CHAPTER

21

AIR CONDITIONING

Insert latest revised pages; destroy superseded or deleted pages.

* Asterisk indicates pages revised, added, or deleted by the current revision. The portion of the text affected by the current revision is indicated by a vertical line in the outer margin of the page.

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21-30-08	208	Jan 12/01	21-43-00	4	May 22/92
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21-41-03	201	May 22/92	21-44-02	201	May 22/92
21-41-03	202	May 22/92	21-44-02	202	May 22/92
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21-42-00	2	Nov 17/89	21-44-03	201	May 22/92
21-42-00	3	Nov 17/89	21-44-03	202	May 22/92
21-42-00	4	Nov 17/89	21-44-04	201	May 22/92
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21-50-00	202	Feb 11/00	21-60-00	105	Jun 29/84
21-50-00	203	Jun 29/84	21-60-00	201	Feb 11/00
21-50-01	201	Feb 11/00	21-60-00	202	Feb 11/00
21-50-01	202	Feb 11/00	21-60-01	201	Jun 29/84
21-50-01	203	Feb 11/00	21-60-02	201	Oct 26/84
21-50-01	204	Feb 11/00	21-60-02	202	Jun 29/84
21-50-01	205	Feb 11/00	21-60-02	203	Jun 29/84
21-50-01	206	Feb 11/00	21-60-02	204	Oct 26/84
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21-50-02	202	Jan 12/01	21-60-03	202	Jun 29/84
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21-50-02	206	Jan 12/01	21-60-05	201	Jun 29/84
21-50-02	207	Jan 12/01	21-60-06	201	Jun 12/87
21-50-02	208	Jan 12/01	21-60-06	202	Jun 12/87
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21-50-04	201	Oct 26/84	21-60-07	203	May 22/92
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21-50-06	206	Sep 15/89	21-60-10	207	May 22/92
21-50-07	201	Jun 29/84	21-60-10	208	May 22/92
21-50-08	201	Sep 15/89	21-60-10	209	Feb 11/00
21-50-08	202	Sep 15/89	21-60-10	210	Feb 11/00
21-60-00	1	Jun 25/93	21-61-00	1	May 22/92

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21-61-03	201	Sep 15/89			
21-61-03	202	Sep 15/89			
21-61-03	203	Sep 15/89			
21-61-04	201	Oct 19/90			
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21-2	Inactive	Apr 8/75	21-60-00 Page 3	Apr 8/75	LJ	Jun 30/75 Rev. 3	LJ
21-3	Inactive	Apr 8/75	21-30-00 Page 3	Apr 8/75	LJ	Jun 30/75 Rev. 3	LJ
21-4	Inactive	Apr 8/75	21-30-08 Page 208	Apr 8/75	LJ	Jun 30/75 Rev. 3	LJ
21-5	Inactive	Apr 8/75	21-61-00 Page 1	Apr 8/75	LJ	Jun 30/75 Rev. 3	LJ
21-6	Not Used						
21-7	Inactive	Aug 30/76	21-00-00 Page 1	Aug 30/76	LJ	Mar 24/77 TR 21-13	LJ
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21-12	Inactive	Oct 22/76	21-30-01 Page 201	Oct 22/76	LJ	Nov 1/77 Rev. 7	LJ
21-13	Inactive	Mar 24/77	21-00-00 Page 1	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ

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21-15	Inactive	Mar 24/77	21-20-00 Page 1	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
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21-17	Inactive	Mar 24/77	21-30-00 Page 3	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-18	Inactive	Mar 24/77	21-30-00 Page 6	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
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21-21	Inactive	Mar 24/77	21-30-03 Page 1	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-22	Inactive	Mar 24/77	21-30-03 Page 203	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-23	Inactive	Mar 24/77	21-30-03 Page 205	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-24	Inactive	Mar 24/77	21-30-04 Page 1	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-25	Inactive	Mar 24/77	21-30-04 Page 203	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-26	Inactive	Mar 24/77	21-30-04 Page 204	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ

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21-28	Inactive	Mar 24/77	21-30-07 Page 1	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-29	Inactive	Mar 24/77	21-30-08 Page 204	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-30	Inactive	Mar 24/77	21-30-08 Page 510	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
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21-34	Inactive	Mar 24/77	21-30-01 Page 202	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-35	Inactive	Mar 24/77	21-41-00 Page 1	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-36	Inactive	Mar 24/77	21-41-01 Page 1	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
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21-38	Inactive	Mar 24/77	21-41-02 Page 1	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-39	Inactive	Mar 24/77	21-41-02 Page 201	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ

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21-42	Inactive	Mar 24/77	21-60-00 Page 5	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
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21-44	Inactive	Mar 24/77	21-60-01 Page 201	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-45	Inactive	Mar 24/77	21-60-02 Page 201	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
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21-47	Inactive	Mar 24/77	21-60-04 Page 201	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
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21-50	Inactive	Mar 24/77	21-60-06 Page 202	Mar 24/77	LJ	Nov 1/77 Rev. 7	LJ
21-51	Inactive	Apr 27/77	21-30-06 Page 201	Apr 27/77	LJ	Nov 1/77 Rev. 7	LJ
21-52	Inactive	Apr 27/77	21-30-01 Page 202	Apr 27/77	LJ	Nov 1/77 Rev. 7	LJ

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21-54	Inactive	Mar 17/78	21-30-11 Page 202	Mar 17/78	LJ	Aug 21/78 Rev. 9	LJ
21-55	Inactive	Nov 8/78	21-30-07 Page 201	Nov 8/78	LJ	May 11/79 Rev. 14	LJ
21-56	Inactive	Feb 23/79	21-20-00 Page 6	Feb 23/79	LJ	May 11/79 Rev. 14	LJ
21-57	Inactive	May 7/79	21-50-00 Page 201	May 7/79	LJ	May 11/79 Rev. 14	LJ
21-58	Inactive	Aug 21/81	21-50-02 Page 201	Aug 21/81	LJ	Dec 11/81 Rev. 25	LJ
21-59	Inactive	Sep 17/93	21-31-00 Page 202	Sep 17/93	LJ	Oct 1/93 TR 21-60	LJ
21-60	Inactive	Oct 1/93	21-30-00 Page 202	Oct 1/93	LJ	Feb 11/00 Rev. 68	LJ
21-61	Inactive	Aug 16/96	21-50-00 Page 1	Aug 16/96	LJ	Feb 11/00 Rev. 68	LJ
21-62	Inactive	Aug 16/96	21-50-01 Page 201	Aug 16/96	LJ	Feb 11/00 Rev. 68	LJ
21-63	Inactive	Jul 15/97	21-30-00 Page 201	Jul 15/97	LJ	Apr 23/99 TR 21-68	LJ
21-64	Inactive	Mar 13/98	21-30-07 Page 201	Mar 13/98	LJ	Feb 11/00 Rev. 68	LJ
21-65	Inactive	Mar 13/98	21-30-08 Page 201	Mar 13/98	LJ	Feb 11/00 Rev. 68	LJ

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21-66	Inactive	Mar 13/98	21-31-01 Page 201	Mar 13/98	LJ	Feb 11/00 Rev. 68	LJ
21-67	Not Used						
21-68	Inactive	Apr 23/99	21-30-00 Page 203	Apr 23/99	LJ	Feb 11/00 Rev. 68	LJ
21-69	Inactive	Mar 17/00	21-30-07 Page 201	Mar 17/00	LJ	Jul 28/00 Rev. 69	LJ
21-70	Inactive	Mar 17/00	21-31-01 Page 201	Mar 17/00	LJ	Jul 28/00 Rev. 69	LJ
21-71	Inactive	Dec 8/00	21-50-02 Page 206	Dec 8/00	LJ	Jan 11/02 Rev. 70	LJ
21-72	Inactive	Mar 16/01	21-LOEP Page 1	Mar 16/01	LJ	Jan 11/02 Rev. 71	LJ
21-73	Inactive	Apr 13/01	21-30-00 Page 205	Apr 13/01	LJ	Jan 11/02 Rev. 71	LJ
21-74	Inactive	Apr 13/01	21-30-00 Page 204	Apr 13/01	LJ	Jan 11/02 Rev. 71	LJ
21-75	Inactive	May 18/01	21-30-00 Page 120	May 18/01	LJ	Jan 11/02 Rev. 71	LJ
21-76	Inactive	Feb 14/03	21-31-01 Page 202	Feb 14/03	LJ	Jan 17/05 Rev. 73	LJ

AIR CONDITIONING - DESCRIPTION AND OPERATION

1. DESCRIPTION

   A. Engine bleed air is regulated by a bleed air modulating valve on each engine. This regulated air is routed to the heat exchanger where it is precooled and then ducted into the cabin area.

   B. A refrigeration (freon) system and an auxiliary cabin heater system supplement the normal air conditioning system. These supplemental systems can be utilized without engine operation using an auxiliary power source.

   C. Engine bleed air is ducted to the heat exchanger. The bleed air is precooled in the heat exchanger by ram air that enters the dorsal inlet, passes through the heat exchanger, and then dumps into the tailcone. The amount of cooling accomplished by the heat exchanger is dependent upon the position of the hot air bypass valve.

   D. Precooled bleed air is ducted into the cabin area by two air distribution ducts. The ducts, one on the RH side and one on the LH side, incorporate check valves to prevent loss of cabin pressure in the event of an air distribution duct failure.

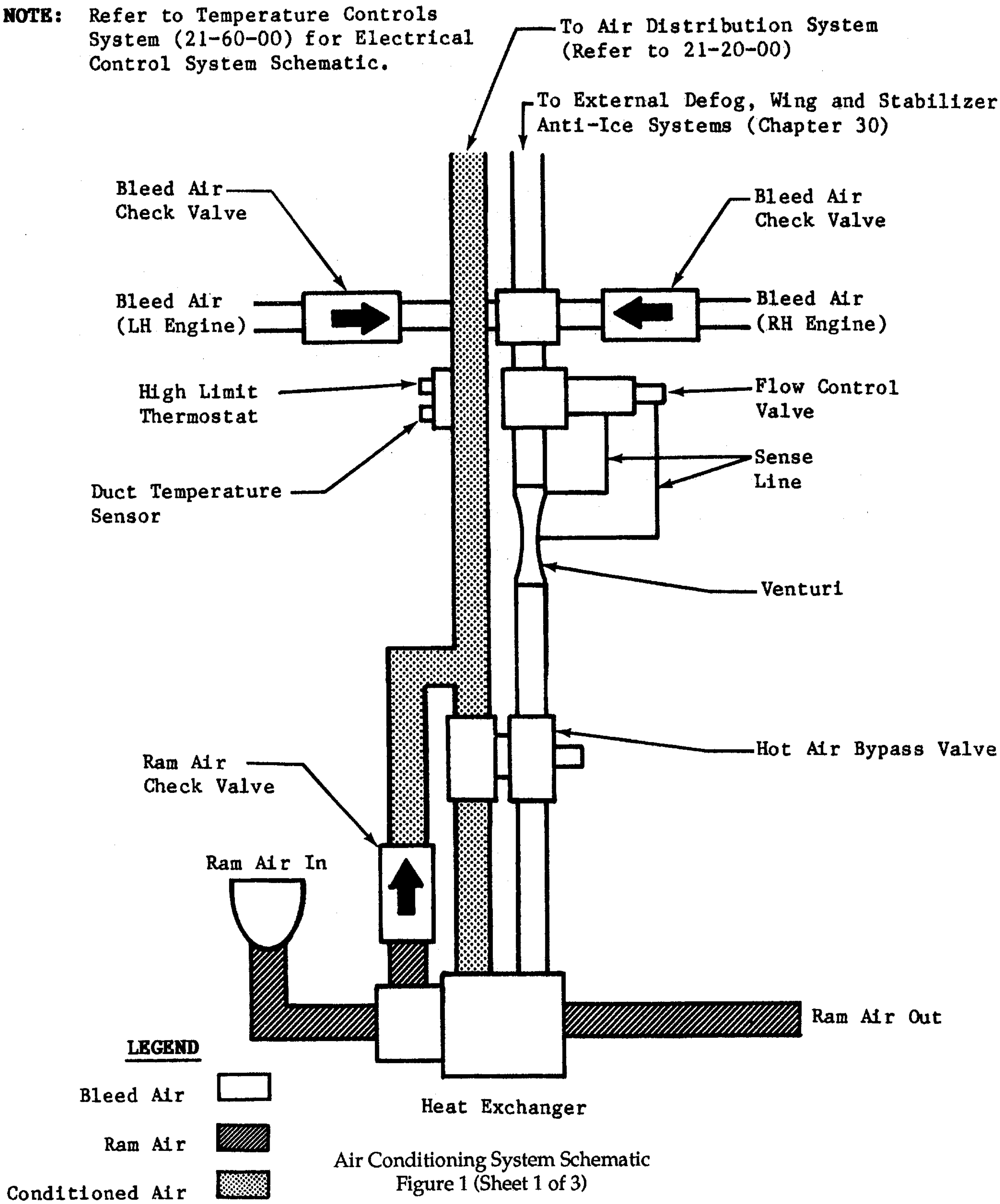
   E. Cabin pressurization is accomplished by conditioned air entering the cabin through the air distribution ducts and controlled by modulating the amount of air that is exhausted from the cabin.

   F. Cabin heating and cooling is accomplished by controlling the amount of bleed air that is allowed to bypass the heat exchanger.

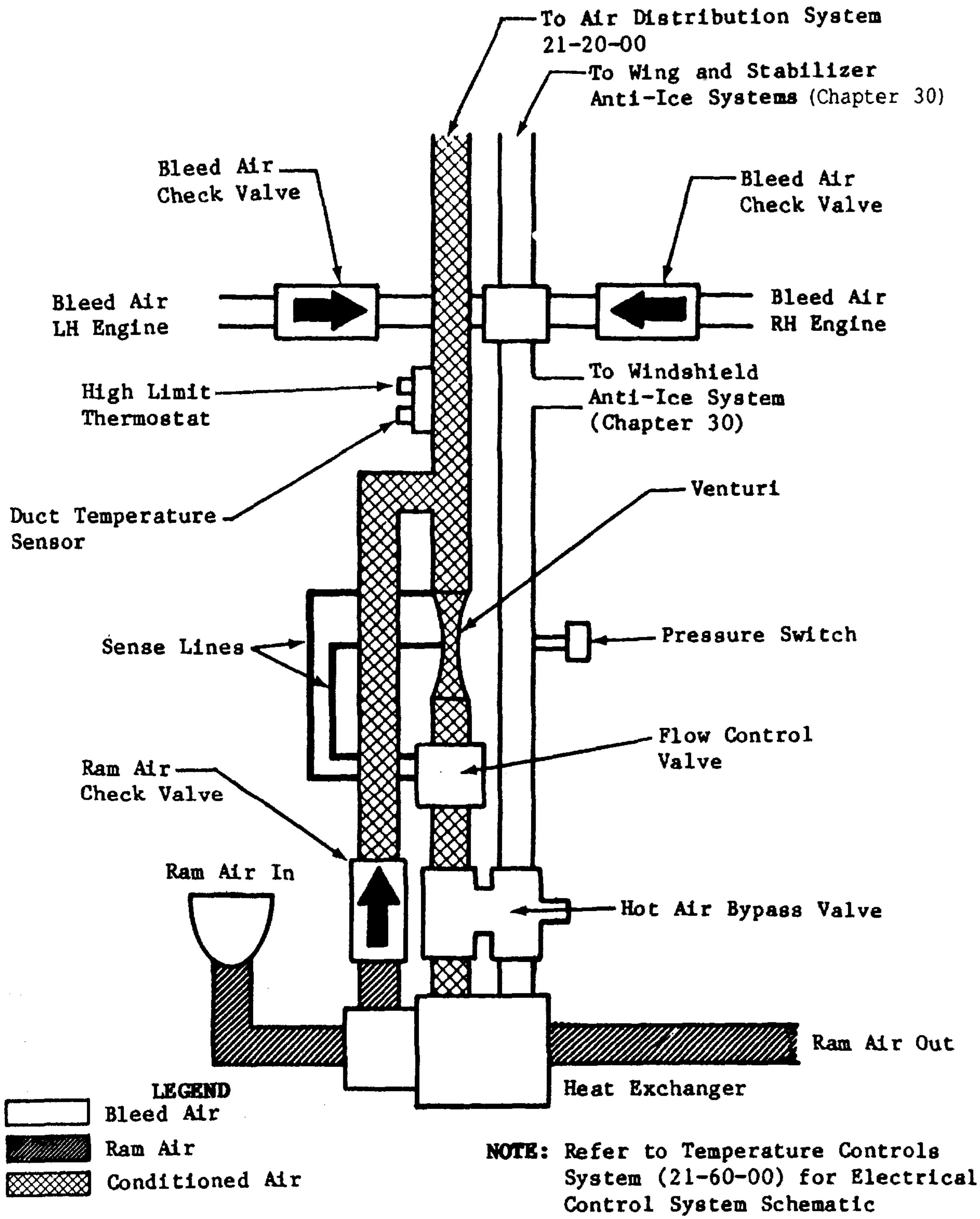
   G. Cabin temperature is maintained by a control circuit which utilizes a temperature sensitive resistance bridge circuit. The bridge circuit controls a bleed air bypass valve. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, temperature control is maintained by a regulated pneumatic system.

   H. Conditioned air is utilized to defog the internal surface of the windshield.

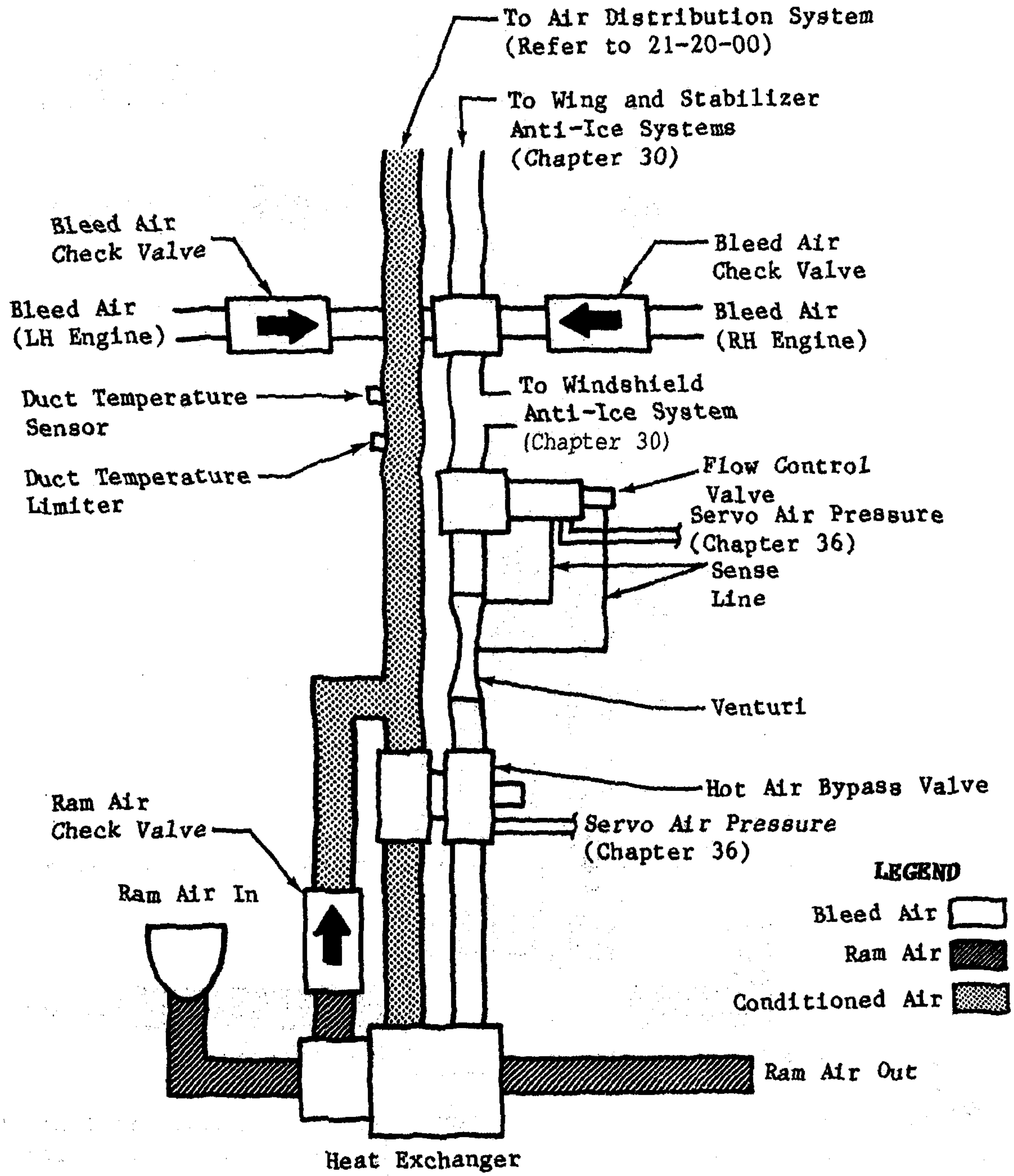
NOTE: Refer to Temperature Controls System (21-60-00) for Electrical Control System Schematic.



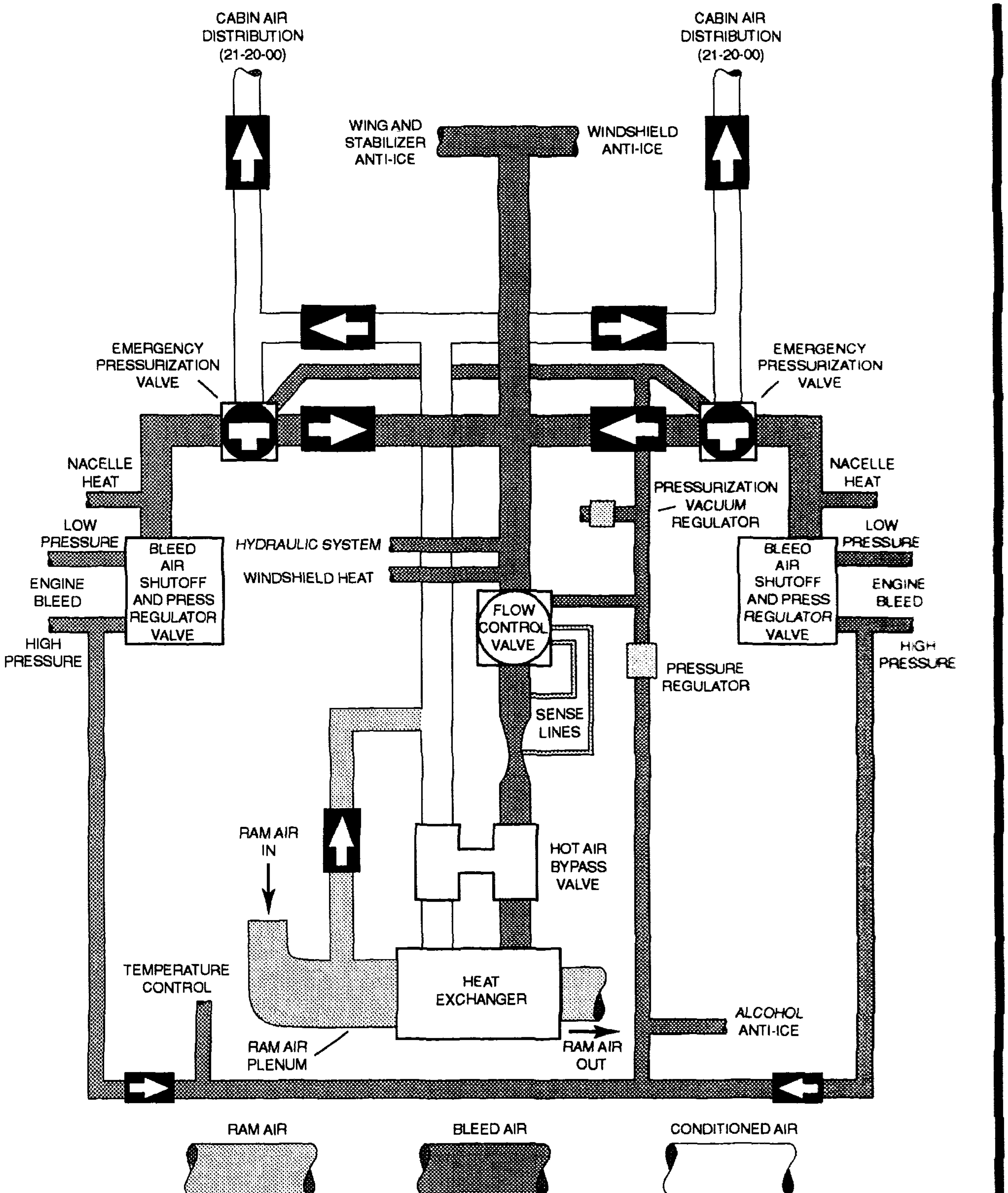
Air Conditioning System Schematic
Figure 1 (Sheet 1 of 3)



Air Conditioning System Schematic
Figure 1 (Sheet 2 of 3)



Air Conditioning System Schematic
Figure 1 (Sheet 3 of 3)



Air Conditioning System Schematic
Figure 2

DISTRIBUTION - DESCRIPTION AND OPERATION

1. DESCRIPTION (See figure 1.)

A. Precooled engine bleed air is routed into the cabin by two air distribution ducts. One is located on the LH side and one on the RH side. A bleed air check valve is installed in each distribution duct to prevent loss of cabin pressure in the event of pressurization system failure.

B. On *Aircraft 35-002 thru 35-055 and 36-002 thru 36-017*, precooled bleed air is vented into the cabin through six diffusers, into the cockpit area by four variable opening diffusers, across the internal surface of the windshield by two diffusers, and into the lower cabin door through a vent opening in the aft side of the door frame.

C. On *Aircraft 35-056 thru 35-106, 35-108 thru 35-112, and 36-018 thru 36-031*, precooled bleed air is vented into the cabin through two diffuser assemblies. One diffuser is located on the RH side of the cabin and one on the LH side. Each diffuser assembly incorporates multiple openings along its entire length. Precooled bleed air is vented into the cockpit area by four variable opening diffusers, across the internal surface of the windshield by two diffusers, and on *Aircraft 35-056 thru 35-085 and 36-018 thru 36-021*, into the lower cabin door through a vent opening in the aft side of the door frame.

D. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, precooled bleed air is vented into the cabin through two diffuser assemblies. One diffuser is located on the RH side of the cabin and one is on the LH side. Each diffuser assembly incorporates multiple openings along its entire length. A diffuser located beneath the divan seat also vents precooled bleed air into the cabin. This diffuser is connected to the RH air distribution duct just aft of the RH diffuser assembly. On *Aircraft 35-131 and Subsequent and 36-035 and Subsequent*, an additional seat rail diffuser (one on each side of the aircraft) vents precooled bleed air into the cabin. These diffusers are connected to the air distribution ducts forward and aft of the upper cabin diffuser assembly.

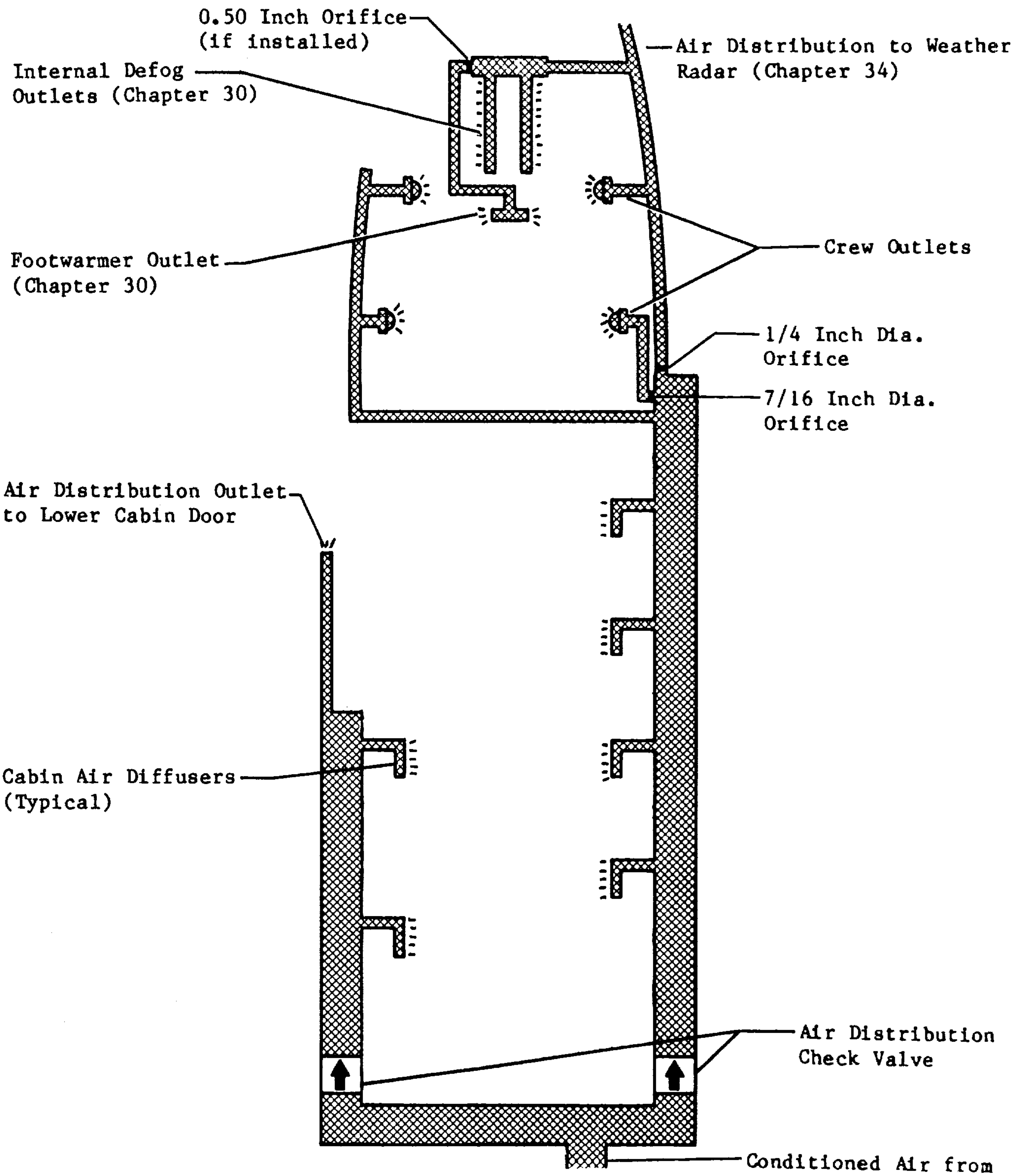
E. On *Aircraft 35-328 thru 35-642 and 36-046 and Subsequent*, two auxiliary diffusers (LH and RH) are installed along the lower edge of the windshield to increase the effectiveness of the internal defog system. On *Aircraft 35-643 and Subsequent*, a temperature-controlled electrical heater is installed in the RH bleed air duct as part of the windshield auxiliary defog heating system (refer to 21-43-00).

2. OPERATION

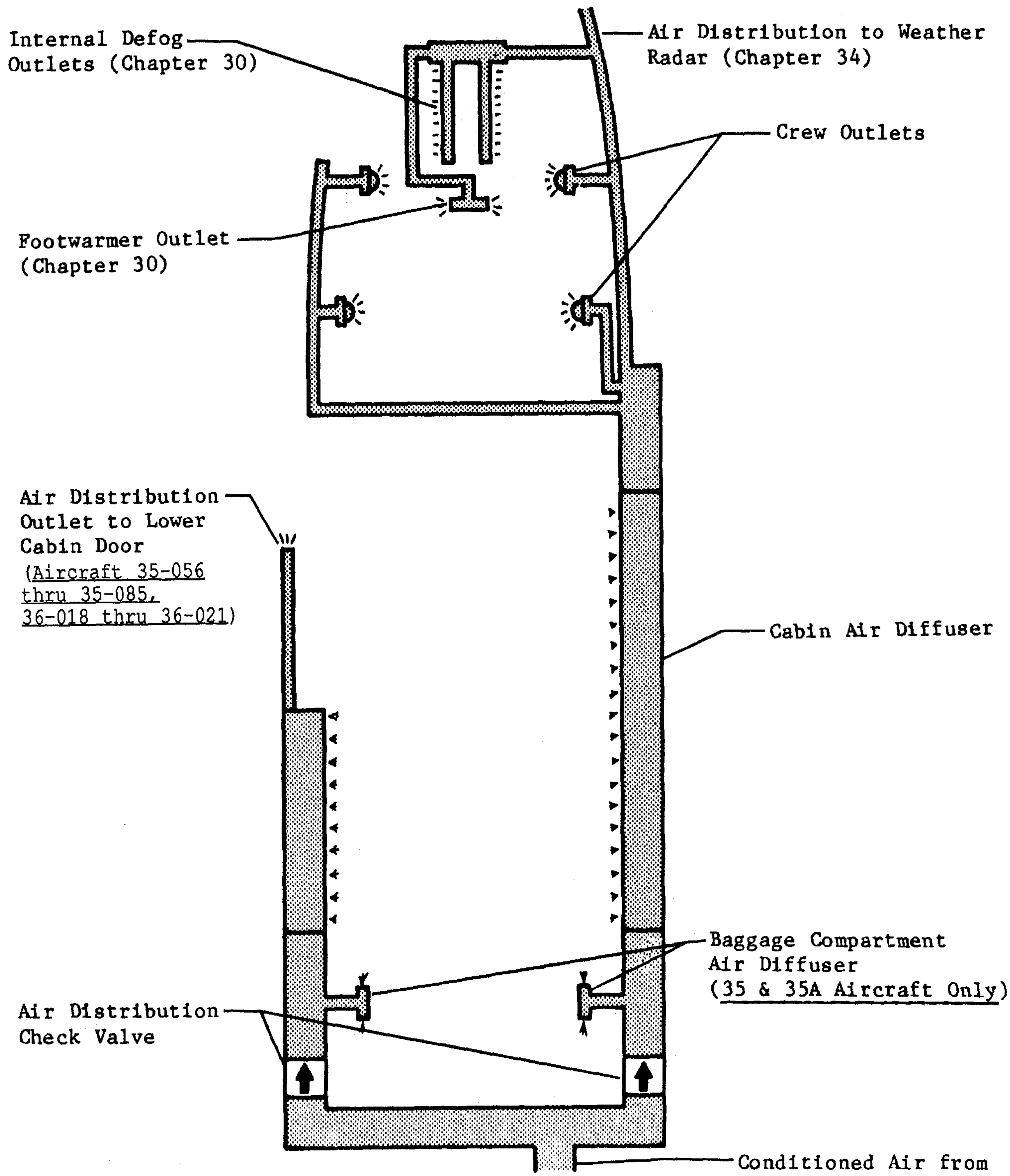
CAUTION: WITH THE AIRCRAFT ON THE GROUND, DO NOT PERFORM EXTENDED ENGINE OPERATION AT 70% TO 100% RPM WITH THE AIR BLEED SWITCH SET TO ON OR NORM OR THE LH AND RH BLEED AIR SWITCHES SET TO ON. WITH THE AIRCRAFT STATIC, THERE IS NO COOLING OF THE ENGINE BLEED AIR AND POSSIBLE DAMAGE TO AIR CONDITIONING COMPONENTS COULD RESULT. CABIN OVERHEATING AND DAMAGE TO CABIN FURNISHINGS MAY ALSO OCCUR.

A. On *Aircraft 35-002 thru 35-081, 35-083 thru 35-086, and 36-002 thru 36-022*, with the Bleed Air Switches (L and R) set to ON and the Cabin Air Switch set to NORM, engine bleed air is routed through the flow control valve to the heat exchanger. On *Aircraft 35-082, 35-087 thru 35-106, 35-108 thru 35-112, and 36-023 thru 36-031*, with the Bleed Air Switches set to ON and Cabin Air Switch set to NORM, engine bleed air is routed directly to the heat exchanger. The bleed air is precooled in the heat exchanger by ram air entering the dorsal inlet, passing through the heat exchanger, and then dumping into the tailcone. The amount of cooling by the heat exchanger is dependent upon the position of the hot air bypass valve. The hot air bypass valve is controlled by the temperature control system. (Refer to 21-60-00.) On *Aircraft 35-002 thru 35-081, 35-083 thru 35-086, and 36-002 thru 36-022*, the precooled air is then ducted from the heat exchanger into the cabin area. On *Aircraft 35-082, 35-087 thru 35-106, 35-108 thru 35-112 and 35-023 thru 36-031*, the precooled air is then ducted through the flow control valve and venturi into the cabin area. The venturi controls the flow control valve to allow the required airflow into the cabin. If a large amount of airflow is desired to remove fumes or smoke from the cabin, the Cabin Air Switch is set to MAX. This energizes a solenoid on the flow control valve overriding the venturi and fully opening the flow control valve.

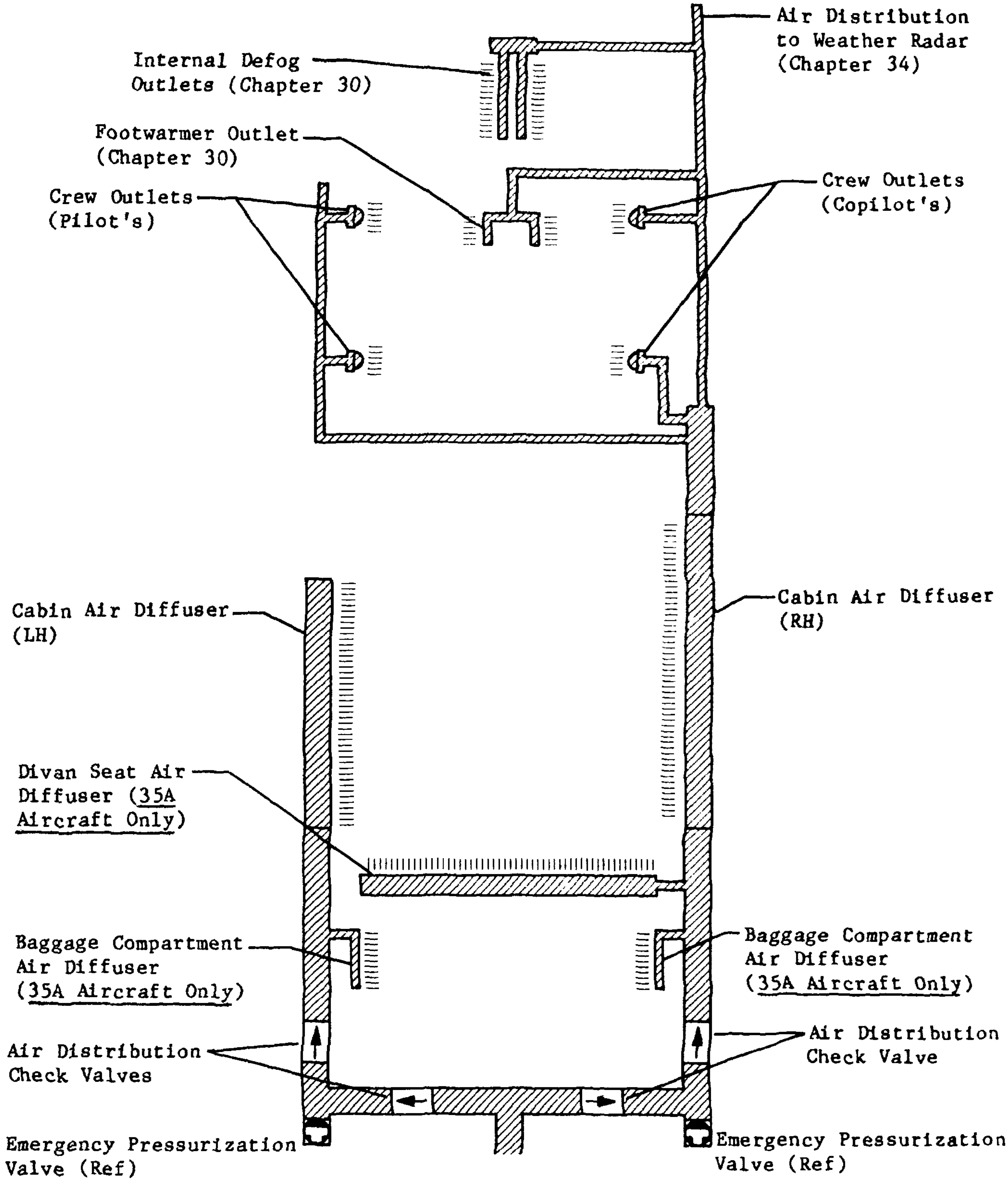
B. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, with the Cabin Air Switch set to ON and the LH and RH Bleed Air Switches set to ON, engine bleed air is admitted through the flow control valve to the heat exchanger. The engine bleed air is precooled in the heat exchanger by ram air entering the dorsal inlet, passing through the heat exchanger, then dumping into the tailcone. The amount of cooling accomplished by the heat exchanger is dependent upon the hot air bypass valve. The bypass valve is controlled by the temperature control system. (Refer to TEMPERATURE CONTROL SYSTEM for further information.) The precooled bleed air is then ducted into the cabin area. If a large amount of airflow is desired to remove fumes or smoke from the cabin, the LH and RH Bleed Air Switches are set to EMER. The emergency pressurization valves located in the engine bleed air ducts are positioned to duct the engine bleed air directly into the cabin. Temperature controls will not be available with the emergency pressurization valves in the EMER position.



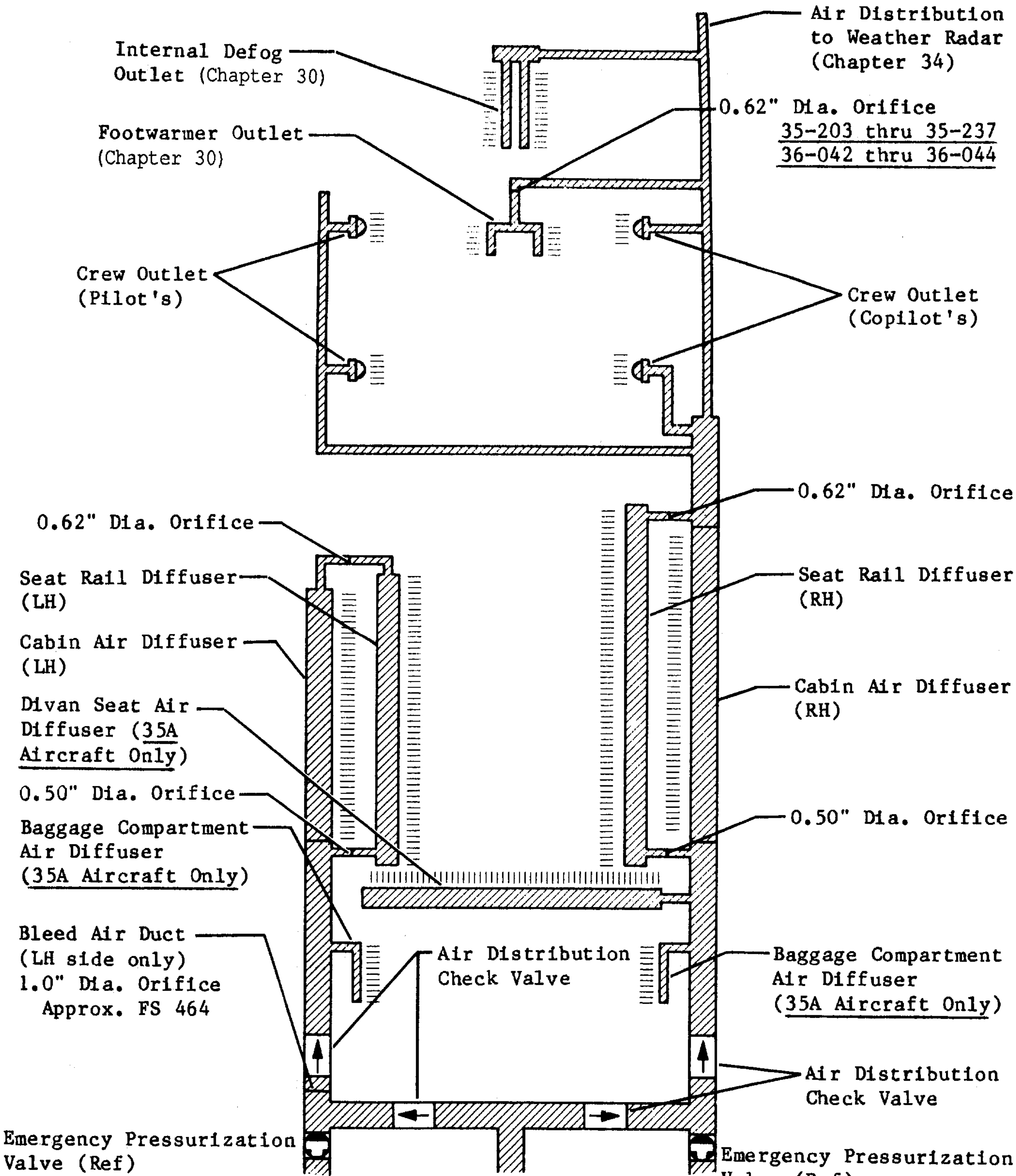
Air Distribution System Schematic
Figure 1 (Sheet 1 of 6)



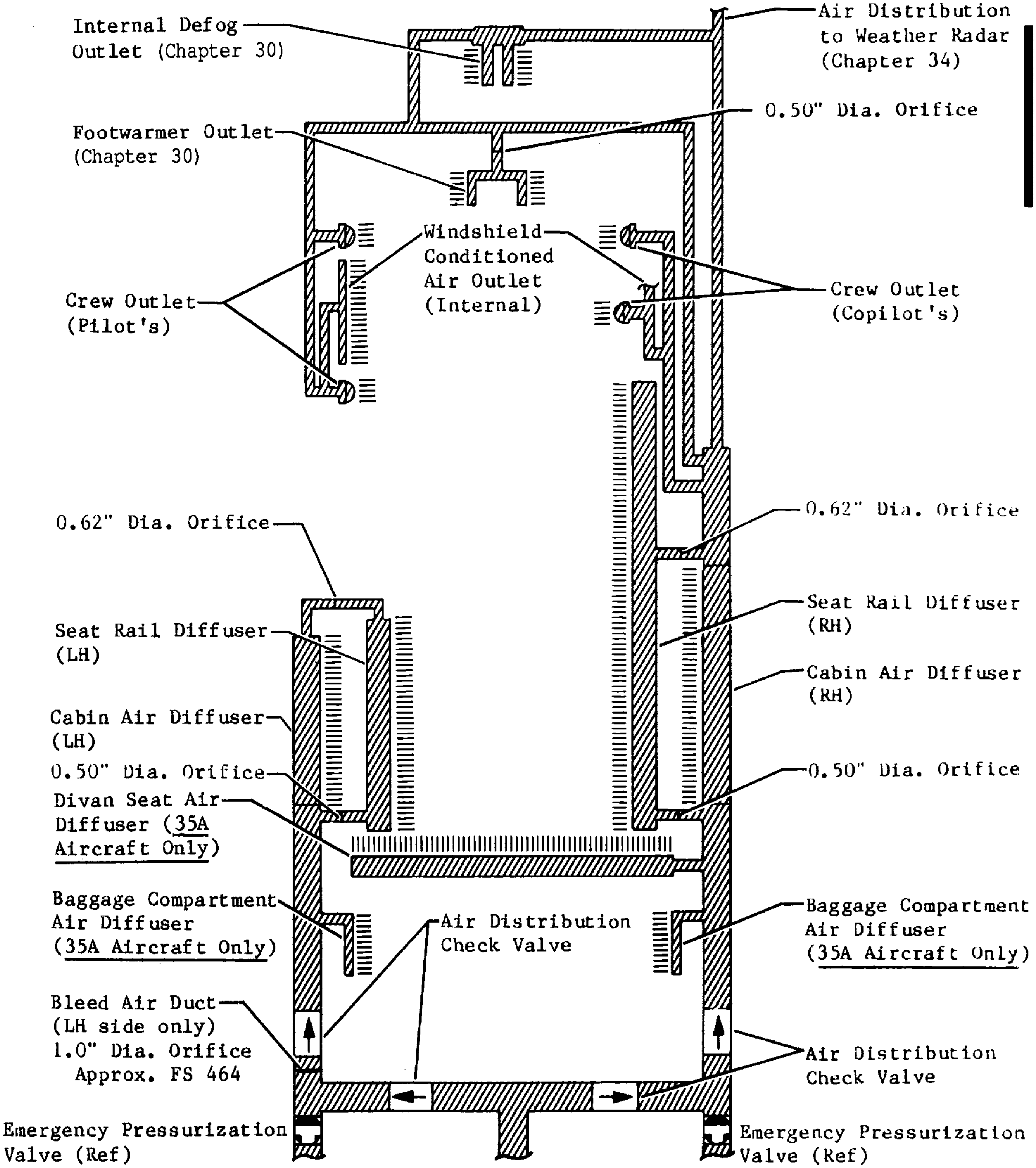
Air Distribution System Schematic
Figure 1 (Sheet 2 of 6)



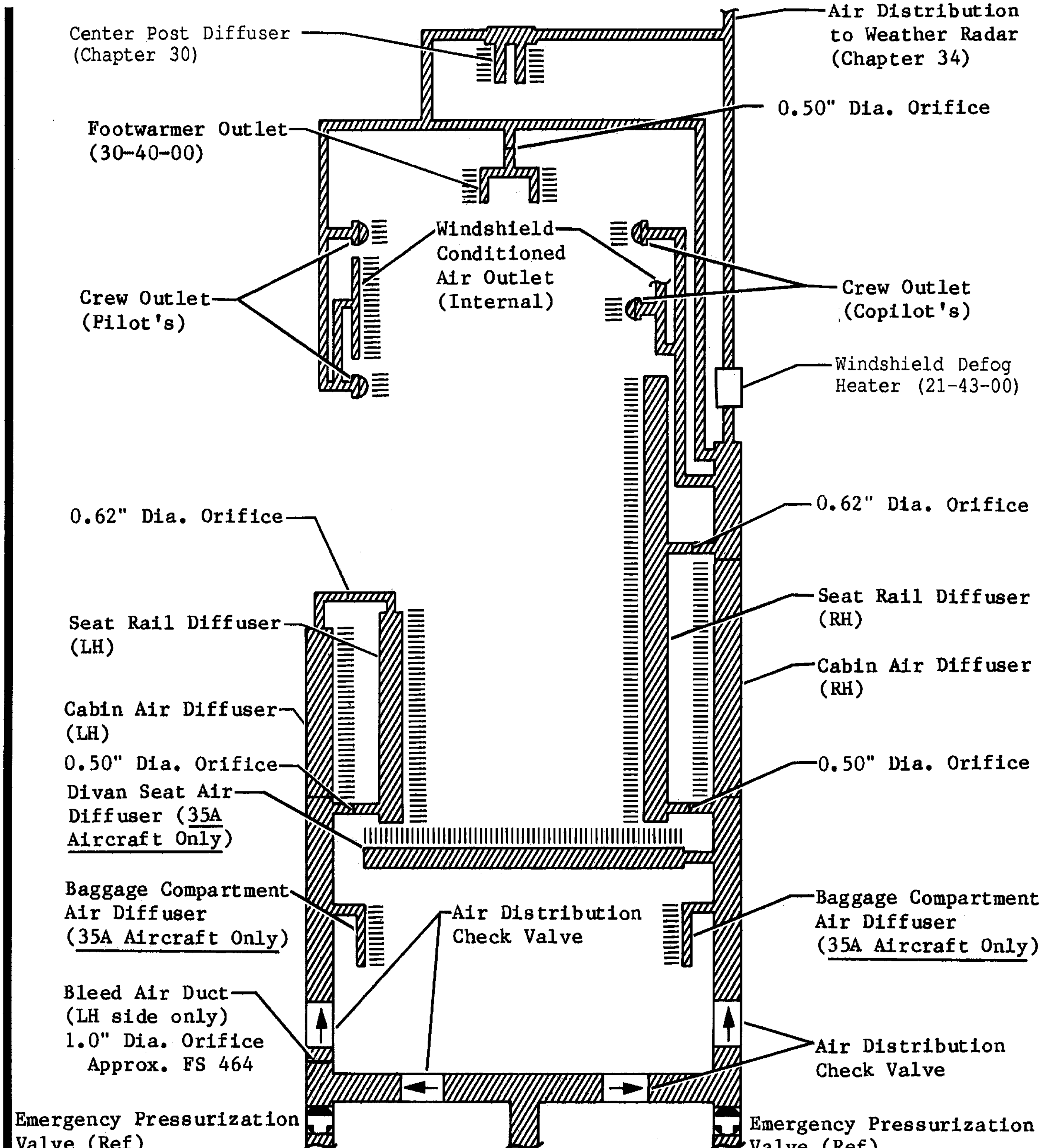
Air Distribution System Schematic
Figure 1 (Sheet 3 of 6)



Air Distribution System Schematic
Figure 1 (Sheet 4 of 6)



Air Distribution System Schematic
Figure 1 (Sheet 5 of 6)



Air Distribution System Schematic
Figure 1 (Sheet 6 of 6)

DISTRIBUTION - TROUBLE SHOOTING

1. GENERAL

A. The following trouble shooting procedures are provided as an aid to detect possible troubles in the air distribution system.

B. The distribution system utilizes orifices and foam restirctors to balance the air flow to each heated area. Leak test can be performed by supplying 20 psig minimum airflow from a ground pressure cart to the service port in the tailcone bleed air system.

C. Any leakage which can be detected by "feel" is not acceptable.

2. TROUBLE SHOOTING

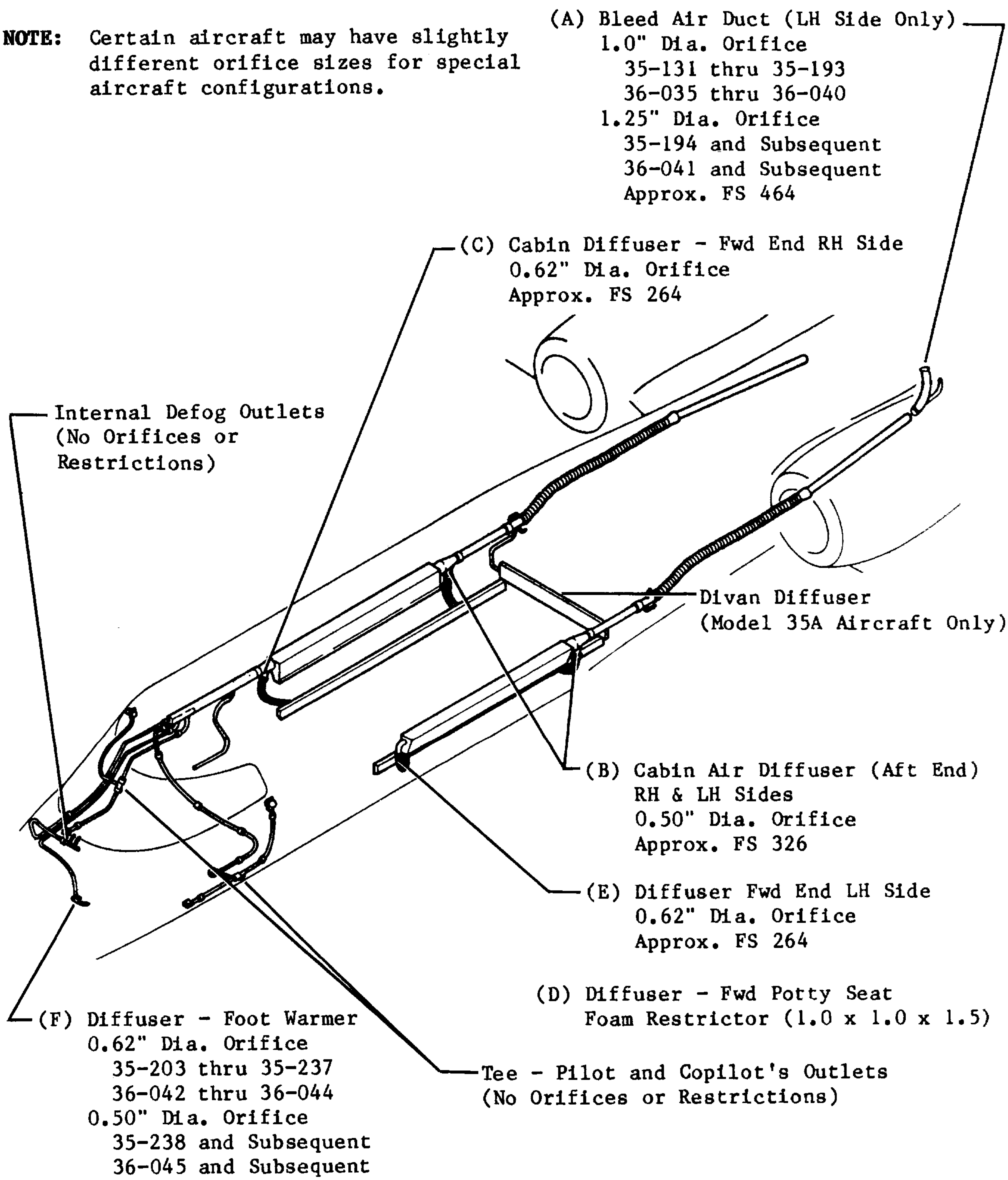
NO.	PROBLEM	PROBABLE CAUSE	TROUBLE SHOOTING	REPAIR
1.	RH seat locations hot. LH seat locations cool.	1. Obstruction at LH armrest diffuser outlet or LH seat-rail diffuser outlet.	1. Check diffuser outlets for obstructions, interior carpet, etc.	1. Remove obstruction.
		2. Component or connector leakage in RH distribution system.	2. Check lines and connectors for leakage, check RH armrest diffuser for external leakage. Check relief valves as follows: With normal air flow force the RH diffuser relief valves against their seat. If valves are leaking, there will be a notable noise change.	2. Remove and replace/ repair leaking connectors or components.
		3. Line restrictions in LH distribution system.	3. Remove LH interior and trace air supply lines for kinks or restrictions.	3. Straighten lines and remove restrictions.
		4. Line restriction in RH distribution system downstream of armrest diffuser (in cockpit area).	4. Remove cockpit and fwd potty interior to check for kinks or restrictions in air ducting.	4. Straighten lines, remove restrictions.
		5. Orifice size or location incorrect. a. Orifice (A) in hell hole too small. b. Orifices (B) or (C) in RH side too large. c. Orifices (E) or (B) in LH side too small. d. Orifice (F) too small.	5. Verify orifice size and location per Figure 1.	5. Correct size and location of orifices.
2.	LH seat locations hot. RH seat locations cool.	1. Obstruction at RH armrest diffuser outlet or RH seat-rail diffuser.	1. Check diffuser outlets for obstructions, interior carpet, etc.	1. Remove obstruction.
		2. Component or connector leakage in LH distribution system.	2. Check lines and connectors for leakage, check RH armrest diffuser for external leakage, check relief valves as follows: With normal air flow, force the LH diffuser relief valves against their seat. If valves are leaking, there will be a notable noise change.	2. Remove and replace/ repair leaking connectors or components.
		3. Line restrictions in RH distribution system.	3. Remove RH interior and trace air supply lines for kinks or restrictions.	3. Straighten line. Remove restrictions.
		4. Orifice size or location incorrect. a. Orifice (A) in hell hole too large. b. Orifices (E) or (B) in LH side too large. c. Orifices (B) or (C) in RH side too small. d. Orifice (F) too large.	4. Verify orifice size and location per Figure 1.	4. Correct size and location of orifices.

NO.	PROBLEM	PROBABLE CAUSE	TROUBLE SHOOTING	REPAIR
3.	RH or LH cabin floor is cold.	1. Obstructions at seat-rail diffuser outlets.	1. Check outlet of seat-rail diffuser for obstructions, interior carpet, etc.	1. Remove obstruction.
		2. Leaking connector.	2. Check all connections to seat-rail diffuser for leaks.	2. Remove and/or repair connections.
		3. Restrictions in seat-rail diffuser supply hoses.	3. Remove interior to check supply lines for kinks or restrictions.	3. Straighten lines. Remove restrictions.
		4. Insulation between seat-rail diffuser not installed.	4. Remove interior to check for insulation between seat-rail and diffuser .18 thick phenolic strip.	4. Insulate as required.
		5. Orifice size or location incorrect. a. Orifices (B), (C) or (E) are too small. b. Orifice (F) too large.	5. Verify orifice size and location per Figure 1.	5. Correct size and location of orifices.
4.	RH or LH floor is hot.	1. Restrictions in armrest diffuser supply or outlets.	1. Remove interior to check for restrictions.	1. Remove restrictions.
		2. Leaks or cracks in seat-rail diffuser or diffuser connectors.	2. Remove carpeting to check for leaks.	2. Repair leaks.
		3. Seat-rail diffuser supply orifice too large. (B), (C) or (E).	3. Verify orifice size and location per Figure 1.	3. Correct size and location of orifice.
5.	Divan seat area is cold.	1. Obstructions at divan diffuser outlets (Model 35 only).	1. Check outlet of divan diffuser for obstructions, interior carpet, etc.	1. Remove obstruction.
		2. Leaking connectors (Model 35 only).	2. Check all connections to divan diffuser for leakage.	2. Remove and/or repair connections.
		3. Restrictions in divan diffuser supply lines (Model 35 only).	3. Remove interior to trace supply line for kinks or restrictions.	3. Straighten lines. Remove restrictions.
		4. Cold draft from emergency escape door.	4. Verify proper insulation around escape hatch.	4. Insulate as required.
		5. Cold draft from baggage compartment.	5. Verify interior liner is properly installed in baggage compartment. Verify compartment curtain is closed during flight.	5. Reinstall interior liner. Close baggage curtain during flight.
		6. Aft fan speed too high.	6. Cabin blower should be on minimum speed.	6. Reposition blower switch.
		7. Orifice size or location incorrect. a. Orifice (A) too large. b. Orifices (B), (C) or (E) RH and LH side too large. c. Orifice (F) too large.	7. Verify orifice size and location per Figure 1.	7. Correct size and location of orifice.
6.	Divan seat area is hot.	1. Restriction in the armrest or seat-rail diffuser supply.	1. Remove interior to check diffuser supply for restrictions.	1. Remove restrictions.
		2. Leaks in RH air distribution ducting next to divan seat or in baggage area.	2. Remove interior to check for leaks.	2. Repair leaks.
		3. Armrest or seat-rail diffuser supply orifice too small.	3. Verify orifice size and location per Figure 1.	3. Correct orifice size and location.

NO.	PROBLEM	PROBABLE CAUSE	TROUBLE SHOOTING	REPAIR
7.	Fwd potty area is cold.	1. Obstruction to potty diffuser outlet.	1. Check outlet of diffuser for obstructions, interior carpet, etc.	1. Remove obstruction.
		2. Leaking connectors to potty diffuser.	2. Check connectors for leakage.	2. Remove and/or repair connectors.
		3. Restrictions in potty diffuser supply.	3. Remove interior to trace supply line for kinks or restrictions or excessive foam restriction in diffuser supply tube (Ref. Figure 1).	3. Straighten lines. Remove restrictions.
		4. Cold draft from cabin entry door.	4. Inspect door seal and door fit.	4. Repair door and door fit.
		5. Orifice size or location incorrect. a. Orifice (A) too large. b. Orifices (B), (C) or (E) too large, RH or LH side. c. Orifice (F) too large.	5. Verify orifice size and location per Figure 1.	5. Correct size and location of orifice.
8.	Fwd potty area hot.	1. Leaking connections to fwd end of armrest diffuser or supply ducting in the potty area.	1. Remove interior to check for leaks or loose connections.	1. Repair leaks.
		2. Foam restrictor (D) to potty diffuser too small.	2. Verify foam installation in potty diffuser per Figure 1.	2. Correct foam installation.
9.	Cockpit cold, cabin hot.	1. Restrictions to cockpit air supply lines.	1. Remove interior to trace cockpit air supply lines for kinks or restrictions.	1. Straighten lines. Remove restrictions.
		2. Leaking connections or components in cabin air distribution system.	2. Check lines and connectors for leakage, check diffusers for external leakage, check relief valves as follows: With normal air flow, force the diffuser relief valves against their seat. If valves are leaking, there will be a notable noise change.	2. Remove and replace or repair leaking connectors or components.
		3. Orifice size or location incorrect. a. Orifice (A) too large. b. Orifices (B), (C) or (E) too large, RH or LH side. c. Orifice (F) too small.	3. Verify orifice size and location per Figure 1.	3. Correct size and location of orifices.
10.	Cockpit hot, cabin cold.	1. Leaks in cockpit air distribution ducting and connectors.	1. Remove interior to check for leaks in the cockpit area.	1. Repair leaks.
		2. Restrictions in cabin air distribution ducting.	2. Remove interior to check for restrictions in the cabin area.	2. Remove restrictions.
		3. Orifice size or location incorrect: a. Orifice (A) too small. b. Orifice (B), (C) or (E) too small, LH or RH side. c. Orifice (F) too large.	3. Verify orifice size and location per Figure 1.	3. Correct orifice size and location.

