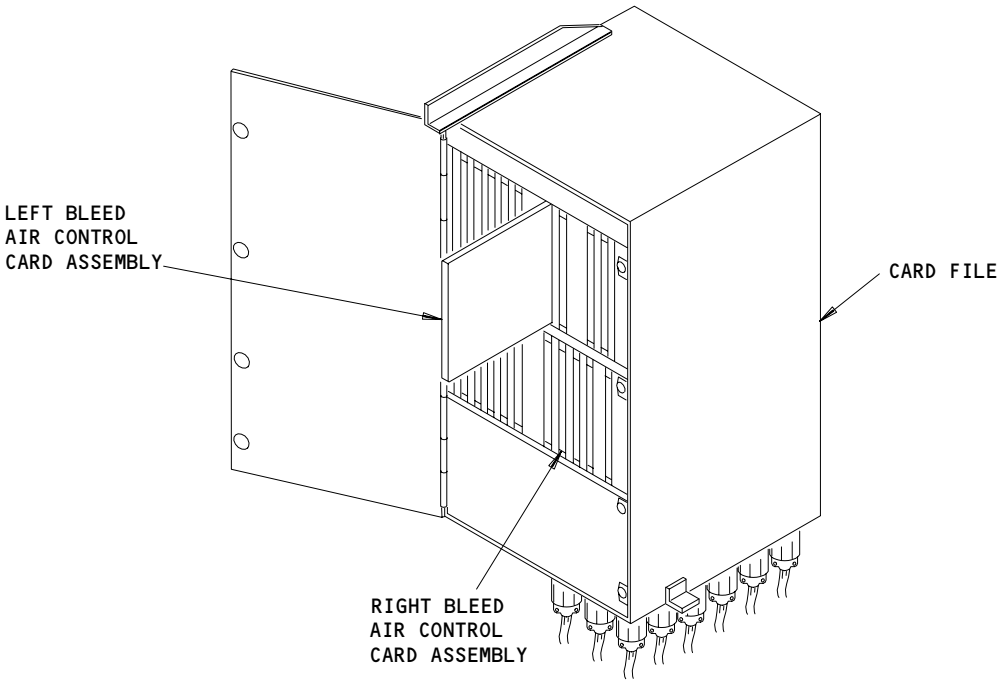


PNEUMATIC GROUND AIR CONNECTORS

L

Pneumatic Distribution - Component Location
Figure 102 (Sheet 7)





P50 CARD FILE
(M)

Pneumatic Distribution – Component Location
Figure 102 (Sheet 8)

EICAS MESSAGE "L (R) BLD DUCT LEAK" AND LEFT (RIGHT) DUCT LEAK LIGHT ILLUMINATED

PREREQUISITES
NONE

1 ALIGN THE DUCT CLAMPS; OR REPAIR OR REPLACE THE DUCT SECTION TO REPAIR THE DUCT LEAK IN THE WING LEADING EDGE (AMM 36-11-01/401).

EICAS Message L (R) BLD DUCT LEAK and Left (Right) Duct Leak Light Illuminated
Figure 103

EICAS MESSAGE "C BLD ISLN VAL", CENTER ISOLATION VALVE LIGHT FAILS TO GO OUT WITH VALVE SELECTED OPEN.

PREREQUISITES

MAKE SURE THESE CIRCUIT BREAKERS ARE CLOSED:
11S14,11S15

MAKE SURE THE AIRPLANE IS IN THIS CONFIGURATION:
ELECTRICAL POWER IS ON (AMM 24-22-00/201)

DESCRIPTION:

THE ISOLATION VALVE IS NOT IN THE COMMANDED POSITION.

POSSIBLE CAUSES:

1. ISOLATION VALVE
2. ELECTRICAL CIRCUIT (OPEN/CLOSED POSITION INDICATION)(WDM 36-11-31).

FAULT ISOLATION:

1 PUT THE CENTER ISOLATION VALVE SWITCH-LIGHT ON THE P5 PANEL TO THE "OPEN" POSITION.
WAIT 30 SECONDS.
OPEN THIS CIRCUIT BREAKER ON THE P11 PANEL:

11S14, CENTER ISOLATION VALVE POWER

DISCONNECT CONNECTOR D418 FROM THE CENTER ISOLATION VALVE, V46.
DO A CHECK FOR 25 ±7V DC FROM PIN 4 TO PIN 5 (GROUND) ON THE CONNECTOR (WDM 36-11-31).
IS THERE 25 ±7V DC ON THE VOLTMETER?

NO → 11 REPLACE THE CENTER ISOLATION VALVE OPEN INDICATION RELAY, K22, ON THE P36 PANEL (WDM 36-11-31).

YES → SEE SHEET 2 (BLOCK 2)

EICAS Message C BLD ISLN VAL, Center Isolation Valve Light Fails to Go Out with Valve Selected Open.
Figure 104 (Sheet 1)

E92140

AIR SUPPLY DISTRIBUTION SYSTEM - ADJUSTMENT/TEST

1. General
   A. This procedure contains three tasks:
      (1) The first task is an operational test of the air supply system.
      (2) The second task is an air leak test of the air supply system, downstream of the pressure regulating and shutoff valve. This test is used to find the air leaks at the duct and duct joints.
      (3) The third task is an air leak test of all the air supply system. This test gives an indication of the tightness of the air supply system. This test measures an air pressure decrease of the air supply system for a given amount of time. This test does not find individual air leaks in the duct or duct joints.
   B. This procedure also has a graph of manifold pressure (as seen on the duct pressure gauge on the P5 panel) versus engine EPR (Figure 504).

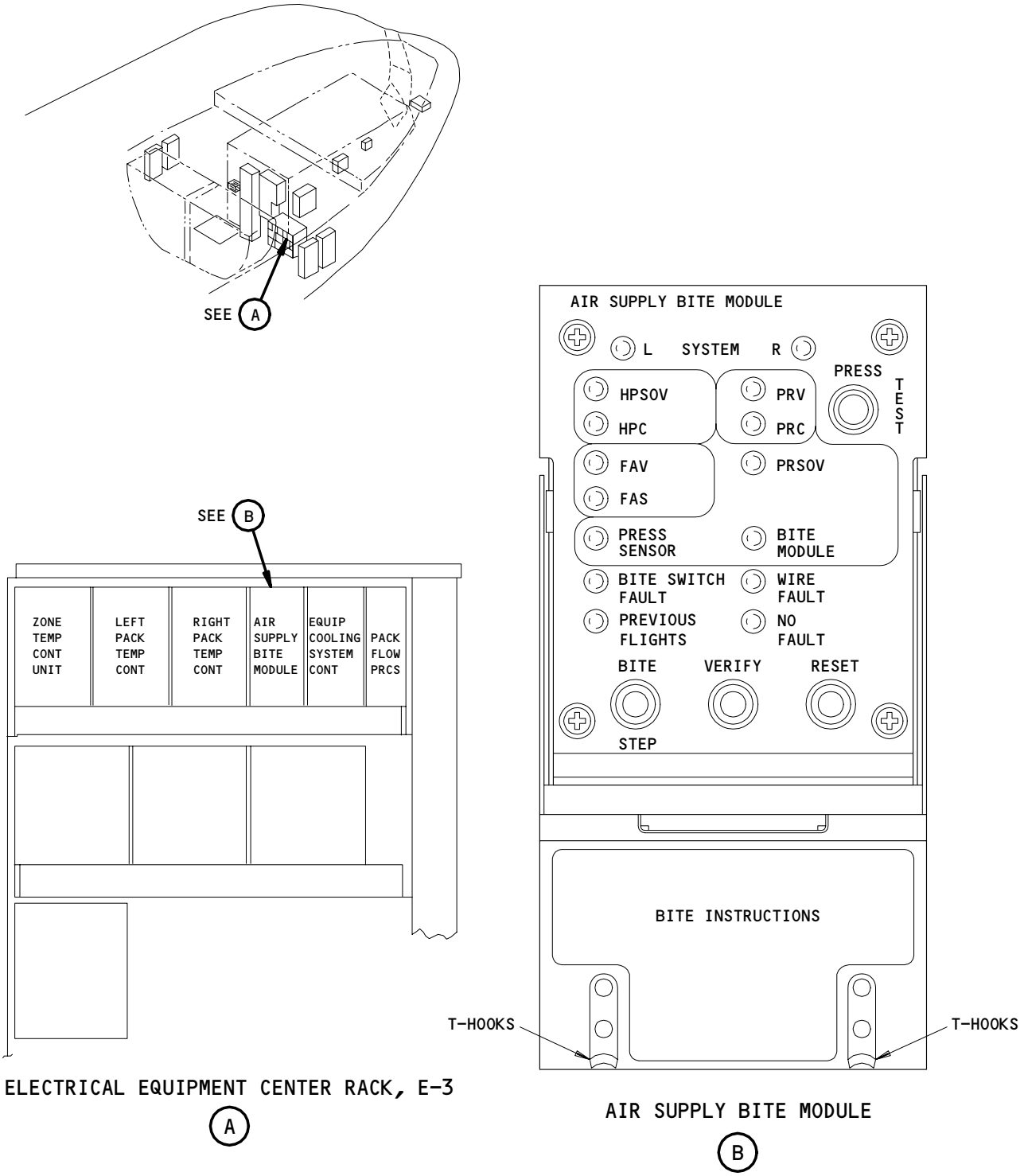
TASK 36-11-00-715-149

2. Operational Test - Air Supply Distribution System (Fig. 501, 502)
   A. General
      (1) This is a test of the engine bleed air and the air supply system, and their controls. The test will also include the BITE test and a test of all the bleed air and air supply indications. The test is done with operational engines.
   B. References
      (1) AMM 24-22-00/201, Electric Power Control
      (2) FIM 36-20-00/101, Indicating
      (3) AMM 71-00-00/201, Engine General
   C. Access
      (1) Location Zones
          100 Lower Half of Fuselage (except Section 48)
          500 Left Wing
          600 Right Wing

   D. Prepare for the Operational test

      S 865-004
      (1) Make sure the EICAS circuit breakers (6 locations) on the overhead circuit breaker panel, P11, are closed.

      S 865-006
      (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
      (a) 11D19, START CONT L



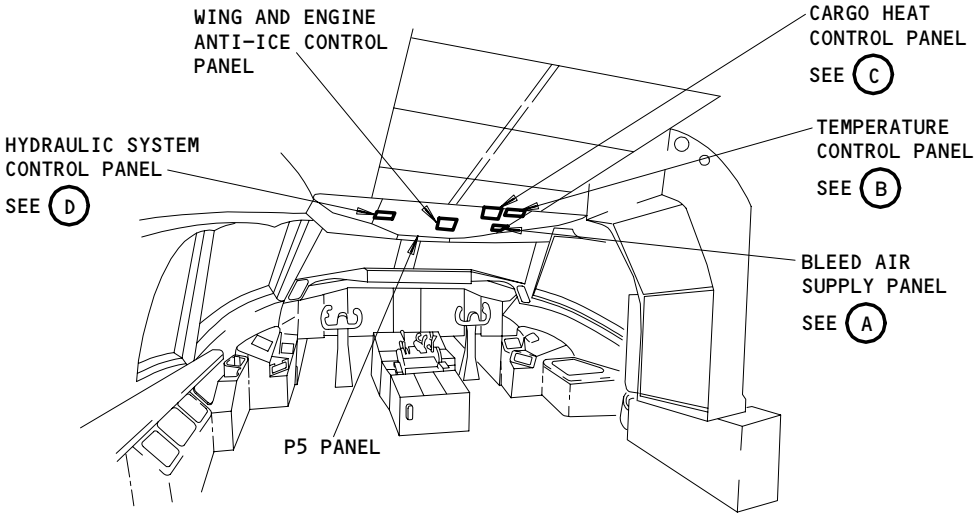
ELECTRICAL EQUIPMENT CENTER RACK, E-3

A

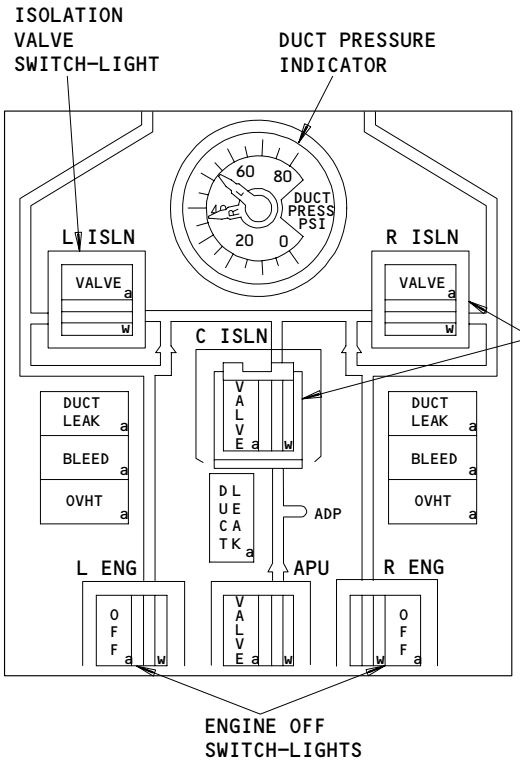
AIR SUPPLY BITE MODULE

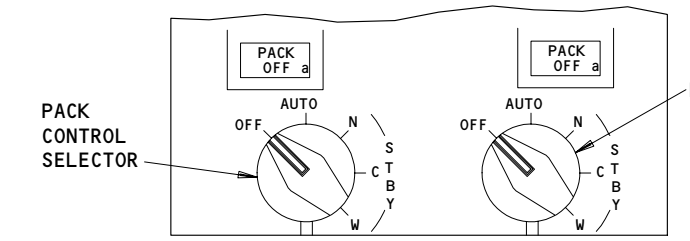
B

Air Supply Distribution Adjustment Test
Figure 501



FLIGHT COMPARTMENT





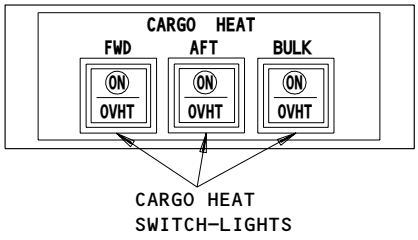
TEMPERATURE CONTROL PANEL

B

BLEED AIR SUPPLY PANEL

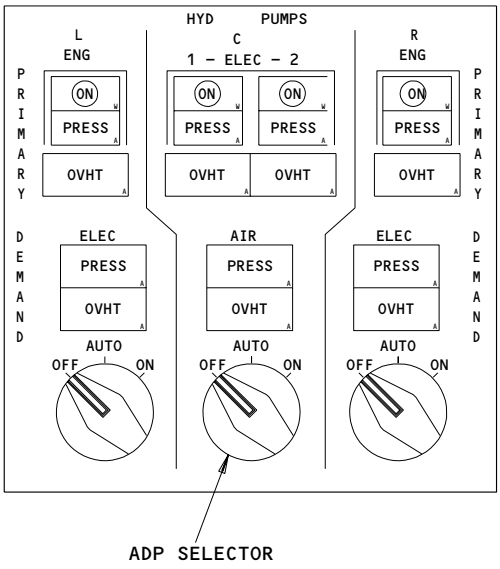
A

Air Supply Distribution Adjustment Test
Figure 502 (Sheet 1)



FORWARD, AFT AND BULK CARGO HEAT
SWITCH–LIGHTS

C



HYDRAULIC SYSTEM CONTROL PANEL

D

Air Supply Distribution Adjustment Test
Figure 502 (Sheet 2)

(b) 11D20, START CONT R
(c) 11N27, BULK CARGO HEAT OVRD
(d) 11RO1, L IND LTS 1
(e) 11R21, FWD CARGO HEAT OVERRIDE
(f) 11R22, AFT CARGO HEAT OVERRIDE
(g) 11R28, R IND LTS 1
(h) 11S10, L ENG BLEED IND
(i) 11S11, L ENG BLEED CONT
(j) 11S12, L AIR SUPPLY ISLN VLV PWR (or)
ISOL VALVE PWR L
(k) 11S14, C AIR SUPPLY ISLN VLV PWR(or)
ISOL VALVE PWR C
(l) 11S15, C AIR SUPPLY ISLN VLV CONT(or)
ISOL VALVE CONT C
(m) 11S19, R ENG BLEED IND
(n) 11S20, R ENG BLEED CONT
(o) 11S21, R AIR SUPPLY ISLN VLV PWR(or)
ISOL VALVE PWR R
(p) 11S22, R AIR SUPPLY ISLN VLV CONT(or)
ISOL VALVE CONT R
(q) 11S23, AIR SUPPLY APU BLEED PWR (or)
APU BLEED PWR
(r) 11S24, AIR SUPPLY APU BLEED CONT(or)
APU BLEED CONT
(s) 11T19, ANTI-ICE ENG R

S 865-266

(3) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11A13, L PACK FLOW CONT
(b) 11A14, AIR SUPPLY ISOL VALVE CONT L
(c) 11A16, ANTI-ICE ENG L
(d) 11A26, R PACK FLOW CONT
(e) 11A27, AIR SUPPLY ISOL ALT R CONT
(f) 11A30, ENG ANTI-ICE R ALT
(g) 11A31, WING ANTI-ICE

S 215-150

(4) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed.
(a) 36L7 OR 36K7, AIR SUPPLY BITE

S 865-151

(5) Supply electrical power (AMM 24-22-00/201).

E. Do the Air Supply System Operational Test.

S 745-007
(1) Do the air supply BITE test (FIM 36-20-00/101, Fig. 104).
(a) Push the BIT STEP button on the BITE module.
1) Make sure the note NO FAULT light comes on.

S 865-008
(2) Push the L and R ENG BLEED AIR switch-lights on the P5 panel to the open position (the OFF light comes on and the white bar shows).

S 215-009
(3) Push the L ISLN valve switch-light on the P5 panel to the closed position.
(a) Make sure the VALVE light comes on and goes off.

S 715-011
(4) Do a Test of the Center Isolation Valve
(a) Push the C ISLN valve switch-light on the P5 panel to open the position.
(b) Make sure the VALVE light comes on and goes off.
(c) Push the C ISLN valve switch-light on the P5 panel to the closed position.
(d) Make sure the VALVE light comes on and goes off.

S 215-012
(5) Push the R ISLN valve switch-light on the P5 panel to the closed position.
(a) Make sure the VALVE light comes on and goes off.

S 865-014
(6) Push the L, R, and C ISLN valve switch-lights to the OPEN position.

S 865-015
(7) Start the Left engine (AMM 71-00-00/201).

S 215-016
(8) Make sure the L ENG BLEED AIR switch-light shows OFF during the engine start.

S 215-018
(9) Make sure the L ENG BLEED AIR switch-light does not show OFF at the end of the start cycle.

S 215-020
(10) Make sure the indicator for the left and right duct pressure shows a value between 30 and 35 psig. Make sure the left and right duct pressure is at a stable pressure during engine idle.

S 865-022
(11) Start the Right engine (AMM 71-00-00/201).

S 215-359
(12) Make sure the R ENG BLEED AIR switch-light shows OFF during the engine start.

S 215-360
(13) Make sure the R ENG BLEED AIR switch-light does not show OFF at the end of the start cycle.

S 215-027
(14) Make sure the indicator for the left and right duct pressure shows a value between 30 and 35 psig. Make sure the left and right duct pressure is at a stable pressure during engine idle.

S 865-028
(15) Turn the selectors for the left and right pack control, on the P5 panel, to the AUTO position.

S 215-031
(16) Slowly increase the power for the Left engine until this step occurs.
(a) Make sure the left duct pressure increases to approximately 35 to 45 psig then decreases to 15 to 26 psig then increases to 25 to 35 psig.

NOTE: This decrease in pressure shows a change from the high stage pressure to the intermediate pressure of the engine bleed air at 35 to 45 psig (approximately 70-86 percent of N2).

S 215-032
(17) Slowly move the power of the Left engine to idle.
(a) Make sure the left duct pressure decreases to 15 to 25 psig then increases to 35 to 45 psig.

S 215-033
(18) Slowly increase the power of the Right engine until this step occurs.
(a) Make sure the right duct pressure increases to approximately 35 to 45 psig then decreases to 15 to 26 psig then increases to 25 to 35 psig.

NOTE: This decrease in pressure shows a change from the high stage pressure to the intermediate pressure of the engine bleed air at 35 to 45 psig (approximately 70-86 percent at N2).

S 215-034

(19) Slowly move the power of the Right engine to idle.

(a) Make sure the right duct pressure decreases to 15 to 25 psig then increases to 35 to 45 psig.

S 765-043

(20) Do a Test of the APU interlock circuit.

(a) Start the Auxiliary Power Unit (APU) (AMM 49-11-00/201).

(b) Push the L and R ENG BLEED AIR switch-lights on the P5 panel to the OFF position.

(c) Make sure the C ISLN valve switch-light on the P5 panel is in the open position.

(d) Slowly advance the thrust lever for the Left engine until you have 70% N2.

(e) Push the APU bleed valve switch on the P5 panel to the on position.

(f) Push the L ENG BLEED AIR switch-light on the P5 panel to the on position.

1) Make sure the OFF light goes off.

2) Make sure the APU VALVE light comes on and goes off.

(g) Push the L ENG BLEED AIR switch-light on the P5 panel to the OFF position.

1) Make sure the OFF light comes on.

2) Make sure the APU VALVE light comes on and goes off.

(h) Slowly move the power of the Left engine to idle.

(i) Slowly advance the thrust lever for the Right engine until the 70% N2 is reached.

(j) Push the R ENG BLEED AIR switch-light on the P5 panel to the on position.

1) Make sure the OFF light goes off.

2) Make sure the APU VALVE light comes on and goes off.

(k) Push the R ENG BLEED AIR switch-light on the P5 panel to the OFF position.

1) Make sure the OFF light comes on.

2) Make sure the APU VALVE light comes on and goes off.

(l) Slowly move the power of the Right engine to idle.

(m) Shut down the APU (AMM 49-11-00/201).

(n) Push the ANTI-ICE ENG L switch-light on the P5 panel to the ON position.

(o) Make sure the VALVE light comes on and goes off in 30 seconds.

(p) Make sure the EICAS message, L ENG HPSOV, does not show on the top display.

(q) Make sure the left BLEED light is off.

(r) Push the ANTI-ICE ENG L switch-light on the P5 panel to the OFF position.

(s) Make sure the VALVE light comes on and goes off in 30 seconds.

(t) Push the L ENG BLEED AIR switch-light on the P5 panel to the on position (the white flow bar comes on).

1) Make sure the OFF light is off.

(u) Make sure the EICAS message, L ENG BLEED OFF, does not show on the top display.
(v) Make sure the R ENG BLEED AIR switch-light on the P5 panel is in the OFF position.
1) Make sure the OFF light is on.
(w) Make sure this EICAS message, R ENG BLEED OFF, shows on the top display.

(x) Push the ANTI-ICE ENG R switch-light on the P5 panel to the ON position.
(y) Make sure the VALVE light comes on and goes off in 30 seconds.
(z) Make sure the EICAS message, R ENG HPSOV, does not show on the top display.
(aa) Make sure the right BLEED light is off.
(ab) Push the ANTI-ICE ENG R switch-light on the P5 panel to the OFF position.
(ac) Make sure the VALVE light comes on and goes off in 30 seconds.
(ad) Push the R ENG BLEED AIR switch-light on the P5 panel to the on position (the white flow bar comes on).
1) Make sure the OFF light is off.
(ae) Make sure the EICAS message, R ENG BLEED OFF, does not show on the top display.

F. Put the Airplane Back to Its Usual Condition.

S 865-044
(1) Shut down the left engine and the right engine (AMM 71-00-00/201).

S 745-045
(2) Do the BITE test (FIM 36-20-00/101, Fig. 104).

S 865-046
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 36-11-00-795-148

3. Air Supply Distribution System Leakage Test

A. General
(1) This test gives a leakage test for the air supply system, downstream of the pressure regulating and shutoff valve (PRSOV).

B. Equipment
(1) An air source that can supply an air pressure of 45 psig at an approximate flow of 20 lbs/min, commercially available.
(2) A connection to connect with a pneumatic ground service fitting that is 3.0 inches in diameter.

C. References
(1) AMM 24-22-00/201, Electrical Power Control
(2) AMM 36-00-00/201, Air Supply-General (Pressurize/Depressurize)

D. Access
(1) Location Zones
100 Lower Half of Fuselage (except Section 48)
500 Left Wing
600 Right Wing

E. Prepare for the System Test

S 865-047
(1) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed.
(a) 11D19, START CONT L
(b) 11D20, START CONT R
(c) 11N27, BULK CARGO HEAT OVRD
(d) 11R01, L IND LTS 1
(e) 11R21, FWD CARGO HEAT OVERRIDE
(f) 11R22, AFT CARGO HEAT OVERRIDE
(g) 11R28, R IND LTS 1
(h) 11S10, L ENG BLEED IND
(i) 11S11, L ENG BLEED CONT
(j) 11S12, L AIR SUPPLY ISLN VLV PWR (or) ISOL VALVE PWR L
(k) 11S14, C AIR SUPPLY ISLN VLV PWR(or) ISOL VALVE PWR C
(l) 11S15, C AIR SUPPLY ISLN VLV CONT(or) ISOL VALVE CONT C
(m) 11S19, R ENG BLEED IND
(n) 11S20, R ENG BLEED CONT
(o) 11S21, R AIR SUPPLY ISLN VLV PWR(or) ISOL VALVE PWR R
(p) 11S22, R AIR SUPPLY ISLN VLV CONT(or) ISOL VALVE CONT R
(q) 11S23, AIR SUPPLY APU BLEED PWR (or) APU BLEED PWR
(r) 11S24, AIR SUPPLY APU BLEED CONT (or) APU BLEED CONT
(s) 11T19, ANTI-ICE ENG R

S 865-301
(2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11A13, L PACK FLOW CONT
(b) 11A14, AIR SUPPLY ISOL VALVE CONT L
(c) 11A16, ANTI-ICE ENG L
(d) 11A26, R PACK FLOW CONT
(e) 11A27, AIR SUPPLY ISOL ALT R CONT
(f) 11A30, ENG ANTI-ICE R ALT
(g) 11A31, WING ANTI-ICE

S 215-304
(3) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed.
(a) 36L7 OR 36K7, AIR SUPPLY BITE

F. Do the Air Supply Distribution System Test

S 865-048
(1) Supply electrical power (AMM 24-22-00/201).

S 215-049
(2) Turn the selector switches for the left and right pack control, on the P5 panel, to the OFF position.
(a) Make sure the PACK OFF light is on.

S 865-051
(3) Push the FWD, AFT, and BULK CARGO HEAT switch-light on the P5 panel to the off position.

S 865-054
(4) Turn the AIR DEMAND switch on the hydraulic control module of the P5 panel to the OFF position.

S 215-056
(5) Push the L ENG, R ENG, and APU bleed air switch-lights on the P5 panel to the OFF position.
(a) Make sure the OFF light comes on for the L ENG, R ENG switch-lights.
(b) Make sure the flow bar is off for the APU switch-light.

S 215-058
(6) Push the L, C, and R ISLN switch-lights on the P5 panel to the open position.
(a) Make sure the flow bar is on.
(b) Make sure the VALVE light comes on and goes off.

S 215-060
(7) Push the WING ANTI-ICE switch-light on the P5 panel to the off position.

S 485-061
(8) Attach the air source to the pneumatic ground connector.

S 865-094
(9) Pressurize the pneumatic duct to 45 ±1 psig.

S 795-062
(10) Do a check of all the joints and connections in the isolated system for air leakage.

NOTE: Air leakage is when you feel the airflow with your hand at a distance of 12 inches from a point on the duct joint or connection.

S 865-001

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(11) Decrease the air pressure to zero psi.

S 365-064
(12) Repair air leakage by joint or coupling adjustment or replacement of the duct.

S 795-065
(13) Do a leak test again after you do a repair.

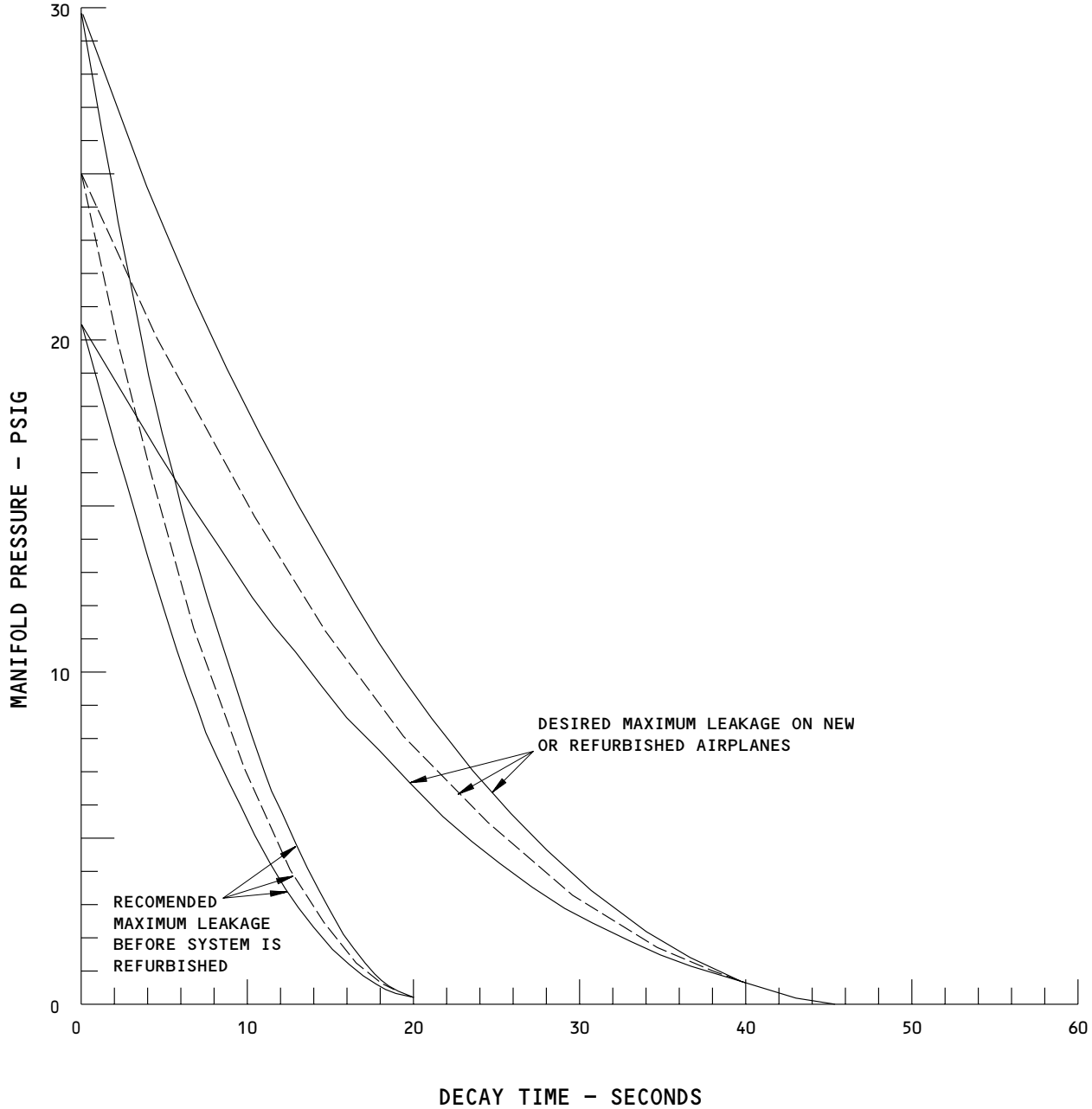
S 085-066
(14) Remove the air source.

S 215-067
(15) Push the L and R ISLN switch-lights on the P5 panel to the closed position.
(a) Make sure the flow bar light goes off.
(b) Make sure the VALVE light comes on and goes off.

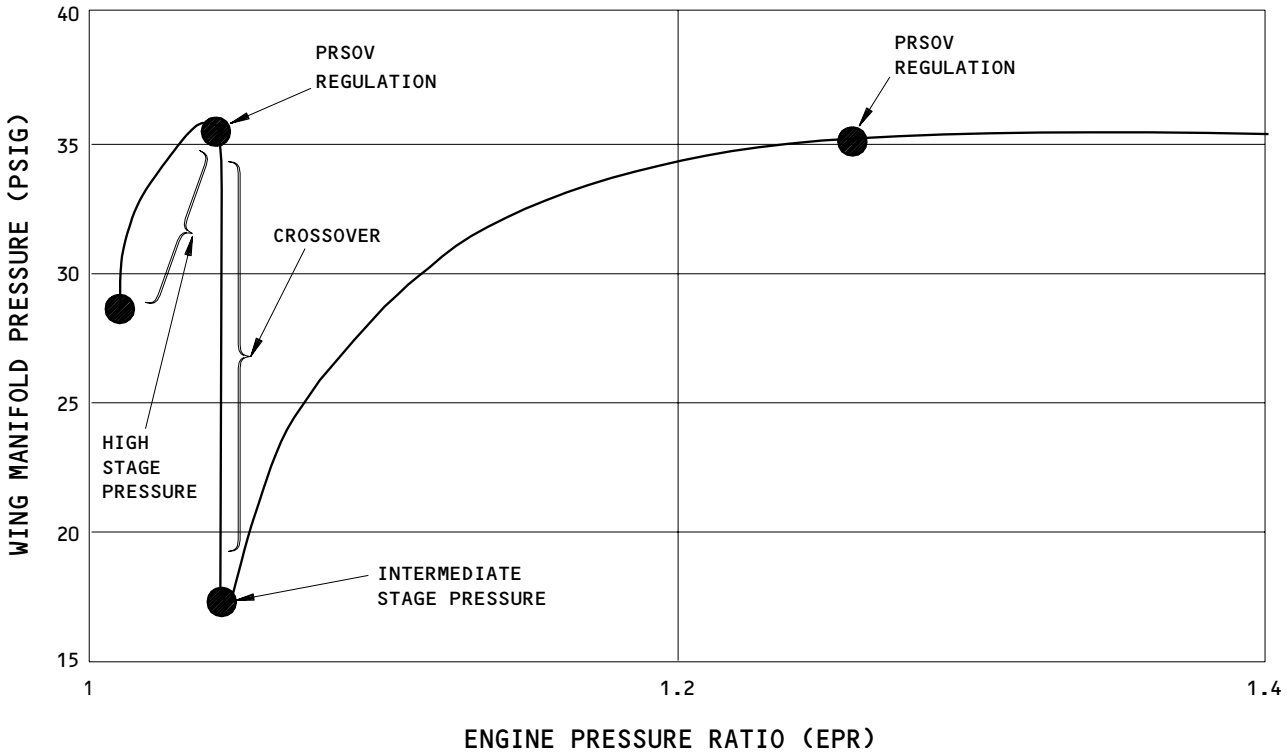
S 865-069
(16) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 36-11-00-795-152

4. Air Supply Distribution System Gross Leakage Test (Fig. 503)
A. General
(1) This test gives a procedure to do an air leak check of the pneumatic system. Figure 503 gives a graph of the system duct pressure vs. time for the duct pressure decay. Figure 503 can only be used as a base to compare.
B. Equipment
(1) Use the Auxiliary Power Unit (APU) to supply the air pressure of 45 psig at a flow rate of 20 pounds/minute, commercially available.
(2) A connection to connect with a pneumatic ground service fitting that is 3.0 inches in diameter.
(3) A Stopwatch
C. References
(1) AMM 24-22-00/201, Electrical Power Control



Air Supply Distribution System Gross Leakage Test
Figure 503



Pressure vs EPR at Sea Level
Figure 504

L44048

(2) AMM 36-00-00/201, Air Supply-General (Pressurize/Depressurize)

D. Prepare for the System Test

S 865-070

(1) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11D19, START CONT L
(b) 11D20, START CONT R
(c) 11N27, BULK CARGO HEAT OVRD
(d) 11R01, L IND LTS 1
(e) 11R21, FWD CARGO HEAT OVERRIDE
(f) 11R22, AFT CARGO HEAT OVERRIDE
(g) 11R28, R IND LTS 1
(h) 11S10, L ENG BLEED IND
(i) 11S11, L ENG BLEED CONT
(j) 11S12, L AIR SUPPLY ISLN VLV PWR (or) ISOL VALVE PWR L
(k) 11S14, C AIR SUPPLY ISLN VLV PWR (or) ISOL VALVE PWR C
(l) 11S15, C AIR SUPPLY ISLN VLV CONT (or) ISOL VALVE CONT C
(m) 11S19, R ENG BLEED IND
(n) 11S20, R ENG BLEED CONT
(o) 11S21, R AIR SUPPLY ISLN VLV PWR (or) ISOL VALVE PWR R
(p) 11S22, R AIR SUPPLY ISLN VLV CONT (or) ISOL VALVE CONT R
(q) 11S23, AIR SUPPLY APU BLEED PWR (or) APU BLEED PWR
(r) 11S24, AIR SUPPLY APU BLEED CONT(or) APU BLEED CONT
(s) 11T19, ANTI-ICE ENG R

S 865-331

(2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11A13, L PACK FLOW CONT
(b) 11A14, AIR SUPPLY ISOL VALVE CONT L
(c) 11A16, ANTI-ICE ENG L
(d) 11A26, R PACK FLOW CONT
(e) 11A27, AIR SUPPLY ISOL ALT R CONT
(f) 11A30, ENG ANTI-ICE R ALT
(g) 11A31, WING ANTI-ICE

S 865-330

(3) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed.
(a) 36L7 OR 36K7, AIR SUPPLY BITE

E. Do a Test of the Air Supply Distribution System

S 865-071
(1) Supply electrical power (AMM 24-22-00/201).

S 215-072
(2) Turn the selector switches for the left and right pack on the pilots' overhead panel, P5, to the OFF position.
(a) Make sure the PACK OFF light is on.

S 865-074
(3) Push the FWD, AFT, and BULK CARGO HEAT switch-light on the P5 panel to the off position.

S 865-077
(4) Turn the AIR DEMAND switch on the hydraulic control module of the P5 panel to the OFF position.

S 215-079
(5) Push the L ENG, R ENG, and APU bleed air switch-lights on the P5 panel to the OFF position.
(a) Make sure the OFF light comes on for the L ENG, and R ENG switch-light.
(b) Make sure the flow bar is off for the APU switch-light.

S 215-081
(6) Push the L, C, and R ISLN switch-lights on the P5 panel to the open position.
(a) Make sure the flow bar is on.
(b) Make sure the VALVE lights come on and go off.

S 215-083
(7) Push the WING ANTI-ICE switch-light on the P5 panel to the off position.

S 865-168
(8) Start the Auxiliary Power Unit (APU) (AMM 49-11-00/201).

S 865-085
(9) Pressurize the pneumatic duct to at least 30 psig.

S 845-086
(10) With a stopwatch, prepare to write a record of the time that is necessary for the duct pressure to decrease from 30 psi to 0 psi.

S 785-087
(11) Decrease the air source pressure to zero.

S 785-088
(12) When the air source pressure is zero, start the stopwatch.

S 785-002
(13) Stop the stopwatch when the duct pressure is zero.

S 975-332
(14) Write the time (in seconds) for the duct pressure to decrease to zero.

S 995-333
(15) Compare the written results with the graph for airplane leakage on Fig. 503.

NOTE: This comparison give an indication of the decrease in system integrity.

NOTE: Figure 503 shows a graph of manifold pressure versus decay time for three different manifold pressures. The decay time is the amount of time it takes for the pressure to decrease a given amount. For example, with an initial manifold pressure of 30 psig the decay time for a decrease of 20 psig would be approximately 10 seconds for a system that needs to have the leaks fixed and 20 seconds for a new/refurbished system.

(a) If the results are above the top curve the system is satisfactory as far as leakage is concerned and is comparable to a new or refurbished pneumatic system.

(b) If the results fall between the curves then the pneumatic system leaks more than a new/refurbished system but not more than the recommended value of maximum leakage before the system needs to be refurbished.
(c) If the results fall below the bottom curve it is recommended that you find and repair the Leakage.
1) Do this task: Air Supply Distribution System Leakage Test (AMM 36-11-00/501).

S 865-169
(16) Shut down the Auxiliary Power Unit (APU) (AMM 49-11-00/201).

S 215-091
(17) Push the L and R ISLN switch-lights on the P5 panel to the closed position.
(a) Make sure the flow bar goes off.
(b) Make sure the VALVE light comes on and goes off.

S 865-093
(18) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 36-11-00-715-153

5. Center Isolation Valve Operational Test

NOTE: This is a scheduled maintenance task.

A. References
(1) AMM 24-22-00/201, Electric Power Control
B. Prepare for the Operational test

S 865-157
(1) Supply electrical power (AMM 24-22-00/201).

S 215-156
(2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11S14, ISOL VALVE PWR C (or)
ISOL VALVE PWR CTR (or)
C AIR SUPPLY ISLN VLV PWR
(b) 11S15, ISOL VALVE CONT C (or)
ISOL VALVE CONT CTR (or)
C AIR SUPPLY ISLN VLV CONT
C. Do the Air Supply System Operational Test.

S 715-155
(1) Do a Test of the Center Isolation Valve
(a) Push the C ISLN valve switch-light on the pilots' overhead panel, P5, to the open position.

(b) Make sure the VALVE light comes on and goes off.
(c) Push the C ISLN valve switch-light on the P5 panel to the closed position.
(d) Make sure the VALVE light comes on and goes off.

S 865-154
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PNEUMATIC DUCT - REMOVAL/INSTALLATION

1. General
   A. This procedure includes tasks for the removal and the installation of the duct sections that make-up the air supply system. These ducts connect the three air supply sources to the systems that use the air.
   B. The procedures are divided by the location of the ducts:
      (1) Engine Air Supply Ducts
      (2) Duct between the precooler and PRSOV
      (3) Strut Pneumatic Ducts
      (4) Wing Leading Edge Ducts
      (5) Body Crossover Duct
      (6) APU Air Supply Ducts
   C. Install the pneumatic ducts and couplings to get these minimum clearance requirements:

      NOTE: These values do not apply to the engine and strut duct.

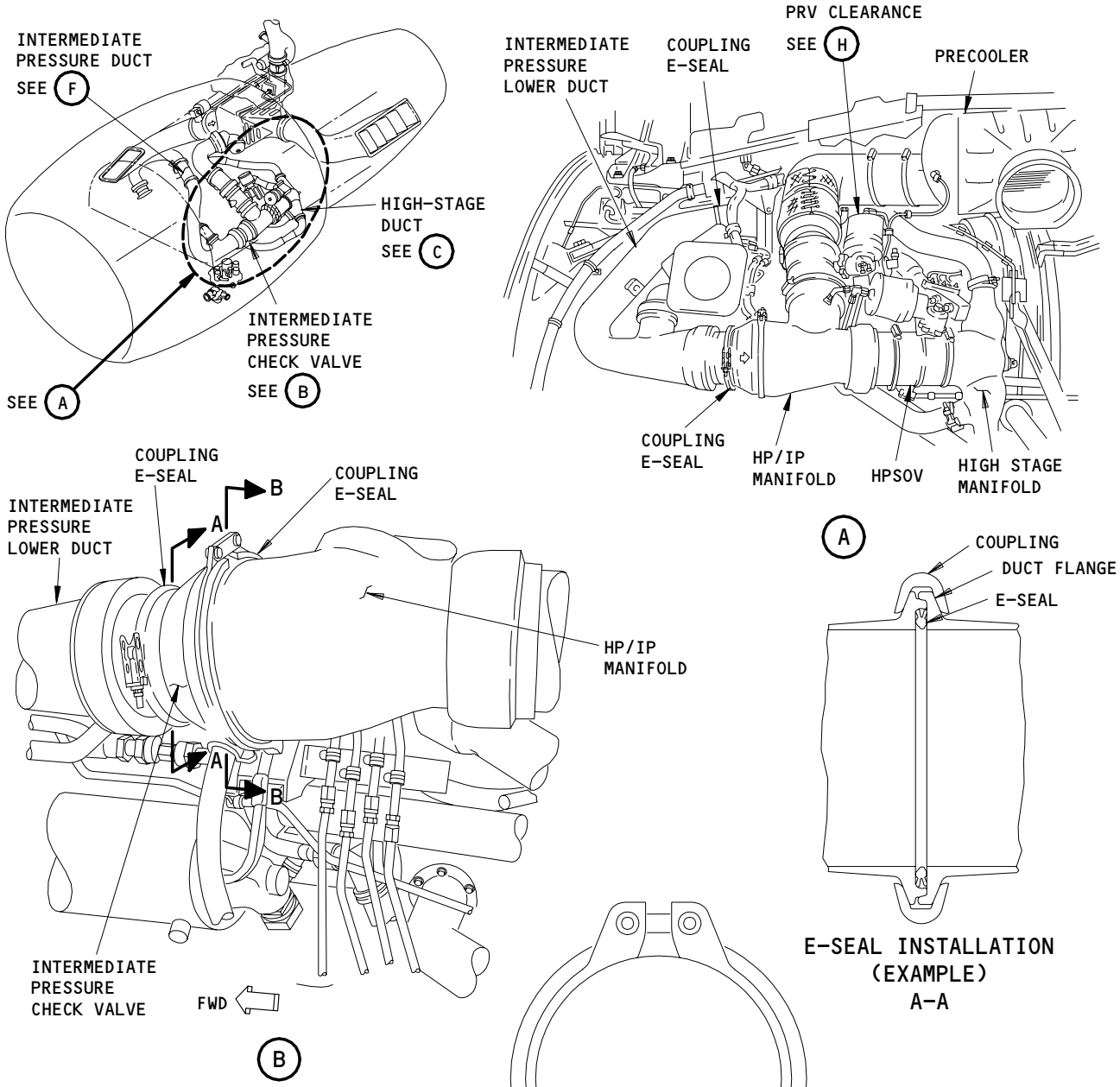
      (1) Duct and couplings at the support locations should be 0.10 inches from:

         NOTE: The clearance may be the thickness of the cushion or clamp if the duct is installed directly to supporting structure.

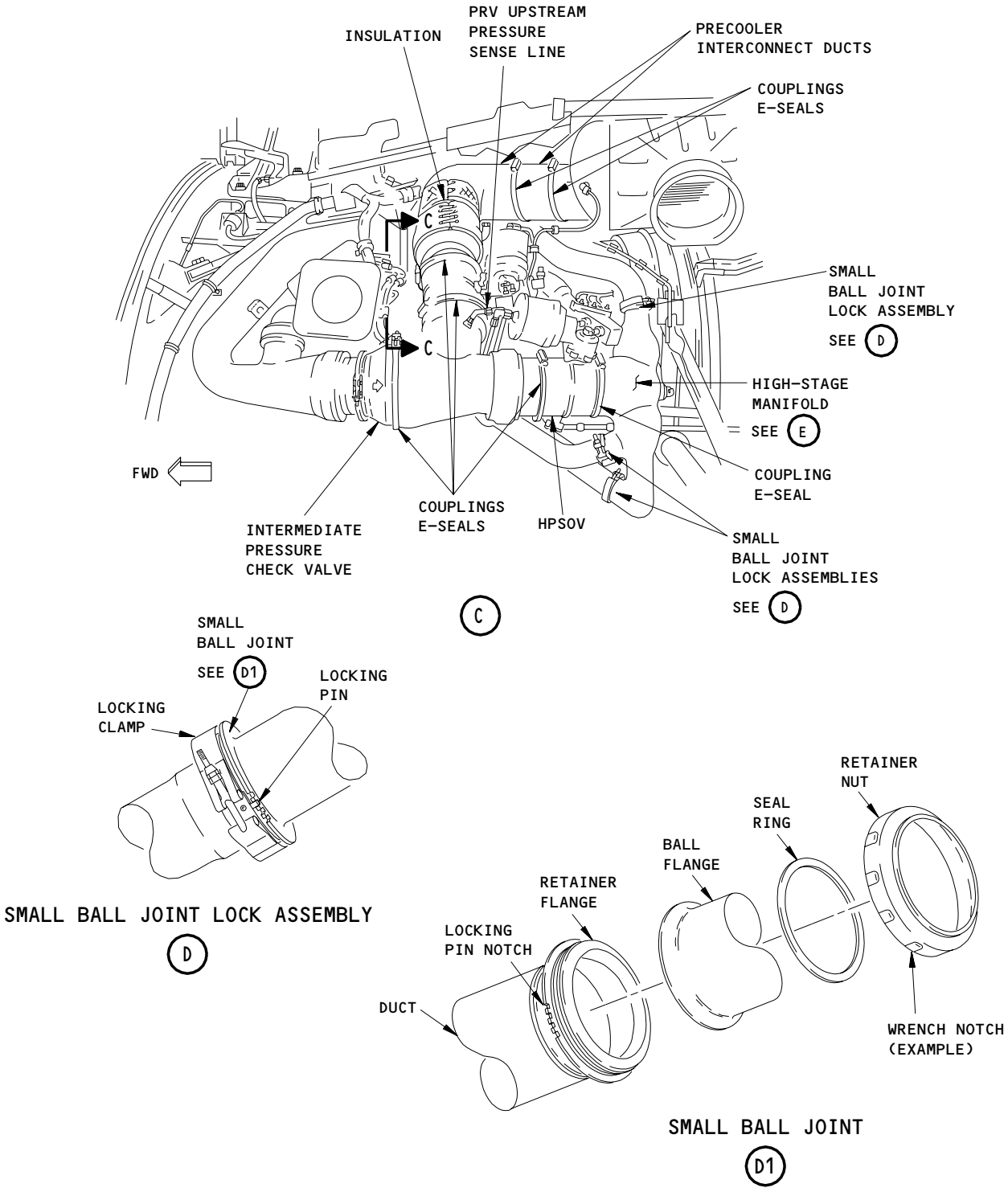
         (a) Adjacent structure.
         (b) Fixed structure.
         (c) Fixed and moving equipment.
         (d) Other tubing and fitting connectors
      (2) Duct and couplings that are not at the support locations should be 0.20 inch from:
         (a) Adjacent structure.
         (b) Fixed structure.
         (c) Fixed and moving equipment.
         (d) Other tubing and fitting connectors.

TASK 36-11-01-004-170

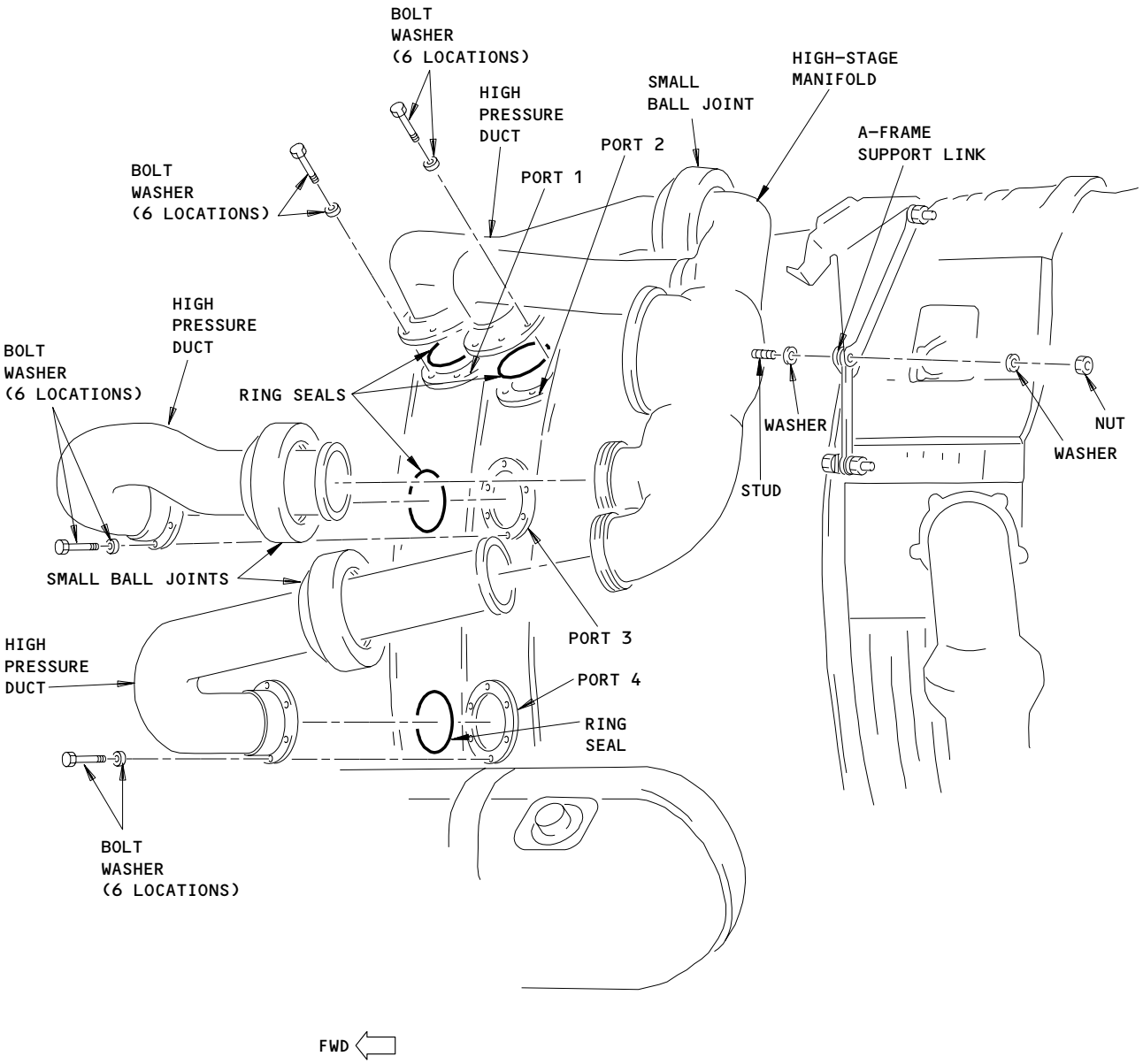
2. Remove the Engine Air Supply Ducts (Fig. 401)
   A. References
      (1) 24-22-00/201, Electric Power - Control
      (2) 36-00-00/201, Pneumatic - General
      (3) 36-11-02/401, Insulation - Pneumatic Duct
      (4) 36-11-07/401, High Pressure Shutoff Valve
      (5) 71-11-04/201, Engine Fan Cowl
      (6) 71-11-06/201, Engine Core Cowl
      (7) 78-31-00/201, Thrust Reverser System
   B. Equipment
      (1) Wrench - Spanner, G71020-1



Engine Pneumatic Duct Installation
Figure 401 (Sheet 1)



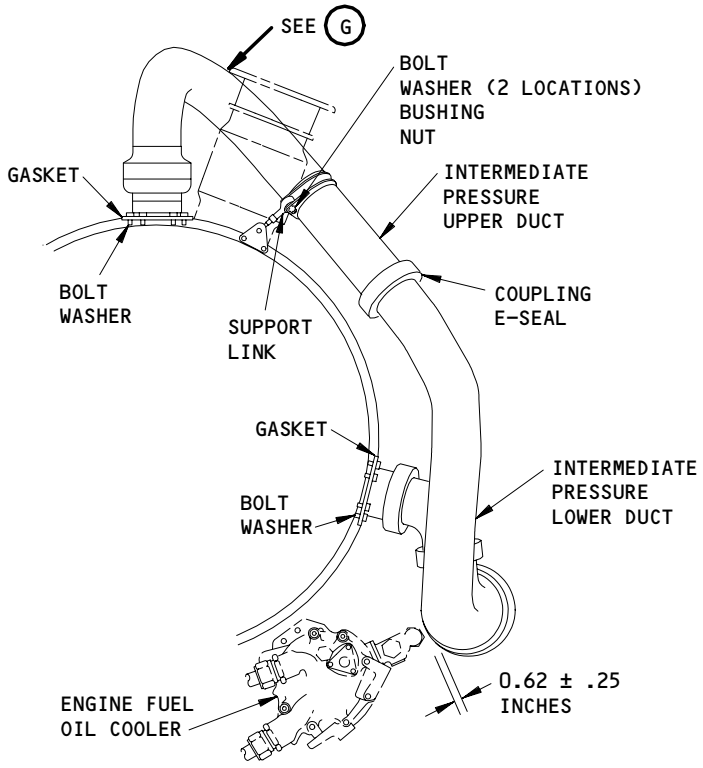
Engine Pneumatic Duct Installation
Figure 401 (Sheet 2)



HIGH-STAGE MANIFOLD

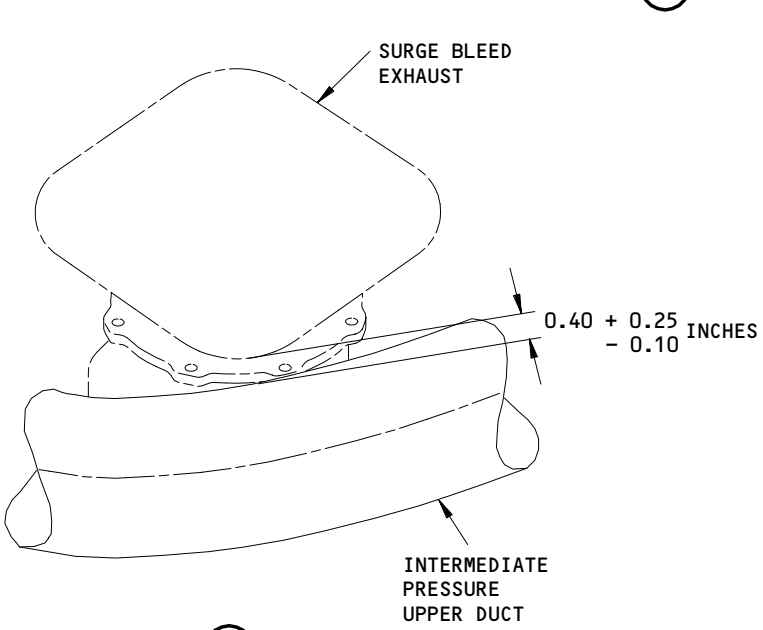
E

Engine Pneumatic Duct Installation
Figure 401 (Sheet 3)

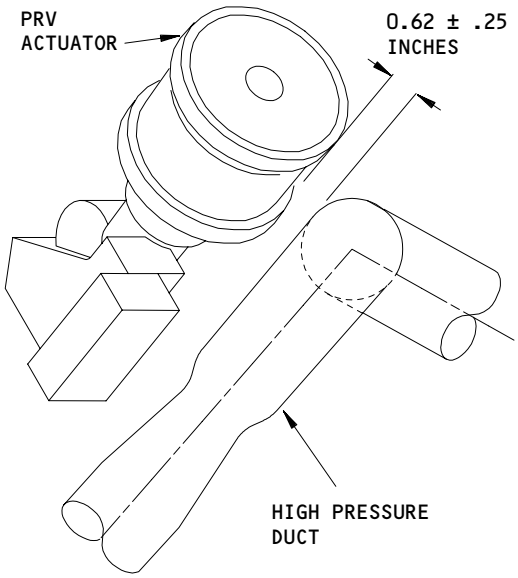


INTERMEDIATE PRESSURE DUCT

F



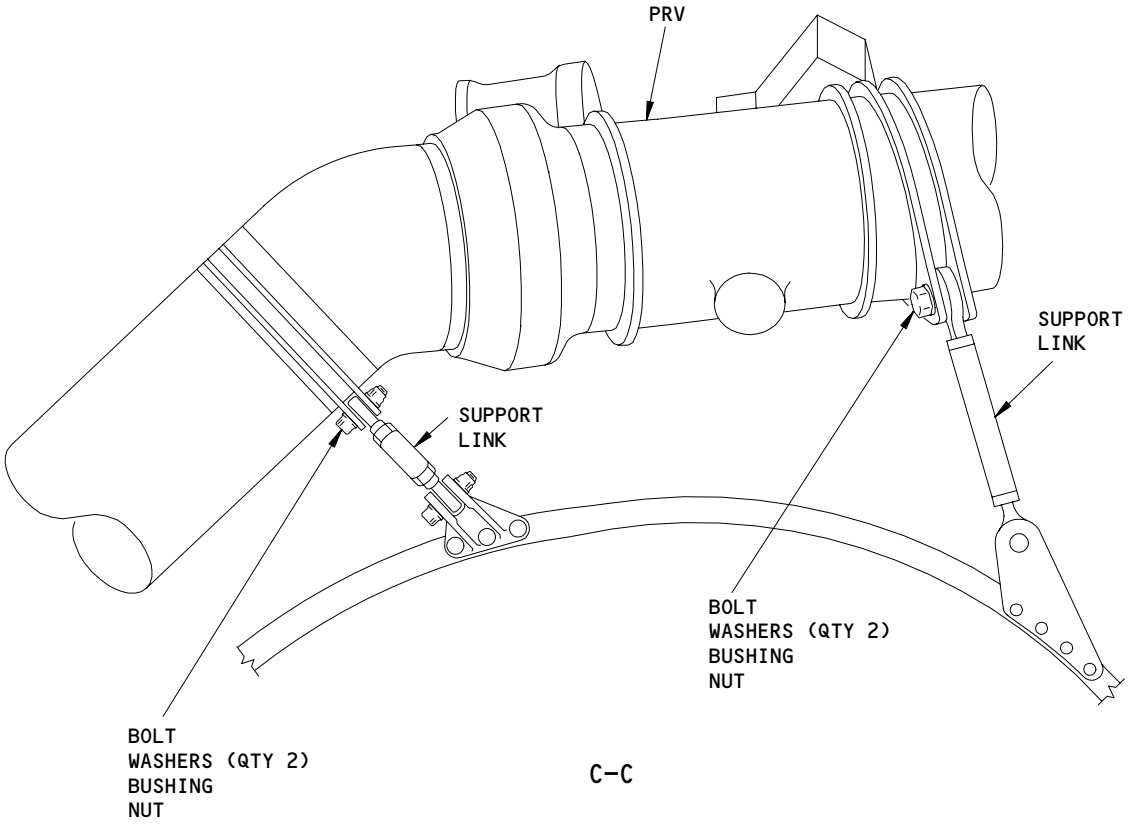
G



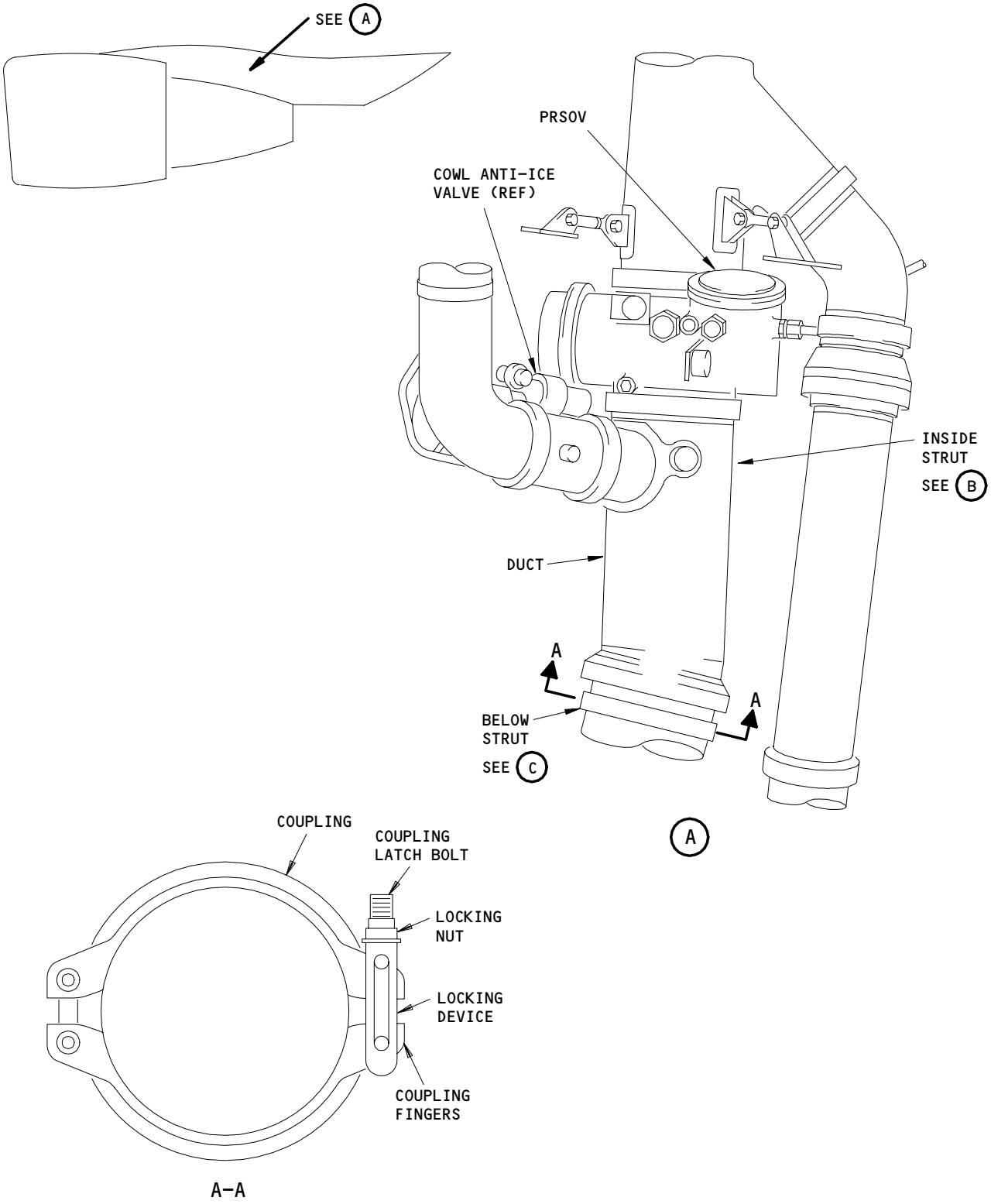
PRV CLEARANCE

H

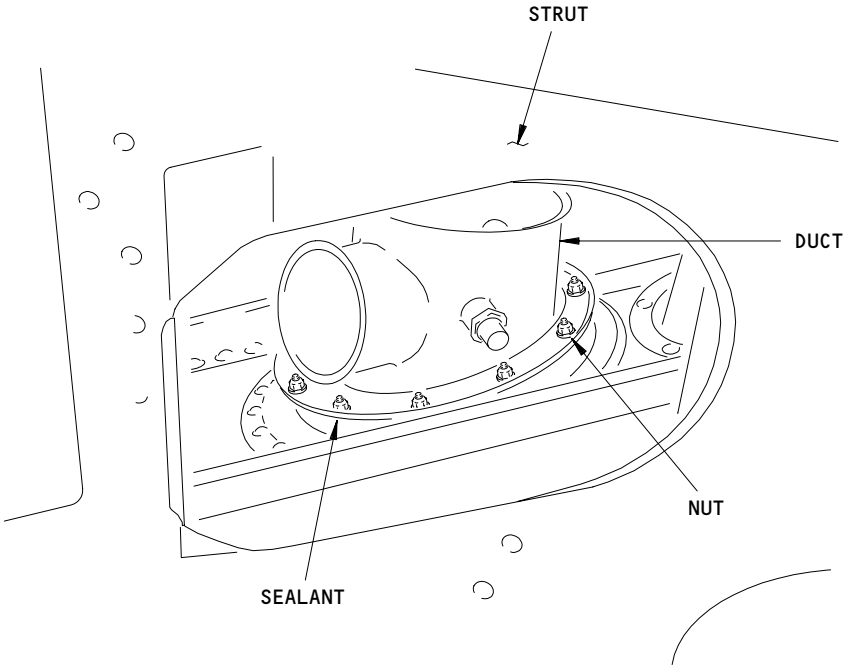
Engine Pneumatic Duct Installation
Figure 401 (Sheet 4)



Engine Pneumatic Duct Installation
Figure 401 (Sheet 5)

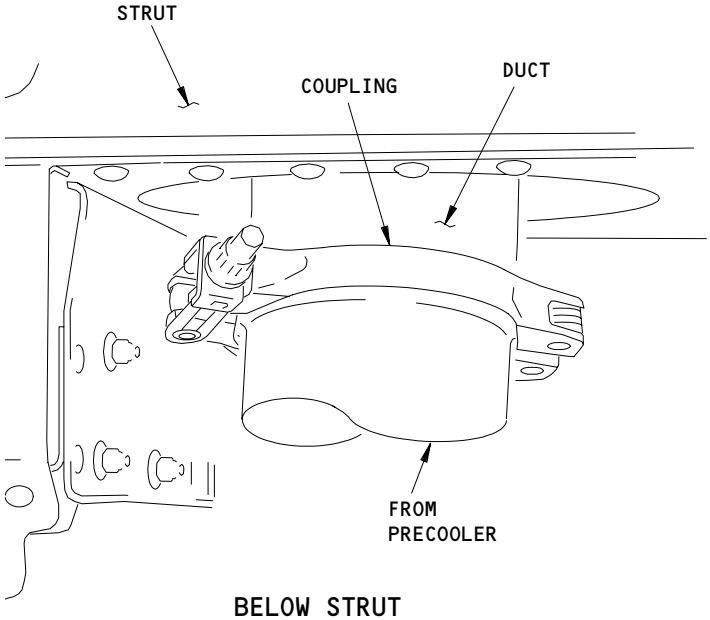


Duct Between Precooler and PRSOV
Figure 401A (Sheet 1)



INSIDE STRUT

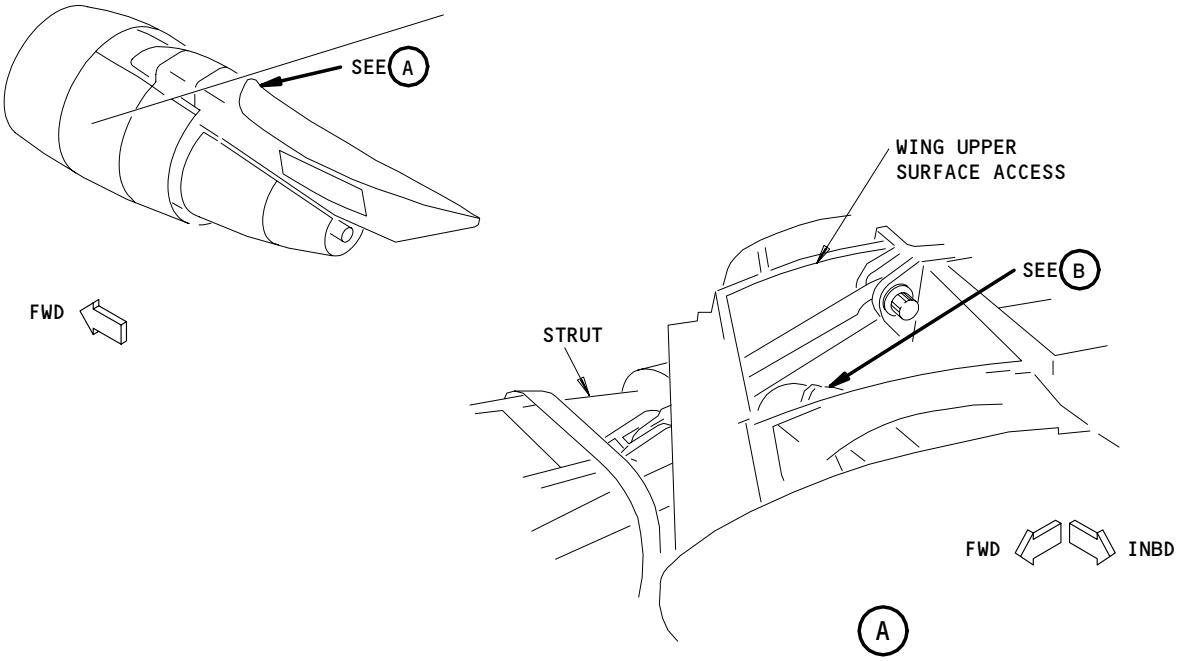
B

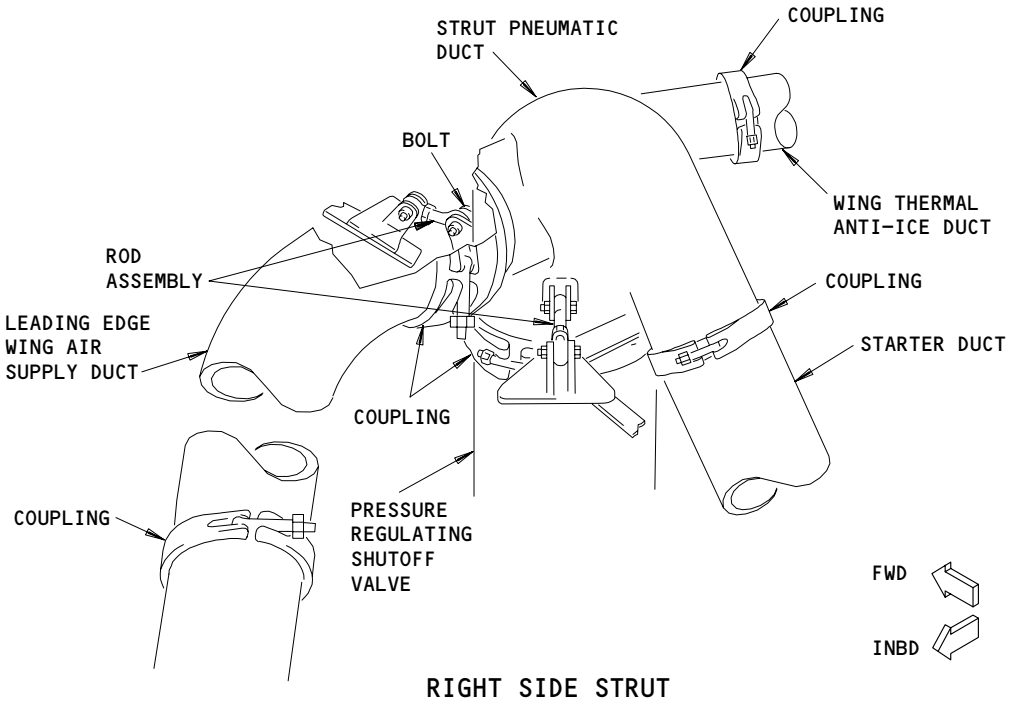


BELOW STRUT

C

Duct between Precooler and PRSOV
Figure 401A (Sheet 2)



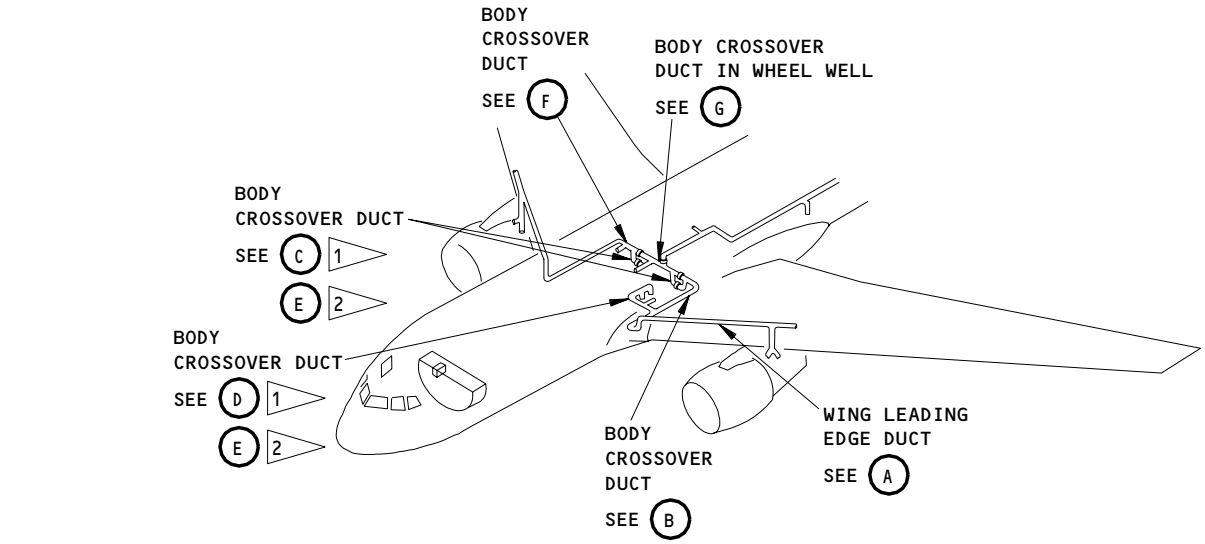


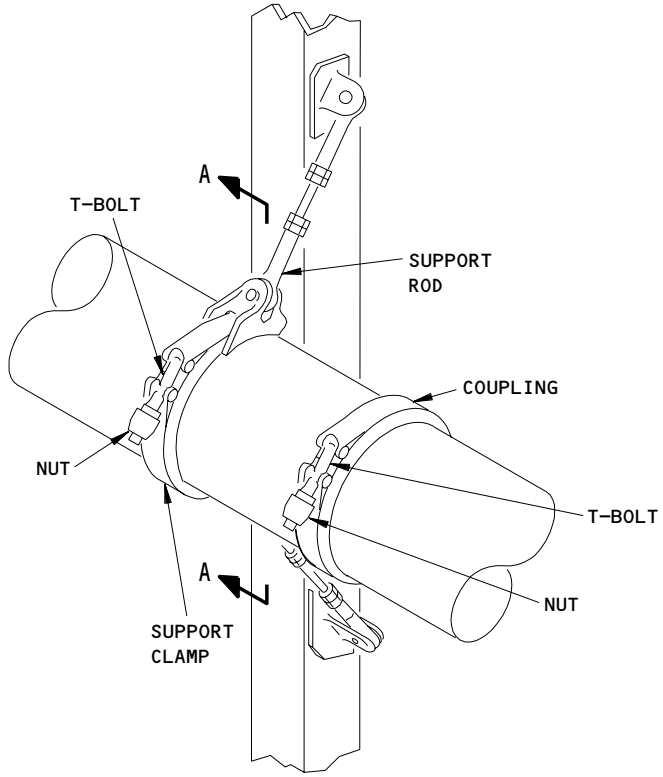
RIGHT SIDE STRUT
(LEFT SIDE SIMILAR)

B

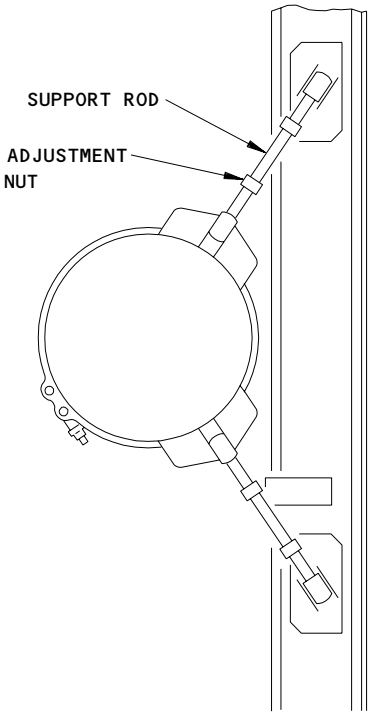
Pneumatic Duct Installation
Figure 402

298255





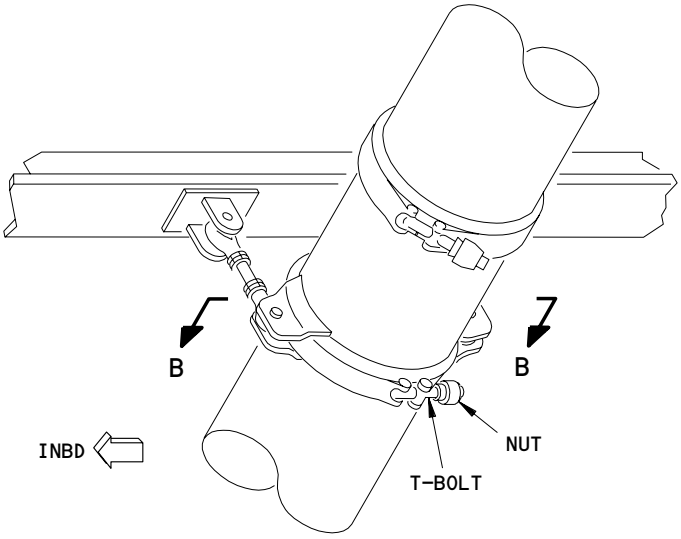
A



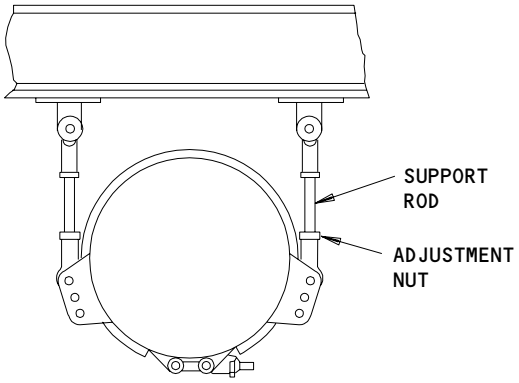
A-A

1 DUCTING WITH FLANGE CONNECTOR
2 DUCTING WITH BRACKET CONNECTOR

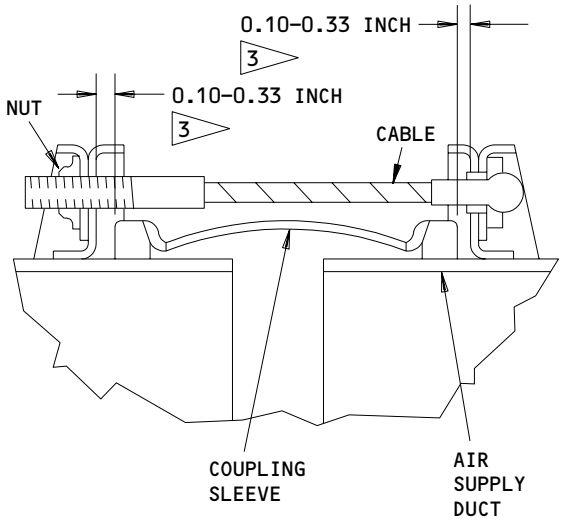
Wing Leading Edge/Body Duct Support Installation
Figure 403 (Sheet 1)



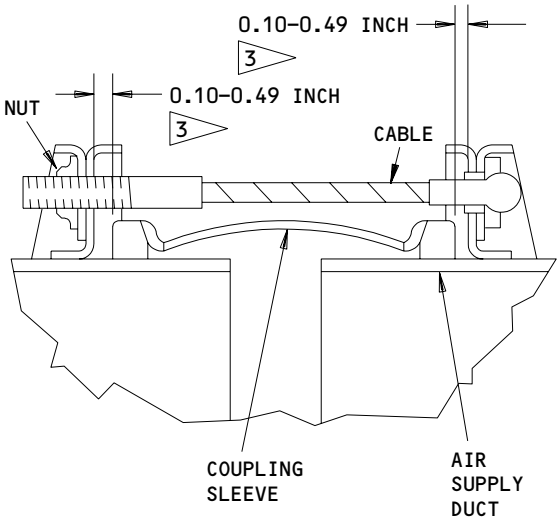
BODY CROSSOVER DUCT
B



B-B



BODY CROSSOVER DUCT
C 1

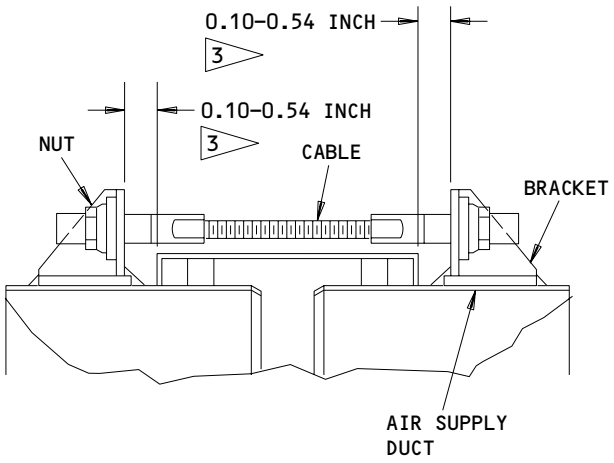


BODY CROSSOVER DUCT
D 1

3 THIS TOLERANCE IS FOR THE DUCT INSTALLATION ONLY

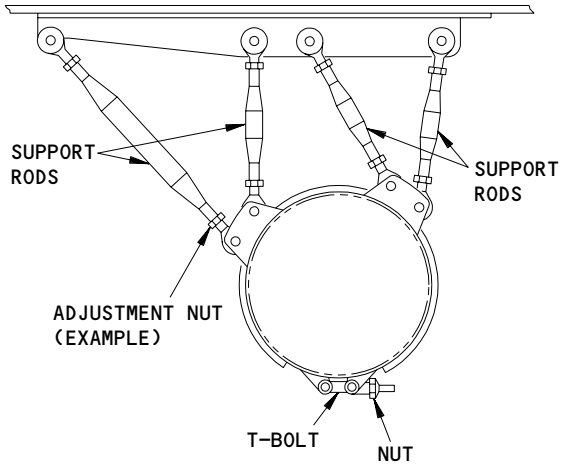
Wing Leading Edge/Body Duct Support Installation
Figure 403 (Sheet 2)

F93518



BODY CROSSOVER DUCT

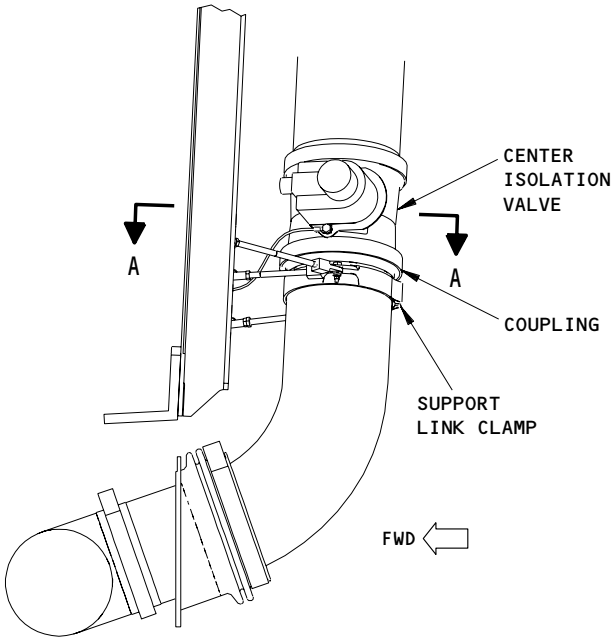
E 2



BODY CROSSOVER DUCT

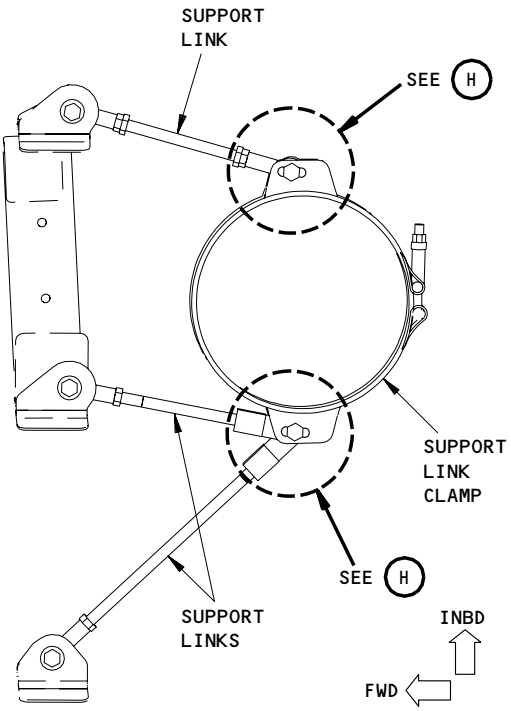
F

Wing Leading Edge/Body Duct Support Installation
Figure 403 (Sheet 3)

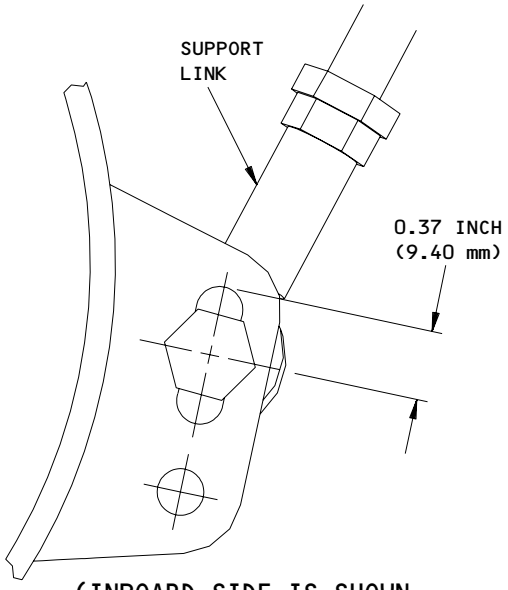


BODY CROSSOVER DUCT IN WHEEL WELL

G



A–A

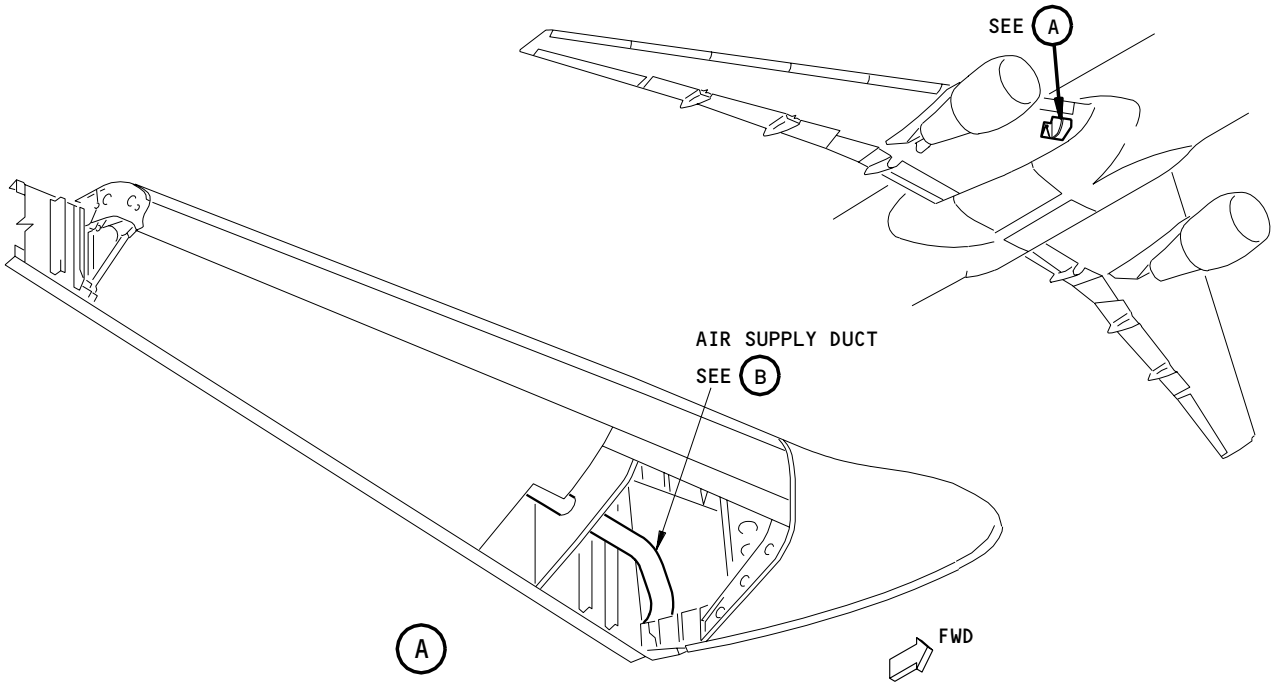


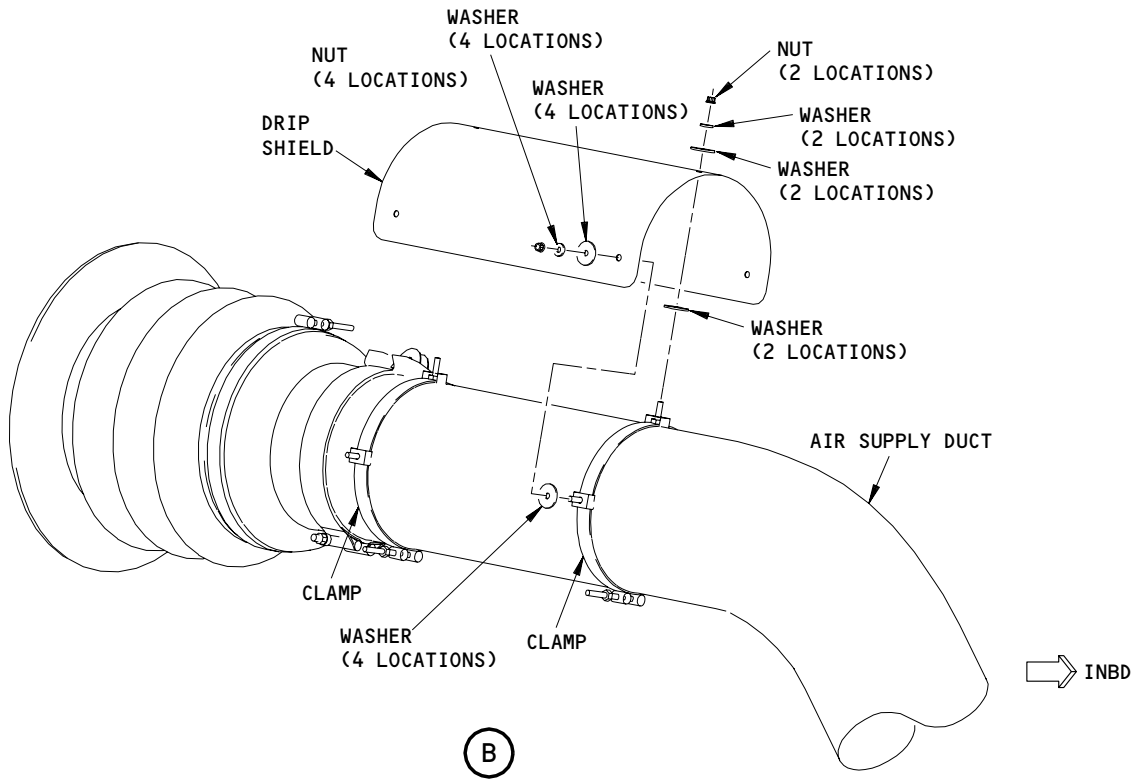
(INBOARD SIDE IS SHOWN,
OUTBOARD SIDE IS EQUIVALENT)

H

Wing Leading Edge/Body Duct Support Installation
Figure 403 (Sheet 4)

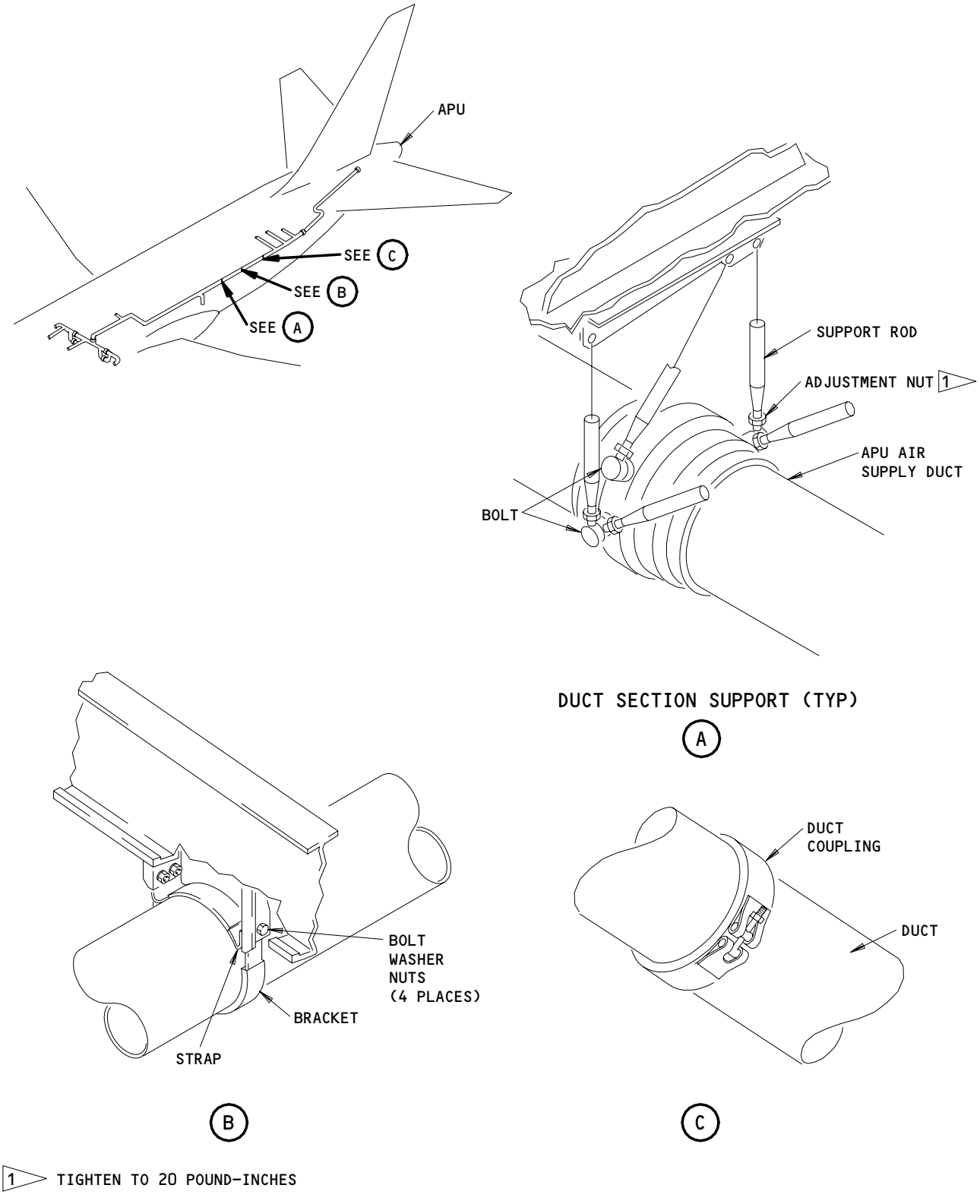
M34098





Right Wing Leading Edge Air Supply Duct and Drip Shield
Figure 403A

G15584



APU Duct Installation
Figure 404

C. Remove the Engine Air Supply Duct.

S 864-002

(1) Supply electrical power (Ref 24-22-00).

