CHAPTER

36

PNEUMATIC

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A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

36-EFFECTIVE PAGES

CHAPTER 36
PNEUMATIC

Subject/Page	Date	COC
36-10 TASKS (cont)		
297	Jun 15/2015	
298	Jun 15/2015	
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298.3	Feb 15/2016	
298.4	Feb 15/2016	
298.5	Feb 15/2016	
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36-10 TASK SUPPORT		
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334	Feb 15/2013	
335	Feb 15/2013	
336	Feb 15/2013	

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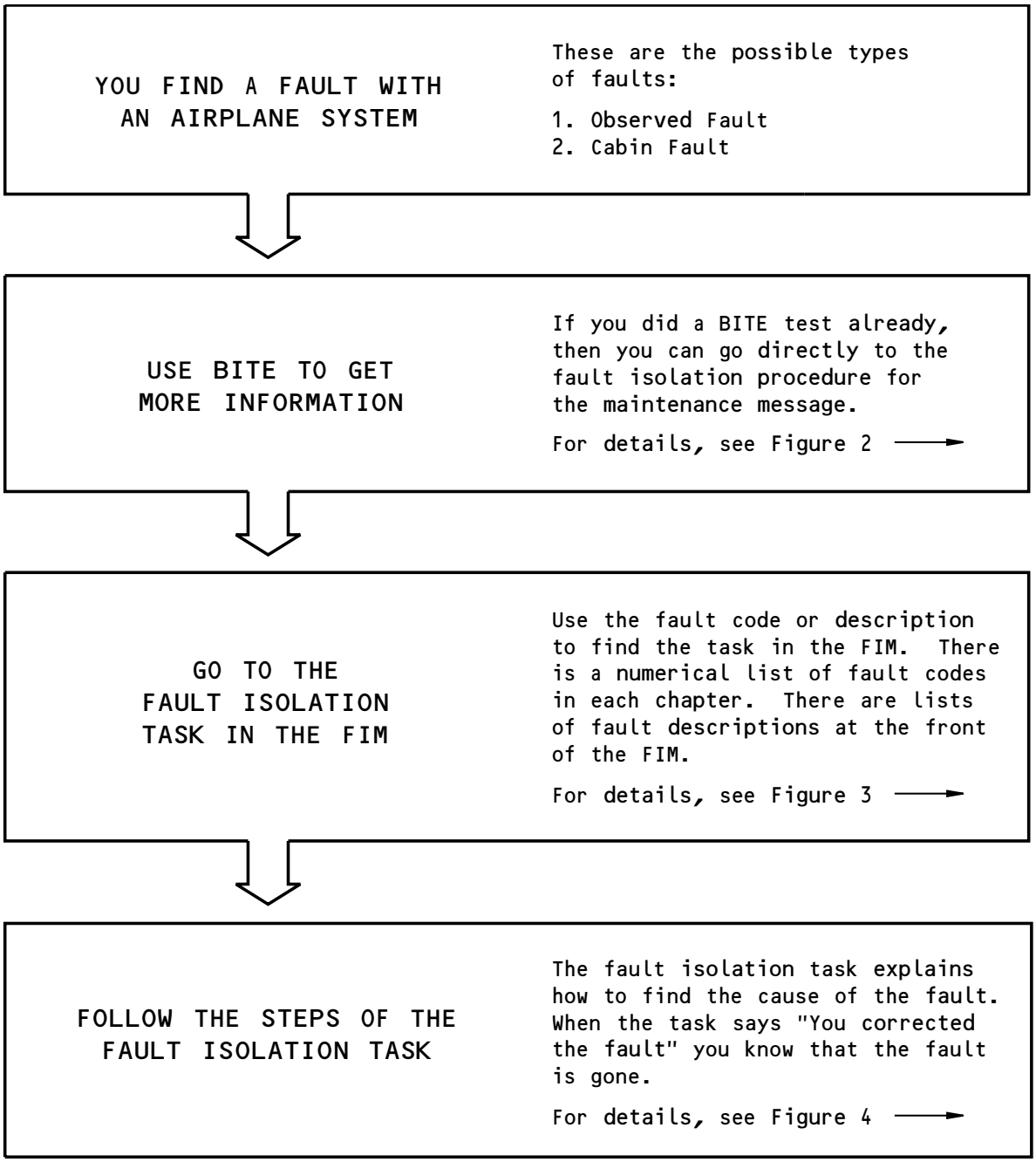
36-EFFECTIVE PAGES



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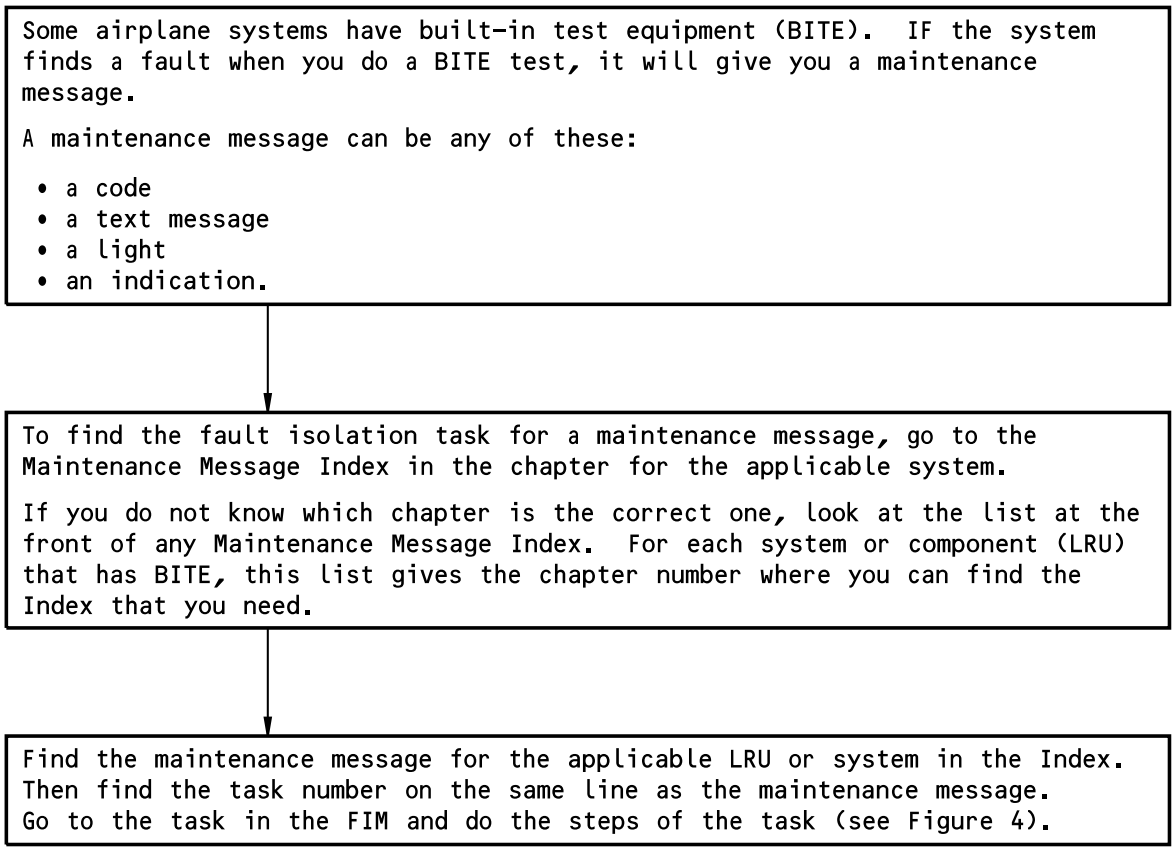
Basic Fault Isolation Process
Figure 1



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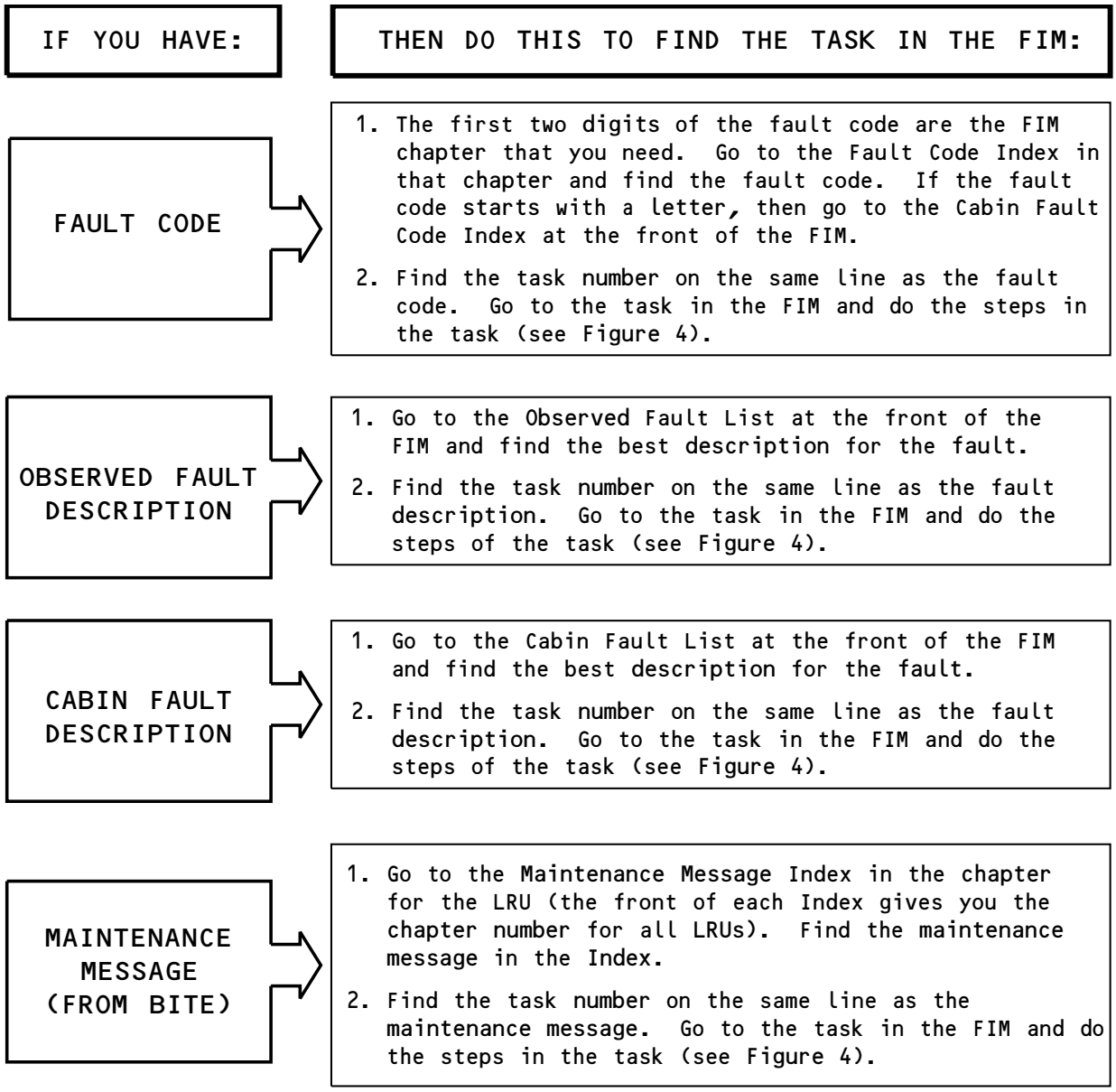
Getting Fault Information from BITE
Figure 2



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Finding the Fault Isolation Task in the FIM
Figure 3

ASSUMED CONDITIONS AT START OF TASK

- External electrical power is ON
- Hydraulic power and pneumatic power are OFF
- Engines are shut down
- No equipment in the system is deactivated

POSSIBLE CAUSES

- The list of possible causes has the most likely cause first and the least likely cause last.
- You can use the maintenance records of your airline to determine if the fault occurred before. Compare the list of possible causes to the past maintenance actions. This will help prevent repetition of the same maintenance actions.

INITIAL EVALUATION PARAGRAPH

- The primary purpose of the Initial Evaluation paragraph at the start of the task is to help you find out if you can detect the fault right now:
  - If you cannot detect the fault right now, then the task cannot isolate the fault and the Initial Evaluation paragraph will say that there was an intermittent fault.
  - If you have an intermittent fault, you must use your judgement (and follow your airline's policy) to decide which maintenance action to take. Then monitor the airplane to see if the fault happens again on subsequent flights.
- The Initial Evaluation paragraph can also help you find out which Fault Isolation Procedure to use to isolate and correct the fault.

FAULT ISOLATION STEPS

- The FIM task steps are presented in a specified order. The "If... then" statements will guide you along a logical path. But if you do not plan to follow the FIM task exactly, make sure that you read it before you start to isolate the fault. Some FIM procedures start with important steps that have an effect on the other steps in the procedure.
- When you are at the endpoint of the path, the step says "...you corrected the fault." Complete the step and exit the procedure.

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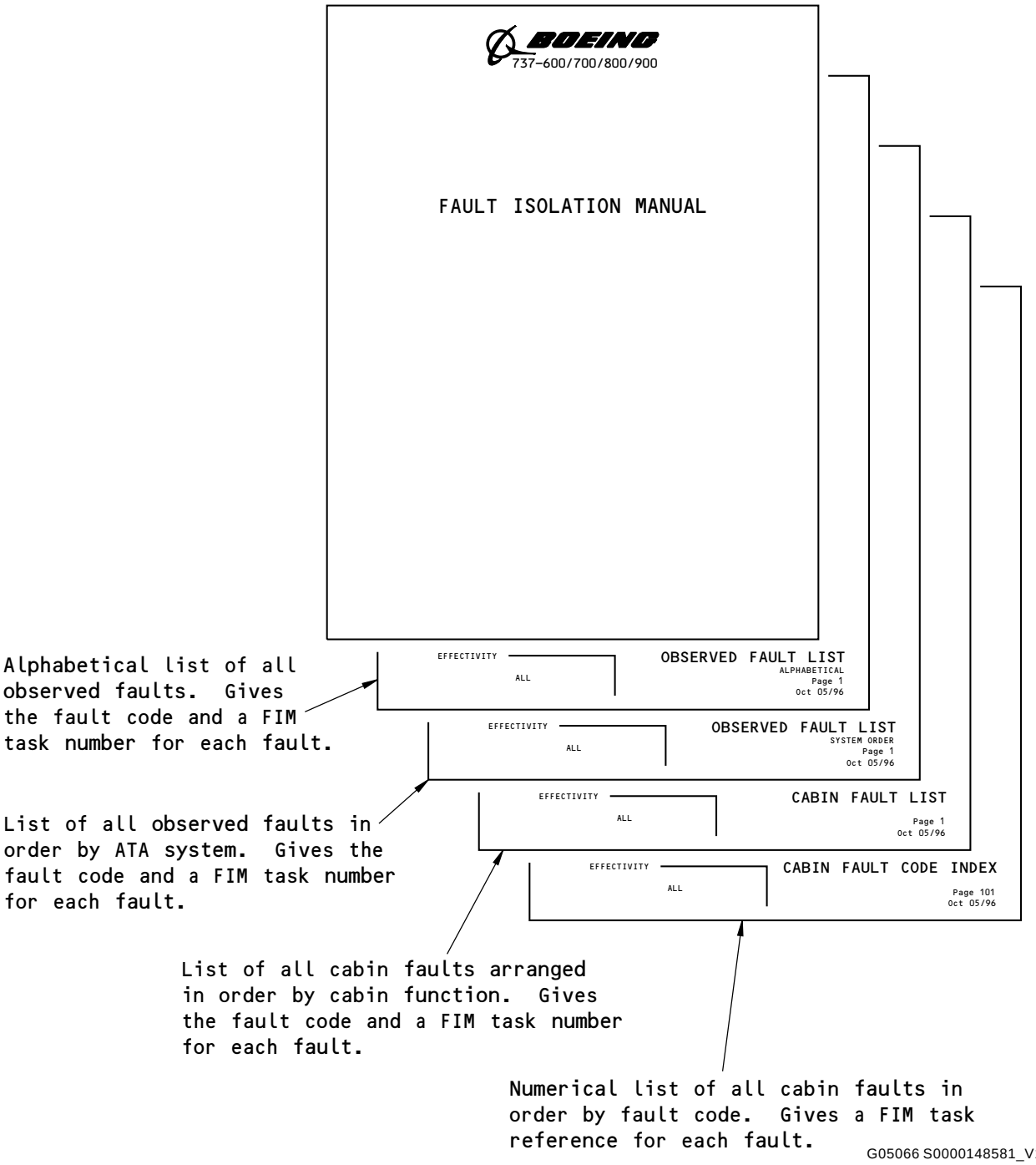
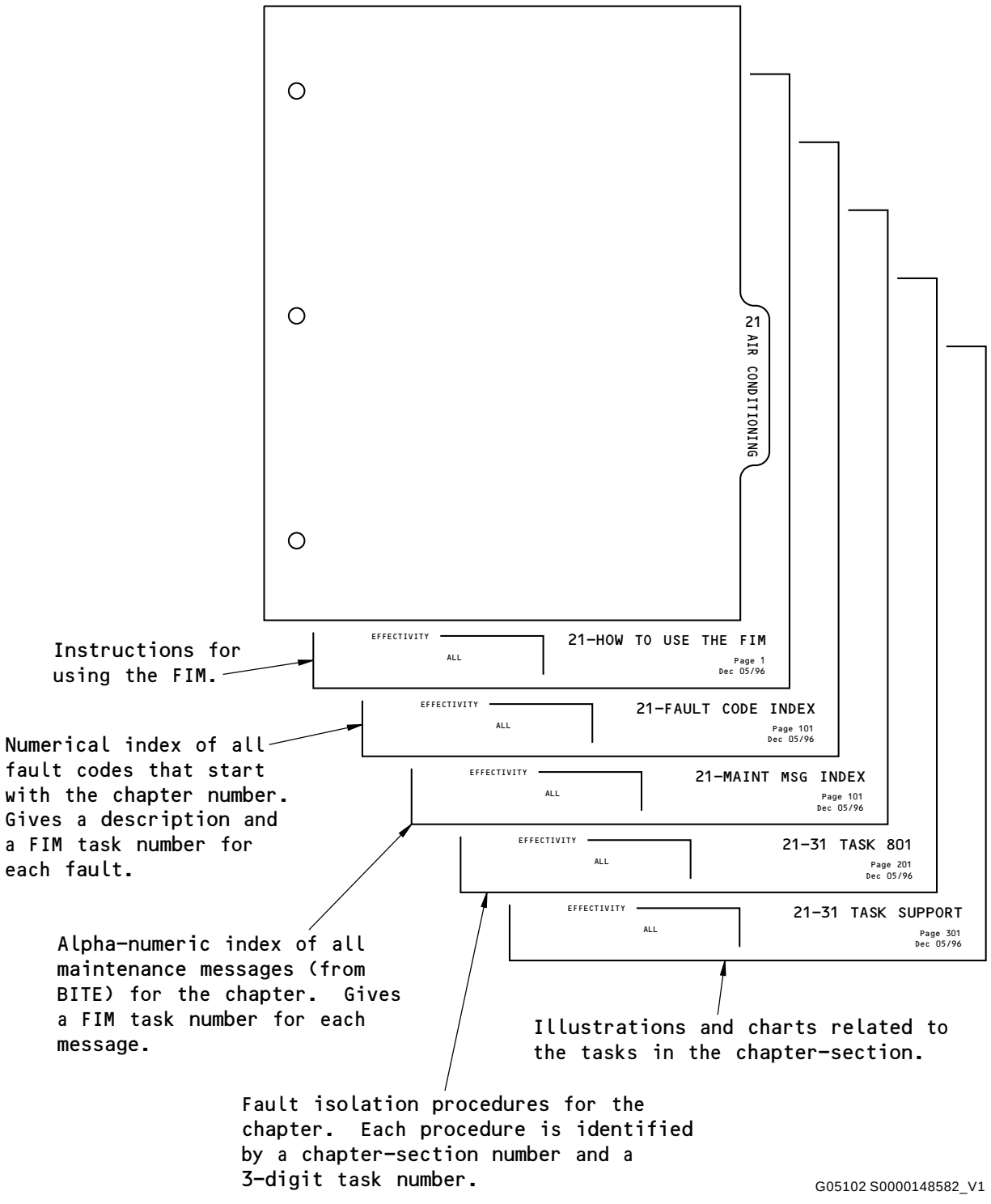
Doing the Fault Isolation Task
Figure 4



Subjects at Front of FIM
Figure 5



Subjects in Each FIM Chapter
Figure 6

FAULT CODE	FAULT DESCRIPTION	GO TO FIM TASK
361 011 01	BLEED TRIP OFF light comes on: during takeoff - light No. 1.	36-10 TASK 801
361 011 02	BLEED TRIP OFF light comes on: during takeoff - light No. 2.	36-10 TASK 801
361 012 01	BLEED TRIP OFF light comes on: during climb - light No. 1.	36-10 TASK 801
361 012 02	BLEED TRIP OFF light comes on: during climb - light No. 2.	36-10 TASK 801
361 013 01	BLEED TRIP OFF light comes on: during cruise - light No. 1.	36-10 TASK 801
361 013 02	BLEED TRIP OFF light comes on: during cruise - light No. 2.	36-10 TASK 801
361 014 01	BLEED TRIP OFF light comes on: during idle descent - light No. 1.	36-10 TASK 801
361 014 02	BLEED TRIP OFF light comes on: during idle descent - light No. 2.	36-10 TASK 801
361 020 00	Bleed valve: does not close when the bleed switches are moved to off, the engine is the bleed source.	36-10 TASK 802
361 030 00	Duct pressure indication: high, the engine is the bleed source.	36-10 TASK 803
361 040 00	Duct pressure indication: low (below 18 psig) during takeoff, climb and cruise; the engine is the bleed source.	36-10 TASK 804
361 050 00	Duct pressure indication: Zero, the engine is the bleed source.	36-10 TASK 805
361 060 00	Isolation valve: does not operate correctly.	36-10 TASK 806
361 070 00	Duct pressure indication: L and R pointers not the same (split), with either pointer below 18 psig during takeoff, climb and cruise; the engine is the bleed source.	36-10 TASK 807
361 080 00	Duct pressure indication: L and R pointers not the same (split), the APU is the bleed source.	36-10 TASK 808

801. BLEED TRIP OFF Light On - Fault Isolation

A. Description

(1) The BLEED TRIP OFF Light on the Overhead Panel can come ON if one or both of these conditions occur:

(a) Precooler Outlet Temperature gets to 485-500°F (252-260°C)

(b) AIRPLANES WITH BLEED AIR REGULATORS WITH PART NUMBER 10-62008-37; pneumatic pressure upstream of the PRSOV gets to the applicable pressure ranges: 170-190 psi.

(c) AIRPLANES WITH BLEED AIR REGULATORS WITH PART NUMBER 10-62008-40; pneumatic pressure upstream of the PRSOV gets to the applicable pressure ranges: 210-230 psi.

(2) The most valuable tool in the fault isolation of the Pneumatic System is a thorough knowledge of the system. Information from the flight crew and an awareness of the maintenance history of the aircraft can be invaluable in determining the fault isolation plan.

(a) If the BLEED TRIP OFF Light comes ON intermittently during various phases of flight and system operation, do a check of the system wiring before you replace any components.

NOTE: The BLEED TRIP OFF Light can come ON when a BLEED Switch is selected immediately after a NO BLEED takeoff. If the BLEED TRIP OFF Light can be reset, no maintenance action is necessary.

B. Possible Causes

(1) Precooler Control Valve

(a) Failure Mode: Valve sticks closed or is closed when it should be open

(2) Precooler Control Valve Sensor (390° F Sensor)

(a) Failure Mode: Failed to closed position

(3) 450° F Thermostat

(a) Failure Mode: Failed to closed position

(4) High Stage Regulator

(a) Failure Mode: High Control Pressure

(5) High Stage Valve

(a) Failure Mode: Butterfly not completely closed, seal ring leakage.

(6) Bleed Air Regulator, M1180

(a) Failure Mode: Pressure Switch actuates at pressure below minimum specified

(7) Sense Lines

(a) Failure Mode: Obstructed or kinked line from Precooler Control Valve to 390° F sensor; Obstructed or kinked line from PRSOV to 450° F sensor

(8) Precooler Kiss Seal

(a) Failure Mode: Distorted or torn seals allow air to be blocked or bypass precooler

(9) Precooler

(a) Failure Mode: Clogged or obstructed passages, cracked plenums, internal leaks, damaged surfaces

(10) Engine 1 (Engine 2) 490° F Overtemperature Switch, S20 (S21)

(a) Failure Mode: Switch is out of calibration (closes at temperature that is too low), short-to-ground in the wiring

(11) Air Conditioning Accessory Unit, M324 or M1455

(a) Failure Mode: Internal short or faulty relay

(12) Air Conditioning Module P5-10

(a) Failure Mode: Internal short

(13) Wiring

(a) Failure Mode: Shorted wiring to Overpressure Switch in Bleed Air Regulator or 490° F Overtemperature Switch

(b) MW0311 Engine Wiring Harness

NOTE: MW0311 electrical harnesses P/N 325-029-901-0 and 325-029-902-0 are known to be the source of faults. These electrical harnesses can be reworked to serviceable units with the incorporation of CFM International Service Bulletin 72-0262.

1) Failure Mode: Possible wire shorting on backshell of connector DP1102

C. Circuit Breakers

(1) These are the primary circuit breakers related to the fault:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN
A	6	C01470	AIR CONDITIONING BLEED AIR XDCR LEFT
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	5	C00077	AIR CONDITIONING BLEED AIR PRESS IND
B	6	C01469	AIR CONDITIONING BLEED AIR XDCR RIGHT
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

D. Related Data

(1) Component Location (Figure 301)

(2) Component Location (Figure 302)

(3) Pneumatic System Schematic (Figure 304)

(4) Troubleshooting Check (Figure 307)

(5) Pneumatic System Control Valve Position Indicators (Figure 312)

(6) SSM 36-11-11

(7) WDM 36-11-11

(8) Precooler Control Valve System Health Check, AMM TASK 36-12-00-700-801.

(9) Engine Bleed Air System Health Check, AMM TASK 36-11-00-700-801.

(10) Duct Pressure Versus N1 at Various Altitudes (Figure 305)

(11) Engine Bleed Air System Leak Check Using the APU, AMM TASK 36-11-00-700-802

(12) SDS SUBJECT 36-11-00

E. Initial Evaluation

(1) Push the TRIP RESET button on the P5-10 Panel to put the Bleed System back to the normal configuration.

(a) If the BLEED TRIP OFF Light was ON and successfully reset or the pilot's report stated that the BLEED TRIP OFF Light came ON and was reset one or more times, then do the Fault Isolation Procedure - Preliminary Checks.

(b) If the BLEED TRIP OFF light was on and does not go off, then do the Fault Isolation Procedure - BLEED TRIP OFF Light is ON and Cannot Be Reset.

NOTE: This condition indicates a problem with a Pressure Switch in the Bleed Air Regulator, the 490° F Overtemperature Switch or associated electrical wiring of the BLEED TRIP OFF Light.

(c) If the BLEED TRIP OFF Light came ON during a "no engine bleeds takeoff", then replace the High Stage Valve. These are the tasks:

- High Stage Valve Removal, AMM TASK 36-11-06-000-801
- High Stage Valve Installation, AMM TASK 36-11-06-400-801

NOTE: A High Stage Valve with a leaky butterfly valve can cause the pressure switch in the Bleed Air Regulator to close and initiate the BLEED TRIP OFF Light to come ON during a "no engine bleeds takeoff".

1) Do the Repair Confirmation at the end of this task.

2) If the Repair Confirmation is not satisfactory, then continue.

NOTE: The tables below list various causes and effects of a bleed trip.

Possible Causes and Effects of a Bleed Trip.

FIRST COMPONENT FAULT AND FAILURE MODE	FIRST FAULT SUB-SYSTEM EFFECT	SECOND COMPONENT FAULT AND FAILURE MODE	SECOND FAULT SUB-SYSTEM EFFECT	FLIGHT DECK EFFECT
High Stage Valve sticks OPEN	Reduction or loss of the first level of temperature control	None	None	BLEED TRIP
Precooler Control Valve (PCCV) not OPEN		450° F thermostat does not OPEN or Pc sense line is plugged between the pressure regulating shutoff valve and the 450° F thermostat	Loss of the second level of temperature control	BLEED TRIP
Blockage in the sense line (Pc) between PCCV and 390°F sensor				
390° sensor does not OPEN				
Kiss seal torn or degraded				
Blockage in the fan air path				
Precooler cracked or plugged fan air path				
High Stage Valve slightly open or excessive bore leakage	Bleed air temperature from the engine is higher than normal			
450° F thermostat failed CLOSED	Loss of the second level of temperature control	None	None	BLEED TRIP
Blockage in the sense line (Pc) between PRSOV and 450° F thermostat				
Bleed Air Regulator 220 psig switch closes at lower pressure	Indication fault	None	None	BLEED TRIP
490° F thermostat closes at lower temperature	Indication fault	None	None	BLEED TRIP
Airplane or strut wiring short	Indication fault	None	None	BLEED TRIP

Bleed Trip Fault Table Organized by Flight Phase.

CONDITION	GROUND/TAXI	TAKEOFF	CLIMB	CRUISE	IDLE DESCENT
Normal Operation	WTAI OFF - 18 to 22 psig WTAI ON - 12 to 14 psig HSV: Full OPEN PRSOV: Full OPEN PCCV: CLOSED Engine supply pressure and temperature are below regulation levels.	37 to 53 psig HSV: CLOSED PRSOV: Regulating PCCV: Regulating Engine supply pressure and temperature are being regulated.	37 to 53 psig HSV: CLOSED PRSOV: Regulating PCCV: Regulating Engine supply pressure and temperature are being regulated.	26 to 45 psig HSV: May be CLOSED or Regulating PRSOV: May be Regulating or OPEN PCCV: May be Regulating or CLOSED At lower cruise settings, engine pressure and temperature drop below regulated levels.	WTAI OFF - 18 to 25 psig HSV: Full OPEN PRSOV: Full OPEN PCCV: CLOSED Engine supply pressure and temperature are below regulation levels.
Ground/Taxi Fault	BLEED TRIP Supply pressure and temperature are not sufficient to cause a TRIP	No Fault	No Fault	No Fault	No Fault
Takeoff Fault	No Fault	BLEED TRIP Trips immediately on high power - over pressure: - HSV does not CLOSE Mid to late takeoff roll-over temperature: - First and second level temperature control not operating (PCCV/390°F Sensor, 450°F Sensor, or plugged sense lines) - HSV leakage	No Fault	No Fault	No Fault

Bleed Trip Fault Table Organized by Flight Phase. (Continued)

CONDITION	GROUND/TAXI	TAKEOFF	CLIMB	CRUISE	IDLE DESCENT
Climb Fault	No Fault	No Fault	BLEED TRIP Over temperature: - First and second level temperature control not operating (PCCV/390°F Sensor, 450°F Sensor, or plugged sense lines) - HSV leakage	No Fault	No Fault
Cruise Fault	No Fault	No Fault	No Fault	BLEED TRIP Pressure and temperature should be below TRIP level. NOTE: Use of WTAI in cruise can cause the high stage valve to OPEN, causing an overtemperature.	No Fault
Descent Fault	No Fault	No Fault	No Fault	No Fault	BLEED TRIP Top of descent (part power) - over temperature: - HSV opens; second level of temperature control not operate (450°F Sensor or sense line plugged)

F. Fault Isolation Procedure - Preliminary Checks

NOTE: This check provides a means to quickly fault isolate the High Stage Valve, the Precooler Control Valve, the "Kiss" Seal, the Precooler Control Valve to 390° F Sensor Sense Line, and the PRSOV to 450° F Thermostat Sense Line. It is recommended that you do the entire Preliminary Checks - Fault Isolation Procedure before you do the Repair Confirmation.

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

(a) Make sure there is no pressure in the Pneumatic System:

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

(b) Make sure the applicable engine BLEED Switch is set to OFF.

(c) Make sure that the Fuel Shutoff Lever for the applicable engine is in the CUTOFF position and install DO-NOT-OPERATE tags.

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Retract the Leading Edge Flaps and Slats, if not previously accomplished, and deactivate the Leading Edge Flaps and Slats. This is the task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

(e) Do this task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00.

(f) For the applicable Thrust Reverser, do this task: Open the Thrust Reverser (Selection), AMM TASK 78-31-00-010-801-F00.

(2) Do these steps to do a check of the High Stage Valve:

(a) Examine the position indicator on the High Stage Valve:

1) Make sure that the position indicator points to the fully closed position.

a) If the position indicator does not point to the fully closed position, replace the High Stage Valve. These are the tasks:

- High Stage Valve Removal, AMM TASK 36-11-06-000-801
- High Stage Valve Installation, AMM TASK 36-11-06-400-801

b) If the position indicator points to the fully closed position, then continue.

(b) Use a wrench on the High Stage Valve position indicator to open the valve, then remove the wrench and make sure that the valve closes fully.

1) If the position indicator on the High Stage Valve does not move to the OPEN and CLOSED positions smoothly or does not return to the fully closed position, replace the High Stage Valve. These are the tasks:

- High Stage Valve Removal, AMM TASK 36-11-06-000-801
- High Stage Valve Installation, AMM TASK 36-11-06-400-801

2) If the position indicator on the High Stage Valve moves to the OPEN and CLOSED positions smoothly, then continue.

(c) Examine the High Stage Valve for excessive gaps between the valve body and the valve plate seal which can cause excessive leakage.

1) Remove the High Stage Valve. This is the task: High Stage Valve Removal, AMM TASK 36-11-06-000-801.

2) Hold the valve up to the light and look for gaps between the valve body and the valve plate seal.

NOTE: It is normal to see several slivers of light between the valve body and the valve plate seal in isolated locations.

3) Excessive leakage can be expected if there is a gap around the entire circumference of the valve plate (about 0.020 inch gap).

a) If you find excessive gaps, install a new or overhauled High Stage Valve. This is the task: High Stage Valve Installation, AMM TASK 36-11-06-400-801.

b) If the gaps between the valve body and valve plate seal are determined to be normal, reinstall the valve. This the task: High Stage Valve Installation, AMM TASK 36-11-06-400-801.

(3) Do these steps to do a check of the Precooler Control Valve:

(a) Examine the position indicator on the Precooler Control Valve.

1) If the Precooler Control Valve is not fully open, then replace it. These are the tasks:

- Precooler Control Valve Removal, AMM TASK 36-12-02-000-801
- Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

2) If the Precooler Control Valve is in the fully open position, then continue.

(4) Use the APU to pressurize the Bleed Air System. Do this task:

(a) Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803

NOTE: The PRSOV should be closed when you pressurize the Bleed Air System.

(5) Put the BLEED Switch in the ON position.

WARNING: USE A RATCHET-TYPE WRENCH TO OPEN THE PRSOV. PRESSURE IN THE SYSTEM CAN CAUSE THE PRSOV TO OPEN QUICKLY. THIS CAN PULL THE WRENCH FROM YOUR HANDS. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(6) Use a 3/8-inch socket on a ratcheted-type wrench to turn the manual override nut on the PRSOV. Once you begin turning the manual override nut, the air pressure should move the PRSOV to the fully OPEN position.

(7) Listen for air leakage in the engine.

NOTE: Air leakage in the engine is an indication that the High Stage Valve is allowing air to backflow into the engine.

WARNING: REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. HOT HIGH PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(a) Replace the High Stage Valve if air can be heard in the engine when the system is pressurized. Do these tasks:

1) Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806
2) High Stage Valve Removal, AMM TASK 36-11-06-000-801
3) High Stage Valve Installation, AMM TASK 36-11-06-400-801

(b) If you replaced the High Stage Valve use the APU to pressurize the bleed air system. This is the task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

(8) Disconnect the Supply Pressure Sense Line from the High Stage Regulator.

(9) Examine the Supply Pressure Inlet on the High Stage Regulator for air leakage.

NOTE: Air leaking from the supply pressure inlet when the Bleed Air System is pressurized with the APU indicates that the Reverse Flow Diaphragm inside the High Stage Regulator is damaged.

(a) If air leakage is detected from the Supply Pressure Inlet, replace the High Stage Regulator. These are the tasks:

- High Stage Regulator Removal, AMM TASK 36-11-07-000-801
- High Stage Regulator Installation, AMM TASK 36-11-07-400-801

(b) Perform the Repair Confirmation at the end of this task.

(10) Do a check of the Supply and Control Pressure Sense Lines:

(a) Do this task: Supply Pressure Upstream of the PRSOV, AMM TASK 36-00-00-860-805.

(b) Do a leak check with a soap solution on the entire length of the flexible and rigid lines and fittings of these pneumatic sense lines:

NOTE: Only leakage in the sense lines listed below will cause the low duct pressure condition.

1) Supply pressure sense line to the Bleed Air Regulator

2) Control pressure sense line from the Bleed Air Regulator to the PRSOV

3) Control pressure sense line from the PRSOV to the 450° F thermostat

NOTE: A small leak at the top of the 450° F Thermostat is acceptable. Leakage found at the sense lines or sense line fittings must be repaired.

(c) If you find leakage in the sense lines or fittings, do these steps:

1) Repair the sense line or, if necessary, replace the sense line.

a) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) when you reconnect the sense lines.

2) Do the Repair Confirmation at the end of this task.

(d) If you do not find leakage in the sense lines or fittings, then continue.

(11) Look at the position indicator on the Precooler Control Valve:

(a) If the Precooler Control Valve is not within 30 degrees from the fully closed position, examine these areas for leakage:

NOTE: If the Precooler Control Valve is not within 30 degrees from the fully closed position, it can be due to a defective 390° F Precooler Control Valve Sensor or a leak in the sense line or the sense line fittings between the Precooler Control Valve and the 390° F Precooler Control Valve Sensor which should be isolated and corrected. However, if the Precooler Control Valve moves to the fully OPEN position in the next step, then the Precooler Control Valve should be modulating to open and this condition will not result in low duct pressure unless the Precooler Control Valve Sensor is failed in the CLOSED position. There is no way to do a check of the 390° F Precooler Control Valve Sensor on the aircraft. Keep this in mind if you do not find any defective components or if you still get a low duct pressure condition during the Repair Confirmation.

1) Sense line to the Precooler Control Valve

2) Sense line between the Precooler Control Valve and the Precooler Control Valve Sensor

3) Precooler Control Valve Sensor.

(b) If leakage is detected, repair the applicable lines and connections as necessary:

1) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) when you reconnect lines.

(c) If leakage is not found, replace the precooler control valve as follows:

1) Do this task: Precooler Control Valve Removal, AMM TASK 36-12-02-000-801.

2) Make sure that there is no debris at the Precooler Inlet.

3) Do this task: Precooler Control Valve Installation, AMM TASK 36-12-02-400-801.

(d) If the Precooler Control Valve is within 30 degrees fully closed, then continue.

(12) Do these steps to simulate the opening of the Precooler Control Valve Sensor:

WARNING: MAKE SURE THAT YOU WEAR THE PERSONAL PROTECTIVE EQUIPMENT WHEN YOU DO THIS TASK. PERSONAL PROTECTIVE EQUIPMENT WILL PREVENT INJURIES TO PERSONNEL.

(a) Slowly remove the cap from the test fitting in the Control Pressure Sense Line for the Precooler Control Valve. (Figure 307, View B)

NOTE: This simulates the opening of the Precooler Control Valve Sensor.

(b) Make sure that the Precooler Control Valve opens fully or to within 30° of full open.

1) If the Precooler Control Valve does not open fully or to within 30° of full open, then replace the Precooler Control Valve. Do these tasks:

a) Precooler Control Valve Removal, AMM TASK 36-12-02-000-801

b) Make sure that there is no debris at the Precooler Inlet.

c) Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

2) If the Precooler Control Valve opens fully or to within 30° of full open, then continue.

(13) Do these steps to do a check of the Precooler "kiss" seal:

(a) Examine the Precooler "kiss" seal for proper seating against the Precooler, distortion or obvious damage that might cause fan air to bypass the Precooler or obstruct the flow of fan air through the precooler.

(b) If the "kiss" seal is distorted, obviously damaged, or not properly seated, replace the "kiss" seal as follows:

NOTE: The "kiss" seal replacement is part of the Precooler Control Valve replacement.

1) Do this task: Precooler Control Valve Removal, AMM TASK 36-12-02-000-801.

2) Inspect the fan air side of the Bleed Air Precooler for foreign matter:

a) Remove all foreign matter found.

3) Do this task: Precooler Control Valve Installation, AMM TASK 36-12-02-400-801.

(14) Do the Repair Confirmation at the end of this task.

(a) If the Repair Confirmation was not satisfactory, then continue.

(15) Do the Fault Isolation Procedure for BLEED TRIP OFF Light Came ON But Could Be Reset if one of these conditions exist:

(a) No system faults have been isolated

(b) Repair Confirmation was unsuccessfully performed.

G. - Fault Isolation Procedure - BLEED TRIP OFF light Came ON But Could Be Reset

(1) If the BLEED TRIP OFF Light came ON but could be reset and there were no system faults found in the Fault Isolation Procedure - Preliminary Checks, then do the steps that follow:

(a) Make sure that there is no pressure in the Pneumatic System:

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

(b) Make sure that the applicable Engine Bleed Switch is in the OFF position.

(2) Do these steps to do a check of the pressure actuation point of the Overpressure Switch in the Bleed Air Regulator:

(a) Do only the applicable steps of the Engine Bleed System Health Check below that makes sure the Overpressure Switch in the Bleed Air Regulator will operate at the correct pressure range.

1) Do this task: Engine Bleed Air System Health Check, AMM TASK 36-11-00-700-801.

2) If the pressure actuation point of the Overpressure Switch is either low or high, replace the Bleed Air Regulator. These are the tasks:

- Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801
- Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801

a) If the pressure actuation point of the Overpressure Switch is low, do the Repair Confirmation at the end of this task.

b) If the pressure actuation point of the Overpressure Switch is high, continue.

(3) Do these checks of the High Stage Regulator:

(a) Do the Engine Bleed Air System Health Check, AMM TASK 36-11-00-700-801.

1) Do only those steps that do a test of the pressure regulation of the High Stage Regulator.

2) If the High Stage Regulator control pressure is out of limits, replace the High Stage Regulator. These are the tasks:

- High Stage Regulator Removal, AMM TASK 36-11-07-000-801
- High Stage Regulator Installation, AMM TASK 36-11-07-400-801

a) Do the Repair Confirmation at the end of this task.

3) If the High Stage Regulator control pressure is within specifications, then continue.

(4) Do the Precooler Control Valve System Health Check, AMM TASK 36-12-00-700-801.

(a) If you found and repaired defects when you performed the Precooler Control Valve System Health Check, then do the Repair Confirmation at the end of this task.

(b) If the Precooler Control Valve control pressure is within specifications, then continue.

(5) Do this check of the sense line between the Precooler Control Valve and the Precooler Control Valve Sensor, (Figure 307):

(a) Disconnect the sense line at both ends.

(b) Blow dry shop air (80 psi maximum) or low pressure nitrogen through the sense line to make sure there are no obstructions in the line.

(c) Make sure that there is good airflow through the open line.

1) If the airflow is satisfactory, then reconnect the sense line as follows:

a) Apply a light coat of Never-Seez Pure Nickel Special anti-seize compound (or equivalent) to the sense line connections.

b) Reconnect the sense line and continue.

2) If there is poor airflow, do these steps:

a) Repair the obstruction or get a new sense line.

b) Apply a light coat of Never-Seez Pure Nickel Special anti-seize compound (or equivalent) to the sense line connections.

c) Reconnect the sense line.

d) Do the Repair Confirmation at the end of this task.

e) If the Repair Confirmation is not satisfactory, then continue.

(6) Examine the fan air side of the Bleed Air Precooler for foreign matter as follows:

(a) Do this task: Precooler Control Valve Removal, AMM TASK 36-12-02-000-801.

(b) Remove all foreign matter found.

(c) Do this task: Precooler Control Valve Installation, AMM TASK 36-12-02-400-801.

(7) Replace these components if this Fault Isolation Procedure has not isolated any defective components:

NOTE: The Precooler Control Valve sensor and the 450° F Thermostat cannot be tested on the wing. Replace both the Precooler Control Valve Sensor and the 450° F Thermostat before you do the Repair Confirmation.

(a) Replace the Precooler Control Valve sensor and the 450° F Thermostat. These are the tasks:

- Precooler Control Valve Sensor Removal, AMM TASK 36-12-03-000-801
- Precooler Control Valve Sensor Installation, AMM TASK 36-12-03-400-801
- Thermostat Removal, AMM TASK 36-11-05-000-801
- Thermostat Installation, AMM TASK 36-11-05-400-801

1) Do the Repair Confirmation at the end of this task.

2) If the Repair Confirmation is not satisfactory, then continue.

(b) Replace the MW0311 Wiring Harness to the Bleed Air Regulator, M1180. These are the tasks:

- 3 O'clock Strut Harness Removal, AMM TASK 73-21-06-000-802-F00
- 3 O'clock Strut Harness Installation, AMM TASK 73-21-06-400-802-F00

NOTE: MW0311 Electrical Harnesses P/N 325-029-901-0 and 325-029-902-0 are known to be the source of faults. The P/N 325-029-901-0 and 325-029-902-2 Electrical Harnesses can be reworked by CFM International Service Bulletin 72-0262 to serviceable Electrical Harnesses P/N 325-029-903-0 and 325-029-904-0, respectively. P/N 325-029-905-0 is the Production Harness and also the spared replacement.

1) Do the Repair Confirmation at the end of this task.

2) If the Repair Confirmation is not satisfactory, then continue.

(c) Replace or test the 490° F Overtemperature Switch as follows:

1) Replace the 490° F Overtemperature Switch. These are the tasks:

- Overtemperature Switch Removal, AMM TASK 36-11-08-000-801
- Overtemperature Switch Installation, AMM TASK 36-11-08-400-801

a) Do the Repair Confirmation at the end of this task.

b) If the Repair Confirmation is not satisfactory, then continue.

2) As an option to switch replacement, do this test of the switch to make sure it is within specification:

NOTE: If the switch is within specification, there is no need to replace it at this time.

a) Do this task: Bleed Air Regulator and 490F Overtemperature Switch Functional Test, AMM TASK 36-11-00-720-801.

NOTE: It is only necessary to do those steps applicable to the Functional Test of the 490° F Overtemperature Switch.

b) Replace the switch if it is not within specification. These are the tasks:
- Overtemperature Switch Removal, AMM TASK 36-11-08-000-801
- Overtemperature Switch Installation, AMM TASK 36-11-08-400-801

c) Do the Repair Confirmation at the end of this task.

d) If the Repair Confirmation is not satisfactory, then continue.