NO.	PROBLEM	PROBABLE CAUSE	TROUBLE SHOOTING	REPAIR
11.	Cockpit wemac velocities low.	1. Faulty wemac or wemac connection.	1. Remove interior to inspect wemac body and connection.	1. Remove and/or repair wemac and connection.
		2. Restriction to wemac supply.	2. Remove interior to check supply line for kinks or restrictions.	2. Straighten lines. Remove restriction.
		3. Low bleed air supply.	3. Check tailcone ducting connectors for leaks, check flow control valve.	3. Repair leaking connectors or lines. Replace flow control valve.
		4. Leaks in cabin air distribution system.	4. Remove interior to check for leaks in the cabin air distribution system.	4. Repair leaks.
		5. Orifice size or location incorrect. a. Orifice (A) too large. b. Orifices (B), (C) or (E) too large, LH or RH side. c. Orifice (F) too large.	5. Verify orifice size and location per Figure 1.	5. Correct size and location of orifice.
12.	Windshield defog velocities low.	1. Leaking connection to interior defog diffuser.	1. Check connection to diffuser for leaks.	1. Repair connection.
		2. Restrictions in defog diffuser supply line.	2. Trace supply line to defog diffuser for restrictions. Check base of defog tubes for restrictions.	2. Straighten kinked lines. Remove restrictions.
		3. Low bleed air supply.	3. Check tailcone duct connectors for leaks. Check flow control valve.	3. Repair leaking connections. Replace flow control valve.
		4. Orifice size or location incorrect: a. Orifice (A) too large. b. Orifices (B), (C) or (E) too large. c. Orifice (F) too large.	4. Verify orifice size and location per Figure 1.	4. Correct size and location of orifice.
13.	Air at diffuser outlets too hot.	1. Low bleed air supply.	1. Check tailcone ducts for leakage. Check flow control valve.	1. Repair leaking connections. Replace flow control valve.
		2. Restrictions or leakage in ram air supply to heat exchanger.	2. Check ram air supply ducting for leaks and restrictions.	2. Repair connections. Remove restrictions.
14.	Hot spot in cabin.	1. Leaking supply lines or components in vicinity of hot spot.	1. Remove interior near the hot spot to check for leaks.	1. Repair leaks.

NOTE: Certain aircraft may have slightly different orifice sizes for special aircraft configurations.



Cabin Air Distribution System - Orifice Location and Size

13-75C-7

Figure 1

DISTRIBUTION - MAINTENANCE PRACTICES

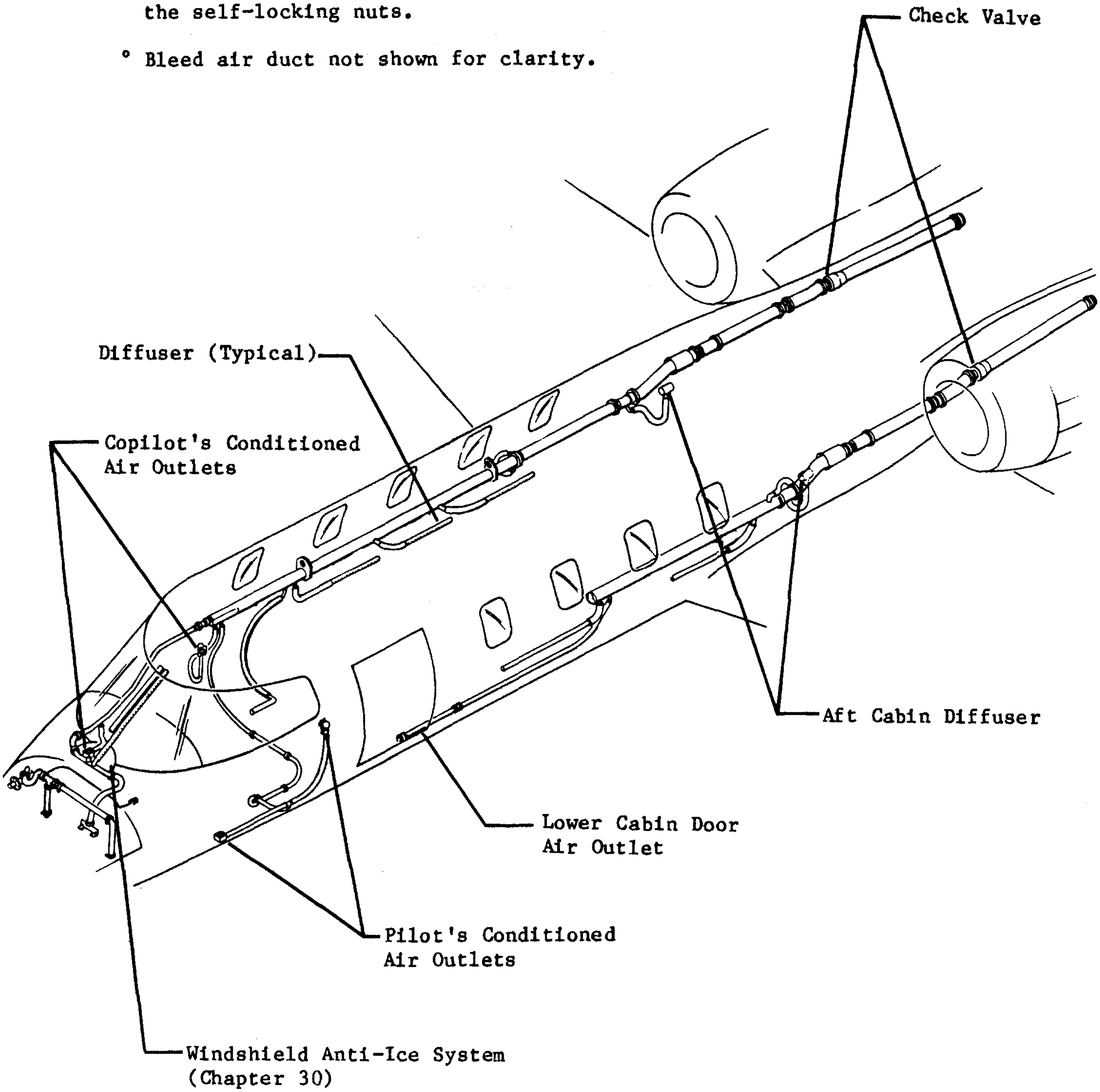
1. REMOVAL/INSTALLATION
   A. Remove Distribution Ducts (See figures 201 through 206.)
      (1) Remove equipment and upholstery as required to gain access to distribution ducts.
      (2) Loosen and remove clamps as required to allow removal of distribution ducts.
   B. Install Distribution Ducts (See figures 201 through 206.)
      (1) Install distribution ducts.
      (2) Secure with clamps.

      NOTE: Torque T-bolt couplings between frames 17A and 22 to 20 inch-pounds plus drag torque. Drag torque is the amount of torque required to overcome the friction of any self-locking nut. This nut friction (drag torque) must be added to the torque callout to assure proper torquing.

      (3) Install previously removed upholstery and equipment.

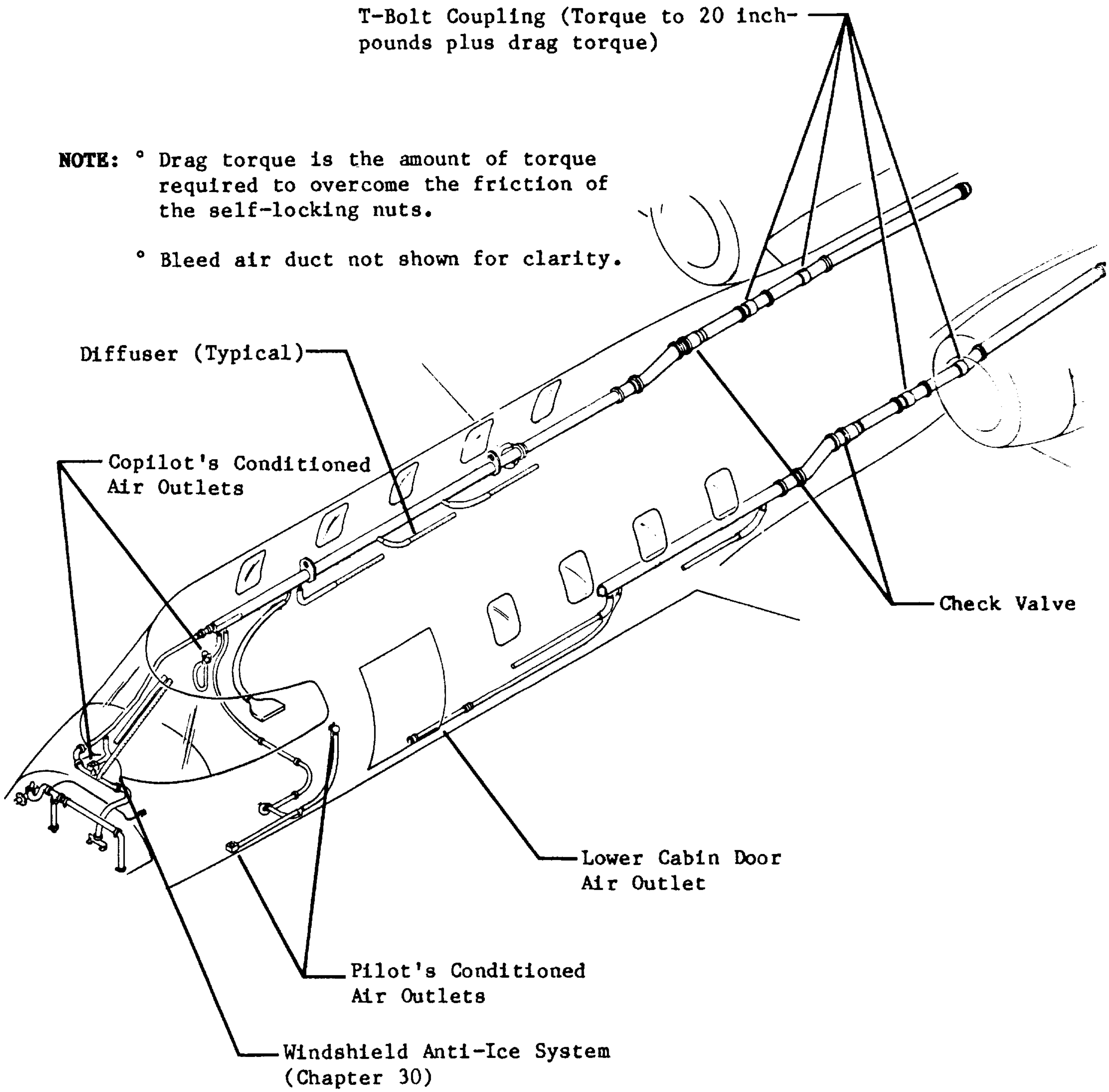
NOTE: ° Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.

° Bleed air duct not shown for clarity.



Air Distribution and Feeder Duct Installation
Figure 201 (Sheet 1 of 2)

13-75C-1

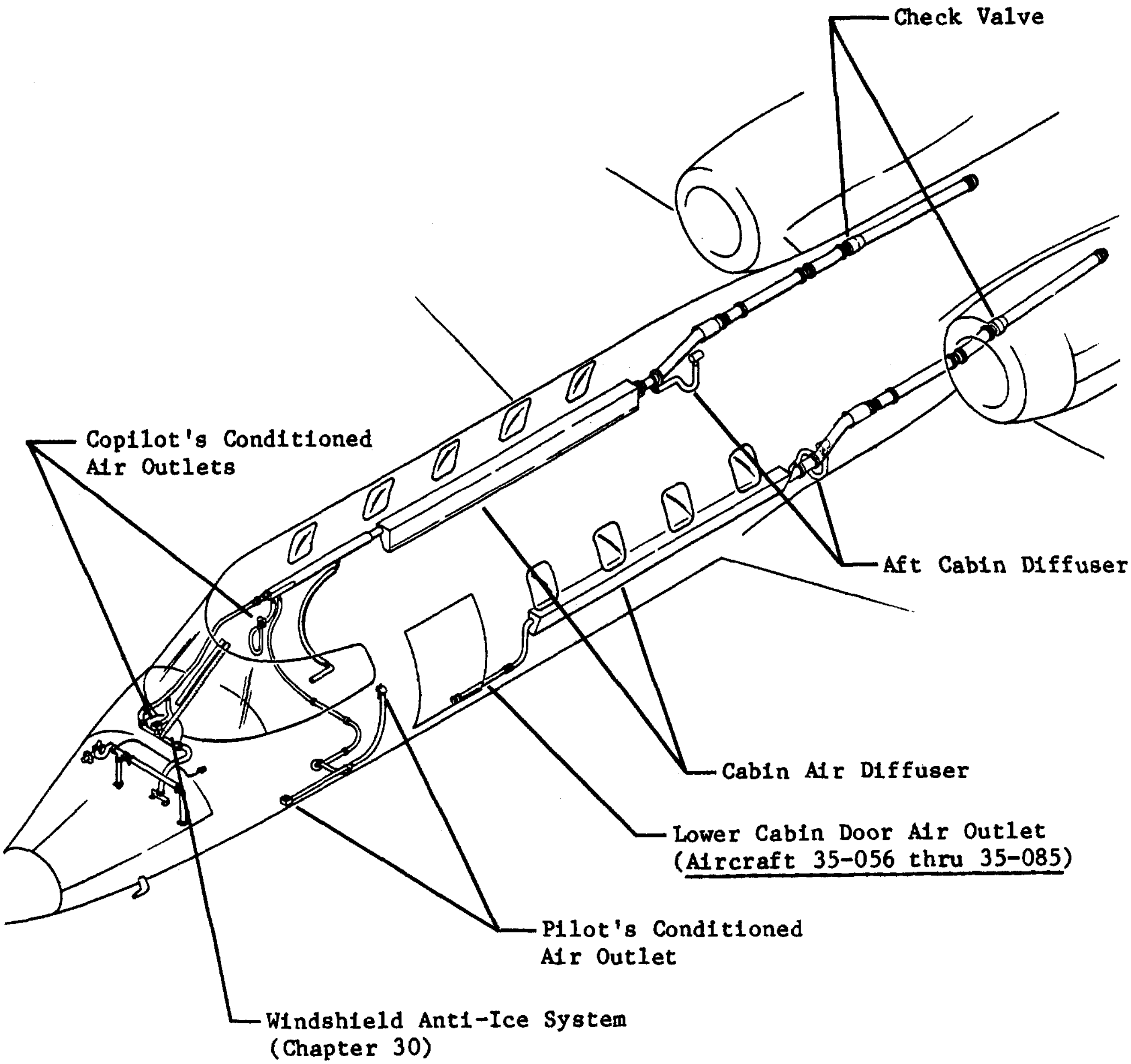


13-75C-2

Air Distribution and Feeder Duct Installation
Figure 201 (Sheet 2 of 2)

NOTE: ° Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.

° Bleed air duct not shown for clarity.

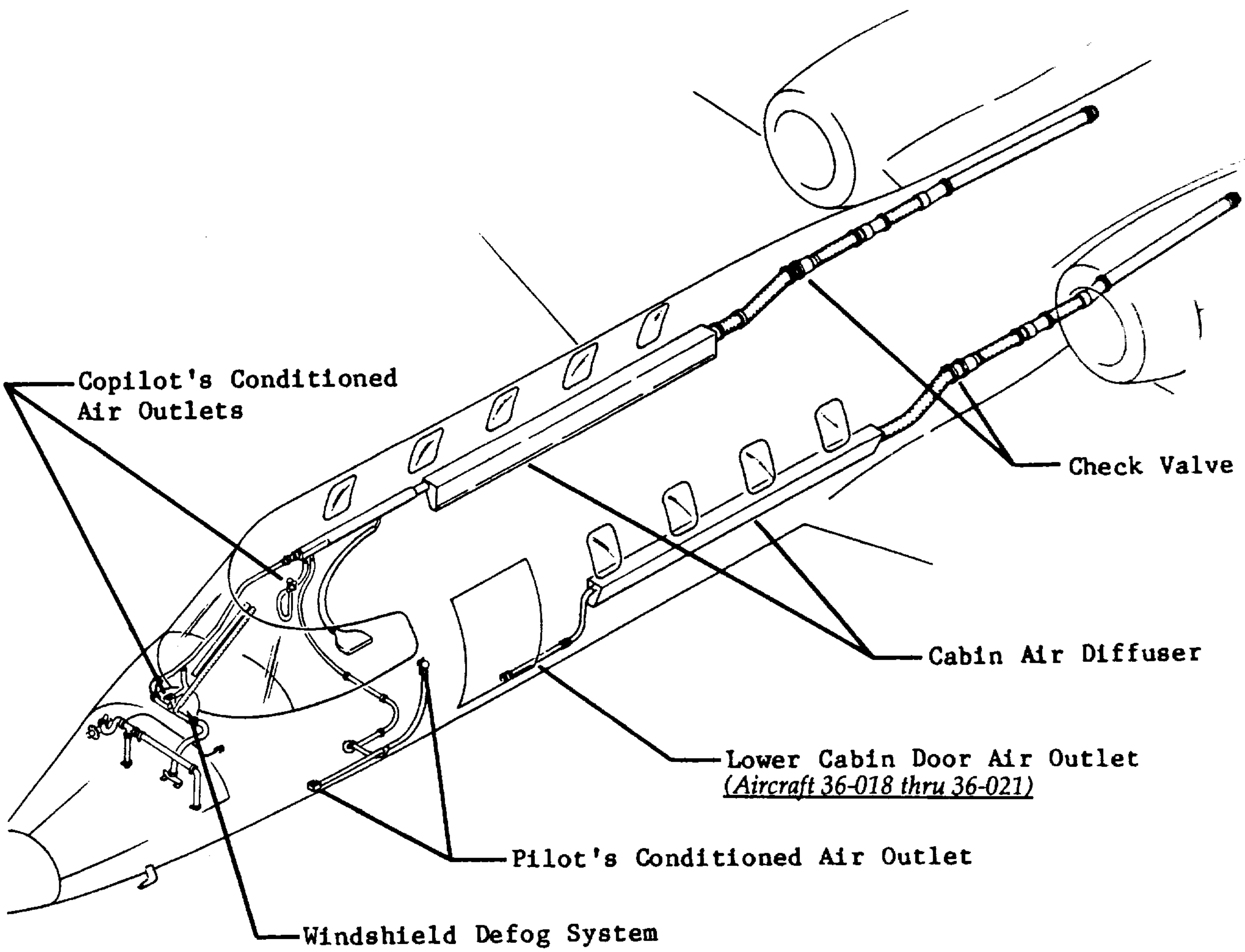


Air Distribution and Feeder Duct Installation
Figure 202 (Sheet 1 of 2)

13-75C-1
13-75C-4

NOTE: ° Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.

° Bleed air duct not shown for clarity.

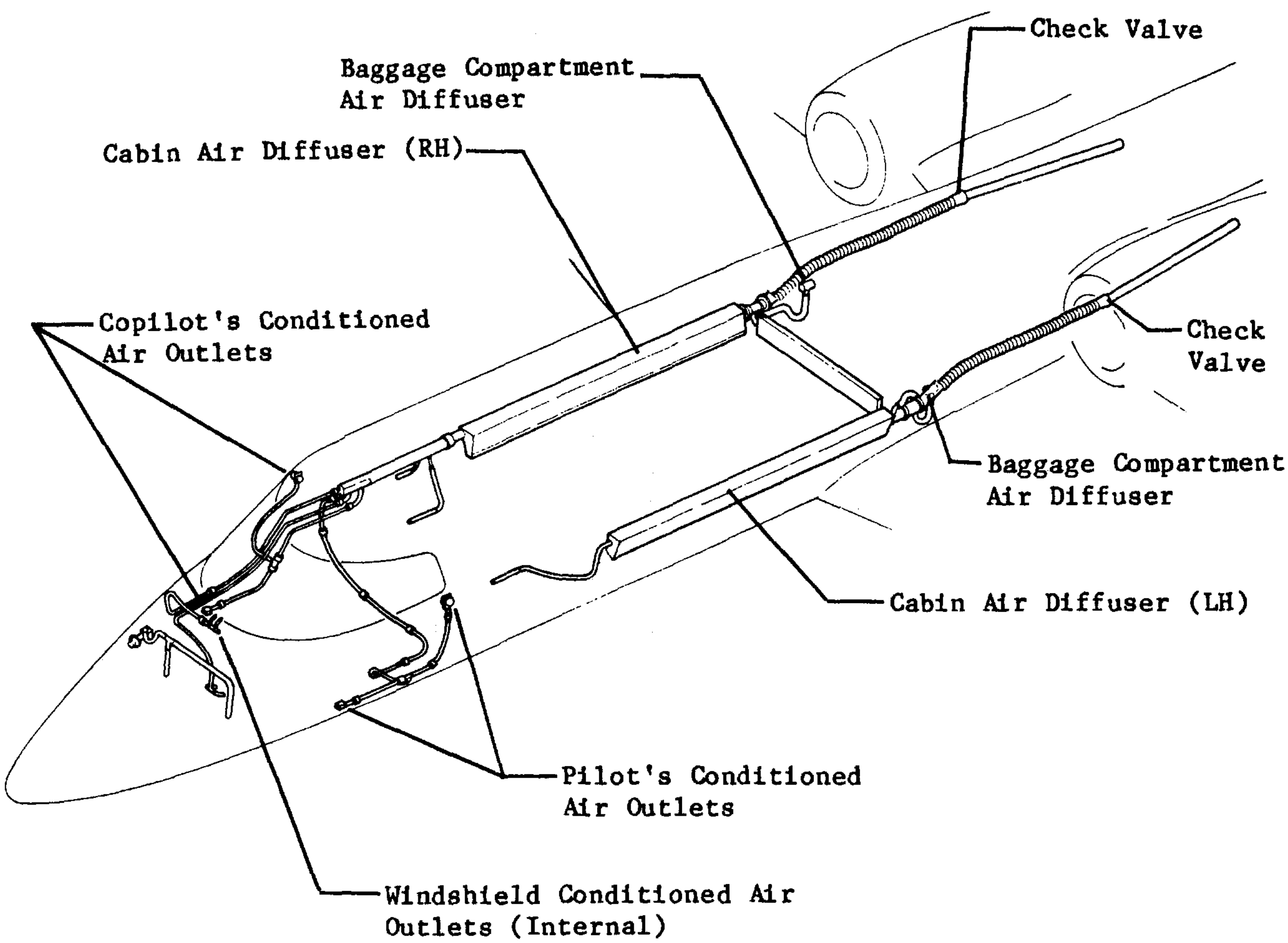


Air Distribution and Feeder Duct Installation
Figure 202 (Sheet 2 of 2)

13-75C-5

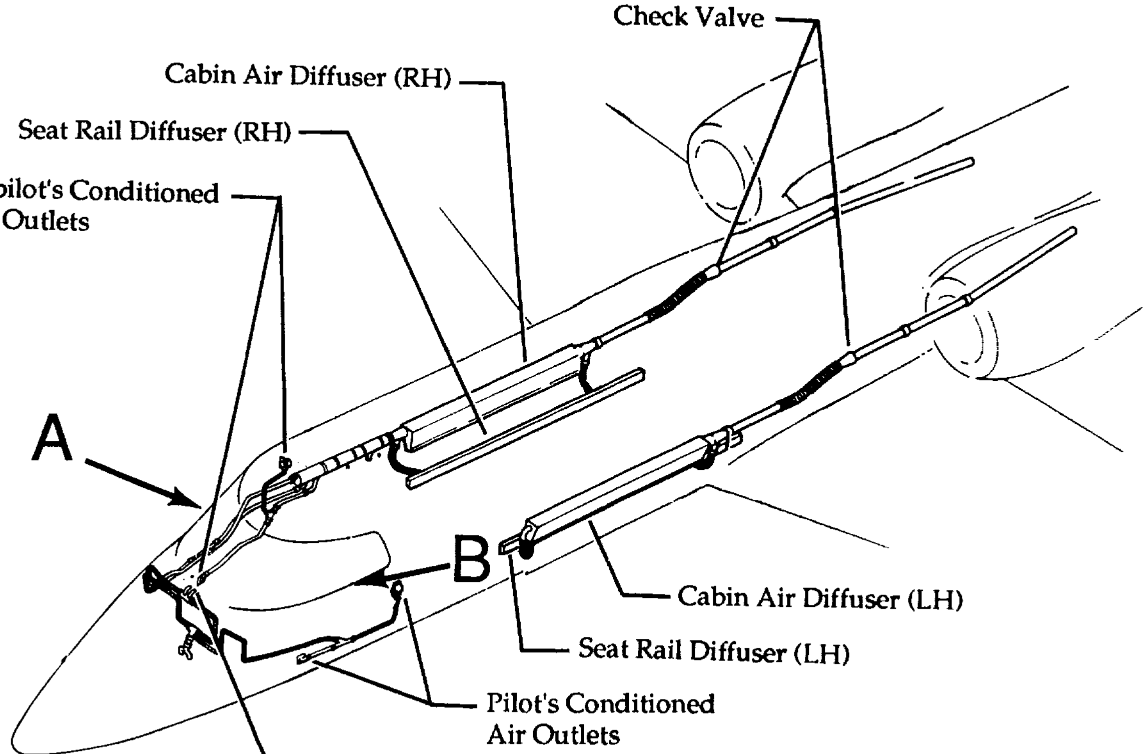
NOTE: ° Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.

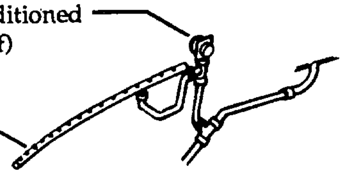
° Bleed air duct not shown for clarity.



Air Distribution and Feeder Duct Installation
Figure 203

13-75C-7





Effective on Aircraft 36-046 and Subsequent

Detail A

Effective on Aircraft 36-046 and Subsequent

Detail B

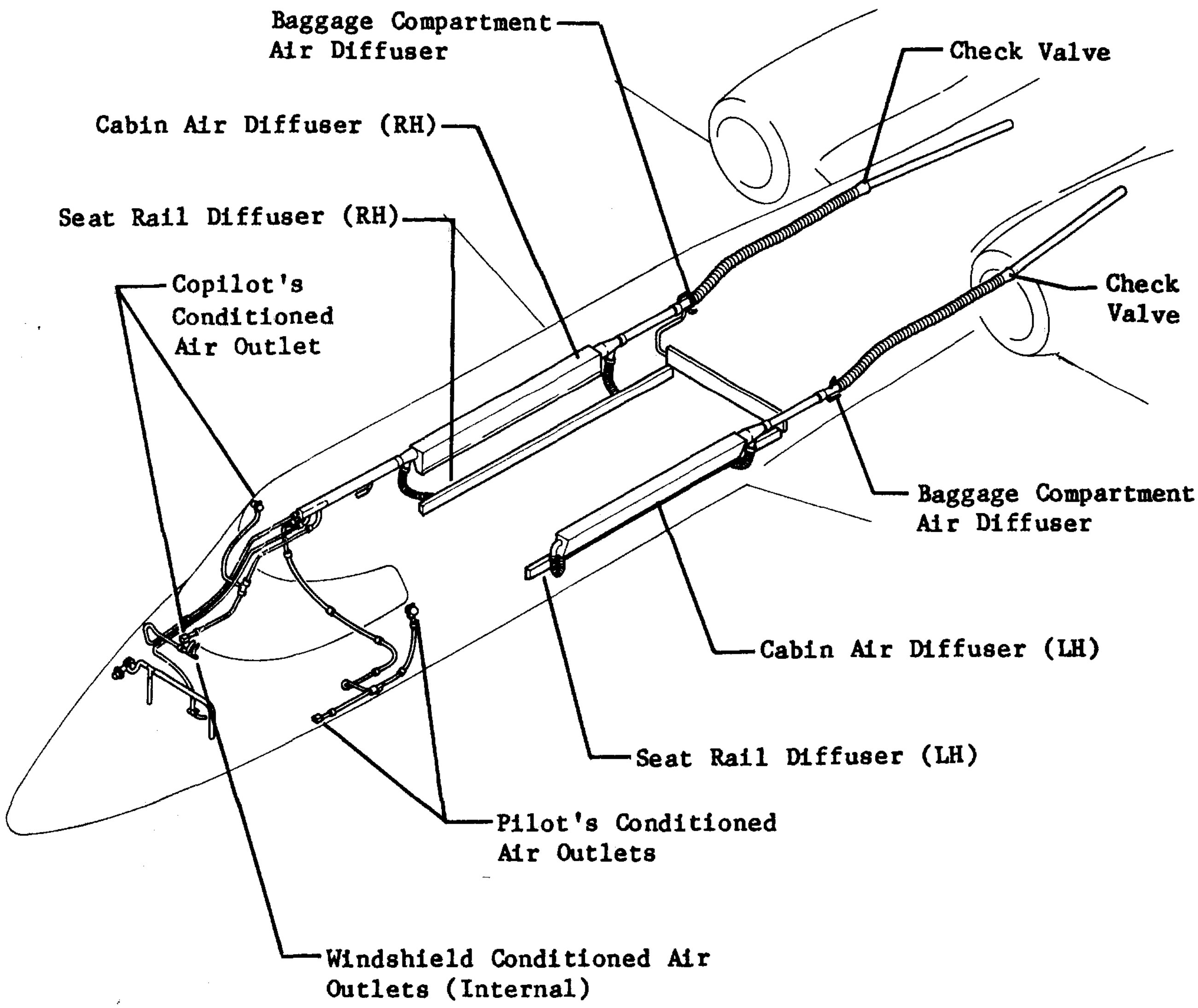
Air Distribution and Feeder Duct Installation
Figure 204

13-175C

EFFECTIVITY: 36-022, 36-023, 36-032 and Subsequent and previous aircraft modified per AAK77-2 or AAK77-10 "Cabin Temperature Control and Air Distribution Improvement."

NOTE: ° Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.

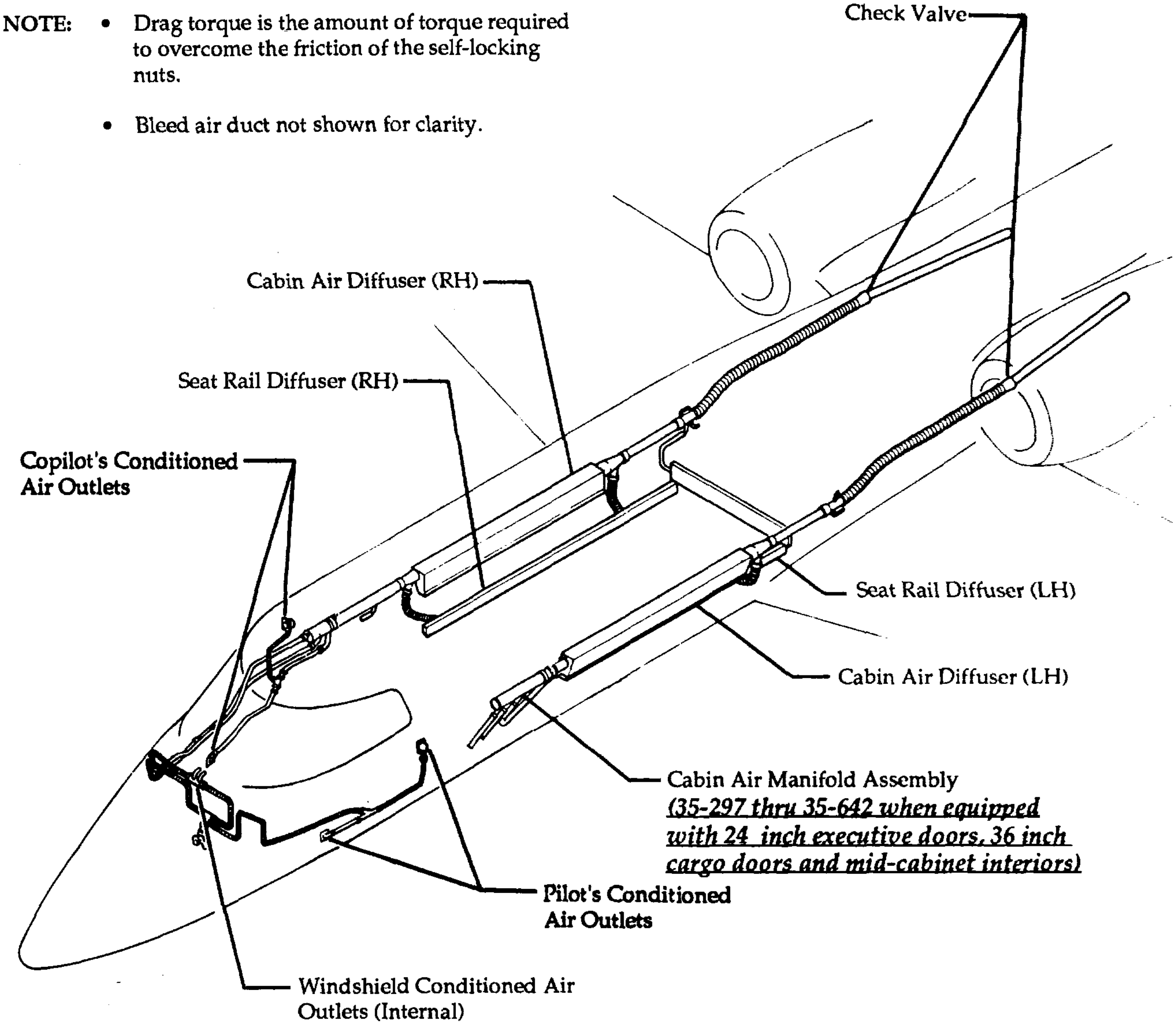
° Bleed air duct not shown for clarity.

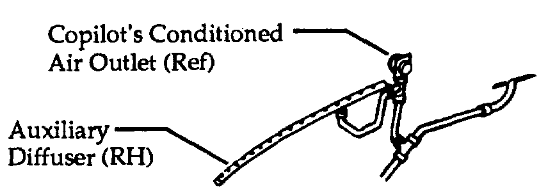


Air Distribution and Feeder Duct Installation
Figure 205

13-75C-7

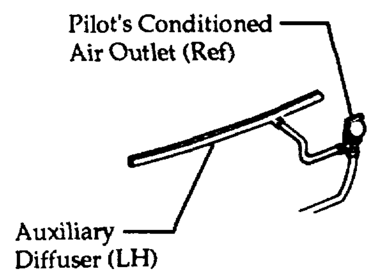
NOTE:
- Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.
- Bleed air duct not shown for clarity.





Effective on Aircraft 35-328 thru 35-642

Detail A



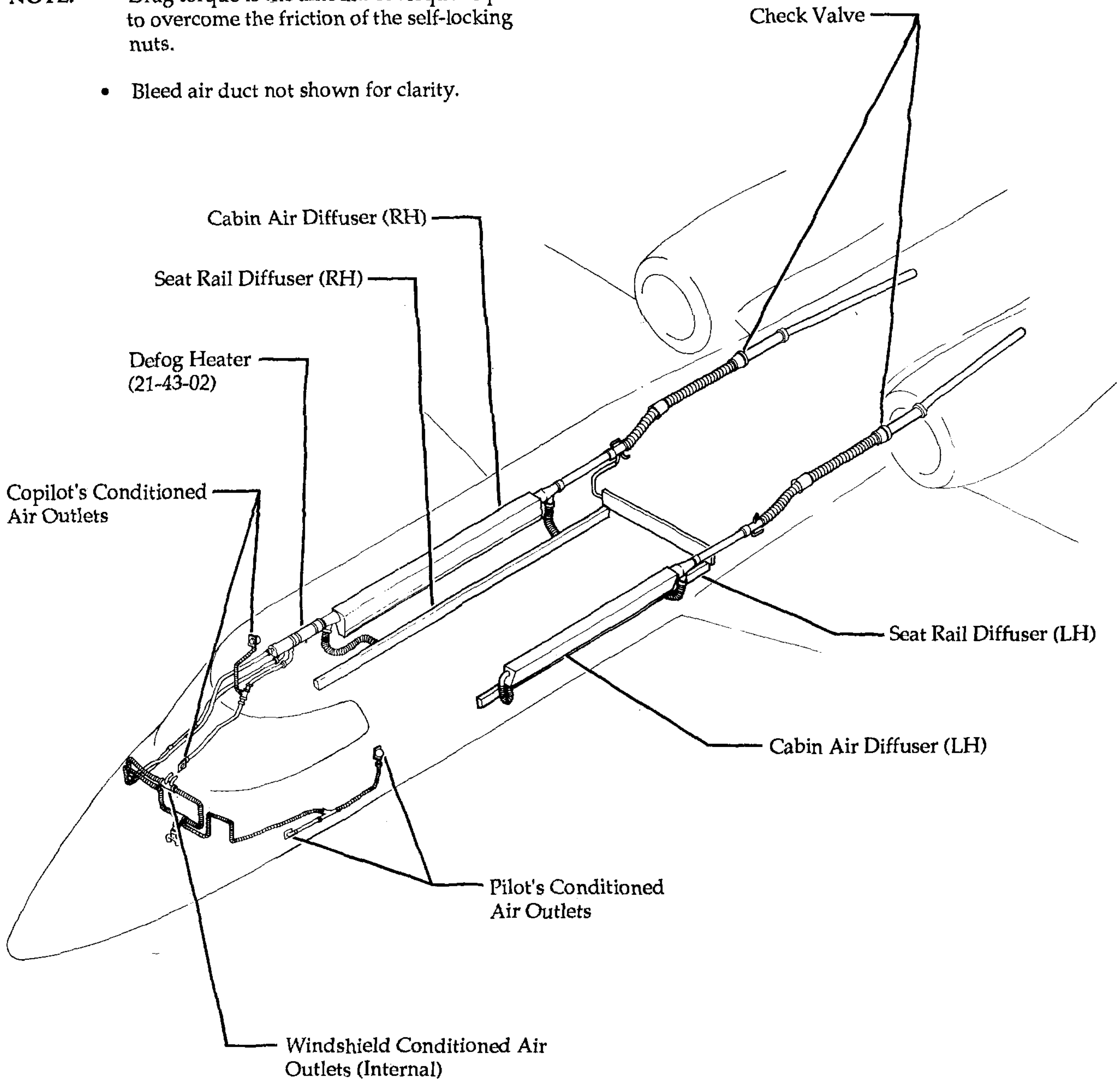
Effective on Aircraft 35-328 thru 35-642

Detail B

Air Distribution and Feeder Duct Installation
Figure 206

13-175C

NOTE:
- Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.
- Bleed air duct not shown for clarity.



Air Distribution and Feeder Duct Installation
Figure 207

13-175C

CABIN AND COCKPIT BLOWER SYSTEM - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The cabin blower system utilizes the evaporator and blower assembly without the refrigeration system in operation. The blower is controlled by the COOL-OFF-FAN Switch on the cabin climate and lighting switch panel. When the switch is set to FAN, the cabin blower relay is energized, applying 28 vdc to the cabin blower. On Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent and Aircraft 35-056 thru 35-106, 35-108 thru 35-112 and 36-018 thru 36-031 Modified per AAK 77-4, "Installation of Variable Speed Control for Cabin Blower," a rheostat-type switch is installed on the copilot's side panel and is used to control the speed of the cabin blower only when the COOL SYS Switch is at FAN. When the auxiliary heater or the refrigeration system are utilized, the blower speed is constant and cannot be varied.

B. The cockpit blower system utilizes a fan installed between the outlet ducts of the evaporator and blower assembly. The air is ducted down both sides of the upper center panel to individual light and gasper assemblies. Additional ducts are routed to the cockpit headliner light and gasper assemblies. The ventilator portion of the gasper assembly allows the passengers and crew to adjust the airflow. The fan is controlled by a rheostat-type Cockpit Air Switch located adjacent to the copilot's map light switch.

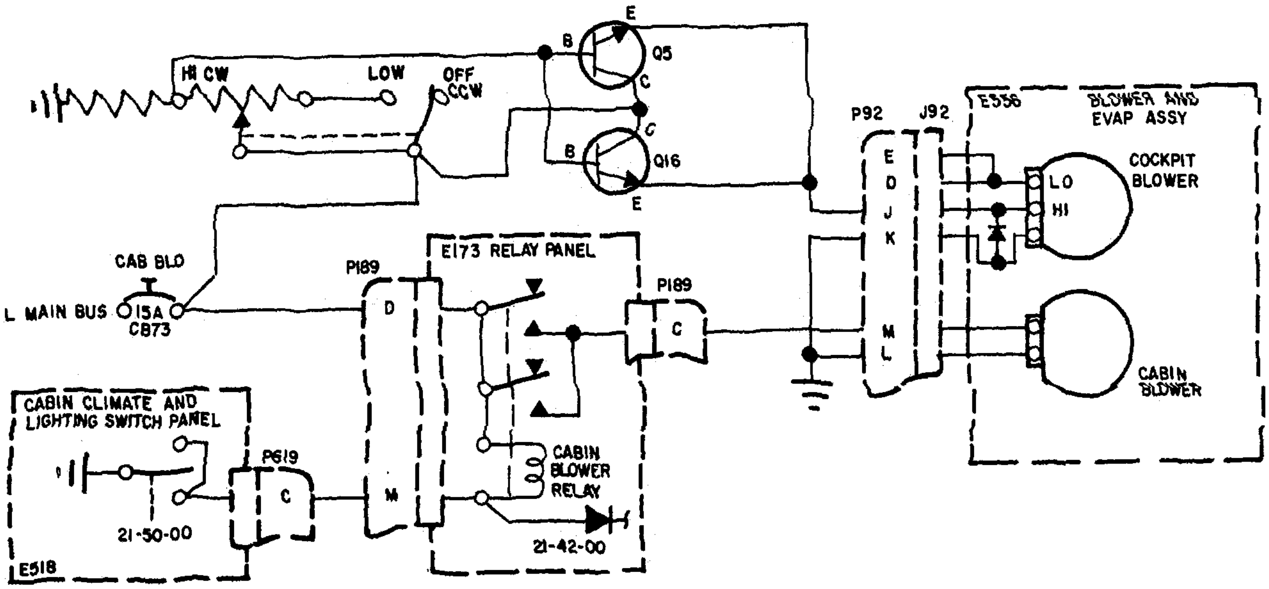
C. On Aircraft 35-002 thru 35-051 and 36-002 thru 36-016, the transistor and heat sink assemblies Q5 and Q16 are installed in the nose compartment. Transistor Q5 is located on the RH side of the nose compartment, forward of frame 2, between stringers 11 and 14. Transistor Q16 is located on the LH side of the nose compartment, forward of frame 2, between stringers 11 and 14. On Aircraft 35-052 and Subsequent and 36-017 and Subsequent, the transistor and heat sink assembly (Q16) is installed on the LH side of the tailcone aft of frame 25, between stringers 13A and 14.

D. On Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent, the cabin blower control box (E108) is located on the LH side of the tailcone at stringers 16 and 14 just aft of frame 27. On Aircraft 35-056 thru 35-106, 35-108 thru 35-112 and 36-018 thru 36-031 modified per AAK 77-4, "Installation of Variable Speed Control for Cabin Blower," the cabin blower control box (E108) is located either on the LH side of the tailcone at stringers 12 and 14 just forward of frame 26 or on the LH side of the tailcone at stringers 14 and 16 just aft of frame 27.

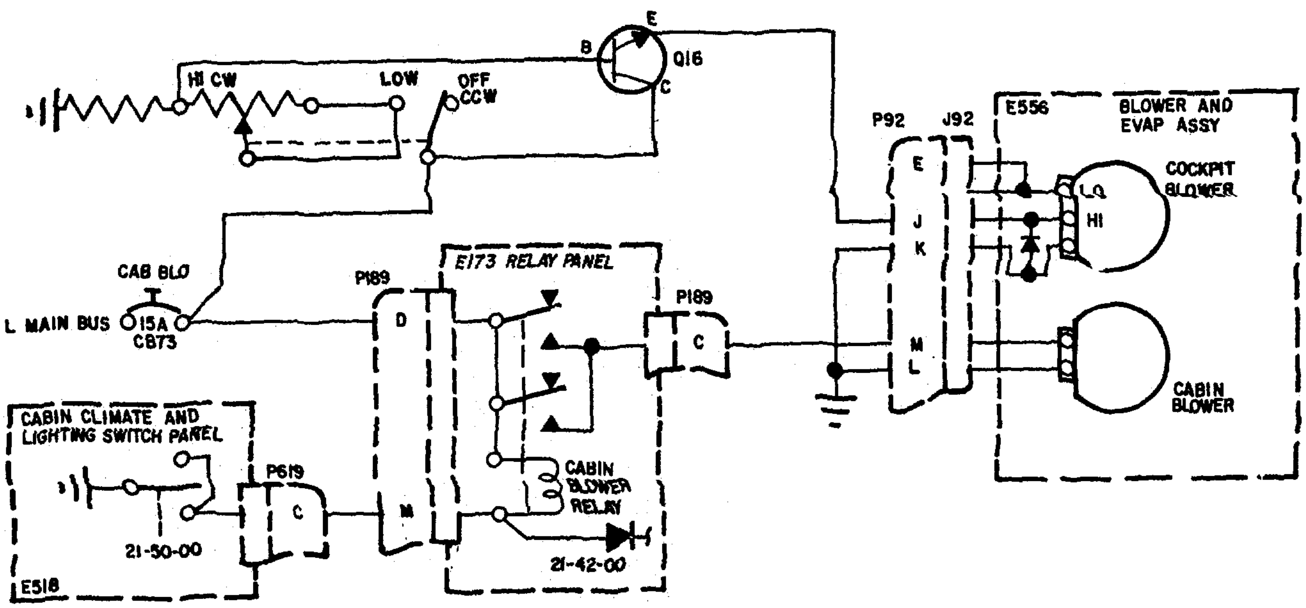
E. **Component Description**

(1) The cockpit cooling fan , a vane-axial type, has a 1/12 hp rating at 14,200 rpm. The fan is installed between two transition-type ducts forward of the evaporator and blower assembly. The fan is controlled by the rheostat-type Cockpit Air Switch located adjacent to the copilot's map light switch.

(2) The light and gasper asemblies are a combination lighting and ventilation (gasper) outlet. The ventilation portion of the assembly consists of an adjustable lever which controls the volume and the direction of the airflow. For further information on the lighting portion of the light and gasper assembly, refer to 33-21-00.

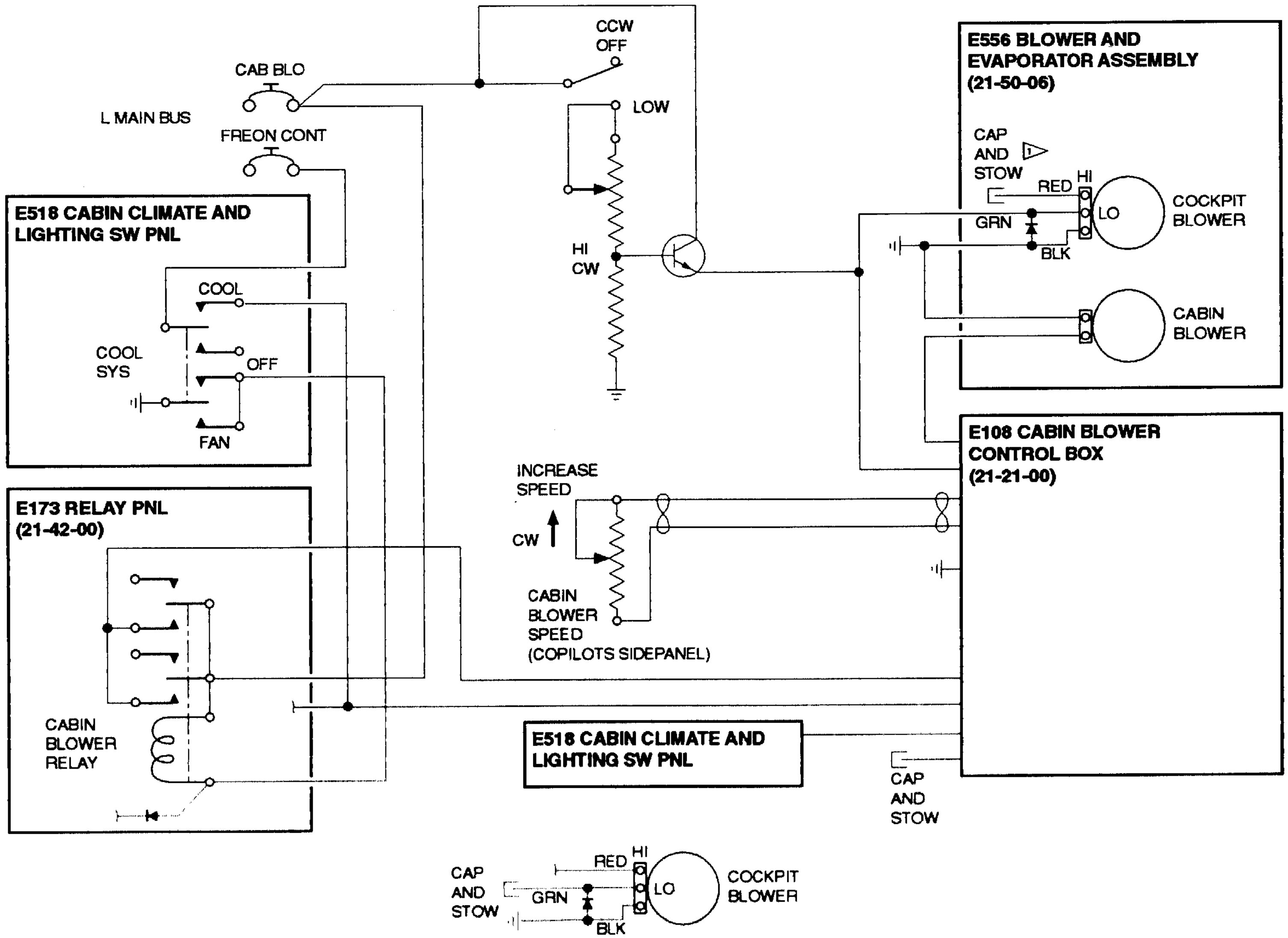


Aircraft 35-002 thru 35-051 and 36-002 thru 36-016



Aircraft 35-052 thru 35-106, 35-108 thru 35-112,
and 36-017 thru 36-031 not modified per AAK 77-4

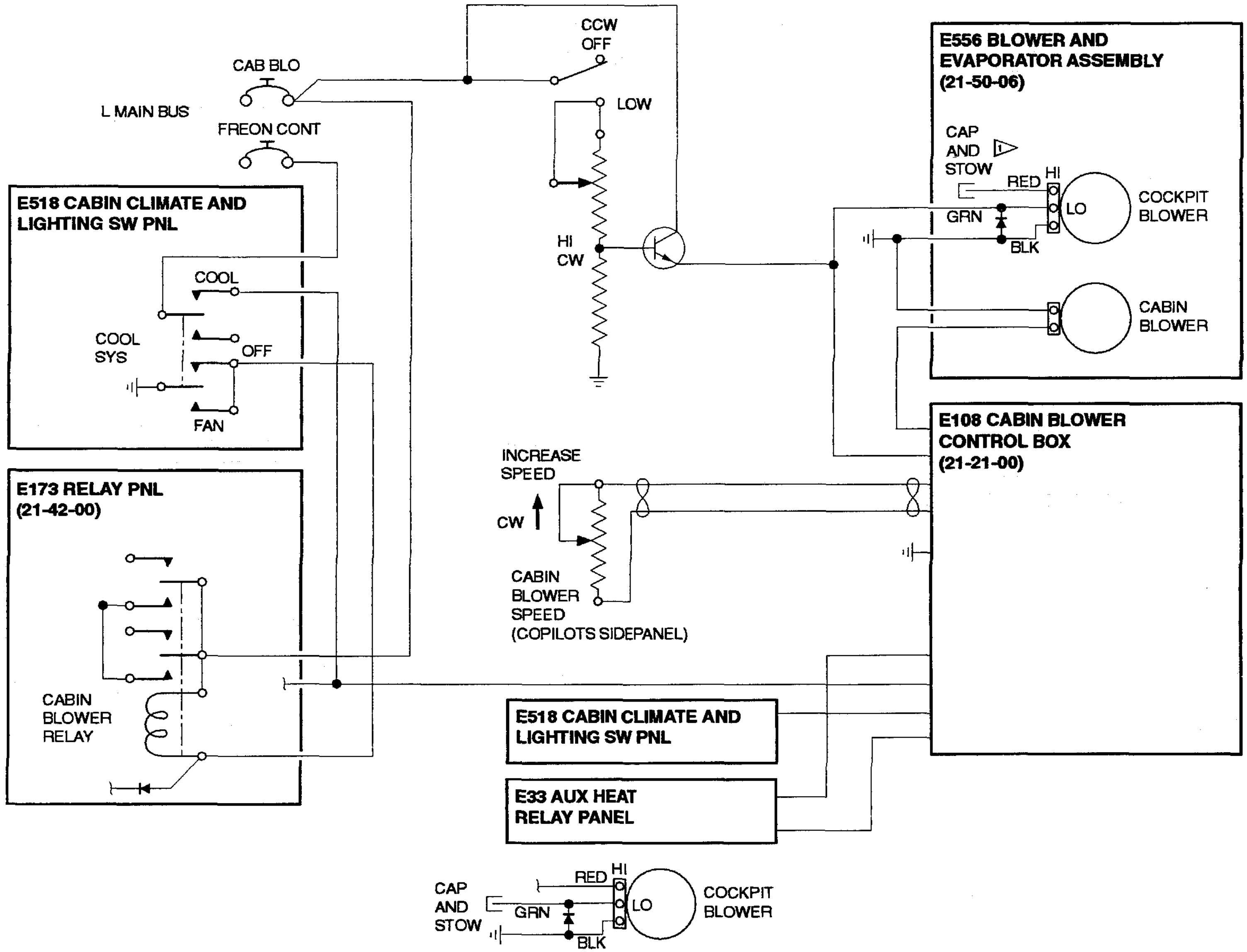
Cabin and Cockpit Blower Systems Electrical Control Schematic
Figure 1 (Sheet 1 of 4)



Effective on Aircraft 35-002 thru 35-039 and 36-002 thru 36-028

Cabin and Cockpit Blower Systems Electrical Control Schematic
Figure 1 (Sheet 2 of 4)

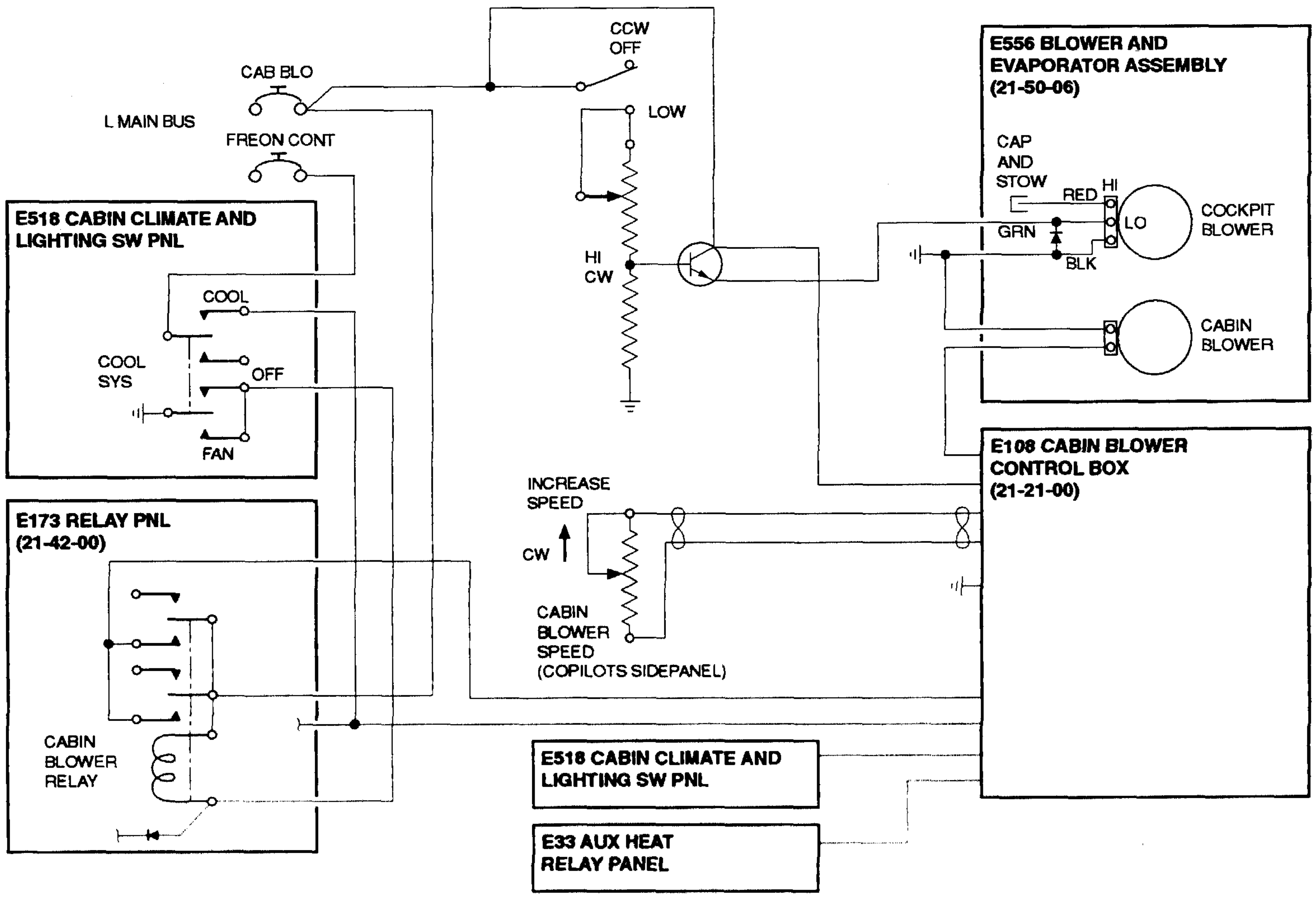
EFFECTIVITY: 35-036 THRU 35-106, 35-108 THRU 35-112 AND 36-018
THRU 36-031 MODIFIED PER AAK 77-4 BUT NOT
EQUIPPED WITH AUXILIARY CABIN HEATER



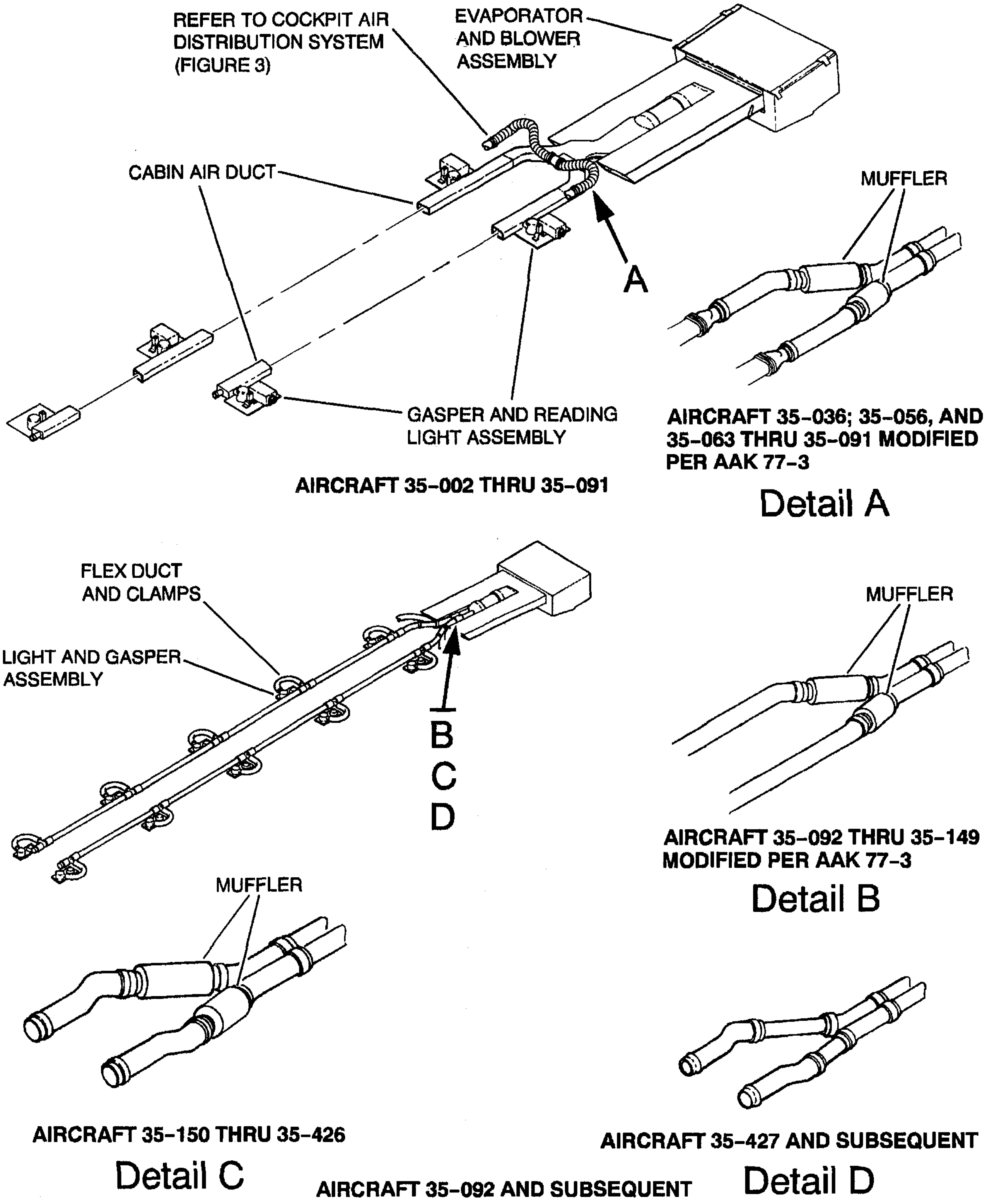
Effective on Aircraft 35-002 thru 35-039 and 36-002 thru 36-028.