S 864-174

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(2) Remove Pneumatic Power (Ref 36-00-00).

S 014-008

(3) Open the applicable engine cowl(s) or thrust reverser(s):
   (a) The engine fan cowl (Ref 71-11-04).
   (b) The engine core cowl (Ref 71-11-06).

   WARNING: DO THE STEPS IN AMM 78-31-00/201 TO OPEN THE THRUST REVERSERS. IF THESE STEPS ARE NOT FOLLOWED, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

   (c) Open the thrust reverser(s) (AMM 78-31-00/201).

S 024-006

(4) Remove the high pressure duct.
   (a) Remove the high pressure shutoff valve (HPSOV) (Ref 36-11-07).
   (b) Remove the locking clamp from small ball joints.
   (c) Loosen the small ball joint bearing nut.
   (d) Remove the bolts that hold the high pressure ducts to the engine ports.
   (e) Remove the three high pressure ducts from the engine.
   (f) Remove the ring seals from the engine ports.
   (g) Install the duct covers on all the openings to keep out unwanted objects.
   (h) Remove the nut that holds the high stage manifold to the A-frame support link.
   (i) Remove the high stage manifold from the engine.
   (j) Remove the ring seal from the fourth engine port.
   (k) Install the duct covers on all of the openings to keep out the unwanted objects.

S 024-009

(5) Remove the intermediate pressure (IP) duct
   (a) Remove the couplings that connect the IP upper and IP lower duct sections.
   (b) Remove the bolts that hold the IP upper duct to the duct mounting flange.
   (c) Remove the bolt that holds the IP upper duct to the support link.
   (d) Remove the IP upper duct.

(e) Remove the coupling between the IP lower duct and the IP check valve.
(f) Remove the bolts that hold the IP lower duct to the duct mounting flange.
(g) Remove the IP lower duct.
(h) Remove the gaskets from the engine ports.
(i) Install the duct covers on all of the openings to keep out the unwanted objects.

S 024-010
(6) HP/IP manifold Removal
(a) Remove the bolt that attaches the HP/IP manifold to the support link.
(b) Disconnect the PRV upstream pressure sense line from the HP/IP manifold.
(c) Remove the couplings between the HP/IP manifold and the IP check valve, the HPSOV, and the PRV.
(d) Remove the HP/IP manifold.
(e) Remove the E-seals from all of the flanges.
(f) Install the duct covers on all of the openings to keep out the unwanted objects.

S 024-011
(7) Precooler interconnect ducts removal:
(a) Remove the bolt that holds the forward precooler interconnect duct to the support link.
(b) Remove the couplings at each end of the forward precooler interconnect duct.
(c) Remove the forward precooler interconnect duct.
(d) Remove the coupling between the aft precooler interconnect duct and the precooler.
(e) Remove the aft precooler interconnect duct.
(f) Remove the E-seals from the flanges.
(g) Remove the insulation from the duct sections that are removed (AMM 36-11-02/401).

NOTE: The insulation will be installed on the replacement duct sections.

(h) Install the duct covers on all of the openings to keep out unwanted objects.

TASK 36-11-01-404-172

3. Install The Engine Air Supply Ducts (Fig. 401)

A. References
(1) 20-10-23/401, Standard Practices - Lockwire
(2) 20-30-04/201, Lubricants
(3) 24-22-00/201, Electric Power - Control
(4) 36-00-00/201, Pneumatic - General
(5) 36-11-01/601, Pneumatic Duct
(6) 36-11-02/401, Insulation - Pneumatic Duct
(7) 36-11-07/401, High Pressure Shutoff Valve

(8) 71-00-00/201, Power Plant (Operating Procedures)
(9) 71-11-04/201, Engine Fan Cowl
(10) 71-11-06/201, Engine Core Cowl
(11) 78-31-00/201, Thrust Reverser System

B. Equipment
(1) Mallet - Plastic, commercially available
(2) Wrench - Spanner, G71020-1

C. Consumable Materials
(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature antiseize compound)
(2) G00095 - Detector - Leak-Tek 160X (Ref 20-30-07)

D. Prepare for the Installation

S 084-226
(1) Remove all the duct covers.

S 214-227
(2) Examine all the E-seals. The E-seals must be free of cracks, dents, or other damage. Replace all damaged E-seals.

S 424-228
(3) When you are told to tighten the coupling use these torque values:
(a) 4.5 inch coupling - 105-120 pound-inches
(b) 5.5 or 7.5 inch coupling - 115-125 pound-inches

E. Engine Supply Duct Installation

S 424-013
(1) To install the High Pressure ducts, do these steps:
(a) Put the high stage manifold stud into the A-frame support link.
(b) Put the nut and washers on the stud.
1) Do not tighten the nut.
(c) Put a ring seal the engine port.
(d) Apply antiseize compound to the threads and install the bolts.
1) Do not tighten the bolts.

CAUTION: DO THE BALL JOINT INSPECTION WITH AMM 36-11-01/601. DUCT LEAKAGE AND DAMAGE CAN OCCUR IF THE PARTS ARE WORN MORE THAN THE ALLOWANCE.

(e) Do the ball joint component worn area check (AMM 36-11-01/601).
(f) Apply antiseize compound to the threads of the small ball joint flange.
(g) Attach the high pressure ducts to the High-Stage manifold.
1) Do not tighten the small ball joint.
(h) Put an ring seal on each of the engine ports.
(i) Apply antiseize compound to the threads and install the bolts to connect the high pressure ducts to the engine ports.
1) Do not tighten the bolts.
(j) Make sure you get the clearance between the PRV actuator and the HP duct as shown on the illustration.
(k) Install the HPSOV (AMM 36-11-07/401).

CAUTION: USE THE STEPS BELOW TO ASSEMBLE THE SMALL BALL JOINTS. IF YOU DO NOT ASSEMBLE THE JOINT CORRECTLY, THERE CAN BE DUCT LEAKS OR OTHER DAMAGE.

(l) Do these steps to assemble the small ball joint:
1) Use the spanner wrench to install the nut on the flange.
2) Tighten the duct flange bolts to 50-85 pound-inches.
3) Tighten the bearing nut to 50-60 pound-feet.

NOTE: This is the torque to be applied to the nut. The tool offset value must be used to calculate the torque value that the wrench must be set to.

4) Use a non - metalic hammer to carefully hit the joint around the edge.
5) Tighten the bearing nut to 50-60 pound-feet.
6) Put the locking clamp on the bearing nut.
7) Put the slots of the clamp on the lockwire retainer on the joint flange.
8) Put the pin in the nut wrench hole that is 180 degrees from the lockwire retainer.
9) Tighten the clamp to 25-35 pound-inches.

(m) Tighten the High-Stage manifold nut.

S 424-014

(2) Intermediate Pressure (IP) duct installation:
(a) Put a gasket on the duct mounting flange for the IP upper duct.
(b) Put the IP upper duct on the duct mounting flange.
(c) Install the bolts with washers to attach the IP upper duct.
1) Do not tighten the bolts.
(d) Use a bolt, washers, and a nut to attach the support link to the IP upper duct.
1) Do not tighten the nut.
(e) Put a gasket on the duct mounting flange for the IP lower duct.
(f) Install the bolts with washers to attach the IP lower duct.
1) Do not tighten the bolts.
(g) Put an E-seal between the IP lower duct and the IP check valve.
(h) Install the coupling to attach the IP lower duct to the IP check valve.
1) Do not tighten the coupling.
(i) Put an E-seal between the IP duct sections and install the coupling.
(j) Make sure you get the clearance between the engine fuel oil cooler and the IP lower duct as shown on the illustration.
(k) Make sure you get the clearance between the surge bleed exhaust and the IP upper duct as shown on the illustration.
(l) Tighten the coupling.
(m) Tighten the IP duct bolts to 75-85 pound-inches.
(n) Tighten the coupling between the IP check valve and the IP lower duct.

(o) Tighten the bolt that holds the IP upper duct to the support link.

S 424-015

(3) HP/IP manifold installation:
(a) Put an E-seal on each HP/IP manifold flange.
(b) Put the HP/IP manifold into its position between the IP check valve, the HPSOV, and the PRV.
(c) Install the couplings at all of the joints.
(d) Attach the support link to the HP/IP manifold with a bolt, a washer, two bushings, a washer, and a nut.
(e) Tighten all of the couplings.
(f) Tighten the nut on the bolt.
(g) Apply antiseize compound on the fitting for the PRV upstream pressure sense line.
(h) Attach the PRV upstream pressure sense line.

S 424-016

(4) Precooler interconnect duct installation:
(a) Install the insulation on the forward precooler interconnect duct (AMM 36-11-02/401).
(b) Put an E-seal on the precooler inlet flange.
(c) Put the aft precooler interconnect duct on the precooler inlet flange.
(d) Install a coupling on the precooler interconnect duct/precooler joint.
(e) Put the E-seals on each of the flanges for the forward precooler interconnect duct.
(f) Install a coupling to the the forward precooler interconnect duct/aft precooler interconnect duct joint.
1) Do not tighten the coupling.
(g) Install a coupling on the PRV/forward precooler interconnect duct joint.
1) Do not tighten the coupling.
(h) Use a bolt, a washer, a nut to attach the support link to the precooler interconnect duct.
(i) Tighten the nut on the bolt.
(j) Tighten all of the couplings.

F. Make Sure That There Are No Duct Flange Leaks

S 794-017

(1) Put the leak detector on the duct flanges.

S 864-018

(2) With the thrust reverser open, do the steps to dry motor the engine (Ref 71-00-00).

S 794-019

(3) Look for leaks at the duct flanges.
(a) A small leak is ok.
(b) You must repair a large leak.

S 864-020
(4) Do the steps to shut down the engine (Ref 71-00-00).

S 864-021
(5) Remove electrical power if it is not necessary.

G. Put the Airplane Back to Its Usual Condition

S 414-229

WARNING: DO THE STEPS IN AMM 78-31-00/201 TO CLOSE THE THRUST REVERSERS. IF THESE STEPS ARE NOT FOLLOWED, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(1) Close the thrust reverser(s) (AMM 78-31-00/201).

S 414-230
(2) Close the engine core cowl (Ref 71-11-06).

S 414-231
(3) Close the engine fan cowl (Ref 71-11-04).

TASK 36-11-01-004-180

4. Duct Removal - Between the Precooler and the PRSOV (Fig. 401A)

A. References
(1) AMM 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
(2) AMM 27-81-00/201, Leading Edge Slats (Activation, Deactivation)
(3) AMM 30-21-03/401, Engine Inlet Thermal Anti-ice Valve
(4) AMM 36-00-00/201, Pneumatic Power - General
(5) AMM 36-11-09/201, Pressure Regulating and Shutoff Valve
(6) AMM 36-11-17/401, Fan Air Temperature Sensor
(7) AMM 71-11-04/201, Fan Cowl Panels
(8) AMM 71-11-06/201, Core Cowl Panels
(9) AMM 36-22-02/401, Precooler Temperature Bulb
(10) AMM 78-31-00/201, Thrust Reverser PRSOV system

B. Access
(1) Location Zones

415/416/425/426	Fan Reverser
434/444	Mid Torque Box

(2) Access Panels

434AL/444AL	Strut Pressure Relief Door

C. Prepare for the Removal

S 864-181

WARNING: YOU MUST REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. IF YOU DO NOT REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS, HOT HIGH PRESSURE AIR CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove Pneumatic Power (AMM 36-00-00/201).

S 044-182

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Do this procedure: Leading Edge Slat Deactivation (AMM 27-81-00/201).

D. Remove the Duct Between the Precooler and the PRSOV

S 014-183

(1) Remove the access door for the PRSOV (AMM 06-43-00/201).

S 024-184

(2) Remove the PRSOV (AMM 36-11-09/201).

S 024-185

(3) Remove the Engine Inlet Thermal Anti-ice Valve (AMM 30-21-03/401).

S 024-186

(4) Remove the Fan Air Temperature Sensor (AMM 36-11-17/401).

S 024-188

(5) Remove the Precooler Temperature Bulb (AMM 36-22-02/401) if it is installed.

S 024-216

(6) Disconnect the sense line tee for the Overpressure Sensor.

S 024-190

(7) Remove the nuts that hold the duct in its position.

S 044-191

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(8) Do the deactivation procedure for the thrust reverser deactivation for ground maintenance (AMM 78-31-00/201).

S 014-192
(9) Open the fan cowl panel (AMM 71-11-04/201).

S 014-193
(10) Open the core cowl panel (AMM 71-11-06/201).

S 014-194

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS WHEN YOU OPEN THE THRUST REVERSERS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(11) Open the thrust reverser (AMM 78-31-00/201).

S 024-195
(12) Remove the coupling on the bottom of the duct under the strut.

S 024-196
(13) Remove the duct through the access panel in the strut.

NOTE: Remove the seal ring if it is necessary.

S 484-197
(14) Put a cover on the duct openings to keep out unwanted material.

TASK 36-11-01-404-198

5. Duct Installation - Between the Precooler and the PRSOV

A. References
(1) AMM 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
(2) AMM 27-81-00/201, Leading Edge Slats (Activation, Deactivation)
(3) AMM 30-21-03/401, Engine Inlet Thermal Anti-ice Valve
(4) AMM 36-00-00/201, Pneumatic Power - General
(5) AMM 36-11-09/201, Pressure Regulating and Shutoff Valve
(6) AMM 36-11-17/401, Fan Air Temperature Sensor
(7) AMM 71-11-04/201, Fan Cowl Panels
(8) AMM 71-11-06/201, Core Cowl Panels
(9) AMM 36-22-02/401, Precooler Temperature Bulb
(10) AMM 78-31-00/201, Thrust Reverser PRSOV system

B. Access
(1) Location Zones

415/416/425/426	Fan Reverser
434/444	Mid Torque Box

(2) Access Panels

434AL/444AL	Strut Pressure Relief Door

C. Consumable Materials
(1) A00160 Sealant - BMS 5-63

D. Install the Duct Between the Precooler and the PRSOV

S 084-199
(1) Remove the covers.

S 424-200
(2) Install the duct.

NOTE: Install the seal ring if it was removed before.

S 644-218
(3) Apply the sealant between the duct and the seal.

S 424-219
(4) Install the nuts that hold the duct in its position.

S 424-220
(5) Install coupling on the bottom of the duct under the strut.

S 424-221
(6) Tighten the couplings to 115-125 inch-pounds.

S 424-201
(7) Install the sense line tee for the Overpressure Sensor.

S 424-202
(8) Install the Precooler Temperature Bulb (AMM 36-22-02/401) if it was removed.

S 424-204
(9) Install the Fan Air Temperature Sensor (AMM 36-11-17/401).

S 424-205
(10) Install the Engine Inlet Thermal Anti-ice Valve (AMM 30-21-03/401).

S 424-206
(11) Install the PRSOV (AMM 36-11-09/201).

E. Duct Installation Test

S 794-207
(1) With the thrust reverser open, do the steps to dry motor the engine (AMM 71-00-00/201).

S 794-208
(2) Put leak detector on the duct flanges.

S 214-209
(3) Look for leaks at the duct flanges.
(a) A small leak is satisfactory.
(b) Repair all large leakage.

F. Put the Airplane Back to Its Usual Condition

S 414-217
(1) Install the access door for the PRSOV (AMM 06-43-00/201).

S 414-222

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS WHEN YOU CLOSE THE THRUST REVERSERS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Close the thrust reverser (AMM 78-31-00/201).

S 414-212
(3) Close the core cowl panel (AMM 71-11-06/201).

S 414-213
(4) Close the fan cowl panel (AMM 71-11-04/201).

S 444-214
(5) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 444-215
(6) Do the activation procedure for the leading edge slats (AMM 27-81-00/201).

TASK 36-11-01-004-171

6. Remove the Strut-Pneumatic Duct (Fig. 402)
A. References
(1) 06-43-00/201, Engine and Nacelle (Major Zone 400) Access Doors and Panels
(2) 06-44-00/201, Wings (Major Zones 500 & 600) Access Doors and Panels
(3) 24-22-00/201, Electric Power - Control
(4) 36-00-00/201, Pneumatic - General
(5) 78-31-00/201, Thrust Reverser System
B. Remove the strut-pneumatic duct.

S 864-175

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(1) Remove pneumatic power (Ref 36-00-00).

S 864-223

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 YOU OR DAMAGE TO EQUIPMENT.

(2) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (Forward Thrust Position) (Ref 78-31-00).

S 014-025
(3) Remove The applicable wing nacelle strut access panel on the upper surface of the wing (511PT, 611PT) (Ref 06-44-00).

S 014-026
(4) Open the pressure relief door on the right side strut (434AR or 444AR) (Ref 06-43-00).

S 034-027
(5) Remove the clamp above the pressure regulating and shutoff valve (PRSOV).

S 034-028
(6) Remove the bolt from the duct side of the forward rod assembly.

S 034-029
(7) Loosen the bolt on the strut end of the rod assembly.

S 984-030
(8) Move the rod assembly away from the duct.

S 034-031
(9) Remove the clamp between the starter duct and the strut-pneumatic duct.

S 034-032
(10) Remove the clamp between the wing thermal anti-ice duct and the strut pneumatic duct.

S 034-033
(11) Remove The clamp between the wing leading edge duct and the strut pneumatic duct.

S 034-034
(12) Remove the inboard lower leading edge skin panel (511RB, 611RB, 511QB or 611QB) (Ref 06-44-00).

S 034-035
(13) Loosen the second clamp inboard from the strut-pneumatic duct on the wing-leading-edge duct.

S 984-036
(14) From the upper surface nacelle access, turn the wing leading edge duct away from the strut pneumatic duct.

S 984-038
(15) Hold the strut pneumatic duct.

S 034-039
(16) Remove the bolt from the duct side of the aft rod assembly.

S 034-040
(17) Loosen the bolt on the strut end of the rod assembly.

S 984-041
(18) Turn the rod assembly away from the duct.

S 024-042
(19) Remove the strut pneumatic duct.

S 434-043
(20) Install the duct covers on all of the openings to keep out unwanted objects.

TASK 36-11-01-404-044

7. Install the Strut Pneumatic Duct (Fig. 402)

A. References
(1) 06-43-00/201, Engine and Nacelle (Major Zone 400) Access Doors and Panels
(2) 06-44-00/201, Wings (Major Zones 500 & 600) Access Doors and Panels
(3) 24-22-00/201, Electric Power - Control
(4) 36-00-00/201, Pneumatic - General
(5) 78-31-00/201, Thrust Reverser System

B. Install the strut duct.

S 024-045
(1) Remove the duct covers.

S 214-046
(2) Examine all of the E-seals.
(a) The E-seals must be free of cracks, dents or other damage.

S 964-047
(3) Replace all of the E-seals that are damaged.

S 984-048
(4) Align the strut pneumatic duct with the PRSOV, the wing thermal anti-ice duct and the starter duct.

S 434-049
(5) Install the E-seals and the clamps.
(a) Do not tighten the clamps.

S 984-050
(6) Align the wing leading edge duct with the strut duct and the second section of the wing leading edge duct.

S 434-051
(7) Install the clamps and the E-seals.
(a) Do not tighten the clamps.

S 984-052
(8) Adjust the rod assemblies to align the brackets on the strut pneumatic duct.

S 984-053
(9) Make sure that the duct does not touch the structure at the inboard end of the duct.

S 434-054
(10) Install and tighten the rod assemblies.

S 434-055
(11) Connect the starter duct and the wing thermal anti-ice duct to the strut pneumatic duct.

S 434-056
(12) Install the clamps to the joints.

S 984-057
(13) Align the clamp until they do not touch the hydraulic reservoir air tube.

S 434-058
(14) Tighten all of the clamps.

S 864-059
(15) Supply pneumatic power (Ref 36-00-00).

S 794-060
(16) Make sure that the connections between the strut pneumatic ducts and the wing-leading-edge ducts have no leaks.

S 794-061
(17) Put the leak detector on the duct flanges.

S 864-062
(18) With the thrust reverser open, dry motor the engine (Ref 71-00-00).

S 794-063
(19) Look for leaks at the duct flanges.
(a) A small leak is satisfactory.
(b) You must repair a large leak.

S 864-064
(20) Remove pneumatic power if it is not necessary (Ref 36-00-00).

S 414-066
(21) Install the lower inboard leading edge skin panel (511RB, 611RB, 511QB, or 611QB).

S 414-067
(22) Install the wing-upper-surface-nacelle-strut-access panel (511PT or 611PT).

S 414-068
(23) Close the strut-pressure-relief door (434AR or 444AR).

S 864-069
(24) Do this procedure: Thrust Reverser Activation (Forward Thrust Position)(Ref 78-31-00).

S 864-070
(25) Remove electrical power if it is not necessary.

TASK 36-11-01-004-071

8. Remove the First Leading Edge Duct Section of the Wing (Fig. 403)

A. References
(1) 06-44-00/201, Wings (Major Zone 500 & 600) Access Doors and Panels
(2) 24-22-00/201, Electric Power - Control
(3) 36-00-00/201, Pneumatic - General
(4) 78-31-00/201, Thrust Reverser System

B. Access
(1) Location Zones
510 Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Left)
610 Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Right)

C. Prepare for Removal

S 864-072
(1) Supply electrical power (Ref 24-22-00).

S 864-176

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(2) Remove pneumatic power (Ref 36-00-00).

NOTE: Before you remove the first duct section of the wing leading edge on the inboard side of the strut pneumatic duct, you must remove the second section of the duct on the wing leading edge.

S 044-224

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 YOU OR DAMAGE TO EQUIPMENT.

(3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (Ref 78-31-00).

S 014-075

(4) Remove the applicable skin panel on the lower leading edge (511RB, 611RB, 511QB, 611QB, 511NB, 611NB, 511LB, 611LB, 511JB, 611JB, 511GB, 611GB, 511FB, 611FB, 511BB, 611BB) (Ref 06-44-00).

S 014-076

(5) Remove the lower leading edge inboard pressure relief panel (511KB, 611KB) (Ref 06-44-00) if necessary.

D. Remove the first leading edge duct section of the wing.

S 034-077

(1) Remove the couplings on both ends of the second section of the duct.

S 034-078

(2) Remove the band clamp attaching the wing-seal rib boot to the duct and remove the duct.

S 034-079

(3) Remove the coupling and the seal between the strut pneumatic duct and the duct of the wing leading edge.

S 984-080

(4) Move the duct inboard and remove it from the access panel that permits the duct to be moved.

S 984-081
(5) Cover the duct openings to prevent the entry of unwanted objects.

TASK 36-11-01-404-082

9. Install the First Leading Edge Duct Section of the Wing

A. Consumable Materials
(1) G00091 Detector - Leak-Tek 160X (Ref 20-30-07)

B. References
(1) 06-44-00/201, Wings (Major Zone 500 & 600) Access Doors and Panels
(2) 24-22-00/201, Electric Power - Control
(3) 36-00-00/201, Pneumatic - General
(4) 78-31-00/201, Thrust Reverser System

C. Access
(1) Location Zones
510 Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Left)
610 Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Right)

D. Procedure.

S 034-083
(1) Remove the duct covers.

S 984-084
(2) Align the first and the second sections of the ducts in the wing leading edge (through the inboard access doors).

S 434-085
(3) Install the seal and the coupling between the strut pneumatic duct and the leading edge duct of the wing but do not tighten the coupling.

S 434-086
(4) Install the clamps on the duct sections of the wing leading edge.

S 434-087
(5) Put the clamps over the primer markings on the duct if present.

S 434-088
(6) Tighten the clamps.

S 434-089
(7) Tighten the support rods as shown in Fig. 403.

S 434-090
(8) Install the band clamp that attaches the rib boot of the wing seal to the duct.

S 984-091
(9) Put the ducts of the wing leading edge to obtain a clearance with the structure at the inboard end of duct.

S 434-092
(10) Tighten the couplings.

S 864-093
(11) Supply pneumatic power (Ref 36-00-00).

S 794-094
(12) Do a check of the duct joints for leaks.
(a) A small leak is permitted.
(b) You must repair a large leak.

E. Put the Airplane Back to Its Usual Condition

S 864-095
(1) Remove pneumatic power if it is not necessary.

S 864-096
(2) Remove electrical power if it is not necessary.

S 414-097
(3) Install the applicable skin panel for the lower leading edge (511RB, 611RB, 511QB, 611QB, 511NB, 611NB, 511LB, 611LB, 511KB, 611KB, 511JB, 611JB, 511GB, 611GB, 511FB, 611FB, 511BB, 611BB); or the inboard pressure relief door, (511KB, 611KB), if necessary.

S 864-098
(4) Operate the isolation valve for the thrust reverser (Ref 78-31-00).

TASK 36-11-01-004-099

10. Remove the Typical Duct Section of the Wing Leading Edge

A. References
(1) 06-44-00/201, Wings (Major Zone 500 & 600) Access Doors and Panels
(2) 24-22-00/201, Electric Power - Control
(3) 36-00-00/201, Pneumatic - General
(4) 78-31-00/201, Thrust Reverser System

B. Access
(1) Location Zones
510 Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Left)
610 Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Right)

C. Prepare for Removal.

S 864-100
(1) Supply electrical power (Ref 24-22-00).

S 864-177

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(2) Remove pneumatic power (Ref 36-00-00).

S 044-225

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 YOU OR DAMAGE TO EQUIPMENT.

(3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (Ref 78-31-00).

S 014-104

(4) Remove the applicable inboard skin panel on the lower leading edge (511RB, 611RB, 511QB, 611QB, 511NB, 611NB, 511LB, 611LB, 511JB, 611JB, 511GB, 611GB, 511FB, 611FB, 511BB, 611BB) (Ref 06-44-00).

S 014-105

(5) Remove the inboard pressure relief door for the lower leading edge (511KB, 611KB) (Ref 06-44-00), if necessary.

D. The usual procedure for the removal of a duct section from a wing leading edge.

S 034-236

(1) AIRPLANES WITH RIGHT AIR SUPPLY DUCT DRIP SHIELD;
If you want to remove the drip shield do the steps that follow (Fig. 403A):
(a) Open access panel 611BB.
(b) Remove the nut and three washers (six places) from the drip shield.
(c) Remove the drip shield.
(d) Remove the two clamps from the duct.

S 034-106

(2) Loosen the support clamps necessary for the removal of the duct section.

S 034-107

(3) Remove the couplings on both ends of the duct section and remove the duct section.

S 434-108

(4) Put covers on the duct openings to prevent the entry of unwanted objects.

TASK 36-11-01-404-109

11. Install the Typical Duct Section of the Wing Leading Edge

A. Consumable Materials

(1) G00091 Detector - Leak-Tek 160X (Ref 20-30-07)

B. References

(1) 06-44-00/201, Wings (Major Zone 500 & 600) Access Doors and Panels
(2) 24-22-00/201, Electric Power - Control
(3) 36-00-00/201, Pneumatic - General
(4) 78-31-00/201, Thrust Reverser System

C. Access

(1) Location Zones

510 Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Left)
610 Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Right)

D. Procedure.

S 034-110
(1) Remove the duct covers.

S 984-111
(2) Align the duct sections.

S 984-112
(3) To adjust the support clamps, put the adjusting nut on the rod support.

S 434-113
(4) Install the duct couplings.

S 434-114
(5) Locate the couplings over the primer marks on the duct if present.

S 434-115
(6) Tighten the couplings.

S 434-116
(7) Tighten the support rods as shown in Fig. 403

S 424-237
(8) AIRPLANES WITH RIGHT AIR SUPPLY DUCT DRIP SHIELD;
If you want to install the drip shield, do the steps that follow (Fig. 403A):
(a) Install the two clamps on the duct.
1) DUCT WITH PAINT STRIPE;
Make sure that clamp is centered over paint strip within 0.06 inch.
2) Do not tighten the nut on the T-bolt (two places).
(b) Install washers on the clamps (six places).
(c) Install drip shield on clamps.

(d) Install two washers and nut (six places). Tighten nut (six places).
(e) Make sure there is a minimum clearance of 0.3 inch between the drip shield and structure.
(f) Tighten the clamp nut (two places) to 10 to 15 inch-pounds.

S 864-117
(9) Supply pneumatic power (Ref 36-00-00).

S 794-118
(10) Do a Check of the duct connections for leaks.
(a) A small leak is permitted.
(b) You must repair a large leak.

E. Put the Airplane Back to Its Usual Condition

S 864-119
(1) Remove pneumatic power if it is not necessary.

S 864-120
(2) Remove electrical power if it is not necessary.

S 414-121
(3) Install the applicable inboard skin panel for the lower leading edge (511RB, 611RB, 511QB, 611QB, 511NB, 611NB, 511LB, 611LB, 511JB, 511GB, 611GB, 511FB, 611FB, 511BB, 611BB).

S 414-122
(4) Install the inboard pressure relief door for the lower leading edge (511KB, 611KB), if necessary.

S 864-123
(5) Operate the thrust reverser isolation valve (Ref 78-31-00).

TASK 36-11-01-004-124

12. Remove the Body Crossover Duct (Fig. 403)
A. References
(1) 06-41-00/201, Fuselage (Major Zones 100 & 200) Access Doors and Panels
(2) 24-22-00/201, Electric Power - Control

(3) 36-00-00/201, Pneumatic - General

B. Access

(1) Location Zones

130 BS785.9 to BS955.1
190 Fairings

C. Prepare for Removal.

S 864-125

(1) Supply electrical power (Ref 24-22-00).

S 864-178

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(2) Remove pneumatic power (Ref 36-00-00).

S 014-127

(3) For the body crossover duct, remove the applicable fairing panel on the wing/body fairing (193KL, 193ML, 136LR, 194KR) (Ref 06-41-00) or open the applicable ECS access door (193NL, 194LR) (Ref 06-41-00).

S 014-128

(4) For the air supply duct, remove the applicable fairing panel on the wing/body fairing (136LR, 193ML) (Ref 06-41-00) or open the applicable ECS access door (193NL, 194LR) (Ref 06-41-00).

D. Remove the typical duct section:

S 034-129

(1) If cable clamp couplings are installed, remove the nut from the cable, and remove the cable.

S 034-130

(2) Remove the couplings on both ends of the duct section.

S 034-131
(3) Loosen the support clamps necessary for the removal.

S 024-132
(4) Remove the duct.

S 034-133
(5) If cable clamp couplings are installed, remove the coupling sleeve from the end of the duct section.

S 434-134
(6) Put covers on the duct openings to prevent the entry of unwanted objects.

TASK 36-11-01-404-173

13. Install the Body Crossover Duct

A. Consumable Materials
(1) G00091 Detector - Leak-Tek 160X (Ref 20-30-07)

B. References
(1) 06-41-00/201, Fuselage (Major Zones 100 & 200) Access Doors and Panels
(2) 24-22-00/201, Electric Power - Control
(3) 36-00-00/201, Pneumatic - General

C. Access
(1) Location Zones
130 BS785.9 to BS955.1
190 Fairings

D. Procedure.

S 034-136
(1) Remove the duct covers.

S 434-137
(2) If cable clamp couplings are installed, install the coupling sleeve on the end of the duct section.

S 984-138
(3) Align the section.

S 984-139
(4) Adjust the support clamps by positioning the adjusting nut on the rod support.

S 424-248
(5) To install the clamp and support rods next to the center isolation valve do these steps:
(a) Install the support rods to the clamp with the bolts, washers and nuts.
1) Do not tighten the bolts and nuts at this time.
(b) Tighten the clamp nut to 20 inch-pounds.
(c) Adjust each rod length so the bolt is at the center of the slot in the clamp.
(d) Tighten the bolts and nuts to 25-35 inch-pounds.
1) Make sure there is no clamp-up force between the bolt and the duct clamp.

S 434-140
(6) For the installation of the crossover duct section, install the couplings on both ends of the duct section.

S 434-148
(7) Tighten the duct section.
(a) If you install the cable clamp couplings:

NOTE: Do these steps only during installation of the cable clamp connector.

1) Insert the cables through the coupling flanges and install the nuts.
2) Tighten the cable nuts on the three cables equally. Do this until the cables are in tension.

CAUTION: DO NOT TIGHTEN THE CABLES TOO MUCH. IF YOU TIGHTEN THE CABLES TOO MUCH , YOU CAN CAUSE DAMAGE TO THE COUPLING OR THE DUCT WHEN YOU PRESSURIZE THE SYSTEM.

3) If necessary, continue to tighten the cable nuts. Do this until the clearance at each end of the coupling sleeve is within the permitted tolerance (Fig. 403).

NOTE: Try to adjust to the lowest permitted tolerance.

S 434-141
(8) Tighten the support rods as shown in Fig. 403.

S 864-233
(9) Pressurize the pneumatic system (AMM 36-00-00/201).

S 794-143
(10) Do a check of the duct connections for leaks:
(a) A small leak is permitted.

(b) You must repair a large leak.

S 704-234

(11) If you installed the cable clamp couplings:
(a) Make sure that the clearance at each end of the coupling sleeve is within the permitted tolerance (Fig. 403).
(b) If you cannot get the proper tolerance:
1) Depressurize the pneumatic system (AMM 36-00-00/201).
2) Do the steps as follows, as required:
a) Adjust the coupling sleeve clearance.
b) Adjust the wing leading edge sections.

E. Put the Airplane Back to Its Usual Condition

S 864-144

(1) Remove pneumatic power if it is not necessary.

S 864-145

(2) Remove electrical power if it is not necessary.

S 414-146

(3) For the crossover duct sections, install the applicable fairing panel on the wing/body fairing (193KL, 193ML, 136LR, 194KR) or open the applicable ECS Access Door (193NL, 194LR).

S 414-147

(4) For the air supply duct, install the applicable fairing panel on the wing/body fairing (136LR, 193ML) and close the applicable ECS Access Door (193NL, 194LR).

TASK 36-11-01-004-148

14. Remove the APU Air Supply Duct Sections (Fig. 404)
A. References
(1) 06-42-00/201, Empennage (Major Zone 300) Access Doors and Panels
(2) 06-46-00/201, Entry, Service, and Cargo Doors (Major Zone 800) Access Doors and Panels
(3) 24-22-00/201, Electric Power - Control

(4) 36-00-00/201, Pneumatic - General
(5) AMM 36-11-02/401, Insulation - Pneumatic Duct
(6) AMM 38-32-06/401, Blowers - Vacuum
(7) AMM 38-32-08/201, Tubing - Waste System

B. Access
(1) Location Zone
310 Fuselage - Body Section 48

C. Prepare for removal.

S 864-149
(1) Supply electrical power (Ref 24-22-00).

S 864-179

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(2) Remove pneumatic power (Ref 36-00-00).

S 014-151
(3) Open the applicable access door.
(a) APU door (315AL/316AR) (Ref 06-42-00).

WARNING: STAY OFF THE SERVICE ACCESS DOOR, 312AR. YOUR WEIGHT CAN CAUSE THE SPRING LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

(b) Stabilizer/trim jackscrew compartment access door (312AR) (Ref 06-42-00).
(c) Bulk cargo door, left side (811) (Ref 06-46-00).
(d) Aft cargo door, right side (822) (Ref 06-46-00).
(e) Remove the applicable cargo compartment panels (AMM 06-46-00/201).

S 014-246
(4) AIRPLANES WITH LARGE CAPACITY WASTE TANKS;
If it is necessary, remove the vacuum blower motors (AMM 38-32-06/401).

S 014-247
(5) AIRPLANES WITH LARGE CAPACITY WASTE TANKS;
If it is necessary, remove the waste system tubing (AMM 38-32-08/201).

D. Remove the Duct Section for the APU.

S 024-239
(1) If it is necessary, do these steps to remove the duct shroud:
(a) Remove the nuts, bolts and washers.
(b) Remove the duct shroud.

S 034-152
(2) Loosen the duct support couplings if necessary.

S 034-153
(3) Remove the bolts that attach the brackets to the straps, if necessary, to free the duct from position.

S 034-154
(4) Remove the couplings on both ends of the duct.

S 034-155
(5) Remove the support rod, at the duct end, if necessary.

S 024-240
(6) Remove the insulation (AMM 36-11-02/401).

S 434-156
(7) Cover the duct openings to prevent the entry of unwanted objects.

TASK 36-11-01-404-157

15. Install the Duct Section for the APU

A. Consumable Materials
(1) G00091 Detector - Leak-Tek 160X (Ref 20-30-07)

B. References
(1) 06-42-00/201, Empennage (Major Zone 300) Access Doors and Panels
(2) 06-46-00/201, Entry, Service, and Cargo Doors (Major Zone 800) Access Doors and Panels
(3) 24-22-00/201, Electric Power - Control
(4) 36-00-00/201, Pneumatic - General
(5) AMM 36-11-02/401, Insulation - Pneumatic Duct
(6) AMM 38-32-06/401, Blowers - Vacuum
(7) AMM 38-32-08/201, Tubing - Waste System

C. Access
(1) Location Zone
310 Fuselage - Body Section 48

D. Procedure.

S 034-158
(1) Remove the duct covers.

S 424-241
(2) Install the insulation (AMM 36-11-02/401).

S 984-159
(3) Put the duct in position.

S 434-160
(4) Install the bolts, the washers, and the nuts that attach the brackets to the straps, if necessary.

S 434-161
(5) Install but do not tighten the couplings at both ends of the duct.
(a) For APU bleed duct sections installed between STA 1140-1250 and STA 1355-1365, make sure there is a minimum clearance of 0.75-inch between the coupling T-bolt and the adjacent fire extinguisher tube assembly (SB 26A0130, SB 26A0123).

NOTE: The clearance is measured from the outer surface of the insulation on the fire extinguisher tube to the nearest part of the coupling T-bolt.

(b) Turn each coupling until the T-bolt is below the APU duct centerline and that there is at minimum 2 inches of clearance between the T-bolt and other adjacent system components.
(c) Make sure the coupling V-band, T-bolt, and latch do not touch other adjacent system components.

S 424-250
(6) For the APU duct section that connects to the air-driven pump (ADP) duct (approx. STA 1197), install the coupling but do not tighten it.
(a) Turn the coupling until there is at minimum 2 inches of clearance between the T-bolt and other adjacent system components.
(b) Make sure the coupling V-band, T-bolt, and latch do not touch other adjacent system components.

S 434-162
(7) Install the support rods to the duct, if necessary.

S 434-163
(8) Tighten the duct couplings.
(a) For BACC10GY600 couplings, tighten T-bolt 50-60 pound-inches (5.6-6.8 newton-meters).
(b) For BACC10GY450 couplings, tighten T-bolt 45-55 pound-inches (5.1-6.2 newton-meters).

S 434-164
(9) Tighten the support rods as shown in Fig. 404.

S 864-165
(10) Supply pneumatic power (Ref 36-00-00).

S 794-166
(11) Do a check of the duct connections for leaks:
(a) A small leak is permitted.
(b) You must repair a large leak.

S 424-242
(12) If it is necessary, install the duct shroud with the bolts, washers and nuts.
(a) Install the nuts on the outside of the duct shroud.
(b) Make sure the minimum clearance between the duct shroud and the support is 0.10 inches.
(c) You can move the bolts in the slotted holes of the brackets to get the necessary clearance.

S 424-243
(13) If it is necessary, install the vacuum blower motors (AMM 38-32-06/401).

S 424-244
(14) If it is necessary, install the waste system tubing (AMM 38-32-08/201).

E. Put the Airplane Back to Its Usual Condition

S 864-167
(1) Remove pneumatic power if it is not necessary.

S 414-245
(2) Install the cargo compartment panels (AMM 06-46-00/201).

S 414-168
(3) Close the applicable access door.

S 864-169
(4) Remove electrical power if it is not necessary.

PNEUMATIC DUCT - INSPECTION/CHECK

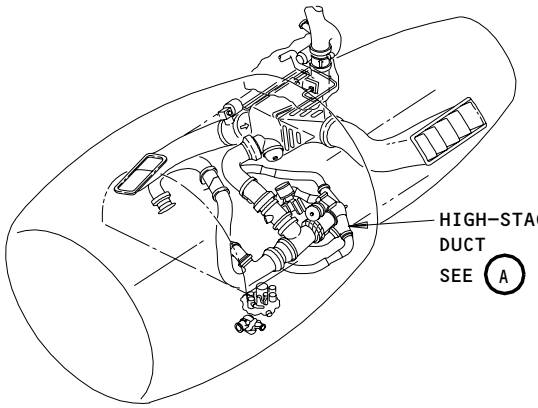
1. General
   A. This procedure has these tasks:
      (1) The inspection/check of the pneumatic ducts from the air sources (the engine, the APU, and the ground connector) to the airplane systems (the air cooling packs, the anti-ice, and the engine starter valve).
      (2) The inspection/check (wear limits) for the ball joints of the pneumatic ducts.
      (3) The inspection/check of the ball joint nut torque.
      (4) The inspection/check (leakage limit) for the ball joints of the pneumatic ducts.

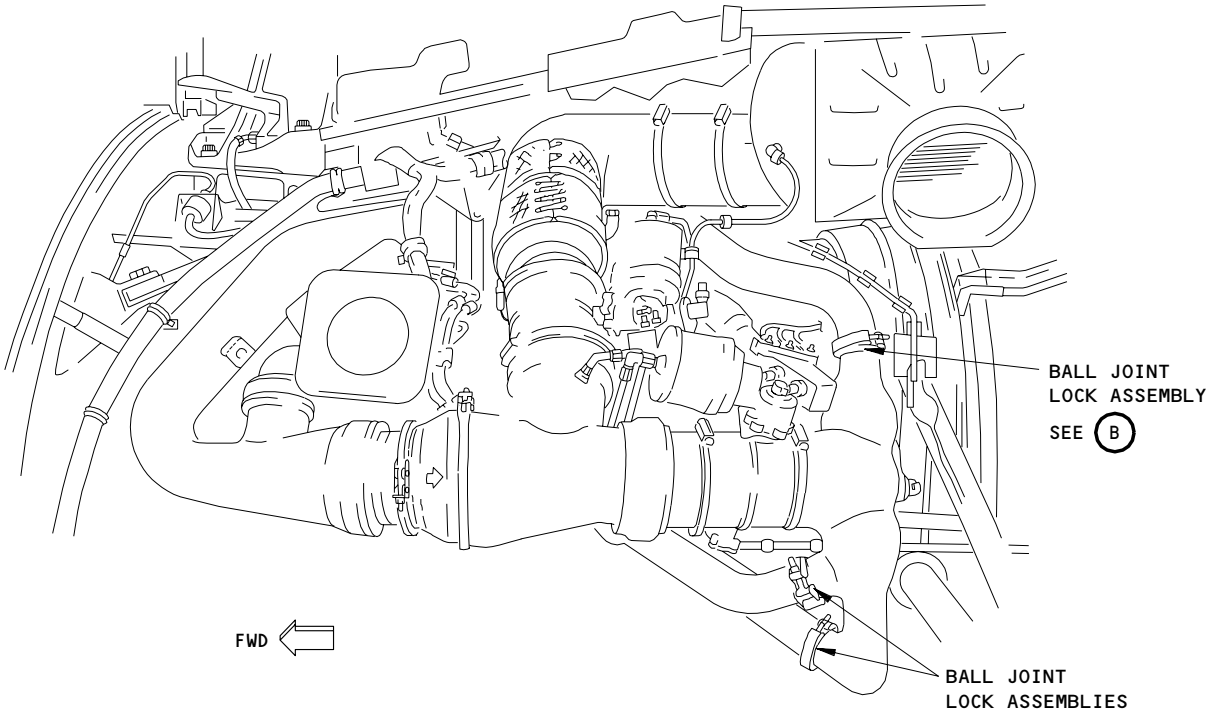
TASK 36-11-01-206-001

2. Do an Inspection/Check of the Pneumatic Duct
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 & 200) Access Doors and Panels
      (2) AMM 06-42-00/201, Empennage (Major Zone 300) Access Doors and Panels
      (3) AMM 06-43-00/201, Engine and Nacelle (Major Zone 400) Access Doors and Panels
      (4) AMM 06-44-00/201, Wings (Major Zones 500 & 600) Access Doors and Panels
      (5) AMM 06-46-00/201, Entry, Service, and Cargo Doors (Major Zone 800) Access Doors and Panels
      (6) AMM 27-81-00/201, Leading Edge Slat System
      (7) AMM 36-11-01/401, Pneumatic Duct
      (8) AMM 36-11-01/701, Pneumatic Duct
      (9) AMM 36-11-01/801, Pneumatic Duct
      (10) AMM 78-31-00/201, Thrust Reverser System
   B. Access
      (1) Location Zones
          100 Lower Half of Fuselage
          400 Power Plants and Nacelle Struts

   C. Prepare for the Duct Inspection/Check

      S 016-002
      (1) Remove or open the applicable access panels and/or doors:
          (a) For the engine air supply duct or the precooler fan duct

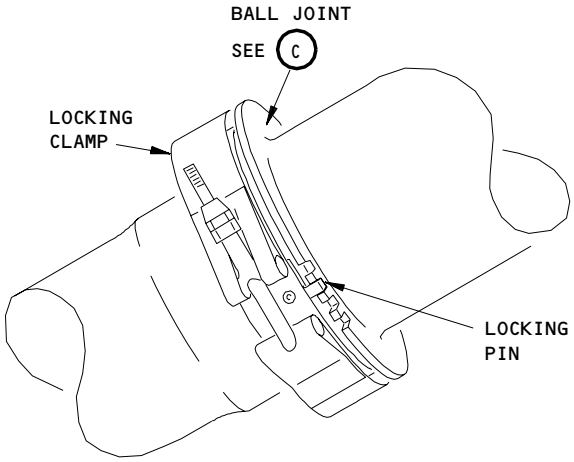




HIGH-STAGE DUCT

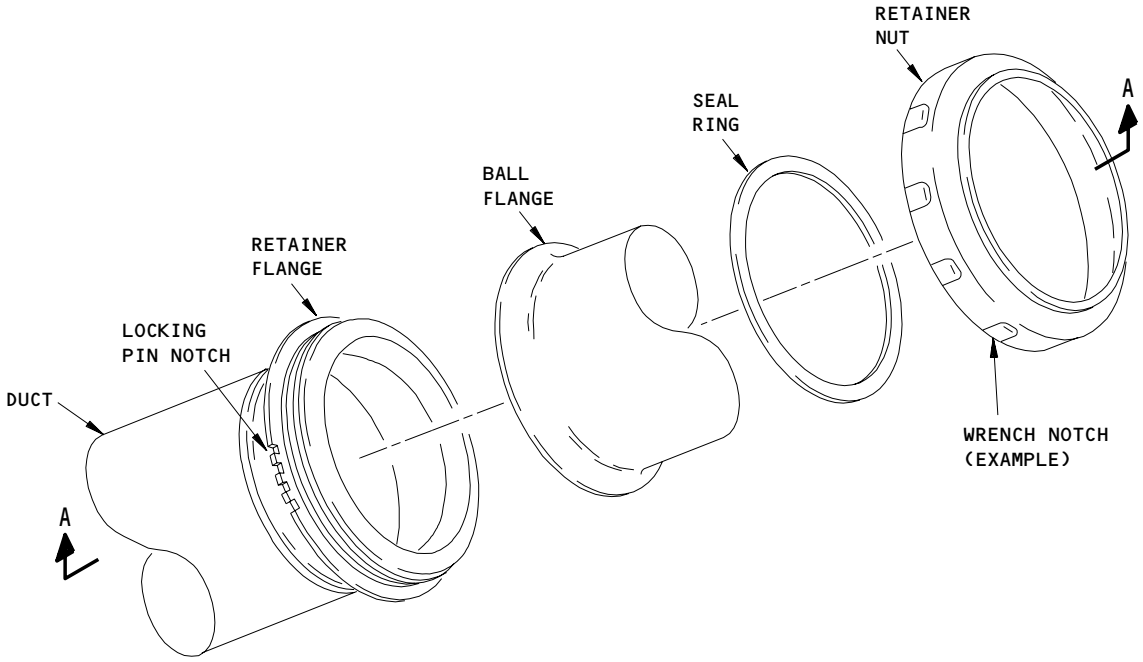
A

Pneumatic Duct Ball Joint Inspection
Figure 601 (Sheet 1)



BALL JOINT LOCK ASSEMBLY

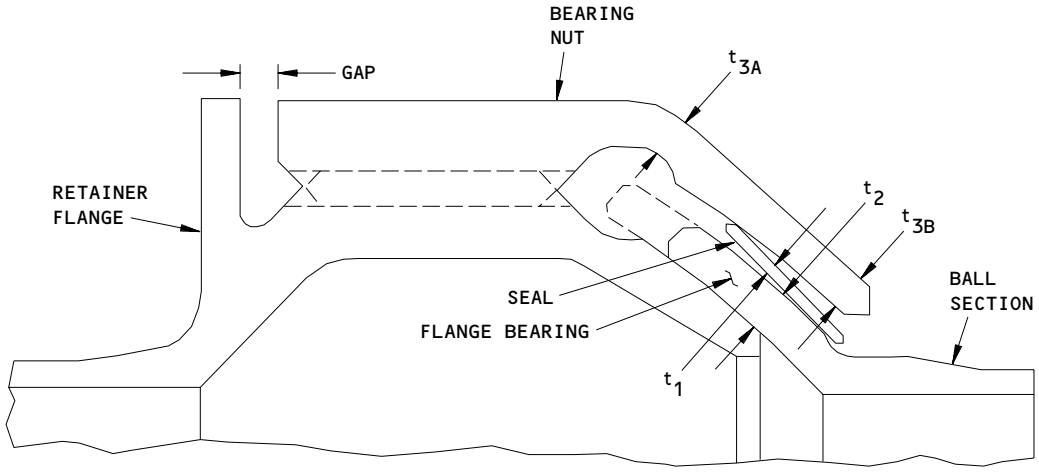
B



BALL JOINT

C

Pneumatic Duct Ball Joint Inspection
Figure 601 (Sheet 2)



BALL JOINT CROSS-SECTION
A-A

BALL JOINT WEAR LIMITS		
BALL JOINT SIZE (DIAMETER)	PART	t_{MIN} [1] INCH (mm)
2.5 INCH (63.5 mm)	SEAL (t_1) BEARING FLANGE (t_2) BEARING NUT [2] (t_{3A} to t_{3B})	0.015 (0.381) 0.055 (1.397) 0.070-0.032 (1.778-0.8128)

[1] REPLACE DUCT SECTION (BALL JOINT) IF ANY OF THE MEASUREMENTS ARE LESS THAN t_{MIN} (AMM 36-11-01/401).

[2] REPLACE DUCT SECTION (BALL JOINT) (AMM 36-11-01/401) IF THE SHIM GAP (BETWEEN THE BEARING NUT AND THE RETAINER FLANGE) IS LESS THAN 0.003 INCH (0.0762 mm) WHEN THE JOINT IS ASSEMBLED AND TIGHTENED TO 20 LB-FT. (27.11 newton-meters)

Pneumatic Duct Ball Joint Inspection
Figure 601 (Sheet 3)

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201. FAILURE TO OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

1) Open the left and the right thrust reversers (AMM 78-31-00/201).

(b) For the strut pneumatic duct
1) Remove the applicable access panels for the wing upper surface nacelle strut (511PT, 611PT) (AMM 06-44-00/201).
2) Open the right side pressure relief door for the strut (434AR or 444AR) (AMM 06-43-00/201).

(c) For the leading edge duct of the wing
1) Fully extend and then deactivate the leading edge slat (AMM 27-81-00/201).
2) Remove the applicable lower leading edge skin panel (511RB, 611RB, 511QB, 611QB, 511NB, 611NB, 511LB, 611LB, 511JB, 611JB, 511GB, 611GB, 511FB, 611FB, 511BB, 611BB) (AMM 06-44-00/201).
3) Remove the inboard pressure relief panel for the lower leading edge (511KB, 611KB) if necessary (AMM 06-44-00/201).

(d) For the body air supply duct
1) Remove the applicable fairing panel on the wing/body fairing (136LR, 193ML, 193KL, 194KR) (AMM 06-41-00/201) or open the applicable ECS access door (193NL, 194LR) (AMM 06-41-00/201).

(e) For the APU air supply duct
1) Open the APU door (315AL, 316AR) (AMM 06-42-00/201).

WARNING: DO NOT STAND ON THE ACCESS DOOR 312AR. IF YOU STAND ON THE DOOR THE SPRING-LOADED LATCHES CAN RELEASE AND CAUSE INJURY TO PERSONS.

2) Open the access door for the stabilizer/trim jackscrew compartment (312AR) (AMM 06-42-00/201).
3) Open the bulk cargo door.
4) Open the aft cargo door.

D. Examine the Pneumatic Duct

S 216-003

(1) Examine the bare corrosion resistant steel (CRES) pneumatic ducts for grease residue.

S 106-004
(2) Clean the contaminated duct (AMM 36-11-01/701).

S 216-005
(3) Do a check to see if hydraulic fluid caused damage to the titanium pneumatic ducts:

NOTE: Titanium ducts in hydraulic fluid areas have a black finish or a gold finish. The black finish can look almost the same as hydraulic fluid contamination.

(a) Examine the ducts in hydraulic fluid areas for contamination and metal or paint deterioration.
1) Ducts that have been contaminated have light glossy brown film, remaining dull black carbon, or a bare surface.
2) Ducts with metal deterioration can have a bright surface with removed paints.
3) Replace the duct(s) that have paint deterioration or removed paint (AMM 36-11-01/401) or make an approved temporary repair until the damaged duct is replaced (AMM 36-11-01/801).

S 216-006
(4) Do a check of the gold finish duct in the wing leading edge and main landing gear wheel well for contamination with hydraulic fluid.
(a) Clean the contaminated duct (AMM 36-11-01/701).

S 216-007
(5) Do a check of the duct for metal deterioration, cracks, and dents.
(a) Replace the duct (AMM 36-11-01/401) or make an approved temporary repair until the damaged duct is replaced (AMM 36-11-01/801).

NOTE: Do not repair Ducts cracked along their circumference. These ducts must be replaced (AMM 36-11-01/401).

E. Put the Airplane Back to Its Usual Condition

S 416-008
(1) Install or close the applicable access doors and panels:
(a) For the engine air supply duct or the precooler fan duct

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201. FAILURE TO OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS CAN CAUSE INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT.

1) Close the left and the right thrust reversers (AMM 78-31-00/201).

(b) For the strut pneumatic duct:
1) Install the applicable access panels for the wing upper surface nacelle strut (511PT, 611PT) (AMM 06-44-00/201).
2) Close the pressure relief door for the right side strut (434AR or 444AR) (AMM 06-43-00/201).

(c) For the wing leading edge duct:
1) Install the applicable lower leading edge skin panel (511RB, 611RB, 511QB, 611QB, 511NB, 611NB, 511LB, 611LB, 511JB, 611JB, 511GB, 611GB, 511FB, 611FB, 511BB, 611BB (AMM 06-44-00/201).
2) Install the applicable inboard pressure relief panel for the lower leading edge (511KB, 611KB) (AMM 06-44-00/201).
3) Operate the leading edge slat (AMM 27-81-00/201).

(d) For the body air supply duct:
1) Install the applicable fairing panel on the wing/body fairing (136LR, 193ML, 193KL, 194KR) (AMM 06-41-00/201) or close the applicable ECS access door (193NL, 194LR) (AMM 06-41-00/201).

(e) For the APU air supply duct:
1) Close the APU door (315AL, 316AR) (AMM 06-42-00/201).
2) Close the stabilizer/trim jackscrew compartment access door (312AR) (AMM 06-42-00/201).
3) Close the bulk cargo door.
4) Close the aft cargo door.

TASK 36-11-01-206-009

3. Do an Inspection/Check of the Ball Joint of the Pneumatic Duct (Fig. 601)

A. General
(1) This procedure has an illustration and a wear limit table for the inspection of the pneumatic duct ball joints.

B. Examine the Pneumatic Duct Ball Joint for Wear Limits

S 226-010

(1) Refer to Fig. 601 for the inspection points and the wear limit table.

TASK 36-11-01-206-011

4. Do an Inspection/Leakage Check of the Ball Joints of the Pneumatic Duct

A. General

(1) This procedure has steps to make sure that the HP duct assembly ball joints do not exceed acceptable leakage limits.

B. References

(1) AMM 24-22-00/201, Electrical Power
(2) AMM 36-00-00/201, Pneumatic Power
(3) AMM 36-11-01/401, Pneumatic Ducts
(4) AMM 78-31-00/201, Thrust Reversers

C. Access

(1) Location Zones

411 Left Power Plant Nacelle
421 Right Power Plant Nacelle

(2) Access Panels

413AL Fan Access and Fan Cowl Assembly - Engine 1
414AR Fan Access and Fan Cowl Assembly - Engine 1
415AL Fan Reverser, Forward Engine Mount - Engine 1
416AR Fan Reverser, Forward Engine Mount - Engine 1
417AL Core Cowl and Engine Mount - Engine 1
418AR Core Cowl and Engine Mount - Engine 1
423AL Fan Access and Fan Cowl Assembly - Engine 2
424AR Fan Access and Fan Cowl Assembly - Engine 2
425AL Fan Reverser, Forward Engine Mount - Engine 2
426AR Fan Reverser, Forward Engine Mount - Engine 2
427AL Core Cowl and Engine Mount - Engine 2
428AR Core Cowl and Engine Mount - Engine 2

D. Prepare for the Inspection

S 866-012

(1) Remove pneumatic power (AMM 36-00-00/201).

S 016-013

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open the right thrust reverser (AMM 78-31-00/201).

E. Ball Joint Inspection

S 796-014

(1) Do a leakage check of the ball joints:
(a) Install a 2x2-foot sheet of heavy-duty aluminum foil (kitchen type) over each ball joint.
1) Fold the aluminum foil in half to double the thickness.
2) Wrap the aluminum foil around the ball joint and coupling and fold the edges of the foil to make a seal.

3) Make sure the aluminum foil is installed completely around the ball joint and that the foil extends more than one-inch beyond each end of the ball joint.
4) Wrap a wire around the ends of the aluminum foil to install the foil onto the HP duct assembly.
5) Make sure there are no punctures or tears in the aluminum foil.

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE WHEN YOU CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(b) Close the right thrust reverser, 416AR(426AR) (AMM 78-31-00/201).
(c) Start the applicable engine (AMM 71-00-00/201).
(d) Run the applicable engine at maximum continuous power for 60 to 120 seconds (AMM 71-00-00/201).
(e) Shutdown the applicable engine (AMM 71-00-00/201).
(f) Wait for the engine to cool down sufficiently before you get access to the HP duct assembly.

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(g) Open the right thrust reverser (AMM 78-31-00/201).
(h) Do an inspection of the aluminum foil installed around the ball joints.
1) If the aluminum foil shows signs of leakage (large punctures, tears, or foil is missing), replace the entire HP duct assembly (AMM 36-11-01/401).

NOTE: You must replace the entire HP duct assembly, because the maintenance of the ball joint cannot be accomplished on-aircraft.

2) If the aluminum foil does not show signs of leakage, remove the wire and the aluminum foil from the ball joint and look at the lockwire or locking clamp installation.
a) If the lockwire or locking clamp is broken or missing, replace the lockwire (AMM 20-10-23/401) or locking clamp.

F. Put the Airplane Back to Its Usual Condition

S 026-015

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Close the applicable thrust reverser (AMM 78-31-00/201).

S 446-016
(2) Do the activation procedure for the thrust reverser if it is applicable (Forward Thrust Position) (AMM 78-31-00/201).

S 026-017
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 36-11-01-206-018

5. Do a Torque Inspection/Check of the Ball Joint of the Pneumatic Duct

A. General
(1) This procedure has steps to make sure that the pneumatic duct ball joint is tightened to the correct value.

B. References
(1) AMM 24-22-00/201, Electrical Power
(2) AMM 36-00-00/201, Pneumatic Power
(3) AMM 36-11-01/401, Pneumatic Ducts
(4) AMM 78-31-00/201, Thrust Reversers

C. Access
(1) Location Zones
411 Engine 1
421 Engine 2

(2) Access Panels

413AL	Fan Access and Fan Cowl Assembly - Engine 1
414AR	Fan Access and Fan Cowl Assembly - Engine 1
415AL	Fan Reverser, Forward Engine Mount - Engine 1
416AR	Fan Reverser, Forward Engine Mount - Engine 1
417AL	Core Cowl and Engine Mount - Engine 1
418AR	Core Cowl and Engine Mount - Engine 1
423AL	Fan Access and Fan Cowl Assembly - Engine 2
424AR	Fan Access and Fan Cowl Assembly - Engine 2
425AL	Fan Reverser, Forward Engine Mount - Engine 2
426AR	Fan Reverser, Forward Engine Mount - Engine 2
427AL	Core Cowl and Engine Mount - Engine 2
428AR	Core Cowl and Engine Mount - Engine 2

D. Procedure

S 866-019

(1) Remove pneumatic power (AMM 36-00-00/201).

S 046-020

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (Forward Thrust Position) (AMM 78-31-00/201).

S 016-021

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Open the left thrust reverser (AMM 78-31-00/201).

S 216-022

(4) To make sure the locking clamp is installed correctly, do these steps:
   (a) Make sure the locking pin is installed in one of the notches of the flange.
   (b) Make sure the locking clamp is tight.

S 216-023

(5) If the locking clamp is not correctly installed, disassemble the ball joint (AMM 36-11-01/401).
   (a) Do the steps in the ball joint (wear limit) inspection/check paragraph (Fig. 601).
   (b) Assemble and tighten the ball joint as shown "Ball Joint Installation" section in the pneumatic duct installation procedure (AMM 36-11-01/401).

S 026-024

(6) If the locking clamp was installed correctly, remove the locking clamp from the ball joint.

NOTE: Inspection of the ball joint parts is not necessary.

   (a) Tighten the nut on the ball joint to the final value given in the "Ball Joint Installation" section in the pneumatic duct installation procedure (AMM 36-11-01/401).
   (b) Install the locking clamp (AMM 36-11-01/401).

E. Put the Airplane Back to Its Usual Condition

S 416-025

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Close the applicable thrust reverser (AMM 78-31-00/201).

S 446-026

(2) Do the activation procedure for the thrust reverser (Forward Thrust Position) (AMM 78-31-00/201).

S 866-027

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

PNEUMATIC DUCT - CLEANING/PAINTING

1. General
   A. There are three types of ducts on the airplane:
      (1) Bare titanium ducts
      (2) Gold-coated titanium ducts
      (3) Corrosion resistant steel ducts (CRES)
   B. A different clean procedure is necessary for each type of duct.
   C. The gold-coated titanium ducts are in the wing leading edge and in the wheel well.
   D. The corrosion resistant steel duct is in section 48 (APU area) of the airplane.
   E. This procedure has one task. The task contains instructions to clean and paint pneumatic ducts.
   F. Titanium ducts (bare and gold-coated) must be inspected and cleaned if touched by hydraulic fluid. Replacement may be required.

TASK 36-11-01-107-001

2. Clean the Pneumatic Duct
   A. References
      (1) 36-11-01/601, Pneumatic Duct
      (2) 36-11-01/801, Pneumatic Duct
   B. Consumable Materials
      (1) B00178 Solvent - Acetone
      (2) B00130 Solvent - Isopropyl Alcohol, Spec TT-I-735
      (3) B00148 Solvent - Methyl-Ethyl-Ketone - TT-M-261
      (4) E00015 Cloth - Lint Free Clean
      (5) E00017 Scrapers, wood or plastic - Commercially Available
   C. Clean the Corrosion Resistant Steel (CRES) Ducts

      S 117-003
      (1) Use a detergent solution to clean the duct.

      S 117-008

      WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

      (2) If there is grease on a duct, use solvent, Series 80 (AMM 20-30-80/201) to clean it.
   D. Cleaning the Bare Titanium Ducts

      S 287-005
      (1) If hydraulic fluid touched the titanium duct, examine the titanium duct for damage (Ref 36-11-01/601).

S 967-002
(2) If the titanium duct is damaged, replace the titanium duct (Ref 36-11-01).

S 117-006
(3) If the duct is not damaged, use acetone with a scraper to remove the contamination.

E. Cleaning the Gold Coated Titanium Ducts

S 117-007
(1) Use a lint free clean cloth with isopropyl alcohol to clean the gold titanium duct.

PNEUMATIC DUCT - APPROVED REPAIRS

1. General
   A. You can repair thin wall ducts that are damaged.
   B. Refer to the Overhaul Manual if you need to weld or do other repairs not included here.
   C. This procedure also contains a task to repair the duct flanges while the duct is installed on-wing.

TASK 36-11-01-208-001

2. Examine The Duct For Damage
   A. Examine the duct to see if it is necessary to repair it.

S 208-002

(1) This damage is permitted:
   (a) There are smooth dents that do not decrease the airflow.
   (b) There are thin scratches that have a depth that is less than 10% of the duct wall thickness.
   (c) The two edges of each scratch are smooth and rounded.
   (d) The bottom of each scratch is smooth and rounded.

S 308-003

(2) Repair or replace the duct if there is more damage.

TASK 36-11-01-308-004

3. Repair the Dent In the Duct
   A. Repair a smooth dent with one these procedures:

S 358-005

(1) Pull a ball mandrel through the dented area of the duct.

S 358-006

(2) Use an expansion device in the duct.

S 358-007

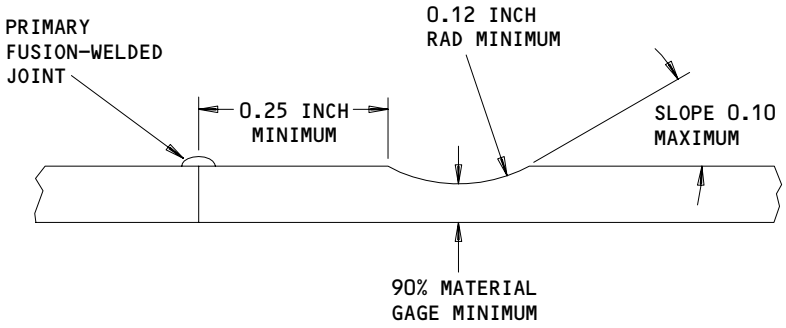
(3) Increase the pressure in the duct (do not exeed the maximum permitted pressure limits of the system) and hit around the edges of the dent lightly with a mallet that is non metallic.

TASK 36-11-01-308-008

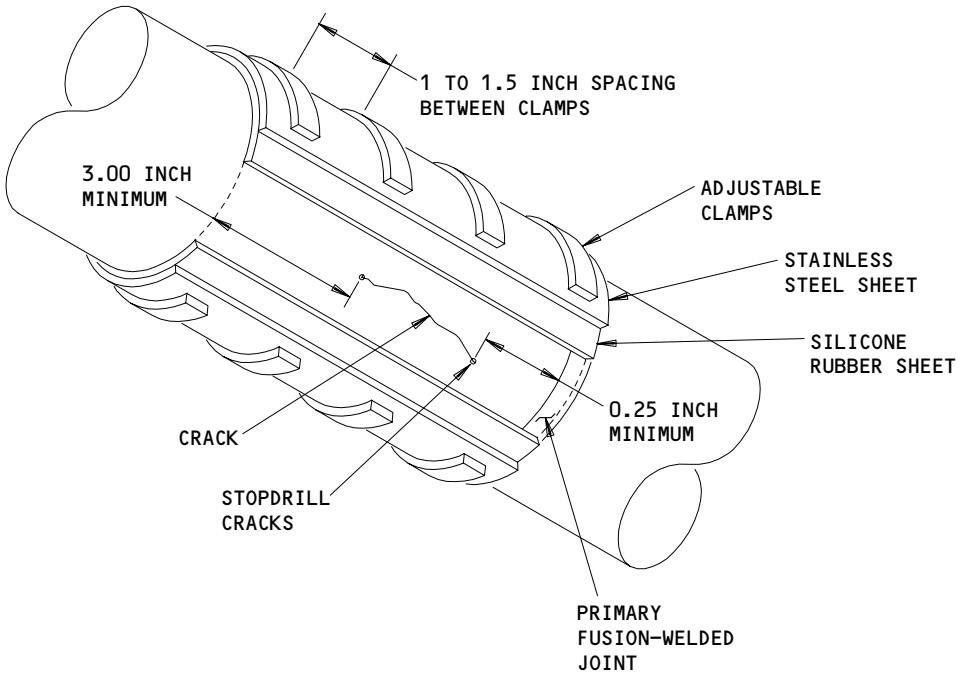
4. Repair the Scratch in the Duct
   A. To repair a scratch in the duct, remove metal that is adjacent to the scratch, with the subsequent conditions (Fig. 801):

S 228-009

(1) The minimum wall thickness at the bottom of the scratch after it is repaired must not be less than 90% of the minimum duct wall thickness.



DUCT REWORK (TYPICAL)



DUCT REPAIR (TYPICAL)

Pnumatic Duct Approved Repairs
Figure 801

S 228-010
(2) The surface roughness of the repaired area must not be more than 40 microinches (arithmetical average).

S 228-011
(3) The slope of the repaired area must not be more than 10%.

S 228-012
(4) The inner and the outer radius of the repaired area must not be more than 0.12 inch.

S 228-013
(5) The damage must not be found less than 0.25 inch from a primary welded joint.

S 968-025
(6) You must replace the duct if it can not be repaired to these conditions

TASK 36-11-01-308-014

5. Temporarily Repair the Duct With a Crack (Fig. 801)

A. General

(1) You can temporarily repair ducts that have a crack along their longitude.

NOTE: This procedure is only permitted with ducts that have a crack along their longitude. Replace ducts that have a crack along their circumference.

(2) The repair is temporary and you must replace the duct as soon as possible.

B. Consumable Materials

(1) G02306 BMS 1-54, Grade 50, Elastomer, Synthetic for Elevated Temp Service, .10 -.15 inch thick

(2) G02313 BMS 1-57 Grade 53, Silicone Rubber, BMS3-11 Resistant, High Physical Properties, .10 -.15 inch thick
(3) G50268 BMS 1-52, Synthetic Rubber, High Performance Silicone, .10 -.15 inch thick
(4) G02318 Stainless steel sheet (AMM 20-30-07/201)

C. Equipment
(1) Adjustable stainless steel clamps - 3 to 7 inch diameter (AMM 20-30-07/201)

D. Repair the duct with the crack

S 328-017
(1) Stop-drill the cracks. The size of the hole you drill must have a diameter between 3/16 inch to 1/4 inch.

S 358-018
(2) Put the silicone rubber sheet on the cracks and extend it three inches beyond the cracks.

S 358-019
(3) Put the stainless steel sheet (0.010 inch thick) on the rubber sheet.

S 358-020
(4) Put the clamps on the duct every 1 to 1 1/2 inches and tighten the clamps.

TASK 36-11-01-308-021

6. Duct Flange Repair

A. Equipment
(1) 6FT001-101, Adams-Bird Flange Reforming Tool Kit
Innovative Support Equipment Engineering, Inc. (formerly Adams-Bird)
745 Potsgrove Place
Tracy, California 95377-9023 USA
Phone (209) 832-3285

B. References
(1) 36-11-01/401 - Ducts

C. Access
(1) Location Zones

130	BS785.9 to BS955.1
190	Fairings
310	Fuselage - Body Section 48
430/440	No.1/No.2 Nacelle Strut
510/610	Wing Leading Edge - Forward of Front San and Inboard of Nacelle Strut

D. Procedure

S 018-023
(1) Get access to the duct flange that you will repair.

S 328-024

(2) Use the flange reforming tool and repair the duct flange.

S 328-022

(3) If you cannot repair the duct flange while the duct flange is installed, remove the duct to get access to the damaged flange (Ref 36-11-01/401).
   (a) Repair the duct flange with the flange reforming tool.
   (b) Install the Duct (Ref 36-11-01/401).

PNEUMATIC DUCT INSULATION - REMOVAL/INSTALLATION

1. General
   A. This procedure removes and installs the pneumatic duct insulation. The duct insulation is on the precooler inlet duct on each engine and on the APU air supply duct in the aft cargo area. You can see the engine insulation sections when you extend the left thrust reverser. The APU insulation blankets are behind the sidewall panels in the aft cargo bays.

   TASK 36-11-02-004-006

2. Remove the Precooler Inlet Duct Insulation (Fig. 402)
   A. References
      (1) 06-46-00/201, Entry, Service, and Cargo Doors
      (2) 20-10-23/401, Standard Practices - Lockwire
      (3) 24-22-00/201, Electrical Power Control
      (4) 25-52-01/401, Sidewall Panels
      (5) 36-00-00/201, Pneumatic - General
   B. Access
      (1) Location Zones
          413/423 Fan cowl panel (Left)
          415/425 Fan reverser (Left)

   C. Prepare for the Removal

      S 864-011
      (1) Supply electrical power (Ref 24-22-00).

      S 864-012
      (2) Remove pneumatic power (Ref 36-00-00).

      S 044-001

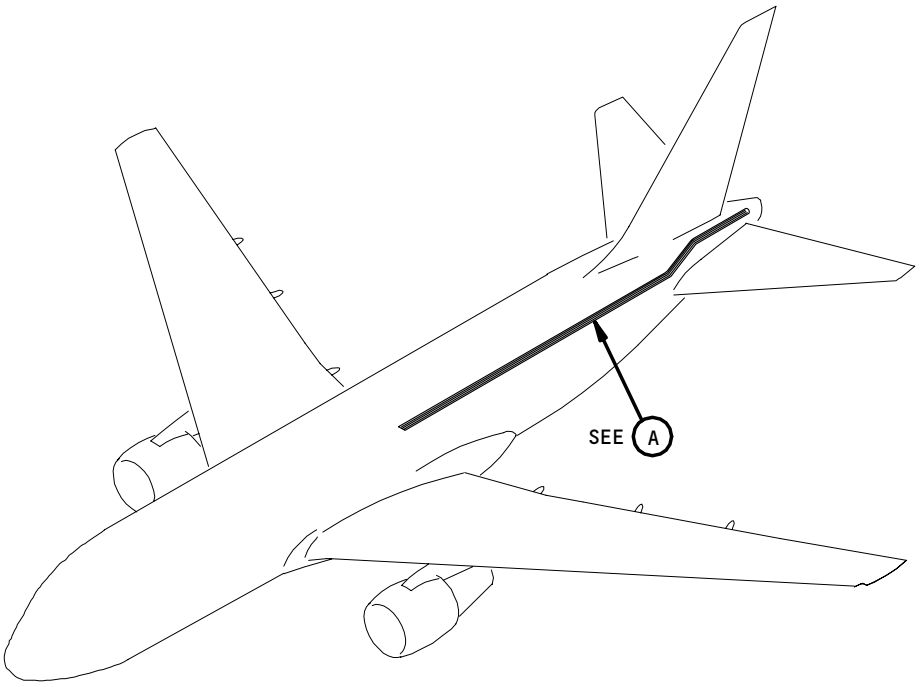
      WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

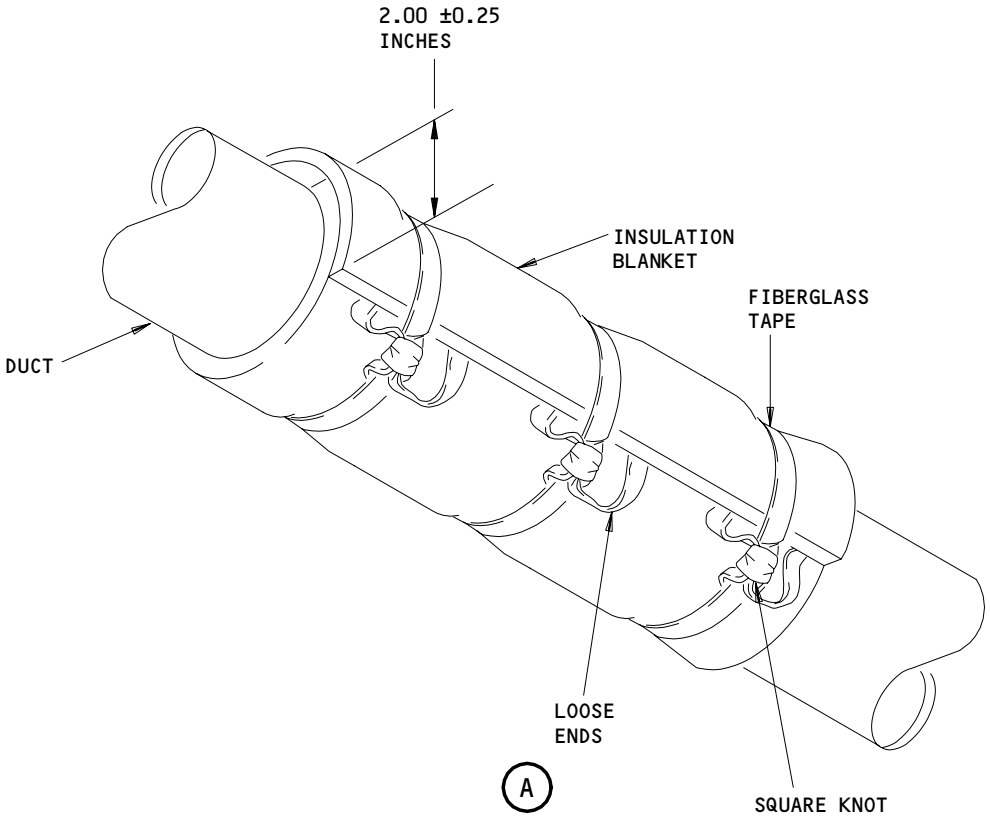
      (3) Do this procedure: Thrust Reverser for Ground Maintenance (Ref 78-31-00).

      S 014-002

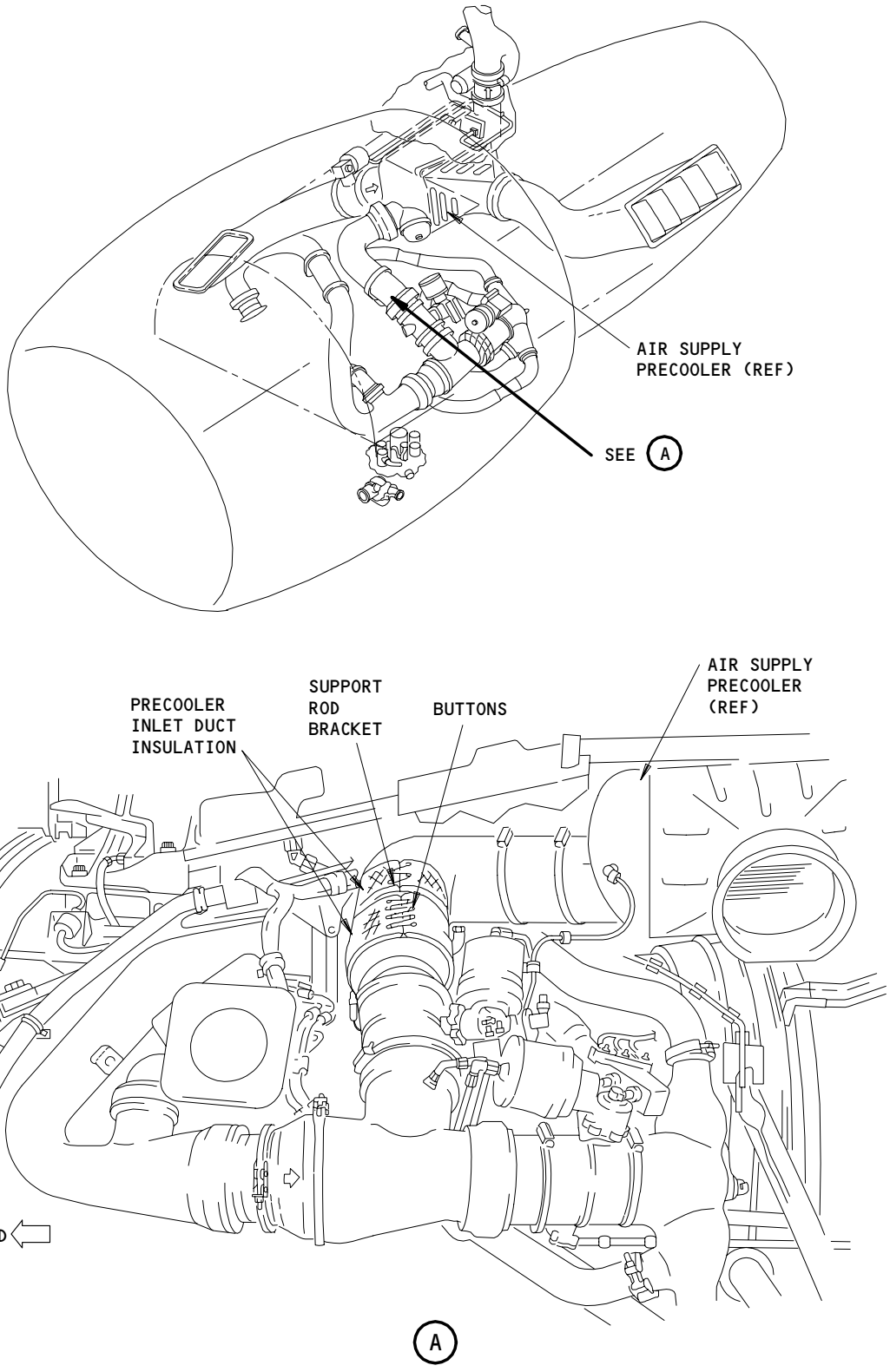
      WARNING: MAKE SURE YOU OPEN THE FAN AND CORE COWL PANELS CORRECTLY (AMM 78-31-00/201) BEFORE YOU OPEN THE FAN DUCT COWL AND THRUST REVERSER. FAILURE TO OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

      (4) Open the applicable left fan duct cowl and left thrust reverser (AMM 78-31-00/201).





Pneumatic Duct Insulation
Figure 401



Engine Pneumatic Duct Insulation
Figure 402

D. Remove the Precooler Inlet Duct Insulation

S 034-013
(1) Cut the safety wire that holds each end of the insulation together.

S 024-008
(2) Open and remove the insulation from the aft side of the duct.

TASK 36-11-02-004-005

3. Remove Pneumatic Duct Insulation (Fig. 401)

A. References
(1) AMM 06-46-00/201, Entry, Service, and Cargo Doors
(2) AMM 20-10-23/401, Standard Practices - Lockwire
(3) AMM 24-22-00/201, Electrical Power Control
(4) AMM 25-52-01/401, Sidewall Panels
(5) AMM 36-00-00/201, Pneumatic - General

B. Access
(1) Location Zone
822 Aft cargo door

C. Prepare for the Removal

S 864-015
(1) Remove pneumatic power (AMM 36-00-00/201).

S 014-016
(2) Open the aft cargo door (AMM 06-46-00/201).

S 014-017
(3) Remove the applicable sidewall panels in the cargo bay (AMM 25-52-01/401).

D. Remove the Pneumatic Duct Insulation

S 034-018

WARNING: THE PNEUMATIC DUCTS CAN BE HOT. IF YOU DO NOT TOUCH THE DUCT INSULATION CORRECTLY, INJURY TO PERSONS CAN OCCUR.

(1) Turn the duct insulation until you get access to the square knots in the tape.

S 034-019
(2) Loosen and remove the square knots.

NOTE: If the square knots cannot be loosened, use a knife to cut the tape.

S 024-020
(3) Remove the pneumatic duct blanket.

TASK 36-11-02-004-004
4. Install the Pneumatic Duct Insulation (Fig. 401)
A. Consumable Materials
(1) G00431, Fiberglass Tape
Owens Corning - ECC-A
Guide Brod Bros - 26X (Ref 20-30-07)
B. References
(1) AMM 06-46-00/201, Entry, Service, and Cargo Doors
(2) AMM 24-22-00/201, Electrical Power Control
(3) AMM 25-52-01/401, Sidewall Panels
(4) AMM 36-00-00/201, Pneumatic - General
C. Access
(1) Location Zone
822 Aft cargo door

D. Procedure

S 424-021
(1) Install the insulation blanket around the duct.

NOTE: Make sure the insulation blanket makes an overlap of 2 ±0.25 inches along the length of the insulation blanket.

S 434-022
(2) Install the fiberglass tape around the insulation blanket in the applicable location.

S 434-023
(3) Tie the tape together with a square knot.

S 434-024
(4) Put the loose ends of the fiberglass tape under the insulation blanket overlap.
E. Put the Airplane Back to Its Usual Condition

S 414-025
(1) Install the sidewall panels in the cargo compartment (AMM 25-52-01/401).

S 414-026
(2) Close the aft cargo door.

S 864-009
(3) Remove electrical power if it is not necessary (Ref 24-22-00).

TASK 36-11-02-404-007

5. Install the Precooler Inlet Duct Insulation (Fig. 402)

A. References

(1) 06-46-00/201, Entry, Service, and Cargo Doors
(2) 20-10-23/401, Standard Practices - Lockwire
(3) 24-22-00/201, Electrical Power Control
(4) 25-52-01/401, Sidewall Panels
(5) 36-00-00/201, Pneumatic - General

B. Access

(1) Location Zones

413/423 Fan cowl panel (Left)
415/425 Fan reverser (Left)

C. Procedure

S 424-027

(1) Move the insulation blanket from the aft side of the duct between the engine and the duct.

S 434-028

(2) Connect each end of the insulation blanket until one end touches the support rod bracket for the precooler inlet duct.

S 434-029

(3) Install the safety wire between each pair of buttons (Ref 20-10-23).

D. Put the Airplane Back to Its Usual Condition

S 414-003

WARNING: MAKE SURE YOU CLOSE THE FAN AND CORE COWL PANELS CORRECTLY (AMM 78-31-00/201) BEFORE YOU CLOSE THE FAN DUCT COWL AND THRUST REVERSER. FAILURE TO OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Close the left fan duct cowl and the thrust reverser (AMM 78-31-00/201).

S 444-030

(2) Do this procedure: Thrust Reverser Activation (AMM 78-31-00/201).

S 864-010

(3) Remove electrical power if it is not necessary (Ref 24-22-00).

PNEUMATIC DUCT INSULATION - APPROVED REPAIRS

1. General
   A. This procedure supplies instructions to repair the pneumatic duct insulation.

TASK 36-11-02-308-001

2. Repair the Pneumatic Duct Insulation (Fig. 801)
   A. Consumable Materials
      (1) G01996 Tape-Repair 0T-6C
   B. References
      (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors
      (2) AMM 24-22-00/201, Electrical Power Control
      (3) AMM 25-55-01/401, Sidewall Lining Panels
      (4) AMM 36-00-00/201, Pneumatic-General
      (5) AMM 36-11-02/401, Pneumatic Duct Insulation
   C. Access
      (1) Location Zone
          822 Aft Cargo Door

   D. Procedure

      S 868-003
      (1) Remove pneumatic power (AMM 36-00-00/201).

      S 018-004
      (2) Open the aft cargo door (AMM 06-46-00/201).

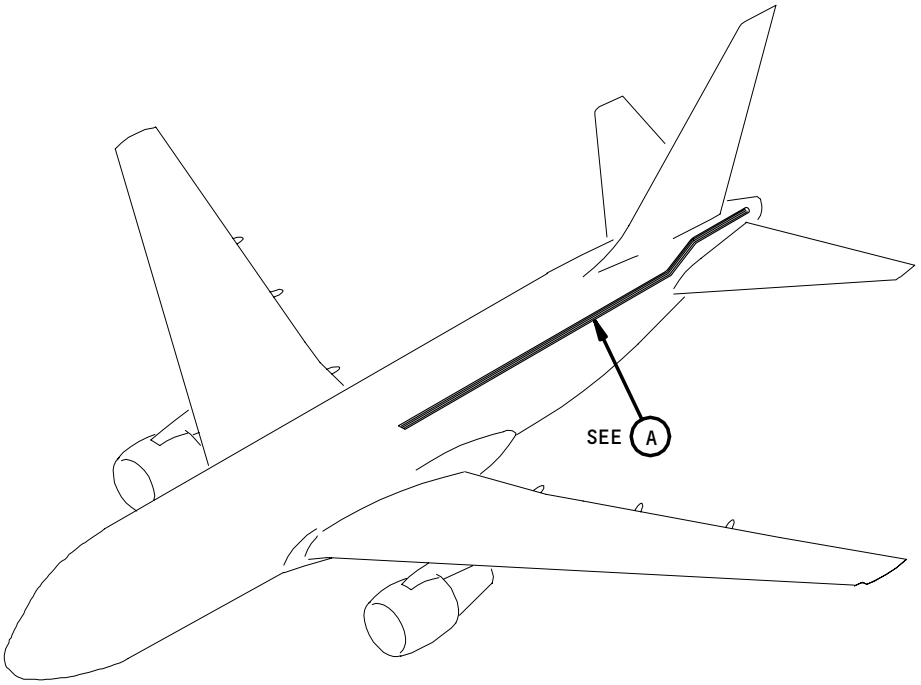
      S 018-005
      (3) Remove the applicable sidewall panels in the cargo bay (AMM 25-55-01/401).

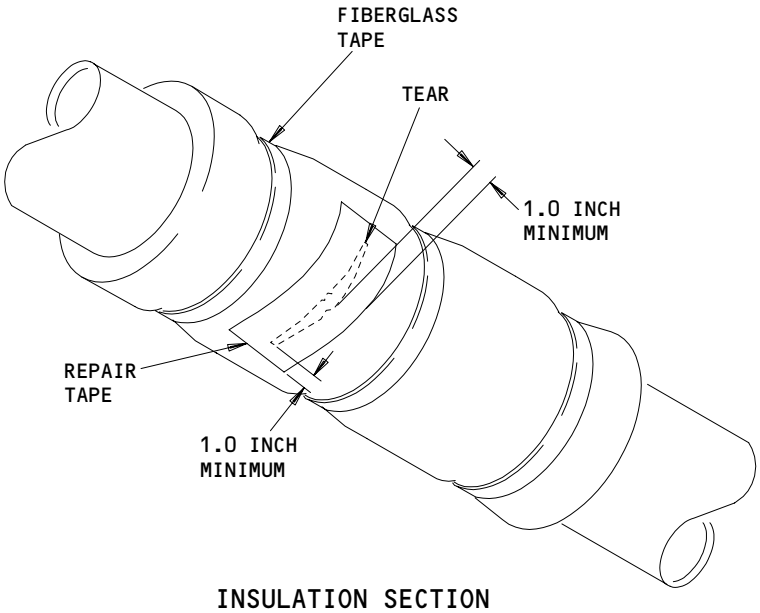
      S 038-006
      (4) Remove the fiberglass tape if it is necessary.

      S 428-012
      (5) Replace the insulation blanket if more than 25 percent of the fiberglass material is not there (AMM 36-11-02/401).

      S 348-007
      (6) Put the tape over the tear so the tape extends around the tear a minimum of one inch in all directions.

      S 438-008
      (7) Install the fiberglass tape if it was removed.





INSULATION SECTION
(EXAMPLE)

A

Pneumatic Duct Insulation Approved Repairs
Figure 801

E. Put the Airplane Back to Its Usual Condition

S 418-009
(1) Install the sidewall panels in the cargo bay.

S 418-010
(2) Close the aft cargo door (AMM 06-46-00/201).

S 868-011
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PNEUMATIC GROUND AIR CONNECTOR - REMOVAL/INSTALLATION

1. General
   A. This procedure includes the removal and installation of the pneumatic ground air connectors. The air connectors are in the wing/body fairing on the left side, forward of the access doors for the air conditioning packs.

TASK 36-11-03-004-001

2. Remove The Pneumatic Ground Air Connector (Fig. 401)
   A. References
      (1) 06-41-00/201, Fuselage Access Doors and Panels
      (2) 20-10-23/401, Standard Practices - Lockwires
      (3) 24-22-00/201, Electric Power Control
      (4) 36-00-00/201, Pneumatic - General
   B. Access
      (1) Location Zone
          135/136 Environmental Control System Bay

      (2) Access Panel
          193LL Ground Air Service Connector

   C. Prepare for the Removal

      S 864-002
      (1) Supply electrical power (Ref 24-22-00).

      S 864-003
      (2) Remove pneumatic power (Ref 36-00-00).