(d) Replace the Bleed Air Precooler. These are the tasks:
- Bleed Air Precooler Removal, AMM TASK 36-12-01-000-801
- Bleed Air Precooler Installation, AMM TASK 36-12-01-400-802

1) Do the Repair Confirmation at the end of this task.

H. - Fault Isolation Procedure - BLEED TRIP OFF Light is ON and Cannot Be Reset

(1) If the BLEED TRIP OFF Light is on at this time or if the fault is intermittent and suspected to be an electrical fault, then do these steps to prepare pneumatic components on the engine for fault isolation:

NOTE: MW0311 Electrical Harnesses P/N 325-029-901-0 and 325-029-902-0 are known to be the source of faults. These harnesses can short to the connector backshell under hot operating conditions with a result of a BLEED TRIP OFF light or a tripped circuit breaker.

(a) Make sure that there is no pressure in the Pneumatic System.

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

(b) Make sure that the applicable Engine Bleed Switch is in the OFF position.

(c) Make sure that the Fuel Shutoff Lever for the applicable engine is in the CUTOFF position and install DO-NOT-OPERATE tags.

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Retract the Leading Edge Flaps and Slats, if not previously accomplished, and deactivate the Leading Edge Flaps and Slats. This is the task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

(e) Do this task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00.

(f) For the applicable Thrust Reverser, do this task: Open the Thrust Reverser (Selection), AMM TASK 78-31-00-010-801-F00.

(2) Do these steps to do a check of the Pressure Switch wiring in the Bleed Air Regulator:

(a) Disconnect the electrical connector DP1102 from the Bleed Air Regulator, M1180.

(b) Push the TRIP RESET button on the P5-10 Panel.

(c) If the BLEED TRIP OFF light goes OFF, replace the Bleed Air Regulator. These are the tasks:
- Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801
- Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801

1) Do the Repair Confirmation at the end of this task.

(d) If the BLEED TRIP OFF light does not go OFF, re-connect electrical connector DP1102 to the Bleed Air Regulator, M1180, and continue.

(3) Do these steps to do a check of the for the 490° F Overtemperature Switch wiring:

(a) Disconnect the electrical connector D526 (Engine 1) or D528 (Engine 2) from the applicable 490° F Overtemperature Switch, S20 or S21.

(b) Push the TRIP RESET button on the P5-10 Panel.

(c) If the BLEED TRIP OFF Light goes OFF, then replace the 490° F Overtemperature Switch, S20 or S21, as applicable. These are the tasks:

- Overtemperature Switch Removal, AMM TASK 36-11-08-000-801
- Overtemperature Switch Installation, AMM TASK 36-11-08-400-801

1) Do the Repair Confirmation at the end of this task.

(d) If the BLEED TRIP OFF Light does not go OFF, re-connect electrical connector, D526 (Engine 1) or D528 (Engine 2) to the applicable Overtemperature Switch and continue.

(4) Do a check of the wiring for a short to ground as follows: (WDM 36-11-11).

NOTE: An internal short to ground within the ACAU, the P5-10 Air Conditioning Module, the MW0311 Engine Bleed Air Regulator Harness, or other aircraft wiring can cause the BLEED TRIP OFF Light to stay ON.

(a) Remove the Air Conditioning Accessory Unit (ACAU). This is the task: Air Conditioning Accessory Unit (ACAU) Removal, AMM TASK 21-51-02-000-801.

1) If the BLEED TRIP OFF Light goes OFF, do a check of the wiring between:

- ACAU and the Bleed Air Regulator Pressure Switch
- ACAU and the Bleed Air Overtemperature Switch

a) Repair the problems you find.

2) If the light does not go OFF, then do a check of the wiring between the P5-10 Air Conditioning Module and the ACAU.

a) Repair any problems that you find.

b) If you do not find any wiring problems, then install a serviceable ACAU. This is the task: Air Conditioning Accessory Unit (ACAU) Installation, AMM TASK 21-51-02-400-801.

NOTE: You can do the Adjustment/Test of the ACAU after the Electrical Fault Isolation has been completed.

c) If you do not find any problems, then install a serviceable P5-10 Air Conditioning Module. This is the task: Air Conditioning Module Installation, AMM TASK 21-51-65-400-801.

d) Do the Repair Confirmation at the end of this task.

e) If you have not already done so, do the Air Conditioning Accessory Unit - Operational Test, AMM TASK 21-51-02-710-802-002.

I. BLEED TRIP Troubleshooting Table

(1) Refer to the table below to do quick troubleshooting for bleed trips.

BLEED TRIP Troubleshooting Table

OPERATING PHASE	RECOMMENDED MAINTENANCE ACTION
GROUND IDLE/TAXI: BLEED TRIP OCCURS ONLY DURING GROUND IDLE/TAXI	
5th and 9th stage supply pressure and temperature are not sufficient to cause a BLEED TRIP.	- Wiring short - Over Pressure Switch - Over Temperature Switch Note: These failure modes can occur at all flight phases.
TAKEOFF: BLEED TRIP OCCURS ONLY DURING TAKEOFF ROLL	
Immediately on application of takeoff power: over pressure	
High Stage Valve does not close.	Do a check to see if the High Stage Valve closes. (FIM 36-10 TASK 801, Step F(2).
Mid to Late Takeoff Roll: Over Temperature First Level (PCCV and 390° F sensor) and Second Level (450° F Sensor) of Temperature Control does not operate	
Precooler Control Valve (PCCV) not open.	Do a check to see if PCCV opens when Pc is less than 3 psig. (FIM 36-10 TASK 801, Steps F(3), F(11), and F(12).
390° F Sensor does not open.	If PCCV opens, replace the 390° F Sensor • Precooler Control Valve Sensor Removal, AMM TASK 36-12-03-000-801 • Precooler Control Valve Sensor Installation, AMM TASK 36-12-03-400-801
450° F Sensor does not open.	Replace the 450° F Sensor • Thermostat Removal, AMM TASK 36-11-05-000-801 • Thermostat Installation, AMM TASK 36-11-05-400-801
High Stage Valve has excessive internal leakage	
High Stage Valve leakage causes elevated Bleed Temperature from engine.	Examine the High Stage Valve internal clearance (FIM 36-10 TASK 804, Step F(2)(c)).
CLIMB: BLEED TRIP OCCURS ONLY DURING CLIMB	
Over Temperature: First Level (PCCV and 390° F Sensor) and Second Level (450° F Sensor) of Temperature Control does not operate	
Precooler Control Valve (PCCV) not open.	Do a check to see if PCCV opens when Pc is less than 3 psi (FIM 36-10 TASK 801, Steps F(3), F(11), and F(12).
390° F Sensor does not open.	If PCCV opens, replace the 390° F Sensor • Precooler Control Valve Sensor Removal, AMM TASK 36-12-03-000-801 • Precooler Control Valve Sensor Installation, AMM TASK 36-12-03-400-801
450° F Sensor does not open.	Replace the 450° F Sensor • Thermostat Removal, AMM TASK 36-11-05-000-801 • Thermostat Installation, AMM TASK 36-11-05-400-801
High Stage Valve has excessive internal leakage	

BLEED TRIP Troubleshooting Table (Continued)

OPERATING PHASE	RECOMMENDED MAINTENANCE ACTION
High Stage Valve leakage causes elevated Bleed Temperature from engine.	Examine the High Stage Valve internal clearance (FIM 36-10 TASK 804, Step F(2)(c)).
Restricted fan air flow to the Precooler.	-Visually check for kiss seal degradation - Debris in the fan air path.
CRUISE: BLEED TRIP OCCURS ONLY DURING CRUISE	
Over Temperature (above 25,000 feet the engine cannot produce pressure to cause a trip and 5th Stage Bleed Temperature is below trip 450° F) High Stage Valve opens early	
Use of wing anti-ice in cruise can cause the High Stage Valve to open early.	Operationally induced. Not a component fault.
High Stage Valve opens early.	Replace the High Stage valve. • High Stage Valve Removal, AMM TASK 36-11-06-000-801 • High Stage Valve Installation, AMM TASK 36-11-06-400-801 There is no procedure to replicate valve operation (downstream pressure closing force is internal to the valve).
DECENT: BLEED TRIP OCCURS ONLY DURING DESCENT	
Overtemperature	
450° F Sensor does not open.	Replace the 450° F Sensor • Thermostat Removal, AMM TASK 36-11-05-000-801 • Thermostat Installation, AMM TASK 36-11-05-400-801)

J. Repair Confirmation

(1) Remove all pressure gages, test equipment and associated hardware.

(2) Re-connect all sense lines that were disconnected.

(a) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) on the sense line fittings.

(3) Re-install all components that were removed.

(4) Make sure that all electrical connectors removed for wiring checks have been re-connected.

(5) Do the Operational Tests for all components that were removed and re-installed.

(6) Install the access panels that were removed.

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.

(7) For the Left Thrust Reverser, do this task: Close the Thrust Reverser (Selection), AMM TASK 78-31-00-010-804-F00.

(8) Close the Fan Cowl Panels. This is the task: Close the Fan Cowl Panels, AMM TASK 71-11-02-410-801-F00.

(9) Reactivate the Leading Edge Flaps and Slats. This is the task: Leading Edge Flaps and Slats - Activation, AMM TASK 27-81-00-440-801.

(10) Reactivate the thrust reverser. This is the task: Thrust Reverser Activation After Ground Maintenance, AMM TASK 78-31-00-440-803-F00.

(11) Push the TRIP RESET button on the P5-10 Panel:

(a) Make sure that there are no BLEED TRIP OFF lights ON.

(12) Do this task: Supply Pressure to the Pneumatic System with One or Both Engines, AMM TASK 36-00-00-860-804.

(13) Putt the APU BLEED Switch to the OFF position and remove the External Pneumatic Source, if applicable.

(14) Do these steps if the BLEED TRIP OFF Light came on during a "no engine bleeds takeoff":

(a) If applicable, put the applicable PACK Switch to OFF.

(b) Put the applicable engine BLEED Switch to OFF.

CAUTION: DO NOT EXCEED THE ENGINE OPERATING LIMITS. FAILURE TO COMPLY WITH THE ENGINE OPERATING LIMITS COULD RESULT IN ENGINE DAMAGE.

(c) Slowly increase the applicable Engine N1 Speed to 80% and maintain for 5 minutes.

(d) Make sure that the engine BLEED TRIP OFF Light does not come ON.

(e) Slowly return the Engine Throttle to idle and make sure that the BLEED TRIP OFF Light does not come ON.

(f) If the BLEED TRIP OFF Light did not come on, then you corrected the fault.

(g) If the Repair Confirmation is not satisfactory, then do these steps:

1) Make sure that there is no pressure in the Pneumatic System:

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

2) Make sure that the applicable Engine BLEED Switch is set to OFF.

3) Make sure that the Fuel Shutoff Lever for the applicable engine is in the CUTOFF position.

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

4) Retract the Leading Edge Flaps and Slats, if not previously accomplished, and deactivate the Leading Edge Flaps and Slats. This is the task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

5) Do this task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00.

6) For the applicable Thrust Reverser, do this task: Open the Thrust Reverser (Selection), AMM TASK 78-31-00-010-801-F00.

7) Return to the step in the Fault Isolation Procedure step that sent you to the Repair Confirmation and continue with the Fault Isolation.

(h) Do these steps to complete the task:

1) Do this task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

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

3) Put the ISOLATION VALVE Switch on the P5-10 Panel to the AUTO position.

(15) Do this check for all fault conditions except the case when the BLEED TRIP OFF Light came ON during a "no engine bleeds takeoff":

NOTE: This check will operate the Pneumatic System under conditions which the BLEED TRIP OFF Light is most likely to come ON.

(a) Set the applicable engine BLEED Switch on the P5-10 Panel to the ON position.

(b) Set the ISOLATION VALVE Switch on the P5-10 Panel to the OPEN position.

(c) Slowly increase N1 to approximately 48% so that the Bleed System is operating on regulated 9th stage supply just before the crossover to 5th stage supply:

1) Make sure that the duct pressures follow the pressure schedules shown on Figure 305, Duct Pressure vs. N1 at Sea Level and 5000 feet.

(d) Put the L and R PACK Switches to HIGH.

(e) Operate the applicable Engine Pneumatic System for approximately 5 minutes and observe for these conditions:

1) Make sure that the BLEED TRIP OFF Light does not come ON.

2) Make sure that the pressure indication on the Dual Duct Pressure Indicator is 32 ±6 psi.

3) Monitor the applicable pointer on the Dual Duct Pressure Indicator for a decrease in pressure.

NOTE: If the outside air temperature is near 100° F or higher, the duct pressure can decrease as the 450° F Thermostat opens and the PRSOV moves toward the CLOSED position.

(f) After 5 minutes at 48% N1, put the PACK Switch of the other Engine Pneumatic System to the OFF position.

1) For example, if the Left Engine Pneumatic System is being checked and the BLEED 1 Switch is ON, then put the R PACK Switch to OFF.

(g) Slowly increase N1 to approximately 80% so that the applicable Bleed System operates on regulated 5th stage supply:

1) Make sure that the duct pressures follow the pressure schedules shown on Figure 305, Duct Pressure vs. N1 at Sea Level and 5000 feet.

(h) Operate the applicable Engine Pneumatic System for approximately 5 minutes and observe for these conditions:

1) Make sure that the duct pressure on the Dual Duct Pressure Indicator shows at 42 ±8 psi and does not decrease during the 5 minutes.

2) Make sure that the BLEED TRIP OFF Light does not come ON.

3) Monitor the applicable pointer on the Dual Duct Pressure Indicator for a decrease in pressure.

NOTE: If the outside air temperature is near 100° F or higher, the duct pressure can decrease as the 450° F Thermostat opens and the PRSOV moves toward the CLOSED position.

(i) Slowly return the throttle to IDLE and make sure that the BLEED TRIP OFF Light does not come ON.

(j) If the BLEED TRIP OFF Light did not come ON, then you corrected the fault.

(k) If the Repair Confirmation is not satisfactory, then do these steps:

1) Make sure that there is no pressure in the Pneumatic System:

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

2) Make sure the applicable engine BLEED Switch is set to OFF.

3) Make sure that the Fuel Shutoff Lever for the applicable engine is in the CUTOFF position (Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00).

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

4) Retract the Leading Edge Flaps and Slats, if not previously accomplished, and deactivate the Leading Edge Flaps and Slats. This is the task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

5) Do this task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00.

6) For the applicable Thrust Reverser, do this task: Open the Thrust Reverser (Selection), AMM TASK 78-31-00-010-801-F00.

7) Return to the Fault Isolation Procedure step that sent you to the Repair Confirmation and continue with the Fault Isolation.

(l) Do these steps to complete the task:

1) Do this task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

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

3) Set the ISOLATION VALVE Switch on the P5-10 Panel to the AUTO position.

——— END OF TASK ———

802. Bleed Valve Will Not Close When the Bleed Switches Are Moved to Off, the Engine Is the Bleed Source - Fault Isolation

A. Description

(1) (SDS SUBJECT 36-11-00)

(2) This condition may be shown when the pressure indication on the dual duct pressure indicator does not decrease to less than 10 psi with the engines as the bleed source and with the engine bleed switches in the OFF position.

(3) The MW0311 harness with part numbers 325-029-901-0 and 325-029-902-0 can have internal shorting which can cause the circuit breaker that powers the solenoid on the bleed air regulator to trip and, subsequently, not allow the PRSOV to close. This internal shorting may not be a constant condition. However, if the circuit breaker is found tripped and has been found tripped in the past, it is possible that there is an intermittent short in the harness. If this is the case, the MW0311 harness should be considered a likely source of the fault and it should be thoroughly examined to determine if it should be replaced.

NOTE: CFM International Service Bulletin 72-0262 provides instructions to rework the harness part numbers listed above to a serviceable condition.

B. Possible Causes

(1) MW0311 Electrical Harness

(a) Failure Mode: Open or shorted wiring

NOTE: CFM56-7b Service Bulletin 72-0262 reworks this harness.

(2) Circuit Breakers

(a) Failure Mode: Failed open

(3) P5-10 Air Conditioning Module

(a) Failure Mode: Internal open or shorted circuit

(4) Engine/APU Fire Control Panel - P8-1

(a) Failure Mode: Internal open or shorted circuit

(5) Air Conditioning Accessory Unit M324

(a) Failure Mode: Internal short or open

(6) Air Conditioning Accessory Unit, M1455

NOTE: Only 737-800 and 737-900 airplanes have the M1455 ACAU.

(a) Failure Mode: Internal short or open

(7) Aircraft Wiring

(a) Failure Mode: Failed open or short circuit

(8) Pressure regulator and shutoff valve (PRSOV)

(a) Failure Mode: Failed open

(9) Bleed air regulator, M1180

(a) Failure Mode: Open or shorted coil

(10) Indication System

C. Circuit Breakers

(1) These are the primary circuit breakers related to the fault:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN
A	6	C01470	AIR CONDITIONING BLEED AIR XDCR LEFT
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	5	C00077	AIR CONDITIONING BLEED AIR PRESS IND
B	6	C01469	AIR CONDITIONING BLEED AIR XDCR RIGHT
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

D. Related Data

(1) Component Location (Figure 301)

(2) Troubleshooting Check (Figure 308)

(3) Pneumatic System Control Valve Position Indicators (Figure 312)

(4) (SSM 36-11-11)

(5) (WDM 36-21-11)

E. Initial Evaluation

(1) Make sure that these circuit breakers have not tripped:

(a) These are the circuit breakers:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(b) If one or both of the circuit breakers have tripped, do these steps:

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

WARNING: DO NOT HOLD THE CIRCUIT BREAKER IN THE RESET POSITION. IF YOU HOLD THE CIRCUIT BREAKER IN THE RESET POSITION WHEN A WIRING FAULT IS PRESENT, THE CIRCUIT BREAKER WILL NOT BE ABLE TO TRIP AGAIN. FAILURE TO RESET AND RELEASE THE CIRCUIT BREAKER QUICKLY CAN RESULT IN A FIRE, EXTENSIVE DAMAGE TO WIRING, AND INJURY TO PERSONS.

2) Quickly reset the circuit breaker and release it.

3) Do this task: Supply Electrical Power, AMM TASK 24-22-00-860-811.

(c) If the circuit breaker trips again, proceed to the Fault Isolation Procedure.

(d) If the circuit breaker was reset successfully, then continue with the Initial Evaulation.

1) If the circuit breaker trips again in the steps that follow, make a record of the position that the engine bleed switch was in as it may be useful later on.

(e) If the circuit breaker(s) has not tripped, then continue.

(2) Remove the pressure from the pneumatic system. To remove the pressure, do this task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806.

(3) Make sure that the manifold pressure pointer on the dual duct pressure indicator for the applicable system indicates less than 2 psi with no pneumatic source available.

(a) If the indicated pressure on the dual duct pressure indicator is 2 psi or greater, then do this fault isolation:

1) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

2) Continue with the Initial Evaluation.

(b) If the indicated pressure on the dual duct pressure indicator is less than 2 psi, continue.

(c) Supply pressure to the pneumatic system with the APU. To supply pressure with the APU, do this task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

(d) Make sure that the pneumatic pressure increases to a minimum of 12 psi with no user systems in operation and the L and R pointers on the dual duct pressure indicator are within 3 psi of each other when the ISOLATION VALVE switch is set to OPEN.

1) If the pneumatic pressure does not increase to a minimum of 12 psi with the APU BLEED switch on or if there is a difference (split) in the L and R pointers on the dual duct pressure indicator that is greater than 3 psi, then do this fault isolation:

a) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

b) Continue with this Initial Evaluation.

2) If the pneumatic pressure indication is a minimum of 12 psi with no user systems in operation and the L and R pointers on the dual duct pressure indicator are within 3 psi of each other, then continue.

(4) Supply pneumatic pressure with the engine on the side with the fault:

(a) Do this task: Supply Pressure to the Pneumatic System with One or Both Engines, AMM TASK 36-00-00-860-804.

(5) Set these pneumatic control switches to the position shown:

(a) APU BLEED to OFF

(b) ISOLATION VALVE to CLOSE

(6) If applicable, remove any external pneumatic source.

(7) Do these steps to do a check of the operation of the engine BLEED switch/PRSOV:

NOTE: The engine BLEED switch will be cycled in these steps to make sure that there are no intermittent malfunctions in the system operation.

(a) Set the applicable engine BLEED 1 or 2 switch to the OFF position.

(b) Make sure that the pointer for the applicable system on the dual duct pressure indicator decreases to less than 10 psi.

(c) Set the applicable engine BLEED switch to the ON position.

(d) Make sure that the manifold pressure pointer for the applicable system increases to 10-25 psi with the engine at steady idle without user systems in operation.

NOTE: The duct pressure pointers on the dual duct pressure indicator may fluctuate without user systems in operation.

(e) Set the applicable engine BLEED switch to the OFF position

(f) Make sure that the applicable pointer on the dual duct pressure indicator decreases to less than 10 psi.

(8) If the pressure pointer decreases to less than 10 psi when the applicable engine BLEED switch is moved to the OFF position, then there was an intermittent fault.

(a) Use your judgement, airline policy, and the aircraft's pneumatic system history to decide if you will take action to correct the fault.

(b) Do this task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

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

(9) If the manifold pressure either does not decrease to less than 10 psi when the applicable BLEED switch is moved to the OFF position or intermittently decreases to less than 10 psi when the applicable BLEED switch is moved to the OFF position, perform the Fault Isolation Procedure.

F. Fault Isolation Procedure

(1) Do these steps to prepare for fault isolation:

(a) Make sure that there is no pressure in the pneumatic system. To remove the pressure from the pneumatic system, do this task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806.

(b) Make sure the fuel shutoff lever for the applicable engine is in the cutoff position and install DO-NOT-OPERATE tags.

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE LEADING EDGE FLAPS AND SLAPS, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Retract the Leading Edge Flaps and Slats if not previously accomplished. To retract the Leading Edge Flaps and Slats, do this task: Leading Edge Flaps and Slats Retraction, AMM TASK 27-81-00-860-804.

(d) Deactivate the Leading Edge Flaps and Slats. To deactive the Leading Edge Flaps and Slats, do this task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

(e) Deactivate the applicable thrust reverser. To deactivate the thrust reverser, do this task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00.

(f) Open the applicable thrust reverser. To open the thrust reverser, do this task: Open the Thrust Reverser (Selection), AMM TASK 78-31-00-010-801-F00.

(2) Do these steps to do a check of the PRSOV:

NOTE: This step makes sure that the valve has not stuck in an open position.

(a) Look at these circuit breakers to see if they are tripped:

1) These are the circuit breakers:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(b) If the applicable circuit breaker has not tripped, then do these steps:

1) Make sure that the applicable engine BLEED switch is set to OFF.

2) Look at the position indicator on the PRSOV.

3) If the PRSOV is not in the fully closed position, then replace the PRSOV. These are the tasks:

- PRSOV Removal, AMM TASK 36-11-04-000-801
- PRSOV Installation, AMM TASK 36-11-04-400-801

a) Do the Repair Confirmation at the end of this task.

b) If the Repair Confirmation is not satisfactory, then continue.

4) If the PRSOV is in the fully closed position, then continue.

(c) If the applicable circuit breaker has tripped, then continue to the check of the MW0311 engine harness.

NOTE: The MW0311 engine harness may have a short that trips the circuit breaker.

(3) Do this check for 28 VDC to the bleed air regulator:

(a) Open these circuit breakers:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(b) Disconnect electrical connector DP1102 from the applicable bleed air regulator.

(c) Close these circuit breakers:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(d) Make sure that the applicable engine BLEED switch is set to OFF.

(e) Measure the voltage between pins 7 and 6 of connector DP1102.

1) If there is 22-30 VDC between pins 7 and 6 of connector DP1102, measure the resistance between pins 7 and 6 of the electrical connector on the bleed air regulator.

a) If the resistance between pins 7 and 6 of the bleed air regulator electrical connector is not between 20-40 ohms, replace the bleed air regulator. To replace the regulator, these are the tasks:

- Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801
- Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801

b) Do the Repair Confirmation at the end of this task.

c) If the Repair Confirmation is not satisfactory, then continue.

d) If the resistance between pins 7 and 6 of the bleed air regulator electrical connector is between 20-40 ohms, then continue.

2) If there is not 22-30 VDC between pins 7 and 6 of connector DP1102, do a check of the wiring between connector DP1102, pin 6 and the ground (GD3838-DC, left) (GD3938-DC, right).

a) Repair any problems that you find.

b) If the ground does not have any problems, then continue.

(4) Do this check to make sure there is 28 VDC at the MW0311 engine harness:

(a) Open these circuit breakers:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(b) Disconnect electrical connector DP1104 from electrical connector D30204 (D30404) at the engine firewall disconnect, as applicable.

(c) Close these circuit breakers:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(d) Make sure that there is 22-30 VDC between pins 12 and 11 of electrical connector D30204 (D30404).

1) If there is not 22-30 VDC between pins 12 and 11 of electrical connector D30204 (D30404), then proceed to the Open Electrical Circuit - Fault Isolation Procedure.

2) If there is 22-30 VDC between pins 12 and 11 of electrical connector D30204 (D30404), then continue.

(5) Do these steps to do a check of the MW0311 engine harness:

NOTE: MW0311 engine harnesses with part numbers 325-029-901-0 or 325-029-902-0 are susceptible to internal shorting which can cause the bleed air valve circuit breaker to trip and prevent the PRSOV from closing. This type of failure is not always a hard fault (always present). Therefore, if you find that the applicable circuit breaker has tripped or if it has tripped in the past, it is quite possible there is an intermittent short in the harness. A thorough check of the harness must be accomplished to determine if the harness must be replaced.

NOTE: A multimeter is required to perform the electrical checks in this procedure. If there is an intermittent short or the fault is not present at any point in the Fault Isolation, you will need to use a megohmmeter instead of the multimeter to perform a more thorough check of the electrical circuit.

(a) If not already done, disconnect electrical connector DP1104 at the firewall disconnect.

(b) Do a visual examination of the MW0311 engine harness for worn areas, deformed areas, loose or damaged connectors, and damaged pins and sockets:

1) If there is obvious damage to the harness that could cause a short or open circuit, then replace the harness. These are the tasks:

- 3 O'clock Strut Harness Removal, AMM TASK 73-21-06-000-802-F00
- 3 O'clock Strut Harness Installation, AMM TASK 73-21-06-400-802-F00

a) Do the Repair Confirmation at the end of this task.

b) If the Repair Confirmation is not satisfactory, then continue.

2) If there is no obvious damage to the harness, then continue.

(c) Examine these circuits of the MW0311 harness for continuity:

DP1102		DP1104
pin 7	. . . . .	pin 12
pin 6	. . . . .	pin 11
pin 5	. . . . .	pin 3
pin 10	. . . . .	pin 10
pin 9	. . . . .	pin 2

1) If any of the circuits fail the continuity check, then replace the harness. To replace the MW0311 harness, these are the tasks:
   - 3 O'clock Strut Harness Removal, AMM TASK 73-21-06-000-802-F00
   - 3 O'clock Strut Harness Installation, AMM TASK 73-21-06-400-802-F00

   a) Do the Repair Confirmation at the end of this task.

   b) If the Repair Confirmation is not satisfactory, then continue.

2) If there is continuity in all of the circuits, then continue.

(d) If the applicable circuit breaker C796 (C797) was tripped or has a history of tripping, do these steps:

1) Disconnect the applicable electrical connectors D3200 (D3202) from the Ground WTAI Temperature Solenoid valve and DP1101 from the Fan Frame Compressor Case Vibration sensor.

CAUTION: YOU MUST PERFORM THE MEG CHECK IN ACCORDANCE WITH STANDARD WIRING MAINTENANCE PRACTICES. FAILURE TO FOLLOW PROPER PROCEDURES COULD RESULT IN DAMAGE TO EQUIPMENT.

2) Use a megohmmeter to examine the MW0311 circuits listed below for internal shorts:

DP1104		DP1104
pin 12	. . . . .	pin 1
pin 12	. . . . .	pin 2
pin 12	. . . . .	pin 5
pin 12	. . . . .	pin 10
pin 12	. . . . .	pin 11
pin 12	. . . . .	pin 14
pin 3	. . . . .	pin 1
pin 3	. . . . .	pin 2
pin 3	. . . . .	pin 5
pin 3	. . . . .	pin 10
pin 3	. . . . .	pin 11
pin 3	. . . . .	pin 12
pin 3	. . . . .	pin 14

3) Use a megohmmeter to do a check of pins 5, 7 and 10 of connector DP1102 to the connector backshell.

4) If any of the checks with the megohmmeter failed, replace the MW0311 harness. These are the tasks:
   - 3 O'clock Strut Harness Removal, AMM TASK 73-21-06-000-802-F00
   - 3 O'clock Strut Harness Installation, AMM TASK 73-21-06-400-802-F00

a) Perform the Repair Confirmation at the end of this task.

5) If the checks with the megohmmeter are satisfactory, then continue.

6) If the circuit breaker continues to trip open, use WDM 36-11-11 to perform additional checks for the source of the ground fault.

G. Open Electrical Circuit - Fault Isolation Procedure

(1) Do the steps that follow to do a check for an open circuit:

NOTE: These steps examine the electrical circuitry between the circuit breaker and the engine firewall connector.

(a) Lower the P5 forward overhead panel to get access to the back of the P5-10 panel:

1) Disconnect electrical connector D646 (D680).

(b) Do a continuity check between pin 18 (15) of electrical connector D646 (D680) and pin 12 of electrical connector D30204 (D30404).

1) If there is no continuity, repair the problems that you find (WDM 36-11-11).

a) Do the Repair Confirmation at the end of this task.

b) If the Repair Confirmation is not satisfactory, then continue.

2) If there is continuity, then continue.

(c) Do a continuity check between pins 18 and 33 of electrical connector D646 (pins 15 and 14 of electrical connector D680) on the P5-10 air conditioning panel as follows:

1) Make sure the applicable engine BLEED switch is set to the OFF position.

2) If there is no continuity, then replace the P5-10 air conditioning panel as follows:

a) These are the tasks:

- Air Conditioning Module Removal, AMM TASK 21-51-65-000-801
- Air Conditioning Module Installation, AMM TASK 21-51-65-400-801

3) If there is continuity, then continue.

(d) Do this check for 28 VDC at pin 33 (14) of connector D646 (D680) on the ship's wiring:

1) Make sure the OVHT DET switches on the Fire Control Panel, P8-1, are in the NORMAL position.

2) Make sure there is 22-30 VDC present at pin 33 (14) of connector D646 (D680).

3) If there is not 22-30 VDC present at pin 33 (14) of connector D646 (D680), then repair the circuit problems you find (WDM 36-11-11).

a) Do the Repair Confirmation at the end of this task.

H. Repair Confirmation

(1) Re-install all components that were removed.

(a) Make sure that the installation test or operational test for each component installed has been accomplished.

1) If the appropriate test has not already been accomplished, perform the test.

(2) Re-connect all electrical connectors that were disconnected.

(3) Reinstall all access panels that were removed.

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

(4) For the left thrust reverser, do this task: Close the Thrust Reverser (Selection), AMM TASK 78-31-00-010-804-F00.

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

(6) Do this task: Leading Edge Flaps and Slats - Activation, AMM TASK 27-81-00-440-801.

(7) Do this task: Thrust Reverser Activation After Ground Maintenance, AMM TASK 78-31-00-440-803-F00.

(8) Make sure that the pressure indication on the dual duct pressure indicator is less than 2.0 psi.

(9) Supply pressure to the pneumatic system with the engine on the applicable side. To supply pressure, do this task: Supply Pressure to the Pneumatic System with One or Both Engines, AMM TASK 36-00-00-860-804.

(10) Set these pneumatic system control switches to the positions shown:

(a) APU BLEED switch to OFF

(b) ISOLATION VALVE switch to CLOSE

(11) If applicable, remove any external pneumatic source.

(12) Do these steps to do a check of the operation of the engine BLEED switch/PRSOV:

NOTE: The engine BLEED switch will be cycled in these steps to make sure that there are no intermittent malfunctions in the system operation.

(a) Set the applicable engine BLEED 1 or 2 switch to the OFF position.

(b) Make sure that the pointer for the applicable system on the dual duct pressure indicator decreases to less than 10 psi.

(c) Set the applicable engine BLEED switch to the ON position.

(d) Make sure that the manifold pressure pointer for the applicable system increases to 10 - 25 psi with the engine at steady idle without user systems in operation.

NOTE: The duct pressure pointers on the dual duct pressure indicator may fluctuate without user systems in operation.

(e) Set the applicable engine BLEED switch to the OFF position

(f) Make sure that the applicable pointer on the dual duct pressure indicator decreases to less than 10 psi.

(13) If the manifold pressure pointer decreases to less than 10.0 psi when the applicable engine bleed switch is set to OFF, then you corrected the fault.

(a) Do these steps to complete the task:

1) Do this task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

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

(14) If the Repair Confirmation is unsatisfactory, return to the step in the Fault Isolation Procedure that you were at prior to performing the Repair Confirmation and continue the fault isolation procedure with these constraints:

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE) AND OPEN THE FAN COWL PANEL. FAILURE TO OBEY THE ABOVE SEQUENCE MAY RESULT IN INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Retract the Leading Edge Flaps and Slats.

(b) Deactivate the Leading Edge Flaps and Slats as follows:

1) Do this task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

(c) Deactivate the applicable thrust reverser as follows:

1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00.

(d) Open the applicable thrust reverser, as follows:

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

——— END OF TASK ———

803. Duct Pressure High, the Engine is the Bleed Source - Fault Isolation

A. Description

(1) (SDS SUBJECT 36-11-00, SDS SUBJECT 36-12-00)

(2) A high duct pressure condition is a condition in which one or both pointers on the dual duct pressure indicator are higher than 50 psi, with the engines as the bleed source when operating on regulated 5th stage pressure in a stabilized condition. If you have a pilot report or an observed fault and you know the bleed pressure, engine N1 speed, and the altitude at the time the fault was observed, you can determine if the system was operating within limits. If you have this information, use the information in Figure 305, Duct Pressure Versus N1 at Various Altitudes, to determine if the duct pressure was within the operating limits. If you do not have this information, you must perform a high power engine run during the Initial Evaluation to obtain that information.

B. Possible Causes

(1) Pressure regulator and shutoff valve (PRSOV)

(a) Failure Mode: sticking

(2) Bleed air regulator, M1180

(a) Failure Mode: Incorrect regulation

(3) Leak in the downstream pressure sense line or fittings(Figure 308)

NOTE: The downstream pressure sense line runs between the high stage regulator and the bleed air outlet side of the precooler. There is also a line from the PRSOV that is connected by a tee fitting to the downstream pressure sense line.

(a) Failure Mode:

1) The downstream pressure sense line is also connected to the high stage regulator. A leak anywhere in that sense line tubing or sense line fittings can cause a high duct pressure condition. This includes the line to the high stage regulator.

(4) Wiring

(a) Failure Mode: Indication circuit wiring problem

(5) Duct pressure transducer, T405 (Left) or T403 (Right)

(a) Failure Mode: Out-of-tolerance or faulty transducer

(6) Dual duct pressure indicator, N12

(a) Failure Mode: Out-of-tolerance or faulty indicator

C. Circuit Breakers

(1) These are the primary circuit breakers related to the fault:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN
A	6	C01470	AIR CONDITIONING BLEED AIR XDCR LEFT
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	5	C00077	AIR CONDITIONING BLEED AIR PRESS IND
B	6	C01469	AIR CONDITIONING BLEED AIR XDCR RIGHT
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

D. Related Data

(1) Component Location (Figure 301)

(2) Component Location (Figure 302)

(3) Troubleshooting Check (Figure 308)

(4) (Figure 305), Duct Pressure Versus N1 at Sea Level and 5000 feet

(5) (Figure 305), Duct Pressure Versus N1 at Sea Level, 10K feet, 22K feet, 31K feet, 37K feet and 41K feet

(6) (Figure 312), Pneumatic System Control Valve Position Indicators

(7) (SSM 36-11-11)

(8) (WDM 36-21-11)

E. Initial Evaluation

(1) If you have a pilot report or an observed fault and you know the bleed pressure, engine N1 speed and the altitude at the time the fault was observed, then use the "Duct Pressure versus N1 at Sea level and 5000 feet" graph or the "Duct Pressure versus N1 at Sea Level, 10K feet, 22K feet, 31K feet, 37K feet and 41K feet" graph to determine if one or both engine pneumatic systems have High Duct Pressure.

(2) If you determine that one or both systems have High Duct Pressure, perform the Fault Isolation Procedure.

(3) If you determine that the Duct Pressure for both systems are within limits, then no further action is necessary.

(a) Review the aircraft's pneumatic system history to see if there have been reports of high duct pressure in the past. If there have been reports of high duct pressure in the past, you should perform the Fault Isolation Procedure. If not, you should monitor the aircraft's pneumatic system on subsequent flights.

(4) If you do not have the necessary information to use the graphs to determine if the duct pressure was high, then continue with the Initial Evaluation Procedure.

(5) Supply pressure to the pneumatic system using the APU. To supply pressure, do this task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

(a) Make sure that the ISOLATION VALVE switch is set to OPEN.

(b) Make sure that these conditions occur:

1) The pressure on the dual duct pressure indicator increases to a minimum of 12 psi

2) The duct pressure pointers are within 3 psi of each other.

3) If the duct pressure pointers are not within 3 psi of each other, then do the Fault Isolation below before you proceed.

a) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

4) If the indicated pressures are satisfactory, then continue.

NOTE: The subsequent steps of this Initial Evaluation procedure are very similar to the Repair Confirmation procedure. Both procedures involve a high power engine run to either confirm a fault exists or confirm that you have corrected the fault. Therefore, if you suspect that a fault or faults with the bleed system exist, you may proceed to the Fault Isolation procedure without completing the Initial Evaluation procedure to save time. To complete the Initial Evaluation procedure will only prolong the length of time required to return the aircraft to service by performing the high power engine run twice, getting the pneumatic system components very hot and needing more time to allow the components to cool down before working on them. However, if you suspect that there are no faults, then continue.

(6) Supply pressure to the pneumatic system with the engine with the reported high bleed pressure or both engines if you suspect a problem with both systems. To supply pressure, do this task: Supply Pressure to the Pneumatic System with One or Both Engines, AMM TASK 36-00-00-860-804.

(a) Position the APU BLEED switch to OFF and remove any external pneumatic source, if applicable.

(b) Set the ISOLATION VALVE switch on the P5-10 forward overhead panel to CLOSE.

(c) Make sure that the duct pressure pointer for the applicable system(s) indicates between 10-25 psi.

NOTE: The duct pressure pointer on the dual duct pressure indicator may fluctuate without any user system in operation.

CAUTION: DO NOT EXCEED THE ENGINE OPERATION LIMITS. FAILURE TO COMPLY WITH THE ENGINE OPERATION LIMITS COULD RESULT IN ENGINE DAMAGE.

(7) Do not exceed the engine operation limits in the next step. To operate the engine within limits, do this task: Engine Operation Limits, AMM TASK 71-00-00-800-806-F00.

(8) Slowly increase N1 to 80% or greater and make sure that the duct pressure follows the "Duct Pressure versus N1 at Sea Level and 5000 feet" graph as the N1 speed increases.

(9) Examine the dual duct pressure indicator, N12, on the P5-10 panel.

(10) Make sure that the dual duct pressure pointers are not higher than 50 psi.

(11) If the duct pressure pointers on one or both sides are higher than 50 psi, then do the Fault Isolation Procedure below.

(12) If the duct pressure pointers on both sides are not greater than 50 psi, then there was an intermittent fault and no further action is required.

(13) Do this task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

(14) Set the ISOLATION VALVE switch on the P5-10 panel to AUTO.

(15) Remove pressure from the pneumatic system. To remove pressure, do this task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806.

F. Fault Isolation Procedure

(1) Do these steps to check the sense lines and fittings for leakage:

(a) Remove the pressure from the pneumatic system. To remove pressure, do this task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806.

(b) Make sure that the applicable engine bleed switch is in the OFF position.

(c) Make sure the fuel shutoff lever for the applicable engine is in the cutoff position and install DO-NOT-OPERATE tags.

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DEACTIVATE THE LEADING EDGE, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Retract the leading edge flaps and slats if not previously accomplished.

(e) Deactivate the Leading Edge Flaps and Slats:

1) Do this task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

(f) Deactivate the applicable thrust reverser:

1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00.

(g) Open the applicable thrust reverser:

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

(h) Supply pressure to the pneumatic system with the APU or a ground air source. To supply pressure, do this task: Supply Pressure to the Pneumatic System (Selection), AMM TASK 36-00-00-860-801.

(i) Use a soap solution to detect any leakage in the sense line tubing and sense line fittings from the high stage regulator and the sense line tubing and fittings from the PRSOV that connect together and run to the downstream sense port on the precooler.

NOTE: A leak in the downstream sense line or sense line fitting to the PRSOV can cause the PRSOV to regulate high and cause a high duct pressure condition. Leakage in other sense lines and fittings should be repaired even though the leakage will not cause a high duct pressure condition.

(j) Make sure that there are no leakages.

(k) If you find leakage, then do these steps:

1) Remove the pressure from the pneumatic system. To remove pressure, do this task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806.

2) Repair the leakages found.

3) Do the Repair Confirmation at the end of this task.

(l) If you do not find any leakage, then continue.

(2) Do this check of the PRSOV for correct operation.

(a) Remove the pressure from the pneumatic system. To remove pressure, (AMM TASK 36-00-00-860-806).

(b) Look at the position indicator on the PRSOV.

(c) If the PRSOV is not completely closed, then replace it:

1) These are the tasks:

- PRSOV Removal, AMM TASK 36-11-04-000-801
- PRSOV Installation, AMM TASK 36-11-04-400-801

2) Do the Repair Confirmation at the end of this task.

(d) If the PRSOV is completely closed, do the steps that follow:

1) Use a wrench on the manual override nut to open the valve.

2) Remove the wrench and make sure that the PRSOV closes smoothly.

3) If the PRSOV does not move to the open and closed position smoothly, then replace the PRSOV:

a) These are the tasks:

- PRSOV Removal, AMM TASK 36-11-04-000-801
- PRSOV Installation, AMM TASK 36-11-04-400-801

b) Do the Repair Confirmation at the end of this task.

4) If the PRSOV moves to the open and closed position smoothly, then continue.

(3) Do these tests of the bleed air regulator control pressure:

(a) Disconnect the bleed air supply line at the inlet to the tee at the supply pressure sense line to the bleed air regulator.

(b) Connect a nitrogen pressure source, pressure regulator, supply pressure gage (Ps) and test hose at the tee to the supply pressure sense line (Figure 308, View A).

NOTE: The test equipment used in this or subsequent steps is part of P/N C36001-44 Engine Bleed Air System Test Equipment listed in the 737 Illustrated Tool and Equipment List (ITEL). Equivalent test equipment to that specified in P/N C36001-44 can also be used.

(c) Disconnect the control pressure sense line fom the PRSOV (Figure 308, View B).

(d) Install a 30 psi control pressure gage (Pc) between the flex line and the PRSOV.

1) If you use an equivalent control pressure gage to the one specified in P/N C36001-44, make sure that the indication increments are no greater than 0.2 psi and that the gage accuracy is +/- 0.5% full scale.

(e) Set the applicable engine bleed switch on the P5-10 panel to the ON position.

(f) Adjust the regulator on the nitrogen pressure source, STD-1455 to provide 230–250 psi (16–17 Bar or 1600-1700 kPa) to the pressure regulator, STD-1454.

(g) Slowly increase Ps to 60-70 psig.

(h) Make sure that Pc is between 20-28 psig.

(i) If Pc is between 20-28 psig, then do these steps:

1) Replace the PRSOV. These are the tasks:

- PRSOV Removal, AMM TASK 36-11-04-000-801
- PRSOV Installation, AMM TASK 36-11-04-400-801

2) Do the Repair Confirmation at the end of this task.

(j) If Pc is not between 20-28 psig, then do these steps:

1) Replace the bleed air regulator. These are the tasks:

- Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801
- Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801

2) Do the Repair Confirmation at the end of this task.

G. Repair Confirmation

(1) Remove all pressure gages, associated test equipment and hardware.

(2) Re-connect all sense lines that were disconnected.

(a) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) when you reconnect the sense lines.

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) For the left thrust reverser, do this task: Close the Thrust Reverser (Selection), AMM TASK 78-31-00-010-804-F00.

(4) Activate the applicable thrust reverser:

(a) Do this task: Thrust Reverser Activation After Ground Maintenance, AMM TASK 78-31-00-440-803-F00.

(5) Close the fan cowl panels. To close the panels, do this task: Close the Fan Cowl Panels, AMM TASK 71-11-02-410-801-F00.

(6) Supply pressure to the pneumatic system with the applicable engine(s). To supply pressure, do this task: Supply Pressure to the Pneumatic System with One or Both Engines, AMM TASK 36-00-00-860-804.

(7) Set the APU BLEED switch to OFF.

(a) Remove any external pneumatic source, if applicable.

(8) Set the ISOLATION VALVE switch on the P5-10 panel to the CLOSE position.

(9) Examine the dual duct pressure indicator, N12 on the P5-10 panel.

(10) Make sure the duct pressure pointer for the applicable pneumatic system increases to 10-25 psi.

NOTE: The duct pressure pointer on the dual duct pressure indicator may fluctuate without user systems in operation.

CAUTION: DO NOT EXCEED THE ENGINE OPERATION LIMITS. FAILURE TO COMPLY WITH THE ENGINE OPERATION LIMITS COULD RESULT IN ENGINE DAMAGE.

(11) Slowly increase N1 to 80% or greater and make sure that the duct pressure follows the "Duct Pressure versus N1 at Sea Level and 5000 feet" graph as the N1 speed increases.

(12) Examine the dual duct pressure indicator, N12, on the P5-10 panel.

(13) If the duct pressure is higher than 50 psi, return to the step in the Initial Evaluation Procedure or Fault Isolation Procedure that you were at prior to performing the Repair Confirmation and continue with the procedure.

(14) If the duct pressure pointer(s) of the applicable system(s) is 42 (+/- 8) psi, then you corrected the fault.

(15) Do these steps to complete the task:

(a) Slowly return the throttle to idle and allow the engine to stabilize.

(b) Make sure the duct pressure is 10 - 25 psi.

NOTE: The duct pressure pointer on the dual duct pressure indicator may fluctuate without user systems in operation.

(c) Stop the engine. To stop the engine, do this task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

(d) Set the ISOLATION VALVE switch on the P5-10 panel to AUTO.

(e) Remove the pressure from the pneumatic system. To remove the pressure, do this task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806

(f) Reactivate the Leading Edge Flaps and Slats:

1) Do this task: Leading Edge Flaps and Slats - Activation, AMM TASK 27-81-00-440-801.

——— END OF TASK ———

804. Duct Pressure Low, the Engine is the Bleed Source - Fault Isolation

A. Description

(1) A low duct pressure condition is a condition in which one or both pointers on the Dual Duct Pressure Indicator are lower than 34 psi with the engines as the bleed source when operating on the regulated 5th stage pressure as determined by using the "Duct Pressure Versus N1 at Various Altitudes" graphs. The graphs are based on steady state operating conditions.