Cabin and Cockpit Blower Systems Electrical Control Schematic
Figure 1 (Sheet 3 of 4)

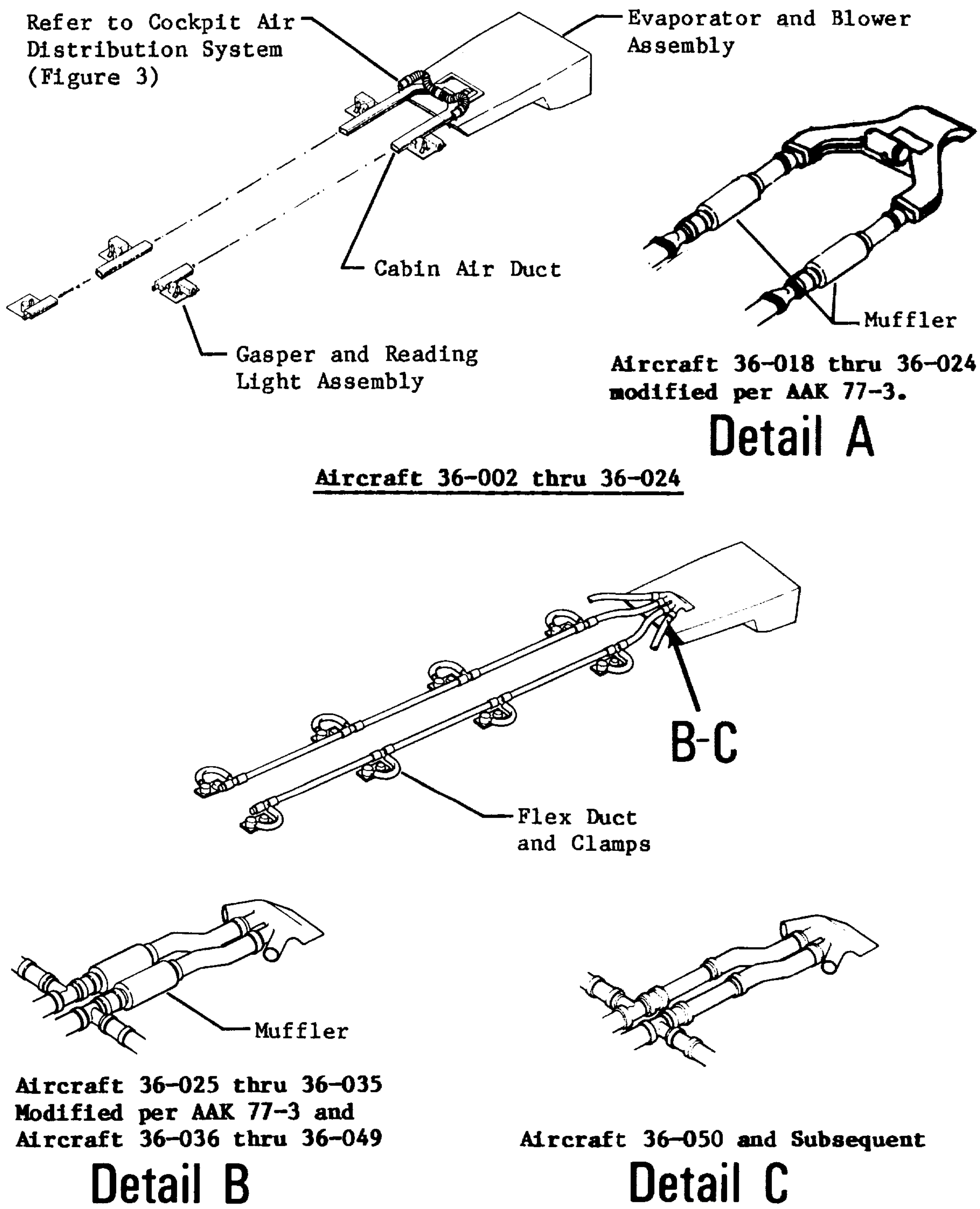
EFFECTIVITY: 35-036 THRU 35-106, 35-108 THRU 35-112 AND 36-018 THRU 36-031 MODIFIED PER AAK 77-4 AND EQUIPPED WITH AUXILIARY CABIN HEATER



Cabin and Cockpit Blower Systems Electrical Control Schematic
Figure 1 (Sheet 4 of 4)



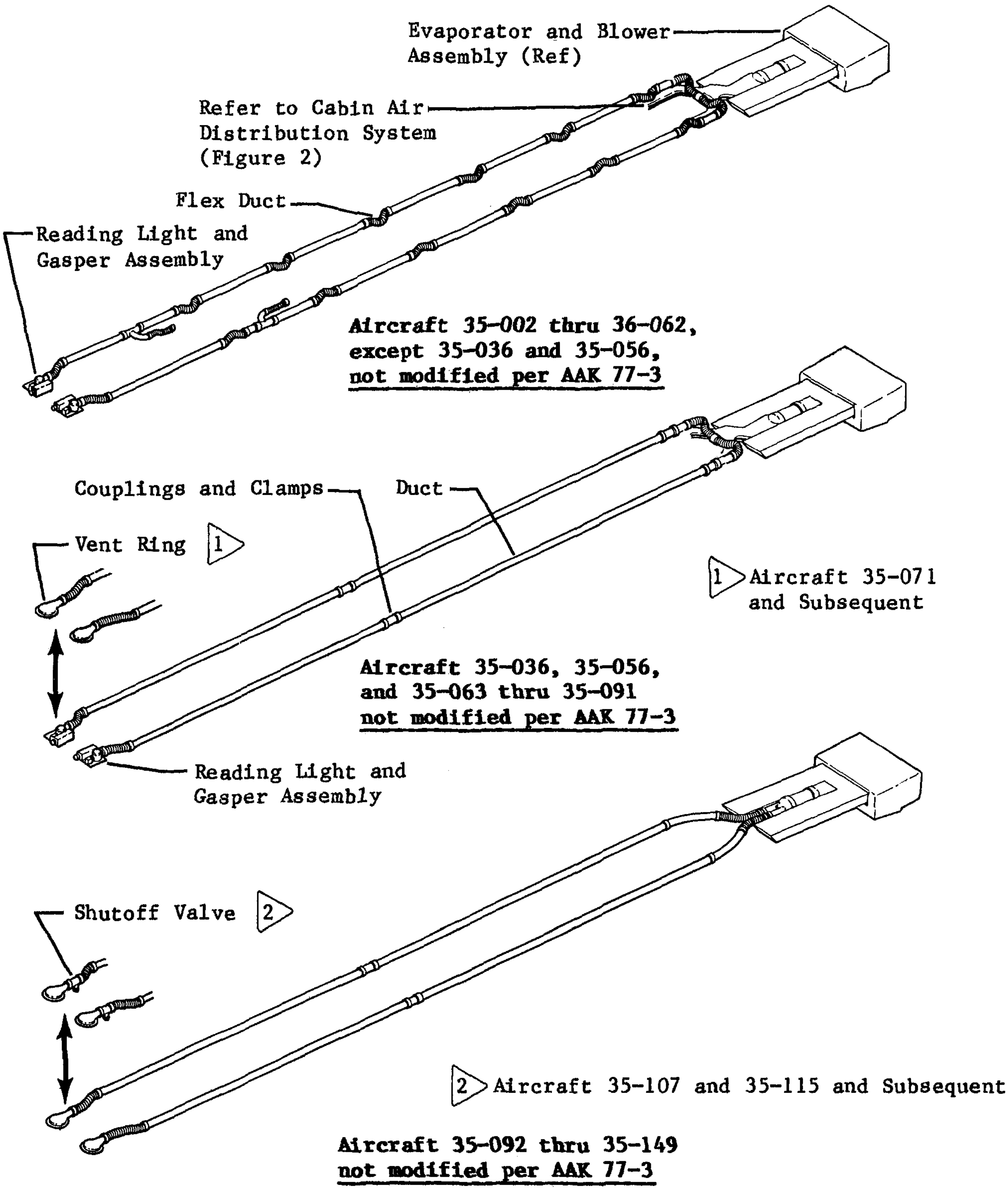
Cockpit Air Distribution System Component Locator
Figure 2 (Sheet 1 of 2)



Aircraft 36-092 and Subsequent

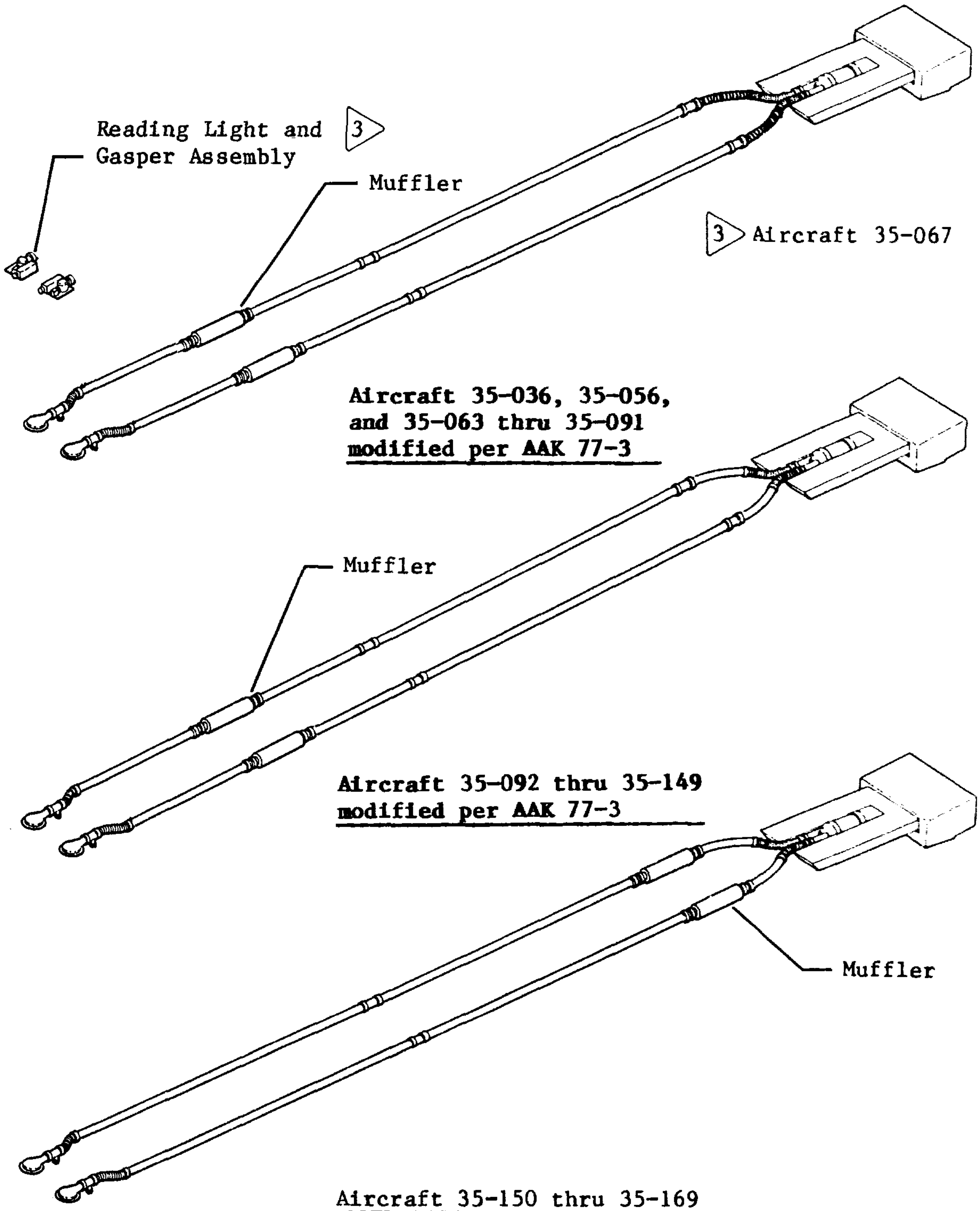
13-81C
13-81C-1
A/B/C 13-105B

Cabin Air Distribution System Component Locator
Figure 2 (Sheet 2 of 2)



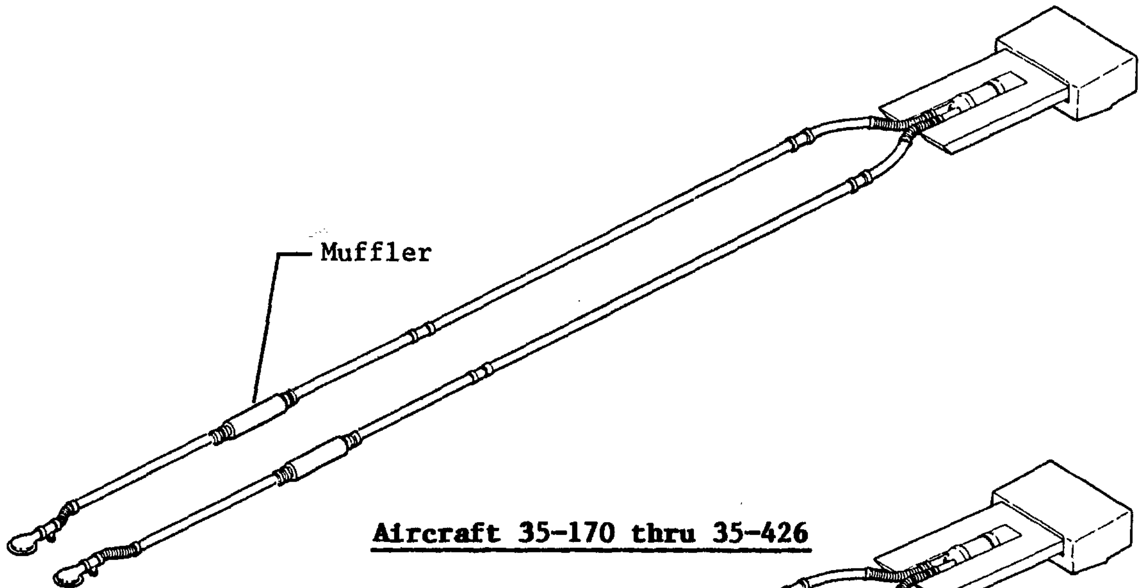
13-81C-1
13-81C-2

Cockpit Air Distribution System Component Locator
Figure 3 (Sheet 1 of 6)

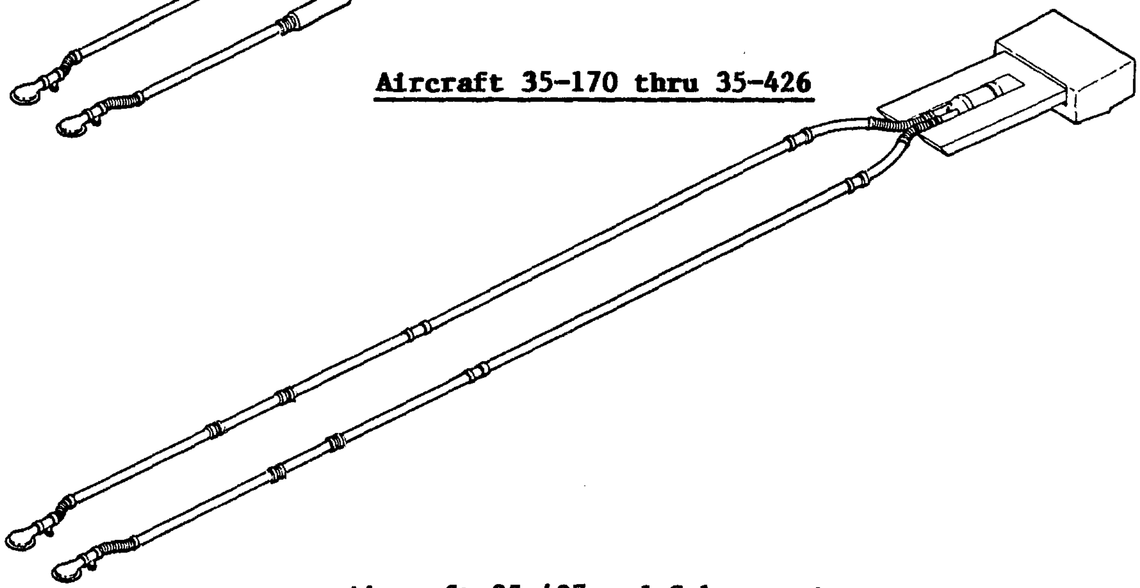


13-81C-2

Cockpit Air Distribution System Component Locator
Figure 3 (Sheet 2 of 6)



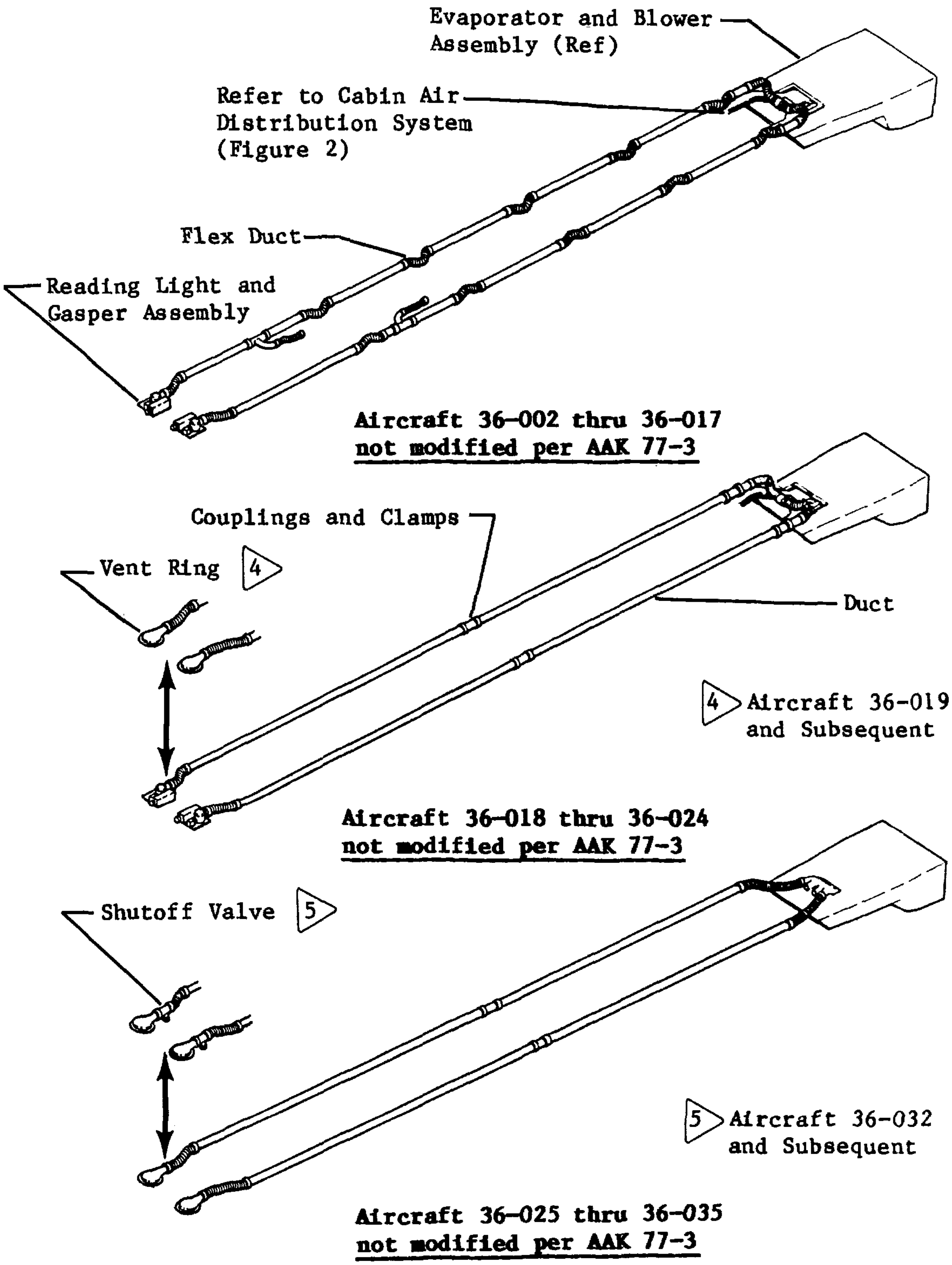
Aircraft 35-170 thru 35-426



Aircraft 35-427 and Subsequent

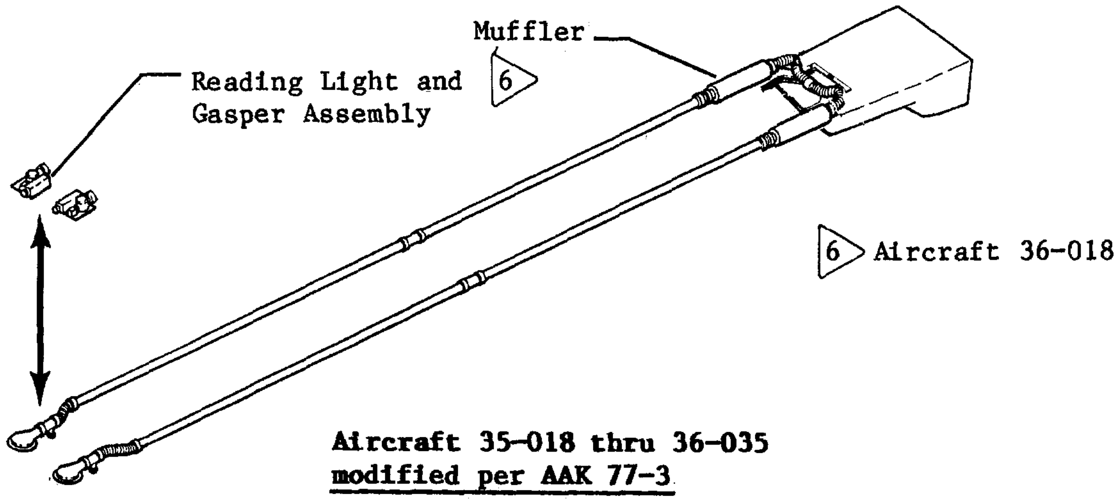
13-81C-2

Cockpit Air Distribution System Component Locator
Figure 3 (Sheet 3 of 6)

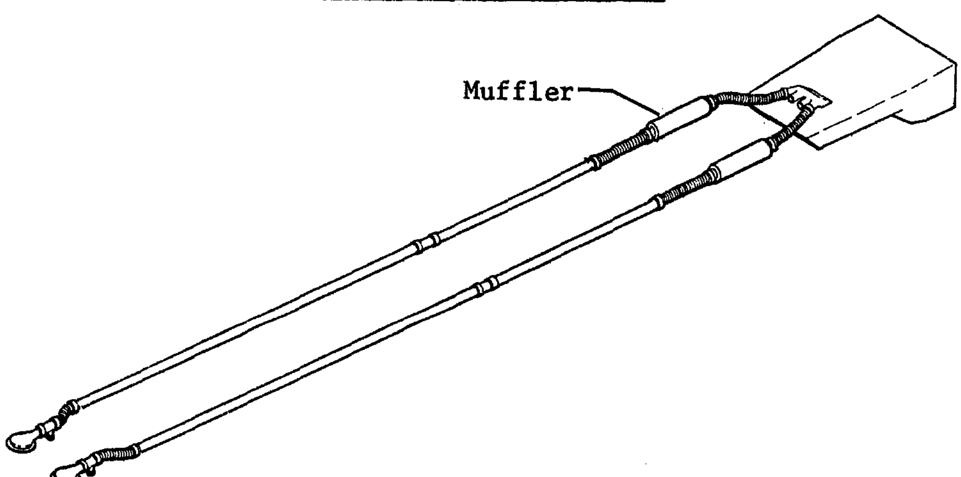


13-81C-1
13-81C-2

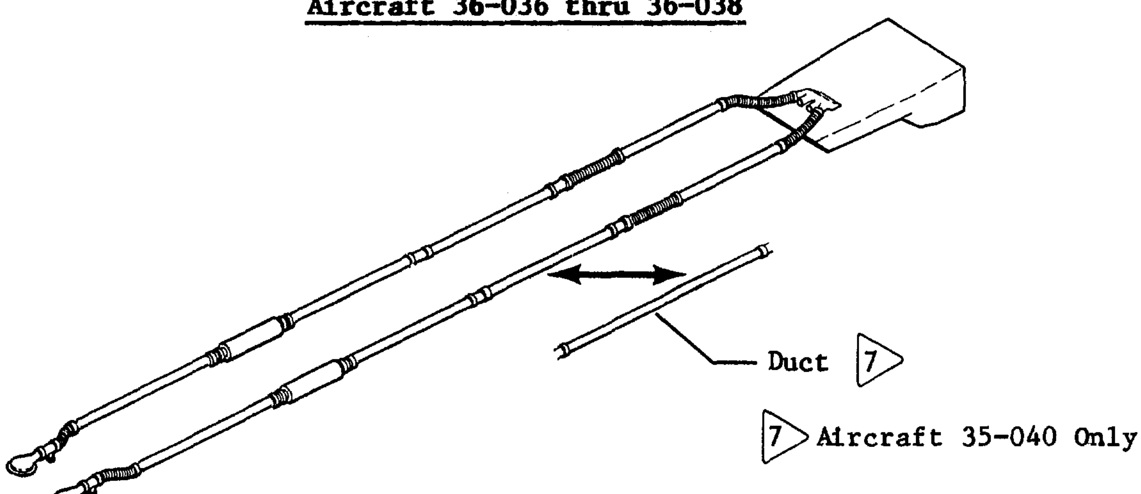
Cockpit Air Distribution System Component Locator
Figure 3 (Sheet 4 of 6)



Aircraft 35-018 thru 36-035
modified per AAK 77-3



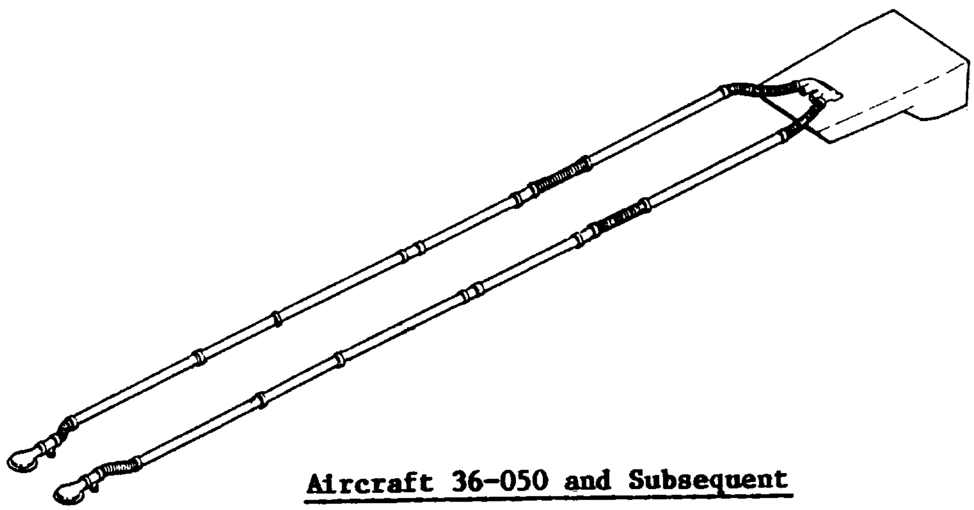
Aircraft 36-036 thru 36-038



Aircraft 36-039 thru 36-049

13-81C-2

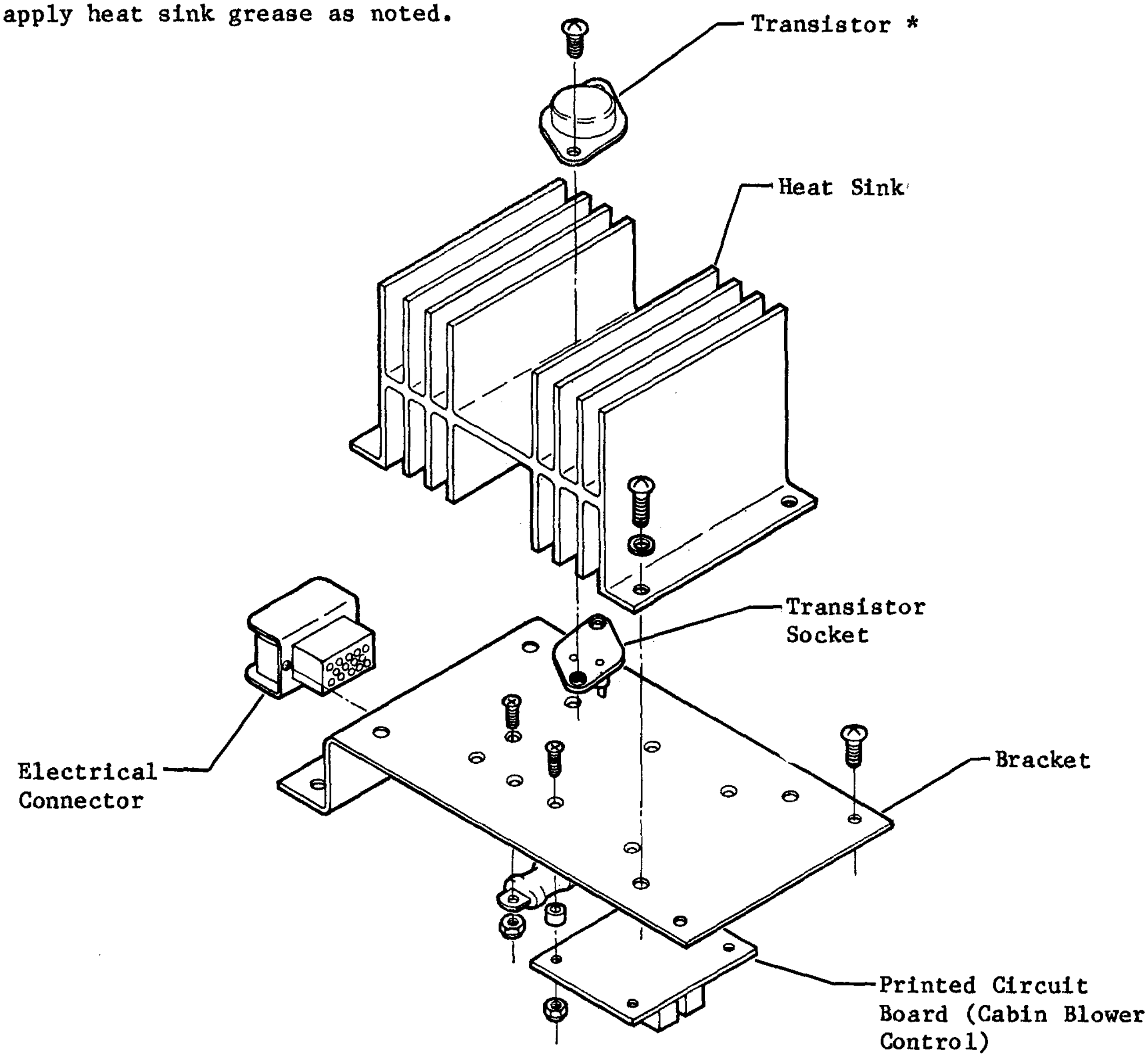
Cockpit Air Distribution System Component Locator
Figure 3 (Sheet 5 of 6)



Aircraft 36-050 and Subsequent

Cockpit Air Distribution System Component Locator
13-81C-2
Figure 3 (Sheet 6 of 6)

*Use Dow-Corning Heat Sink Grease P/N 340 between heat sink and insulator and insulator and transistor. On earlier heat sink and transistor installations, apply heat sink grease as noted.



Shown rotated 90° clockwise

Cabin Blower Control Box Assembly
Figure 4

COCKPIT COOLING FAN - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**

A. **Remove Cooling Fan (Aircraft 36-002 and Subsequent)** (See figure 201.)

(1) Remove evaporator and blower assembly from aircraft. (Refer to 21-50-06 for applicable removal procedure.)
(2) Remove screws and cover from evaporator and blower assembly.
(3) Disconnect cooling fan electrical wiring at splice. Tag wiring.
(4) Remove safety wire from screws securing forward end of cooling fan to cockpit cooling duct.
(5) Loosen clamps and remove cooling fan from evaporator and blower assembly.

B. **Install Cooling Fan (Aircraft 36-002 and Subsequent)** (See figure 201.)

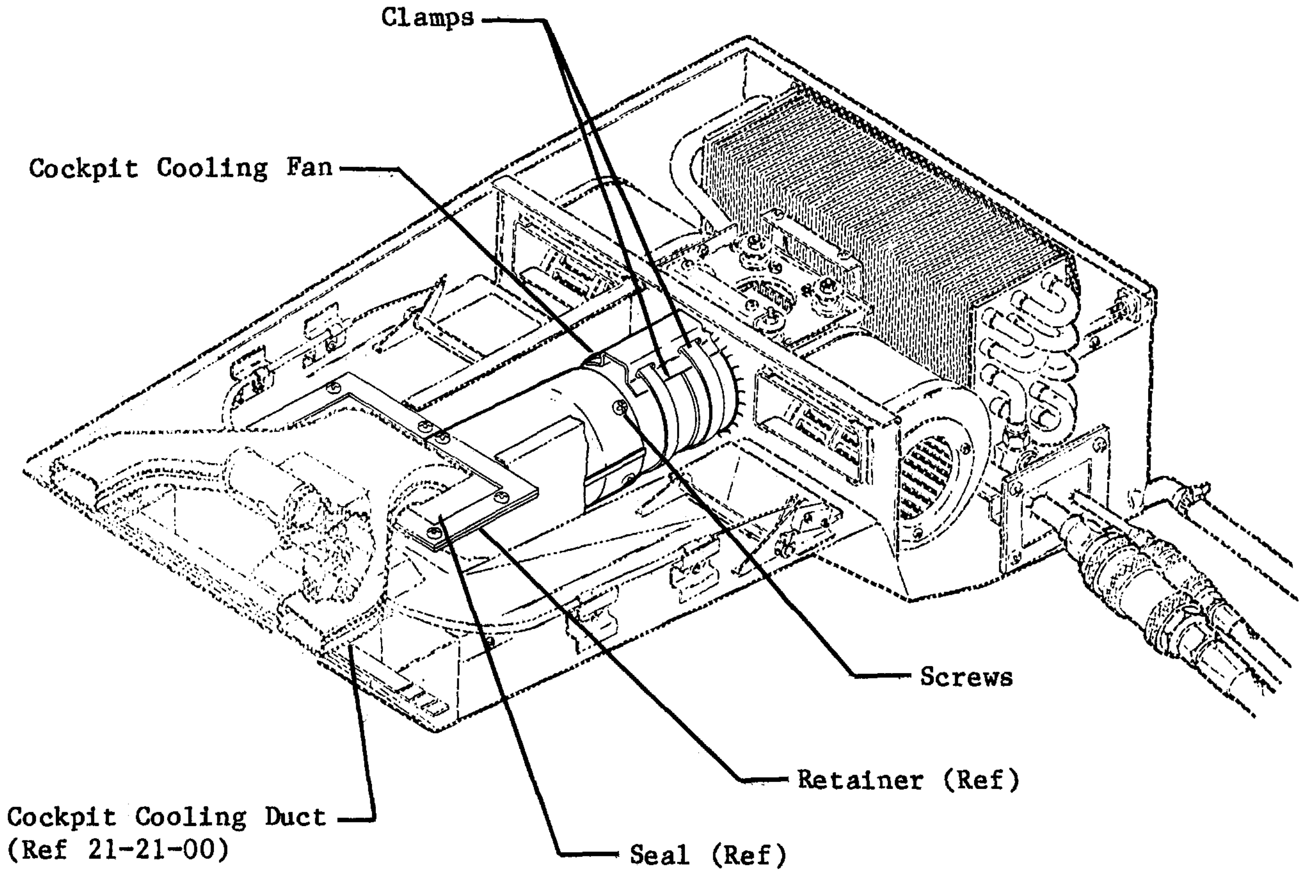
(1) Install cooling fan (electrical wiring at top) and secure with clamps.
(2) Secure duct to forward end of cooling fan with screws. Safety wire screws.
(3) Connect electrical wiring at splice.
(4) Install cover on evaporator and blower assembly and secure with screws.
(5) Install evaporator and blower assembly. (Refer to 21-50-06 for applicable installation procedures.)

C. **Remove Cooling Fan (Aircraft 35-002 and Subsequent)** (See figure 202.)

(1) Remove headliner from baggage compartment.
(2) Loosen clamps and hoses securing forward transition duct to cockpit air ducts. Remove forward transition duct from cooling fan.
(3) Cut cooling fan wiring at splice.
(4) Loosen clamp securing cooling fan and remove cooling fan from aircraft.

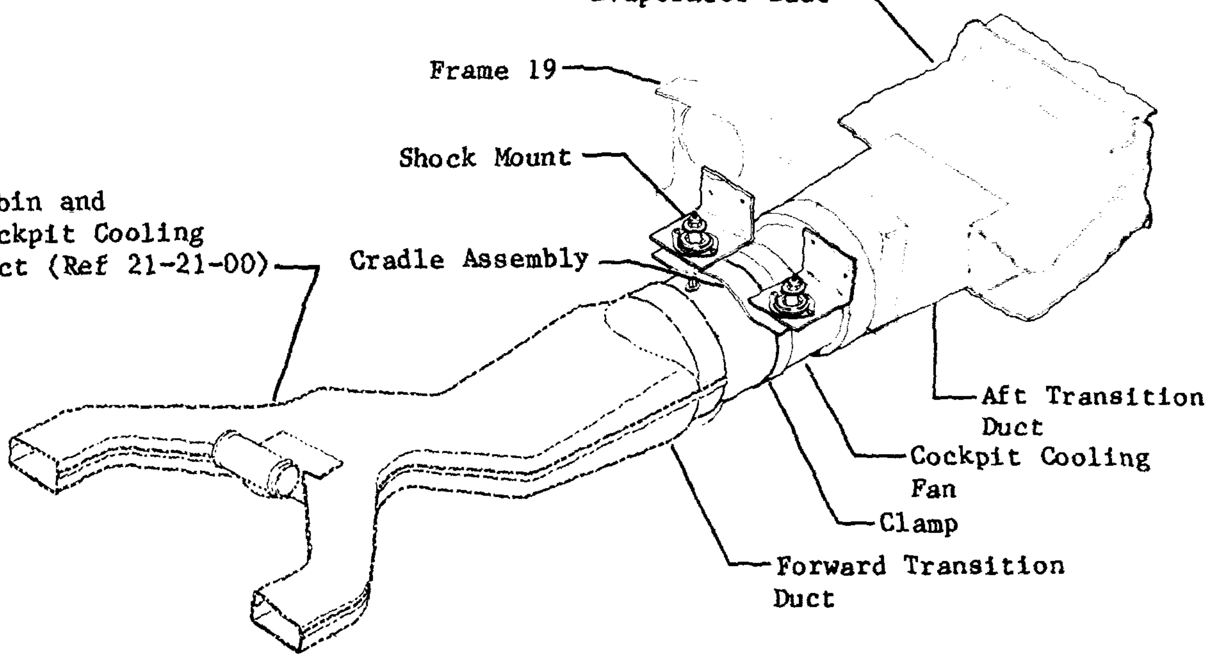
D. **Install Cooling Fan (Aircraft 35-002 and Subsequent)** (See figure 202.)

(1) Install cooling fan and secure with clamps.
(2) Cut off excess cooling fan wiring, if necessary, and splice to aircraft wiring.
(3) Install forward transition duct and secure to cockpit cooling ducts with clamps and hoses.
(4) Install headliner in baggage compartment.



13-41D

Cockpit Cooling Fan Installation
Figure 201



13-52C-2

Cockpit Cooling Fan Installation
Figure 202

PRESSURIZATION - DESCRIPTION AND OPERATION

1. **Description** (See Figure 1.)
   A. Cabin pressurization is provided by conditioned air entering the cabin through the air distribution ducts and controlled by modulating the amount of air exhausted from the cabin.
   B. Components of the pressurization system consist of a cabin air exhaust control valve, a cabin safety valve, a differential pressure relief valve, altitude limiter, pressurization filters, a pressurization vacuum regulator (jet pump), pressurization aneroid switch(es), a cabin pressurization module, and cabin altitude pressure limiter. On *Aircraft 35-099 and Subsequent and 36-029 and Subsequent*, a vacuum shutoff solenoid valve is installed between the regulated vacuum line and the cabin safety valve. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, two emergency pressurization valves are installed, one in the RH bleed air duct and one in the LH bleed air duct.
   C. Component Description
      (1) The exhaust control valve consists of a base and cover. The cover provides a connection for the control pressure line. The air exhaust control valve is installed on frame 5 forward of the instrument panel.
      (2) The cabin safety valve consists of a base and cover. The cover provides connections for a static line and a 0.025-inch orifice and filter. The base contains a spring-balanced poppet valve. On *Aircraft 36-002 and Subsequent*, the cabin safety valve is installed on a manifold assembly secured to frame 18. On *Aircraft 35-002 and Subsequent*, the cabin safety valve is installed on frame 22.
      (3) On *Aircraft 36-002 and Subsequent*, the cabin differential pressure relief valve is installed on frame 18. On *Aircraft 35-002 and Subsequent*, the cabin differential pressure relief valve is installed on frame 22.
      (4) There are two cabin altitude limiters located in the aircraft, one in the forward cabin area and one in the aft cabin area. The cabin altitude limiters consist of an evacuated capsule, poppet, and valve spring enclosed in a housing and housing cover. A cabin air pressure inlet with a FILTER port and screen, a CONTROL port, and a VALVE port are located in the cabin altitude limiter housing. In the forward cabin area, on *Aircraft 35-002 thru 35-112, except 35-107, and 36-001 thru 36-031, modified per AMK 78-5, "Installation of Cabin Altitude Pressure Limiter*," a cabin altitude pressure limiter is installed on the aft side of frame 5, plumbed between the cabin air exhaust control valve and the pressurization module. On *Aircraft 35-002 and Subsequent*, a cabin altitude pressure limiter is installed on frame 22, on *Aircraft 36-002 and Subsequent* on frame 18. The aft cabin altitude pressure limiters are plumbed between the cabin safety valve and the differential pressure relief valve.

(5) The pressurization control system utilizes three filters: one filter is installed on the pressurization module, one on the cabin safety valve, and one on the aft pressure bulkhead. The pressurization filters are utilized to remove contaminants from the air, and to operate the pressurization control system. The filter consists of a top cap, a base cap, an element, spring, filter stud, O-ring, washer, retainer, and a snap ring. Replacement elements are one piece.

(a) The filters on the safety valve and the aft pressure bulkhead contain a cleanable element which should be removed and cleaned at the time interval specified in Chapter 5. On *Aircraft 35-107, 35-113 and Subsequent, 36-032 and Subsequent, and earlier aircraft equipped with single-piece filter in the module*, remove and replace filter at the time interval specified in Chapter 5. Modules equipped with cleanable elements should be cleaned at the time interval specified in Chapter 5.

(b) The pressurization system filters are not interchangeable due to the orifice of the filter stud. The following table is provided as an aid to maintenance personnel to ensure proper location of the filter:

PART NUMBER	USE	EFFECTIVITY
131230-3 (0.234 inch diameter)	Cabin Air to Jet Pump	35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031
6600207-27 (0.2335 inch diameter)	Cabin Air to Jet Pump	35-107, 35-113 and Subsequent, and 36-032 and Subsequent
131230-4 (0.025 inch diameter)	Safety Valve	35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031
6600207-26 (0.025 inch diameter)	Safety Valve	35-107, 35-113 and Subsequent, and 36-032 and Subsequent
131230-2 or *131374-1 (Alternate) (0.040 inch diameter)	Pressurization Module	35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031
EBG02-05001 (Throw-away filter, non-interchangeable)	Pressurization Module	35-107, 35-113 and Subsequent, and 36-032 and Subsequent

* 131374-1 Filter is a Throw-Away Type Filter.

(6) The vacuum regulator assembly (jet pump) is installed in the tailcone equipment section on LH side of frame 26. In addition to the jet pump, two types of vacuum regulator assemblies were installed; a Sterer or an Airborne (Task). The units are basically the same, except the Airborne (Task) vacuum regulator assembly incorporates a 40 micron filter in the regulated vacuum port. (See figure 8.) The vacuum regulator is designed to regulate a differential pressure of 4.0 (±0.75) inches of Hg below the existing cabin pressure.

(7) On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031*, a pressurization aneroid switch is installed in the pressurization module adjacent to the rate controller. On *Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent*, two aneroid switches (cabin pressurization) are installed in the aft cabin. On *Aircraft 35-107 and 35-113 and Subsequent*, the aneroid switches are located on the RH and LH sides of frame 19 at stringer 9. On *Aircraft 36-032 and Subsequent*, the aneroid switches are located on stringer 3, RH and LH, aft of frame 16. Two aneroid switches are installed in the pressurization module. One of the module aneroid switches controls a normally open solenoid in the module and the CAB ALT caution light. The remaining aneroid switch controls the cabin pressure aural warning. Refer to 21-30-00 for further information.

(8) The pressurization module is installed in the lower portion of the copilot's instrument panel. It is hinged at the back to allow easy access. The copilot's instrument panel is secured to the module structure by four screws. On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031*, the module consists of a rate selector, rate controller, cabin altitude controller, volume control box, manual cabin altitude control valve, differential pressure relief valve, three solenoid valves, cabin differential pressure indicator, air bleed switch, and the pressurization AUTO-MAN Switch. On *Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent*, the module consists of a cabin pressure controller (mini-controller), which incorporates the rate controller and rate selector; a volume control chamber; a manual cabin altitude control valve; a cabin altitude limiter; a differential pressure relief valve; three solenoid valves; two aneroid switches; a cabin air switch; a pressurization control switch; and a differential pressure indicator.

(9) Two emergency pressurization valves are installed, one in the RH bleed air duct and one in the LH bleed air duct to provide the aircraft with emergency pressurization should the normal pressurization system fail. The valves are spring loaded to the emergency position with no power applied.

(10) The pressurization system pressure regulator is installed in the tailcone equipment section. The pressure regulator provides a regulated pressure (servo pressure) to open the flow control valve and the emergency pressurization valves.

2. **OPERATION** (See figures 2 and 3.)

A. On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031*, during ground operation with the Pressurization Switch set to AUTO, all solenoids in the pressurization module are energized through a set of contacts in the squat switch relay panel. Under these conditions the exhaust control valve is held open by a regulated vacuum from the vacuum regulator (jet pump). This allows cabin air to be vented to ambient if the Cabin Air Switch is set to NORM. When the Cabin Air Switch is set to OFF, power is applied to a normally open solenoid on the flow control valve, causing the flow control valve to close. On *Aircraft 35-099 thru 35-106, 35-108 thru 35-112, and 36-029 thru 36-031*, a vacuum shutoff solenoid valve is also electrically held open through a set of contacts in the squat switch relay panel. The vacuum is applied to the safety valve through the open vacuum shutoff solenoid. This holds the safety valve open and allows it to vent cabin pressure to ambient. If the Cabin Air Switch is set to NORM, power is applied to the deenergized relay and to a 10-second delay timer. After 10 seconds, the relay energizes, opening the power and ground circuits to the vacuum shutoff valve, and allows the shutoff valve to move to its normally closed position. The increasing cabin pressure will then drive the safety valve closed.

B. On *Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent*, during normal ground operation with the Pressurization Switch set to AUTO, all solenoids in the pressurization module are energized through a set of contacts in the squat switch relay panel. Under these conditions, the exhaust control valve is held open by a regulated vacuum from the vacuum regulator. This allows cabin air to be vented to ambient if the Cabin Air Switch is set to ON. When the Cabin Air Switch is set to OFF, power is applied to a normally open solenoid on the flow control valve, causing the flow control valve to close. Power is also applied to a vacuum shutoff solenoid valve through a set of contacts in the squat switch relay panel. The vacuum is applied to the safety valve through the open vacuum shutoff solenoid. This holds the safety valve open and allows it to vent cabin pressure to ambient. On *Aircraft 35-099 and Subsequent and 36-029 and Subsequent*, if the Cabin Air Switch is set to ON, power is applied to the deenergized relay and to a 10-second delay timer. After 10 seconds, the relay energizes, opening the power and ground circuits to the vacuum shutoff valve, and allows the shutoff valve to move to its normally closed position. The increasing pressure in the safety valve will drive it closed.

C. During flight, Pressurization Switch set to AUTO, and the Cabin Air Switch set to ON, power is removed from the electrically operated solenoids, which makes the pressurization system completely independent of the electrical system. On *Aircraft 35-002 thru 35-112 except 35-107, and 36-002 thru 36-031,* the regulated vacuum source is applied through the normally open solenoid and cabin altitude controller to the "up rate chamber" of the rate controller. Initially the cabin pressure that is vented through the orificed filter is a greater pressure than the vacuum being metered through the altitude controller. This holds the cabin air exhaust control valve in its last attained position. As the cabin air exhaust control valve closes, the increased cabin pressure is sensed by the altitude controller which meters more vacuum to the rate controller. As more vacuum is metered to the rate controller, the ratio of pressure to vacuum decreases. The reduced pressure in the "up rate chamber" is sensed by the cabin air exhaust control valve control chamber. With the changing cabin air exhaust control valve control chamber pressure, an unbalanced condition will exist and move the cabin air exhaust control valve open until the proper amount of air is exhausted to maintain the required altitude controller selection. The reduced pressure is also sensed in the rate chamber of the rate controller; and as pressure decreases, the down rate needle valve opens, metering more cabin pressure to the vacuum source. An aneroid switch will limit cabin altitude to 10,000 feet when in the AUTO mode. On *Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent,* the regulated vacuum source is applied through a normally open solenoid to the mini-controller's reference pressure metering valve. Cabin air flows through a filter and an orifice into the reference pressure (B1) chamber of the mini-controller. The same air flows out through the reference pressure metering valve to aircraft vacuum.

The pressure drop caused by air flowing through the orifice causes reference pressure (B1) to be slightly less than cabin pressure (C). The lower reference pressure (B1) causes cabin pressure (C) to be greater than the rate pressure (B2) in the rate chamber of the mini-controller, and the vacuum flowing through the mini-controller's rate control valve. During flight, the reference pressure metering valve modulates until the rate pressure (B2) is equal to the reference pressure (B1). The reference pressure metering valve continues to modulate until the cabin air pressure flowing through the orifice is approximately a steady flow. Constant reference pressure (B1) is obtained when the selected cabin altitude is reached. As the cabin air exhaust valve closes, the increased cabin pressure causes the reference pressure to decrease. This causes the cabin exhaust valve to open until the proper amount of air is exhausted to maintain the pressure altitude selected on the altitude controller. Any increase or decrease in cabin altitude causes the absolute bellows in the mini-controller to expand or contract. An increase causes the bellows to expand slightly, restricting the flow of reference pressure (B1) and causing the cabin air exhaust valve to modulate toward the closed position. A decrease in cabin air pressure causes the bellows to contract slightly, increasing the flow of reference pressure (B1) and causing the cabin air exhaust valve to modulate toward the open position. An aneroid switch limits the maximum cabin altitude to 8750 (±250) feet, when in the AUTO mode. The switch also illuminates the CAB ALT indicator light on the readout panel. With the Pressurization AUTO-MAN Switch set to MAN, the cabin altitude is controlled by manually positioning the cabin exhaust valve with the red UP-DN Switch. If the aircraft is inadvertently allowed to ascend and exceed the controlling limits of the controller and selector, the normal differential pressure relief valve opens the cabin air exhaust control valve which raises the cabin altitude and maintains a cabin differential of 8.9 psi on *Aircraft 35-002 thru 35-112 except 35-107, and 36-002 thru 36-031* (9.4 psi differential on *Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent*). If the normal differential pressure relief valve or cabin exhaust control valve fails, the maximum differential pressure relief valves will modulate the cabin safety valve to maintain a cabin differential of 9.2 psi on *Aircraft 35-002 thru 35-112 except 35-107, and 36-002 thru 36-031* (9.7 psi on *Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent*). Cabin altitude limiters are installed to close the cabin air exhaust control valve and cabin safety valve should a differential pressure relief valve fail, allowing the cabin air exhaust control valve or the cabin safety valve to open. Should rapid descent cause a negative pressure in the cabin, both exhaust and safety valves will open to admit atmospheric pressure to the cabin. Normal descent depressurization is essentially a reverse of pressurization sequence.

D. On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031*, the windshield defog air can be routed into the cabin as an emergency source of pressurization. This is accomplished by pushing the IN NORMAL-OUT DEFOG knob (full in), setting the Windshield Heat Switch to AUTO, and the CABIN AIR Switch to OFF. Cabin pressurization will then be maintained automatically. If pressurization cannot be maintained in the AUTO position, cabin altitude can be maintained by moving the AUTO-MAN Switch to MAN and controlling the exhaust valve using the manual UP-DN Switch.

E. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, emergency pressurization is automatically provided by routing engine bleed air directly into the cabin through the emergency pressurization valves. This is accomplished automatically by emergency pressurization aneroid switches when cabin altitude increases to 9500 (±250) feet, if an electrical power failure should occur, or when the Bleed Air Switches are set to the EMER position. With the emergency pressurization valves in the emergency position, engine bleed air is routed directly from the engine into the cabin air distribution ducts. This bypasses all bleed air plumbing in the tailcone area and will stabilize the cabin altitude if a failure has occurred in this area. During the emergency mode of operation, temperature control, wing, stabilizer, and windshield bleed air anti-ice will not be available. Cabin pressurization can then be maintained automatically. If pressurization cannot be maintained in the AUTO position, cabin pressurization can be maintained by moving the AUTO-MAN Switch to MAN and controlling the cabin exhaust control valve using the manual UP-DN Switch.

F. Component Operation

(1) The cabin air exhaust control valve base contains a spring-balanced poppet valve. (See figure 4.) During normal operation (Pressurization Switch set to AUTO), the control pressure applied to the exhaust valve by the rate controller is in excess to the cabin pressure admitted through the orificed filter. This creates a pressure unbalance between the control chamber and the balance chamber and positions the exhaust valve to maintain the desired rate of modulation. During normal operation (Pressurization Switch set to MAN), either cabin pressure or ambient pressure can be applied to the control valve by the red UP-DN control knob.

(2) The cabin pressure admitted through the cabin safety valve (see figure 5) filter and orifice balances the pressure in the balance chamber and is held closed by the spring-balanced poppet. The safety valve is entirely separate from the cabin altitude controller system and provides the following safety functions: (1) It acts as a relief valve for differential pressure should the cabin differential pressure exceed those specified in paragraph F.(3). The differential pressure relief valve will open and vent the safety valve control chamber pressure to ambient. This causes a pressure unbalance between the control chamber and the balance chamber, causing the safety valve to open and vent cabin pressure to ambient; and (2) should the cabin pressure ever decrease below the outside pressure (as in the case of a dive with the cabin exhaust valve too far closed), a positive ambient pressure will override the negative pressure in the control chamber and move the valve open, allowing ambient pressure to flow into the cabin. On *Aircraft 35-099 and Subsequent and 36-029 and Subsequent*, a vacuum line is connected to the safety valve and incorporates a N.C. (normally closed) vacuum shutoff solenoid. The solenoid is electrically opened when the Cabin Air Switch is set to OFF and remains open for approximately 10 seconds after the Cabin Air Switch is set to ON. When the solenoid is open, pressure in the safety valve control chamber is reduced below the pressure of the cabin. When this occurs, the safety valve is opened and allows the cabin pressure to be vented to ambient.

(3) Cabin Differential Pressure Relief Valve. (See figure 6.) The differential pressure relief valve consists of a spring-loaded diaphragm with adjustment screw and a metering valve. The differential pressure relief valve is plumbed to ambient and to the control chamber of the cabin safety valve and orificed filter. The control chamber and orificed filter form the control pressure for the safety valve. When cabin pressure reaches the differential pressure setting of the relief valve (9.1 [±0.1] psi), the diaphragm moves off the metering valve and vents excess pressure to ambient. On Aircraft 35-107, 35-113 thru 35-129 and 36-032 thru 36-034, the relief valve is set to 9.6 (±0.1) psi. On Aircraft 35-130 and Subsequent and 36-035 and Subsequent, the relief valve is set at 9.7 (±0.1) psi.

(4) Cabin Altitude Pressure Limiter. (See figure 7.) When cabin altitude increases to 11,000 (±1,000) feet, the limiter capsule expands, causing the poppet to open and allowing cabin air to flow into the safety valve control chamber at a greater rate than what will escape through the failed differential pressure relief valve. The safety valve then closes to prevent cabin air pressure flow to ambient. When cabin altitude in the capsule chamber decreases to 11,000 (±1,000) feet, the capsule contracts and allows the valve spring to position the poppet on its seat. The limiter will then control the safety valve rate of modulation to maintain a cabin pressure of approximately 11,000 feet.

(5) Vacuum Regulator (Jet Pump) (See figure 8.)

(a) Jet Pump. On Aircraft 35-002 thru 35-045 and 36-002 thru 36-016, the jet pump utilizes engine bleed air as the driving force to generate a vacuum in the venturi. The vacuum increases until the ball-type relief valve opens to the cabin pressure reference line. The vacuum is maintained at 4.00 (±.75) inches of Hg differential pressure between the cabin and the vacuum line. The Schrader-type relief valve to the vacuum line relieves any pressure injected into the vacuum line through any system component malfunction.

(a) Vacuum Regulator. On Aircraft 35-046 and Subsequent, 36-017 and Subsequent, and prior aircraft modified per SSK 937, "Installation of Cabin Pressurization Vacuum Regulator Assembly," the vacuum regulator uses the venturi principle to create a vacuum for the pressurization control system. The regulator is shown in the static position (no bleed air passing through the venturi nozzle). When engine bleed air passes through the venturi, a vacuum is created in the regulated vacuum chamber. The vacuum (negative pressure) flow is from the pressurization module, through the regulated vacuum chamber and then overboard through the bleed air discharge port. As the vacuum reaches the regulated setting of 4.0 (±0.75) inches of Hg below existing cabin pressure, the pressure in the cabin reference chamber, combined with the negative pressure in the regulated vacuum chamber, overrides the regulator diaphragm spring and moves the diaphragm and ball/seat to close the opening. This restricts the flow of air at negative pressure and provides a constantly regulated vacuum for the pressurization control system.

(6) **Pressurization Aneroid Switch** (See figure 9.)

(a) On Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031, if cabin altitude should increase to 10,000 feet or above, the aneroid switch completes a power circuit to the normally open solenoid valve within the module. The solenoid is electrically held closed, isolating the cabin air exhaust control valve. The control chamber of the cabin air exhaust control valve, being isolated, will hold its last attained position. When cabin altitude decreases, the aneroid switch opens on or before 7500 feet and opens the circuit and allows the solenoid to return to its normally open position.

(b) On Aircraft 35-107, 35-113 thru 35-128 and 36-032, if cabin altitude should increase to 9000 (±250) feet, an aneroid switch completes a power circuit to a normally open solenoid within the pressurization module. The solenoid is electrically held closed, isolating the cabin air exhaust control valve. The control chamber of the cabin air exhaust control valve, being isolated, will hold its last attained position. The CAB ALT caution light will also illuminate. (Refer to 21-31-00.) As cabin altitude decreases, the aneroid switch opens on or before 7570 feet. The power circuit is opened, and the solenoid valve returns to its normally open position. On Aircraft 35-129 and Subsequent and 36-033 and Subsequent, the aneroid switch actuates at 8750 (±250) feet and deactuates on or before 7200 feet.

(c) The emergency pressurization aneroid switches are set to actuate at 9,500 (±250) feet of cabin altitude. The aneroid switches sense cabin depressurization and (1) automatically switch the modulating valves to low pressure, low temperature bleed air for cabin pressurization and (2) switch the emergency pressurization valves to the emergency position. During normal operation, the aneroid switches provide a ground circuit through the modulating valve control box to the emergency pressurization valve and to Solenoid A on the bleed air shutoff and pressure regulating valve. If the aneroid switches are actuated, the ground circuit is opened and automatically provides emergency pressurization to the cabin.

(7) **Pressurization Module** (See figures 10 thru 14.)

(a) The rate selector (figure 10) is basically a needle valve employed as a variable orifice. The knob is used to position the needle valve. The rate selector is used to meter control pressure to the rate reference chamber of the rate controller.

(b) The rate controller (figure 11) consists basically of a housing assembly with a cover at each end. The housing and covers are separated by two diaphragms: an up rate diaphragm and a down rate diaphragm. This forms three chambers: the up rate chamber, down rate chamber, and the rate reference chamber. As normal pressurization is initiated, the regulated vacuum is metered through the metering valve in the up rate chamber. The metering valve, being spring-loaded open, will start to close as the pressure decreases in the up chamber. The control pressure that is metered through the rate selector to the rate reference chamber will stabilize the position of the up rate metering valve, thus allowing the regulated vacuum to be metered at a selected rate. The rate of metered vacuum into the up rate chamber can be varied by the selection of the rate controller. The reduced control pressure is also sensed in the down rate chamber and the down rate needle valve opens and meters cabin pressure directly to the vacuum source.

(c) The cabin altitude controller (figure 12) consists of an evacuated bellows connected to a metering valve. The metering valve controls the amount of vacuum metered to the rate controller. As the cabin pressure increases, the evacuated bellows contracts, bypassing more vacuum to the rate controller.

(d) The differential pressure relief valve (figure 13) consists of a spring-loaded diaphragm with adjustment screw and a metering valve. The exhaust control valve differential pressure relief valve is plumbed to ambient and to the rate controller "up rate chamber" and orificed filter. The "up rate chamber" and orificed filter form the control pressure for the exhaust control valve. When cabin pressure reaches the differential pressure setting of the relief valve (8.9 [±0.1] psi), or 9.4 (±0.15) psi on Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent, the diaphragm moves off the metering valve and meters excess pressure to ambient.

(e) The volume control box acts as a damper for changes in rate selection.

(f) The manual cabin altitude control valve allows the pilot to change cabin altitude if normal pressurization system controls fail.

(g) The solenoid valves control passage of air to components in the pressurization control system.

(h) The cabin altitude and differential pressure gage is vented to ambient pressure and to cabin pressure. The gage has two pointers, each traveling over a separate arc of calibrations. The large (outside) pointer shows flight altitude; the smaller pointer indicates differential pressure (between cabin and outside air) in pounds per square inch.

(i) On Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent, a cabin altitude pressure limiter is installed in the pressurization module. The cabin altitude pressure limiter (figure 14) consists of an evacuated capsule, poppet, and valve spring enclosed in a housing and housing cover. A cabin air pressure inlet with a filter screen is located in the housing. The limiter, set at 11,500 (±1500) feet, closes the outflow valve should the differential relief valve fail. On increasing cabin altitude, the capsule expands, causing the poppet to open and allowing cabin airflow into the outflow valve control chamber at a greater rate than what will escape through the differential pressure relief valve. This closes the outflow valve and prevents cabin airflow to ambient.

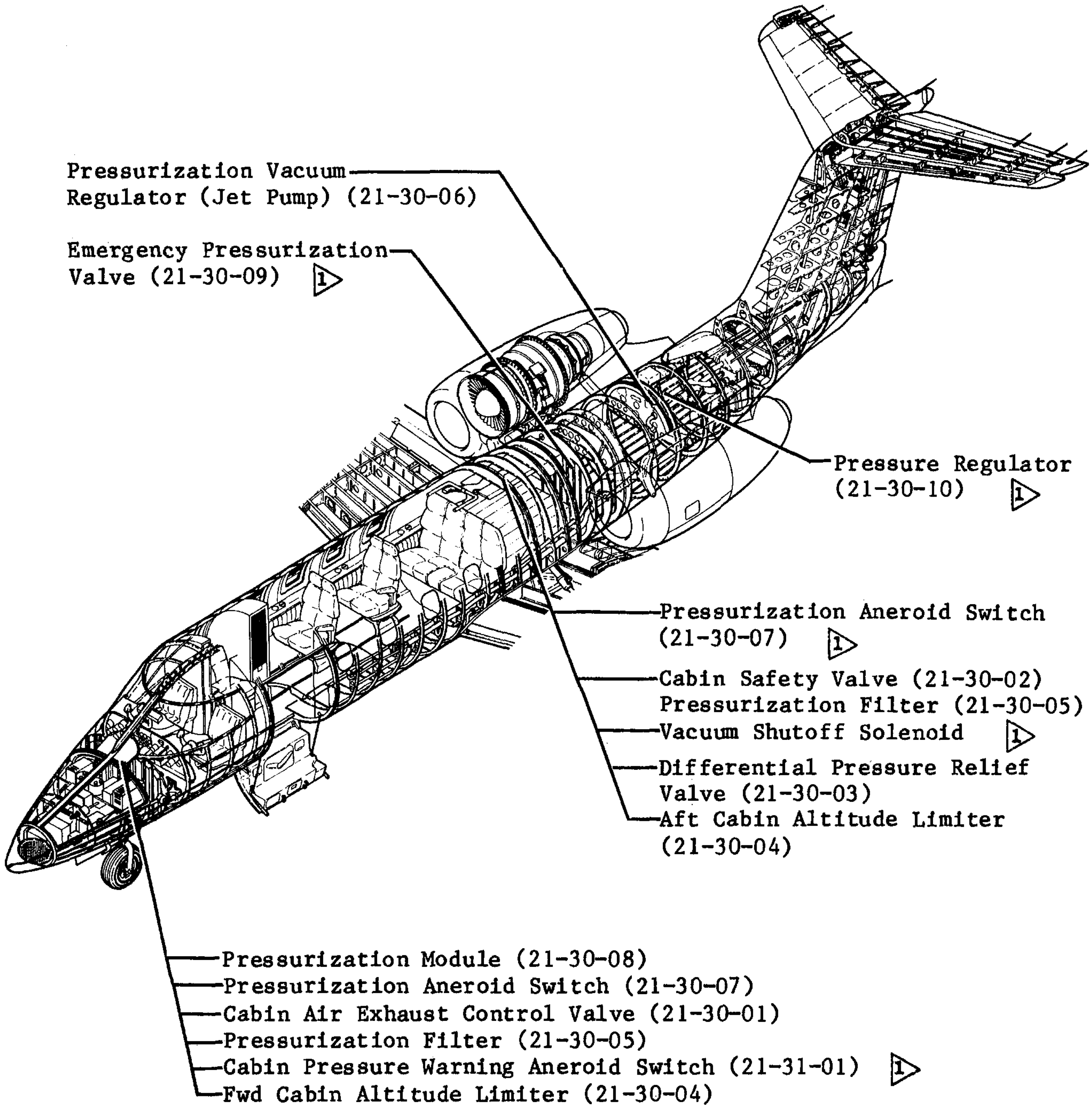
(8) Emergency Pressurization Valve (See figures 15 and 17.)

(a) On Aircraft without Whittaker Emergency Pressurization Valve, when one engine is started, bleed air pressure builds up in the piston chamber and is bled into the cylinder chamber through a small hole in the top of the piston until the air pressure on both sides of the piston is equal. When the Bleed Air Switches are set to on, a solenoid is energized to the open position and vents the cylinder chamber pressure to ambient. The air pressure at the top of the piston overcomes the spring pressure and drives the piston down until it hits its internal stop. As the piston moves down, a yoke, attached to the piston and to the actuating arm on the ball valve, positions the ball valve for bleed air pressure to the normal pressure outlet port. When the Bleed Air Switches are set to EMER or if an electrical failure should occur, the solenoid closes. This blocks the bleed path for the cylinder pressure. The cylinder pressure increases until a balanced condition is reached. Spring pressure will then drive the piston up and position the ball valve to direct bleed air pressure through the emergency outlet.

(b) On Aircraft with Whittaker Emergency Pressurization Valve, when one engine is started, servo air pressure builds up in the cylinder chamber and works in conjunction with the spring to maintain the valve in the emergency position. When the Bleed Air Switches are set to on, a solenoid is energized to the open position, redirecting the servo air to the top of the piston and to the top of the relief valve venting the cylinder chamber pressure to ambient. The air pressure at the top of the piston overcomes the spring pressure and drives the piston down until it hits its internal stop. As the piston moves down, a yoke attached to the piston and to the actuating arm on the ball valve, positions the ball for bleed air to the normal outlet port. When the Bleed Air Switches are set to EMER or if an electrical failure should occur, the solenoid closes. This vents the air pressure on top of the piston to ambient. This pressure in conjunction with the spring will then drive the piston up and position the ball to direct bleed air through the emergency outlet port.