      S 014-004
      (3) Open the door for the ground air service connection 193LL (Ref 06-41-00).
   D. Remove the Ground Air Connector

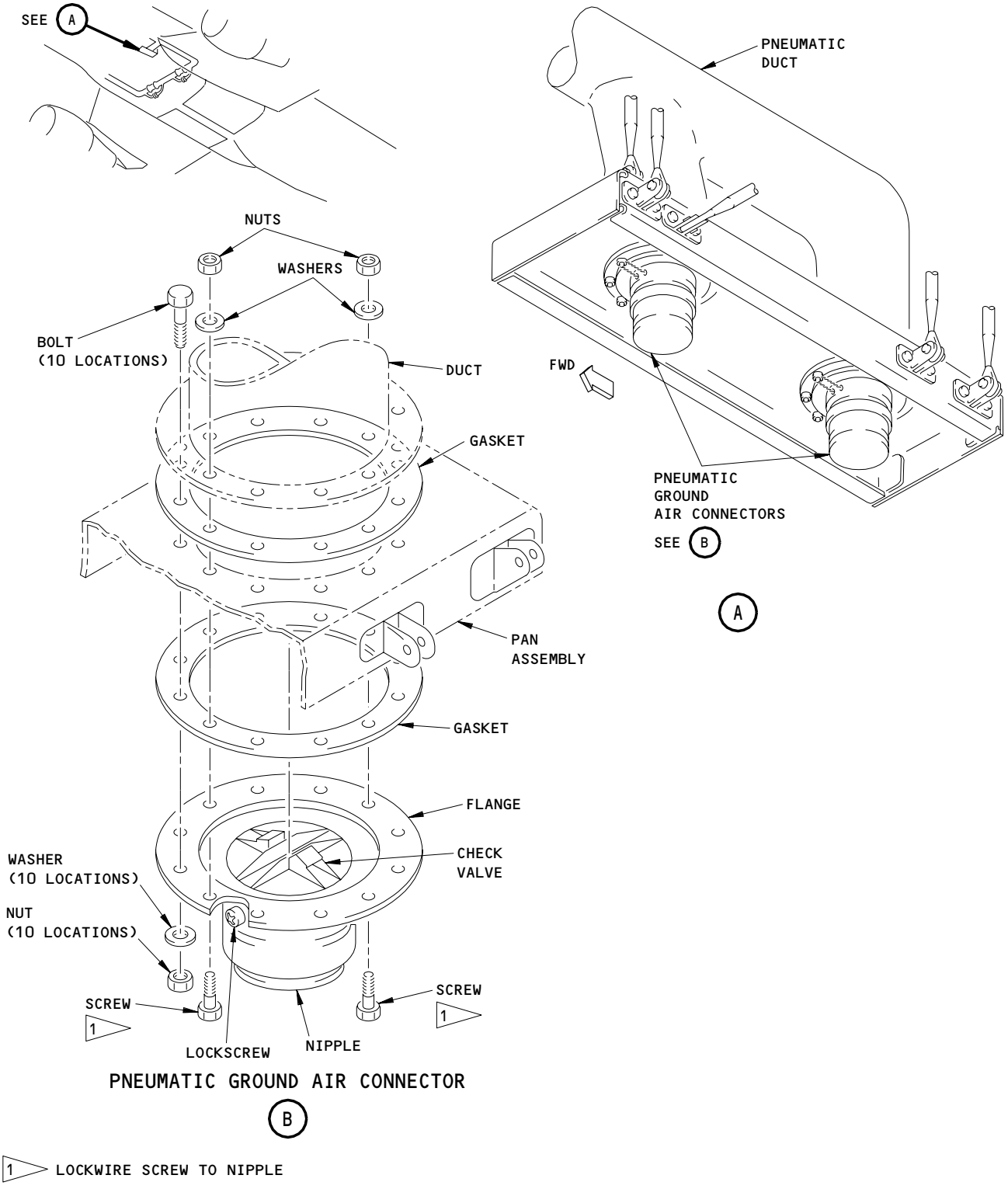
      S 864-033

      WARNING: DO NOT REMOVE THE GROUND CONNECTOR WHILE THE PNEUMATIC DUCT IS PRESSURIZED. THE HOT, HIGH PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

      (1) Remove the bolts from the flange of the ground air connector.

      S 024-007
      (2) Remove the ground air connector.

      S 494-008
      (3) Put a cover on the hole in the duct to keep out unwanted objects.



Pneumatic Ground Air Connector Installation
Figure 401

TASK 36-11-03-404-009

3. Install The Pneumatic Ground Air Connector (Fig. 401)

A. References

(1) 06-41-00/201, Fuselage Access Doors and Panels
(2) 20-10-23/401, Standard Practices - Lockwires
(3) 24-22-00/201, Electric Power Control
(4) 36-00-00/201, Pneumatic - General

B. Access

(1) Location Zones

135/136 Environmental Control System Bay

(2) Access Panel

193LL Ground Air Service Connector

C. Procedure

S 094-010

(1) Remove the duct cover.

S 434-017

(2) Install a new gasket on the ground air connector.

S 424-018

(3) Put the ground air connector on the pan assembly.

S 824-019

(4) Align the holes for the ground air connector with the holes in the pan assembly.

S 434-011

(5) Install the bolts and the nuts.

S 434-020

(6) Install the lockwire (Ref 20-10-23).

S 794-012

(7) Do a check of the ground connector for air leakage.
(a) Supply pneumatic power (Ref 36-00-00).
(b) Small air leakage is satisfactory.

(c) Repair large air leakage.

D. Put the Airplane Back to Its Usual Condition

S 864-013

(1) Remove pneumatic power if it is not necessary (Ref 36-00-00).

S 414-014

(2) Close the door for the ground air service connection 193LL (Ref 06-41-00).

S 864-016

(3) Remove electrical power if it is not necessary (Ref 24-22-00).

ISOLATION VALVES - REMOVAL/INSTALLATION

1. General
   A. This procedure includes the removal and installation of the left, right and center isolation valves. The left and right valves are on the air supply crossover duct immediately aft of the left and right air conditioning packs in the ECS Bay. The center isolation valve is on the air supply manifold in the left wheel well for the main landing gear. The removal of all the isolation valves is the same.

TASK 36-11-04-004-001

2. Remove the Isolation Valve (Fig. 401, Fig. 402)
   A. References
      (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
      (2) AMM 24-22-00/201, Electric Power-Control
      (3) AMM 32-00-15/201, Main Gear Door Lock
      (4) AMM 36-00-00/201, Pneumatic - General
   B. Access
      (1) Location Zones

135/136	Environmental Control System Bay
732	MLG Body Doors

      (2) Access Panels

193NL/194LR	Environmental Control Systems (ECS) Bay

   C. Prepare for the Removal

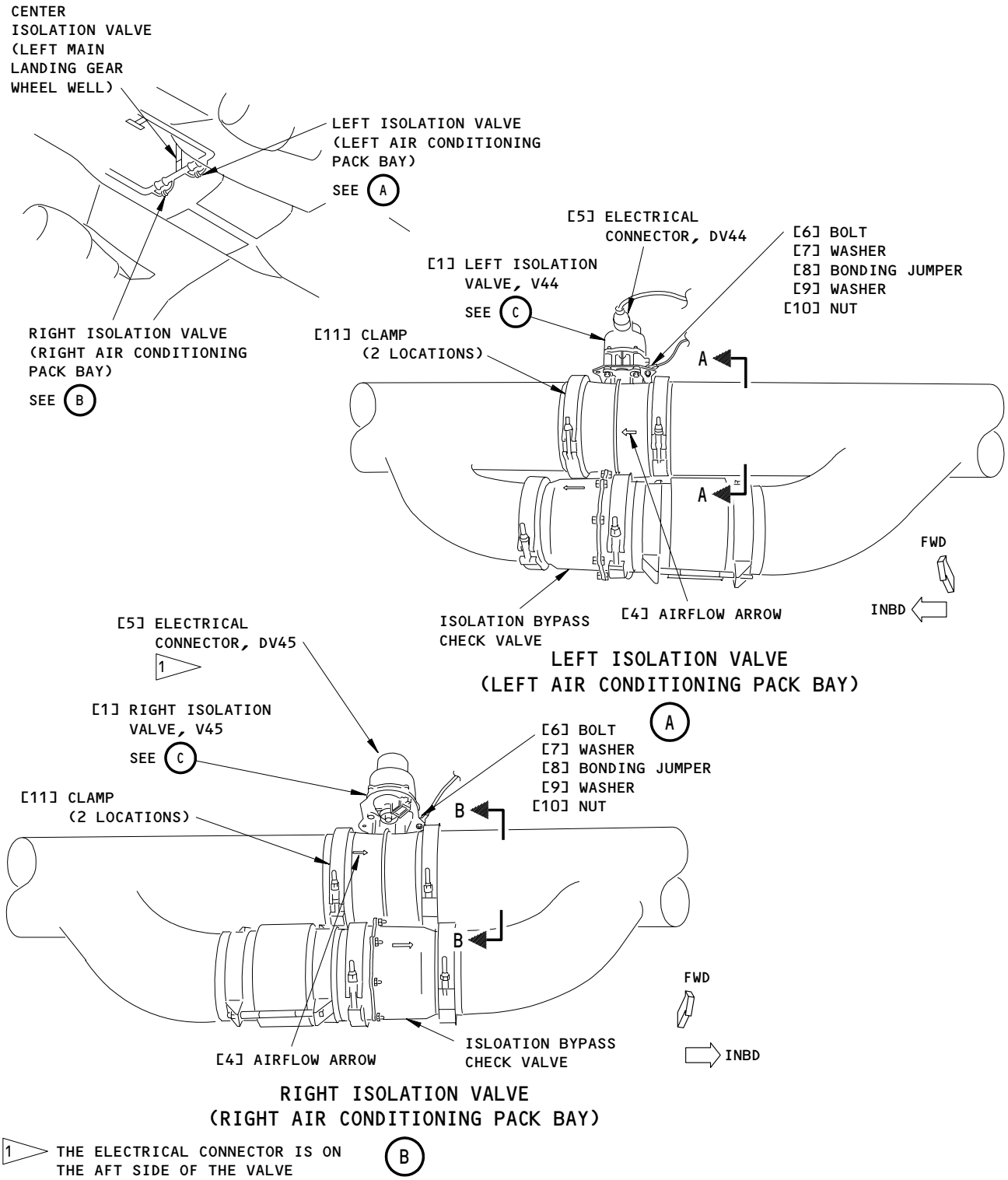
      S 864-002
      (1) Supply electrical power (AMM 24-22-00/201).

      S 864-003

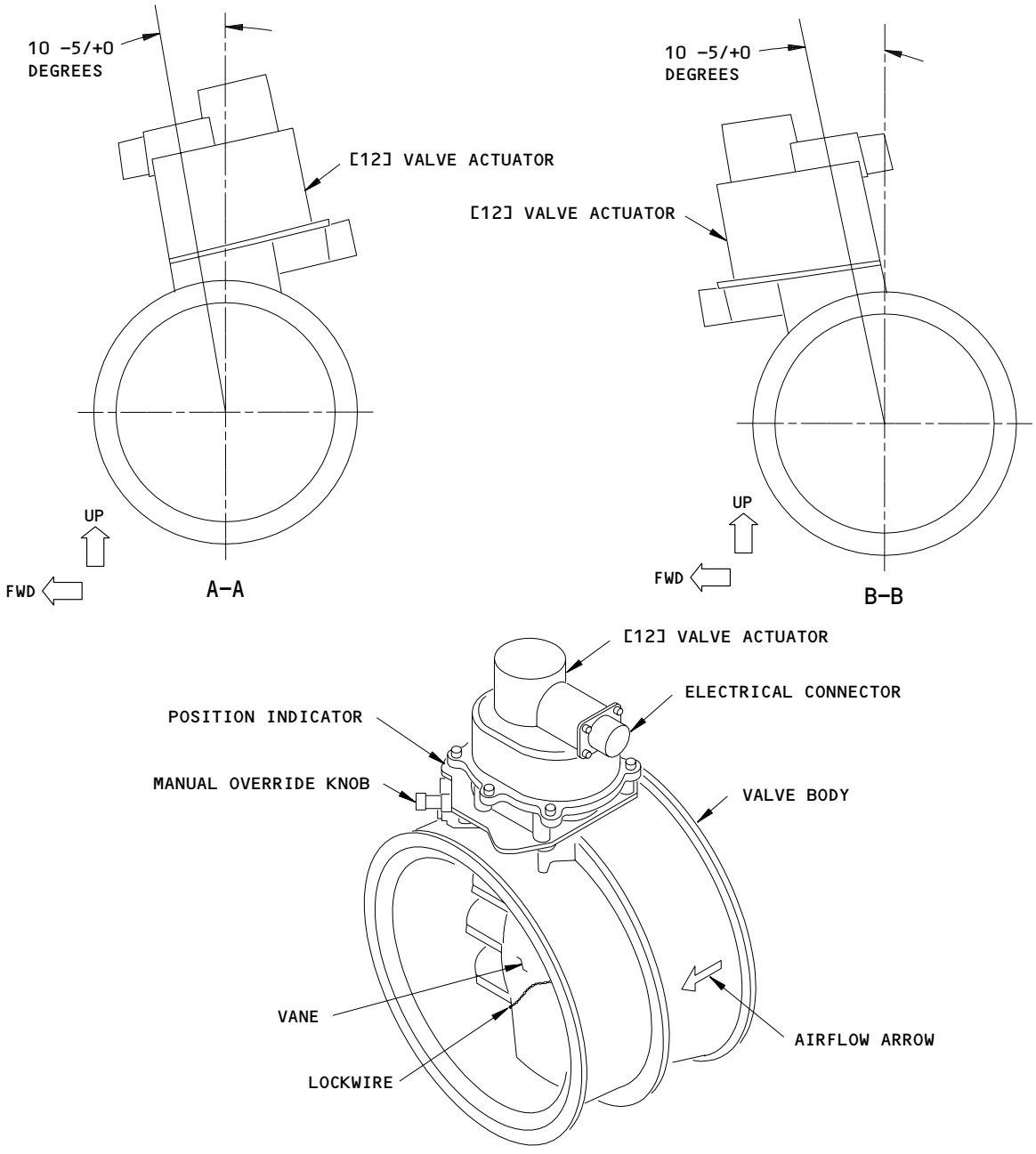
      WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

      (2) Remove pneumatic power (AMM 36-00-00/201).

      S 864-004
      (3) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
      (a) 11S12, ISOL VALVE PWR L



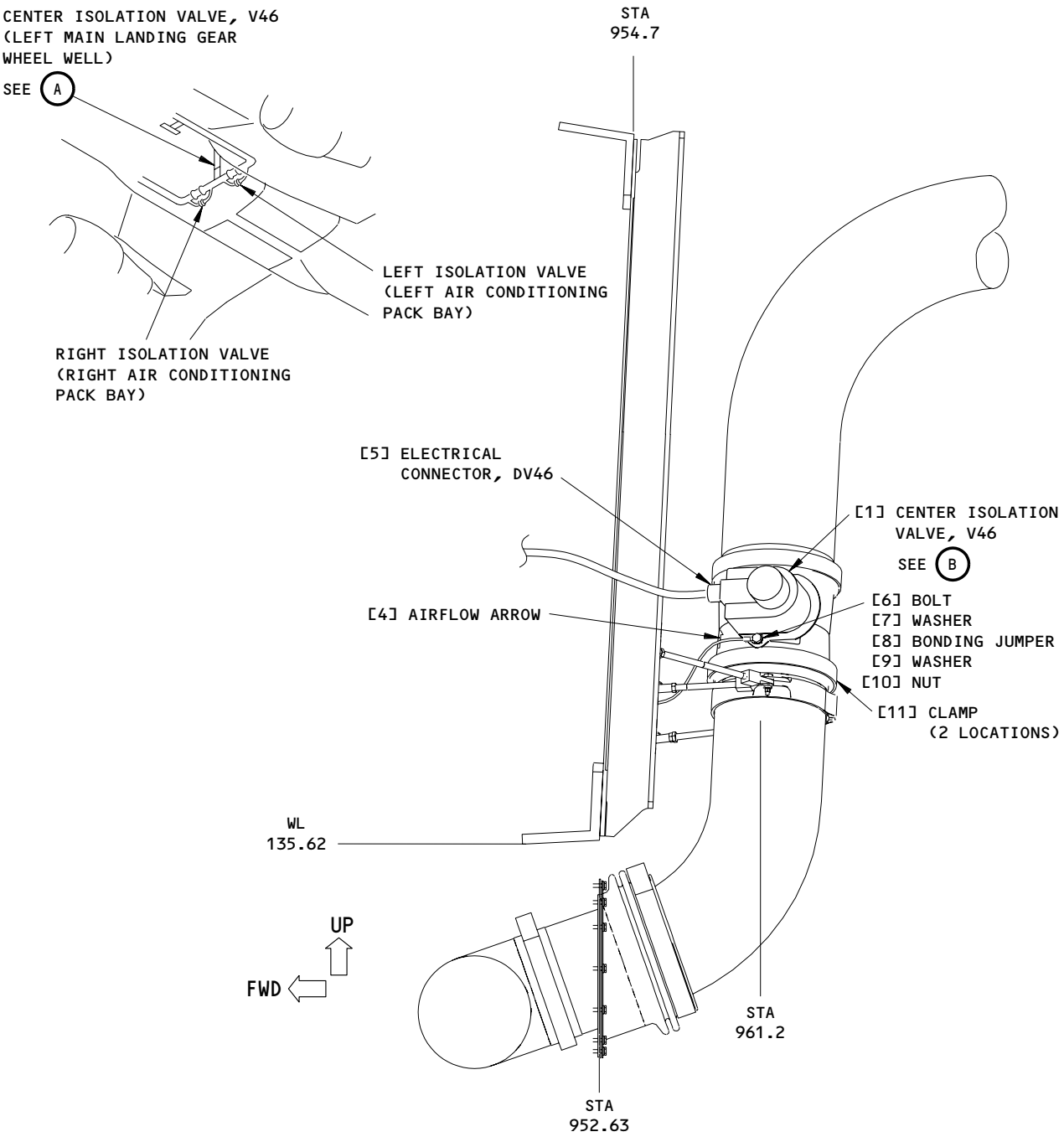
Left and Right Isolation Valves Installation
Figure 401 (Sheet 1)



ISOLATION VALVE

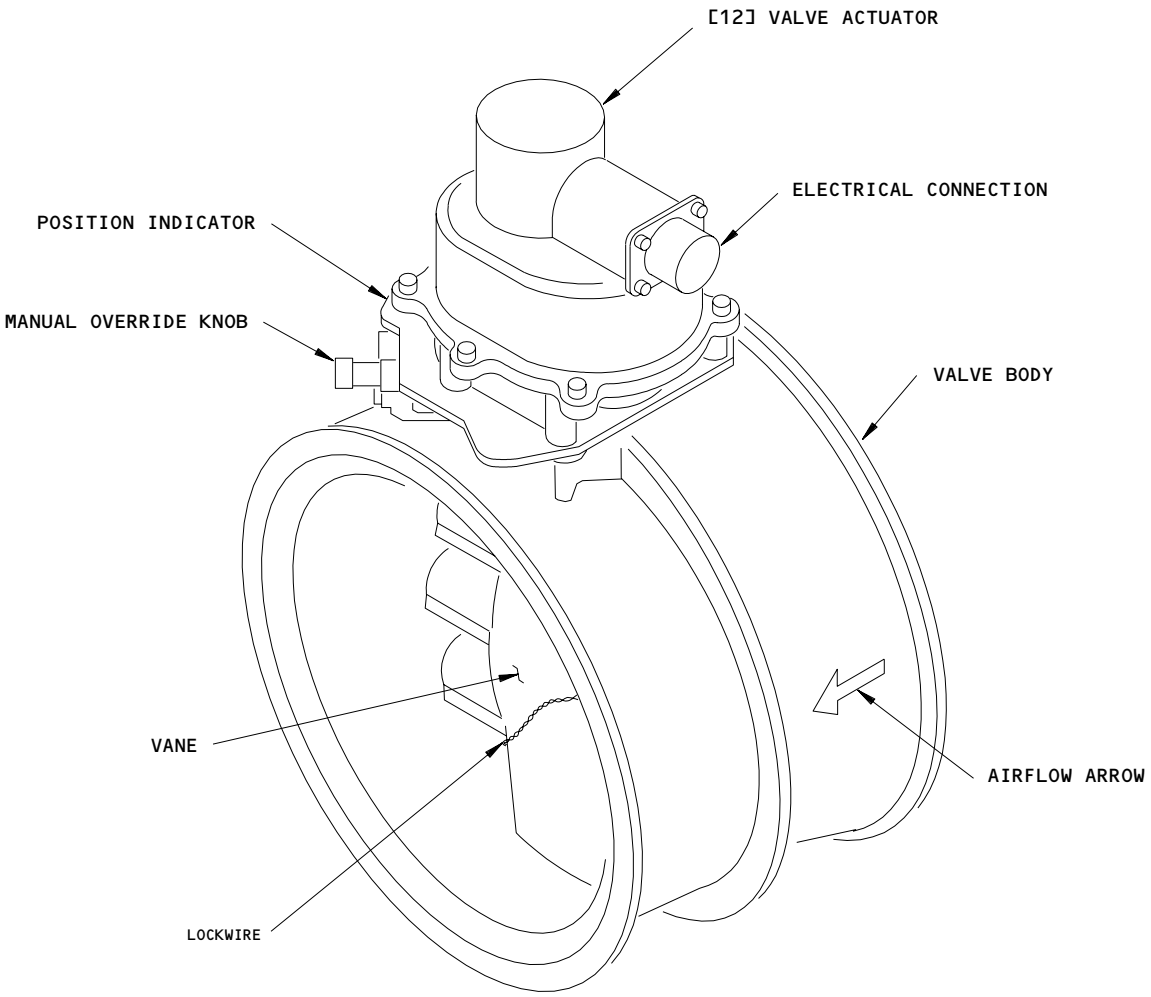
C

Left and Right Isolation Valves Installation
Figure 401 (Sheet 2)



CENTER ISOLATION VALVE
(LEFT MAIN LANDING GEAR WHEEL WELL)
A

Center Isolation Valve Installation
Figure 402 (Sheet 1)



ISOLATION VALVE
B

Center Isolation Valves Installation
Figure 402 (Sheet 2)

(b) 11S14, ISOL VALVE PWR C
(c) 11S21, ISOL VALVE PWR R

S 014-005

WARNING: USE AMM 32-00-15/201 TO DO THE LOCK INSTALLATION PROCEDURE. THE FAST MOVEMENT OF THE DOORS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT.

(4) For the center isolation valve, open the left MLG DOOR (732) (AMM 06-41-00/201).

S 494-031
(5) Install the main door locks (AMM 32-00-15/201).

S 014-006
(6) For the left or right isolation valve, open the applicable ECS access door (193NL, 194LR) (AMM 06-41-00/201).

D. Remove the Isolation Valve

S 034-007
(1) Disconnect the applicable electrical connector (5) (DV44, DV45, DV46) from the isolation valve (1) (V44, V45, V46)

S 034-008
(2) Disconnect the bonding jumper (8) from the isolation valve (1).
(a) Remove the bolt (6), washer (7), bonding jumper (8), washer (9), and nut (10).

S 034-009

WARNING: DO NOT REMOVE THE CLAMPS WHILE THE AIR SUPPLY DUCT IS PRESSURIZED. THE PRESSURIZED AIR CAN CAUSE INJURY TO PERSONS.

(3) Loosen the clamps (11) on each side of the isolation valve (1).

NOTE: Look at the location of the clamps with the safety latches. Install the clamps with the safety latches in the same position.

S 034-010
(4) Hold the isolation valve (1) while you move the clamps (11) along the duct.

S 024-011
(5) Remove the isolation valve (1).

S 494-012
(6) Install covers on the duct holes to keep out unwanted objects.

TASK 36-11-04-404-013

3. Install the Isolation Valve (Fig. 401, Fig. 402)

A. References

(1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 20-10-21/601, Electrical Bonding
(3) AMM 24-22-00/201, Electric Power-Control
(4) AMM 32-00-15/201, Main Gear Door Lock
(5) AMM 36-00-00/201, Pneumatic - General
(6) SWPM 20-20-00, Electrical Bonds and Grounds

B. Access

(1) Location Zones

135/136	Environmental Control System Bay
732	MLG Body Doors

(2) Access Panels

193NL/194LR	Environmental Control Systems (ECS) Bay

C. Procedure

S 094-014

(1) Remove the duct cover.

S 424-032

(2) Install the left isolation valve (1) (V44).
  (a) Make sure that the valve actuator (12) is installed 10 -5/+0 degrees forward of the vertical position.
  (b) Make sure that the airflow arrow (4) on the valve points to the INBOARD direction.

S 424-033

(3) Install the right isolation valve (1) (V45).
  (a) Make sure that the valve actuator (12) is installed 10 -5/+0 degrees forward of the vertical position.
  (b) Make sure that the airflow arrow (4) on the valve points to the INBOARD direction.

S 424-034

(4) Install the center isolation valve (1) (V46).
  (a) Make sure that the valve electrical connection points to the forward direction as shown in Figure 402.
  (b) Make sure that the airflow arrow on the valve points in the UP direction.

S 434-016
(5) Install the clamps (11) on each side of the isolation valve (1).

NOTE: Install the clamps with the safety latches on the inboard side of the left and right isolation valves. Install the clamps with the safety latches on the lower side of the center isolation valve.

S 434-017
(6) Tighten the clamps (11) to 55 pound-inches.

S 434-018
(7) Install the bonding jumper(s) (8) to the isolation valve (1).
(a) Install the bolt (6), washer (7), bonding jumper (8), washer (9), and nut (10).
(b) Measure the electrical resistance between the valve body and the primary structure and make sure that it is no more than .004 ohms (AMM 20-10-21/601 and SWPM 20-20-00).

S 434-019
(8) Connect the applicable electrical connector (5) (DV44, DV45, DV46) to the valve (1) (V44, V45, V46).

S 864-020
(9) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11S12, ISOL VALVE PWR L
(b) 11S14, ISOL VALVE PWR C
(c) 11S21, ISOL VALVE PWR R

S 214-021
(10) Push the applicable L, R, or C ISLN valve switch-light on the pilot's overhead panel, P5, to the open position.
(a) Make sure the VALVE light comes on and then goes off.
(b) Make sure the white flowbar light comes on.

S 794-023
(11) Do an air leakage check of the isolation valve (1).
(a) Supply pneumatic power (AMM 36-00-00/201).
(b) Small air leakage is satisfactory.
(c) Repair large leakage by joint or clamp adjustment.

S 214-024
(12) Push the applicable L, R, or C ISLN switch-light, on the P5 panel, to the close position.
(a) Make sure the VALVE light comes on and then goes off.
(b) Make sure the white flowbar light goes out.

D. Put the Airplane Back to Its Usual Condition

S 864-026
(1) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-027
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-028

WARNING: USE AMM 32-00-15/201 TO DO THE LOCK REMOVAL PROCEDURE. THE FAST MOVEMENT OF THE DOORS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Remove the locks for the door of the main landing gear (AMM 32-00-15/201).

S 414-029
(4) Close the main landing gear door if it is open (AMM 32-00-15/201).

S 414-030
(5) Close the applicable access door, if it is open (AMM 06-41-00/201).

ISOLATION BYPASS CHECK VALVES - REMOVAL/INSTALLATION

1. General
   A. This procedure includes the removal and installation of the isolation bypass check valves. These two check valves are on the air supply crossover duct. This is immediately aft of the right and left air conditioning packs and below the right and left isolation valves.

TASK 36-11-05-004-002

2. Remove the Isolation Bypass Check Valves (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
      (2) AMM 24-22-00/201, Electric Power Control
      (3) AMM 36-00-00/201, Pneumatic - General
   B. Access
      (1) Location Zones
          135/136 Environmental Control Systems Bay

      (2) Access Panels
          193NL/194LR Environmental Control Systems (ECS) Bay

   C. Prepare for the Removal

      S 864-003
      (1) Supply electrical power (AMM 24-22-00/201).

      S 864-021

      WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY.

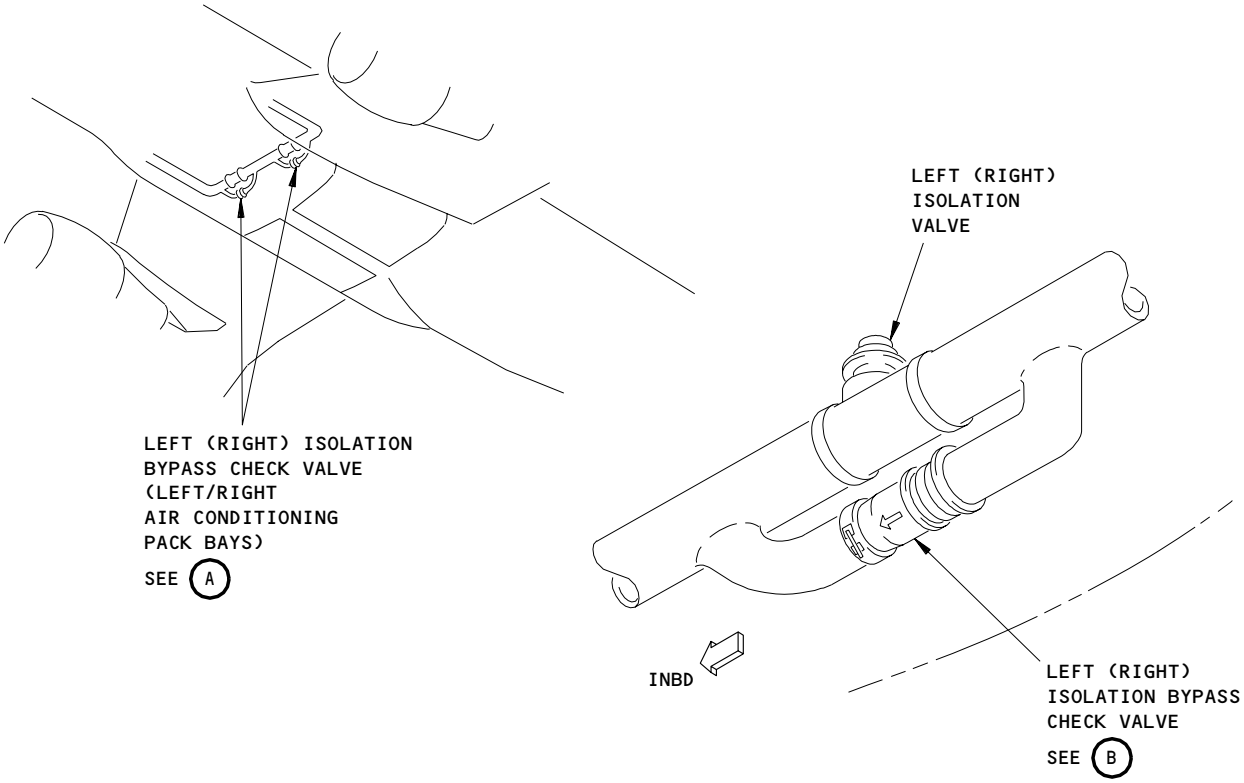
      (2) Remove pneumatic power (AMM 36-00-00/201).

      S 014-004
      (3) Open the applicable ECS access door, 193NL or 194LR (AMM 06-41-00/201).
   D. Remove the Bypass Check Valve.

      S 034-005
      (1) Loosen the clamps on each side of the check valve.

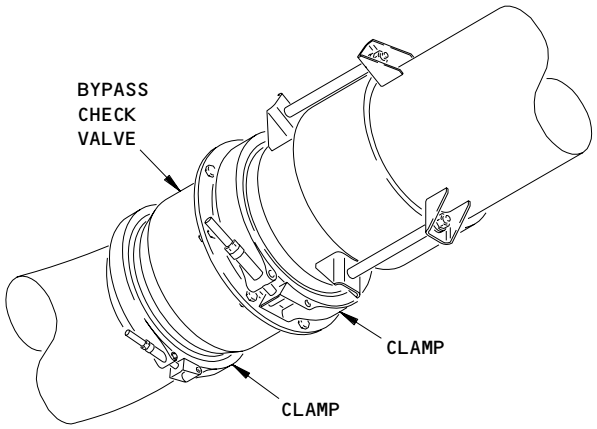
      NOTE: The clamp with the safety latch is on the inboard side of the check valve. Install this clamp in the same position.

      S 034-006
      (2) Hold the check valve while you move the clamps along the duct.



LEFT (RIGHT) ISOLATION BYPASS CHECK VALVE
(LEFT/RIGHT AIR CONDITIONING PACK BAYS)

A



ISOLATION BYPASS CHECK VALVE
(EXAMPLE)

B

Isolation Bypass Check Valve Installation
Figure 401

S 024-007
(3) Remove the check valve.

S 494-008
(4) Install a cover on the duct openings to keep out unwanted objects.

TASK 36-11-05-404-009

3. Install the Isolation Bypass Check Valve (Fig. 401)

A. References
(1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 36-00-00/201, Pneumatic - General

B. Access
(1) Location Zones
135/136 Environmental Control Systems Bay

(2) Access Panels
193NL/194LR Environmental Control Systems (ECS) Bay

C. Procedure

S 094-010
(1) Remove the duct covers.

S 424-011
(2) Install the check valve to make sure the flow arrow points inboard and the flapper hinge pin is in the vertical position.

S 434-012
(3) Install the clamps on each side of the check valve.

NOTE: The clamp with the safety latch is on the inboard side of the check valve. Install this clamp in the same location.

S 434-013
(4) Tighten the clamp on the outboard side of the check valve to between 50-60 pound-inches.

S 434-020
(5) Tighten the clamp on the inboard side of the check valve to between 45-55 pound-inches.

D. Do a test of the isolation bypass check valve.

S 864-015
(1) Supply pneumatic power (AMM 36-00-00/201).

S 794-016
(2) Do a check of the valve connections for leakage.
(a) Small leakage is satisfactory,
(b) You must repair large leakage by joint or clamp adjustment.

E. Put the Airplane Back to Its Usual Condition

S 864-017
(1) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-018
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-019
(3) Close the ECS access door, 194NL or 194LR.

ISOLATION BYPASS CHECK VALVE - INSPECTION/CHECK

1. General
   A. The isolation bypass check valve (check valve) will be examined to find damage and make sure the check valve operates correctly.

TASK 36-11-05-206-001

2. Examine the Isolation Bypass Check Valve (Fig. 601)
   A. References
      (1) AMM 36-11-05/401, Isolation Bypass Check Valve
   B. Access
      (1) Location Zones
          135/136 Environmental Control Systems Bay

      (2) Access Panels
          193NL/194LR Environmental Control Systems (ECS) Bay

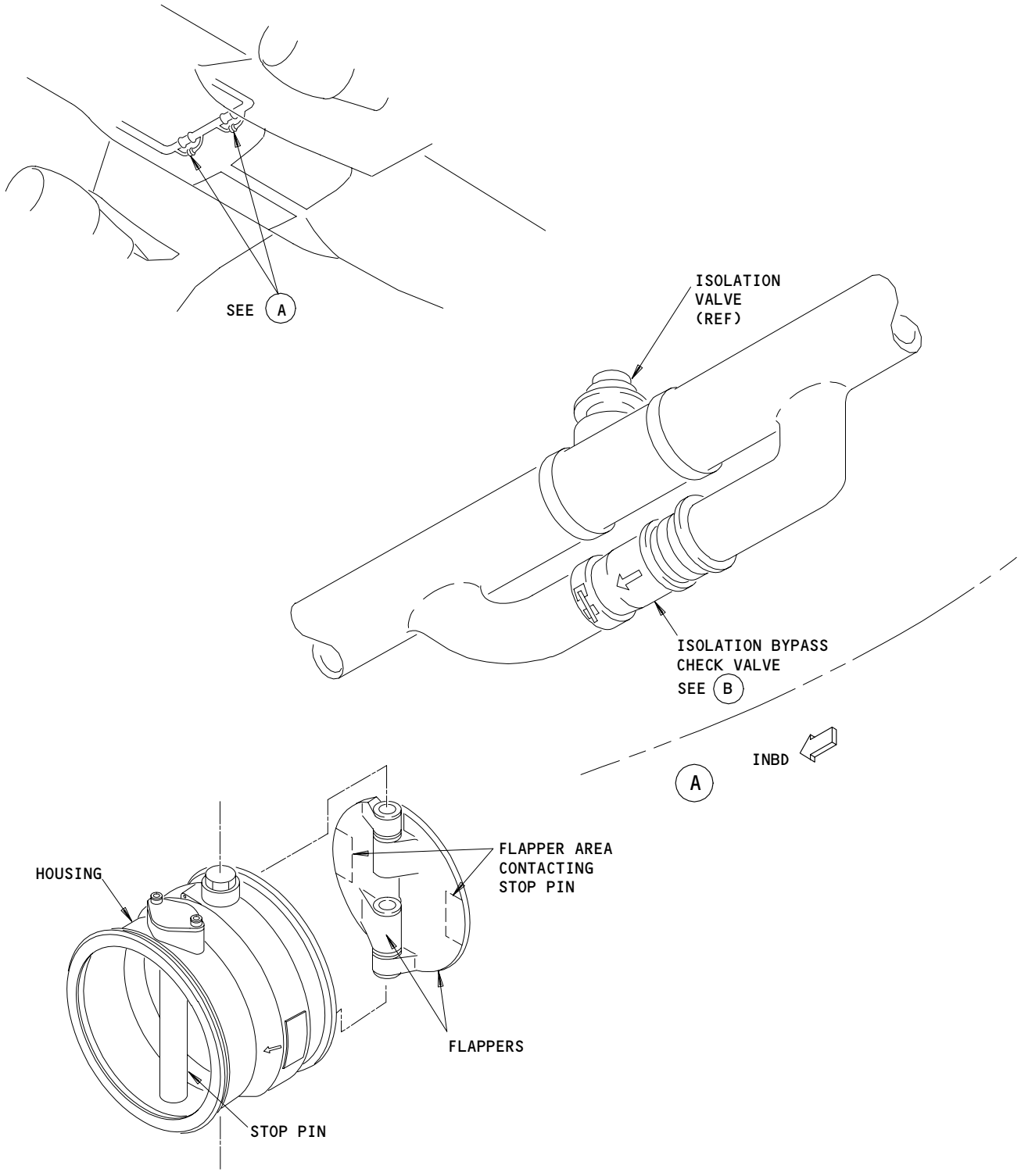
   C. Procedure

      S 026-002
      (1) Remove the check valve (AMM 36-11-05/401).

      S 216-003
      (2) Examine the check valve for these items:
          (a) Parts that are loose or missing.
          (b) Cracks or corrosion on the valve housing.
          (c) The surfaces that touch between the flapper and the valve body are badly worn.
          (d) Carbon streaks or dirt particles on the surfaces of the flappers and the valve body that seal (this shows valve leakage in the closed position).
          (e) Correct installation of the valve flapper and hinge.

      S 426-004
      (3) If you find one of the above conditions, replace the check valve.

      S 426-005
      (4) Install the check valve (AMM 36-11-05/401).



Isolation Bypass Check Valve Inspection Check
Figure 601

AIR SUPPLY INTERMEDIATE PRESSURE CHECK VALVE - REMOVAL/INSTALLATION

1. General
   A. The check valve in the intermediate pressure line keeps the high pressure bleed air out of the engine intermediate bleed port.

TASK 36-11-06-004-002

2. Remove The Intermediate Pressure Check Valve (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power Control
      (2) AMM 36-00-00/201, Pneumatic General
      (3) AMM 36-11-09/201, Air Supply Pressure Regulating and Shutoff Valve
      (4) AMM 78-31-00/201, Engine Fan Thrust Reverser
   B. Access
      (1) Location Zones
          415/416 Fan Reverser
          425/426 Fan Reverser

   C. Prepare for the Removal

      S 864-003
      (1) Supply electrical power (AMM 24-22-00/201).

      S 864-072

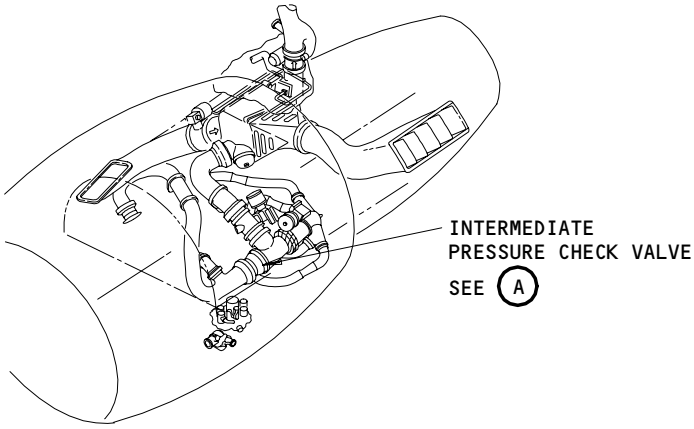
      WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

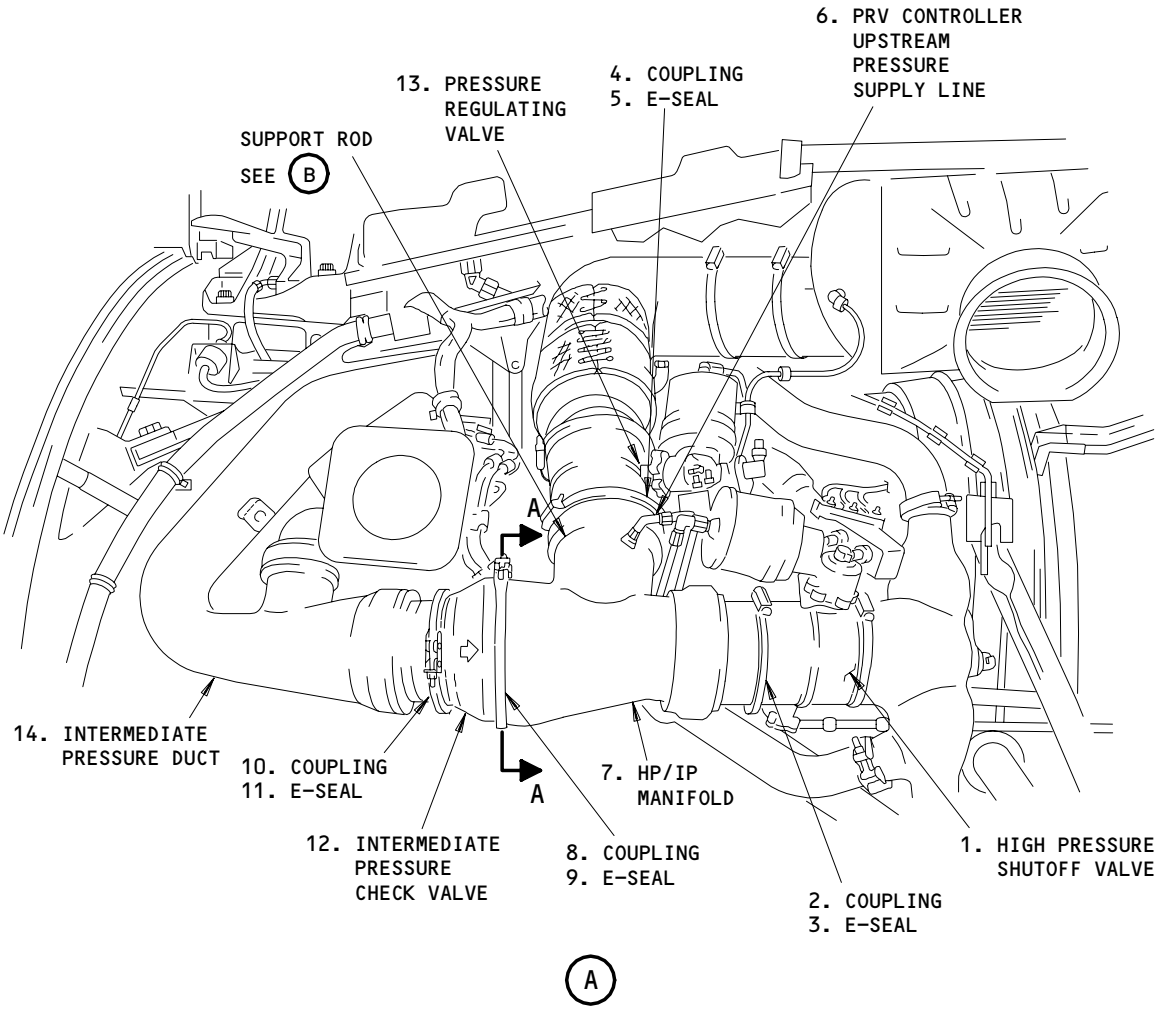
      (2) Remove pneumatic power (AMM 36-00-00/201).
   D. Remove the Intermediate Pressure Check Valve

      S 044-078

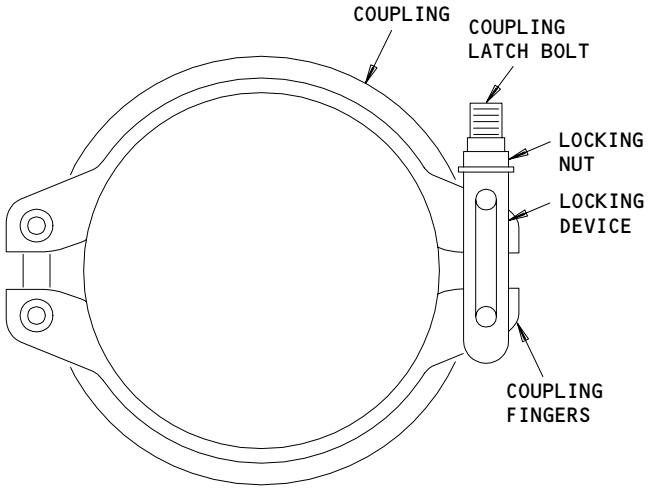
      WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

      (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

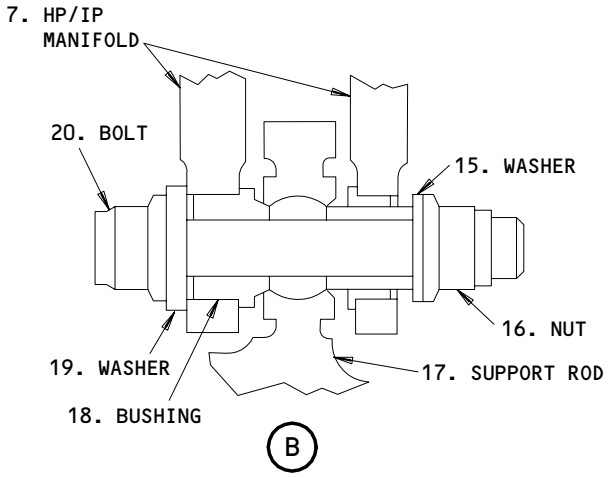




Air Supply Intermediate Pressure Check Valve Installation
Figure 401 (Sheet 1)



A–A



Air Supply Intermediate Pressure Check Valve Installation
Figure 401 (Sheet 2)

A36581

S 014-079

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open the applicable left thrust reverser (AMM 78-31-00/201).

S 034-022

(3) Remove the bolt (20) that holds the duct support rod (17) to the HP/IP manifold (7).

S 034-023

(4) Disconnect the supply line for the upstream pressure on the pressure regulating valve (PRV) controller (6) from the high pressure/intermediate pressure (HP/IP) manifold (7).

S 034-024

(5) Remove the coupling (2) from the HP/IP manifold (7) and the high pressure shutoff valve (HPSOV) (1) joint.

S 034-025

(6) Remove the coupling (4) from the HP/IP manifold (7) and the pressure regulating valve (PRV) (13) joint.

S 034-026

(7) Remove the coupling (10) from the IP duct (14) and the check valve (12) joint.

S 034-027

(8) Remove the HP/IP manifold (7)/check valve (12) assembly from the engine.

S 034-028

(9) Remove the coupling (8) from the HP/IP manifold (7) and the check valve (12) joint.

S 024-029

(10) Remove the IP check valve (12) from the HP/IP manifold (7).

S 034-030

(11) Remove the E-seals from all the duct and check valve flanges.

S 914-031

(12) Put a cover on all the duct or valve holes to keep out unwanted objects.

TASK 36-11-06-404-033

3. Install the Intermediate Pressure Check Valve (Fig. 401)

A. Consumable Materials

(1) G00095 Detector - Leak-Tek 160X (AMM 20-30-07/201)

(2) D00006 - Antiseize Compound, High Temperature, Bostik Never-Seez

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	2	Coupling	36-11-01	05	47
	3	E-Seal			55
	4	Coupling			47
	5	E-Seal			55
	7	HP/IP Manifold			345
	8	Coupling			46
	9	E-Seal			60
	10	Coupling			45
	11	E-Seal			55
	12	Intermediate Pressure Check Valve			380
	15	Washer			185
	16	Nut			190
	18	Bushing			215
	19	Washer			175
	20	Bolt			165

C. References

(1) AMM 24-22-00/201, Electrical Power Control

(2) AMM 36-00-00/201, Pneumatic General

(3) AMM 36-11-09/201, Air Supply Pressure Regulating and Shutoff Valve

(4) AMM 71-00-00/201, Power Plant (Operating Procedure)

(5) AMM 78-31-00/201, Engine Fan Thrust Reverser

D. Access
(1) Location Zones
415/416 Fan Reverser
425/426 Fan Reverser

E. The Procedure to Install the Check Valve

S 024-034
(1) Remove the duct covers.

S 214-035
(2) Look at the surfaces that touch, on the duct and the check valve, for worn areas and abrasion.

S 214-084

CAUTION: THE VALVE GASKETS ARE EASILY DAMAGED. INSTALLATION OF DAMAGED GASKETS WILL CAUSE LEAKAGE.

(3) Look at all the E-seals.
(a) The E-seal must not have cracks, dents, or other damage.
(b) Replace all the damaged E-seals.

S 414-049
(4) Install an E-seal (9) on the large diameter flange of the check valve (12).

S 434-070

CAUTION: MAKE SURE YOU INSTALL THE LOCKING DEVICE OF THE COUPLING CORRECTLY AS SHOWN IN FIGURE 401. IF YOU DO NOT INSTALL THE COUPLING FINGERS INSIDE THE LOCKING DEVICE THE COUPLING CAN LOOSEN AND CAUSE DAMAGE TO EQUIPMENT.

(5) Install the coupling (8) at the HP/IP manifold (7) and the check valve (12) joint.

S 434-082

CAUTION: DO NOT TIGHTEN THE COUPLINGS MORE THAN THE SPECIFIED LIMIT. IF YOU APPLY TOO MUCH TORQUE, THE VALVE FLOW BODY CAN WARP (BECOME OVAL) AND CAUSE THE VALVE TO BIND DURING OPERATION.

(6) Tighten the coupling nut to 115-125 pound-inches.

S 434-051

(7) Install the E-seals (3, 5, 11) on the duct/check valve flanges.

S 424-052

(8) Install the HP/IP manifold (7)/check valve (12) assembly into position.

S 434-069

CAUTION: MAKE SURE YOU INSTALL THE LOCKING DEVICE OF THE COUPLING CORRECTLY AS SHOWN IN FIGURE 401. IF YOU DO NOT INSTALL THE COUPLING FINGERS INSIDE THE LOCKING DEVICE THE COUPLING CAN LOOSEN AND CAUSE DAMAGE TO EQUIPMENT.

(9) Install the couplings (2, 4, 10) on the duct and the valve flange joints.

CAUTION: DO NOT TIGHTEN THE COUPLINGS MORE THAN THE SPECIFIED LIMIT. IF YOU APPLY TOO MUCH TORQUE, THE VALVE FLOW BODY CAN WARP (BECOME OVAL) AND CAUSE THE VALVE TO BIND DURING OPERATION.

(a) Tighten the coupling nuts to 115-125 pound-inches.

S 434-054

(10) Attach the duct support rod (17) to the HP/IP manifold (7) with the bolt (20), washer (19), bushing (18), washer (15) and nut (16).

S 434-053

(11) Tighten the nut (16) on the bolt (20).

S 644-071

(12) Apply antiseize compound on the upstream supply line fitting for the PRV controller.

S 434-055

(13) Connect the upstream pressure supply line (6), for the PRV controller, to the duct.

S 424-087

(14) Tighten the supply line nut.

F. Do the steps that follow to do a Test of the Intermediate Pressure Check Valve:

S 714-056

(1) Do a Test of the Intermediate Pressure Check Valve for leakage (preferred method):

NOTE: This test will do a check of the upstream and downstream flanges of the check valve.

(a) Apply the leak detector to the flanges of the check valve.
(b) With the thrust reverser open, dry motor the engine (AMM 71-00-00/201).
(c) Do a leak check of the check valve flanges.
1) Some leakage is permitted.
2) Strong leakage must be repaired by a joint or coupling adjustment.
(d) Stop the engine (AMM 71-00-00/201).

S 714-057

(2) Do a Test of the Intermediate Pressure Check Valve for leakage (optional method):

NOTE: This test will do a check of the downstream flange of the valve and not the upstream flange.

(a) Make sure the applicable (L/R) ENG OFF switch-light on the air supply control module (on P5 panel) is in the OFF position.
(b) Look at the valve position indicator and make sure the High Pressure Shutoff Valve (HPSOV) is in the closed position.
1) If the valve is not closed, turn the valve manual drive until the position indicator is in the closed position.
(c) Apply pressure to the pneumatic system, upstream of the pressure regulating and shutoff valve (PRSOV) (AMM 36-11-09/201).
(d) Do a check for leaks around the intermediate pressure check valve.
1) Some leakage is permitted.
2) Strong leakage must be repaired by a joint or coupling adjustment.

G. Put the Airplane Back to Its Usual Condition

S 864-068

(1) Remove the pneumatic pressure upstream of the PRSOV (AMM 36-11-09/201).

S 414-063

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Close the left thrust reverser (AMM 78-31-00/201).

S 444-060

(3) Do the activation procedure for the thrust reversers (AMM 78-31-00/201).

S 864-061

(4) Remove electrical power if it is not necessary.

AIR SUPPLY INTERMEDIATE PRESSURE CHECK VALVE - INSPECTION/CHECK

1. General
   A. The intermediate pressure (IP) check valve is examined for damage and to make sure the IP check valve operates correctly.

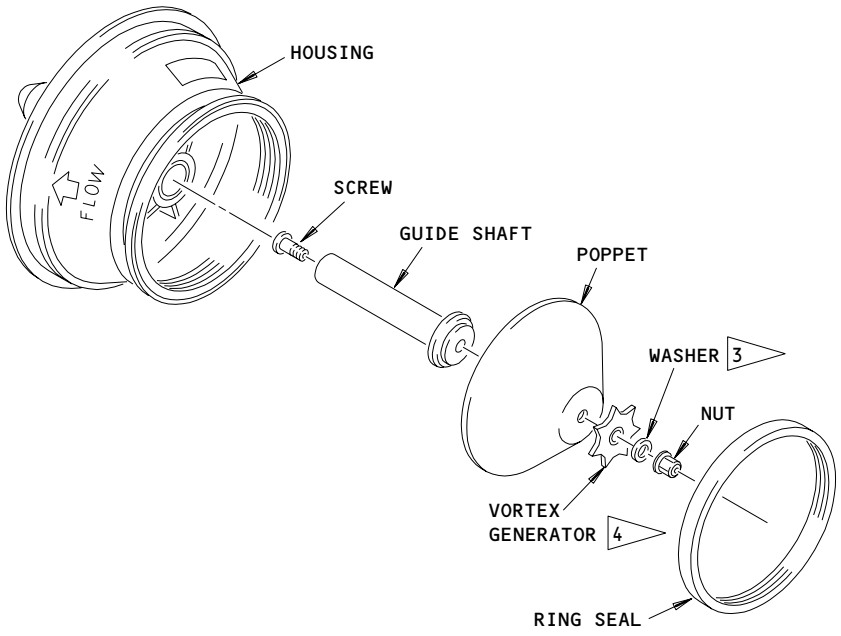
TASK 36-11-06-206-002

2. Examine the Air Supply Intermediate Pressure Check Valve (Fig. 601)
   A. References
      (1) 36-11-06/401, Air Supply IP Check Valve
   B. Access
      (1) Location Zones
          415/416 Fan Reverser
          425/426 Fan Reverser

   C. The procedure for the Hamilton Standard check valves:

      S 026-003
      (1) Remove the IP check valve (Ref 36-11-06/401).

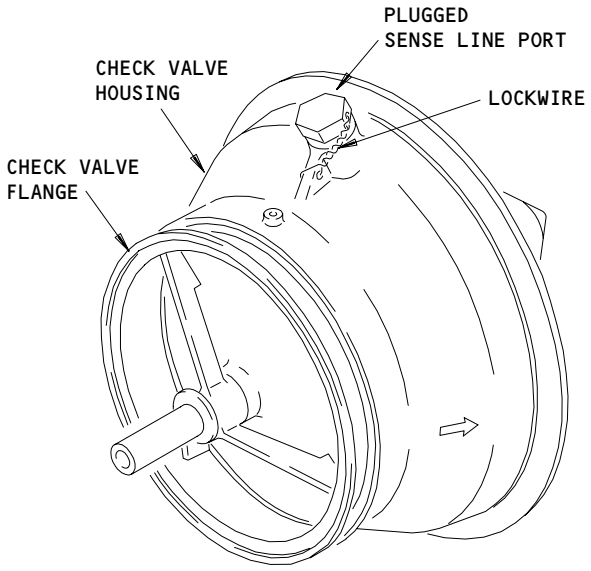
      S 216-004
      (2) Examine the IP check valve for these items:
          (a) The valve poppet is in the closed position (the poppet is extended to the inlet of the valve) and cannot be moved freely.
          (b) The poppet body and rim have cracks or there is poppet damage.
          (c) Parts that are loose or missing (see the illustration).
          (d) Blockage that prevents the correct movement of the poppet.
          (e) Cracks or corrosion on the valve housing.
          (f) Clearances between the surfaces that seal on the poppet and the valve body.
          (g) To check the side play for the shaft, do these steps:
              1) Extend the poppet even with the flange.
              2) Make sure the side play for the shaft is less than 0.055 inch (0.14 cm).
          (h) Make sure the wear is less than 0.01 inch (0.0254 cm) on the poppet and the valve body surfaces that seal.
          (i) Carbon streaks or dirt particles on the surface of the poppet and the valve body that seal (this shows valve leakage in the closed position).



IP CHECK VALVE
A 1

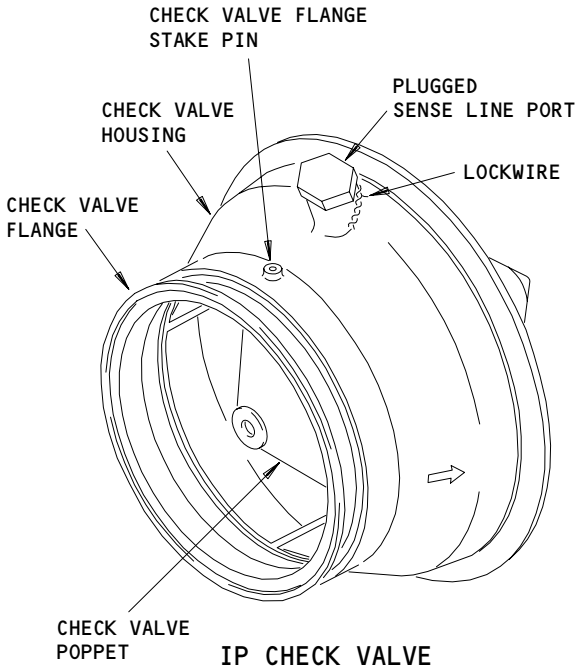
1 HAMILTON STANDARD CHECK VALVE
3 IP CHECK VALVES WITHOUT THE VORTEX GENERATOR
4 IP CHECK VALVES WITH THE VORTEX GENERATOR

Intermediate Pressure Check Valve Inspection Check
Figure 601 (Sheet 1)



IP CHECK VALVE
(RECOMMENDED)

A 2

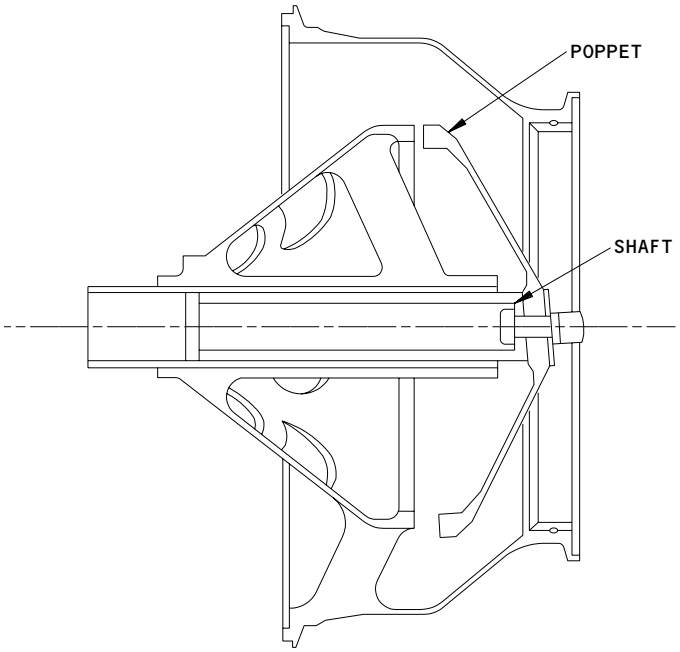


IP CHECK VALVE
(ALTERNATIVE)

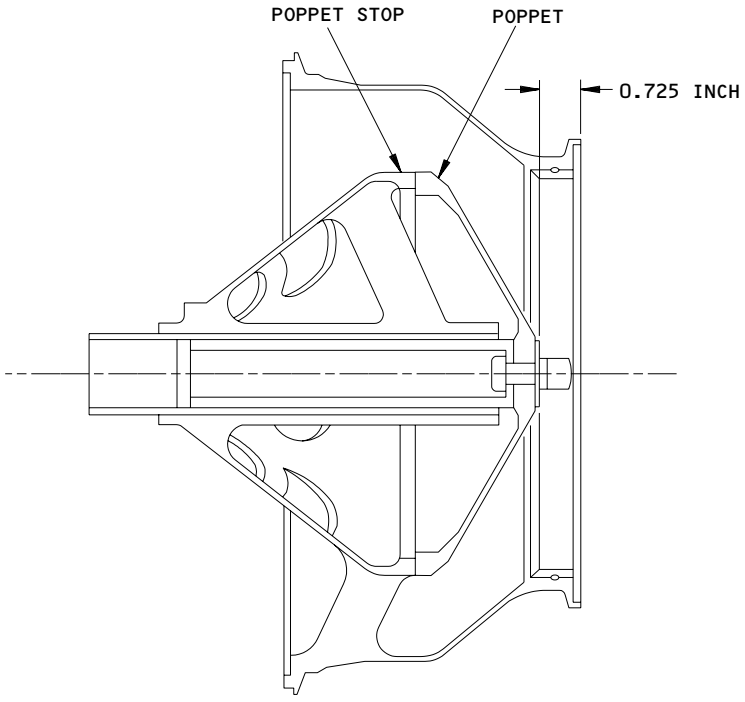
A 2

2 GARRETT CHECK VALVE

Intermediate Pressure Check Valve Inspection Check
Figure 601 (Sheet 2)



IP CHECK VALVE
(SHAFT PLAY)
A



IP CHECK VALVE
(POPPET CLEARANCE)
A

Intermediate Pressure Check Valve Inspection/Check
Figure 601 (Sheet 3)

(j) AIRPLANES WITH CHECK VALVE P/N 773856 AND WITH ANTI-ROTATION TEETH;
To do a check for maximum rotation of the poppet in the open position, do these steps:
1) Mark the position of the poppet on the housing.
2) Rotate the poppet full counter clockwise.
3) Mark the second position of the poppet valve on the housing.
4) Make sure the distance between the two housing marks is less than 1.3 inch (3.30 cm).
a) If the measuremed stance is greater than 1.3 in (3.30 cm), replace the valve.
5) Make sure there are no broken anti-rotation teeth.

(k) AIRPLANES WITH CHECK VALVE P/N 808556;
To do a check of wear on the open stop and poppet, do these steps:
1) Push the poppet down to the poppet stop.
2) Measure the gap between the poppet and the inlet flange.
3) Make sure the distance is less than 0.725 in (1.84 cm).
a) If the measured distance is greater than 0.725 in (1.84 cm), replace the valve.

S 426-005

(3) If you find one or more of the above conditions, replace the IP check valve.

S 426-006

(4) Install the IP check valve (Ref 36-11-06/401).

D. The procedure for the Garrett check valve:

S 026-007

(1) Remove the IP check valve (Ref 36-11-06/401).

S 216-008

(2) Examine the check valve for these items:
(a) On the alterntive IP check valves, make sure the flange stake pins are installed.
(b) Cracks or corrosion on the valve housing.
(c) Move the poppet assembly from one side to the other in the valve housing. The poppet assembly must move freely.
(d) Clearances between the surfaces of the poppet and the valve housing that seal.
(e) Carbon streaks or dirt particles on the surfaces of the poppet and valve housing that seal (this shows valve leakage in the closed position).

S 426-009

(3) If you find one or more of the above conditions, replace the IP check valve.

S 426-010

(4) Install the IP check valve (Ref 36-11-06/401).

HIGH PRESSURE SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General
   A. The high pressure shutoff valve does not let 14th stage bleed air enter the pneumatic system when there is sufficient 8th stage bleed air. The valve is on the left side of each engine forward of the precooler.

TASK 36-11-07-004-032

2. Remove High Pressure Shutoff Valve (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control
      (2) AMM 36-00-00/201, Pneumatic - General
      (3) AMM 36-11-01/401, Pneumatic Duct
      (4) AMM 36-11-09/201, Air Supply Pressure Regulating and Shutoff Valve
      (5) AMM 36-23-00/501, Air Supply BITE System
      (6) AMM 71-00-00/201, Power Plant (Operating Procedure)
      (7) AMM 78-31-00/201, Engine Fan Thrust Reverser
   B. Access
      (1) Location Zones
          413 No. 1 Power Plant
          423 No. 2 Power Plant

   C. Procedure to remove the high pressure shutoff valve.

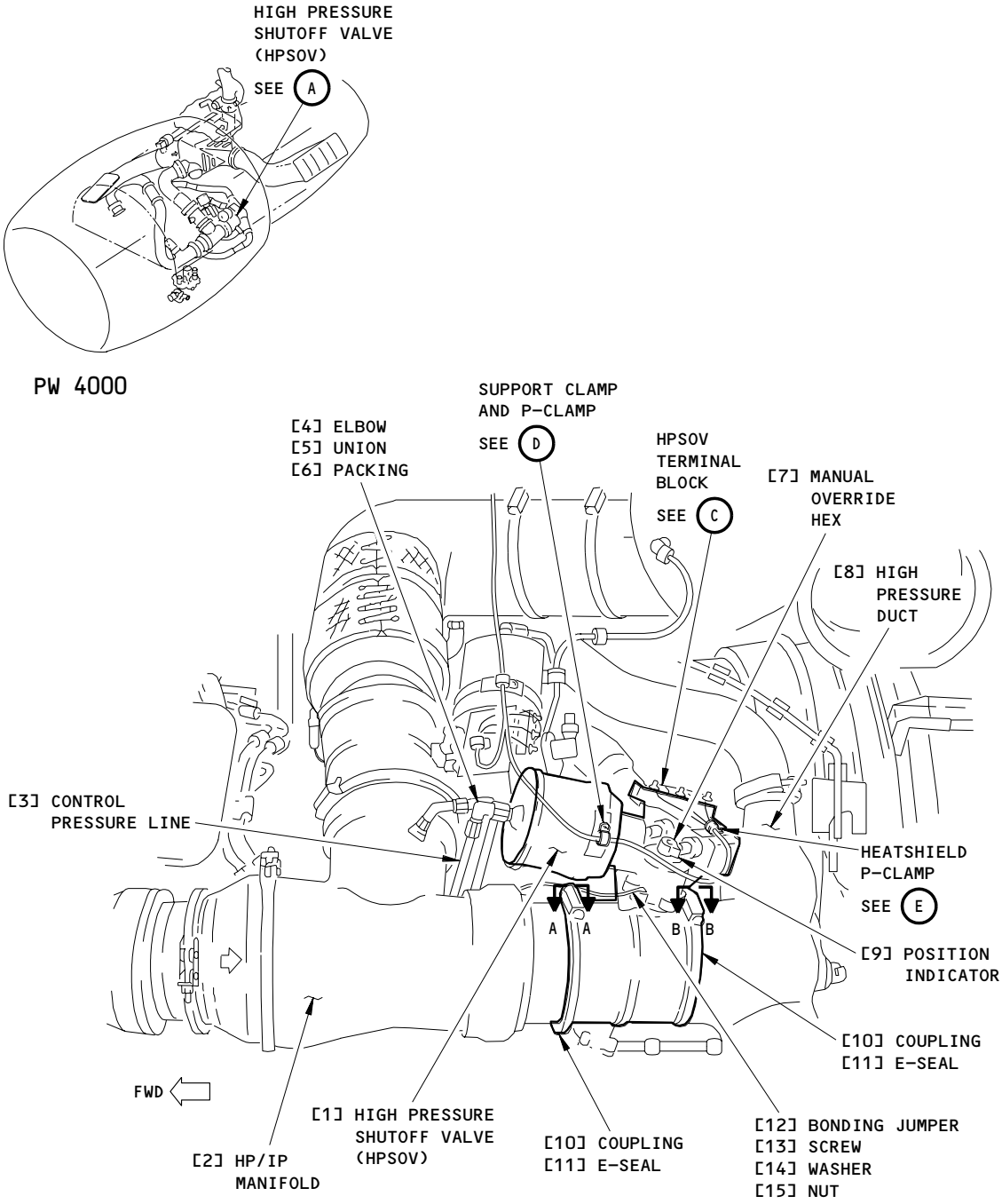
S 864-035

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(1) Remove the pneumatic power (AMM 36-00-00/201).

S 864-004

(2) If electrical power is supplied to the airplane, open these circuit breakers on the overhead circuit breaker panel P11 and attach DO-NOT-CLOSE tags:
   (a) For the removal of the left high pressure (HP) shutoff valve:
      1) 11S10, LEFT ENG BLEED IND
      2) 11S11, LEFT ENG BLEED CONT

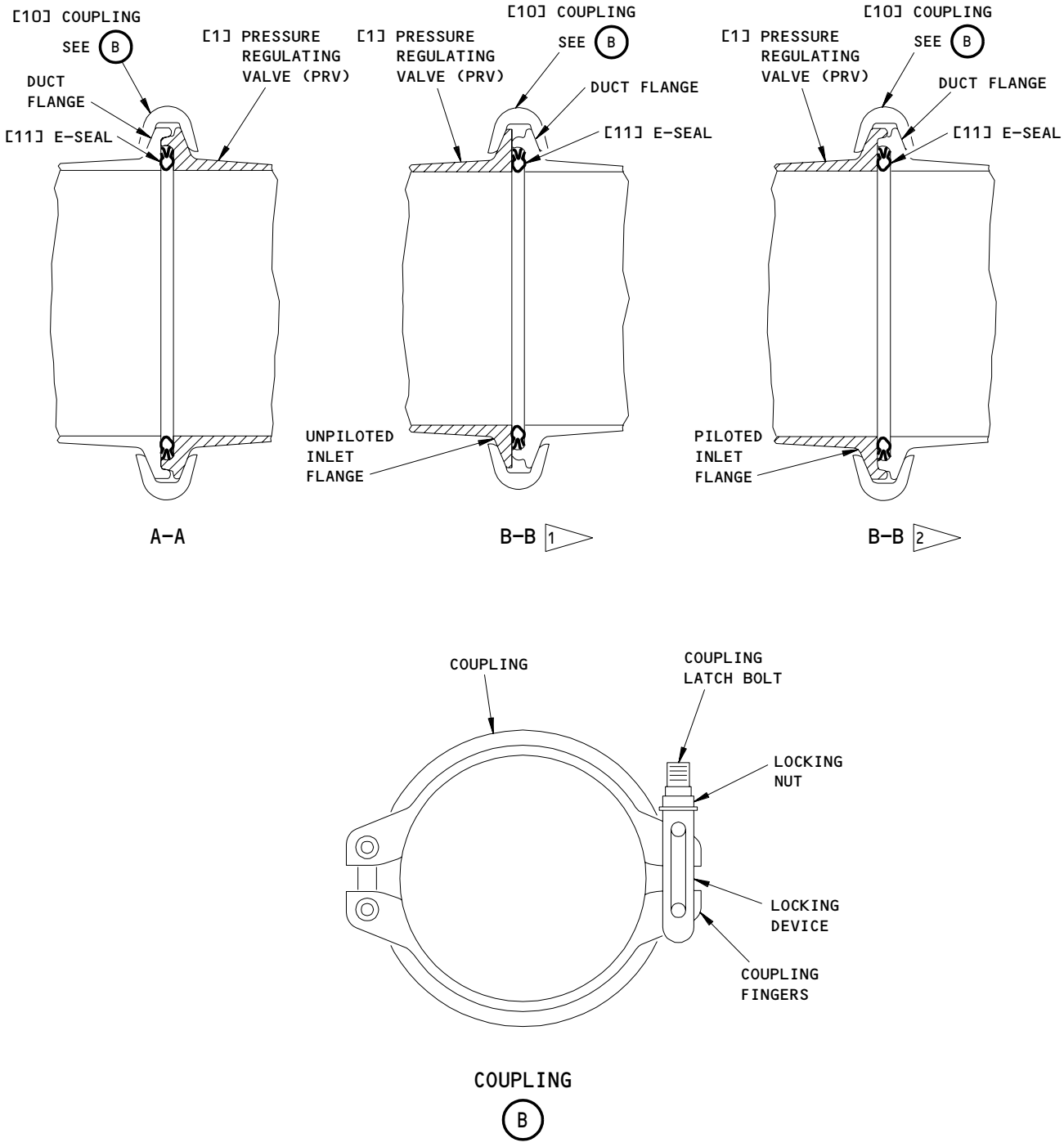


HIGH PRESSURE SHUTOFF VALVE (HPSOV)

A

High Pressure Shutoff Valve Installation
Figure 401 (Sheet 1)

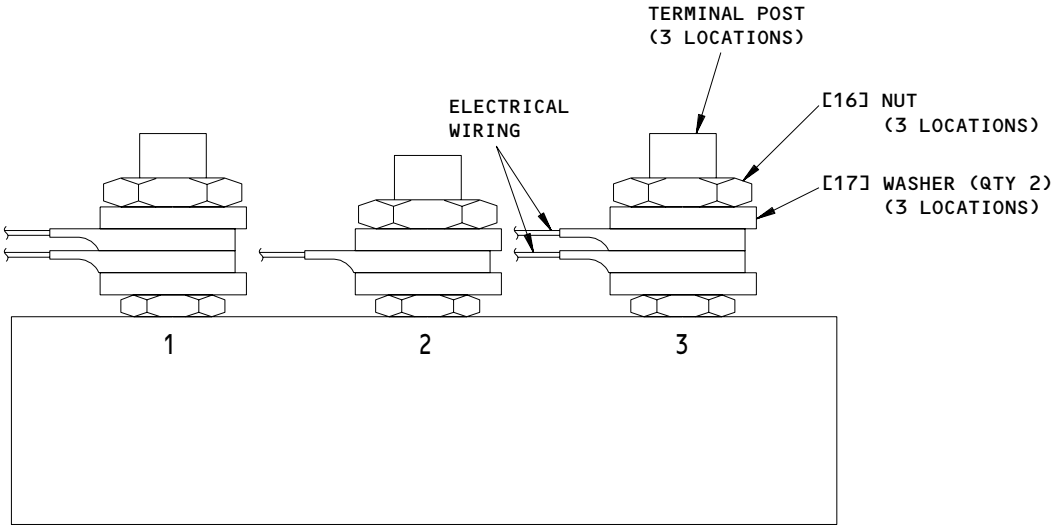
K99659



1 PRV WITH UNPILOTED INLET FLANGE
2 PRV WITH PILOTED INLET FLANGE

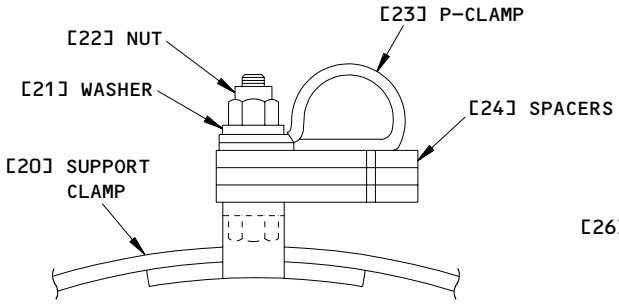
High Pressure Shutoff Valve Installation
Figure 401 (Sheet 2)

L74592



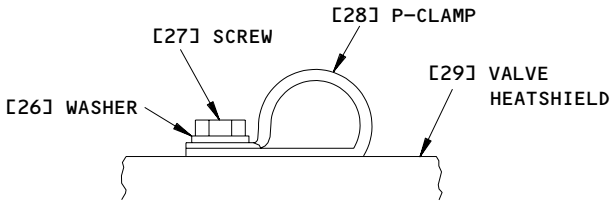
HPSOV TERMINAL BLOCK

C



SUPPORT CLAMP AND P-CLAMP

D

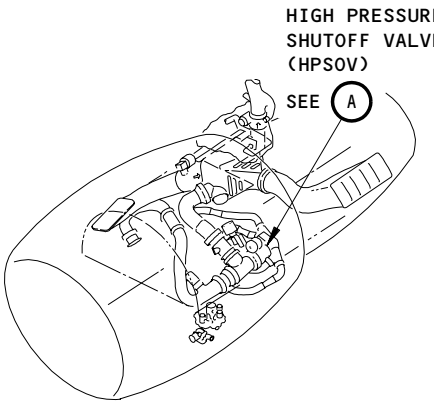


HEATSHIELD P-CLAMP

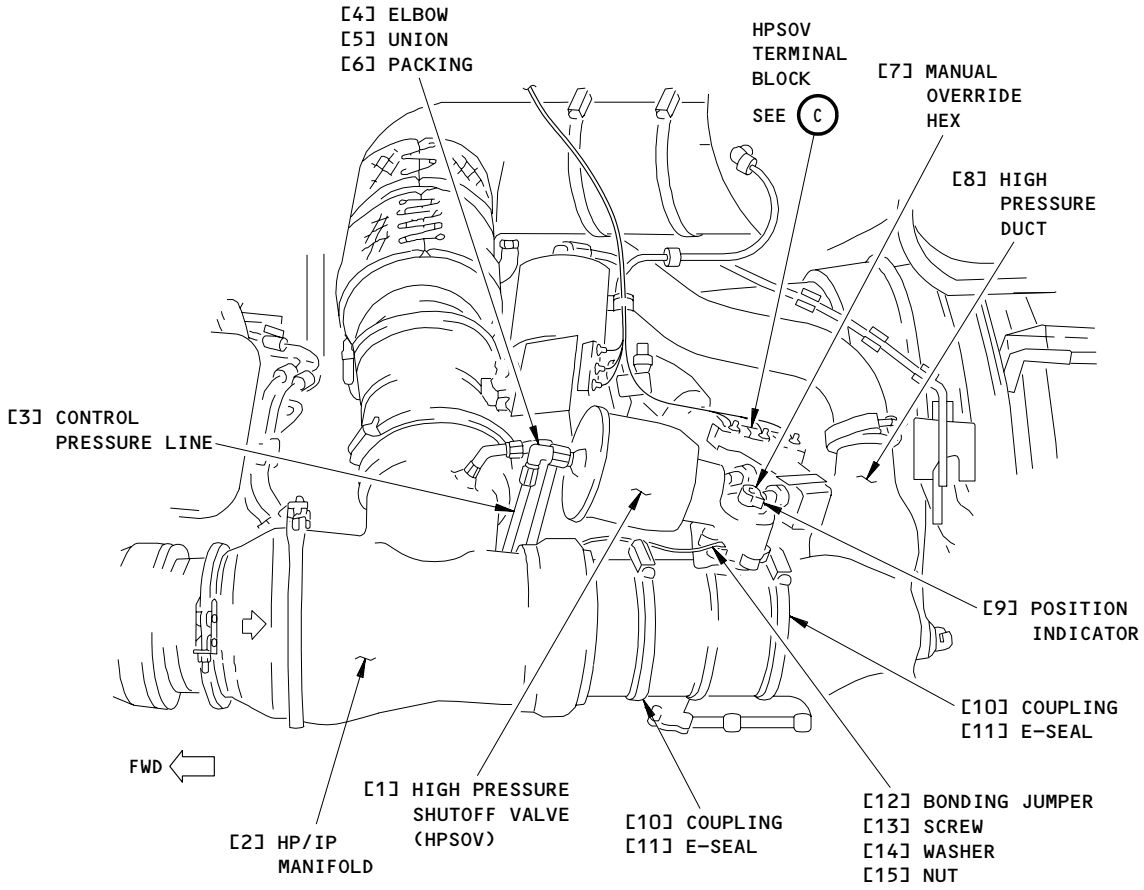
E

High Pressure Shutoff Valve Installation
Figure 401 (Sheet 3)

M34686



PW 4000



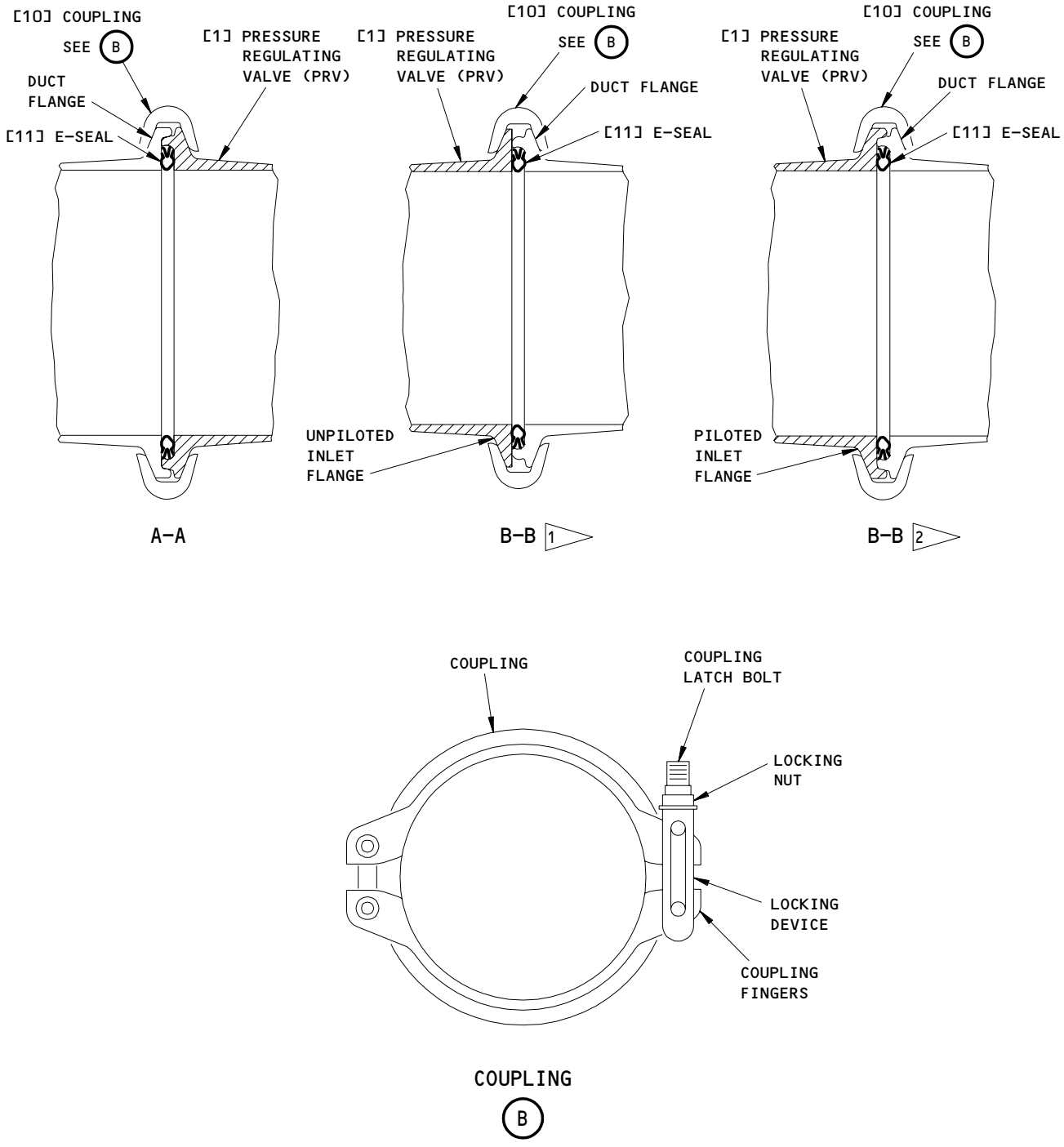
HIGH PRESSURE SHUTOFF VALVE (HPSOV)

A

High Pressure Shutoff Valve Installation
Figure 401A (Sheet 1)

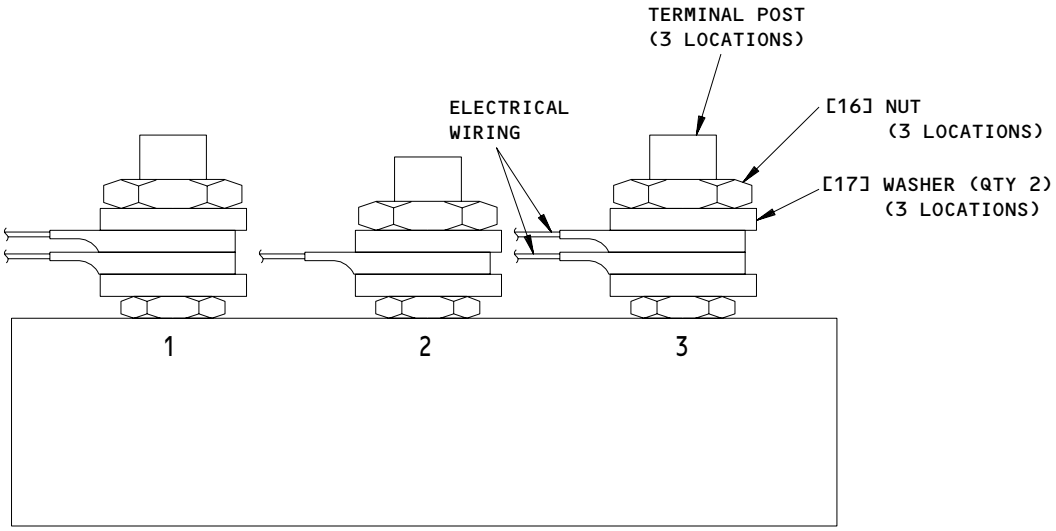
EFFECTIVITY
AIRPLANES WITH HPSOV PRE-SB 36-53;

300027



1 PRV WITH UNPILOTED INLET FLANGE
2 PRV WITH PILOTED INLET FLANGE

High Pressure Shutoff Valve Installation
Figure 401A (Sheet 2)



HPSOV TERMINAL BLOCK

C

High Pressure Shutoff Valve Installation
Figure 401A (Sheet 3)

(b) For the removal of right high pressure (HP) shutoff valve:
1) 11S19, RIGHT ENG BLEED IND
2) 11S20, RIGHT ENG BLEED CONT

S 864-005

(3) If electrical power is supplied to the airplane, open this circuit breaker on the left misc equip panel P36 and attach DO-NOT-CLOSE tag:
(a) 36L7 or 36K7, AIR SUPPLY BITE

S 864-006

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do the thrust reverser deactivation for ground maintenance (AMM 78-31-00/201).

S 864-007

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(5) Open the applicable left thrust reverser (AMM 78-31-00/201).

S 034-008

(6) Remove the screw (13), washer (14) and nut (15) and disconnect the bonding jumper (12) from the HPSOV (1).

S 034-009

(7) Disconnect the electrical wiring from the HPSOV terminal block.
(a) Put tags on the electrical wires to identify their correct position for the installation.

S 024-047

(8) AIRPLANES WITH HPSOV POST-SB 36-53;
AIRPLANES WITH HPSOV P/N S210T120-141 (PRR B12745);
Disconnect the electrical wiring connected to the HPSOV actuator and HPSOV heatshield:
(a) Remove the nut (22) and washer (21) that hold the P-clamp (23) to the support clamp (20) on the HPSOV actuator.
(b) Remove the P-clamp (23) and wiring from the support clamp (20) on the HPSOV actuator.
1) Re-install the washer (21) and nut (22) to keep the three spacers (24) attached to the support clamp (20).
(c) Loosen and remove the support clamp (20) from the HPSOV actuator and keep for subsequent installation.
(d) Cut the lockwire and remove the screw (27) and washer (26) to disconnect the P-clamp (28) and wiring from the valve heatshield (29).
1) Re-install the washer (26) and screw (27) to the valve heatshield (29).

S 034-010

(9) Disconnect the control pressure line (3) from the elbow (4) at the HPSOV actuator.
(a) Remove the elbow (4), union (5) and packing (6) from HPSOV.
(b) Discard the packing (6).
(c) Put a cover in the opening in control pressure line (3) to prevent entry of unwanted material.

S 024-011

(10) Remove the couplings (10) from the HPSOV (1) and remove the HPSOV from the engine.
(a) Keep the couplings (10) for the installation of the HPSOV (1).
(b) If you cannot easily remove the HPSOV because it is too tight, loosen one of the duct sections (2) or (8) on either side of the HPSOV (AMM 36-11-01/401).

S 024-012

(11) Remove the E-Seals (11) from the duct flanges.

S 954-013

(12) Put a cover in the duct openings to prevent entry of unwanted material.

TASK 36-11-07-424-014

3. Install High Pressure Shutoff Valve (Fig. 401)
A. Consumable Materials
(1) G00095 Detector - Leak-Tek 160X
(2) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature antiseize compound)
(3) G00145, Tape - Permacel P-421 (or P-440)
B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	High Pressure Shutoff Valve	36-11-01	05	375
401	1	High Pressure Shutoff Valve	36-11-01	11	455
401	1	High Pressure Shutoff Valve	36-11-01	11A	515
401	6	Packing	36-11-08	06	355
401	6	Packing	36-11-08	07	370
401	6	Packing	36-12-51	08A	210
401	11	E-Seal	36-11-01	05	55
401	11	E-Seal	36-11-01	11	95
401	11	E-Seal	36-11-01	11A	90

C. References
(1) AMM 20-10-21/601, Electrical Bonding
(2) AMM 24-22-00/201, Electrical Power - Control
(3) AMM 36-00-00/201, Pneumatic - General
(4) AMM 36-11-01/401, Pneumatic Duct
(5) AMM 36-11-09/201, Air Supply Pressure Regulating and Shutoff Valve
(6) AMM 36-23-00/501, Air Supply BITE System
(7) AMM 71-00-00/201, Power Plant (Operating Procedure)
(8) AMM 78-31-00/201, Engine Fan Thrust Reverser
(9) SWPM 20-20-00, Electrical Bonds and Grounds

D. Access
(1) Location Zones
413 No. 1 Power Plant
423 No. 2 Power Plant

E. Procedure to install a high pressure shutoff valve.

S 014-015
(1) Remove the duct covers.

S 214-016
(2) Inspect the HPSOV (1) for the damage.

S 214-017

CAUTION: THE VALVE E-SEALS ARE EASILY DAMAGED. THE INSTALLATION OF DAMAGED E-SEALS WILL CAUSE TOO MUCH LEAKAGE.

(3) Examine all the E-seals (11).
(a) The E-seals (11) must be free of any cracks, dents, or other damage.
(b) Replace all the damaged E-seals (11).

S 434-018

(4) Put the E-seals (11) in the HPSOV (1) flanges.

S 434-033

CAUTION: MAKE SURE YOU INSTALL THE LOCKING DEVICE OF THE COUPLING CORRECTLY AS SHOWN IN FIGURE 401. IF YOU DO NOT INSTALL THE COUPLING FINGERS INSIDE THE LOCKING DEVICE THE COUPLING CAN LOOSEN AND CAUSE DAMAGE TO EQUIPMENT.

(5) Put the HPSOV (1) between the High Pressure duct (8) and the HP/IP manifold (2).
   (a) If you cannot easily install the HPSOV because it is too tight, loosen one of the duct sections (2) or (8) on either side of the HPSOV (AMM 36-11-01/401).

S 424-050

CAUTION: MAKE SURE YOU INSTALL THE LOCKING DEVICE OF THE COUPLING CORRECTLY AS SHOWN IN FIGURE 401. IF YOU DO NOT INSTALL THE COUPLING FINGERS INSIDE THE LOCKING DEVICE THE COUPLING CAN LOOSEN AND CAUSE DAMAGE TO EQUIPMENT.

(6) Loosely install the couplings (10).

S 434-020

(7) Adjust the valve position in the duct to align with the control pressure line (3).

NOTE: Make sure you align the joints of the duct and HPSOV correctly before you tighten the couplings. The duct and HPSOV flanges will not automatically align themselves when you tighten the couplings. Do a check of the joints after you tighten the couplings.

S 434-036

CAUTION: DO NOT TIGHTEN THE COUPLINGS MORE THAN THE SPECIFIED LIMIT. IF YOU APPLY TOO MUCH TORQUE, THE VALVE FLOW BODY CAN WARP (BECOME OVAL) AND CAUSE THE VALVE TO BIND DURING OPERATION.

(8) Tighten the couplings (10) to 120 pound-inches (13.56 newton-meters).

S 644-034

(9) Apply a light coat of antiseize compound to the threads of the control pressure line (3), elbow (4) and union (5).

S 434-022
(10) Install the new packing (6), union (5) and the elbow (4) to the HPSOV (1).

S 434-023
(11) Connect the control pressure line (3) to the elbow (4).

S 424-024
(12) Install the bonding jumper (15) to the HPSOV (1) with the screw (13), washer (14) and nut (15).
(a) Make sure the position of the ground tab for the bonding jumper will not interfere with the movement of the position indicator lever.
(b) Measure the electrical resistance between the ground tab and the bonding jumper and make sure it is less than 0.005 ohms (AMM 20-10-21/601 and SWPM 20-20-00).

S 424-025
(13) Install the electrical wiring at the correct positions on the HPSOV terminal block.
(a) Make sure you install the terminal lug barrel in the up position.
(b) Install the two washers (17) and a nut (16) at each terminal on the HPSOV terminal block.
1) Tighten the nuts (16) to 15-20 pound-inches (1.69-2.26 newton-meters)
(c) Remove the tags from the electrical wiring.

S 424-046
(14) AIRPLANES WITH HPSOV POST-SB 36-53;
AIRPLANES WITH HPSOV P/N S210T120-141 (PRR B12745);
Attach the electrical wiring to the valve heatshield on the HPSOV actuator.
(a) Remove and discard the old tape under the P-clamp (28) and around the HPSOV wiring, then replace with 2-4 layers of new Permacel tape P-421 (or P-440).

(b) Install the P-clamp (28) to the valve heatshield with the washer (26) and screw (27).
1) Tighten the screw (27) to a torque of 25-30 pound-inches (2.8-3.4 Newton-meters) above running torque, then install a new lockwire to the screw (27).
(c) Install the support clamp (20) around the HPSOV actuator.
1) Adjust the support clamp to permit connection of the P-clamp (23).
2) Attach the P-clamp (23) to the support clamp (20) with the three spacers (24), washer (21) and nut (22).
3) Tighten the support clamp (20) to a torque of 30-40 pound-inches (3.4-4.5 Newton-meters).

S 424-043
(15) If it is necessary, tighten any loose duct sections (AMM 36-11-01/401).

S 864-026
(16) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) For the installation of left high pressure shutoff valve:
1) 11S10, LEFT ENG BLEED IND
2) 11S11, LEFT ENG BLEED CONT
(b) For the installation of the right high pressure shutoff valve:
1) 11S19, RIGHT ENG BLEED IND
2) 11S20, RIGHT ENG BLEED CONT

S 864-027
(17) Remove DO-NOT-CLOSE tags and close this circuit breaker on the P36 panel:
(a) 36L7 or 36K7, AIR SUPPLY BITE

F. HPSOV Installation Test

S 714-028
(1) Do these steps for a test of the HPSOV (1) installation.
(a) Supply electrical power (AMM 24-22-00/201).