(2) The operating limits of the Bleed System within the regulated 9th stage pressure area is 32 ±6 psi and within the regulated 5th stage is 42 ±8 psi. These limits do not apply to the unregulated 9th stage, the unregulated 5th stage, the 9th stage to 5th stage switchover when the engine throttle is advanced or the 5th stage to 9th stage switchover when the engine throttle is retarded.

(3) If you have the necessary information, you can determine if the Bleed System is operating properly without operating the engine by using the "Duct Pressure Versus N1 at Various Altitudes" graphs, (Figure 305). If you do not have this information, you must perform a high power engine run during the Initial Evaluation to obtain that information. Determining the mode of operation of the bleed system at the time the fault was observed can be very helpful in determining the possible cause of the fault. For example, if the duct pressure was low when the throttles were retarded during descent, the problem is most likely with the High Stage Valve, the High Stage Regulator, or the Sense Lines between the two components. Ultimately, the most valuable tool in the fault isolation of this system is a thorough working knowledge of the system operation.

(4) If the N1 speed of the engine and altitude of the aircraft at the time the fault was observed places the Bleed System in the regulated 5th stage pressure area of the graph, the duct pressure should not be lower than 34 psi. In the regulated 9th stage area of the graph, the duct pressure should not be lower than 26 psi. If the bleed system was in the unregulated 9th stage area, the pressure can be significantly lower than 26 psi but should not be less than 10 psi.

(5) If inflight duct pressures are below the values shown on Figure 305 during takeoff, climb and cruise but greater than 18 psig and the aircraft is able to pressurize normally, the bleed system is experiencing drifting performance but is still serviceable. The aircraft may be operated normally but maintenance action should be taken to restore the bleed system performance to normal operation at the operator's earliest convenience.

(6) If duct pressures below 18 psig are noted during takeoff, climb and cruise, the Bleed System is operating below acceptable performance and fault isolation is required to return the Pneumatic System to acceptable performance.

(7) If duct pressures below 18 psig are noted during takeoff, climb and cruise, the Bleed System is operating below acceptable performance and fault isolation is required to return the Pneumatic System to acceptable performance.

B. Possible Causes

(1) Precooler Control Valve

(a) Failure Mode: Valve not modulating correctly or stuck closed

(2) Precooler Control Valve Sensor (390° F Sensor)

(a) Failure Mode: Sensor is out-of-tolerance, stuck closed or plugged

(3) Pressure Regulator and Shutoff Valve (PRSOV)

(a) Failure Mode: Sticking butterfly valve

(4) Bleed Air Regulator, M1180

(a) Failure Mode: regulates control pressure too low (Service Letter 71-051)

(5) 450° F Thermostat

(a) Failure Mode: Failed open

(6) High Stage Valve

(a) Failure Mode: Sticky valve

(7) High stage regulator

(a) Failure Mode: Not regulating properly

(8) Kiss Seal

(a) Failure Mode: Damaged, foreign object debris (FOD), blocked fan airflow

(9) Precooler

(a) Failure Mode: Degraded operational capability

(10) Leaky Sense Lines or Fittings

(a) Failure Mode: loose connections or damaged lines

(b) Leakage at these sense lines or sense line fittings can cause low duct pressures:

1) Transducer Sense Line: low duct pressure APU and engines (all phases of operation)

2) PRSOV Control Pressure Line from Bleed Air Regulator to PRSOV and 450° F Thermostat line (5th and 9th stage operation)

3) Supply line to the Bleed Air Regulator (5th and 9th stage operations)

4) Control Pressure Line between the High Stage Regulator and High Stage Valve (9th stage operation)

5) Supply Pressure Line to High Stage Regulator (9th stage operations)

6) Sense Line between the Precooler Control Valve and the 390° F Precooler Control Valve Sensor (obstructed, not leaking)

(11) Duct PressureTransducer, T405 (Left) or T403 (Right)

(a) Failure Mode: Out-of-tolerance or faulty transducer

(12) Dual Duct Pressure Indicator, N12

(a) Failure Mode: Out-of-tolerance or faulty indicator

C. Circuit Breakers

(1) These are the primary circuit breakers related to the fault:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN
A	6	C01470	AIR CONDITIONING BLEED AIR XDCR LEFT
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	5	C00077	AIR CONDITIONING BLEED AIR PRESS IND
B	6	C01469	AIR CONDITIONING BLEED AIR XDCR RIGHT
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

D. Related Data

(1) Component Location (Figure 301)

(2) Component Location (Figure 302)

(3) Duct Pressure Versus N1 at Sea Level and 5000 Feet Graph (Figure 305)

(4) Duct Pressure Versus N1 at Sea Level, 10K, 22K, 31K, 37K and 41K Feet Graph (Figure 305)

(5) Troubleshooting Check (Figure 309)

(6) Pneumatic System Control Valve Position Indicators (Figure 312)

(7) SSM 36-11-11

(8) WDM 36-11-11

(9) SDS SUBJECT 36-11-00

(10) SDS SUBJECT 36-12-00

E. Initial Evaluation

(1) If you have a pilot report or an observed fault of low duct pressure and you know the bleed pressure, the N1 speed of the applicable engine and the altitude of the aircraft at the time the fault was observed, use the "Duct Pressure Versus N1 at 10K, 22K, 31K, 37K or 41K feet" graph or the "Duct Pressure Versus N1 at Sea Level and 5000 feet" graph to determine if the pressure is within limits.

NOTE: If the inflight pneumatic duct pressures are within the values shown in Figure 305, the Bleed System is operating normally and no maintenance action is required.

If the inflight pneumatic duct pressures are below the values shown in Figure 305 but are 18 psig or greater, the Bleed System is experiencing drifting performance. The airplane can be operated normally (without imposing the MEL), but action should be taken to investigate and restore the bleed system performance to normal operation at a convenient opportunity.

If the inflight pneumatic duct pressures are less than 18 psig, the Bleed System will not ensure normal operation of the user systems and the bleed system should be considered inoperative. The Bleed System should be investigated and restored to normal operation before flight or declared inoperative and impose the MEL restriction for continued operation.

NOTE: If the fault was observed at an altitude other than sea level, 5K feet, 10K feet, 22K feet, 31K feet, 37K feet or 41K feet, you may use the altitude line on the graph that is closest to the altitude the fault was observed at provided that the N1 speed of the engine at that time was sufficient for the pneumatic system to be operating in the regulated 5th stage or regulated 9th stage pressure areas on both the higher and lower altitude lines on the graph. For example, if the pilot report indicated a low duct pressure at 16,000 feet during climb with the engine N1 speed at 88%, you can see that both the 10,000 feet and 22,000 feet altitude lines on the graph indicate that the system should be operating within the regulated 5th stage pressure of 42 ±8 psi at the N1 speed of 88%. (Figure 305, Figure 305)

NOTE: If the N1 engine speed and altitude at the time the fault was observed fall within the 5th to 9th stage switchover area, the duct pressure can decay to as low as 20 psi below 5,000 feet and even lower than 20 psi at higher altitudes when the throttles are retarded before the High Stage Valve opens. This is a typical response during the 5th to 9th stage transition and is considered normal operation.

(a) If you are not certain that the bleed system was operating in the regulated 5th or regulated 9th stage areas, then continue with this Initial Evaluation procedure to determine if the system pressure was normal for the mode of operation that the Bleed System was in at the time the fault was observed.

(b) If the bleed pressure is not within limits, proceed to the Fault Isolation Procedure.

(c) If the bleed pressure is within limits, then the bleed system is functioning normally and no further action is necessary provided there were no faults reported with associated systems.

1) Find if there are any reports of associated faults with the user systems at the time the fault was observed such as air conditioning, pressurization, wing or cowl anti-ice systems. If there are associated faults, perform the appropriate FIM task for the specific fault. If there are no associated faults, you should review the aircraft's pneumatic system history. If the system does have a recent history of problems, you should perform the Fault Isolation Procedure. If there is no history of problems with the system, then you should monitor the system on subsequent flights. If you are not certain that the system is operating properly, then continue.

(2) If you suspect that the Pneumatic System has faults based on the aircraft's pneumatic system history or if there are associated faults with systems like the air conditioning or pressurization systems, you may proceed to the Fault Isolation Procedure without completion of the Initial Evaluation procedure to save time.

NOTE: The tables below list possible causes and effects of low duct pressure.

Possible Causes and Effects of Low Duct Pressure.

FIRST COMPONENT FAULT AND FAILURE MODE	FIRST FAULT SUBSYSTEM EFFECT	SYSTEM EFFECT	FLIGHT DECK EFFECT
INDICATION ERROR			

Possible Causes and Effects of Low Duct Pressure. (Continued)

FIRST COMPONENT FAULT AND FAILURE MODE	FIRST FAULT SUBSYSTEM EFFECT	SYSTEM EFFECT	FLIGHT DECK EFFECT
Duct Pressure Transmitter out of calibration	Indication Fault	Indication Fault	LOW DUCT PRESSURE
Duct Pressure Indicator out of calibration			
Wiring open or short between the Transmitter and Indicator			
LOW ENGINE POWER SETTING (ground idle, taxi, flight idle)			
Ps Sense Line leak between 9th stage supply to High Stage Regulator	Low or no opening force to High Stage Valve	High Stage Valve regulation is lower than normal, resulting in low duct pressure	LOW DUCT PRESSURE
High Stage Regulator - Shutoff struck CLOSED - Regulator failure - Relief Valve stuck OPEN - Reverse Flow Diaphragm operated Poppet Valve stuck OPEN			
Pc Sense Line leak between High Stage Regulator and High Stage Valve			
High Stage Valve: - sticks CLOSED - excessive leakage on opening piston	High Stage Valve does not OPEN		
ANY OR ALL ENGINE POWER SETTINGS			

Possible Causes and Effects of Low Duct Pressure. (Continued)

FIRST COMPONENT FAULT AND FAILURE MODE	FIRST FAULT SUBSYSTEM EFFECT	SYSTEM EFFECT	FLIGHT DECK EFFECT
Ps Sense Line leak between 5th stage supply to BAR	Low opening force to PRSOV	Pressure Regulating Shutoff Valve (PRSOV) regulation is lower than normal, resulting in low duct pressure	LOW DUCT PRESSURE
Bleed Air Regulator -reference regulator failure - Relief Valve has excessive leakage			
Pc Sense Line leak between the BAR and PRSOV			
PRSOV - sticks CLOSED - excessive leakage on opening piston	PRSOV does not OPEN		
Pc sense line leaks between the PRSOV and 450° F Thermostat	Low opening force to PRSOV		
450° F Thermostat - stuck OPEN - excessive leakage -opens below 450° F			
HIGH/INTERMEDIATE ENGINE POWER SETTING (takeoff, climb, cruise)			

Possible Causes and Effects of Low Duct Pressure. (Continued)

FIRST COMPONENT FAULT AND FAILURE MODE	FIRST FAULT SUBSYSTEM EFFECT	SYSTEM EFFECT	FLIGHT DECK EFFECT
High Stage Valve - does not fully CLOSE - excessive internal bore leakage	5th stage supply engine bleed air temperature is higher than normal	Second level of temperature control becomes active. 450° F Thermostat opens causing the PRSOV regulated pressure to decrease NOTE: This is normal operation of the second level of temperature control.	LOW DUCT PRESSURE
Ps Sense Line leaks between the 5th stage manifold and the Precooler Control Valve	First level of temperature control is degraded or not functioning		
PCCV fault; does not OPEN			
Pc Sense Line plugged between the PCCV and 390° F Sensor			
390° F Sensor does not OPEN			
Kiss Seal torn or degraded			
Fan air blockage			
Precooler damaged or fan air path blocked			
Reverse Flow Diaphragm in the High Stage Regulator is ruptured	Causes elevated downstream pressure sensed by the PRSOV	PRSOV regulated pressure is lower than normal. NOTE: Low pressure occurs at start of cruise phase and gradually increases as cruise progresses.	

Low Duct Pressure Fault Table Organized by Flight Phase.

CONDITION	GROUND/TAXI	TAKEOFF	CLIMB	CRUISE	IDLE DESCENT
Normal Operation	WTAI OFF - 18 to 22 psig WTAI ON - 12 to 14 psig HSV: Full OPEN PRSOV: Full OPEN PCCV: CLOSED Engine supply pressure and temperature are below regulation levels.	34 to 50 psig HSV: CLOSED PRSOV: Regulating PCCV: Regulating Engine supply pressure and temperature are being regulated.	34 to 50 psig HSV: CLOSED PRSOV: Regulating PCCV: Regulating Engine supply pressure and temperature are being regulated.	26 to 45 psig HSV: May be CLOSED or Regulating PRSOV: May be Regulating or OPEN PCCV: May be Regulating or CLOSED At lower cruise settings, engine pressure and temperature may drop below regulated levels.	WTAI OFF - 18 to 25 psig HSV: Full OPEN PRSOV: Full OPEN PCCV: CLOSED Engine supply pressure and temperature are below regulation levels.

Low Duct Pressure Fault Table Organized by Flight Phase. (Continued)

CONDITION	GROUND/TAXI	TAKEOFF	CLIMB	CRUISE	IDLE DESCENT
Ground/Taxi Fault	LOW PRESSURE No high stage air - HSR, HSV, or sense line leak	No Fault	No Fault	No Fault	No Fault
Takeoff Fault	No Fault	LOW PRESSURE Low regulated pressure - First level of temperature control not operating (PCCV/390° F Sensor, or plugged Sense Line) Temperature topping (450° F opens) - BAR, PRSOV, or Sense Line leak - HSV leakage.	No Fault	No Fault	No Fault
Climb Fault	No Fault	No Fault	LOW PRESSURE Low regulated pressure - First level of temperature control not operating (PCCV/390° F Sensor, or plugged Sense Line) Temperature topping (450° F opens) - BAR, PRSOV, or sense line leak - HSV leakage.	No Fault	No Fault

Low Duct Pressure Fault Table Organized by Flight Phase. (Continued)

CONDITION	GROUND/TAXI	TAKEOFF	CLIMB	CRUISE	IDLE DESCENT
Cruise Fault	No Fault	No Fault	No Fault	LOW PRESSURE Low regulated pressure - First level of temperature control not operating (PCCV/390° F Sensor, or plugged sense line) - BAR, PRSOV, or sense line leak HSR reverse flow diaphragm rupture. Low duct pressure starts at start of cruise and gradually goes away during cruise.	No Fault
Descent Fault	No Fault	No Fault	No Fault	No Fault	LOW PRESSURE No high stage air - HSR, HSV, or sense line leak.

NOTE: The subsequent steps of this Initial Evaluation Procedure are very similar to the Repair Confirmation Procedure. Both procedures involve a high power engine run to either confirm a fault exists or confirm that you have corrected the fault.

(a) If you suspect that there are no faults, then continue.

(3) If you do not have the necessary information to determine if the bleed pressure is within limits, then continue with the Initial Evaluation procedure.

(4) Make sure that the ISOLATION VALVE Switch on the P5-10 Panel is set to the OPEN position.

(5) Put the engine BLEED 1 and 2 Switches on the P5-10 Panel to OFF.

(6) Supply pressure to the Pneumatic System with the APU. This is the task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

(a) Make sure that the manifold pressure on the Dual Duct Pressure Indicator increases to a minimum of 12 psi for both the left and right Pneumatic Systems.

(b) Make sure that the pressure pointers on the Dual Duct Pressure Indicator are within 3 psi of each other.

1) If the pressure pointers on the Dual Duct Pressure Indicator are not within 3 psi of each other, then do these steps:

a) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

b) Continue.

2) If the indicated pressures are correct, then continue.

(7) Supply pressure with the engine with the pneumatic system that has the report of low bleed pressure or both engines if you suspect a low bleed pressure problem on both sides. To supply pressure, do this task: Supply Pressure to the Pneumatic System with One or Both Engines, AMM TASK 36-00-00-860-804

(a) Put the APU BLEED switch to OFF.

(b) If applicable, remove external pneumatic source.

(c) Put the ISOLATION VALVE switch on the P5-10 Panel to the CLOSE position.

(d) Make sure that the duct pressure pointer for the applicable Pneumatic System indicates between 10-25 psi.

NOTE: The duct pressure pointers on the Dual Duct Pressure Indicator may fluctuate without user systems in operation.

1) If the duct pressure pointer for the applicable Pneumatic System does not indicate 10-25 psi, then perform the Fault Isolation Procedure.

2) If the duct pressure pointer for the applicable Pneumatic System indicates 10-25 psi, then continue.

(e) Put the engine BLEED switch to the OFF position.

(f) Monitor that the duct pressure on the Dual Duct Pressure Indicator decreases to less than 10 psi.

NOTE: This indicates that the PRSOV has closed.

1) If the PRSOV does not close properly, do this task:

a) Do this task: Bleed Valve Will Not Close When the Bleed Switches Are Moved to Off, the Engine Is the Bleed Source - Fault Isolation, 36-10 TASK 802.

NOTE: Faults with the Engine Harness MW0311, aircraft wiring and the bleed air regulator can cause both fault conditions (low duct pressure and bleed valve will not close). Therefore, the continuation of this Initial Evaluation with the engine high power run is not necessary to further isolate the fault.

(g) Put the applicable engine BLEED switch to ON.

(h) Make sure that the duct pressure on the Dual Duct Pressure Indicator increases to 10-25 psi.

NOTE: The duct pressure pointers on the Dual Duct Pressure Indicator may fluctuate without user systems in operation.

(8) Put the applicable PACK to normal operation.

(a) Put the switch on the P5-10 Panel in the AUTO position.

(9) Do these steps to do a check of the Pneumatic System pressures:

(a) To operate the engine within the guidelines, do this task: Engine Operation Limits, AMM TASK 71-00-00-800-806-F00.

(b) Slowly increase N1 in 5-10% increments on the applicable engine to 80% or greater and make sure the applicable pneumatic pressure indication follows the "Duct Pressure Versus N1 at Sea Level and 5000 Feet" graph and is within the limits of the graph.

1) If the duct pressure is lower than the specified pressures on the graph, then perform the Fault Isolation Procedure.

2) If the duct pressures are within limits of the graph, then continue.

(c) Maintain the N1% setting at 80% or greater for a minimum of 5 minutes.

(d) Monitor the duct pneumatic pressures to make sure the pressures remain at 42 ±8 psi.

1) If the duct pressure starts to decrease after reaching a stable pressure of 42 ±8 psi, the problem is most likely temperature related and not a pressure regulation fault.

a) In this situation, either the High Stage Valve, the High Stage Regulator, the Precooler Control Valve or the 390° F Precooler Control Valve Sensor is most likely to be at fault.

(10) Examine the Dual Duct Pressure Indicator, N12 on the P5-10 Panel.

(11) Make sure that the duct pressure pointers are not lower than 34 psig.

(12) Slowly return the Throttle(s) to idle as you make sure that the duct pressure follows the "Duct Pressure Versus N1 at Sea Level and 5000 Feet" graph.

(a) Make sure that the switchover from 5th stage regulation to 9th stage regulation occurs.

(13) Once the Throttle is at IDLE, make sure the duct pressure is at 10-25 psi.

(14) If the duct pressure pointer on one or both sides was lower than 34 psi when the system was on regulated 5th stage pressure, lower than 20 psi in the unregulated 5th stage mode, lower than 26 psi when the system was on regulated 9th stage pressure or less than 10 psi in the unregulated 9th stage mode, then do the Fault Isolation Procedure below.

(15) If you do not find a fault with either the left or right pneumatic systems, then one of these situations exists:

(a) There was an intermittent fault

(b) One or both of the Pneumatic Systems was operating in the 5th to 9th stage switchover, the 9th to 5th stage switchover, or the unregulated 9th stage which makes a duct pressure comparison invalid.

(c) Continue to the next step for a possible course of action.

(16) Use your judgement, airline policy, the history of the aircraft's pneumatic systems, and any reports of user systems malfunctions to determine which of the actions that follow to take:

(a) Monitor the system performance on subsequent flights

(b) Perform the Engine Bleed System Health Check and the Precooler Control Valve System Health Check.

(17) Set the applicable engine BLEED switch to OFF.

(a) Make sure that the applicable duct pressure pointer decreases to less than 10 psi.

(18) Set the applicable engine BLEED switch to ON.

(a) Make sure the applicable duct pressure pointer increases to 10-25 psi.

NOTE: The duct pressure pointers on the Dual Duct Pressure Indicator may fluctuate without any user systems in operation.

(19) Stop the engine operation. This is the task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

(20) Set the ISOLATION VALVE switch on the P5-10 Panel to the AUTO position.

(21) Remove the pressure from the pneumatic system. This is the task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806

F. Fault Isolation Procedure

(1) Make sure that there is no pressure in the Pneumatic System:

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

(b) Make sure that the applicable engine BLEED Switch is set to OFF.

(2) Make sure the Fuel Shutoff Lever for the applicable engine is in the CUTOFF position.

(a) Install DO-NOT-OPERATE tags.

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE LEADING EDGE FLAPS AND SLATS, DEACTIVATE THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Retract the leading edge flaps and slats if not previously accomplished. This is the task: Leading Edge Flaps and Slats Retraction, AMM TASK 27-81-00-860-804.

(4) Deactivate the leading edge flaps and slats. This is the task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

(5) Deactivate the applicable thrust reverser. This is the task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00

(6) Open the applicable thrust reverser. This is the task: Open the Thrust Reverser (Selection), AMM TASK 78-31-00-010-801-F00.

(7) Look at the position indicator/manual override nut on the Precooler Control Valve to make sure that it is in the OPEN position. Use a dental mirror, STD-3907 if necessary.

(a) Use a 3/4-inch wrench on the manual override nut to close the Precooler Control Valve to make sure it moves smoothly.

(b) Remove the wrench and allow the valve to return to the OPEN position by spring force only.

(c) If the Precooler Control Valve does not close smoothly or return to the OPEN position, replace the valve by following these procedures:

- Precooler Control Valve Removal, AMM TASK 36-12-02-000-801
- Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

(8) Do this inspection of the precooler "kiss" seal:

(a) Examine the precooler "kiss" seal for any of these conditions:

1) Improper seating

2) Distortion that can block air flow

3) Any damage that would cause the fan air flow to bypass the precooler.

(b) If the inspection finds any of the above conditions, then replace the "Kiss" Seal as follows:

1) These are the tasks:

- Precooler Control Valve Removal, AMM TASK 36-12-02-000-801
- Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

NOTE: The steps to replace the "Kiss" Seal are part of the Precooler Control Valve removal and installation procedure.

2) If you replace the "Kiss" Seal, examine the face of the Precooler for contamination and FOD damage.

a) Replace the Precooler if contamination or damage is found. These are the tasks:

- Bleed Air Precooler Removal, AMM TASK 36-12-01-000-801
- Bleed Air Precooler Installation, AMM TASK 36-12-01-400-802

(c) If the inspection does not find any of the conditions listed above, then continue.

(9) Look at the position indicator/manual override nut on the PRSOV to make sure that it is in the CLOSED position.

(a) Use a 3/4-inch wrench on the manual override nut to open the PRSOV to make sure it moves smoothly.

(b) Remove the wrench and allow the valve to return to the CLOSED position by spring force only.

(c) If the PRSOV does not open smoothly or return to the CLOSED position, replace the valve by following these procedures:

- PRSOV Removal, AMM TASK 36-11-04-000-801
- PRSOV Installation, AMM TASK 36-11-04-400-801

(10) Look at the position indicator/manual override nut on the High Stage Valve to make sure that it is in the CLOSED position.

(a) Use a 3/8-inch wrench on the manual override nut to open the High Stage Valve to make sure it moves smoothly.

(b) Remove the wrench and allow the valve to return to the CLOSED position by spring force only.

(c) If the High Stage Valve does not open smoothly or return to the CLOSED position, replace the valve by following these procedures:

- High Stage Valve Removal, AMM TASK 36-11-06-000-801
- High Stage Valve Installation, AMM TASK 36-11-06-400-801

(11) Use the APU to pressurize the Bleed Air System. This is the task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803

NOTE: The PRSOV should be closed when pressurizing the Bleed Air System.

(12) Put the BLEED Switch in the ON position.

WARNING: USE A RATCHET-TYPE WRENCH TO OPEN THE PRSOV. PRESSURE IN THE SYSTEM CAN CAUSE THE PRSOV TO OPEN QUICKLY. THIS CAN PULL THE WRENCH FROM YOUR HANDS. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(13) Use a 3/8-inch socket on a ratcheted-type wrench to turn the manual override nut on the PRSOV. Once you begin turning the manual override nut, the air pressure should move the PRSOV to the fully OPEN position.

(14) Listen for air leakage in the engine.

NOTE: Air leakage in the engine is an indication that the High Stage Valve is allowing air to backflow into the engine.

WARNING: REMOVE THE PRESSURE FROM THE PNEUMATIC DUCTS BEFORE YOU REMOVE A PNEUMATIC SYSTEM COMPONENT. HOT HIGH PRESSURE AIR CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(a) Replace the High Stage Valve if air can be heard in the engine when the system is pressurized. Do these tasks:

- Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806
- High Stage Valve Removal, AMM TASK 36-11-06-000-801
- High Stage Valve Installation, AMM TASK 36-11-06-400-801

(b) Use the APU to pressurize the bleed air system again if you replaced the high stage valve. This is the task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

(15) Disconnect the Supply Pressure Sense Line from the High Stage Regulator.

(16) Do a check for air leakage at the Supply Pressure Inlet on the High Stage Regulator.

NOTE: Air leaking from the Supply Pressure Inlet when the Bleed Air System is pressurized with the APU indicates the reverse flow diaphragm inside the High Stage Regulator is damaged.

(17) Replace the High Stage Regulator if air leakage is detected from the Supply Pressure Inlet. These are the tasks:

- High Stage Regulator Removal, AMM TASK 36-11-07-000-801
- High Stage Regulator Installation, AMM TASK 36-11-07-400-801

(18) Perform the repair confirmation at the end of this task.

(19) Do a check of the Supply and Control Pressure Sense Lines:

(a) Do this task: Supply Pressure Upstream of the PRSOV, AMM TASK 36-00-00-860-805.

(b) Do a leak check with a soap solution on the entire length of the flexible and rigid lines and fittings of these pneumatic sense lines:

NOTE: Only leakage in the sense lines listed below will cause the low duct pressure condition.

1) Supply Pressure Sense Line to the Bleed Air Regulator
2) Control Pressure Sense Line from the Bleed Air Regulator to the PRSOV
3) Control Pressure Sense Line from the PRSOV to the 450° F Thermostat

NOTE: A small leak at the top of the 450° F Thermostat is acceptable. Leakage found at the sense lines or sense line fittings must be repaired.

(c) If you find leakage in the sense lines or fittings, do these steps:

1) Repair the sense line or, if necessary, replace the sense line.
   a) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) when you reconnect the sense lines.
2) Do the Repair Confirmation at the end of this task.

(d) If you do not find any leakage in the sense lines or fittings, then continue.

(20) Look at the position indicator on the Precooler Control Valve:

(a) If the Precooler Control Valve is not within 30 degrees from the fully closed position, examine these areas for leakage:

NOTE: If the Precooler Control Valve is not within 30 degrees from the fully closed position, it may be due to a faulty 390° F Precooler Control Valve Sensor or a leak in the sense line between the Precooler Control Valve and the 390° F Precooler Control Valve Sensor which should be isolated and corrected. However, if the Precooler Control Valve moves to the fully open position in the next step, then the Precooler Control Valve should be modulating to open and this condition will not result in low duct pressure unless the Precooler Control Valve Sensor is failed in the closed position. There is no way to do a check of the 390° F Precooler Control Valve Sensor on the aircraft. Keep this in mind if you do not find any failed components or if you still get a low duct pressure condition during the Repair Confirmation.

1) Sense line and fittings to the Precooler Control Valve.
2) Sense line and fittings between the Precooler Control Valve and the Precooler Control Valve Sensor.
3) Precooler Control Valve Sensor.

(b) If leakage is detected, repair lines and connections as necessary:

1) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) when you reconnect lines.

(c) If leakage is not found, replace the Precooler Control Valve as follows:

1) Do this task: Precooler Control Valve Removal, AMM TASK 36-12-02-000-801.
2) Make sure there is no debris at the Precooler Inlet.
3) Do this task: Precooler Control Valve Installation, AMM TASK 36-12-02-400-801.

(d) If the Precooler Control Valve is within 30 degrees of being fully closed, then continue.

(21) Do these steps to simulate the opening of the Precooler Control Valve Sensor:

WARNING: USE THERMAL PROTECTIVE EQUIPMENT WHEN YOU REMOVE THE CAP ON THE TEST PORT. HOT, HIGH PRESSURE AIR MAY BE PRESENT WHICH CAN CAUSE INJURIES TO PERSONS.

(a) Slowly remove the cap from the test fitting in the Precooler Control Valve Control Pressure Sense Line. (Figure 309), View G.

NOTE: This simulates the opening of the Precooler Control Valve Sensor.

(b) Make sure that the Precooler Control Valve opens fully.

1) If the Precooler Control Valve does not open fully, then replace the Precooler Control Valve:
   a) Do this task: Precooler Control Valve Removal, AMM TASK 36-12-02-000-801.
   b) Make sure that there is no debris at the Precooler Inlet.
   c) Do this task: Precooler Control Valve Installation, AMM TASK 36-12-02-400-801..
2) If the Precooler Control Valve opens fully, then continue.

(22) Set the applicable engine BLEED switch to OFF.

(23) Set the APU BLEED switch to OFF.

(24) Make sure that the PRSOV closes.

(25) Consider the results of the fault isolation at this point and take the appropriate action listed below:

(a) If you have isolated and replaced any faulty components, perform the Repair Confirmation at the end of the task.

1) If the Repair Confirmation is unsatisfactory, then continue.

(b) If you have not found any faults or if you have found and corrected faults that may not necessarily cause a low duct pressure condition, then continue.

NOTE: Additional test equipment is required in the subsequent procedures.

(26) Install this test equipment to the pressure supply side of the applicable bleed air regulator:

NOTE: The test equipment used in this and subsequent steps is part of P/N C36001-44 Engine Bleed Air System Test Equipment listed in the 737 Illustrated Tool and Equipment List (ITEL). Test equipment equivalent to the equipment in the P/N C36001-44 may be used.

(a) Connect a Nitrogen Pressure Source, a Pressure Regulator, a Supply Pressure Gage (Ps), and a Supply Pressure Test Hose at the tee to the supply pressure sense line to the Bleed Air Regulator. (Figure 309, View A)

(27) Install test equipment to the control pressure side of the Bleed Air Regulator. (Figure 309):

(a) Disconnect the Control Pressure Sense Line from the PRSOV and install a 30 psi Control Pressure Gage (Pc) between the flex line and the PRSOV (Figure 309, View B).

1) If you use a pressure gage equivalent to the gage specified in P/N C36001-44, make sure that the indication increments are no greater than 0.2 psi and that the gage accuracy is +/- 0.5% full scale.

(28) Do this check of the Bleed Air Regulator Circuit:

(a) Put the applicable BLEED switch on the P5-10 panel to the ON position.

(b) Adjust the regulator on the nitrogen pressure source, STD-1455 to provide 230-250 psi (16-17 Bar or 1600-1700 kPa) to the pressure regulator, STD-1454.

(c) Increase Ps to 60-70 psig.

(d) Make sure that the PRSOV is fully open.

NOTE: Sense line leakage or low control pressure (Pc) could prevent the PRSOV from being fully open.

(e) If Pc is greater than 28 psig, then replace the Bleed Air Regulator:

1) These are the tasks:

- Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801
- Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801

2) Continue with this procedure as this will not cause a low duct pressure condition.

(f) If Pc is less than 20 psig, then use a soap solution to examine the sense line and fittings from the Bleed Air Regulator to the PRSOV and the sense line and fittings from the PRSOV to 450° F Thermostat for pressure leakage.

NOTE: A small leak at the top of the 450° F Thermostat is acceptable. The 450° F Thermostat will be isolated in subsequent steps. Leakage detected at the sense line connections must be repaired.

1) If you find any leakage, decrease Ps to 0 psig.

2) Repair the sense line to stop the leakage:

a) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) when you reconnect sense lines.

b) Increase Ps to 60-70 psig and make sure the repaired sense line or fittings do not leak.

3) If you do not find any leakage, then continue.

4) Slowly increase Ps to 60-70 psig.

5) Make sure that Pc is 20-28 psig.

6) If Pc is not between 20-28 psig, do these steps:

a) Decrease Ps to 0 psig.

b) Disconnect the Control Pressure Sense Line to the 450° F Thermostat and install a cap (Figure 309, View C).

NOTE: This removes the 450° F Thermostat as a source of pressure leakage.

(g) Increase Ps to 60-70 psig.

(h) Continue.

(29) If Pc is between 20-28 psig, then do these steps:

NOTE: These steps are a continuation of the check of the bleed air regulator circuit from the previous step.

(a) Decrease Ps to 0 psig.

(b) Replace the 450° F Thermostat. These are the tasks:

- Thermostat Removal, AMM TASK 36-11-05-000-801
- Thermostat Installation, AMM TASK 36-11-05-400-801

1) Do the Repair Confirmation.

(c) If Pc is not between 20-28 psig, then do these steps:

1) Decrease Ps to 0 psig.

2) Remove the cap from the Control Pressure Sense Line to the 450° F Thermostat.

3) Reconnect the Control Pressure Sense Lines:

a) Use Never-Seez NSBT compound, D00006 (or equivalent) when you reconnect sense lines.

4) Disconnect the Control Pressure Gauge connection from the PRSOV.

5) Install a cap on the open end of the Control Pressure (Pc) Gauge connection. (Figure 309, View D).

6) Increase Ps to 60-70 psig.

7) Make sure that Pc is 20-28 psig.

8) If Pc is not between 20-28 psig, then do these steps:

a) Decrease Ps to 0 psig.

b) Replace the Bleed Air Regulator. These are the tasks:

- Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801
- Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801

c) Do the Repair Confirmation.

9) If Pc is between 20-28 psig, then do these steps:

a) Decrease Ps to 0 psig.

b) Replace the PRSOV. These are the tasks:
- PRSOV Removal, AMM TASK 36-11-04-000-801
- PRSOV Installation, AMM TASK 36-11-04-400-801

10) Increase Ps to 60-70 psig.

11) If Pc is between 20-28 psig, then do these steps:

a) Decrease Ps to 0 psig.

b) Remove all the pressure gages, associated test equipment, and hardware that was installed.

c) Re-connect all sense lines that were disconnected using Never-Seez Pure Nickel Special anti-seize compound (or equivalent).

(d) If Pc is 20-28 psi, then continue.

(30) Do this check of the Control Pressure Sense Line from the High Stage Regulator to the High Stage Valve:

(a) Disconnect the Supply Pressure Sense Line at the ninth stage duct (Figure 309, View F).

(b) Connect a Pressure Regulator, Supply Pressure Gage (Ps), and a nitrogen pressure source to the removed supply pressure line (Figure 309, View F).

(c) Adjust the Regulator on the nitrogen pressure source, STD-1455 to provide 230-250 psi (16-17 Bar or 1600-1700 kPa) to the pressure regulator, STD-1454.

(d) Slowly increase Ps to 70 psig.

(e) Examine the Control Pressure Sense Line and fittings from the High Stage Regulator to the High Stage Valve for pressure leakage.

(f) If any leakage is detected, then do these steps:

1) Decrease Ps to 0 psig.

2) Repair the sense line as required.

a) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) when you reconnect sense lines.

3) Do the Repair Confirmation at the end of this task.

(g) If no leakage is detected, decrease Ps to 0 psig.

(h) Continue.

(31) Do this check of the High Stage Regulator and High Stage Valve for correct operation:

(a) Disconnect the Control Pressure Sense Line at the High Stage Valve Figure 309), View F).

(b) Install a 30 psi Control Pressure Gage (Pc) between the Control Pressure Sense Line and the High Stage Valve (Figure 309, View F).

1) If you use a pressure gage that is equivalent to the one specified in the P/N C36001-44 test set, make sure that the pressure indication increments are no greater than 0.2 psi and that the gage accuracy is ± 0.5% full scale.

(c) Increase Ps to 35-40 psi and then back to 0 psig to cycle the valve several times.

(d) Slowly increase the supply pressure Ps to the high stage regulator as you monitor the control pressure Pc to the High Stage Valve.

(e) Make a note of the Ps pressure at which the High Stage Valve moves to the fully open position.

1) If the supply pressure Ps was greater than 10 psi when the High Stage Valve opened fully, then replace the High Stage Valve:
   a) These are the tasks:
      • High Stage Valve Removal, AMM TASK 36-11-06-000-801
      • High Stage Valve Installation, AMM TASK 36-11-06-400-801
   b) Perform the Repair Confirmation.
2) If the control pressure was 10 psi or less when the High Stage Valve opened fully, then continue.

(f) Continue to increase Ps to 60-70 psig.

(g) Make sure that Pc is more than 14 psig.
1) If Pc is not more than 14 psig, then do these steps:
   a) Decrease Ps to 0 psig.
   b) Replace the High Stage Regulator. These are the tasks:
      • High Stage Regulator Removal, AMM TASK 36-11-07-000-801
      • High Stage Regulator Installation, AMM TASK 36-11-07-400-801
   c) Do the Repair Confirmation at the end of this task.
   d) If the Repair Confirmation is not satisfactory, then continue.

(h) If no faults are found, then continue.

(32) Replace the 450° F Thermostat:

NOTE: You cannot do a test of this component on the aircraft.

(a) These are the tasks:
• Thermostat Removal, AMM TASK 36-11-05-000-801
• Thermostat Installation, AMM TASK 36-11-05-400-801

(33) Replace the Precooler Control Valve Sensor:

NOTE: You cannot do a test of this component on the aircraft.

(a) These are the tasks:
• Precooler Control Valve Sensor Removal, AMM TASK 36-12-03-000-801
• Precooler Control Valve Sensor Installation, AMM TASK 36-12-03-400-801

(b) Do the Repair Confirmation at the end of this task.
1) If the Repair Confirmation is not satisfactory, then continue.

(34) If you have completed the entire Fault Isolation Procedure and the low duct pressure condition still exists, then replace the Bleed Air Precooler:

(a) These are the tasks:
• Bleed Air Precooler Removal, AMM TASK 36-12-01-000-801
• Bleed Air Precooler Installation, AMM TASK 36-12-01-400-802

(b) Do the Repair Confirmation.

G. DUCT LOW PRESSURE Troubleshooting Table

(1) The following is a quick-reference table for troubleshooting duct low pressure.

DUCT LOW PRESSURE Troubleshooting Table

OPERATING PHASE	RECOMMENDED MAINTENANCE ACTION
GROUND IDLE/TAXI: LOW PRESSURE OCCURS ONLY DURING GROUND IDLE/TAXI	
High Stage Valve not full open	
High Stage Regulator reverse flow mechanism.	Do a check of the reverse flow mechanism (FIM 36-10 TASK 804 Steps F(11) and F(12)).
High Stage Regulator Control Pressure Sense Line leakage and High Stage Valve operation.	Do the check of the High Stage Valve operation (FIM 36-10 TASK 804 Step F(31)).
TAKEOFF: LOW PRESSURE OCCURS ONLY DURING TAKEOFF ROLL (NOTE: PILOTS MAY NOT NOTICE LOW PRESSURE DURING TAKEOFF)	
Low pressure regulation: one or a combination of the following	
BAR control pressure (Pc) low.	Do a check on the BAR control pressure (FIM 36-10 TASK 804 Step F(29)).
PRSOV opening piston leakage and sense line leakage.	Do a leakage check (FIM 36-10 TASK 804, Steps F(27) and F(28)).
Temperature greater than 450° F: one or a combination of the following	
Precooler Control Valve (PCCV) not open.	Examine PCCV opens when Pc is less than 3 psig. (FIM 36-10 TASK 801, Steps F(3), F(11), and F(12).
390° F Sensor does not open.	If PCCV opens, replace the 390° F sensor. • Precooler Control Valve Sensor Removal, AMM TASK 36-12-03-000-801 • Precooler Control Valve Sensor Installation, AMM TASK 36-12-03-400-801
High Stage Valve has excessive internal leakage.	Examine the internal butterfly clearance (FIM 36-10 TASK 804 Step F(2)(c)).
CLIMB: LOW PRESSURE OCCURS ONLY DURING CLIMB	
Low pressure regulation: one or a combination of the following	
BAR control pressure (Pc) low.	Do a check on the BAR control pressure (FIM 36-10 TASK 804 Step F(29)).
PRSOV Opening Piston leakage and Sense Line leakage.	Do the leakage check (FIM 36-10 TASK 804, Steps F(27) and F(28)).
Temperature greater than 450° F: one or a combination of the following	
Precooler Control Valve (PCCV) not open.	Examine that PCCV opens when Pc is less than 3 psi (FIM 36-10 TASK 801, Steps F(3), F(11), and F(12).
390° F Sensor does not open.	If PCCV opens, replace 390° F Sensor. • Precooler Control Valve Sensor Removal, AMM TASK 36-12-03-000-801 • Precooler Control Valve Sensor Installation, AMM TASK 36-12-03-400-801

DUCT LOW PRESSURE Troubleshooting Table (Continued)

OPERATING PHASE	RECOMMENDED MAINTENANCE ACTION
High stage valve has excessive internal leakage.	Examine internal butterfly clearance (FIM 36-10 TASK 804 Step F(2)(c)).
CRUISE: LOW PRESSURE OCCURS ONLY DURING CRUISE	
Low pressure regulation: one or a combination of the following	
BAR control pressure (Pc) low.	Do a check on the BAR control pressure (FIM 36-10 TASK 804 Step F(29)).
PRSOV Opening Piston leakage and Sense Line leakage.	Do a check for leakage (FIM 36-10 TASK 804, Steps F(27) and F(28)).
False high downstream pressure to PRSOV	
High Stage Regulator reverse flow mechanism: ruptured diaphragm ports high stage supply pressure into the PRSOV downstream sense line.	Examine for diaphragm rupture (FIM 36-10 TASK 804, Steps F(15) and F(16)).
DECENT: LOW PRESSURE OCCURS ONLY DURING DESCENT	
High Stage Valve not full open	
High Stage Regulator reverse flow mechanism.	Examine reverse flow mechanism (FIM 36-10 TASK 804, Steps F(11) and F(12)).

H. Repair Confirmation

(1) Remove all pressure gages, associated test equipment and hardware.

(2) Re-connect all sense lines that were disconnected.

(a) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) when you reconnect the sense lines.

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) For the applicable Thrust Reverser, do this task: Close the Thrust Reverser (Selection), AMM TASK 78-31-00-010-804-F00.

(4) Reactivate the applicable Thrust Reverser. This is the task: Thrust Reverser Activation After Ground Maintenance, AMM TASK 78-31-00-440-803-F00.

(5) Close the Fan Cowl Panels. This is the task: Close the Fan Cowl Panels, AMM TASK 71-11-02-410-801-F00.

(6) Supply pressure to the Pneumatic System with the APU. To supply pressure, do this task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

(7) Set the ISOLATION VALVE switch on the P5-10 Panel to the OPEN position.

(8) Examine the Dual Duct Pressure Indicator, N12, on the P5-10 Panel.

(a) Make sure that the pressure increases to a minimum of 12 psi on the pressure indications for both the left and right pneumatic systems.

(b) Make sure that the L and R duct pressure pointers are within 3 psi of each other.

1) If the duct pressure pointers differ by more than 3 psi, do this step:

a) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

2) If the pressure indications are correct, then continue.

(9) Supply pressure to the Pneumatic System with the engine that had the report of low bleed pressure or supply pressure with both engines if there were reports of low bleed pressure on both sides. To supply pressure, do this task: Supply Pressure to the Pneumatic System with One or Both Engines, AMM TASK 36-00-00-860-804.

(10) Set the APU BLEED Switch to OFF or remove any external pneumatic source, if applicable.

(11) Set the ISOLATION VALVE switch on the P5-10 Panel to CLOSED.

(12) Make sure that the duct pressure pointer for the applicable system indicates between 10-25 psi.

NOTE: The duct pressure pointers on the dual duct pressure indicator may fluctuate without user systems in operation.

(13) Set the engine BLEED switch to the OFF position.

(a) Make sure the applicable duct pressure on the Dual Duct Pressure Indicator decreases to less than 10 psi.

(14) Set the engine BLEED Switch to the ON position.

(a) Make sure that the applicable duct pressure on the Dual Duct Pressure Indicator increases to 10-25 psi.

(15) Set the L or R PACK Switch, as applicable, to the HIGH position.

(16) Do these steps to do a check of the Pneumatic System pressures:

CAUTION: OBSERVE THE ENGINE OPERATIONAL LIMITS. IF YOU DO NOT OBEY THE ENGINE OPERATIONAL LIMITS, DAMAGE TO THE ENGINE COULD RESULT.

(a) To operate the engine within the operational limits, do this task: Engine Operation Limits, AMM TASK 71-00-00-800-806-F00.

(b) Slowly increase engine N1 in 5-10% increments on the applicable engine to 80% or greater and make sure the applicable pneumatic pressure indication follows the "Duct Pressure Versus N1 at Sea Level and 5000 Feet" graph and is within the limits of the graph.

1) If the duct pressure is lower than the specified pressures on the graph, then do this step:

a) If you did not do all the Fault Isolation steps, then return to the step in the Fault Isolation that directed you to the Repair Confirmation.

2) If the duct pressures are within limits of the graph, then continue.

(17) Slowly return the throttle(s) to idle as you make sure that the duct pressure follows the "Duct Pressure Versus N1 at Sea Level and 5000 Feet" graph.

(a) Make sure that the switchover from 5th stage regulation to 9th stage regulation occurs.

(18) Allow the engine to stabilize at idle throttle, then make sure that the duct pressure is at 10-25 psi.

(19) Do this task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

(20) If the duct pressure pointer on one or both sides was less than 34 psi when the system was on regulated 5th stage pressure, less than 20 psi in the unregulated 5th stage mode, less than 26 psi when the system was on regulated 9th stage pressure or less than 10 psi in the unregulated 9th stage mode, then return to the step in the Fault Isolation Procedure that directed you to the Repair Confirmation and continue with the Fault Isolation Procedure.

(21) If the duct pressure pointer on one or both sides was greater than 34 psi when the system was on regulated 5th stage pressure, greater than 20 psi in the unregulated 5th stage mode, greater than 26 psi when the system was on regulated 9th stage pressure or greater than 10 psi in the unregulated 9th stage mode, then you have corrected the fault.

(22) Do these steps to complete the task:

(a) Remove the pressure from the pneumatic system. To remove the pressure, do this task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806.

(b) Set the ISOLATION VALVE switch on the P5-10 panel to AUTO.

(c) Reactivate the leading edge flaps and slats. To reactivate the LE flaps and slats, do this task: Leading Edge Flaps and Slats - Activation, AMM TASK 27-81-00-440-801.