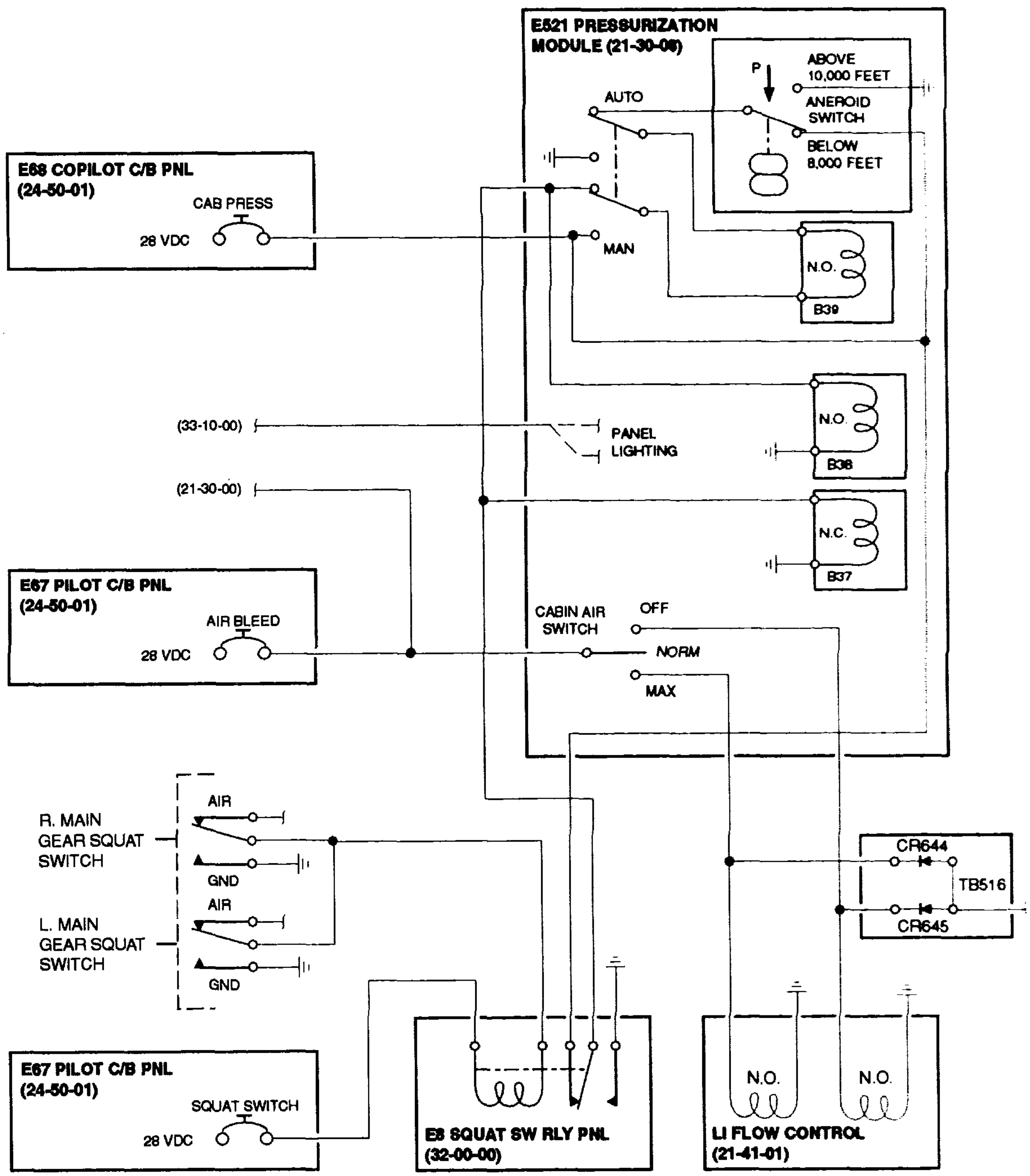
(9) **Pressurization System Pressure Regulator** (See figure 16.)

(a) Unregulated bleed air pressure is ported through the bleed-on metering valve into the system. The air pressure increase sensed in the diaphragm control chamber moves the diaphragm off the spring-loaded metering valve and allows the metering valve to modulate the air pressure. If the regulated pressure should exceed the preset pressure, the bleed-off regulator will close and the bleed-off regulator will move to bleed off the excess pressure to ambient. The pressure regulator incorporates a secondary backup diaphragm.

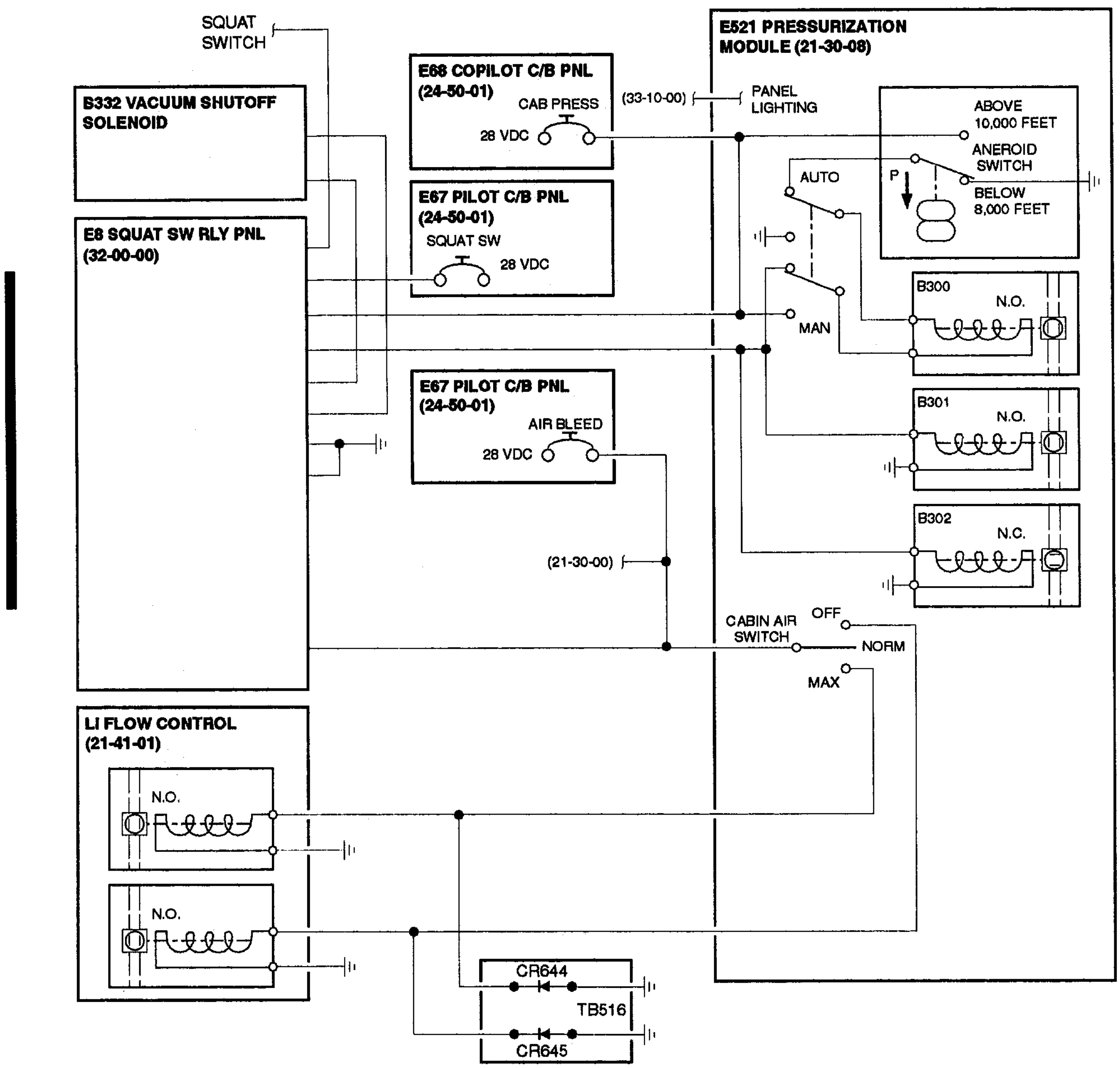


1 Effective Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent

Pressurization System Component Locator (Typical)
Figure 1

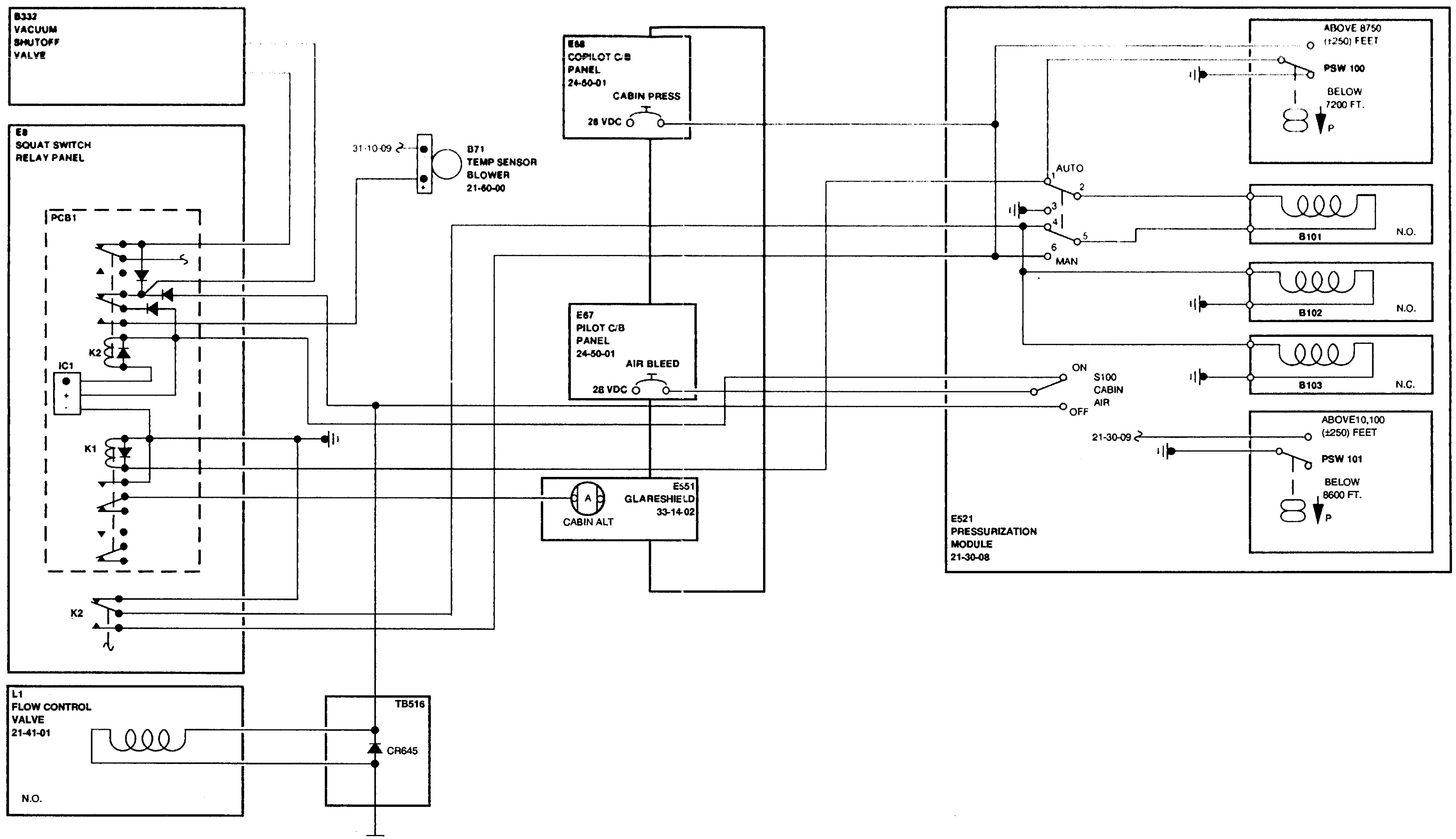


Pressurization System Electrical Control Schematic
Figure 2 (Sheet 1 of 3)

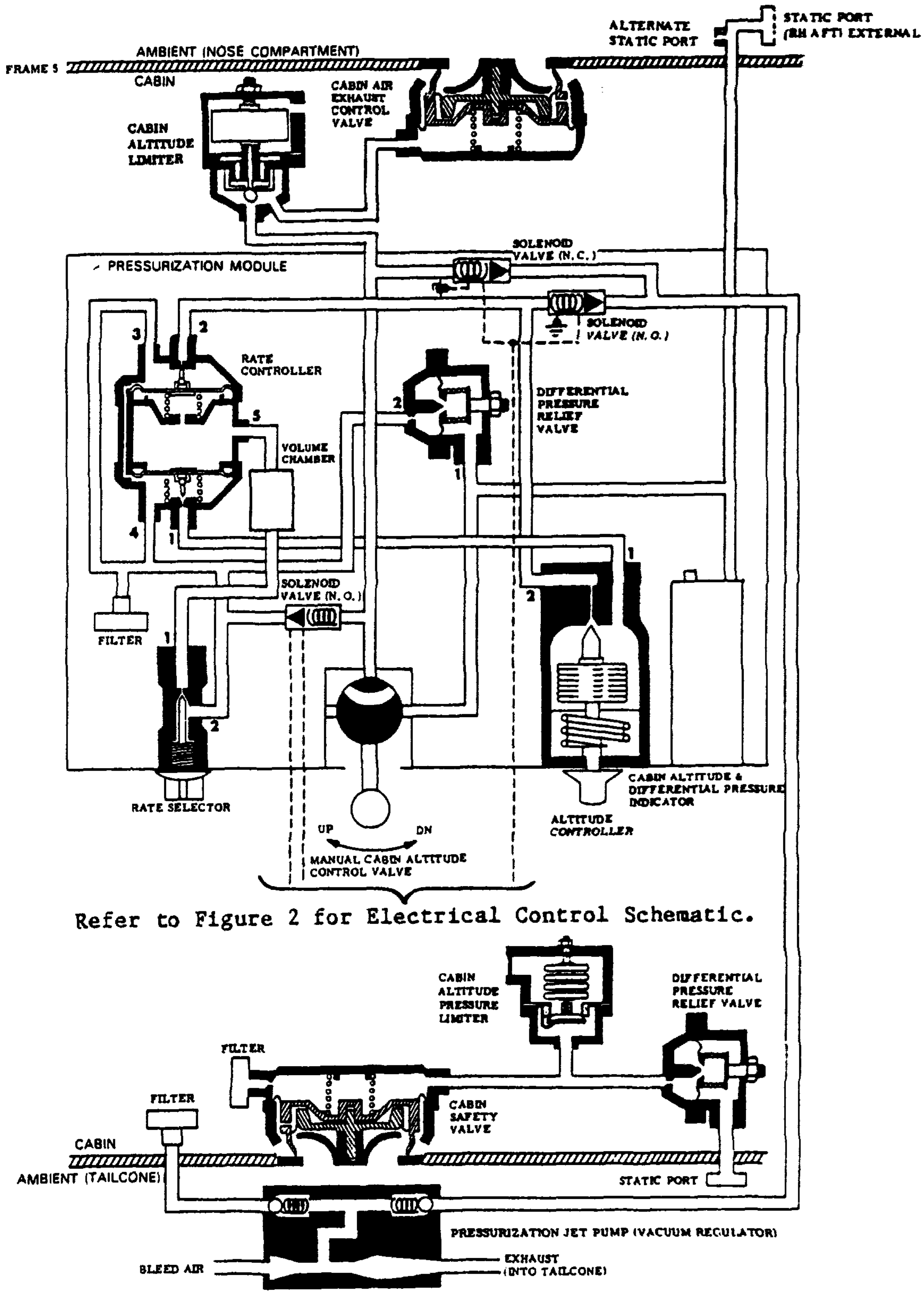


35S2130B-1

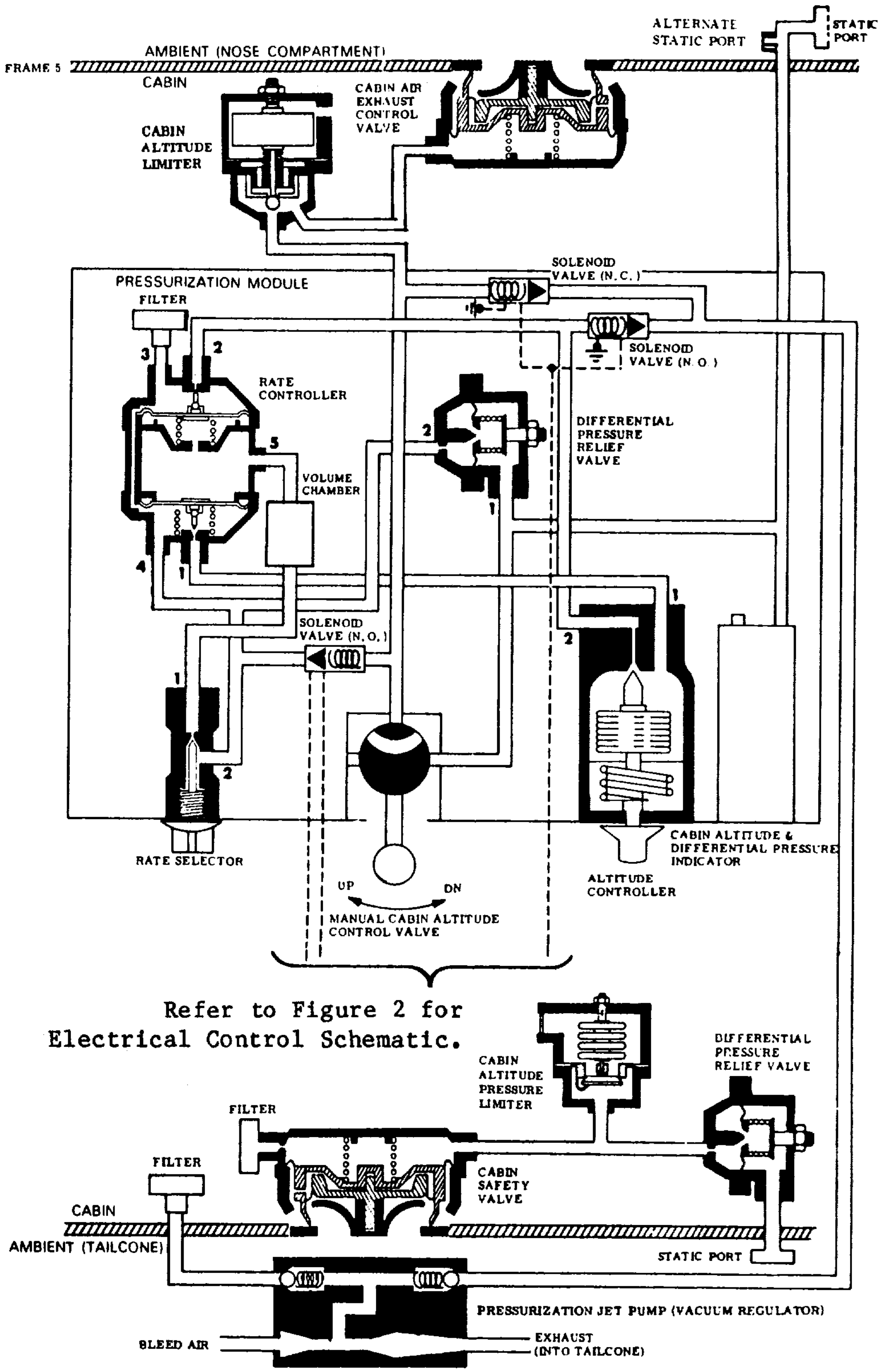
Pressurization System Electrical Control Schematic
Figure 2 (Sheet 2 of 3)



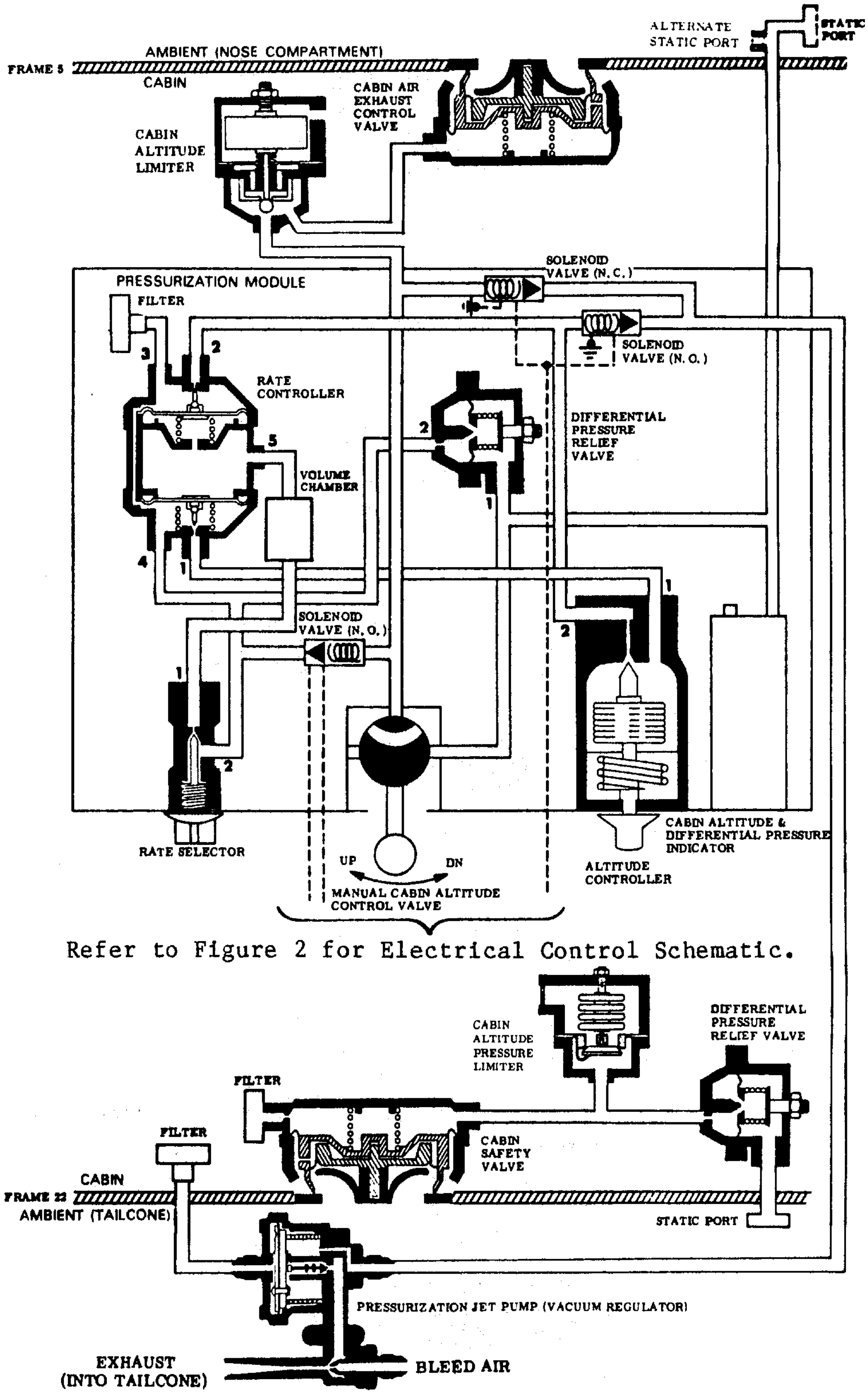
Pressurization System Electrical Control Schematic
Figure 2 (Sheet 3 of 3)



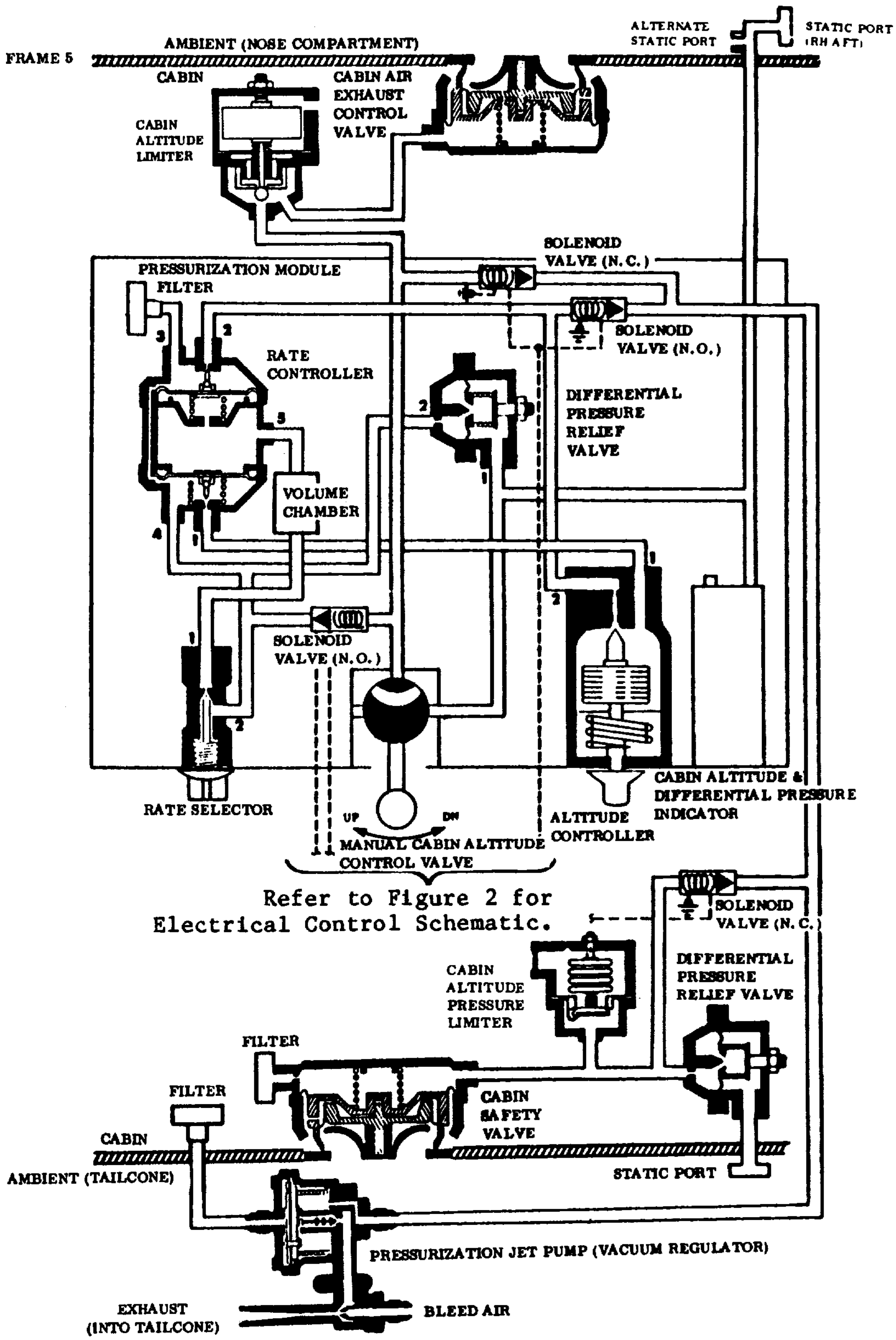
Pressurization System Control Schematic
Figure 3 (Sheet 1 of 6)



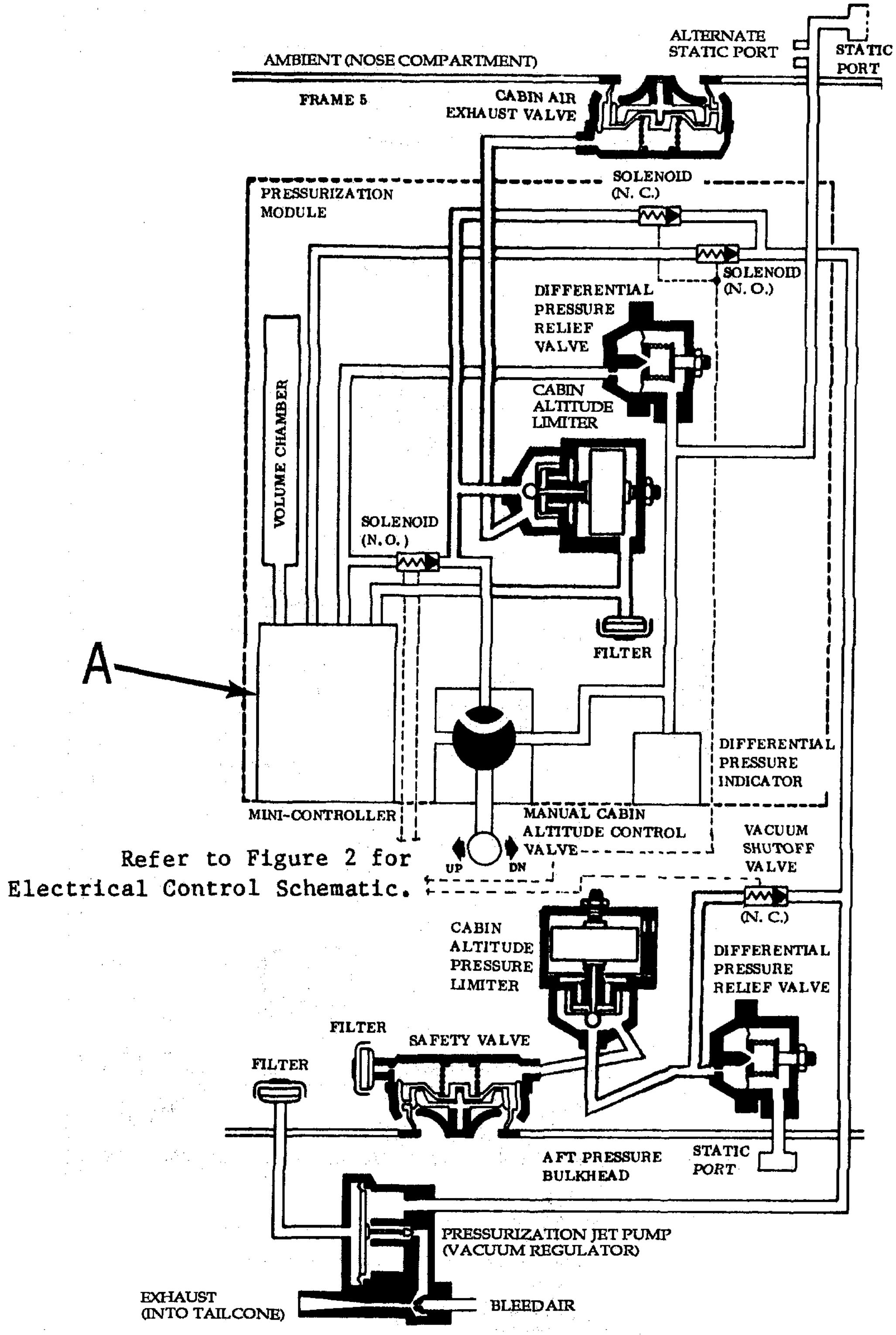
Pressurization System Control Schematic
Figure 3 (Sheet 2 of 6)



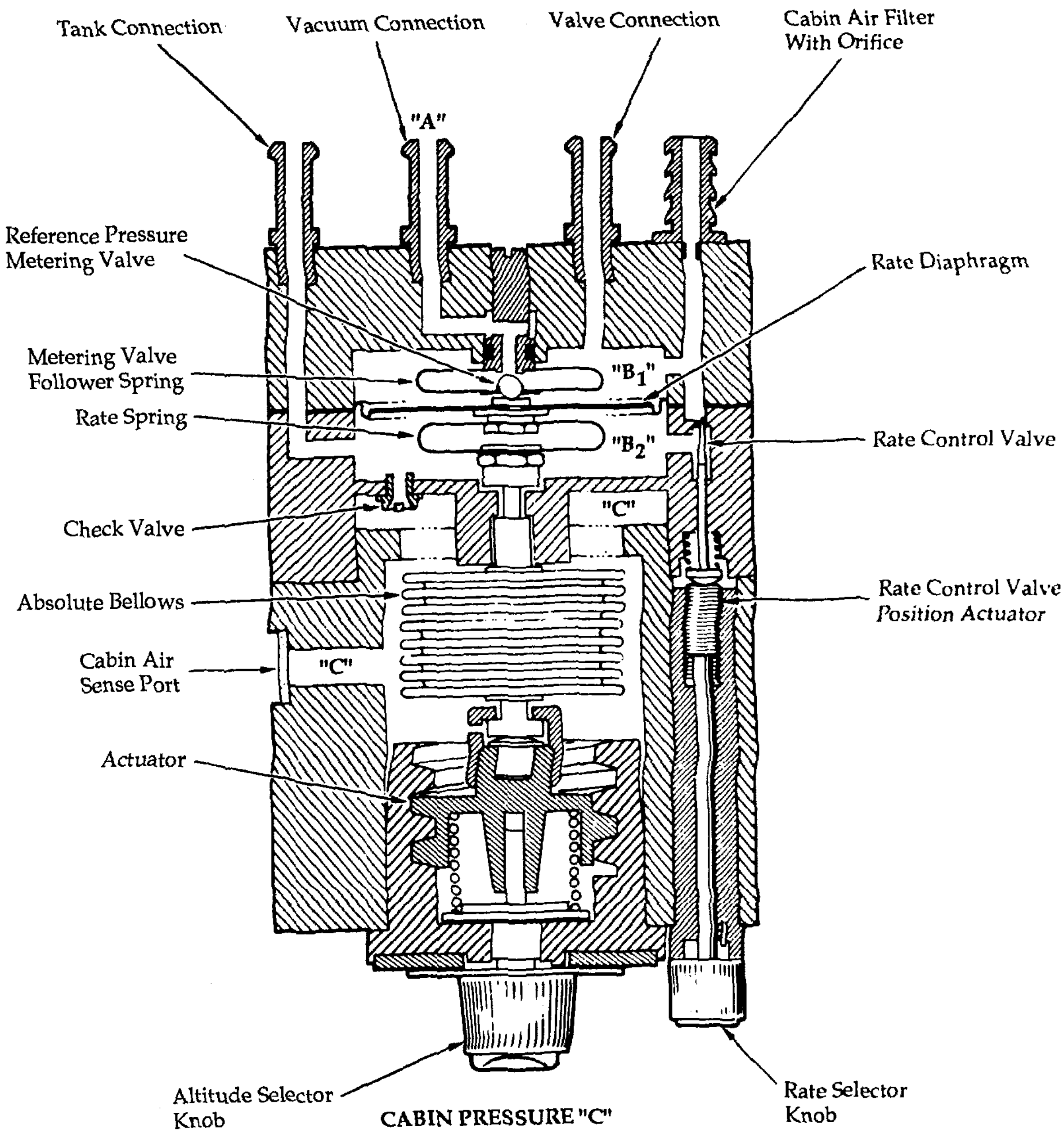
Pressurization System Control Schematic
Figure 3 (Sheet 3 of 6)



Pressurization System Control Schematic
Figure 3 (Sheet 4 of 6)



Pressurization System Control Schematic
Figure 3 (Sheet 5 of 6)



CABIN PRESSURE "C"

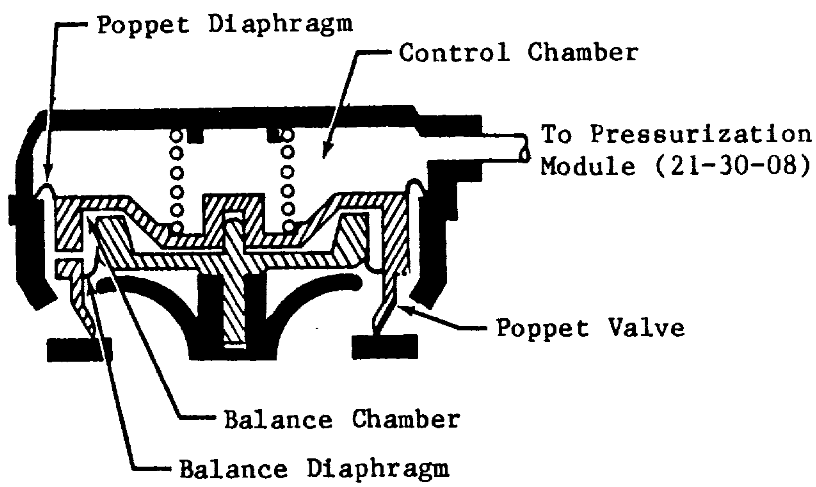
RATE PRESSURE "B_2"

REFERENCE PRESSURE "B_1"

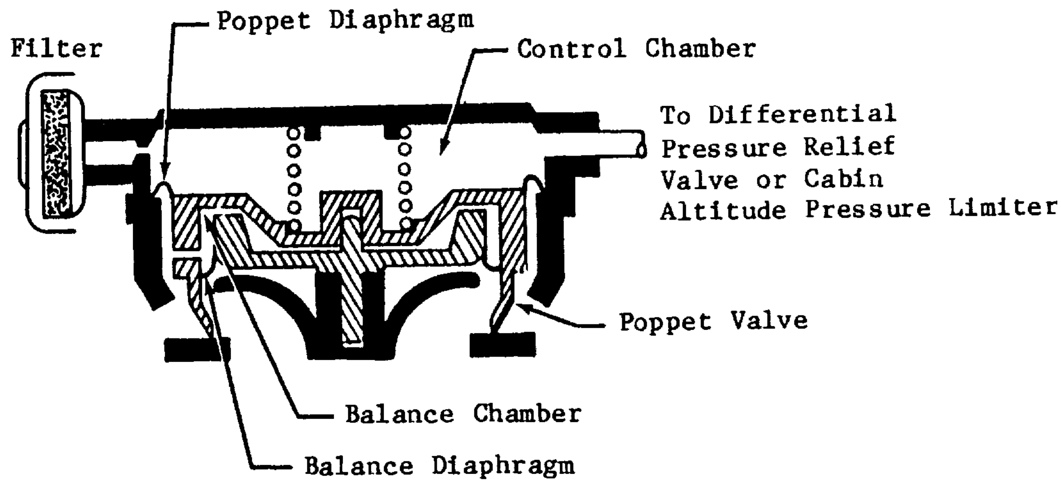
VACUUM "A"

Detail A

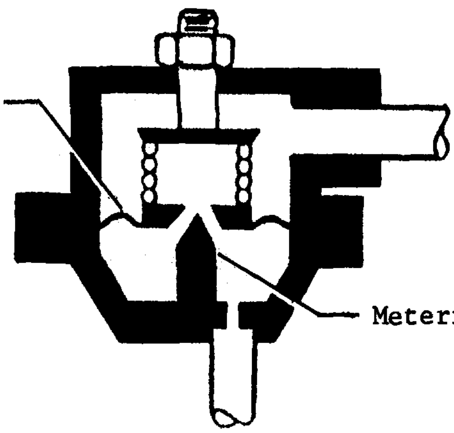
Pressurization System Control Schematic
Figure 3 (Sheet 6 of 6)



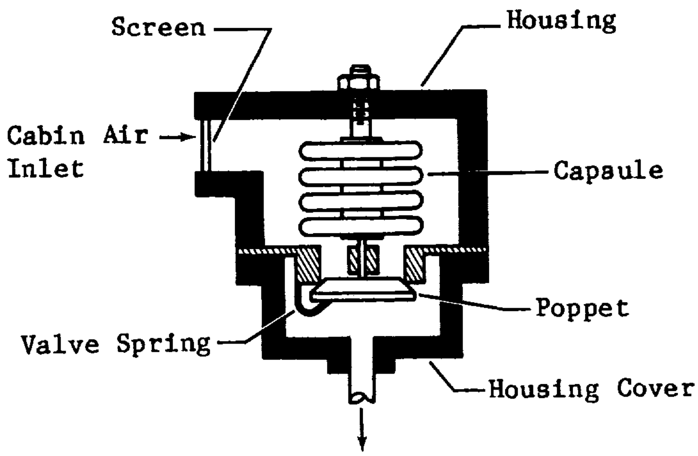
Cabin Air Exhaust Control Valve Schematic
Figure 4



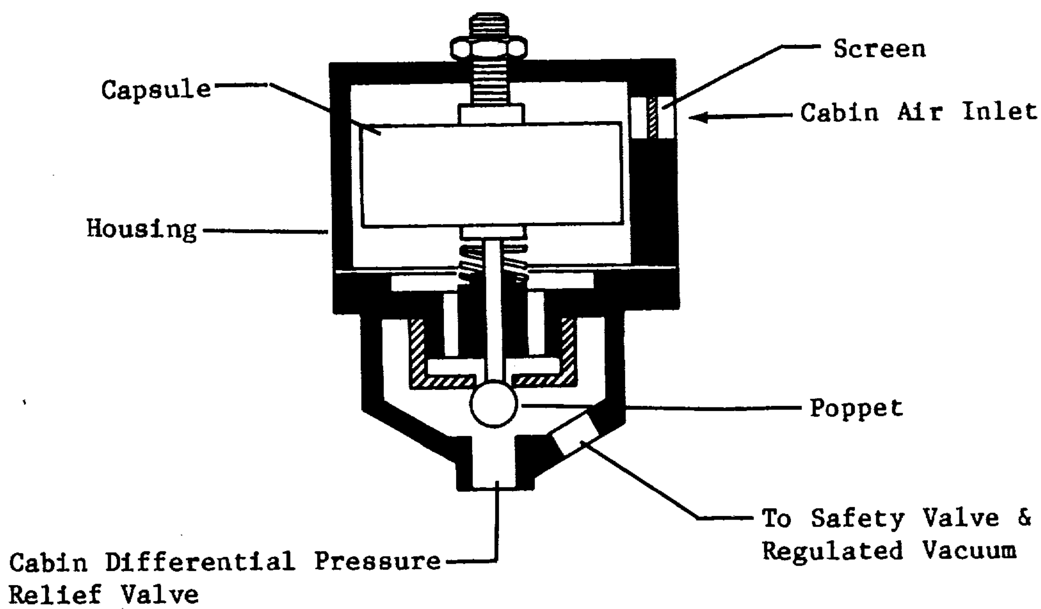
Cabin Safety Valve Schematic
Figure 5



Cabin Differential Pressure Relief Valve
Figure 6

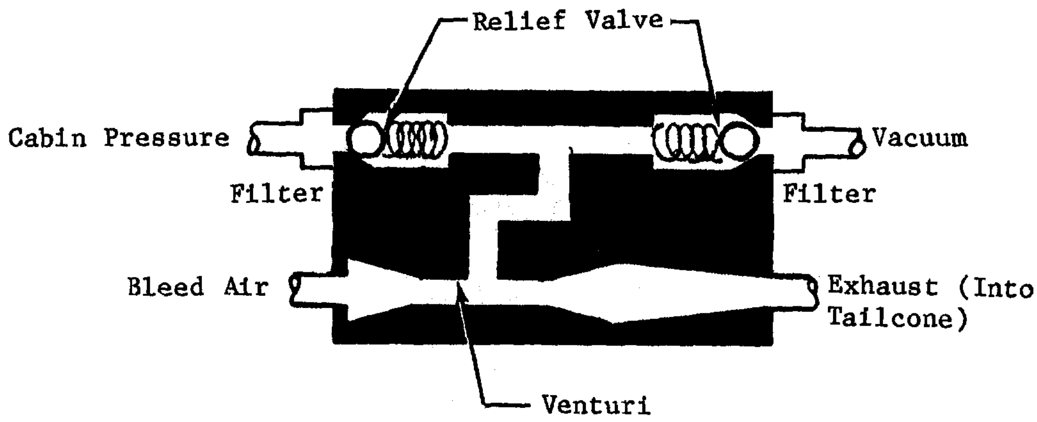


Aircraft 35-002 thru 35-106, 35-108 thru 35-112; 36-002 thru 36-031 (Aft Cabin Altitude Limiter Only)



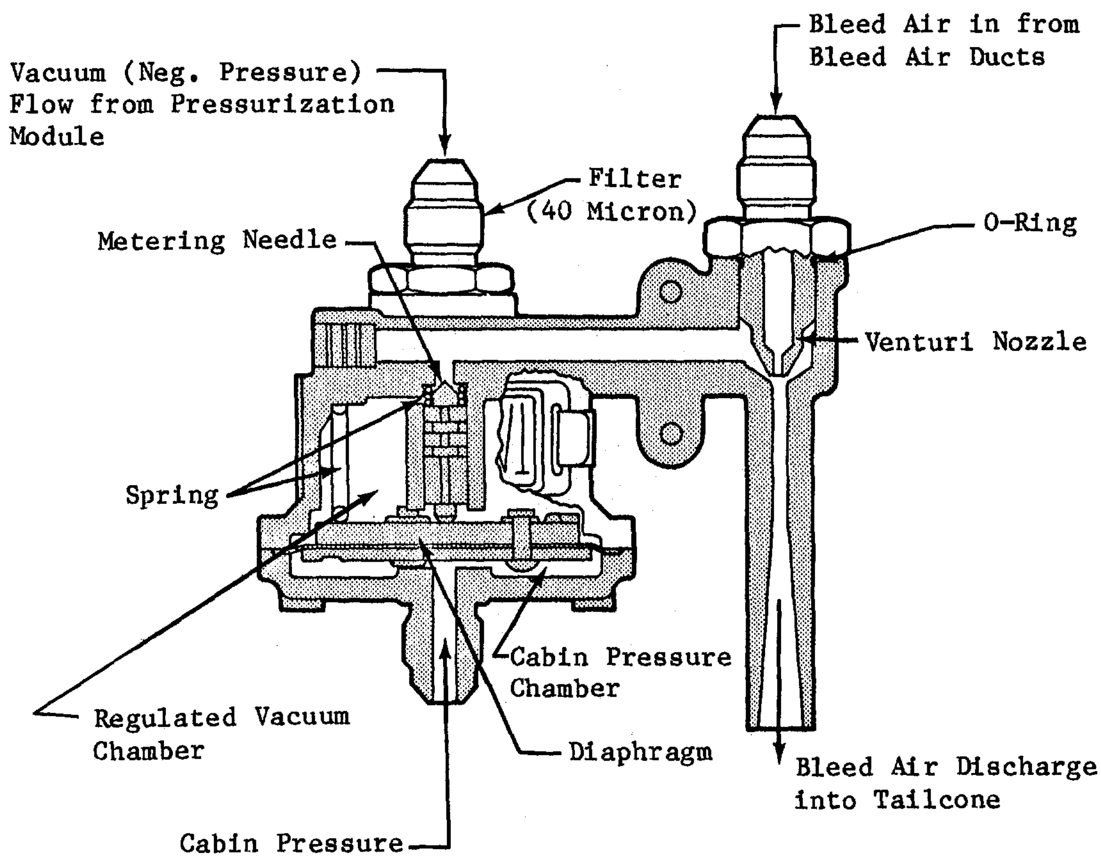
Aircraft 35-107, 35-113 and Subsequent, 36-032 and Subsequent, and prior aircraft modified per AMK 78-5, "Installation of Cabin Altitude Pressure Limiter"

Altitude Limiter Schematic
Figure 7



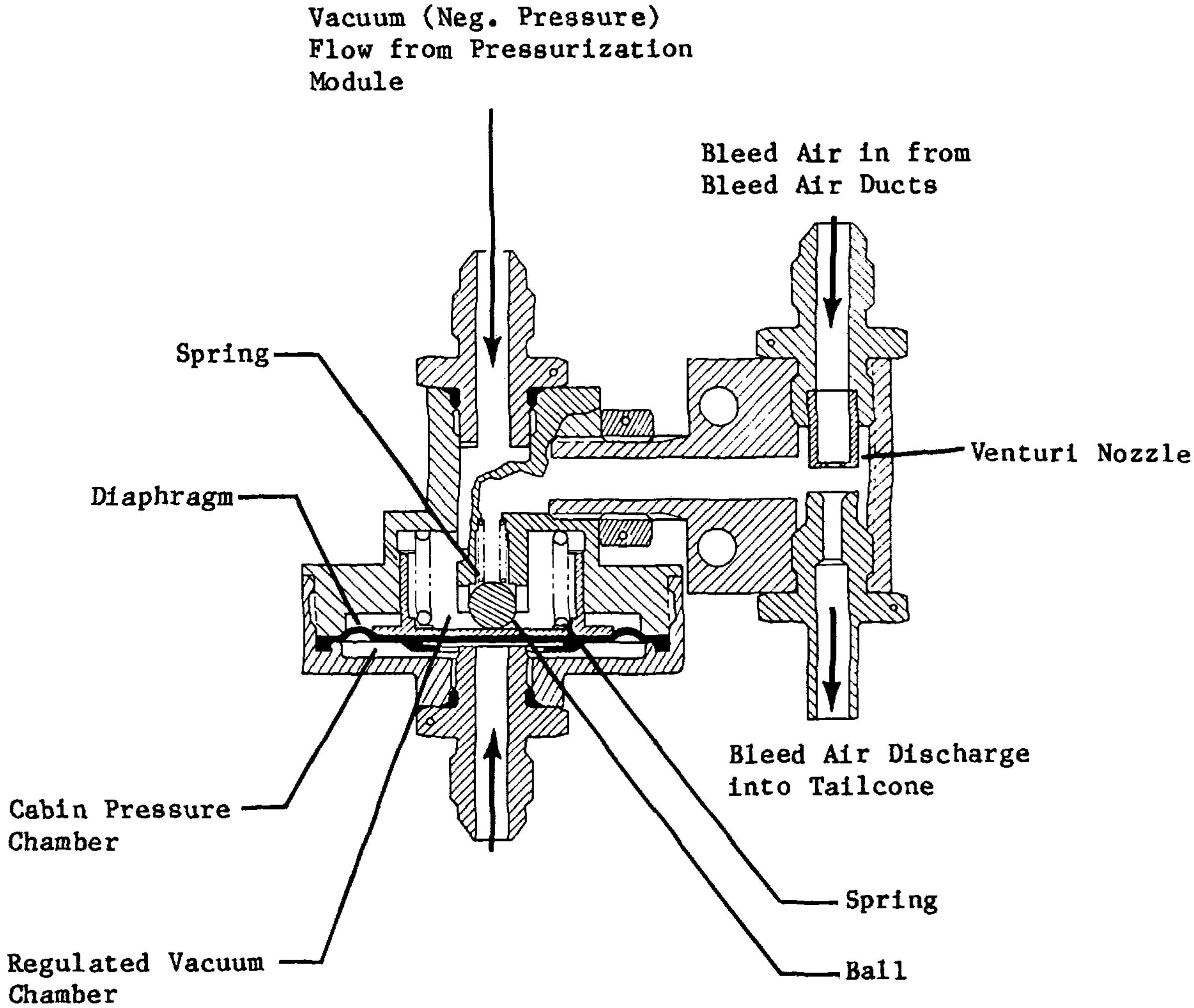
Jet Pump

Aircraft 35-002 thru 35-045 and 36-002 thru 36-016



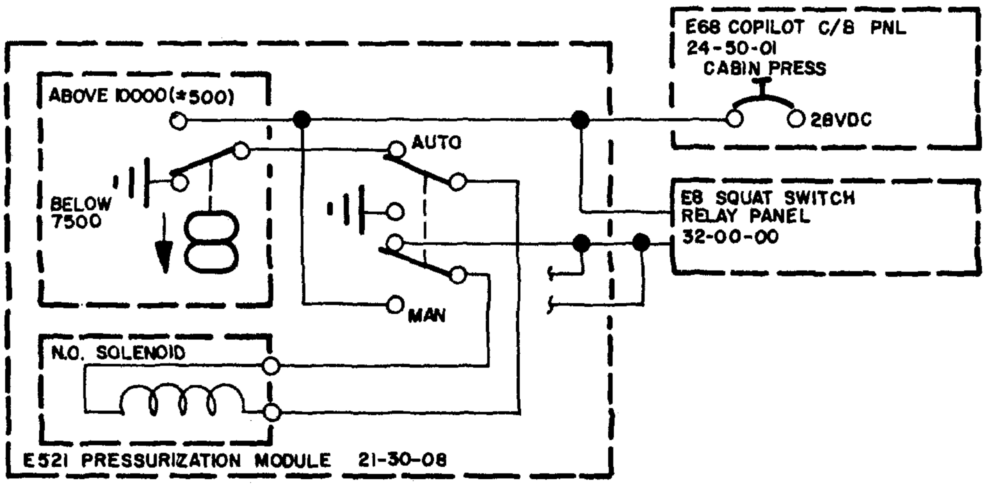
35-046 and Subsequent, 36-017 and Subsequent equipped with Airborne vacuum regulator

Vacuum Regulator (Jet Pump) Schematic
Figure 8 (Sheet 1 of 2)

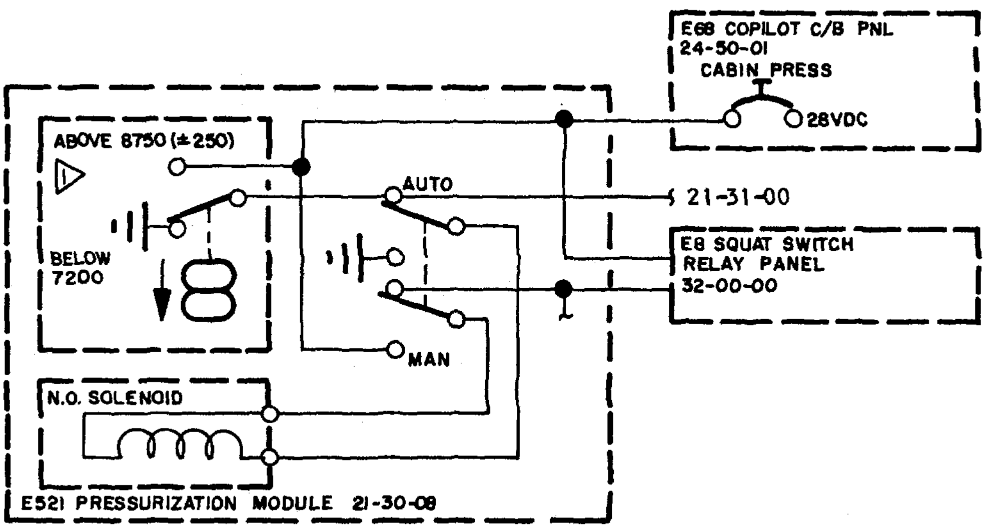


35-046 and Subsequent, 36-017 and Subsequent equipped with Sterer vacuum regulator

Vacuum Regulator (Jet Pump) Schematic
Figure 8 (Sheet 2 of 2)



35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031

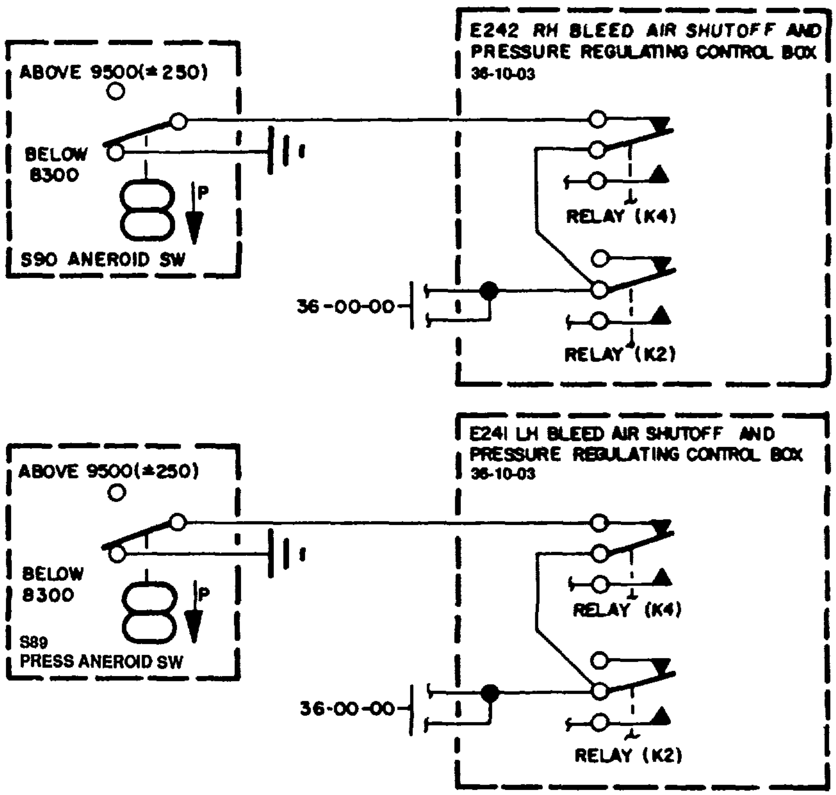


1
- On Aircraft 35-107, 35-113 thru 35-128 and 36-032, the cabin air exhaust control valve aneroid switch actuates at 9000 (±250) feet and resets on or before 7570 feet.
- On Aircraft 35-127 and Subsequent and 36-033 and Subsequent, the cabin air exhaust control valve aneroid switch actuates at 8750 (±250) feet and resets on or before 7200 feet minimum.

35-107, 35-113 and Subsequent, 36-032 and Subsequent

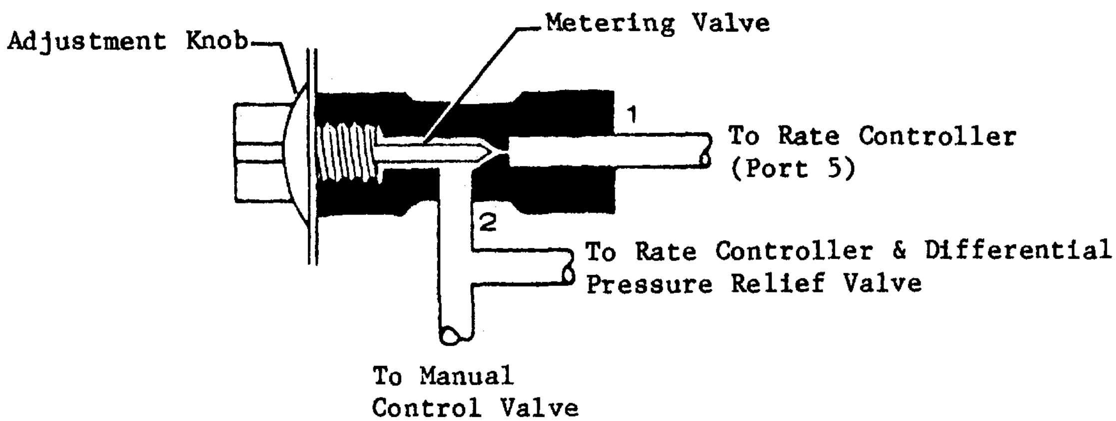
Cabin Air Exhaust Control Valve Aneroid Switch

Pressurization Aneroid Switch Electrical Control Schematic
Figure 9 (Sheet 1 of 2)

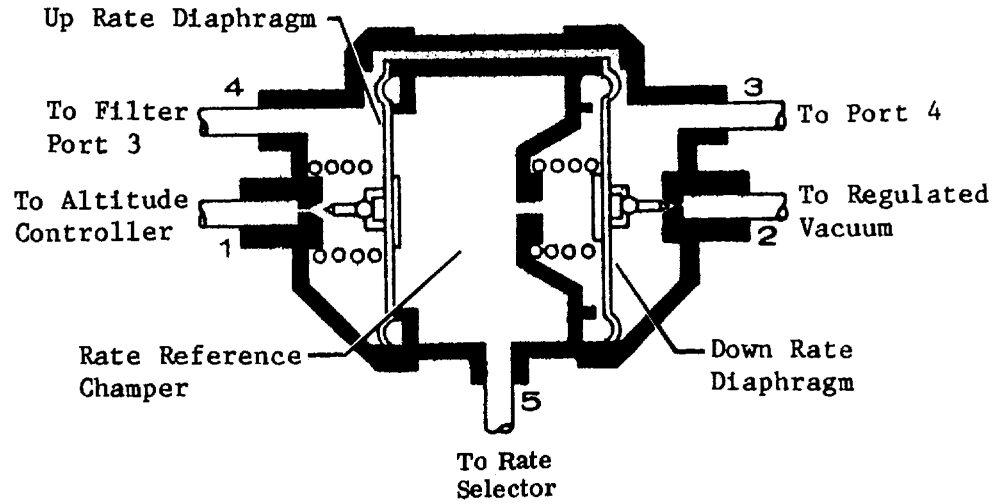


Cabin Pressurization Aneroid Switch

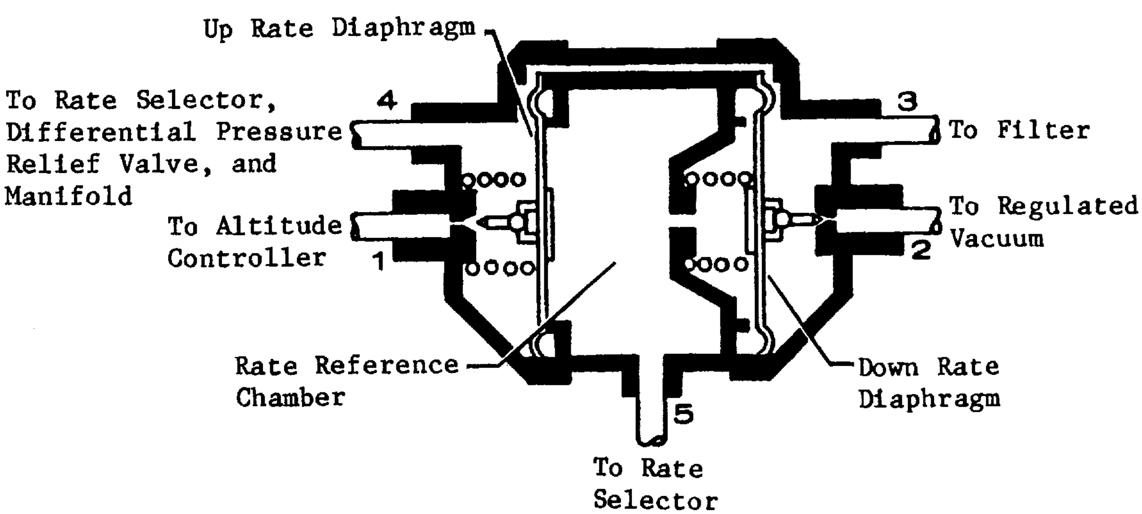
Pressurization Aneroid Switch Electrical Control Schematic
Figure 9 (Sheet 2 of 2)



Rate Selector Schematic
Figure 10

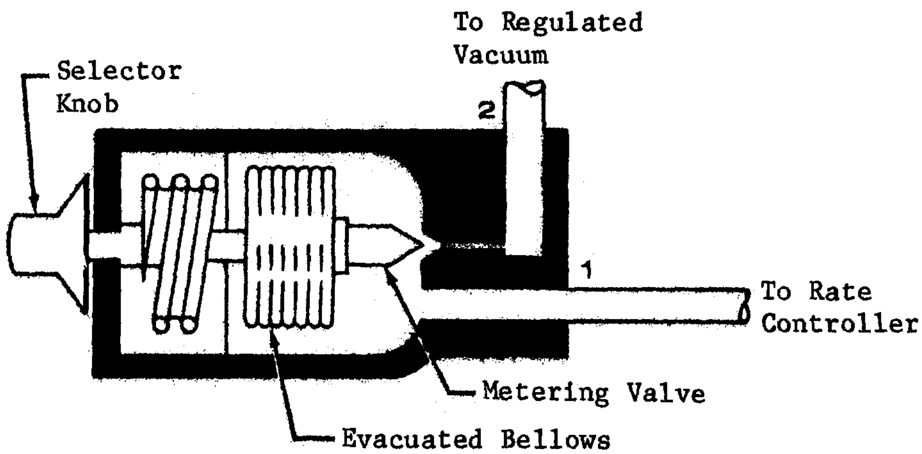


Aircraft 35-002 thru 35-015 and 36-002 thru 36-008



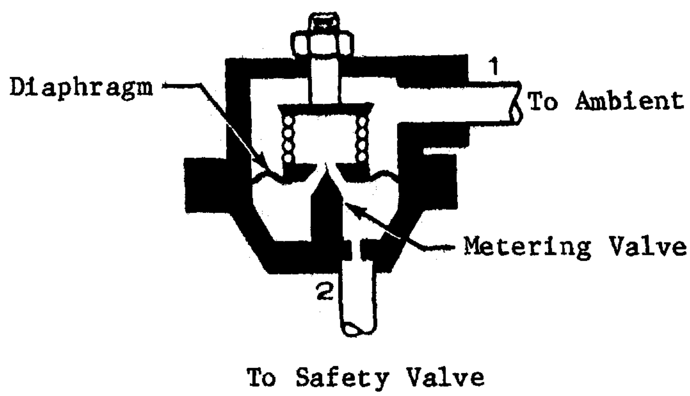
Aircraft 35-016 thru 35-106, 35-108 thru 35-112 and 36-009 thru 36-031

Rate Controller Schematic
Figure 11

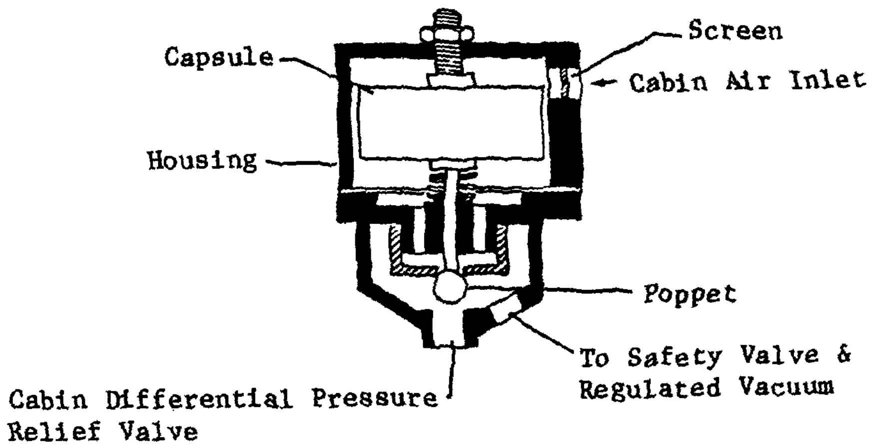


Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031

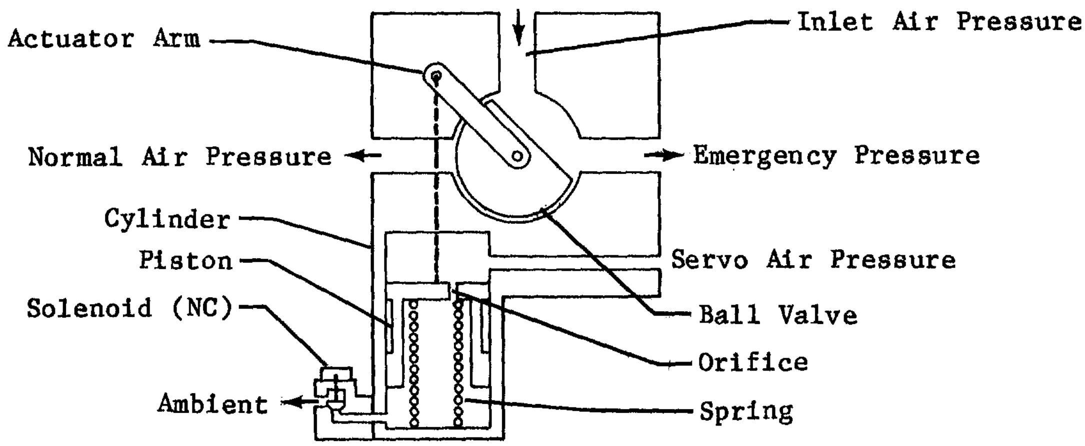
Cabin Altitude Controller Schematic
Figure 12



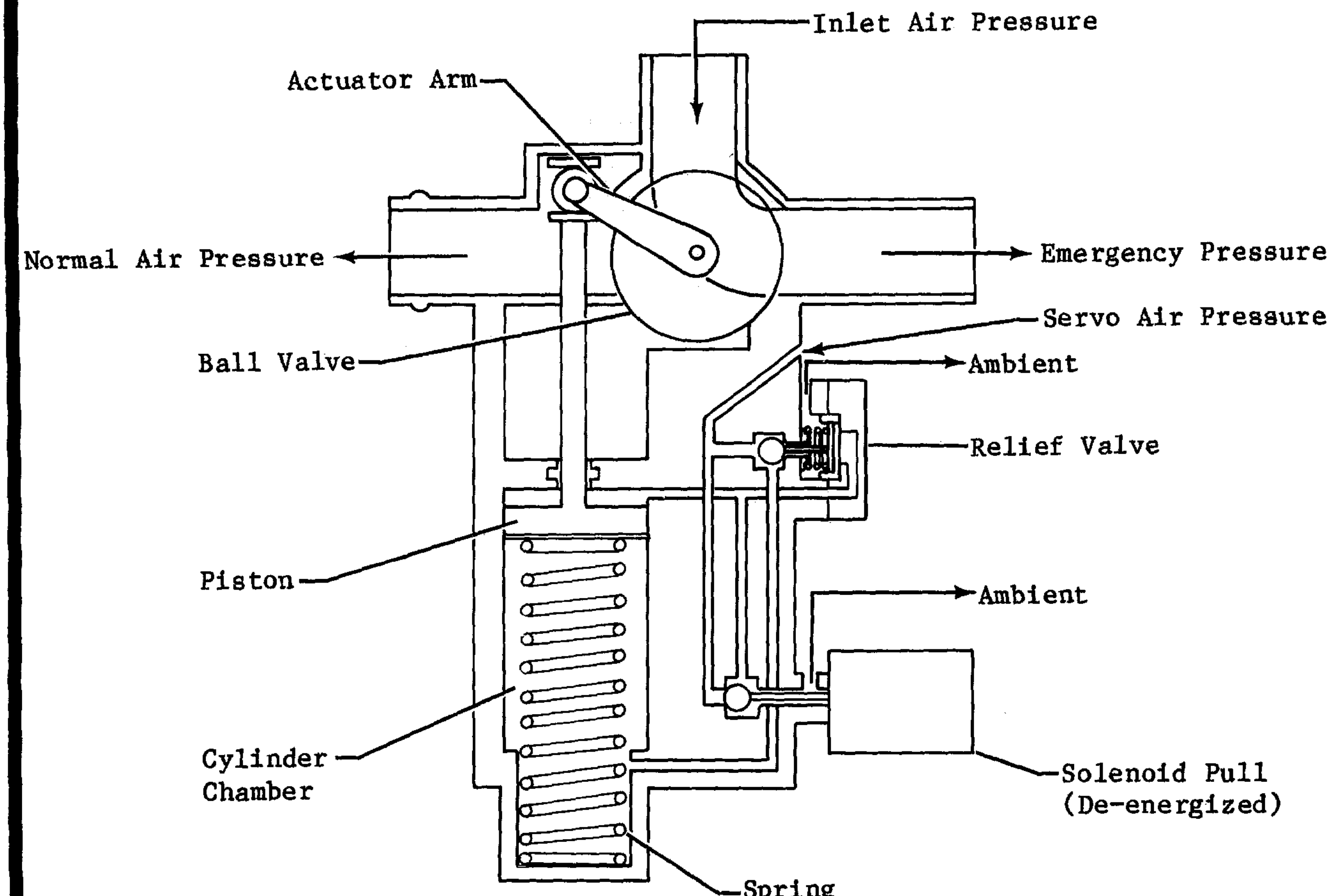
Differential Pressure Relief Valve Schematic
Figure 13



Cabin Altitude Pressure Limiter Schematic
Figure 14



Aircraft Without Whittaker Emergency Valve



Aircraft With Whittaker Emergency Valve

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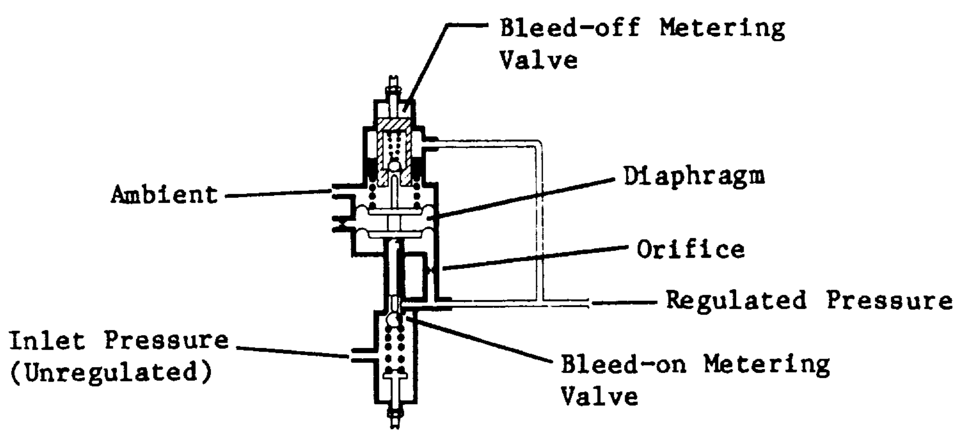
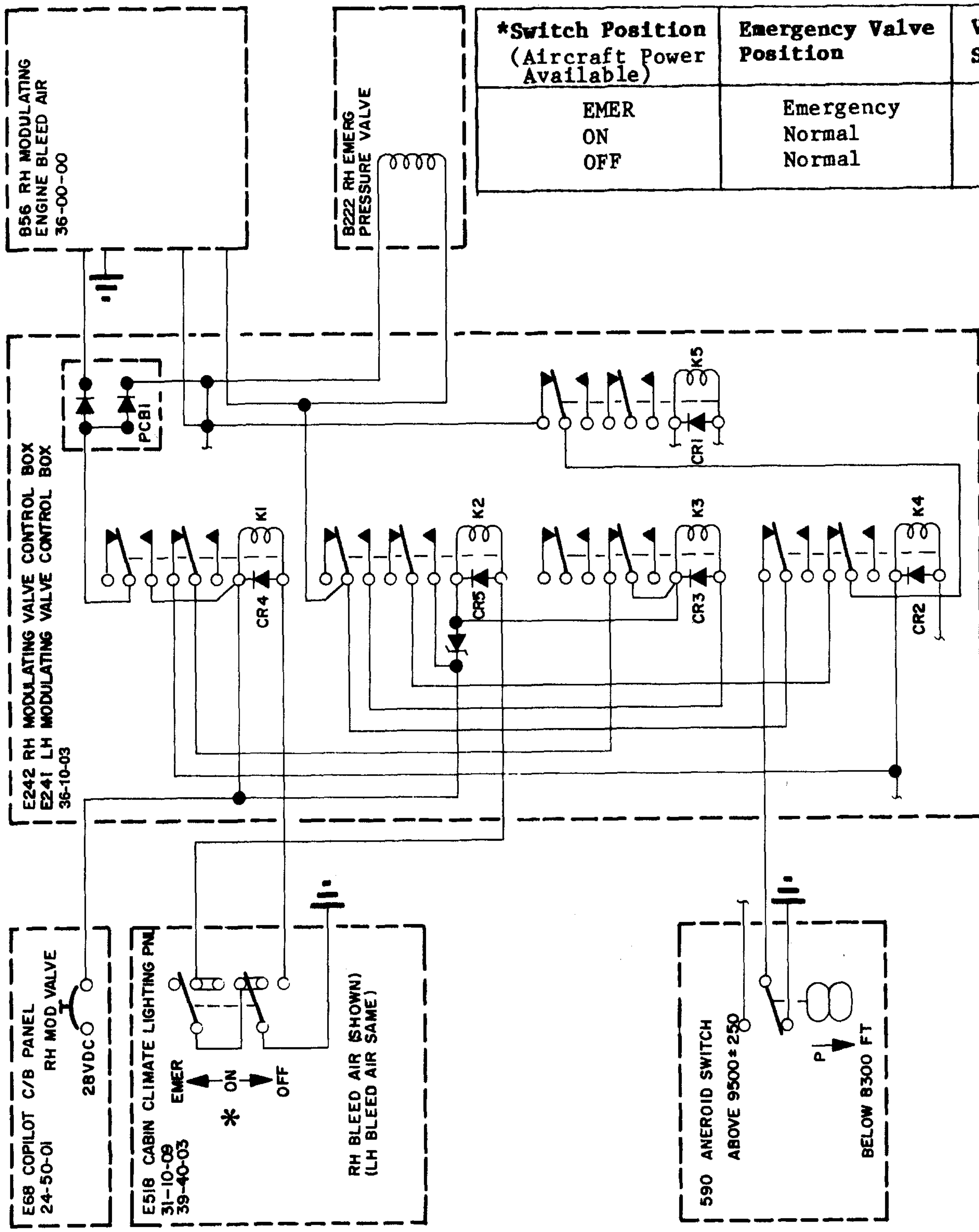
Emergency Pressurization Valve Schematic
Figure 15



Pressure Regulator Schematic
Figure 16

*Switch Position (Aircraft Power Available)	Emergency Valve Position	Voltage at Solenoid
EMER	Emergency	0 VDC
ON	Normal	28 VDC
OFF	Normal	28 VDC



35S2130B-2

Emergency Pressure Valve Electrical Control Schematic
Figure 17

35S2130B-2

PRESSURIZATION CONTROL - TROUBLE SHOOTING

1. Description

A. A trouble shooting table is provided listing possible troubles, the conditions under which the trouble occurred, a list of probable causes, and references to trouble shooting test and isolation procedures.

B. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Vacuum Gage (0 to 100 inches of H20)		Commercially Available	Check jet pump.

(1) See Figure 101 for trouble shooting procedure. *(Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031.)*

TROUBLE	EXISTING CONDITION	PROBABLE CAUSE	TROUBLE SHOOTING REF
1. Excessive Ground Pressure Bump.	1. When bleed air is turned on.	1. Normally closed solenoid in vacuum line failed closed.	1. None. (Refer to functional test of pressurization module.)
		2. Exhaust control valve malfunctioned.	2. Reference "Regulated vacuum too low, jet pump plugged, or flow restrictions in vacuum line" (Sheet 3 of 5).
		3. Regulated vacuum line leakage.	3. Reference "Regulated vacuum line leakage" (Sheet 4 of 5).
		4. Jet pump plugged - low vacuum.	4. Reference "Regulated vacuum too low, jet pump plugged, or flow restrictions in vacuum line" (Sheet 3 of 5).
		5. Electrical circuit malfunctioned.	5. None. (Perform continuity check of wiring.)

Pressurization System Trouble Shooting
Figure 101 (Sheet 1 of 5)

TROUBLE	EXISTING CONDITION	PROBABLE CAUSE	TROUBLE SHOOTING REF
2. Cabin dives, will not rate up automatically.	1. During flight when altitude controller is set above ambient altitude. 2. During ground check with altitude controller set above field elevation.	1. Regulated vacuum line leakage. 2. Jet pump plugged - low vacuum. 3. Malfunction within pressurization module. 4. Flow control valve full open.	1. Reference "Regulated vacuum line leakage" (Sheet 4 of 5). 2. Reference "Regulated vacuum too low, jet pump plugged, or flow restrictions in vacuum line" (Sheet 3 of 5). 3. None. (Refer to functional test of pressurization module.) 4. Reference "Flow control valve in full open position" (Sheet 3 of 5).
3. Cabin altitude climbs with aircraft altitude.	1. Normal flight conditions.	1. Flow control valve closes at high inlet pressures. 2. Regulated vacuum too high. 3. Pressurization module malfunctioned.	1. Reference "Flow control valve closes at high inlet pressures" (Sheet 5 of 5). 2. Reference "Regulated vacuum too high" (Sheet 5 of 5). 3. None. (Refer to functional test of pressurization module.)
4. Cabin will not maintain differential pressure at normal cruise power.	1. Aircraft in flight at altitudes up to 45,000 ft.	1. Insufficient air flow into cabin. 2. Obstructions under safety valve poppet seat. 3. Regulated vacuum too high. 4. Pressurization module malfunctioned. 5. Excessive cabin leakage.	1. Reference "Insufficient air flow into cabin" (Sheet 5 of 5). 2. None. (Inspect safety valve. Remove and clean poppet seat.) 3. Reference "Regulated vacuum too high" (Sheet 5 of 5). 4. None. (Refer to functional test of pressurization module.) 5. None.
5. System abnormally sluggish - slow response to inflow changes.		1. Regulated vacuum line leakage. 2. Regulated vacuum too low. 3. Pressurization module malfunctioned.	1. Reference "Regulated vacuum line leakage" (Sheet 4 of 5). 2. Reference "Regulated vacuum too low, jet pump plugged, or flow restrictions in vacuum line" (Sheet 3 of 5). 3. None. (Refer to functional test of pressurization module.)
6. System instability - rate fluctuations.		1. Regulated vacuum too low. 2. Regulated vacuum too high. 3. Regulated vacuum line leakage. 4. Pressurization module malfunctioned.	1. Reference "Regulated vacuum too low, jet pump plugged, or flow restrictions in vacuum line" (Sheet 3 of 5). 2. Reference "Regulated vacuum too high (Sheet 5 of 5). 3. Reference "Regulated vacuum line leakage" (Sheet 4 of 5). 4. None. (Refer to functional test of pressurization module.)

Pressurization System Trouble Shooting
Figure 101 (Sheet 2 of 5)

REGULATED VACUUM TOO LOW, JET PUMP PLUGGED, OR FLOW RESTRICTION IN VACUUM LINE. Conduct the following test:

1. Connect a vacuum gage to the vacuum line test port.
2. Start one engine. (Refer to Airplane Flight Manual for starting procedure.) Set Pressurization switch to AUTO.
3. Set engine at 70% rpm. Check vacuum gage for 75 (±10) inches of water or 5.52 (±0.74) Hg.
4. Check exhaust valve in full open position.

IF

OK, the malfunction has occurred within the module. Remove and functional test module. Refer to 21-30-08.

NOT OK, disconnect vacuum line from test port tee (line to module) and cap tee. Retest system as outlined above.

OK, check for restrictions in vacuum line between module and test port.

NOT OK, remove and clean jet pump.

FLOW CONTROL VALVE IN FULL OPEN POSITION. Proceed as follows:

1. Set Cabin Air switch to MAX. IF

Switch setting decreases airflow, the MAX airflow solenoid is wired incorrectly. Refer to applicable wiring diagram and rewire solenoid.

Switch setting has no affect on airflow. Check for capped MAX flow solenoid and/or loose, broken, or kinked venturi sense lines. IF

NOT OK, remove cap if one was installed. Remove and replace sense lines if required.

OK, flow control valve is stuck in the full open position. Remove and replace flow control valve.

Pressurization System Trouble Shooting
Figure 101 (Sheet 3 of 5)

REGULATED VACUUM LINE LEAKAGE. Conduct the following test:

1. Connect vacuum side of MB-1 tester to frame 5 static port. Static port is located on the forward side of frame 5 adjacent to the outflow valve.
2. Block remaining static port.
3. Remove filter from pressurization module and cap fitting.
4. Set rate selector to full INCR.
5. Set altitude controller to maximum cabin differential pressure.
6. Block manual cabin altitude control valve to the UP position.

CAUTION

Apply vacuum with MB-1 tester at a rate not to exceed 2000 feet per minute or damage to the rate controller diaphragm could result.

7. Apply a vacuum of 10,000 feet with MB-1 tester. Allow vacuum to stabilize and close valve on tester.
8. The altimeter should not decrease more than 500 fpm. IF

OK, decrease vacuum at a rate not to exceed 2000 fpm. Disconnect MB-1 tester. Remove plug and install filter. Remove block from manual cabin altitude control valve and return rate selector and altitude controller to the original settings.

NOT OK, disconnect vacuum line from pressurization jet pump and cap line. Retest system as outlined above.

Note

If system retest proves to be satisfactory, vacuum leakage is through the pressurization jet pump check valve. During normal operation, leakage through the check valve will not cause any system malfunction; however, to eliminate possible trouble, the pressurization jet pump should be removed and cleaned. (Refer to 21-30-06)

OK, decrease vacuum at a rate not to exceed 2000 fpm. Disconnect MB-1 tester. Remove plug and install filter. Remove block from manual cabin altitude control valve and return rate selector and altitude controller to their original settings.

NOT OK, remove plug from vacuum line and connect line to pressurization jet pump. Lower pressurization module and disconnect vacuum line from module. Cap module and retest system. IF

OK (system retest proves satisfactory), vacuum leakage is between the pressurization jet pump and the pressurization module assembly. Check line for leaks and fittings for security. Retest system as outlined above.

NOT OK, disconnect line from exhaust valve and cap fitting. Retest system.

NOT OK, remove and functional check module. (Refer to FUNCTIONAL TEST OF PRESSURIZATION, this section.)

OK (system retest proves satisfactory), vacuum leakage is in the exhaust valve. Remove and replace valve.

Pressurization System Trouble Shooting
Figure 101 (Sheet 4 of 5)

REGULATED VACUUM TOO HIGH. Conduct the following test:

1. Connect a vacuum gage to the line test port.
2. Start one engine. (Refer to Airplane Flight Manual for starting procedure.) Set Pressurization switch to AUTO.
3. Set engine at 70% rpm. Check vacuum gage for 75 (±10) inches of water or 5.52 (±0.74) inches of Hg. **IF**

Ok, malfunction has occurred within the pressurization module. Remove and functional check module. Refer to 21-30-08.

NOT OK, check the following items:

1. Remove and clean pressurization jet pump.
2. Check pressurization jet pump filter.
3. Check lines between filter and jet pump for leakage.
4. Retest system as outlines above.

FLOW CONTROL VALVE CLOSES AT HIGH INLET PRESSURES.

NOTE

If previous testing indicates no pressurization system malfunction, it is possible that insufficient airflow is entering the cabin in the first minutes of flight.

Perform the following test:

1. Apply 30 psig thru pressurization cart or operate engine at 70% rpm.
2. Apply soap solution to flow control sense lines and check for leakage. **IF**

OK, flow control valve may be faulty. Remove and replace flow control valve.

NOT OK, tighten sense lines. Retest system as outlined above.

INSUFFICIENT AIRFLOW INTO CABIN.

NOTE

In case of this trouble, the flight squawk will probably include insufficient cabin heat.

Proceed as follows:

1. If pressurization cart is used, remove either bleed air duct and connect pressurization cart.
2. If pressurization cart is not available, use one engine at 70% rpm.
3. Apply 30 psig thru cart or operate engine at 70% rpm.
4. Set Air Bleed switch to NORM and, using a soap solution, check flow control valve sense lines. **IF**

NOT OK, tighten sense lines and retest system

OK, the flow control may have malfunctioned. Remove and replace flow control valve. Retest system as outlined above.

Pressurization System Trouble Shooting
Figure 101 (Sheet 5 of 5)

2. **Trouble Shooting Functional Test** *(Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent)* (See Figures 102 thru 105.)

WARNING: THE CABIN DOOR MUST BE OPEN WHILE PERFORMING TESTS IN PARAGRAPHS H THRU J TO PREVENT PERSONNEL INJURY.

ALL DRAIN HOLES AND VENTS NORMALLY OPEN DURING FLIGHT SHALL BE LEFT OPEN DURING THIS TEST.

A. The following functional test procedure is provided as an aid in trouble shooting the cabin pressurization system, cabin temperature control system, and cabin leakage.

B. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Vacuum Gage (0 to 10 inches of H20)		Commercially Available	General.
Compressed Air Source (filtered) (Shop air may be used if capable of 150 CFM at 40 psi)		Commercially Available	General.
Compressed Nitrogen Source		Commercially Available	General.
Pitot-Static Tester	1811G	Barfield Instrument Corp. Atlanta, GA	General.
Cabin Pressurization Test Cart	B1737, B21117 or TronAir 15-7603-1000	Learjet Inc. Wichita, KS Aircraft Ground Support Equipment Holland, OH	General.

C. Bleed Air System Electrical Check

NOTE: Ensure that Fire Extinguisher T-handles are pushed in (normal position).

On Aircraft 35-604 thru 35-623, 35-626, 35-627 and 35-630 and Subsequent and 36-056 and Subsequent, the Emergency Pressurization Override Switches must be in the NORMAL position during this test.

Voltage reading shall be made at RH and LH engine modulating valves (B56 and B59) and RH and LH emergency pressurization valves (B222 and B223). Record voltage readings. (See Figure 102.)

(1) Gain access to engine modulating valves and disconnect electrical connectors P218, P217, P896, and P895.
(2) Gain access to emergency pressurization valves and disconnect electrical connectors P897 and P898.
(3) *If aircraft is equipped with auxiliary crew heat*, disconnect electrical connector P1326 from auxiliary crew heat control box (E646).

NOTE: Auxiliary crew heat control box is located in tailcone, right hand electrical equipment tray.

(4) Set Battery Switches on.
(5) On *Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057*, set Bleed Air Switches off and check voltage reading as follows:
   (a) Electrical Connector P217 24 volts; pin A (-) to pin B (+).
   (b) Electrical Connector P218 24 volts; pin A (-) to pin B (+).
   (c) Electrical Connector P897 24 volts; pin A (-) to pin B (+).
   (d) Electrical Connector P898 24 volts; pin A (-) to pin B (+).
(6) On *Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent*, set Bleed Air Switches off and check voltage reading as follows:
   (a) Electrical Connector P217 24 volts; pin A (-) to pin B (+).
   (b) Electrical Connector P218 24 volts; pin A (-) to pin B (+).
   (c) Electrical Connector P897 24 volts; pin A (+) to pin B (-).
   (d) Electrical Connector P898 24 volts; pin A (+) to pin B (-).
(7) On *Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057*, set Bleed Air Switches on and check voltage reading as follows:
   (a) Electrical Connector P217 0 volts; pin A (-) to pin B (+).
   (b) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
   (c) Electrical Connector P897 24 volts; pin A (-) to pin B (+).
   (d) Electrical Connector P898 24 volts; pin A (-) to pin B (+).
   (e) Electrical Connector P895 24 volts; pin A (-) to pin C (+).
   (f) Electrical Connector P896 24 volts; pin A (-) to pin C (+).
(8) On *Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent*, set Bleed Air Switches on and check voltage reading as follows:

(a) Electrical Connector P217 0 volts; pin A (-) to pin B (+).
(b) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
(c) Electrical Connector P897 24 volts; pin A (+) to pin B (-).
(d) Electrical Connector P898 24 volts; pin A (+) to pin B (-).
(e) Electrical Connector P895 24 volts; pin A (-) to pin C (+).
(f) Electrical Connector P896 24 volts; pin A (-) to pin C (+).

(9) On _Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057_, set Bleed Air Switches to EMER and check voltage readings as follows:
(a) Electrical Connector P217 0 volts; pin A (-) to pin B (+).
(b) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
(c) Electrical Connector P897 0 volts; pin A (-) to pin B (+).
(d) Electrical Connector P898 0 volts; pin A (-) to pin B (+).
(e) Electrical Connector P895 0 volts; pin A (-) to pin C (+).
(f) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(10) On _Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent_, set Bleed Air Switches to EMER and check voltage readings as follows:
(a) Electrical Connector P217 0 volts; pin A (-) to pin B (+).
(b) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
(c) Electrical Connector P897 0 volts; pin A (+) to pin B (-).
(d) Electrical Connector P898 0 volts; pin A (+) to pin B (-)
(e) Electrical Connector P895 0 volts; pin A (-) to pin C (+).
(f) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(11) Set Bleed Air Switches off and check voltage readings as follows: voltage readings shall be the same as step (5) or (6).

D. Fire Extinguisher T-Handle Check

(1) On _Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057_, set Bleed Air Switches on, pull Fire Extinguisher T-handles out and check voltage reading as follows:
(a) Electrical Connector P217 24 volts; pin A (-) to pin B (+).
(b) Electrical Connector P218 24 volts; pin A (-) to pin B (+).
(c) Electrical Connector P897 0 volts; pin A (-) to pin B (+).
(d) Electrical Connector P898 0 volts; pin A (-) to pin B (+).
(e) Electrical Connector P895 0 volts; pin A (-) to pin C (+).
(f) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(2) On _Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent_, set Bleed Air Switches on, pull Fire Extinguisher T-handles out and check voltage reading as follows:
(a) Electrical Connector P217 24 volts; pin A (-) to pin B (+).
(b) Electrical Connector P218 24 volts; pin A (-) to pin B (+).
(c) Electrical Connector P897 0 volts; pin A (+) to pin B (-).
(d) Electrical Connector P898 0 volts; pin A (+) to pin B (-).
(e) Electrical Connector P895 0 volts; pin A (-) to pin C (+).
(f) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(3) Pull RH MOD VALVE and LH MOD VALVE circuit breakers. Verify that voltage readings are the same as in step D.(1) or D(2).

(4) Reset circuit breakers and push in T-handles.

E. Emergency Pressurization Aneroid Switch Check

(1) Gain access to RH and LH emergency pressurization aneroid switches. (Refer to 21-30-07.)

(2) Connect pitot-static tester to RH emergency pressurization aneroid switch and set RH Bleed Air Switch on. Verify voltages per step C.(5) or C(6).

(3) On *Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057*, increase pitot-static tester altimeter and verify voltage reading at 9500 (±250) feet (aneroid switch actuation).

(a) Electrical Connector P218 0 volts; pin A (-) to pin B (+).

(b) Electrical Connector P898 0 volts; pin A (-) to pin B (+).

(c) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(4) On *Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent*, increase pitot-static tester altimeter and verify voltage reading at 9500 (±250) feet (aneroid switch actuation).

(a) Electrical Connector P218 0 volts; pin A (-) to pin B (+).

(b) Electrical Connector P898 0 volts; pin A (+) to pin B (-).

(c) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(5) Reduce pitot-static tester below 8300 feet. Verify that voltage readings are not changed.

(6) Cycle RH Bleed Air Switch off; then back on. Verify voltage readings per step C.(5) or C(6).

(7) On *Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057,equipped with Emergency Pressurization Override Switches*, set R Emergency Pressurization Override Switch to OVERRIDE. Increase pitot-static tester altimeter and verify voltage readings at 9500 (±250) feet (aneroid switch actuation).

(a) Electrical Connector P218 0 volts; pin A (-) to pin B (+).

(b) Electrical Connector P898 24 volts; pin A (-) to pin B (+).

(c) Electrical Connector P896 24 volts; pin A (-) to pin C (+).

(8) On *Aircraft 35-518 and Subsequent and 36-055, 36-057, and 36-062 and Subsequent, equipped with Emergency Pressurization Override Switches*, set R Emergency Pressurization Override Switch to OVERRIDE. Increase pitot-static tester altimeter and verify voltage readings at 9500 (±250) feet (aneroid switch actuation).

(a) Electrical Connector P218 0 volts; pin A (-) to pin B (+).

(b) Electrical Connector P898 24 volts; pin A (+) to pin B (-).

(c) Electrical Connector P896 24 volts; pin A (-) to pin C (+).

(9) Reduce pitot-static tester to ambient.

(10) Repeat steps E.(2) thru E.(9) using LH emergency pressurization aneroid switch, LH Bleed Air Switch, L Emergency Pressurization Override Switch, and corresponding electrical connectors.

F. Bleed Air Duct and Pylon Overtemperature Circuit Check

(1) Gain access to LH and RH bleed air duct and pylon overtemperature thermal switches (S20, S21, S355, and S356) by removing lower pylon access covers.

(2) Set Battery Switches on and depress warning light test switch to verify proper operation of annunciators. Release test switch.

(3) Disconnect electrical connector (P747) from LH bleed air duct temperature switch (S21). Connect jumper across electrical connector P747 (pins A to B), L BLEED AIR annunciator shall illuminate. Remove jumper and connect electrical connector to LH bleed air duct temperature switch.

(4) Connect jumper across terminals of LH pylon temperature switch (S355). L BLEED AIR annunciator shall illuminate. Remove jumper.

(5) Repeat steps F. (3) and F. (4) for RH bleed air duct temperature switch (S20) and RH pylon temperature switch (S356).
(6) Set Battery Switches off.

G. Cabin Leak Rate Check

WARNING: ALL DRAIN HOLES AND VENTS NORMALLY OPEN DURING FLIGHT SHALL BE LEFT OPEN DURING THIS TEST.

(1) Lower the pressurization module and plug the cabin inlet port to the differential pressure gage.
(2) Open tailcone access door.
(3) Disconnect the regulated vacuum line and the cabin pressure line from the vacuum regulator at the jet pump and cap exposed fittings. (Refer to 21-30-06).
(4) Connect pressurization test cart reference line to cabin pressure line removed from vacuum regulator.
(5) Connect pneumatic test cart to the test port adjacent to the flow control valve. (Refer to Instruction Manual for hook-up instructions.)
(6) Set Battery Switches on. Select maximum rate (increase) and maximum altitude on the mini-controller. Ensure that Nacelle Heat Switches are off and their respective circuit breakers are depressed. Pull SQUAT SW circuit breaker.
(7) Disconnect high pressure pneumatic line from RH engine and connect compressed air source to the pneumatic line. Set regulated air to 25 to 30 psi [172.4 to 206.8 kPa].
(8) Set the Cabin Air Switch on.

WARNING: THIS PART OF TEST IS TO BE CONDUCTED WITH NO PERSONNEL IN THE CABIN.

CAUTION: DO NOT PRESSURIZE THE CABIN AT A RATE IN EXCESS OF 2000 FEET PER MINUTE.

(9) Close and secure cabin door.
(10) Slowly pressurize the cabin to 8.0 psig [55.15 kPa].
(11) Allow pressure cart pressure regulator to stabilize at pressure necessary to maintain cabin at 8 psig [55.15 kPa] differential. When using B1737 Cabin Pressure Cart only, determine cabin leakage using conversion chart shown in Figure 104. Leakage rate shall not exceed 115 SCFM.
(12) Make sure that the divan floor does not contact the upper wing skin during the cabin leakage test.
(13) If leakage rate is greater that 115 SCFM, depressurize the aircraft.

WARNING: DO NOT SEAL HOLES OR VENTS THAT ARE NORMALLY OPEN DURING FLIGHT.

DO NOT EXCEED 3000 FEET PER MINUTE TO DEPRESSURIZE.

DO NOT OPEN CABIN DOOR WITH CABIN PRESSURIZED.

(14) Check cable seals, wire bundle seals, cabin door seals, etc., for excessive leaks.

(15) Repair as required.
(16) Repeat steps (10) through (13) until leakage rate requirements are met.
(17) Disconnect the cabin pressurization test cart from the test port.
(18) Remove the plug from the cabin inlet port of the module differential pressure gage.
(19) Remove the caps from the jet pump and connect the vacuum lines.
(20) Set the Cabin Air Switch off.
(21) Set the Battery Switches off

H. Cabin Air Exhaust Valve and Safety Valve Test

NOTE: This test is to be conducted with Battery Switches off.

(1) Gain access to cabin air exhaust control valve. Maintenance personnel will be required to watch the opening of the valve poppet during this test.
(2) Attach pitot-static tester to either the alternate static port in the nose compartment or the RH aft static port while blocking the other.
(3) Set pitot-static tester altimeter baro knob to 29.92. Read existing field altitude on altimeter. Refer to Figure 105 and find corresponding PSIA for the existing field altitude on altimeter. Record (start) reading on Figure 102.
(4) Set mini-controller altitude select knob to stop below S.L. and turn rate selector full CW to maximum rate. Slowly apply vacuum and monitor cabin air exhaust valve poppet. When poppet moves to full open, stop vacuum and read altimeter.

NOTE: If vacuum is applied too rapidly as the valve poppet starts to move, a false reading of the differential pressure relief valve may be obtained. If reading is doubtful, release vacuum and rerun test.

(5) Refer to Figure 105 and find final PSIA reading for the altitude reading in step H.(4). Record reading on Figure 102.
(6) Subtract final reading from the start reading. The differential shall be 9.4 (±0.15) psig. Record reading on Figure 102.
(7) Release vacuum and disconnect pitot-static tester from static port. Unblock remaining static port.

I. Cabin Safety Valve Test

(1) Remove baggage compartment as required to gain access to cabin differential pressure relief valve.
(2) Disconnect static line from cabin differential pressure relief valve. Attach pitot-static tester to cabin differential pressure relief valve.
(3) On _Aircraft 35-099 and Subsequent and 36-029 and Subsequent_, ensure that Battery Switches are off. This will close the vacuum shutoff solenoid.
(4) Set pitot-static tester altimeter baro knob to 29.92. Read existing field altitude on altimeter. Refer to Figure 105 and find PSIA for the existing field altitude on altimeter. Record (start) reading on Figure 102.

(5) Slowly apply vacuum to pressure relief valve and monitor safety valve poppet. When safety valve poppet moves to full open, stop vacuum and read altimeter.

NOTE: If vacuum is applied too rapidly, as safety valve poppet starts to move, a false reading of the pressure relief valve setting may be obtained. If reading is doubtful, release vacuum and rerun test.

Check that retention ring has not separated from valve poppet assembly.

(6) Refer to Figure 105 and find final PSIA for the altimeter reading in step I.(4). Record final reading on Figure 102.

(7) Subtract final reading from the start reading. The differential shall be the setting of the pressure relief valve in psig.

(a) On *Aircraft 35-107, 35-113 thru 35-129 and 36-032 thru 36-034*, differential pressure setting shall be 9.6 (±0.15) psig.

(b) On *Aircraft 35-130 and Subsequent and 36-035 and Subsequent*, differential pressure setting shall be 9.7 (±0.15) psig

(8) Release vacuum and disconnect pitot-static tester from pressure relief valve.

(9) Connect static line to pressure relief valve. Install previously removed equipment and upholstery.

J. Altitude Limiter Test

(1) Loosen attaching parts and lower pressurization module.

(2) Remove plastic tie securing hose (filter to altitude limiter) at altitude limiter end (refer to 21-30-08). Disconnect hose from altitude limiter fitting.Remove plastic tie securing hose (filter to altitude limiter) at altitude limiter end (refer to 21-30-08). Disconnect hose from altitude limiter fitting.

(3) Attach pitot-static tester to altitude pressure limiter.

(4) Steadily increase vacuum to altitude pressure limiter until test altimeter shows an abrupt change in rate of increase. The change in increase shall occur at 11,500 (±1500) feet. Record reading on Figure 102. The change in increase indicates that the altitude pressure limiter has opened.

(5) Release vacuum from pitot-static tester. Disconnect tester from altitude pressure limiter.

(6) Connect hose to altitude pressure limiter fitting and secure with plastic tie.

(7) Raise and secure pressurization module.

(8) Gain access to altitude pressure limiter located on aft pressure bulkhead.

(9) Remove fitting with screen from altitude pressure limiter.

NOTE: Fabricate an adapter which will allow attachment of the pitot-static tester to the altitude pressure limiter. Threads of the adapter must be 3/4-16NF-3A and no longer than the threads of the removed fitting.

(10) Install adapter in altitude pressure limiter and attach pitot-static tester.

(11) Steadily increase vacuum to altitude pressure limiter until test altimeter shows an abrupt change in rate of increase. The change in increase shall occur at 11,500 (±1500) feet. Record reading on Figure 102. The change in increase indicates that the altitude pressure limiter has opened.

(12) Release vacuum from pitot-static tester. Disconnect tester from altitude pressure limiter.

(13) Remove adapter from altitude pressure limiter and install previously removed fitting with screen.

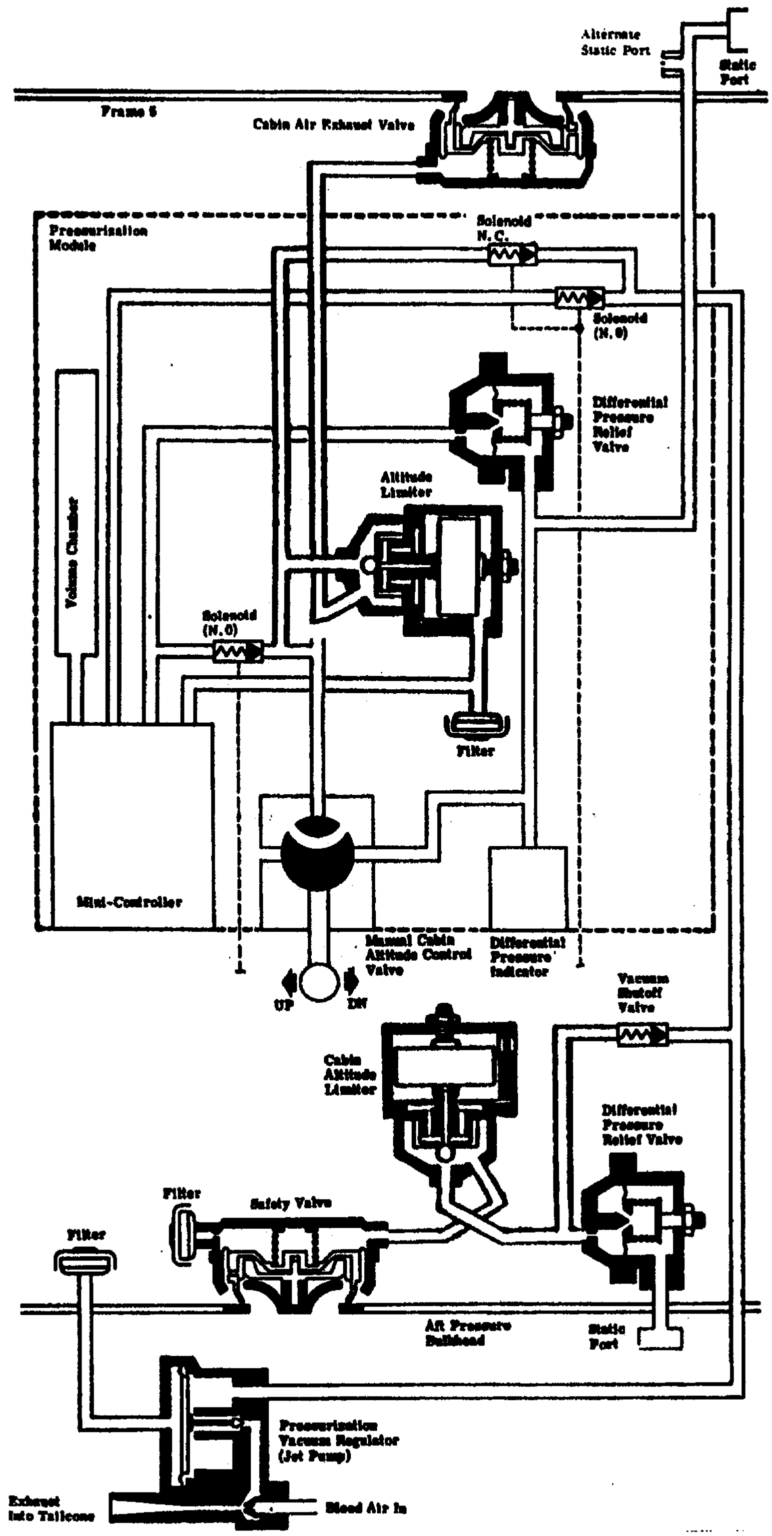
(14) Install previously removed equipment.

Para. Ref.	Test	Required	Actual
C.(5) or C.(6)	Voltage, Bleed Air Switches off	24 volts; P217, A and B	_______ volts
		24 volts; P218, A and B	_______ volts
		24 volts; P897, A and B	_______ volts
		24 volts; P898, A and B	_______ volts
C.(7) or C.(8)	Voltage, Bleed Air Switches on	0 volts; P217, A and B	_______ volts
		0 volts; P218, A and B	_______ volts
		24 volts; P897, A and B	_______ volts
		24 volts; P898, A and B	_______ volts
		24 volts; P895, A and C	_______ volts
		24 volts; P896, A and C	_______ volts
C.(9) or C.(10)	Voltage, Bleed Air Switch Emergency	0 volts; P217, A and B	_______ volts
		0 volts; P218, A and B	_______ volts
		0 volts; P897, A and B	_______ volts
		0 volts; P898, A and B	_______ volts
		0 volts; P895, A and C	_______ volts
		0 volts; P896, A and C	_______ volts
C.(11)	Voltage, Bleed Air Switches off	Same as step C.(5) or C.(6)	_______ verified
D.(1) or D.(2)	LH and RH Fire Extinguisher T-handles Pulled Out; Bleed Air Switches on.	24 volts; P217, A and B	_______ volts
		24 volts; P218, A and B	_______ volts
		0 volts; P897, A and B	_______ volts
		0 volts; P898, A and B	_______ volts
		0 volts; P895, A and C	_______ volts
		0 volts; P896, A and C	_______ volts
D.(3)	MOD VALVE Circuit Breakers Pulled	Same as step D.(1) or D.(2)	_______ verified
E.(3) or E.(4)	RH Emergency Press. Aneroid Switch at 9,500 (±250) ft.	0 volts; P218, A and B	_______ volts
		0 volts; P898, A and B	_______ volts
		0 volts; P896, A and C	_______ volts
E.(5)	Pitot-Static Tester Below 8,300 ft.	No Voltage change	_______ verified
E.(6)	RH Bleed Air Switch cycled off; then on	Voltage reading same as C.(5) or C.(6)	_______ verified

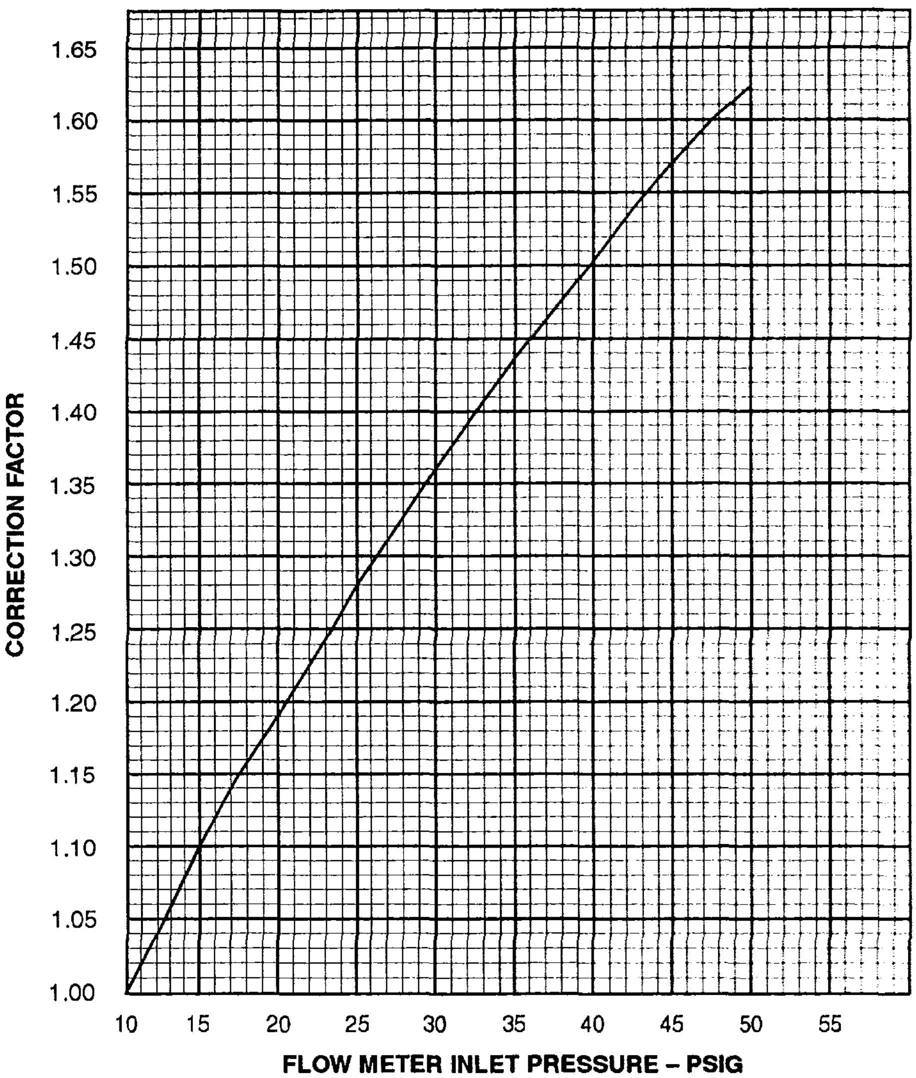
Pressurization Functional Test Record
Figure 102 (Sheet 1 of 2)

Para. Ref.	Test	Required	Actual
E.(7) or E.(8)	RH Emergency Press. (override) Switch to OVERRIDE; Pitot-Static tester at 9,500 (±250) ft.	0 volts 24 volts 24 volts	________ volts ________ volts ________ volts
E.(10)	LH Emergency Press. Aneroid Switch at 9,500 (±250) ft.	Same as step E.(3) or E.(4)	________ verified
	Pitot-Static Tester below 8,300 ft.	Same as step E.(5) or E.(6)	________ verified
	LH Bleed Air Switch cycled off; then on	Voltage reading same as C.(5) or C.(6)	________ verified
F.(3)	LH Bleed Air Switch (S21)	Illuminated	________ verified
F.(4)	LH Pylon Temp. Switch (S355)	Illuminated	________ verified
F.(5)	RH Bleed Air Sw (S20) and RH Pylon Temp Sw (S356)	Illuminated Illuminated	________ verified ________ verified
G.(11)	Cabin Leakage	115 SCFM max	________ SCFM
H.(3) H.(5) H.(6)	Cabin Air Exhaust Control Valve, Delta P Relief	9.4 (±0.15) psig	________ Start PSIA (-) ________ Final PSIA (=) ________ PSIG
I.(4) I.(6) I.(7)	Cabin Safety Valve, Delta P relief	9.6 (±0.15) psig (35-107, 35-113 thru 35-129 and 36-032 thru 36-034)	________ Start PSIA (-) ________ Final PSIA (=) ________ PSIG
		9.7 (±0.15) psig (35-130 and Sub 36-035 and Sub)	________ Start PSIA (-) ________ Final PSIA (=) ________ PSIG
J.(4)	Altitude Limiter (Pressurization Module)	11,500 (±1,500) ft.	________ feet
J.(11)	Altitude Limiter (Aft Pressure Bulkhead)	11,500 (±1,500) ft.	________ feet

Pressurization Functional Test Record
Figure 102 (Sheet 2 of 2)



Pressurization Control System Schematic
Figure 103



NOTE: Use this conversion chart when using air cart B1737.

This conversion chart can only be used when airflow temperature is between 60° and 80°F.

1. Read SCFM from flowmeter on pressurization cart.
2. Read flowmeter inlet pressure in PSIG.
3. Read correction factor from graph.
4. Mulitply correction factor times flowmeter SCFM reading.

Flow Rate Conversion Chart
Figure 104

ALTITUDE — PRESSURE — TEMPERATURE

REFERENCE — U.S. STANDARD ATMOSPHERE 1962 (G.P.O.)

ALTITUDE	PRESSURE			TEMPERATURE		ALTITUDE	PRESSURE			TEMPERATURE	
Feet	In.Hg	Mm. Hg	Psi	°C	°F	Feet	In.Hg	Mm. Hg	Psi	°C	°F
-1000	31.02	787.9	15.24	17.0	62.6	33500	7.58	192.5	3.72	-51.3	-60.3
-500	30.47	773.8	14.96	16.0	60.8	34000	7.40	188.0	3.64	-52.3	-62.1
0	29.92	760.0	14.70	15.0	59.0	34500	7.23	183.6	3.55	-53.2	-63.8
500	29.38	746.4	14.43	14.0	57.2	35000	7.06	179.3	3.47	-54.2	-65.6
1000	28.86	732.9	14.17	13.0	55.4	36000	6.73	171.0	3.31	-56.2	-69.2
1500	28.33	719.7	13.92	12.0	53.7	37000	6.42	163.0	3.15	-56.5	-69.7
2000	27.82	706.7	13.67	11.0	51.9	38000	6.12	155.4	3.00	-56.5	-69.7
2500	27.32	693.8	13.42	10.0	50.1	39000	5.83	148.1	2.86	-56.5	-69.7
3000	26.82	681.2	13.17	9.1	48.3	40000	5.56	141.2	2.73	-56.5	-69.7
3500	26.33	668.7	12.93	8. 1	46.5	41000	5.30	134.6	2.60	-56.5	-69.7
4000	25.84	656.4	12.69	7.1	44.7	42000	5.05	128.3	2.48	-56.5	-69.7
4500	25.37	644.3	12.46	6.1	43.0	43000	4.81	122.3	2.37	-56.5	-69.7
5000	24.90	632.4	12.23	5.1	41.2	44000	4.59	116.6	2.25	-56.5	-69.7
5500	24.43	620.6	12.00	4.1	39.4	45000	4.38	111.1	2.15	-56.5	-69.7
6000	23.98	609.1	11.78	3.1	37.6	46000	4.17	105.9	2.05	-56.5	-69.7
6500	23.53	597.7	11.56	2.1	35.8	47000	3.98	101.0	1.95	-56.5	-69.7
7000	23.09	586.5	11.34	1.1	34.0	48000	3.79	96.3	1.86	-56.5	-69.7
7500	22.66	575.4	11.13	0.1	32.3	49000	3.61	91.8	1.77	-56.5	-69.7
8000	22.23	564.6	10.92	-0.8	30.5	50000	3.44	87.5	1.69	-56.5	-69.7
8500	21.81	553.9	10.71	-1.8	28.7	51000	3.28	83.4	1.61	-56.5	-69.7
9000	21.39	543.3	10.51	-2.8	26.9	52000	3.13	79.5	1.54	-56.5	-69.7
9500	20.98	533.0	10.31	-3.8	25.1	53000	2.98	75.8	1.47	-56.5	-69.7
10000	20.58	522.8	10.11	-4.8	23.4	54000	2.87	72.3	1.40	-56.5	-69.7
10500	20.19	512.7	9.91	-5.8	21.6	55000	2.71	68.9	1.33	-56.5	-69.7
11000	19.80	502.8	9.72	-6.8	19.8	56000	2.59	65.7	1.27	-56.5	-69.7
11500	19.41	493.1	9.54	-7.8	18.0	57000	2.46	62.6	1.21	-56.5	-69.7
12000	19.03	483.5	9.35	-8.8	16.2	58000	2.35	59.7	1.15	-56.5	-69.7
12500	18.66	474.0	9.17	-9.8	14.5	59000	2.24	56.9	1.10	-56.5	-69.7
13000	18.30	464.8	8.99	-10.7	12.7	60000	2.14	54.2	1.05	-56.5	-69.7
13500	17.94	455.6	8.81	-11.7	10.9	61000	2.04	51.7	1.00	-56.5	-69.7
14000	17.58	446.6	8.64	-12.7	9.1	62000	1.94	49.3	0.95	-56.5	-69.7
14500	17.24	437.8	8.47	-13.7	7.3	63000	1.85	47.0	0.91	-56.5	-69.7
15000	16.89	429.1	8.30	-14.7	5.5	64000	1.76	44.8	0.87	-56.5	-69.7
15500	16.56	420.5	8.13	-15.7	3.8	65000	1.68	42.7	0.83	-56.5	-69.7
16000	16."2	412.1	7.97	-16.7	2.0	66000	1.60	40.7	0.79	-56.4	-69.6
16500	15.90	403.8	7.81	-17.7	0.2	67000	1.53	38.8	0.75	-56.1	-69.1
17000	15.58	395.7	7.65	-18.7	-1.6	68000	1.46	37.0	0.72	-55.8	-68.5
17500	15.26	387.7	7.50	-19.6	-3.4	69000	1.39	35.3	0.68	-55.5	-68.0
18000	14.95	379.8	7.34	-20.6	-5.1	70000	1.33	33.7	0.65	-55.2	-67.4
18500	14.65	372.0	7.19	-21.6	-6.9	71000	1.26	32.1	0.62	-54.9	-66.9
19000	14.35	364.4	7.05	-22.6	-8.7	72000	1.21	30.6	0.59	-54.6	-66.3
19500	14.05	356.9	6.90	-23.6	-10.5	73000	1.15	29.2	0.56	-54.3	-65.8
20000	13.76	349.5	6.76	-24.6	-12.3	74000	1.10	27.9	0.54	-54.0	-65.2
20500	13.48	342.3	6.62	-25.6	-14.0	75000	1.05	26.6	0.51	-53.7	-64.7
21000	13.20	335.2	6.48	-26.6	-15.8	76000	1.00	25.4	0.49	-53.4	-64.2
21500	12.92	328.2	6.35	-27.6	-17.6	77000	0.95	24.2	0.47	-53.1	-63.6
22000	12.65	321.3	6.21	-28.5	-19.4	78000	0.91	23.1	0.45	-52.8	-63.1
22500	12.38	314.5	6.08	-29.5	-21.2	79000	0.87	22.0	0.43	-52.5	-62.5
23000	12.12	307.9	5.95	-30.5	-22.9	80000	0.83	21.0	0.41	-52.2	-62.0
23500	11.86	301.3	5.83	-31.5	-24.7	81000	0.79	20.1	0.39	-51.9	-61.4
24000	11.61	294.9	5.70	-32.5	-26.5	82000	0.75	19.1	0.37	-51.6	-60.9
24500	11.36	288.6	5.58	-33.5	-28.3	83000	0.72	18.3	0.35	-51.3	-60.3
25000	11.12	282.4	5.46	-34.5	-30.0	84000	0.69	17.4	0.34	-51.0	-59.8
25500	10.88	276.3	5.34	-35.5	-31.8	85000	0.66	16.6	0.32	-50.7	-59.3
26000	10.64	270.3	5.23	-36.4	-33.6	86000	0.63	15.9	0.31	-50.4	-58.7
26500	10.41	264.4	5.11	-37.4	-35.4	87000	0.60	15.2	0.29	-50.1	-58.2
27000	10.18	258.7	5.00	-38.4	-37.2	88000	0.57	14.5	0.28	-49.8	-57.6
27500	9.96	253.0	4.89	-39.4	-38.9	89000	0.54	13.8	0.27	-49.5	-57.1
28000	9.74	247.4	4.78	-40.4	-40.7	90000	0.52	13.2	0.26	-49.2	-56.5
28500	9.53	242.0	4.68	-41.4	-42.5	91000	0.50	12.6	0.24	-48.9	-56.0
29000	9.31	236.6	4.58	-42.4	-44.3	92000	0.47	12.0	0.23	-48.6	-55.4
29500	9.11	231.3	4.47	-43.4	-46.1	93000	0.45	11.5	0.22	-48.3	-54.9
30000	8.90	226.1	4.37	-44.4	-47.8	94000	0.43	11.0	0.21	-48.0	-54.4
30500	8.70	221.0	4.27	-45.3	-49.6	95000	0.41	10.5	0.20	-47.7	-53.8
31000	8.51	216.1	4.18	-46.3	-51.4	96000	0.39	10.0	0.19	-47.4	-53.3
31500	8.31	211.2	4.08	-47.3	-53.2	97000	0.38	9.6	0.19	-47.1	-52.7
32000	8.12	206.4	3.99	-48.3	-54.9	98000	0.36	9.2	0.18	-46.8	-52.2
32500	7.94	201.6	3.90	-49.3	-56.7	99000	0.34	8.7	0.17	-46.5	-51.6
33000	7.76	197.0	3.81	-50.3	-58.5	100000	0.33	8.4	0.16	-46.2	-51.1

Altitude-Pressure-Temperature Conversion Chart
Figure 105

3. **Trouble Shooting Functional Test** *(Aircraft 35-002 thru 35-112 except 35-107 and 36-002 thru 36-031)* (See Figure 107.)

WARNING: THE CABIN DOOR MUST BE OPEN WHILE PERFORMING TESTS IN PARAGRAPHS C THRU F TO PREVENT PERSONNEL INJURY.

ALL DRAIN HOLES AND VENTS NORMALLY OPEN DURING FLIGHT SHALL BE LEFT OPEN DURING THIS TEST.

A. The following functional test procedure is provided as an aid in trouble shooting the cabin pressurization system and cabin leakage. Pressurization control schematics are given in Figure 109.

B. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Vacuum Gage (0 to 100 inches of H2O)		Commercially Available	General.
Compressed Air Source and 0 to 30 psig gage (Required only if engines are not run for this test.)		Commercially Available	General.
Pitot-Static Tester	1811G	Barfield Instrument Corp. Atlanta, GA	General.
Cabin Pressurization	B1737, B21117 or TronAir 15-7603-1000	Learjet Inc. Wichita, KS Aircraft Ground Support Equipment Holland, OH	General.

C. Cabin Reference Line Leakage Test

(1) Gain access to and remove pressurization filter (21-30-02) and disconnect cabin pressure line (21-30-06) from jet pump. Cap or plug all exposed fittings.

(2) Connect pitot-static tester to bulkhead fitting and apply pressure until tester indicates 450 knots. Shut off valve on tester, sealing the system. Leakage shall not exceed one knot in one minute. Record reading on Figure 107.
(3) Disconnect pitot-static tester. Install filter and connect cabin pressure line to jet pump.

D. Pressurization Leakage Test
(1) Ensure Battery Switches are set to OFF.
(2) Gain access to pressurization module and remove filter. Cap all exposed fittings.
(3) Select full increase on rate selector and maximum cabin altitude on altitude controller.
(4) Set altimeter on pitot-static tester to 29.92 in. of Hg.
(5) Remove cap from regulated vacuum line test port and connect pitot-static tester (21-30-04). Disconnect and cap cabin pressure line (21-30-06) from jet pump.

CAUTION: TO PREVENT DAMAGE TO THE RATE CONTROLLER DIAPHRAGMS, APPLY AND RELEASE VACUUM AT A RATE NOT TO EXCEED 1000 FEET PER MINUTE.

(6) Slowly apply vacuum to regulated vacuum line until 3000 feet is indicated on altimeter. Allow vacuum to stabilize, then close valve on tester, sealing the system.
(7) The pilot/static altimeter shall not decrease more than 500 feet in 1 minute. Record reading on Figure 107.
(8) Slowly release vacuum from regulated vacuum line. Disconnect pilot/static tester from test port. Remove cap and install pressurization module filter and connect cabin pressure line to jet pump.

E. Regulated Jet Pump Test (Ground Mode)
(1) Connect the 0 to 100-inch H20 vacuum gage to the regulated vacuum line test port.
(2) Set Cabin Air Switch to OFF and Battery Switch to ON. Ensure that squat switches are in ground mode.
(3) Provide an air source to the jet pump by either operating one engine or attaching an air source to the bleed air manifold.
(4) Slowly increase engine rpm until the vacuum gage stabilizes or set air pressure at inlet side of jet pump at 15 (+7) psig.
(5) Record vacuum gage reading on Figure 107. This is normal operating vacuum (44 to 82 inches H20) in the ground mode.
(6) On *Aircraft 35-002 thru 35-098 and 36-002 thru 36-028*, check position of cabin air exhaust valve poppet is full open and safety valve is full closed. Record position on Figure 107.
(7) On *Aircraft 35-099 thru 35-106, 35-108 thru 35-112, and 36-029 thru 36-031*, proceed as follows:
   (a) Check position of cabin air exhaust valve poppet and safety valve poppet; both valves should be full open. Record position on Figure 107.

   NOTE: The avionics control heads may be removed and an inspection mirror used to check the cabin air exhaust valve poppet.

   (b) Set Cabin Air Switch to ON. Check that safety valve starts to close after 15 (±5) seconds and is fully closed after 30 (±15) seconds. Record readings on Figure 107.

F. Regulated Jet Pump Test (Flight Mode)

(1) Set Pressurization Switch to AUTO. Pull squat switch circuit breaker to simulate an in-flight mode.

(2) Select maximum altitude on the altitude controller and maximum rate on rate selector.

(3) Increase engine rpm or air pressure until the vacuum gage indicates vacuum has stabilized. This is the pressure required to produce regulated vacuum in the flight mode. Record rpm or pressure readings on Figure 107.

(4) Record the vacuum gage reading on Figure 107. This is the normal operating vacuum (44 to 82 inches H20) in the flight mode.

(5) Maintain a cabin altitude 1000 feet above field pressure altitude on the altitude controller; the cabin air exhaust valve shall remain open. Record position of cabin air exhaust valve on Figure 107.

(6) Set Pressurization Switch to MANUAL; the cabin air exhaust valve shall remain open. Record cabin air exhaust valve position on Figure 107.

(7) Select below field elevation on the altitude controller; the cabin air exhaust valve shall remain open. Record cabin air exhaust valve position on Figure 107.

(8) Hold the manual cabin altitude control valve to DN; the cabin air exhaust valve shall close. Record cabin air exhaust valve position on Figure 107.

(9) Set Pressurization Switch to AUTO. Select 1000 feet above field pressure altitude on altitude controller; the cabin air exhaust valve shall open. Record cabin air exhaust valve position on Figure 107.

(10) Set Pressurization Switch to MANUAL. Hold manual cabin altitude control valve to DN; the cabin air exhaust valve shall close. Record cabin air exhaust valve position on Figure 107.

(11) Reduce engine rpm to idle or shut off air pressure source. Disconnect gage from test port and install cap on test port.

G. Pressurized Cabin Test (Ground Test)

(1) Connect cabin pressurization test cart to aircraft.

(2) Set Cabin Air Switch to NORM, Battery Switch to ON, squat switches to ground mode, and Pressurization Switch to AUTO.

(3) Close and secure cabin door and pressurize the aircraft with authorized personnel in the cabin. Supply bleed air to the jet pump by operating one engine or by connecting compressed air to the bleed air manifold.

(4) Set engine rpm or compressed air pressure to about 40 psi inlet pressure.

(5) Observe the cabin air exhaust valve position; the valve shall be open. Record reading on Figure 107.

(6) Record U-tube manometer reading of cabin pressure on Figure 107.

(7) Set Pressurization Switch to MANUAL. Select various cabin altitudes on the altitude controller and various rates on the rate selector; pressure shall not change. Record readings on Figure 107.

H. Pressurized Cabin Test (Flight Mode)

(1) Set Pressurization Switch to AUTO and select a cabin altitude 1000 feet above field pressure altitude on altitude controller. Check cabin rate-of-climb indicator.

(2) Pull the squat switch circuit breaker to simulate an in-flight mode. Record cabin rate-of-climb reading on Figure 107.

(3) Select minimum rate (decrease) on the rate selector. Select below sea level elevation on the altitude controller. Observe cabin rate-of-climb indicator and record reading on Figure 107.

(4) Select maximum rate (increase) on the rate selector. Observe cabin rate-of-climb indicator and record reading on Figure 107.

NOTE: If maximum down rate cannot be achieved, energize maximum flow switch.

(5) Select field elevation on the altitude controller. Select minimum rate (decrease) on the rate selector. Observe cabin rate-of-climb indicator and record reading on Figure 107.
(6) Select maximum rate (increase) on the rate selector. Observe cabin rate-of-climb indicator and record reading on Figure 107.
(7) Note that the increase in rate is smooth and linear. Select a nominal rate (approximately 500 ft./min.) on the rate selector. Allow cabin altitude to stabilize and rate-of-climb indicator to reach zero. Record readings on Figure 107.
(8) Depress squat switch circuit breaker and record rate-of-climb reading on Figure 107.
(9) Set Cabin Air Switch to OFF.

I. Cabin Leak Rate Check.
(1) Lower the pressurization module and plug the cabin inlet port to the differential pressure gage.
(2) Open tailcone access door.
(3) Disconnect vacuum line at the jet pump and cap exposed fittings. Connect pneumatic test cart to the port of the flow control valve manifold.
(4) Block off air manifold assembly. (See Figure 108.)
(5) Set Battery Switches on. Leave manual control valve in the NEUTRAL position.
(6) Select maximum rate (increase) on the rate selector. Select maximum altitude on the altitude controller.
(7) Set the Cabin Air Switch to NORM.

WARNING: THIS PART OF TEST IS TO BE CONDUCTED WITH NO PERSONNEL IN THE CABIN.

(8) Close and secure cabin door.
(9) Slowly pressurize the cabin to 8.0 psig [55.2 kPa].
(10) When using the B1737 test cart only, determine cabin leakage as follows:
(a) Stabilize the pressure at the regulator pressure gage at 20 psig [137.9 kPa].
(b) Determine cabin leakage using the conversion chart shown in Figure 104. Leakage rate shall not exceed 115 SCFM.
(11) When using pressurization test carts other than the B1737, the leakage rate shall not exceed 115 SCFM.
(12) Make sure that the divan floor does not contact the upper wing skin during the cabin leakage test.
(13) If leakage rate is greater that 115 SCFM, depressurize the aircraft.

WARNING: DO NOT SEAL HOLES OR VENTS THAT ARE NORMALLY OPEN DURING FLIGHT. DO NOT EXCEED 3000 FEET PER MINUTE TO DEPRESSUR-IZE. DO NOT OPEN CABIN DOOR WITH CABIN PRESSURIZED

(14) Check cable seals, wire bundle seals, cabin door seals, etc., for excessive leaks.
(15) Repair as required.

(16) Repeat steps (9) through (13) until leakage rate requirements are met.
(17) Disconnect the cabin pressurization test cart from the test port.
(18) Remove the plug from the cabin inlet port of the module differential pressure gage.
(19) Remove the caps from the jet pump and connect the vacuum lines.
(20) Remove the block from the air manifold assembly. (See Figure 108.)
(21) Close and secure tailcone access door.
(22) Set the Cabin Air Switch off.
(23) Set the Battery Switches off.

J. Cabin Air Exhaust Valve and Safety Valve Test.

(1) Set up aircraft as outlined in step I, Cabin Leakage Test.