(b) Do a test of the valve flanges for leakage (preferred method):

NOTE: This method will examine the upstream and downstream flanges of the valve.

1) Push the applicable (L/R) ENG OFF switch-light on the air supply control module (on P5 panel) to the on position.
2) Apply a leak detector to the flanges of the valve.
3) With the thrust reverser open, dry motor the engine (AMM 71-00-00/201).
4) Examine the flanges of valve for the leakage.
   a) Slow movement of bubbles is permitted.
   b) Repair fast movement of bubbles or strong leakage by joint or clamp alignment.
5) Stop the engine (AMM 71-00-00/201).

(c) Do a test of valve flanges for the leakage (optional method):

NOTE: This method will examine only the downstream flange of the valve.

1) Push the applicable L or R ANTI-ICE ENGINE switch-light on the pilot's overhead P5 panel to off position. Make sure the ON light is off.
2) To do a test of the right high pressure shutoff valve, push the L ISLN and R ISLN valve switch-light on P5 panel to the open position. Make sure the white bar lights come on.
3) Do a check of the valve position to make sure the high pressure shutoff valve is in full closed position.
   a) If not closed, turn the valve manual drive hex (7) until position indicator (9) is in the closed position.
4) Pressurize pneumatic duct upstream of PRSOV (AMM 36-11-09/201).
5) Examine the downstream flange of valve for leakage.
   a) Apply leak detector to the downstream flange of the valve.
   b) Slow movement of bubbles is permitted.

c) Repair fast movement of bubbles or strong leakage by joint or clamp alignment.

6) Remove the pneumatic pressure upstream of PRSOV (AMM 36-11-09/201).

(d) Do the Air Supply System BITE Check (AMM 36-23-00/501).

NOTE: System BITE check verifies electrical operation of high pressure shutoff valve

(e) Push and release RESET button on the BITE module.

S 864-029

(2) Put the airplane back to its usual condition.

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(a) Close the applicable right thrust reverser (AMM 78-31-00/201).

S 864-030

(3) Do the thrust reverser activation (AMM 78-31-00/201).

(a) Remove electrical power if it is not necessary.

HIGH PRESSURE SHUTOFF VALVE AND HIGH PRESSURE CONTROLLER - ADJUSTMENT/TEST

1. General
   A. This procedure contains one task. This task performs an operational test of the HPSOV and the HPC while the HPSOV and HPC are installed on-wing.

   TASK 36-11-07-705-130

2. High Pressure Shutoff Valve (HPSOV) and High Pressure Controller (HPC) Test
   A. General
      (1) This test will do a check of the HPC servo pressure switch, differential pressure switch, low pressure switch and high pressure switch. The test will also do a functional check of the HPC and HPSOV.
      (2) The test equipment listed in this task are commercially available. For an optional test of the HPC and HPSOV which uses the Boeing GSE Pneumatic System Health Check (PSHC) Test Equipment, G36035, refer to the following procedure(s) for the applicable engine configuration installed on the aircraft:
         (a) AMM 36-00-22/501, Pneumatic System Health Check (PW 4000)
   B. Equipment
      (1) Air or Nitrogen Source
      (2) HPC breakout connector (optional to ARINC 429 monitor)
      (3) Low Speed ARINC 429 monitor, Odd Parity, SDI (Bit 10, Bit 9) (optional to HPC breakout connector)
      (4) Supply pressure gage - 0-200 PSIG
      (5) Pressure hose - 0-200 PSIG
      (6) Fitting - MS-6 size
   C. Consumable Materials
      (1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature antiseize compound)
   D. References
      (1) AMM 24-22-00/201, Electrical Power - General
      (2) AMM 36-00-00/201, Pneumatic Power - General
      (3) AMM 36-11-07/401, High Pressure Shutoff Valve
      (4) AMM 36-11-08/401, High Pressure Controller

(5) AMM 36-11-12/401, Air Supply Control Card Assembly
(6) AMM 71-11-04/201, Fan Cowl Panels
(7) AMM 71-11-06/201, Core Cowl Panels
(8) AMM 78-31-00/201, Thrust Reverser System
(9) WDM 36-11-61
(10) WDM 36-11-62

E. Access

(1) Location Zones

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

(2) Access Panels (PW 4000 or PW JT9D ENGINES)

413AL	Left Fan Cowl (Left engine)
415AL	Left Thrust Reverser (Left engine)
417AL	Left Core Cowl (Left engine)
423AL	Left Fan Cowl (Right engine)
425AL	Left Thrust Reverser (Right engine)
427AL	Left Core Cowl (Right engine)

F. Prepare for the Test

S 865-002

WARNING: YOU MUST REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. IF YOU DO NOT REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS, HOT HIGH PRESSURE AIR CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove pneumatic power (AMM 36-00-00/201).

S 865-003

(2) Supply electrical power (AMM 24-22-00/201).

S 015-071

(3) AIRPLANES WITH PW 4000 OR PW JT9D ENGINES;
Get access to the High Pressure Controller (HPC) and the High Pressure Shutoff Valve (HPSOV) on the 'left' side of the associated (left/right) engine:

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.

(a) Do the deactivation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).
(b) Open the associated left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(c) Open the associated left core cowl panel (417AL/427AL) (AMM 71-11-06/201).

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.

(d) Open the associated left thrust reverser (415AL/425AL) (AMM 78-31-00/201).

S 865-068

(4) For the left engine, make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11S10, LEFT ENG BLEED IND
(b) 11S11, LEFT ENG BLEED CONT

S 865-069

(5) For the right engine, make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11S19, RIGHT ENG BLEED IND
(b) 11S20, RIGHT ENG BLEED CONT

S 865-070

(6) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
(a) 36L7 or 36K7, AIR SUPPLY BITE

G. BITE Test

S 745-008

(1) Push the PRESS TEST button on the BITE module.

S 215-009

(2) Make sure all the lights are on.

S 745-010

(3) Push the VERIFY button. Continue to push the VERIFY button until the NO FAULT light comes on or no lights are on.
(a) Keep a record of all the faults.

S 745-011

(4) Push the BITE STEP button. Continue to push the BITE STEP button until the NO FAULT light comes on or no lights are on.
(a) Keep a record of all the faults.

S 355-012

(5) Repair all HPC and HPSOV faults before you continue with the test.

S 215-051

(6) Do a check of the sense lines to and from the HPC and HPSOV.
(a) Repair all loose and/or damaged sense lines.

H. HPSOV Actuator Leakage (Thumb) Test

S 215-136
(1) Make sure the HPSOV visual position indicator is at the fully 'closed' position.

S 025-036
(2) Remove the servo pressure sense line from the HPSOV actuator.

S 725-037
(3) Manually open the HPSOV.

S 725-038
(4) Put your thumb, a cap or plug (AN814 or equivalent) with suitable O-ring on the HPSOV actuator sense line connection.

S 725-039
(5) Let the HPSOV close.
(a) Make sure the HPSOV does not bind and goes to the fully closed position. If the HPSOV binds or does not go to the fully closed position replace the HPSOV (AMM 36-11-07/401).

S 725-040
(6) Measure how long (in seconds) it takes for the HPSOV to close.

NOTE: The HPSOV may not close if it is completely "leak free". If the HPSOV does not close, make sure that the HPSOV does not bind then continue the test.

S 725-041
(7) Did the HPSOV close in less than 20 seconds?
(a) YES, replace the HPSOV (AMM 36-11-07/401).
(b) NO, the HPSOV is satisfactory. Remove the cap or plug. Apply antiseize compound to the servo pressure sense line and install the sense line connection to the HPSOV actuator.

I. HPSOV/HPC Operational Test

NOTE: During the test you will be asked some questions. Each question will have a yes or no answer. Each yes or no answer gives a recommeded action, for example: NO, replace the HPSOV (AMM 36-11-07/401). You can continue with the test without doing the action if you want to see other characteristics of the test. However, you should do the recommended action after you complete the test.

S 215-042
(1) Look at the HPSOV position indicator. Is the HPSOV in the fully closed position?
(a) NO, replace the HPSOV (AMM 36-11-07/401).

(b) YES, continue.

S 765-043

(2) Do a check for continuity of the HPSOV closed position switch when the HPSOV is closed. Is there continuity?
(a) NO, replace the HPSOV (AMM 36-11-07/401).
(b) YES, continue.

S 025-044

(3) Disconnect the electrical connector to the HPC.

S 765-045

(4) Do a check for continuity at pins 5 and 6 on the HPC while you pull on the Phh switch wiring (use approximately 5 lbs maximum tension in all directions). Is the continuity satisfactory?
(a) NO, replace the HPC (AMM 36-11-08/401).
(b) YES, continue.

S 425-046

(5) Install the electrical connector to the HPC.

S 865-047

(6) Push the L(R) ENG OFF switch-light to the ON position and then to the OFF position. Put your hand on the HPC solenoid and listen or feel for the HPC solenoid to operate.

NOTE: A latching solenoid should not be continuously energized because it will overheat.

NOTE: AIRPLANES WITH GE CF6-80C2 OR PW 4000 ENGINES;
The PRVC solenoid will also click at the same time as the HPC solenoid.

S 725-048

(7) Did you here or feel the solenoid click?
(a) No, Do a check of the shutoff and auto voltages to the HPC controller at pins 7 and 9 (8 is ground) of the airplane wiring.

NOTE: There can be a time delay before a pulse can be recorded.

1) If the voltages are satisfactory, replace the HPC (AMM 36-11-08/401).
2) If the voltages are not satisfactory, do a check of the wiring and/or Bleed Air Supply Control Card (WDM 36-11-61, WDM 36-11-62).

(b) YES, continue.

S 215-049
(8) Do a check of the sense lines to and from the HPC and HPSOV.
(a) Repair all loose and/or damaged sense lines.

S 025-050
(9) Remove the supply pressure sense line to the HPC.

S 485-051
(10) Install an nitrogen source (or equivalent) to the supply pressure sense line.

S 865-063
(11) Push the L(R) ENG Bleed switch-light to the ON position.

NOTE: Do a close inspection of the HPSOV close and open limit switches during valve operation. If the HPSOV is not closed when the L(R) ENG Bleed switch-light is in the OFF position and pressure is supplied, the BLEED light will illuminate with an EICAS message.

S 865-053
(12) Slowly apply 15 PSIG.

NOTE: The HPSOV should open at approximately 10 PSIG.

S 215-062
(13) Make sure there is no leakage at the sense lines. Tighten or repair if it is necessary.

S 725-054
(14) Did the HPSOV open at ≤ 15 PSIG?
(a) NO, do these steps:
1) Remove the HPSOV lockout pin from the HPSOV actuator cap to vent the actuator.
2) Do a check for airflow. Do you feel airflow?
a) YES, replace the HPSOV (AMM 36-11-07/401).
b) NO, replace the HPC (AMM 36-11-08/401). Install the lockout pin in the HPSOV.
(b) YES, continue.

S 865-065
(15) Put the L(R) ENG Bleed switch-light in the OFF position.

S 215-066
(16) Make sure the HPSOV goes to the closed position.

S 865-067
(17) Put the L(R) ENG Bleed switch-light in the ON position.

S 215-068
(18) Make sure the HPSOV is fully open.

S 715-069
(19) Do these steps to do a check of the "crossover" from high stage pressure to low stage pressure:
(a) Slowly increase the supply pressure to 120 psig.

NOTE: The HPC will command the HPSOV to close at approximately 105 psig.

(b) If the HPSOV does not close at ≤ 120 psig, replace the HPC (AMM 36-11-08/401).
(c) For your information, if you increase the supply pressure to 127 psig and the HPSOV is not closed, then these messages will occur:

NOTE: If the HPSOV operation is satisfactory but the BLEED light and EICAS message remain illuminated when the valve is fully closed, then troubleshoot the HPSOV indication circuit.

1) AIRPLANES WITH GE CF6-80C2 OR PW 4000 ENGINES;
BLEED light and L(R) ENG BLEED HPSOV EICAS message illuminate. The BLEED light monitors the HPSOV and PRV closed position.

S 865-071
(20) Decrease the supply pressure to 0 psig.

S 085-064
(21) Remove the nitrogen source. Apply antiseize compound to the supply pressure sense line and install the sense line.

J. HPSOV/HPC Operational Check (ARINC 429 Monitor or HPC Breakout Connector)

NOTE: The ARINC 429 portion of this test can only be done on BITE modules with part numbers S210T120-67 and above. These Bite modules have an ARINC 429 test port that will allow you to monitor real time data from pneumatic component switches/sensors.

NOTE: During the test you will be asked some questions. Each question will have a yes or no answer. Each yes or no answer gives a recommeded action, for example: NO, replace the HPSOV (AMM 36-11-07/401). You can continue with the test without doing the action if you want to see other characteristics of the test. However, you should do the recommended action after you complete the test.

S 485-030

(1) Install one of these pieces of equipment:

(a) Install a low speed ARINC 429 monitor to pins FA56 and FC56 of the terminal block 130 found on the E1-2 shelf. Get access to the back of the BITE module from the forward cargo bay.

NOTE: Monitor octal label 351. The left channel data is shown on the source/destination identifier (SDI) 01 and the right channel data is on SDI 10. These are Bit 10 and Bit 9 as shown on the ARINC 429 monitor. The output signals are shown in table 1.

TABLE 1 BITE MODULE ARINC 429 OUTPUTS FOR HPC/HPSOV DATA SIGNALS

OCTAL LABEL	BIT	SIGNAL DESCRIPTION	STATUS
351	11	HPC ENABLED COMMAND	HPC ENABLED - BIT=1
	11	HPC CLOSED COMMAND	HPC CLOSED - BIT=0
	14	HPSOV CLOSED POSITION SWITCH	HPSOV CLOSED - BIT=1
	15	HPSOV OPEN POSITION SWITCH	HPSOV IS NOT OPEN - BIT=1
	16	HPC HIGH PRESSURE SWITCH (Phh)	PRESSURE >127 PSIG - BIT=0
	17	HPC LOW PRESSURE SWITCH (Phl)	PRESSURE >62 PSIG - BIT=0
	18	HPC SERVO PRESSURE SWITCH (Pc)	PRESSURE >14 PSIG - BIT=0
	19	HPC DIFFERENTIAL PRESSURE SWITCH (PH-PC)	PRESSURE >20 PSIG - BIT=0

Left channel SDI — 01
Right channel SDI — 10

(b) Install the HPC breakout connector to the HPC and the HPC wire bundle (WDM 36-11-61, 36-11-62).

NOTE: A schematic diagram of the HPC breakout connector installation is shown in Fig. 502. HPC faults may be recorded by the BITE module when the HPC breakout connector is installed or removed. These faults should be reset.

TABLE 2 BREAKOUT CONNECTOR OUTPUTS FOR HPC/HPSOV DATA SIGNALS		
PIN	SIGNAL DESCRIPTION	STATUS
7=28 VDC (1.5-3.5S.)	HPC CLOSED COMMAND	HPC CLOSE
9=28 VDC (1.5-3.5S.)	HPC ENABLED COMMAND	HPC ENABLED
1=3 VDC	HPC SERVO PRESSURE SWITCH (Pc)	PRESSURE >14 PSIG
10=3 VDC	HPC DIFFERENTIAL PRESSURE SWITCH (Ph-Pc)	PRESSURE >20 PSIG
3=3 VDC	HPC LOW PRESSURE SWITCH (Phl)	PRESSURE >62 PSIG
1 AND 2=3 VDC	HPSOV OPEN POSITION SWITCH	HPSOV IS OPEN
1 AND 2=0 VDC	HPSOV CLOSED POSITION SWITCH	HPSOV IS CLOSED
5=3 VDC	HPC HIGH PRESSURE SWITCH (Phh)	PRESSURE >127 PSIG

S 215-060

(2) Do a check of the sense lines to and from the HPC and HPSOV.

(a) Repair all loose and/or damaged sense lines.

S 215-031

(3) Look at the position indicator on the HPSOV. Make sure the HPSOV is in the fully closed position.

(a) Do you see ARINC Bit 14=1 and 15=1 (HPSOV connector pins 1 and 2= 0 VDC) and the HPSOV is in the fully closed position. This means the HPSOV OPEN and CLOSED position switches are closed.

1) NO, replace the HPSOV (AMM 36-11-07/401).

2) YES, continue.

S 715-052

(4) Do these steps to do a check of the "close" signal to the HPC:

(a) Push the L(R) ENG OFF switch-light, on the P5 panel, to the OFF position. Listen or feel for the HPC solenoid to operate.

NOTE: A latching solenoid should not be continuously energized because it will overheat.

NOTE: AIRPLANES WITH GE CF6-80C2 OR PW 4000 ENGINES;
The PRVC solenoid will also click at the same time as the HPC solenoid.

(b) Do you see ARINC Bit 11=0 (a 1.5-3.5 second, 28 VDC pulse on pin 7 of the breakout connector)?

1) NO, do a check of the electrical wiring (WDM 36-11-61, WDM 36-11-62). If the problem continues, replace the bleed air supply control card (AMM 36-11-12/401).

2) YES, continue.

S 715-053

(5) Do these steps to do a check of the "enable" signal to the HPC:

(a) Push the L(R) ENG OFF switch-light, on the P5 panel, to the ON position. Listen or feel for the HPC solenoid to operate.

NOTE: A latching solenoid should not be continuously energized because it will overheat.

NOTE: AIRPLANES WITH GE CF6-80C2 OR PW 4000 ENGINES;
The PRVC solenoid will also click at the same time as the HPC solenoid.

(b) Do you see ARINC Bit 11=1 (a 1.5-3.5 second, 28 VDC pulse on pin 9 of the breakout connector)?

1) NO, do a check of the electrical wiring (WDM 36-11-61, WDM 36-11-62). If the problem continues, replace the bleed air supply control card (AMM 36-11-12/401).
2) YES, continue.

S 025-035

(6) Remove the supply pressure sense line at the HPC.

S 485-036

(7) Install a supply pressure gage (Ps) and nitrogen pressure source to the supply pressure sense line as shown in Fig. 501.

S 715-054

(8) Do these steps to do a check of the HPSOV opening pressure:

WARNING: DO NOT EXCEED THE PRESSURE LIMITS THAT ARE GIVEN.
TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE EQUIPMENT.

(a) Slowly apply 15 - 20 psig.

NOTE: The HPSOV should open at approximately 10 psig.

(b) Do you see ARINC Bit 14=0 and 15=0 (HPSOV connector pins 1 and 2= 3 VDC) and the HPSOV in the fully open position. This means the HPSOV OPEN and CLOSED position switches are open.

1) If the HPSOV is not in the fully open position, remove the HPSOV lockout pin from the HPSOV actuator cap.
   a) Do you feel air flow?
   b) YES, replace the HPSOV (AMM 36-11-07/401).
   c) NO, replace the HPC (AMM 36-11-08/401).
2) If the HPSOV OPEN or CLOSED position switch indication are not correct (does not agree with the position indicator on the HPSOV) replace the HPSOV (AMM 36-11-07/401).

S 715-055

(9) Do these steps to do a check of the operation of the HPC servo pressure switch:

(a) Make sure the L (R) ENG bleed switch is selected to ON.

WARNING: DO NOT EXCEED THE PRESSURE LIMITS THAT ARE GIVEN. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE EQUIPMENT.

(b) Slowly increase Ps to 20-25 PSIG.

(c) Make sure the ARINC Bit 18=0 (pin 1=3 VDC at the breakout connector) and the HPSOV is in the fully open position. This means the servo pressure switch in the HPC opened at 14 ±3.5 PSIG.

1) If the HPSOV is not in the fully open position, do a check of the sense line between the HPSOV and the HPC for leaks. Repair or replace a leaky sense line.

2) If the HPSOV does not go to the fully open position and ARINC Bit 18=0 (pin 1=3 VDC at the breakout connector) replace the HPSOV (AMM 36-11-07/401).

3) If the HPSOV does not go to the fully open position and ARINC Bit 18=1 (pin 1=0 VDC at the breakout connector) replace the HPC (AMM 36-11-08/401).

S 715-056

(10) Do these steps to do a check of the operation of the HPC differential pressure switch (Ph-Pc):

(a) Push the L (R) ENG bleed switch to the OFF position. Listen or feel for the HPC solenoid to operate.

NOTE: The solenoid should not be continuously operated because it can overheat.

NOTE: AIRPLANES WITH GE CF6-80C2 OR PW 4000 ENGINES; The PRVC solenoid will also click at the same time as the HPC solenoid.

WARNING: DO NOT EXCEED THE PRESSURE LIMITS THAT ARE GIVEN. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE EQUIPMENT.

(b) Slowly increase Ps to 40-50 PSIG.

(c) Does ARINC Bit 19=0 (pin 10=3 VDC at the breakout connector)? This means the differential pressure switch in the HPC opened at 20 ±3 PSIG.

1) NO, replace the HPC (AMM 36-11-08/401).

2) YES, continue.

S 715-057

(11) Do these steps to do a check of the HPC low pressure switch (Phl):

(a) Push the L (R) ENG bleed switch to the ON position. Listen or feel for the HPC solenoid to operate.

NOTE: The solenoid should not be continuously operated because it can overheat.

NOTE: AIRPLANES WITH GE CF6-80C2 OR PW 4000 ENGINES; The PRVC solenoid will also click at the same time as the HPC solenoid.

WARNING: DO NOT EXCEED THE PRESSURE LIMITS THAT ARE GIVEN. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE EQUIPMENT.

(b) Slowly increase Ps to 70-80 PSIG.

(c) Does ARINC Bit 17=0 (pin 3=3 VDC at the breakout connector)? This means the low pressure switch in the HPC opened at 62 ±5 PSIG.

1) NO, replace the HPC (AMM 36-11-08/401).

2) YES, continue.

S 715-058

(12) Do these steps to do a check of the HPC crossover function by verifying the HPSOV open and closed position switches will close:

(a) Make sure the L (R) ENG bleed switch is selected to ON.

WARNING: DO NOT EXCEED THE PRESSURE LIMITS THAT ARE GIVEN. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE EQUIPMENT.

(b) Slowly increase Ps to 95-105 PSIG.

(c) Make sure the ARINC Bit 14=0 and 15=0 (HPSOV connector pins 1 and 2=3 VDC at the breakout connector) and the HPSOV is in the fully open position. This means the HPSOV OPEN and CLOSED position switches are open.

1) If the HPSOV is not in the fully open position, replace the HPC (AMM 36-11-08/401).

2) If the HPSOV OPEN or CLOSED position switch indication is not correct (does not agree with the position indicator on the HPSOV) replace the HPSOV (AMM 36-11-07/401).

(d) Continue to increase Ps to 110-120 PSIG.

(e) Make sure the ARINC Bit 14=1 and 15=1 (HPSOV connector pins 1 and 2=0 VDC at the breakout connector) and the HPSOV is in the fully closed position. This means the HPSOV OPEN and CLOSED position switches are closed.

1) If the HPSOV is not in the fully closed position, replace the HPC (AMM 36-11-08/401).

2) If the HPSOV OPEN or CLOSED position switch indication is not correct (does not agree with the position indicator on the HPSOV) replace the HPSOV (AMM 36-11-07/401).

S 715-059

(13) Do these steps to do a check of the operation of the HPC High Pressure Switch (Phh):

(a) Make sure the L (R) ENG bleed switch is selected to ON.

WARNING: DO NOT EXCEED THE PRESSURE LIMITS THAT ARE GIVEN. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE EQUIPMENT.

(b) Slowly increase Ps to 140-150 PSIG.

(c) Does ARINC Bit 16=0 (pin 5=3 VDC at the breakout connector)? This means the high pressure switch in the HPC opened at 127 ±10 PSIG.

1) NO, replace the HPC (AMM 36-11-08/401).

2) YES, continue.

(d) Pull the Phh switch airplane side wiring with approximately 5-pound force. This will do a check for continuity at pins 5 and 6 on the HPC while you pull the Phh switch wiring (use approximately 5 pounds maximum tension in all directions).

(e) Does ARINC Bit 16=0 the entire time you pull on the Phh wiring (pin 5=3 VDC at the breakout connector)?

1) NO, replace the HPC (AMM 36-11-08/401).

2) YES, continue.

K. Put the Airplane Back to Its Usual Condition

S 865-137

(1) Push the L (R) ENG bleed switch to the OFF position.

S 085-057

(2) Remove the nitrogen source, supply pressure gage, hoses and fittings from the high pressure inlet sense line connection.

S 425-058

(3) Apply antiseize compound and connect the supply pressure sense line to the engine.

S 085-059

(4) If the breakout connector was used, remove the breakout connector.

NOTE: HPC faults may be recorded by the BITE module when the breakout connector is installed or removed. These faults should be reset.

S 085-060

(5) If the ARINC monitor was used, remove the ARINC 429 monitor.

S 415-085

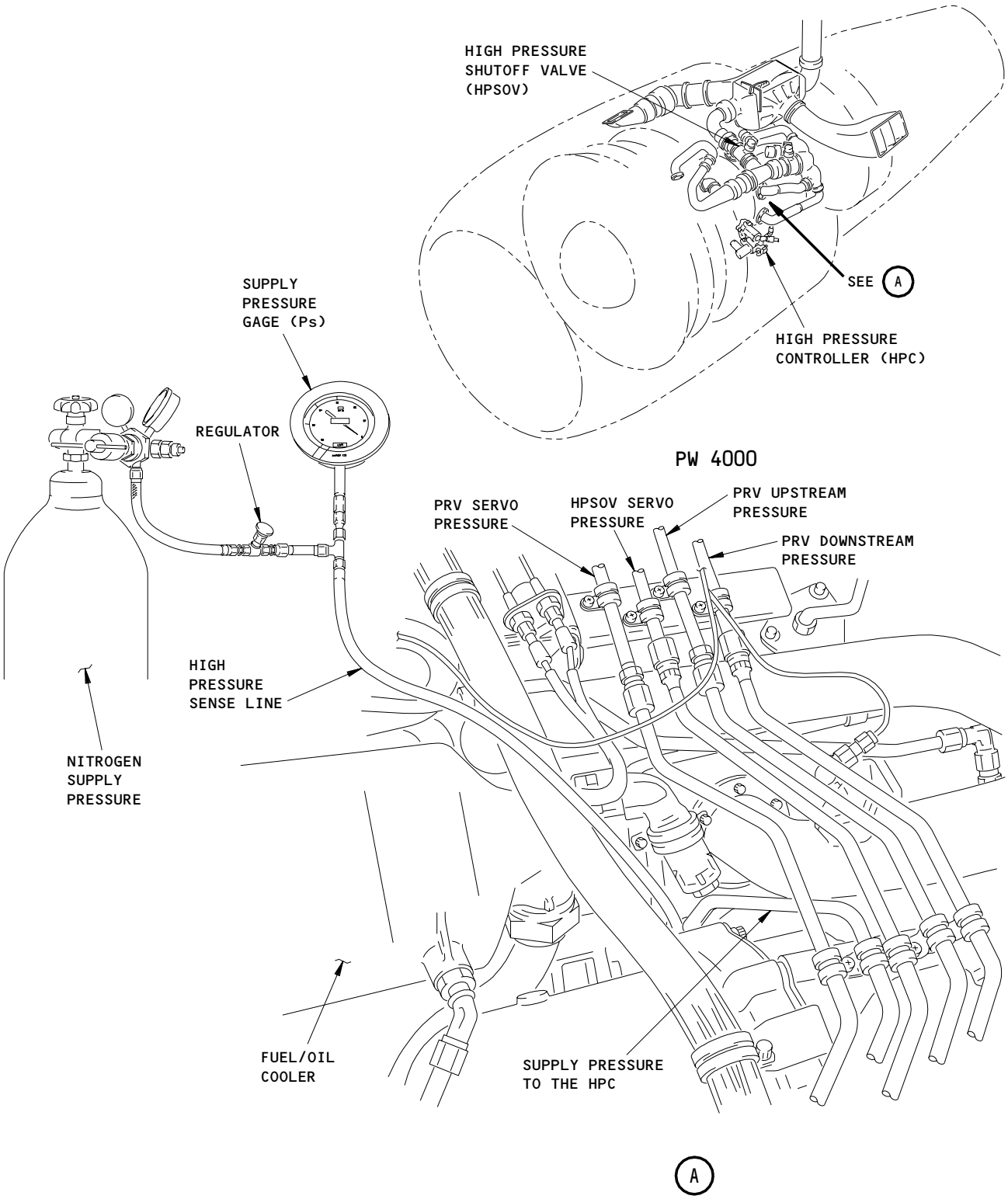
(6) AIRPLANES WITH PW 4000 OR PW JT9D ENGINES;
Close up the access to the HPC and HPSOV on the 'left' side of the associated (left/right) engine:

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

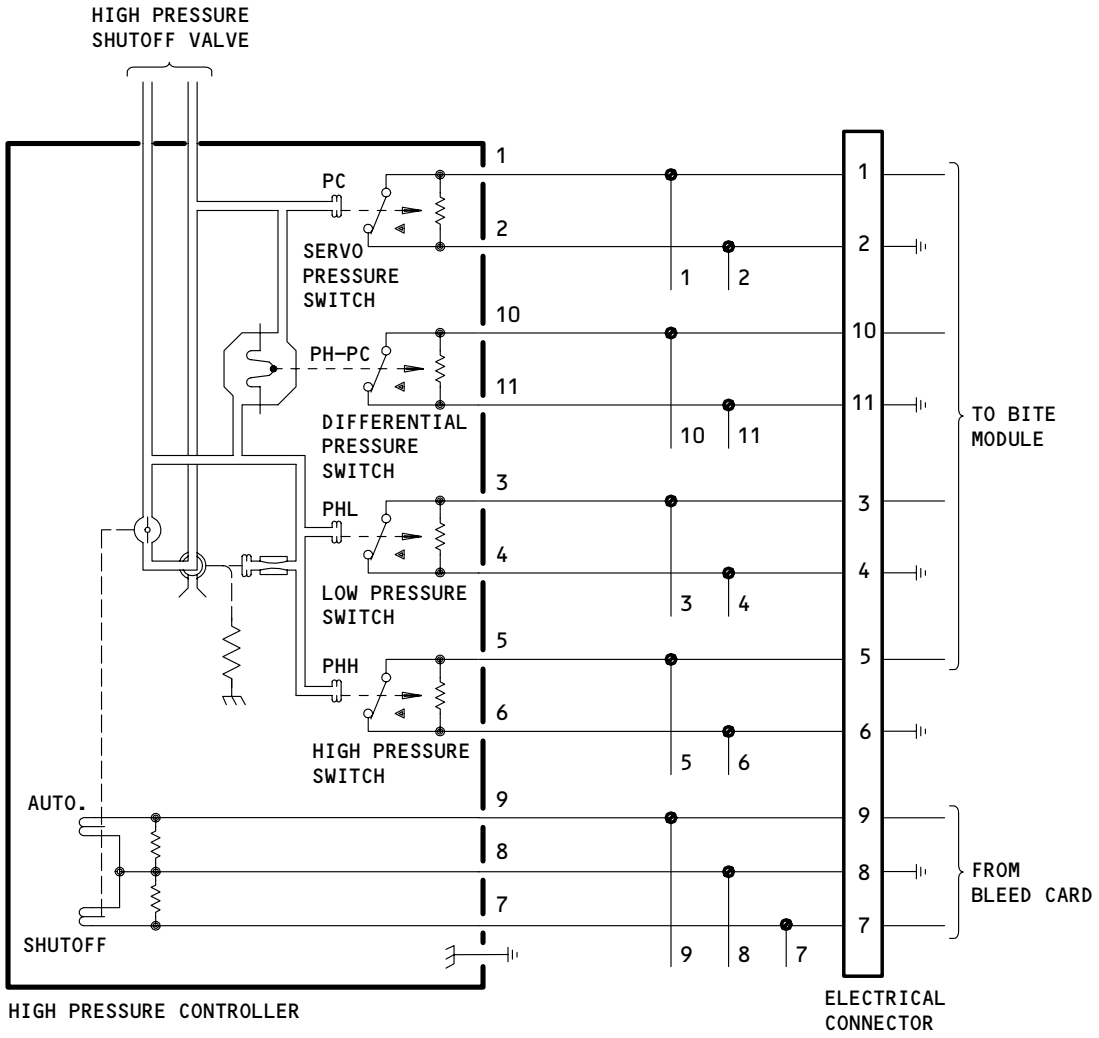
(a) Close the left thrust reverser (415AL/425AL) (AMM 78-31-00/201).
(b) Close the left core cowl panel (417AL/427AL) (AMM 71-11-06/201).
(c) Close the left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(d) Do the activation procedure for the thrust reversers (AMM 78-31-00/201).

S 865-064

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



HPC/HPSOV Test Equipment
Figure 501



HPC Breakout Connector Schematic Diagram
Figure 502

HIGH PRESSURE SHUTOFF VALVE - INSPECTION/CHECK

1. General
   A. This task contains instructions to examine the high pressure shutoff valve (HPSOV) for the correct operation of the HPSOV.

TASK 36-11-07-206-007

2. Examine the High Pressure Shutoff Valve (HPSOV)
   A. References
      (1) 36-11-07/401, High Pressure Shutoff Valve
   B. Access
      (1) Location Zones
          413/423 Fan Cowl Panel (Left)

   C. Do a Check of the HPSOV

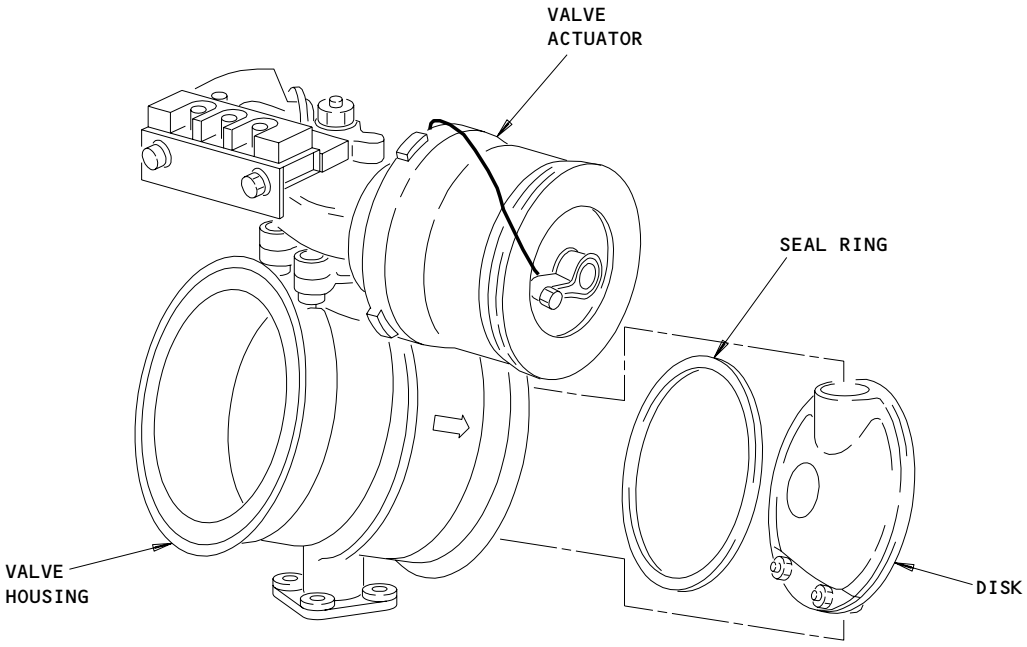
      S 216-001
      (1) Look at the sense lines that are connected to the HPSOV for cracks.

      S 026-003
      (2) Remove the HPSOV (AMM 36-11-07/401).

      S 216-004
      (3) Examine the HPSOV for the items that follow:
          (a) Parts that are missing.
          (b) Small scratches or burrs on the surface and the edges of the seal ring
          (c) Cracks or corrosion on the valve housing, valve actuator, or disk
          (d) Worn areas in the layer of dry-film lubricant

      S 426-005
      (4) If you find one or more of the above items, replace the HPSOV.

      S 426-006
      (5) Install the HPSOV (AMM 36-11-07/401).



High Pressure Shutoff Valve Inspection Check
Figure 601

HIGH PRESSURE CONTROLLER - REMOVAL/INSTALLATION

1. General
   A. This procedure has these tasks:
      (1) The removal and installation of the high pressure controller.
      (2) The removal and installation of the air filter on the high pressure controller.
   B. The controller is on the lower left side of each engine.

TASK 36-11-08-004-090

2. Remove the High Pressure Controller (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power Control
      (2) AMM 36-00-00/201, Pneumatic - General
      (3) AMM 36-11-19/401, Pressure Regulating Valve Controller
      (4) AMM 71-11-04/201, Fan Cowl Panels
      (5) AMM 71-11-06/201, Core Cowl Panels
      (6) AMM 78-31-00/201, Thrust Reverser System
   B. Access
      (1) Location Zones

411/421	Engine

      (2) Access Panels

413AL/423AL	Fan Cowl Panel (Left)
415AL/425AL	Thrust Reverser (Left)
417AL/427AL	Core Cowl (Left)

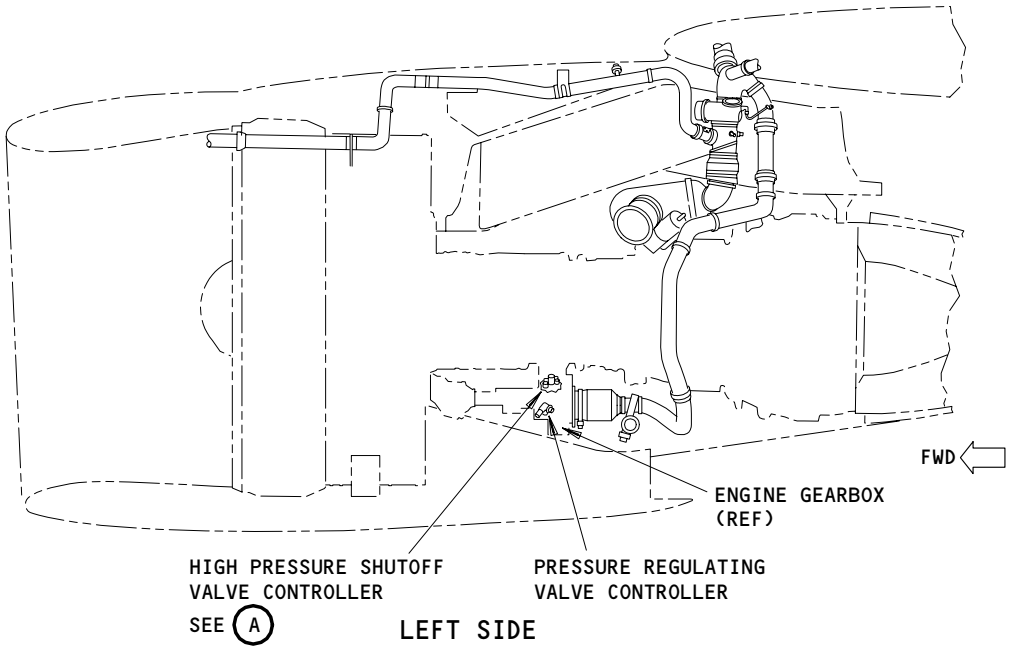
   C. Prepare for the Removal

      S 864-095

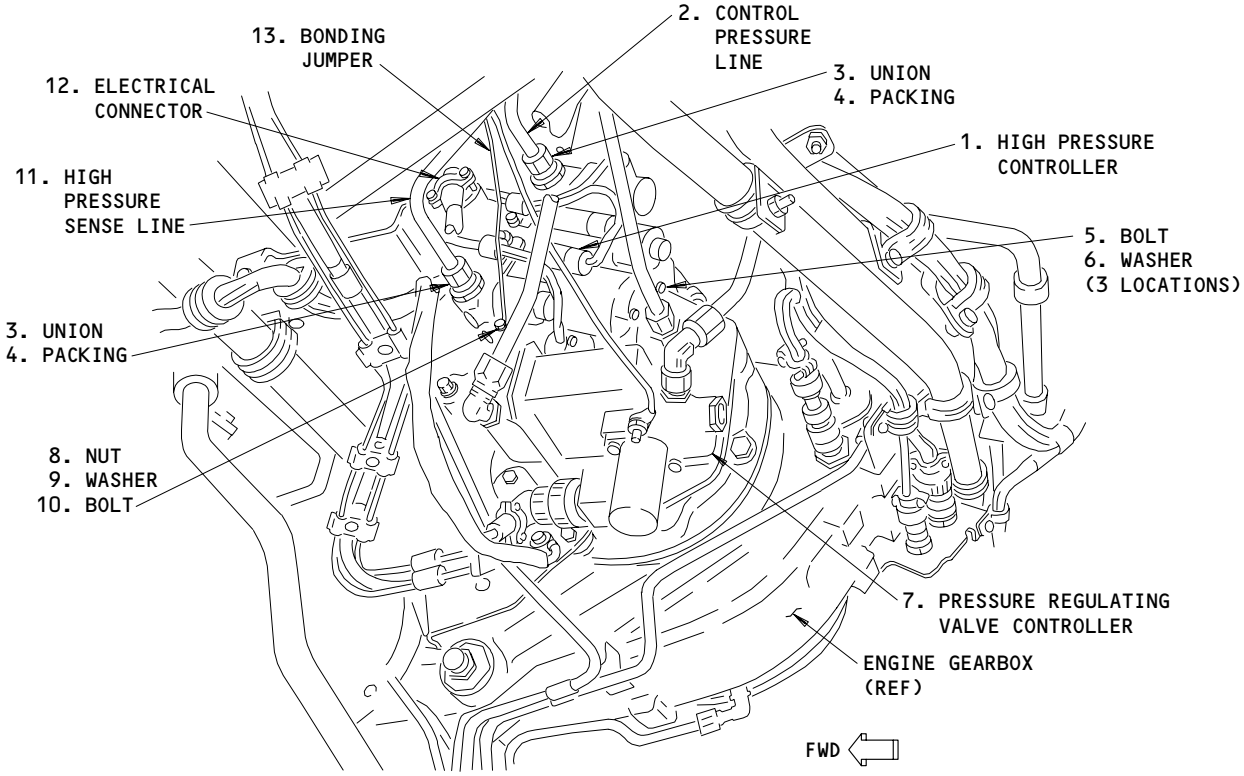
      WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

      (1) Remove pneumatic power (AMM 36-00-00/201).

      S 864-002
      (2) To remove the left high pressure controller, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
      (a) 11S10, LEFT ENG BLEED IND
      (b) 11S11, LEFT ENG BLEED CONT



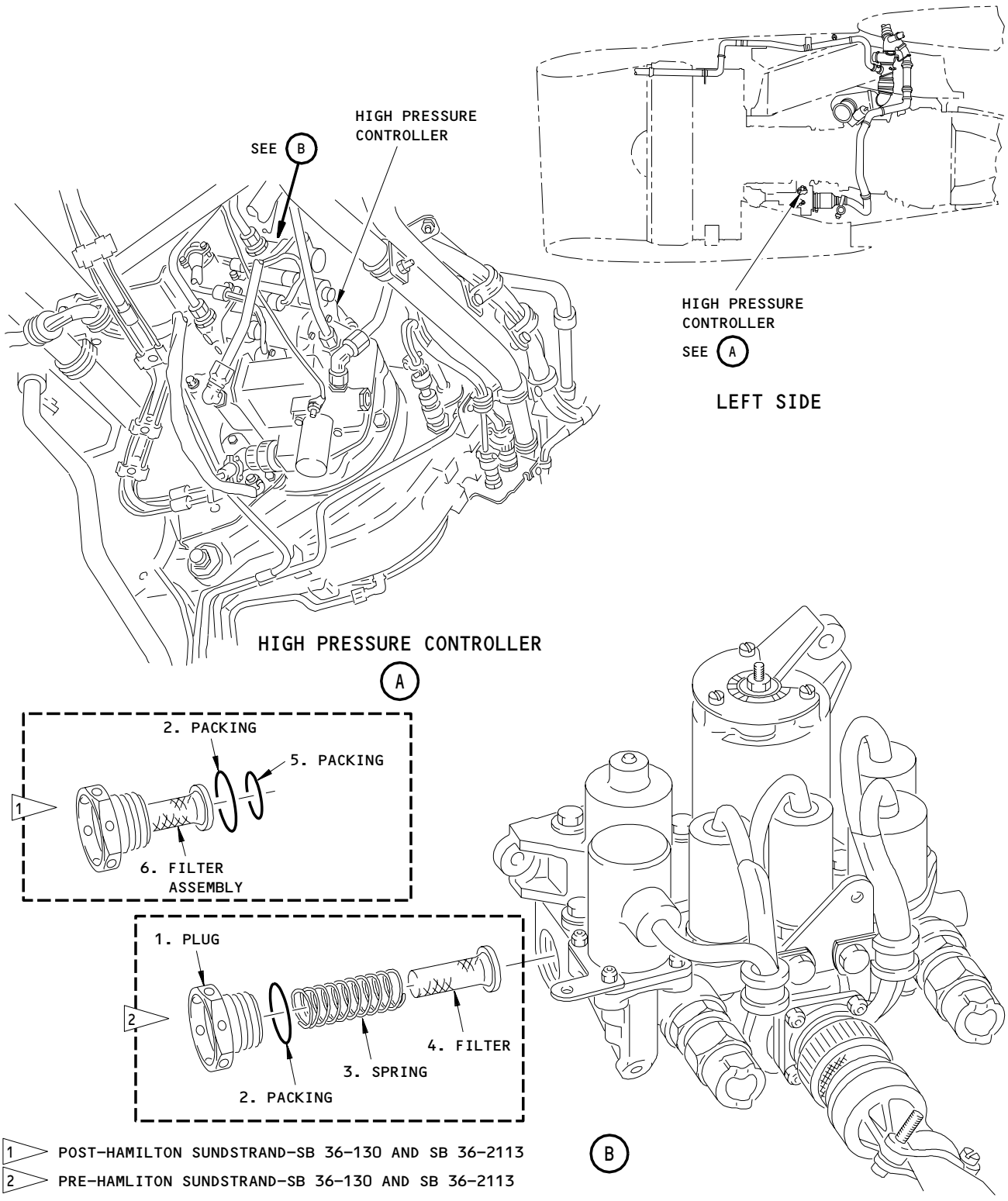
LEFT SIDE



HIGH PRESSURE SHUTOFF VALVE CONTROLLER

A

High Pressure Controller - Installation
Figure 401



High Pressure Controller Air Filter Installation
Figure 402

S 864-003
(3) To remove the right high pressure controller, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11S19, RIGHT ENG BLEED IND
(b) 11S20, RIGHT ENG BLEED CONT

S 864-004
(4) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36, and attach a DO-NOT-CLOSE tag:
(a) 36L7 or 36K7, AIR SUPPLY BITE

S 044-001

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER ISOLATION VALVE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do this procedure: Thrust Reverser Isolation Valve Deactivation for Ground Maintenance (Ref 78-31-00).

S 014-131
(6) Open the left fan cowl panel, 413AL/423AL (AMM 71-11-04/201).

S 014-115
(7) Open the left core cowl, 417AL/427AL (AMM 71-11-06/201).

S 014-136

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.

(8) Open the left thrust reverser, 415AL/425AL (AMM 78-31-00/201).

D. Remove the High Pressure Controller (AMM 36-11-19/401).

S 864-007
(1) Find the high pressure controller (1).

S 034-010
(2) Remove the contoller for the pressure regulating valve (PRV) (Ref 36-11-19).

S 034-014
(3) Disconnect the electrical connector (12) from the high pressure controller (1).

S 034-016
(4) Disconnect the control pressure line (2) from the union (3).

S 034-018
(5) Disconnect the sense lines for the high pressure (11) from the union (3).

S 034-020
(6) Remove the packing (4) and unions (3).
(a) Discard the packing (4).

S 034-029
(7) Remove the bolts (5) that hold the controller (1) to the mounting bracket.

S 024-030
(8) Remove the high pressure controller (1).

TASK 36-11-08-404-092

3. Install The High Pressure Controller

A. Consumable Materials
(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature anti-seize compound)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	High Pressure Controller	36-11-08	06	410
	3	Union			330
	4	Packing			355
	5	Bolt			400
	6	Washer			405
	7	Pressure Regulating Valve Controller			490
	8	Nut			25
	9	Washer			15
	10	Bolt			5

C. References
(1) AMM 24-22-00/201, Electrical Power Control
(2) AMM 20-10-22-701, Metal Surfaces
(3) AMM 36-00-00/201, Pneumatic - General
(4) AMM 36-11-19/401, Pressure Regulating Valve Controller
(5) AMM 36-23-00/501, Air Supply BITE System

(6) AMM 71-11-04/201, Fan Cowl Panels
(7) AMM 71-11-06/201, Core Cowl Panels
(8) AMM 78-31-00/201, Thrust Reverser System

D. Access
(1) Location Zones
411/421 Engine

(2) Access Panels
413AL/423AL Fan Cowl Panel
415AL/425AL Thrust Reverser
417AL/427AL Core Cowl

E. HPC Installation

S 424-038
(1) Install the high pressure controller (1) on mounting brackets.
(a) Install the bolts (5) and washers (6).
(b) Tighten the bolts (5).

S 644-094
(2) Apply anti-seize compound to all of the sense line fittings.

S 434-041
(3) Install the new packings (4) and unions (3) on the high pressure controller (1).
(a) Tighten the unions (3).

S 434-043
(4) Connect the control pressure line (2) to the union (3).
(a) Tighten the line.

S 434-089
(5) Connect the sense line for the high pressure (11) to the union (3).
(a) Tighten the sense line (11).

S 434-046
(6) Connect the electrical connector (12) to the high pressure controller (1).

S 164-047
(7) Clean the mounting bracket and the side of the high pressure controller (1) that touches the bracket (AMM 20-10-22/701).

S 434-058
(8) Install the PRV controller (7) (Ref 36-11-19).

S 864-080
(9) For the left high pressure controller, remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11S10, LEFT ENG BLEED IND
(b) 11S11, LEFT ENG BLEED CONT

S 864-081
(10) For the right high pressure controller, remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11S19, RIGHT ENG BLEED IND
(b) 11S20, RIGHT ENG BLEED CONT

S 864-082
(11) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
(a) 36L7 or 36K7, AIR SUPPLY BITE

S 864-059
(12) Supply electrical power (AMM 24-22-00/201).

S 744-060
(13) Do the Air Supply BITE - System Test (AMM 36-23-00/501).

F. Put the Airplane Back to Its Usual Condition

S 414-125

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Close the left thrust reverser, 415AL/425AL (AMM 78-31-00/201).

S 414-084
(2) Close the left core cowl (AMM 71-11-06/201).

S 414-133
(3) Close the left fan cowl panel, 413AL/423AL (AMM 71-11-04/201).

S 444-085
(4) Do this procedure: Thrust Reverser Isolation Valve Activation (AMM 78-31-00/201).

S 864-086
(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 36-11-08-004-091

4. Remove the Air FIlter on the High Pressure Controller (Fig. 402)

A. References
(1) AMM 24-22-00/201, Electrical Power Control
(2) AMM 36-00-00/201, Pneumatic - General
(3) AMM 36-11-19/401, Pressure Regulating Valve Controller
(4) AMM 36-23-00/501, Air Supply BITE System
(5) AMM 71-11-04/201, Fan Cowl Panels
(6) AMM 71-11-06/201, Core Cowl Panels
(7) AMM 78-31-00/201, Thrust Reverser System

B. Access
(1) Location Zones
411/421 Engine

(2) Access Panels
413AL/423AL Fan Cowl Panel
415AL/425AL Thrust Reverser
417AL/427AL Core Cowl

C. Prepare for the Removal

S 044-116

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER ISOLATION VALVE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Do this procedure: Thrust Reverser Isolation Valve Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 014-005
(2) Open the left fan cowl panel, 413AL/423AL (AMM 71-11-04/201).

S 014-134
(3) Open the left core cowl panel, 417AL/427AL (AMM 71-11-06/201).

S 014-118

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.

(4) Open the left thrust reverser, 415AL/425AL (AMM 78-31-00/201).

D. HPC WITH FILTER AND SPRING (PRE-SB 36-130, PRE-SB 36-2113);
Filter Removal

S 034-062
(1) Remove the plug (1) and the packing (2).
(a) Discard the packing (2).

S 034-063
(2) Remove the spring (3).

S 024-064
(3) Remove the filter (4).

E. HPC WITH FILTER ASSEMBLY/NO SPRING (POST-SB 36-130, POST-SB 36-2113);
Filter Removal

S 024-096
(1) Remove the filter assembly (6).
(a) Discard the packing (2,5).

TASK 36-11-08-404-065

5. Install the Air Filter on the High Pressure Controller (Fig. 402)

A. Consumable Materials
(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
402	1	Plug	36-11-08	06	415
	2	Packing			420
	3	Spring			505
	4	Filter			425
	5	Packing			435
	6	Filter Assembly			430

C. References
(1) AMM 20-10-23/401, Lockwire

(2) AMM 24-22-00/201, Electrical Power Control
(3) AMM 36-00-00/201, Pneumatic - General
(4) AMM 36-11-19/401, Pressure Regulating Valve Controller
(5) AMM 36-23-00/501, Air Supply BITE System
(6) AMM 71-11-04/201, Fan Cowl Panels
(7) AMM 71-11-06/201, Core Cowl Panels
(8) AMM 78-31-00/201, Thrust Reverser System

D. Access
(1) Location Zones
411/421 Engine

(2) Access Panels
413AL/423AL Fan Cowl Panel
415AL/425AL Thrust Reverser
417AL/427AL Core Cowl

E. HPC WITH FILTER AND SPRING (PRE-SB 36-130, PRE-SB 36-2113);
Filter Installation

S 424-066
(1) Install the filter (4).

S 434-067
(2) Install the spring (3).

S 434-068
(3) Install a new packing (2) on the plug (1).

S 644-069
(4) Put the anti-seize compound on the threads of the plug (1).

S 434-070
(5) Install the plug (1).

S 434-071
(6) Tighten the plug (1) to 70-80 inch-pounds.

S 424-097
(7) Install the lockwire (AMM 20-10-23/401).

F. HPC WITH FILTER ASSEMBLY/NO SPRING (POST-SB 36-130, POST-SB 36-2113);
Filter Installation

S 424-098
(1) Install a new packing (2,5) on the filter assembly (6).

S 644-099
(2) Put the anti-seize compound on the threads of the filter assembly (6).

S 424-100
(3) Install the filter assembly (6).

S 424-101
(4) Tighten the filter assembly (6) to 70-80 inch-pounds.

S 424-102
(5) Install the lockwire (AMM 20-10-23/401).

G. Put the Airplane Back to Its Usual Condition

S 424-121

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Close the left thrust reverser, 415AL/425AL (AMM 78-31-00/201).

S 414-075
(2) Close the left core cowl (AMM 71-11-06/201).

S 414-135
(3) Close the left fan cowl panel, 413AL/423AL (AMM 71-11-04/201).

S 444-076
(4) Do this procedure: Thrust Reverser Isolation Valve Activation (AMM 78-31-00/201).

S 864-077
(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

AIR SUPPLY PRESSURE REGULATING AND SHUTOFF VALVE - MAINTENANCE PRACTICES

1. General
   A. This procedure has these tasks:
      (1) Pressurization Upstream of the Pressure Regulating and Shutoff Valve (PRSOV).
      (2) Remove the PRSOV.
      (3) Install the PRSOV.
      (4) Remove the PRSOV Air Filters.
      (5) Install the PRSOV Air Filters.
   B. The procedure for pressurization upstream of the PRSOV is used to do an air leakage test of these components:
      (1) Pressure Regulating and Shutoff Valve (PRSOV)
      (2) Intermediate Check Valve
      (3) The applicable ducts.
   C. Make sure the leading edge slats are fully retracted before you start one of these procedures. Extended slats will keep to a limit the space that is available to get access to the valve.

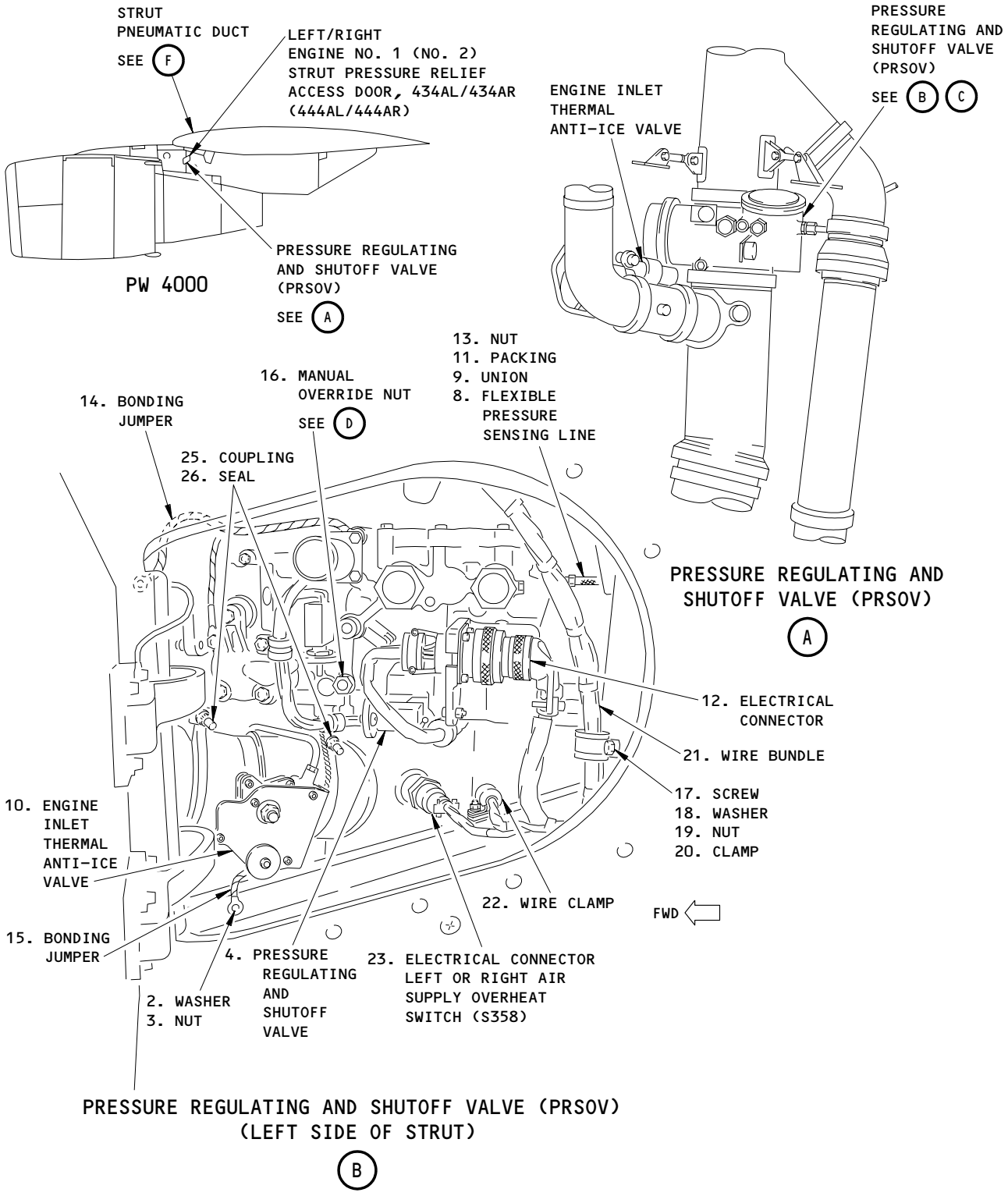
TASK 36-11-09-712-162

2. Pressurization Upstream of the Pressure Regulating and Shutoff Valve
   A. Equipment
      (1) A36005-15 Hold Open Equipment - Pressure Regulator Shutoff Valve (Recommended)

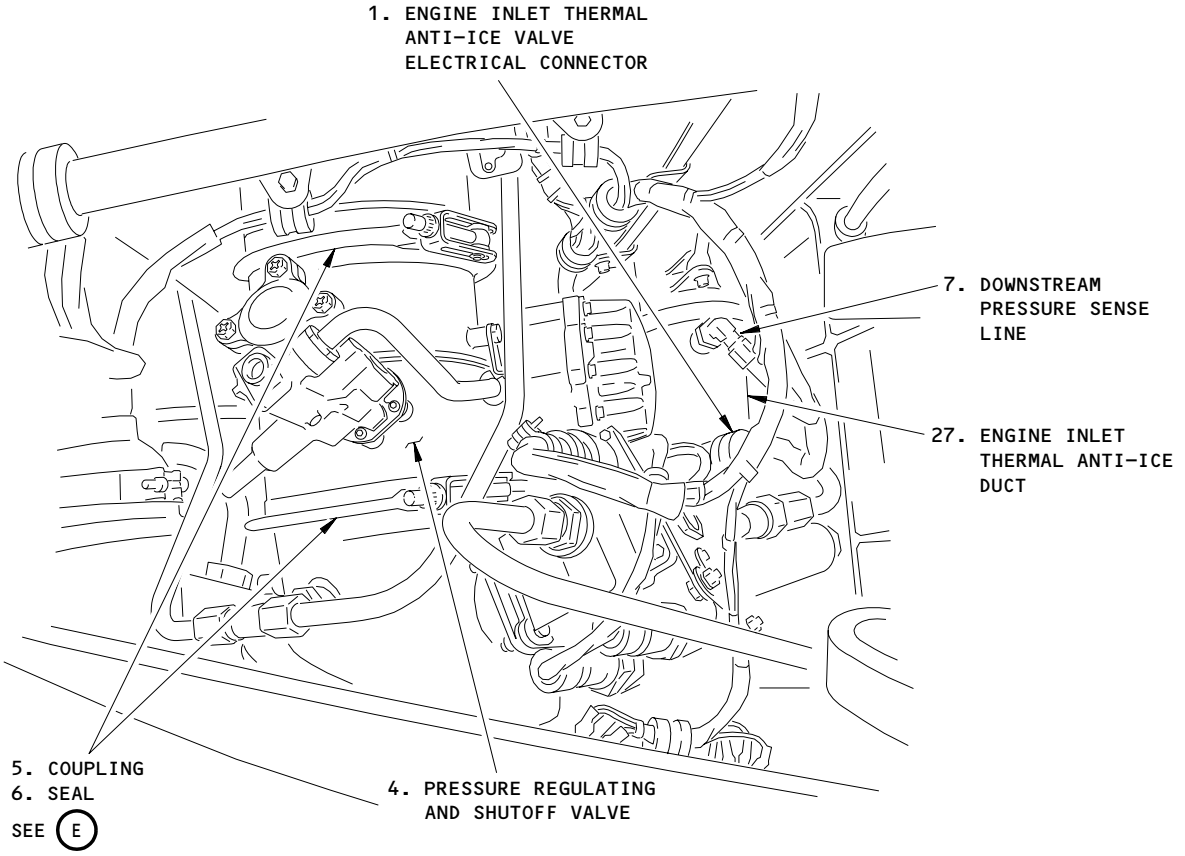
          A36005-1 Hold Open Equipment - Pressure Regulator Shutoff Valve (Alternative)

          (This equipment is to be used on all Airplanes with PW4000, JT9D, and CF6-80A engines installed, and all airplanes with CF6-80C2 engines installed prior to Line No. 334).
   B. References
      (1) 06-43-00/201, Vertical Stabilizer and Elevator Access Doors and Panels
      (2) 36-00-00/201, Pneumatic - General
      (3) 78-31-00/201, Fan Thrust Reverser System
   C. Access
      (1) Location Zones
          434/444 Mid Torque Box

      (2) Access Panels
          434AL/444AL Strut Pressure Relief Door
          434AR/444AR Strut Pressure Relief Door

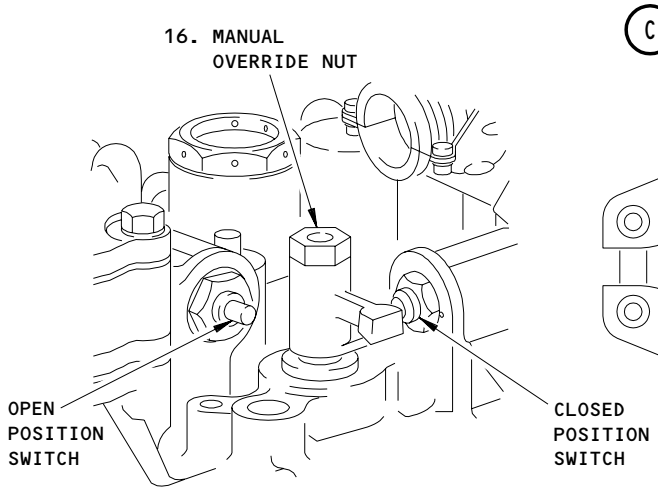


Air Supply Pressure Regulating and Shutoff Valve - Maintenance Practices
Figure 201 (Sheet 1)



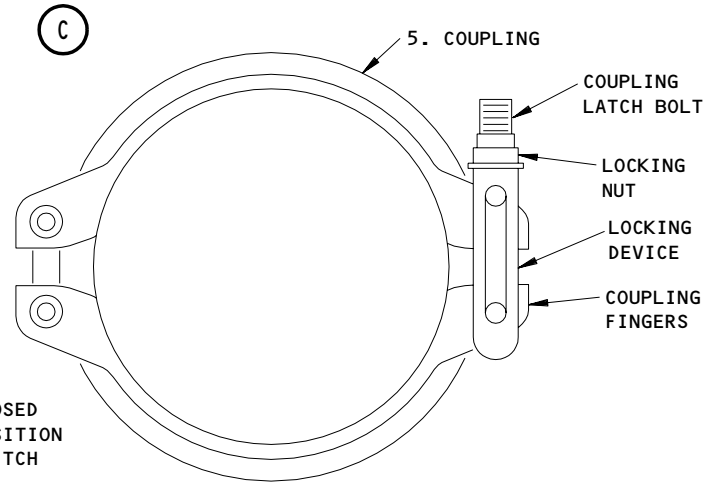
PRESSURE REGULATING AND SHUTOFF VALVE (PRSOV)
(RIGHT SIDE OF STRUT)

C



MANUAL OVERRIDE NUT

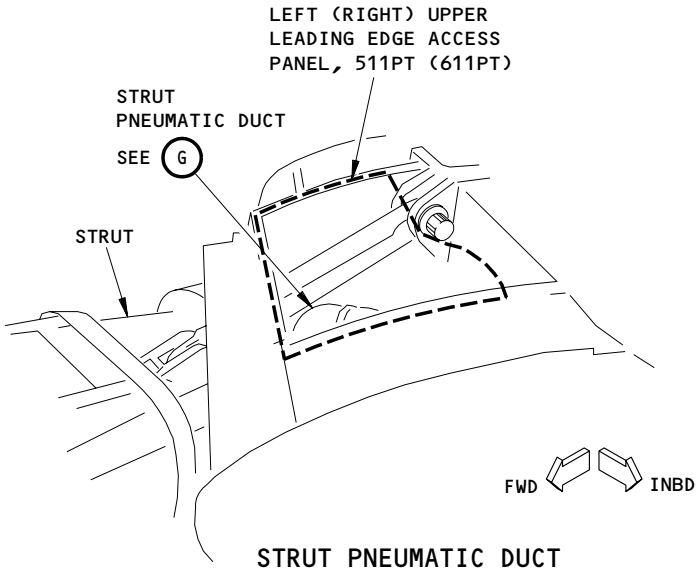
D



COUPLING

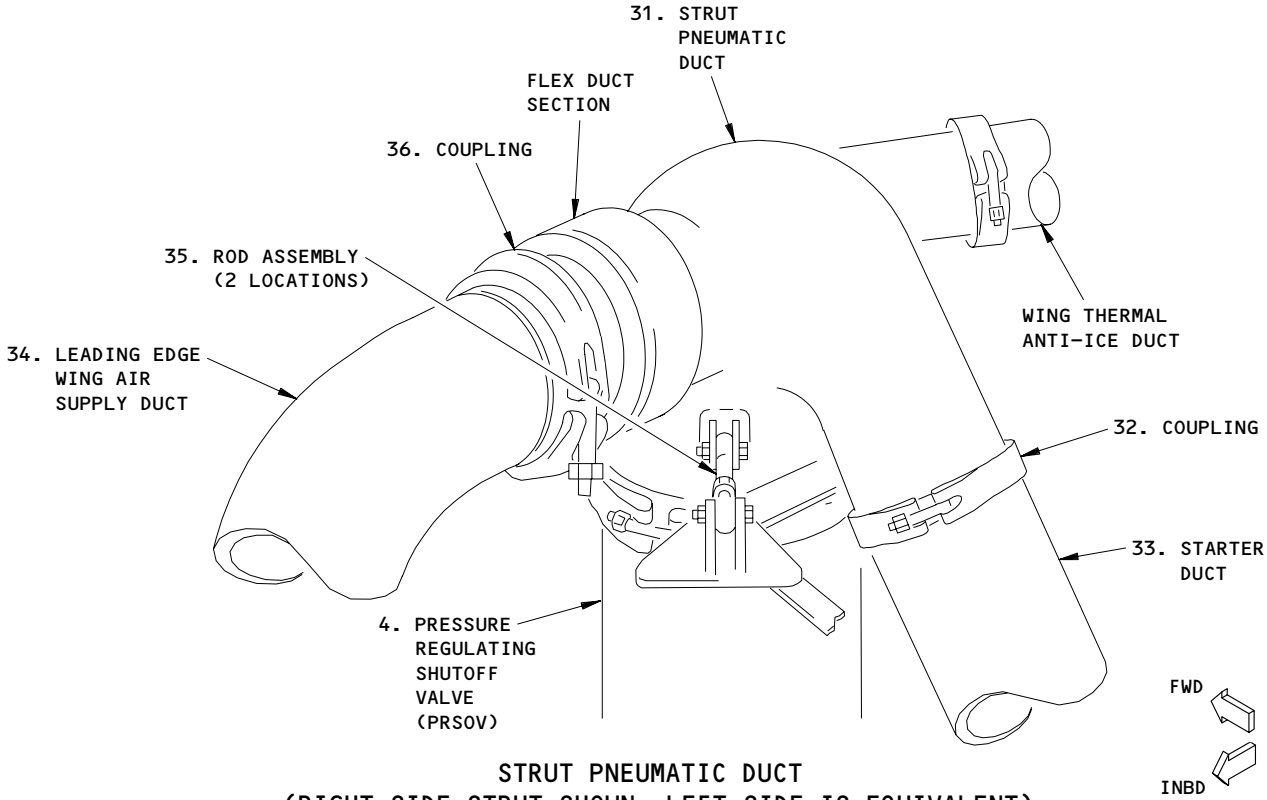
E

Air Supply Pressure Regulating and Shutoff Valve - Maintenance Practices
Figure 201 (Sheet 2)



STRUT PNEUMATIC DUCT

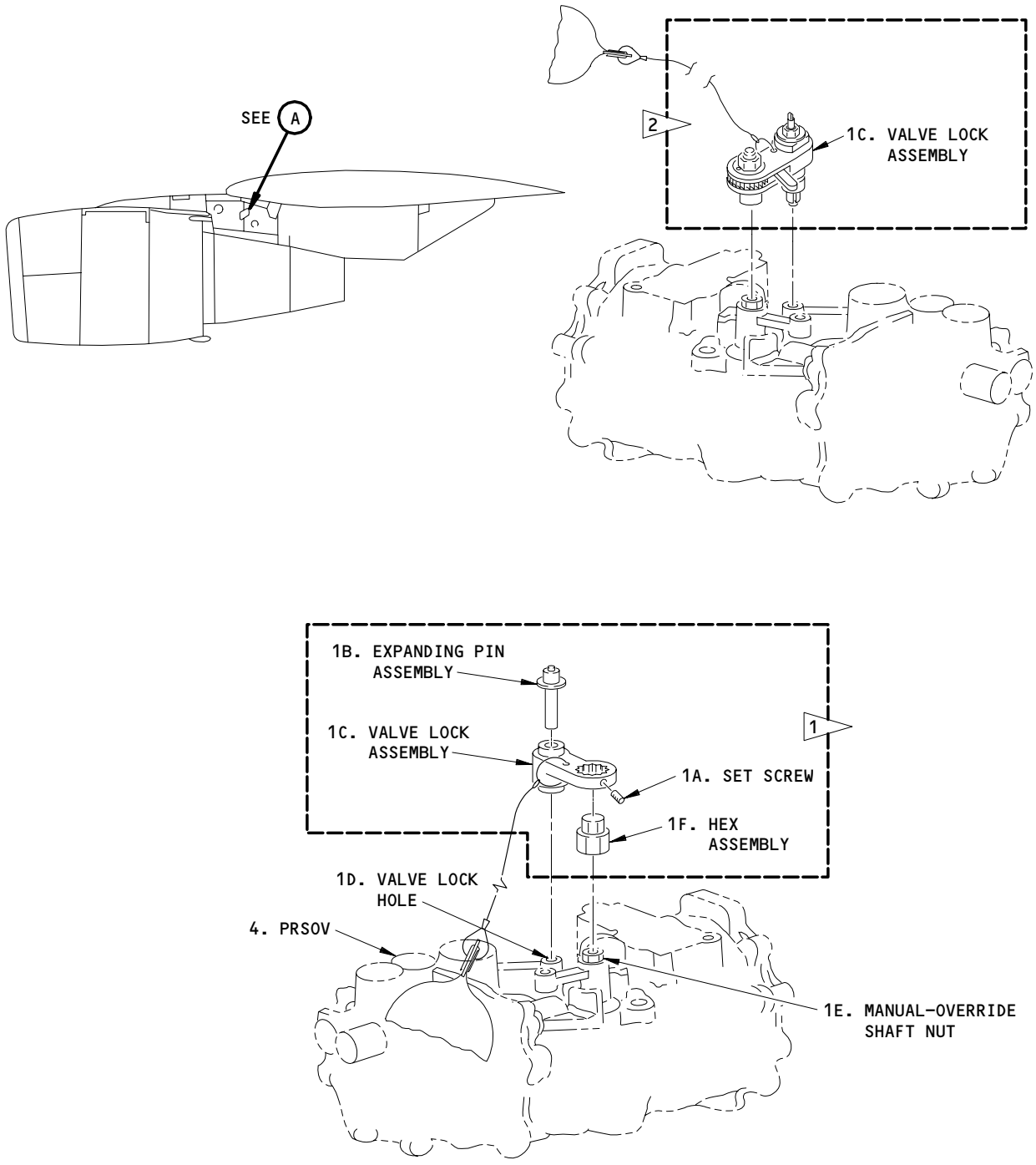
F



STRUT PNEUMATIC DUCT
(RIGHT SIDE STRUT SHOWN, LEFT SIDE IS EQUIVALENT)

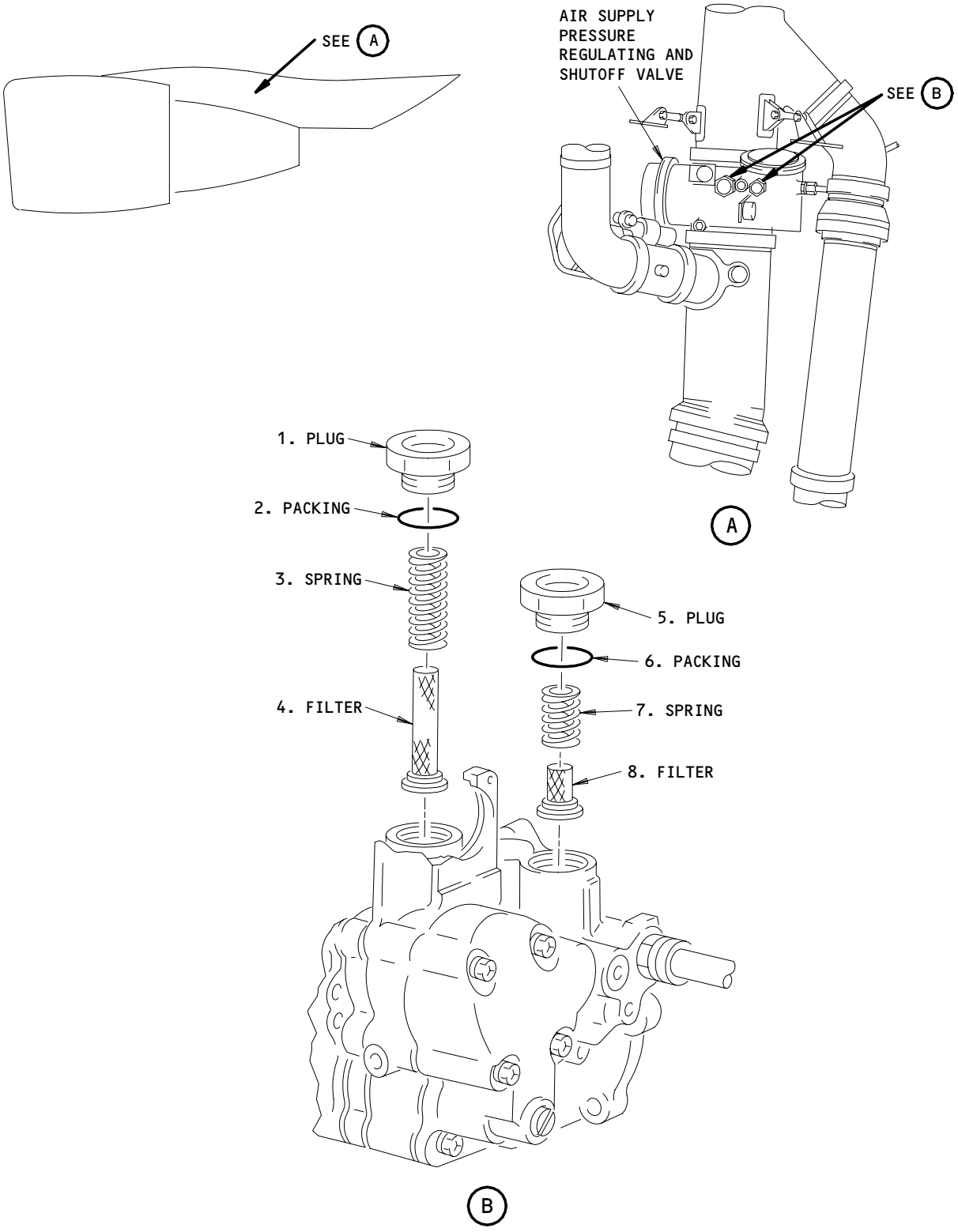
G

Air Supply Pressure Regulating and Shutoff Valve (PRSOV) - Maintenance Practices
Figure 201 (Sheet 3)



1 ALTERNATE CONFIGURATION
2 RECOMMENDED CONFIGURATION

Air Supply Pressure Regulating and Shutoff Valve - Installation
Figure 201A



Air Supply Pressure Regulating and Shutoff Valve Air Filters Installation
Figure 202

D. Pressurize Upstream of the Air Supply PRSOV

S 212-001

(1) Make sure the DUCT PRESSURE PSI on the pilots overhead panel, P5, shows zero.
   (a) If the pressure does not show zero, remove pneumatic power (Ref 36-00-00).

S 042-003

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER ISOLATION VALVE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do this procedure: Thrust Reverser Isolation Valve Deactivation for Ground Maintenance (Ref 78-31-00).

S 042-159

WARNING: DO NOT TOUCH THE TAI DUCT. THE TAI DUCT CAN BE HOT. A HOT DUCT CAN BURN YOU.

(3) For the air leakage test on the left or right engine, open the left pressure relief door 434AL or 444AL (Ref 06-43-00).
   (a) The pressure relief door is on the engine strut.

S 012-005

(4) Open the pressure relief door on the right side, 434AR or 444AR (Ref 06-43-00).

S 212-006

(5) Make sure the engine inlet thermal anti-ice (TAI) valve is in the closed position.

S 862-124

(6) Do the steps that follow to manually open the PRSOV:
   (a) Put the valve lock assembly (1C) on the small diameter end of the hex assembly (1F).
   (b) Put the hex assembly (1F) on the manual override nut (1E) on the PRSOV.
   (c) Put a wrench on the small diameter end of the hex assembly (1F).
   (d) Turn the wrench clockwise to open the PRSOV (2).
   (e) Move the valve lock assembly (1C) until the pin hole is at the valve lock hole (1D).
   (f) Move the valve lock assembly (1C) on the large diameter end of the hex assembly (1F).

(g) Put the expanding pin (1B) through the lock assembly (1C) into the valve lock hole (1D). If the expanding pin (1B) does not go into the valve lock hole (1D), turn the expanding pin (1B) until the pin goes into the valve lock hole (1D).

NOTE: The expanding pin is not circular. When you turn the pin it will find the valve lock hole.

(h) Tighten the expanding pin (1B) to 4 pound-feet. This will hold the valve lock assembly (1C) to the PRSOV (2).

(i) Tighten the set screw (1A).

S 862-016

(7) Use a ground pneumatic source or the APU to slowly and continuously apply 25 ±5 psig pressure (Ref 36-00-00).

S 032-172

(8) Do these steps to open the PRV if it is necessary to pressurize upstream of the PRV:

WARNING: USE A RATCHET WRENCH TO TURN THE PRV MANUAL OVERRIDE DRIVE. THE PRV CAN OPEN QUICKLY WHEN YOU TURN THE MANUAL OVERRIDE DRIVE. THIS CAN PULL THE WRENCH OUT OF YOUR HANDS AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) With a wrench, open the PRV approximately 45 degrees.

NOTE: The PRV must stay in this position until the duct pressure is stable on each side of the PRV. After the pressures are stable, the PRV will stay in the open position.

E. Put the Airplane Back to Its Usual Condition

S 862-017

(1) Remove pneumatic power (Ref 36-00-00).

S 212-018

(2) Make sure the DUCT PRESSURE PSI on the pilots overhead panel, P5, shows zero.

S 092-019

(3) Loosen and remove the expanding pin (1B) from the PRSOV (2) and the valve lock assembly (1C).

S 092-020

(4) Remove the valve lock assembly (1C) and the hex assembly (1F) from the PRSOV (2).

S 412-022
(5) Close the right strut pressure door, 434AR or 444AR.

S 412-023
(6) Close the left strut pressure relief door, 434AL or 444AL.

S 442-024
(7) Do this procedure: Thrust Reverser Isolation Valve Activation (Ref 78-31-00).

TASK 36-11-09-002-194

3. Remove the Air Supply Pressure Regulating and Shutoff Valve (Fig. 201)

A. General
(1) The air supply pressure regulating and shutoff valve (PRSOV) is in the strut area immediately above the air supply precooler.

B. References
(1) 06-41-00/201, Fuselage Access Doors and Panels
(2) 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
(3) 24-22-00/201, Electric Power - Control
(4) 27-81-00/201, Leading Edge Slats (Activation, Deactivation)
(5) 30-21-03/401, Nose Cowl Thermal Anti-Ice Valve
(6) 36-00-00/201, Pneumatic - General
(7) 36-11-09/201, Pressure Regulating and Shutoff Valve
(8) 36-23-00/501, Air Supply BITE System
(9) AMM 54-52-01/401, Strut Fairings
(10) 71-00-00/201, Power Plant - General
(11) 78-31-00/201, Thrust Reverser PRSOV System

C. Access
(1) Location Zones

434/444	Mid Torque Box
510	Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Left)
610	Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Right)

(2) Access Panels

434AL/444AL	Strut Pressure Relief Door
434AR/444AR	Strut Pressure Relief Door
432CL/442CL	Thrust Reverser Fairing Access panel
511PT	Upper Leading Edge Access
611PT	Upper Leading Edge Access

D. Prepare for the Removal

S 862-195
(1) Supply electrical power (Ref 24-22-00).

S 862-196

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(2) Remove pneumatic power (Ref 36-00-00).

S 862-197

(3) For the removal of the left PRSOV, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11S10, LEFT ENG BLEED IND
(b) 11S11, LEFT ENG BLEED CONT

S 862-198

(4) For the removal of the right PRSOV or the air filters, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11S19, RIGHT ENG BLEED IND
(b) 11S20, RIGHT ENG BLEED CONT

S 042-200

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER ISOLATION VALVE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do this procedure: Thrust Reverser Isolation Valve Deactivation for the Ground Maintenance (Ref 78-31-00).

S 042-201

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(6) Do this procedure: leading edge slats deactivation (Ref 27-81-00).

E. Remove the Pressure Regulating and Shutoff Valve (PRSOV) (Fig. 201).

S 012-202

(1) On the engine strut, open the pressure relief door on the left side, 434AL or 444AL (Ref 06-43-00).

S 032-203

(2) Remove the bolts that hold the door hinge panel to the structure.

S 012-204

(3) Remove the pressure relief door.

S 012-314
(4) Remove the left thrust reverser fairing access panel 432CL(442CL) (AMM 54-52-01/401) if you need more access to remove the PRSOV.

S 032-205
(5) Disconnect the electrical connector (12) from the PRSOV (4).

S 032-207
(6) Disconnect the electrical connector (23) from the overheat switch for the air supply.

S 032-208
(7) Disconnect the electrical connector (24) from the precooler out temperature bulb.

S 032-212
(8) Disconnect the wire clamp (20), aft of the left access door.
(a) Keep the wire bundle (21) out of the work area.

S 032-215
(9) Disconnect the PRSOV bonding jumpers (14, 15) from the strut.

S 032-222
(10) Disconnect the flexible sense line (8) from the union fitting (9).

S 032-223
(11) Remove the union (9) from the PRSOV (4).

S 012-224
(12) On the engine strut, open the pressure relief door on the right side 434AR and 444AR (Ref 06-43-00).

S 032-229
(13) Disconnect the electrical connector (1) from the engine inlet TAI valve (10) (Ref 30-21-03).

S 032-231
(14) Loosen the downstream pressure sense line (7) at the engine TAI duct (27).

S 032-233
(15) Disconnect the downstream pressure sense line (7) from the engine TAI valve (10) to give clearance to remove the PRSOV (4).

S 032-237
(16) Remove the top and lower couplings (5) from the PRSOV (4).

S 032-239
(17) Remove the electrical connector from the Fan Air Temperature Sensor to get better access for the removal of the PRSOV.

S 032-241
(18) Loosen the forward and aft couplings (25) for the engine TAI valve (10) from the left side of the engine strut.
(a) Do not remove the couplings.

S 032-242
(19) Turn and move the engine TAI valve and the couplings out of the work area (Ref 30-21-03).

S 432-243
(20) If you can not move the engine inlet TAI valve, remove the engine inlet TAI valve from the duct (Ref 30-21-03).

S 012-323
(21) If it is necessary to move the duct on each side of the PRSOV to help you remove the PRSOV, do these steps to get better access:
(a) Remove the upper leading edge access panel, 511PT or 611PT (AMM 06-44-00/201).
(b) Remove the coupling (32) for the starter duct (33).
(c) Remove the coupling (36) for the leading edge wing air supply duct (34).
(d) If necessary, disconnect one end of the two rod assemblies assemblies (35).
(e) From the upper wing panel, have one person pull the strut pneumatic duct (31) slightly up.

S 862-244

CAUTION: BE CAREFUL WHEN YOU MOVE THE PRSOV. INCORRECT MOVEMENT CAN CAUSE DAMAGE TO EQUIPMENT.

(22) Carefully move the PRSOV (4) to get access to the top and lower seals (6).

S 032-246
(23) Remove the top and lower seals (6).

S 032-247
(24) Align the PRSOV with the duct.

S 822-248
(25) Turn the PRSOV approximately 180 degrees from the original installed position.

S 022-249
(26) Carefully remove the PRSOV (4) from between the duct flanges.

S 022-250

CAUTION: THE TEMPERATURE PROBE IS IN THE VALVE BODY. DO NOT USE THE TEMPERATURE PROBE AS A HANDLE WHEN YOU MOVE THE PRSOV. HEAVY LOADS ON THE TEMPERATURE PROBE CAN CAUSE DAMAGE TO THE PROBE.

(27) Carefully remove the PRSOV through the access door.
  (a) Remove the valve body first.

S 492-251
(28) Put a cover on the duct holes to keep out unwanted objects.

TASK 36-11-09-402-252

4. Install the Pressure Regulating and Shutoff Valve (PRSOV) (Fig. 201)
  A. Consumable Materials
    (1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature antiseize compound)
  B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	4	Pressure Regulating Shutoff Valve	36-11-09	03	215
201	6	Seal	36-11-01	01	95
201	11	Packing	36-11-16	03	115
201	11	Packing	36-12-02	02	72

  C. References
    (1) 06-41-00/201, Fuselage Access Doors and Panels
    (2) 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
    (3) 24-22-00/201, Electric Power - Control
    (4) 27-81-00/201, Leading Edge Slats (Activation, Deactivation)
    (5) 30-21-03/401, Nose Cowl Thermal Anti-Ice Valve
    (6) 36-00-00/201, Pneumatic - General
    (7) 36-11-09/201, Pressure Regulating and Shutoff Valve
    (8) 36-23-00/501, Air Supply BITE System
    (9) AMM 54-52-01/401, Strut Fairings
    (10) 71-00-00/201, Power Plant - General
    (11) 78-31-00/201, Thrust Reverser PRSOV System

D. Access

(1) Location Zones

434/444	Mid Torque Box
510	Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Left)
610	Wing Leading Edge - Forward of Front Span and Inboard of Nacelle Strut (Right)

(2) Access Panels

434AL/444AL	Strut Pressure Relief Door
434AR/444AR	Strut Pressure Relief Door
432CL/442CL	Thrust Reverser Fairing Access panel
511PT	Upper Leading Edge Access
611PT	Upper Leading Edge Access

E. Procedure

S 092-253

(1) Remove the duct covers.

S 422-254

CAUTION: THE TEMPERATURE PROBE IS IN THE VALVE BODY. DO NOT USE THE TEMPERATURE PROBE AS A HANDLE WHEN YOU MOVE THE PRSOV. HEAVY LOADS ON THE TEMPERATURE PROBE CAN CAUSE DAMAGE TO THE PROBE.

(2) Put the PRSOV (4) into the access door opening.
   (a) Put the actuator end in first.

S 422-255

(3) From the right side of the strut, push down on the lower pneumatic duct and/or pull up on the upper strut pneumatic duct (31).

S 422-324

(4) Carefully install the PRSOV (4) valve body between the higher and lower ducts.

S 432-256

(5) Turn the PRSOV (4) approximately 100 degrees toward the final installed position.

S 642-257

(6) Apply antiseize compound to all of the sense line fittings.

S 432-260

(7) Install the union (9) with the nut (10) and the new packing (11).

S 432-261

(8) Turn the PRSOV (4) 80 degrees until the sense line for the downstream pressure (8) aligns with the PRSOV connection.

S 432-263
(9) Carefully move the PRSOV (4) to get access to install the E-seals at each PRSOV flange.

S 212-264
(10) Examine all the E-seals.
(a) Make sure the E-seals do not have cracks, dents, unwanted material or other damage.
(b) Replace all the damaged E-seals.
(c) Install the E-seal at each PRSOV flange.

S 822-265
(11) Align the PRSOV (4) with the pneumatic ducts.

S 432-266

CAUTION: MAKE SURE YOU INSTALL THE LOCKING DEVICE OF THE COUPLING CORRECTLY AS SHOWN IN FIGURE 201. IF YOU DO NOT INSTALL THE COUPLING FINGERS INSIDE THE LOCKING DEVICE THE COUPLING CAN LOOSEN AND CAUSE DAMAGE TO EQUIPMENT.

(12) Install the higher and lower duct couplings (5) on the PRSOV (4).
(a) Do not tighten the couplings (5).

S 422-325
(13) If necessary, install the coupling (32) for the starter duct (33).

S 422-326
(14) If necessary, install the coupling (36) for the wing leading edge air supply duct (34).

S 422-327
(15) If necessary, connect the two rod assemblies (35).

S 432-269
(16) Connect the pressure sense line (8) to the union (9).

S 432-274
(17) Connect the top (15) and the bottom (14) bonding jumpers to the strut with the screws (1), washers (2), and nuts (3).
(a) Tighten the screws (1) and nuts (3).

S 422-277
(18) Install the electrical connector for the Fan Air Temperature Sensor.

S 432-278
(19) Put the engine inlet TAI Valve into its position or install the engine inlet TAI valve (Ref 30-21-03).

S 422-280
(20) Connect the downstream pressure sense line (7) to the engine inlet TAI valve (10).

S 422-282
(21) Connect the downstream pressure sense line (7) to the engine inlet TAI valve duct (27).

S 432-284
(22) Connect the electrical connector (1) to the engine inlet TAI valve (10).

S 432-286
(23) Tighten the TAI valve couplings.

S 432-293
(24) Install the clamp (20) to the strut ceiling with the screw (17), washer (18), and nut (19).
(a) Tighten the screw (17) and nut (19).

S 432-294
(25) Install the electrical connector (12) on the PRSOV (4).

S 432-296
(26) Install the electrical connector (23) for the overheat switch.

S 432-297
(27) Install the electrical connector (24) for the precooler out temperature bulb.

S 432-298

CAUTION: DO NOT TIGHTEN THE COUPLINGS MORE THAN THE SPECIFIED LIMIT. IF YOU APPLY TOO MUCH TORQUE, THE VALVE FLOW BODY CAN WARP (BECOME OVAL) AND CAUSE THE VALVE TO BIND DURING OPERATION.

(28) Tighten the PRSOV upper and lower couplings (5) to 115-125 pound-inches (13.0-14.1 newton-meters).

S 862-299
(29) For the installation of the left PRSOV remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11S10, LEFT ENG BLEED IND
(b) 11S11, ENG BLEED CONT

S 862-300
(30) For the installation of the right PRSOV remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11S19, RIGHT ENGINE BLEED IND
(b) 11S20, RIGHT ENG BLEED CONT

S 722-302

(31) Do a Test of the PRSOV

(a) Push the L or R ANTI-ICE ENGINE switch-light on the pilot's overhead panel, P5, to the off position.

1) Make sure the ON light is off.

(b) To do a test of the right PRSOV, push the L ISLN and R ISLN valve switch-light on the P5 panel to the open position. Make sure the white bar lights come on.

NOTE: You must open the left and right isolation valves to allow air to reach the right PRSOV during the test of the right PRSOV. It is not necessary to open the isolation valves for a test of the left PRSOV.

(c) Make sure the high pressure shutoff valve (HPSOV) is in the full closed position.

1) If the HPSOV is not closed, turn the manual override nut (16) to the full closed position.

(d) Pressurize the pneumatic system upstream of the PRSOV (Ref 36-11-09).

(e) Do a Test of the PRSOV flanges for air leakage:

1) Small air leakage is satisfactory.

2) Repair large air leakage with joint or clamp adjustment.

(f) Put the PRSOV Back to Its Usual Condition (Ref 36-11-09).

(g) Do the air supply BITE test (Ref 36-23-00).

F. Put the Airplane Back to Its Usual Condition

S 412-315

(1) Install the left thrust reverser fairing access panel 432CL(442CL) (AMM 54-52-01/401) if it was removed for access to the PRSOV.

S 432-303

(2) Install the left strut pressure relief door and the door hinge plate with the bolts, washers, and nuts.

(a) Tighten the nuts and bolts.

S 412-304
(3) Close the left strut pressure relief door 434AL(444AL).

S 412-305
(4) Close the right strut pressure relief door 434AR(444AR).

S 412-330
(5) If necessary, install the upper leading edge access panel, 511PT or 611PT (AMM 06-44-00/201).

S 862-306
(6) Do this procedure: Leading Edge Slats Activation (AMM 27-81-00/201).

S 442-307
(7) Do this procedure: Thrust Reverser Isolation Valve Activation (Ref 78-31-00).

S 862-308
(8) Remove electrical power if it is not necessary (Ref 24-22-00).