(23) The following is an Engine Bleed System Troubleshooting Table. Print out the table and use it as a quick reference troubleshooting guide when working on the bleed system of an airplane.

Engine Bleed System Troubleshooting Table

STEP	TASK REFERENCE	TROUBLESHOOTING STEP	EXPECTATION NORMAL OPERATION	REMEDY FOR ABNORMAL OPERATION	OBSERVATION
1	AMM TASK 24-22-00-860-811, AMM TASK 78-31-00-010-801-F00	Open the thrust reverser.			
2.A	FIM 36-10-804, Step F.(10)	Look at the position indicator on the high stage valve.	Should be CLOSED.		
2.B	FIM 36-10-804, Step F.(10)(a)	Manually wrench OPEN the high stage valve and allow it to move CLOSED by spring force only.	Should move smoothly to the OPEN position and return to the CLOSED position by spring force only.	If the valve does not move smoothly and return to CLOSED, replace per: AMM TASK 36-11-06-000-801, AMM TASK 36-11-06-400-801	
3.A	FIM 36-10-804, Step F.(9)	Look at the position indicator on the Pressure Regulating Shutoff Valve (PRSOV).	Should be CLOSED.		
3.B	FIM 36-10-804, Step F.(9)(a)	Manually wrench OPEN the PRSOV and allow it to move CLOSED by spring force only.	Should move smoothly to the OPEN position and return to the CLOSED position by spring force only.	If the valve does not move smoothly and return to CLOSED, replace per: AMM TASK 36-11-04-000-801, AMM TASK 36-11-04-400-801	

Engine Bleed System Troubleshooting Table (Continued)

STEP	TASK REFERENCE	TROUBLESHOOTING STEP	EXPECTATION NORMAL OPERATION	REMEDY FOR ABNORMAL OPERATION	OBSERVATION
4.A	AMM TASK 36-11-00-700-802 Para 6.F.(7)(a), FIM 36-10-804, F.(7)	Look at the position indicator on the Precooler Control Valve.	Should be open.		
4.B	AMM TASK 36-11-00-700-802 Para 6.F.(7)(a), FIM 36-10-804, F.(7)(a)	Manually wrench CLOSED the Precooler Control Valve and allow it to move OPEN by spring force only.	Should move smoothly to the CLOSED position and return to the OPEN position by spring force only.	If the valve does not move smoothly and return to CLOSED, replace per: AMM TASK 36-12-02-000-801, AMM TASK 36-12-02-400-801	
5.A	AMM TASK 36-11-00-700-802 Para 6.G.(1)(a), FIM 36-10-804, F.(11)	Supply pneumatic pressure from the APU or ground supply (pressure should be less than 40 psig).			
5.B	AMM TASK 36-11-00-700-802 Para 6.G.(8), FIM 36-10-804, F.(15)	Disconnect the supply line connection from the high stage regulator port.	No air should flow from the supply port.	If air flows from the supply port, the Reverse Flow Diaphragm is ruptured. Replace the High Stage Regulator per: AMM TASK 36-11-07-000-801 AMM TASK 36-11-07-400-801	

Engine Bleed System Troubleshooting Table (Continued)

STEP	TASK REFERENCE	TROUBLESHOOTING STEP	EXPECTATION NORMAL OPERATION	REMEDY FOR ABNORMAL OPERATION	OBSERVATION
5.C	AMM TASK 36-11-00-700-802 Para 6.G.(3), FIM 36-10-804, Step F.(13)	Manually OPEN the PRSOV with a wrench if it does not OPEN when the APU bleed is selected ON. WARNING: Use a ratchet-type wrench when opening the PRSOV to avoid injury.	PRSOV will move to and stay in the FULL OPEN position. Low control pressure from the BAR or leaking control pressure lines can result in low duct pressure when the PRSOV is regulating the pneumatic pressure. Check for leaking relief valve on the Bleed Air Regulator, leaking flex line to the PRSOV, leaking control pressure line from the PRSOV to the 450° F Sensor, excessive venting of the 450° F Sensor.	Check for leaks on: 1. the supply and control pressure lines. 2. relief valve on the regulator. If the relief valve is leaking, replace the bleed air regulator per: AMM TASK 36-11-03-000-801 AMM TASK 36-11-03-400-801	
5.D	AMM TASK 36-11-00-700-802 Para 6.G.(4), FIM 36-10-804, Step F.(20)	When the PRSOV moves OPEN, the Precooler Control Valve should move CLOSED.	The Precooler Control Valve moves to the CLOSED position.	If the valve does not move CLOSED, check for leaks on the supply and control pressure lines. If no leaks are found, replace the Precooler Control Valve per: AMM TASK 36-12-02-000-801 AMM TASK 36-12-02-400-801	
5.E	AMM TASK 36-11-00-700-802 Para 6.G.(5), FIM 36-10-804, Step F.(21)(a)	Disconnect the test cap on the Precooler Control Valve control pressure line.	The Precooler Control Valve should move to the OPEN position.	If the valve does not move OPEN, check for blockage in the sense line.	
6.A	AMM TASK 36-11-00-700-802 Para 6.H.(1)-(3)	Return Pneumatic System to normal configuration.			
6.B	AMM TASK 36-11-00-700-802 Para 6.H.(4),(5)	Return airplane to normal configuration.			

END OF TASK

805. Duct Pressure Zero, the Engine is the Bleed Source - Fault Isolation

A. Description

(1) (SDS SUBJECT 36-11-00, SDS SUBJECT 36-12-00)

(2) A zero duct pressure condition is a condition in which one or both pointers on the dual duct pressure indicator is at 0 psi with the engine(s) as the bleed source.

B. Possible Causes

(1) Pressure regulator and shutoff valve (PRSOV)

(a) Failure Mode: stuck or locked closed

(2) Bleed air regulator, M1180

(a) Failure Mode: No or low control pressure, open or shorted solenoid

(3) Tripped circuit breaker

(4) Pneumatic sense lines (supply or control)

(a) Failure Mode: leakage or blockage

(5) Wiring

(a) Failure Mode: open or shorted

(b) MW0311 Engine Wiring Harness

NOTE: MW0311 electrical harnesses P/N 325-029-901-0 and 325-029-902-0 are known to be the source of faults. These electrical harnesses can be reworked to serviceable units with the incorporation of CFM International Service Bulletin 72-0262.

1) Failure Mode: Possible wire shorting on backshell of connector DP1102

2) Failure Mode: Possible broken wires inside connector DP1102

(6) Precooler control valve

(a) Failure Mode: leaking diaphragm that causes insufficient supply pressure to the bleed air regulator

(7) Duct pressure transducer, T405 (Left) or T403 (Right)

(a) Failure Mode: Out of tolerance or totally failed

(8) Dual duct pressure indicator, N12

(a) Failure Mode: Out of tolerance or totally failed

C. Circuit Breakers

(1) These are the primary circuit breakers related to the fault:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN
A	6	C01470	AIR CONDITIONING BLEED AIR XDCR LEFT
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	5	C00077	AIR CONDITIONING BLEED AIR PRESS IND
B	6	C01469	AIR CONDITIONING BLEED AIR XDCR RIGHT
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

D. Related Data

(1) Component Location (Figure 301)

(2) Component Location (Figure 302)

(3) Troubleshooting Check (Figure 310)

(4) Pneumatic System Control Valve Position Indicators (Figure 312)

(5) (SSM 36-11-11)

(6) (WDM 36-21-11)

E. Initial Evaluation

(1) Do a check to see if any of these circuit breakers have tripped:

(a) These are the circuit breakers:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	6	C01470	AIR CONDITIONING BLEED AIR XDCR LEFT
B	5	C00077	AIR CONDITIONING BLEED AIR PRESS IND
B	6	C01469	AIR CONDITIONING BLEED AIR XDCR RIGHT

WARNING: RESET AND RELEASE THE CIRCUIT BREAKER QUICKLY. DO NOT HOLD THE CIRCUIT BREAKER IN THE RESET POSITION. IF THERE IS AN ACTIVE WIRING FAULT, HOLDING THE CIRCUIT BREAKER IN THE RESET POSITION WILL PREVENT IT FROM TRIPPING AGAIN. THIS CAN CAUSE EXTENSIVE DAMAGE TO WIRING, INJURY TO PERSONS AND IT CAN RESULT IN A FIRE.

(b) If any of the circuit breakers are tripped, reset the circuit breaker(s).

(c) If the circuit breaker trips again, then do these checks of the indication circuit:

1) Fault isolate and repair the short in the wiring or faulty component.

2) Do a check of the wiring between the power supply, the dual duct pressure indicator, and the transducers (WDM 36-21-11).

3) Repair any problems that you find.

4) Do the Repair Confirmation at the end of this task.

(d) If the circuit breaker(s) was successfully reset or if none of the circuit breakers has tripped, then continue.

(2) Do a check to see if any of these circuit breakers have tripped:

(a) These are the circuit breakers:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

WARNING: RESET AND RELEASE THE CIRCUIT BREAKER QUICKLY. DO NOT HOLD THE CIRCUIT BREAKER IN THE RESET POSITION. IF THERE IS AN ACTIVE WIRING FAULT, HOLDING THE CIRCUIT BREAKER IN THE RESET POSITION WILL PREVENT IT FROM TRIPPING AGAIN. THIS CAN CAUSE EXTENSIVE DAMAGE TO WIRING, INJURY TO PERSONS AND IT CAN RESULT IN A FIRE.

(b) If the circuit breaker(s) for the applicable engine bleed air valve(s) has tripped, reset the circuit breaker(s).

(c) If the circuit breaker trips again, then proceed to the Electrical Checks - Fault Isolation Procedure.

(d) If the circuit breaker(s) was successfully reset or if none of the circuit breakers has tripped, then continue.

(3) Make sure that there is no pressure in the pneumatic systems and make these observations:

(a) Make sure that both L and R pressure pointers on the dual duct pressure indicator indicate 0 (+/-2) psi.

(b) Make sure that the left and right pressure indications are not different more than 3 psi.

(c) If one or both pressure pointers do not indicate 0 (+/-2) psi or if the pointer indications are split more than 3 psi, do these steps:

1) Fault isolate the duct pressure indication fault as follows:

a) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

2) Continue with this Initial Evaluation procedure.

(d) If both the left and right pressure indications are within limits, then continue.

(4) Supply pressure to the pneumatic system with the APU or a ground pneumatic source. To supply pressure, do this task: Supply Pressure to the Pneumatic System (Selection), AMM TASK 36-00-00-860-801.

(5) Set the ISOLATION VALVE switch on the P5-10 panel to the OPEN position.

(6) Examine the dual duct pressure indicator, N12, on the P5-10 panel:

(a) If you pressurized the pneumatic system with the APU, make sure these results occur:

1) The L and R pointers indicate a minimum of 12 psi.

2) The L and R pointer indications are within 3 psi of each other.

3) If the L and R pressure pointers do not indicate a minimum of 12 psi or if the pointer indications are split more than 3 psi, do these steps:

a) Fault isolate the duct pressure indication fault as follows: Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

b) Continue with this Initial Evaluation procedure.

4) If both the left and right pressure indications are within limits, then continue.

(b) If you pressurized the pneumatic systems with a ground pneumatic source, make sure these results occur:

1) The L and R pointers indications are the same as the output pressure indication on the ground source.

2) The L and R pointer indications are within 3 psi of each other.

3) If the pressure pointers do not indicate the same as the pressure indication on the ground source or if the pointer indications are split more than 3 psi, do these steps:

a) Fault isolate the duct pressure indication fault. Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808

b) Continue with this Initial Evaluation procedure.

4) If both the left and right pressure indications are within limits, then continue.

(c) If both the L and R pressure pointers indicate 0 psi, then do these steps:

1) These are the tasks:

- Dual Duct Pressure Indicator Removal, AMM TASK 36-21-02-600-801
- Dual Duct Pressure Indicator Installation, AMM TASK 36-21-02-600-802

2) Do the Initial Evaluation procedure again.

(d) If one of the pressure pointers indicates 0 psi, then do this step:

1) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

2) Continue with this Initial Evaluation procedure.

(e) If both of the pressure pointers indicate properly, then continue.

(7) If you suspect that there is a system fault, you may proceed to the Fault Isolation Procedure to avoid an engine run to confirm the fault or continue.

(8) Supply pneumatic pressure to the pneumatic systems as follows:

(a) Supply pressure to the pneumatic system with the faulty pressure with its respective engine.

1) Do this task: Supply Pressure to the Pneumatic System with One or Both Engines, AMM TASK 36-00-00-860-804.

(9) Set the ISOLATION VALVE switch on the P5-10 panel to the CLOSED position.

(10) Set the APU BLEED switch to OFF or remove the external pneumatic source if applicable.

(11) Examine the dual duct pressure indicator, N12, on the P5-10 panel:

(12) Make sure that the respective duct pressure pointer(s) indicates between 10-25 psi.

NOTE: The duct pressure pointers on the dual duct pressure indicator may fluctuate without any user systems in operation.

(13) If the respective duct pressure pointer(s) indicates between 10 - 25 psi, then there was an intermittent fault.

(a) Use your judgement, airline policy and the history of the aircraft's pneumatic system to determine if you will take further action or monitor the system performance on subsequent flights.

(14) Do this task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

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

(16) If one or both duct pressure pointer(s) indicates 0 psi, then do the Fault Isolation Procedure.

F. Fault Isolation Procedure

NOTE: It is unlikely that both bleed systems have zero duct pressure. However, if this is the case, this procedure must be done on both engines.

NOTE: At this point in this fault isolation task, you should have confirmed that the duct pressure indication system is not at fault.

(1) Do these steps to prepare for fault isolation:

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

(b) Make sure that the applicable engine BLEED switch is in the OFF position.

(c) Make sure that the fuel shutoff lever for the applicable engine is in the cutoff position.

1) Install a DO-NOT-OPERATE tag.

(d) Retract the Leading Edge Flaps and Slats. To do this, do this task: Leading Edge Flaps and Slats Retraction, AMM TASK 27-81-00-860-804.

(e) Deactivate the Leading Edge Flaps and Slats. Do this task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

(f) Do this task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00.

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

(2) Examine these circuit breakers:

(a) These are the circuit breakers:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(3) If the circuit breaker applicable to the pneumatic system with the zero duct pressure has tripped, then do the Electrical Checks - Fault Isolation.

(4) If the circuit breaker applicable to the pneumatic system with the zero duct pressure has not tripped, do these steps:

(a) Make sure that the locking device on the position indicator of the PRSOV is not engaged with the bracket on the valve.

1) If the locking device is engaged, do these steps:

a) Unlock the PRSOV.

Do this task: MMEL 36-5 (DDPG) Restoration - Pressure Regulating and Shutoff Valve Inoperative, AMM TASK 36-00-00-440-804

b) Do the Repair Confirmation procedure at the end of this task.

2) If the PRSOV was not locked closed, then continue.

(5) Do these steps to make sure there is power to the bleed air regulator solenoid:

(a) Make sure the applicable engine BLEED switch on the P5-10 panel is set to ON.

(b) Open the applicable circuit breaker(s):

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(c) Disconnect electrical connector DP1102 from the bleed air regulator.

(d) Open the housing of electrical connector DP1102 and inspect the wires.

1) Make sure that none of the wires are broken.

a) If wires are broken, repair the wires.

<1> Do the Repair Confirmation at the end of this task.

b) If the wires are not broken, then continue.

(e) Close the applicable circuit breaker(s):

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(f) Do a check for 22 - 30 VDC between pins 5 and 6 of electrical connector DP1102:

1) If there is 22 - 30 VDC between pins 5 and 6 of electrical connector DP1102, then do these steps:

a) Do a check of the resistance between pins 5 and 6 of the bleed air regulator electrical connector.

b) If the resistance is 20 - 40 ohms, then proceed to Electrical Check - Fault Isolation.

c) If the electrical resistance is not 20 - 40 ohms, then replace the bleed air regulator. These are the tasks:

- Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801
- Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801

d) Do the Repair Confirmation at the end of this task.

2) If there is not 22 - 30 VDC between pins 5 and 6 of electrical connector DP1102, then continue.

(6) If the circuit breaker applicable to the pneumatic system with the zero duct pressure has not tripped and electrical power to the bleed air regulator solenoid is satisfactory, do a check of the operation of the PRSOV as follows:

(a) Use a wrench to open the PRSOV.

1) Make sure the PRSOV opens smoothly.

(b) Remove the wrench and make sure the PRSOV closes fully.

(c) If the PRSOV does not smoothly move to the open and closed positions, replace the PRSOV: These are the tasks:

- PRSOV Removal, AMM TASK 36-11-04-000-801
- PRSOV Installation, AMM TASK 36-11-04-400-801

(d) If the PRSOV moves smoothly to the open and closed positions, then continue.

(7) Install P/N C36001-44 test equipment (or equivalent) to the pressure supply side of the applicable bleed air regulator:

NOTE: The test equipment used in this and subsequent steps is part of P/N C36001-44 Engine Bleed Air System Test Equipment listed in the 737 Illustrated Tool and Equipment List (ITEL). Equivalent test equipment to that specified in P/N C36001-44 can also be used.

(a) Connect a nitrogen pressure source, a pressure regulator, a supply pressure gage (Ps), and a supply pressure test hose at the tee to the supply pressure sense line to the bleed air regulator (Figure 310, View A).

(8) Install this test equipment to the control pressure side of the bleed air regulator:

(a) Disconnect the control pressure sense line from the PRSOV and install a 30 psi control pressure gage (Pc) between the flex line and the PRSOV (Figure 310, View B).

1) If you use an equivalent control pressure gage to the one specified in P/N C36001-44, make sure that the indication increments are no greater than 0.2 psi and that the gage accuracy is +/- 0.5% full scale.

(9) Do this check of the bleed air regulator circuit:

(a) Put the applicable BLEED switch on the P5-10 panel to the ON position.

(b) Adjust the regulator on the nitrogen pressure source, STD-1455 to provide 230–250 psi (16–17 Bar or 1600-1700 kPa) to the pressure regulator, STD-1454.

(c) Increase Ps to 60-70 psig.

(d) Make sure the PRSOV is fully open.

(e) If Pc is greater than 28 psi, then replace the bleed air regulator:

1) These are the tasks:

- Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801
- Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801

2) Continue with this procedure as this will not cause a zero duct condition.

(f) If Pc is less than 20 psig, then use a soap solution to examine the sense line and fittings from the bleed air regulator to the PRSOV and the sense line and fittings from the PRSOV to 450 F thermostat for pressure leakage.

NOTE: A small leak at the top of the 450 F thermostat is acceptable. The 450 F thermostat will be isolated in subsequent steps. Leakage detected at the sense line connections must be repaired.

1) If you find any leakage, decrease Ps to 0 psig.

2) Repair the sense line to stop the leakage:

a) Use Never-Seez Pure Nickel Special anti-seize compound when you reconnect sense lines.

b) Increase Ps to 60 - 70 psig and make sure the repaired sense line and fittings do not leak.

3) If you do not find any leakage, then continue.

4) Slowly increase Ps to 60 - 70 psig.

5) Make sure that Pc is 20 - 28 psig.

6) If Pc is not between 20 - 28 psig, do these steps:

a) Decrease Ps to 0 psig.

b) Disconnect the control pressure sense line to the 450 F thermostat and install a cap (Figure 310, View C).

NOTE: This removes the 450° F thermostat as a source of excessive pressure leakage.

(g) Increase Ps to 60 - 70 psig.

(h) Continue.

(10) If Pc is between 20 - 28 psig, then do these steps:

NOTE: These steps are a continuation of the check of the bleed air regulator circuit from the previous step.

(a) Decrease Ps to 0 psig.

(b) Replace the 450 F thermostat. These are the tasks:

- Thermostat Removal, AMM TASK 36-11-05-000-801
- Thermostat Installation, AMM TASK 36-11-05-400-801

1) Do the Repair Confirmation.

(c) If Pc is not between 20 - 28 psig, then do these steps:

1) Decrease Ps to 0 psig.
2) Remove the cap and reconnect the control pressure sense lines (Figure 310, View D).:
   a) Use Never-Seez NSBT compound, D00006 when you reconnect sense lines.
3) Disconnect the control pressure sense line to gage connection from the PRSOV.
4) Install a cap on the open end of the control pressure (Pc) gage connection (Figure 310, View D).
5) Increase Ps to 60-70 psig.
6) Make sure that Pc is 20-28 psig.
7) If Pc is not between 20-28 psig, then do these steps:
   a) Decrease Ps to 0 psig.
   b) Replace the bleed air regulator. These are the tasks:
      - Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801
      - Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801
   c) Do the Repair Confirmation.
8) If Pc is between 20 - 28 psig, then do these steps:
   a) Decrease Ps to 0 psig.
   b) Replace the PRSOV. These are the tasks:
      - PRSOV Removal, AMM TASK 36-11-04-000-801
      - PRSOV Installation, AMM TASK 36-11-04-400-801
9) Increase Ps to 60 - 70 psig.
10) If Pc is between 20 - 28 psig, then do these steps:
    a) Decrease Ps to 0 psig.
    b) Remove all the pressure gages, associated test equipment, and hardware that was installed.
    c) Re-connect all sense lines that were disconnected using Never-Seez Pure Nickel Special anti-seize compound.

(d) If Pc is 20-28 psi, then continue.

G. Electrical Checks - Fault Isolation

(1) Do this check of electrical harness MW0311 between the engine firewall connector DP1104 and the connector DP1102 to the solenoid on the bleed air regulator:

NOTE: These electrical checks are needed to determine why the circuit breaker that controls the PRSOV trips.

NOTE: Harnesses with part numbers 325-029-901-0 or 325-029-902-0 are susceptible to internal shorting which can cause the bleed air valve circuit breaker to trip and prevent the PRSOV from opening. This type of failure is not always a hard fault (always present). Therefore, if you found the applicable circuit breaker tripped or if it has tripped in the past, it is quite possible there is an intermittent short in the harness. A thorough check of the harness must be accomplished to determine if the harness must be replaced.

NOTE: A multimeter is required to perform the electrical checks in this procedure. If there is an intermittent short or the fault is not present at any point in the Fault Isolation, you may use a megohmmeter instead of the multimeter to perform a more thorough check of the electrical circuit.

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

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(b) Disconnect electrical connectors DP1104 and DP1102.

(c) Do these steps to do a general visual inspection of the airplane wire harness MW0311:

1) Visually examine the airplane wire harness for loose connections, worn areas, deformation and internal damage.

2) If you find loose connections, worn areas, deformation and internal damage, then do these steps:

a) Repair the problems that you find.

b) Do the Repair Confirmation at the end of this task.

c) If the Repair Confirmation is not satisfactory, then continue.

3) If you do not find loose connections, worn areas, deformation and internal damage, then continue.

(d) Do the continuity checks on the MW0311 harness as listed below:

DP1104	DP1102
pin 12	pin 7
pin 11	pin 6
pin 3	pin 5
pin 10	pin 10
pin 2	pin 9

1) If any of the continuity checks failed, then replace the MW0311 harness:

a) These are the tasks:

- 3 O'clock Strut Harness Removal, AMM TASK 73-21-06-000-802-F00
- 3 O'clock Strut Harness Installation, AMM TASK 73-21-06-400-802-F00

b) Do the Repair Confirmation at the end of this task.

c) If the Repair Confirmation is not satisfactory, then continue.

2) If the continuity checks are satisfactory, then continue.

3) Use a multimeter or megohmmeter to do checks for continuity from the backshell of connector DP1102 to pins 5, 7, and 10 of connector DP1102.

4) If any of the electrical checks fail, replace the wiring harness MW0311:

a) These are the tasks:

- 3 O'clock Strut Harness Removal, AMM TASK 73-21-06-000-802-F00
- 3 O'clock Strut Harness Installation, AMM TASK 73-21-06-400-802-F00

b) Do the Repair Confirmation at the end of this task.

5) If all of the electrical checks are satisfactory, then continue.

(e) Connect electrical connector DP1102 to the bleed air regulator.

(f) Do a check of the resistance between pins 3 and 11 of connector D30204 (D30404).

1) If the resistance is not 20 - 40 ohms, then replace the MW0311 wiring harness. To replace the wiring harness, These are the tasks:

- 3 O'clock Strut Harness Removal, AMM TASK 73-21-06-000-802-F00
- 3 O'clock Strut Harness Installation, AMM TASK 73-21-06-400-802-F00

2) If the resistance is 20 - 40 ohms, then do the Repair Confirmation at the end of the task.

(2) Do this check of the electrical connector for the bleed air regulator:

NOTE: If there is a problem with the bleed air regulator or power is not supplied to the bleed air regulator, the PRSOV may not close.

(a) Make sure that these circuit breakers are open:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(b) Disconnect the electrical connector DP1102 at the bleed air regulator, M1180.

(c) Examine the connector for contamination and damage:

1) If the connector has contamination, then clean the connector.

2) If the connector has a loose backshell, bent or pushed pins, then do these steps:

a) Repair the connector.

b) Reconnect the connector DP1102 to the bleed air regulator.

c) Do the Repair Confirmation at the end of this task.

d) If the Repair Confirmation is not satisfactory, then continue.

(d) If you do not find any contamination or damage at the connector, then continue.

(3) Do this check for power at the bleed air regulator:

(a) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

(b) Set the applicable engine BLEED switch on the P5-10 panel to the ON position.

(c) Do a check for 22 - 30 VDC between pins 5 and 6 (ground) of the applicable connector DP1102.

(d) If there is 22 - 30 VDC between pins 5 and 6 (ground) of the applicable connector, then do these steps:

1) Replace the bleed air regulator, M1180. These are the tasks:

- Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801
- Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801

2) Do the Repair Confirmation at the end of this task.

(e) If there is not 22 - 30 VDC between pins 5 and 6 (ground) of the applicable connector, then continue.

(4) Do this check of the wiring:

(a) For the left side pneumatic system, do a continuity check between these pins on connector DP1102 at the bleed air regulator, M1180, and connector D458A at the air conditioning relay module, M324 on the E4-1 shelf.

DP1102		D458A
pin 5	. . . . .	pin 2

(b) For the right side pneumatic system, do a continuity check between these pins on connector DP1102 at the bleed air regulator, M1180, and connector D10002A at the air conditioning relay module, M1455 on the E4-1 shelf.

DP1102		D10002A
pin 5	. . . . .	pin 2

(c) If you find a problem with the wiring, then do these steps:

(d) Repair the wiring.

(e) Re-connect the electrical connector DP1102 to the bleed air regulator, M1180.

(f) For the left side pneumatic system, reconnect the electrical connector D458A to the air conditioning relay module, M324.

(g) For the right side pneumatic system, reconnect the electrical connector D10002A to the air conditioning relay module, M1455.

(h) Do the Repair Confirmation at the end of this task.

H. Repair Confirmation

(1) Remove all pressure gages, associated test equipment and hardware.

(2) Re-connect all sense lines that were disconnected.

(a) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) when you reconnect the sense lines.

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) For the left thrust reverser, do this task: Close the Thrust Reverser (Selection), AMM TASK 78-31-00-010-804-F00.

(4) Activate the thrust reverser. To activate the thrust reverser, do this task: Thrust Reverser Activation After Ground Maintenance, AMM TASK 78-31-00-440-803-F00.

(5) Close the fan cowl panels. To close the fan cowl panels, do this task: Close the Fan Cowl Panels, AMM TASK 71-11-02-410-801-F00.

(6) Reactivate the Leading Edge Flaps and Slats. To reactivate the LE Flaps and Slats, do this task: Leading Edge Flaps and Slats - Activation, AMM TASK 27-81-00-440-801

(7) Supply pressure to the pneumatic system with the engine(s), APU or a ground air source. To supply pressure, do this task: Supply Pressure to the Pneumatic System (Selection), AMM TASK 36-00-00-860-801.

(8) Set the ISOLATION VALVE switch on the P5-10 panel to the OPEN position.

(9) Examine the dual duct pressure indicator, N12, on the P5-10 panel.

(10) Make sure that both duct pressure pointers are not at 0 psi.

(11) If both duct pressure pointers are not at 0 psig, then you corrected the fault.

(12) If a duct pressure pointer is at 0 psi, then return to the step in the Fault Isolation that directed you to this Repair Confirmation and continue.

(13) Remove the pressure from the pneumatic system. To remove pressure, do this task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806.

——— END OF TASK ———

806. Isolation Valve Does Not Open or Close Properly - Fault Isolation

A. Description

(1) (SDS SUBJECT 36-13-00)

(2) The isolation valve is controlled by a three-position switch on the P5-10 panel. The switch is also electrically connected through these four switches: engine No. 1 bleed switch, engine No. 2 bleed switch, left pack switch and right pack switch.

(a) If the isolation valve switch is in the AUTO position with the Engine No. 1 and No. 2 bleed switches in the ON position and the left and right pack switches in the AUTO or HIGH position, the isolation valve will close.

(b) However, if the isolation valve switch is in the AUTO position with one or more of these four switches in the OFF position: Engine No. 1 bleed switch, Engine No. 2 bleed switch, left pack switch or right pack switch, the isolation valve will open.

(c) The other two positions (OPEN and CLOSE) function as a conventional switch regardless of the pack and engine bleed switch positions.

(d) APU bleed air or bleed air from an external ground air source may be used to determine if the operation of the isolation valve is correct. The APU connects to the pneumatic manifold on the left side of the isolation valve. An external ground air source connects to the pneumatic manifold on the right side of the isolation valve. Therefore if the isolation valve is closed, the side of the pneumatic manfifold that will be pressurized depends upon the source of the pneumatic pressure.

B. Possible Causes

(1) Bleed air isolation valve, V16

(a) Failure Mode: open or shorted motor windings, a failed limit switch, a valve in a locked position

(2) Air conditioning module, P5-10

(a) Failure Mode: failure of air conditioning pack switch(s), engine bleed switch(s), isolation valve switch, or internal wiring

(3) Wiring

(a) Failure Mode: Open or short in wiring

C. Circuit Breakers

(1) This is the primary circuit breaker related to the fault:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN

D. Related Data

(1) Component Location (Figure 303)

(2) Troubleshooting Check (Figure 311)

(3) (SSM 36-11-11)

(4) (WDM 36-11-11)

E. Initial Evaluation

(1) Supply pressure to the pneumatic system with the APU or an external ground air source with one of the procedures listed below:

(a) Do this task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

(b) Do this task: Supply Pressure to the Pneumatic System with an External Ground Air Source, AMM TASK 36-00-00-860-802.

(2) Set the ISOLATION VALVE switch on the P5-10 panel to the OPEN position.

(3) If the APU is used to pressure the pneumatic system, then make sure the L and R pointers on the dual duct pressure indicator show a minimum of 12 psi.

(4) If an external ground air source is used to pressure the pneumatic system, then make sure the L and R pointers on the dual duct pressure indicator indicate the same pressure as the external ground air source indicates.

(5) If you do not have either the APU or an external ground air source available, examine the valve position indicator on the isolation valve, V16, to make sure that it is at OPEN.

(6) Set the ISOLATION VALVE switch to the CLOSE position.

(7) If the APU is being used to pressure the pneumatic system, then make sure the R pointer on the dual duct pressure indicator decreases to 0 (+/-2) psi.

(a) If the R pointer on the dual duct pressure indicator does not decrease to 0 (+/-2) psi, then do the Fault Isolation procedure.

(b) If the R pointer on the dual duct pressure indicator does decrease to 0 (+/-2) psi, then continue.

(8) If an external ground air source is being used to pressure the pneumatic system, then make sure the L pointer on the dual duct pressure indicator decreases to 0 (+/-2) psi.

(a) If the L pointer on the dual duct pressure indicator does not decrease to 0 (+/-2) psi, then do the Fault Isolation procedure.

(b) If the L pointer on the dual duct pressure indicator does decrease to 0 (+/-2) psi, then continue.

(9) Set the ISOLATION VALVE switch on the P5-10 panel to the OPEN position.

(10) If the APU is being used to pressure the pneumatic system, then make sure the L and R pointers on the dual duct pressure indicator indicate a minimum of 12 psi and the pointers are within 3 psi of each other.

(a) If the R pointer does not increase, then do the Fault Isolation procedure.

(b) If the duct pressure pointers differ by more than 3 psi, visually examine the position indicator on the valve to make sure that it is fully open.

1) If the valve is open and the duct pressure pointers differ by more than 3 psi, do this fault isolation:

a) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

(c) If the L and R pointers on the dual duct pressure indicator indicate a minimum of 12 psi and the pointers are within 3 psi of each other, then continue.

(11) If an external ground air source is being used to pressure the pneumatic system, then make sure the L and R pointers on the dual duct pressure indicator indicate the same pressure as the external ground air source and the pointers are within 3 psi of each other.

(a) If the L pointer does not increase, then do the Fault Isolation procedure.

(b) If the duct pressure pointers differ by more than 3 psi, visually examine the position indicator on the valve to make sure that it is fully open.

1) If the valve is open and the duct pressure pointers differ by more than 3 psi, do this fault isolation:

a) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

(c) If the L and R pointers on the dual duct pressure indicator indicate the same pressure as the external ground air source and the pointers are within 3 psi of each other, then continue.

(12) If you do not have either APU or an external ground air source available, visually examine the position indicator on the isolation valve to make sure it shows the valve is open.

(a) If the valve is not open, then do the Fault Isolation procedure.

(b) If the position indicator shows that the valve is open, then continue.

(13) Set the ISOLATION VALVE switch on the P5-10 panel to the AUTO position.

(14) Make sure that both the L and R duct pressure pointers on the dual duct pressure indicator on the P5-10 panel indicate a minimum of 12 psi and the indications are within 3 psi of each other.

(a) If the L and R pointers do not indicate within 3 psi of each other, then do the fault isolation that follows:

1) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

(b) If the L and R pointers are within 3 psi of each other, then continue.

(15) If you are using the APU to pressurize the pneumatic system, set the BLEED 1, BLEED 2, L PACK and R PACK switches on the P5-10 panel to the positions listed below for configurations 1-6 and check the L and R duct pressures for each configuration:

Table 201

CONFIG.	L BLEED	R BLEED	L PACK	R PACK	L DUCT	R DUCT
1	ON	ON	ON	ON	PSI	NO PSI
2	OFF	ON	ON	ON	PSI	PSI
3	ON	OFF	ON	ON	PSI	PSI
4	ON	ON	OFF	ON	PSI	PSI
5	ON	ON	ON	ON	PSI	NO PSI
6	ON	ON	ON	OFF	PSI	PSI

(a) Make sure the left and right duct pressure indications are correct for each configuration.

(b) If the duct pressure indications are not correct for each configuration, then replace the P5-10 panel. These are the tasks:

- Air Conditioning Module Removal, AMM TASK 21-51-65-000-801
- Air Conditioning Module Installation, AMM TASK 21-51-65-400-801

(c) Do the Repair Confirmation at the end of this task.

(16) If you are using an external ground air source to pressurize the pneumatic system, set the BLEED 1, BLEED 2, L PACK and R PACK switches on the P5-10 panel to the positions listed below for configurations 1-6 and check the L and R duct pressures for each configuration:

Table 202

CONFIG.	L BLEED	R BLEED	L PACK	R PACK	L DUCT	R DUCT
1	ON	ON	ON	ON	NO PSI	PSI
2	OFF	ON	ON	ON	PSI	PSI
3	ON	OFF	ON	ON	PSI	PSI
4	ON	ON	OFF	ON	PSI	PSI
5	ON	ON	ON	OFF	PSI	PSI
6	ON	ON	ON	ON	NO PSI	PSI

(a) Make sure the left and right duct pressure indications are correct for each configuration.

(b) If the duct pressure indications are not correct for each configuration, then replace the P5-10 panel. These are the tasks:

- Air Conditioning Module Removal, AMM TASK 21-51-65-000-801
- Air Conditioning Module Installation, AMM TASK 21-51-65-400-801

(c) Do the Repair Confirmation at the end of this task.

(17) If the isolation valve operates correctly, then there may have been an intermittent fault.

(a) No further action is required other than to complete this Initial Evaluation.

(18) Remove the pressure from the pneumatic system as follows:

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

(19) As applicable, install any access panels that were removed for the Initial Evaluation.

(20) Close the following, or any other access doors that were opened for this Initial Evaluation:

(a) Close this access panel:

Number	Name/Location
192CL	ECS Access Door

F. Fault Isolation Procedure

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

(2) Set the ISOLATION VALVE switch in the position applicable to one of the steps that follow:

(a) If the valve will not move to the open position when commanded, set the ISOLATION VALVE switch to the OPEN position.

(b) If the valve will not move to the closed position when commanded, set the ISOLATION VALVE switch to the CLOSE position.

(3) Do this check for power to the bleed air isolation valve:

(a) Open this circuit breaker:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN

(b) Disconnect the connector D398 at the bleed air isolation valve, V16.

(c) Close this circuit breaker:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN

(d) Do a check for 115V AC between pins 1 and 3 (ground) of connector D398 if the ISOLATION VALVE switch is set to the OPEN position or between pins 2 and 3 (ground) of connector D398 if the ISOLATION VALVE switch is set to the CLOSE position.

1) If 115V AC is present between pins 1 and 3 or between pins 2 and 3, as applicable, then replace the isolation valve. These are the tasks:

- Engine Bleed Air Isolation Valve Removal, AMM TASK 36-13-04-000-801
- Bleed Air Isolation Valve Installation, AMM TASK 36-13-04-400-801

a) Do the Repair Confirmation at the end of the task.

2) If 115V AC is not present between pins 1 and 3 or between pins 2 and 3, as applicable, then do these steps:

a) Do a check of the wiring between pin 3 of connector D398 and the ground GD548-AC (WDM 36-11-11).

b) Repair any problems that you find.

c) If the ground is good, then continue.

(4) Do these steps to do a check of the wiring between the isolation valve and the P5-10 panel:

(a) Get access to the back of the P5-10 panel and disconnect electrical connector D646.

(b) Do a check of the wiring between either pin 1 of connector D398 and pin 22 of electrical connector D646 on the P5-10 panel or pin 2 of connector D398 and pin 21 of electrical connector D646 on the P5-10 panel.

(c) Repair any problems that you find in the wiring (WDM 36-11-11).

(d) Re-connect electrical connector D646 to the back of the P5-10 panel.

(e) Re-connect electrical connector D398 to the isolation valve.

(f) Do the Repair Confirmation at the end of this task.

G. Repair Confirmation

(1) Set the ISOLATION VALVE switch to the AUTO position.

(a) Make sure the valve position indicator on the bleed air isolation valve is in the open position.

(2) Suppy pressure to the pneumatic system with one of the steps below:

(a) Do this task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

(b) Do this task: Supply Pressure to the Pneumatic System with an External Ground Air Source, AMM TASK 36-00-00-860-802.

(3) Examine the duct duct pressure indicator on the P5-10 panel:

(a) Make sure that both the L and R pressure pointers on the duct duct pressure indicator indicate a minimum of 12 psi and the pressure indications are within 3 psi of each other.

(b) If both the L and R pressure indications are not within 3 psi of each other, then do this fault isolation:

1) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

(c) If both the L and R pressure indications are with 3 psi of each other, then continue.

(4) If you are using the APU to pressurize the pneumatic system, set the BLEED 1, BLEED 2, L PACK and R PACK switches on the P5-10 panel to the positions listed below for configurations 1-6 and check the L and R duct pressures for each configuration:

Table 203

CONFIG.	L BLEED	R BLEED	L PACK	R PACK	L DUCT	R DUCT
1	ON	ON	ON	ON	PSI	NO PSI
2	OFF	ON	ON	ON	PSI	PSI
3	ON	OFF	ON	ON	PSI	PSI
4	ON	ON	OFF	ON	PSI	PSI
5	ON	ON	ON	ON	PSI	NO PSI
6	ON	ON	ON	OFF	PSI	PSI

(a) Make sure the left and right duct pressure indications are correct for each configuration.

(5) If you are using an external air source to pressurize the pneumatic system, set the BLEED 1, BLEED 2, L PACK and R PACK switches on the P5-10 panel to the positions listed below for configurations 1-6 and check the duct pressures for each configuration:

Table 204

CONFIG.	L BLEED	R BLEED	L PACK	R PACK	L DUCT	R DUCT
1	ON	ON	ON	ON	NO PSI	PSI
2	OFF	ON	ON	ON	PSI	PSI
3	ON	OFF	ON	ON	PSI	PSI
4	ON	ON	OFF	ON	PSI	PSI
5	ON	ON	ON	OFF	PSI	PSI
6	ON	ON	ON	ON	NO PSI	PSI

(a) Make sure the left and right duct pressure indications are correct for each configuration.

(6) If the bleed air isolation valve operates correctly, then you corrected the fault.

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

(8) Install any access panels that were removed.

(9) Close the following, or any other access doors that were opened during this procedure:

(a) Close this access panel:

Number	Name/Location
192CL	ECS Access Door

(10) If the isolation valve did not operate properly, then return to the step in the Fault Isolation procedure that directed you to the Repair Confirmation and continue with the fault isolation.

——— END OF TASK ———

807. Duct pressure, L and R pointers not the same (split), the engine is the bleed source - Fault Isolation

A. Description

(1) Split duct pressure is a condition in which the duct pressure on one side, as shown on the dual duct pressure indicator, is either lower or higher than the duct pressure on the other side with the engines as the bleed source. Duct pressure splits can occur during both normal and abnormal operation of the engine bleed systems. The procedures in this task will enable you to determine if a fault exists in either the left or right pneumatic system based on information from the pilot report or knowledge of the pneumatic system pressure at specific engine N1 speeds and aircraft altitudes.

There are no system controls to regulate both systems to a common pressure so an acceptable split in duct pressure cannot be specified. Each system regulates duct pressure independent from the other when the isolation valve is closed and should be evaluated based on the engine N1, not compared to the other duct pressure. FIM 36–10 Task Support Figure 305 defines the 9th stage regulated pressure as 32 ± 6 psig and 5th stage regulated presure as 42 ± 8 psig.

(2) When an engine pneumatic system is operating properly, the N1 speed of the engine and altitude of the aircraft determines what the pneumatic system pressure should be when within the regulated 5th stage or regulated 9th stage pressure areas of the "Duct Pressure Versus N1 at sea level and 5K feet) graph or the "Duct Pressure Versus N1 at sea level, 10K feet, 22K feet, 31K feet, 37K feet and 41K feet" graph.

(3) If the pilot report contains all of the necessary information to use either one of the graphs, a system test using the engines may not be necessary to determine if one or both systems have faults. For example, if the data from the pilot report shows that the duct pressure split occurred when one of the engine pneumatic systems was operating in the unregulated pressure areas or within the 5th or 9th stage switchover areas, then fault isolation does not have to be accomplished.

(4) If the pilot report does not contain all of the necessary information, the duct pressure split can be greater than 15 psi but the pneumatic systems still may be operating within normal limits. In this situation, a system test using the engines is necessary to determine if either system has faults because the systems may have been operating in different modes of pressure regulation and a duct pressure comparison under those conditions would be invalid.

(5) In summary, duct pressure splits do not always indicate a fault condition. As long as the pressures are within system tolerances for the pneumatic system 9th and 5th stage operation, fault isolation is not required.

B. Possible Causes

(1) These are the possible causes for the condition where the duct pressure on one side is lower than normal based on the "Duct Pressure Versus N1 at Sea Level" graphs. See task 804.

(a) Duct pressure transducer, T405 (left) or T403 (right)

1) Failure Mode: Faulty transducer

(b) Dual duct pressure indicator, N12

1) Failure Mode: Faulty indicator

(c) Precooler control valve

1) Failure Mode: stuck closed or not modulating properly

(d) Precooler control valve sensor (390 F)

1) Failure Mode: Not opening when temperature is in the 390-440 degree F range

(e) Pressure Regulator and Shutoff Valve (PRSOV)

1) Failure Mode: sticking

(f) 450 Degree F thermostat

1) Failure Mode: failed open

(g) Bleed air regulator, M1180

1) Failure Mode: regulates control pressure too low (Service Letter 71-051)

(h) High stage valve

1) Failure Mode: sticking

(i) High stage regulator

1) Failure Mode: not regulating properly (reverse flow)

(j) Sense lines and fittings

NOTE: There are several sense lines where leakage can cause low duct pressure.

1) Transducer sense line: low duct pressure APU and engines (all phases of operation)

2) PRSOV control pressure line from bleed air regulator to PRSOV and 450 F thermostat line (5th and 9th stage operations)

3) Supply line to the bleed air regulator (5th and 9th stage operations)

4) Control pressure line between the high stage regulator and high stage valve (9th stage operations)

5) Supply pressure line to high stage regulator (9th stage operations)

6) Sense line between the precooler control valve and 390 F sensor (obstructed not leaking)

(k) Wiring (Indication Circuit)

NOTE: This applies to all pneumatic sources.

1) Failure Mode:

a) Open in the wiring results in 0 psi indication

b) Short in the wiring results in low pressure indication

(l) Precooler

1) Failure Mode:

a) Obstructed

b) Cracked and leaking

c) Contamination

d) Temperature topping at high altitude (450 F thermostat) or on high regulated 5th or 9th stage operations

(m) Precooler kiss seal

1) Failure Mode: Distorted, torn or missing

(n) Duct pressure transducer, T405 (left) and T403 (right)

1) Failure Mode: Faulty transducer

(o) Dual duct pressure indicator, N12

1) Failure Mode: Faulty indicator

(2) These are the possible causes for the condition where the duct pressure on one side is higher than normal based on the "Duct Pressure Versus N1 at Sea Level" graphs. Refer to Duct Pressure High, the Engine is the Bleed Source - Fault Isolation, 36-10 TASK 803.

(a) Pressure regulator and shutoff valve (PRSOV)

1) Failure Mode: sticking

(b) Bleed air regulator, M1180

1) Failure Mode: Regulating control pressure too high

(c) Leak in PRSOV downstream pressure sense line or fittings

1) Failure Mode: Leakage will cause the PRSOV to regulate too high

(d) Wiring

1) Failure Mode: induced voltage

C. Circuit Breakers

(1) Refer to circuit breakers in the fault isolation task that this procedure references.

D. Related Data

(1) (Figure 305)

(2) (Figure 305)

E. Initial Evaluation

(1) Collect the applicable information that follows, if available, either from the pilot report or the data recorded from an observed fault:

(a) Both left and right pneumatic duct pressures at the time of fault observation

(b) Both left and right engine N1 speeds at the time of fault observation

(c) Altitude at time of fault observation

NOTE: The information in the above three steps is necessary to perform the Initial Evaulation. The information in the next four steps is not necessary but it may be helpful.

(d) Position of the isolation valve switch

(e) Position of the engine bleed valve switches

(f) Position of the APU bleed switch

(g) Pneumatic pressure operated systems at the time of fault observation such as:

NOTE: If other related faults were observed, then perform the respective FIM tasks for those faults.

1) Respective air conditioning system

2) Cowl or wing anti-ice systems

3) Cabin pressurization problems if existing

(2) If the pilot report contains the following data, then perform the Initial Evaluation Procedure.