CAUTION: DO NOT PRESSURIZE THE CABIN AT A RATE IN EXCESS OF 2000 FEET PER MINUTE.

(2) Slowly increase cabin pressure until cabin pressure until cabin air exhaust valve opens. Record reading on Figure 107.

NOTE: If the compressed air source has limited capacity in excess of the cabin leak rate, the cabin air exhaust control valve may open as low as 8.6 psig.

(3) Block RH aft static port and alternate static port in nose compartment.

WARNING: DO NOT EXCEED 9.45 PSIG CABIN PRESSURE.

(4) Continue to increase cabin pressure until cabin safety valve opens. Record reading on Figure 107. The safety valve must open a minimum of 0.1 psig above the outflow valve.

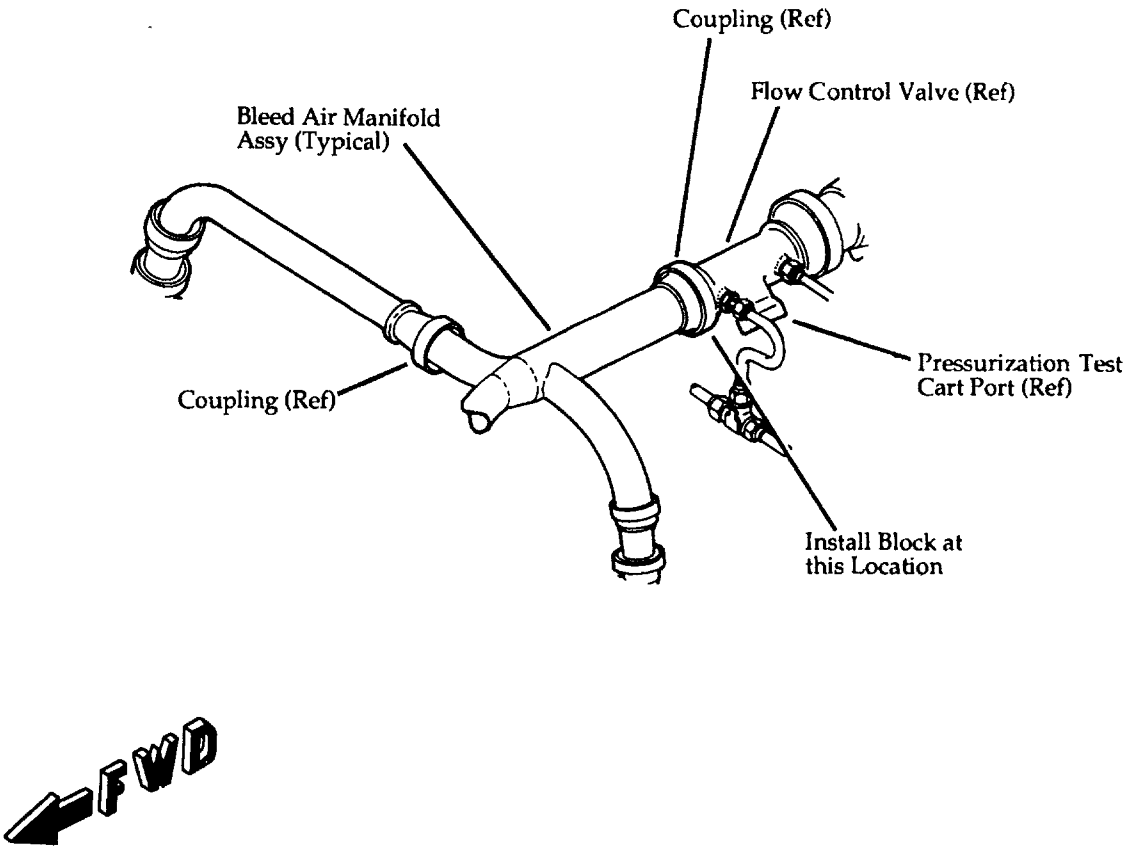
NOTE: If the compressed air source has limited capacity in excess of the cabin leak rate, the safety valve may open as low as 9.0 psig.

WARNING: DO NOT OPEN CABIN DOOR BEFORE CABIN PRESSURE REACHES 0 PSIG AND THE CABIN RATE IS 0 FEET PER MINUTE TO PREVENT PERSONNEL INJURY AND AIRCRAFT DAMAGE.

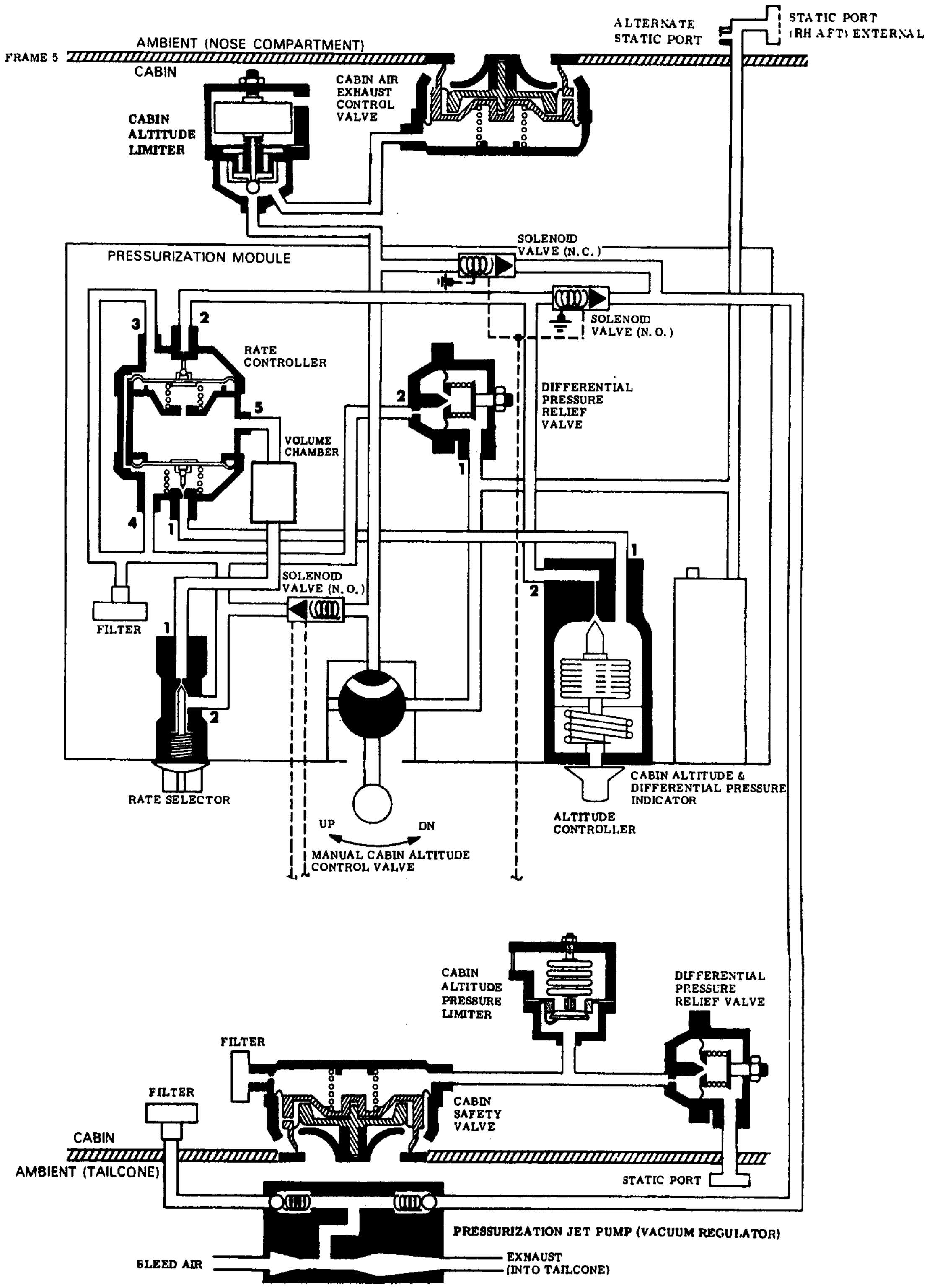
(5) Depressurize the cabin at a rate not to exceed 3,000 feet per minute. Remove plug from differential pressure gage. Shut down test cart. Disconnect test cart from aircraft. Install cap on flow control valve test port and bleed air manifold.
(6) Depress STAB HEAT circuit breaker.

Para.	Test	Required	Actual
3.C.(2)	Cabin Reference Line	449 kt. min. after 1 min.	________ knots
3.D.(7)	System Leakage	2,500 ft. after 1 min.	________ ft.
3.E.(4)	Required Air Pressure	%RPM or 15 (±2) psig.	________ %RPM or ______ psig
3.E.(5)	Regulated Vacuum	44 to 82 In. H20	________ In. H20
3.E.(6)	Outflow Valve and Safety Valve	Full open and/or full closed	________
3.E.(7)	Safety Valve Closes	Starts to close 15 (±5) sec. Full closed 30 (±15) sec.	________ Sec. ________ Sec.
3.F.(3)	Required Air Pressure	%RPM or 15 (±2) psig.	________ %RPM or ______ psig
3.F.(4)	Regulated Vacuum	44 to 82 In. H20	________ In. H20
3.F.(5)	Outflow Valve Position	Open	________
3.F.(6)	Outflow Valve Position	Open	________
3.F.(7)	Outflow Valve Position	Open	________
3.F.(8)	Outflow Valve Position	Closed	________
3.F.(9)	Outflow Valve Position	Open	________
3.F.(10)	Outflow Valve Position	Closed	________
3.G.(5)	Outflow Valve Position	Open	________
3.G.(6)	Ground Diff. Pressure	7 In. H20 Max.	________ In. H20
3.G.(7)	Manual Alt. Hold	0 Feet (Change)	________ Ft.
3.H.(2)	Transition Bump (Ground to Flight Mode)	±100 FPM	________ FPM
3.H.(3)	Min. Down Rate - Auto	Less than 400 FPM	________ FPM
3.H.(4)	Max. Down Rate - Auto	In excess of 1200 FPM	________ FPM
3.H.(5)	Min. Up Rate - Auto	Less than 400 FPM	________ FPM
3.H.(6)	Max. Up Rate - Auto	In excess of 2100 FPM	________ FPM
3.H.(7)	Rate Controller (Isobaric Accuracy)	Smooth and Linear Field ±500 Ft.	________ ________ Ft.
3.H.(8)	Transition Bump - Ldg. (Flight to Ground Mode)	Less than 100 FPM	________ FPM
3.I.(10) or 3.I.(11)	Cabin Leakage	Less than 115 SCFM	________ SCFM
3.J.(2)	Outflow Valve ΔP relief	8.60 to 9.00 psig	________ psig
3.J.(4)	Safety Valve ΔP relief	9.00 to 9.30 psig	________ psig

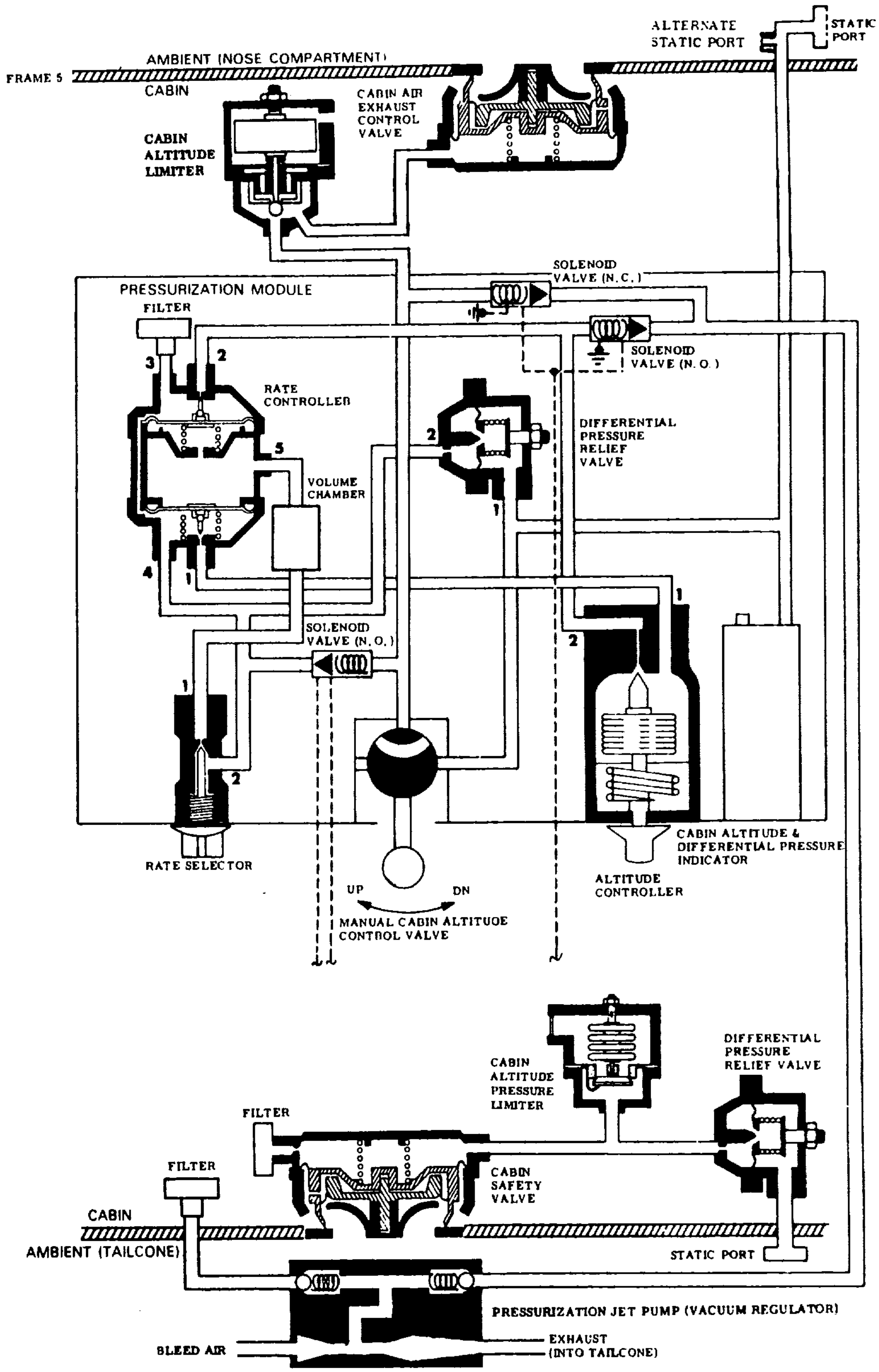
Inspection Test Record
Figure 107



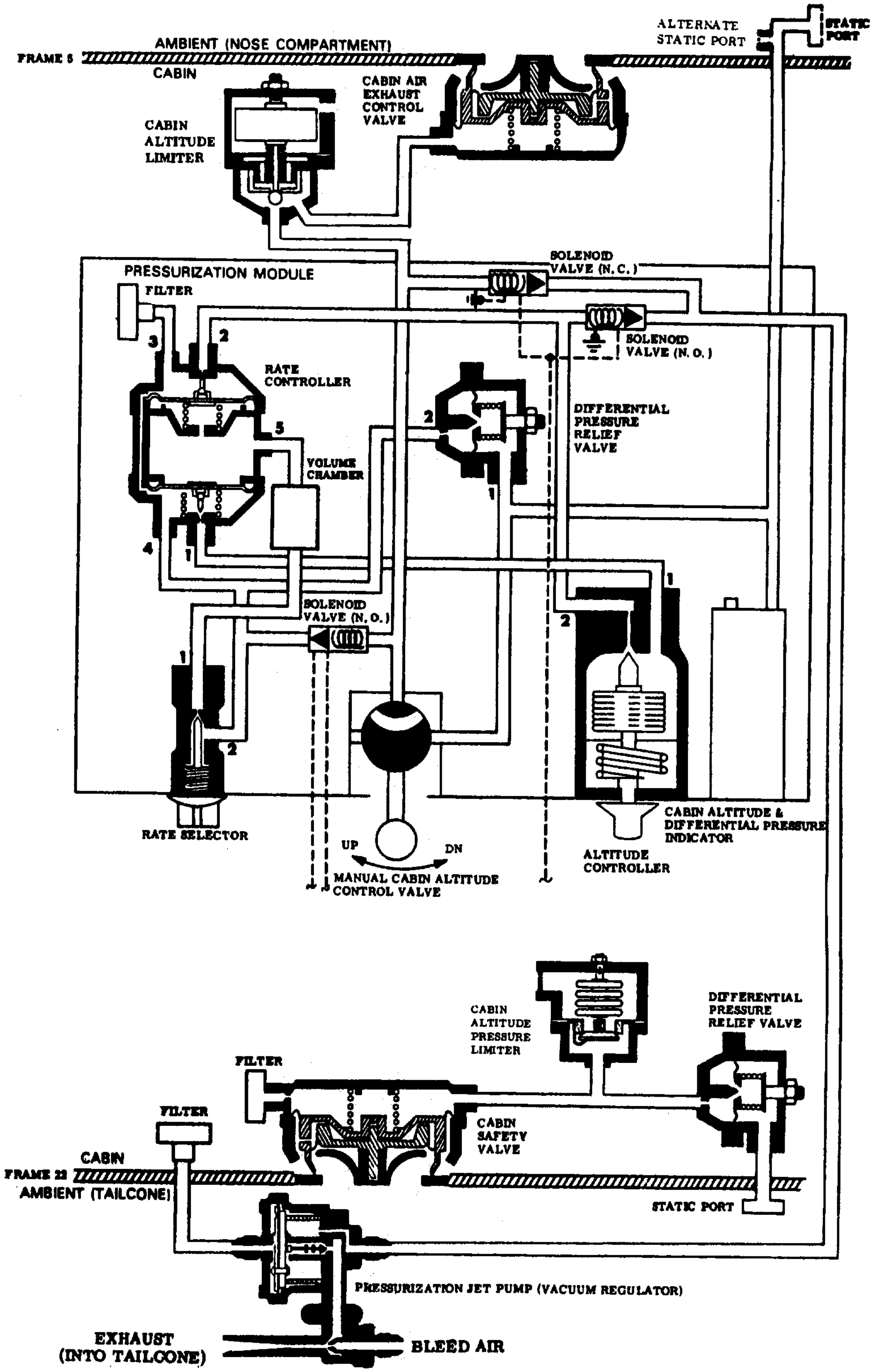
Bleed Air Manifold Assembly
Figure 108



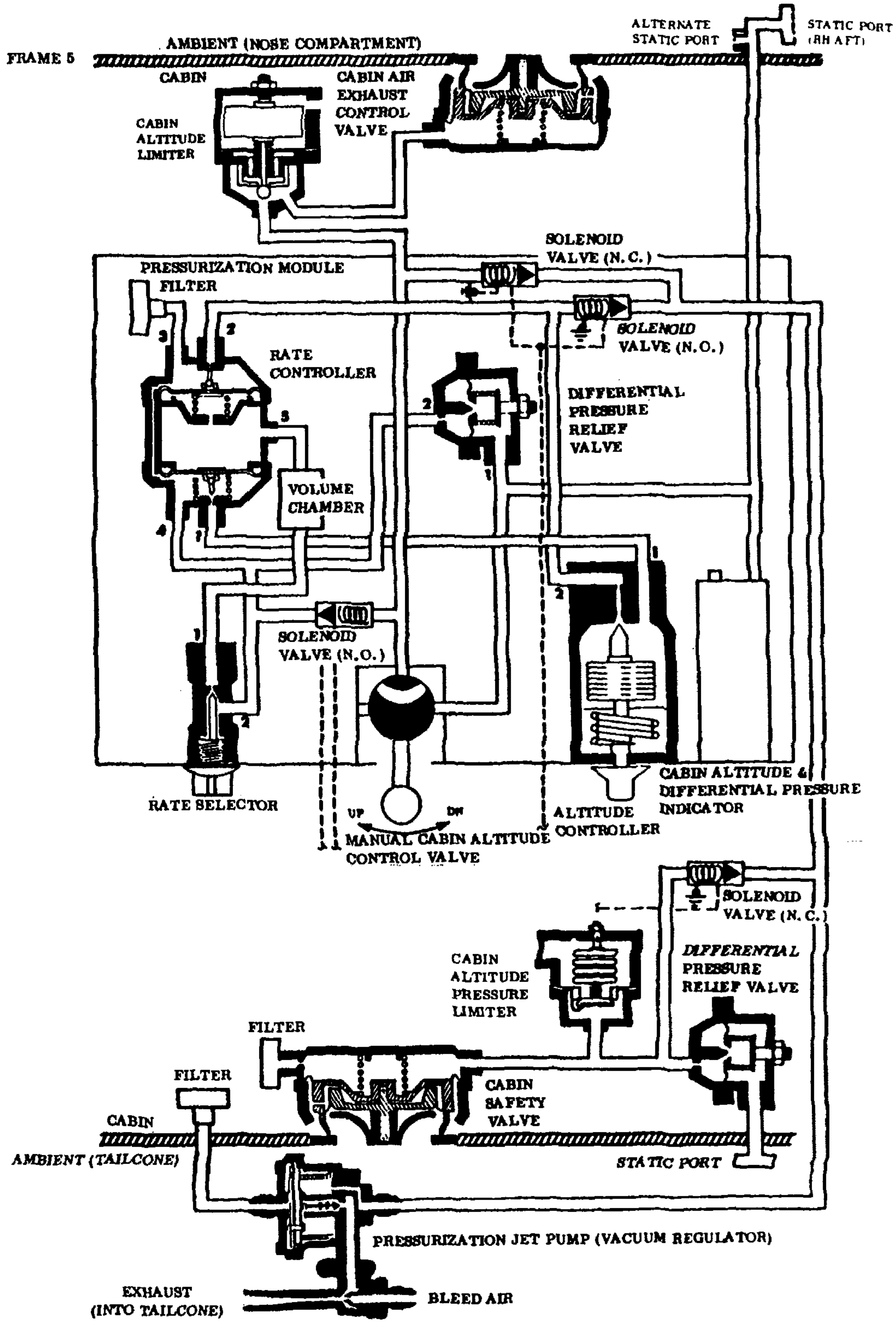
Pressurization System Control Schematic
Figure 109 (Sheet 1 of 4)



Pressurization System Control Schematic
Figure 109 (Sheet 2 of 4)



Pressurization System Control Schematic
Figure 109 (Sheet 3 of 4)



Pressurization System Control Schematic
Figure 109 (Sheet 4 of 4)

PRESSURIZATION CONTROL - MAINTENANCE PRACTICES

1. Description

A. The pressurization control system filters require periodic cleaning or replacement. Refer to Chapter 5 for time interval and 21-30-05 for cleaning procedure.

B. The cabin air exhaust control valve requires periodic cleaning. Refer to Chapter 5 for time interval and 21-30-01 for cleaning procedure.

C. The cabin altitude limiter inlet screen requires periodic cleaning and inspection for screen damage. Refer to Chapter 5 for time interval and 21-30-04 for cleaning and screen replacement procedures.

D. *On Aircraft 35-002 thru 35-045 and 36-002 thru 36-016*, the pressurization control system jet pump (vacuum regulator) and its filters require periodic cleaning. Refer to 21-30-06 for cleaning procedures.

2. Inspection/Check

A. Operational Check of Cabin Pressurization System

NOTE: Perform Operational Check of Cabin Pressurization System in accordance with the current intervals specified in Chapter 5.

The pressurization system shall be operationally checked after any maintenance is performed on the pressurization system.

In the following steps involving positioning of the squat switches, the switch will be either in the air mode or in the ground mode.

Ground Mode - Aircraft is resting on gear with strut compressed.

Air Mode - *On Aircraft 35-002 thru 35-052 and 36-002 thru 36-017, not modified by AMK 75-12*, the squat switch can be blocked to the air mode. *On Aircraft 35-053 and Subsequent, 36-018 and Subsequent, and prior Aircraft modified per AMK 75-12*, the SQUAT SW circuit breaker must be pulled to simulate an air mode.

(1) Close and latch cabin door.

NOTE: Aircraft engines shall be operated by qualified personnel only.

(2) Ensure Bleed Air Switches are ON, Cabin Air Switch is OFF, AUTO-MAN Switch is set to AUTO, and LH and RH EMER PRESS Switches are set to NORMAL.
(3) Start both engines. (Refer to FAA Approved Airplane Flight Manual for engine starting procedure.) Set engines at IDLE.
(4) Turn Rate Selector Knob to DECR (completely counterclockwise.)
(5) *On Aircraft 35-002 thru 35-112 except 35-107 and 36-002 thru 36-031*, set Cabin Air Switch to NORM.

(a) *On Aircraft 35-002 thru 35-098 and 36-002 thru 36-028*, cabin will momentarily down rate between 600 to 900 fpm with a maximum of 0.5 psid, then settle back to 0 rate.

(b) *On Aircraft 35-099 thru 35-112 except 35-107 and 36-029 thru 36-031*, cabin will experience two (2) down rate bumps. The first down rate of approximately 600 to 900 fpm shall occur immediately after switch is set to NORM then settle back to 0 rate. Approximately 30 to 45 seconds after the switch is set to NORM, a second, lesser down rate of approximately 500 (±100) fpm shall occur, then settle to 0 with a maximum of 0.5 psid.

NOTE: The first down rate occurs when the flow control valve opens and allows air flow into the cabin. The second down rate occurs after the cabin air switch is turned on initiating a timer in the squat switch relay panel. Approximately 10 seconds later the vacuum shutoff valve is de-energized (closed), removing vacuum from the safety valve head. The safety valve will slowly dissipate through the 0.025 inch orifice at the safety valve filter and close in 30 (±15) seconds.

(6) *On Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, set Cabin Air Switch to ON. Cabin shall experience a down rate of 600 to 900 fpm immediately after switch is set ON, then settle back to 0 rate.

NOTE: Maximum allowable initial down rate shall not exceed 1200 fpm.

(7) Approximately 30 to 45 seconds after Cabin Air Switch is set to ON, a second, lesser down rate of 500 (±100) fpm will occur, then settle to 0 rate with a maximum 0.5 psid.

NOTE: The first down rate occurs when the flow control valve opens and allows air flow into the cabin. The second down rate occurs after the cabin air switch is turned on initiating a timer in the squat switch relay panel. Approximately 10 seconds later the vacuum shutoff valve is de-energized (closed), removing vacuum from the safety valve head. The safety valve will slowly dissipate through the 0.025 inch orifice at the safety valve filter and close in 30 (±15) seconds.

(8) *On Aircraft 35-002 thru 35-112, except 35-107 and 36-002 thru 36-031* move thrust levers from IDLE to 60% (N1); cabin down rate shall not exceed 1200 fpm. *On Aircraft 35-107, 35-113 and Subsequent, 36-032 and Subsequent*, cabin rate shall not exceed 500 fpm.

(9) *On Aircraft 35-002 thru 35-052; 36-002 thru 36-017 not modified per AMK 75-12 "Relocation of Squat Switch Striker Plate,"* set the left and right landing gear squat switches to the air mode. *On Aircraft 35-052 and Subsequent; 36-018 and Subsequent, and prior aircraft modified per AMK 75-12*, pull squat switch circuit breaker to simulate an in-flight condition. Pull and tag GEAR circuit breaker.

(10) Set altitude controller at 1000 feet below field elevation; the vertical speed indicator should show an increase in the down rate.

(11) *On Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031*, set Cabin Air Switch to MAX; the vertical speed indicator may indicate 2000 fpm down for a short time then return to the down rate as selected on the rate selector.

(12) *On Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031*, set Cabin Air Switch to NORM; the vertical speed indicator may indicate 2000 fpm for a short time then return to the down rate as selected on the rate selector.

(13) *On Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, set LH Bleed Air Switch to EMER; the vertical speed indicator may indicate 2000 fpm down for a short time then return to the down rate as selected on the rate selector.

(14) *On Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, set LH Bleed Air Switch to OFF, then to ON; the vertical speed indicator may indicate 2000 fpm up for a short time then return to the down rate as selected on the rate selector. Perform steps (11) and (12) using the RH Bleed Air Switch.

(15) Set Pressurization Auto-Man Switch to MAN and move manual cabin pressure control valve to DN; cabin pressure should increase. Move manual cabin pressure control valve to UP; cabin pressure should decrease. Pressurize cabin to 1 to 2 psid.

(16) Set altitude controller above field elevation, rate selector to DECR, and Pressurization Auto-Man Switch to AUTO; cabin should rate up. Move rate selector from DECR to INCR; the vertical speed indicator should show an increase in up rate.

(17) Remove tag and reset GEAR circuit breaker. Set squat switches to ground mode; cabin pressure shall stabilize at less than 0.5 psid.

(18) Set Cabin Air Switch to OFF and shut down engines.

B. Operational Check of Emergency Pressurization System *(Aircraft 35-107 and 35-113 and Subsequent and 36-032 and Subsequent.)*

NOTE: Perform Operational Check of Emergency Pressurization System in accordance with the current inspection intervals specified in Chapter 5.

(1) Start aircraft engines. (Refer to FAA Approved Airplane Flight Manual.)

(2) Set switches in positions indicated in Table 201 and verify results.

(3) Shut down aircraft engines. (Refer to FAA Approved Airplane Flight Manual.)

	SWITCH POSITION				INDICATION		CHECK VERIFIES
	Cabin Air Switch	Left Bleed Air Switch	Right Bleed Air Switch		Left Airflow	Right Airflow	
1.	OFF	ON	ON		NO	NO	Flow control valve is closed.
2.	ON	ON	ON		YES	YES	Flow control valve is open.
3.	ON	OFF	OFF		NO	NO	Both bleed air regulator and shutoff valve closed.
4.	ON	ON	OFF		YES	YES	Left bleed air regulator and shutoff valve open.
5.	ON	OFF	ON		YES	YES	Right bleed air regulator and shutoff valve open.
6.	OFF	EMER	OFF		YES	NO	Left emergency pressurization valve opened. Left bleed air regulator and shutoff valve opened. Left bleed air mixing valve spring not compressed. Flow control valve closes. Left cabin air check valve closed.
7.	OFF	ON	OFF		YES	NO	Left system continues to flow emergency air.
8.	OFF	OFF	EMER		NO	YES	Right emergency pressurization valve opened. Right bleed air regulator and shutoff valve opened. Right bleed air mixing valve spring not compressed. Flow control valve closes. Right cabin air check valve closed. Left system resets.
9.	OFF	OFF	ON		NO	YES	Right system continues to flow emergency air.
10.	OFF	OFF	OFF		NO	NO	Right system resets.
11.					NO	NO	Normal configuration.

Emergency Pressurization System Operational Check
Table 201

C. Cabin Leak Rate Check *(35-107, 35-113 and Subsequent and 36-032 and Subsequent) (1181AJ)*

NOTE: Perform Cabin Leak Rate Check in accordance with the current inspection interval specified in Chapter 5.

WARNING: ALL DRAIN HOLES AND VENTS NORMALLY OPEN DURING FLIGHT SHALL BE LEFT OPEN DURING THIS TEST.

(1) Tools and Equipment

NOTE: The following tools and equipment or their equivalent are required for this test:

NAME	PART NUMBER	MANUFACTURER	USE
Cabin Pressurization Test Cart	B1737, B21117 or	Learjet Inc. Wichita, KS	Check the cabin leak rate.
	15-7603-1000	TronAir Holland, OH	Check the cabin leak rate.

(2) Lower the pressurization module and plug the cabin inlet port to the differential pressure gage.
(3) Open tailcone access door.
(4) Disconnect the regulated vacuum line and the cabin pressure line from the vacuum regulator at the jet pump and cap exposed fittings. (Refer to 21-30-06).
(5) Connect pressurization test cart reference line to cabin pressure line removed from vacuum regulator.
(6) Connect pneumatic test cart to the test port adjacent to the flow control valve. (Refer to Instruction Manual for hook-up instructions.)
(7) Set Battery Switches on. Select maximum rate (increase) and maximum altitude on the mini-controller. Ensure that Nacelle Heat Switches are off and their respective circuit breakers are depressed. Pull SQUAT SW circuit breaker.
(8) Disconnect high pressure pneumatic line from RH engine and connect compressed air source to the pneumatic line. Set regulated air to 25 to 30 psi [172.4 to 206.8 kPa].
(9) Set the Cabin Air Switch on.

WARNING: THIS PART OF TEST IS TO BE CONDUCTED WITH NO PERSONNEL IN THE CABIN.

CAUTION: DO NOT PRESSURIZE THE CABIN AT A RATE IN EXCESS OF 2000 FEET PER MINUTE.

(10) Close and secure cabin door.
(11) Slowly pressurize the cabin to 8.0 psig [55.15 kPa].

(12) Allow pressure cart pressure regulator to stabilize at pressure necessary to maintain cabin at 8 psig [55.15 kPa] differential. When using B1737 Cabin Pressure Cart only, determine cabin leakage using conversion chart shown in Figure 201. Leakage rate shall not exceed 115 SCFM.
   (a) Make sure that the divan floor does not contact the upper wing skin during the cabin leakage test.
   (b) Check for leakage on the forward presssure bulkhead between B.L. 10.4 and B.L.14.7 near the intersection with the windshield structure during the cabin leakage test. If leakage is noted, remove the sealant and inspect for cracks.

(13) If leakage rate is greater that 115 SCFM, depressurize the aircraft.

WARNING: DO NOT SEAL HOLES OR VENTS THAT ARE NORMALLY OPEN DURING FLIGHT.

DO NOT EXCEED 3000 FEET PER MINUTE TO DEPRESSURIZE.

DO NOT OPEN CABIN DOOR WITH CABIN PRESSURIZED.

(14) Check cable seals, wire bundle seals, cabin door seals, etc., for excessive leaks.
(15) Repair as required.
(16) Repeat steps (11) through (13) until leakage rate requirements are met.
(17) Disconnect the cabin pressurization test cart from the test port.
(18) Remove the plug from the cabin inlet port of the module differential pressure gage.
(19) Remove the caps from the jet pump and connect the vacuum lines.
(20) Close and secure tailcone access door.
(21) Set the Cabin Air Switch off.
(22) Set the Battery Switches off

D. Cabin Leak Rate Check *(35-002 thru 35-112, except 35-107 and 36-002 thru 36-031)* *(1181AJ)*

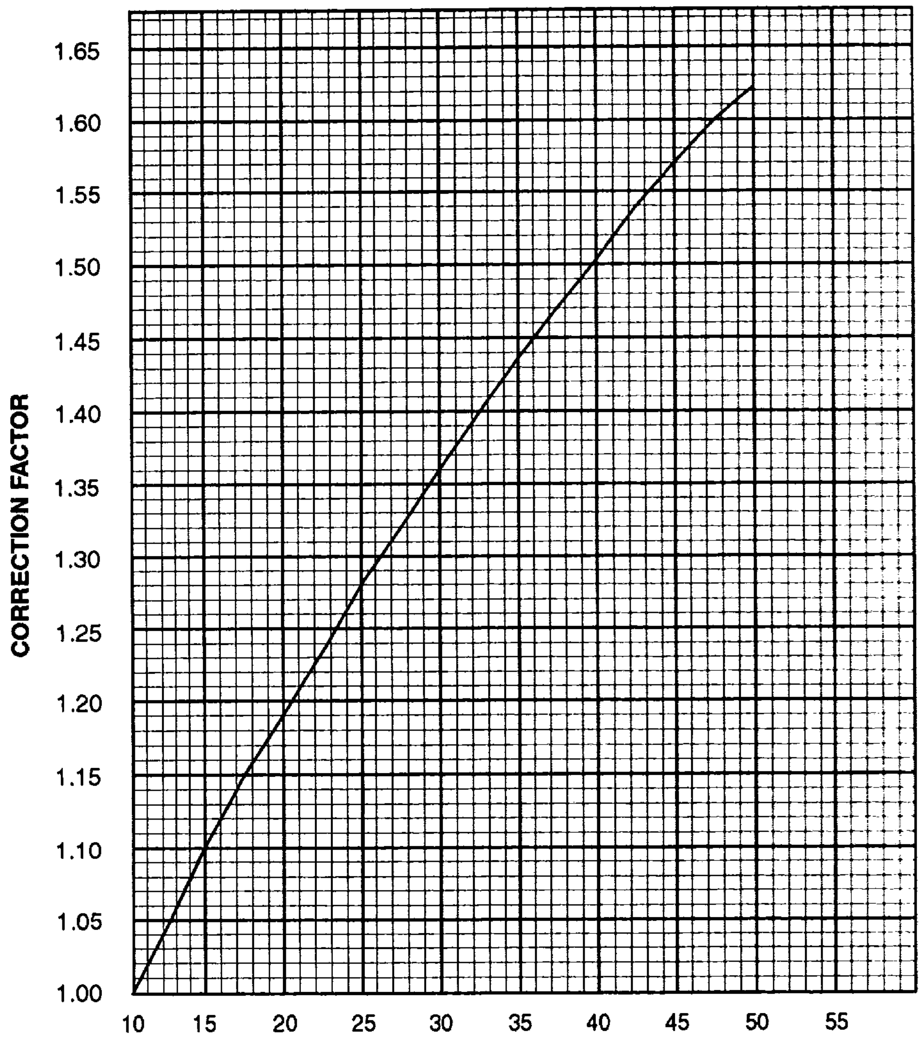
NOTE: Perform Cabin Leak Rate Check in accordance with the current inspection interval specified in Chapter 5.

WARNING: ALL DRAIN HOLES AND VENTS NORMALLY OPEN DURING FLIGHT SHALL BE LEFT OPEN DURING THIS TEST

(1) Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Cabin Pressurization Test Cart	B1737, B21117 or	Learjet Inc. Wichita, KS	Check the cabin leak rate.
	15-7603-1000	TronAir Holland, OH	Check the cabin leak rate.



NOTE: Use this conversion chart when using air cart B1737.

This conversion chart can only be used when airflow temperature is between 60° and 80°F.

1. Read SCFM from flowmeter on pressurization cart.
2. Read flowmeter inlet pressure in PSIG.
3. Read correction factor from graph.
4. Mulitply correction factor times flowmeter SCFM reading.

Conversion Chart
Figure 201

(2) Lower the pressurization module and plug the cabin inlet port to the differential pressure gage.
(3) Open tailcone access door.
(4) Disconnect vacuum line at the jet pump and cap exposed fittings. Connect pneumatic test cart to the port of the flow control valve manifold.
(5) Block off air manifold assembly. (See Figure 202.)
(6) Set Battery Switches on. Leave manual control valve in the NEUTRAL position.
(7) Select maximum rate (increase) on the rate selector. Select maximum altitude on the altitude controller.
(8) Set the Cabin Air Switch to NORM.

WARNING: THIS PART OF TEST IS TO BE CONDUCTED WITH NO PERSONNEL IN THE CABIN.

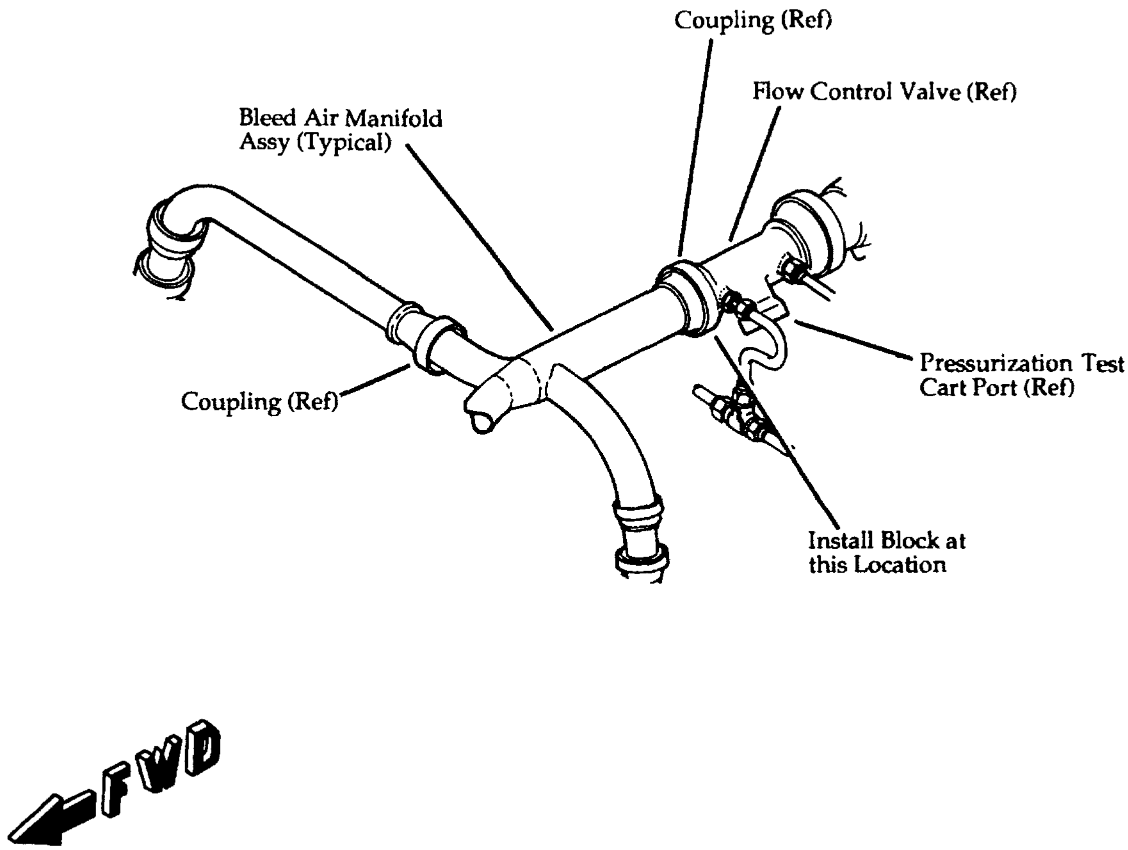
(9) Close and secure cabin door.

CAUTION: DO NOT PRESSURIZE THE CABIN AT A RATE IN EXCESS OF 2,000 FEET PER MINUTE.

(10) Slowly pressurize the cabin to 8.0 psig [55.2 kPa].
(11) When using the B1737 test cart only, determine cabin leakage as follows:
  (a) Stabilize the pressure at the regulator pressure gage at 20 psig [137.9 kPa].
  (b) Determine cabin leakage using the conversion chart shown in Figure 202. Leakage rate shall not exceed 115 SCFM.
(12) When using pressurization test carts other than the B1737, the leakage rate shall not exceed 115 SCFM.
(13) Make sure that the divan floor does not contact the upper wing skin during the cabin leakage test.
(14) Check for leakage on the forward presssure bulkhead between B.L. 10.4 and B.L.14.7 near the intersection with the windshield structure during the cabin leakage test. If leakage is noted, remove the sealant and inspect for cracks.
(15) If leakage rate is greater that 115 SCFM, depressurize the aircraft.

WARNING: DO NOT SEAL HOLES OR VENTS THAT ARE NORMALLY OPEN DURING FLIGHT. DO NOT EXCEED 3000 FEET PER MINUTE TO DEPRESSUR-IZE. DO NOT OPEN CABIN DOOR WITH CABIN PRESSURIZED

(16) Check cable seals, wire bundle seals, cabin door seals, etc., for excessive leaks.
(17) Repair as required.
(18) Repeat steps (10) through (15) until leakage rate requirements are met.
(19) Disconnect the cabin pressurization test cart from the test port.
(20) Remove the plug from the cabin inlet port of the module differential pressure gage.
(21) Remove the caps from the jet pump and connect the vacuum lines.
(22) Remove the block from the air manifold assembly. (See Figure 202.)
(23) Close and secure tailcone access door.
(24) Set the Cabin Air Switch off.
(25) Set the Battery Switches off.



Bleed Air Manifold Assembly Location
Figure 202

3. **Adjustment/Test**

A. Functional Test of Pressurization System *(35-107, 35-113 and Subsequent and 36-032 and Subsequent.)* *(1181AF)*

WARNING: ALL DRAIN HOLES AND VENTS NORMALLY OPEN DURING FLIGHT SHALL BE LEFT OPEN DURING THIS TEST.

(1) Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Compressed Air Source (filtered) with 0 - 40 psi gage (0 - 275 kPa) gage (required if engines are not run for functional test) and capable of 150 CFM (4.24 cu. m/min.) at 40 psi (275 kPa).		Commercially Available	Air source for pressurization.
Pitot-Static Tester	1811G	Barfield Instrument Corp Atlanta, GA	General.
Digital VOM	Model 77	Fluke	Voltage readings.
Cabin Pressurization Test Cart	B1737, B21117	Learjet Inc. Wichita, KS	General.
	TronAir 15-7603-1000	Aircraft Ground Support Equipment Holland, OH	General.

(2) Bleed Air System Electrical Check

NOTE: Ensure that Fire Extinguisher T-handles are pushed in (normal position).

On Aircraft 35-604 thru 35-623, 35-626, 35-627 and 35-630 and Subsequent and 36-056 and Subsequent, the Emergency Pressurization Override Switches must be in the NORMAL position during this test.

Voltage reading shall be made at RH and LH engine modulating valves (B56 and B59) and RH and LH emergency pressurization valves (B222 and B223). Record voltage readings. (See Figure 203.)

(a) Gain access to engine modulating valves and disconnect electrical connectors P218, P217, P896, and P895.

(b) Gain access to emergency pressurization valves and disconnect electrical connectors P897 and P898.

(c) *If aircraft is equipped with auxiliary crew heat*, disconnect electrical connector P1326 from auxiliary crew heat control box (E646).

NOTE: Auxiliary crew heat control box is located in tailcone, right hand electrical equipment tray.

(d) Set Battery Switches on.

(e) *On Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057*, set Bleed Air Switches off and check voltage reading as follows:
1) Electrical Connector P217 24 volts; pin A (-) to pin B (+).
2) Electrical Connector P218 24 volts; pin A (-) to pin B (+).
3) Electrical Connector P897 24 volts; pin A (-) to pin B (+).
4) Electrical Connector P898 24 volts; pin A (-) to pin B (+).

(f) *On Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent*, set Bleed Air Switches off and check voltage reading as follows:
1) Electrical Connector P217 24 volts; pin A (-) to pin B (+).
2) Electrical Connector P218 24 volts; pin A (-) to pin B (+).
3) Electrical Connector P897 24 volts; pin A (+) to pin B (-).
4) Electrical Connector P898 24 volts; pin A (+) to pin B (-).

(g) *On Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057*, set Bleed Air Switches on and check voltage reading as follows:
1) Electrical Connector P217 0 volts; pin A (-) to pin B (+).
2) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
3) Electrical Connector P897 24 volts; pin A (-) to pin B (+).
4) Electrical Connector P898 24 volts; pin A (-) to pin B (+).
5) Electrical Connector P895 24 volts; pin A (-) to pin C (+).
6) Electrical Connector P896 24 volts; pin A (-) to pin C (+).

(h) *On Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent*, set Bleed Air Switches on and check voltage reading as follows:

1) Electrical Connector P217 0 volts; pin A (-) to pin B (+).
2) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
3) Electrical Connector P897 24 volts; pin A (+) to pin B (-).
4) Electrical Connector P898 24 volts; pin A (+) to pin B (-).
5) Electrical Connector P895 24 volts; pin A (-) to pin C (+).
6) Electrical Connector P896 24 volts; pin A (-) to pin C (+).

(i) _On Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057_, set Bleed Air Switches to EMER and check voltage readings as follows:
1) Electrical Connector P217 0 volts; pin A (-) to pin B (+).
2) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
3) Electrical Connector P897 0 volts; pin A (-) to pin B (+).
4) Electrical Connector P898 0 volts; pin A (-) to pin B (+).
5) Electrical Connector P895 0 volts; pin A (-) to pin C (+).
6) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(j) _On Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent_, set Bleed Air Switches to EMER and check voltage readings as follows:
1) Electrical Connector P217 0 volts; pin A (-) to pin B (+).
2) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
3) Electrical Connector P897 0 volts; pin A (+) to pin B (-).
4) Electrical Connector P898 0 volts; pin A (+) to pin B (-)
5) Electrical Connector P895 0 volts; pin A (-) to pin C (+).
6) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(k) Set Bleed Air Switches off and check voltage readings as follows: voltage readings shall be the same as step (2)(e) or (f).

(3) Fire Extinguisher T-Handle Check

(a) _On Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057_, set Bleed Air Switches on, pull LH and RH Fire Extinguisher T-handles out and check voltage reading as follows:
1) Electrical Connector P217 24 volts; pin A (-) to pin B (+).
2) Electrical Connector P218 24 volts; pin A (-) to pin B (+).
3) Electrical Connector P897 0 volts; pin A (-) to pin B (+).
4) Electrical Connector P898 0 volts; pin A (-) to pin B (+).
5) Electrical Connector P895 0 volts; pin A (-) to pin C (+).
6) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(b) _On Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent_, set Bleed Air Switches on, pull LH and RH Fire Extinguisher T-handles out and check voltage reading as follows:
1) Electrical Connector P217 24 volts; pin A (-) to pin B (+).
2) Electrical Connector P218 24 volts; pin A (-) to pin B (+).
3) Electrical Connector P897 0 volts; pin A (+) to pin B (-).
4) Electrical Connector P898 0 volts; pin A (+) to pin B (-).
5) Electrical Connector P895 0 volts; pin A (-) to pin C (+).
6) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(c) Pull RH MOD VALVE and LH MOD VALVE circuit breakers. Verify that voltage readings are the same as in step (3)(a) or (b).

(d) Reset circuit breakers and push in LH and RH Fire Extinguisher T-handles.

(4) Emergency Pressurization Aneroid Switch Check

(a) Gain access to RH and LH emergency pressurization aneroid switches. (Refer to 21-30-07.)

(b) Connect pitot/static tester to RH emergency pressurization aneroid switch and set RH Bleed Air Switch on. Verify voltages per step (2)(f) or (g).

(c) _On Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057_, increase pitot/static tester altimeter and verify voltage reading at 9,500 (±250) feet aneroid switch actuation.

1) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
2) Electrical Connector P898 0 volts; pin A (-) to pin B (+).
3) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(d) _On Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent_, increase pitot/static tester altimeter and verify voltage reading at 9,500 (±250) feet aneroid switch actuation.

1) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
2) Electrical Connector P898 0 volts; pin A (+) to pin B (-).
3) Electrical Connector P896 0 volts; pin A (-) to pin C (+).

(e) Reduce pitot/static tester below 8,300 feet. Verify that voltage readings are not changed.

(f) Cycle RH Bleed Air Switch off; then back on. Verify voltage readings per step (2)(f) or (g).

(g) _On Aircraft 35-107, 35-113 thru 35-517 and 36-032 thru 36-061, except 36-055 and 36-057_, equipped with Emergency Pressurization Override Switches, set R Emergency Pressurization Override Switch to OVERRIDE. Increase pitot/static tester altimeter and verify voltage readings at 9500 (±250) feet aneroid switch actuation.

1) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
2) Electrical Connector P898 24 volts; pin A (-) to pin B (+).
3) Electrical Connector P896 24 volts; pin A (-) to pin C (+).

(h) _On Aircraft 35-518 and Subsequent and 36-055, 36-057, 36-062 and Subsequent_, equipped with Emergency Pressurization Override Switches, set R Emergency Pressurization Override Switch to OVERRIDE. Increase pitot/static tester altimeter and verify voltage readings at 9,500 (±250) feet aneroid switch actuation.

1) Electrical Connector P218 0 volts; pin A (-) to pin B (+).
2) Electrical Connector P898 24 volts; pin A (+) to pin B (-).
3) Electrical Connector P896 24 volts; pin A (-) to pin C (+).

(i) Reduce pitot/static tester to ambient.

(j) Repeat steps (4)(b) thru (4)(i) using LH emergency pressurization aneroid switch, LH Bleed Air Switch, L Emergency Pressurization Override Switch, and corresponding electrical connectors.

Para. Ref.	Test	Required	Actual
(2)(e) or (2)(f)	Voltage, Bleed Air Switches off	24 volts; P217, A and B	________ volts
		24 volts; P218, A and B	________ volts
		24 volts; P897, A and B	________ volts
		24 volts; P898, A and B	________ volts
(2)(g) or (2)(h)	Voltage, Bleed Air Switches on	0 volts; P217, A and B	________ volts
		0 volts; P218, A and B	________ volts
		24 volts; P897, A and B	________ volts
		24 volts; P898, A and B	________ volts
		24 volts; P895, A and C	________ volts
		24 volts; P896, A and C	________ volts
(2)(i) or (2)(j)	Voltage, Bleed Air Switch Emergency	0 volts; P217, A and B	________ volts
		0 volts; P218, A and B	________ volts
		0 volts; P897, A and B	________ volts
		0 volts; P898, A and B	________ volts
		0 volts; P895, A and C	________ volts
		0 volts; P896, A and C	________ volts
(2)(k)	Voltage, Bleed Air Switches off	Same as step (2)(e) or (2)(f)	________ verified
(3)(a) or (3)(b)	LH and RH Fire Extinguisher T-handles Pulled Out; Bleed Air Switches on.	24 volts; P217, A and B	________ volts
		24 volts; P218, A and B	________ volts
		0 volts; P897, A and B	________ volts
		0 volts; P898, A and B	________ volts
		0 volts; P895, A and C	________ volts
		0 volts; P896, A and C	________ volts
(3)(c)	MOD VALVE Circuit Breakers Pulled	Same as step (3)(a) or (3)(b)	________ verified
(4)(c) or (4)(d)	RH Emergency Press. Aneroid Switch at 9,500 (±250) ft.	0 volts; P218, A and B	________ volts
		0 volts; P898, A and B	________ volts
		0 volts; P896, A and C	________ volts
(4)(e)	Pitot-Static Tester Below 8,300 ft.	No Voltage change	________ verified
(4)(f)	RH Bleed Air Switch cycled off; then on	Voltage reading same as (2)(f) or (2)(g)	________ verified

Pressurization Functional Test Record
Figure 203 (Sheet 1 of 2)

Para.	Test	Required	Actual
(4)(g) or (4)(h)	RH Emergency Press. (override) Switch to OVERRIDE; Pitot-Static tester at 9,500 (±250) ft.	0 volts, P218 A and B 24 volts, P898 A and B 24 volts, P896 A and C	________ volts ________ volts ________ volts
(4)(j)	LH Emergency Press. Aneroid Switch at 9,500 (±250) ft.	Same as step (4)(c) or (4)(d)	________ verified
	Pitot-Static Tester below 8,300 ft.	Same as step (4)(e)	________ verified
	LH Bleed Air Switch cycled off; then on	Voltage reading same as (4)(g) or (4)(h)	________ verified
(5)(c)	LH Bleed Air Switch (S21)	Illuminated	________ verified
(5)(d)	LH Pylon Temp. Switch (S355)	Illuminated	________ verified
(5)(e)	RH Bleed Air Sw (S20) and RH Pylon Temp Sw (S356)	Illuminated Illuminated	________ verified ________ verified
(6)(e) (6)(g) (6)(h)	Cabin Air Exhaust Control Valve, Delta P Relief	9.4 (±0.15) psig	________ Start PSIA (-) ________ Final PSIA (=) ________ PSIG
(7)(d) (7)(f) (7)(g)	Cabin Safety Valve, Delta P relief	9.6 (±0.15) psig (35-107, 35-113 thru 35-129 and 36-032 thru 36-034)	________ Start PSIA (-) ________ Final PSIA (=) ________ PSIG
		9.7 (±0.15) psig (35-130 and Sub 36-035 and Sub)	________ Start PSIA (-) ________ Final PSIA (=) ________ PSIG
(8)(d)	Altitude Limiter (Pressurization Module)	11,500 (±1,500) ft.	________ feet
(8)(k)	Altitude Limiter (Aft Pressure Bulkhead)	11,500 (±1,500) ft.	________ feet

Pressurization Functional Test Record
Figure 203 (Sheet 2 of 2)

ALTITUDE — PRESSURE — TEMPERATURE											
REFERENCE — U.S. STANDARD ATMOSPHERE 1962 (G.P.O.)											
ALTITUDE	PRESSURE			TEMPERATURE		ALTITUDE	PRESSURE			TEMPERATURE	
Feet	In.Hg	Mm. Hg	Psi	°C	°F	Feet	In.Hg	Mm. Hg	Psi	°C	°F
-1000	31.02	787.9	15.24	17.0	62.6	33500	7.58	192.5	3.72	-51.3	-60.3
-500	30.47	773.8	14.96	16.0	60.8	34000	7.40	188.0	3.64	-52.3	-62.1
0	29.92	760.0	14.70	15.0	59.0	34500	7.23	183.6	3.55	-53.2	-63.8
500	29.38	746.4	14.43	14.0	57.2	35000	7.06	179.3	3.47	-54.2	-65.6
1000	28.86	732.9	14.17	13.0	55.4	36000	6.73	171.0	3.31	-56.2	-69.2
1500	28.33	719.7	13.92	12.0	53.7	37000	6.42	163.0	3.15	-56.5	-69.7
2000	27.82	706.7	13.67	11.0	51.9	38000	6.12	155.4	3.00	-56.5	-69.7
2500	27.32	693.8	13.42	10.0	50.1	39000	5.83	148.1	2.86	-56.5	-69.7
3000	26.82	681.2	13.17	9.1	48.3	40000	5.56	141.2	2.73	-56.5	-69.7
3500	26.33	668.7	12.93	8.1	46.5	41000	5.30	134.6	2.60	-56.5	-69.7
4000	25.84	656.4	12.69	7.1	44.7	42000	5.05	128.3	2.48	-56.5	-69.7
4500	25.37	644.3	12.46	6.1	43.0	43000	4.81	122.3	2.37	-56.5	-69.7
5000	24.90	632.4	12.23	5.1	41.2	44000	4.59	116.6	2.25	-56.5	-69.7
5500	24.43	620.6	12.00	4.1	39.4	45000	4.38	111.1	2.15	-56.5	-69.7
6000	23.98	609.1	11.78	3.1	37.6	46000	4.17	105.9	2.05	-56.5	-69.7
6500	23.53	597.7	11.56	2.1	35.8	47000	3.98	101.0	1.95	-56.5	-69.7
7000	23.09	586.5	11.34	1.1	34.0	48000	3.79	96.3	1.86	-56.5	-69.7
7500	22.66	575.4	11.13	0.1	32.3	49000	3.61	91.8	1.77	-56.5	-69.7
8000	22.23	564.6	10.92	-0.8	30.5	50000	3.44	87.5	1.69	-56.5	-69.7
8500	21.81	553.9	10.71	-1.8	28.7	51000	3.28	83.4	1.61	-56.5	-69.7
9000	21.39	543.3	10.51	-2.8	26.9	52000	3.13	79.5	1.54	-56.5	-69.7
9500	20.98	533.0	10.31	-3.8	25.1	53000	2.98	75.8	1.47	-56.5	-69.7
10000	20.58	522.8	10.11	-4.8	23.4	54000	2.87	72.3	1.40	-56.5	-69.7
10500	20.19	512.7	9.91	-5.8	21.6	55000	2.71	68.9	1.33	-56.5	-69.7
11000	19.80	502.8	9.72	-6.8	19.8	56000	2.59	65.7	1.27	-56.5	-69.7
11500	19.41	493.1	9.54	-7.8	18.0	57000	2.46	62.6	1.21	-56.5	-69.7
12000	19.03	483.5	9.35	-8.8	16.2	58000	2.35	59.7	1.15	-56.5	-69.7
12500	18.66	474.0	9.17	-9.8	14.5	59000	2.24	56.9	1.10	-56.5	-69.7
13000	18.30	464.8	8.99	-10.7	12.7	60000	2.14	54.2	1.05	-56.5	-69.7
13500	17.94	455.6	8.81	-11.7	10.9	61000	2.04	51.7	1.00	-56.5	-69.7
14000	17.58	446.6	8.64	-12.7	9.1	62000	1.94	49.3	0.95	-56.5	-69.7
14500	17.24	437.8	8.47	-13.7	7.3	63000	1.85	47.0	0.91	-56.5	-69.7
15000	16.89	429.1	8.30	-14.7	5.5	64000	1.76	44.8	0.87	-56.5	-69.7
15500	16.56	420.5	8.13	-15.7	3.8	65000	1.68	42.7	0.83	-56.5	-69.7
16000	16.[illegible]2	412.1	7.97	-16.7	2.0	66000	1.60	40.7	0.79	-56.4	-69.6
16500	15.90	403.8	7.81	-17.7	0.2	67000	1.53	38.8	0.75	-56.1	-69.1
17000	15.58	395.7	7.65	-18.7	-1.6	68000	1.46	37.0	0.72	-55.8	-68.5
17500	15.26	387.7	7.50	-19.6	-3.4	69000	1.39	35.3	0.68	-55.5	-68.0
18000	14.95	379.8	7.34	-20.6	-5.1	70000	1.33	33.7	0.65	-55.2	-67.4
18500	14.65	372.0	7.19	-21.6	-6.9	71000	1.26	32.1	0.62	-54.9	-66.9
19000	14.35	364.4	7.05	-22.6	-8.7	72000	1.21	30.6	0.59	-54.6	-66.3
19500	14.05	356.9	6.90	-23.6	-10.5	73000	1.15	29.2	0.56	-54.3	-65.8
20000	13.76	349.5	6.76	-24.6	-12.3	74000	1.10	27.9	0.54	-54.0	-65.2
20500	13.48	342.3	6.62	-25.6	-14.0	75000	1.05	26.6	0.51	-53.7	-64.7
21000	13.20	335.2	6.48	-26.6	-15.8	76000	1.00	25.4	0.49	-53.4	-64.2
21500	12.92	328.2	6.35	-27.6	-17.6	77000	0.95	24.2	0.47	-53.1	-63.6
22000	12.65	321.3	6.21	-28.5	-19.4	78000	0.91	23.1	0.45	-52.8	-63.1
22500	12.38	314.5	6.08	-29.5	-21.2	79000	0.87	22.0	0.43	-52.5	-62.5
23000	12.12	307.9	5.95	-30.5	-22.9	80000	0.83	21.0	0.41	-52.2	-62.0
23500	11.86	301.3	5.83	-31.5	-24.7	81000	0.79	20.1	0.39	-51.9	-61.4
24000	11.61	294.9	5.70	-32.5	-26.5	82000	0.75	19.1	0.37	-51.6	-60.9
24500	11.36	288.6	5.58	-33.5	-28.3	83000	0.72	18.3	0.35	-51.3	-60.3
25000	11.12	282.4	5.46	-34.5	-30.0	84000	0.69	17.4	0.34	-51.0	-59.8
25500	10.88	276.3	5.34	-35.5	-31.8	85000	0.66	16.6	0.32	-50.7	-59.3
26000	10.64	270.3	5.23	-36.4	-33.6	86000	0.63	15.9	0.31	-50.4	-58.7
26500	10.41	264.4	5.11	-37.4	-35.4	87000	0.60	15.2	0.29	-50.1	-58.2
27000	10.18	258.7	5.00	-38.4	-37.2	88000	0.57	14.5	0.28	-49.8	-57.6
27500	9.96	253.0	4.89	-39.4	-38.9	89000	0.54	13.8	0.27	-49.5	-57.1
28000	9.74	247.4	4.78	-40.4	-40.7	90000	0.52	13.2	0.26	-49.2	-56.5
28500	9.53	242.0	4.68	-41.4	-42.5	91000	0.50	12.6	0.24	-48.9	-56.0
29000	9.31	236.6	4.58	-42.4	-44.3	92000	0.47	12.0	0.23	-48.6	-55.4
29500	9.11	231.3	4.47	-43.4	-46.1	93000	0.45	11.5	0.22	-48.3	-54.9
30000	8.90	226.1	4.37	-44.4	-47.8	94000	0.43	11.0	0.21	-48.0	-54.4
30500	8.70	221.0	4.27	-45.3	-49.6	95000	0.41	10.5	0.20	-47.7	-53.8
31000	8.51	216.1	4.18	-46.3	-51.4	96000	0.39	10.0	0.19	-47.4	-53.3
31500	8.31	211.2	4.08	-47.3	-53.2	97000	0.38	9.6	0.19	-47.1	-52.7
32000	8.12	206.4	3.99	-48.3	-54.9	98000	0.36	9.2	0.18	-46.8	-52.2
32500	7.94	201.6	3.90	-49.3	-56.7	99000	0.34	8.7	0.17	-46.5	-51.6
33000	7.76	197.0	3.81	-50.3	-58.5	100000	0.33	8.4	0.16	-46.2	-51.1

Altitude-Pressure-Temperature Conversion Chart

Figure 204

(5) Bleed Air Duct and Pylon Overtemperature Circuit Check
   (a) Gain access to LH and RH bleed air duct and pylon overtemperature thermal switches (S20, S21, S355, and S356) by removing lower pylon access covers.
   (b) Set Battery Switches on and depress warning light test switch to verify proper operation of annunciators. Release test switch.
   (c) Disconnect electrical connector (P747) from LH bleed air duct temperature switch (S21). Connect jumper across electrical connector P747 (pins A to B), L BLEED AIR annunciator shall illuminate. Remove jumper and connect electrical connector to LH bleed air duct temperature switch.
   (d) Connect jumper across terminals of LH pylon temperature switch (S355). L BLEED AIR annunciator shall illuminate. Remove jumper.
   (e) Repeat steps (5)(c) and (5)(d) for RH bleed air duct temperature switch (S20) and RH pylon temperature switch (S356).
   (f) Set Battery Switches off.
(6) Cabin Air Exhaust Valve Test

NOTE: This test is to be conducted with Battery Switches off.

To produce proper test results, the pressurization module vacuum line must be removed and its fitting must be capped tightly.