TASK 36-11-09-002-104

5. Remove the Air Supply Pressure Regulating and Shutoff Valve (PRSOV) Air Filters (Fig. 202)
   A. General
      (1) The PRSOV air filters are on the left side of the PRSOV. The two filters use the same procedure for the removal and installation.
   B. References
      (1) 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
      (2) 24-22-00/201, Electric Power - Control
      (3) 27-81-00/201, Leading Edge Slats (Activation, Deactivation)
      (4) 36-00-00/201, Pneumatic - General
      (5) 71-00-00/201, Power Plant - General
   C. Access
      (1) Location Zones
          434/444 Mid Torque Box

(2) Access Panels
434AL/444AL Strut Pressure Relief Door

(3) Remove pneumatic power (Ref 36-00-00).

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER ISOLATION VALVE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this procedure: Thrust Reverser Isolation Valve Deactivation for the Ground Maintenance (Ref 78-31-00).

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(5) Do this procedure: leading edge slats deactivation (Ref 27-81-00).

D. Remove the PRSOV air filters.

S 012-105
(1) Open the left strut pressure relief door, 434AL or 444AL (Ref 06-43-00).

S 032-106
(2) Remove the plug (1, 5) and the packing (2, 6).
(a) Discard the packing.

S 022-107
(3) Remove the spring (3, 7) and the filter (4, 8) from the PRSOV.

TASK 36-11-09-422-163

6. Install the Air Supply Pressure Regulating and Shutoff Valve Air Filters

A. Consumable Materials
(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature antiseize compound)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
202	1	Plug	36-11-01	01	259
	2	Packing			260
	3	Spring			261
	4	Filter			262
	5	Plug			263
	6	Packing			263A
	7	Spring			264
	8	Filter			264A

C. References
(1) AMM 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
(2) AMM 20-10-23/401, Lockwire
(3) AMM 24-22-00/201, Electric Power - Control
(4) AMM 27-81-00/201, Leading Edge Slats (Activation, Deactivation)
(5) AMM 36-00-00/201, Pneumatic - General
(6) AMM 71-00-00/201, Power Plant - General

D. Access
(1) Location Zones
434/444 Mid Torque Box

(2) Access Panels
434AL/444AL Strut Pressure Relief Door

E. Procedure

S 422-108
(1) Install the air filter (4, 8) and the spring (3, 7) in the PRSOV.

S 432-109
(2) Install a new packing (2, 6) on the plug (1, 5).

S 642-110
(3) Lubricate the threads of the plug (1, 5) with the antiseize compound.

S 432-111
(4) Install the plug (1, 5) in the PRSOV.

S 432-112
(5) Tighten the plug (1, 5) to 60 to 70 pound-inches.

S 432-113
(6) Install the lockwire on the plug (1, 5) (AMM 20-10-23/401).

F. Put the Airplane Back to Its Usual Condition

S 412-123
(1) Close the pressure relief door on the left side 434AL(444AL).

S 862-183
(2) Do this procedure: Leading Edge Slats Activation (AMM 27-81-00/201).

S 442-118
(3) Do this procedure: Thrust Reverser Isolation Valve Activation (Ref 78-31-00).

S 862-120
(4) Remove electrical power if it is not necessary (Ref 24-22-00).

PRESSURE REGULATING AND SHUTOFF VALVE -ADJUSTMENT/TEST

1. General
   A. This procedure will perform an operational test of the PRSOV while the PRSOV is installed on-wing.

TASK 36-11-09-705-068

2. Pressure Regulating and Shutoff Valve (PRSOV) - Operational Test
   A. General
      (1) This test will do a check of the power supply to the PRSOV, pneumatic sense lines to and from the PRSOV and an operational check of the opening pressure for the PRSOV.
      (2) The test equipment listed in this task are commercially available. For an optional test of the PRSOV which uses the Boeing GSE Pneumatic System Health Check (PSHC) Test Equipment, G36035, refer to the following procedure(s) for the applicable engine configuration installed on the aircraft:
         (a) AMM 36-00-22/501, Pneumatic System Health Check (PW 4000)
   B. Equipment
      (1) Air or Nitrogen Source
      (2) Supply pressure gage - 0-50 PSIG
      (3) Pressure hose - 0-50 PSIG
      (4) Test fitting - Hamilton Standard Part number 799725-1 or equivalent
   C. Consumable Materials
      (1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature antiseize compound)
   D. References
      (1) AMM 27-81-00/201, Leading Edge Slats (Activation, Deactivation)
      (2) AMM 24-22-00/201, Electrical Power - General
      (3) AMM 36-00-00/201, Pneumatic Power - General
      (4) AMM 36-11-09/201, Pressure Regulating and Shutoff Valve (PRSOV)
      (5) AMM 36-11-12/401, Air Supply Control Card Assembly
      (6) AMM 78-31-00/201, Thrust Reverser System
   E. Access
      (1) Location Zones
         430 No. 1 Nacelle Strut (Left)
         440 No. 2 Nacelle Strut (Right)

(2) Access Panels
434AL Strut Pressure Relief Door (Left strut)
444AL Strut Pressure Relief Door (Right strut)

F. Prepare for the Test

S 865-002

WARNING: YOU MUST REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. IF YOU DO NOT REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS, HOT HIGH PRESSURE AIR CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove pneumatic power (AMM 36-00-00/201).

S 865-003
(2) Supply electrical power (AMM 24-22-00/201).

S 045-004

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(3) Do this procedure: Leading Edge Slat Deactivation (AMM 27-81-00/201).

S 045-011

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do the deactivation procedure for the thrust reverser deactivation for ground maintenance (AMM 78-31-00/201).

S 015-012
(5) To get access to the PRSOV, open the strut pressure relief door (434AL/444AL) on the 'left' side of the associated (left/right) engine strut:

S 865-028
(6) For the left PRSOV, make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11S10, L ENG BLEED IND
(b) 11S11, L ENG BLEED CONT

S 865-029
(7) For the right PRSOV, make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11S19, R ENG BLEED IND
(b) 11S20, R ENG BLEED CONT

S 865-030
(8) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
(a) 36L7 or 36K7, AIR SUPPLY BITE

G. BITE Test

S 745-006
(1) Push the "PRESS TEST" button on the BITE module.

S 215-007
(2) Make sure all the lights are on.

S 745-008
(3) Push the "VERIFY" button.

NOTE: Continue to push the "VERIFY" button until the "NO FAULT" light comes on.

(a) Keep a record of all the faults.

S 745-009
(4) Push the "BITE STEP" button.

NOTE: Continue to push the "BITE STEP" button until the "NO FAULT" light comes on.

(a) Keep a record of all the faults.

S 355-010
(5) Repair all PRSOV faults before you continue with the test.

H. PRSOV Operational Test

NOTE: During the test you will be asked some questions. Each question will have a yes or no answer. Each yes or no answer gives a recommended action, for example: NO, replace the PRSOV (AMM 36-11-09/201). You can continue with the test without doing the action if you want to see other characteristics of the test. However, you should do the recommended action after you complete the test.

S 215-013
(1) Make sure the PRSOV is in the fully closed position.

S 865-014
(2) Push the L(R) ENG "OFF" switch-light to the "ON" position and then to the "OFF" position. Listen for the PRSOV solenoid to operate.

NOTE: A latching solenoid should not be continuously energized because it will overheat.

S 725-015
(3) Do you hear the solenoid operate?
(a) No, Do a check of the shutoff and auto voltages to the PRSOV at pins 7 and 5 (6 is ground) of the airplane wiring. The voltage pulse should be 18-32 volts for 6 seconds.
1) If the voltages are satisfactory, replace the PRSOV (AMM 36-11-09/201).
2) If the voltages are not satisfactory, do a check of the wiring and/or Bleed Air Supply Control Card (WDM 36-11-61, WDM 36-11-62).
(b) Yes, continue.

S 215-016
(4) Do a check of the sense lines to and from the PRSOV.
(a) Repair all loose and/or damaged sense lines.

S 025-017
(5) Remove the air filter from the PRSOV (AMM 36-11-09/201).

S 485-018
(6) Install a test fitting in the PRSOV where the filter was removed.

S 485-019
(7) Install a nitrogen source (or equivalent) to the supply pressure sense line.

S 865-020
(8) Push the L(R) ENG "OFF" switch-light to the "ON" position.

S 865-021
(9) Slowly apply 11 PSIG.

NOTE: The PRSOV should open at approximately 10 ±1 PSIG.

S 725-022
(10) Did the PRSOV open at ≤ 11 PSIG?
(a) YES, the PRSOV is satisfactory.
(b) NO, Replace the PRSOV (AMM 36-11-09/201).

I. PRSOV Operational Check with the ARINC 429 Monitor

NOTE: The ARINC 429 portion of this test can only be done on BITE modules with part numbers S210T120-67 and above. These Bite modules have an ARINC 429 test port that will allow you to monitor real time data from pneumatic component switches/sensors.

S 725-041

(1) Install a low speed ARINC 429 monitor to pins FA56 and FC56 of the terminal block 130 found on the E1-2 shelf. Get access to the back of the BITE module from the forward cargo bay.

NOTE: Monitor octal label 351. The left channel data is shown on the source/destination identifier (SDI) 01 and the right channel data is on SDI 10. These are Bit 10 and Bit 9 as shown on the ARINC 429 monitor. The output signals are shown in Table 501.

NOTE: Left channel SDI – 01
Right channel SDI - 10

Bite Module ARINC 429 Outputs for PRSOV Data Signal
Table 501

OCTAL LABEL	BIT	SIGNAL DESCRIPTION	STATUS
351	13	PRSOV ENABLED COMMAND	PRSOV ENABLED - BIT=1
	13	PRSOV CLOSED COMMAND	PRSOV CLOSED - BIT =0
	26	PRSOV OPEN POSITION SWITCH	PRSOV CLOSED - BIT=1
	27	PRSOV OPEN POSITION SWITCH	PRSOV IS NOT OPEN - BIT=1

S 215-031

(2) Look at the position indicator on the PRSOV. Is the PRSOV in the fully closed position (BIT 26=1)?
(a) NO, replace the PRSOV (AMM 36-11-09/201).
(b) YES, continue.

S 715-032

(3) Push the L(R) ENG OFF switch-light, on the P5 panel, to the OFF position.

S 215-033
(4) Do you see ARINC Bit 13=0? This is a "close" signal sent to the PRSOV.
(a) NO, do a check of the electrical wiring (WDM 36-11-41, WDM 36-11-51, WDM 36-11-52). If the problem continues, replace the bleed air supply control card (AMM 36-11-12/401).
(b) YES, continue.

S 715-034
(5) Push the L(R) ENG OFF switch-light, on the P5 panel, to the ON position.

S 215-035
(6) Do you see ARINC Bit 13=1? This is an "enable" signal sent to the PRSOV.
(a) NO, do a check of the electrical wiring (WDM 36-11-41, WDM 36-11-51, WDM 36-11-52). If the problem continues, replace the bleed air supply control card (AMM 36-11-12/401).
(b) YES, continue.

S 025-036
(7) Remove the supply pressure sense line at the PRSOV.

S 485-037
(8) Install a supply pressure gage (Ps) and nitrogen pressure source to the PRSOV as shown in Fig. 501.

S 715-042

WARNING: DO NOT EXCEED THE PRESSURE LIMITS THAT ARE GIVEN. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE EQUIPMENT.

(9) Slowly increase Ps to 20-25 PSIG.

S 215-038
(10) Make sure the ARINC Bit 26=0 and 27=0 and the PRSOV is in the fully open position. This means the PRSOV OPEN position switch is closed.
(a) If the PRSOV is not in the fully open position, replace the PRSOV (AMM 36-11-09/201).
(b) If the PRSOV OPEN or CLOSED position switch indication (ARINC BIT indication) is not correct (does not agree with the position indicator on the PRSOV) replace the PRSOV (AMM 36-11-09/201).

S 715-040
(11) Decrease the supply pressure to 0 PSIG.

J. Put the Airplane Back to Its Usual Condition

S 085-023
(1) Remove the nitrogen source, supply pressure gage, hoses and fittings from the air filter connection.

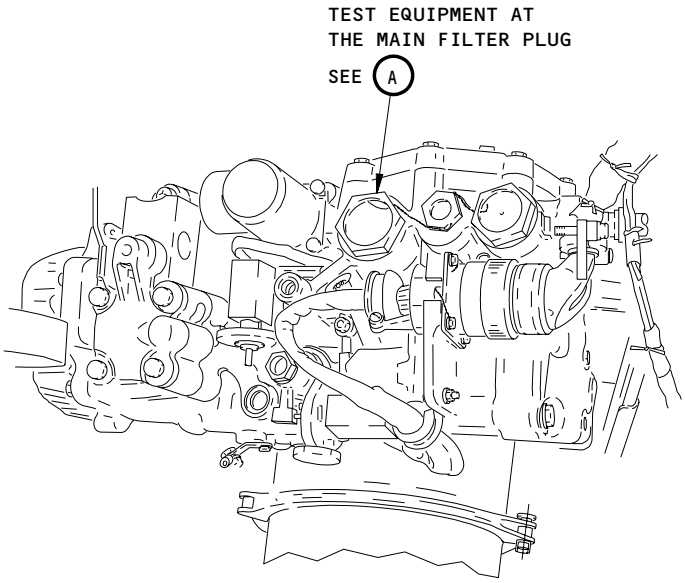
S 215-044
(2) Make sure the air filter is not dirty or clogged.

S 425-024
(3) Install the air filter for the PRSOV (AMM 36-11-09/201).

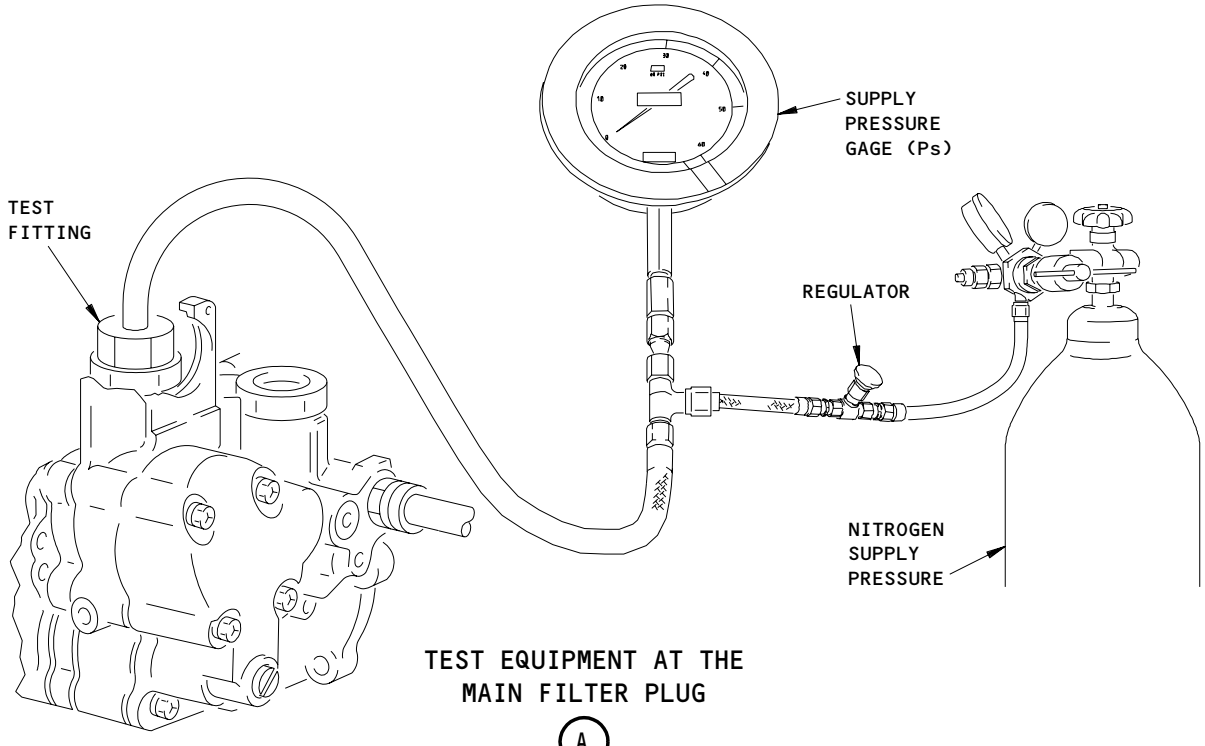
S 445-025
(4) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 445-026
(5) Do the activation procedure for the leading edge slat (AMM 27-81-00/201).

S 415-027
(6) Close the strut pressure relief door (434AL/444AL).

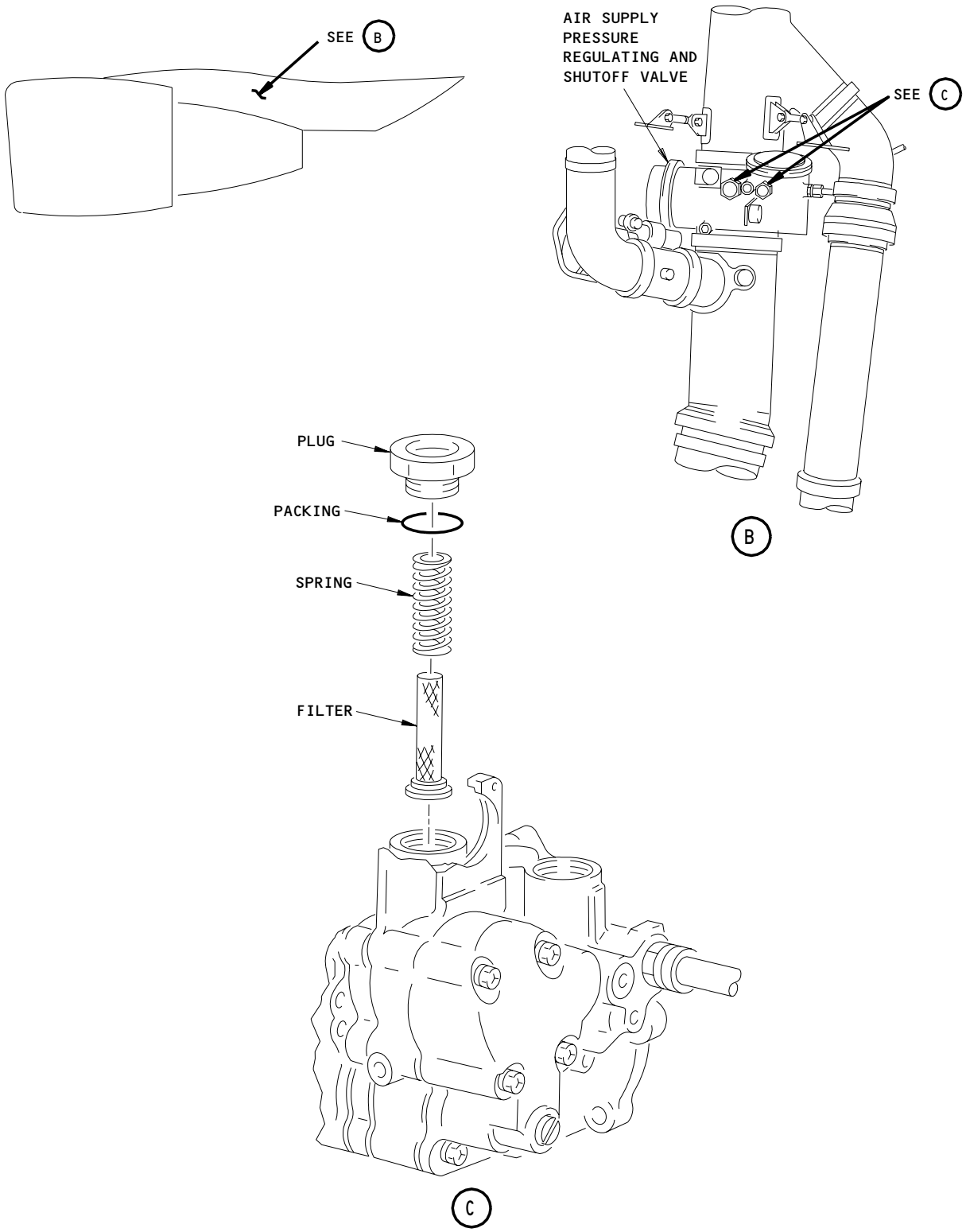


PRESSURE REGULATING AND SHUTOFF VALVE (PRSOV)
(THE LEFT SIDE OF THE STRUT)



TEST EQUIPMENT AT THE
MAIN FILTER PLUG
A

PRSOV Test Equipment
Figure 501



Air Supply Pressure Regulating and Shutoff Valve Air Filters
Figure 502

APU AIR SUPPLY SHUTOFF VALVE - REMOVAL/INSTALLATION

TASK 36-11-10-004-001

1. Remove the APU Shutoff Valve (Fig. 401)

A. Equipment

(1) Service Platform, Control Bay Access Door - A51001-19

B. References

(1) AMM 06-42-00/201, Empennage Access Doors and Panels
(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 36-00-00/201, Pneumatic - General

C. Access

(1) Location Zone
313 Stabilizer Torsion Box Compartment (Left)

(2) Access Panel
313AL Elevator Mechanical Linkages

D. Prepare for the Removal

S 864-002
(1) Supply electrical power (AMM 24-22-00/201).

S 864-004
(2) Turn the APU selector switch, on the pilot's overhead panel P5, to the OFF position.
(a) Attach a DO-NOT-OPERATE tag to the APU selector switch.

S 864-005
(3) Remove pneumatic power (AMM 36-00-00/201).

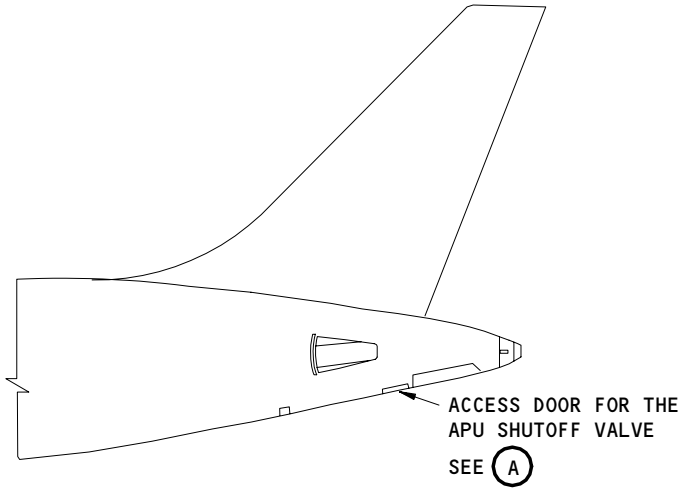
S 864-006
(4) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11S23, APU BLEED PWR

S 014-007
(5) Open the controls access door 313AL (AMM 06-42-00/201). The controls access door is forward of the APU firewall.

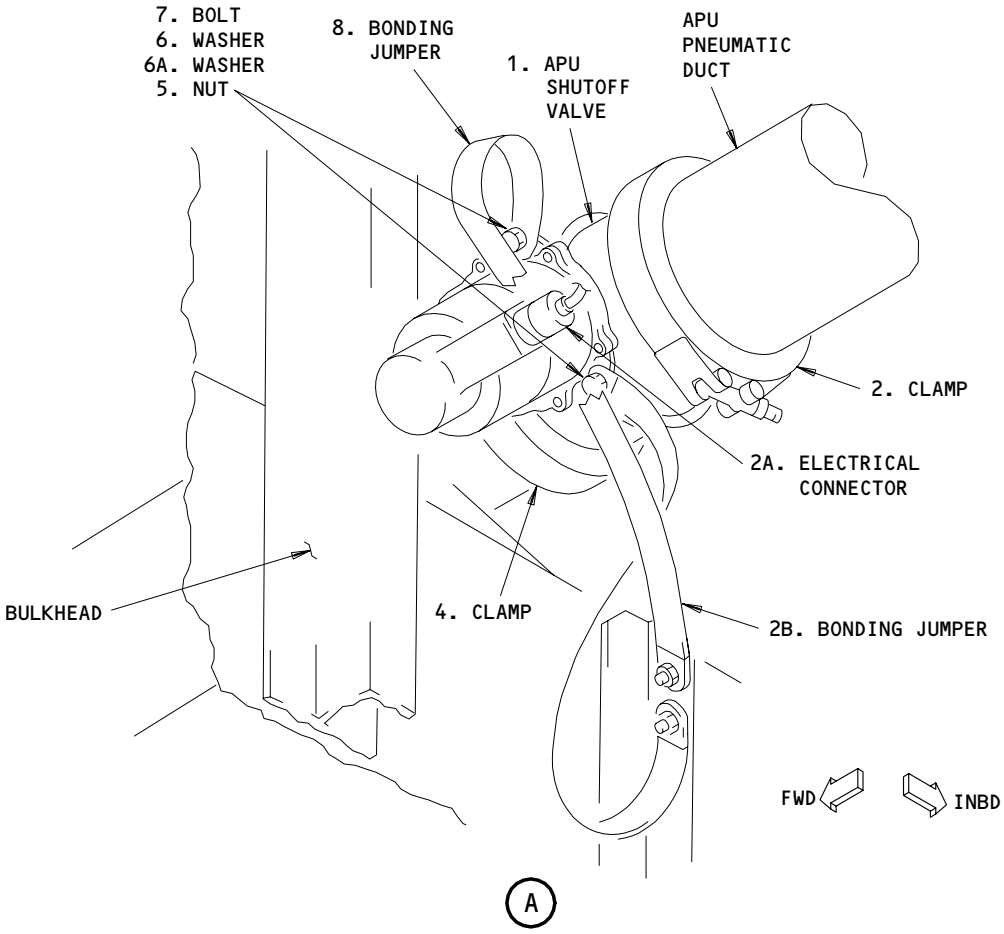
S 494-029

WARNING: DO NOT PUT TOO MUCH WEIGHT ON THE CONTROLS BAY ACCESS DOOR, 313AL. THE WEIGHT OF PERSONS CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE, AND CAUSE INJURY TO PERSONS.

(6) Install the service platform on the access door for the controls bay.



LEFT SIDE
(HORIZONTAL STABILIZER NOT SHOWN)



APU Air Supply Shutoff Valve
Figure 401

E. Remove the APU Shutoff Valve.

S 034-009
(1) Disconnect the electrical connector (2A) from the APU shutoff valve.

S 034-010
(2) Disconnect the two bonding jumpers (2B, 8) from the APU shutoff valve.

S 034-011

WARNING: DO NOT REMOVE THE CLAMPS WHILE THE AIR SUPPLY DUCT IS PRESSURIZED. PRESSURIZED AIR CAN CAUSE INJURY TO PERSONS.

(3) Loosen the clamps at each side of the valve.

S 034-028
(4) Hold the valve and move the clamps along the duct.

S 024-012
(5) Remove the valve.

S 494-013
(6) Install a cover on the openings in the duct to keep out unwanted objects.

TASK 36-11-10-404-014

2. Install the APU Shutoff Valve (Fig. 401)

A. Equipment
(1) Service Platform, Control Bay Access Door - A51001-19

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	APU Shutoff Valve	36-11-01	80	170

C. References
(1) 06-42-00/201, Empennage Access Doors and Panels
(2) 24-22-00/201, Electric Power Control
(3) 36-00-00/201, Pneumatic - General

D. Access

(1) Location Zone

313 Stabilizer Torsion Box Compartment (Left)

(2) Access Panel

313AL Elevator Mechanical Linkages

E. Procedure

S 094-015

(1) Remove the duct covers.

S 424-016

(2) Install the valve (1) in the duct.

(a) Make sure the flow arrow points forward.

(b) Make sure the electrical connector is on the outboard side and below the horizontal plane of the valve.

S 434-017

(3) Install a clamp (2, 4) on each side of the valve.

S 434-018

(4) Tighten the clamp to 50 inch-pounds.

S 434-019

(5) Install the bolt (7), the washers (6 and 6A), and the nut (5) to the bonding jumpers (2B, 8) and the valve (1).

S 434-020

(6) Tighten the nuts (5) on the bolts (7).

S 434-021

(7) Connect the electrical connector (2A) to the valve (1).

S 864-022

(8) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead circuit breaker panel P11:

(a) 11S23, APU BLEED PWR

S 724-023
(9) Do a Test of the APU shutoff valve (1):
(a) Supply pneumatic power (AMM 36-00-00/201).
(b) Push the APU VALVE switch-light on the P5 panel to the open position.
(c) Make sure the VALVE light comes on then goes off.
(d) Do a check of the valve flanges for air leakage:
1) Small air leakage is satisfactory.
2) Repair large air leakage with joint or clamp adjustment.
(e) Push the APU VALVE switch-light on the P5 panel to the closed position.
(f) Make sure the VALVE light comes on then goes off.

F. Put the Airplane Back to Its Usual Condition

S 864-024
(1) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-025
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 094-026
(3) Remove the service platform from the controls bay.

S 414-027
(4) Close the controls access door 313AL (AMM 06-42-00/201).

APU CHECK VALVE - REMOVAL/INSTALLATION

1. General
   A. This procedure gives instructions for the removal and installation of the APU check valve.
   B. This valve is immediately aft of the rear cabin pressure bulkhead on the APU air supply manifold duct.

TASK 36-11-11-004-001

2. Remove the APU Check Valve (Fig. 401)
   A. References
      (1) AMM 06-42-00/201, Empennage Access Doors and Panels
      (2) AMM 24-22-00/201, Electric Power-Control
      (3) AMM 36-00-00/201, Pneumatic - General
   B. Access
      (1) Location Zone
          311 Area Aft of Pressure Bulkhead to BS 1725 (Left)

      (2) Access Panel
          312AR APU Air Supply Check Valve

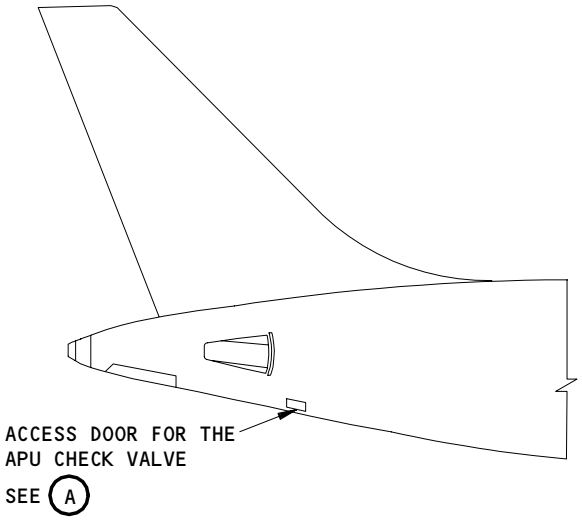
   C. Prepare for the Removal

      S 864-002
      (1) Supply electrical power (AMM 24-22-00/201).

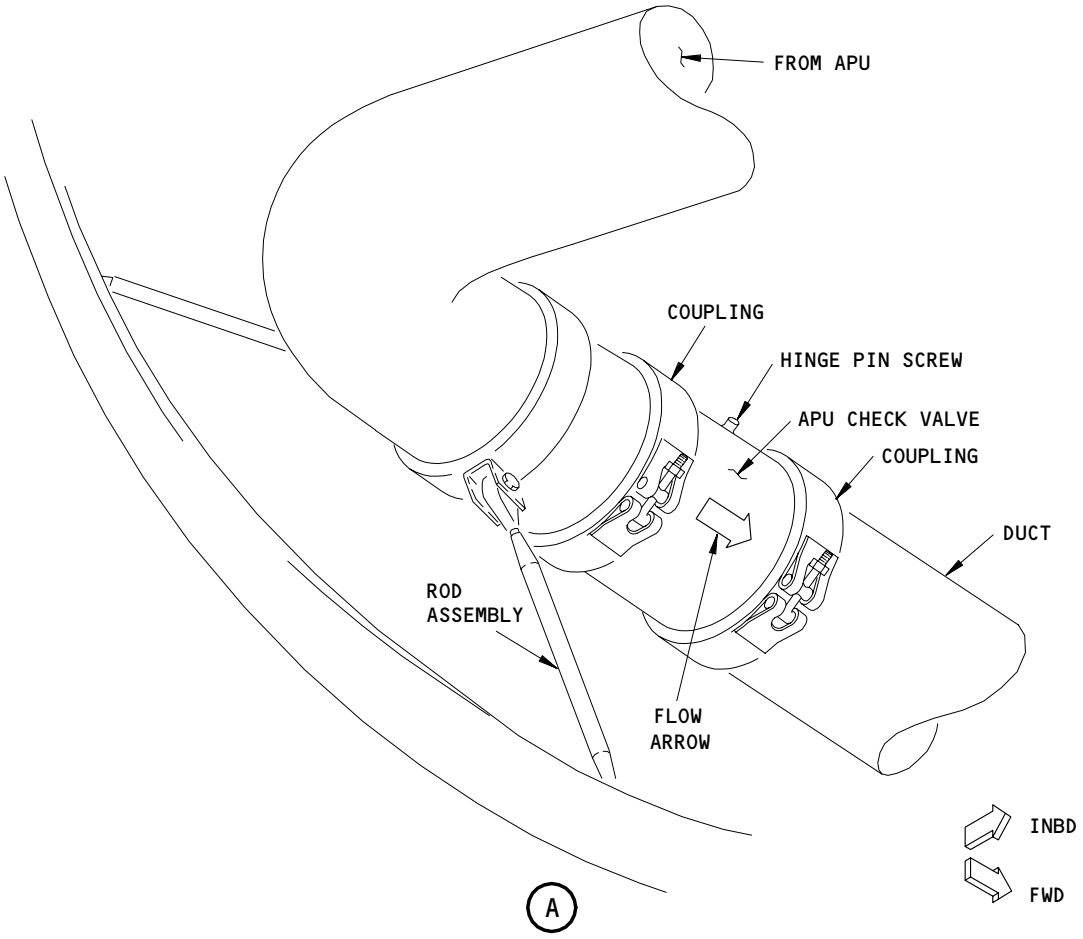
      S 864-003
      (2) Remove pneumatic power (AMM 36-00-00/201).

      S 014-004

      WARNING: DO NOT PUT TOO MUCH WEIGHT ON THE ACCESS DOOR 312AR. THE WEIGHT OF PERSONS CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE AND CAUSE INJURY TO PERSONS.
      (3) Open the service access door 312AR (AMM 06-42-00/201) aft of the rear cabin pressure bulkhead on the right side.



RIGHT SIDE
(HORIZONTAL STABILIZER NOT SHOWN)



APU Air Supply Check Valve
Figure 401

D. Remove the APU Check Valve

S 034-005

WARNING: DO NOT REMOVE THE COUPLINGS WHILE THE AIR SUPPLY DUCT IS PRESSURIZED. PRESSURIZED AIR CAN CAUSE INJURY TO PERSONS.

(1) Loosen the couplings at each side of the APU check valve.

S 034-017

(2) Hold the APU check valve while you move the couplings along the duct.

S 024-006

(3) Remove the APU check valve.

S 494-007

(4) Install a cover on the duct openings to keep out unwanted objects.

TASK 36-11-11-404-008

3. Install The APU Check Valve (Fig. 401)

A. References

(1) AMM 06-42-00/201, Empennage Access Doors and Panels
(2) AMM 24-22-00/201, Electric Power-Control
(3) AMM 36-00-00/201, Pneumatic - General

B. Access

(1) Location Zone
311 Area Aft of Pressure Bulkhead to BA 1725 (Left)

(2) Access Panel
312AR APU Air Supply Check Valve

C. Procedure

S 094-009

(1) Remove the duct covers.

S 424-010
(2) Install the APU check valve in the duct.
(a) Make sure the flow arrow points forward.
(b) Make sure the hinge pin is vertical with the screw head up.

S 434-011
(3) Install a coupling on each side of the APU check valve.

S 434-012
(4) Tighten the coupling nuts to 55 inch-pounds.

S 724-013
(5) Do a test of the two flanges on the APU check valve
(a) Pressurize the APU duct with the APU (AMM 36-00-00/201).
(b) Do a test of the APU check valve flanges for air leakage.
1) Small air leakage is satisfactory.
2) Repair large air leakage with joint or coupling adjustment.

D. Put the Airplane Back to Its Usual Condition

S 864-014
(1) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 414-015
(2) Close the service access door 312AR (AMM 6-42-00/201).

S 864-016
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

APU CHECK VALVE - INSPECTION/CHECK

TASK 36-11-11-206-006

1. Examine the APU Air Supply Check Valve (Fig. 601)

A. References

(1) AMM 36-11-11/401, APU Check Valve

B. Access

(1) Location Zone

311 Area Aft of Pressure Bulkhead to BS 1725 (Left)

(2) Access Panel

312AR APU Air Supply Check Valve

C. Procedure

S 026-001

(1) Remove the APU check valve (AMM 36-11-11/401).

S 216-002

(2) Examine the APU check valve for these conditions:

(a) The incorrect installation of the screws.

(b) The incorrect installation of the valve flappers and the hinge pin.

(c) The incorrect installation of the lockwire between the retainer screws for the hinge pin and the stop pin.

(d) Corrosion or cracks on the valve housing

(e) Deterioration, contamination, or carbon on the seal surfaces of the flappers and the valve body

S 426-003

(3) If one of the above conditions occur, replace the APU check valve.

S 216-007

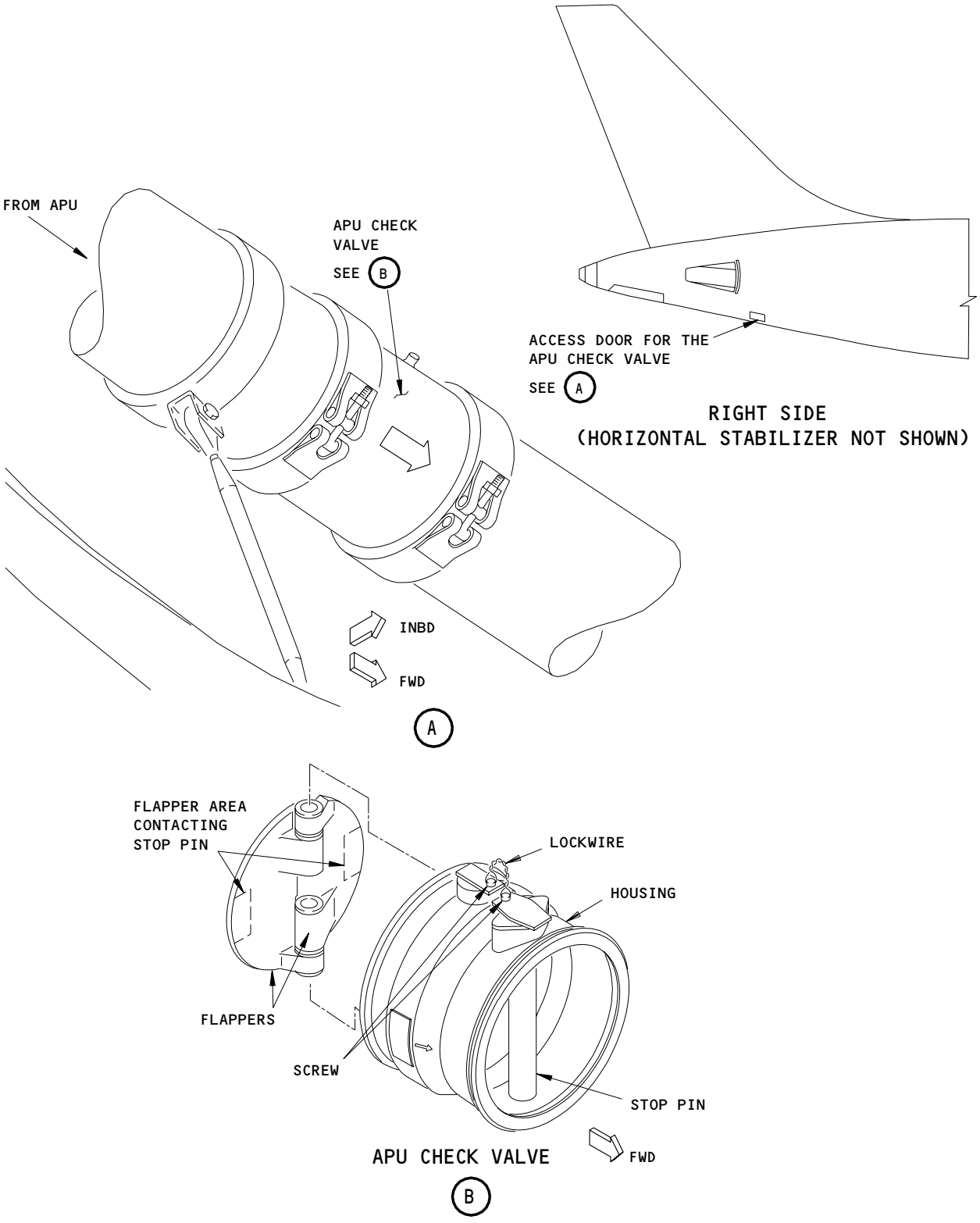
(4) If the thickness of the flappers in the area that touches the stop pin is less than 0.060 inch, replace the APU check valve.

S 436-004

(5) Tighten all the loose screws.

S 426-005

(6) Install the APU check valve (AMM 36-11-11/401).



APU Air Supply Check Valve Inspection Check
Figure 601

AIR SUPPLY CONTROL CARD ASSEMBLY - REMOVAL/INSTALLATION

1. General
   A. The air supply control card assembly supplies power and logic to control the air supply control valves. It also supplies the electrical interface with the air supply BITE module. The assembly is in the electrical systems card file (P50) in the right forward side of the main equipment center.

TASK 36-11-12-004-001

2. Remove The Air Supply Control Card (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
      (2) AMM 20-10-01/401, E/E Rack Mounted Components
      (3) AMM 20-41-01/201, Electro Static Sensitive Devices
      (4) AMM 24-22-00/201, Electric Power Control
      (5) AMM 36-00-00/201, Pneumatic General
      (6) AMM 36-23-01/401, Air Supply BITE Module
   B. Access
      (1) Location Zones
          120 Main Equipment Center (Right)

      (2) Access Panel
          119AL Main Equipment Center

   C. Prepare for the Removal

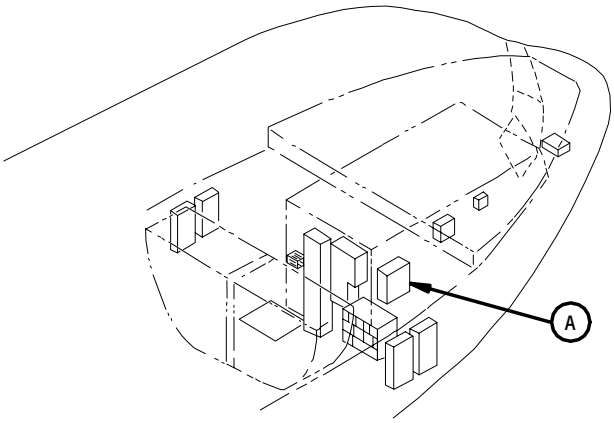
      S 864-002
      (1) Supply electrical power (AMM 24-22-00/201).

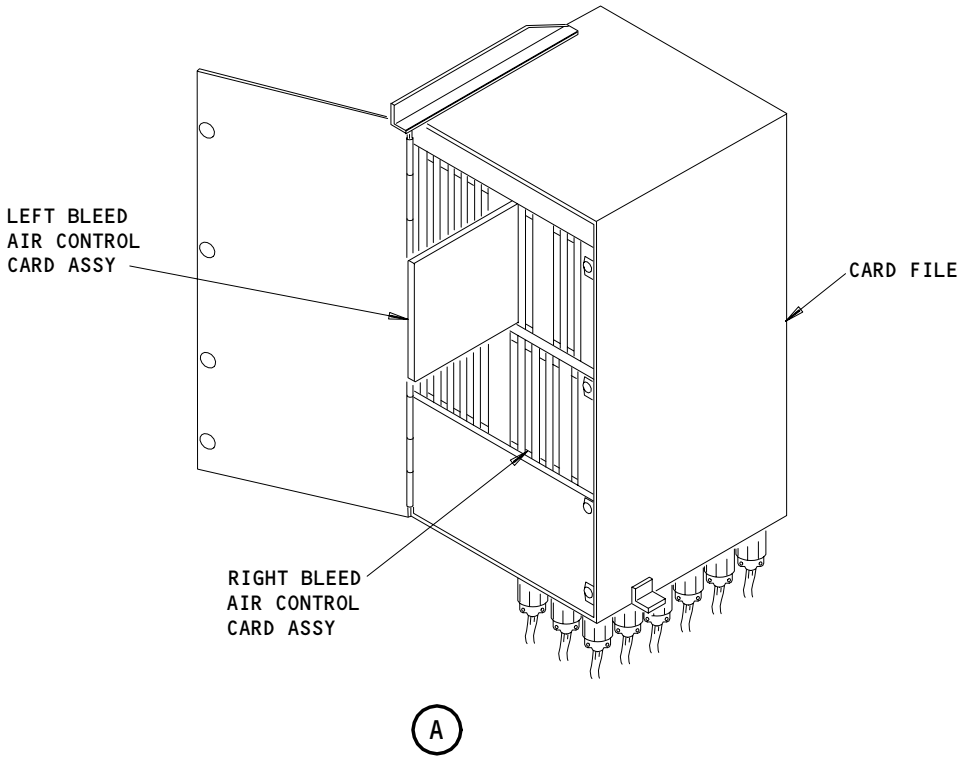
      S 864-003
      (2) Remove pneumatic power (AMM 36-00-00/201).

      S 864-004
      (3) For the right control card, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11S19, R ENG BLEED IND
          (b) 11S20, R ENG BLEED CONT

      S 864-005
      (4) For the left control card, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11S10, L ENG BLEED IND
          (b) 11S11, L ENG BLEED CONT

      S 864-027
      (5) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36, and attach a DO-NOT-CLOSE tag:
          (a) 36L7 or 36K7, AIR SUPPLY BITE





Air Supply Control Card Assembly - Installation
Figure 401

D. Remove the Air Supply Control Card

S 014-006

(1) Open the access door for the main equipment center, 119AL, and find the P50 card file (AMM 06-41-00/201).

S 014-028

CAUTION: DAMAGE TO THE CONTROL CARD CAN OCCUR IF YOU USE INCORRECT PRECAUTIONS TO GROUND OR MOVE THE CONTROL CARD. THE CONTROL CARD CONTAINS ELECTRO-STATIC SENSITIVE DEVICES (AMM 20-41-01/201).

(2) Open the P50 card file door.

S 024-008

(3) Remove the applicable control card (AMM 20-10-01/401).

TASK 36-11-12-404-026

3. Install the Air Supply Control Card (Fig. 401)

A. References

(1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 20-10-01/401, E/E Rack Mounted Components
(3) AMM 20-41-01/201, Electro Static Sensitive Devices
(4) AMM 24-22-00/201, Electric Power Control
(5) AMM 36-00-00/201, Pneumatic General
(6) AMM 36-23-01/401, Air Supply BITE Module
(7) AMM 78-31-00/201, Fan Thrust Reverser

B. Access

(1) Location Zones
120 Main Equipment Center (Right)

(2) Access Panel
119AL Main Equipment Center

C. Procedure

S 424-029

CAUTION: DAMAGE TO THE CONTROL CARD CAN OCCUR IF YOU USE INCORRECT PRECAUTIONS TO GROUND OR MOVE THE CONTROL CARD
THE CONTROL CARD CONTAINS ELECTRO-STATIC SENSITIVE DEVICES (AMM 20-41-01/201).

(1) Install the control card in the P50 card file (AMM 20-10-01/201).

S 414-011
(2) Close the card file door.

S 864-012
(3) For the right control card, remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11S19, R ENG BLEED IND
(b) 11S20, R ENG BLEED CONT

S 864-013
(4) For the left control card, remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11S10, L ENG BLEED IND
(b) 11S11, L ENG BLEED CONT

S 864-014
(5) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
(a) 36L7 or 36K7, AIR SUPPLY BITE

S 214-015
(6) Make sure the OFF light for the L or R ENG bleed air supply is on.

S 044-016

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 INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(7) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 014-017
(8) Put a screwdriver in the latch of the right strut pressure relief door, 434AR or 444AR (AMM 06-43-00/201).

S 014-030
(9) Use the screwdriver to open the right strut pressure relief door until the latch releases.

S 724-018
(10) Turn the manual override, with a wrench, to the full open position to manually open the PRSOV. Hold the valve in this position.

S 214-019
(11) Make sure the OFF light for the L or R ENG bleed air supply is off.

S 724-020
(12) Close the PRSOV.

S 414-021
(13) Close the right strut pressure relief door, 434AR or 444AR.

S 214-022
(14) Make sure the OFF light for the L or R ENG bleed air supply is on.

D. Put the Airplane Back to Its Usual Condition

S 444-023
(1) Do this procedure: Thrust Reverser Isolation Valve Activation (AMM 78-31-00/201).

S 864-024
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-025
(3) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).

AIR SUPPLY PRECOOLER - REMOVAL/INSTALLATION

1. General
   A. This procedure gives instructions to remove and install the air supply coolers.
   B. The air supply precooler is above each engine, below the strut, forward of the starter duct, and aft of the raceway.

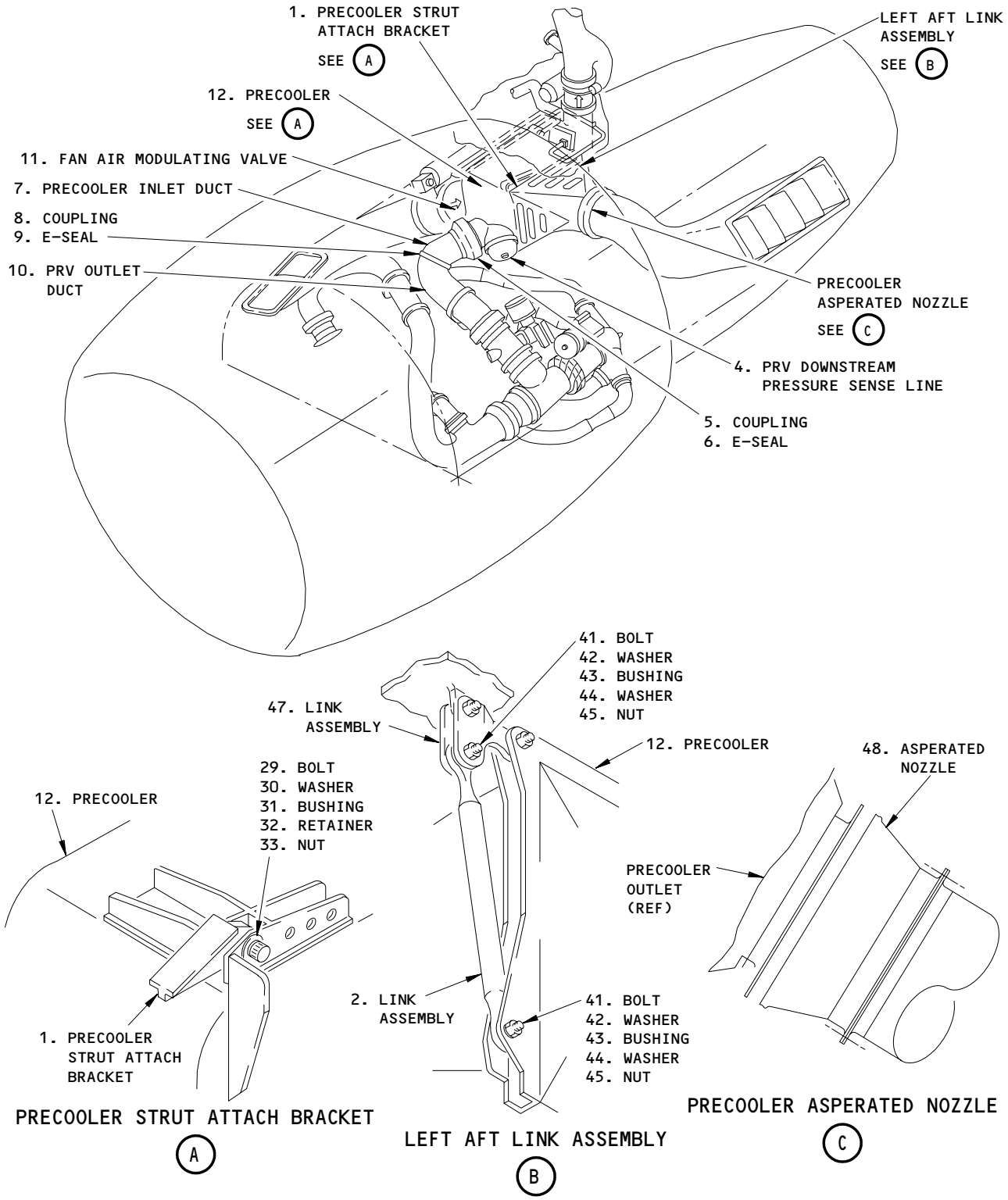
TASK 36-11-15-004-075

2. Remove the Air Supply Precooler (Fig. 401)
   A. Equipment
      (1) Precooler Removal/Installation Equipment, A36001-45
   B. References
      (1) 24-22-00/201, Electric Power Control
      (2) 26-11-02/401, Engine Fire and Overheat Detection Sensors
      (3) 27-81-00/201, Leading Edge Slat System
      (4) 36-00-00/201, Pneumatics - General
      (5) 36-11-06/401, Air Supply Intermediate Pressure Check Valve
      (6) 36-11-09/201, Air Supply Pressure Regulating and Shutoff Valve
      (7) 36-11-16/401, Fan Air Modulating Valve
      (8) 54-51-51/401, Core Cowl Hinge
      (9) 54-52-01/401, Strut to Fairing Trailing Edge
      (10) 71-00-00/201, Power Plant - General
      (11) 71-11-06/401, Core Cowl Panels
      (12) 78-31-00/201, Fan Thrust Reverser System
   C. Access
      (1) Location Zones

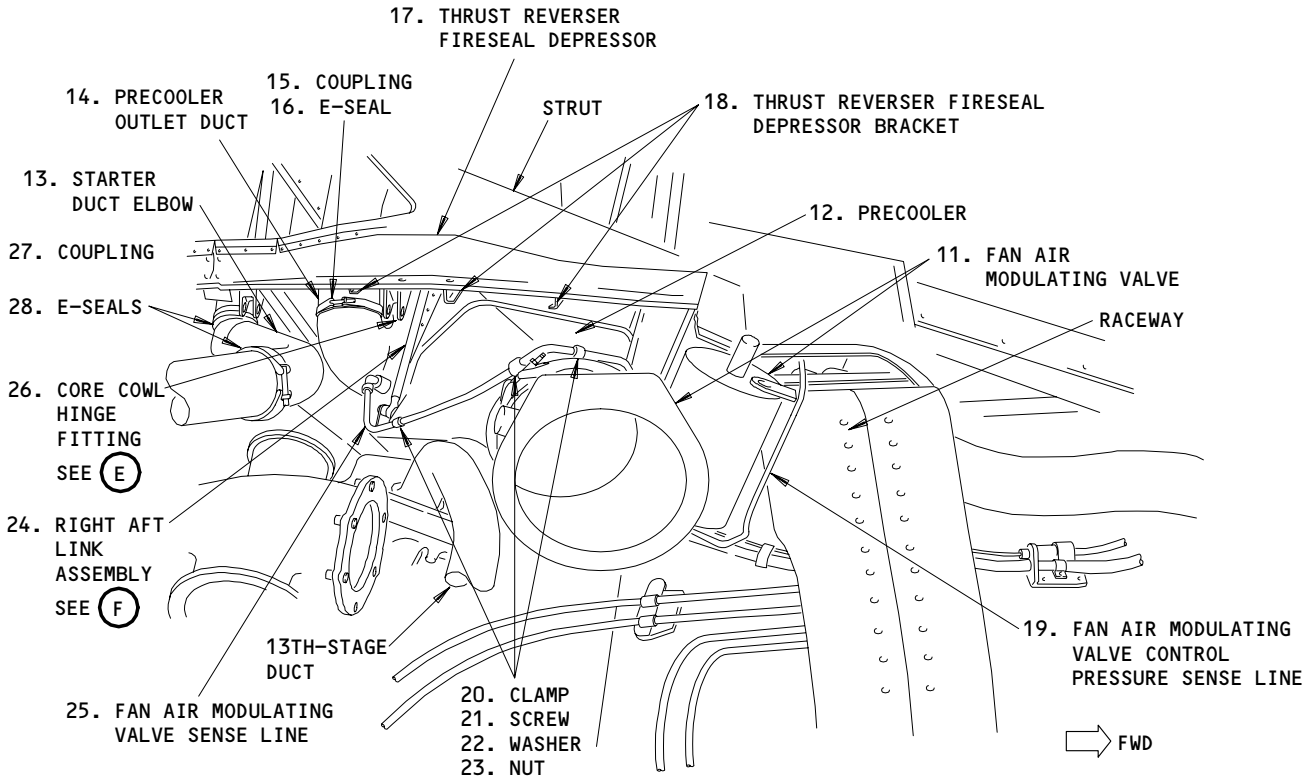
413/414/423/424	Fan Cowl Panel
415/416/425/426	Fan Reverser
417/427	Core Cowl (Left)

   D. Prepare for the Removal

      S 864-009
      (1) Supply electrical power (Ref 24-22-00).



Air Supply Precooler
Figure 401 (Sheet 1)



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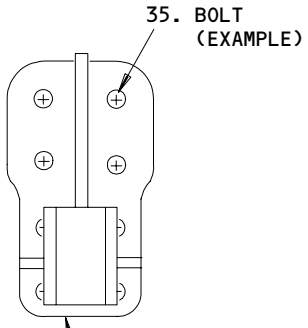
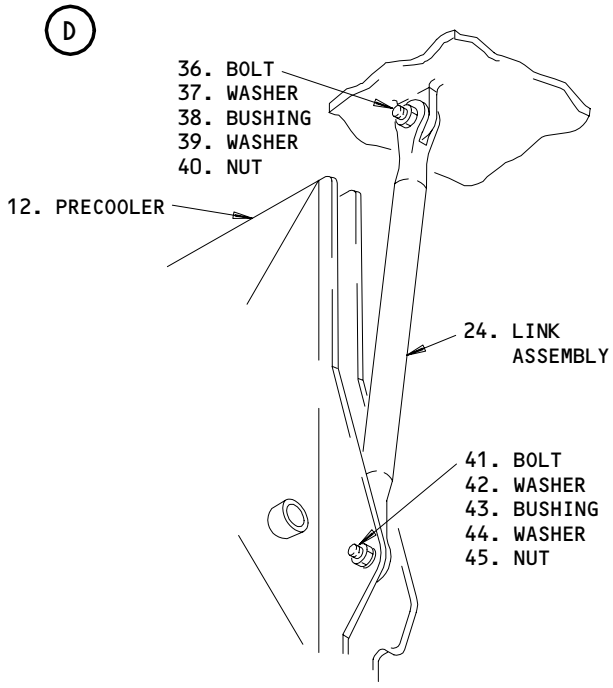


CORE COWL HINGE FITTING

E



RIGHT AFT LINK ASSEMBLY

F

Air Supply Precooler
Figure 401 (Sheet 2)

S 864-079

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(2) Remove pneumatic power (Ref 36-00-00).

S 044-006

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 Reversers Deactivation for Ground Maintenance (Ref 78-31-00).

S 014-011

(4) Remove the core cowl on the right side (Ref 71-11-06).

S 044-012

(5) Do this procedure: Leading Edge Slats Deactivation (Ref 27-81-00).

S 014-013

(6) Open the core cowl for the left side (Ref 71-11-06).

S 014-001

WARNING: MAKE SURE YOU OPEN THE FAN AND CORE COWL PANELS CORRECTLY (AMM 78-31-00/201) BEFORE YOU OPEN THE FAN DUCT COWL AND THRUST REVERSER. FAILURE TO OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(7) Open the fan duct cowl and the thrust reverser on the left and the right side (Ref 78-31-00).

S 014-014

(8) Remove the fire seal depressor and supports on the right side thrust reverser (17) (Ref 54-52-01).

S 014-015
(9) Remove the hinge fitting on the core cowl (26) that is near the right aft link assembly (24) (Ref 54-51-51).

NOTE: Because of the interference between the bolt and the precooler, make sure the hinge fitting is removed after the precooler is lowered.

E. Remove the Air Supply Precooler

S 034-016
(1) Remove the coupling (27) at each end of the starter duct elbow (13).

S 034-007
(2) Remove the starter duct elbow (13).

S 034-017
(3) Remove the coupling (15) and the seal (16) between the precooler (12) and the outlet duct (14).

S 034-018
(4) Remove the fan air modulating valve (11) (Ref 36-11-16).

S 034-019
(5) Remove the couplings (5, 8) from each end of the precooler inlet duct (7).

S 034-020
(6) Remove the precooler inlet duct (7).

S 034-021
(7) Disconnect the PRV downstream sense line (4) from the precooler (12).

S 034-022
(8) Disconnect the control pressure sense line (19) from the strut floor.

S 034-023
(9) Disconnect the sense line clamps (20) from the precooler (12).

S 034-024
(10) Remove the sense line for the modulating valve (25) from the precooler (12).

S 494-025
(11) Hold up the precooler (12) with the precooler lift tool.

S 034-026

CAUTION: MAKE SURE THE PRECOOLER HAS SATISFACTORY SUPPORT WHEN YOU REMOVE THE BOLTS THAT HOLD THE PRECOOLER IN ITS POSITION. THE INCORRECT SUPPORT OF THE PRECOOLER CAN CAUSE DAMAGE TO THE ENGINE COMBUSTION CHAMBER.

(12) Remove the bolt (41) that attaches the precooler (12) to the left aft link assembly (47).

S 034-027

(13) Remove the bolt (41) that attaches the lower end of the left aft link assembly (2) to the precooler (12).

S 034-028

(14) Remove the bolt (29) from the strut attach bracket for the precooler (1) on the top left forward part of the precooler (12).

S 034-029

(15) Remove the bolts (36, 41) at the top and bottom of the right aft link assembly (24).

S 034-030

(16) Remove the link (24) assembly from the precooler (12).

S 494-031

(17) Install the precooler lift tool at the attach points for the link assembly.

S 024-033

(18) While you hold and lift the precooler (12), turn the precooler counterclockwise.

S 024-076

(19) Remove the precooler (12).

S 024-032

(20) Remove the precooler between the raceway and the starter duct and over the 13th stage duct on the right side of the engine.

S 494-034

(21) Put a cover on all the duct openings to keep out unwanted objects.

TASK 36-11-15-404-035

3. Install the Air Supply Precooler (Fig. 401)

A. Equipment

(1) Precooler Removal/Installation Equipment, A36001-45

B. Consumable Materials
   (1) DO1062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature antiseize compound)

C. Parts

AMM			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
401	2	Left Link Assembly	36-12-01	02	90
	5	Coupling			131
	6	E-Seal			132
	7	Precooler Inlet Duct			133
	8	Coupling			131
	9	E-Seal			132
	12	Precooler			135
	15	Coupling			160
	16	E-Seal			165
	20	Clamp	36-12-02	01	122
	21	Screw			125
	22	Washer			127
	23	Nut			128
	24	Right Link Assembly	36-12-01	02	110
	26	Core Cowl Hinge	54-51-51	01	330
	27	Coupling	80-11-01	10	50
	28	E-Seal			52
	36	Bolt	36-12-01	02	10
	37	Washer			28
	38	Bushing			52
	39	Washer			25
	40	Nut			40
	41	Bolt			15
	42	Washer			28
	43	Bushing			50
	44	Washer			25
	45	Nut			40

D. References

(1) 24-22-00/201, Electric Power Control
(2) 26-11-02/401, Engine Fire and Overheat Detection Sensors
(3) 27-81-00/201, Leading Edge Slat System
(4) 36-00-00/201, Pneumatics - General
(5) 36-11-06/401, Air Supply Intermediate Pressure Check Valve
(6) 36-11-09/201, Air Supply Pressure Regulating and Shutoff Valve
(7) 36-11-16/401, Fan Air Modulating Valve
(8) 54-51-51/401, Core Cowl Hinge
(9) 54-52-01/401, Strut to Fairing Trailing Edge
(10) 71-00-00/201, Power Plant - General
(11) 71-11-06/401, Core Cowl Panels
(12) 78-31-00/201, Fan Thrust Reverser System

E. Access

(1) Location Zones

413/414/423/424	Fan Cowl Panel
415/416/425/426	Fan Reverser
417/427	Core Cowl (Left)

F. Procedure

S 494-036

(1) Install the precooler lift tool on to the precooler.

S 094-037

(2) Remove the duct covers.

S 424-038

CAUTION: CAREFULLY MOVE THE PRECOOLER INTO ITS POSITION BELOW THE STRUT. THE INCORRECT INSTALLATION CAN CAUSE DAMAGE TO THE ENGINE COMBUSTION CHAMBER.

(3) Install the precooler (12) on the support.

S 424-039

(4) Move the precooler into its position below the strut and above the engine from the right side.

S 214-040

(5) Examine all the precooler attach bolts (29, 36, 41) for damage to the chrome plating.
(a) Replace all the damaged bolts.

S 644-041

(6) Lubricate all the precooler attach bolts (29, 36, 41) with the antiseize compound.

S 824-042

(7) Align the hinge fitting for the core cowl (26) with the nutplate on the strut, immediately aft of the right aft link assembly (24).

S 434-043

(8) Install the hinge fitting bolts (35).

NOTE: The Precooler can be lowered to give clearance for the bolts. The skirt fairing support brackets for the core cowl increase in dimension from the aft end to the forward end.

S 434-003

(9) Tighten the hinge fitting bolts (35).

S 214-044
(10) Make sure the spherical bearing is in the correct location on the forward precooler support fitting of the precooler.

S 824-045
(11) Align the attach fitting on the forward top left of the precooler with the strut bracket (1).

S 434-046
(12) Install the attach bolt (29), washer (30), bushing (31), nut (33) and retainer (32).
(a) Do not tighten the nut (33) and bolt (29).

S 434-047
(13) Install the bolt (41), washer (42), bushing (43), washer (44), and nut (45) in the link assembly (47) at the left aft part of the precooler to the top of the precooler (12).

S 434-048
(14) Install the bolt (41), washer (42), bushing (43), washer (44), and nut (45) at the lower end of the same link assembly (46) to the precooler.
(a) Tighten the nuts (45) on the bolts (4).

S 434-049
(15) Install the bolt (36), washer (37), bushing (38), washer (39), and nut (40) to attach the top end of the right aft link assembly (24) to the strut attach bracket. Do not tighten the nut (40) and bolt (36).

NOTE: You can move the precooler to align the precooler support fittings.

S 434-050
(16) Install the bolt (41), washer (42), bushing (43), washer (44) and nut (45) at the lower end of the right aft link assembly (24) to the precooler (12).

S 094-051
(17) Remove the precooler lifting tool.

S 214-052

CAUTION: THE VALVE E-SEALS CAN BE EASILY DAMAGED. THE INSTALLATION OF THE DAMAGED E-SEALS CAN CAUSE TOO MUCH LEAKAGE.

(18) Examine all the E-seals.
(a) Make sure the E-seals do not have cracks, dents, unwanted material or other damage.

(b) Replace all the damaged E-seals.

S 434-053
(19) Install an E-seal (6, 9) on each flange of the precooler inlet duct (7).

S 824-054
(20) Align the precooler inlet duct (7) with the precooler (12) inlet and the PRV outlet duct (10).

S 434-055
(21) Install the couplings (5, 8) at each end of the precooler inlet duct (7). Do not tighten coupling nuts.

S 434-056
(22) Install the E-seal (16) on the precooler outlet flange.

S 824-057
(23) Align the precooler outlet with the precooler outlet duct (14) flange.

S 434-058
(24) Install the coupling (15) to the joint for the precooler outlet and the precooler outlet duct (14). Do not tighten the coupling nuts.

S 644-078
(25) Apply antiseize compound to all the sense line fittings.

S 434-059
(26) Connect the PRV controller downstream sense line (4) to the precooler (12). Tighten the nut to the union.

S 434-060
(27) Connect the modulating valve sense line (25) to the precooler (12). Tighten the nut to the union.

S 434-061
(28) Attach the sense line clamps (20) to the precooler (12) with the screws (21), washers (25), and nuts (23).

S 434-062
(29) Attach the control pressure sense line (19) to the strut floor.

S 434-063
(30) Install the modulating valve (11) (Ref 36-11-16).

S 434-064
(31) Adjust and tighten all the precooler attach fittings.

S 434-005
(32) Tighten the coupling (5, 8, 15) nuts to 120 ±5 pound-inches.

S 824-077
(33) Align the starter duct elbow (13) with the starter duct.

S 434-066
(34) Install the E-seals (28) between the starter duct elbow (13) and the starter duct connections.

S 434-065
(35) Install the couplings (27).

S 434-004
(36) Tighten the coupling (27) nuts to 107 ±7 pound-inches.

S 794-067
(37) Do a Test of the precooler for leakage.
  (a) Supply electrical power (Ref 24-22-00).
  (b) Pressurize upstream of the pressure regulating and shutoff valve (Ref 36-11-09).
  (c) Do a Test of the precooler and the duct flanges for air leakage:
    1) Small air leakage is satisfactory.
    2) Repair air large leakage with joint or clamp adjustment.
  (d) Remove pneumatic power if it is not necessary (Ref 36-00-00).

G. Put the Airplane Back to Its Usual Condition

S 414-068
(1) Install the fire seal depressor and supports on the right side thrust reverser (17) (Ref 54-52-01).

S 414-069
(2) Close the core cowl on the left side (Ref 71-11-06).

S 414-070
(3) Install the core cowl hinge on the right side (26) (Ref 54-51-51).

S 414-071
(4) Install the core cowl on the right side (Ref 71-11-06).

S 014-002

WARNING: MAKE SURE YOU CLOSE THE FAN AND CORE COWL PANELS CORRECTLY (AMM 78-31-00/201) BEFORE YOU CLOSE THE FAN DUCT COWL AND THRUST REVERSER. FAILURE TO OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Close the fan duct cowl and the thrust reverser on the right side (Ref 78-31-00).

S 444-072

(6) Do this procedure: Leading Edge Slats Activation (Ref 27-81-00).

S 444-073

(7) Do this procedure: Thrust Reversers Activation (Ref 78-31-00).

S 864-074

(8) Remove electrical power if it is not necessary (Ref 24-22-00).

AIR SUPPLY PRECOOLER - INSPECTION/CHECK

1. General
   A. This procedure contains one task.
      (1) The inspection of the air supply precooler.

   TASK 36-11-15-206-001

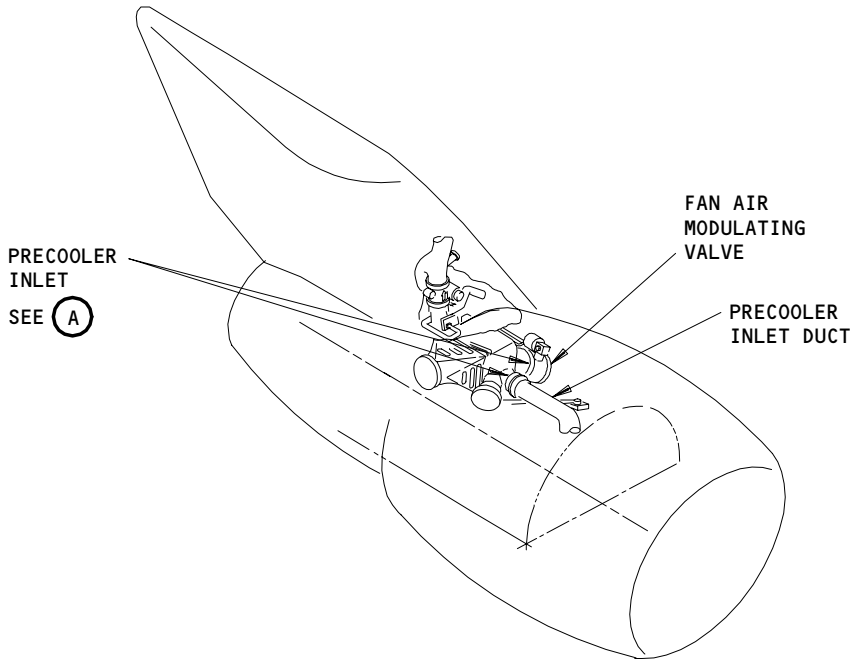
2. Examine the Air Supply Precooler (Fig. 601)
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control
      (2) AMM 36-00-00/201, Pneumatic - General
      (3) AMM 36-11-01/401, Pneumatic Duct
      (4) AMM 36-11-15/401, Air Supply Precooler
      (5) AMM 36-11-16/401, Fan Air Modulating Valve
      (6) AMM 54-52-01/401, Strut Fairings
      (7) AMM 71-11-04/201, Fan Cowl Panels
      (8) AMM 71-11-06/201, Core Cowl Panels
      (9) AMM 78-31-00/201, Engine Fan Thrust Reverser
   B. Access
      (1) Location Zones
            410/420 No. 1/2 Engine
   C. Procedure

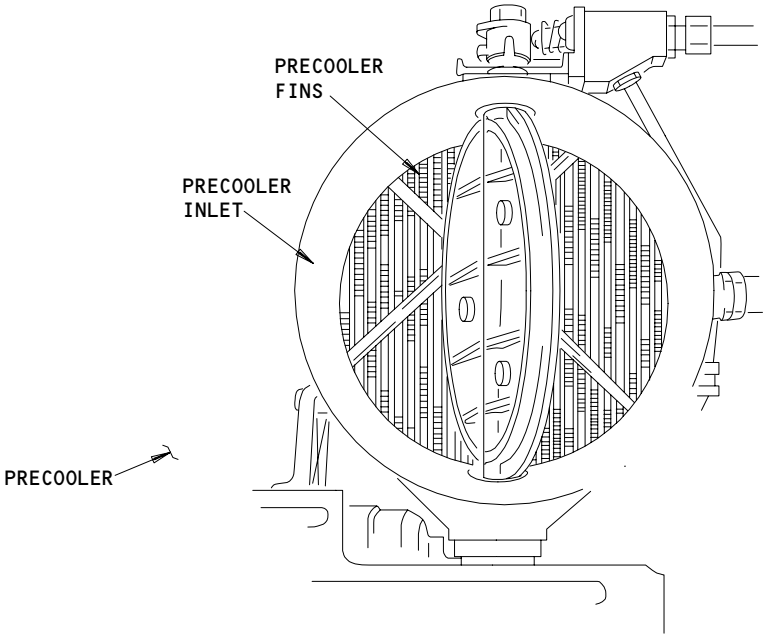
      S 866-002
      (1) Supply electrical power (AMM 24-22-00/201).

      S 866-003
      (2) Remove the pneumatic power (AMM 36-00-00/201).

      S 016-034
      (3) Do these steps to get access to the precooler:

      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.





PRECOOLER INLET

A

Air Supply Precooler Inlets
Figure 601

(a) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).
(b) Open the left and right fan cowl panels (AMM 71-11-04/201).
(c) Open the left and right core cowl panels (AMM 71-11-06/201).

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.

(d) Open the left and right thrust reversers (AMM 78-31-00/201).

S 866-019
(4) Find the air supply precooler.

S 016-005
(5) Remove the applicable skirt fairing on the right core cowl, 436BR or 446BR (AMM 54-52-01/401).

S 036-007
(6) Remove the inlet duct on the precooler to show the precooler fins (AMM 36-11-01/401).

S 036-008
(7) Remove the fan air modulating valve to show the precooler fins (AMM 36-11-16/401).

S 216-009
(8) Examine the precooler fins for unwanted material, dirt, and bent or clogged fins.

NOTE: For off-wing repair or cleaning of the precooler do the procedures in the vendor component maintenance manual (CMM).

S 216-010
(9) Examine the external welds on the precooler for signs of carbon material caused by air leakage and cracks.

S 216-011
(10) Examine the precooler inlet and outlet flanges for damage.
(a) Repair all the damage.

S 216-012
(11) Examine the precooler mounting hardware for damage.
(a) Replace the precooler or mounting hardware if there is damage that could cause failure or injury, or if a blockage prevents its usual operation (AMM 36-11-15/401).

S 436-013
(12) Install the fan air modulating valve (AMM 36-11-16/401).

S 436-014
(13) Install the inlet duct on the precooler (AMM 36-11-01/401).

S 416-016
(14) Install the right core cowl skirt fairing (AMM 54-52-01/401).

S 416-042
(15) Do these steps to close the cowl panels and thrust reversers:

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Close the left and right thrust reversers (AMM 78-31-00/201).
(b) Close the left and right core cowl panels (AMM 71-11-06/201).
(c) Close the left and right fan cowl panels (AMM 71-11-04/201).
(d) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 866-018
(16) Remove electrical power if it is not necessary (AMM 24-22-00/201).

FAN AIR MODULATING VALVE - REMOVAL AND INSTALLATION

1. General
   A. This procedure contains four tasks:
      (1) The first task is the removal of the fan air modulating valve.
      (2) The second task is the installation of the fan air modulating valve.
      (3) The third task is the removal of the air filter for the fan air modulating valve.
      (4) The fourth task is the installation of the air filter for the fan air modulating valve.

TASK 36-11-16-004-001

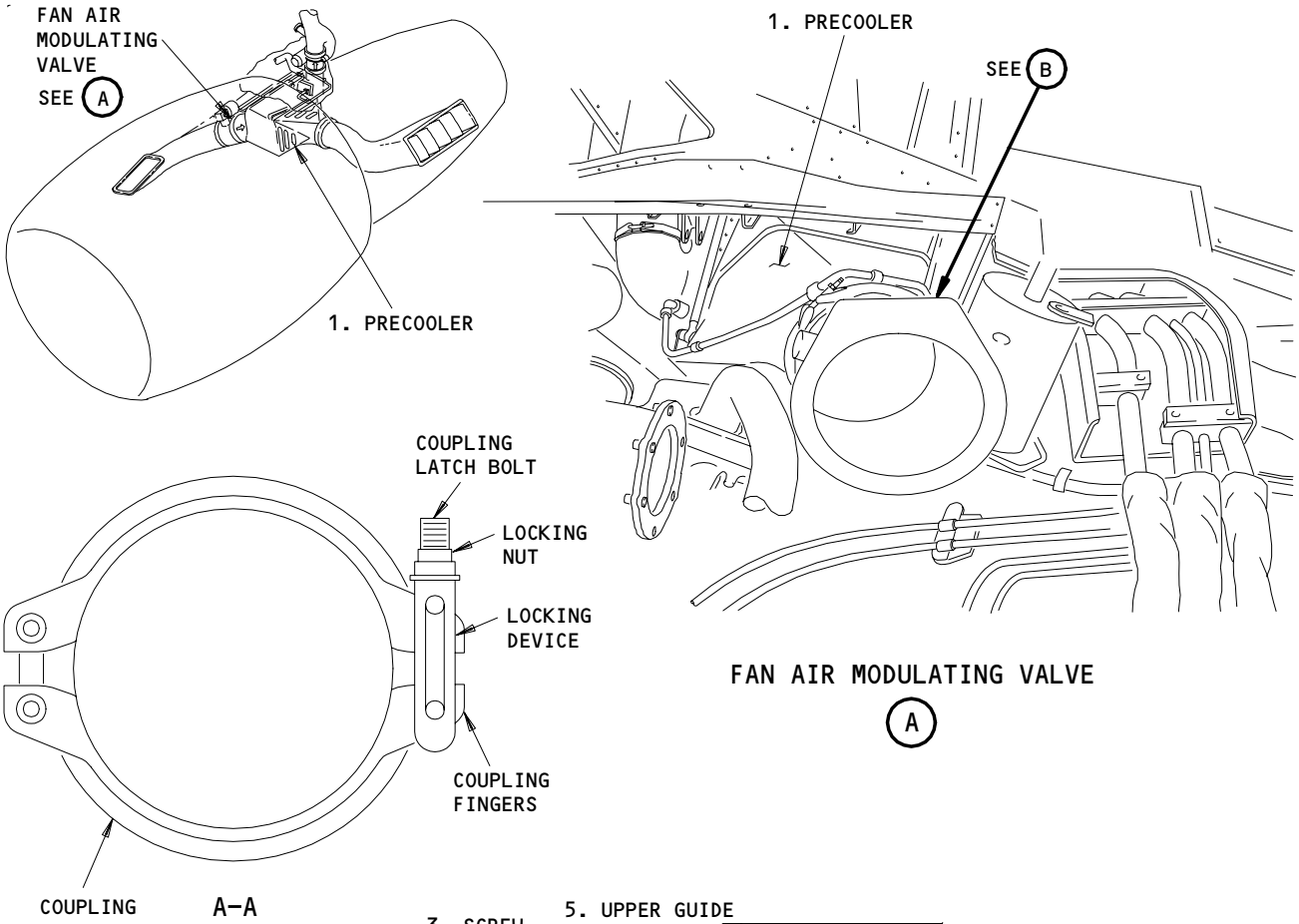
2. Remove the Fan Air Modulating Valve (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
      (2) AMM 24-22-00/201, Electric Power Control
      (3) AMM 27-81-00/201, Leading Edge Slat System
      (4) AMM 36-00-00/201, Air Supply - General
      (5) AMM 78-31-00/201, Thrust Reverser System
   B. Access
      (1) Location Zones
          410/420 No. 1/2 Power Plant
      (2) Access Panels
          119AL Main Equipment Center
   C. Prepare for Removal

      S 864-002
      (1) Apply electrical power (AMM 24-22-00/201).

      S 864-003
      (2) Remove the pneumatic power (AMM 36-00-00/201).

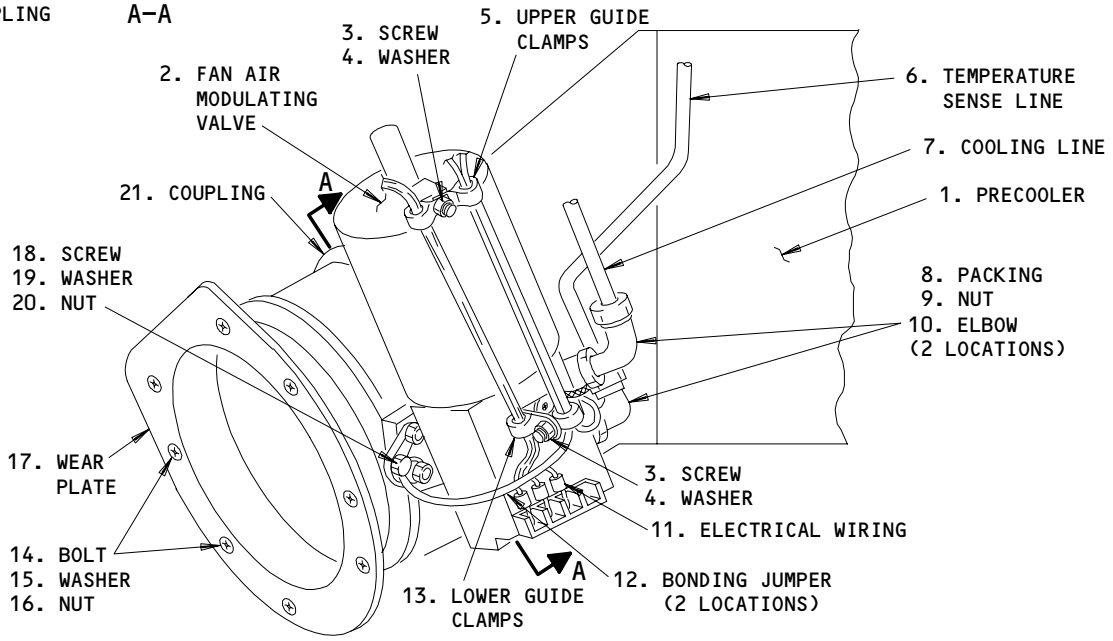
      S 864-004
      (3) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36, and attach a DO-NOT-CLOSE tag:
      (a) 36L7 or 36K7, AIR SUPPLY BITE

      S 864-005
      (4) Do the deactivation procedure for the leading edge slats (AMM 27-81-00/201).



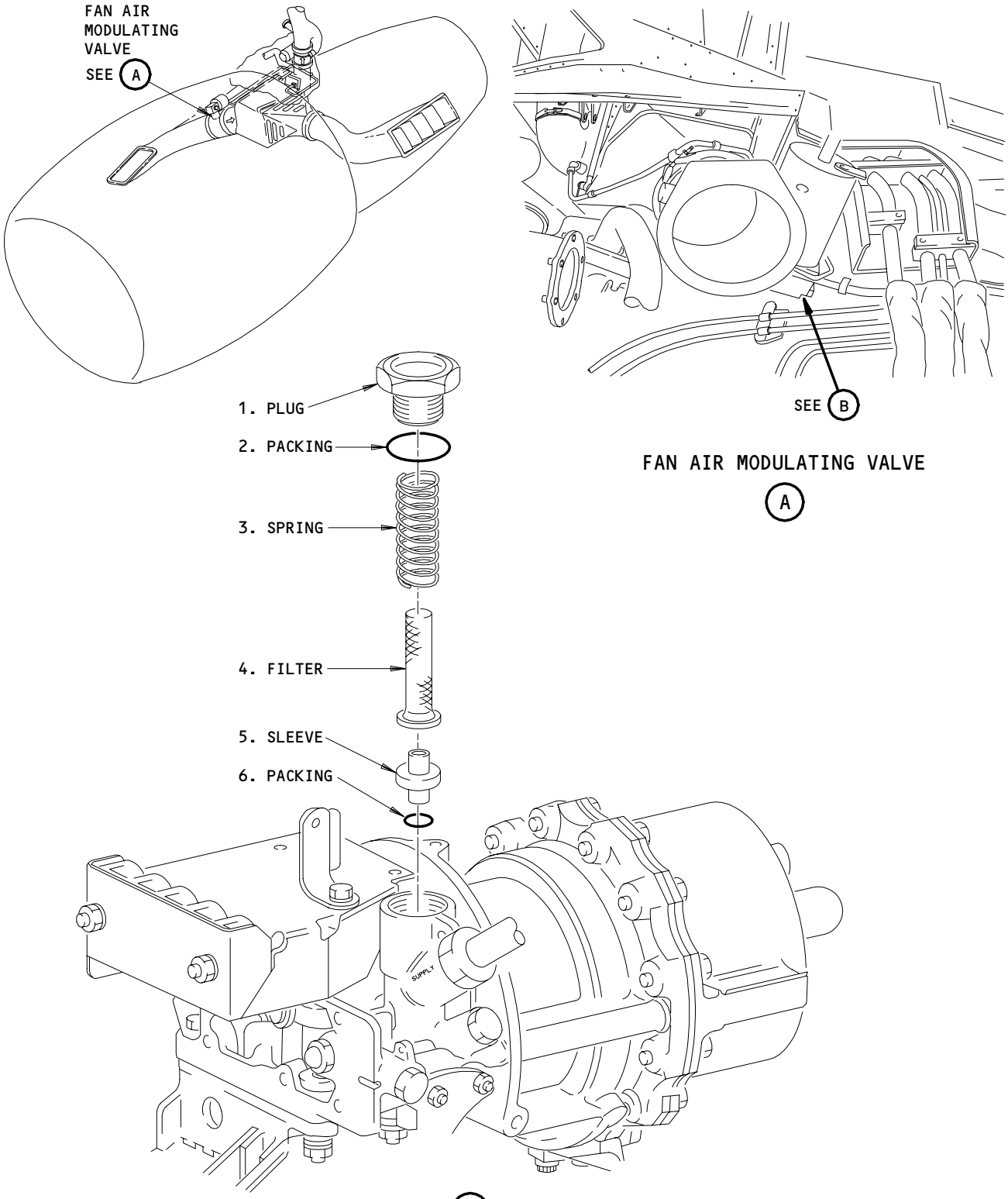
FAN AIR MODULATING VALVE

A



B

Fan Air Modulating Valve
Figure 401



Fan Air Modulating Valve Air Filter Installation
Fig 402

S 014-006

WARNING: MAKE SURE THE FAN COWL PANELS AND CORE COWL PANELS ARE OPEN (AMM 78-31-00/201) BEFORE YOU OPEN THE FAN DUCT COWL AND THRUST REVERSER. FAILURE TO OBEY AMM 78-31-00/201 COULD CAUSE INJURY TO PERSONS AND DAMAGE TO THE FAN COWL PANELS, CORE COWL PANELS, FAN DUCT COWL, AND THRUST REVERSER.

(5) Open the right half of the fan thrust reverser (AMM 78-31-00/201).

D. Fan Air Modulating Valve Removal

S 034-008

(1) Remove the bolts (14) that attach the wear plate (17) to the modulating valve (2) and remove the wear plate (17).

SAS NOTE: If a wear-plate is installed on the new/overhauled valve, the
SAS wear-plate does not need to be removed from the old valve.

S 034-011

(2) To disconnect the top and bottom guide clamps (5, 13), remove the screws (3) that attach the guide clamps to the modulating valve.

S 034-012

(3) Disconnect the electrical wire (11) from the modulating valve actuator and put a tag on it for installation.

S 034-019

(4) Disconnect the bonding jumper (12) from the modulating valve (2).

S 034-020

(5) Disconnect the cooling line (7) from the elbow (10).

S 034-021

(6) Disconnect the temperature sense line (6) from the elbow (10).

S 034-077

(7) Remove the coupling (21) from the modulating valve (2).

S 024-078

(8) Remove the modulating valve (2).

S 494-024

(9) Put a cover on the duct opening to keep out unwanted materials.

TASK 36-11-16-404-080

3. Install the Fan Air Modulating Valve

A. Consumable Materials

(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature anti-seize compound)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	2	Fan Air Modulating Valve	36-12-02	02	365
	3	Screw			305
	4	Washer			315
	8	Packing			175
	9	Nut			180
	10	Elbow			170
	14	Bolt			345
	15	Washer			350
	16	Nut			355
	17	Wear Plate			360
	18	Screw			310
	19	Washer			320
	20	Nut			330
	21	Coupling			370

C. References

(1) AMM 06-41-00/201, Fuselage Access Doors and Panels

(2) AMM 24-22-00/201, Electric Power Control

(3) AMM 27-81-00/201, Leading Edge Slat System
(4) AMM 36-00-00/201, Air Supply - General
(5) AMM 36-23-01/401, Air Supply BITE Module
(6) AMM 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zones
410/420 No. 1/2 Power Plant
(2) Access Panels
119AL E/E Access Door

E. Fan Air Modulating Valve Installation

S 094-026
(1) Remove the duct cover.

S 424-027
(2) Put the modulating valve (2) on the precooler inlet (1).
(a) Make sure the indexing key on the modulating valve flange engages with the keyway on the precooler flange.

S 434-082

CAUTION: MAKE SURE YOU INSTALL THE LOCKING DEVICE OF THE COUPLING CORRECTLY AS SHOWN IN FIGURE 401. IF YOU DO NOT INSTALL THE COUPLING FINGERS INSIDE THE LOCKING DEVICE THE COUPLING CAN LOOSEN AND CAUSE DAMAGE TO EQUIPMENT.

(3) Install the coupling (21) on the valve and precooler flange.

S 434-084

CAUTION: DO NOT TIGHTEN THE COUPLINGS MORE THAN THE SPECIFIED LIMIT. IF YOU APPLY TOO MUCH TORQUE, THE VALVE FLOW BODY CAN WARP (BECOME OVAL) AND CAUSE THE VALVE TO BIND DURING OPERATION.

(4) Tighten the coupling to 120 inch-pounds.

S 644-083
(5) Apply the anti-seize compound to all of the sense line fittings.

S 434-032
(6) Install the elbow (10) and nut (9) to the modulating valve (2) with new O-rings (8).

S 434-038
(7) Install the top and bottom guide clamps (5, 13) to the modulating valve (2) with the screws (3) and washers (4).
(a) Tighten the screws to 20 to 25 inch-pounds.

S 434-040

(8) Install the cooling and temperature sense lines (6, 7) to the elbows (10).
    (a) Tighten the fittings and nuts.

S 434-041

(9) Connect the electrical wires (11) to the limit switches.

S 434-042

(10) Connect the bonding jumpers (12) to the modulating valve (2) with the screws (18), washers (19), and nuts (20).

S 434-044

(11) Attach the wear plate (17) to the modulating valve with the bolts (14), washers (15), and nuts (16).

SAS NOTE: If a wear-plate is installed on the new/overhauled valve,
SAS check the condition of the wear-plate and the installation.
SAS If a wear-plate is not installed on the new/overhauled valve
SAS or is damaged, remove the wear-plate from the old valve and
SAS inspect for damage or excessive wear. If the wear-plate is
SAS found OK, install the wear-plate on the new/overhauled valve.
SAS If the wear-plate is found damaged or has excessive wear,
SAS replace the wear-plate.
SAS

    (a) Tighten the bolts (14) and nuts (16).

S 864-045

(12) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
    (a) 36L7 or 36K7, AIR SUPPLY BITE

S 714-103

(13) Do these steps to do an operational test of the FAMV:
    (a) Pressurize the pnuematic system upstream of the PRSOV (AMM 36-11-09/201).

(b) Make sure the FAMV goes to the closed position.
(c) Make sure there is no leakage at the sense line connections for the FAMV.
1) Repair any leakage.
(d) Remove pneumatic power (AMM 36-11-09/201).
(e) Make sure the FAMV goes back to the full open position.

S 714-046
(14) Do a BITE test.
(a) Open the E/E Access Door, 119AL, and find the Air Supply BITE module on the E3 equipment rack (AMM 06-41-00/201).
(b) Push and hold the PRESS/TEST switch of the air supply BITE module.
1) Make sure all 12 indicator lights come on.
2) Release the PRESS/TEST switch.
3) If all 12 indicator lights do not come on, replace the Air Supply BITE module (AMM 36-23-01/401).
(c) Push and release the BITE/STEP switch on the BITE module.
1) Make sure the NO FAULT indicator light comes on for approximately 10 seconds.
2) If a light other than the NO FAULT light comes on, replace the component that shows or do the air supply BITE system test (AMM 36-23-00/501).
(d) Push and release the RESET switch on the BITE module.

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

S 414-096
(1) Close the E/E Access Door, 119AL (AMM 06-41-00/201).

S 414-047

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201. INJURY TO PERSONS AND DAMAGE TO THE FAN COWL, CORE COWL, FAN DUCT COWL, AND THRUST REVERSER COULD OCCUR.

(2) Close the right half of the fan thrust reverser (AMM 78-31-00/201).

S 864-049
(3) Do the activation procedure for the leading edge slats (AMM 27-81-00/201).

S 864-050
(4) Remove electrical power if it is not necessary.

TASK 36-11-16-004-079

4. Remove the Air Filter for the Fan Air Modulating Valve (Fig. 402)

A. References
(1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 27-81-00/201, Leading Edge Slat System
(4) AMM 36-00-00/201, Air Supply - General

(5) AMM 54-52-01/401, Strut Fairings
(6) AMM 78-31-00/201, Thrust Reverser System

B. Access
(1) Location Zones
435/445 No. 1/2 Nacelle/Core Cowl

C. Prepare for Removal

S 864-052
(1) Apply electrical power (AMM 24-22-00/201).

S 864-053
(2) Remove the pneumatic power (AMM 36-00-00/201).

S 864-055
(3) Do the deactivation procedure for the leading edge slats (AMM 27-81-00/201).

S 014-102
(4) As an option for access without opening the thrust reversers, remove the core cowl skirt fairing 436CR(446CR) (AMM 54-52-01/401).