(a) Both left and right pneumatic duct pressures at the time of fault observation

(b) Both left and right engine N1 speeds at the time of fault observation

(c) Altitude at time of fault observation.

(3) If the pilot report does not contain the following data, then perform the Fault Isolation Procedure.

(a) Both left and right pneumatic duct pressures at the time of fault observation

(b) Both left and right engine N1 speeds at the time of fault observation

(c) Altitude at time of fault observation

(4) If this was an observed fault and the fault conditions are not known, then perform the Fault Isolation Procedure.

NOTE: The Fault Isolation Procedure and the Repair Confirmation procedure in this task are similar. Both procedures require a high power run to determine if both pneumatic system duct pressures are within limits.

(5) Low duct pressures can be caused by the bleed system crossover from low-to-high stage occuring at a different time for the left and right sides. This can give the impression that one side has a lower pressure than the other side. If the crossover occurs within the normal range as shown on the "Duct Pressure Versus N1 at Various Altitudes" graph (Figure 305, Figure 305), the system is normal and no action is required.

(6) If the necessary information is available in the pilot report, use the "Duct Pressure Versus N1 at 10K feet, 22K feet, 31K feet, 37K feet, or 41K feet" graph or if you have the necessary information from an observed fault, use the "Duct Pressure Versus N1 at Sea Level and 5000 feet" graph to determine if both the left and right engine bleed systems operated within the limits of the graph.

NOTE: If the fault was observed at an altitude other than sea level, 5K, 10K, 22K, 31K, 37K or 41K feet, you may use the altitude line that is closest to the altitude at which the fault was observed provided that the N1 speed of both engines at that time were within the N1 speed necessary for both pneumatic systems to be operating in either the regulated 5th stage or regulated 9th stage pressure areas on both the higher and lower altitude lines on the graph. For example, if the pilot report indicates a duct pressure split at 16,000 feet during climb with both engine N1 speeds at 88%, you can see that both 10,000 feet and 22,000 feet altitudes lines on the graph indicate that both systems should be operating within the regulated 5th stage pressure of 42 (+/-8) psi at the N1 speed of 88% at both altitudes. See (Figure 305, Figure 305).

(a) If you are not sure if both N1 speeds were sufficient for both the bleed systems to be operating within the regulated 5th or regulated 9th stage pressure areas or if you suspect that one or both systems were operating in the switchover area between regulated 5th and regulated 9th stage pressures or in the unregulated 5th or 9th stage area, then it is possible that both systems are operating properly and you should perform the Fault Isolation Procedure.

NOTE: If N1 speeds and the altitude at the time the fault was observed on one or both systems falls within the 5th and 9th stage switchover area or the unregulated 5th or 9th stage area, the duct pressure split can be greater than the graphs(s) show during normal operation.

NOTE: In the unlikely event that the reported duct pressures are at 50 and 34 psi (PRSOV regulates to 42 +/-8 psi) when both systems are operating on regulated 5th stage, then both systems may be showing signs of degradation. You must use your judgement, airline policy, and the aircraft's bleed system history to determine your course of action.

(b) If you determine that both system pressures are within limits and there were no faults reported with any of the user systems such as air conditioning, pressurization, wing or cowl anti-ice systems, a wing body overheat or a false engine fire warning condition, then the system is operating properly and no further action is necessary. You should monitor the aircraft's pneumatic systems operation on subsequent flights.

NOTE: Pneumatic duct pressure must be a minimum of 18 psig to supply sufficient air for cabin pressurization.

(c) If you determine that one or both engine bleed systems has either low or high duct pressure, then continue.

(7) If you know which side has low duct pressure, do this task: Duct Pressure Low, the Engine is the Bleed Source - Fault Isolation, 36-10 TASK 804.

(8) If you know which side has high duct pressure, do this task: Duct Pressure High, the Engine is the Bleed Source - Fault Isolation, 36-10 TASK 803.

(9) If you do not know if either side has low or high duct pressure, then perform the Fault Isolation Procedure.

F. Fault Isolation

NOTE: The Fault Isolation procedure and the Repair Confirmation procedure in this task are similar. Both procedures require a high power run to determine if both pneumatic system duct pressures are within limits.

(1) Supply pressure to the pneumatic system with the APU. To supply pressure, do this task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

(a) You may use an external pneumatic source if the APU is not available to make sure the pneumatic duct pressure indications are accurate.

(b) If you use an external source, the pressure indication should be the same as the output of that source.

(c) The 12 psi minimum limit in the next step only applies if the APU is the pneumatic source.

(2) Make sure that the isolation valve is open.

(3) Make sure that the duct pressure pointers indicate a minimum of 12 psi.

(4) Make sure that the duct pressure indications are within 3 psi of each other:

(a) If the duct pressure indications are not within 3 psi of each other, then do this fault isolation procedure:

1) Do this task: Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation, 36-10 TASK 808.

(b) If the duct pressure indications are within 3 psi of each other, then continue.

(5) Supply pressure to the pneumatic system with both engines. To supply pressure, do this task: Supply Pressure to the Pneumatic System with One or Both Engines, AMM TASK 36-00-00-860-804.

(a) If applicable, set the APU BLEED switch on the P5-10 panel to OFF or remove any external pneumatic source.

(b) Set the ISOLATION VALVE switch on the P5-10 panel to CLOSE.

(c) Make sure that the engine BLEED 1 and 2 switches are set to ON.

(d) Make sure that both left and right manifold duct pressures increase to 10-25 psi:

NOTE: The duct pressure pointers on the dual duct pressure indicator may fluctuate without user systems in operation.

1) If both left and right manifold duct pressure do not increase to 10-25 psi, then record the pressures and continue.

NOTE: A dual duct pressure indication of less than 10 psi may be caused by a PRSOV not opening properly or a problem with the high stage regulator or high stage valve.

2) If both left and right manifold duct pressures increase to 10 - 25 psi, then continue.

(6) Set the L and R PACK switches on the P5-10 panel to AUTO.

(7) You can do the two steps [(7) and (8)] that follow at the same time or you can do them separately if you so choose.

NOTE: Doing them at the same time will prevent possible undesired airplane movement under inclement conditions.

CAUTION: DO NOT EXCEED THE ENGINE OPERATION LIMITS. FAILURE TO COMPLY WITH THE ENGINE LIMITS COULD RESULT IN ENGINE DAMAGE.

(8) Slowly increase the left engine N1 speed in 5-10% increments to 80% or greater as you monitor the engine N1 and pressure indications on the dual duct pressure indicator:

(a) To comply with the engine operation limits, do this task: Engine Operation Limits, AMM TASK 71-00-00-800-806-F00.

(b) Make sure the L pressure pointer on the dual duct pressure indicator follows the "Duct Pressure Versus N1 at Sea Level and 5000 feet" graph and stays within the limits of the graph.

1) Make a record of any N1 speeds and pressures where the pressure is either lower or higher than the limits of the graph.

(c) Keep the engine N1 speed at 80% or greater for a minimum of 5 minutes.

(d) Monitor left side duct pressure to make sure it stays at 42 (+/-8) psi.

1) If the left side duct pressure starts to decrease after it reaches a stable pressure of 42 (+/-8) psi, there is most likely a temperature related problem and not a presssure regulation fault.

a) Possible causes for the pressure decrease are a faulty high stage valve, high stage regulator, a precooler control valve, a precooler control valve sensor or the 450 F thermostat.

CAUTION: DO NOT EXCEED THE ENGINE OPERATION LIMITS. FAILURE TO COMPLY WITH THE ENGINE LIMITS COULD RESULT IN ENGINE DAMAGE.

(9) Slowly increase the right engine N1 speed in 5-10% increments to 80% or greater as you monitor the engine N1 and pressure indications on the dual duct pressure indicator:

(a) To comply with the engine operation limits, do this task: Engine Operation Limits, AMM TASK 71-00-00-800-806-F00.

(b) Make sure the R pressure pointer on the dual duct pressure indicator follows the "Duct Pressure Versus N1 at Sea Level and 5000 feet" graph and stays within the limits of the graph.

1) Make a record of any N1 speeds and pressures where the pressure is either lower or higher than the limits of the graph.

(c) Keep the engine N1 speed at 80% or greater for a minimum of 5 minutes.

(d) Monitor right side duct pressure to make sure it stays at 42 (+/-8) psi.

1) If the right side duct pressure starts to decrease after it reaches a stable pressure of 42 (+/-8) psi, there is most likely a temperature related problem and not a presssure regulation fault.

a) Possible causes for the pressure decrease are a faulty high stage valve, high stage regulator, a precooler control valve, a 390 F precooler control valve sensor or the 450 F thermostat.

(10) Set the L and R PACK switches to OFF.

(11) Slowly return both engine throttles to idle and allow the engines to stabilize.

(12) Do this task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

(13) If one or both sides has duct pressure lower than 34 psi when operating on regulated 5th stage pressure, less than 26 psi when operating on regulated 9th stage pressure or is less than 10 psi in the unregulated 9th stage mode, do this task:

(a) Do this task: Duct Pressure Low, the Engine is the Bleed Source - Fault Isolation, 36-10 TASK 804.

(14) If one or both sides has duct pressure higher than 50 psi when operating on regulated 5th stage pressure, higher than 38 psi when operating on regulated 9th stage pressure or higher than 25 psi when operating in the unregulated 9th stage mode, do this step:

(a) Do this task: Duct Pressure High, the Engine is the Bleed Source - Fault Isolation, 36-10 TASK 803.

(15) If you do not find a fault with either the left or right pneumatic systems, then one of these situations exist:

(a) There was an intermittent fault

(b) One or both of the pneumatic systems was operating in the 5th to 9th stage transition, the 9th to 5th stage transition, or the unregulated 5th or 9th stage; any of which make a duct pressure comparison invalid.

(c) Continue to the next step for a possible course of action.

(16) Use your judgment, airline policy, the history of the aircraft's pneumatic systems, and any reports of user systems malfunctions to determine which of the following actions to take:

(a) Monitor the system performance on subsequent flights

(b) Perform the Engine Bleed System Health Check and the Precooler Control Valve System Health Check:

1) Do this task: Engine Bleed Air System Health Check, AMM TASK 36-11-00-700-801.

2) Do this task: Precooler Control Valve System Health Check, AMM TASK 36-12-00-700-801.

G. Repair Confirmation

(1) Supply pressure to the pneumatic system with both engines. To supply pressure, do this task: Supply Pressure to the Pneumatic System with One or Both Engines, AMM TASK 36-00-00-860-804.

(a) If applicable, set the APU BLEED switch to OFF or remove any external pneumatic source.

(b) Set the ISOLATION VALVE switch to CLOSE.

(c) Make sure the duct pressure pressure pointers for both systems indicate 10 - 25 psi.

NOTE: The duct pressure pointers on the dual duct pressure indicator may fluctuate without user systems in operation.

NOTE: A dual duct pressure indication of less than 10 psi may be caused by a PRSOV not opening properly or a problem with the high stage regulator or high stage valve.

1) If one or both pneumatic systems do not indicate pressure, then fault isolate as follows:

a) Do this task: Duct Pressure Zero, the Engine is the Bleed Source - Fault Isolation, 36-10 TASK 805.

(d) Set the engine BLEED 1 and 2 switches on the P5-10 panel to OFF.

1) Observe that the manifold duct pressures in both the left and right sides decrease to 10 psi or less to make sure that the PRSOVs close.

2) If a PRSOV does not close, fault isolate as follows:

a) Do this task: Bleed Valve Will Not Close When the Bleed Switches Are Moved to Off, the Engine Is the Bleed Source - Fault Isolation, 36-10 TASK 802.

(e) Set the engine BLEED 1 and 2 switches on the P5-10 panel to ON.

(f) Observe that the manifold duct pressures in the left and right systems increase to 10 - 25 psi to make sure that both PRSOVs open.

NOTE: The duct pressure pointers on the dual duct pressure indicator may fluctuate with no user systems in operation.

(2) Set the L PACK switch on the P5-10 panel to AUTO.

CAUTION: DO NOT EXCEED THE ENGINE OPERATION LIMITS. FAILURE TO COMPLY WITH THE ENGINE LIMITS COULD RESULT IN ENGINE DAMAGE.

(3) Slowly increase the left engine N1 speed in 5-10% increments to 80% or greater as you monitor the engine N1 and pressure indications on the dual duct pressure indicator:

(a) To comply with the engine operation limits, do this task: Engine Operation Limits, AMM TASK 71-00-00-800-806-F00.

(b) Make sure the L pressure pointer on the dual duct pressure indicator follows the "Duct Pressure Versus N1 at Sea Level and 5000 feet" graph and stays within the limits of the graph.

1) Make a record of any N1 speeds and pressures where the pressure is either lower or higher than the limits of the graph.

(c) Keep the engine N1 speed at 80% or greater for a minimum of 5 minutes.

(d) Monitor left side duct pressure to make sure it stays at 42 (+/-8) psi.

1) If the left side duct pressure starts to decrease after it reaches a stable pressure of 42 (+/-8) psi, there is most likely a temperature related problem and not a pressure regulation fault.

NOTE: Possible causes for the pressure decrease are a faulty high stage valve, high stage regulator, a precooler control valve, a 390 F precooler control valve sensor or the 450 F thermostat.

(4) Set the R PACK switch on the P5-10 panel to AUTO.

CAUTION: DO NOT EXCEED THE ENGINE OPERATION LIMITS. FAILURE TO COMPLY WITH THE ENGINE LIMITS COULD RESULT IN ENGINE DAMAGE.

(5) Slowly increase the right engine N1 speed in 5-10% increments to 80% or greater as you monitor the engine N1 and pressure indications on the dual duct pressure indicator:

(a) To comply with the engine operation limits, do this task: Engine Operation Limits, AMM TASK 71-00-00-800-806-F00.

(b) Make sure the R pressure pointer on the dual duct pressure indicator follows the "Duct Pressure Versus N1 at Sea Level and 5000 feet" graph and stays within the limits of the graph.

1) Make a record of any N1 speeds and pressures where the pressure is either lower or higher than the limits of the graph.

(c) Keep the engine N1 speed at 80% or greater for a minimum of 5 minutes.

(d) Monitor right side duct pressure to make sure it stays at 42 (+/-8) psi.

1) If the right side duct pressure starts to decrease after it reaches a stable pressure of 42 (+/-8) psi, there is most likely a temperature related problem and not a presssure regulation fault.

NOTE: Possible causes for the pressure decrease are a faulty high stage valve, high stage regulator, a precooler control valve, a 390 F precooler control valve sensor or the 450 F thermostat.

(6) Slowly return both engine throttles to idle and allow the engines to stabilize.

(7) Do this task: Stop the Engine Procedure (Usual Engine Stop), AMM TASK 71-00-00-700-819-F00.

(8) If both pneumatic system pressures are within limits of the "Duct Pressure Versus N1 at Sea Level and 5000 feet" (or 10,000 feet) graphs when both bleeds are operating on either regulated 5th stage or both are operating on regulated 9th stage pressures, then you have corrected the fault.

(9) If one or both sides has duct pressure lower than 34 psi when operating on regulated 5th stage pressure, less than 26 psi when operating on regulated 9th stage pressure or is less than 10 psi in the unregulated 9th stage mode, do this task:

(a) Do this task: Duct Pressure Low, the Engine is the Bleed Source - Fault Isolation, 36-10 TASK 804.

(10) If one or both sides has duct pressure higher than 50 psi when oprating on regulated 5th stage pressure, higher than 38 psi when operating on regulated 9th stage pressure or higher than 25 psi when operating in the unregulated 9th stage mode, do this task:

(a) Do this task: Duct Pressure High, the Engine is the Bleed Source - Fault Isolation, 36-10 TASK 803.

(11) If you do not find a fault with either the left or right pneumatic systems, then one of these situations exist:

(a) There was an intermittent fault

(b) One or both of the pneumatic systems was operating in the 5th to 9th stage transition, the 9th to 5th stage transition, or the unregulated 5th or 9th stage; any of which make a duct pressure comparison invalid.

(c) Continue to the next step for a possible course of action.

(12) Use your judgment, airline policy, the history of the aircraft's pneumatic systems, and any reports of user systems malfunctions to determine which of the following actions to take:

(a) Monitor the system performance on subsequent flights

(b) Perform the Engine Bleed System Health Check and the Precooler Control Valve System Health Check:

1) Do this task: Engine Bleed Air System Health Check, AMM TASK 36-11-00-700-801.

2) Do this task: Precooler Control Valve System Health Check, AMM TASK 36-12-00-700-801.

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

END OF TASK

808. Duct pressure, L and R pointers not the same (split) the APU is the bleed source - Fault Isolation

A. Description

(1) Split duct pressure is a condition in which the duct pressure on one side, as shown on the dual pressure indicator, is either lower or higher than the duct pressure on the other side when the APU is the only bleed source and the isolation valve is open. When the APU BLEED switch is ON and the isolation valve is open, the duct pressure in the left and right pneumatic manifolds should be the same. The left and right pneumatic pressure indication systems should indicate the actual duct pressures within a tolerance of plus/minus 2 psi. However, when the left and right systems are pressurized by only the APU bleed air, the maximum duct pressure indication difference (split) between the left and right indication systems is 3 psi.

B. Possible causes:

(1) Duct pressure transducer, T405 (Left) or T403 (Right)

(a) Failure Mode: out of tolerance

(2) Dual duct pressure indicator, N12

(a) Failure Mode: out of tolerance

(3) Isolation valve

(a) Failure Mode: not in commanded position

(4) Leaky sense line or fittings

(a) Failure Mode: loose fittings or damaged tube assembly

(5) Wiring

(a) Failure Mode: open or shorted wiring

C. Circuit Breakers

(1) These are the primary circuit breakers related to the fault:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN
A	6	C01470	AIR CONDITIONING BLEED AIR XDCR LEFT
B	5	C00077	AIR CONDITIONING BLEED AIR PRESS IND
B	6	C01469	AIR CONDITIONING BLEED AIR XDCR RIGHT

D. Related Data

(1) Figure 302, Figure 303, Figure 309

(2) SSM 36-21-11

(3) WDM 36-21-11

E. Initial Evaluation

NOTE: The initial evaluation will direct you to fault isolation procedures for component faults or faults in the electrical wiring (or component internal electrical faults).

(1) Make sure that none of the circuit breakers listed below have tripped:

(a) These are the circuit breakers:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN

(Continued)

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	6	C01470	AIR CONDITIONING BLEED AIR XDCR LEFT
B	5	C00077	AIR CONDITIONING BLEED AIR PRESS IND
B	6	C01469	AIR CONDITIONING BLEED AIR XDCR RIGHT

(b) Reset any circuit breakers that you find tripped.

(c) If a circuit breaker trips again, then proceed to the Indication Circuit Wiring - Fault Isolation Procedure.

(d) If no circuit breaker was found tripped or if a circuit breaker was successfully reset, then continue.

(2) Remove the pressure from the pneumatic system if not previously accomplished. To remove the pneumatic pressure, do this task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806.

(3) Do this check of the precision of the dual duct pressure indicator:

(a) Make sure that the L and R pointers on the dual duct pressure indicator are at 0 (± 2) psi and are not split more than 3 psi.

(b) If one or both pointers do not indicate 0 (±2) psi or are split by 3 psi or greater, then perform the Indication System - Fault Isolation Procedure on the faulty indication system(s).

(c) If both pointers indicate 0 (±2) psi and are within 3 psi of each other, then continue.

(4) Supply pressure to the pneumatic system with the APU. To supply pressure, do this task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

NOTE: You may use a pneumatic ground source to supply pneumatic pressure.

(5) Set the ISOLATION VALVE switch on the P5-10 air conditioning panel to the OPEN position.

(6) If the duct pressure pointers on both sides are not within 3 psi of each other, then proceed to the Indication System - Fault Isolation Procedure.

(7) If the duct pressure needles on both sides indicate a minimum of 12 psi and are within 3 psi of each other, then do these steps:

(a) Set the R PACK switch on the P5-10 air conditioning panel to the AUTO or HIGH position.

NOTE: The left and right duct pressure indications may fluctuate momentarily.

(b) Allow the left and right duct pressures to stabilize.

(c) Make sure that the L and R duct pressure pointers are within 3 psi of each other:

1) If the L and R duct pressure pointers are within 3 psi of each other, then the system is normal and no further action is required.

2) If the L and R duct pressure pointers are not within 3 psi of each other, then continue.

(8) Look at the position indicator on the isolation valve.

(9) If the position indicator shows that the valve is not fully open, then fault isolate the isolation valve:

(a) Do this task: Isolation Valve Does Not Open or Close Properly - Fault Isolation, 36-10 TASK 806.

(10) If the position indicator shows that the valve is fully open, then look for leaks at the sense lines and sense line fittings between the duct and the duct pressure transducer.

(11) If you find leakage, then do these steps:

(a) Repair any leakage or problems that you find:

1) Use Never-Seez Pure Nickel Special anti-seize compound (or euivalent) when you reconnect sense lines.

(b) Do the Repair Confirmation at the end of this task.

(12) If you do not find any leakage, then do the Indication System - Fault Isolation Procedure.

F. Indication System - Fault Isolation Procedure

(1) Set the ISOLATION VALVE switch on the P5-10 panel to the OPEN position.

(2) If not done previously, look at the position indicator on the isolation valve to make sure it is fully open:

(a) If the isolation valve is not fully open, then fault isolate the valve as follows:

1) Do this task: Isolation Valve Does Not Open or Close Properly - Fault Isolation, 36-10 TASK 806.

(b) If the isolation valve is fully open, then continue.

(3) Do these steps to prepare for a check of the precision of the indication system:

(a) Remove the pressure from the pneumatic system if not previously accomplished. To remove the pneumatic pressure, do this task: Remove Pressure from the Pneumatic System, AMM TASK 36-00-00-860-806.

(b) Disconnect the flexible sense line from the pneumatic duct in the system (left or right) that is suspected to be out of tolerance.

(c) Install a nitrogen source and a 60 psi test gauge, part of C36001-44 (or equivalent), to the flexible sense line.

NOTE: The test equipment used in this step is part of P/N C36001-44 Engine Bleed Air System Test Equipment listed in the 737 Illustrated Tool and Equipment List (ITEL).

CAUTION: DO NOT EXCEED 50 PSI. EXCESSIVE PRESSURE CAN DAMAGE THE EQUIPMENT.

(4) Supply 50 psi to the pressure transducer with the nitrogen source.

(5) Do these checks for leakage in the pneumatic indication system:

(a) Use a soap solution to examine for leaks in the flexible sense line and connections.

(b) If you find leaks in the flexible sense line and connections, do these steps:

1) Remove the pressure from the transducer.

2) Repair any leaks that you find:

a) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) when you reconnect the flexible sense line or connections.

3) Supply 50 psi with the nitrogen source to the transducer and test gage.

a) Make sure that all leaks have been repaired.

b) Continue.

(c) If there is no leakage detected in the flexible sense line and connections, then continue.

(6) Make sure that the applicable pointer on the dual duct pressure indicator agrees within +/-3 psi of the test gage.

(7) If the applicable pointer on the dual duct pressure indicator does not agree within +/-3 psi of the test gage, then do these steps:

(a) Remove the pressure from the transducer.

(b) Replace the pressure transducer. These are the tasks:

- Duct Pressure Transducer Removal, AMM TASK 36-21-01-000-801
- Duct Pressure Transducer Installation, AMM TASK 36-21-01-400-801

NOTE: The nitrogen source and the test gage should still be connected to the flexible sense line.

(c) Supply 50 psi to the transducer.

(d) If the applicable pointer on the dual duct pressure indicator agrees within +/-3 psi of the test gage, then do these steps:

1) Remove the pressure.

2) Disconnect the test gage.

3) Reconnect the flexible sense line to the pneumatic system duct.

a) Use Never-Seez Pure Nickel Special anti-seize compound (or equivalent) at the connection.

4) Do the Repair Confirmation at the end of this task.

(e) If the applicable pointer on the dual duct pressure indicator does not agree within +/-3 psi of the test gage, then continue.

(f) Remove the pressure from the transducer.

(g) Replace the dual duct pressure indicator. These are the tasks:

- Dual Duct Pressure Indicator Removal, AMM TASK 36-21-02-600-801
- Dual Duct Pressure Indicator Installation, AMM TASK 36-21-02-600-802

(h) Supply 50 psi to the transducer.

(i) Make sure that the applicable pointer on the dual duct pressure indicator agrees within +/-3 psi of the test gage:

1) If the applicable pointer on the dual duct pressure indicator does not agree within +/-3 psi of the test gage, do these steps:

a) Remove the pressure to the transducer.

b) Do the Indication Circuit Wiring - Fault Isolation Procedure.

2) If the applicable pointer on the dual duct pressure indicator agrees within +/-3 psi of the test gage, then do the Repair Confirmation at the end of this task.

(8) If the applicable pointer on the dual duct pressure indicator agrees within +/-3 psi of the test gage, then continue.

(9) Do the above steps, as applicable, to examine the precision of the pressure transducer on the other pneumatic indication system.

G. Indication Circuit Wiring - Fault Isolation Procedure

NOTE: This procedure is used when circuit breakers have tripped and cannot be reset or components have been replaced and the fault still exists.

(1) Do these steps for a check of the indication circuit wiring:

(a) If any of the system circuit breakers tripped, isolate and repair the short in the wiring or faulty component.

(b) Do a check of the wiring between these components WDM 36-21-11:

1) The load side of circuit breaker C77 on the P6-4 panel and the dual duct pressure indicator, N12

2) As applicable, the load side of circuit breaker C1469 on the P6-4 panel and the right manifold transducer, T403

3) As applicable, the load side of circuit breaker C1470 on the P6-4 panel and the left manifold transducer, T405

4) As applicable, the dual duct pressure indicator and the left manifold transducer, T405, and/or the right manifold transducer, T403.

(c) Repair any problems that you find.

(d) Do the Repair Confirmation at the end of this task.

H. Repair Confirmation

(1) Supply pressure to the pneumatic system with one of the steps below:

(a) Do this task: Supply Pressure to the Pneumatic System with the APU, AMM TASK 36-00-00-860-803.

(b) Do this task: Supply Pressure to the Pneumatic System with an External Ground Air Source, AMM TASK 36-00-00-860-802.

(2) Examine the dual pressure indicator, N12, on the P5-10 air conditioning panel as follows:

(a) Make sure that the duct pressure pointers on both sides are within 3 psi of each other.

1) If the duct pressure pointers on both sides are within 3 psi of each other, then you corrected the fault.

2) If the duct pressure pointers on both sides are not within 3 psi of each other, then return to the step you were at in the Initial Evaluation or Fault Isolation Procedure and continue.

(3) Remove pressure from the pneumatic system:

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

——— END OF TASK ———

809. QUICK FIM TASK - Bleed Trip, the Engine is the Bleed Source - Fault Isolation

A. Description

(1) This is a QUICK FIM TASK. It is designed to quickly isolate the most common faulty components for Bleed Trip based on operator experience. If no resolution can be made by the use of this task, it is recommended that the operator use BLEED TRIP OFF Light On - Fault Isolation, 36-10 TASK 801.

(2) SDS SUBJECT 36-11-00, SDS SUBJECT 36-12-00

(3) Bleed Trip is most often a cooling problem. This Quick FIM Task will concentrate on the cooling aspect of the pneumatic system. This includes the Precooler Control Valve, 390° Sensor and 450° Sensor.

(4) Bleed Trip can be caused by an overpressure situation where too much pressure enters the system via the High Stage Valve. This would only happen at high thrust levels of takeoff and climb. Based on operator experience, it is more likely that a bleed trip is caused by a cooling problem. Because of this, the overpressure scenario is not included in this task.

(5) A partially stuck open High Stage Valve could cause an over temperature condition that the precooler system cannot cool. This is not considered likely but is possible. Since this is very easy to look at, it is included in this task.

(6) A faulty 490° overtemperature switch or bleed air regulator overpressure switch could provide a false bleed trip. Damaged wiring or ACAU could also provide a false bleed trip.

(7) It is not necessary to accomplish all steps in this Task, however, there may be multiple faults causing low duct pressure and completing this Task is recommended and will ensure all faults are corrected.

B. Possible Causes

(1) Precooler System

(a) Precooler control valve - Failure Mode: Valve not modulating correctly or stuck closed.

(b) 390° sensor - Failure Mode: Sensor is out-of-tolerance, stuck closed or plugged.

(c) 450° sensor – Failure Mode: Sensor is out of tolerance, stuck closed, or plugged.

(d) Kiss seal - Failure Mode: Damaged, foreign object debris (FOD), blocked fan airflow.

(e) Precooler - Failure Mode: Foreign object debris blocking fan airflow, degraded operational capability.

(2) High Stage System

(a) High Stage Valve - Failure Mode: Stuck open butterfly plate.

C. Circuit Breakers

(1) These are the primary circuit breakers related to the fault:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN
A	6	C01470	AIR CONDITIONING BLEED AIR XDCR LEFT
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	5	C00077	AIR CONDITIONING BLEED AIR PRESS IND
B	6	C01469	AIR CONDITIONING BLEED AIR XDCR RIGHT
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

D. Related Data

(1) Component Location (Figure 301)

(2) Component Location (Figure 302)

(3) Duct Pressure Versus N1 at Sea Level and 5000 Feet Graph (Figure 305)

(4) Duct Pressure Versus N1 at Sea Level, 10K, 22K, 31K, 37K and 41K Feet Graph (Figure 305)

(5) Troubleshooting Check (Figure 309)

(6) Pneumatic System Control Valve Position Indicators (Figure 312)

(7) (SSM 36-11-11)

(8) (WDM 36-11-11)

E. Initial Evaluation

(1) Because a bleed trip is most likely a cooling problem, this procedure looks at the cooling system almost exclusively.

Bleed Trip Fault Table Organized by Flight Phase.

CONDI-TION	GROUND/TAXI	TAKEOFF	CLIMB	CRUISE	IDLE/DESCENT
Normal Operation	WTAI OFF-18 to 22 psig WTAI ON 12 to 14 psig HSV: Full OPEN PRSOV: Full OPEN PCCV: CLOSED Engine supply pressure and temperature are below regulation levels.	34 to 50 psig HSV: CLOSED PRSOV: Regulating PCCV: Regulating Engine supply pressure and temperature are being regulated	34 to 50 psig HSV: CLOSED PRSOV: Regulating PCCV: Regulating Engine supply pressure and temperature are being regulated	26 to 50 psig HSV: May be CLOSED or Regulating PRSOV: May be Regulating or OPEN PCCV: May be Regulating or CLOSED At lower cruise settings, engine pressure and temperature may drop below regulated levels.	WTAI OFF - 18 to 25 psig HSV: Full OPEN PRSOV: Full OPEN PCCV: CLOSED Engine supply pressure and temperature are below regulation levels.
Bleed Trip	Supply pressure and temperature are not sufficient to cause a TRIP	Trips immediately on high power - Mid to late takeoff roll-over temperature: - PCCV/390° Sensor, 450° Sensor not operating properly, or plugged 390° or 450° sensor sense lines	Over temperature: - PCCV/390° Sensor, 450° Sensor not operating properly, or plugged 390° or 450° sensor sense lines	Temperature should be below TRIP level but may be above TRIP level. - PCCV/390 Sensor, 450° Sensor not operating properly, or plugged 390 or 450° sensor sense lines	Top of descent (part power) - Over temperature: - PCCV/390 Sensor, 450° Sensor not operating properly, or plugged 390 or 450° sensor sense lines

F. Fault Isolation Procedure

(1) Do the following to prepare the airplane for troubleshooting:

(a) Make sure with electrical power on, the applicable engine BLEED switch is set to ON.

1) If electrical power is not available, supply electrical power.

(b) Make sure there is no pressure in the pneumatic system:

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

(c) Make sure the fuel shutoff lever for the applicable engine is in the cutoff position.

1) Install DO-NOT-OPERATE tags.

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

(2) Do the following to deactivate the leading edge flaps and slats and thrust reverser.

(a) Retract the leading edge flaps and slats if not previously accomplished:

1) Do this task: Leading Edge Flaps and Slats Retraction, AMM TASK 27-81-00-860-804.

(b) Deactivate the leading edge flaps and slats:

1) Do this task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

(c) Deactivate the applicable thrust reverser:

1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00.

(d) Open the applicable thrust reverser:

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

(3) Do the following to check the positions of the PCCV and HSV:

(a) Look at the position indicator/manual override nut on the precooler control valve to make sure it is in the OPEN position. Use a dental mirror, STD-3907 if necessary.

1) If the precooler control valve is not open or 30° from full open, replace the valve by following these procedures:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Precooler Control Valve Removal, AMM TASK 36-12-02-000-801

Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

(b) Look at the position indicator/manual override nut on the high stage valve to make sure it is in the CLOSED position.

1) If the high stage valve is not closed, replace the valve by following these procedures:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

High Stage Valve Removal, AMM TASK 36-11-06-000-801

High Stage Valve Installation, AMM TASK 36-11-06-400-801

(4) Do the following to prepare for troubleshooting the precooler system.

(a) Connect a nitrogen pressure source, STD-1455, pressure regulator, STD-1454 to supply pressure tee for PCCV as shown in Figure 313, View B.

(b) Remove the cap on the precooler control valve control line and install a gage with needle valve as shown in Figure 313, View C.

(c) Adjust the regulator on the nitrogen pressure source, STD-1455 to provide 130–250 psi (9–17 Bar or 900-1700 kPa) to the pressure regulator, STD-1454.

(5) Do the following to test the precooler control valve.

(a) Slowly adjust the regulator installed in Figure 313, View B to provide 70-75 psi.

1) Make sure the control pressure (Pc) gauge, installed in Figure 313, View C., shows that the control pressure (Pc) is 6 -11 psi.

2) If control pressure (Pc) is less than 6 psig, check the control pressure sense lines for leaks and fix all leaks found. If control pressure (Pc) is still less than 6 psig, replace the precooler control valve. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Precooler Control Valve Removal, AMM TASK 36-12-02-000-801

Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

3) If control pressure (Pc) is greater than 11 psig, replace the precooler control valve. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Precooler Control Valve Removal, AMM TASK 36-12-02-000-801

Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

(b) Slowly open the needle shutoff valve to reduce the control pressure (Pc). Use a dental mirror if necessary and watch the precooler control valve position indicator.

(c) Make sure the precooler control valve position indicator moves fully open or to within 30° of fully open when control pressure (Pc) is 3 psig or greater.

1) If the precooler control valve did not move fully open or to within 30° of fully open when the control pressure (Pc) was 3 psig or greater, then replace the precooler control valve. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Precooler Control Valve Removal, AMM TASK 36-12-02-000-801

Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

(d) Close needle valve.

(6) Remove test equipment from the engine and restore all connections.

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

(7) If no faults were found, the problem could be with the following parts:

(a) 390° Sensor and 450° Sensor

(b) Kiss Seal

(c) Precooler

(d) 490° Overtemperature Switch

(e) Wiring faults

(f) ACAU

(8) Check the kiss seal for deformation. Make sure that it makes a proper seal between the precooler control valve and the precooler.

(a) If the kiss seal is deformed or has gaps that would allow fan air to escape, or is otherwise not installed correctly, replace the kiss seal.

(9) Move the kiss seal and check the precooler inlet for obstructions.

(a) Remove any obstructions found.

(10) There is no procedure to test the 390° and 450° sensors. Because all else has shown to be good, replace the 390° and 450° sensors. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Precooler Control Valve Sensor Removal, AMM TASK 36-12-03-000-801

Precooler Control Valve Sensor Installation, AMM TASK 36-12-03-400-801

Thermostat Removal, AMM TASK 36-11-05-000-801

Thermostat Installation, AMM TASK 36-11-05-400-801

(11) If the airplane has another report of a bleed trip, please refer to BLEED TRIP OFF Light On - Fault Isolation, 36-10 TASK 801.

——— END OF TASK ———

810. QUICK FIM TASK - Duct Pressure Low, the Engine is the Bleed Source - Fault Isolation

A. Description

(1) This is a QUICK FIM TASK. It is designed to quickly isolate the most common faulty components for low duct pressure based on operator experience. If no resolution can be made by the use of this task, it is recommended that the operator use Duct Pressure Low, the Engine is the Bleed Source - Fault Isolation, 36-10 TASK 804.

(2) SDS SUBJECT 36-11-00, SDS SUBJECT 36-12-00

(3) Low duct pressure is conditional based on the phase of flight, altitude, and throttle settings. Using Figure 305, the technician can determine whether a pilot report of low duct pressure is a real fault or within operational tolerances.

(4) If phase of flight is known, a determination of which part of the pneumatic system may be at fault and only those items need to have troubleshooting performed. For instance, if the phase of flight is takeoff or climb, the high stage regulator and high stage valve should not be operational and they do not need to be tested. If the phase of flight is cruise or descent, then all items in the pneumatic system can be operational and complete system troubleshooting per this task is recommended.

(5) If phase of flight or altitude and N1 is not known, it is suggested that the operator complete all the troubleshooting in this task.

(6) It is not necessary to accomplish all steps in this Task, however, there may be multiple faults causing low duct pressure and completing this Task is recommended and will ensure all faults are corrected.

B. Possible Causes

(1) Precooler System - Temperature

(a) Precooler control valve - Failure Mode: Valve not modulating correctly or stuck closed.

(b) 390° sensor - Failure Mode: Sensor is out-of-tolerance, stuck closed or plugged.

(c) Kiss seal - Failure Mode: Damaged, foreign object debris (FOD), blocked fan airflow.

(d) Precooler - Failure Mode: Foreign object debris blocking fan airflow, degraded operational capability.

(2) Pressure Regulating System

(a) PRSOV - Failure Mode: Sticking butterfly valve or leaky control pressure side.

(b) Bleed Air Regulator - Failure Mode: regulates control pressure too low.

(c) 450° Sensor - Failure Mode: Out of tolerance or failed open.

(3) High Stage System

(a) High Stage Valve - Failure Mode: Sticking butterfly valve or leaky control pressure side.

(b) High Stage Regulator - Failure Mode: regulates control pressure too low.

(4) Leaky Sense Lines or Fittings.

(a) Failure Mode: loose connections or damaged lines.

1) PRSOV control pressure line from bleed air regulator to PRSOV and 450° F thermostat line (5th and 9th stage operation).
2) Supply line to the bleed air regulator (5th and 9th stage operations).
3) Control pressure line between the high stage regulator and high stage valve (9th stage operation).
4) Supply pressure line to high stage regulator (9th stage operations).
5) Transducer sense line: low duct pressure APU and engines (all phases of operation).

C. Circuit Breakers

(1) These are the primary circuit breakers related to the fault:

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	5	C00259	AIR CONDITIONING BLEED AIR VALVE ISLN
A	6	C01470	AIR CONDITIONING BLEED AIR XDCR LEFT
A	7	C00796	AIR CONDITIONING BLEED AIR VALVES L
B	5	C00077	AIR CONDITIONING BLEED AIR PRESS IND
B	6	C01469	AIR CONDITIONING BLEED AIR XDCR RIGHT
B	7	C00797	AIR CONDITIONING BLEED AIR VALVES R

D. Related Data

(1) Component Location (Figure 301)
QU
(2) Component Location (Figure 302)
(3) Duct Pressure Versus N1 at Sea Level and 5000 Feet Graph (Figure 305)
(4) Duct Pressure Versus N1 at Sea Level, 10K, 22K, 31K, 37K and 41K Feet Graph (Figure 305)
(5) Troubleshooting Check (Figure 309)
(6) Pneumatic System Control Valve Position Indicators (Figure 312)
(7) (SSM 36-11-11)
(8) (WDM 36-11-11)

E. Initial Evaluation

(1) Use the table below as a reference guide to possible causes and effects of low duct pressure.

Low Duct Pressure Fault Table Organized by Flight Phase.

CONDITION	GROUND/TAXI	TAKEOFF	CLIMB	CRUISE	IDLE/DESCENT
Normal Operation	WTAI OFF-18 to 22 psig WTAI ON 12 to 14 psig HSV: Full OPEN PRSOV: Full OPEN PCCV: CLOSED Engine supply pressure and temperature are below regulation levels	34 to 50 psig HSV: CLOSED PRSOV: Regulating PCCV: Regulating Engine supply pressure and temperature are being regulated	34 to 50 psig HSV: CLOSED PRSOV: Regulating PCCV: Regulating Engine supply pressure and temperature are being regulated	26 to 50 psig HSV: May be CLOSED or Regulating PRSOV: May be Regulating or OPEN PCCV: May be Regulating or CLOSED At lower cruise settings, engine pressure and temperature may drop below regulated levels.	WTAI OFF - 18 to 25 psig HSV: Full OPEN PRSOV: Full OPEN PCCV: CLOSED Engine supply pressure and temperature are below regulation levels.
Bleed Pressure Low	Most likely a High Stage system Fault. Go to Quick FIM Task 810, Step F.2.c, and 7, 8, and 9	Most likely a cooling problem. -Precooler Control Valve not modulating open properly causing high temps, go to Quick FIM 810 Step, F.2.a, and steps 3-4 - BAR, PRSOV, or sense line leak, go to Quick FIM 810 Step, F.2.b, and steps 3 and 5.	Most likely a cooling problem. -Precooler Control Valve not modulating open properly causing high temps, go to Quick FIM 810 Step, F.2.a, and steps 3-4 - BAR, PRSOV, or sense line leak, go to Quick FIM 810 Step, F.2.b, and steps 3 and 5.	Low duct pressure could be caused by a cooling problem, a PRSOV problem, or a High Stage system problem. It is recommended to complete Quick FIM Task 810.	Low duct pressure could be caused by a cooling problem, a PRSOV problem, or a High Stage system problem. It is recommended to complete Quick FIM Task 810.

(2) If the pilot report includes the low duct pressure value, the altitude, and the N1 engine speed at the time of the low duct pressure, you can use Figure 305 sheet 2 of 2 to determine if the report of low duct pressure is valid. If the pressure is within tolerance, then there is no fault.

(3) Because the PRSOV has a tolerance of 34-50 psi and the High Stage Valve has a tolerance of 26-38 psi, a low pressure that is noted by flight crew that is 34 psi or above, is not considered a low duct pressure. See Figure 305 to determine stage of operation if possible.

(4) If the low duct pressure report is valid, it is more often the case that it is a result of a cooling problem. This would indicate that the 450° sensor is working properly. Therefore the precooler control valve and/or the 390° sensor are not working properly in most cases.

F. Fault Isolation Procedure

(1) Do the following to prepare the airplane for troubleshooting:

(a) Make sure with electrical power on, the applicable engine BLEED switch is set to ON.

1) If electrical power is not available, supply electrical power.

(b) Make sure there is no pressure in the pneumatic system:

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

(c) Make sure the fuel shutoff lever for the applicable engine is in the cutoff position.

1) Install DO-NOT-OPERATE tags.

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

(2) Do the following to deactivate the leading edge flaps and slats and thrust reverser.

(a) Retract the leading edge flaps and slats if not previously accomplished:

1) Do this task: Leading Edge Flaps and Slats Retraction, AMM TASK 27-81-00-860-804.

(b) Deactivate the leading edge flaps and slats:

1) Do this task: Leading Edge Flaps and Slats - Deactivation, AMM TASK 27-81-00-040-801.

(c) Deactivate the applicable thrust reverser:

1) Do this task: Thrust Reverser Deactivation For Ground Maintenance, AMM TASK 78-31-00-040-802-F00.

(d) Open the applicable thrust reverser:

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

(3) Do the following to check the positions of the PCCV, PRSOV, and HSV:

(a) Look at the position indicator/manual override nut on the precooler control valve to make sure it is in the OPEN position. Use a dental mirror, STD-3907 if necessary.

1) If the precooler control valve is not open or 30° from full open, replace the valve by following these procedures:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Precooler Control Valve Removal, AMM TASK 36-12-02-000-801

Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

(b) Look at the position indicator/manual override nut on the PRSOV to make sure it is in the CLOSED position.

1) If the PRSOV is not closed, replace the PRSOV by following these procedures:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

PRSOV Removal, AMM TASK 36-11-04-000-801

PRSOV Installation, AMM TASK 36-11-04-400-801

(c) Look at the position indicator/manual override nut on the High Stage Valve to make sure it is in the CLOSED position.

1) If the high stage valve is not closed, replace the valve by following these procedures:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

High Stage Valve Removal, AMM TASK 36-11-06-000-801

High Stage Valve Installation, AMM TASK 36-11-06-400-801

(4) Do the following to prepare for troubleshooting the Precooler and PRSOV systems.

(a) Connect a nitrogen pressure source, STD-1455, pressure regulator, STD-1454 to supply pressure tee for the bleed air regulator and PCCV as shown in Figure 309, View A.

(b) Disconnect the control line to the PRSOV and tee in a gage as shown in Figure 309, View B.

(c) Remove the cap on the precooler control valve control line and install a gage with needle valve as shown in Figure 313, View C.

(d) Adjust the regulator on the nitrogen pressure source, STD-1455 to provide 130–250 psi (9–17 Bar or 900-1700 kPa) to the pressure regulator, STD-1454.

(5) Do the following to test the precooler control valve.

(a) Slowly adjust the regulator installed in Figure 309, View A to provide 70-75 psi.

1) Make sure the control pressure (Pc) gauge, installed in Figure 313, View C., shows that the control pressure (Pc) is 6 -11 psi.

2) If control pressure (Pc) is less than 6 psig, check the control pressure sense lines for leaks and fix all leaks found. If control pressure (Pc) is still less than 6 psig, replace the precooler control valve. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Precooler Control Valve Removal, AMM TASK 36-12-02-000-801

Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

3) If control pressure (Pc) is greater than 11 psig, replace the precooler control valve. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Precooler Control Valve Removal, AMM TASK 36-12-02-000-801

Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

(b) With supply pressure still at 70-75, slowly open the needle shutoff valve to reduce the control pressure (Pc). Watch the precooler control valve position indicator. Use a dental mirror, STD-3907 if necessary.

(c) Make sure the precooler control valve position indicator moves fully open or to within 30° of fully open when control pressure (Pc) is 3 psig or greater.

1) If the precooler control valve did not move fully open or to within 30° of fully open when the control pressure (Pc) was 3 psig or greater, then replace the precooler control valve. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Precooler Control Valve Removal, AMM TASK 36-12-02-000-801

Precooler Control Valve Installation, AMM TASK 36-12-02-400-801

(d) Close needle valve.

(6) Do the following to test the PRSOV system.

(a) Increase supply pressure (Ps) to 70-75 psig and check the control pressure (Pc) gage installed in Figure 309, View B.

(b) Is control pressure (Pc) 20 to 28 psig and the PRSOV fully open?

(c) If yes, go to Step 7.

(d) If control pressure is less than 20 psi, check all of the control pressure lines for leaks.

1) If leaks are found, reduce supply pressure to 0 psi and fix the leaks.

(e) Increase supply pressure to 70-75 psi. Make sure control pressure is 20-28 psi.

1) If control pressure is between 20-28 psi, go to step 7.