   (a) Set battery switches off.
   (b) Gain access to cabin air exhaust control valve. Maintenance personnel will be required to watch the opening of the valve poppet during this test.
   (c) Attach pitot/static tester to either the alternate static port in the nose compartment or the RH aft static port while blocking the other.
   (d) Gain access to pressurization module, remove cabin air filter and plug port in pressurization module.
   (e) Set pitot/static tester altimeter baro knob to 29.92. Read existing field altitude on altimeter. Refer to Figure 204 and find corresponding PSIA for the existing field altitude on altimeter. Record (start) reading on Figure 203.
   (f) Set mini-controller altitude select knob to stop below S.L. and turn rate selector full CW to maximum rate. Slowly apply vacuum and monitor cabin air exhaust valve poppet. When poppet moves to full open, stop vacuum and read altimeter.

   NOTE: If vacuum is applied too rapidly as the valve poppet starts to move, a false reading of the differential pressure relief valve may be obtained. If reading is doubtful, release vacuum and run the test again.

   (g) Refer to Figure 204 and find final PSIA reading for the altitude reading in step (6)(e). Record reading on Figure 203.
   (h) Subtract final reading from the start reading. The differential shall be 9.4 (±0.15) psig. Record reading on Figure 203.
   (i) Release vacuum and disconnect pitot/static tester from static port. Unblock remaining static port.

(7) Cabin Safety Valve Test

(a) Remove baggage compartment as required to gain access to cabin differential pressure relief valve.

(b) Disconnect static line from cabin differential pressure relief valve. Attach pitot/static tester to cabin differential pressure relief valve.

(c) _On Aircraft 35-099 and Subsequent and 36-029 and Subsequent_, ensure that Battery Switches are off. This will close the vacuum shutoff solenoid.

(d) Set pitot/static tester altimeter baro knob to 29.92. Read existing field altitude on altimeter. Refer to Figure 204 and find PSIA for the existing field altitude on altimeter. Record (start) reading on Figure 203.

(e) Slowly apply vacuum to pressure relief valve and monitor safety valve poppet. When safety valve poppet moves to full open, stop vacuum and read altimeter.

NOTE: If vacuum is applied too rapidly, as safety valve poppet starts to move, a false reading of the pressure relief valve setting may be obtained. If reading is doubtful, release vacuum and rerun test.

Check that retention ring has not separated from valve poppet assembly. This check will satisfy a corresponding inspection requirement on the safety valve. (Refer to Chapter 5.)

(f) Refer to Figure 204 and find final PSIA for the altimeter reading in step (8)(d). Record final reading on Figure 203.

(g) Subtract final reading from the start reading. The differential shall be the setting of the pressure relief valve in psig.

1) _35-107, 35-113 thru 35-129 and 36-032 thru 36-034_, differential pressure setting shall be 9.6 (±0.1) psig.

2) _35-130 and Subsequent and 36-035 and Subsequent_, differential pressure setting shall be 9.7 (±0.1) psig

(h) Release vacuum and disconnect pitot/static tester from pressure relief valve.

(i) Connect static line to pressure relief valve. Install previously removed equipment and upholstery.

(8) Altitude Limiter Test

(a) Loosen attaching parts and lower pressurization

(b) Remove plastic tie securing hose (filter to altitude limiter) at altitude limiter end (Refer to 21-30-08). Disconnect hose from altitude limiter fitting.

(c) Attach pitot/static tester to altitude pressure limiter.

(d) Steadily increase vacuum to altitude pressure limiter until test altimeter shows an abrupt change in rate of increase. The change in rate of increase shall occur at 11,500 (±1,500) feet. Record reading on Figure 203. The change in rate of increase indicates that the altitude pressure limiter has opened.

(e) Release vacuum from pitot/static tester. Disconnect tester from altitude pressure limiter.

(f) Connect hose to altitude pressure limiter fitting and secure with plastic tie.

(g) Raise and secure pressurization module.

(h) Gain access to altitude pressure limiter located on aft pressure bulkhead.

(i) Remove fitting with screen from altitude pressure limiter.

NOTE: Fabricate an adapter which will allow attachment of the pitot/static tester to the altitude pressure limiter. Threads of the adapter must be 3/4-16NF-3A and no longer than the threads of the removed fitting

(j) Install adapter in altitude pressure limiter and attach pitot/static tester.
(k) Steadily increase vacuum to altitude pressure limiter until test altimeter shows an abrupt change in rate of increase. The change in rate of increase shall occur at 11,500 (±1500) feet. Record reading on Figure 203. The change in rate of increase indicates that the altitude pressure limiter has opened.
(l) Release vacuum from pitot/static tester. Disconnect tester from altitude pressure limiter.
(m) Remove adapter from altitude pressure limiter and install previously removed fitting with screen.
(n) Install previously removed equipment and electrical connectors

B. Functional Test of the Pressurization System *(Aircraft 35-002 thru 35-112 except 35-107 and 36-002 thru 36-031)*
(1) Acquire necessary tools and equipment.

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Vacuum Gage (0 to 100 inches of H2O)		Commercially Available	General.
Compressed Air Source and 0 to 30 psig gage (Required only if engines are not run for this test.)		Commercially Available	General.
Pitot-Static Tester	1811G	Barfield Instrument Corp. Atlanta, GA	General.
Cabin Pressurization	B1737, B21117	Learjet Inc. Wichita, KS	General.
	TronAir 15-7603-1000	Aircraft Ground Support Equipment Holland, OH	General.

(2) Cabin Reference Line Leakage Test

(a) Gain access to and remove pressurization filter (21-30-02) and disconnect cabin pressure line (21-30-06) from jet pump. Cap or plug all exposed fittings.

(b) Connect pitot-static tester to bulkhead fitting and apply pressure until tester indicates 450 knots. Shut off valve on tester, sealing the system. Leakage shall not exceed one knot in one minute. Record reading on Figure 205.

(c) Disconnect pitot-static tester. Install filter and connect cabin pressure line to jet pump.

(3) Pressurization Leakage Test

(a) Ensure Battery Switches are set to OFF.

(b) Gain access to pressurization module and remove filter. Cap all exposed fittings.

(c) Select full increase on rate selector and maximum cabin altitude on altitude controller.

(d) Set altimeter on pitot-static tester to 29.92 in. of Hg.

(e) Remove cap from regulated vacuum line test port and connect pitot-static tester (21-30-04). Disconnect and cap cabin pressure line (21-30-06) from jet pump.

CAUTION: TO PREVENT DAMAGE TO THE RATE CONTROLLER DIAPHRAGMS, APPLY AND RELEASE VACUUM AT A RATE NOT TO EXCEED 1,000 FEET PER MINUTE.

(f) Slowly apply vacuum to regulated vacuum line until 3000 feet is indicated on altimeter. Allow vacuum to stabilize, then close valve on tester, sealing the system.

(g) The pilot/static altimeter shall not decrease more than 500 feet in 1 minute. Record reading on Figure 205.

(h) Slowly release vacuum from regulated vacuum line. Disconnect pilot/static tester from test port. Remove cap and install pressurization module filter and connect cabin pressure line to jet pump.

(4) Regulated Jet Pump Test (Ground Mode)

(a) Connect the 0 to 100-inch H20 vacuum gage to the regulated vacuum line test port.

(b) Set Cabin Air Switch to OFF and Battery Switch to ON. Ensure that squat switches are in ground mode.

(c) Provide an air source to the jet pump by either operating one engine or attaching an air source to the bleed air manifold.

(d) Slowly increase engine rpm until the vacuum gage stabilizes or set air pressure at inlet side of jet pump at 15 psig.

(e) Record vacuum gage reading on Figure 205. This is normal operating vacuum (44 to 82 inches H20) in the ground mode.

(f) *On Aircraft 35-002 thru 35-098 and 36-002 thru 36-028*, check position of cabin air exhaust valve poppet is full open and safety valve is full closed. Record position on Figure 205.

(g) *On Aircraft 35-099 thru 35-106, 35-108 thru 35-112, and 36-029 thru 36-031*, proceed as follows:

1) Check position of cabin air exhaust valve poppet and safety valve poppet; both valves should be full open. Record position on Figure 205.

NOTE: The avionics control heads may be removed and an inspection mirror used to check the cabin air exhaust valve poppet.

2) Set Cabin Air Switch to ON. Check that safety valve starts to close after 15 (±5) seconds and is fully closed after 30 (±15) seconds. Record readings on Figure 205.

(5) Regulated Jet Pump Test (Flight Mode)

(a) Set Pressurization Switch to AUTO. Pull squat switch circuit breaker to simulate an in-flight mode.

(b) Select maximum altitude on the altitude controller and maximum rate on rate selector.

(c) Increase engine rpm or air pressure until the vacuum gage indicates vacuum has stabilized. This is the pressure required to produce regulated vacuum in the flight mode. Record rpm or pressure readings on Figure 205.

(d) Record the vacuum gage reading on Figure 205. This is the normal operating vacuum (44 to 82 inches H20) in the flight mode.

(e) Maintain a cabin altitude 1000 feet above field pressure altitude on the altitude controller; the cabin air exhaust valve shall remain open. Record position of cabin air exhaust valve on Figure 205.

(f) Set Pressurization Switch to MANUAL; the cabin air exhaust valve shall remain open. Record cabin air exhaust valve position on Figure 205.

(g) Select below field elevation on the altitude controller; the cabin air exhaust valve shall remain open. Record cabin air exhaust valve position on Figure 205.

(h) Hold the manual cabin altitude control valve to DN; the cabin air exhaust valve shall close. Record cabin air exhaust valve position on Figure 205

(i) Set Pressurization Switch to AUTO. Select 1000 feet above field pressure altitude on altitude con-troller; the cabin air exhaust valve shall open. Record cabin air exhaust valve position on Figure 205.

(j) Set Pressurization Switch to MANUAL. Hold manual cabin altitude control valve to DN; the cabin air exhaust valve shall close. Record cabin air exhaust valve position on Figure 205.

(k) Reduce engine rpm to idle or shut off air pressure source. Disconnect gage from test port and in-stall cap on test port

(6) Pressurized Cabin Test (Ground Test)

(a) Connect cabin pressurization test cart to aircraft.

(b) Set Cabin Air Switch to NORM, Battery Switch to ON, squat switches to ground mode, and Pressurization Switch to AUTO.

(c) Close and secure cabin door and pressurize the aircraft with authorized personnel in the cabin. Supply bleed air to the jet pump by operating one engine or by connecting compressed air to the bleed air manifold.

(d) Set engine rpm or compressed air pressure to about 40 psi inlet pressure.

(e) Observe the cabin air exhaust valve position; the valve shall be open. Record reading on Fig-ure 205.

(f) Record U-tube manometer reading of cabin pressure on Figure 205.

(g) Set Pressurization Switch to MANUAL. Select various cabin altitudes on the altitude controller and various rates on the rate selector; pressure shall not change. Record readings on Figure 205.

(7) Pressurized Cabin Test (Flight Mode)

(a) Set Pressurization Switch to AUTO and select a cabin altitude 1000 feet above field pressure altitude on altitude controller. Check cabin rate-of-climb indicator.

(b) Pull the squat switch circuit breaker to simulate an in-flight mode. Record cabin rate-of-climb reading on Figure 205.

(c) Select minimum rate (decrease) on the rate selector. Select below sea level elevation on the altitude controller. Observe cabin rate-of-climb indicator and record reading on Figure 205.

(d) Select maximum rate (increase) on the rate selector. Observe cabin rate-of-climb indicator and record reading on Figure 205.

NOTE: If maximum down rate cannot be achieved, energize maximum flow switch.

(e) Select field elevation on the altitude controller. Select minimum rate (decrease) on the rate selector. Observe cabin rate-of-climb indicator and record reading on Figure 205.

(f) Select maximum rate (increase) on the rate selector. Observe cabin rate-of-climb indicator and record reading on Figure 205.

(g) Note that the increase in rate is smooth and linear. Select a nominal rate (approximately 500 ft./ min.) on the rate selector. Allow cabin altitude to stabilize and rate-of-climb indicator to reach zero. Record readings on Figure 205.

(h) Depress squat switch circuit breaker and record rate-of-climb reading on Figure 205.

(i) Set Cabin Air Switch to OFF.

(8) Cabin Air Exhaust Valve and Safety Valve Test.

(a) Lower the pressurization module and plug the cabin inlet port to the differential pressure gage.

(b) Open tailcone access door.

(c) Disconnect vacuum line at the jet pump and cap exposed fittings. Connect pneumatic test cart to the port of the flow control valve manifold.

(d) Set Battery Switch to OFF. Leave manual control valve in the NEUTRAL position.

(e) Select maximum rate (increase) on the rate select. Select maximum altitude on the altitude controller.

WARNING: THIS PART OF THE TEST IS TO BE CONDUCTED WITH NO PERSONNEL IN THE CABIN.

(f) Close and secure cabin door.

CAUTION: DO NOT PRESSURIZE THE CABIN AT A RATE IN EXCESS OF 2000 FEET PER MINUTE.

(g) Slowly increase cabin pressure until cabin pressure until cabin air exhaust valve opens. Record reading on Figure 205.

NOTE: If the compressed air source has limited capacity in excess of the cabin leak rate, the cabin air exhaust control valve may open as low as 8.6 psig.

(h) Block RH aft static port and alternate static port in nose compartment.

WARNING: DO NOT EXCEED 9.45 PSIG CABIN PRESSURE.

(i) Continue to increase cabin pressure until cabin safety valve opens. Record reading on Figure 205. The safety valve must open a minimum of 0.1 psig above the outflow valve.

NOTE: If the compressed air source has limited capacity in excess of the cabin leak rate, the safety valve may open as low as 9.0 psig.

WARNING: DO NOT OPEN CABIN DOOR BEFORE CABIN PRESSURE REACHES 0 PSIG AND THE CABIN RATE IS 0 FEET PER MINUTE TO PREVENT PERSONNEL INJURY AND AIRCRAFT DAMAGE.

(j) Depressurize the cabin at a rate not to exceed 3,000 feet per minute. Remove plug from differential pressure gage. Shut down test cart. Disconnect test cart from aircraft. Install cap on flow control valve test port and bleed air manifold.

(k) Depress STAB HEAT circuit breaker.

Para.	Test	Required	Actual
(2)(b)	Cabin Reference Line	449 kt. min. after 1 min.	________ knots
(3)(g)	System Leakage	2,500 ft. after 1 min.	________ ft.
(4) (d)	Required Air Pressure	%RPM or 15 (±2) psig.	________ %RPM or ______ psig
(4)(e)	Regulated Vacuum	44 to 82 In. H20	________ In. H20
(4)(f) or (4)(g)1)	Outflow Valve and Safety Valve	Full open and/or full closed	________
(4)(g)2)	Safety Valve Closes	Starts to close 15 (±5) sec. Full closed 30 (±15) sec.	________ Sec. ________ Sec.
(5)(c)	Required Air Pressure	%RPM or 15 (±2) psig.	________ %RPM or ______ psig
(5)(d)	Regulated Vacuum	44 to 82 In. H20	________ In. H20
(5)(e)	Outflow Valve Position	Open	________
(5)(f)	Outflow Valve Position	Open	________
(5)(g)	Outflow Valve Position	Open	________
(5)(h)	Outflow Valve Position	Closed	________
(5)(i)	Outflow Valve Position	Open	________
(5)(j)	Outflow Valve Position	Closed	________
(6)(e)	Outflow Valve Position	Open	________
(6)(f)	Ground Diff. Pressure	7 In. H20 Max.	________ In. H20
(6)(g)	Manual Alt. Hold	0 Feet (Change)	________ Ft.
(7)(b)	Transition Bump (Ground to Flight Mode)	±100 FPM	________ FPM
(7)(c)	Min. Down Rate - Auto	Less than 400 FPM	________ FPM
(7)(d)	Max. Down Rate - Auto	In excess of 1200 FPM	________ FPM
(7)(e)	Min. Up Rate - Auto	Less than 400 FPM	________ FPM
(7)(f)	Max. Up Rate - Auto	In excess of 2100 FPM	________ FPM
(7)(g)	Rate Controller (Isobaric Accuracy)	Smooth and Linear Field ±500 Ft.	________ ________ Ft.
(7)(h)	Transition Bump - Ldg. (Flight to Ground Mode)	Less than 100 FPM	________ FPM
(8)(g)	Outflow Valve ΔP relief	8.60 to 9.00 psig	________ psig
(8)(i)	Safety Valve ΔP relief	9.00 to 9.30 psig	________ psig

Inspection Test Record
Figure 205

CABIN AIR EXHAUST CONTROL VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

CAUTION: WHEN ANY LINE IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ENSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE SYSTEM MALFUNCTION.

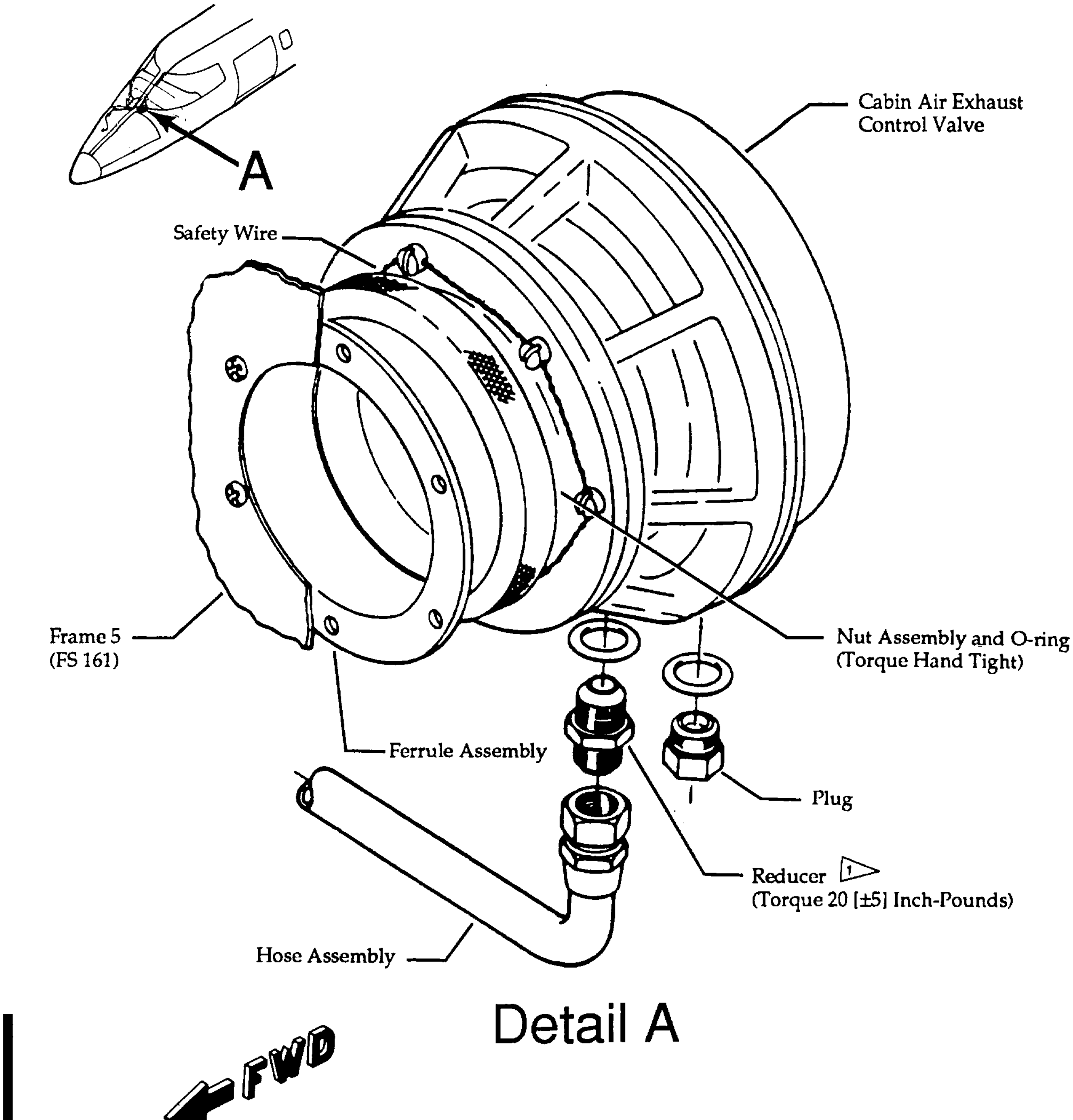
A. Removal of Cabin Air Exhaust Control Valve (See Figure 201.)
   (1) Remove Nav and Comm control heads from center instrument panel. Disconnect and tag electrical connectors to ensure correct connection when control heads are installed.
   (2) Disconnect hose from exhaust valve and cap exposed openings.
   (3) *On Aircraft 35-002 thru 35-642, 36-002 thru 36-053 and 36-055 not modified per SB 35/36-21-20 or incorporating the one-piece adapter*, remove safety wire and loosen nut assembly and remove exhaust valve from aircraft. Remove O-ring and inspect for any damage.
   (4) *On Aircraft 35-643 and Subsequent, 36-054, 36-056 and Subsequent, and prior Aircraft modified per SB 35/36-21-20 or incorporating the one-piece adapter*, remove mount bolts, gasket, and exhaust valve from aircraft. Inspect valve and mount area for any damage.

B. Installation of Cabin Air Exhaust Control Valve (See Figure 201.)
   (1) *On Aircraft 35-002 thru 35-642, 36-002 thru 36-053 and 36-055 not modified per SB 35/36-21-20 or incorporating the one-piece adapter*, set O-ring and exhaust valve on ferrule assembly. Tighten nut assembly hand-tight and safety wire.
   (2) *On Aircraft 35-643 and Subsequent, 36-054, 36-056 and Subsequent, and prior Aircraft modified per SB 35/36-21-20 or incorporating the one-piece adapter*, set exhaust valve and gasket in aircraft. Install and tighten mount bolts.

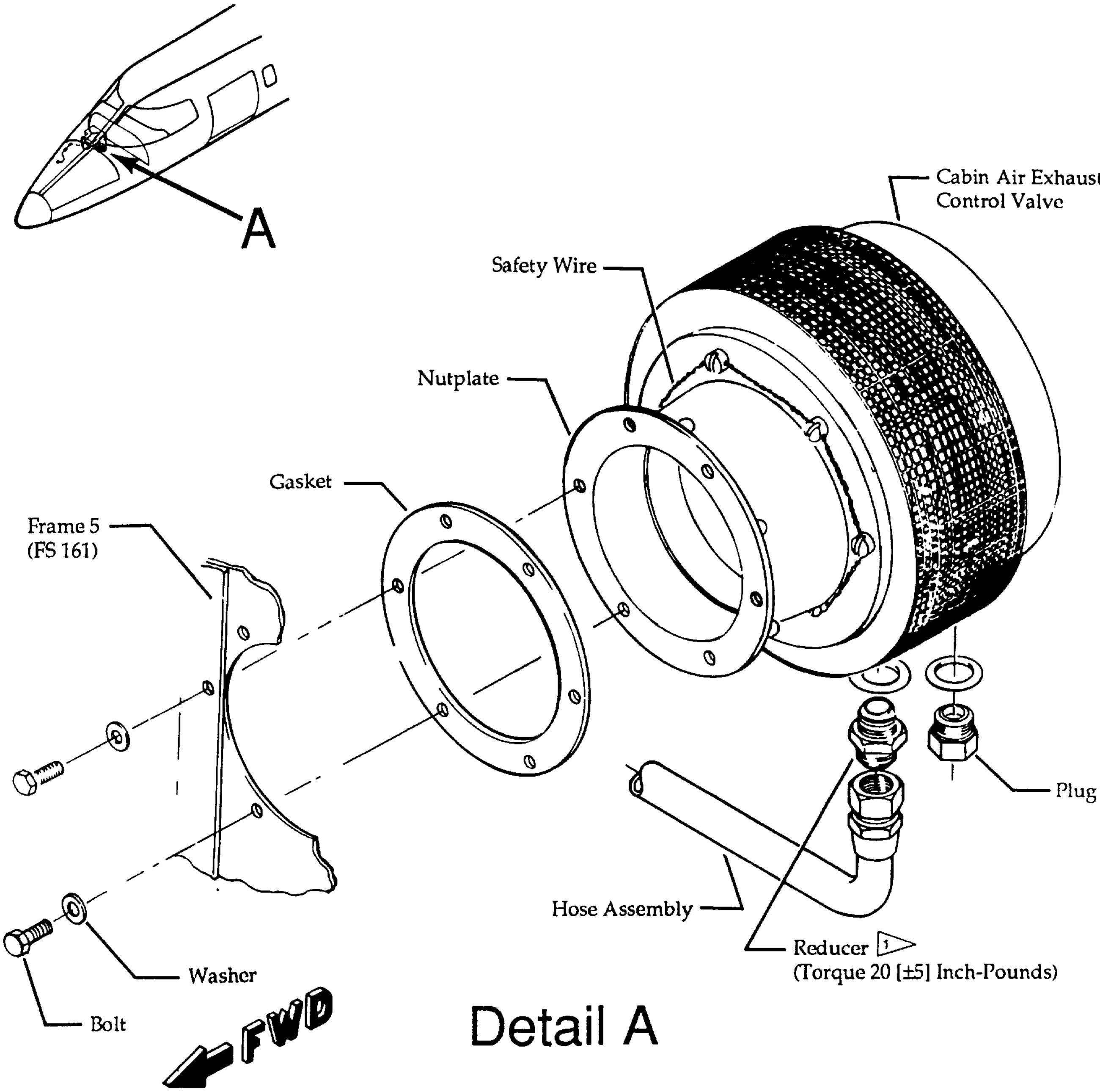
   NOTE: Torque adapter bolts evenly and uniformly to ensure correct sealing between adapter and bulkhead.

   CAUTION: LIMIT TORQUE OF FITTING NEXT TO CABIN AIR EXHAUST CONTROL VALVE TO 20 (±5) INCH-POUNDS [2.26 NEWTON-METERS]. HOLD FITTING WHEN ATTACHING HOSE FITTING TO PREVENT DAMAGE TO EQUIPMENT.

   (3) Remove caps from openings and connect hose to exhaust valve. Torque hose fitting 20 (±5) inch-pounds [2.26 Nm].
   (4) Connect correct electrical connector to control heads. Set control heads in panel and secure with quick-release fasteners.
   (5) Perform operational check of pressurization system. (Refer to 21-30-00, Inspection/Check.)



Cabin Air Exhaust Control Valve Installation
Figure 201 (Sheet 1 of 2)



Cabin Air Exhaust Control Valve Installation
Figure 201 (Sheet 2 of 2)

2. **Inspection/Check**

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Borescope		Commercially Available	Inspect outflow valves.

B. Cabin Air Exhaust Control Valve Inspection

NOTE: This inspection is applicable to the Cabin Air Exhaust Control valve only.

Perform Cabin Air Exhaust Control Valve inspection in accordance with the current inspection interval specified in Chapter 5.

(1) Open tailcone access door.
(2) Disconnect bleed air pressure supply line from vacuum pressure regulator (jet pump).
(3) Connect a filtered air source (nitrogen or shop air) regulated to 45 (±5) psi [310.3 (±34.5) kPa] to the disconnected bleed air pressure supply fitting.
(4) Remove right nose avionic access door.
(5) Set Cabin Air Switch to ON.
(6) Set Battery Switches ON.

NOTE: Ensure that squat switches are in the ground mode and that the squat switch circuit breaker is pushed in.

(7) Gain access to cabin air exhaust control valve from forward side of frame 5. Using boroscope, inspect cabin air exhaust control valve poppet and seat for general cleanliness and accumulation of nicotine tar.
(8) If the inspection reveals an accumulation of contaminants, remove cabin air exhaust control valve and clean with mild detergent. (Refer to 21-30-01, Removal/Installation.)
(9) Set Cabin Air Switch to OFF.
(10) Set Battery Switches OFF.
(11) Remove boroscope from aircraft.
(12) Install right nose avionic access door.
(13) Remove filtered air source from high pressure bleed air supply fitting.
(14) Connect bleed air line to vacuum pressure regulator (jet pump).
(15) Close tailcone access door.

3. Cleaning/Painting

A. Clean Cabin Air Exhaust Control Valve (See Figure 202.)

CAUTION: DO NOT USE MEK OR OTHER HYDROCARBON-BASED SOLVENTS ON COMPONENTS OR SURFACES MADE OF PLASTIC.

DO NOT DISASSEMBLE CABIN AIR CONTROL VALVE ASSEMBLY FOR CLEANING AS THIS WILL VOID ANY WARRANTY AND MAY HAMPER THE INTEGRITY OF THE VALVE ASSEMBLY.

(1) Remove cabin air exhaust control valve. (Refer to Removal/Installation, this section.)

CAUTION: HEAVILY CONTAMINATED VALVES MUST BE SOAKED IN CLEANING AGENT FOR A PERIOD OF TIME TO REMOVE EXCESS CONTAMINANTS BEFORE COMPLETION OF CLEANING PROCEDURE.

DO NOT ALLOW CLEANING AGENT TO ENTER THROUGH CABIN PRESSURE INLET HOLES IN VALVE POPPET ASSEMBLY.

(2) Place valve in pan of isopropyl alcohol or a mild detergent and water solution to soak. For initial soaking, the valve poppet will be closed instead of open as shown in Figure 202.

(3) After removing excess contaminants, insert blunt end of a No. 30 (1/8 inch) drill bit into shank end of valve center cone port and push valve poppet to open position (approximately one inch). Cap the valve fitting to retain vacuum in control chamber. This will hold the valve open when the drill bit is removed.

CAUTION:
- VALVE MUST BE MONITORED TO ENSURE THAT VALVE POPPET DOES NOT SLOWLY CLOSE WHILE SITTING IN CLEANING AGENT. ANY SMALL LEAKAGE, EITHER FROM CAPPED VALVE FITTINGS OR INTERNAL LEAKAGE, WILL ALLOW THE VALVE POPPET TO SLOWLY CLOSE AND ALLOW CLEANING AGENT TO ENTER THE CABIN PRESSURE INLET HOLES.
- CLEANING AGENT LEVEL SHOULD NOT BE ABOVE LEVEL AS ILLUSTRATED WHEN VALVE ASSEMBLY IS IMMERSED.
- DO NOT ALLOW CLEANING AGENT TO ENTER THROUGH CABIN PRESSURE INLET HOLES IN VALVE POPPET ASSEMBLY.

(4) Place valve in a pan of isopropyl alcohol or a mild detergent and water solution as shown in Figure 202. Monitor valve poppet, ensuring that it stays open.

(5) Soak valve in cleaning agent enough to loosen or remove contaminants.

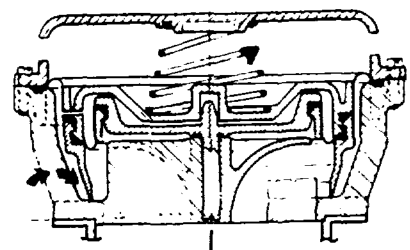
NOTE: A cotton swab or acid brush may be used to scrub the noise suppression screen, poppet, and etc., if required. Pay particular attention to valve poppet assembly and valve poppet seating areas.

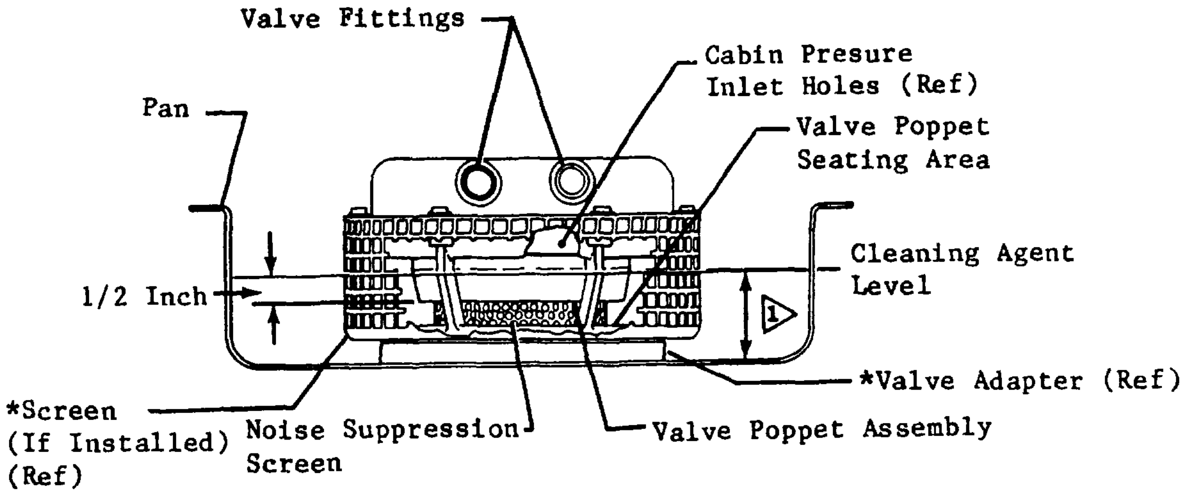
(6) Perform a visual inspection of cabin air exhaust control valve to ensure that diaphragm retention ring has not separated from valve poppet assembly (see Figure 202), and that poppet assembly is seating properly. Replace cabin air exhaust control valve if necessary.

(7) Install cabin air exhaust control valve. (Refer to Removal/Installation.)

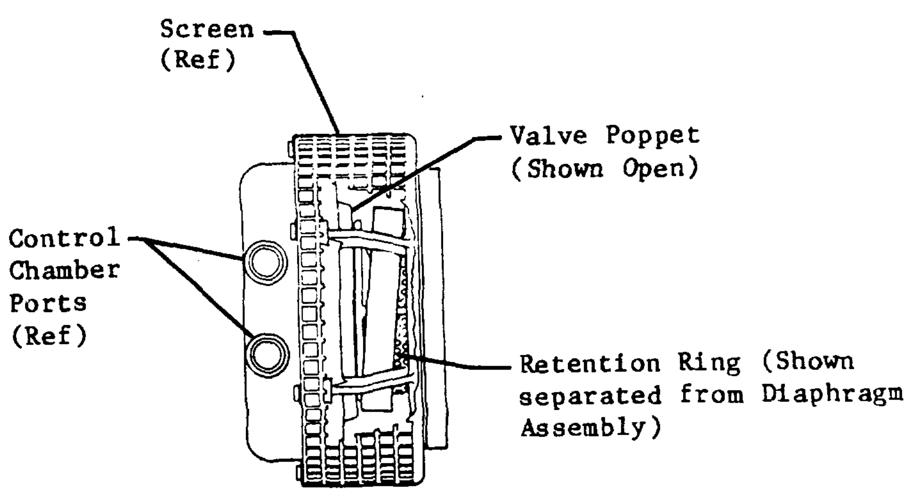
1 Cleaning agent level will vary due to the type of valve adapter installed. Cleaning agent level must be adjusted so that the valve poppet assembly is immersed at least 1/2 inch in cleaning agent. Cleaning agent <u>must not</u> enter the cabin pressure inlet holes.

* Valve screen (if installed) and valve adapter shall not be removed from valve assembly.





<u>Valve Shown Partially Open</u>



WARNING: DEFECTIVE VALVE ASSEMBLY SHOWN. DO <u>NOT</u> INSTALL VALVE ASSEMBLY IN THIS CONDITION.

Cabin Air Exhaust Control Valve Cleaning
Figure 202

CABIN SAFETY VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

CAUTION: WHEN ANY LINE IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ENSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE SYSTEM MALFUNCTION.

NOTE:
- The safety valve is to be functionally tested in accordance with the current inspection interval specified in Chapter 5.
- Removal and installation procedures are identical for both 35/35A and 36/36A.

A. Remove Safety Valve (See Figure 201.)
   (1) Remove upholstery from RH side of baggage compartment.
   (2) On *Aircraft 35-171 and Subsequent*, remove attaching parts and safety valve shield.
   (3) Disconnect static line from cabin safety valve and cap exposed openings.
   (4) Remove attaching parts and safety valve from aircraft.
   (5) Clean sealant from manifold.

B. Install Safety Valve (See Figure 201.)
   (1) Clean mounting surface of safety valve base and apply parting agent per Faying Surface Sealing in Chapter 20.
   (2) Install safety valve, applying a removable faying surface seal, and secure with attaching parts.

   CAUTION: LIMIT TORQUE OF FITTING NEXT TO CABIN SAFETY VALVE TO 20 (±5) INCH-POUNDS. HOLD FITTING WHEN ATTACHING ADDITIONAL PARTS TO PREVENT OVER-TORQUING BACK INTO THE SAFETY VALVE.

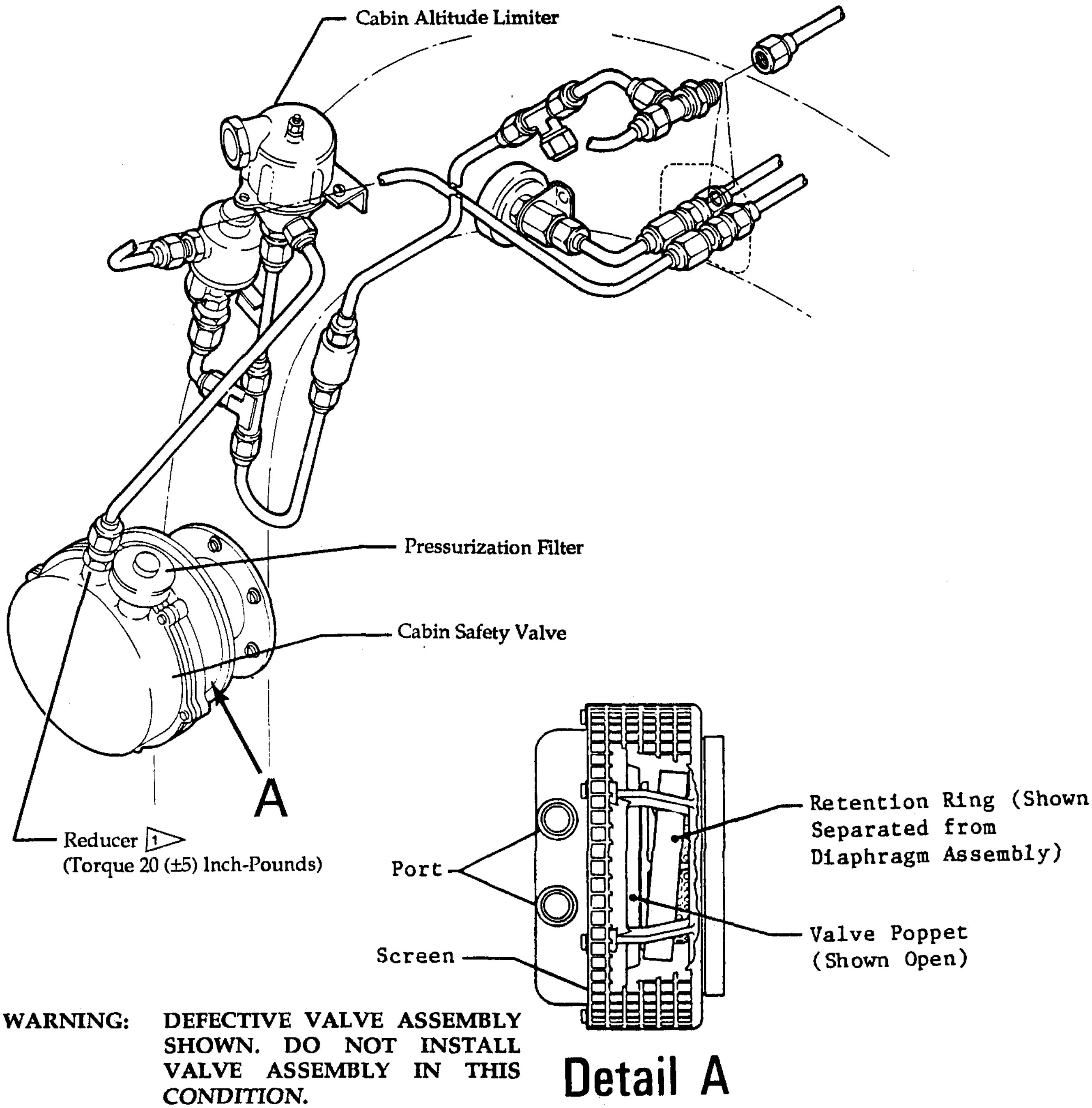
   (3) Remove caps from openings and connect static line to cabin safety valve. Torque safety valve fitting to 20 (±5) inch-pounds.
   (4) On *Aircraft 35-171 and Subsequent*, install safety valve shield and secure with attaching parts.
   (5) Perform operational check of pressurization system. (Refer to 21-30-00.)
   (6) Install baggage compartment upholstery.

2. Adjustment/Test

A. Cabin Pressurization Safety Valve Functional Test (*Aircraft 35-002 thru 35-112 except 35-107 and 36-002 thru 36-031*.)

   NOTE: The following functional test must be performed in accordance with the current inspection interval specified in Chapter 5.

   (1) Remove filter from cabin pressurization safety valve and plug port. (Refer to 21-30-02.)
   (2) Disconnect static line from valve. Connect a source of eight inches of water vacuum to safety valve static port.
   (3) Using a flashlight and an inspection mirror, visually check that safety valve poppet has opened. Check that diaphragm retention ring has not separated from the poppet. (Refer to 21-30-02.)
   (4) If the safety valve fails to open or the retaining ring has separated from the diaphragm, replace with new safety valve.
   (5) Disconnect vacuum source and restore system to normal.

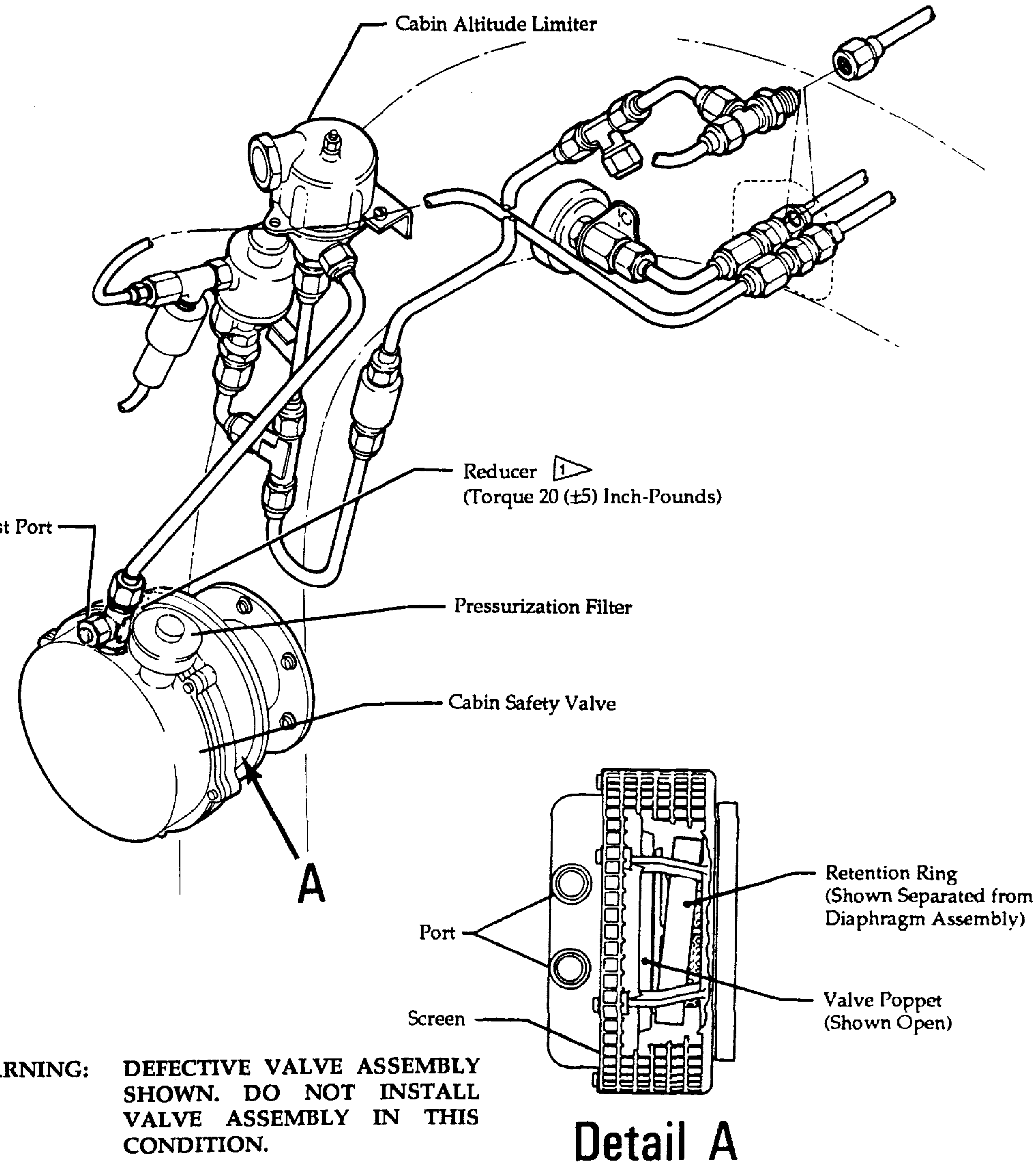


WARNING: DEFECTIVE VALVE ASSEMBLY SHOWN. DO NOT INSTALL VALVE ASSEMBLY IN THIS CONDITION.

1 **CAUTION:** LIMIT TORQUE OF FITTING NEXT TO CABIN SAFETY VALVE TO 20 (±5) INCH-POUNDS. HOLD FITTING WHEN ATTACHING ADDITIONAL PARTS TO PREVENT OVER-TORQUING BACK INTO SAFETY VALVE.

Cabin Safety Valve Installation
Figure 201 (Sheet 1 of 3)

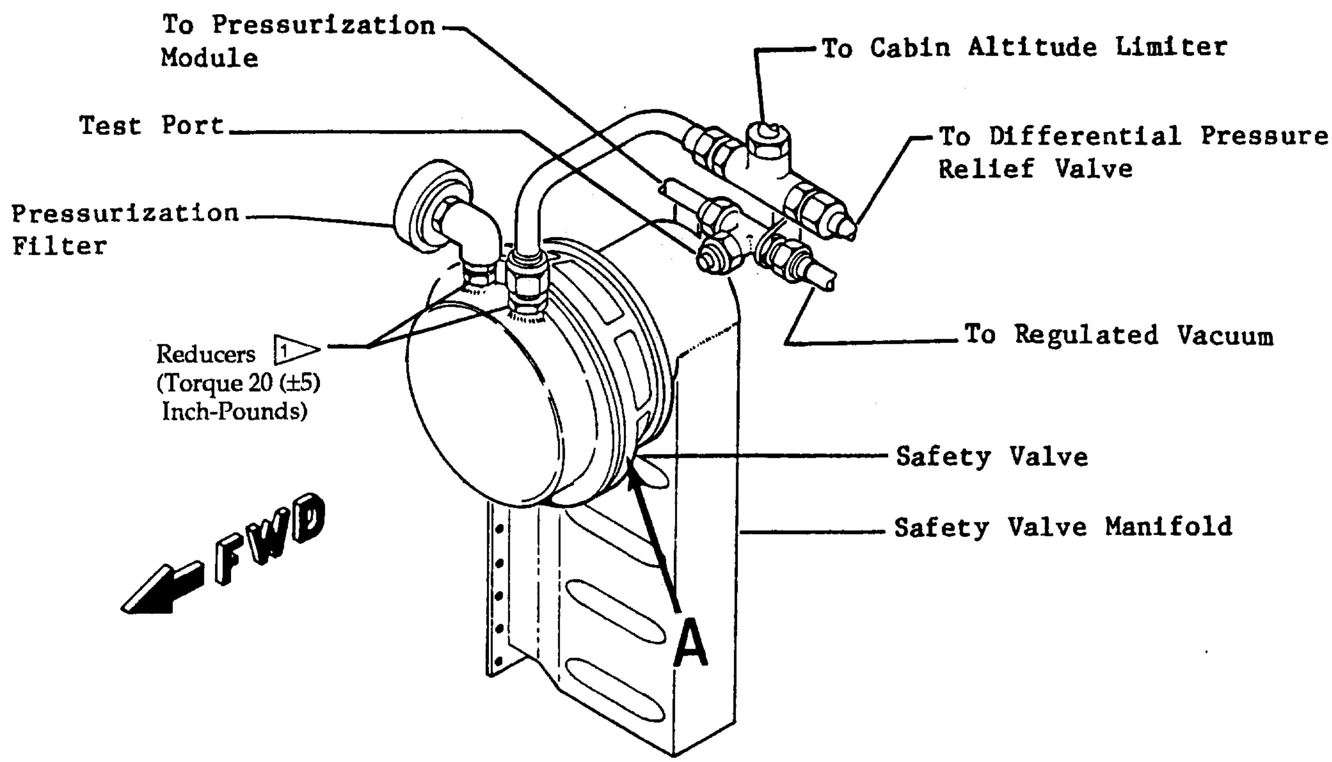
13-78C-3



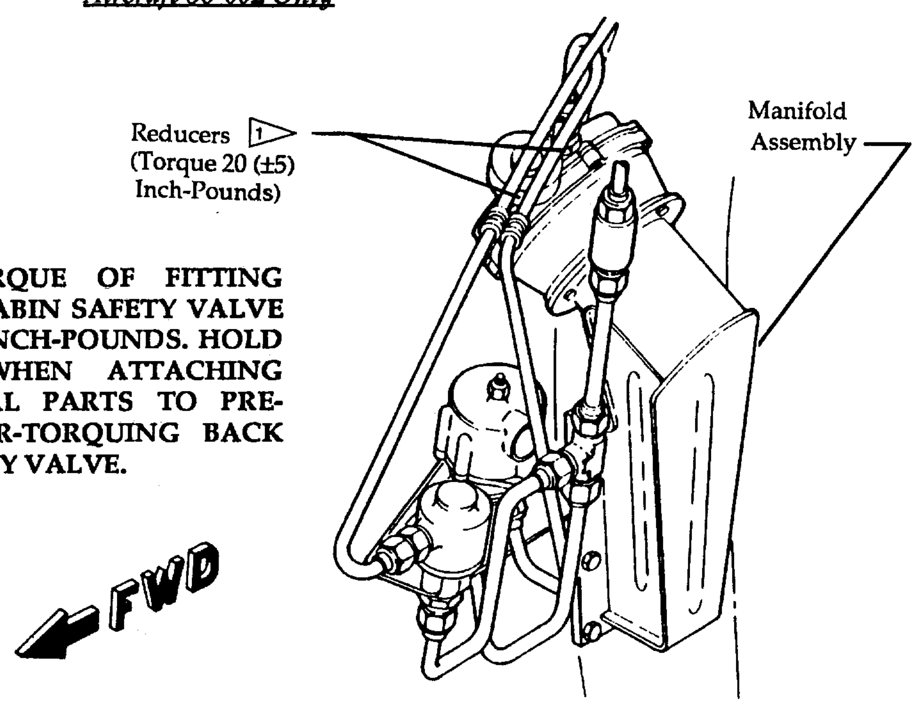
WARNING: DEFECTIVE VALVE ASSEMBLY SHOWN. DO NOT INSTALL VALVE ASSEMBLY IN THIS CONDITION.

1 **CAUTION:** LIMIT TORQUE OF FITTING NEXT TO CABIN SAFETY VALVE TO 20 (±5) INCH-POUNDS. HOLD FITTING WHEN ATTACHING ADDITIONAL PARTS TO PREVENT OVER-TORQUING BACK INTO SAFETY VALVE.

Cabin Safety Valve Installation
Figure 201 (Sheet 2 of 3)



Aircraft 36-002 Only



1 CAUTION: LIMIT TORQUE OF FITTING NEXT TO CABIN SAFETY VALVE TO 20 (±5) INCH-POUNDS. HOLD FITTING WHEN ATTACHING ADDITIONAL PARTS TO PREVENT OVER-TORQUING BACK INTO SAFETY VALVE.

Aircraft 36-003 and Subsequent

Cabin Safety Valve Installation
Figure 201 (Sheet 3 of 3)

13-78C-4

B. Cabin Pressurization Safety Valve Functional Test (*Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*.)

NOTE: The following functional test must be performed in accordance with the current inspection interval specified in Chapter 5.

(1) Set Cabin Air Switch to OFF, set Battery Switches on and ensure that squat switches are in the ground mode.
(2) Provide an air source to the pressurization vacuum regulator by either running one engine or attaching an air source to the bleed air manifold.
(3) Set air pressure at 45 (±5) psi (310 [±34.5] kPa) or slowly increase engine rpm to create a vacuum.
(4) Using a flashlight and an inspection mirror, visually inspect that safety valve poppet has opened. Check that diaphragm retention has not separated from the poppet. (Refer to 21-30-02.)
(5) Set Cabin Air Switch to ON.
(6) Safety valve should start to close after 15 (±5) seconds and be fully closed after 15 to 60 seconds.
(7) Shut down engine and remove air source and restore system to normal.
(8) If the safety valve fails to open or the retaining ring has separated from diaphragm, replace with new safety valve.

3. Cleaning/Painting

A. Clean Cabin Safety Valve (See Figure 202.)

NOTE: Clean Cabin Safety Valve in accordance with the current inspection interval specified in Chapter 5.

CAUTION: DO NOT USE MEK OR OTHER HYDROCARBON-BASED SOLVENTS ON COMPONENTS OR SURFACES MADE OF PLASTIC.

DO NOT DISASSEMBLE CABIN AIR EXHAUST CONTROL VALVE ASSEMBLY FOR CLEANING AS THIS WILL VOID ANY WARRANTY AND MAY HAMPER THE INTEGRITY OF THE VALVE ASSEMBLY.

(1) Remove cabin safety valve. (Refer to Removal/Installation.)

CAUTION: HEAVILY CONTAMINATED VALVES MUST BE SOAKED IN CLEANING AGENT FOR A PERIOD OF TIME TO REMOVE EXCESS CONTAMINANTS PRIOR TO COMPLETION OF CLEANING PROCEDURE.

DO NOT ALLOW CLEANING AGENT TO ENTER THROUGH CABIN PRESSURE INLET HOLES IN VALVE POPPET ASSEMBLY.

(2) Place valve in pan of isopropyl alcohol or a mild detergent and water to soak. For initial soaking, the valve poppet will be closed instead of open as shown in Figure 202.
(3) After removing excess contaminants, insert blunt end of a No. 30 (1/8 inch) drill bit into shank end of valve center cone port and push valve poppet to open position (approximately one inch). Cap the valve fitting to retain vacuum in control chamber. This will hold the valve open when the drill bit is removed.

CAUTION: VALVE MUST BE MONITORED TO ENSURE THAT VALVE POPPET DOES NOT SLOWLY CLOSE WHILE SITTING IN CLEANING AGENT. ANY SMALL LEAKAGE, EITHER FROM CAPPED VALVE FITTINGS OR INTERNAL LEAKAGE, WILL ALLOW THE VALVE POPPET TO SLOWLY CLOSE AND ALLOW CLEANING AGENT TO ENTER THE CABIN PRESSURE INLET HOLES.

(4) Place valve in a pan of isopropyl alcohol or a mild detergent and water as shown in Figure 202. Monitor valve poppet, ensuring that it stays open.

CAUTION: CLEANING AGENT LEVEL SHOULD NOT BE ABOVE LEVEL AS ILLUSTRATED WHEN VALVE ASSEMBLY IS IMMERSED.

DO NOT ALLOW CLEANING AGENT TO ENTER THROUGH CABIN PRESSURE INLET HOLES IN VALVE POPPET ASSEMBLY.

(5) Soak valve in cleaning agent enough to loosen or remove contaminants.

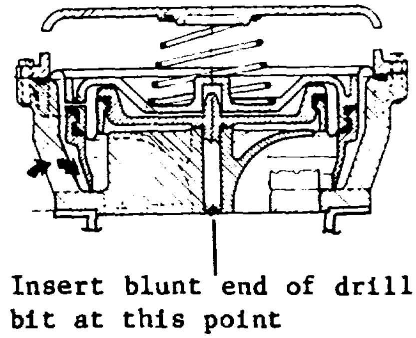
NOTE: A cotton swab or acid brush may be used to scrub the noise suppression screen, poppet, etc., if required. Pay particular attention to valve poppet assembly and valve poppet seating areas.

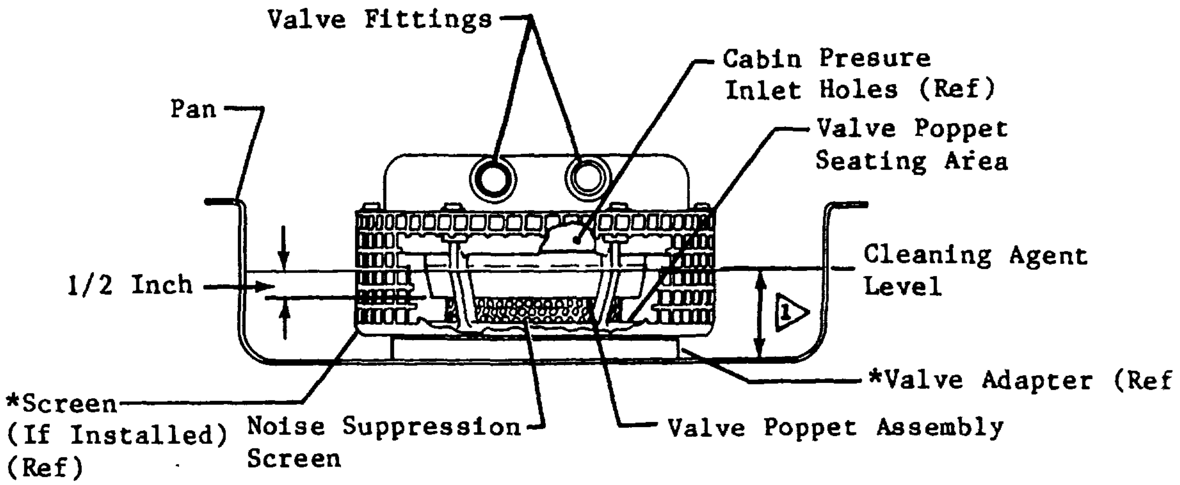
(6) Perform a visual inspection of cabin safety valve to ensure that diaphragm retention ring has not separated from valve poppet assembly (see Figure 201), and that poppet assembly is seating properly. Replace cabin safety valve if necessary.

(7) Install cabin safety valve. (Refer to Removal/Installation.)

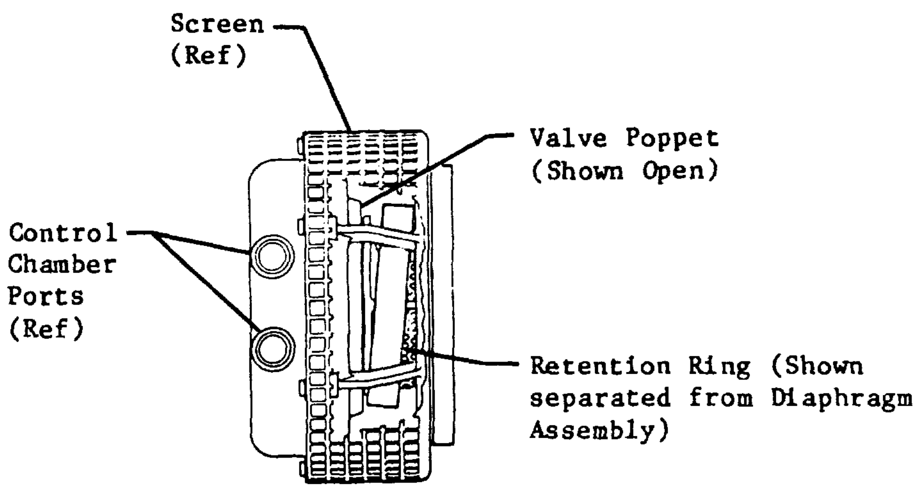
1 ▷ Cleaning agent level will vary due to the type of valve adapter installed. Cleaning agent level must be adjusted so that the valve poppet assembly is immersed at least 1/2 inch in cleaning agent. Cleaning agent must not enter the cabin pressure inlet holes.

* Valve screen (if installed) and valve adapter shall not be removed from valve assembly.





Valve Shown Partially Open



WARNING: DEFECTIVE VALVE ASSEMBLY SHOWN. DO NOT INSTALL VALVE ASSEMBLY IN THIS CONDITION.

Cabin Safety Valve Cleaning
Figure 202

CABIN DIFFERENTIAL PRESSURE RELIEF VALVE - MAINTENANCE PRACTICES

1. Removal/Installation

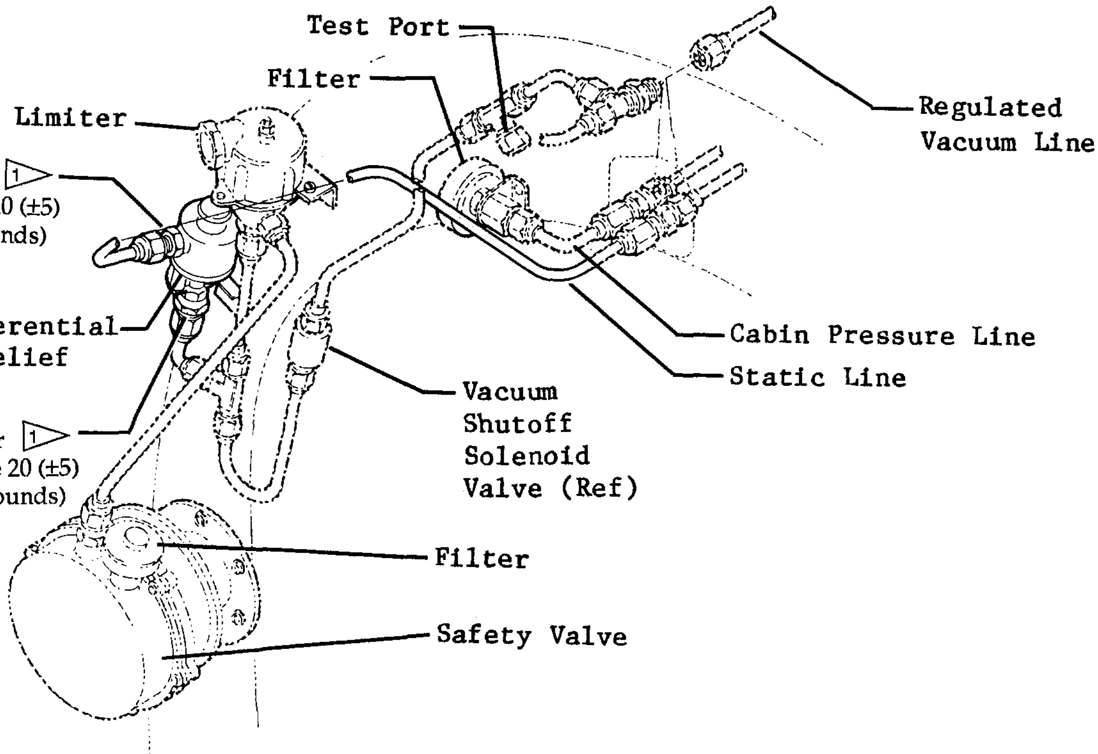
CAUTION:
- WHEN ANY LINE IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ENSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE SYSTEM MALFUNCTION.
- LIMIT TORQUE OF FITTING NEXT TO CABIN DIFFERENTIAL PRESSURE RELIEF VALVE TO 20 (±5) INCH-POUNDS. HOLD FITTING WHEN ATTACHING ADDITIONAL PARTS TO PREVENT OVER-TORQUING BACK INTO CABIN DIFFERENTIAL PRESSURE RELIEF VALVE.

A. Remove Relief Valve (See figure 201.)
   (1) Remove baggage compartment headliner.
   (2) Disconnect static lines from relief valve. Cap all exposed openings.
   (3) Loosen union and remove relief valve from aircraft.

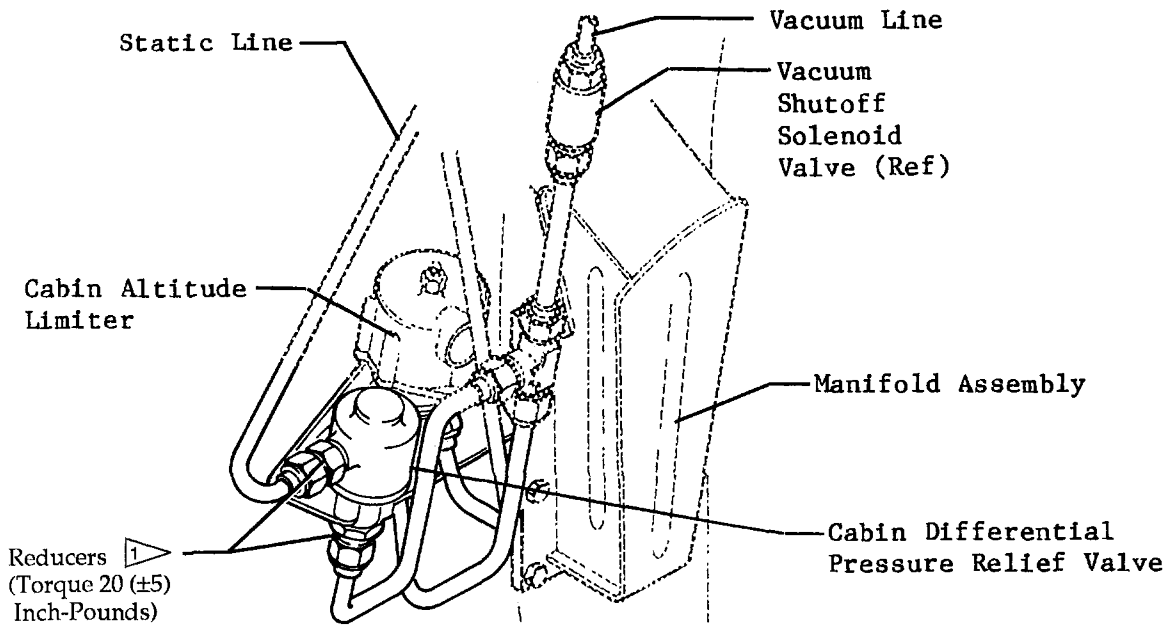
B. Install Relief Valve (See figure 201.)
   (1) Install relief valve and secure with union.
   (2) Remove cap and connect ambient static line to relief valve.
   (3) Perform functional test of relief valve.
   (4) Remove cap and connect remaining tube to relief valve.
   (5) Install baggage compartment headliner.