S 014-056

WARNING: MAKE SURE THE FAN COWL PANELS AND CORE COWL PANELS ARE OPEN BEFORE YOU OPEN THE FAN DUCT COWL AND THRUST REVERSER. FAILURE TO OBEY COULD CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

D. Air Filter Removal

S 034-058
(1) Remove the plug (1) and packing (2).
(a) Discard the packing.

S 024-059
(2) Remove the spring (3) and air filter (4) from the modulating valve.

S 034-060
(3) Remove the sleeve (5) and packing (6) from the modulating valve.
(a) Discard the packing (6).

TASK 36-11-16-404-081

5. Install the Air Filter for the Fan Air Modulating Valve

A. Consumable Materials
(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
402	1	Plug	36-12-02	02	380
	2	Packing			385
	3	Spring			390
	4	Filter			395
	5	Sleeve			397
	6	Packing			398

C. References
(1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 27-81-00/201, Leading Edge Slat System
(4) AMM 36-00-00/201, Air Supply - General
(5) AMM 54-52-01/401, Strut Fairings
(6) AMM 78-31-00/201, Thrust Reverser System

D. Access
(1) Location Zones
435/445 No. 1/2 Nacelle/Core Cowl

E. Air Filter Installation

S 434-100

CAUTION: DO NOT INSTALL THE SLEEVE (5) UPSIDE DOWN. FAILURE OF THE VALVE CAN RESULT.

(1) Install a new packing (6) and sleeve (5) in the modulating valve.

NOTE: Single hole end of sleeve (5) should face out.

S 424-063
(2) Install the air filter (4) and spring (3) in the modulating valve.

S 434-064
(3) Install a new packing (2) on the plug (1).

S 644-065
(4) Lubricate the threads of the plug (1) with the anti-seize compound.

S 434-066
(5) Install the plug (1) in the fan air modulating valve.

S 434-067
(6) Tighten the plug (1) to 20 to 30 inch-pounds.

S 434-068
(7) Install the lockwire.

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

S 414-070

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201. INJURY TO PERSONS AND DAMAGE TO THE FAN COWL, CORE COWL, FAN DUCT COWL, AND THRUST REVERSER COULD OCCUR.

(1) Close the right half of the fan thrust reverser (AMM 78-31-00/201).

S 864-072
(2) Do the activation procedure for the leading edge slats (Ref 27-81-00).

S 414-101
(3) If it was removed install the core cowl skirt fairing 436CR(446CR) (AMM 54-52-01/401).

S 864-073
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

FAN AIR MODULATING VALVE AND FAN AIR TEMPERATURE SENSOR - ADJUSTMENT/TEST

1. General
   A. This procedure has these tasks:
      (1) A BITE test that looks for Fan Air Modulating Valve or Fan Air Temperature Sensor faults.
      (2) A functional test of the FAMV and the FATS while the FAMV and FATS are installed on-wing.

TASK 36-11-16-745-135

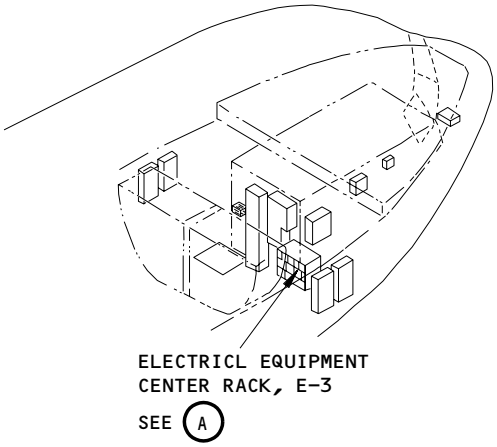
2. Bite Test for FAMV or FATS Faults on The Air Supply Bite Module
   A. References
      (1) AMM 06-41-00/201, Fuselage Access Door and Panels
      (2) AMM 24-22-00/201, Electrical Power - General
      (3) AMM 36-00-00/201, Pneumatic Power - General
   B. Access
      (1) Location Zones
          120 Main Equipment Center (RH side)
      (2) Access Panels
          119AL Electrical Access Door
   C. Prepare for the Test

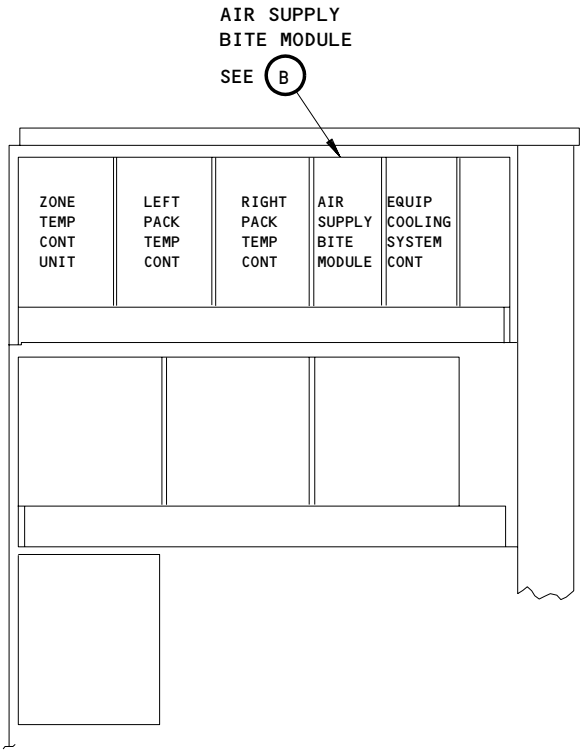
      S 865-126
      (1) Depressurize the pneumatic system (AMM 36-00-00/201).

      S 865-127
      (2) Supply electrical power (AMM 24-22-00/201).

      S 015-076
      (3) Open the door 119AL (AMM 06-41-00/201).

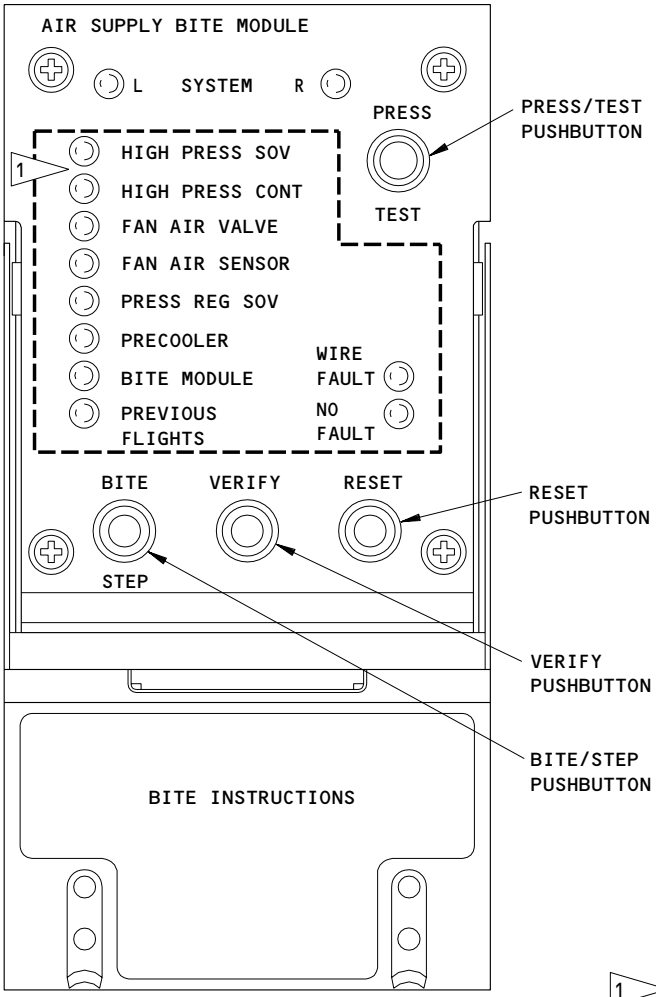
      S 865-028
      (4) Make sure this circuit breaker on the left misc equipment panel, P36, is closed:
          (a) 36L7, AIR SUPPLY BITE

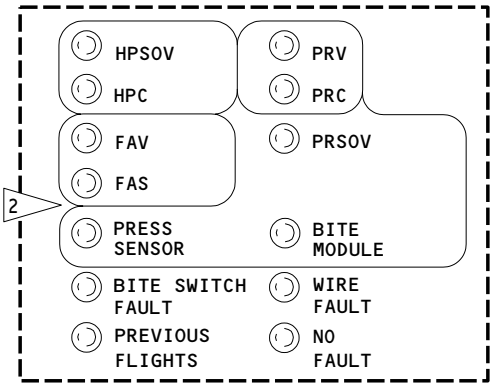




ELECTRICAL EQUIPMENT CENTER RACK, E-3

A





AIR SUPPLY BITE MODULE

B

1 ON AIRPLANES WITH BITE MODULE P/N S210T120-57 (H/S 773461-10) OR LESS

2 ON AIRPLANES WITH BITE MODULE P/N S210T120-67 (H/S 804401-2) OR ABOVE

Air Supply BITE Module
Figure 501

G28344

D. BITE Test (Figure 501)

NOTE: Use of the BITE module is not recommended for part numbers S210T120-47 and less.

S 745-010

(1) Push and hold the "PRESS TEST" button on the BITE module.

NOTE: This does a test of all the indicator lights on the BITE module display panel. The lights should remain illuminated until the PRESS TEST button is released.

S 215-011

(2) Make sure all the indicator lights are on.

S 745-151

(3) Release the "PRESS TEST" button on the BITE module.

S 745-012

(4) Push and release the "BITE STEP" button.

NOTE: BITE STEP is used to show faults stored in fault memory. Current flight (the time before the last ground-to-air transition) faults are shown when the BITE STEP is first pushed. Each subsequent push of the button shows the faults for each of the previous seven flights. A "NO FAULT" light will illuminate for 10 seconds if no faults are stored.

(a) Keep a record of all the faults.

NOTE: If the NO FAULT light does not show, continue to push the "BITE STEP" button until no lights come on.

S 745-013
(5) Push the "VERIFY" button.

NOTE: This test will confirm that the Air Supply LRU's are electrically connected correctly. VERIFY does a test for open wires between the LRU and the BITE module and makes sure the sensors/switches are in their unpressurized state (e.g., the HPSOV position switch is closed, the pressures sensor reads 0 psig etc.). Faults will be shown immediately. Parts of this test will be prevented if the manifold is pressurized.

(a) Keep a record of all the faults.

NOTE: Continue to push the "VERIFY" button until no lights come on.

S 355-014
(6) Repair all FATS and FAMV faults.

NOTE: On the air supply BITE module front panel, FATS faults are indicated by the FAS or FAN AIR SENSOR light. FAMV faults are indicated by the FAV or FAN AIR VALVE light.

S 815-152
(7) If other lights come on during the test, do this procedure: Air Supply BITE Procedure (FIM 36-20-00/104).

E. Put the Airplane Back To Its Usual Position

S 415-128
(1) Close the door 119AL (AMM 06-41-00/201).

S 865-129
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 36-11-16-725-130

3. Fan Air Modulating Valve and Fan Air Temperature Sensor Test

A. Equipment

(1) Air or Nitrogen Source
(2) Supply pressure gage - 0-50 psig
(3) Pressure hose - 0-50 psig
(4) Low Speed ARINC 429 Data Analyzer Odd Parity, SDI (BIT 10, BIT 9)

B. Consumable Materials

(1) D00006 Anti-seize Compound - Bostik Never-Seez

C. References

(1) AMM 24-22-00/201, Electrical Power - General
(2) AMM 25-52-01/401, Sidewall Lining
(3) AMM 36-00-00/201, Pneumatic Power - General
(4) AMM 36-11-16/401, Fan Air Modulating Valve
(5) AMM 36-11-17/401, Fan Air Temperature Sensor
(6) AMM 71-11-04/201, Fan Cowl Panel
(7) AMM 71-11-06/201, Core Cowl Panel
(8) AMM 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zones

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

(2) Access Panels (PW 4000 or PW JT9D ENGINES)

414AR	Right Left Fan Cowl (Left engine)
416AR	Right Thrust Reverser (Left engine)
418AR	Right Core Cowl (Left engine)
424AR	Right Fan Cowl (Right engine)
426AR	Right Thrust Reverser (Right engine)
428AR	Right Core Cowl (Right engine)

E. Prepare for the Test

S 865-101

WARNING: YOU MUST REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. IF YOU DO NOT REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS, HOT HIGH PRESSURE AIR CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Depressurize the pneumatic system (AMM 36-00-00/201).

S 865-102

(2) Supply electrical power (AMM 24-22-00/201).

S 015-155
(3) AIRPLANES WITH PW 4000 OR PW JT9D ENGINES;
Get access to the Fan Air Modulating Valve (FAMV) on the 'right' side of the associated (left/right) engine:

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.

(a) Do the deactivation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).
(b) Open the associated right fan cowl panel (414AR/424AR) (AMM 71-11-04/201).
(c) Open the associated right core cowl panel (418AR/428AR) (AMM 71-11-06/201).

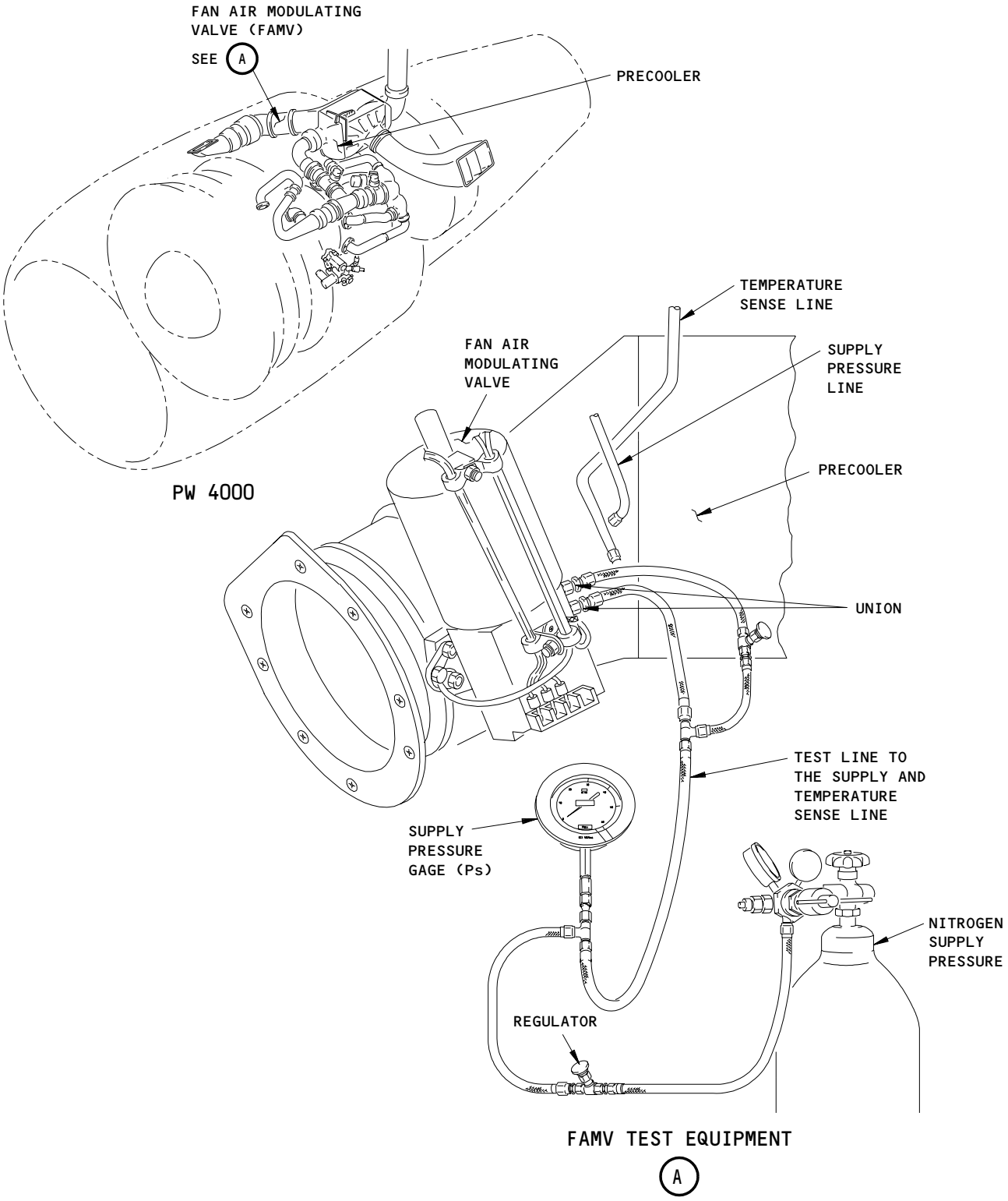
WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Open the associated right thrust reverser (416AR/426AR) (AMM 78-31-00/201).

S 865-143
(4) AIRPLANES WITH BITE MODULE P/N S210T120-67 POST-SB 36-0039;
Do these steps to set up the ARINC monitor:

NOTE: The ARINC 429 portion of this test can only be done on BITE modules with part numbers S210T120-67 and above. These BITE modules have an ARINC 429 test port that will let you monitor real time data from pneumatic component switches and sensors.

(a) Remove the sidewall lining in the forward cargo compartment to find terminal block 130 on the E1-2 shelf (AMM 25-52-01/401).
(b) Install a low speed ARINC 429 monitor to pins FA56 and FC56 of the terminal block 130 on the E1-2 shelf.
(c) The left channel data is shown on the source/destination identifier (SDI) 01 and the right channel data is on (SDI) 10. These are BIT 10 and BIT 9 as shown on the ARINC 429 monitor.
(d) Set the equipment ID number to 002.



Fan Air Modulating Valve
Figure 502

F. FAMV/FATS Operational Test with a Ground Source or the APU (Figure 502)

NOTE: During the test you will be asked some questions. Each question will have a yes or no answer. Each yes or no answer gives a recommended action, for example: NO, replace the FAMV (AMM 36-11-16/401). You can continue with the test without doing the action if you want to see other characteristics of the test. However, you should do the recommended action after you complete the test.

S 215-015

(1) Look at the FAMV position indicator. Is the FAMV in the fully open position?
   (a) NO, replace the FAMV (AMM 36-11-16/401).
   (b) YES, continue.

BITE Module ARINC 429 Outputs for FAMV/FATS Data Signals
Table 501

OCTAL LABEL	BIT	SIGNAL DESCRIPTION	STATUS
351	22	FAMV OPEN POSITION SWITCH	FAMV OPEN: BIT=1
	23	FAMV CLOSED POSITION SWITCH	FAMV IS NOT CLOSED: BIT=1

Left channel SDI=01; Right channel SDI=10

S 215-136

(2) AIRPLANES WITH BITE MODULE P/N S210T120-67 POST-SB 36-0039; Make sure the ARINC 429 Data Analyzer octal label 351 shows these indications:
BIT 22=1
BIT 23=1
   (a) If the FAMV is fully open and either BIT 22 or BIT 23 or both show 0, then troubleshoot the position switches and wiring.

S 215-016

(3) Do a check of the sense lines to and from the FATS and FAMV.
   (a) Repair all loose and/or damaged sense lines.

S 865-061

(4) Push the ECS button on the EICAS Maintenance Module of the accessory panel to show the ECS maintenance page on the lower EICAS screen.

S 865-062

(5) Supply pneumatic power with a ground source or the APU (AMM 36-00-00/201).

S 865-063
(6) Open the Left, Center and Right Isolation Valves.

S 865-064
(7) Make sure the left and right MANIFOLD PRESS increases to at least 20 psig.

S 865-065
(8) Put the applicable L(R) ENG BLEED switch to the on position.

S 865-066
(9) Manually wrench open the PRSOV to pressurize the bleed duct.

S 715-067
(10) Make sure the FAMV goes from the full open to the full closed position within 15 seconds as the ENG DUCT PRESS increases.

NOTE: The FAMV should close within 15 seconds unless the PRECOOLER OUTLET TEMPERATURE is greater than approximately 300°F, at which point the valve may not close because it is on temperature control by the Fan Air Temperature Sensor. If the PRECOOLER OUTLET TEMPERATURE is greater (or suspected to be greater) than 300°F, allow the engine and ducting sufficient time to cool and repeat the test.

S 865-139
(11) AIRPLANES WITH BITE MODULE P/N S210T120-67 POST-SB 36-0039;
Make sure the ARINC 429 Data Analyzer octal label 351 shows these indications:
BIT 22=0
BIT 23=0
(a) If the FAMV is fully closed and either BIT 22 or BIT 23 or both show 1, then troubleshoot the position switches and wiring.

S 795-068
(12) If the FAMV does not close, apply soap solution to the supply and signal line to the FAMV and make sure there are no leaks.

NOTE: Even a very small leak in the Fan Air Temperature signal line will prevent the FAMV from closing.

S 865-078
(13) Depressurize the pneumatic system (AMM 36-00-00/201)

S 865-081
(14) Close the center isolation valve, if required.

S 865-069
(15) If there are no leaks and the FAMV still does not close, Continue.

G. FAMV/FATS Operational Test with a Nitrogen Source (Or Equivalent) (Figure 502)

S 025-017
(1) Remove the supply pressure sense line and fan air temperature sense line to the FAMV.

S 485-018
(2) Install a nitrogen source (or equivalent) to the supply pressure sense line and fan air temperature sense line ports on the FAMV.

S 725-053
(3) Slowly apply 15 ±1 psig.

NOTE: The FAMV should close at approximately 10 psig.

S 865-141
(4) AIRPLANES WITH BITE MODULE P/N S210T120-67 POST-SB 36-0039;
Make sure the ARINC 429 Data Analyzer octal label 351 shows these indications:
BIT 22=0
BIT 23=0

S 725-019
(5) Did the FAMV close at less than or equal to 16 psig?
(a) YES, the FAMV is satisfactory. Replace the FATS (AMM 36-11-17/401).
(b) NO, replace the FAMV (AMM 36-11-16/401).

H. Put the Airplane Back to Its Usual Condition

S 085-111
(1) Remove the nitrogen source, supply pressure gage, hoses and fittings from the supply pressure sense line and fan air temperature sense line ports.

S 415-142
(2) AIRPLANES WITH BITE MODULE P/N S210T120-67 POST-SB 36-0039;
Remove the ARINC 429 analyzer and install the sidewall linings (AMM 25-52-01/401).

S 645-112
(3) Apply antiseize compound and connect the supply pressure sense line and fan air temperature sense line to the FAMV.

S 415-157

(4) AIRPLANES WITH PW 4000 OR PW JT9D ENGINES;
Close up the access to the FAMV on the 'right' side of the associated (left/right) engine:

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Close the associated right thrust reverser (416AR/426AR) (AMM 78-31-00/201).
(b) Close the associated right core cowl panel (418AR/428AR) (AMM 71-11-06/201).
(c) Close the associated right fan cowl panel (414AR/424AR) (AMM 71-11-04/201).
(d) Do the activation procedure for the thrust reversers (AMM 78-31-00/201).

S 865-122

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

FAN AIR TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks. The first task is the removal of the fan air temperature sensor. The second task is the installation of the fan air temperature sensor. The fan air temperature sensor is in the strut, immediately below the pressure regulating and shutoff valve.

TASK 36-11-17-004-001

2. Remove the Fan Air Temperature Sensor (Fig. 401)
   A. References
      (1) AMM 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
      (2) AMM 24-22-00/201, Electrical Power - Control
      (3) AMM 36-00-00/201, Pneumatic - General
      (4) AMM 78-31-00/201, Fan Thrust Reverser System
   B. Access
      (1) Location Zones
          431/441 Forward Nacelle Strut Fairing

   C. Prepare for the Removal

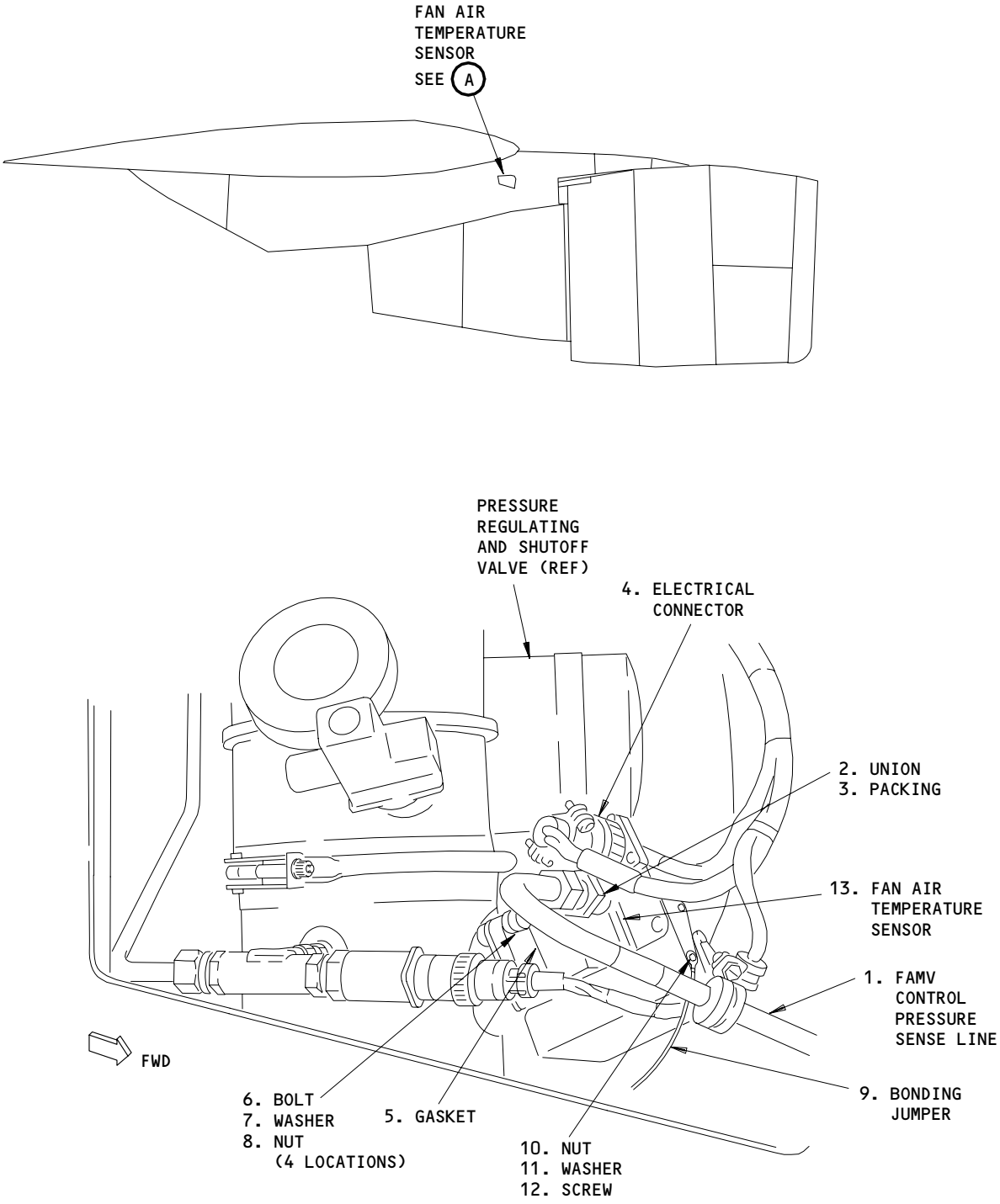
      S 864-002
      (1) Supply electrical power (AMM 24-22-00/201).

      S 864-063

      WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

      (2) Remove pneumatic power (AMM 36-00-00/201).

      S 864-004
      (3) Open this circuit breaker on the left misc equipment panel, P36, and attach a DO-NOT-CLOSE tag:
          (a) 36L7 or 36K7, AIR SUPPLY BITE



FAN AIR TEMPERATURE SENSOR

A

Fan Air Temperature Sensor Installation
Figure 401

S 044-064

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SLATS. THE SLATS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do the deactivation procedure for the leading edge slats (AMM 27-81-00/201) or move all persons and equipment away from the slats.

S 044-005

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER ISOLATION VALVE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do this procedure: Thrust Reverser Isolation Valve Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 014-007

(6) Open the pressure relief door for the right side of the strut (444AR or 434AR).

D. Remove the Fan Air Temperature Sensor

S 034-012

(1) Disconnect the electrical connector (4) from the fan air temperature sensor (13).

S 034-071

(2) Disconnect the nut (10) and washer (11), and screw (12) that hold the bonding jumper (9) to the fan air temperature sensor (13).

S 034-013

(3) Disconnect the bonding jumpers (9) from the fan air temperature sensor (13).

S 034-014

(4) Disconnect the FAMV control pressure sense line (1) from the fan air temperature sensor (13).

S 434-072

(5) Remove the union (2) from the fan air temperature sensor (13).

S 024-015

WARNING: BE CAREFUL WHEN YOU REMOVE THE FAN AIR TEMPERATURE SENSOR. THE TEMPERATURE PROBE EXTENDS INTO THE DUCT. YOU CAN EASILY CAUSE DAMAGE.

(6) Remove the bolts (6), washers (7) and nuts (8) from the fan air temperature sensor (13) flange.

S 024-039

(7) Remove the fan air temperature sensor (13) and the gasket (5).

TASK 36-11-17-404-017

3. Install the Fan Air Temperature Sensor (Fig. 401)

A. Consumable Materials

(1) D01062N, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature anti-seize compound)

B. Parts

AMM			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
401	2	UNION	36-12-02	02	56
	3	PACKING			70
	5	GASKET	36-11-01	01	120
	6	BOLT			105,110
	7	WASHER			115
	8	NUT			122
	10	NUT			310
	11	WASHER			295
	12	SCREW			290
	13	FAN AIR TEMPERATURE SENSOR			100

C. References
(1) AMM 20-10-23/401, Standard Practices - Lockwires
(2) AMM 24-22-00/201, Electrical Power - Control
(3) AMM 36-00-00/201, Pneumatic - General
(4) AMM 36-11-09/201, Pressure Regulating and Shutoff Valve
(5) AMM 36-23-00/501, Air Supply BITE System
(6) AMM 78-31-00/201, Fan Thrust Reverser System

D. Access
(1) Location Zones
431/441 Forward Nacelle Strut Fairing

E. Procedure

S 434-073
(1) Install the union (2) with a new O-ring (3) on the fan air temperature sensor (13).

S 434-018
(2) Install a new gasket (5) on the fan air temperature sensor (13) flange.

S 424-019

WARNING: BE CAREFUL WHEN YOU INSTALL THE FAN AIR TEMPERATURE SENSOR. YOU CAN EASILY BEND AND CAUSE DAMAGE TO THE THE TEMERATURE PROBE.

(3) Install the fan air temperature sensor (13) on the flange with the bolts (6), washers (7), and nuts (8).

S 434-020
(4) Install the lockwire from the top right bolt (6) to one of the three other mounting bolts (6) (AMM 20-10-23/401)

NOTE: The top right bolt is not attached with a nut. You must install a lockwire to one of the three other mounting bolts.

S 644-062
(5) Apply antiseize compound to the fitting for the FAMV control pressure sense line (1).

S 434-026
(6) Install the FAMV control pressure sense line (1) to the fan air temperature sensor (13).

S 434-027
(7) Connect the bonding jumper (9) to the fan air temperature sensor (13) with the nut (10), washer (11), and screw (12).

S 434-028
(8) Install the electrical connector (4).

S 864-032
(9) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
(a) 36L7 or 36K7, AIR SUPPLY BITE

S 714-033
(10) Do a test of the fan air temperature sensor (13).

(a) Make sure the high pressure shutoff valve (HPSOV) is in the full closed position.
(b) If the valve is not closed, turn the HPSOV manual override to the full closed position.
(c) Pressurize the pneumatic system upstream of the pressure regulating shutoff valve (PRSOV) (AMM 36-11-09/201).
(d) Do a test of the temperature sensor flanges for leakage.
1) Some leakage is permitted.
2) Strong leakage must be repaired by joint or clamp adjustment.
(e) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).
(f) Put the PRSOV back to its usual condition.
1) Remove the plug from the PRSOV.
2) Remove the cap from the pressure sense line.
3) Connect the sense line to the PRSOV (AMM 36-11-09/201).

S 744-079
(11) Do the BITE test of the Air Supply System (AMM 36-23-00/501).

NOTE: The system BITE test makes sure the electrical operation of the temperature sensor is correct.

F. Put the Airplane Back to Its Usual Condition

S 864-034
(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 414-035
(2) Close the strut access door 444AR or 434AR.

S 444-036
(3) Do the activation procedure for the thrust reverser isolation valve (AMM 78-31-00/201).

S 444-078
(4) Do the activation procedure for the leading edge slats (AMM 27-81-00/201).

TASK 36-11-17-004-056

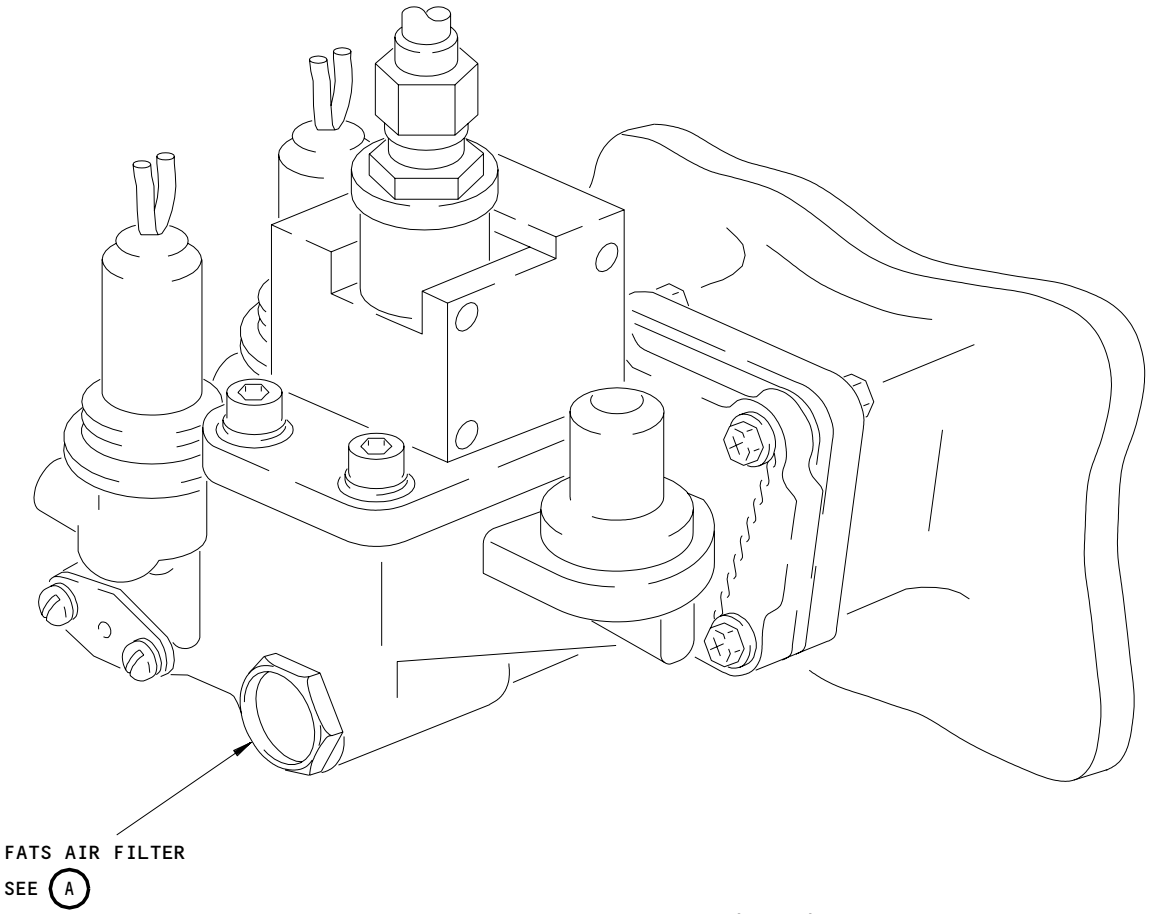
4. Remove the Air Filter for the Fan Air Temperature Sensor (Fig. 402)
A. References
(1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 27-81-00/201, Leading Edge Slat System
(4) AMM 36-00-00/201, Air Supply - General
(5) AMM 78-31-00/201, Thrust Reverser System
B. Access
(1) Location Zones
431/441 Forward Nacelle Strut Fairing
C. Prepare for Removal

S 864-052
(1) Supply electrical power (AMM 24-22-00/201).

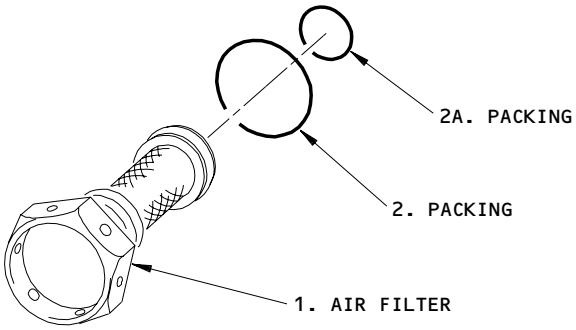
S 864-053
(2) Remove the pneumatic power (AMM 36-00-00/201).

S 044-065

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SLATS. THE SLATS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

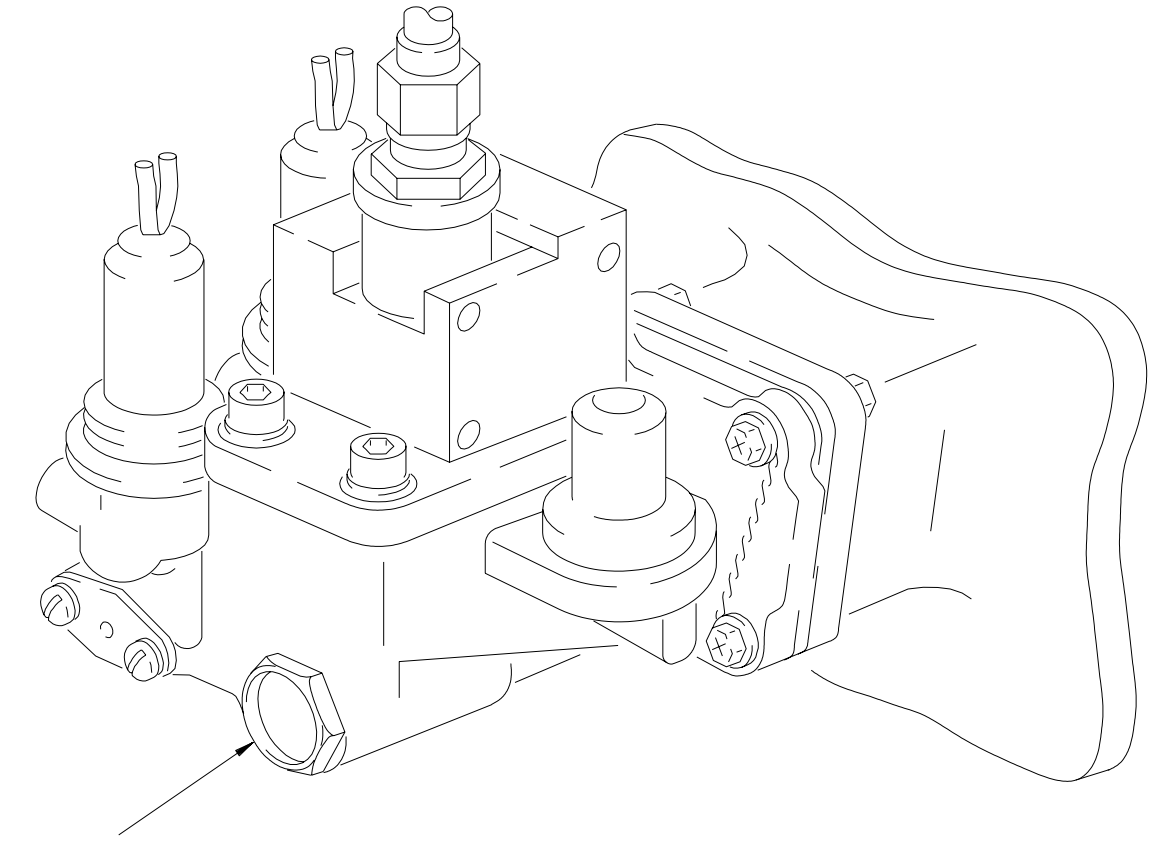


FAN AIR TEMPERATURE SENSOR (FATS)

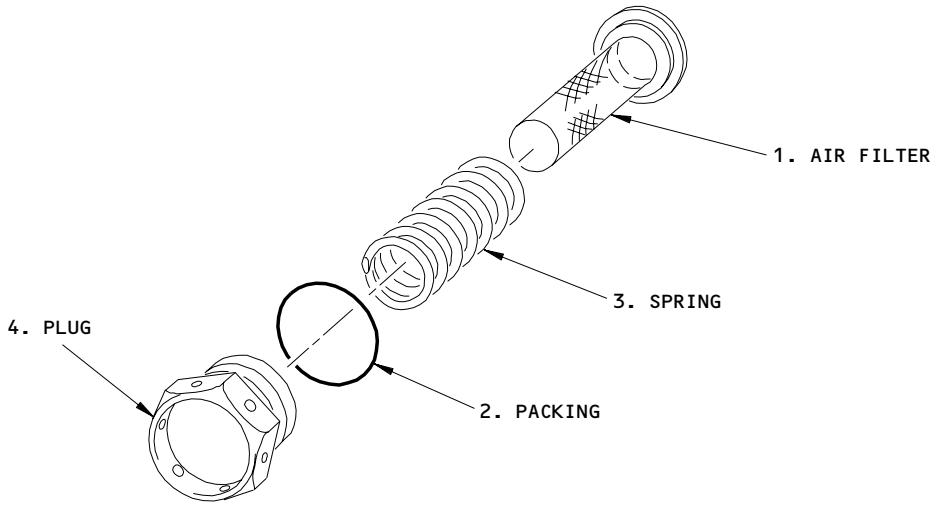


FATS AIR FILTER
(A)

Fan Air Temperature Sensor Filter
Figure 402



FAN AIR TEMPERATURE SENSOR (FATS)



FATS AIR FILTER

(A)

Fan Air Temperature Sensor Filter
Figure 402A

(3) Do the deactivation procedure for the leading edge slats (AMM 27-81-00/201) or move all persons and equipment away from the slats.

S 044-087

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER ISOLATION VALVE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this procedure: Thrust Reverser Isolation Valve Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 024-082

(5) Open the pressure relief door for the right strut (444AR or 434AR) (AMM 78-31-00/201)

D. FATS POST-HAMILTON SUNDSTRAND SB 36-2106;
Air Filter Removal (Fig. 402)

S 024-117

(1) Remove and discard air filter (1), packing (2) and packing (2A) from the FATS port.

E. FATS PRE-HAMILTON SUNDSTRAND SB 36-2106;
Air Filter Removal (Fig. 402A)

S 024-118

(1) Remove plug (4), spring (3), packing (2) and air filter (1) from the FATS port.
(a) Discard air filter (1) and packing (2).

TASK 36-11-17-404-057

5. Install the Air Filter for the Fan Air Temperature Sensor

A. Consumable Materials
(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature antiseize compound)

B. Parts
(1) AIRPLANES WITH PW JT9D OR PW4000 SERIES ENGINES;
Refer to the table that follows:

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
402	1	Air Filter	36-11-01	01	129A
402	2	Packing	36-11-01	01	127
402	2A	Packing (small)	36-11-01	01	129B
402A	1	Air Filter	36-11-01	01	129
402A	2	Packing	36-11-01	01	127

C. References
(1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 20-10-23/401, Standard Practices - Lockwire
(3) AMM 24-22-00/201, Electric Power Control
(4) AMM 27-81-00/201, Leading Edge Slat System
(5) AMM 36-00-00/201, Air Supply - General
(6) AMM 78-31-00/201, Thrust Reverser System

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

E. FATS POST-HAMILTON SUNDSTRAND SB 36-2106;
FATS Air Filter Installation (Fig. 402)

S 424-055
(1) Do these steps to install the FATS air filter:
(a) Apply antiseize compound to the threads on new air filter (1).
(b) Install new air filter (1), new packing (2), and new packing (2A) into the FATS port.
(c) Tighten the air filter (6) 60-70 pound-inches.
(d) Install the lockwire (AMM 20-10-23/401).

F. FATS PRE-HAMILTON SUNDSTRAND SB 36-2106;
FATS Air Filter Installation (Fig. 402A)

S 424-088
(1) Do these steps to install the FATS air filter:
(a) Lubricate the threads of the plug (4) with the antiseize compound.
(b) Install new air filter (1), new packing (2), spring (3), and plug (4) into the FATS port.
(c) Tighten the plug (4) 20-30 pound-inches.
(d) Install the lockwire (AMM 20-10-23/401).

G. Put the Airplane Back to its Usual Condition

S 414-070

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201. INJURY TO PERSONS AND DAMAGE TO THE FAN COWL, CORE COWL, FAN DUCT COWL, AND THRUST REVERSER COULD OCCUR.

(1) Close the pressure relief door for the right strut (AMM 78-31-00/201).

S 444-103

(2) Do the activation procedure for the thrust reverser isolation valve. (AMM 78-31-00/201).

S 864-072

(3) Do the activation procedure for the leading edge slats (AMM 27-81-00/201).

S 864-073

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

PRESSURE REGULATING VALVE (PRV) - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks. The first task is to remove the pressure regulating valve. The second task is to install the pressure regulating valve.
   B. The pressure regulating valve (PRV) controls the duct pressure into the precooler. The valve closes if there is too much pressure or temperature. The valve is on the top left side of each engine, forward of the precooler.

TASK 36-11-18-004-001

2. Pressure Regulating Valve (PRV) Removal (Fig. 401)
   A. References
      (1) AMM 36-00-00/201, Pneumatics - General
      (2) AMM 36-11-01/401, Pneumatic Duct
      (3) AMM 71-11-04/201, Fan Cowl Panels
      (4) AMM 71-11-06/201, Core Cowl Panels
      (5) AMM 78-31-00/201, Thrust Reverser System
   B. Access
      (1) Location Zones

410	No. 1 Power Plant (left engine)
420	No. 2 Power Plant (right engine)

      (2) Access Panels

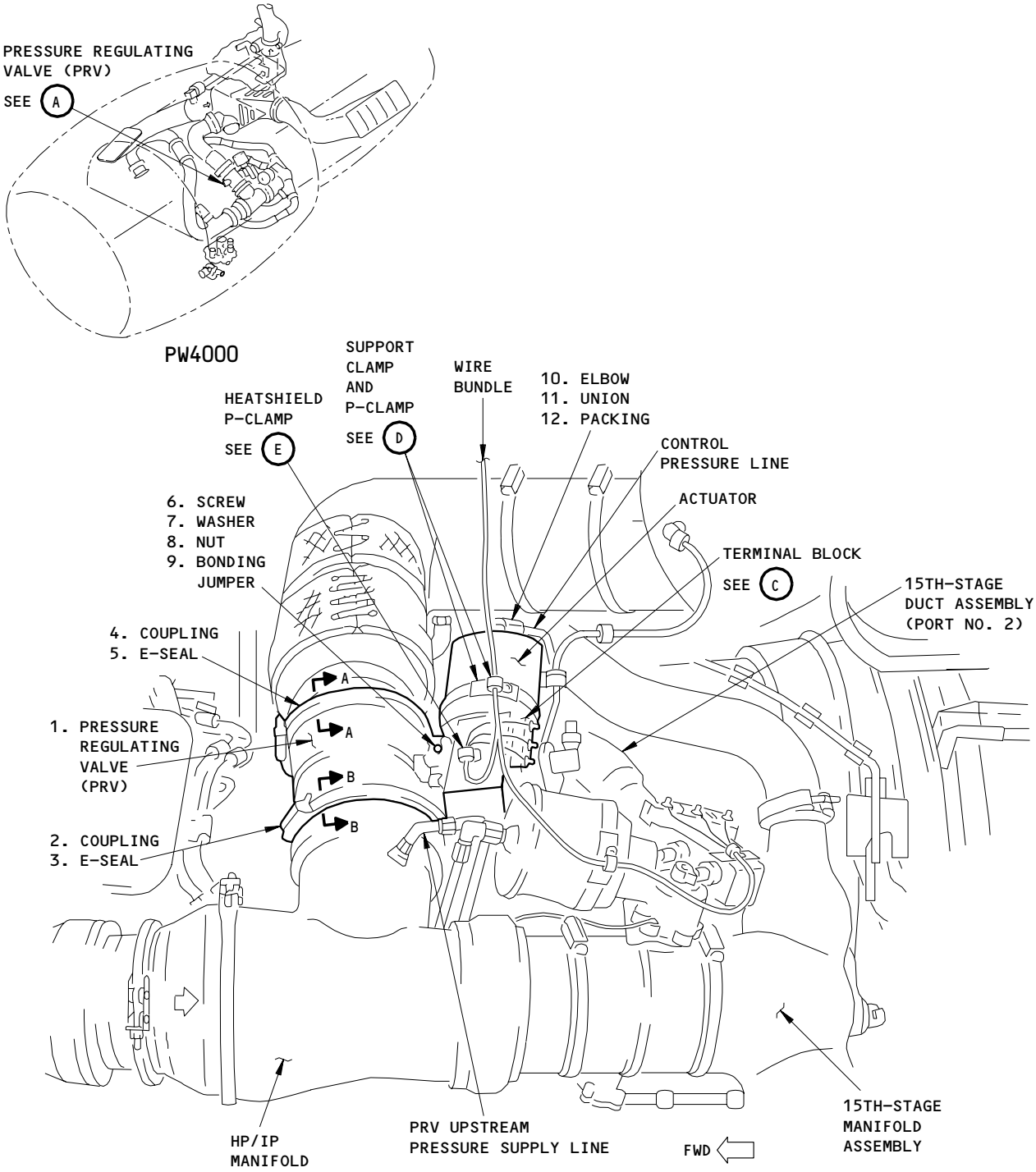
413AL	Left Fan Cowl (left engine)
415AL	Left Thrust Reverser (left engine)
417AL	Left Core Cowl (left engine)
423AL	Left Fan Cowl (right engine)
425AL	Left Thrust Reverser (right engine)
427AL	Left Core Cowl (right engine)

   C. Prepare for Removal

S 864-002

WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

(1) Remove the pneumatic power (AMM 36-00-00/201).



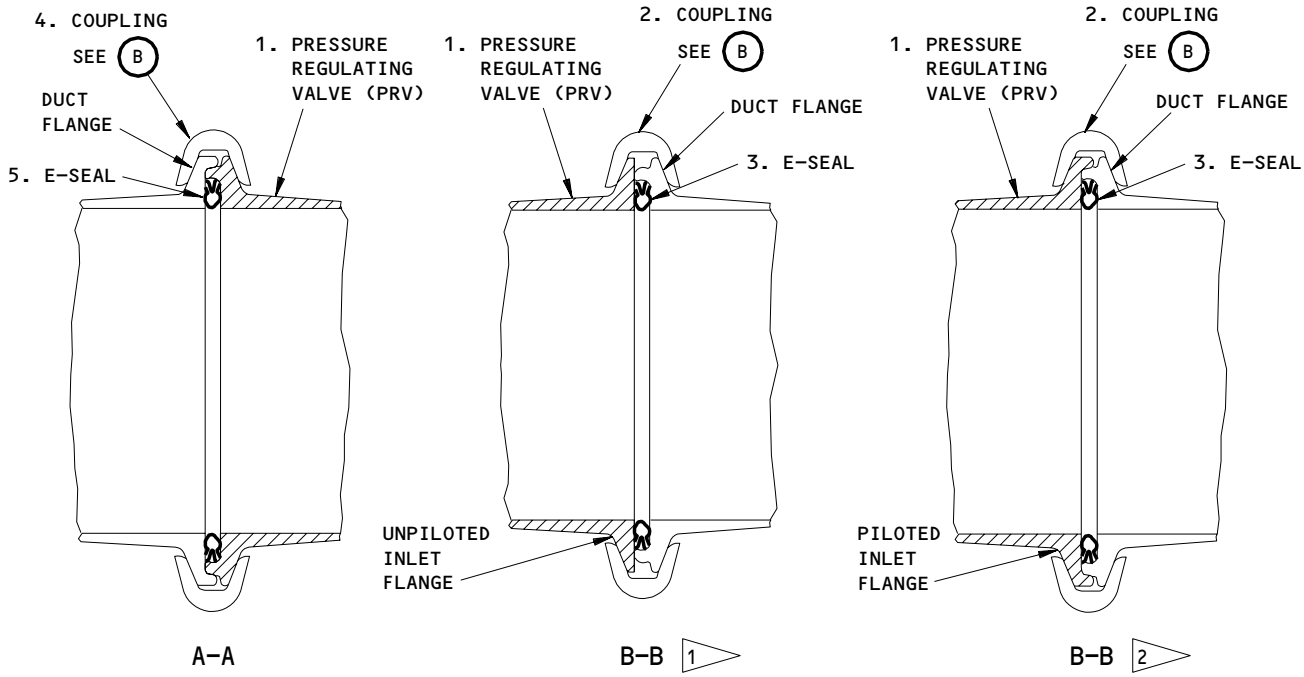
PRESSURE REGULATING VALVE (PRV)

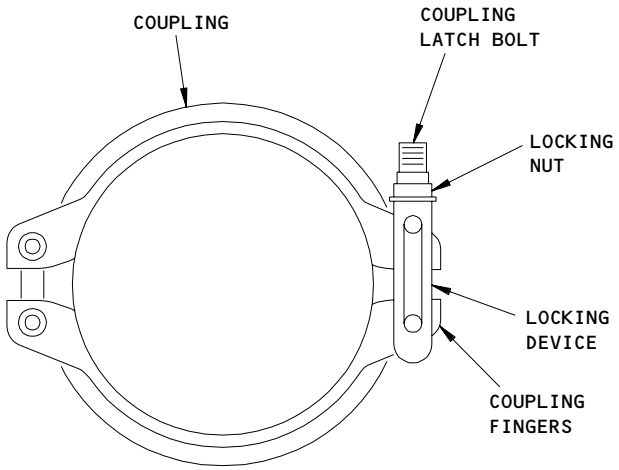
A

Pressure Regulating Valve Installation
Figure 401 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH PRV POST-SB 36-53;
PRV P/N S210T120-141 (PRR B12745)

N93191





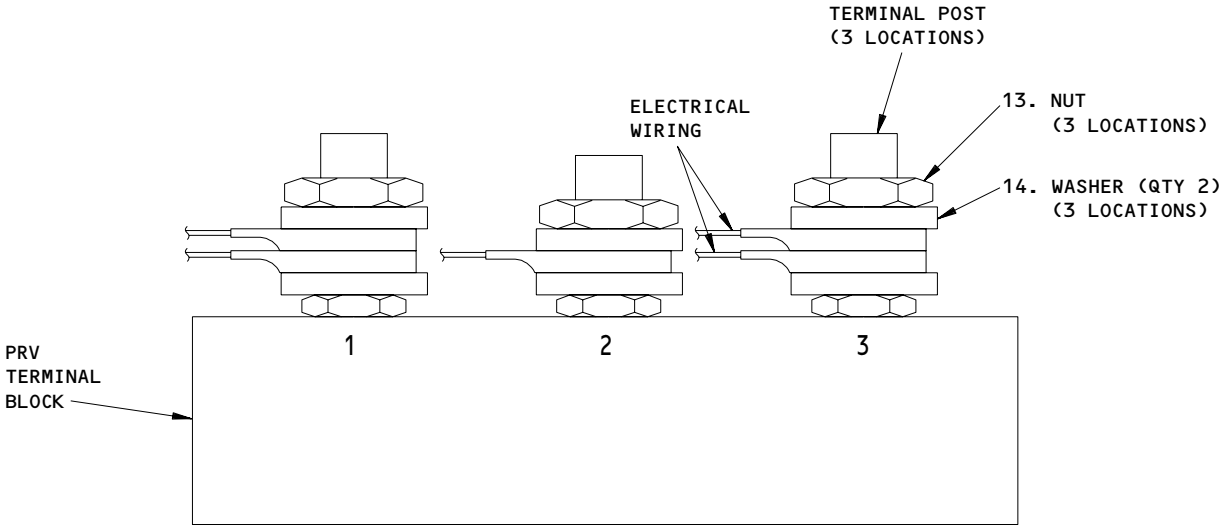
COUPLING
B

1 PRV WITH UNPILOTED INLET FLANGE
2 PRV WITH PILOTED INLET FLANGE

Pressure Regulating Valve Installation
Figure 401 (Sheet 2)

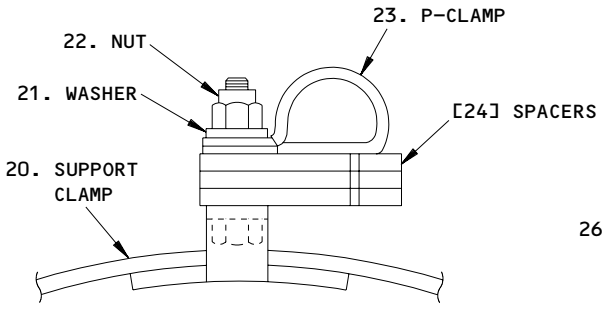
EFFECTIVITY
AIRPLANES WITH PRV POST-SB 36-53;
PRV P/N S210T120-141 (PRR B12745)

N93543



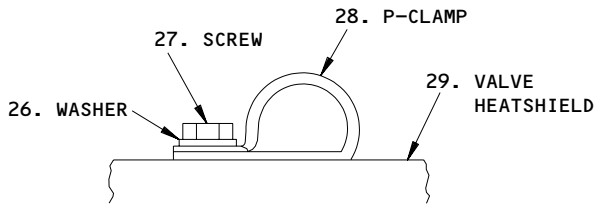
TERMINAL BLOCK

C



SUPPORT CLAMP AND P-CLAMP

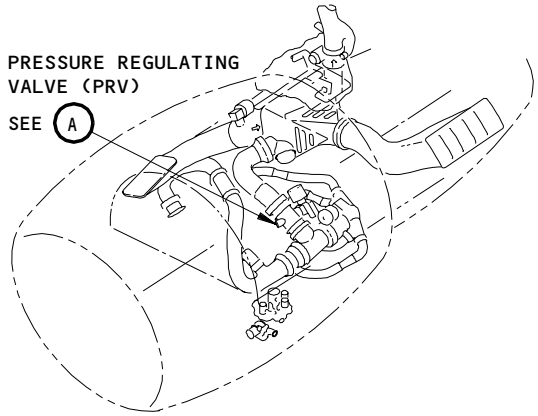
D



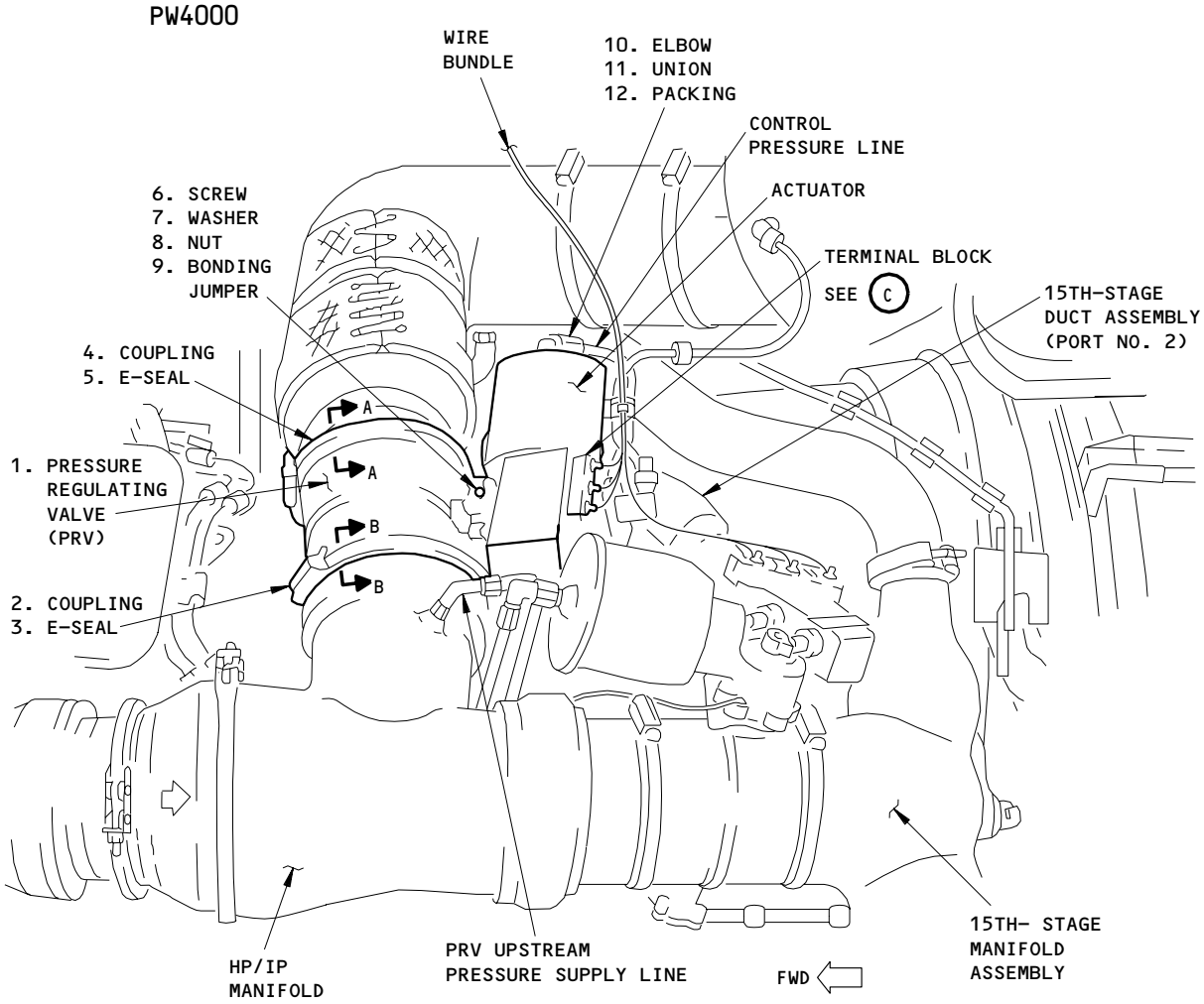
HEATSHIELD P-CLAMP

E

Pressure Regulating Valve Installation
Figure 401 (Sheet 3)



PW4000



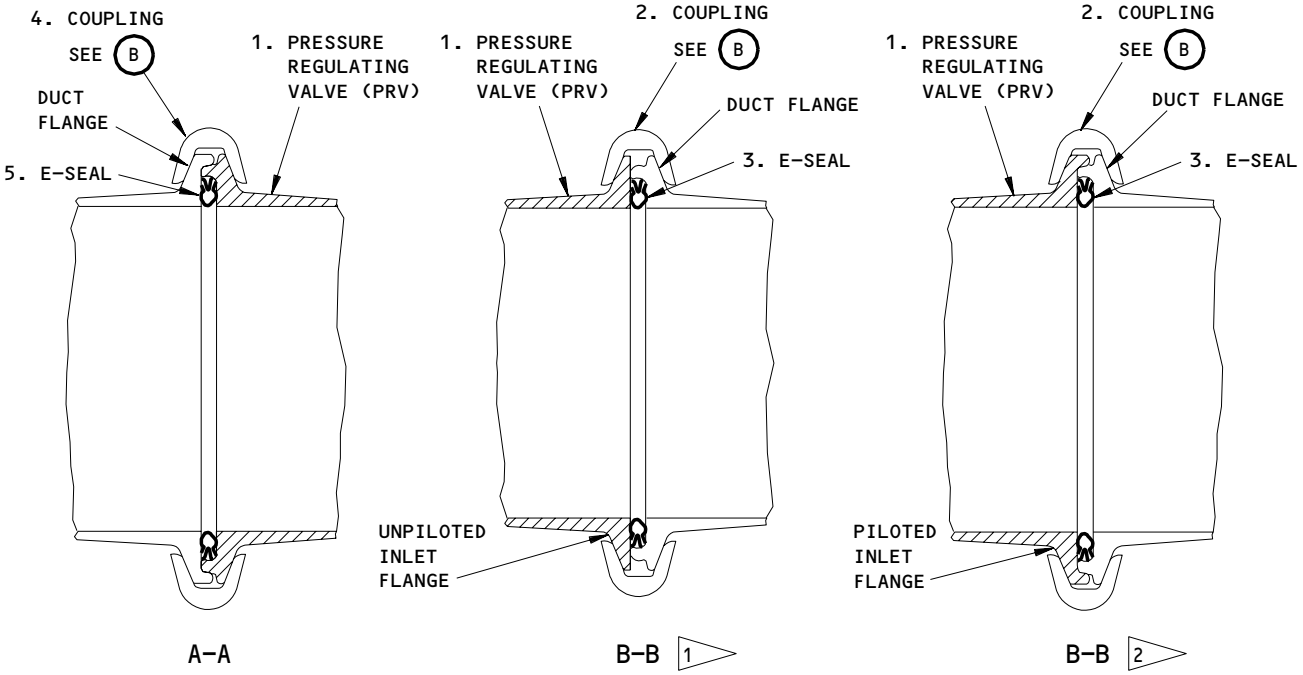
PRESSURE REGULATING VALVE (PRV)

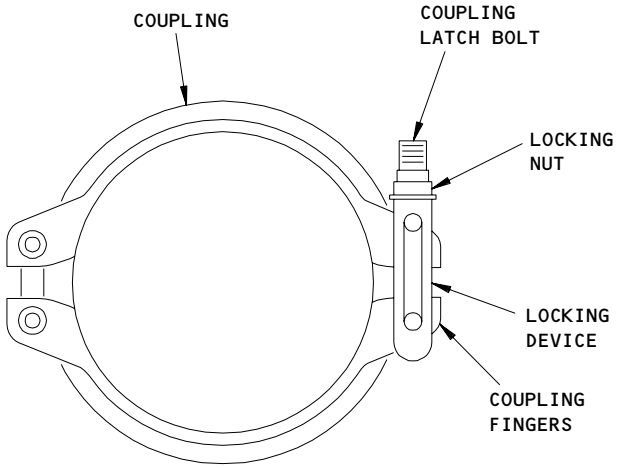
A

Pressure Regulating Valve Installation
Figure 401A (Sheet 1)

EFFECTIVITY
AIRPLANES WITH PRV PRE-SB 36-53;
PRV P/N S210T120-131 OR EARLIER

N93960





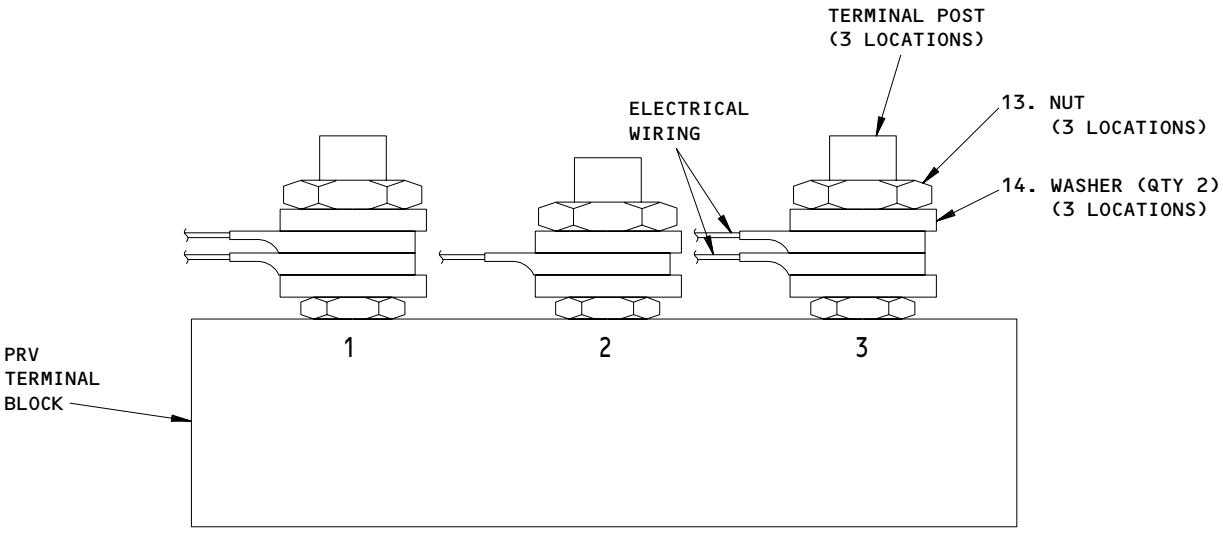
COUPLING
B

1 PRV WITH UNPILOTED INLET FLANGE
2 PRV WITH PILOTED INLET FLANGE

Pressure Regulating Valve Installation
Figure 401A (Sheet 2)

EFFECTIVITY
AIRPLANES WITH PRV PRE-SB 36-53;
PRV P/N S210T120-131 OR EARLIER

N94113



Pressure Regulating Valve Installation
Figure 401A (Sheet 3)

EFFECTIVITY
AIRPLANES WITH PRV PRE-SB 36-53;
PRV P/N S210T120-131 OR EARLIER

N94117

S 864-003
(2) Open these circuit breakers and attach DO-NOT-CLOSE tags:
(a) Pilots' Overhead Circuit Breaker panel, P11
1) For the left PRV:
a) 11S10, LEFT ENG BLEED IND
b) 11S11, LEFT ENG BLEED CONT
2) For the right PRV:
a) 11S19, RIGHT ENG BLEED IND
b) 11S20, RIGHT ENG BLEED CONT
(b) Left Miscellaneous Electrical Equipment panel, P36
1) 36L7 or 36K7, AIR SUPPLY BITE

S 014-005
(3) Get access to the PRV on left side of engine:

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY.

(a) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).
(b) Open the left fan cowl panel (AMM 71-11-04/201).
(c) Open the left core cowl panel (AMM 71-11-06/201).

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.

(d) Open the left thrust reverser (AMM 78-31-00/201).

D. Pressure Regulating Valve (PRV) Removal

S 024-074
(1) Remove the screw (6), washer (7), nut (8), and bonding jumper (9) from the PRV (1).

S 024-073
(2) Disconnect the electrical wiring from the PRV terminal block:
(a) Remove the nut (13) and two washers (14) from the terminal posts No.1,2,3 on the PRV terminal block.
(b) Put tags on the wires to help identify them for re-installation to the terminal posts.

S 024-081

(3) AIRPLANES WITH PRV POST-SB 36-53;
AIRPLANES WITH PRV P/N S210T120-141 (PRR B12745);
Disconnect the electrical wiring connected to the PRV actuator and PRV heatshield:
(a) Remove the washer (21), nut (22) to disconnect the P-clamp (23) and wiring from the support clamp (20) on the PRV actuator.
1) Re-install the washer (21) and nut (22) to keep the three spacers (24) attached to the support clamp (20).
(b) Loosen and remove the support clamp (20) from the valve actuator and keep for subsequent installation.
(c) Cut the lockwire then remove the washer (26) and screw (27) to disconnect the P-clamp (28) and wiring from the PRV heatshield.
1) Re-install the washer (26) and screw (27) to the PRV heatshield.

S 024-075

(4) Disconnect the control pressure line from the PRV actuator port.
(a) Loosen the B-nut to disconnect the elbow (6) from the union (7) connected to the PRV actuator port and control pressure line.
(b) Remove the union (7) and packing (8) from the PRV actuator port
1) Discard the packing (8).
2) Keep the union (7) with the elbow (6) for re-installation.
(c) Put a cover on the control pressure line to keep out unwanted material.

S 024-076

(5) Remove the two couplings (2) and (4) from the PRV (1).

S 024-015

(6) Remove the PRV (1) from the mating duct sections.

NOTE: If you cannot easily remove the PRV because it is too tight, loosen one of the duct sections on either side of the PRV (AMM 36-11-01/401).

(a) Remove the E-seals (3) and (5) and keep for later installation.

S 424-077

(7) Put covers on the duct openings to keep out unwanted material.

TASK 36-11-18-404-017

3. Pressure Regulating Valve (PRV) Installation (Fig. 401)

A. Consumable Materials

(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature antiseize compound)

(2) G00145, Tape - Permacel P-421 (or P-440)

B. References

(1) AMM 20-10-21/601, Electrical Bonding

(2) AMM 24-22-00/201, Electrical Power - Control

(3) AMM 36-11-01/401, Pneumatic Duct

(4) AMM 71-11-04/201, Fan Cowl Panels

(5) AMM 71-11-06/201, Core Cowl Panels

(6) AMM 78-31-00/201, Thrust Reverser System

(7) SWPM 20-20-00, Electrical Bonds and Grounds

C. Access

(1) Location Zones

410	No. 1 Power Plant (left engine)
420	No. 2 Power Plant (right engine)

(2) Access Panels

413AL	Left Fan Cowl (left engine)
415AL	Left Thrust Reverser (left engine)
417AL	Left Core Cowl (left engine)
423AL	Left Fan Cowl (right engine)
425AL	Left Thrust Reverser (right engine)
427AL	Left Core Cowl (right engine)

D. Pressure Regulating Valve (PRV) Installation

S 864-086

(1) Prior to PRV installation, reposition the PRV grounding tab on the PRV actuator such that it will not interfere with the movement of the PRV visual position indicator lever (if necessary).

NOTE: One end of the PRV grounding tab connects to the PRV actuator with a bolt, two washers, retaining cable, and lockwire.

S 024-082

(2) Remove the covers from the duct openings.

S 214-020

(3) Examine the duct flanges for damage.

S 214-021

CAUTION: BE CAREFUL WITH THE PRV E-SEALS. YOU CAN EASILY DAMAGE THEM. INSTALLATION OF DAMAGED E-SEALS CAN CAUSE TOO MUCH LEAKAGE.

(4) Examine the E-seals (3) and (5) to make sure they are free of cracks, dents, or other damage.
(a) Replace the E-seals if found damaged.

S 424-078

(5) Install the E-seal (3) into the mating duct flange (PRV inlet) and the E-seal (5) into the PRV outlet flange.

S 424-023

CAUTION: MAKE SURE YOU INSTALL THE LOCKING DEVICE OF THE COUPLING CORRECTLY AS SHOWN IN FIGURE 401. IF YOU DO NOT INSTALL THE COUPLING FINGERS INSIDE THE LOCKING DEVICE THE COUPLING CAN LOOSEN AND CAUSE DAMAGE TO EQUIPMENT.

(6) Put the PRV (1) between the duct openings, then loosely install the couplings (2) and (4) but do not tighten them yet.
(a) If you cannot easily install the PRV because it is too tight, loosen one of the duct sections on either side of the PRV (AMM 36-11-01/401).

S 824-024

(7) Adjust the PRV (1) to align the PRV actuator port with the control pressure line.
(a) Make sure there is 0.62+/-0.25 inches of clearance between the PRV valve actuator and the 15th-stage duct (Port No. 2).

S 454-028

CAUTION: DO NOT TORQUE THE COUPLINGS MORE THAN THE SPECIFIED LIMIT. IF YOU APPLY TOO MUCH TORQUE, THE VALVE FLOW BODY CAN WARP (BECOME OVAL) AND CAUSE THE VALVE TO BIND DURING OPERATION.

(8) Tighten the couplings (2) and (4) to a torque of 115-125 pound-inches (13-14 Newton-meters).

NOTE: Make sure you align the joints of the duct and PRV correctly before you tighten the couplings. The duct and PRV flanges will not automatically align themselves when you tighten the couplings. Do a check of the joints after you tighten the couplings.

S 424-079

(9) Connect the control pressure line to the PRV actuator port.
  (a) Apply antiseize compound to the threads of the union (7).
  (b) Install a new packing (8) onto the union (7) then re-install the union (7) to the PRV actuator port.
  (c) Connect the elbow (6) to the union (7) and tighten the B-nut.

S 424-083

(10) Connect the electrical wiring to the terminal posts No.1,2,3 on the PRV terminal block.
  (a) Install the wiring lugs between the two washers (14) and secure to the terminal post with the nut (13).

    NOTE: Make sure you install the terminal lug barrel in the up position.

S 424-084

(11) AIRPLANES WITH PRV POST-SB 36-53;
AIRPLANES WITH PRV P/N S210T120-141 (PRR B12745);
Connect the electrical wiring to the PRV heatshield and to the PRV actuator.
  (a) Remove and discard the old tape under the P-clamp (9C) and around the PRV wiring, then replace with 2-4 layers of new Permacel tape P-421 (or P-440).
  (b) Install the P-clamp (28) to the PRV heatshield with the washer (26) and screw (27).
    1) Tighten the screw (27) to a torque of 25-30 pound-inches (2.8-3.4 Newton-meters) above running torque, then install a new lockwire to the screw (27).
  (c) Install the support clamp (20) around the PRV actuator then adjust the clamp to permit connection of the P-clamp (23).
    1) Connect the P-clamp (23) to the support clamp (20) with the three spacers (24), washer (21) and nut (22).
    2) Tighten the support clamp (20) to a torque of 30-40 pound-inches (3.4-4.5 Newton-meters).

S 424-080

(12) Install the bonding jumper (9), nut (8), washer (7) and screw (6) to the PRV (1).
  (a) Measure the electrical resistance between the ground tab and the bonding jumper and make sure it is less than 0.005 ohms (AMM 20-10-21/601 and SWPM 20-20-00).

S 424-037

(13) If it is necessary, tighten any loose duct sections (AMM 36-11-01/401).

E. PRV Post-Installation Test

S 864-039

(1) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
  (a) Pilots' Overhead Circuit Breaker panel, P11
    1) For the left PRV:
      a) 11S10, LEFT ENG BLEED IND
      b) 11S11, LEFT ENG BLEED CONT
    2) For the right PRV:
      a) 11S19, RIGHT ENG BLEED IND
      b) 11S20, RIGHT ENG BLEED CONT
  (b) Left Miscellaneous Electrical Equipment panel, P36
    1) 36L7 or 36K7, AIR SUPPLY BITE

S 864-041

(2) Supply electrical power (AMM 24-22-00/201).

S 764-085

(3) Do a leakage check of the PRV coupling and control pressure line connections:
  (a) Make sure the high pressure shutoff valve (HPSOV) is in the full closed position.
    1) If the valve is not closed, turn the valve manual drive until the position indicator is in the closed position.
  (b) Pressurize the pneumatic ducts upstream of the PRSOV (AMM 36-00-00/201).
  (c) Manually open the PRV to pressurize duct between PRV and HPSOV.
  (d) Make sure there is no leakage at the PRV control pressure line connection.
    1) Repair the cause of any leakage.
  (e) Make sure there is no leakage at the PRV coupling connections.

    NOTE: Diffused leakage is permitted.

    1) To repair jet blast leakage, align the joint or coupling.
  (f) Remove the pneumatic pressure upstream of the PRSOV (AMM 36-00-00/201).

S 734-089
(4) Do the Air Supply System BITE Check (AMM 36-23-00/501).

NOTE: The System BITE Test verifies the electrical operation of the Pressure Regulating Valve (PRV).

F. Put the Airplane Back to Its Usual Condition

S 414-071
(1) Close the access to the PRV on left side of the engine:

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Close the left thrust reverser (AMM 78-31-00/201).
(b) Close the left core cowl panel (AMM 71-11-06/201).
(c) Close the left fan cowl panel (AMM 71-11-04/201).
(d) Do the activation procedure for the thrust reversers (AMM 78-31-00/201).

S 864-072
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PRESSURE REGULATING VALVE AND PRESSURE REGULATING VALVE CONTROLLER - ADJUSTMENT/TEST

1. General
   A. This procedure contains one task. This task performs an operational test of the Pressure Regulating Valve (PRV) and Pressure Regulating Valve Controller (PRVC) while the PRV and PRVC are installed on wing.

   TASK 36-11-18-705-115

2. Pressure Regulating Valve (PRV) / Pressure Regulating Valve Controller (PRVC)
   A. General
      (1) This test will do a functional check of the PRV and PRVC.
      (2) The test equipment listed in this task are commercially available. For an optional test of the PRV and PRVC which uses the Boeing GSE Pneumatic System Health Check (PSHC) Test Equipment, G36035, refer to the following procedure(s) for the applicable engine configuration installed on the aircraft:
         (a) AMM 36-00-22/501, Pneumatic System Health Check (PW 4000)
   B. Equipment
      (1) Air or Nitrogen Source
      (2) Low Speed ARINC 429 monitor, Odd Parity, SDI (Bit 10, Bit 9)
      (3) Supply pressure gage - 0-50 PSIG
      (4) Pressure hose - 0-50 PSIG
      (5) Fitting - MS-6 size
   C. Consumable Materials
      (1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature antiseize compound)
   D. References
      (1) AMM 24-22-00/201, Electrical Power - General
      (2) AMM 36-00-00/201, Pneumatic Power - General
      (3) AMM 36-11-12/401, Air Supply Control Card Assembly
      (4) AMM 36-11-18/401, Pressure Regulating Valve (PRV)
      (5) AMM 36-11-19/401, Pressure Regulating Valve Controller (PRVC)
      (6) AMM 71-11-04/201, Fan Cowl Panels
      (7) AMM 71-11-06/201, Core Cowl Panels
      (8) AMM 78-31-00/201, Thrust Reverser System

E. Access

(1) Location Zones

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

(2) Access Panels (PW 4000 ENGINES)

413AL	Left Fan Cowl (Left engine)
415AL	Left Thrust Reverser (Left engine)
417AL	Left Core Cowl (Left engine)
423AL	Left Fan Cowl (Right engine)
425AL	Left Thrust Reverser (Right engine)
427AL	Left Core Cowl (Right engine)

F. Prepare for the Test

S 865-116

WARNING: YOU MUST REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. IF YOU DO NOT REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS, HOT HIGH PRESSURE AIR CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove pneumatic power (AMM 36-00-00/201).

S 865-117

(2) Supply electrical power (AMM 24-22-00/201).

S 015-118

(3) AIRPLANES WITH PW 4000 ENGINES;
Get access to the Pressure Regulating Valve Controller (PRVC) and the Pressure Regulating Valve (PRV) on the 'left' side of the associated (left/right) engine:

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.

(a) Do the deactivation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).
(b) Open the associated left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(c) Open the associated left core cowl panel (417AL/427AL) (AMM 71-11-06/201).

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.

(d) Open the associated left thrust reverser (415AL/425AL) (AMM 78-31-00/201).

S 865-121

(4) For the left engine, make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11S10, LEFT ENG BLEED IND
(b) 11S11, LEFT ENG BLEED CONT

S 865-122

(5) For the right engine, make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11S19, RIGHT ENG BLEED IND
(b) 11S20, RIGHT ENG BLEED CONT

S 865-123

(6) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
(a) 36L7 or 36K7, AIR SUPPLY BITE

G. BITE Test

S 745-124

(1) Push the PRESS TEST button on the BITE module.

S 215-125

(2) Make sure all the lights are on.

S 745-126

(3) Push the VERIFY button. Continue to push the VERIFY button until the NO FAULT light comes on or no lights are on.
(a) Keep a record of all the faults.

S 745-127

(4) Push the BITE STEP button. Continue to push the BITE STEP button until the NO FAULT light comes on or no lights are on.
(a) Keep a record of all the faults.

S 355-128

(5) Repair all PRVC and PRV faults before you continue with the test.

S 215-129

(6) Do a check of the sense lines to and from the PRVC and PRV.
(a) Repair all loose and/or damaged sense lines.

H. PRV Actuator Leakage (Thumb) Test

S 215-178
(1) Make sure the PRV visual position indicator is at the fully 'closed' position.

S 025-130
(2) Remove the servo pressure sense line from the PRV actuator.

S 725-131
(3) Manually open the PRV.

S 725-132
(4) Put your thumb, a cap or plug (AN814 or equivalent) with suitable O-ring on the PRV actuator sense line connection.

S 725-133
(5) Let the PRV close.
(a) Make sure the PRV does not bind and goes to the fully closed position. If the PRV binds or does not go to the fully closed position replace the PRV (AMM 36-11-18/401).

S 725-134
(6) Measure how long (in seconds) it takes for the PRV to close.

NOTE: The PRV may not close if it is completely "leak free". If the PRV does not close, make sure that the PRV does not bind then continue the test.

S 725-135
(7) Did the PRV close in less than 20 seconds?
(a) YES, replace the PRV (AMM 36-11-18/401).
(b) NO, the PRV is satisfactory. Remove the cap or plug. Apply antiseize compound to the servo pressure sense line and install the sense line connection to the PRV actuator.

I. PRV/PRVC Operational Test

NOTE: During the test you will be asked some questions. Each question will have a yes or no answer. Each yes or no answer gives a recommeded action, for example: NO, replace the PRV (AMM 36-11-18/401). You can continue with the test without doing the action if you want to see other characteristics of the test. However, you should do the recommended action after you complete the test.

S 215-136
(1) Look at the PRV position indicator. Is the PRV in the fully closed position?
(a) NO, replace the PRV (AMM 36-11-18/401).

(b) YES, continue.

S 765-137
(2) Do a check for continuity of the PRV closed position switch when the PRV is closed. Is there continuity?
(a) NO, replace the PRV (AMM 36-11-18/401).
(b) YES, continue.

S 865-141
(3) Push the L(R) ENG OFF switch-light to the ON position and then to the OFF position. Put your hand on the PRVC solenoid and listen or feel for the PRVC solenoid to operate.

NOTE: A latching solenoid should not be continuously energized because it will overheat. The HPC solenoid will also click at the same time as the PRVC solenoid.

S 725-142
(4) Did you here or feel the solenoid click?
(a) No, Do a check of the shutoff and auto voltages to the PRVC controller at pins 1 and 3 (2 is ground) of the airplane wiring.

NOTE: There can be a time delay before a pulse can be recorded. The voltage pulse should be 18-32 volts for 6-seconds.

1) If the voltages are satisfactory, replace the PRVC (AMM 36-11-19/401).
2) If the voltages are not satisfactory, do a check of the wiring and/or Bleed Air Supply Control Card (WDM 36-11-61, WDM 36-11-62).
(b) YES, continue.

S 215-143
(5) Do a check of the sense lines to and from the PRVC and PRV.
(a) Repair all loose and/or damaged sense lines.

S 025-144
(6) Remove the supply pressure sense line to the PRVC.

S 485-145
(7) Install an nitrogen source (or equivalent) to the supply pressure sense line.

S 865-146
(8) Push the L(R) ENG OFF switch-light to the ON position.

S 865-147
(9) Slowly apply 15 PSIG.

NOTE: The PRV should open at approximately 10 PSIG.

S 215-148
(10) Make sure there is no leakage at the sense lines. Tighten or repair if it is necessary.

S 725-149
(11) Did the PRV open at ≤ 15 PSIG?
(a) YES, the PRV is satisfactory. Remove the air source. Apply antiseize compound to the supply pressure sense line and install the sense line to the PRVC.
(b) NO, continue:
1) Remove the PRV lockout pin from the PRV actuator cap to vent the actuator.
2) Do a check for airflow. Do you feel airflow?
a) YES, replace the PRV (AMM 36-11-18/401).
b) NO, replace the PRVC (AMM 36-11-19/401). Install the lockout pin in the PRV.
3) Remove the air source. Apply antiseize compound to the supply pressure sense line and install the sense line to the PRVC.

J. PRV/PRVC Operational Check with the ARINC 429 Monitor

NOTE: The ARINC 429 portion of this test can only be done on BITE modules with part numbers S210T120-67 and above. These Bite modules have an ARINC 429 test port that will allow you to monitor real time data from pneumatic component switches/sensors.

NOTE: During the test you will be asked some questions. Each question will have a yes or no answer. Each yes or no answer gives a recommeded action, for example: NO, replace the PRV (AMM 36-11-18/401). You can continue with the test without doing the action if you want to see other characteristics of the test. However, you should do the recommended action after you complete the test.

S 485-179

(1) Install a low speed ARINC 429 monitor to pins FA56 and FC56 of the terminal block 130 found on the E1-2 shelf. Get access to the back of the BITE module from the forward cargo bay.

NOTE: Monitor octal label 351. The left channel data is shown on the source/destination identifier (SDI) 01 and the right channel data is on SDI 10. These are Bit 10 and Bit 9 as shown on the ARINC 429 monitor. The output signals are shown in Table 1.

TABLE 1 BITE MODULE ARINC 429 OUTPUTS FOR PRVC/PRV DATA SIGNALS

OCTAL LABEL	BIT	SIGNAL DESCRIPTION	STATUS
351	12	PRVC ENABLED COMMAND	PRVC ENABLED - BIT=1
	12	PRVC CLOSED COMMAND	PRVC CLOSED - BIT=0
	20	PRV CLOSED POSITION SWITCH	PRV CLOSED - BIT=1
	21	PRV OPEN POSITION SWITCH	PRV IS NOT OPEN - BIT=1
71	NA	PRV EXIT PRESS SENSOR	ANALOG OUTPUT

Left channel SDI - 01
Right channel SDI - 10

S 215-158

(2) Do a check of the sense lines to and from the PRV and PRVC.
(a) Repair all loose and/or damaged sense lines.

S 215-159

(3) Look at the position indicator on the PRV. Is the PRV in the fully closed position (BIT 20=1)?
(a) NO, replace the PRV (AMM 36-11-18/401).

(b) YES, continue.

S 715-160

(4) Do these steps to do a check of the "close" signal to the PRVC:
(a) Push the L(R) ENG OFF switch-light, on the P5 panel, to the OFF position. Listen or feel for the PRVC solenoid to operate.

NOTE: A latching solenoid should not be continuously energized because it will overheat. The HPC solenoid will also click at the same time as the PRVC solenoid.

(b) Do you see ARINC Bit 12=0?
1) NO, do a check of the electrical wiring (WDM 36-11-61, WDM 36-11-62). If the problem continues, replace the bleed air supply control card (AMM 36-11-12/401).
2) YES, continue.

S 715-161

(5) Do these steps to do a check of the "enable" signal to the HPC:
(a) Push the L(R) ENG OFF switch-light, on the P5 panel, to the ON position. Listen or feel for the PRVC solenoid to operate.

NOTE: A latching solenoid should not be continuously energized because it will overheat. The HPC solenoid will also click at the same time as the PRVC solenoid.

(b) Do you see ARINC Bit 12=1?
1) NO, do a check of the electrical wiring (WDM 36-11-61, WDM 36-11-62). If the problem continues, replace the bleed air supply control card (AMM 36-11-12/401).
2) YES, continue.

S 715-164

(6) Do these steps to do a check of the PRV opening pressure:
(a) Remove the supply pressure sense line at the PRVC.

(b) Install a supply pressure gage (Ps) and air/nitrogen pressure source to the supply pressure sense line as shown in Fig. 501.

WARNING: DO NOT EXCEED THE PRESSURE LIMITS THAT ARE GIVEN. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE EQUIPMENT.

(c) Slowly increase Ps to 15 PSIG.
(d) Make sure the ARINC Bit 20=0 and 21=0 and the PRV is in the fully open position. This means the PRV OPEN position switch is closed.
1) If the PRV is not in the fully open position, replace the PRVC (AMM 36-11-19/401).
2) If the PRV OPEN or CLOSED position switch indication is not correct (does not agree with the position indicator on the PRV), replace the PRV (AMM 36-11-18/401).
(e) Slowly decrease Ps to 0 psig.
(f) Remove the air/nitrogen pressure source, supply pressure gage, hose and fitting from the supply pressure sense line at the PRVC.
(g) Apply antiseize compound and connect the supply pressure sense line to the PRVC.

S 085-173
(7) Remove the ARINC 429 monitor.

K. Put the Airplane Back to Its Usual Condition

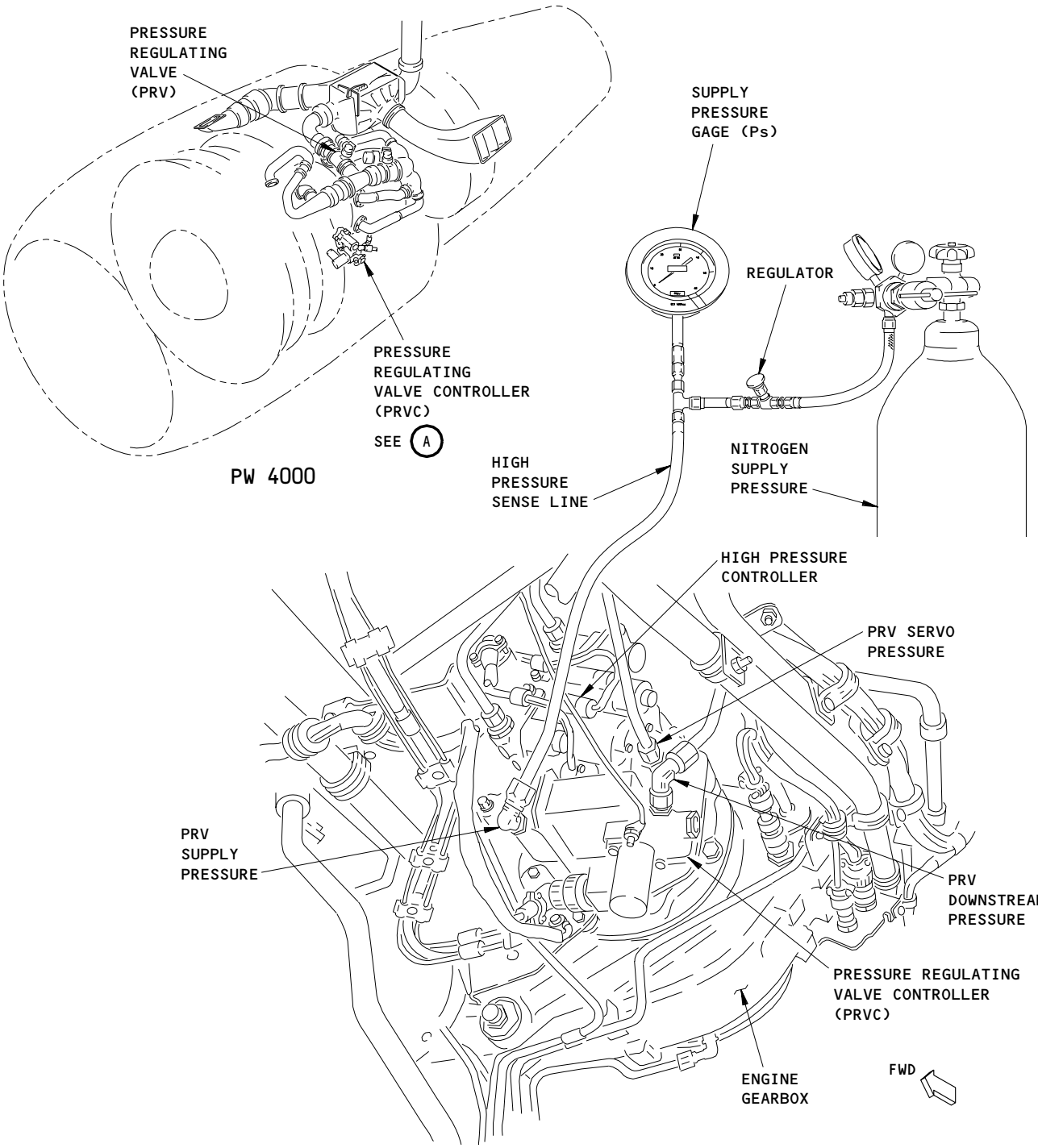
S 415-174
(1) AIRPLANES WITH PW 4000 ENGINES;
Close up the access to the PRVC and PRV on the 'left' side of the associated (left/right) engine:

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Close the left thrust reverser (415AL/425AL) (AMM 78-31-00/201).