(f) If control pressure (Pc) is less than 20 psi, reduce supply pressure to 0 psi, disconnect the control pressure (Pc) gauge from the PRSOV and install a cap on the open end of the control pressure (Pc) gauge connection as shown in Figure 309, View D.

(g) Increase supply pressure (Ps) to 70-75 psig and check the control pressure (Pc).

1) If the control pressure (Pc) is 20 to 28 psig, the PRSOV must be replaced. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

PRSOV Removal, AMM TASK 36-11-04-000-801

PRSOV Installation, AMM TASK 36-11-04-400-801

(h) If control pressure (Pc) is less than 20 psi, reduce supply pressure to 0 psi, disconnect the control pressure (Pc) sense line from the PRSOV/450°F thermostat (Figure 309, View D) and install a cap on the sense line to isolate the 450° sensor.

(i) Increase supply pressure (Ps) to 70-75 psig and check control pressure (Pc).

1) If control pressure (Pc) is less than 20 psig, replace the bleed air regulator. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Bleed Air Regulator Removal, AMM TASK 36-11-03-000-801

Bleed Air Regulator Installation, AMM TASK 36-11-03-400-801

2) If control pressure (Pc) is 20 to 28 psig, the sense lines to the 450° sensor need to be checked. If there are leaks, fix the leaks. If there are no leaks, replace the 450° sensor. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Thermostat Removal, AMM TASK 36-11-05-000-801

Thermostat Installation, AMM TASK 36-11-05-400-801

(7) Remove test equipment from the engine and restore all connections.

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

(8) Do the following to prepare for troubleshooting the high stage system.

(a) Set up test equipment as shown in Figure 309, View F.

1) Hook up to supply pressure (Ps) for high stage regulator and control pressure pressure (Pc) for high stage valve.

NOTE: A union will be needed to connect the test line to the supply pressure sense line. Do not connect the test line to the duct.

(9) Do the following to test the high stage system.

(a) Increase supply pressure (Ps) to 70-75 psig. If control pressure (Pc) is 14 -18 psig, go to Step 10.

(b) If control pressure is above 18 psig, replace HSR.

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

High Stage Regulator Removal, AMM TASK 36-11-07-000-801

High Stage Regulator Installation, AMM TASK 36-11-07-400-801

(c) If control pressure is below 14 psi, check all of the control pressure lines for leaks.

1) If leaks are found, reduce supply pressure to 0 psi and fix the leaks.

(d) Increase supply pressure (Ps) to 70-75 psig. If control pressure (Pc) is below 14 psig, disconnect the control pressure (Pc) gauge connection from the high stage valve.

(e) Install a cap or plug with a 0.032 inch (0.813 mm) hole to the open end of the control pressure (Pc) gauge connection.

NOTE: The cap or plug with the 0.032 inch (0.813 mm) hole allows the high stage regulator to properly regulate the control pressure (Pc) for this procedure. It can be made by taking a cap or plug and drilling a hole using a number 67 drill bit.

(f) Increase supply pressure (Ps) to 70-75 psig.

(g) If control pressure (Pc) is less than 14 psig, replace the high stage regulator. Do these tasks.

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

High Stage Regulator Removal, AMM TASK 36-11-07-000-801

High Stage Regulator Installation, AMM TASK 36-11-07-400-801

(h) If control pressure (Pc) is 14 to 18 psig, replace the high stage valve. Do these tasks.

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

High Stage Valve Removal, AMM TASK 36-11-06-000-801

High Stage Valve Installation, AMM TASK 36-11-06-400-801

(10) Remove troubleshooting equipment and restore all connections.

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

(11) If no faults were found, the problem could be with the following parts:

(a) Kiss Seal

(b) Precooler

(c) 390° Sensor

(d) 450° Sensor

(e) Pressure transmitter or indicator

(f) Wiring faults

(12) Check the kiss seal for deformation. Make sure that it makes a proper seal between the precooler control valve and the precooler.

(a) If the kiss seal is deformed or has gaps that would allow fan air to escape, or is otherwise not installed correctly, replace the kiss seal.

(13) Move the kiss seal and check the precooler inlet for obstructions.

(a) Remove any obstructions found.

(14) There is no procedure to test the 390° and 450° sensors. Because all else has been shown to be good, replace the 390° and 450° sensors. Do these tasks:

NOTE: Use compound, D00010 (Alternate: Never-Seez NSBT compound, D00006) on the threads of all fittings when connecting the sense lines.

Thermostat Removal, AMM TASK 36-11-05-000-801

Thermostat Installation, AMM TASK 36-11-05-400-801

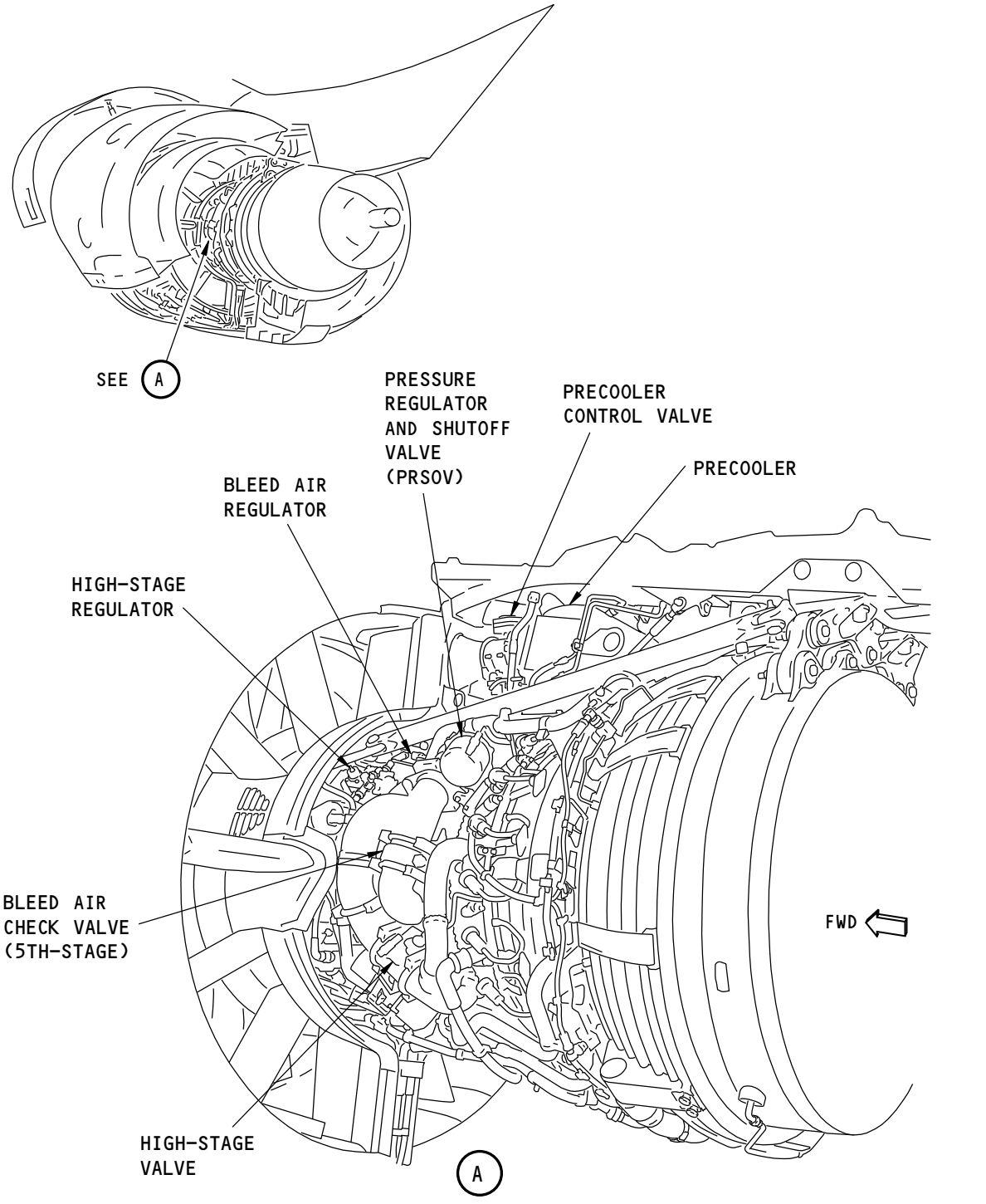
Precooler Control Valve Sensor Removal, AMM TASK 36-12-03-000-801

Precooler Control Valve Sensor Installation, AMM TASK 36-12-03-400-801

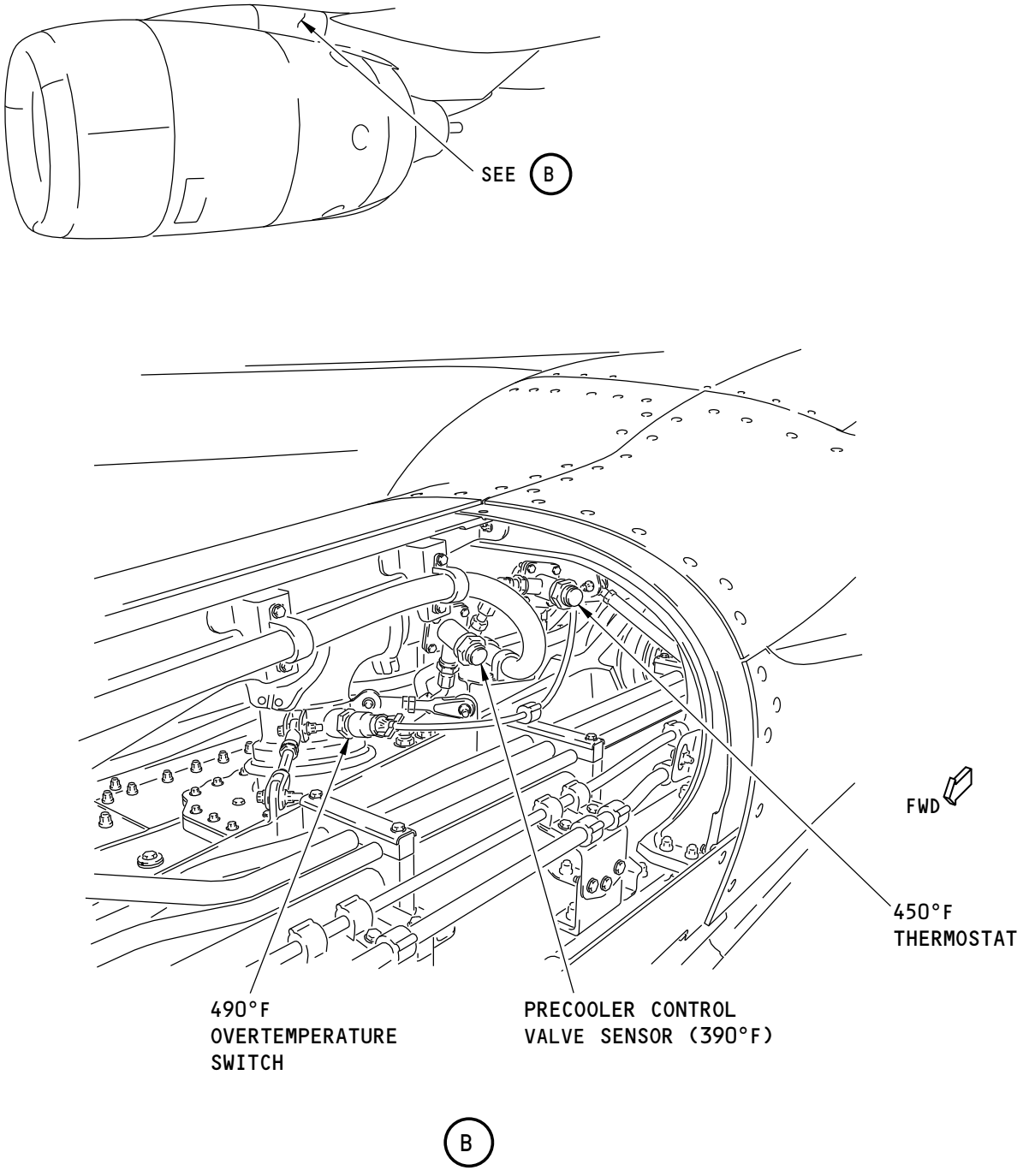
(15) If the problem has not been fixed, please refer to Duct Pressure Low, the Engine is the Bleed Source - Fault Isolation, 36-10 TASK 804.

G. Repair Confirmation

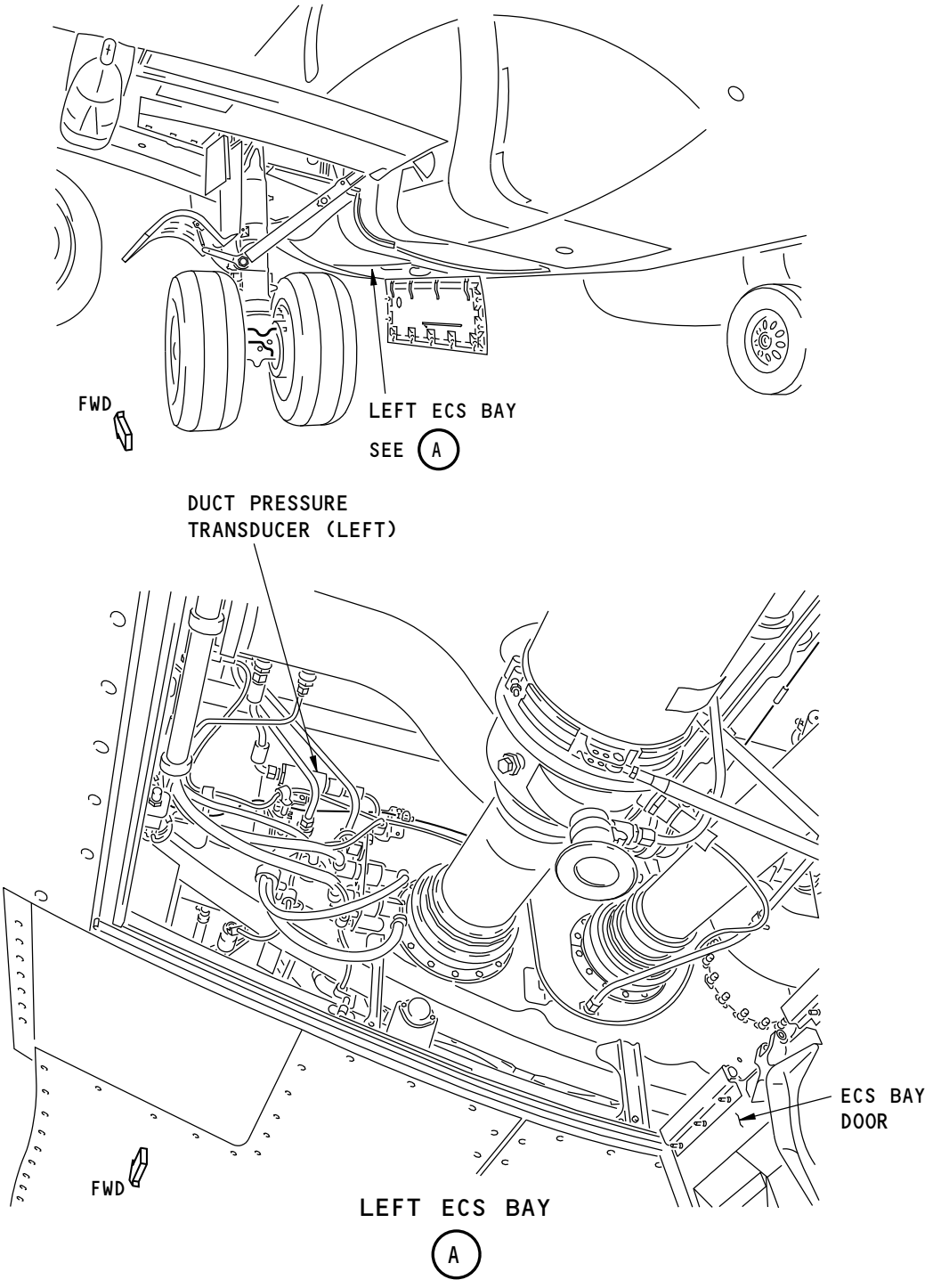
END OF TASK



Pneumatic System on the Engine/Strut Component Location
Figure 301/36-10-00-990-801 (Sheet 1 of 2)

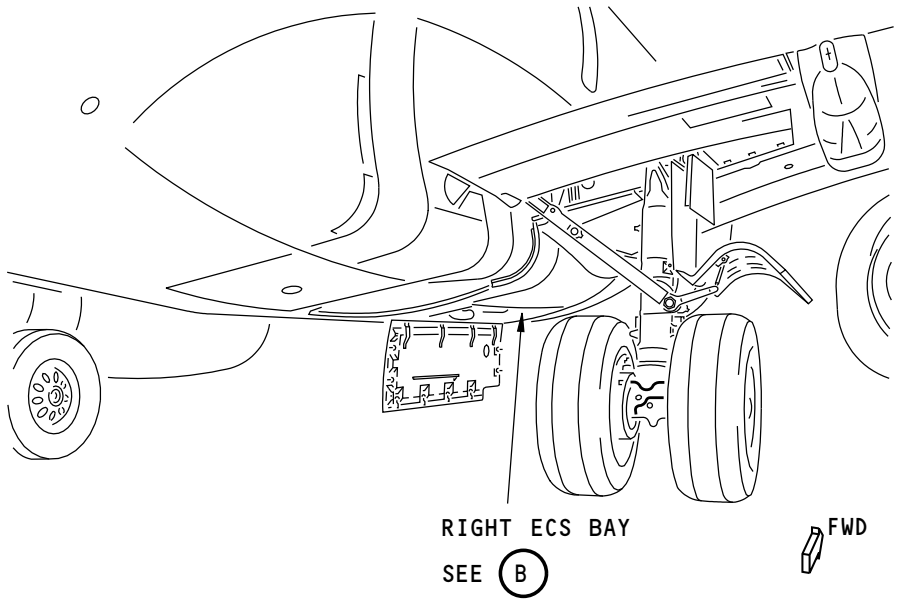


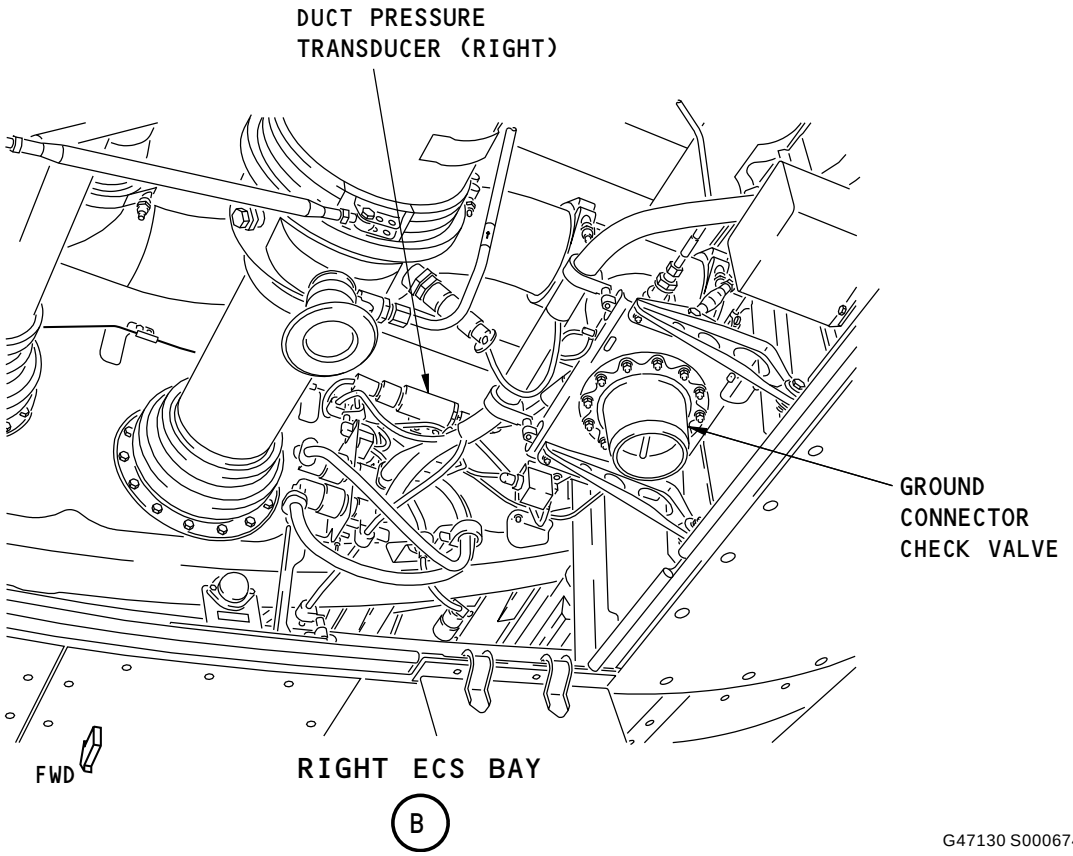
Pneumatic System on the Engine/Strut Component Location
Figure 301/36-10-00-990-801 (Sheet 2 of 2)



G47128 S0006744850_V1

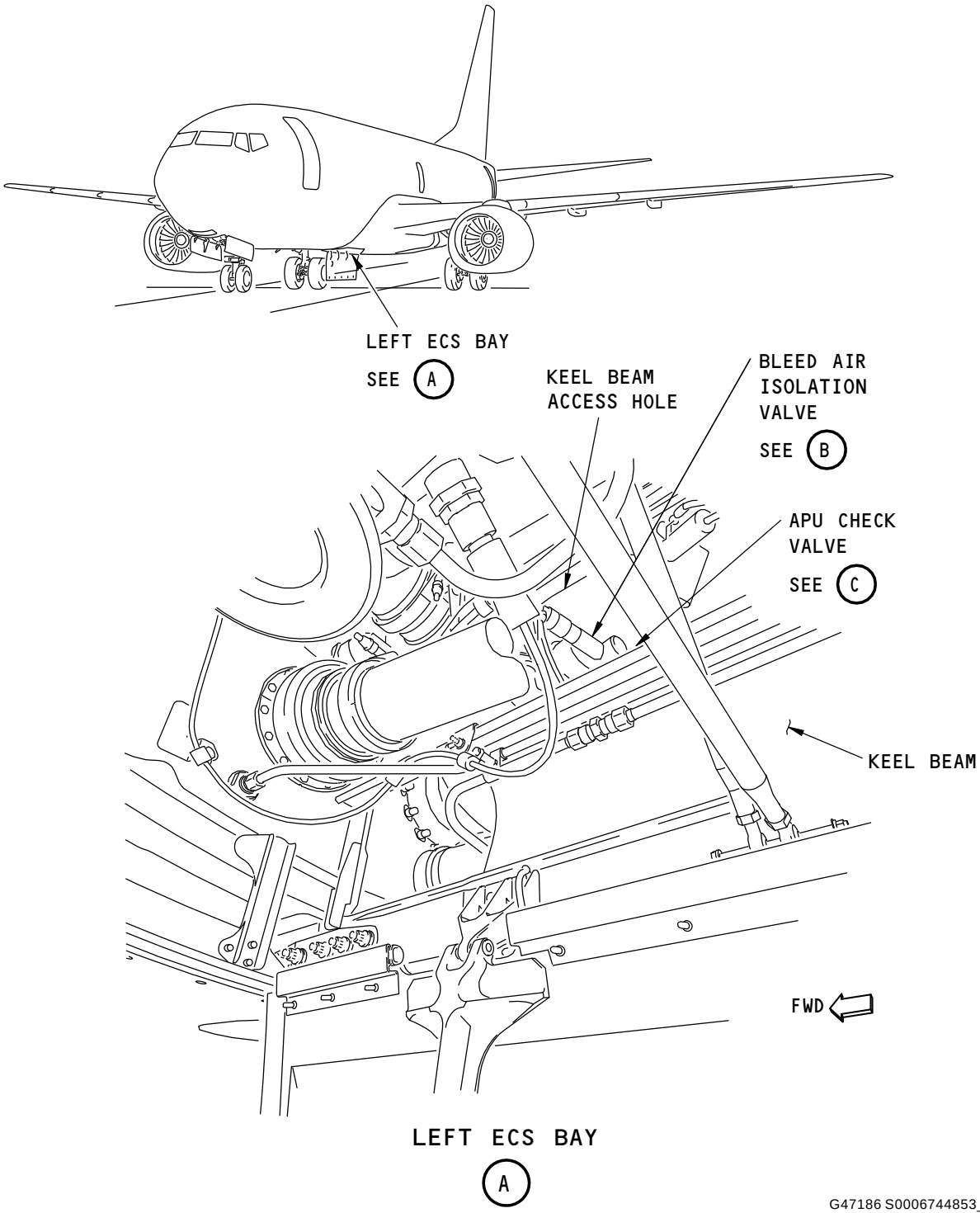
Pneumatic System in the ECS Bay Component Location
Figure 302/36-10-00-990-802 (Sheet 1 of 2)



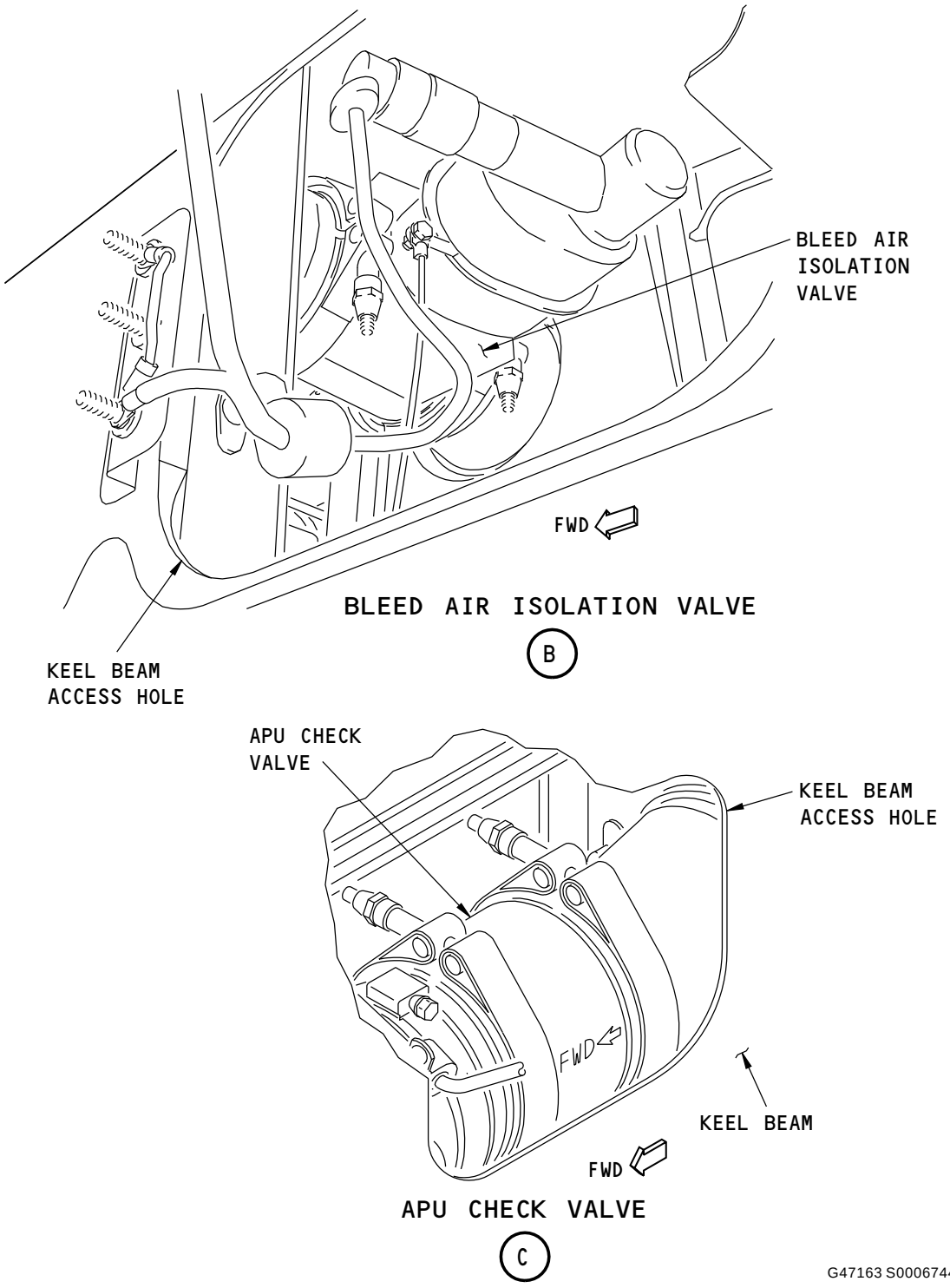


G47130 S0006744851_V1

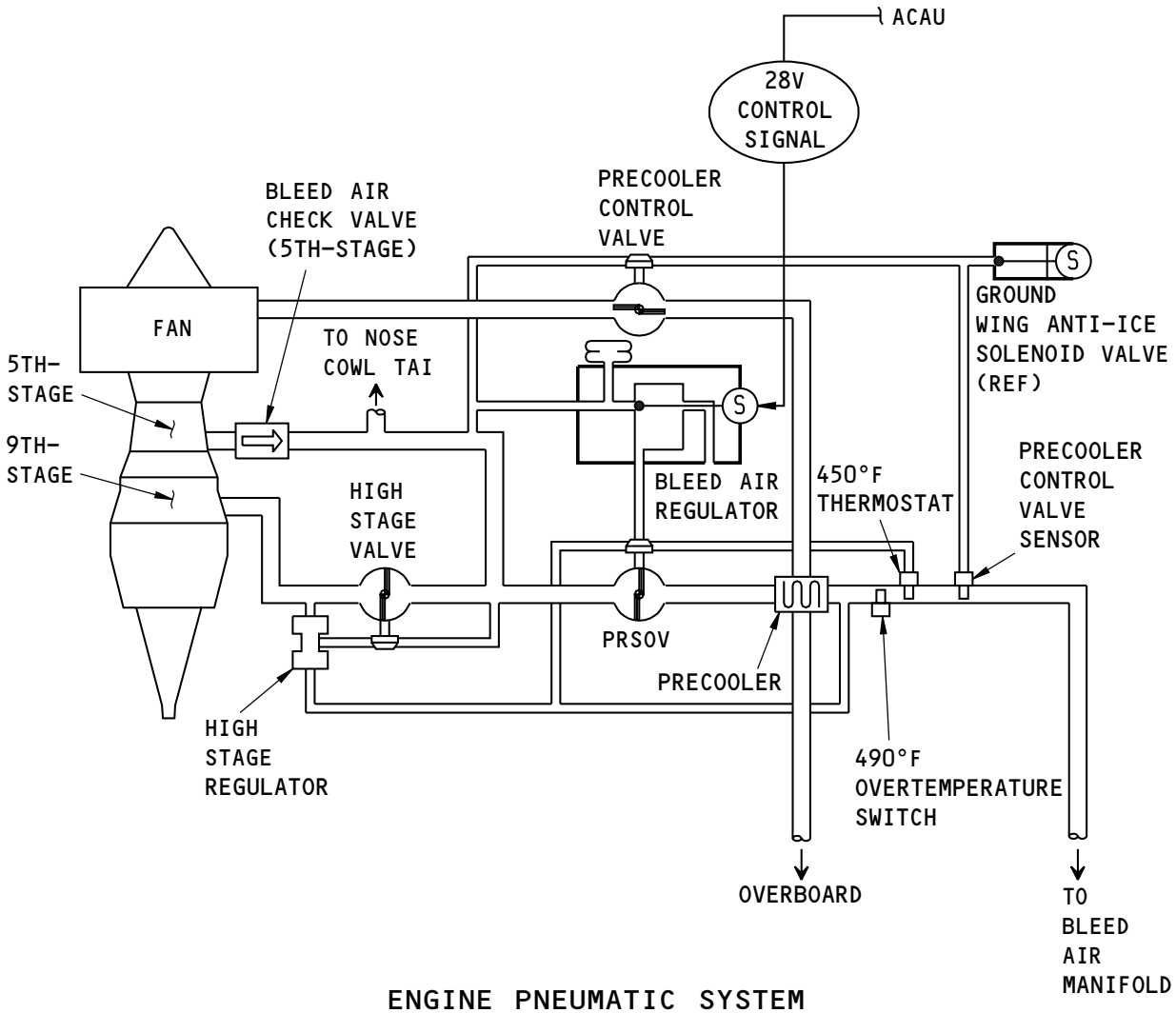
Pneumatic System in the ECS Bay Component Location
Figure 302/36-10-00-990-802 (Sheet 2 of 2)



Pneumatic System in the Keel Beam Component Location
Figure 303/36-10-00-990-803 (Sheet 1 of 2)



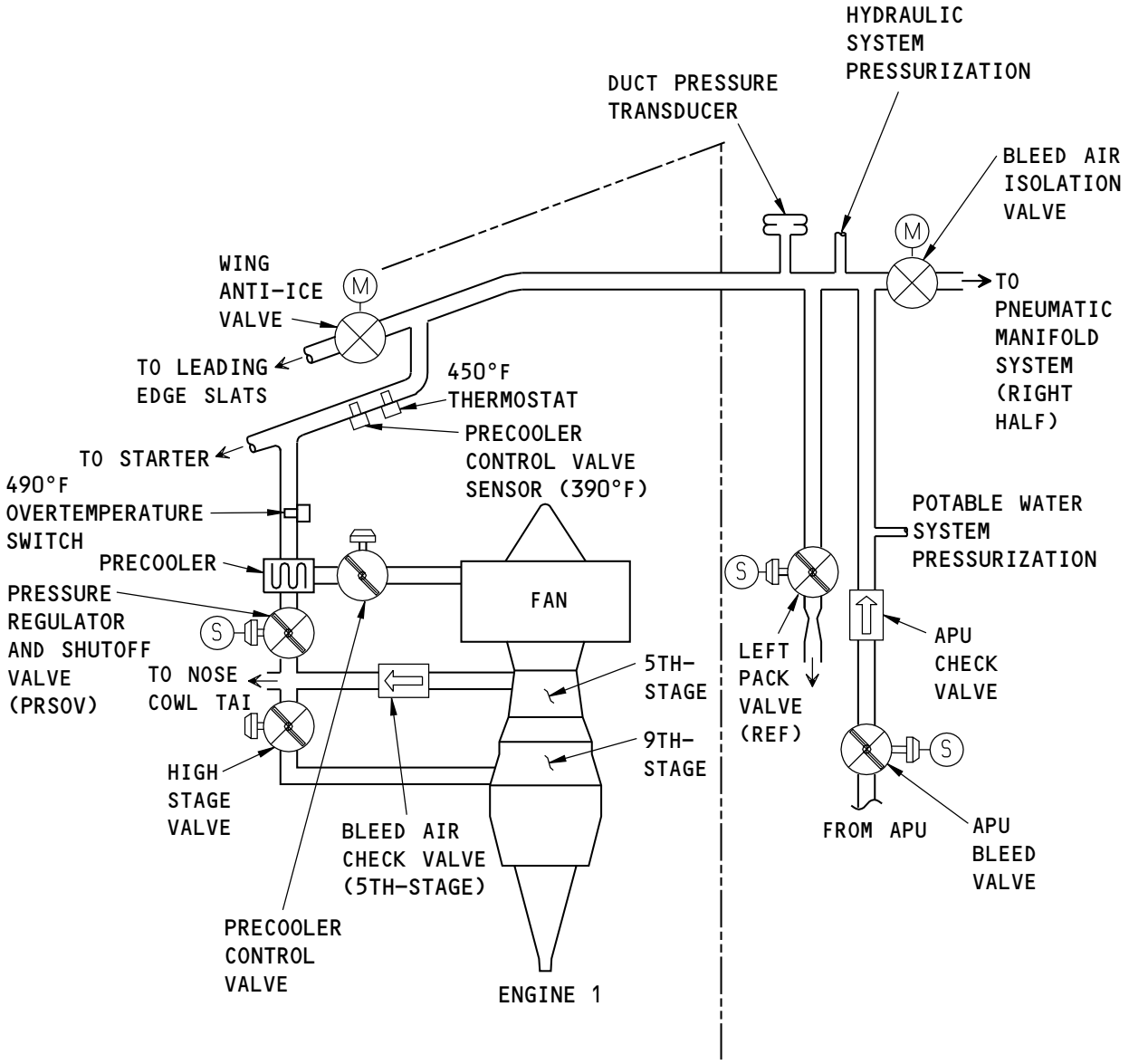
Pneumatic System in the Keel Beam Component Location
Figure 303/36-10-00-990-803 (Sheet 2 of 2)



ENGINE PNEUMATIC SYSTEM

G43678 S0006744855_V1

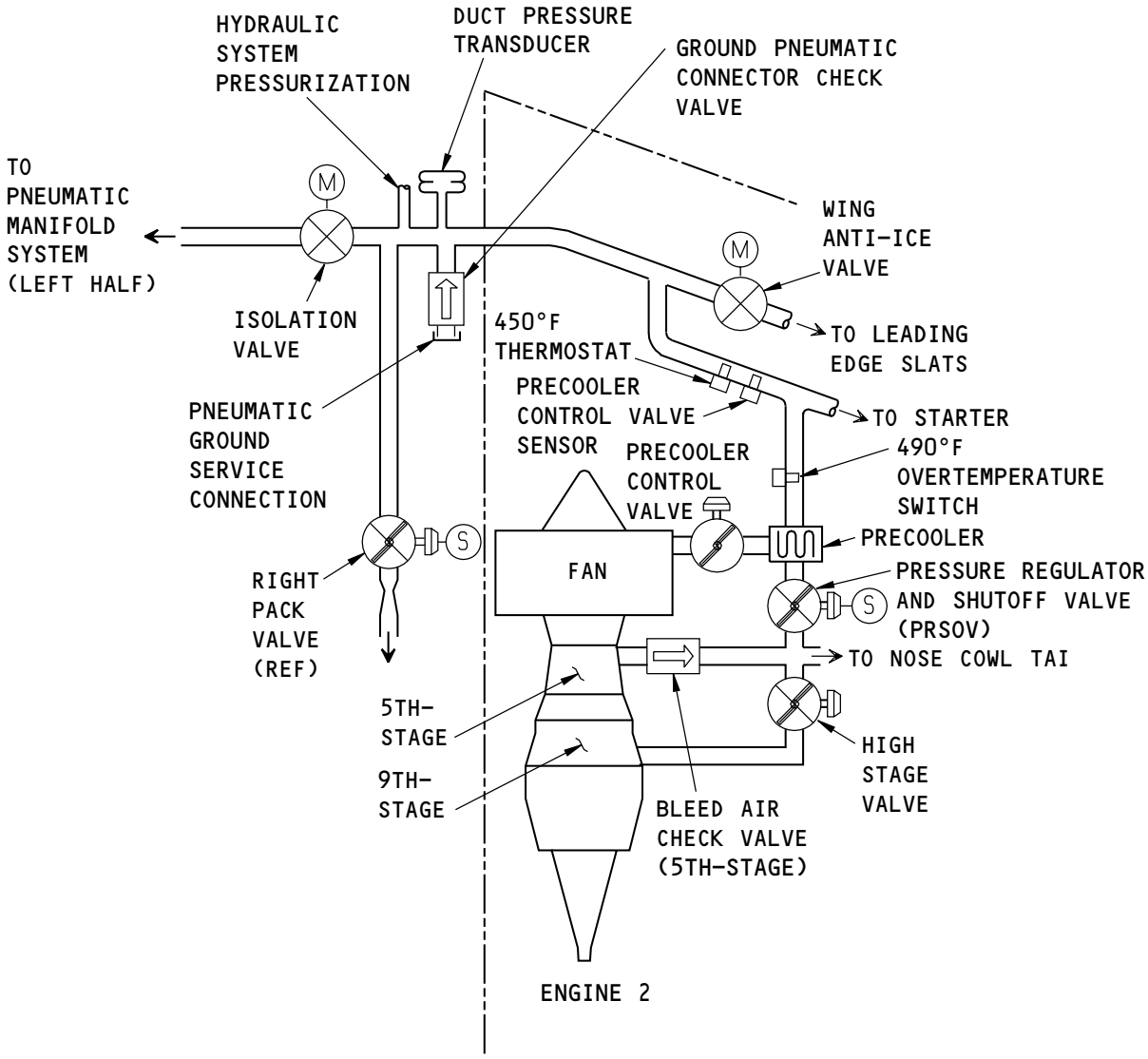
Pneumatic System Schematic
Figure 304/36-10-00-990-804 (Sheet 1 of 3)



PNEUMATIC MANIFOLD SYSTEM
(LEFT HALF)

G49426 S0006744856_V1

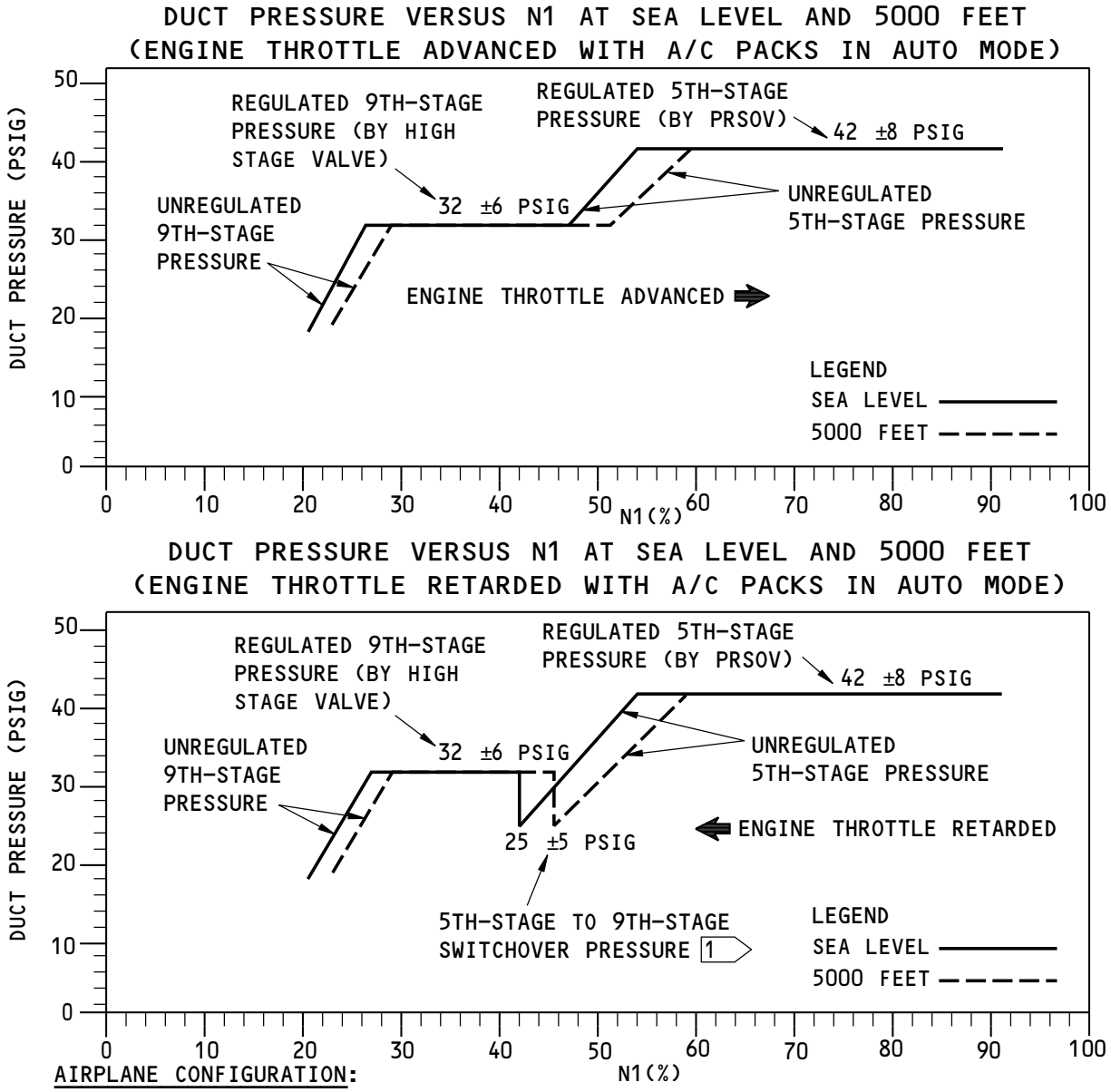
Pneumatic System Schematic
Figure 304/36-10-00-990-804 (Sheet 2 of 3)



PNEUMATIC MANIFOLD SYSTEM
(RIGHT HALF)

G49700 S0006744858_V1

Pneumatic System Schematic
Figure 304/36-10-00-990-804 (Sheet 3 of 3)

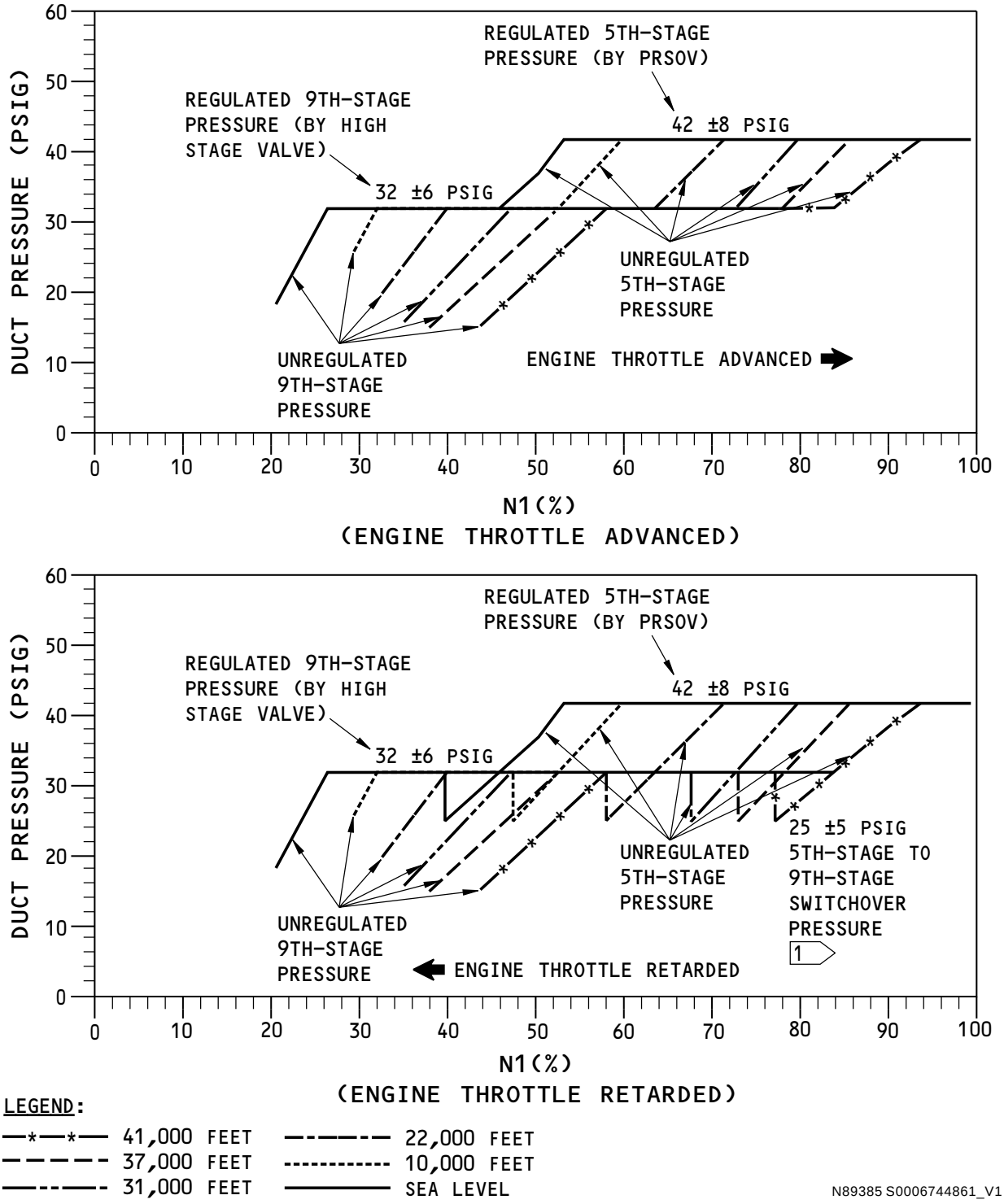


AIRPLANE CONFIGURATION:
ASSOCIATED PACK: AUTO
ASSOCIATED BLEED: ON
ASSOCIATED CTAI: OFF
ISOLATION VALVE: CLOSED
WTAI: OFF

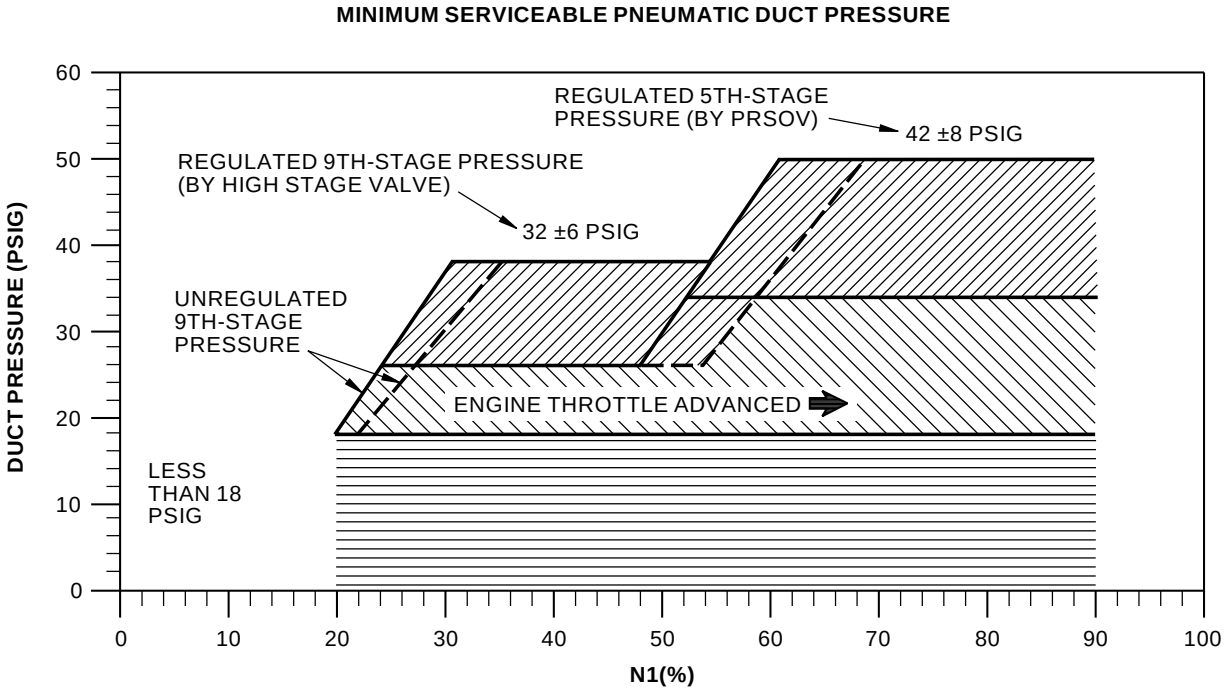
1 WHEN THE ENGINE THROTTLE IS RETARDED AND THE ENGINE BLEED SYSTEM SWITCHOVER OCCUR FROM 5TH-STAGE PRESSURE TO 9TH-STAGE PRESSURE, DUCT PRESSURE CAN DECAY TO AS LOW AS 20 PSIG BEFORE THE HIGH STAGE VALVE OPENS AND REGULATES THE DUCT PRESSURE TO NOMINAL 32 PSIG.