(b) Close the left core cowl panel (417AL/427AL) (AMM 71-11-06/201).
(c) Close the left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(d) Do the activation procedure for the thrust reversers (AMM 78-31-00/201).

S 865-177
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).



PRESSURE REGULATING VALVE CONTROLLER (PRVC)

A

PRV/PRVC Test Equipment
Figure 501

W63648

PRESSURE REGULATING VALVES - INSPECTION/CHECK

1. General
   A. This task contains instructions to examine the pressure regulating valve for damage that will prevent the correct operation of the valve.

TASK 36-11-18-206-001

2. Examine the Pressure Regulating Valve
   A. References
      (1) AMM 36-11-18/401, Pressure Regulating Valve
   B. Access
      (1) Location Zone
          411 Engine

   C. Procedure

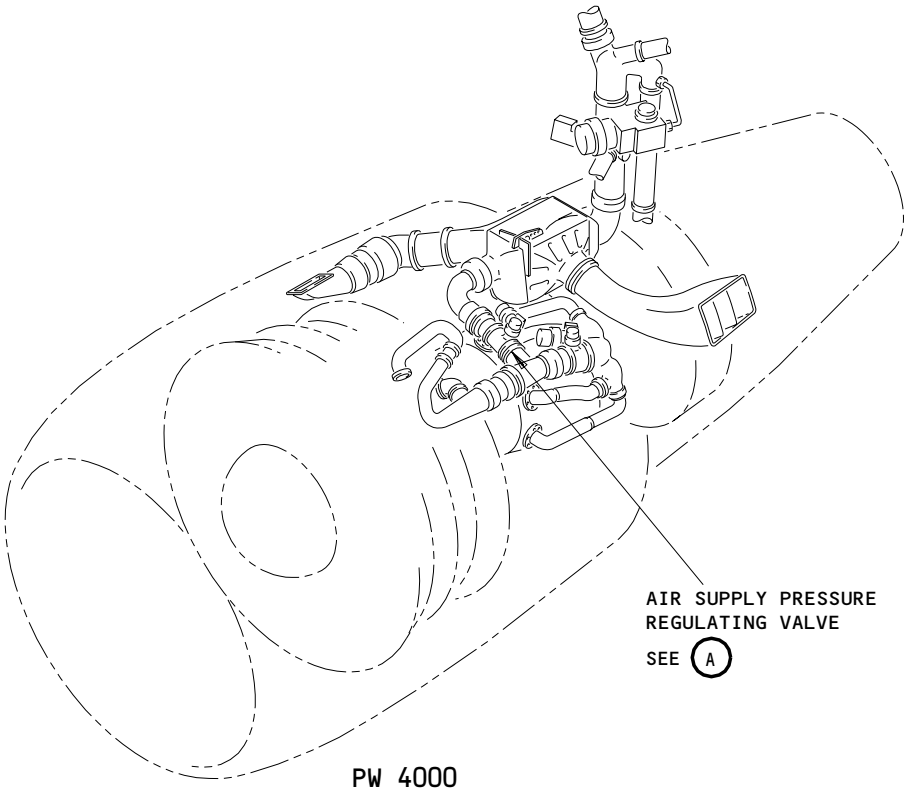
      S 216-002
      (1) Do a check of the pressure sense line for cracks.

      S 026-003
      (2) Remove the pressure regulating valve (PRV) (AMM 36-11-18/401).

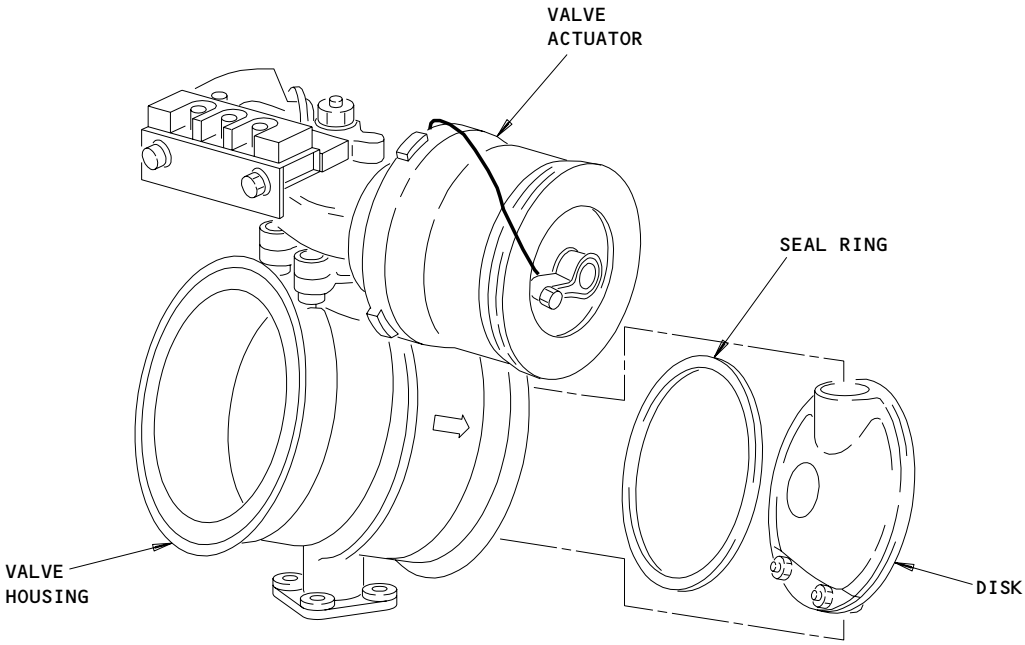
      S 216-004
      (3) Examine the PRV for these conditions:
          (a) Parts that are missing
          (b) Small scratches or burrs on the surface and the edges of the seal ring
          (c) A cracked or corroded valve housing, valve actuator, or disk
          (d) Worn areas in the layer of dry-film lubricant

      S 426-005
      (4) If you find one of the above conditions, replace the PRV.

      S 426-006
      (5) Install the PRV (AMM 36-11-18/401).



PW 4000



AIR SUPPLY PRESSURE REGULATING VALVE

A

Air Supply Pressure Regulating Valve Inspection Check
Figure 601

PRESSURE REGULATING VALVE CONTROLLER - REMOVAL/INSTALLATION

1. General
   A. This procedure contains four tasks:
      (1) The removal of the the controller for the pressure regulating valve (PRV).
      (2) The installation of the PRV controller.
      (3) The removal of the air filter for the PRV controller.
      (4) The installation of the air filter for the PRV controller.

   TASK 36-11-19-004-001
2. Pressure Regulating Valve (PRV) Controller Removal (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power Control
      (2) AMM 36-00-00/201, Pneumatic System
      (3) AMM 71-11-04/201, Fan Cowl Panels
      (4) AMM 71-11-06/201, Core Cowl Panels
      (5) AMM 78-31-00/201, Thrust Reverser System
   B. Access
      (1) Location Zones

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

      (2) Access Panels

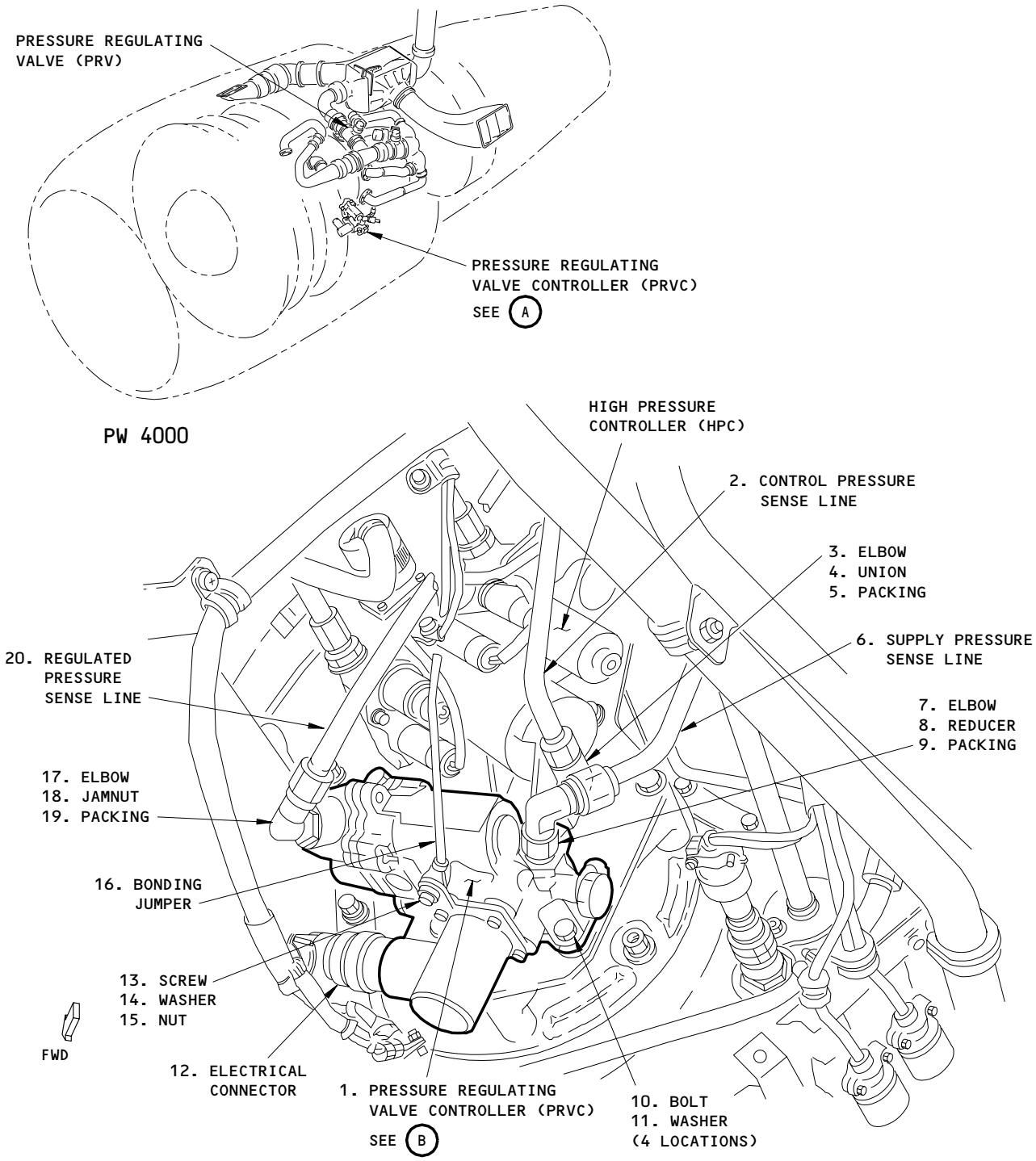
413AL	Left Fan Cowl (Left engine)
415AL	Left Thrust Reverser (Left engine)
417AL	Left Core Cowl (Left engine)
423AL	Left Fan Cowl (Right engine)
425AL	Left Thrust Reverser (Right engine)
427AL	Left Core Cowl (Right engine)

   C. Prepare for Removal

      S 864-002

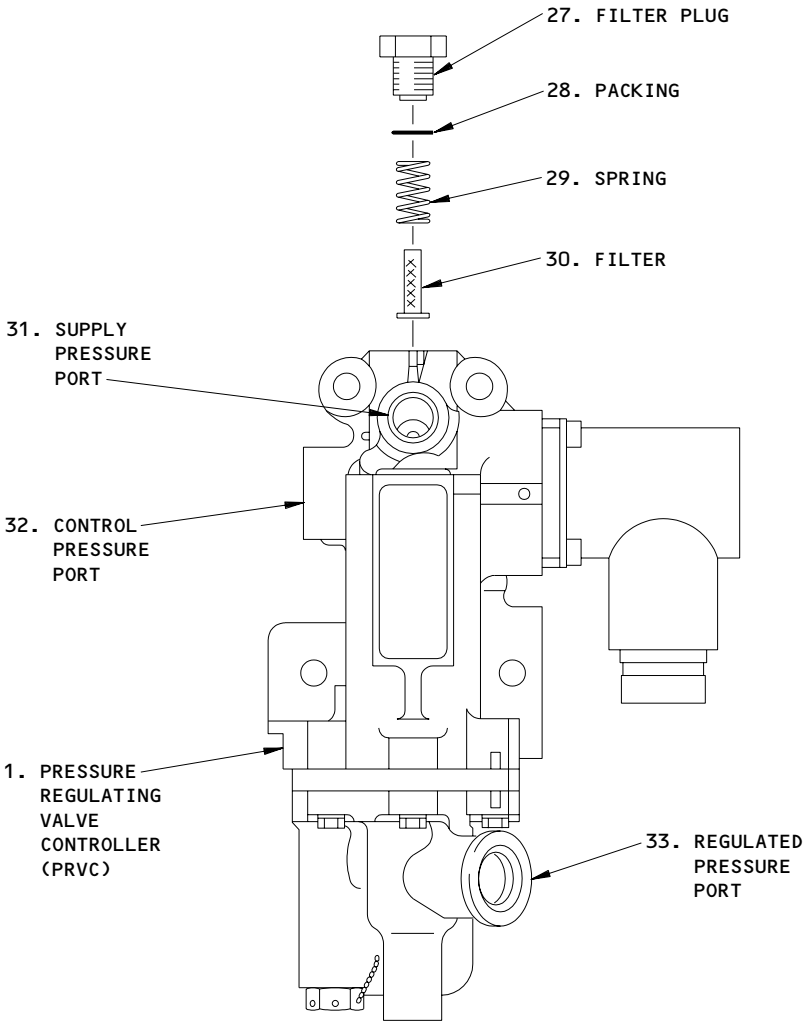
      WARNING: RELEASE THE PRESSURE IN THE PNEUMATIC DUCT BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. THE HOT, HIGH-PRESSURE AIR CAN CAUSE INJURY TO PERSONS.

      (1) Remove the pneumatic power (AMM 36-00-00/201).



PRESSURE REGULATING VALVE CONTROLLER (PRVC)
A

Pressure Regulating Valve Controller (PRVC)
Figure 401 (Sheet 1)



Pressure Regulating Valve Controller (PRVC)
Figure 401 (Sheet 2)

S 864-003
(2) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) For the removal of the PRV controller on the left engine,
1) 11S10, LEFT ENG BLEED IND
2) 11S11, LEFT ENG BLEED CONT
(b) For the removal of the PRV controller on the right engine,
1) 11S19, RIGHT ENG BLEED IND
2) 11S20, RIGHT ENG BLEED CONT

S 864-004
(3) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36, and attach a DO-NOT-CLOSE tag:
(a) 36L7 or 36K7, AIR SUPPLY BITE

S 014-005
(4) Get access to the Pressure Regulating Valve Controller (PRVC) on the 'left' side of the associated (left/right) engine:

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.

(a) Do the deactivation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).
(b) Open the associated left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(c) Open the associated left core cowl panel (417AL/427AL) (AMM 71-11-06/201).

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.

(d) Open the associated left thrust reverser (415AL/425AL) (AMM 78-31-00/201).

D. PRV Controller Removal

S 034-006
(1) Disconnect the clamp that attaches the wire bundle and electrical connector (12).

S 034-007
(2) Disconnect the electrical connector (12) from the PRV controller (1).

S 034-008
(3) Disconnect the control pressure sense line (2) from the elbow (3).

S 034-009
(4) Disconnect the supply pressure sense line (6) from the elbow (7).

S 034-010
(5) Disconnect the regulated pressure sense line (20) from the elbow (17).

S 034-011
(6) Remove the elbow (7), reducer (8), and packing (9) from the supply pressure port (31).
(a) Discard the packing (9).

S 034-043
(7) Remove the elbow (3), union (4), and packing (5) from the control pressure port (32).
(a) Discard the packing (5).

S 034-044
(8) Remove the elbow (17), jamnut (18), and packing (19) from the regulated pressure port (33).
(a) Discard the packing (19).

S 034-012
(9) Remove the screw (13), washer (14), nut (15), and bonding jumper (16) from the PRV controller (1).

S 034-013
(10) Remove the bolts (10) and washers (11) that attach the PRV controller (1) to the mounting bracket.

S 024-014
(11) Remove the PRV controller (1).

TASK 36-11-19-404-015

3. Pressure Regulating Valve Controller (PRVC) Installation (Fig. 401)
A. Parts
(1) Refer to the Illustrated Parts Catalog (IPC) for the part numbers and the effectivities of the items in the table that follows:

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	PRV Controller	36-11-08	06	450,490
	5	Packing	36-11-08	06	355
	9	Packing	36-11-08	06	350
	19	Packing	36-11-08	06	355
401	1	PRV Controller	36-11-08	07	35
	5	Packing	36-11-08	07	370
	9	Packing	36-11-08	07	375
	19	Packing	36-11-08	07	370

B. Consumable Materials
(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature antiseize compound)

C. References
(1) AMM 24-22-00/201, Electrical Power Control
(2) AMM 36-00-00/201, Pneumatic System
(3) AMM 71-11-04/201, Fan Cowl Panels
(4) AMM 71-11-06/201, Core Cowl Panels
(5) AMM 78-31-00/201, Thrust Reverser System

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

(2) Access Panels
413AL Left Fan Cowl (Left engine)
415AL Left Thrust Reverser (Left engine)
417AL Left Core Cowl (Left engine)

423AL Left Fan Cowl (Right engine)
425AL Left Thrust Reverser (Right engine)
427AL Left Core Cowl (Right engine)

E. PRV Controller Installation

S 424-016
(1) Put the PRV controller (1) on the mounting bracket.
(a) Install the bolts (10), washers (11) and tighten.

S 434-017
(2) Install the screw (13), washer (14), and nut (15) that connect the bonding jumper (16) to the PRV controller (1)
(a) Tighten the screw (13).

S 644-018
(3) Apply antiseize compound to all of the sense line fittings.

S 434-019
(4) Install the packing (5), union (4), and elbow (3), in the control pressure port (32) and tighten.

S 434-045
(5) Install the packing (9), reducer (8), elbow (7), in the supply pressure port (31) and tighten.

S 434-046
(6) Install the packing (19), jamnut (18), elbow (17), in the regulated pressure port (33) and tighten.

S 434-020
(7) Connect the control pressure sense line (2) to the elbow (3).

S 434-021
(8) Connect the supply pressure line (6) to the elbow (7).

S 434-022
(9) Connect the regulated pressure sense line (20) to the elbow (17).

S 434-023
(10) Connect the electrical connector (12) to the PRV controller (1).

S 864-024
(11) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
  (a) For the left engine PRV controller,
    1) 11S10, LEFT ENG BLEED IND
    2) 11S11, LEFT ENG BLEED CONT
  (b) For the right engine PRV controller,
    1) 11S19, RIGHT ENG BLEED IND
    2) 11S20, RIGHT ENG BLEED CONT

S 864-025
(12) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
  (a) 36L7 or 36K7, AIR SUPPLY BITE

S 714-026
(13) Do a test of the PRV controller:
  (a) Make sure the applicable left or right engine bleed air switch-light is in the OFF position.
  (b) Supply electrical power (AMM 24-22-00/201).

(c) Push the applicable left or right engine bleed air switch-light to the ON then OFF position.
1) At the PRV controller, in approximately 10 seconds, listen for a click while the controller solenoid operates.

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

S 414-027

(1) Close up the access to the Pressure Regulating Valve Controller (PRVC) on the 'left' side of the associated (left/right) engine:

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Close the associated left thrust reverser (415AL/425AL) (AMM 78-31-00/201).
(b) Close the associated left core cowl panel (417AL/427AL) (AMM 71-11-06/201).
(c) Close the associated left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(d) Do the activation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).

S 864-028

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

TASK 36-11-19-004-029

4. PRVC Air Filter Removal (Fig. 401)

A. References

(1) AMM 24-22-00/201, Electrical Power Control
(2) AMM 36-00-00/201, Pneumatic System
(3) AMM 71-11-04/201, Fan Cowl Panels
(4) AMM 71-11-06/201, Core Cowl Panels
(5) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

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

(2) Access Panels

413AL	Left Fan Cowl (Left engine)
415AL	Left Thrust Reverser (Left engine)
417AL	Left Core Cowl (Left engine)
423AL	Left Fan Cowl (Right engine)
425AL	Left Thrust Reverser (Right engine)
427AL	Left Core Cowl (Right engine)

C. Prepare for Removal

S 864-030

(1) Remove the pressure from the pneumatic system (AMM 36-00-00/201).

S 014-031

(2) Get access to the Pressure Regulating Valve Controller (PRVC) on the 'left' side of the associated (left/right) engine:

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.

(a) Do the deactivation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).
(b) Open the associated left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(c) Open the associated left core cowl panel (417AL/427AL) (AMM 71-11-06/201).

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.

(d) Open the associated left thrust reverser (415AL/425AL) (AMM 78-31-00/201).

D. PRV Controller Air Filter Removal

S 034-032
(1) Remove the filter plug (27) and packing (28).
(a) Discard the packing (28).

S 024-033
(2) Remove the spring (29) and the filter (30) from the PRV controller (1).

TASK 36-11-19-404-034

5. PRVC Air Filter Installation (Fig. 401)

A. Parts

(1) Refer to the Illustrated Parts Catalog (IPC) for the part numbers and the effectivities of the items in the table that follows:

AMM			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
401	1	PRV Controller	36-11-08	06	450,490
	28	Packing	36-11-08	06	460,500
	30	Filter	36-11-08	06	470,510
401	1	PRV Controller	36-11-08	07	35
	28	Packing	36-11-08	07	45
	30	Filter	36-11-08	07	55,60

B. Consumable Materials

(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature anti-seize compound)

C. References

(1) AMM 20-10-23/401, Lockwire
(2) AMM 24-22-00/201, Electrical Power Control
(3) AMM 71-11-04/201, Fan Cowl Panels
(4) AMM 71-11-06/201, Core Cowl Panels
(5) AMM 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zones

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

(2) Access Panels

413AL	Left Fan Cowl (Left engine)
415AL	Left Thrust Reverser (Left engine)
417AL	Left Core Cowl (Left engine)
423AL	Left Fan Cowl (Right engine)
425AL	Left Thrust Reverser (Right engine)
427AL	Left Core Cowl (Right engine)

E. PRV Controller Air Filter Installation

S 424-035
(1) Install the filter (30) and the spring (29) in the PRV controller (1).

S 434-036
(2) Install a new packing (28) on the filter plug (27).

S 644-037
(3) Lubricate the filter plug (27) threads with the antiseize compound.

S 434-038
(4) Install the filter plug (27) in the PRV controller (1).

S 434-039
(5) Tighten the filter plug (27) to 10-20 pound-inches.

S 434-040
(6) Install the lockwire (AMM 20-10-23/401).

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

S 414-041
(1) Close up the access to the Pressure Regulating Valve Controller (PRVC) on the 'left' side of the associated (left/right) engine:

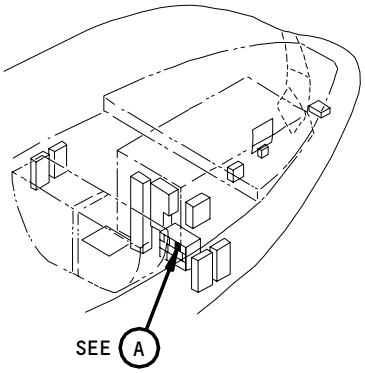
WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

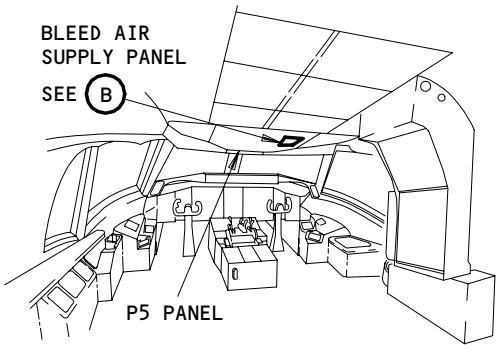
(a) Close the associated left thrust reverser (415AL/425AL) (AMM 78-31-00/201).
(b) Close the associated left core cowl panel (417AL/427AL) (AMM 71-11-06/201).
(c) Close the associated left fan cowl panel (413AL/423AL) (AMM 71-11-04/201).
(d) Do the activation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).

S 864-042
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

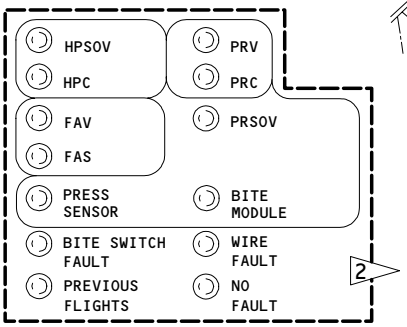
AIR SUPPLY INDICATING SYSTEM - DESCRIPTION AND OPERATION

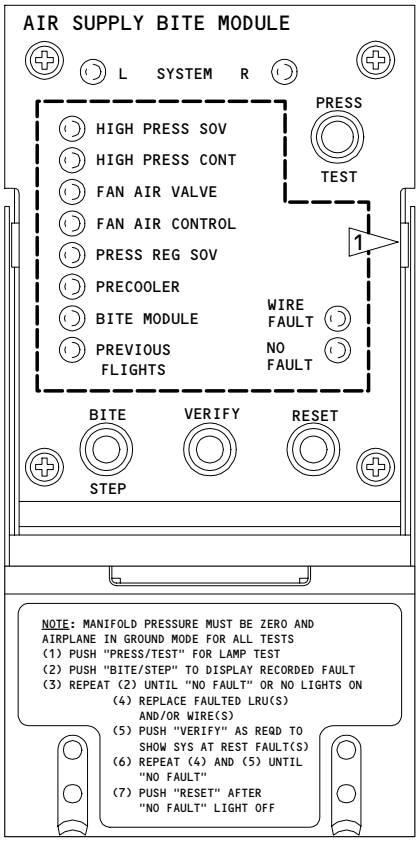
1. General (Fig. 1)
   A. The air supply indicating system provides pressure indication and overtemperature warning for the air supply distribution system (AMM 36-10-00/001). The indication system also provides built-in fault isolation with the air supply Built-In Test Equipment (BITE) system.
   B. Air Supply Pressure Indicating System
      (1) Two duct pressure transducers and their corresponding indicators provide pressure indication for the air supply system. The transducers sense available system pressure on either side of the body crossover duct. Each transducer provides signals to the dual duct pressure indicator on the pilots' overhead P5 panel and to the EICAS computers.
      (2) Overpressure switches monitor the ducting downstream of the precooler for an overpressure situation. When a switch senses a duct overpressure, it closes to supply a ground to the air supply control card. Also, if the pressure regulating shutoff valve is not closed, the control card provides a ground for flight deck indication.
      (3) A pressure sensor supplies the PRV exit pressure to be used by the BITE module to help isolate faults.
   C. Air Supply Temperature Indication System
      (1) The air supply temperature indication system has an overheat switch installed upstream of each pressure regulating and shutoff valve (PRSOV) to monitor the precooler outlet temperature for an overheat situation to prevent excessive precooler outlet temperatures.
      (2) Closure of the overheat switch sends a signal to its bleed air control card assembly to illuminate a warning indicator light on the air supply control module (P5 panel) and to display an EICAS advisory message for annunciation of the overheat situation.
      (3) Air supply precooler temperature indication is provided by a precooler temperature bulb which sends a signal to the EICAS computer. The precooler outlet temperature is then displayed on the EICAS display panel.
   D. Air Supply BITE System
      (1) The air supply BITE system provides failure monitoring of Line Replaceable Unit (LRU) components within the engine air supply system. The BITE system also provides fault isolation assistance in identifying faulty components and aids in on-ground verification of proper LRU operation following component repair. The system consists of an Air Supply BITE Module and the associated wiring between the module and each LRU. Faults identified by the system are stored in the module memory for eight airplane flights.





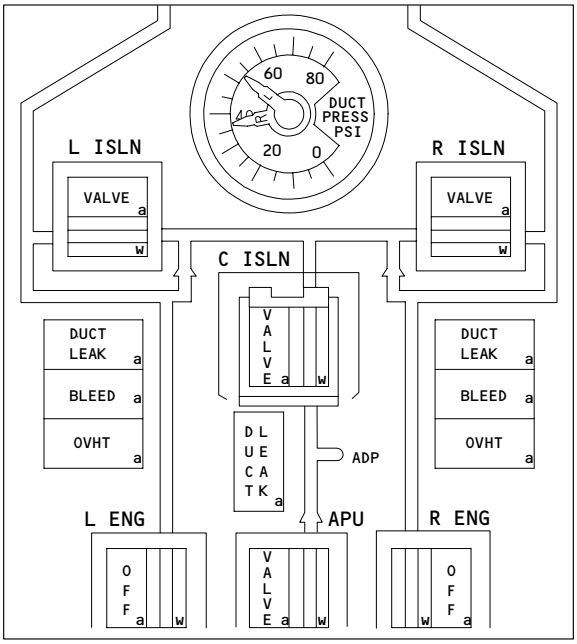
FLIGHT COMPARTMENT





AIR SUPPLY BITE MODULE (E3-1)

A



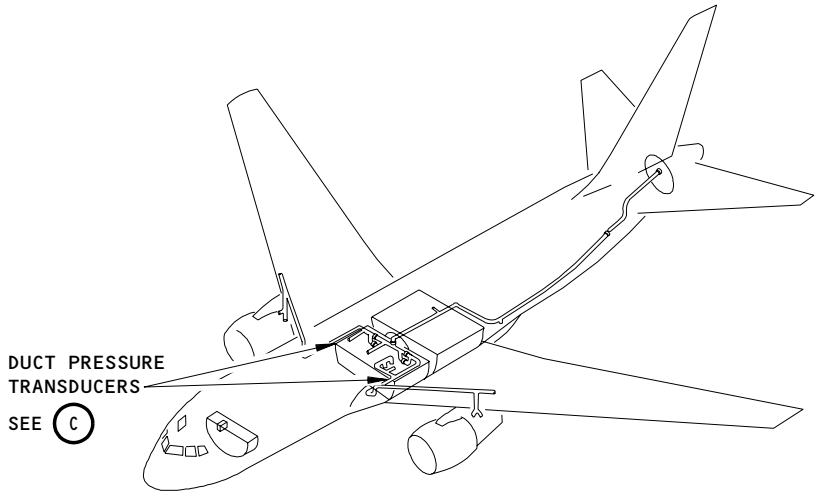
BLEED AIR SUPPLY PANEL (P5)

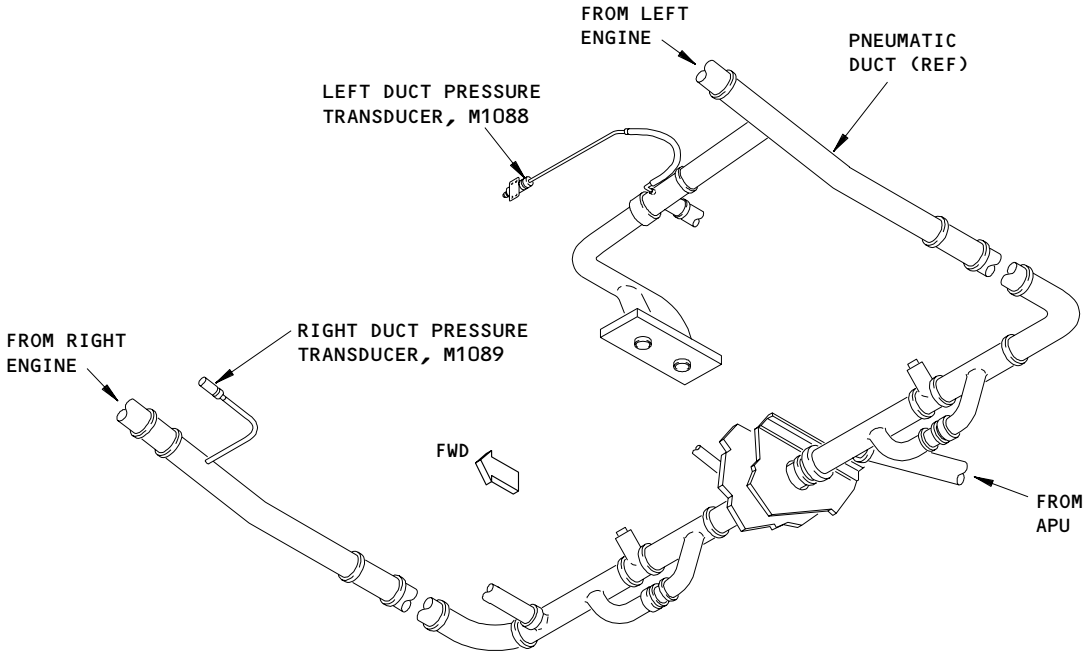
B

1 AIRPLANES WITH BITE MODULE P/N S210T120-57 (H/S 773461-10) OR LESS

2 AIRPLANES WITH BITE MODULE P/N S210T120-67 (H/S 804401-2) OR ABOVE

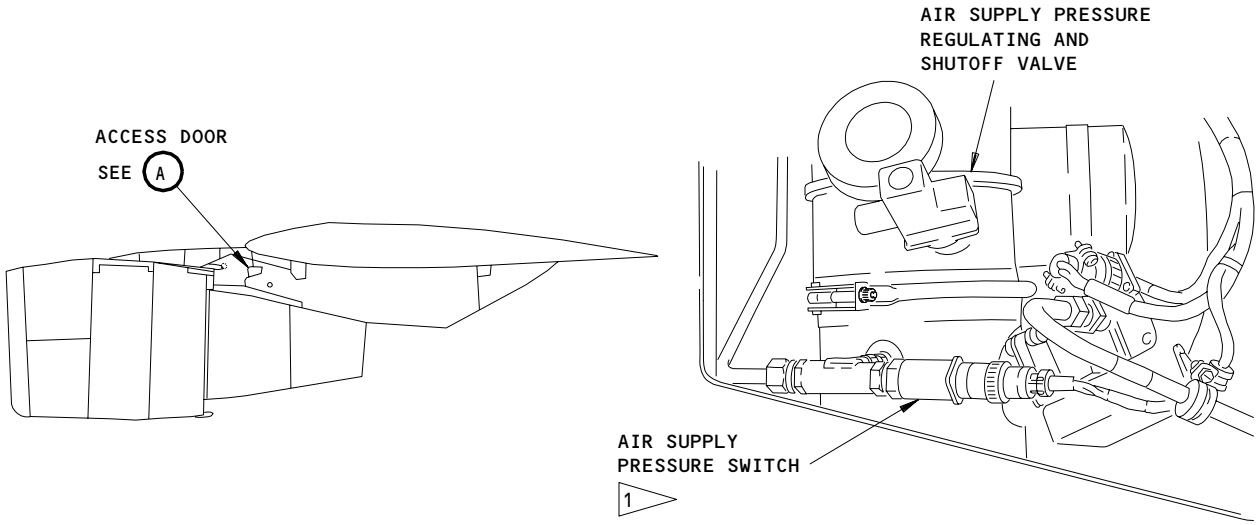
Air Supply Indication
Figure 1 (Sheet 1)





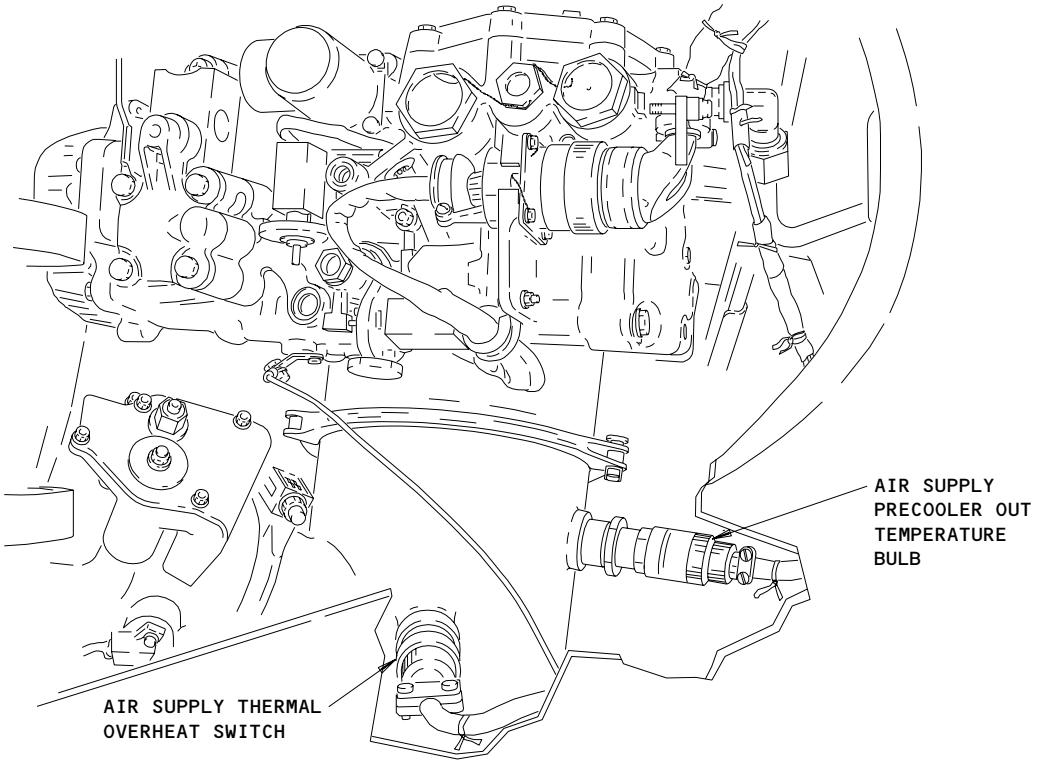
DUCT PRESSURE TRANSDUCERS
C

Air Supply Indication
Figure 1 (Sheet 2)



ACCESS DOOR TO RIGHT SIDE OF STRUT

A

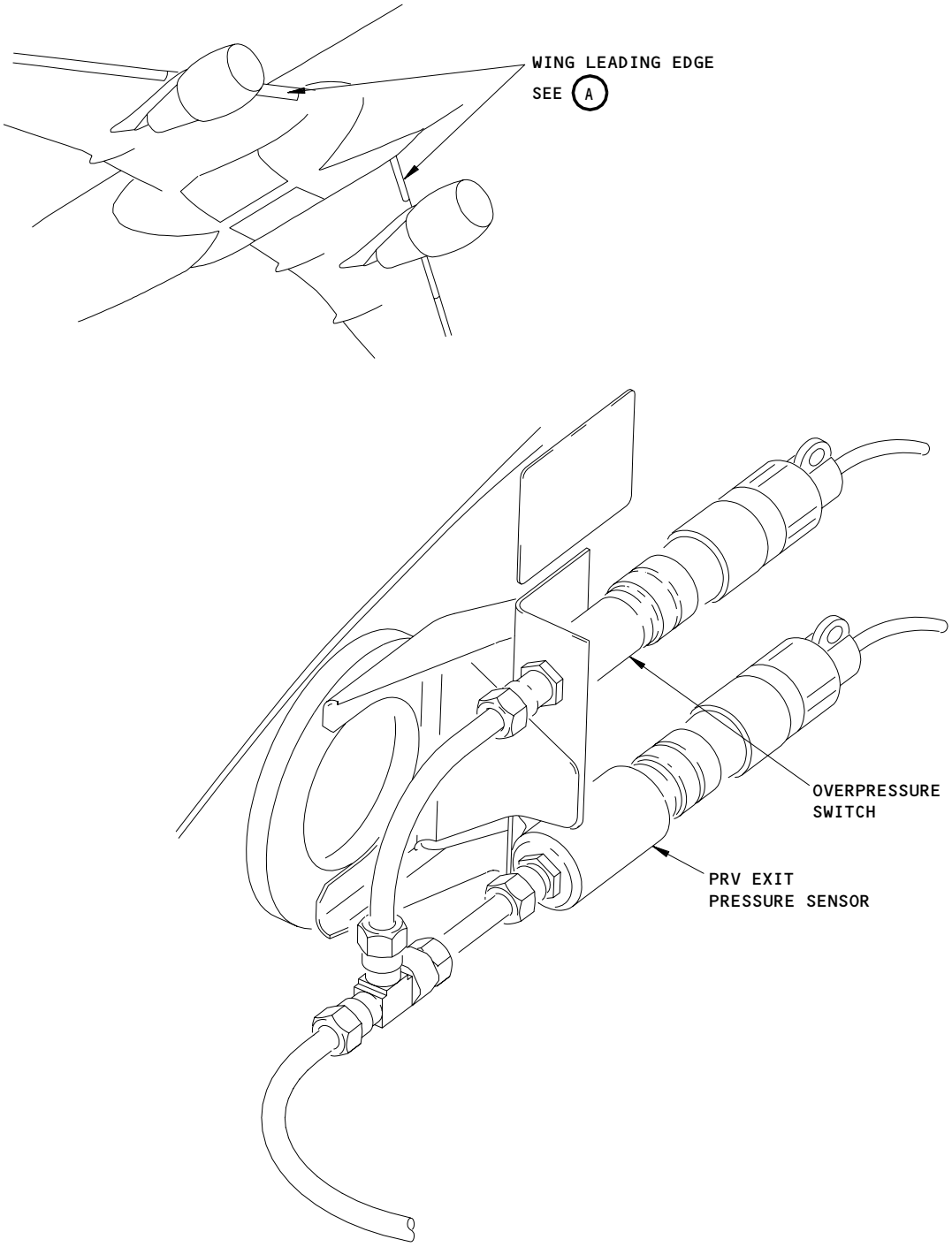


ACCESS DOOR TO LEFT SIDE OF STRUT

A

1 IF INSTALLED

Air Supply Indication
Figure 1A

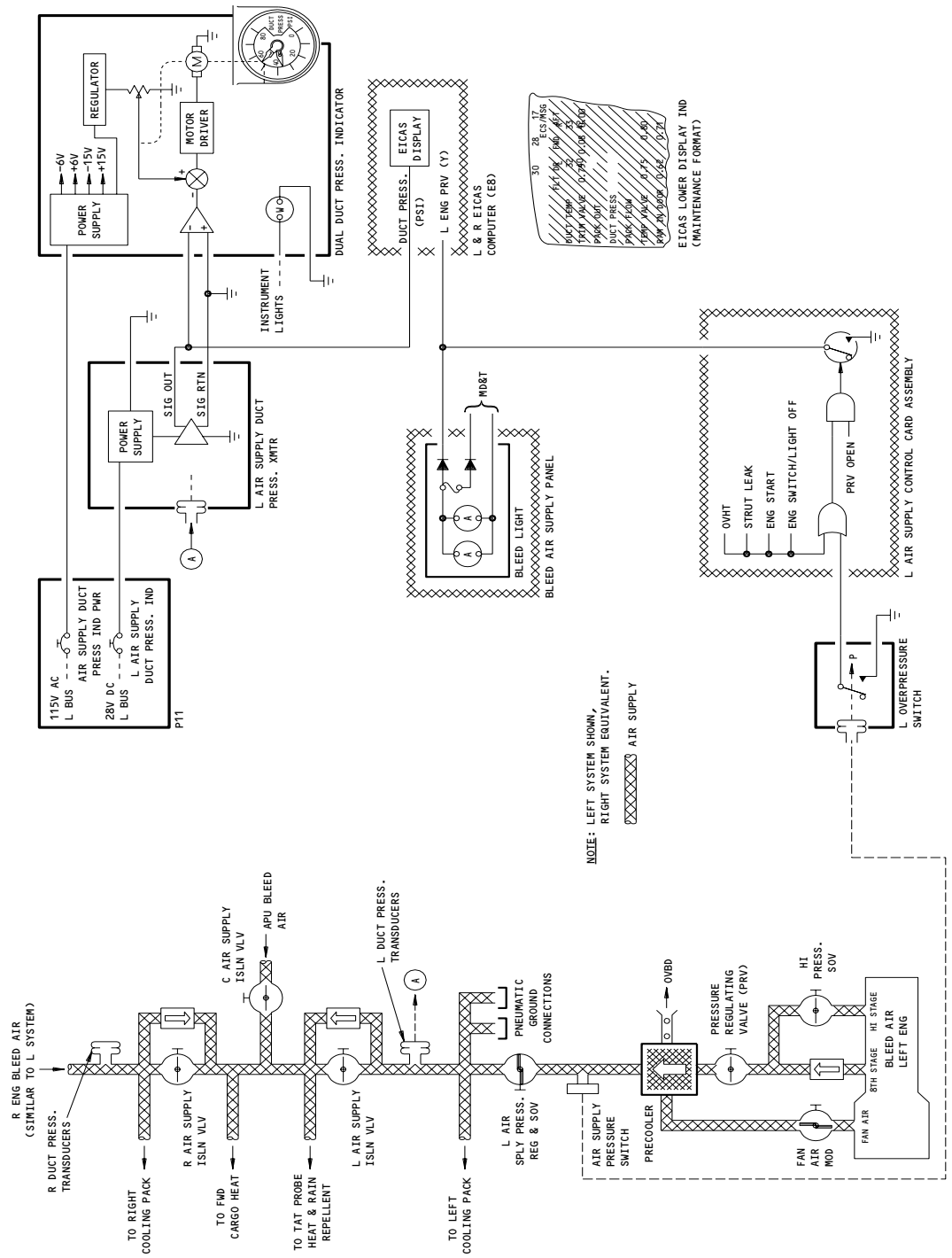


WING LEADING EDGE

A

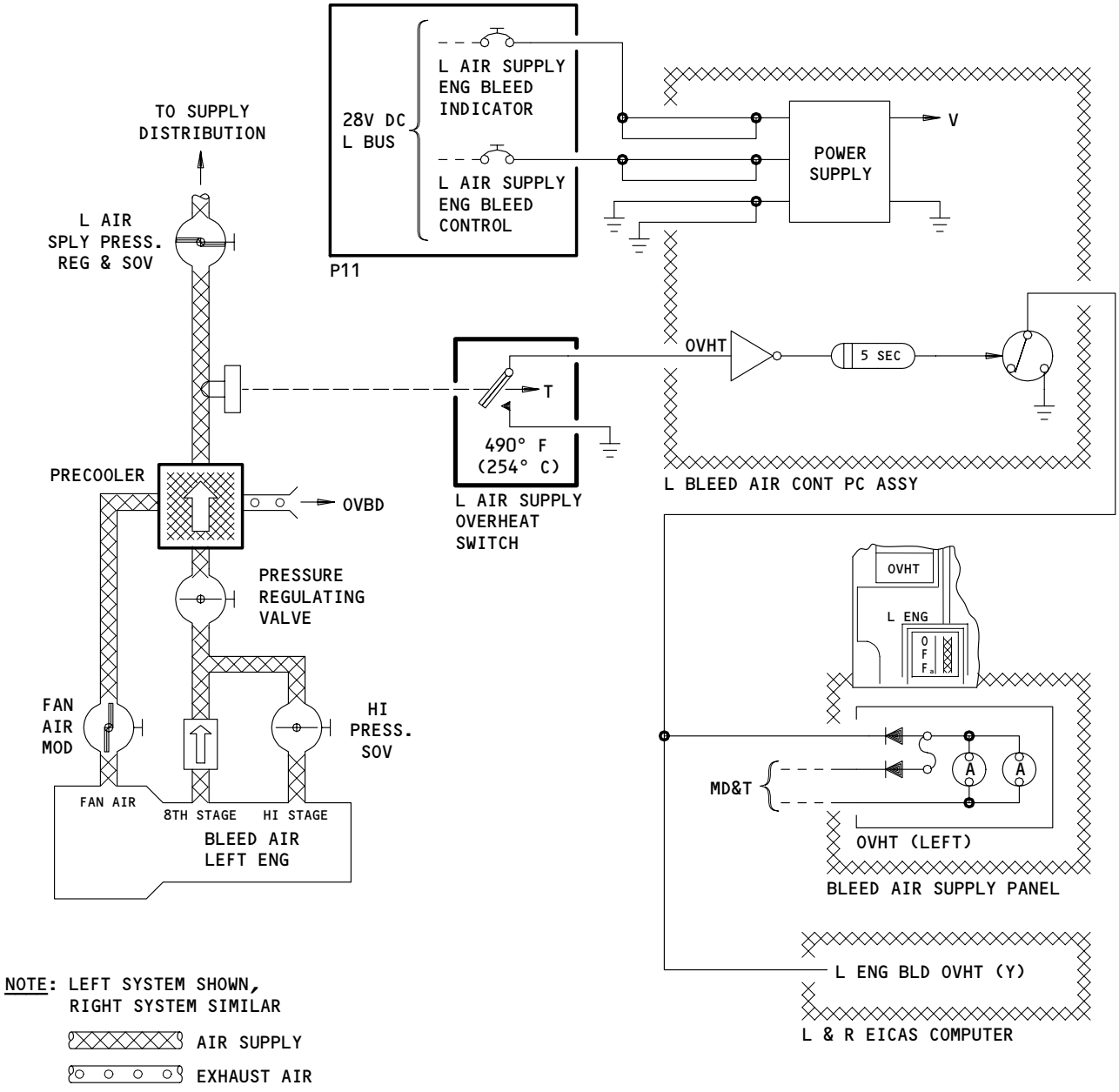
Air Supply Indication
Figure 1B

2. Operation
   A. Functional Description
      (1) Air Supply Pressure Indicating System Operation (Fig. 2)
         (a) Two duct pressure transducers provide a direct reading of the available air pressure supplied by the air supply system. 28v dc power is supplied to each pressure transducer. The pressure transducers are attached to the body crossover duct, one on each side of the airplane. Each transducer supplies an output signal to the dual duct pressure indicator on the pilots' overhead P5 panel and to the left and right EICAS computers. Each transducer drives a separate indication needle on the dual duct pressure indicator which is calibrated from 0 to 80 psi. EICAS displays the duct pressure on the lower EICAS screen whenever the ECS/MSG maintenance page is selected with the airplane on the ground.
         (b) A left and right overpressure switch enables failure indications for an overpressure situation downstream of the precooler.
         (c) When the duct pressure at the switch gets to 81 ±2 psig the switch will close. When the switch closes, the air-supply-control card will get a ground signal. The switch will open again when the duct pressure is below 74 psig.
         (d) If the pressure regulating valve is not closed 5 seconds after the switch closes, these indications will show:
            1) The BLEED light on the P5 panel will come on.
            2) The EICAS message L(R) ENG PRV will come on.
      (2) Air Supply Temperature Indicating System Operation (Fig. 3)
         (a) The air supply temperature indicating system senses an overheat condition at the outlet of the air supply precooler. The indicating systems for both engines are identical.
         (b) The air supply thermal overheat switch is just upstream of the pressure regulating and shutoff valve (AMM 36-10-00/001). When the temperature within the duct reaches 490°F (255°C), the switch closes to provide a ground signal to the air supply control card. The card latches in an overheat configuration.



Air Supply Pressure Indicating System Schematic
Figure 2

244989



Air Supply Overheat Indication Schematic
Figure 3

(c) PW 4000 SERIES ENGINES;
Once the card is latched, it pulses the OFF mode solenoids of the high pressure controller (HPC) and pressure regulating valve controller (PRVC) dumping HPSOV and PRV actuator servo pressure to close both HPSOV and PRV, illuminates the OVHT (or BLD OVHT) light on the air supply control module (P5 panel), and displays the EICAS advisory message L(R) ENG BLD OVHT.

(d) The air supply control card retains the overheat latch until the system is reset without an overheat condition. Reset occurs when ENG OFF switch/light is positioned from ON to OFF then back to ON. If the card is latched while switch is in OFF position, reset occurs when the ENG OFF switch/light is positioned from OFF to ON.

B. Precooler Temperature Indication System Operation (Fig. 3A)

(1) The precooler temperature bulb mounts immediately downstream of the precooler. The bulb's electrical resistance varies directly with temperature. EICAS computers receive temperature signals and convert the signals to PRECOOL OUT temperature display.

C. BITE Operation (Fig. 4)

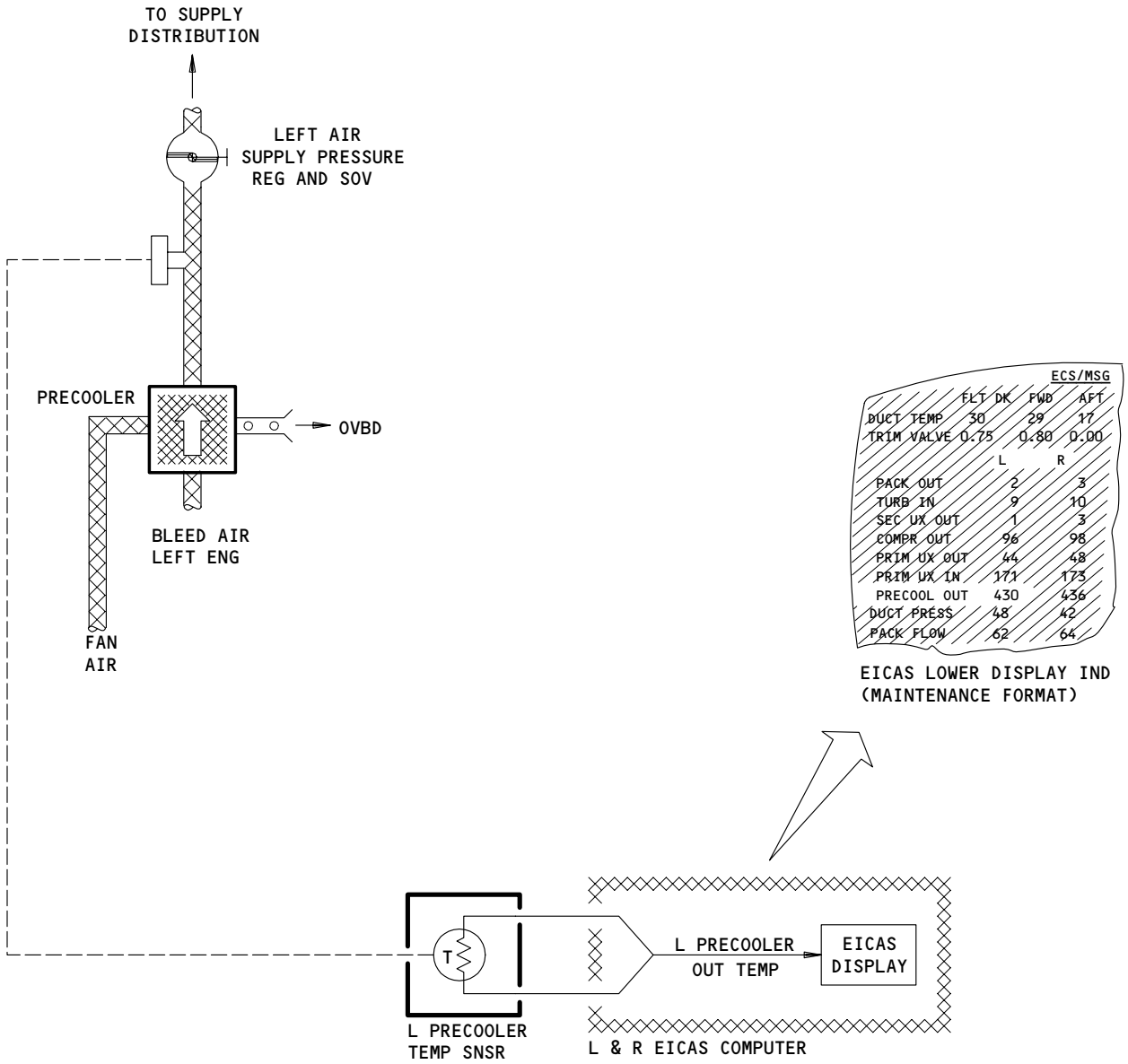
(1) Main Routine (Fig. 5)

D. BITE Module Functional Description

(1) The BITE Module is a fault collection and storage device. It records and stores faults that occur in bleed air supply system line-replaceable units (LRUs) or interface wiring. The BITE Module also performs self-tests that check it own operation.

(2) The BITE Module can detect faults for both left and right engine bleed air systems. The BITE Module isolates the fault to an LRU and stores the fault in a prior fault memory base (i.e. a memory base of faults that can later be retrieved). Faults are stored for the current flight and for the 7 previous flights. Maintenance personnel can review these faults at the Display Panel on the BITE Module. A Display Panel PREVIOUS FAULTS" Light illuminates when a fault occurred in any flight except the most recent flight (i.e. before the most recent takeoff).

(3) The BITE Module is connected to BITE-dedicated valve-position switches, overpressure switches, and temperature and pressure sensors (Fig. 6 "SENSORS USED ONLY FOR THE BITE MODULE"). The failure of any of these BITE-dedicated devices does not degrade the air supply system. These switches are used only by the BITE Module to assist in identifying the faulty LRU. The failure of these switches are shown as "BITE SWITCH FAULTS" on the BITE module display panel.



NOTE: LEFT SYSTEM SHOWN, RIGHT SYSTEM EQUIVALENT

LEGEND

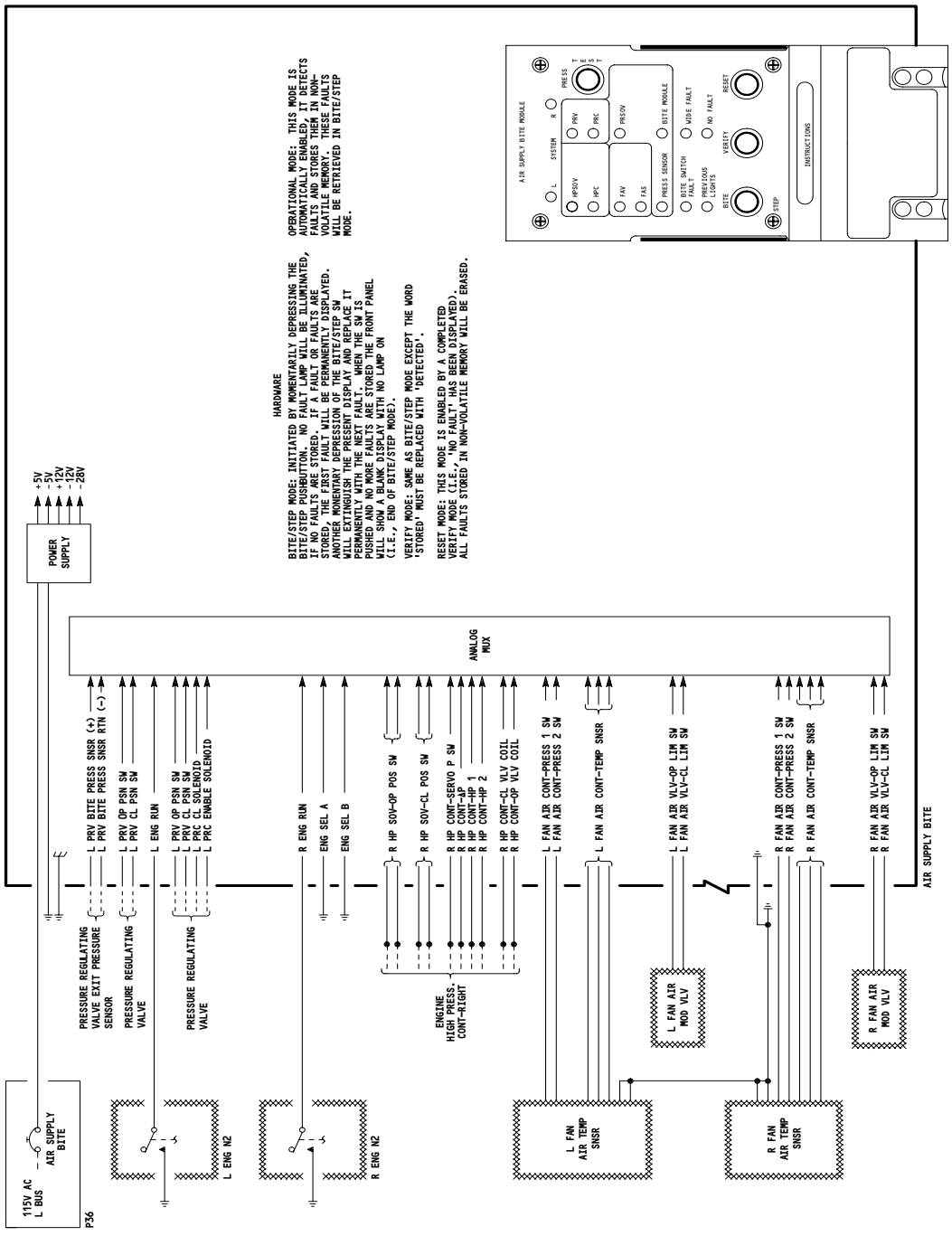
AIR SUPPLY

EXHAUST AIR

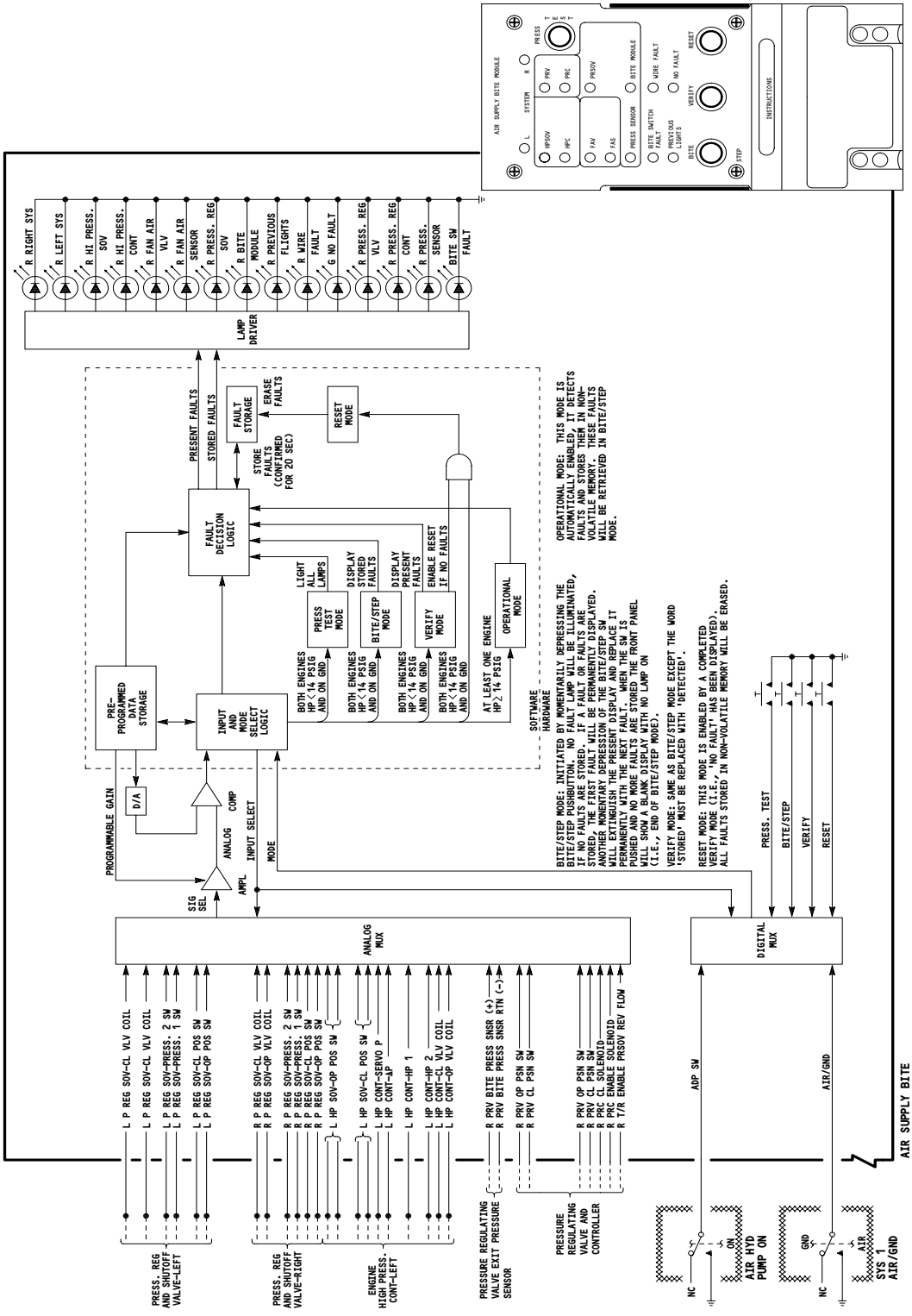
Precooler Temperature Indication
Figure 3A

EFFECTIVITY
AIRPLANES WITH THE PRECOOLER OUT TEMPERATURE BULB

244996



Air Supply BITE Schematic
Figure 4 (Sheet 1)



Air Supply BITE Schematic
Figure 4 (Sheet 2)

950948

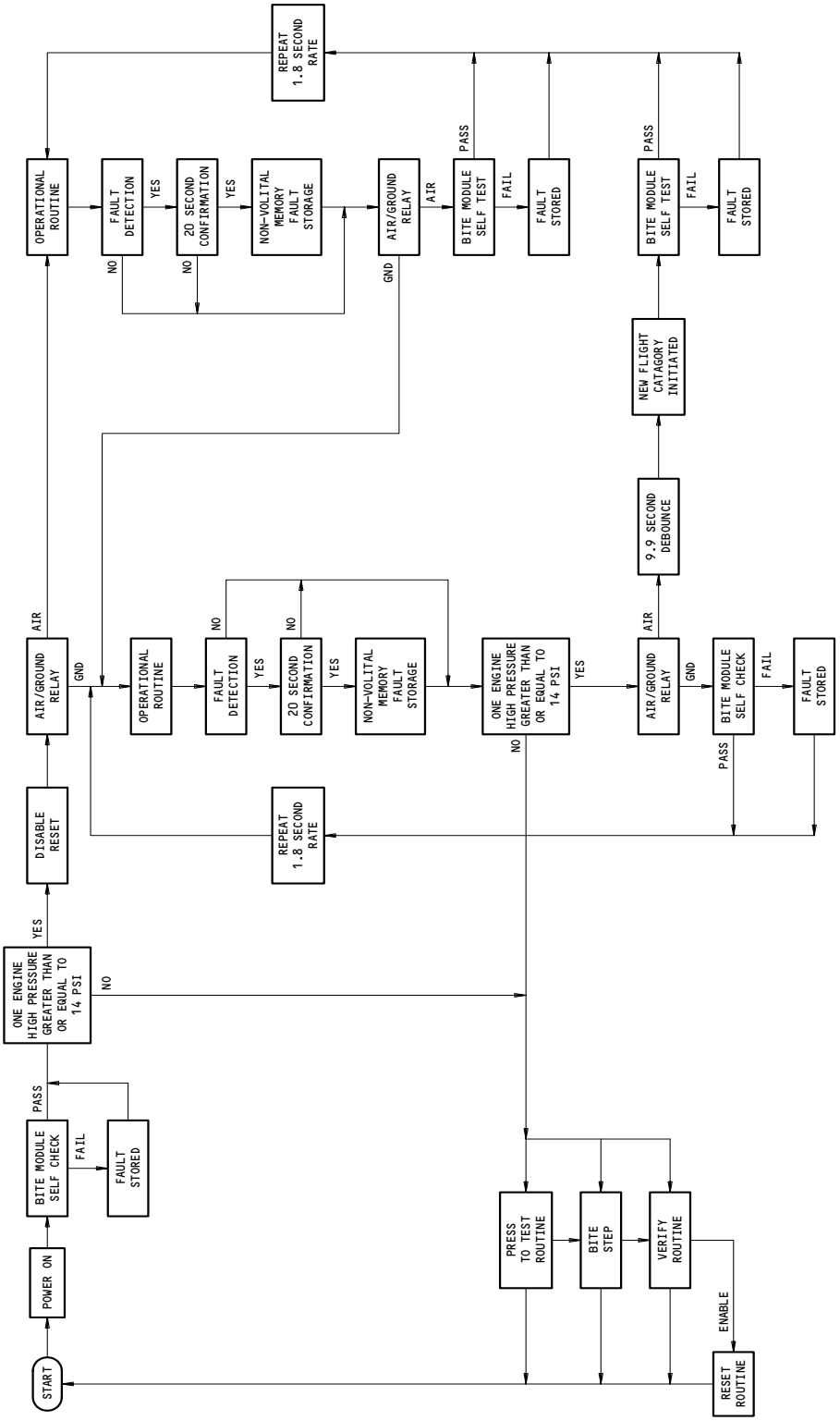
EFFECTIVITY

ALL

36-20-00

11

Page 12
Dec 22/01



Air Supply Bite Module Main Routine Block Diagram
Figure 5

(4) The BITE Module, however, shares certain pressure and position switches with flight-deck indication circuits (Fig. 6 "SENSORS USED FOR SYSTEM CONTROL"). Failure of these switches can cause incorrect flight deck indication. The failure of these switches will result in the applicable "LRU FAULT". The BITE Module is also connected to valve positioning solenoids responsible for turning the bleed air system on and off.

(5) The BITE Module operates in one of two modes:

(a) Operational

(b) Real Time Verify, including the following subsets:

1) PRESS/TEST
2) BITE/STEP
3) VERIFY
4) RESET

(c) The Operational Mode will do tests for LRU and wiring faults and stores the appropriate faults in the prior fault memory base. (System wiring and solenoid coil integrity is monitored continuously as long as power is supplied to the BITE Module.) When the BITE Module is in the Operational Mode you can not erase the prior faults memory base. The operational mode is entered automatically under these conditions:

(d) Electrical power is supplied to the BITE Module and either or both of these conditions occur:

1) Pneumatic power is supplied to the bleed air supply system as shown by the engine 50 percent N2 switch or by the high-pressure controller (HPC) pressure switch.
2) The airplane is airborne.

(e) If a fault is shown, the BITE Module does a check to make sure the fault continues for a predetermined time. This time varies for different faults. This reduces the chance of erroneous fault indications caused by noise or normal system transients. Entry into the operational mode is automatic and disables the ability to erase the prior fault memory base.

(f) The Real-Time Verify Mode is enabled whenever the airplane is on the ground and is depressurized. The main purpose of this mode is to compare the states of wires, switches, and sensors to their known unpressurized states, and to show any differences with a fault light on the BITE Module (e.g. The BITE Module will look at the HPSOV position switch to make sure the HPSOV is closed or the BITE Module will look at the signal from the pressure sensor to make sure it sends a signal of 0 psi). Faults found during Real-Time Verify are stored in a real time fault and prior fault memory base. Those stored in real time memory are not confirmed and are not affected by persistence; that is, no persistence confirmation is necessary. The more serious faults, stored in the prior fault memory, are confirmed. During Real-Time Verify, the BITE Module Display Panel pushbuttons described below are enabled.

1) BITE/STEP is used to show faults stored in the prior fault memory. During BITE/STEP, faults are recalled from (but remain stored in) the prior fault memory. If no faults are stored, the NO FAULT light illuminates for 10 seconds unless extinguished by the RESET pushbutton. If faults are stored, the fault groups of the current flight are displayed when BITE/STEP is first pressed. (The current flight is that of the most recent takeoff). When you continue to push the BITE/STEP pushbutton the BITE Module Display Panel will show the fault for the previous 7 flights. The fault display priorities are:
   a) Current flight before previous flights (up to 7 previous flights)
   b) Left system before right system.
   c) LRU faults (any "LRU" fault light). Table 1
   d) BITE-only switch faults ("BITE SWITCH FAULTS" light). These are switches used only by the BITE module to help isolate the faulty LRU. They are not shared between the BITE Module and flight-deck indicator circuits. Table 2

e) Open wire faults ("WIRE FAULTS" and any "LRU" light). Table 3
f) BITE-only switch open wire faults ("WIRE FAULTS" and "BITE SWITCH FAULT" light). These are faults in the electrical wiring of the BITE-only switches. Table 4

LRU Faults *[1]
Table 1

LRU LIGHT	CAUSE OF FAILURE
HPSOV	CLOSED POSITION SWITCH HPSOV FAILED OPEN OR CLOSED
HPC	ENABLE SOLENOID CLOSE SOLENOID HIGH PRESSURE SENSOR FAILURE TO COMMAND THE HPSOV CLOSED AT HIGH PRESSURE FAILURE TO COMMAND THE HPSOV CLOSED WHEN COMMANDED FAILURE TO COMMAND THE HPSOV OPEN AT LOW PRESSURE
PRV	CLOSED POSITION SWITCH PRV FAILED OPEN OR CLOSED
PRC	ENABLE SOLENOID CLOSE SOLENOID FAILURE TO COMMAND THE PRV CLOSED AT HIGH TEMPERATURE FAILURE TO COMMAND THE PRV CLOSED WHEN COMMANDED FAILURE TO COMMAND THE PRV OPEN AT LOW TEMPERATURE
FAV	FAMV OPEN OR CLOSED
FAS	FAILURE TO COMMAND THE FAMV CLOSED AT HIGH TEMPERATUE FAILURE TO COMMAND THE FAMV OPEN AT LOW TEMPERATURE
PRSOV	CLOSED POSITION SWITCH ENABLE SOLENOID CLOSE SOLENOID PRSOV FAILED OPEN OR CLOSED FAILURE TO COMMAND THE PRSOV CLOSED AT HIGH PRESSURE FAILURE TO COMMAND THE PRSOV CLOSED WHEN COMMANDED FAILURE TO COMMAND THE PRSOV OPEN AT LOW PRESSURE
BITE MODULE	BITE MODULE FAULT
PRESS SENSOR	NONE

*[1] CORRECTIVE ACTION IS TO REPLACE THE LRU

BITE Switch Faults *[2] Table 2	
LRU LIGHT	CAUSE OF FAILURE
HPSOV	OPEN POSITION SWITCH
HPC	LOW PRESSURE SENSOR DIFFERENTIAL PRESSURE SENSOR SERVO PRESSURE SENSOR
PRV	OPEN POSITION SWITCH
PRC	NONE
FAV	OPEN POSITION SWITCH
FAS	TEMPERATURE SENSOR LOW PRESSURE SWITCH HIGH PRESSURE SWITCH
PRSOV	OPEN POSITION SWITCH HIGH PRESSURE SWITCH LOW PRESSURE SWITCH
BITE MODULE	NONE
PRESS SENSOR	PRESSURE SENSOR

*[2] CORRECTIVE ACTION IS TO REPLACE THE LRU

LRU Wire Faults *[3] Table 3	
LRU LIGHT	CAUSE OF FAILURE
HPSOV	CLOSED POSITION SWITCH
HPC	ENABLE SOLENOID CLOSE SOLENOID HIGH PRESSURE SENSOR
PRV	CLOSED POSITION SWITCH
PRC	ENABLE SOLENOID CLOSE SOLENOID
FAV	CLOSED POSITION SWITCH
FAS	NONE
PRSOV	CLOSED POSITION SWITCH ENABLE SOLENOID CLOSE SOLENOID
BITE MODULE	NONE
PRESS SENSOR	NONE

*[3] AN "LRU WIRE FAULT" IS CAUSED BY AN OPEN CIRCUIT IN THE AIRPLANE WIRING OR AN OPEN CIRCUIT IN THE LRU. CORRECTIVE ACTION WOULD BE TO DO A CHECK FOR CONTINUITY BETWEEN THE LRU AND THE BITE MODULE AND REPAIR THE ELECTRICAL WIRING AND/OR REPLACE THE FAULTY LRU.

BITE Switch Wire Faults *[4] Table 4	
LRU LIGHT	CAUSE OF FAILURE
HPSOV	OPEN POSITION SWITCH
HPC	LOW PRESSURE SENSOR DIFFERENTIAL PRESSURE SENSOR SERVO PRESSURE SENSOR
PRV	OPEN POSITION SWITCH
PRC	NONE
FAV	OPEN POSITION SWITCH CLOSED POSITION SWITCH
FAS	TEMPERATURE SENSOR LOW PRESSURE SWITCH HIGH PRESSURE SWITCH
PRSOV	OPEN POSITION SWITCH HIGH PRESSURE SWITCH LOW PRESSURE SWITCH
BITE MODULE	NONE
PRESS SENSOR	PRESSURE SENSOR

*[4] A "BITE SWITCH WIRE FAULT" IS CAUSED BY AN OPEN CIRCUIT IN THE AIRPLANE WIRING OR AN OPEN CIRCUIT IN THE LRU. CORRECTIVE ACTION IS TO DO A CHECK FOR CONTINUITY BETWEEN THE LRU AND THE BITE MODULE AND REPAIR THE ELECTRICAL WIRING AND/OR REPLACE THE FAULTY LRU.

2) The BITE Module can store faults for a total of 8 flights. When a fault is from a previous flight, the "PREVIOUS FAULTS" light will illuminate. Faults found during the previous 7 flights are shown as if they were a single flight.

3) VERIFY is used to show faults that are stored in a real time memory base. The VERIFY pushbutton is used to do a check of the system status after an LRU is replaced. VERIFY confirms that all wiring interfaces have been properly restored after an LRU replacement. It also confirms that the pressure sensors and valve position switches are in their proper depressurized position (e.g. the HPSOV position switch is closed, the pressure sensor reads 0 psig etc.). Faults are shown the same as for the BITE/STEP and have the same priorities. If no failures are found in VERIFY (shown by a "NO FAULTS" light), or if the failures are "BITE SWITCH FAULTS" or "BITE SWITCH WIRING FAULTS", the RESET function is enabled (i.e. you can push RESET to erase the prior fault memory base).
4) PRESS/TEST is a light test for the BITE Module Display Panel. When the PRESS/TEST pushbutton is pushed there will be a check of the operation of the BITE Module Display Panel lights. The PRESS/TEST is done only on the ground and requires electrical power to the BITE Module. The lights will extinguish when the pushbutton is released.
5) RESET is enabled from the VERIFY Mode under the conditions described above (i.e. you must go through the VERIFY test and get 1) a "NO FAULTS" light or 2) a "BITE SWITCH" or "BITE SWITCH WIRE FAULT" light). When you push the RESET pushbutton, the BITE Module clears all or some of the faults stored in the prior memory base, depending on the state of the BITE switches and wires. The RESET Mode is automatically disabled upon entry into the Operational mode, BITE/STEP or PRESS/TEST.

(g) The BITE Module main routine is repeated in less than 3 seconds. If first tests the BITE Module, then determines if the airplane is on the ground or in flight, if the engines are on or off, and the state of system health. This information is used to determine which modes can be entered. Each takeoff initiates a new fault group check for a new flight. When the airplane meets the requirements for the Operational Mode, the RESET Mode is disabled and the Operational Mode is automatically entered. Faults can then be stored for a new flight.

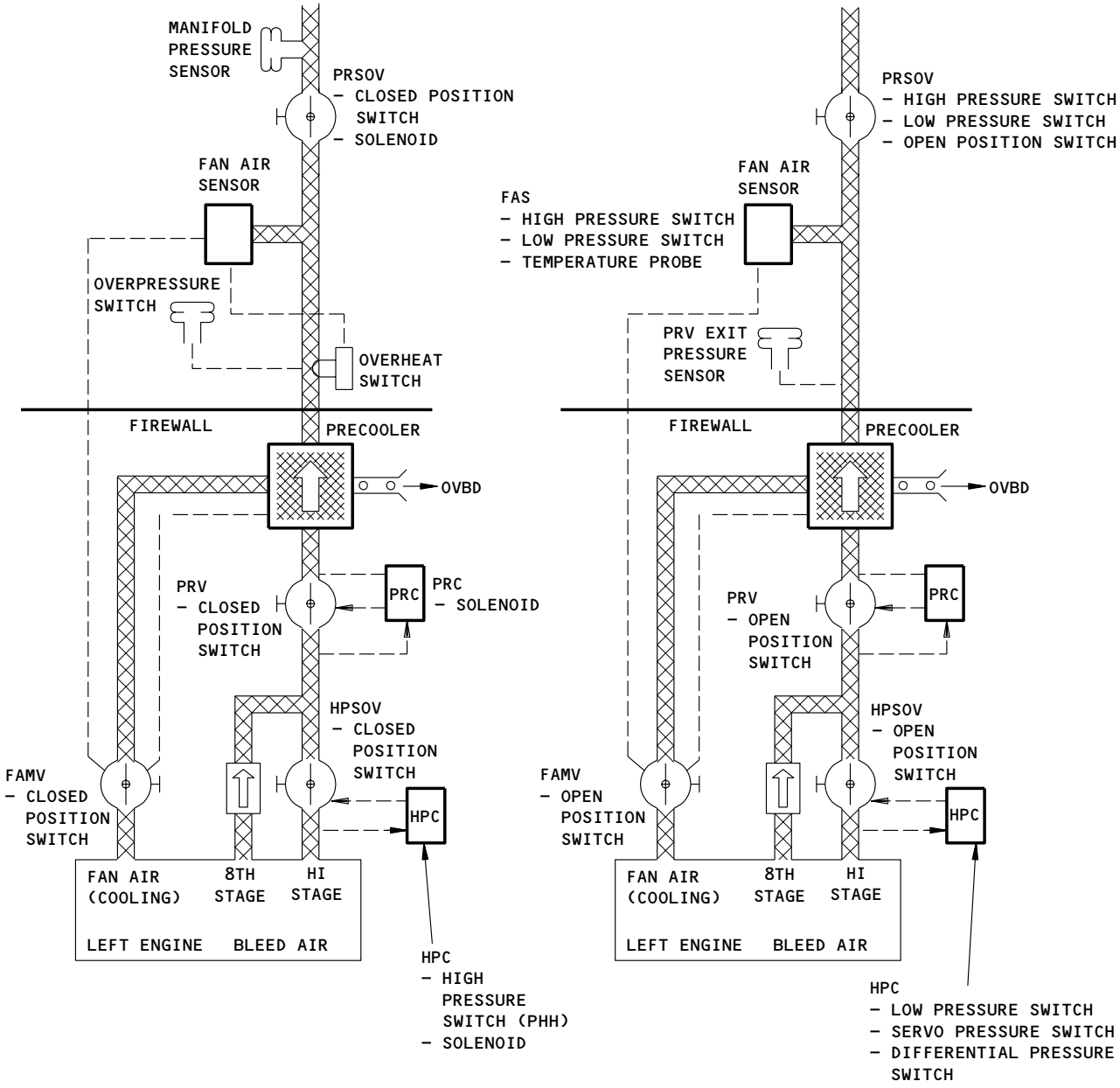
E. Operational Check

(1) In the event that an engine is shutdown or is throttled back below idle (high stage pressure less than 14 psig) during flight, pneumatic system components for that engine are not faulted. The BITE system senses low (or no) engine output pressure and ignores apparent faults from system components.

(2) In the event that a pressure regulating valve is closed, as indicated by the valve position indicator, the BITE system will not fault the pressure regulating shutoff valve for being closed.

(3) The BITE module determines which flight category a fault is stored in by using a signal from the AIR/GND relay. Anytime the module receives a GND signal longer than 9.9 seconds followed by an AIR signal, stops storage of faults in the current FLIGHT category. The module then initiates a new FLIGHT category. The time delay prevents a false AIR/GND signal which may be caused by a power interruption, from interrupting fault storage.

(4) Ground Checks (Fig. 6)



SENSORS USED FOR SYSTEM CONTROL

SENSORS USED ONLY FOR THE BITE MODULE

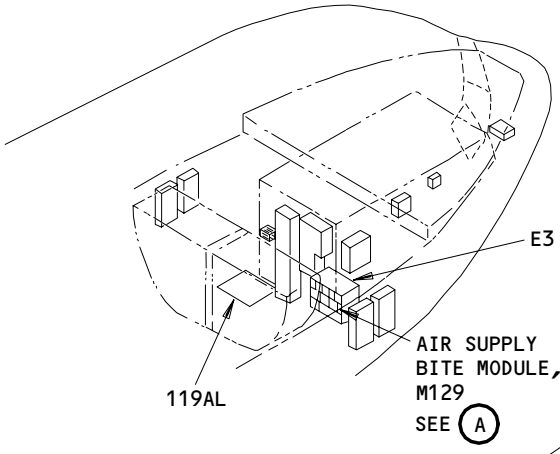
Air Supply Bite System
Figure 6

PNEUMATIC INDICATING

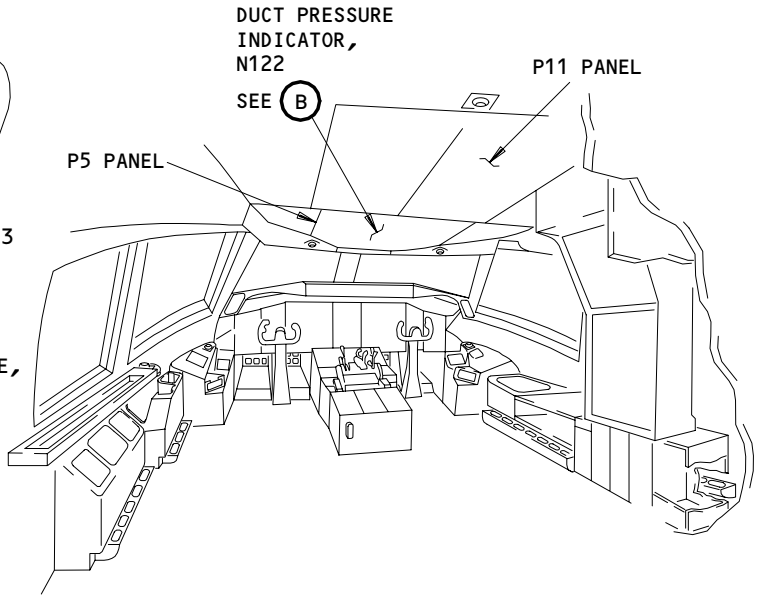
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
BULB - LEFT PRECOOLER TEMPERATURE, TS350	2	1	434AL, L ENG STRUT	36-22-02
BULB - RIGHT PRECOOLER TEMPERATURE, TS351	2	1	444AL, R ENG STRUT	36-22-02
CIRCUIT BREAKER -	1		FLT COMPT, P11	
CONTROL, LEFT AIR SUPPLY ENG BLEED, C1339		1	11S11	*
CONTROL, RIGHT AIR SUPPLY ENG BLEED, C1340		1	11S20	*
IND, AIR SUPPLY DUCT PRESS PWR, C4221		1	11S17	*
IND, LEFT AIR SUPPLY DUCT PRESS, C1332		1	11S16	*
IND, LEFT AIR SUPPLY ENG BLEED, C1343		1	11S10	*
IND, RIGHT AIR SUPPLY DUCT PRESS, C1342		1	11S25	*
IND, RIGHT AIR SUPPLY ENG BLEED, C1344		1	11S19	*
PRESS DUCT				*
CIRCUIT BREAKER -	1		119AL, MAIN EQUIP CTR, P36	
BITE, AIR SUPPLY, C1341		1	36L7 OR 36K7	*
INDICATOR - DUCT PRESSURE, N122	1	1	FLT COMPT, P5	36-21-02
MODULE - AIR SUPPLY BITE, M129	1	1	119AL, MAIN EQUIP CTR, E3	36-23-01
SENSOR - LEFT PRV EXIT PRESSURE, M1842	3	1	511NB, WING ACCESS PANEL	36-21-08
SENSOR - RIGHT PRV EXIT PRESSURE, M1843	3	1	611NB, WING ACCESS PANEL	36-21-08
SWITCH - LEFT AIR SUPPLY THERMAL OVERTEMPERATURE, S358	2	1	434AL, L ENG STRUT	36-22-01
SWITCH - LEFT OVERPRESSURE, S734	2	1	511NB, WING ACCESS PANEL	36-21-03
SWITCH - RIGHT AIR SUPPLY THERMAL OVERTEMPERATURE, S359	2	1	444AL, R ENG STRUT	36-22-01
SWITCH - RIGHT OVERPRESSURE, S735	2	1	611NB, WING ACCESS PANEL	36-21-03
TRANSDUCER - LEFT DUCT PRESSURE, M1088	4	1	193KL, ECS BAY	36-21-01
TRANSDUCER - RIGHT DUCT PRESSURE, M1089	4	1	194KR, ECS BAY	36-21-01

* SEE THE WDM EQUIPMENT LIST

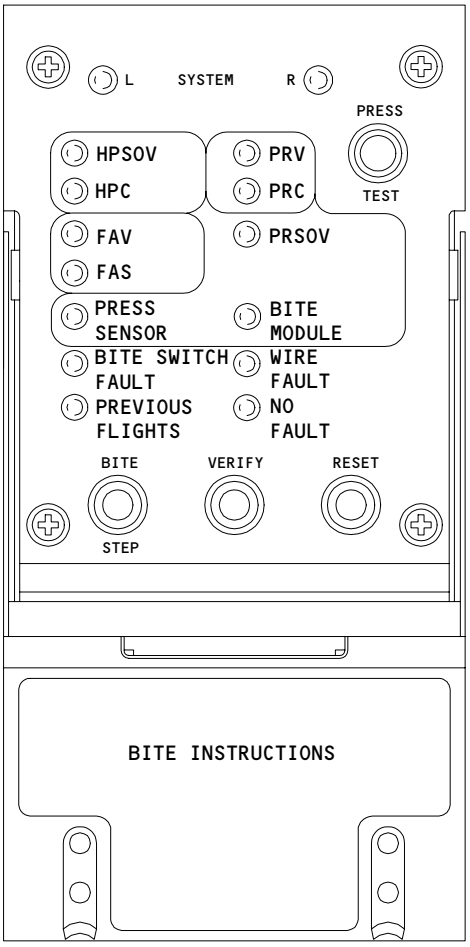
Pneumatic Indicating - Component Index
Figure 101



MAIN EQUIPMENT CENTER

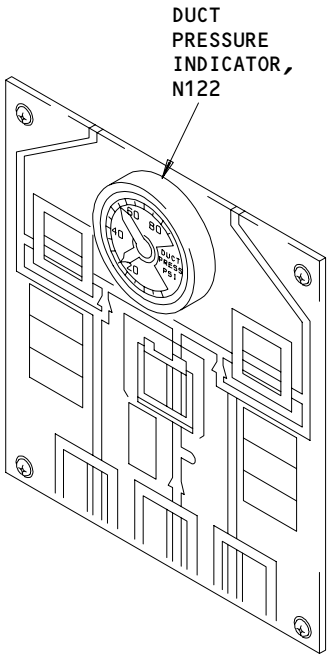


FLIGHT COMPARTMENT



AIR SUPPLY BITE MODULE, M129

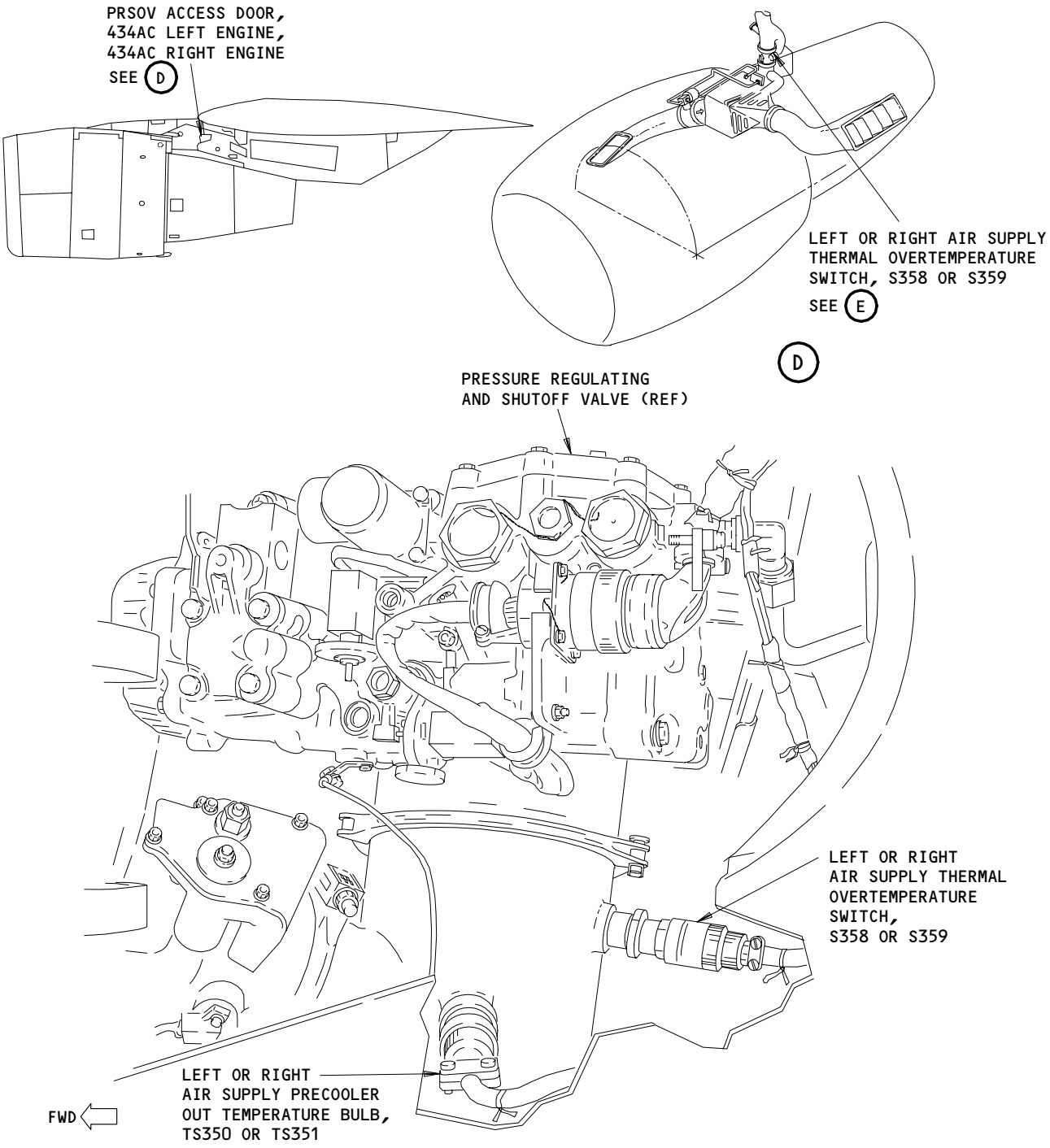
A



DUCT PRESSURE INDICATOR, N122

B

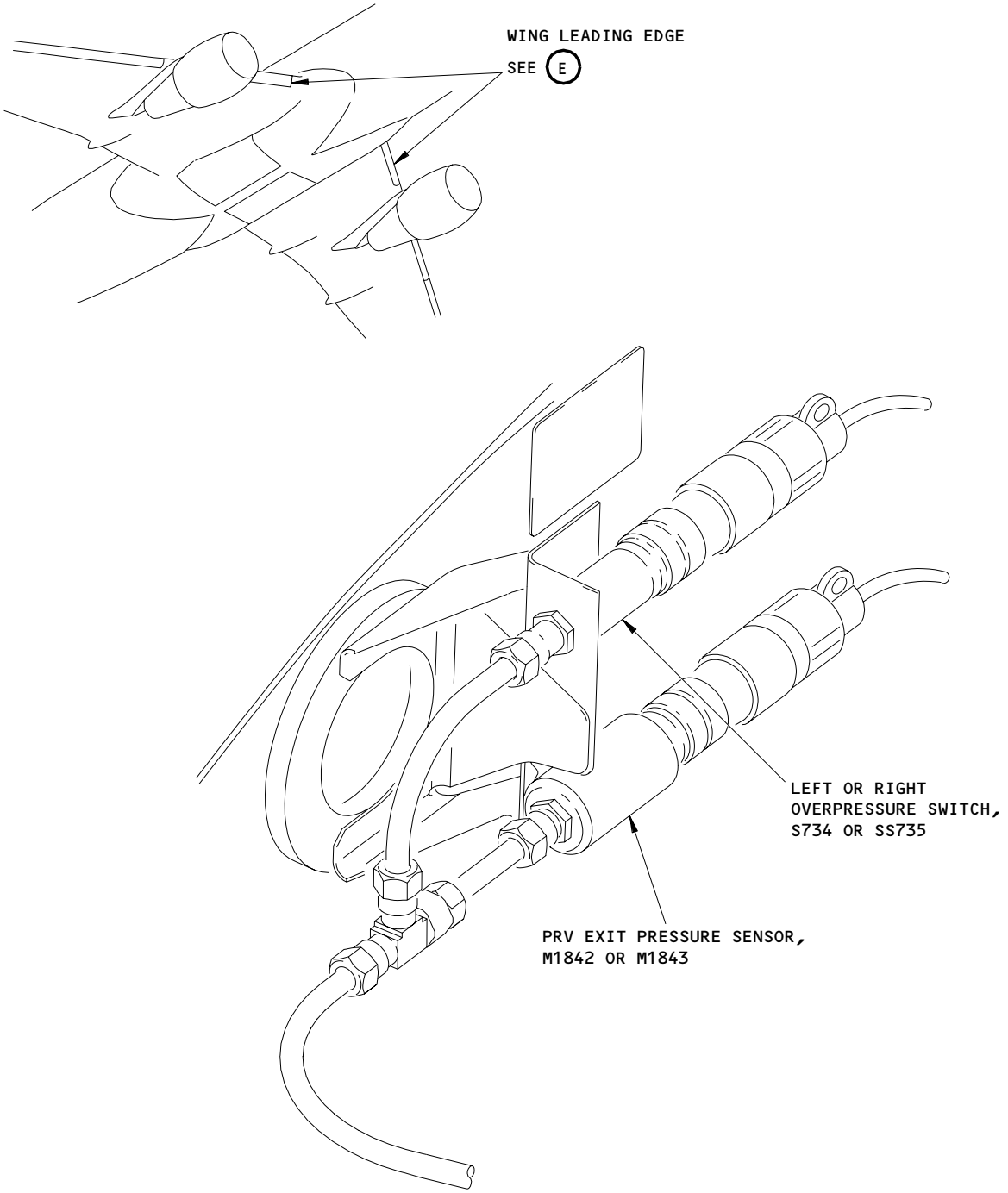
Pneumatic Indicating - Component Location
Figure 102 (Sheet 1)



LEFT OR RIGHT AIR SUPPLY THERMAL
OVERTEMPERATURE SWITCH

E

Pneumatic Indicating - Component Location
Figure 102 (Sheet 2)



WING LEADING EDGE

E

Pneumatic Indicating - Component Location
Figure 102 (Sheet 3)

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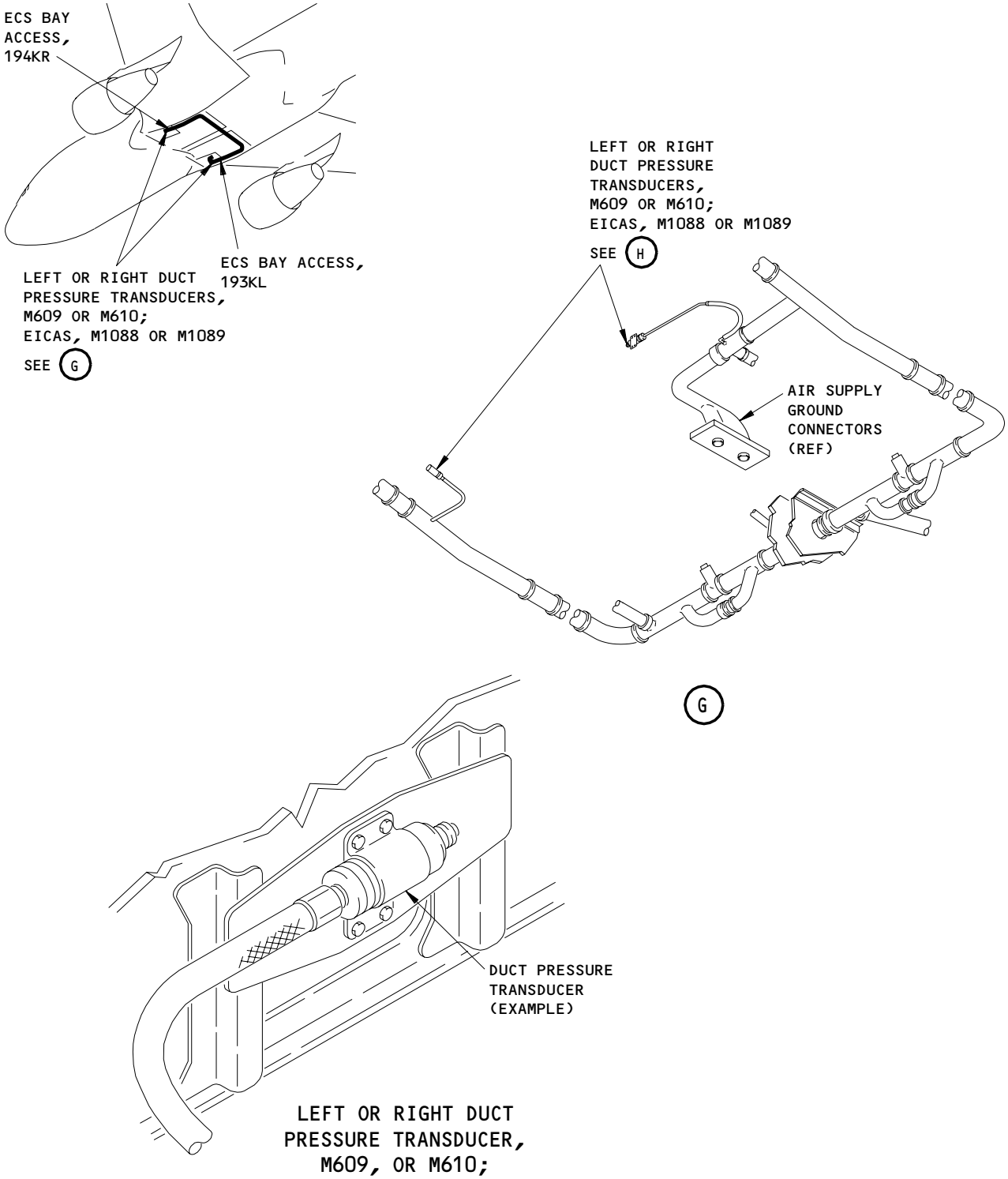


Pneumatic Indicating - Component Location
Figure 102 (Sheet 4)

AIR SUPPLY PRESSURE INDICATING SYSTEM - ADJUSTMENT/TEST

1. General
   A. This procedure has instructions to do an operational test of the Air Supply Pressure Indicating System.

TASK 36-21-00-715-022

2. Air Supply Pressure Indicating System Operational Test
   A. General
      (1) This procedure will do a check of the pneumatic system duct pressure indications that show at these locations in the flight compartment:
         (a) Duct Pressure Indicator on Bleed Air Supply Panel (P5 panel)
         (b) ECS/MSG Maintenance page on lower EICAS display unit (P2 panel)
   B. References
      (1) AMM 24-22-00/201, Electrical Power Control
      (2) AMM 31-41-00/501, Engine Indication and Crew Alerting System (EICAS)
      (3) AMM 36-00-00/201, Pneumatic - General
   C. Access
      (1) Location Zones
         211/212 Control Cabin

   D. Prepare for the Air Supply Pressure Indicating System Operational Test

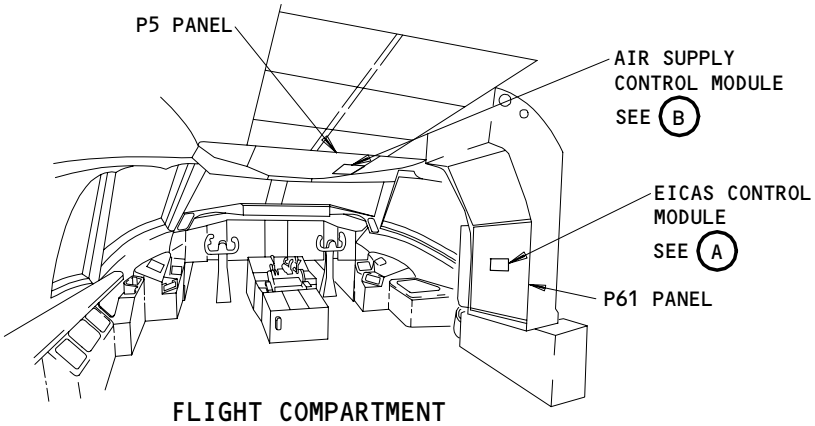
      S 865-002
      (1) Supply the electrical power (AMM 24-22-00/201).

      S 865-012
      (2) Make sure the Engine Indication and Crew Alerting System (EICAS) is operational (AMM 31-41-00/501).

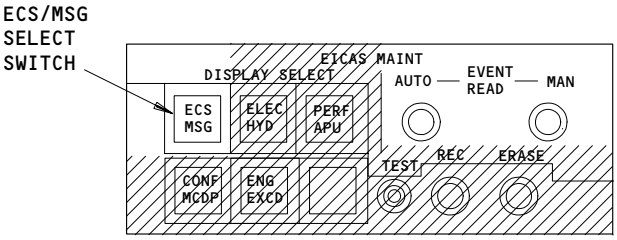
      S 865-003
      (3) Supply the pneumatic power (AMM 36-00-00/201).
   E. Air Supply Pressure Indicating System Operational Test

      S 865-004
      (1) Push the L and R ISLN VALVE switch/lights, on the Bleed Air Supply Panel found on the pilots' overhead P5 panel, to the open position.
         (a) Make sure the VALVE light comes on and goes out.

      S 865-006
      (2) If APU supplies pneumatic power, push the C ISLN VALVE switch/light on the Bleed Air Supply Panel found on the pilots' overhead P5 panel, to the open position.
         (a) Make sure that the VALVE light comes on and goes out.

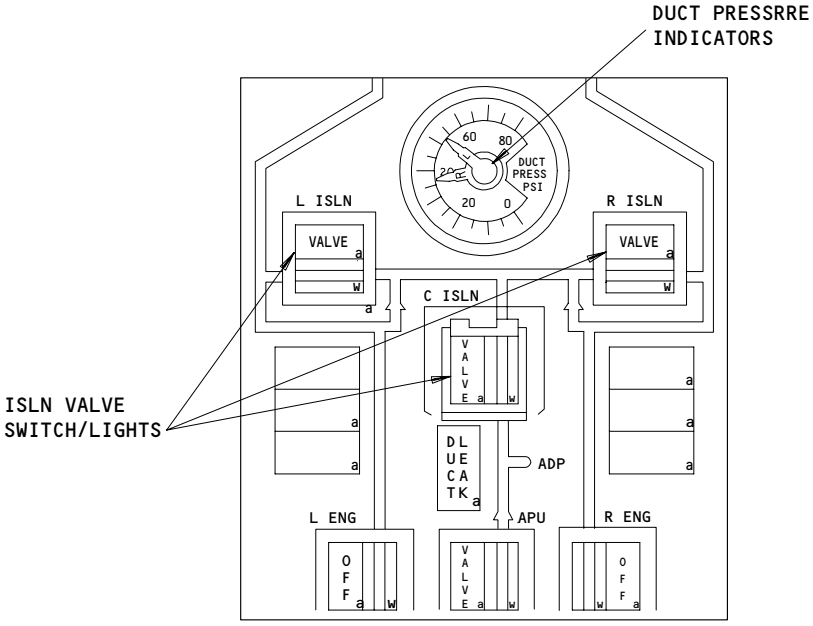


FLIGHT COMPARTMENT



EICAS CONTROL MODULE

A



AIR SUPPLY CONTROL MODULE

B

Air Supply Pressurization Adjustment Test
Figure 501

S 865-035

(3) Push the ECS/MSG switch on the EICAS MAINT panel on the right side panel (P61) to show the ECS/MSG Maintenance page on the lower EICAS display unit (P2 panel).
   (a) Make a record of the L and R DUCT PRESS indications that show on the ECS/MSG maintenance page.

S 215-015

(4) On the Bleed Air Supply panel (P5), make a record of the L and R DUCT PRESS indications on the Duct Pressure Indicator.

S 215-023

(5) Make sure the L and R DUCT PRESS indications that show on the Duct Pressure Indicator (P5) and the Maintenance page are the same for these conditions:
   (a) 18 psi or greater for engine supplied pneumatic power.
   (b) An Approximate value of 25 psi for APU supplied pneumatic power.
   (c) Ground cart pressure for the ground cart which supplies the pneumatic power.

F. Put the Airplane Back to Its Usual Condition

S 865-017

(1) Push each (L,R,C) ISLN VALVE switch/light, on the Bleed Air Supply panel (P5), to the closed position.
   (a) Make sure each VALVE light comes on and then goes off.

S 865-019

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

S 865-020

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

MANIFOLD DUCT PRESSURE TRANSDUCER - REMOVAL/INSTALLATION

1. General
   A. This procedure has these tasks:
      (1) The removal of the duct pressure transducers.
      (2) The installation of the duct pressure transducers.

   TASK 36-21-01-004-031

2. Remove the Duct Pressure Transducer (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electric Power-Control
      (2) AMM 36-00-00/201, Pneumatic - General
   B. Access
      (1) Location Zones
          190 Fairings

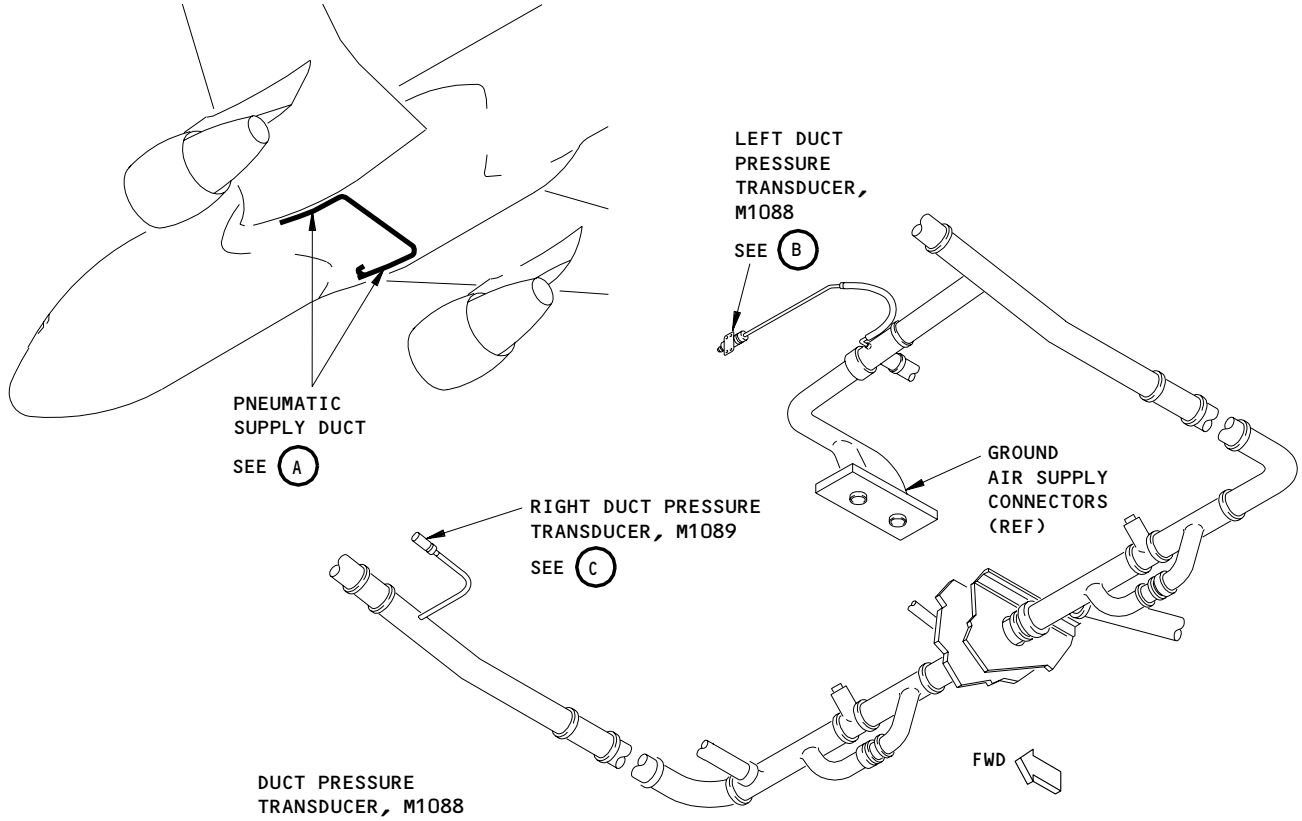
      (2) Access Panels
          193GL ECS Components, Conditioned Air Connection, Pressure Relief Door
          194HR ECS Components - Pressure Relief Panel

   C. Prepare for the Removal of the Duct Pressure Transducer (Fig. 401)

      S 864-001
      (1) Open these circuit breakers on the P11 panel, and attach the DO-NOT-CLOSE tag:
          (a) 11S16, DUCT PRESS IND L
          (b) 11S25, DUCT PRESS IND R

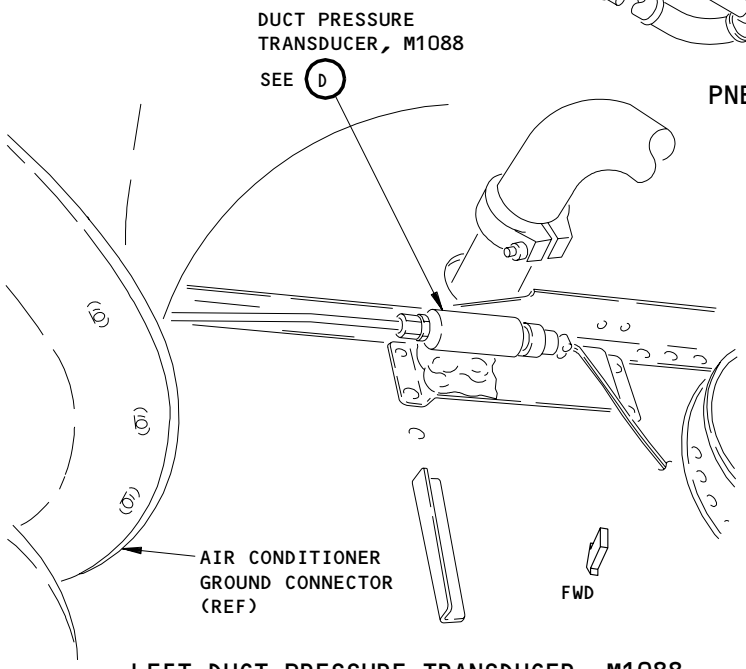
      S 864-003
      (2) Remove the pneumatic power (AMM 36-00-00/201).

      S 014-039
      (3) Open the applicable pressure relief panel (193GL/194HL) to get access to the pressure transducer.



PNEUMATIC SUPPLY DUCT

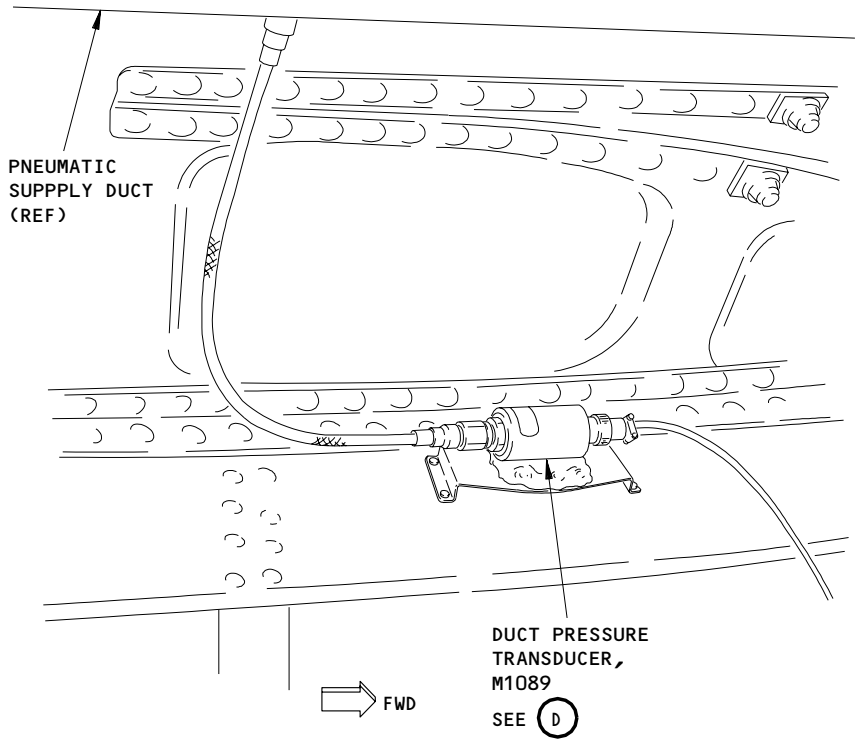
A



LEFT DUCT PRESSURE TRANSDUCER, M1088

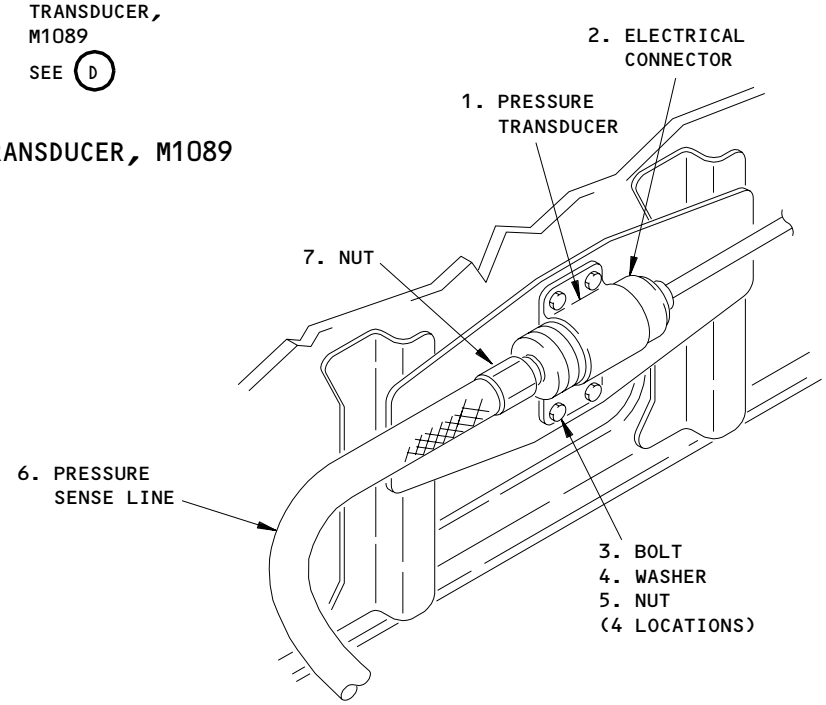
B

Manifold Duct Pressure Transducer Installation
Figure 401 (Sheet 1)



RIGHT DUCT PRESSURE TRANSDUCER, M1089

C



DUCT PRESSURE TRANSDUCER
(EXAMPLE)

D

Manifold Duct Pressure Transducer Installation
Figure 401 (Sheet 2)

D. Remove the Duct Pressure Transducer (Fig. 401)

S 024-033
(1) Disconnect the electrical connector (2) from the transducer (1).

S 034-009
(2) Remove the pressure sense line (6) from the transducer (1).

S 034-010
(3) Remove the bolts (3), washers (4) and nuts (5) from the bracket.

S 024-011
(4) Remove the transducer (1) from the bracket.

TASK 36-21-01-404-012

3. Install the Duct Pressure Transducer (Fig. 401)

A. Consumable Materials
(1) D01062, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature anti-seize compound)

B. References
(1) AMM 24-22-00/201, Electric Power-Control
(2) AMM 36-00-00/201, Pneumatic - General

C. Access
(1) Location Zones
190 Fairings

(2) Access Panels
193GL ECS Components, Conditioned Air Connection, Pressure Relief Door
194HR ECS Components - Pressure Relief Panel

D. Procedure

S 424-013
(1) Put the pressure transducer (1) on the bracket assembly.

S 434-014
(2) Install the bolts (3), washers (4) and nuts (5).

S 434-015
(3) Tighten the bolts (3), washers (4) and nuts (5) to attach the transducer (1) to the bracket assembly.

S 644-032
(4) Apply a light coat of anti-seize compound to the sense line (6) fitting.

S 434-016
(5) Connect the pressure sense line (6) to the transducer (1) pressure port.

S 434-017
(6) Tighten the nut (7).

S 434-018
(7) Attach the electrical connector (2) to the transducer (1).

S 864-019
(8) Close these circuit breakers on the P11 panel and remove the DO-NOT-CLOSE tag:
(a) 11S25, DUCT PRESS IND R
(b) 11S16, DUCT PRESS IND L

S 764-086
(9) Supply electrical power (AMM 24-22-00/201).

S 864-020
(10) Supply the pneumatic power (AMM 36-00-00/201).

S 754-023
(11) Push the L and R ISLN switches on the pilot's P5 Bleed Air Supplypanel to the open position.

S 784-024
(12) Make sure that the two needles on the DUCT PRESS indicator show the same value.

S 724-025
(13) Push the ECS MSG switch on the EICAS MAINT panel on the right side panel, P61.

S 784-026
(14) Make sure that the EICAS values of the duct pressure show the same.

E. Put The Airplane Back to Its Usual Condition

S 724-027
(1) Push the L and R ISLN switches to the closed position.

S 864-028
(2) Remove the pneumatic pressure if it is not necessary.

S 414-029
(3) Close (install) the applicable access panel.

S 864-030

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

DUCT PRESSURE INDICATOR - REMOVAL/INSTALLATION

TASK 36-21-02-004-001

1. Remove The Duct Pressure Indicator

A. Access

(1) Location Zones
211/212 Control Cabin

B. Prepare for the Removal of the Duct Pressure Indicator

S 864-002

(1) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11S16, DUCT PRESS IND L
(b) 11S25, DUCT PRESS IND R
(c) 11S17, AIR SUPPLY DUCT PRESS IND PWR

S 034-003

(2) Loosen 1/4-turn screws from the air supply control module on the pilot's overhead P5 panel.

S 034-004

(3) Carefully pull the module away from the panel sufficiently to get to the electrical connector.

C. Remove the Duct Pressure Indicator

S 034-007

(1) Disconnect the electrical connector from the duct pressure indicator.

S 034-008

(2) Loosen the screw on the clamp.

S 024-009

(3) Remove the duct pressure indicator.

TASK 36-21-02-404-010

2. Install the Duct Pressure Indicator (Fig. 401)

A. References

(1) AMM 24-22-00/201, Electric Power Control
(2) AMM 36-00-00/201, Pneumatic General

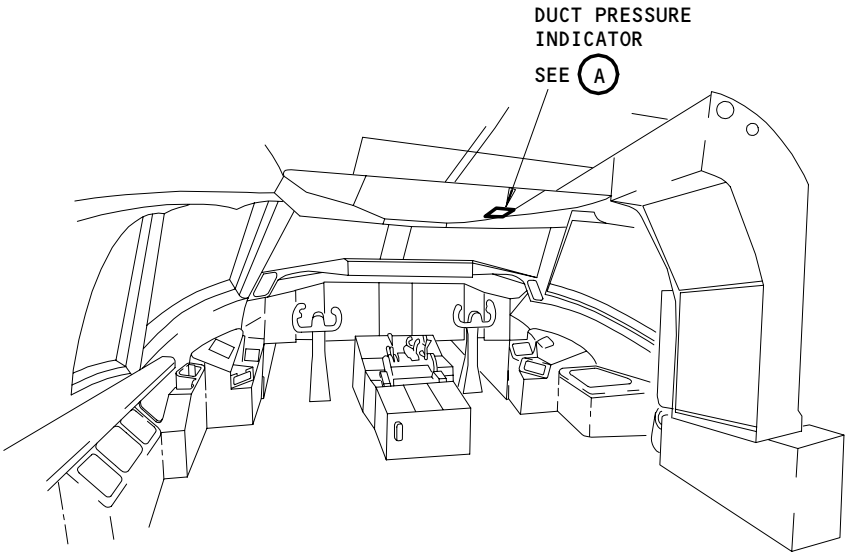
B. Access

(1) Location Zones
211/212 Control Cabin

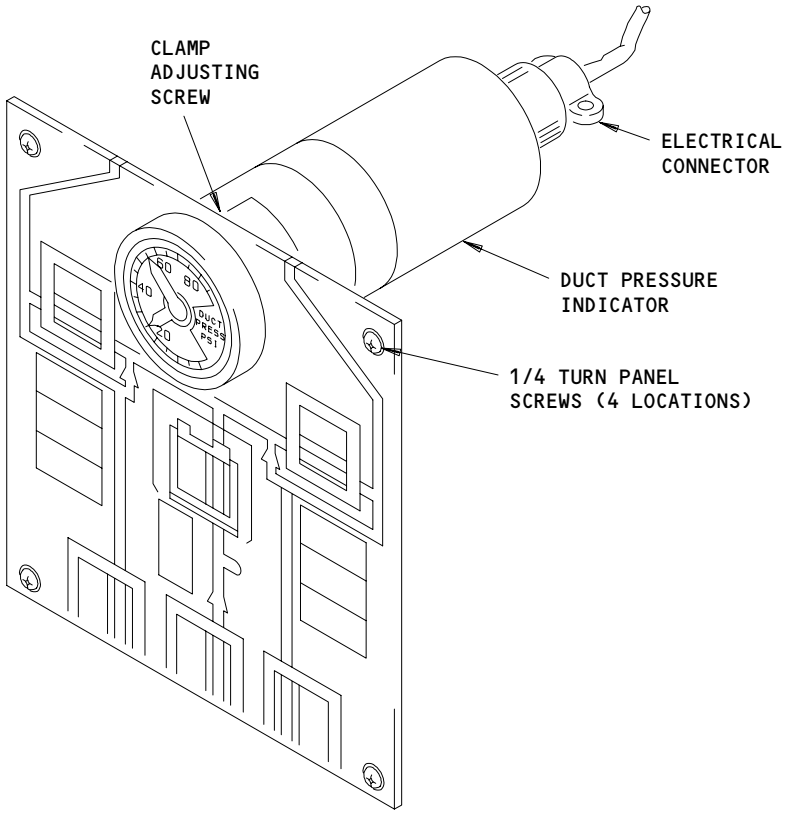
C. Procedure

S 424-011

(1) Put the duct pressure indicator in the air supply control module.
(a) Tighten the screw on the clamp to 5-8 inch-pounds.



FLIGHT COMPARTMENT



DUCT PRESSURE INDICATOR

(A)

Duct Pressure Indicator
Figure 401

S 434-012
(2) Install the electrical connector to the indicator.

S 434-013
(3) Move the air supply control module back into the P5 panel.
(a) Tighten 1/4 turn panel screw.

S 864-014
(4) Remove DO_NOT_CLOSE tag and close these circuit breakers on the p11, panel.
(a) 11S16, DUCT PRESS IND L
(b) 11S25, DUCT PRESS IND R
(c) 11S17, AIR SUPPLY DUCT PRESS IND PWR

D. Do a test on the duct pressure indicator.

S 864-015
(1) Supply the electrical power (AMM 24-22-00/201).

S 864-016
(2) Supply the pneumatic power (AMM 36-00-00/201).

S 214-017
(3) Make sure that the duct pressure indicators show approximately 40 psi

E. Put the Airplane Back to Its Usual Condition

S 864-018
(1) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-019
(2) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

OVERPRESSURE SWITCH - MAINTENANCE PRACTICES

1. General
   A. These procedures are included in this section:
      (1) The removal and installation of the pressure switch
      (2) The circuit test of the pressure switch
   B. The switch measures a high air pressure condition. The switch gives an input to the control card for the air supply. The control card supplies an input to the EICAS (L/R ENG PRV FAIL message) and the (L/R) BLEED LIGHT.

TASK 36-21-03-002-001

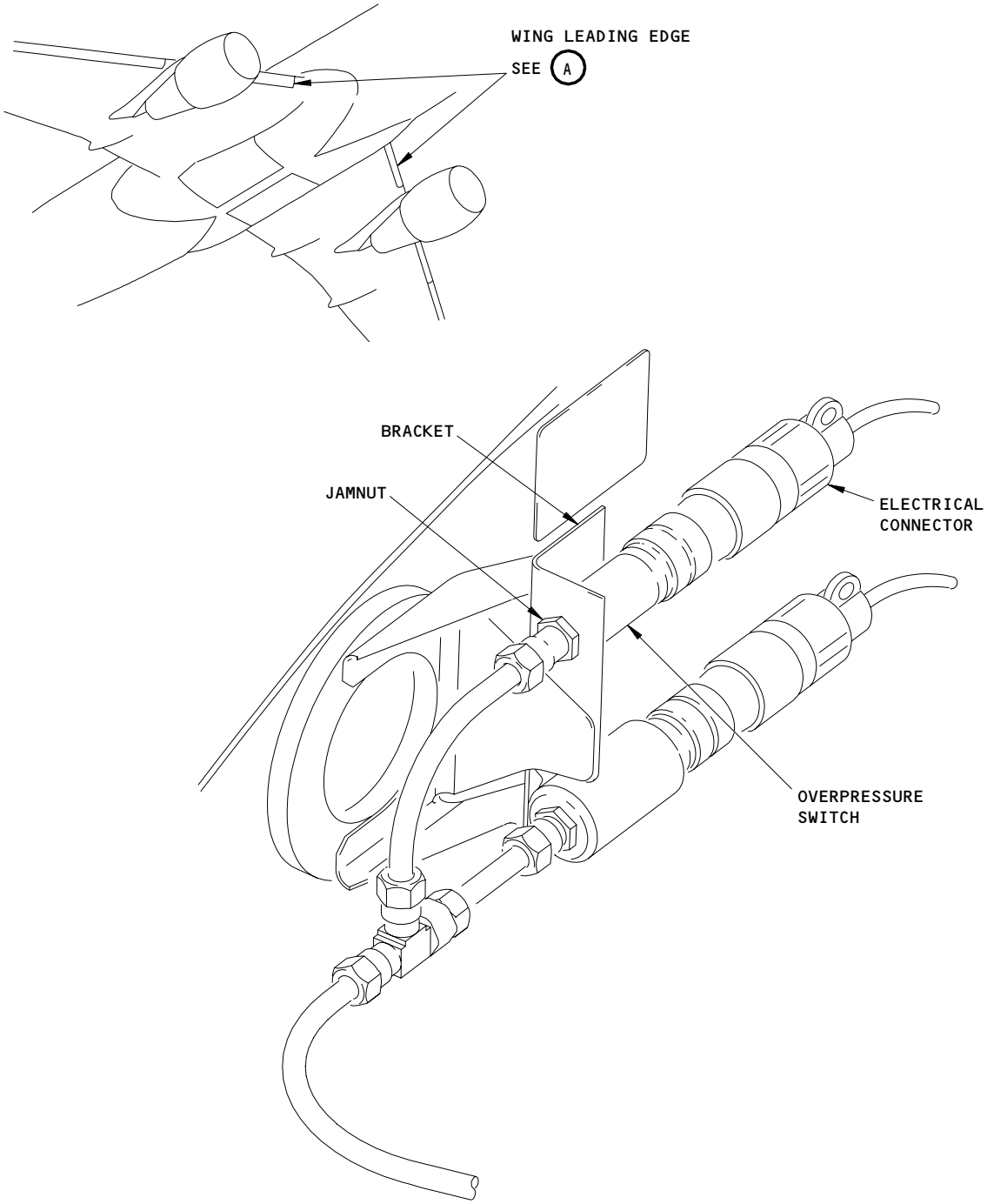
2. Remove the Overpressure Switch
   A. References
      (1) AMM 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels.
      (2) AMM 06-44-00/201, Wing Access Panels
      (3) AMM 20-10-23/401, Standard Practices Lockwire
      (4) AMM 27-81-00/201, Leading Edge Slat System
      (5) AMM 78-31-00/201, Fan Thrust Reverser System
   B. Access
      (1) Location Zones
          511/611 Leading edge to front spar

      (2) Access Panels
          511NB/611NB Wing Access Panel

   C. Procedure

      S 032-002
      (1) Do this procedure: Leading Edge Slats Deactivation (AMM 27-81-00/201).

      S 022-178
      (2) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11S19, RIGHT ENG BLEED IND



Overpressure Switch Installation
Figure 201

(b) 11S20, RIGHT ENG BLEED CONT
(c) 11S10, LEFT ENG BLEED IND
(d) 11S11, LEFT ENG BLEED CONT

S 012-008
(3) Open the wing access panel, 511NB or 611NB, for the switch (AMM 06-44-00/201).

S 022-184
(4) Remove the electrical connector from the switch.

S 032-015
(5) Remove the jamnut from the switch

S 022-074
(6) Remove the pressure switch.

TASK 36-21-03-402-016

3. Install the Overpressure Switch

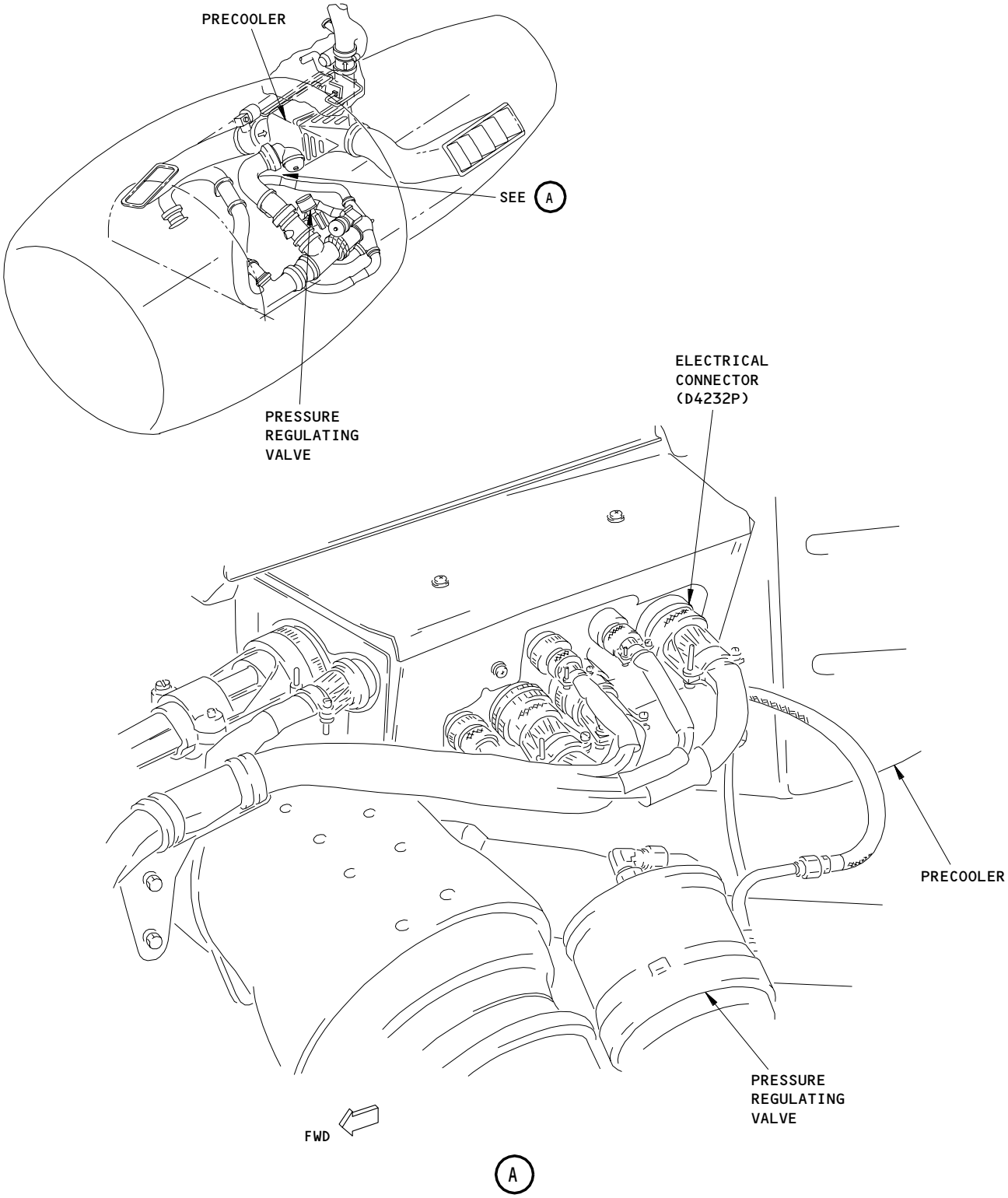
A. References
(1) AMM 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels.
(2) AMM 06-44-00/201, Wing Access Panels
(3) AMM 20-10-23/401, Standard Practices Lockwire
(4) AMM 27-81-00/201, Leading Edge Slat System
(5) AMM 78-31-00/201, Fan Thrust Reverser System

B. Access
(1) Access Panels
511NB/611NB Wing Access Panel

(2) Location Zones
511/611 Leading edge to front spar

C. Procedure

S 422-061
(1) Put the switch into the bracket and install the jamnut.



Overpressure Switch Circuit Test
Figure 202

S 432-062
(2) Install the electrical connector on the switch.

S 862-063
(3) Remove DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11S19, RIGHT ENG BLEED IND
(b) 11S20, RIGHT ENG BLEED CONT
(c) 11S10, LEFT ENG BLEED IND
(d) 11S11, LEFT ENG BLEED CONT

S 862-137
(4) Do the steps in the paragraph "Put the Airplane Back to Its Usual Condition" if you will not do the circuit test.

TASK 36-21-03-702-021

4. Overpressure Switch Circuit Test (Fig. 201, 202)

A. General
(1) This test examines the electrical circuit between the switch and the flight deck annunciator BLEED lights.

B. Reference
(1) AMM 24-22-00/201, Electrical Power - Control

C. Access
(1) Location Zones
511/611 Leading edge to front spar

(2) Access Panels
511NB/611NB Wing Access Panel

D. Do the Circuit Test for the Overpressure Switch

S 862-022
(1) Supply the electrical power (AMM 24-22-00/201).

S 862-232
(2) Set the L/R ENG BLEED switches to the ON position at the pilots' overhead panel (P5).

S 012-139

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Open the left thrust reverser (AMM 78-31-00/201).

S 862-025
(4) Make sure that these circuit breakers on the overhead circuit breaker panel, p11, are closed:
(a) 11S10, LEFT ENG BLEED IND
(b) 11S11, LEFT ENG BLEED CONT

S 032-029
(5) Disconnect the electrical connector (D4232P) from the firewall connector (Fig. 202).
(a) Make sure the L BLEED light is not on.

S 032-233
(6) Disconnect the electrical connector from the left overpressure switch.

S 752-234
(7) Connect a jumper wire to pins 1 and 2 on the overpressure switch electrical connector.
(a) Make sure that the L BLEED light comes on.

S 032-033
(8) Remove the jumper wire from pins 1 and 2 of the switch connector.
(a) Make sure that the L BLEED light goes off.

S 432-035
(9) Connect the electrical connector to the left overpressure switch.

S 432-032
(10) Connect the electrical connector (D4232P) to the firewall connector.

S 862-235
(11) Make sure the R ENG BLEED switch is set to ON position at the pilots' overhead panel (P5).

S 862-036
(12) Make sure that these circuit breakers on the overhead panel, p11, are closed:
(a) 11S19, RIGHT ENG BLEED IND

(b) 11S20, RIGHT ENG BLEED CONT

S 032-040
(13) Disconnect the electrical connector (D4232P) from the firewall connector (Fig. 202).
(a) Make sure the R BLEED light is not on.

S 032-037
(14) Disconnect the electrical connector from the right overpressure switch.

S 752-038
(15) Connect a jumper wire to pins 1 and 2 on the overpressure switch electrical connector.
(a) Make sure the R BLEED light comes on.

S 032-044
(16) Remove the jumper wire from pins 1 and 2 of the switch connector.
(a) Make sure that the R BLEED light is off.

S 432-046
(17) Connect the electrical connector to the right overpressure switch.

S 432-043
(18) Connect the electrical connector (D4232P) to the firewall connector.

S 862-236
(19) Set the L/R ENG BLEED switches to the OFF position at the pilots' overhead panel (P5).

S 412-207

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(20) Close the left thrust reverser (AMM 78-31-00/201).

E. Put the Airplane Back to Its Usual Condition

S 412-053
(1) Close the applicable access panel, 511NB or 611NB (AMM 06-44-00/201).

S 442-054
(2) Do this procedure: Leading Edge Slats Activation (AMM 27-81-00/201).

S 862-055
(3) Remove the electrical power if it is not necessary.

PRV EXIT PRESSURE SENSOR - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks. The first task is the removal of the PRV exit pressure sensor. The second task is the installation of the PRV exit pressure sensor.

   TASK 36-21-08-004-001

2. Remove the PRV Exit Pressure Sensor
   A. References
      (1) AMM 06-44-00/201, Wing Access Panels
      (2) AMM 24-22-00/201, Electrical Power
      (3) AMM 27-81-00/201, Leading Edge Slat System
      (4) AMM 36-00-00/201, Pneumatic Power
   B. Access
      (1) Location Zones
          511/611 Leading Edge to Front Spar

      (2) Access Panels
          511NB/611NB Lower LE Structure, Slat Mechanism

   C. Prepare for the Removal

      S 864-002
      (1) Apply electrical power (AMM 24-22-00/201).

      S 044-003

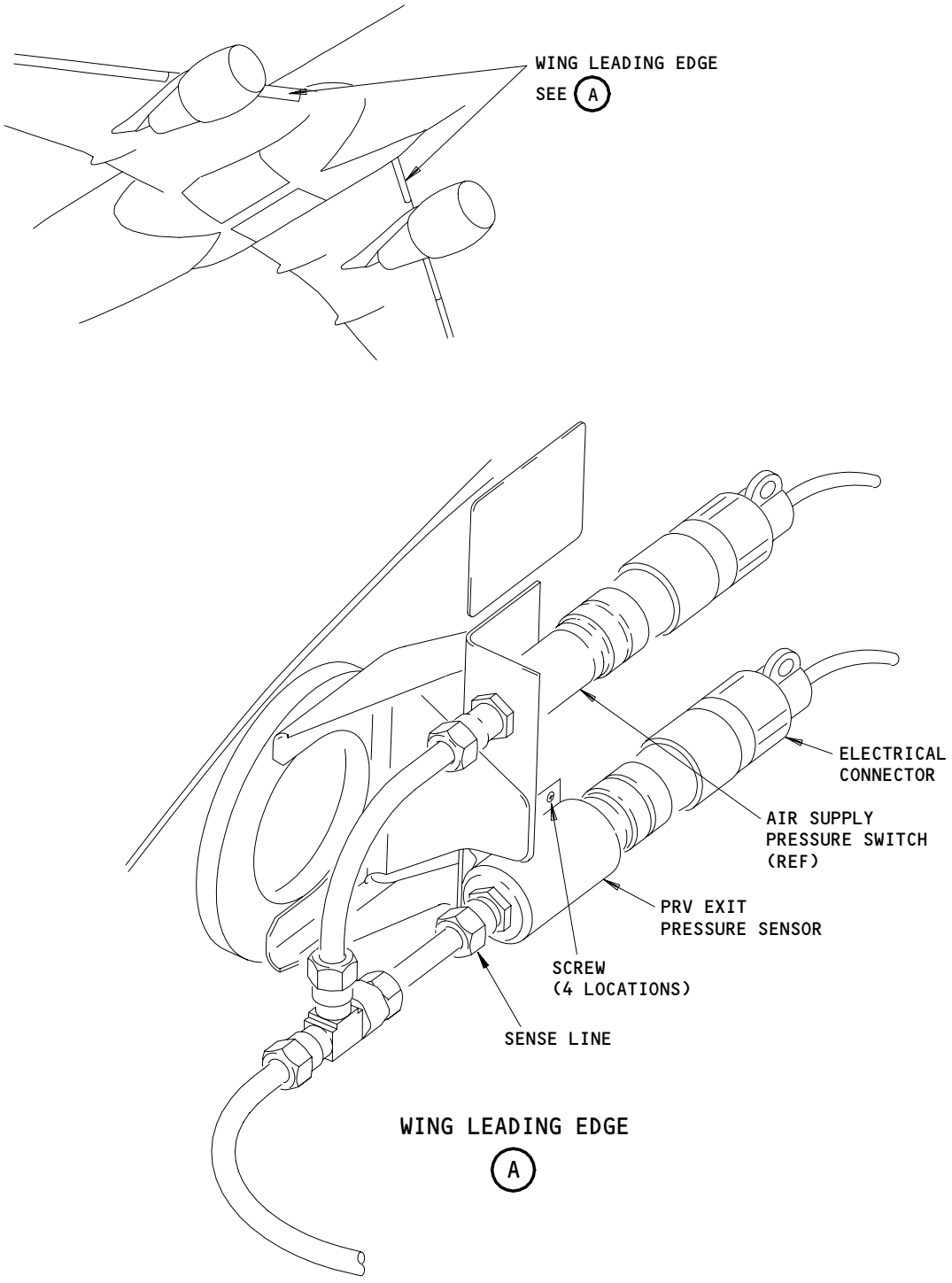
      WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SLATS. THE SLATS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

      (2) Do the deactivation procedure for the leading edge slats (AMM 27-81-00/201) or move all persons and equipment away from the slats.

      S 014-004
      (3) Remove the lower LE mechanism for the access panels 511NB/611NB (AMM 06-44-00/201).

      S 864-005
      (4) Remove the pneumatic power (AMM 36-00-00/201).

      S 864-006
      (5) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
          (a) 11S10, LEFT ENG BLEED IND



PRV Exit Pressure Sensor Installation
Figure 401

(b) 11S11, LEFT ENG BLEED CONT
(c) 11S19, RIGHT ENG BLEED IND
(d) 11S20, RIGHT ENG BLEED CONT

S 034-007
(6) Remove the electrical connector from the sensor for the PRV exit pressure.

D. Remove the PRV exit pressure sensor.

S 034-008
(1) Remove the four screws which connect to the bracket.

S 034-009
(2) Disconnect the sense line from the pressure sensor.

S 024-010
(3) Remove the pressure sensor.

S 434-011
(4) Install a cover on the sense line to keep away the unwanted objects.

TASK 36-21-08-404-012

3. Install the PRV Exit Pressure Sensor

A. References
(1) AMM 06-44-00/201, Wing Access Panels
(2) AMM 24-22-00/201, Electrical Power
(3) AMM 27-81-00/201, Leading Edge Slat System
(4) AMM 36-23-00/501, Air Supply BITE System

B. Access
(1) Location Zones
511/611 Leading Edge to Front Spar

(2) Access Panels
511NB/611NB Lower LE Structure, Slat Mechanism

C. Procedure

S 034-013
(1) Remove the cover from the sense line.

S 424-014
(2) Install the pressure sensor.

S 434-015
(3) Attach the sense line to the pressure sensor.

S 434-016
(4) Install screws to hold the pressure sensor.

S 434-017
(5) Attach the electrical connector to the pressure sensor.

S 864-018
(6) Close these circuit breakers on the P11 panel and remove the DO-NOT-CLOSE tag:
(a) 11S10, LEFT ENG BLEED IND
(b) 11S11, LEFT ENG BLEED CONT
(c) 11S19, RIGHT ENG BLEED IND
(d) 11S20, RIGHT ENG BLEED CONT

S 744-019
(7) Do the BITE test (AMM 36-23-00/501).

D. Put the Airplane Back to Its Usual Condition

S 414-020
(1) Install the lower LE mechanism for the access panels (AMM 06-44-00/201).

S 444-021
(2) Do this procedure: Leading Edge Slats Activation (AMM 27-81-00/201).

S 864-022
(3) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

AIR SUPPLY TEMPERATURE INDICATING SYSTEM-ADJUSTMENT TEST

1. General
   A. Do a test on the overheat switch with the applicable component maintenance manual. The overheat switch referred to in this procedure as the switch.

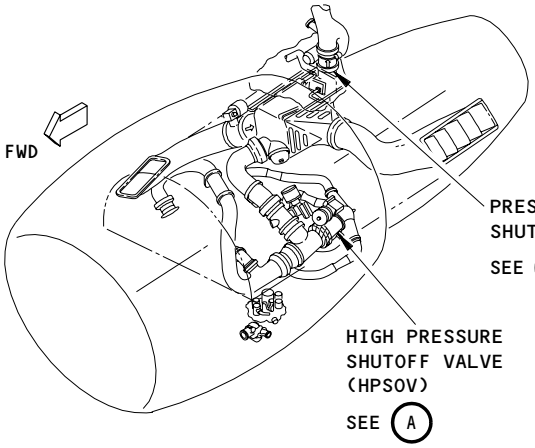
TASK 36-22-00-735-001

2. Operational Test - Left Engine Air Supply Temperature Indicating System
   A. References
      (1) AMM 24-22-00/201, Electrical Power Control
      (2) AMM 27-81-00/201, Leading Edge Slat System
      (3) AMM 36-23-00/501, Pneumatic BITE Procedure
      (4) AMM 71-11-04/201, Fan Cowl Panels
      (5) AMM 71-11-06/201, Core Cowl Panels
      (6) AMM 78-31-00/201, Fan Thrust Reverser System
   B. Access
      (1) Location Zones
          410 Left Power Plant Nacelle
          430 No. 1 Nacelle Strut

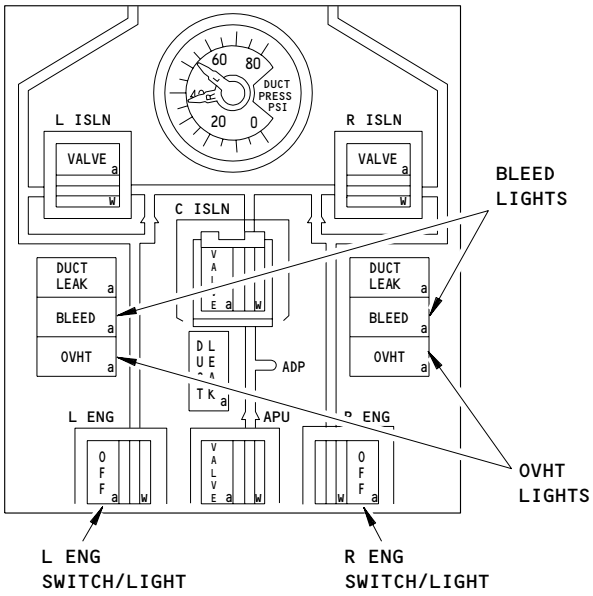
      (2) Access Panels
          413AL Fan Cowl Panel
          415AL Thrust Reverser
          417AL Core Cowl Panel
          434AL Strut Pressure Relief Door and Pneumatic System Valve

   C. Prepare for the Test

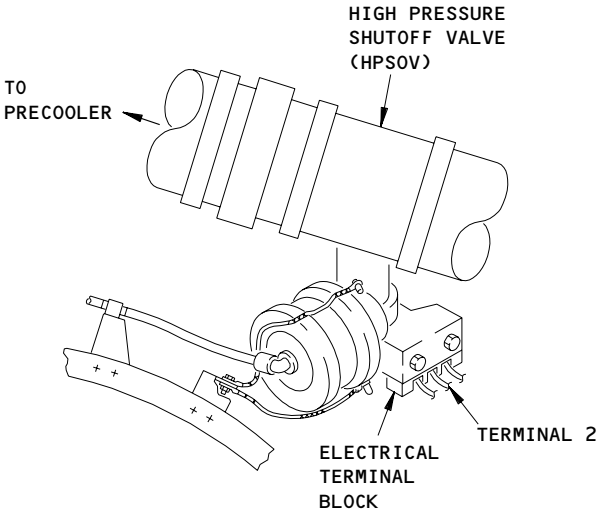
      S 865-002
      (1) Make sure that these circuit breakers on the P11 panel are closed:
          (a) 11J2, EICAS CMPTR L
          (b) 11J3, EICAS UPPER DSPL
          (c) 11J29, EICAS CMPTR R
          (d) 11J30, EICAS LOWER DSPL
          (e) 11J31, EICAS DSPL SW
          (f) 11J32, EICAS DSPL SELECT



PW 4000

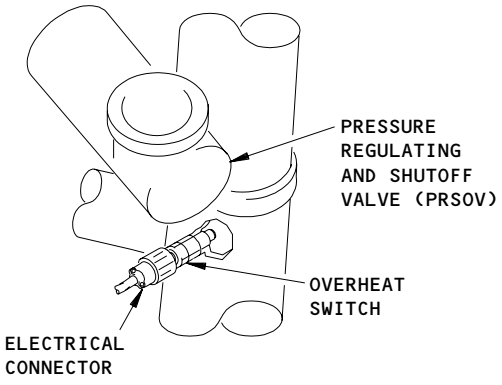


BLEED AIR SUPPLY PANEL (P5)



HIGH PRESSURE SHUTOFF VALVE (HPSOV)

(A)



PRESSURE REGULATING AND SHUTOFF VALVE (PRSOV)

(B)

Temperature Indicating System Adjustment Test
Figure 501

(g) 11S10, LEFT ENG BLEED IND
(h) 11S11, LEFT ENG BLEED CONT
(i) 11S19, RIGHT ENG BLEED IND
(j) 11S20, RIGHT ENG BLEED CONT

S 865-003
(2) Make sure that this circuit breaker on the P36 panel is closed:
(a) 36L7 OR 36K7, AIR SUPPLY BITE

S 865-004
(3) Supply the electrical power (AMM 24-22-00/201).

S 015-316
(4) AIRPLANES WITH PW 4000 ENGINES;
Do these steps to get access to the high pressure shutoff valve (HPSOV), high pressure controller (HPC), and the air supply overheat switch:

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.

(a) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).
(b) Open the left fan cowl panel, 413AL (AMM 71-11-04/201).
(c) Open the left core cowl panel, 417AL (AMM 71-11-06/201).

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Open the left thrust reverser, 415AL (AMM 78-31-00/201).
(e) Find the high pressure shutoff valve (HPSOV) and the high pressure controller (HPC).

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(f) Do the deactivation procedure for the leading edge slats (AMM 27-81-00/201).

(g) Open the strut pressure relief door, 434AL.
(h) Find the air supply overheat switch.

S 865-007
(5) Make sure that the left ENG switch on the P5 panel is in the OFF position (white flow bar is not shown).

D. Do the Test for the Overheat Switch Circuit (Fig. 501)

S 035-009
(1) Disconnect the wire from the terminal 2 of the HPSOV.

S 715-010
(2) Make sure that the wire is fully insulated from the ground.

S 865-011
(3) Make sure that the BLEED light on the P5 panel comes on in 8 ±3 seconds.

S 215-226
(4) Make sure the EICAS message, L ENG HPSOV, shows on the top EICAS screen.

S 865-017
(5) Push the L ENG switch-light on the P5 panel to the on position (white flow bar is on).

S 215-228
(6) Make sure that the BLEED light for the left engine on the P5 panel goes off.

S 215-230
(7) Make sure that the EICAS message, L ENG HPSOV, does not show on the top EICAS display.

S 085-025
(8) Remove the electrical connector from the left high pressure controller (HP Controller).

S 215-233
(9) Make sure that the BLEED light for the left engine on the P5 panel comes on.

S 215-236
(10) Make sure that the EICAS message, L ENG HPSOV, shows on the top EICAS display.

S 035-033
(11) Disconnect the electrical connector from the air supply overheat switch.

S 715-034
(12) Put a jumper between pins 1 and 2 of the connector.

S 215-245
(13) Make sure the OVHT light on the P5 panel comes on in 6 seconds.

S 215-246
(14) Make sure that the EICAS message, L ENG BLD OVHT, shows on the top EICAS display.

S 035-045
(15) Remove the jumpers from the pins 1 and 2 attached to the connector.

S 485-046
(16) Reconnect the electrical connector to the overheat switch.

S 865-049
(17) Make sure the OVHT and BLEED lights stay on.

S 755-050
(18) Make sure the EICAS messages, L ENG BLD OVHT, and L ENG HPSOV, stay shown.

S 485-056
(19) Connect the wire to the terminal 2 of the HPSOV.

S 485-057
(20) Connect the electrical connector to the left engine HP Controller.

S 865-058
(21) Make sure the BLEED light on the P5 panel goes off.

S 755-067
(22) Make sure the EICAS message, L ENG HPSOV, does not show on the top of the EICAS display.

S 865-069
(23) Push the L ENG switch on the P5 panel to the OFF position.
(a) Make sure that the white flow bar goes out.

S 865-070
(24) Push the L ENG switch on the P5 panel to the ON position.
(a) Make sure that the white flow bar comes on.

S 865-081
(25) Make sure the OVHT light on the P5 panel goes off.

S 755-082
(26) Make sure that the EICAS message, L ENG BLD OVHT, does not show on the top of the EICAS display.

E. Put the Airplane Back to Its Usual Condition

S 415-317

(1) AIRPLANES WITH PW 4000 ENGINES;
Do the steps that follow:
(a) Close the strut pressure relief door, 434AL.

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.

(b) Close the left thrust reverser, 415AL (AMM 78-31-00/201).
(c) Close the left core cowl panel, 417AL (AMM 71-11-06/201).
(d) Close the left fan cowl panel, 413AL (AMM 71-11-04/201).
(e) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).
(f) Do the activation procedure for the leading edge slats (AMM 27-81-00/201).

S 745-266

(2) Do the pneumatic BITE procedure (AMM 36-23-00/501).

TASK 36-22-00-735-258

3. Operational Test - Right Engine Air Supply Temperature Indicating System

A. References
(1) AMM 24-22-00/201, Electrical Power Control
(2) AMM 27-81-00/201, Leading Edge Slat System
(3) AMM 36-23-00/501, Pneumatic BITE Procedure
(4) AMM 71-11-04/201, Fan Cowl Panels
(5) AMM 71-11-06/201, Core Cowl Panels
(6) AMM 78-31-00/201, Fan Thrust Reverser System

B. Access
(1) Location Zones
420 Right Power Plant Nacelle
440 No. 2 Nacelle Strut

(2) Access Panels

423AL	Fan Cowl Panel
425AL	Thrust Reverser
427AL	Core Cowl Panel
444AL	Strut Pressure Relief Door and Pneumatic System Valve

C. Prepare for the Test

S 865-259

(1) Make sure that these circuit breakers on the P11 panel are closed:
(a) 11J2, EICAS CMPTR L
(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR R
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

(g) 11S10, LEFT ENG BLEED IND
(h) 11S11, LEFT ENG BLEED CONT
(i) 11S19, RIGHT ENG BLEED IND
(j) 11S20, RIGHT ENG BLEED CONT

S 865-260

(2) Make sure that this circuit breaker on the P36 panel is closed:
(a) 36L7 OR 36K7, AIR SUPPLY BITE

S 865-261

(3) Supply the electrical power (AMM 24-22-00/201).

S 015-318

(4) AIRPLANES WITH PW 4000 ENGINES;
Do these steps to get access to the high pressure shutoff valve (HPSOV), high pressure controller (HPC), and the air supply overheat switch:

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.

(a) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).
(b) Open the left fan cowl panel, 423AL (AMM 71-11-04/201).
(c) Open the left core cowl panel, 427AL (AMM 71-11-06/201).

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Open the left thrust reverser, 425AL (AMM 78-31-00/201).

(e) Find the high pressure shutoff valve (HPSOV) and the high pressure controller (HPC).

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(f) Do the deactivation procedure for the leading edge slats (AMM 27-81-00/201).
(g) Open the strut pressure relief door, 444AL.
(h) Find the air supply overheat switch.

S 865-265
(5) Make sure the right ENG switch on the P5 panel is in the OFF position (white flow bar is not shown).

D. Do the Test for the Overheat Switch Circuit (Fig. 501)

S 485-095
(1) Disconnect the wire from the terminal 2 of the HPSOV.

S 715-096
(2) Make sure that the wire is fully insulated from the ground.

S 865-097
(3) Make sure the BLEED light on the P5 panel comes on in 8 ± 3 seconds.

S 755-106
(4) Make sure the EICAS message, R ENG HPSOV, shows on the top EICAS display.

S 865-107
(5) Push the R ENG switch-light on the P5 panel to the on position (white flowbar comes on).

S 865-110
(6) Make sure that the BLEED light on the right engine on the P5 panel goes off.

S 755-112
(7) Make sure that the EICAS message, R ENG HPSOV, does not show on the top EICAS display.

S 415-119
(8) Remove the electrical connector from the HP Controller in the right engine.

S 865-120
(9) Make sure that the BLEED light on the right engine on the P5 panel comes on.

S 755-123
(10) Make sure that the EICAS message, R ENG HPSOV, does show on the top EICAS display.

S 035-132
(11) Disconnect the electrical connector from the overheat switch.

S 755-133
(12) Put a jumper between pins 1 and 2 of the connector.

S 865-138
(13) Make sure the OVHT light on the P5 panel comes on in 6 seconds.

S 755-139
(14) Make sure the EICAS message, R ENG BLD OVHT, does show on the top EICAS display.

S 415-145
(15) Remove the jumpers from the pins 1 and 2 which is attached to the connector.

S 435-146
(16) Reconnect the electrical connector to the overheat switch.

S 865-149
(17) Make sure the OVHT and BLEED lights stay on.

S 755-150
(18) Make sure the EICAS messages, R ENG BLD OVHT, R ENG HPSOV, stay shown.

S 435-159
(19) Connect the wire to the terminal 2 of the HPSOV.

S 435-160
(20) Connect the electrical connector to the right engine HP Controller.

S 865-161
(21) Make sure the BLEED light on the P5 panel goes off.

S 755-170
(22) Make sure the EICAS message, R ENG HPSOV, does not show on the top EICAS display.

S 865-173
(23) Push the R ENG switch on the P5 panel to the OFF position.

S 755-174
(24) Make sure that the white flow bar goes out.

S 865-175
(25) Push the R ENG switch on the P5 panel to the ON position.

S 755-176
(26) Make sure that the white flow bar comes on.

S 865-187
(27) Make sure the OVHT light on the P5 panel goes off.

S 755-188
(28) Make sure the EICAS message, R ENG BLD OVHT, does not show on the top of the EICAS display.

E. Put the Airplane Back to Its Usual Condition

S 415-319
(1) AIRPLANES WITH PW 4000 ENGINES;
Do the steps that follow:
(a) Close the strut pressure relief door, 444AL.

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.

(b) Close the left thrust reverser, 425AL (AMM 78-31-00/201).
(c) Close the left core cowl panel, 427AL (AMM 71-11-06/201).
(d) Close the left fan cowl panel, 423AL (AMM 71-11-04/201).
(e) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).
(f) Do the activation procedure for the leading edge slats (AMM 27-81-00/201).

S 735-200
(2) Do the pneumatic BITE procedure (AMM 36-23-00/501).

AIR SUPPLY OVERHEAT SWITCH - REMOVAL/INSTALLATION

1. General

A. The air supply overheat switch (which is referred to as the overheat switch in this procedure) is upstream of the PRSOV. When the switch becomes too hot, it sends signals to the control card for the air supply system.

TASK 36-22-01-004-001

2. Remove the Air Supply Overheat Switch

A. References

(1) AMM 27-81-00/201, Leading Edge Slat System
(2) AMM 78-31-00/201, Fan Thrust Reverser System

B. Access

(1) Location Zones

430 No.1 Nacelle Strut
440 No.2 Nacelle Strut

(2) Access Panels

434AL/444AL Strut Pressure Relief Door and Pneumatic System Valve

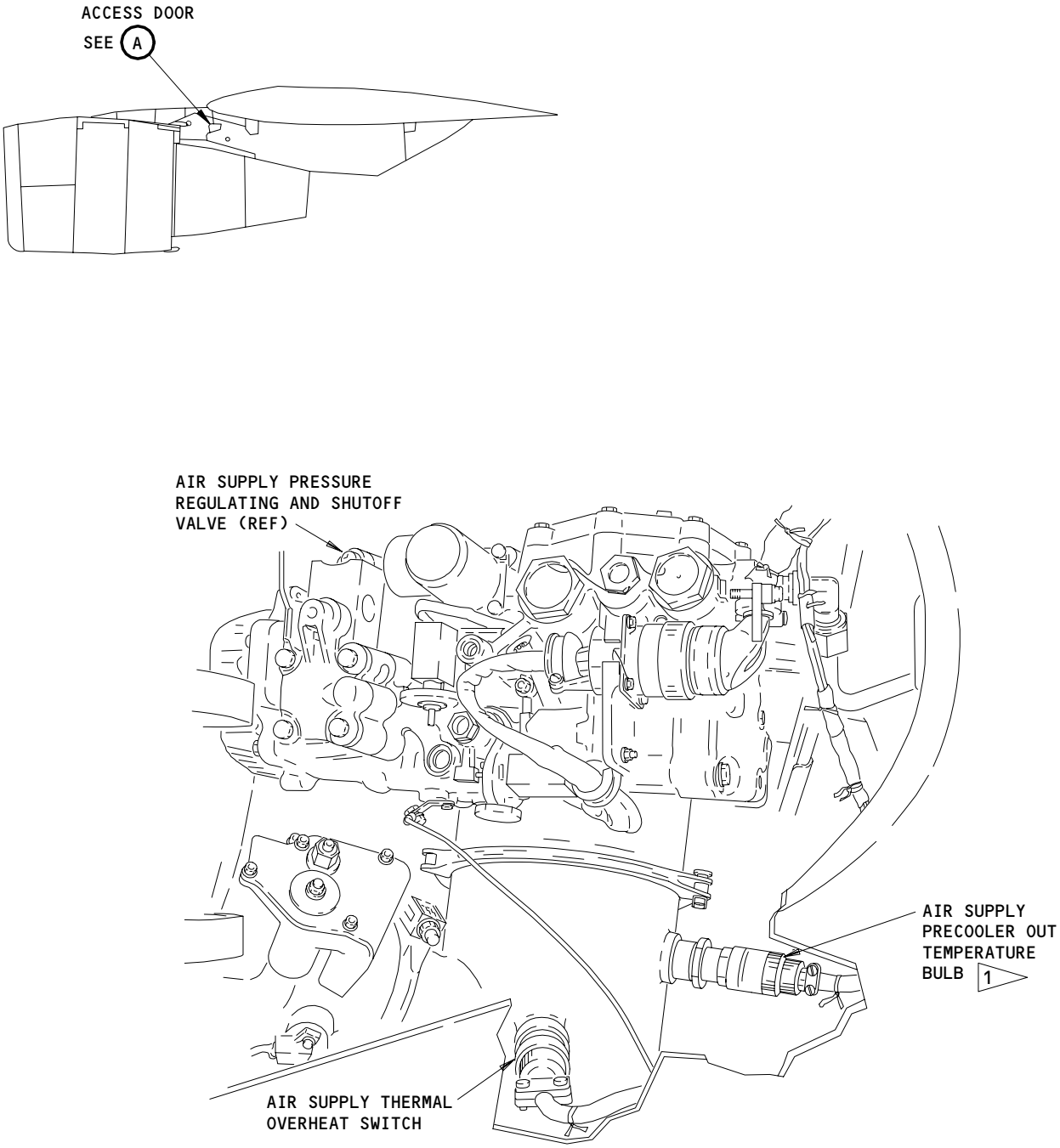
C. Prepare for the Removal of the Air Supply Overheat Switch (Fig. 401)

S 864-002

(1) To remove the right switch, open these circuit breakers on the P11 panel, and attach the DO-NOT-CLOSE tag:
(a) 11S19, R ENG BLEED IND
(b) 11S20, R ENG BLEED CONT

S 864-003

(2) To remove the left switch, open these circuit breakers on the P11 panel, and attach the DO-NOT-CLOSE tag:
(a) 11S10, L ENG BLEED IND
(b) 11S11, L ENG BLEED CONT



1 IF INSTALLED

Air Supply Thermal Overtemperature Switch Installation
Figure 401

S 864-055

WARNING: DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(3) Do the deactivation procedure for the thrust reversers for ground maintenance (AMM 78-31-00/201).

S 864-056

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE SLATS. THE ACCIDENTAL MOVEMENT OF THE SLATS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(4) Do the deactivation procedure for the leading edge slats (AMM 27-81-00/201).

S 014-062

(5) Open the strut pressure relief door, 434AL(444AL).

D. Remove the Air Supply Overheat Switch

S 034-011

(1) Remove the electrical connector from the switch.

S 034-012

(2) Loosen the switch from the boss.

S 024-024

(3) Remove the switch.
(a) Discard the O-ring.

TASK 36-22-01-404-013

3. Install the Air Supply Overheat Switch (Fig. 401)

A. References
(1) AMM 27-81-00/201, Leading Edge Slat System
(2) 78-31-00/201, Fan Thrust Reverser System

B. Access
(1) Location Zones
430 No.1 Nacelle Strut
440 No.2 Nacelle Strut

(2) Access Panels

434AL/444AL	Strut Pressure Relief Door and Pneumatic System Valve

C. Overheat Switch Installation

S 434-014
(1) Install a new O-ring on the overheat switch.

S 424-025
(2) Install and tighten the overheat switch in the boss.

S 434-016
(3) Install the electrical connector on the switch.

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

S 414-063
(1) Close the strut pressure relief door, 434AL(444AL).

S 864-053
(2) Do the activation procedure for leading edge slats (AMM 27-81-00/201).

S 864-054
(3) Do the activation procedure for the thrust reversers (AMM 78-31-00/201).

S 864-019
(4) If you installed the right switch, remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11S19, R ENG BLEED IND
(b) 11S20, R ENG BLEED CONT

S 864-023
(5) If you installed the left switch, remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11S10, L ENG BLEED IND
(b) 11S11, L ENG BLEED CONT

PRECOOLER TEMPERATURE BULB, REMOVAL/INSTALLATION

1. General
   A. The precooler temperature bulb is installed upstream of the PRSOV. The temperature bulb supplies temperature downstream of the air supply precooler, and sends a signal to the EICAS.

TASK 36-22-02-004-001

2. Remove the Precooler Temperature Bulb (Fig. 401)
   A. References
      (1) AMM 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
      (2) AMM 27-81-00/201, Leading Edge Slat System
   B. Access
      (1) Location Zones
          430 No. 1 Nacelle
          440 No. 2 Nacelle Strut

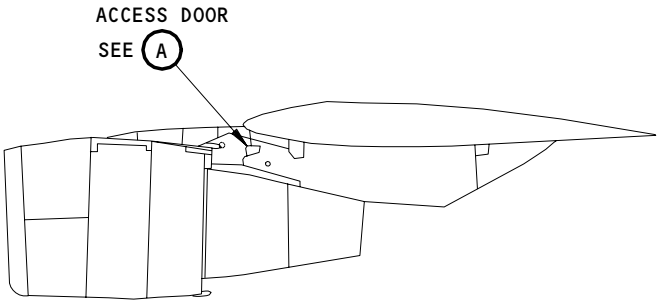
      (2) Access Panels
          434AL/444AL Strut Pressure Relief Door and Pneumatic System Valve

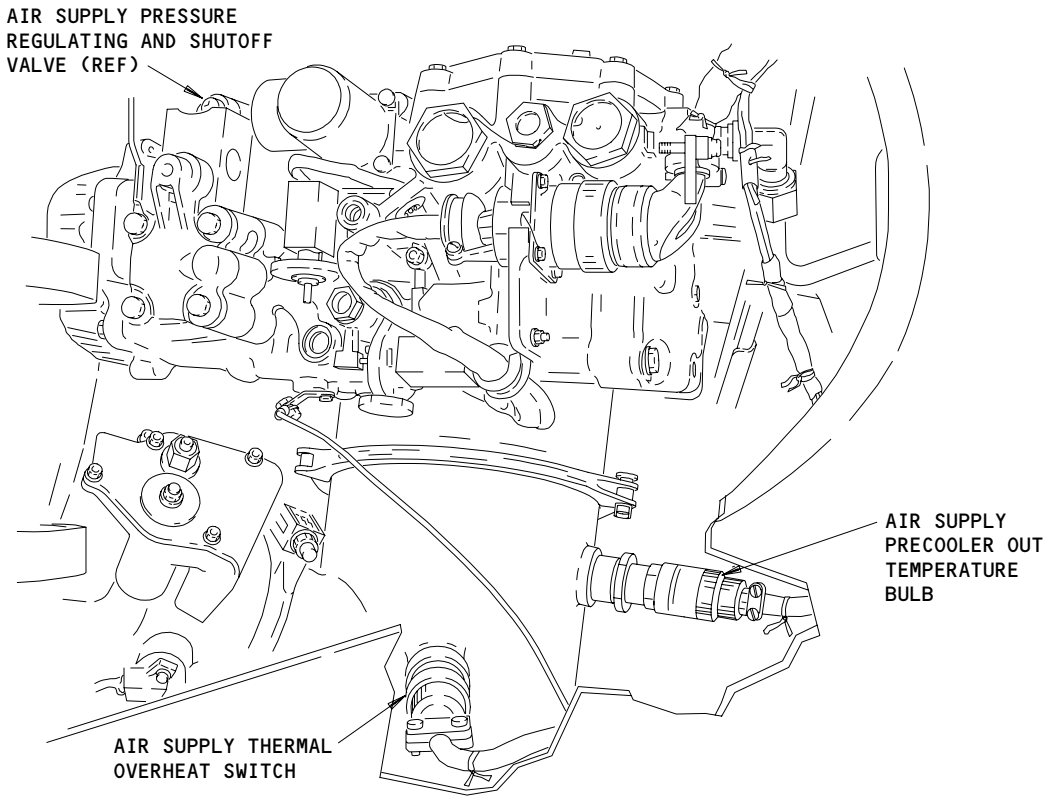
   C. Prepare for the Removal of the Precooler Temperature Bulb (Fig. 401)

      S 864-002
      (1) Open these circuit breakers on the P11 panel, and attach the DO-NOT-CLOSE tag:
          (a) 11S19, R ENG BLEED IND
          (b) 11S20, R ENG BLEED CONT

      S 034-019
      (2) Remove the right precooler bulb.

      S 864-003
      (3) Open these circuit breakers on the P11 panel, and attach the DO-NOT-CLOSE tag:
          (a) 11S10, L ENG BLEED CONT
          (b) 11S11, L ENG BLEED IND





ACCESS DOOR TO LEFT SIDE OF STRUT

A

Precooler Temperature Bulb Installation
Figure 401

S 034-018
(4) Remove the left side of the precooler temperature bulb.

S 044-028

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.

(5) Deactivate the leading edge slats for the removal of the right precooler temperature bulb (AMM 27-81-00/201).

S 014-005
(6) Open the door on the left side of the strut for access (434AL/444AL) and find the precooler temperature bulb (AMM 06-43-00/201).

D. Remove the Precooler Temperature Bulb

S 034-006
(1) Remove the electrical connector from the precooler temperature bulb.

S 034-007
(2) Loosen the precooler temperature bulb from the boss.

S 024-008
(3) Remove the bulb from the boss.

TASK 36-22-02-404-009

3. Install the Precooler Temperature Bulb (Fig. 401)

A. References
(1) AMM 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
(2) AMM 27-81-00/201, Leading Edge Slat System

B. Access
(1) Location Zones
430 No. 1 Nacelle
440 No. 2 Nacelle Strut

(2) Access Panels
434AL/444AL Strut Pressure Relief Door and Pneumatic System Valve

C. Procedure

S 434-010
(1) Use the new O-ring and turn the precooler temperature bulb into the boss.

S 434-012
(2) Tighten and use a lockwire.

S 434-011
(3) Install the electrical connector to the bulb.

S 414-013
(4) Close the strut door (434AL or 444AL) (AMM 06-43-00/201).

S 414-014
(5) Close these circuit breakers on the P11 panel, and remove the DO-NOT-CLOSE tag :
(a) 11S19, R ENG BLEED IND
(b) 11S20, R ENG BLEED CONT

S 434-020
(6) Install the right precooler temperature bulb.

S 444-015
(7) Activate the leading edge slats (AMM 27-81-00/201).

S 864-023
(8) Activate the thrust reverser valve (AMM 78-31-00/201).

S 434-021
(9) Install the right precooler temperature bulb.

S 414-016
(10) Close these circuit breakers on the P11 panel, and remove the DO-NOT-CLOSE tag :
(a) 11S10, L ENG BLEED IND
(b) 11S11, L ENG BLEED CONT

S 434-022
(11) Install the left precooler temperature bulb.

S 714-017
(12) Do a test to the precooler temperature bulb.
(a) Supply the electrical power (AMM 24-22-00/201).
(b) Make sure that the six EICAS circuit breakers on the P11 panel are closed.

S 864-024
(13) Push the ECS MSG switch on the EICAS maintenance panel on the right side panel, P61.
(a) Make sure that the (L,R) PRECOOL OUT shows ambient temperature.
(b) Remove the electrical power if it is not necessary.

AIR SUPPLY BITE SYSTEM - ADJUSTMENT/TEST

1. General
   A. This procedure supplies an operational test for the BITE System of the Air Supply.

TASK 36-23-00-715-001

2. Air Supply BITE System Test
   A. References
      (1) AMM 06-41-00/201, Fuselage Access Door and Panels
      (2) AMM 24-22-00/201, Electric Power Control
      (3) AMM 36-00-00/201, Pneumatic Power
   B. Access
      (1) Location Zones
          120 Main Equipment Center (RH Side)

      (2) Access Panels
          119AL Electrical Access Door

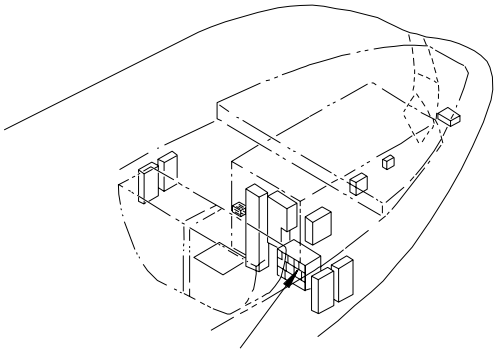
   C. Prepare for a test of the Air Supply BITE System (Fig. 501)

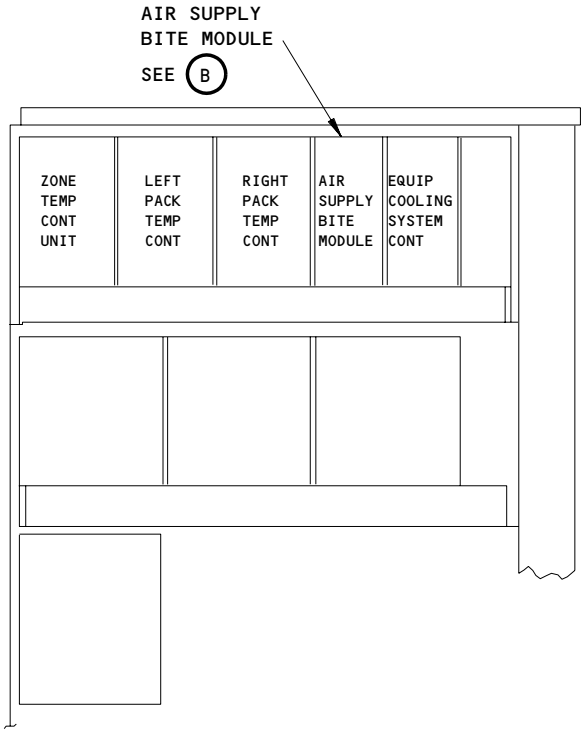
      S 865-002
      (1) Supply the electrical power (AMM 24-22-00/201).

      S 865-003
      (2) Remove the pneumatic power (AMM 36-00-00/201).

      S 865-004
      (3) Make sure that these circuit breakers on the P11 panel are closed:
          (a) 11S11, L ENG BLEED CONT
          (b) 11S20, R ENG BLEED CONT
          (c) 11S10, L ENG BLEED IND
          (d) 11S19, R ENG BLEED IND

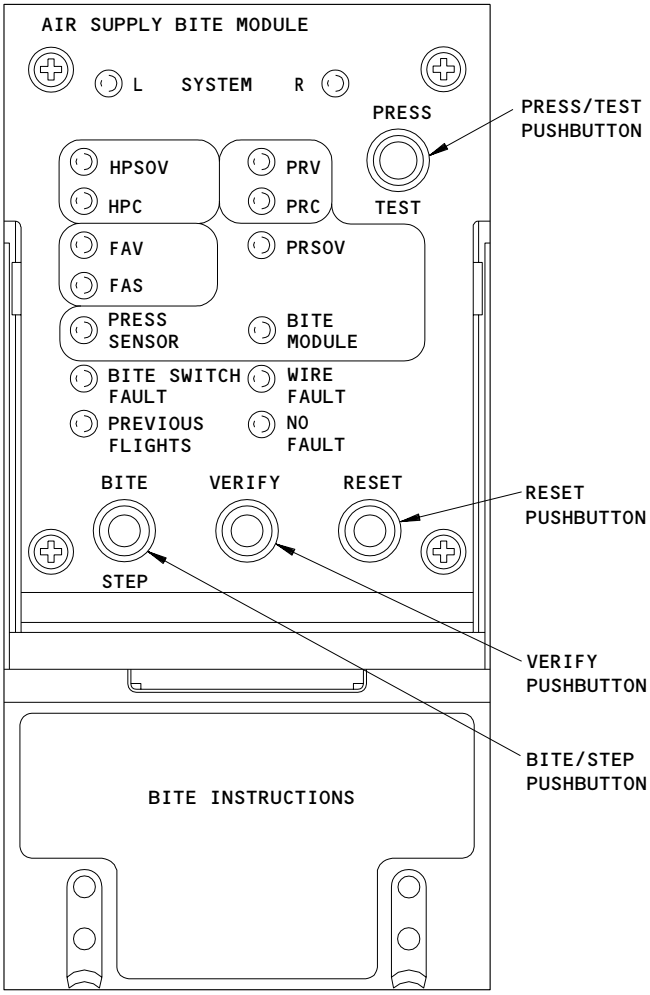
      S 415-005
      (4) Open the door 119AL (AMM 06-41-00/201).





ELECTRICAL EQUIPMENT CENTER RACK, E-3

A



AIR SUPPLY BITE MODULE

B

Air Supply BITE Module Adjustment Test
Figure 501

S 215-028
(5) Make sure that this circuit breaker (36L7 or 36K7) on the left side of the P36 panel is closed.

S 215-027
(6) Find the BITE module for the air supply on the E3 rack.

D. Test the Air Supply BITE System (Fig. 501)

S 715-007
(1) Push and hold the PRESS TEST button.

NOTE: This does a test of all the indicator lights on the BITE module display panel. The lights should remain illuminated until the PRESS TEST button is released.

S 765-008
(2) Make sure that all the indicator lights come on.

S 715-009
(3) Release the PRESS TEST button.

S 715-010
(4) Push and release the BITE STEP button.

NOTE: This is used to show faults stored in a fault memory, Current flight (the time before the last ground-to-air transition) faults are shown when the BITE STEP is first pushed. Each subsequent depression shows the faults for each of the previous seven flights. A "NO FAULT" light will illuminate for 10 seconds if no faults are stored.

S 765-011
(5) Keep a record of all the faults.

NOTE: If the NO FAULT light does not show, continue to push the "BITE STEP" button until no lights come on.

S 715-012
(6) Push and release the VERIFY button.

NOTE: This test will confirm that the LRU'S are electrically connected correctly.

VERIFY does a test for open wires between the LRU and the BITE module and makes sure the sensors/switches are in their unpressurized state (e.g., the HPSOV position switch is closed, the pressures sensor reads 0 psig etc.).

Faults will be shown immediately.

Parts of this test will be prevented if the manifold is pressurized.

S 765-013
(7) Keep a record of all the faults.

NOTE: Continue to push the "VERIFY" button until no lights come on.

S 715-014
(8) Push and release the RESET button after all lights go off.

NOTE: RESET will clear all or some of the faults stored in the prior fault memory, depending on the state of the BITE switches and wires.

RESET is enabled when:
- No faults are found during verify (no fault light is on) or
- If the faults are BITE switch or BITE switch wire faults.

RESET is disabled during BITE STEP and PRESS TEST.

S 915-030
(9) If other lights come on during the test, do this procedure: Air Supply BITE Procedure (FIM 36-20-00/104).

E. Put the Airplane Back to Its Usual Condition

S 415-015
(1) Close the door 119AL (AMM 06-41-00/201).

S 865-016
(2) Remove the electrical power if it is not necessary.

AIR SUPPLY BITE MODULE - REMOVAL/INSTALLATION

1. General
   A. This procedure has the removal and installation of the air supply BITE module. This module is in the electrical equipment of the E-3 rack.

TASK 36-23-01-004-001

2. Remove the Air Supply Bite Module (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
      (2) AMM 20-10-01/401, E/E Rack Mounted Components
      (3) AMM 20-41-01/201, Electrostatic Sensitive Devices
   B. Access
      (1) Location Zones
          120 Main Equipment Center (Right Side)

      (2) Access Panels
          119AL Electrical Bay Access Door

   C. Prepare for the Removal of the Air Supply BITE Module (Fig. 401)

      S 014-002
      (1) Open the door for access (119AL) (AMM 06-41-00/201).

      S 864-003
      (2) Open this circuit breaker on the left Miscellanous Electric Equipment, P36 panel, and attach the DO-NOT-CLOSE tag:
          (a) 36L7, AIR SUPPLY BITE
              or
              36K7, AIR SUPPLY BITE

      S 864-013

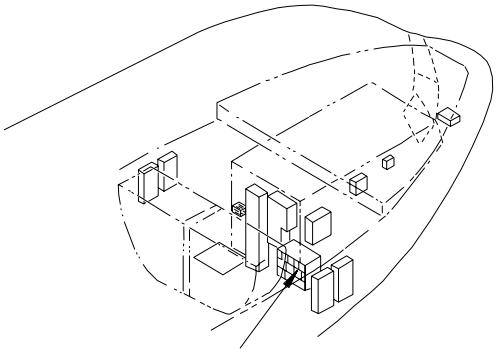
      CAUTION: DO NOT TOUCH THE BITE MODULE BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE BITE MODULE.

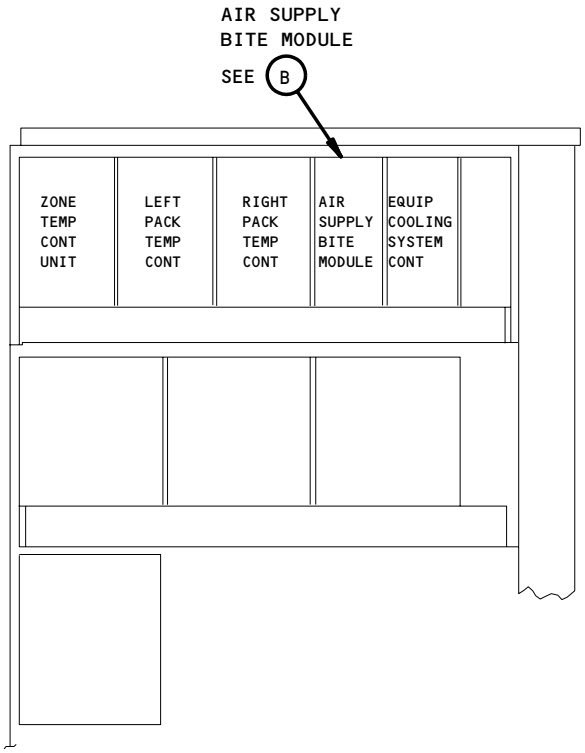
      (3) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).
   D. Remove the Air Supply Bite Module

      S 024-004
      (1) Remove the Air supply Bite module on the E-3 rack (AMM 20-10-01/401).

TASK 36-23-01-404-005

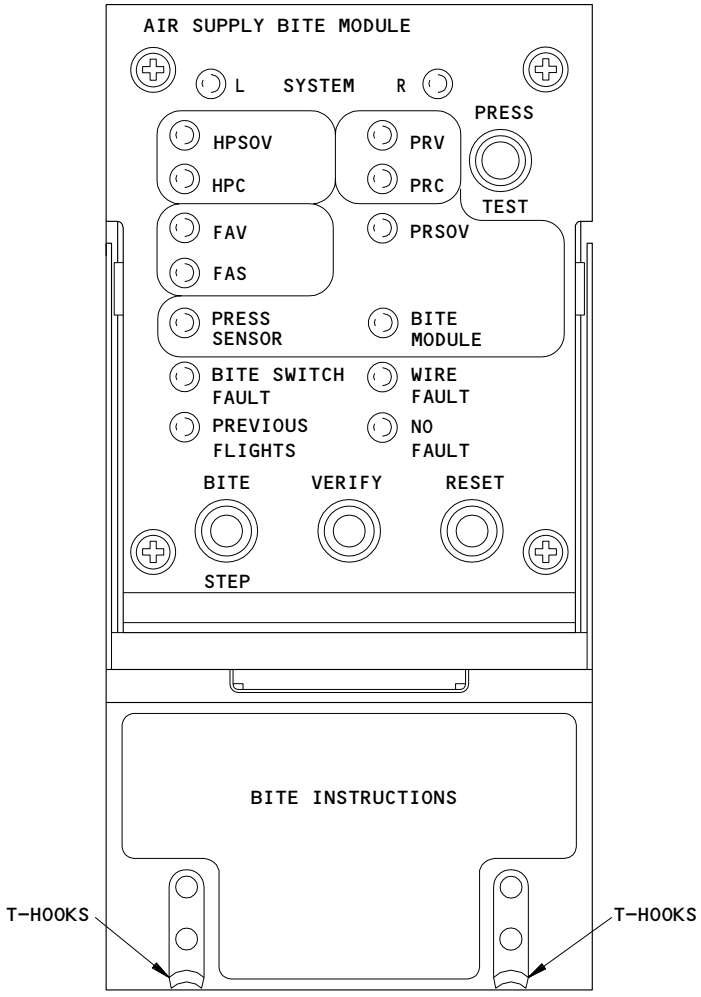
3. Install the Air Supply BITE Module (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage Access Doors and Panels





ELECTRICAL EQUIPMENT CENTER RACK, E-3

A



AIR SUPPLY BITE MODULE

B

Air Supply BITE Module
Figure 401

(2) AMM 20-10-01/401, E/E Rack Mounted Components
(3) AMM 20-41-01/201, Electrostatic Sensitive Devices
(4) AMM 24-22-00/201, Electric Power Control
(5) AMM 36-23-00/501, Air Supply BITE System

B. Access

(1) Location Zones

119 Main Equipment Center (Left Side)

(2) Access Panels

119AL Electrical Bay Access Door

C. BITE Module Installation

S 864-012

CAUTION: DO NOT TOUCH THE BITE MODULE BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE BITE MODULE.

(1) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 424-006

(2) Install the air supply BITE module (AMM 20-10-01/401).

D. BITE Module Post-Installation Test

S 864-007

(1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:

(a) 36L7, AIR SUPPLY BITE
or
36K7, AIR SUPPLY BITE

S 864-008

(2) Supply the electrical power (AMM 24-22-00/201).

S 744-009

(3) For a partial BITE test of the BITE module, push and hold the the PRESS TEST button on the BITE module.

NOTE: This does a test of all the indicator lights on the BITE module display panel. The lights should remain illuminated until the PRESS TEST button is released.

(a) Make sure all of the indicator lights come on.

(b) Release the PRESS TEST button.

S 744-015

(4) For a complete BITE test of the BITE module, do the Air Supply BITE System Test (AMM 36-23-00/501).

E. Put the Airplane Back to Its Usual Condition

S 414-010

(1) Close the door 119AL (AMM 06-41-00/201).

S 034-011

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