G08869 S0006577919_V2

Duct Pressure Versus N1 at Various Altitudes
Figure 305/36-10-00-990-805 (Sheet 1 of 2)



Duct Pressure Versus N1 at Various Altitudes
Figure 305/36-10-00-990-805 (Sheet 2 of 2)



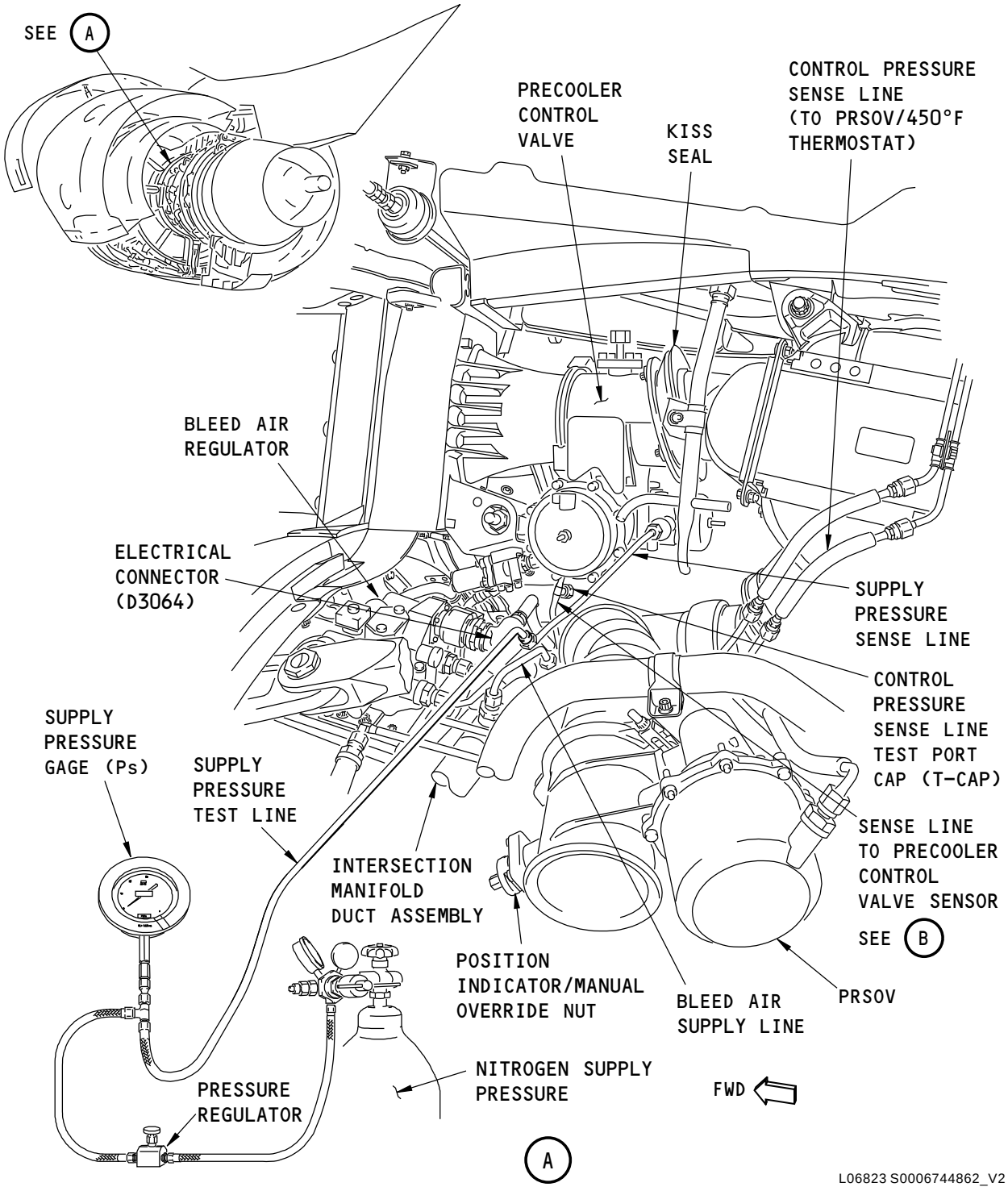
NOTE: MINIMUM POWER IN FLIGHT IS GREATER THAN MINIMUM POWER ON THE GROUND.

LEGEND:

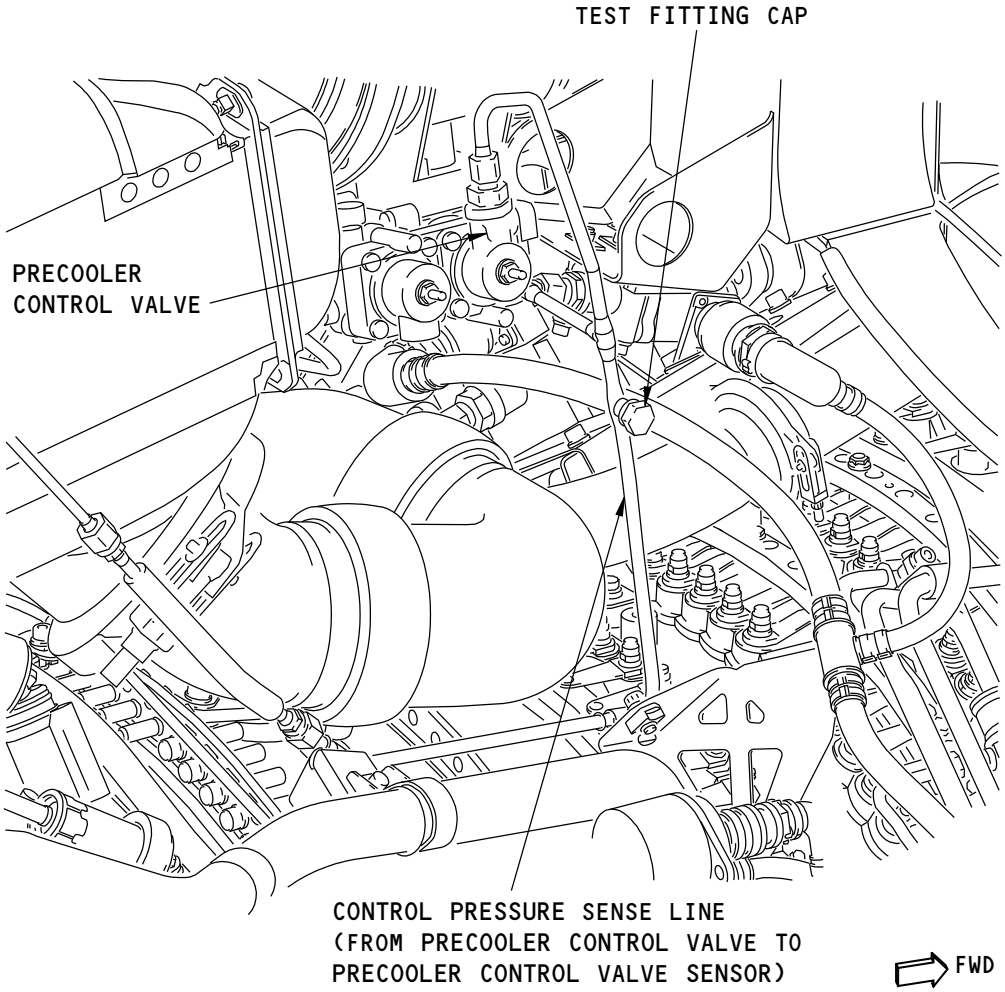
- SEA LEVEL
- 5000 FEET
- BLEED SYSTEM OPERATING NORMALLY.
- BLEED SYSTEM PERFORMANCE DRIFTING. AIRPLANE CAN BE OPERATED NORMALLY BUT ACTION TO RESTORE BLEED SYSTEM TO OPTIMUM OPERATION SHOULD BE TAKEN AT A CONVENIENT OPPORTUNITY.
- BLEED SYSTEM INOPERATIVE. RESTORE TO NORMAL OPERATION BEFORE FLIGHT OR IMPOSE THE MEL RESTRICTION FOR CONTINUED OPERATION.

1418175 S0000255925_V4

Minimum Serviceable Pneumatic Duct Pressure
Figure 306/36-10-00-990-812



Bleed Trip Off Light On. The Engine Is the Bleed Source.
Figure 307/36-10-00-990-806 (Sheet 1 of 2)

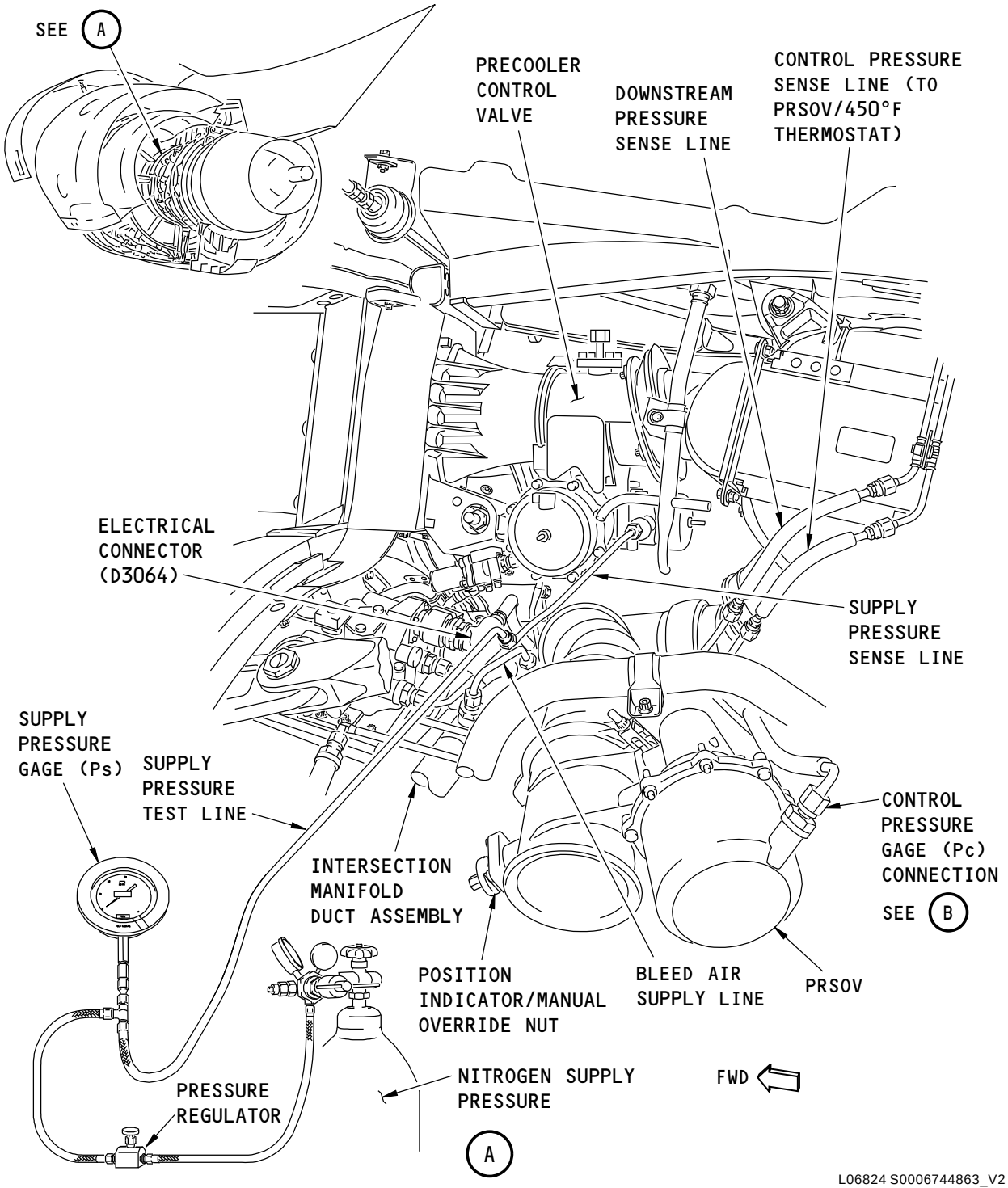


CONTROL PRESSURE SENSE LINE

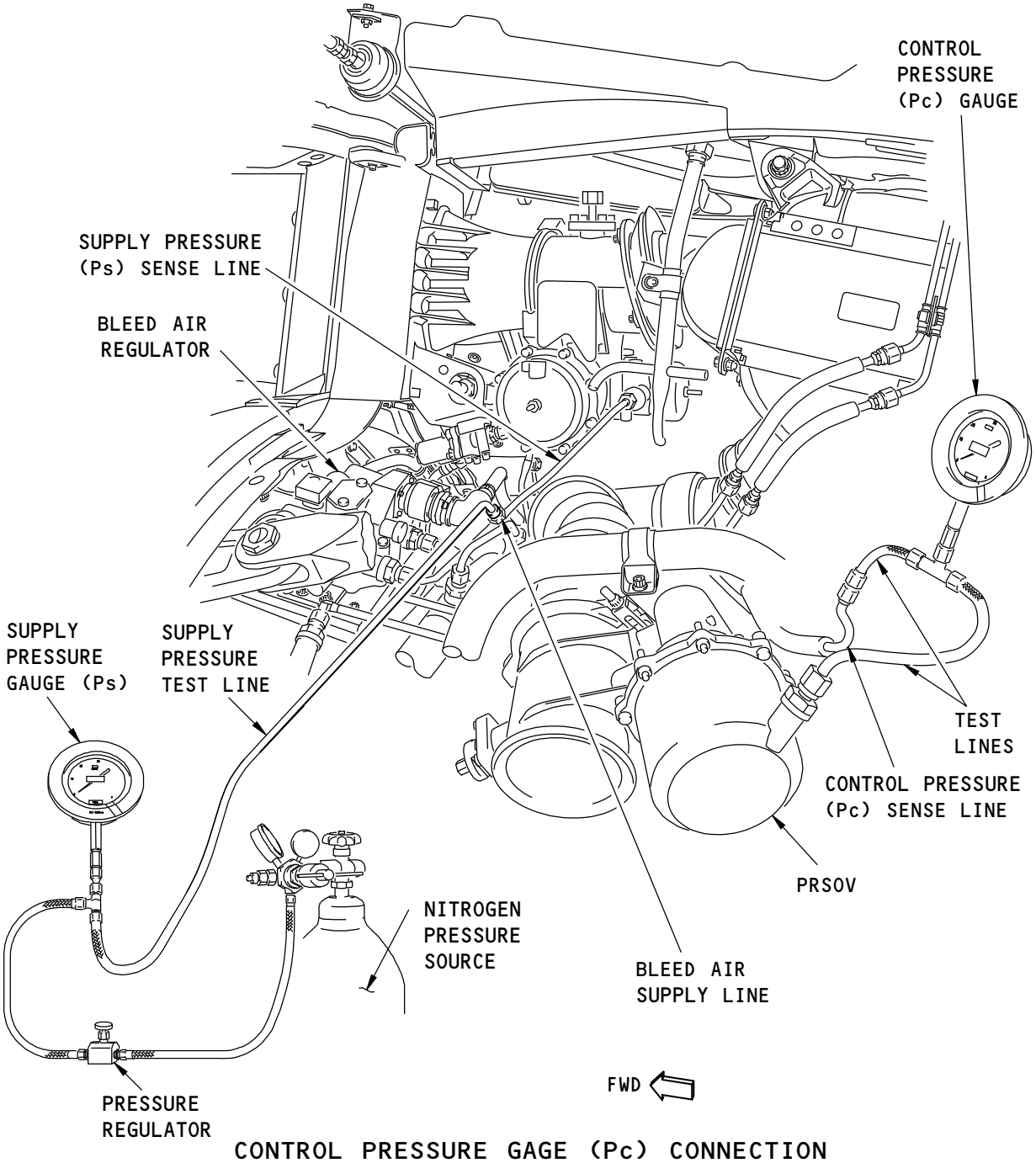
B

1363445 S0000246231_V1

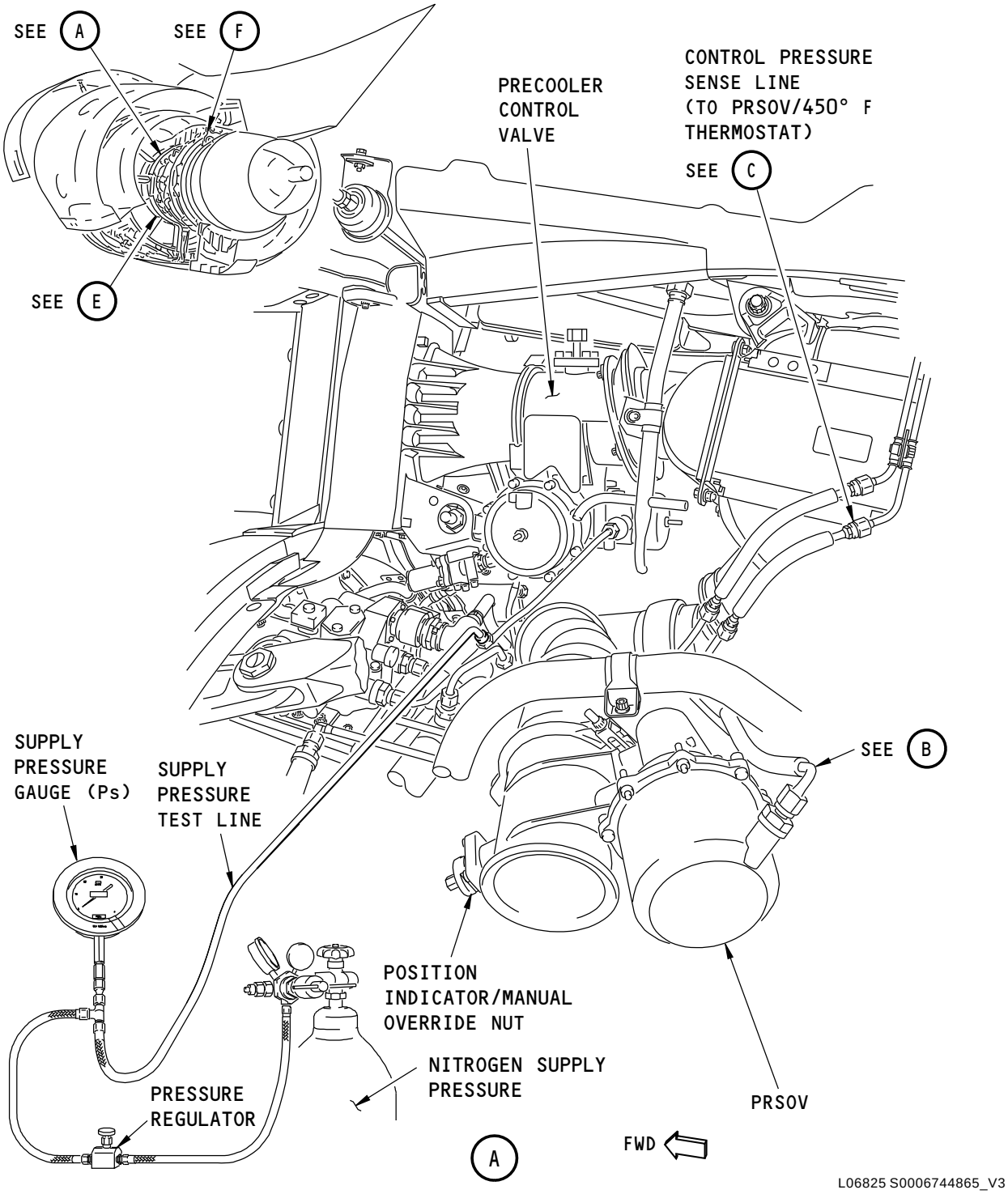
Bleed Trip Off Light On. The Engine Is the Bleed Source.
Figure 307/36-10-00-990-806 (Sheet 2 of 2)



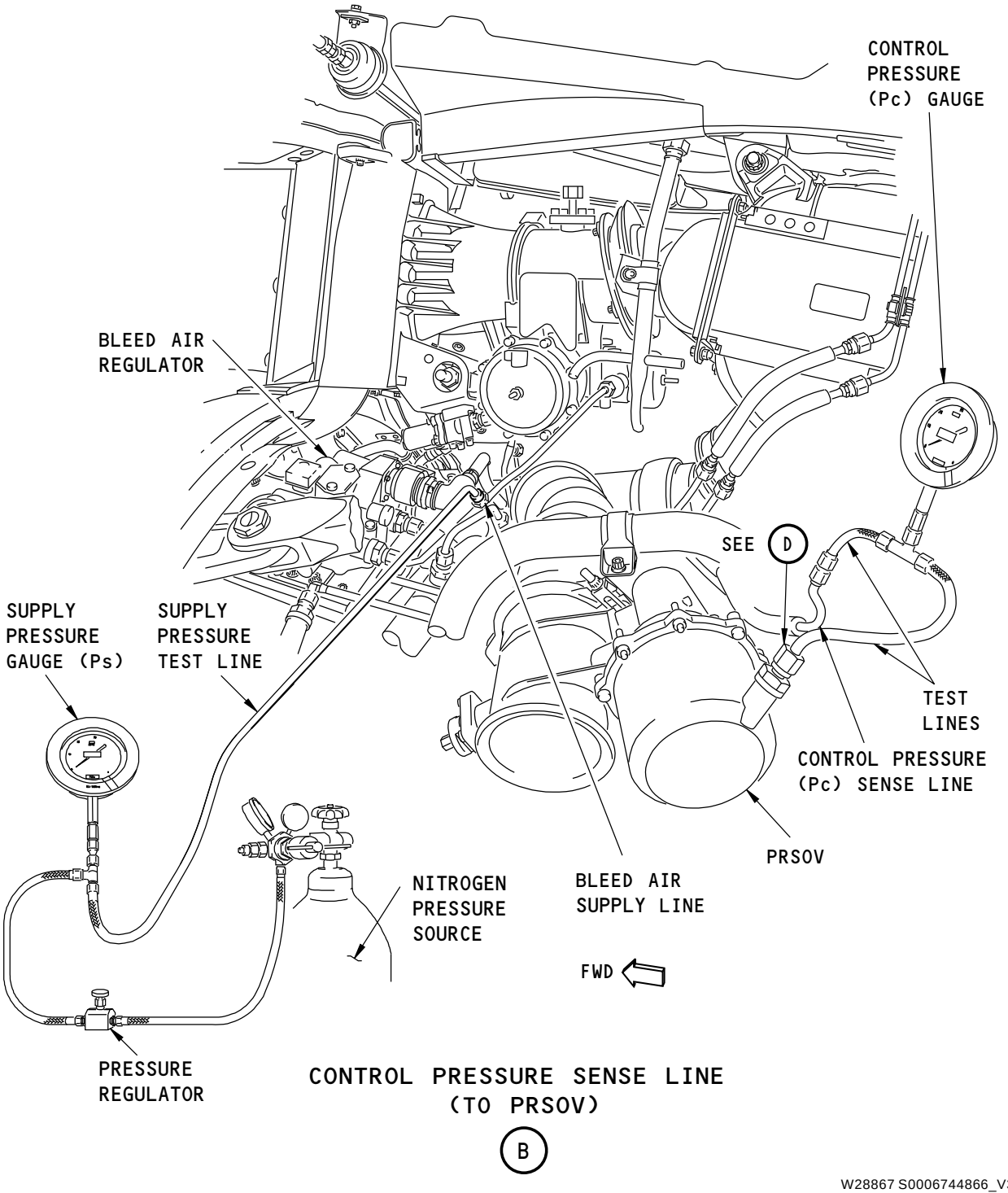
Duct Pressure High/Bleed Valve Does Not Close When Bleed Switches are Moved to Off. The Engine is the Bleed Source.
Figure 308/36-10-00-990-807 (Sheet 1 of 2)



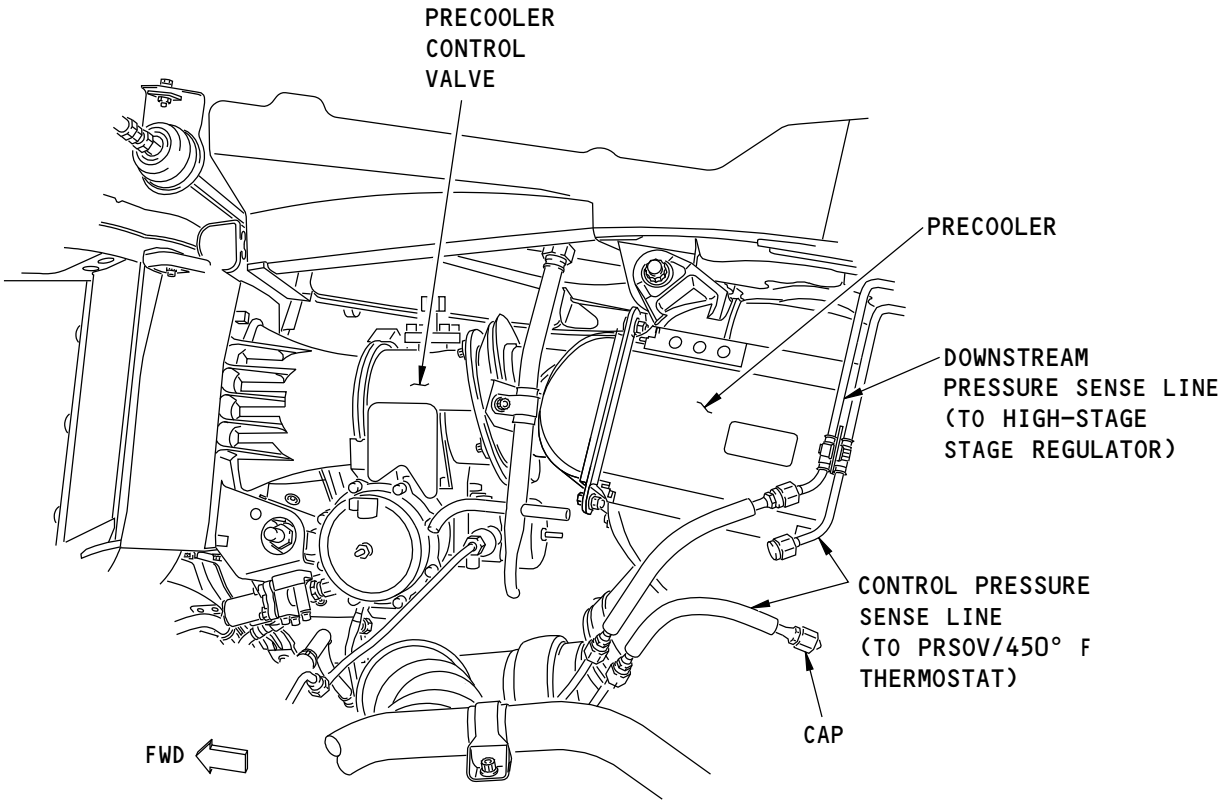
Duct Pressure High/Bleed Valve Does Not Close When Bleed Switches are Moved to Off. The Engine is the Bleed Source.
Figure 308/36-10-00-990-807 (Sheet 2 of 2)



Duct Pressure Low. The Engine is the Bleed Source.
Figure 309/36-10-00-990-808 (Sheet 1 of 6)



Duct Pressure Low. The Engine is the Bleed Source.
Figure 309/36-10-00-990-808 (Sheet 2 of 6)

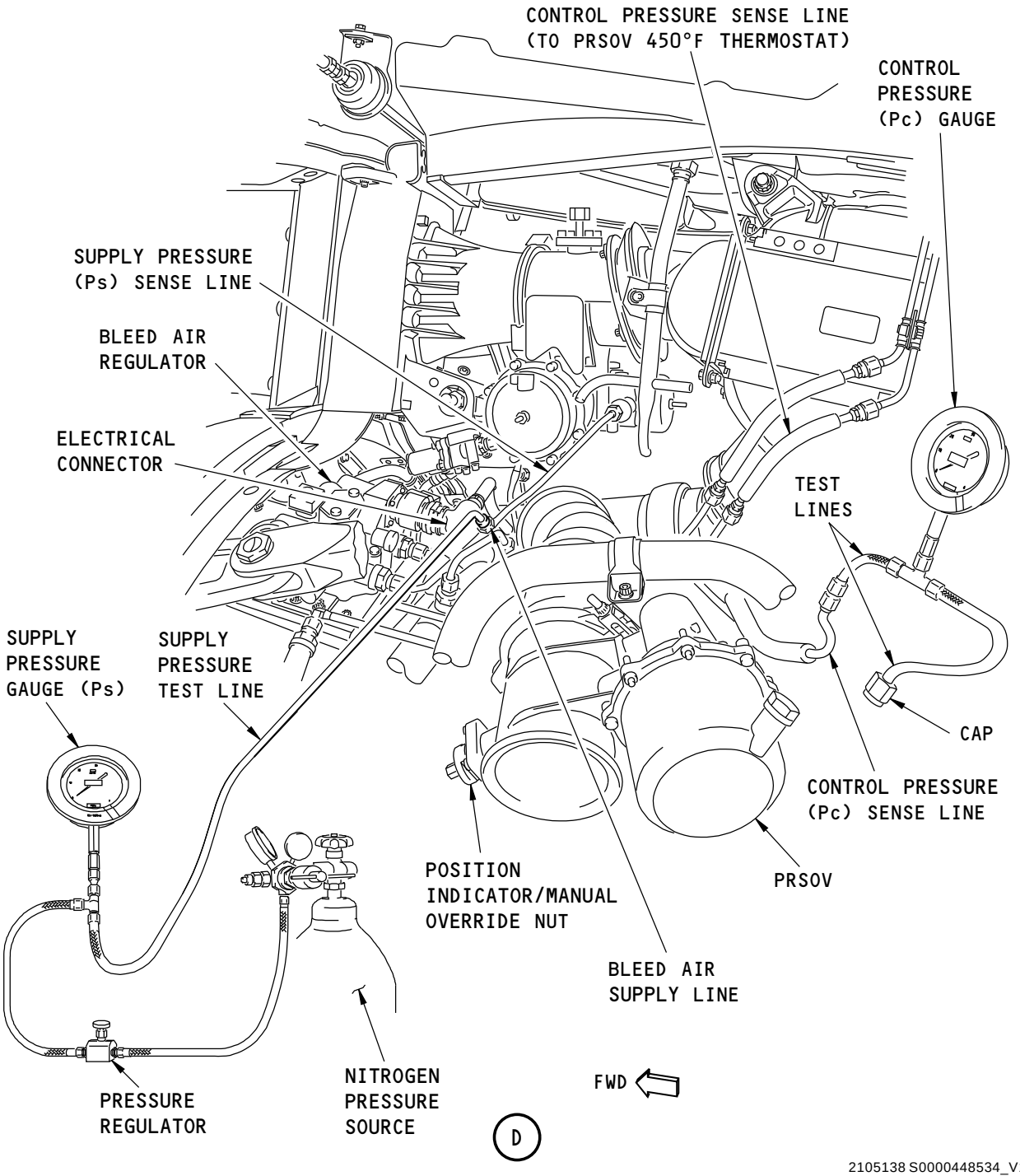


CONTROL PRESSURE SENSE LINE WITH CAP

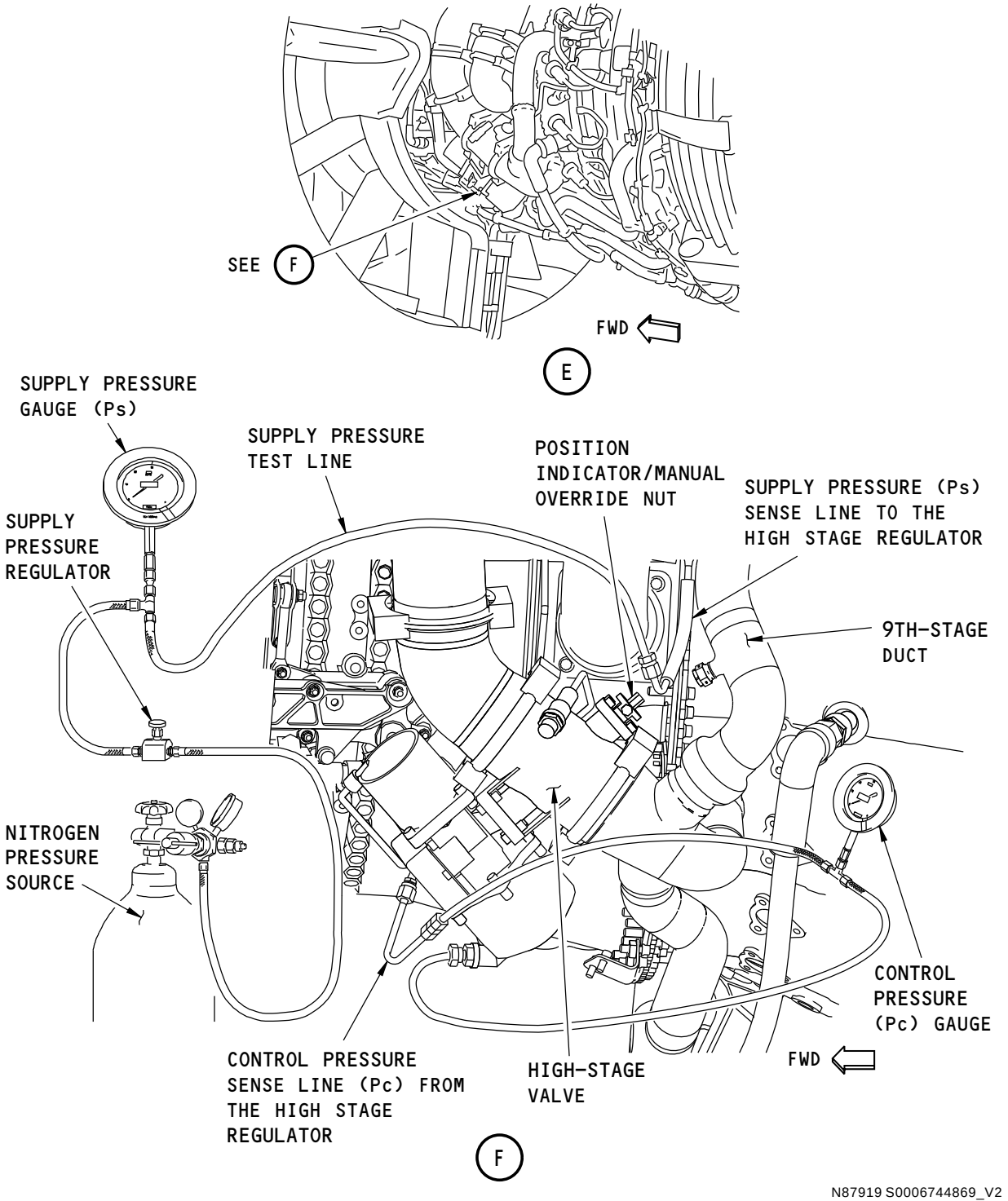
C

W28869 S0006744870_V3

Duct Pressure Low. The Engine is the Bleed Source.
Figure 309/36-10-00-990-808 (Sheet 3 of 6)

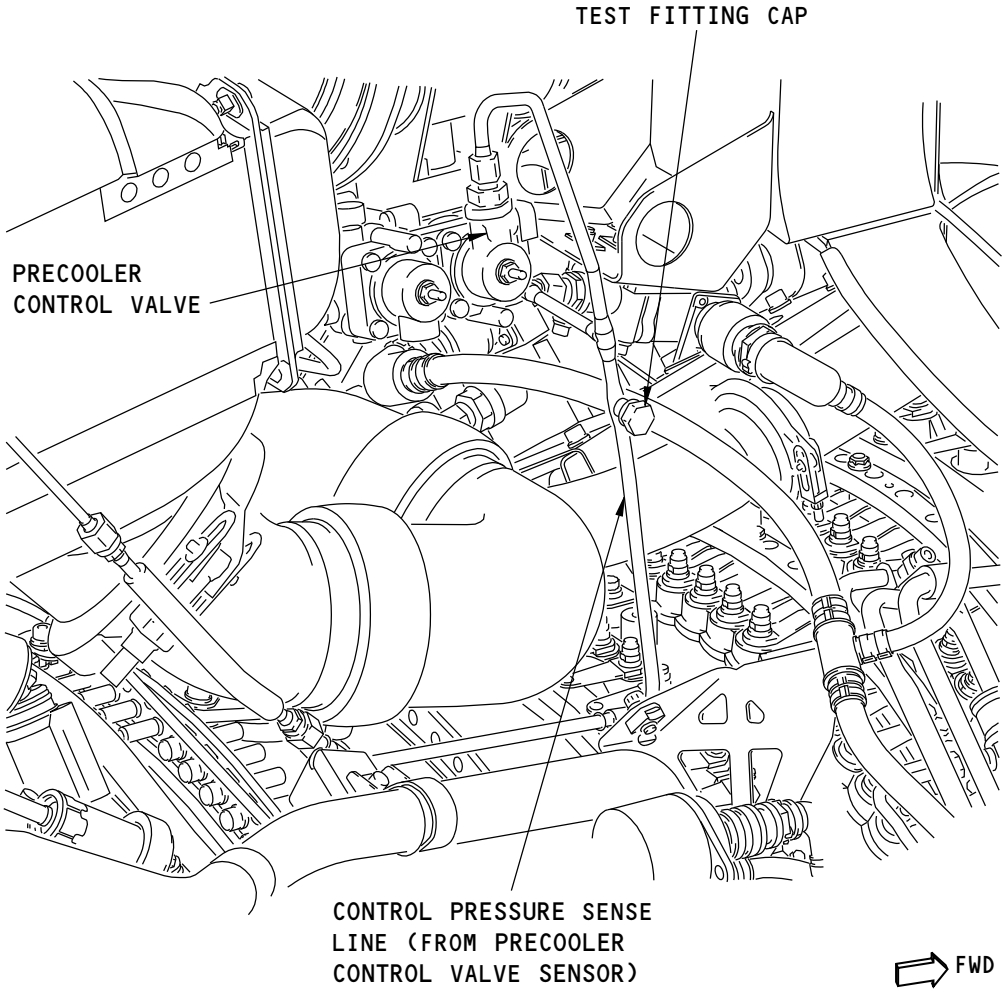


Duct Pressure Low. The Engine is the Bleed Source.
Figure 309/36-10-00-990-808 (Sheet 4 of 6)



N87919 S0006744869_V2

Duct Pressure Low. The Engine is the Bleed Source.
Figure 309/36-10-00-990-808 (Sheet 5 of 6)

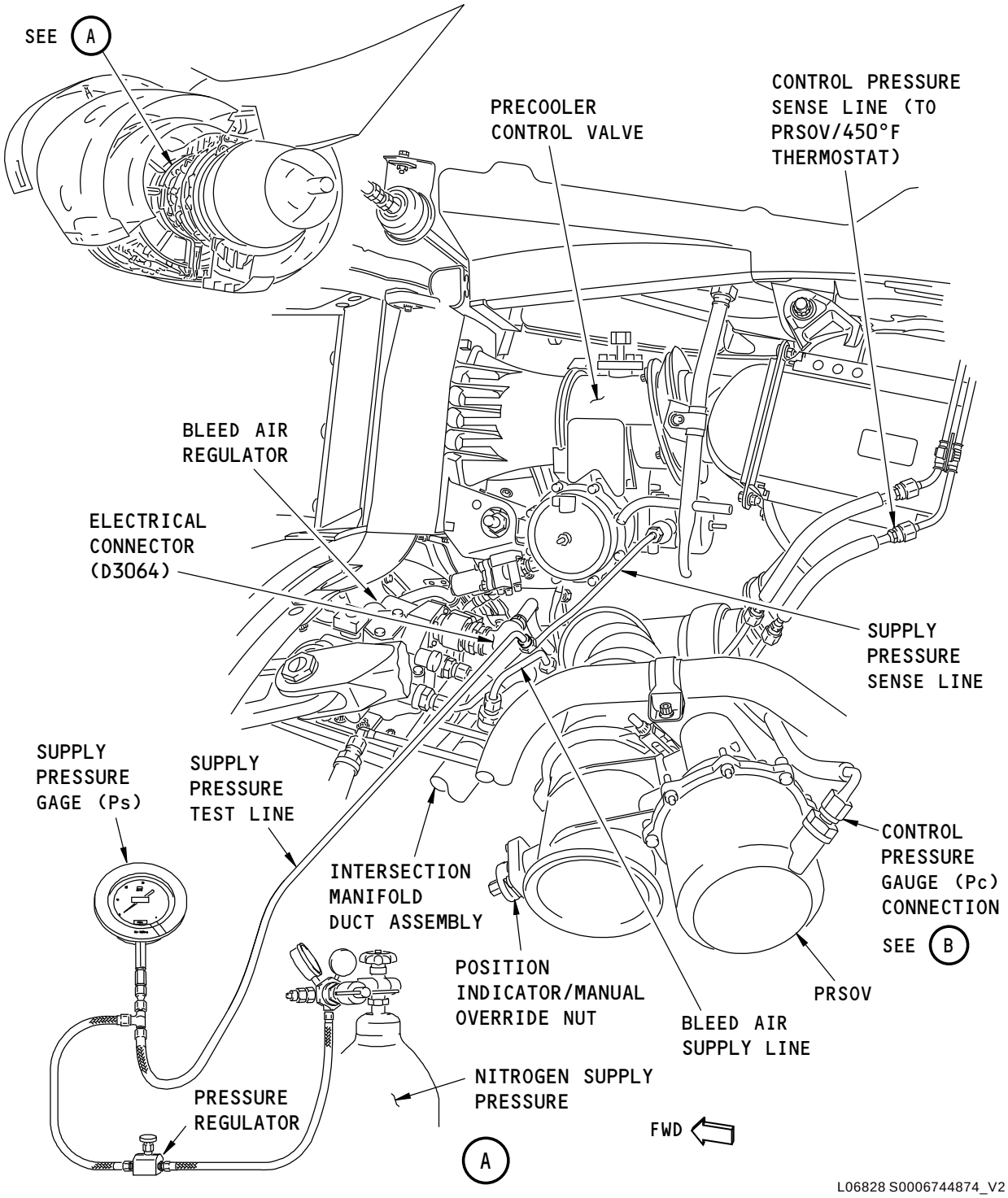


CONTROL PRESSURE SENSE LINE
(FROM PRECOOLER CONTROL VALVE SENSOR)

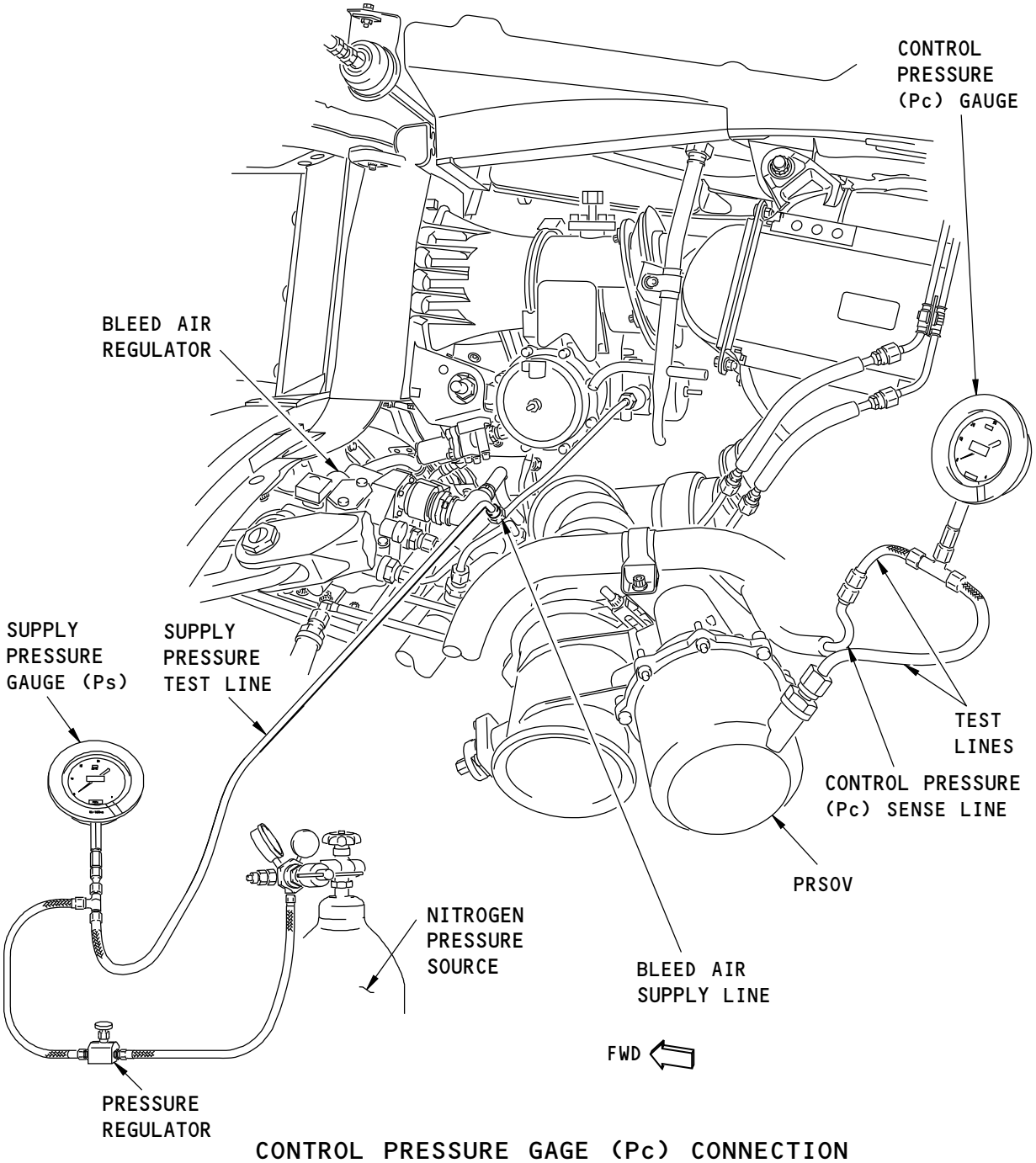
G

L06827 S0006744867_V2

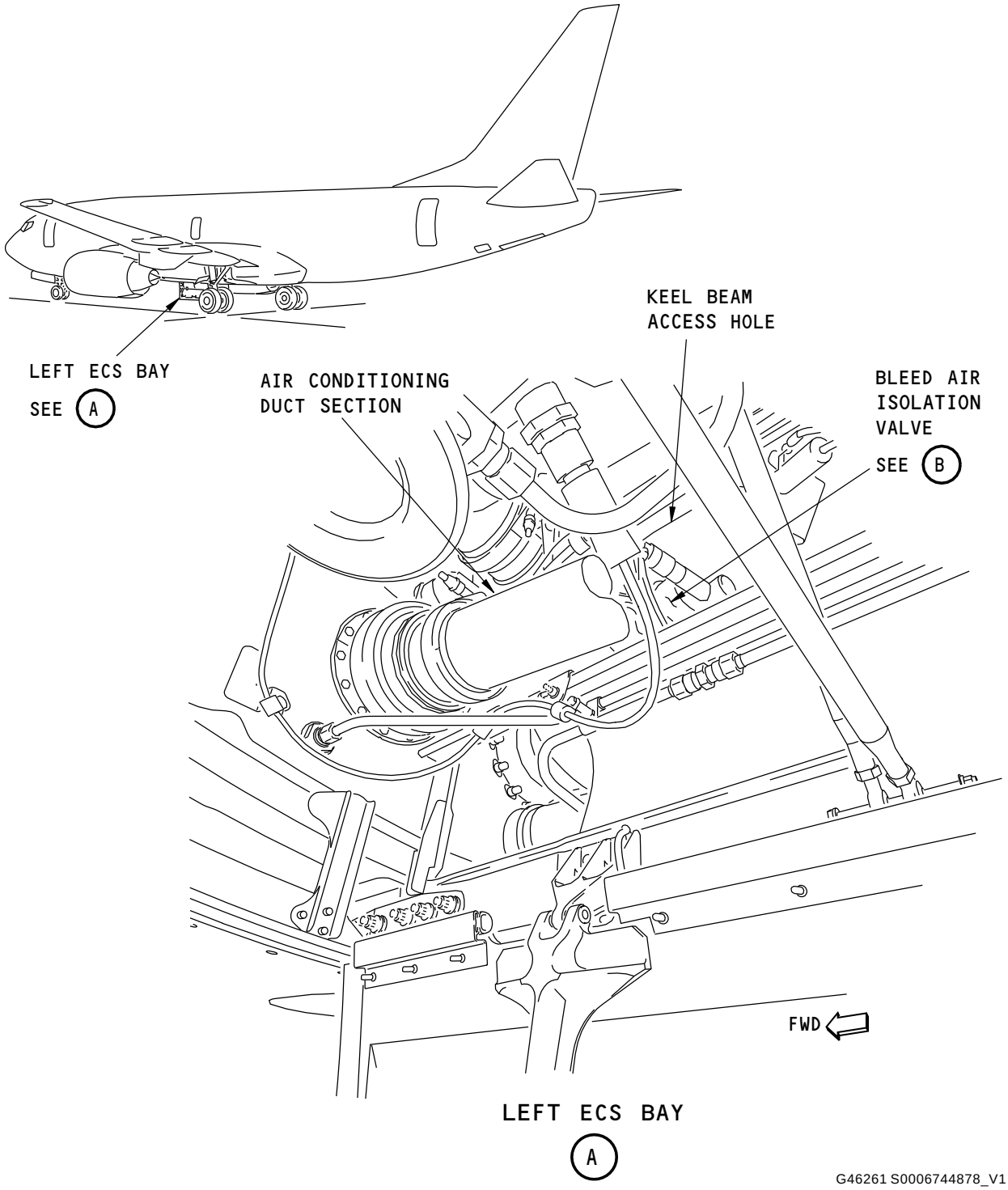
Duct Pressure Low. The Engine is the Bleed Source.
Figure 309/36-10-00-990-808 (Sheet 6 of 6)



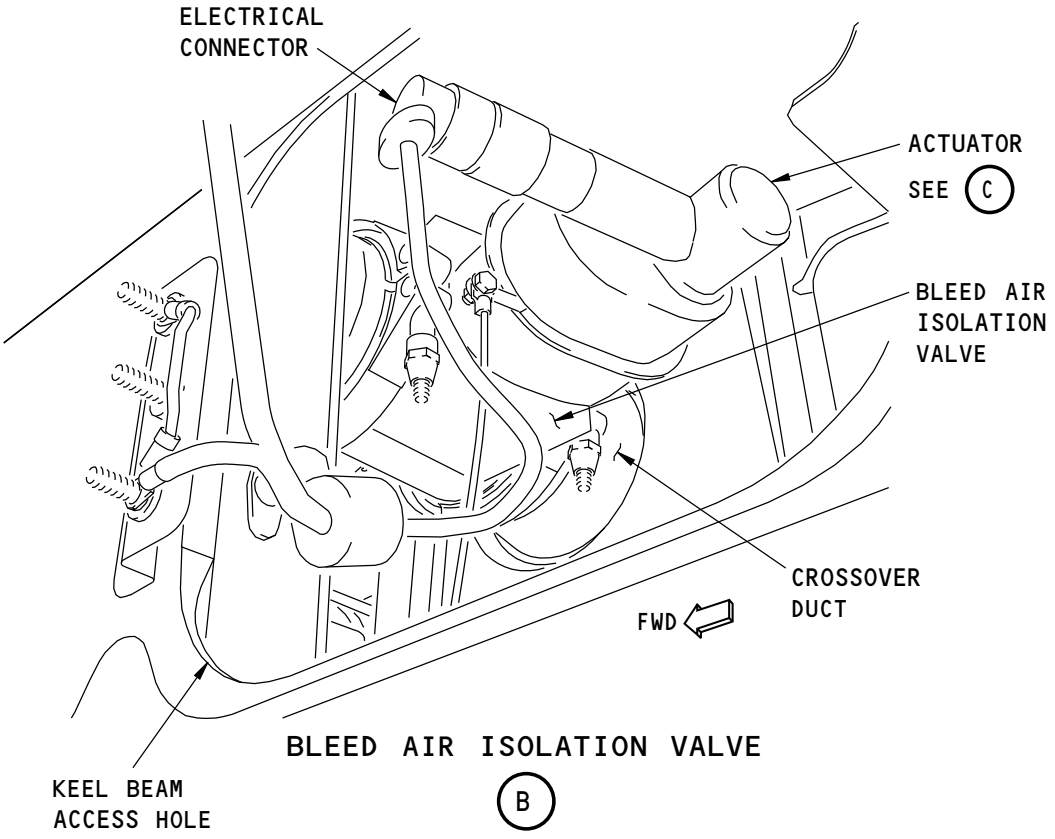
Duct Pressure Zero. The Engine is the Bleed Source.
Figure 310/36-10-00-990-809 (Sheet 1 of 2)



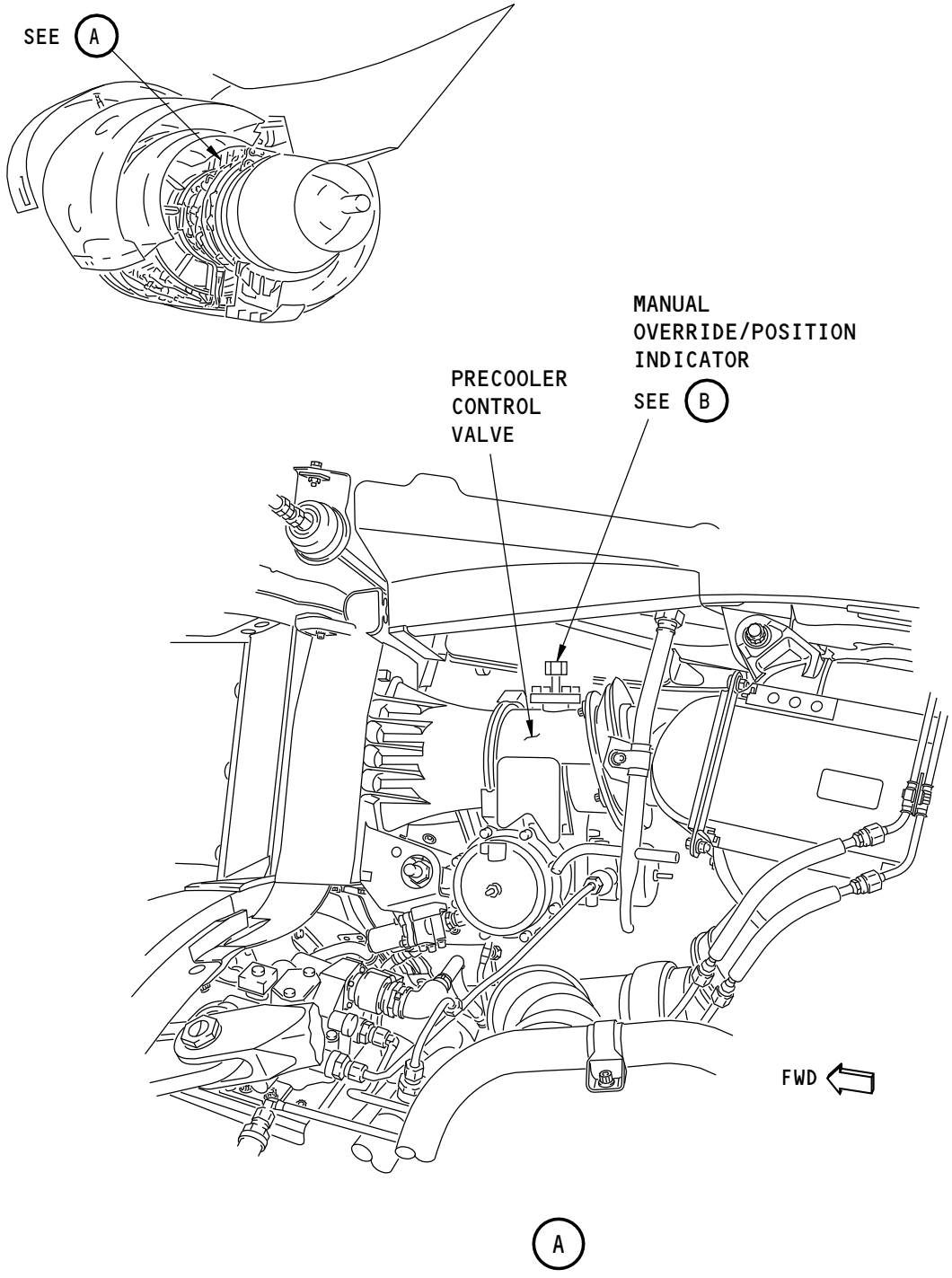
Duct Pressure Zero. The Engine is the Bleed Source.
Figure 310/36-10-00-990-809 (Sheet 2 of 2)



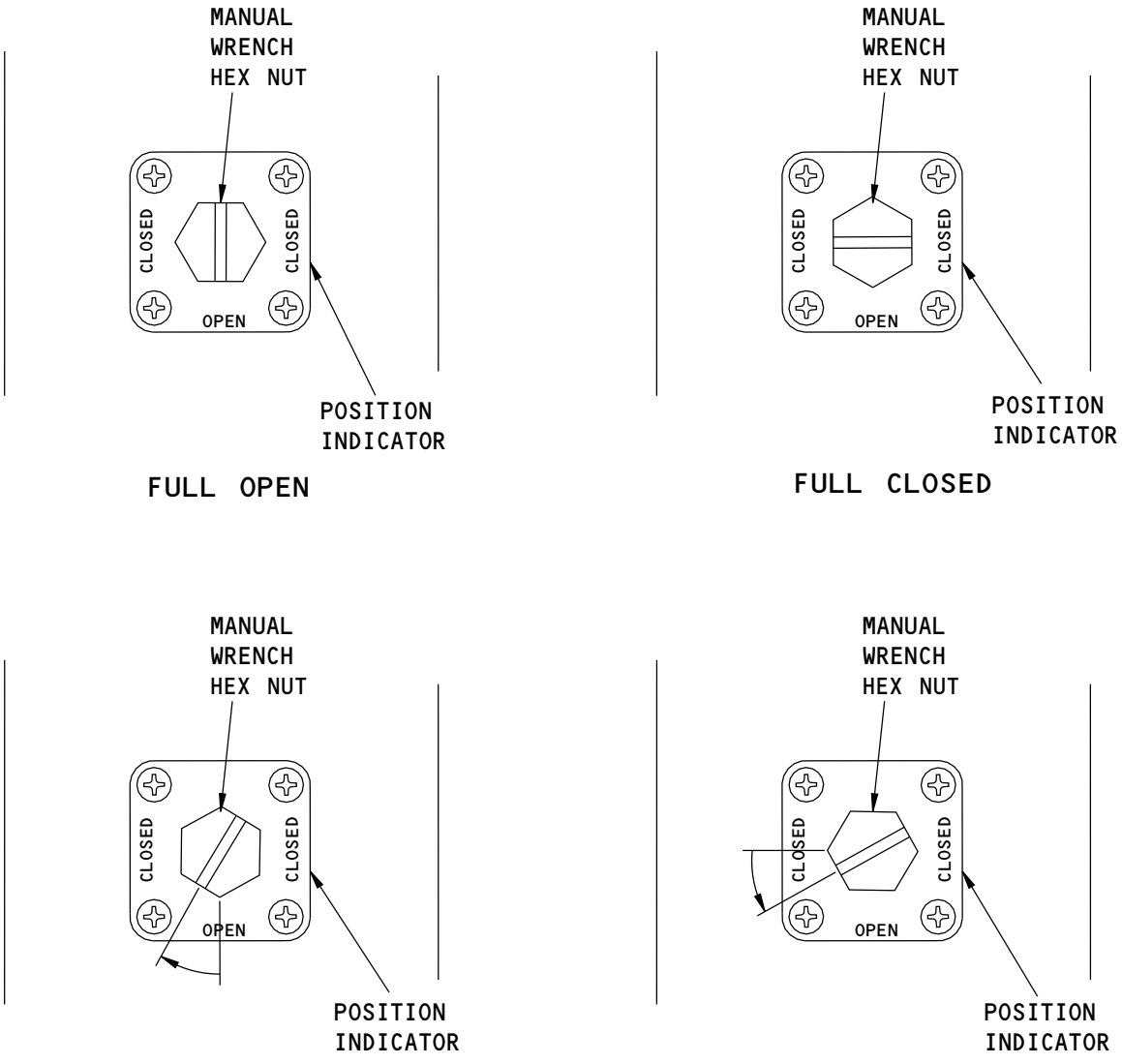
Isolation Valve Does Not Open or Close Properly.
Figure 311/36-10-00-990-810 (Sheet 1 of 2)



Isolation Valve Does Not Open or Close Properly.
Figure 311/36-10-00-990-810 (Sheet 2 of 2)

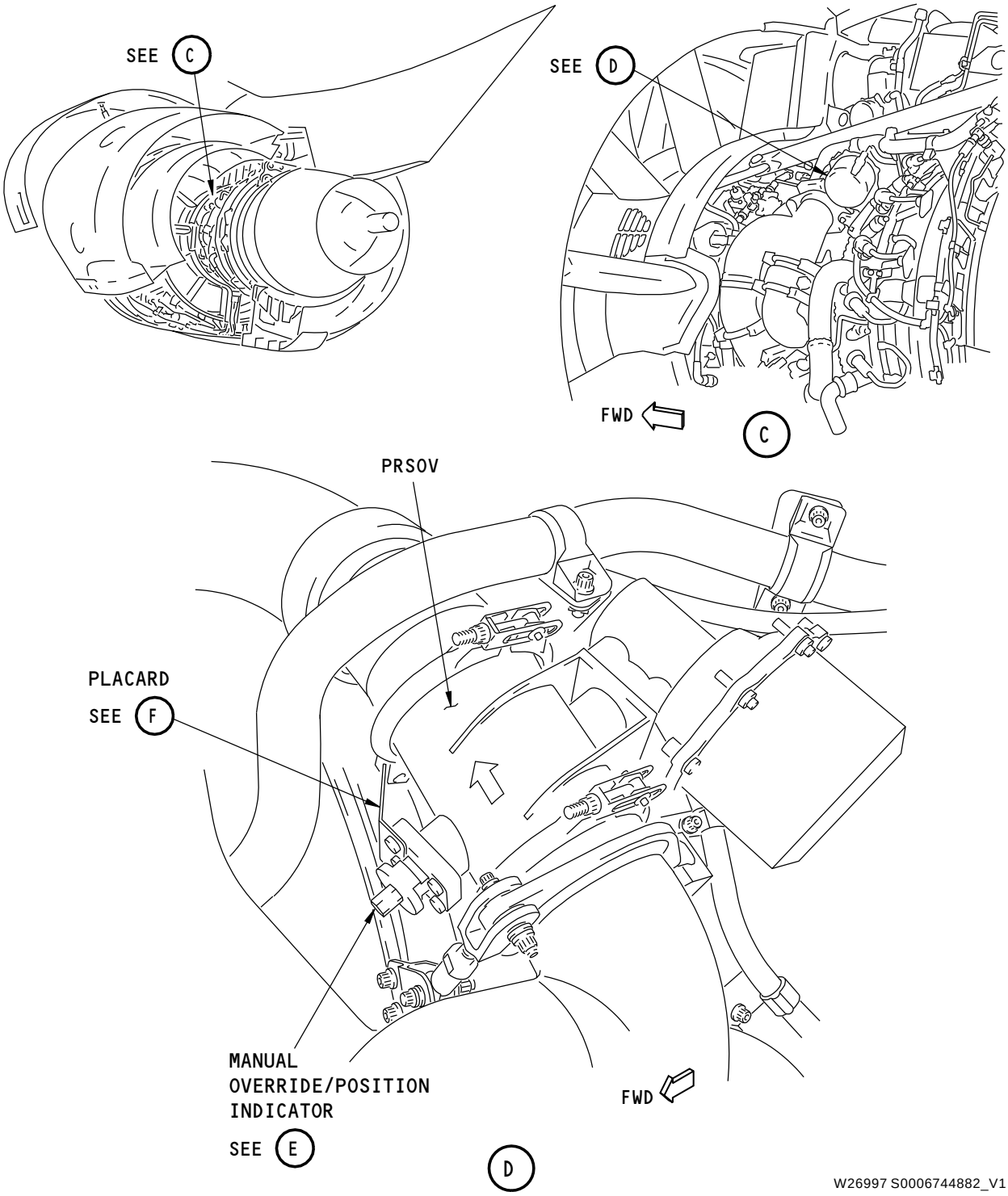


Pneumatic System Control Valve Position Indicators
Figure 312/36-10-00-990-811 (Sheet 1 of 6)

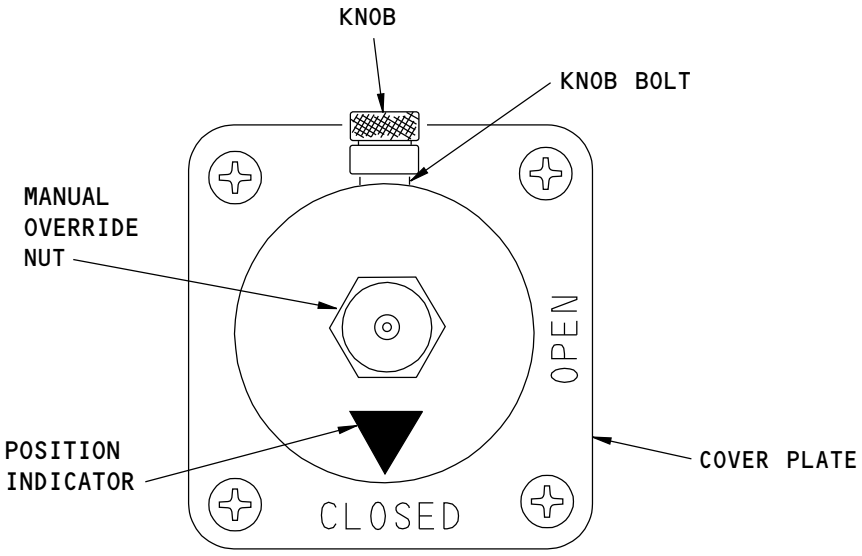


W26989 S0006744881_V2

Pneumatic System Control Valve Position Indicators
Figure 312/36-10-00-990-811 (Sheet 2 of 6)

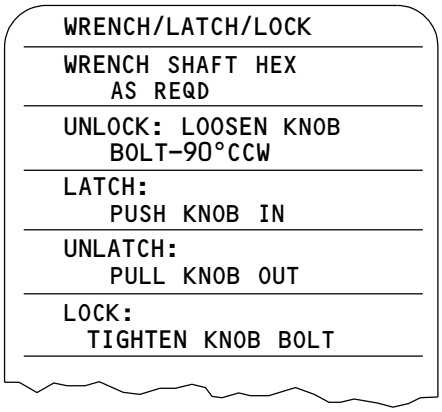


Pneumatic System Control Valve Position Indicators
Figure 312/36-10-00-990-811 (Sheet 3 of 6)



MANUAL OVERRIDE/POSITION INDICATOR

E

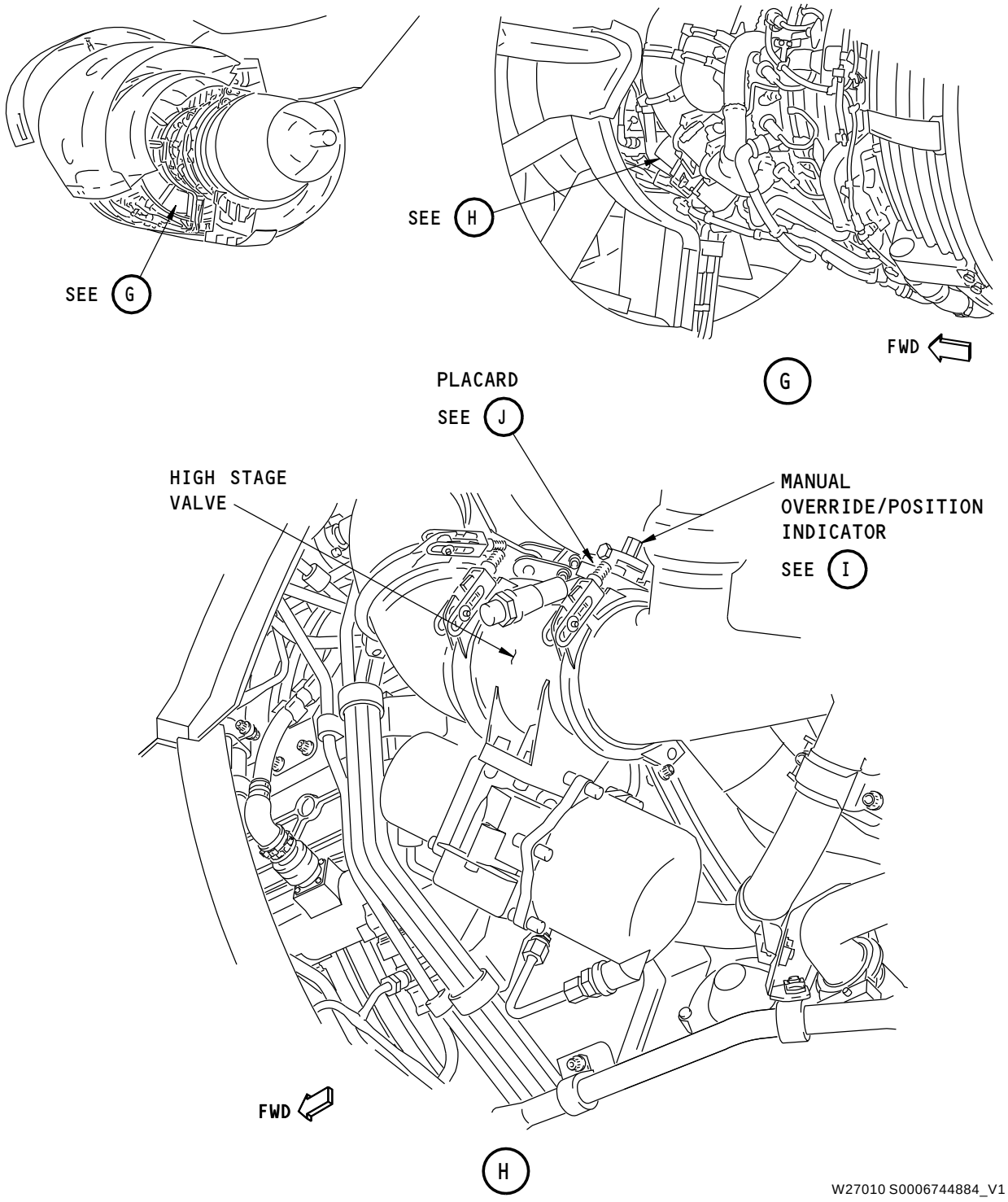


PLACARD

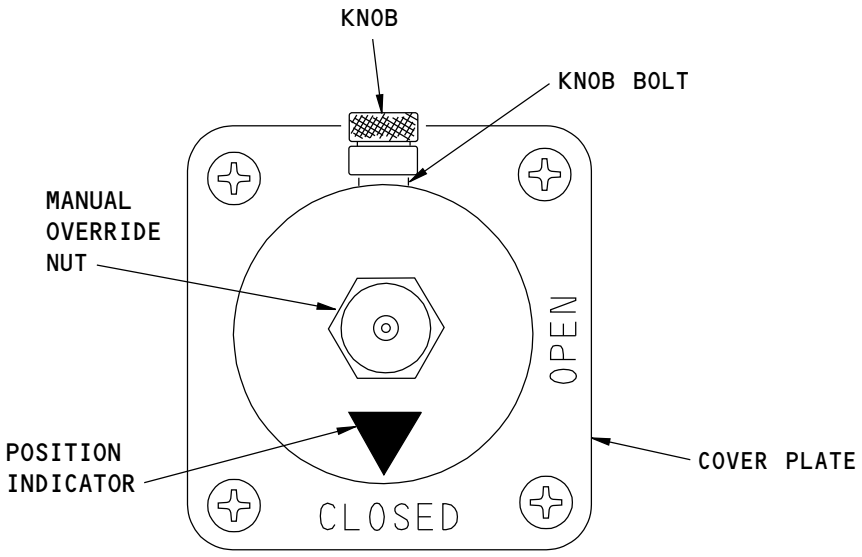
F

W27013 S0006744883_V1

Pneumatic System Control Valve Position Indicators
Figure 312/36-10-00-990-811 (Sheet 4 of 6)



Pneumatic System Control Valve Position Indicators
Figure 312/36-10-00-990-811 (Sheet 5 of 6)



MANUAL OVERIDE/POSITION INDICATOR

I

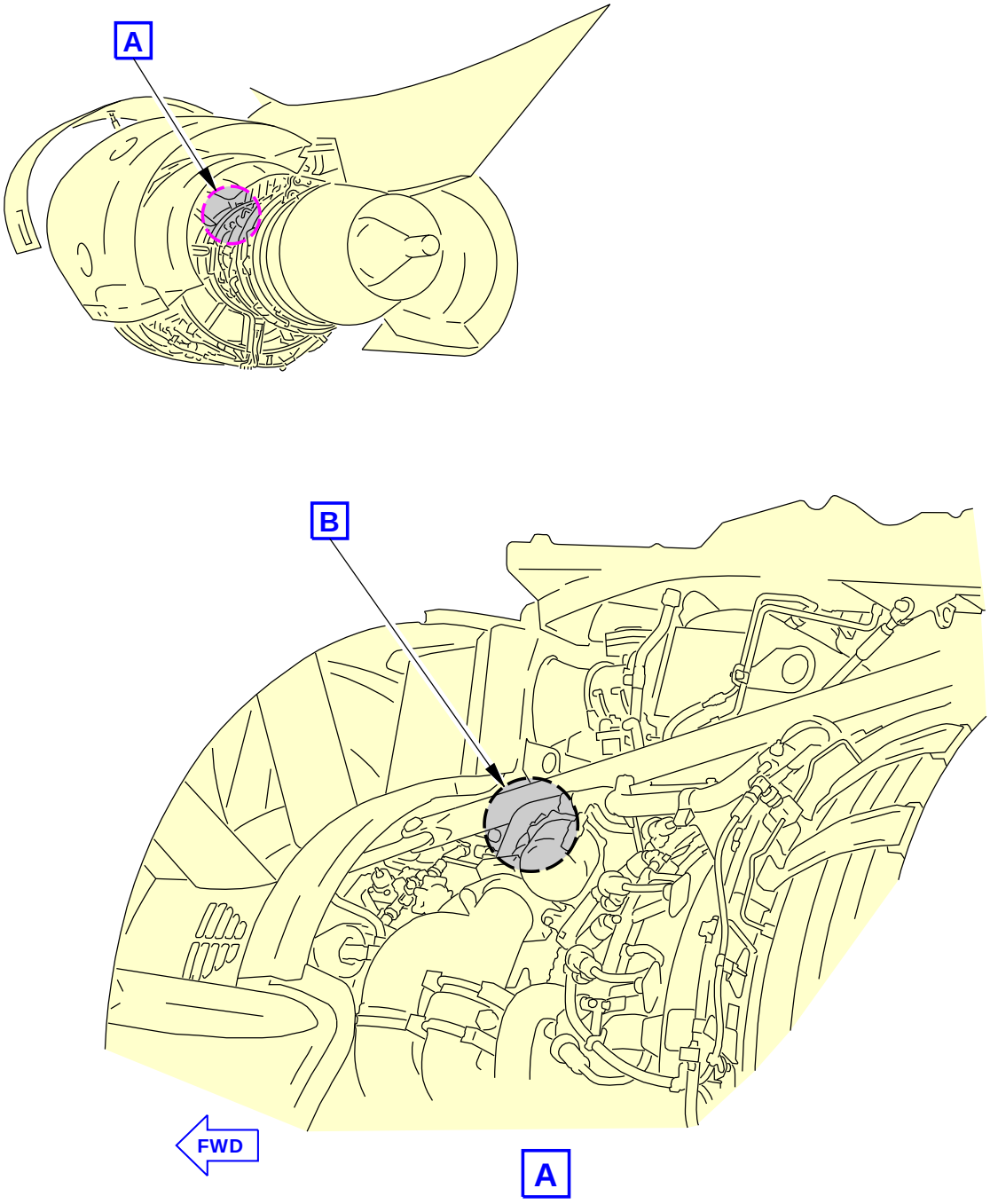
WRENCH/LATCH/LOCK
WRENCH SHAFT HEX AS REQD
UNLOCK: LOOSEN KNOB BOLT–90°CCW
LATCH: PUSH KNOB IN
UNLATCH: PULL KNOB OUT
LOCK: TIGHTEN KNOB BOLT

PLACARD

J

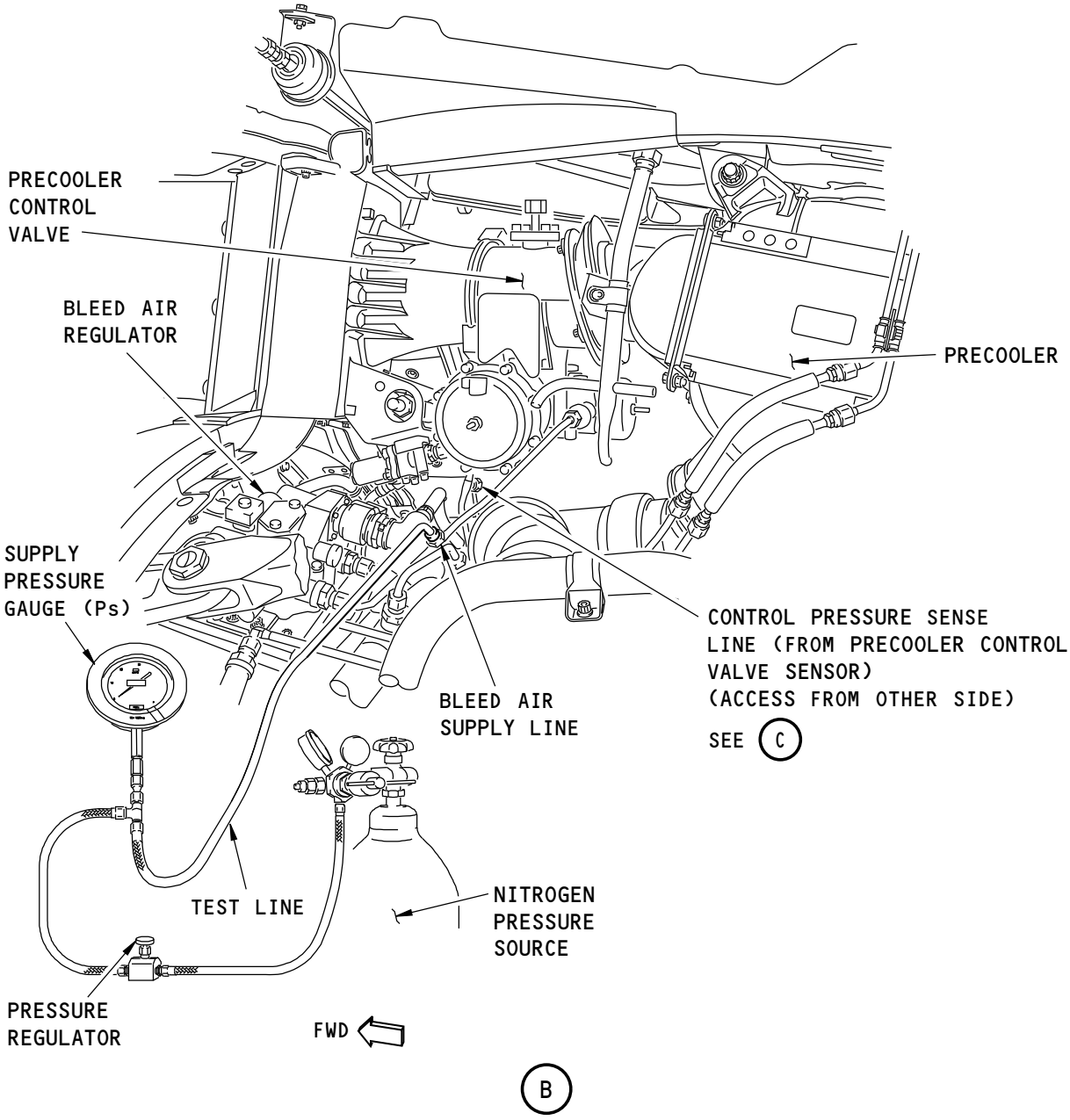
W27017 S0006744885_V1

Pneumatic System Control Valve Position Indicators
Figure 312/36-10-00-990-811 (Sheet 6 of 6)



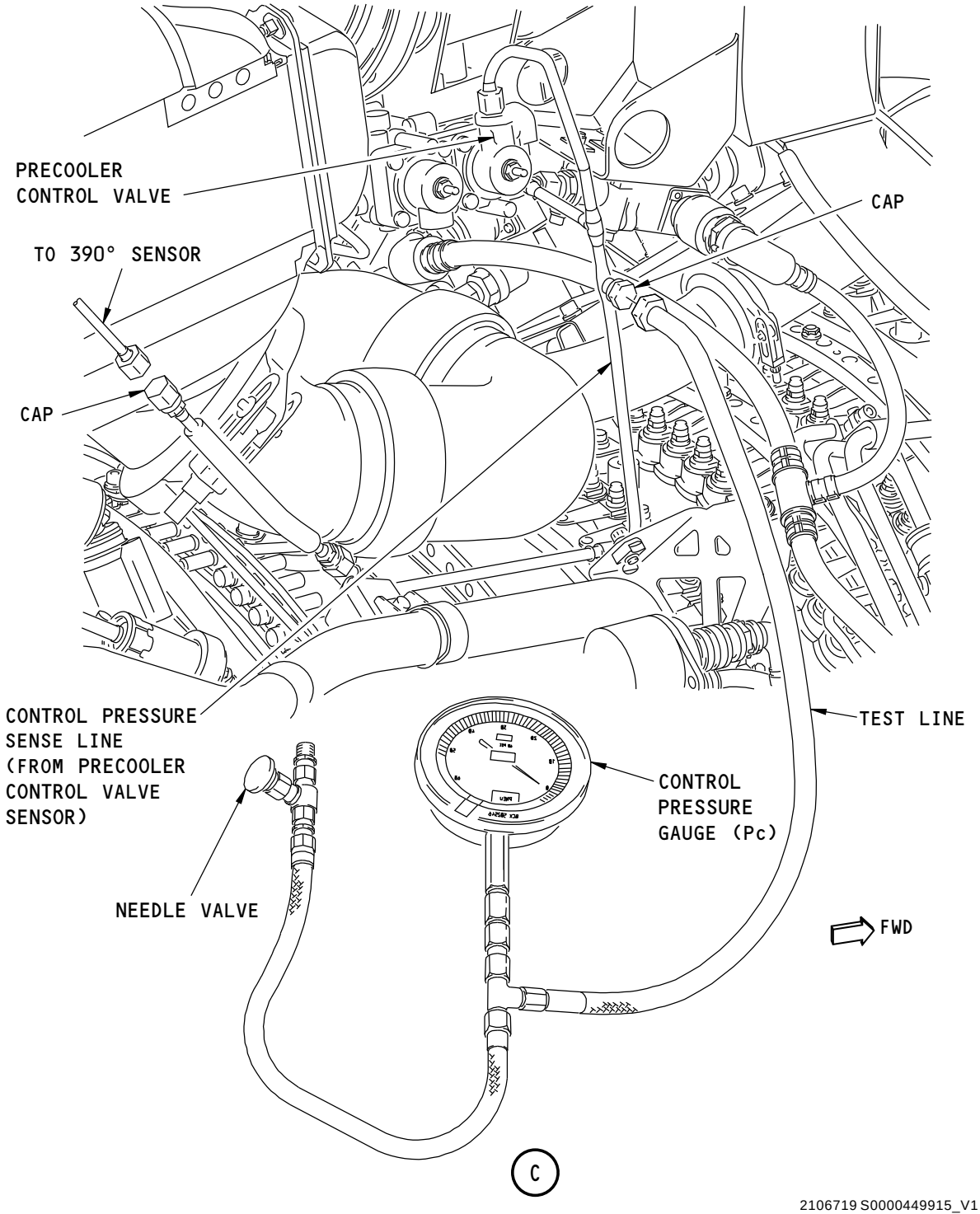
G15633 S0006577989_V2

QUICK FIM TASK - Bleed Trip, the Engine is the Bleed Source
Figure 313/36-10-00-990-813 (Sheet 1 of 3)

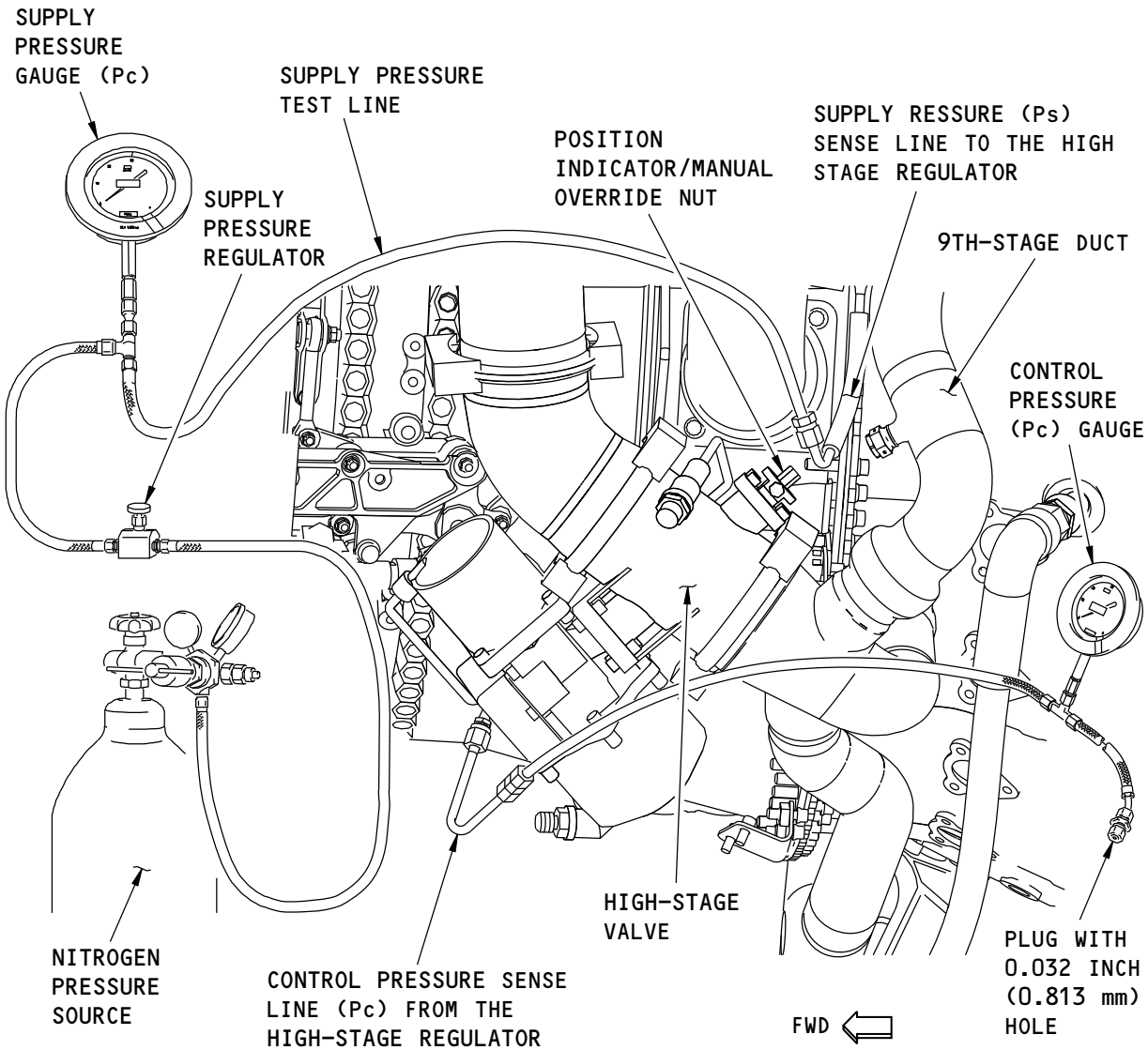


2106718 S0000449914_V1

QUICK FIM TASK - Bleed Trip, the Engine is the Bleed Source
Figure 313/36-10-00-990-813 (Sheet 2 of 3)



QUICK FIM TASK - Bleed Trip, the Engine is the Bleed Source
Figure 313/36-10-00-990-813 (Sheet 3 of 3)



2106729 S0000449927_V1

QUICK FIM TASK - Duct Pressure Low, the Engine is the Bleed Source
Figure 314/36-10-00-990-814