2. Adjustment/Test

A. Perform Functional Test of Cabin Differential Pressure Relief Valve (See figure 202.)
   (1) If a functional test of the cabin differential pressure relief valve is required, refer to "Functional Test of Pressurization System," 21-30-00.



35/35A Aircraft (Typical)



36/36A Aircraft (Typical)

1 **CAUTION: LIMIT TORQUE OF FITTING NEXT TO CABIN DIFFERENTIAL PRESSURE RELIEF VALVE TO 20 (±5) INCH-POUNDS. HOLD FITTING WHEN ATTACHING ADDITIONAL PARTS TO PREVENT OVER-TORQUING BACK INTO CABIN DIFFERENTIAL PRESSURE RELIEF VALVE.**

Cabin Differential Pressure Relief Valve Installation
Figure 201

CABIN ALTITUDE PRESSURE LIMITER - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

CAUTION: WHEN ANY LINE IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE SYSTEM MALFUNCTION.

A. **Remove Forward Cabin Altitude Pressure Limiter** (Aircraft 35-002 thru 35-112, except 35-107, 36-002 thru 36-031, modified per AMK 78-5, "Installation of Cabin Altitude Pressure Limiter") (See figure 201.)
   (1) Gain access to RH aft side of frame 5.
   (2) Disconnect, cap-off, and identify hose assemblies from cabin altitude limiter.
   (3) Remove attaching parts and cabin altitude limiter from aircraft.
   (4) Check cabin air inlet screen. Remove and clean if required.

B. **Install Forward Cabin Altitude Pressure Limiter** (Aircraft 35-002 thru 35-112, except 35-107, 36-002 thru 36-031, modified per AMK 78-5, "Installation of Cabin Altitude Pressure Limiter") (See figure 201.)
   (1) If removed for cleaning, install cabin air inlet screen.
   (2) Install cabin altitude limiter and secure with attaching parts.
   (3) Remove caps and connect hoses to cabin altitude limiter.

C. **Remove Forward Cabin Altitude Pressure Limiter** (Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent) (Refer to 21-30-08.)

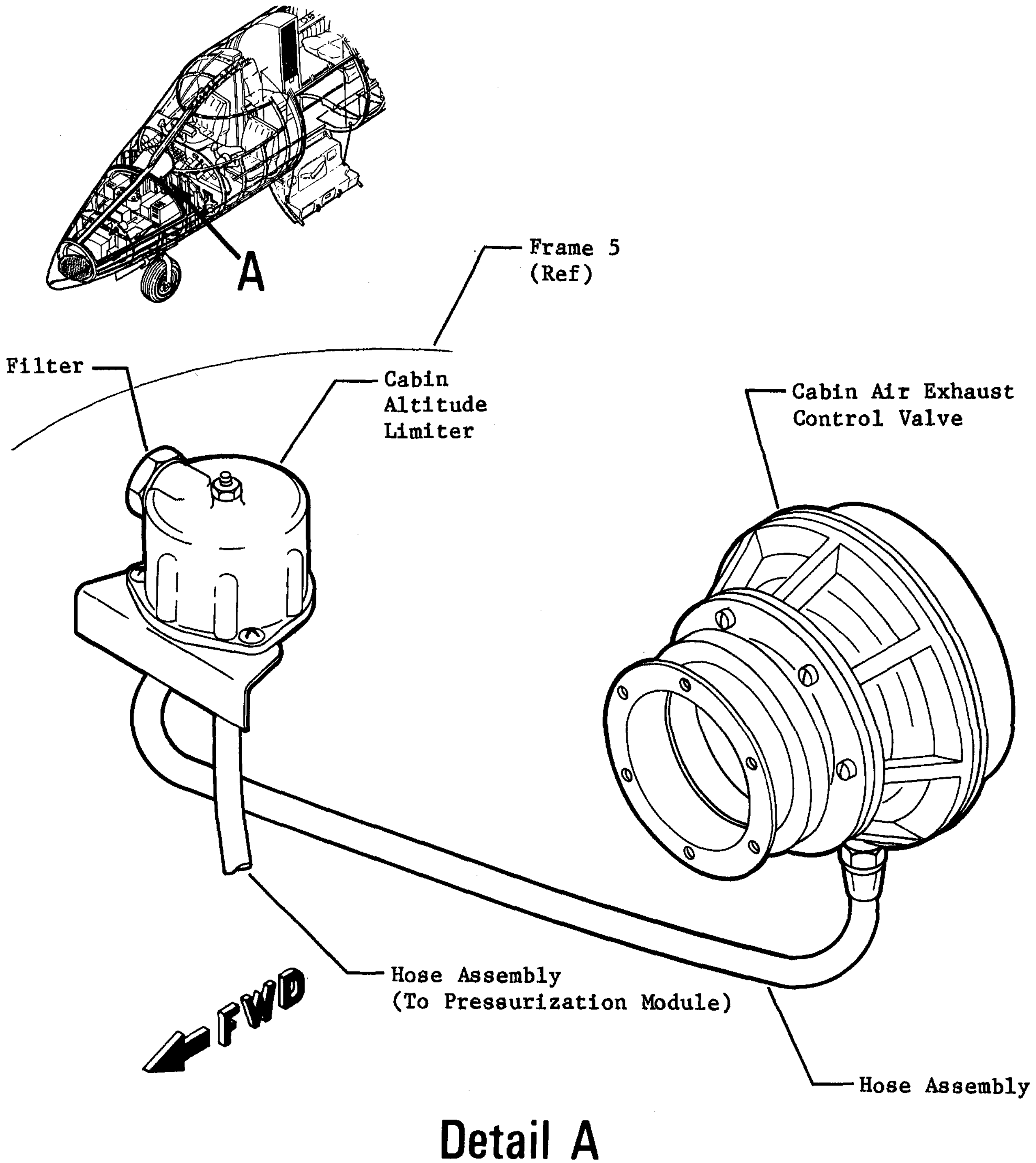
D. **Install Forward Cabin Altitude Pressure Limiter** (Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent) (Refer to 21-30-08.)

E. **Remove Aft Cabin Altitude Pressure Limiter** (See figure 201.)
   (1) Remove baggage compartment headliner.
   (2) Disconnect lines from tee or limiter. Cap all exposed openings.
   (3) Remove attaching parts and altitude limiter with tee attached from aircraft.
   (4) Check cabin air inlet screen. Remove and clean if required.

F. **Install Aft Cabin Altitude Pressure Limiter** (See figure 201.)
   (1) Install altitude limiter and secure with attaching parts.
   (2) Remove caps and connect lines to tee or limiter.
   (3) Install baggage compartment headliner.

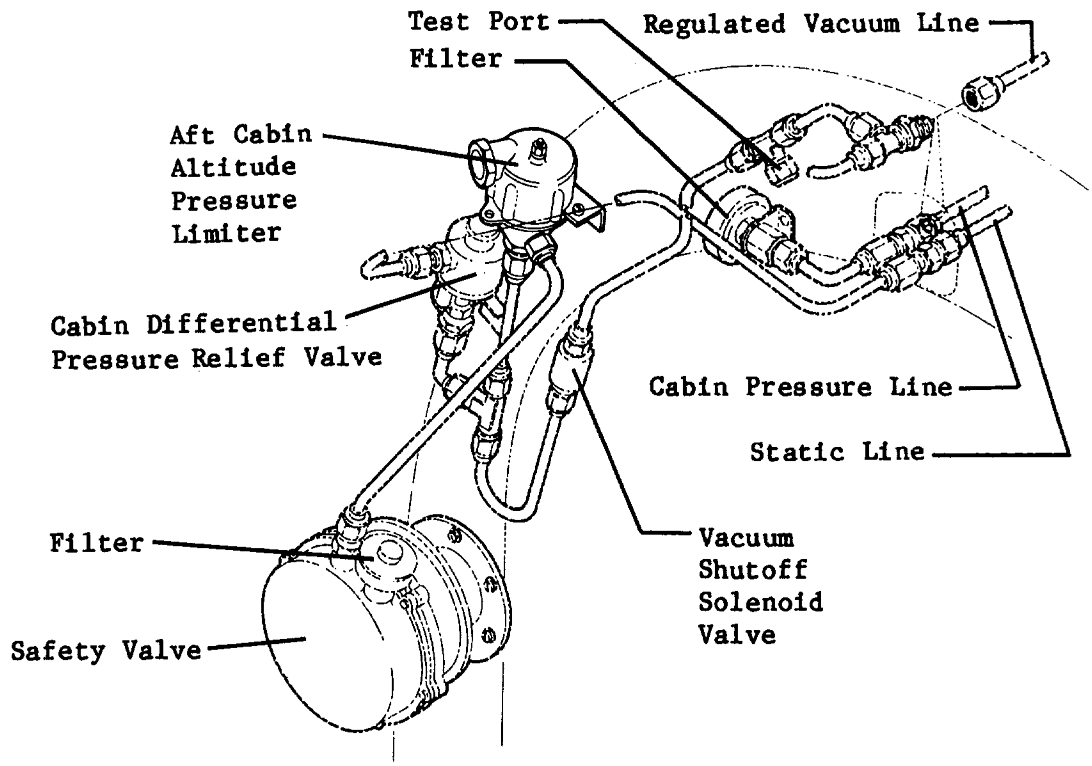
2. CLEANING/PAINTING

A. **Remove and Clean Cabin Altitude Pressure Limiter Air Inlet Screen**
   (1) Remove snap ring and screen from limiter.
   (2) Inspect screen for damage. Replace if necessary.
   (3) Clean screen with MEK and air-dry.
   (4) Install screen and secure with snap ring.

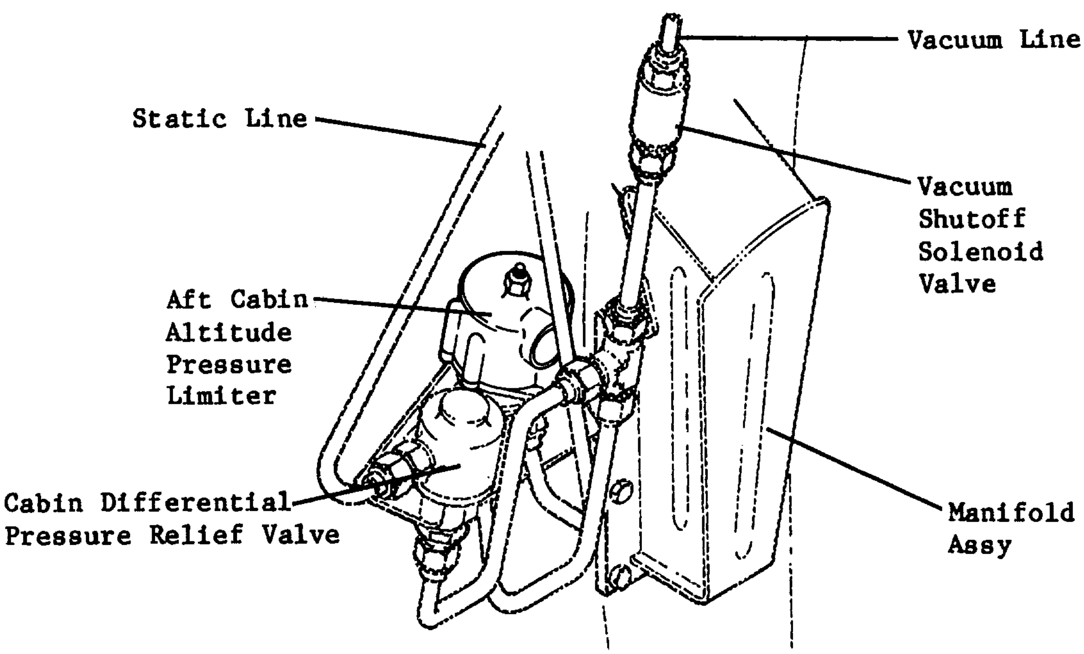


A13-130B

Cabin Altitude Pressure Limiter Installation (Typical)
Figure 201 (Sheet 1 of 2)



35/35A Aircraft



36/36A Aircraft

13-28C-4

Cabin Altitude Pressure Limiter Installation (Typical)
Figure 201 (Sheet 2 of 2)

PRESSURIZATION FILTER - MAINTENANCE PRACTICES

1. Removal/Installation

CAUTION: • ALL MAINTENANCE WORK SHOULD BE DONE IN A CLEAN ENVIRONMENT TO HELP MAINTAIN THE INTEGRITY OF THE SYSTEM. WHEN ANY TUBE OR HOSE ASSEMBLY IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED AND IDENTIFIED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE A SYSTEM MALFUNCTION.

• THE PRESSURIZATION FILTERS ARE NOT INTERCHANGEABLE DUE TO THE ORIFICE IN THE FILTER STUD ASSEMBLIES.

A. Disassemble Foam-Type Filter Assembly (See figure 201.)
   (1) Remove equipment as necessary to gain access to filter installation.
   (2) Remove snap ring, retainer, top cap, spring, base cap, and filter element from filter stud.
   (3) Clean and/or replace filter element.
B. Assemble Foam-Type Filter Assembly (See figure 201.)
   (1) Install base cap, spring, filter element, top cap, retainer, and snap ring on filter stud.
   (2) Install previously removed equipment.
   (3) Visually inspect installation to ensure that components are installed properly.

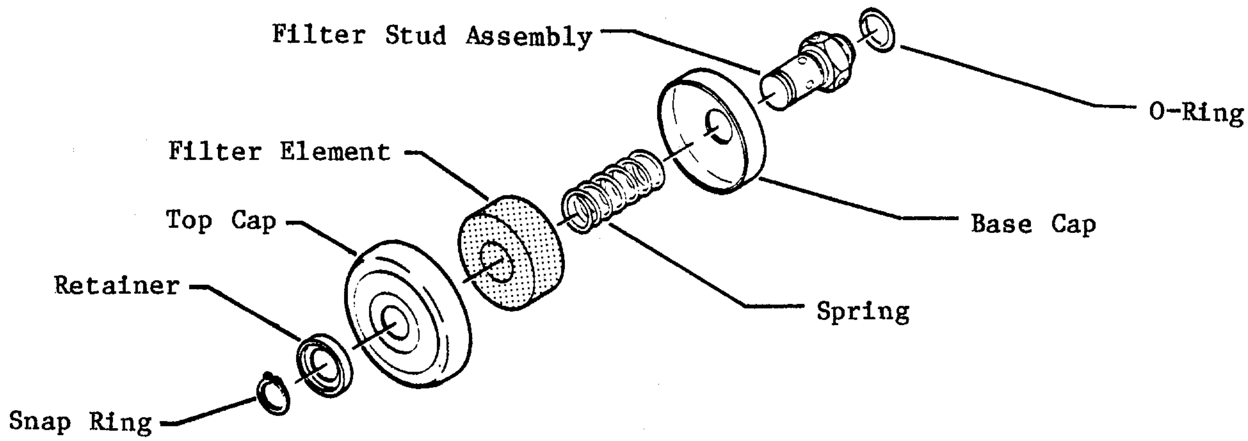
2. Cleaning/Painting

CAUTION: DO NOT USE MEK OR OTHER HYDROCARBON-BASED SOLVENTS ON COMPONENTS OR SURFACES MADE OF PLASTIC.

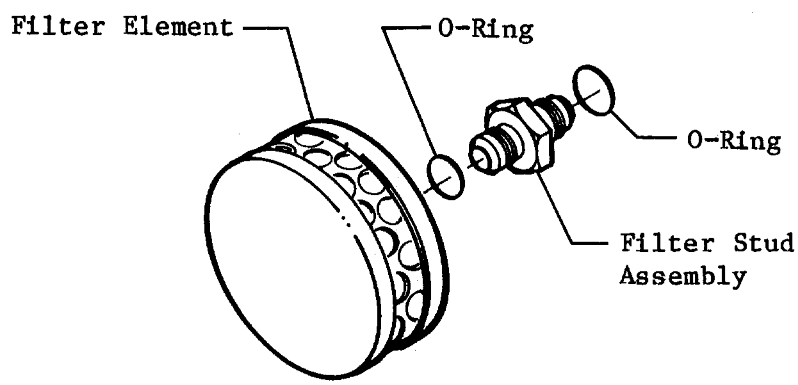
NOTE: • The pressurization filter assemblies must be cleaned or replaced at the time intervals specified in Chapter 5.

• On aircraft equipped with the cleanable foam-type air filter assembly, maintenance practices consist of disassembly, cleaning filter element, and reassembly.

A. Clean Foam-Type Filter Element
   (1) Remove filter element.
   (2) Wash filter element with isopropyl alcohol or with water and mild detergent.
   (3) Install filter element.

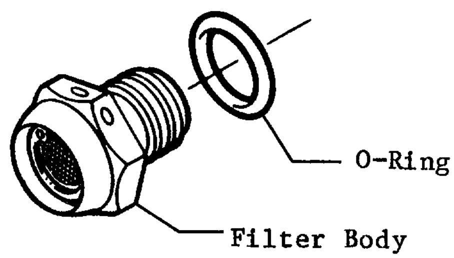


Foam-Type Filter Assembly



Paper-Type Filter Assembly

CAUTION: PRESSURIZATION FILTER ASSEMBLIES ARE NOT INTERCHANGEABLE DUE TO THE ORIFICE IN THE FILTER STUD ASSEMBLIES.



Nut-Type Filter Assembly

13-64D
13-158A
13-123A

Pressurization Filter Assemblies
Figure 201

VACUUM REGULATOR OR JET PUMP - MAINTENANCE PRACTICES

NOTE: Maintenance practices on the vacuum regulator assembly consist of removal and installation of the regulator assembly, replacing vacuum regulator filter (aircraft equipped with Airborne [Task] vacuum regulator), and functionally testing vacuum regulator assembly installed in the aircraft. For additional information pertaining to vacuum regulator assembly maintenance and overhaul, refer to the appropriate vendor's manual in the list of Supplementary Publications in the Introduction to this manual.

Remove, inspect, and replace as required, vacuum regulator assembly filter (aircraft equipped with Airborne [Task] vacuum regulator) in accordance with the current inspection interval specified in Chapter 5.

1. Removal/Installation

A. Remove Vacuum Regulator or Jet Pump Assembly (See Figure 201.)
   (1) Open tailcone access door and remove electrical power from aircraft.
   (2) Disconnect lines from vacuum regulator or jet pump. Cap or plug all exposed openings.
   (3) Remove attaching parts and vacuum regulator or jet pump assembly from aircraft.

B. Install Vacuum Regulator or Jet Pump Assembly (See Figure 201.)
   (1) Position vacuum regulator or jet pump assembly in aircraft and secure with attaching parts.
   (2) Remove caps or plugs and connect lines to vacuum regulator or jet pump assembly.
   (3) On Aircraft equipped with Airborne (Task) vacuum regulator, perform functional test of vacuum regulator assembly in accordance with procedures outlined in step 2. Adjustment/Test.
   (4) Perform an operational test of pressurization system. (Refer to Inspection/Check, 21-30-00.)
   (5) Restore electrical power to aircraft and secure tailcone access door.

C. .Replace Vacuum Regulator Filter(Aircraft equipped with Airborne [Task] vacuum regulator only.) (See Figure 201.)

   NOTE: Replace Vacuum Regulator Filter in accordance with the current inspection interval specified in Chapter 5.

   (1) Open tailcone access door and remove electrical power from aircraft.
   (2) Gain access to vacuum regulator assembly located on frame 26.
   (3) Locate filter on top side of vacuum regulator assembly, installed in regulated vacuum port. Disconnect tube assembly and remove filter assembly from vacuum regulator. Cap or plug all exposed openings.
   (4) Prior to installing new O-ring and filter, coat O-ring and threads of filter with a light film of grease (Hi-Vac, Dow-Corning Corp., S. Saginaw Rd., Midland, MI 48640, or equivalent). Install O-ring on filter.
   (5) Remove caps or plugs from tube assembly and vacuum regulator, and install filter in regulated vacuum port of regulator assembly. Connect tube assembly to filter.

      NOTE: Ensure filter flow-direction arrow (stamped on side of filter) points towards the vacuum regulator.

   (6) Perform functional test of vacuum regulator assembly in accordance with procedures outlined in step 2. Adjustment/Test.
   (7) Perform operational test of pressurization system. (Refer to Inspection/Check, 21-30-00.)
   (8) Restore electrical power to aircraft and secure tailcone access door.

2. **Adjustment/Test**

A. Functional Test of Vacuum Regulator Assembly *(Aircraft equipped with Airborne [Task] Vacuum Regulator Only.)* (See Figure 201.)

(1) Connect a 0 to 100 inch [0 to 254 centimeters] H_2O vacuum gage to the regulated vacuum line test port.

(2) Set Cabin Air Switch to OFF and Battery Switches to BAT 1 and BAT 2. Ensure that squat switches are in ground mode.

(3) Provide an air source to the regulator by either running one engine or attaching a regulated, filtered, compressed dry air source to the bleed air manifold.

(4) Slowly increase engine rpm until the vacuum gage stabilizes or set air pressure at 45 (±5) [310.3 (±34.5) kPag] psig. Vacuum gage indication should be 44 to 65 inches [111.8 to 165.1 centimeters] H_2O.

(5) Shut down engine or shut off and remove compressed air source from vacuum regulator.

(6) Remove vacuum gage from test port and install cap on test port.

(7) Restore aircraft to normal.

3. **Cleaning/Painting**

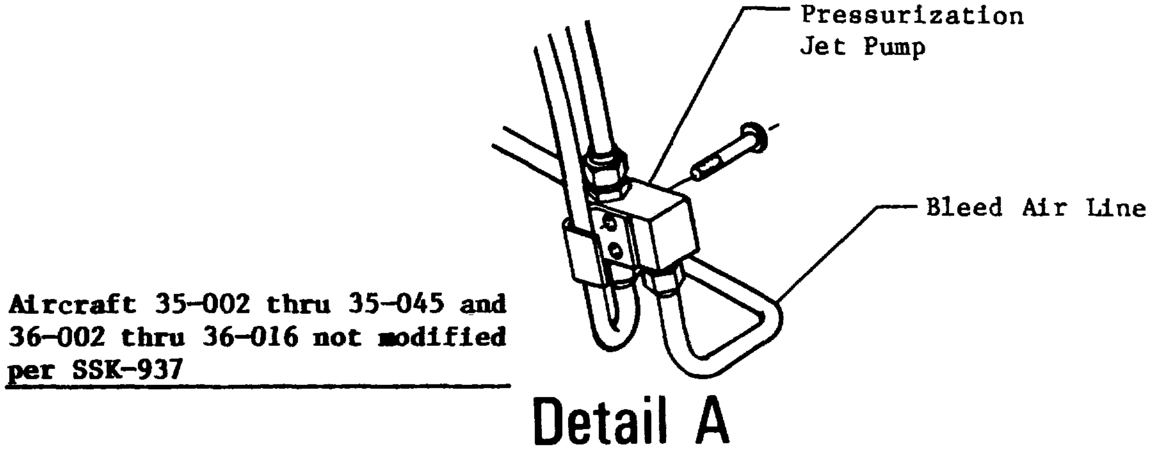
A. Clean Jet Pump (*Aircraft 35-002 thru 35-045 and 36-002 thru 36-016, not modified per SSK 937, "Installation of Cabin Pressurization Vacuum Regulator Assembly"*)

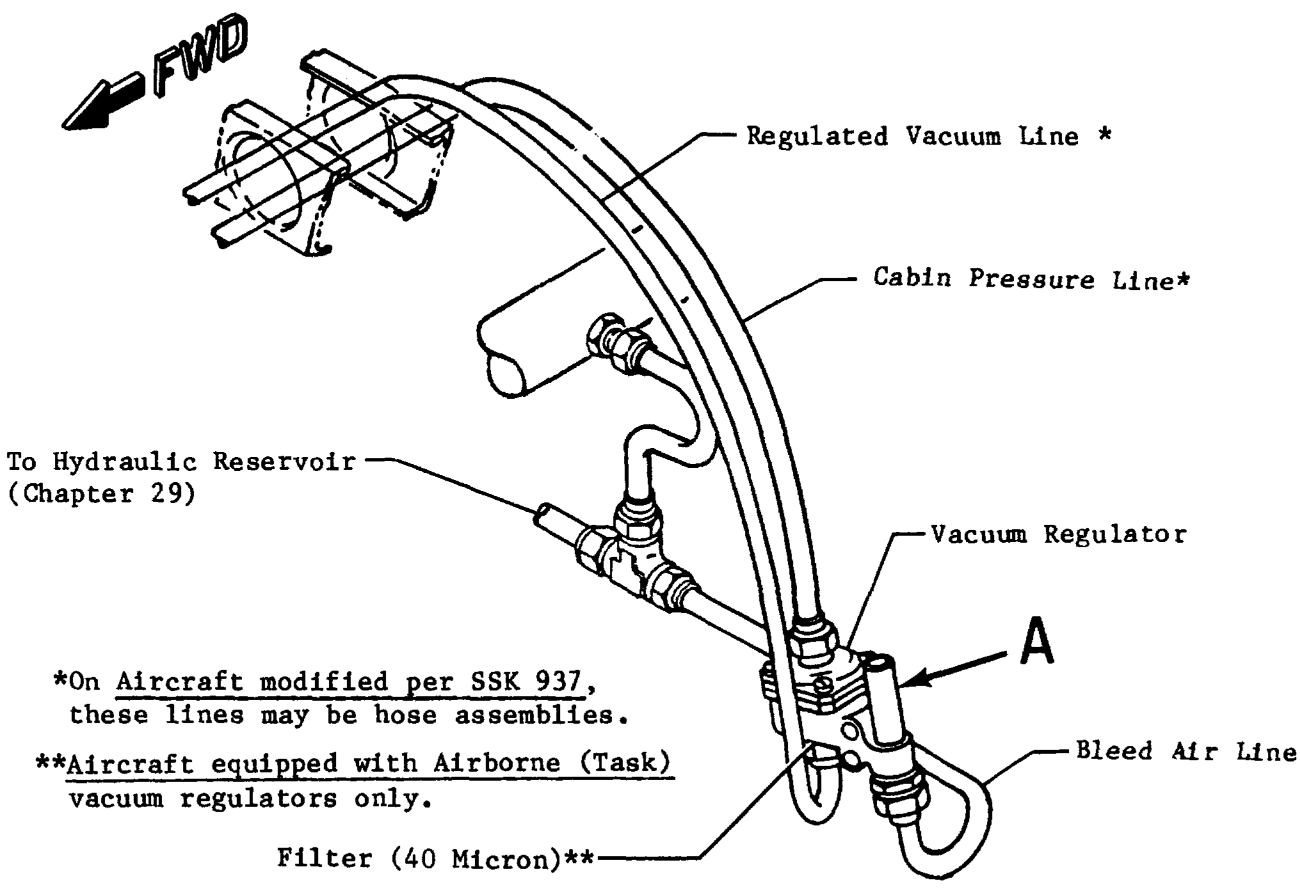
(1) Remove jet pump from aircraft.

(2) Clean jet pump assembly by submerging in methyl alcohol (methanol) and dry with clean, dry air not to exceed 15 [103.4 kPa] psi.

NOTE: To prevent loss of relief valve components, wire mesh screen filters shall not be removed.

(3) Install jet pump in aircraft.





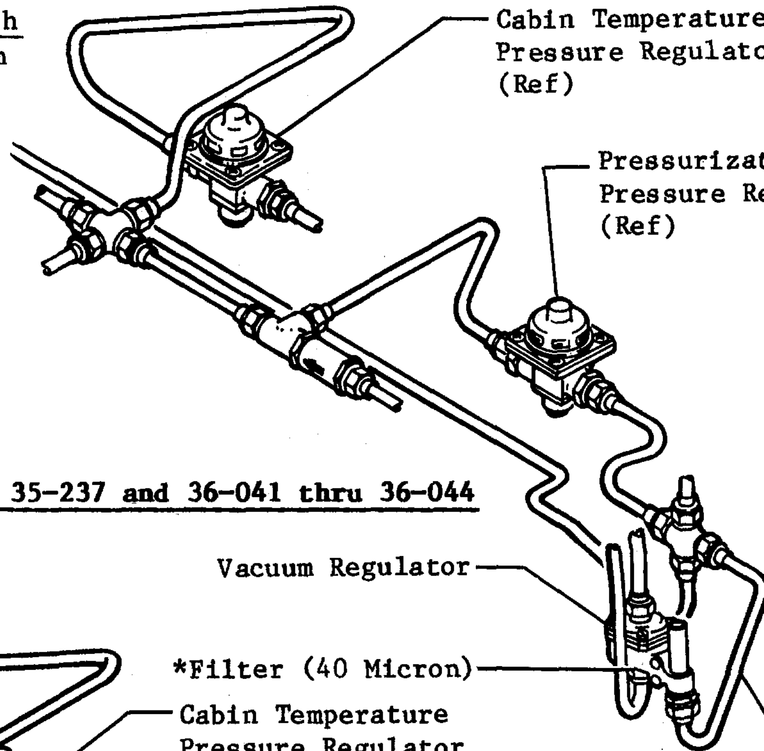
*On Aircraft modified per SSK 937, these lines may be hose assemblies.

**Aircraft equipped with Airborne (Task) vacuum regulators only.

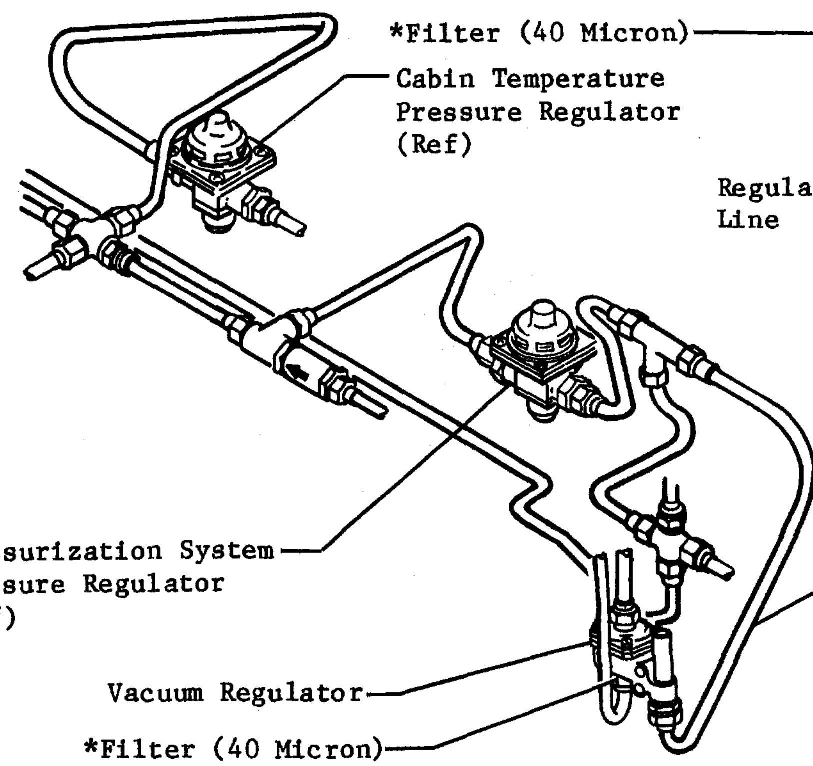
Aircraft 35-046 thru 35-106, 35-108 thru 35-112 and 36-017 thru 36-031

13-78C-2
13-106C

Vacuum Regulator (Jet Pump) Installation
Figure 201 (Sheet 1 of 2)



Aircraft 35-195 thru 35-237 and 36-041 thru 36-044



Aircraft 35-107, 35-113 thru 35-194, 35-238 and Subsequent and 36-032 thru 36-040, 36-045 and Subsequent

13-77B
13-106C

Vacuum Regulator (Jet Pump) Installation
Figure 201 (Sheet 2 of 2)

PRESSURIZATION ANEROID SWITCH - MAINTENANCE PRACTICES

1. **Removal/Installation**

A. Removal of Cabin Air Exhaust Control Valve Aneroid Switch (PSW300) *(Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031)* (See Figure 201.)

(1) Lower copilot's instrument panel.

(2) Remove pressurization module. (Refer to 21-30-08, Removal/Installation.)

(3) *On Aircraft not modified per SB 35/36-21-22*, disconnect and tag electrical wiring from aneroid switch. *On Aircraft modified per SB 35/36-21-22*, disconnect electrical connector.

(4) Remove screws and aneroid switch from pressurization module.

B. Installation of Cabin Air Exhaust Control Valve Aneroid Switch (PSW300) *(Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031)* (See Figure 201.)

(1) Perform Functional Test of Cabin Air Exhaust Control Valve Aneroid Switch (PSW300). (Refer to Adjustment/Test, this section.)

(2) Install aneroid switch and secure with attaching parts.

(3) *On Aircraft not modified per SB 35/36-21-22*, connect electrical wiring to aneroid switch. *On Aircraft modified per SB 35/36-21-22*, connect electrical connector.

(4) Set pressurization module and secure with attaching parts. (Refer to 21-30-08, Removal/Installation.)

(5) Raise and secure copilot's instrument panel.

C. Removal of Emergency Pressurization Aneroid Switch (S89 and S90) *(Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent)* (See Figure 201.)

(1) Remove upholstery or upper center panel as required to gain access to aneroid switch installation.

(2) Disconnect electrical connector from aneroid switch.

(3) Remove attaching parts and aneroid switch from aircraft.

D. Installation of Emergency Pressurization Aneroid Switch (S89 and S90) *(Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent)* (See Figure 201.)

(1) Install aneroid switch and secure with attaching parts.

(2) Connect electrical connector to switch.

(3) Perform Functional Test of Emergency Pressurization Aneroid Switch (S89 and S90). (Refer to Adjustment/Test, this section.)

(4) Install previously removed upholstery and/or upper center panel.

E. Removal of Cabin Air Exhaust Control Valve and CAB ALT Annunciator Control Aneroid Switch (PSW100/S3) *(Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent)* (See Figure 201.)

(1) Gain access to cabin air exhaust control valve aneroid switch (PSW100/S3) located in pressurization module. (Refer to 21-30-08, Removal/Installation.)

NOTE: The Cabin Air Exhaust Control Valve and CAB ALT Annunciator Control Aneroid Switch (PSW100/S3) is located beneath the Cabin Aural Warning Aneroid Switch (PSW101/S4) and may need to be removed before removing the Cabin Air Exhaust Control Valve and CAB ALT Annunciator Control Aneroid Switch (PSW100/S3).

(2) Remove aneroid filter from aneroid switch.

(3) Remove attaching parts from aneroid switch.

(4) Disconnect and identify electrical wiring from aneroid switch.

(5) Remove aneroid switch from aircraft.

F. Installation of Cabin Air Exhaust Control Valve and CAB ALT Annunciator Control Aneroid Switch (PSW100/S3) *(Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent)* (See Figure 201.)

(1) Identify and connect electrical wiring.

(2) Set and secure aneroid switch with attaching parts.

(3) Perform Functional Test of Cabin Air Exhaust Control Valve and CAB ALT Annunciator Control Aneroid Switch (PSW100/S3). (Refer to Adjustment/Test, this section.)

(4) Install aneroid filter in aneroid switch.
(5) Install pressurization module. (Refer to 21-30-08, Removal/Installation.)

2. Adjustment/Test

A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Pitot/Static System Tester	1811F	Barfield Instrument Co. Atlanta, GA	Test static system and components for proper operation.
Multimeter	Model 8000 or Model 77	Fluke Mfg. Inc. Everett, WA	Check continuity of electrical circuits.
Elbow Nut O-ring	AN833-4D AN924-4D MS28778-4	Commercially Available	Connect to aneroid switch.

NOTE: Before performing any of the following functional tests, set test altimeter to 29.92 inches of mercury.

B. Functional Test of Cabin Air Exhaust Control Valve Aneroid Switches (PSW300) _(Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031)_ (See Figure 202.)

NOTE: Perform Functional Test of Cabin Air Exhaust Control Valve Aneroid Switches in accordance with the current inspection interval specified in Chapter 5.

(1) Remove aneroid switch from module.
(2) Place aneroid switch in test set vacuum chamber as shown in Figure 202.
(3) Connect multimeter to wires C and N.O. Ensure that continuity does not exist.
(4) Slowly apply vacuum while observing multimeter and altimeter; switch shall actuate at 10,000 (±500) feet.
(5) Slowly release vacuum while observing multimeter and altimeter; switch shall reset on or before 7500 feet minimum.
(6) Slowly release vacuum until tester indicates appropriate ground altitude.

WARNING: FIELD ADJUSTMENT OF ANEROID SWITCH IS PROHIBITED.

(7) If aneroid switch is within 1500 feet of tolerance, remove switch from service and return to manufacture for calibration.
(8) If aneroid switch is more than 1500 feet out of tolerance, replace switch.
(9) Remove aneroid switch from test setup.
(10) Install switch. (Refer to Removal/Installation, this section.)

C. Functional Test of Emergency Pressurization Aneroid Switches (S89 and S90) _(Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent)_ (See Figure 202.)

NOTE: Perform Functional Test of Emergency Pressurization Aneroid Switches in accordance with the current inspection interval specified in Chapter 5.

(1) Connect LH emergency pressurization aneroid switch to test set (pitot/static tester or equivalent) and to altimeter as shown in Figure 202.
(2) Connect multimeter across pins A and C. Ensure that continuity exists.

CAUTION: TO AVOID DAMAGE TO THE TEST GAGE AND/OR ANEROID SWITCH, DO NOT EXCEED 2000 FEET PER MINUTE OR MAKE SUDDEN OR EXCESSIVE PRESSURE CHANGES ASCENDING OR DESCENDING WHEN FUNCTIONALLY TESTING THESE UNITS.

(3) Slowly apply vacuum while observing multimeter and altimeter; switch shall actuate at 9500 (±250) feet above sea level.
(4) Slowly release vacuum while observing multimeter and altimeter; switch shall actuate at 8300 feet minimum.
(5) Slowly release vacuum until tester indicates appropriate ground altitude.

WARNING: FIELD ADJUSTMENT OF ANEROID SWITCH IS PROHIBITED.

(6) If aneroid switch is within 1500 feet of tolerance, remove switch from service and return to manufacture for calibration.
(7) If aneroid switch is more than 1500 feet out of tolerance, replace switch.
(8) Disconnect test setup from LH emergency pressurization aneroid and connect to RH emergency pressurization aneroid switch. Perform steps C.(2) thru C.(6) on RH aneroid switch.
(9) Disconnect test setup from RH emergency pressurization aneroid.

D. Functional Test of Cabin Air Exhaust Control Valve Aneroid Switch (PSW100/S3) _(Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent)_ (See Figure 202.)

NOTE: Perform Functional Test of Cabin Air Exhaust Control Valve Aneroid Switch in accordance with the current inspection interval specified in Chapter 5.

This procedure is for aircraft without system electrical power available. Aircraft with system electrical power available may use an alternate method outlined in 2.E.

(1) Pull CABIN PRESS circuit breaker. Ensure the Pressurization Switch is set to AUTO.
(2) Remove filter from aneroid switch.
(3) Install 90° elbow on aneroid switch.
(4) Connect a hose in line between the aneroid switch, a vacuum source (pitot/static tester or equivalent), and altimeter as shown in Figure 202.
(5) Connect multimeter across pins J and N of the module plug. Circuit shall be open.

CAUTION: TO AVOID DAMAGE TO THE TEST GAGE AND/OR ANEROID SWITCH, DO NOT EXCEED 2000 FEET PER MINUTE OR MAKE SUDDEN OR EXCESSIVE PRESSURE CHANGES ASCENDING OR DESCENDING WHEN FUNCTIONALLY TESTING THESE UNITS.

(6) Slowly apply vacuum while observing multimeter and altimeter; switch shall actuate (closed circuit) at 8750 (±250) feet. _On Aircraft 35-107, 35-113 thru 35-128, and 36-032_, switch shall actuate at 9000 (±250) feet.

(7) Slowly release vacuum while observing multimeter and altimeter; switch shall reset (open circuit) on or before 7200 feet minimum. _On Aircraft 35-107, 35-113 thru 35-128, and 36-032_, switch shall reset on or before 7570 feet minimum.
(8) Slowly release vacuum until tester indicates appropriate ground altitude.

WARNING: FIELD ADJUSTMENT OF ANEROID SWITCH IS PROHIBITED.

(9) If aneroid switch is within 1500 feet of tolerance, remove switch from service and return to manufacture for calibration.
(10) If aneroid switch is more than 1500 feet out of tolerance, replace switch.
(11) Disconnect hose from test setup.
(12) Remove 90° elbow from aneroid switch.
(13) Clean filter and install in aneroid switch.

E. Alternate Functional Test of Cabin Air Exhaust Control Valve Aneroid Switch (PSW100/S3) _(Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent)_ (See Figure 202.)

NOTE: Perform Functional Test of Cabin Air Exhaust Control Valve Aneroid Switch in accordance with the current inspection interval specified in Chapter 5.

This is an alternate procedure for aircraft with system electrical power available. Aircraft without system electrical power available must use the procedure outlined in 2.D.

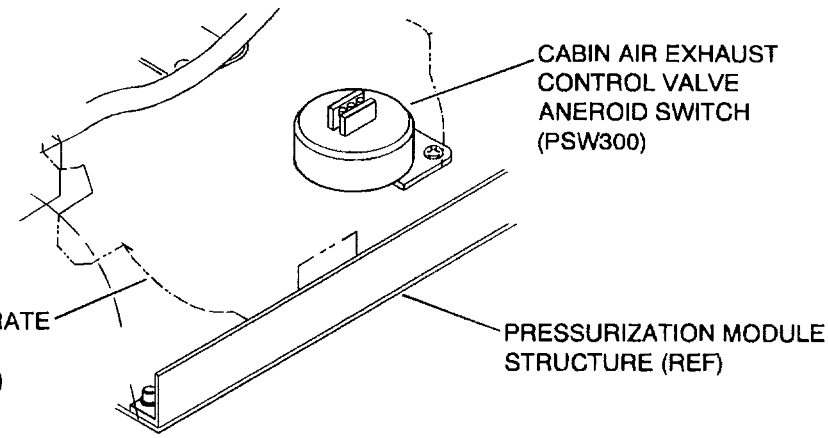
(1) Remove filter from aneroid switch.
(2) Install 90° elbow on aneroid switch.
(3) Connect a hose between vacuum source (pitot/static tester or equivalent), altimeter, and pressure module. (See Figure 202.)

CAUTION: TO AVOID DAMAGE TO THE TEST GAGE AND/OR ANEROID SWITCH, DO NOT EXCEED 2,000 FEET PER MINUTE OR MAKE SUDDEN OR EXCESSIVE PRESSURE CHANGES ASCENDING OR DESCENDING WHEN FUNCTIONALLY TESTING THESE UNITS.

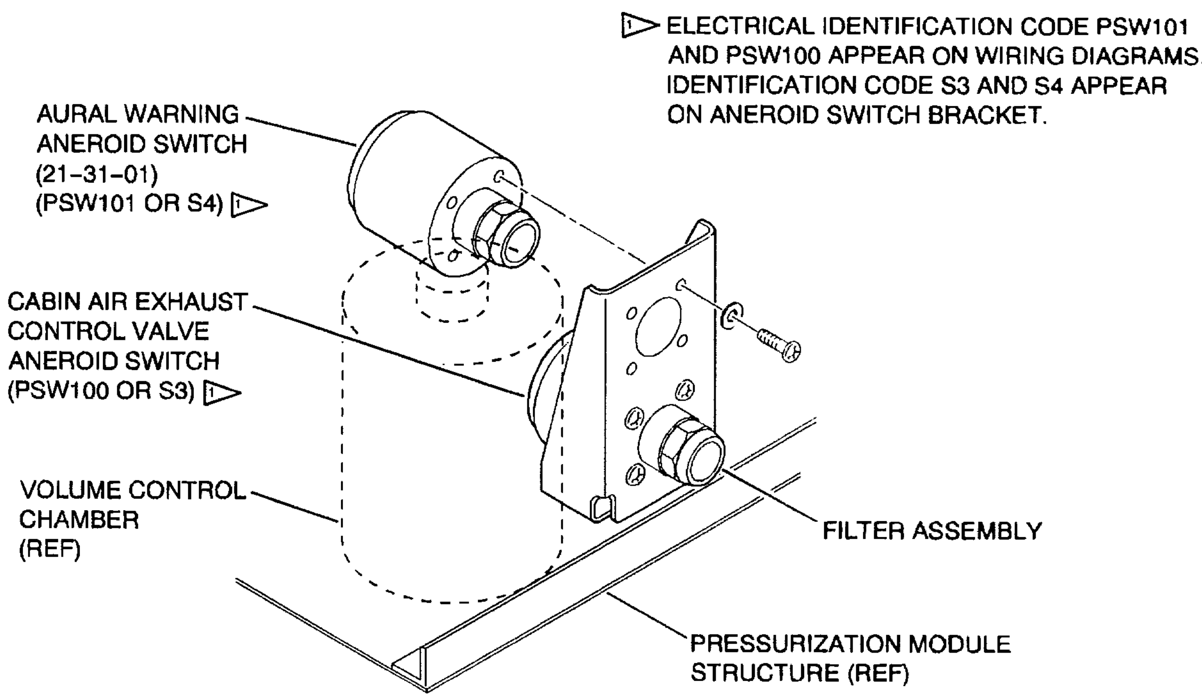
(4) Slowly apply vacuum while observing altimeter and CAB ALT annunciator for illumination; switch shall actuate at 8750 (±250) feet. _On Aircraft 35-107, 35-113 thru 35-128, and 36-032_, switch shall actuate at 9,000 (±250) feet.
(5) Slowly release vacuum while observing altimeter and CAB ALT annunciator to extinguish; switch shall reset on or before 7,200 feet minimum. _On Aircraft 35-107, 35-113 thru 35-128, and 36-032_, switch shall reset on or before 7,570 feet minimum.
(6) Slowly release vacuum until tester indicates appropriate ground altitude.

WARNING: FIELD ADJUSTMENT OF ANEROID SWITCH IS PROHIBITED.

(7) If aneroid switch is within 1500 feet of tolerance, remove switch from service and return to manufacture for calibration.
(8) If aneroid switch is more than 1500 feet out of tolerance, replace switch.
(9) Disconnect hose from test setup.
(10) Remove 90° elbow from aneroid switch.
(11) Clean filter and install in aneroid switch.



35-002 THRU 35-106, 35-108 THRU 35-112 AND 36-002 THRU 36-031



35-107, 35-113 AND SUBSEQUENT AND 36-032 AND SUBSEQUENT

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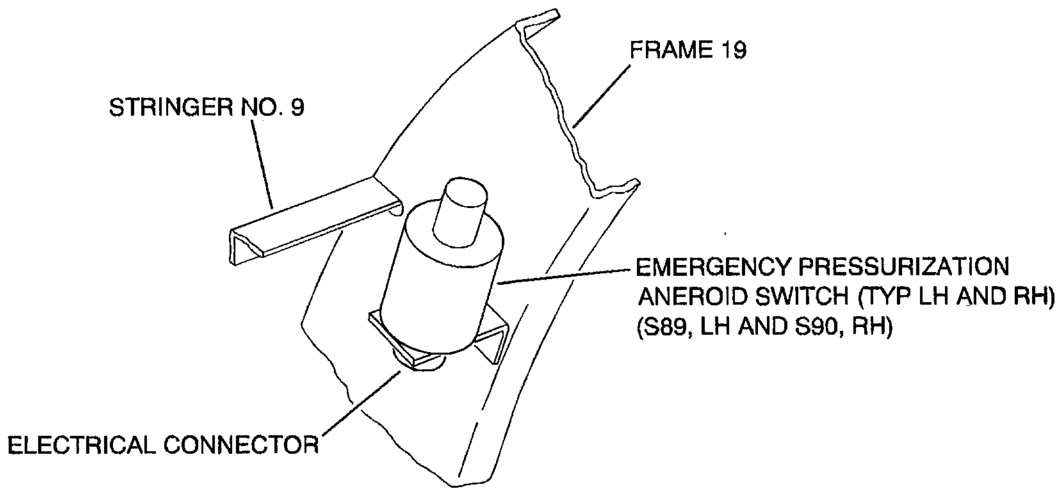
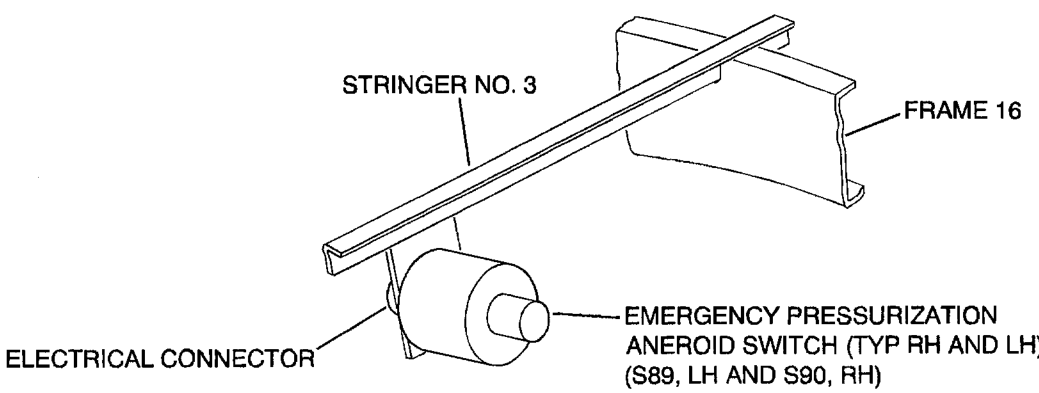
(SHOWN WITH COMPONENTS REMOVED)

Pressurization Aneroid Switch Installation
Figure 201 (Sheet 1 of 2)



35A AIRCRAFT



36A AIRCRAFT

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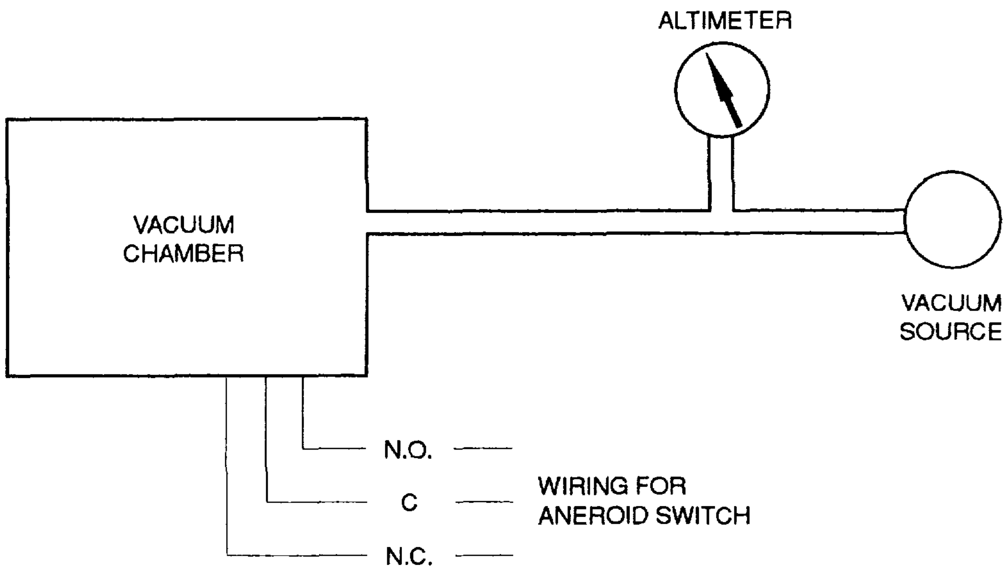
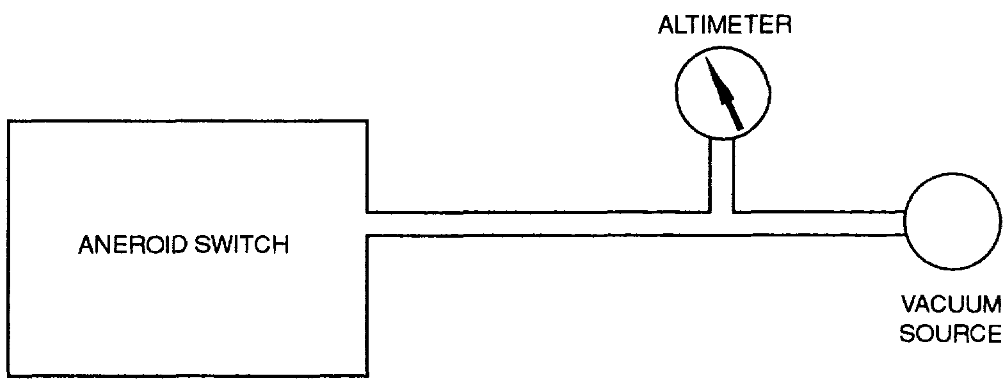
Pressurization Aneroid Switch Installation
Figure 201 (Sheet 2 of 2)



AIRCRAFT 35-002 THRU 35-106, 35-108 THRU 35-112 AND 36-002 THRU 36-031



AIRCRAFT 35-107, 35-113 AND SUBSEQUENT AND 36-032 AND SUBSEQUENT

Functional Test of Pressurization Aneroid Switches
Figure 202

PRESSURIZATION MODULE - MAINTENANCE PRACTICES

1. Removal/Installation

CAUTION: WHEN ANY LINE IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ENSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE SYSTEM MALFUNCTION. ALL FITTINGS OR CONNECTIONS THAT MATE TO PLASTIC COMPONENTS ARE TORQUED 10 TO 15 INCH-POUNDS [1.129 TO 1.69 NEWTON-METERS].

THE ONLY PRESSURIZATION MODULE ITEMS THAT MAY BE REPLACED ARE THE ANEROID SWITCHES AND FILTERS. ANY OTHER REPAIR OF THE PRESSURIZATION MODULE MUST BE ACCOMPLISHED AT THE FACTORY.

A. Removal of Module (See Figure 201.)

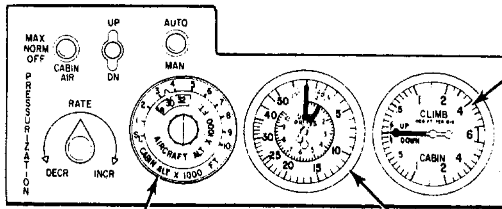
NOTE: All maintenance work should be done in a clean room to maintain integrity of the system.

(1) Set Battery Switches off and disconnect aircraft batteries.
(2) Remove screws, two on each side of module, and lower pressurization module.
(3) Disconnect static, vacuum, and cabin outflow valve lines from module. Cap all exposed lines.
(4) Disconnect electrical connector from module.
(5) Remove screws securing module to hinge and remove module from aircraft.

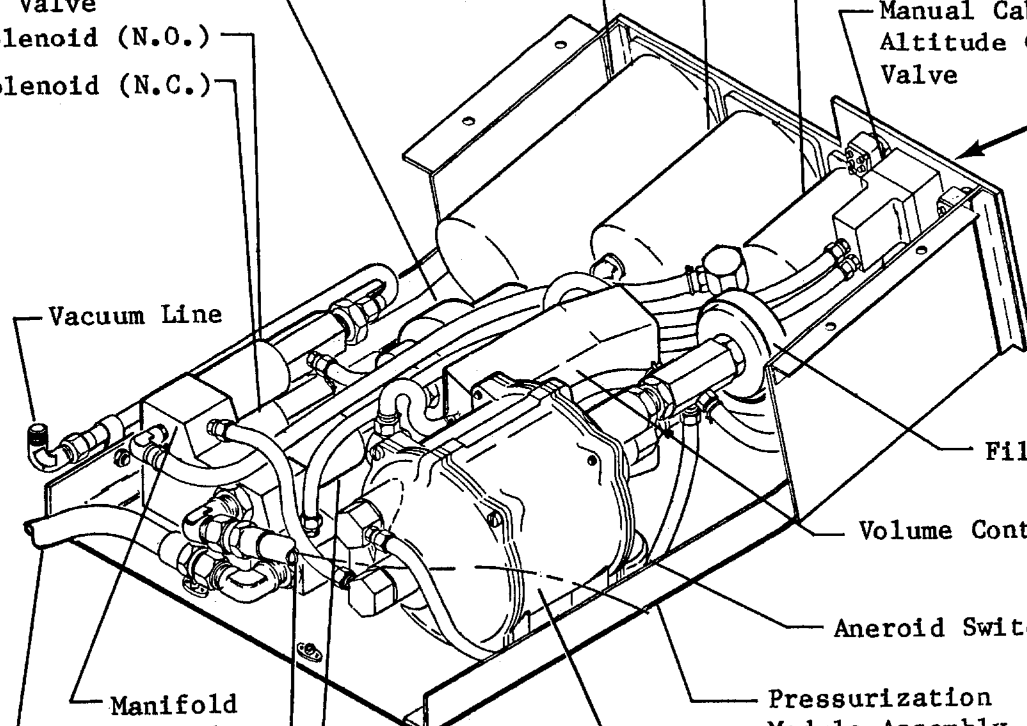
B. Installation of Module (See Figure 201.)

NOTE: All maintenance work should be done in a clean room to maintain integrity of the system.

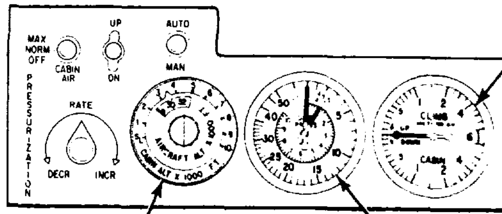
(1) Install module and secure hinge with screws.
(2) Remove caps and connect static, vacuum, and cabin outflow valve lines to pressurization module.
(3) Connect electrical connector.
(4) Raise and secure module to instrument panel.
(5) Connect electrical connector and static and pitot lines to instruments.
(6) Raise instrument panel and secure.
(7) Connect electrical connectors to aircraft batteries.



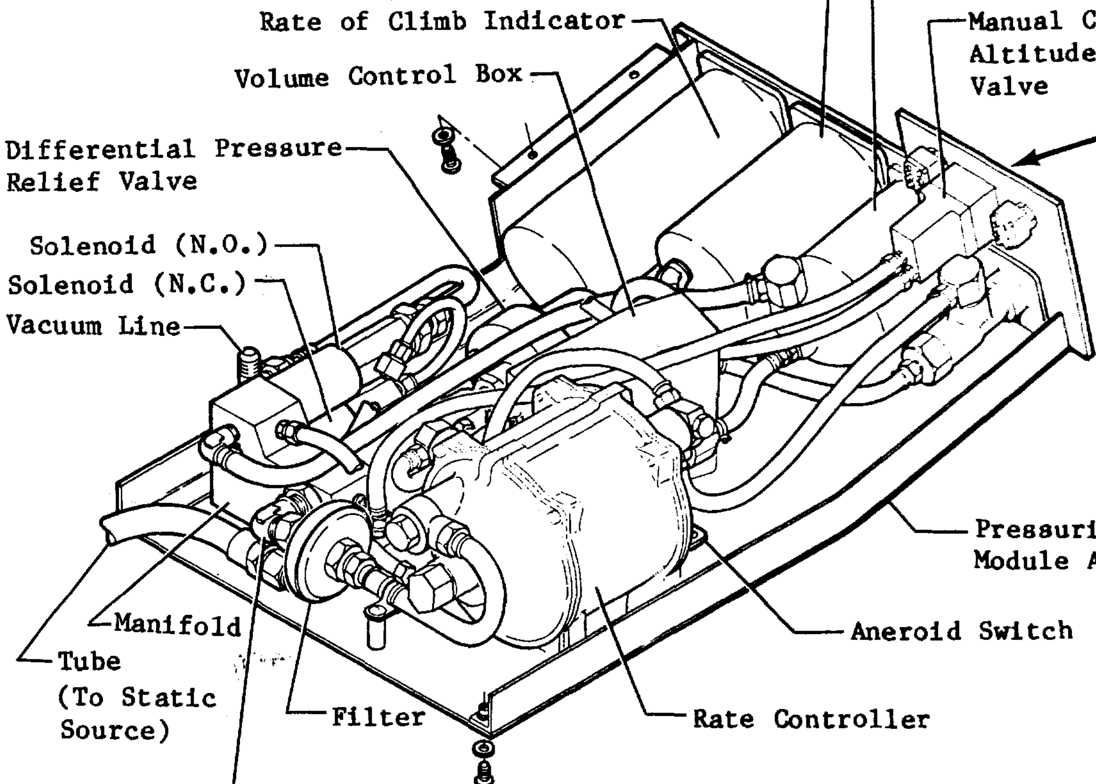
CAUTION: WHEN ANY LINE IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ENSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE SYSTEM MALFUNCTION.



Pressurization Module Installation
Figure 201 (Sheet 1 of 3)



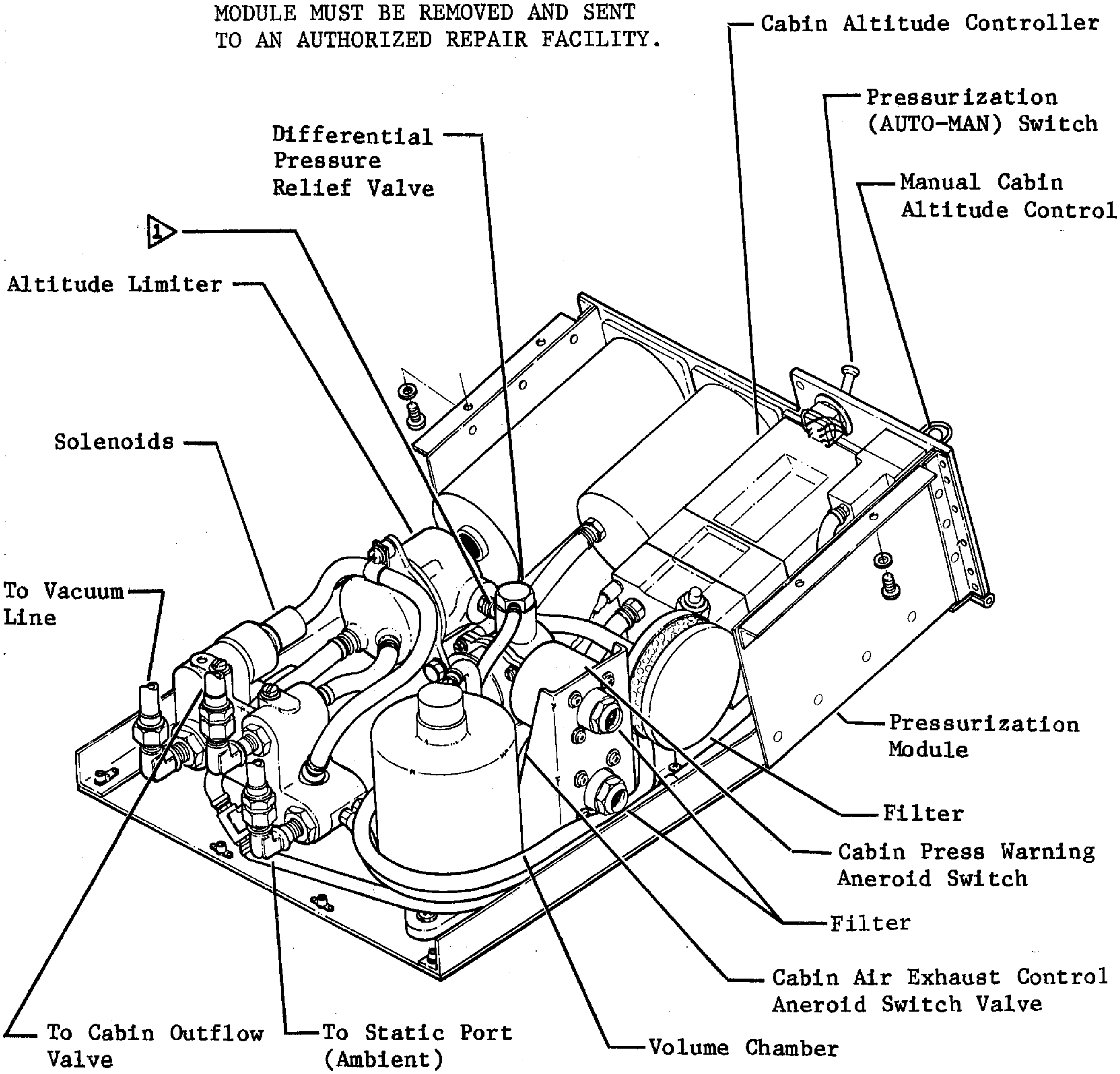
CAUTION:
- WHEN ANY LINE IS DISCONNECTED OR COMPONENT REMOVED FROM THE PRESSURIZATION SYSTEM, ASSURE THAT ALL EXPOSED OPENINGS ARE TIGHTLY CAPPED. THE SMALLEST SPECK OF DUST OR OTHER CONTAMINANT COULD CAUSE SYSTEM MALFUNCTION.
- ALL FITTINGS OR CONNECTIONS THAT MATE TO PLASTIC COMPONENTS ARE TORQUED 10 TO 15 INCH-POUNDS.



Pressurization Module Installation
Figure 201 (Sheet 2 of 3)

1 Remove this tie for Altitude Limiter Test, reference 21-30-00.

CAUTION: IF ANY COMPONENT ON THE MODULE IS DEFECTIVE, EXCEPT FOR FILTERS, THE MODULE MUST BE REMOVED AND SENT TO AN AUTHORIZED REPAIR FACILITY.



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Pressurization Module Installation
Figure 201 (Sheet 3 of 3)

2. Adjustment/Test

NOTE: Perform functional test as required by trouble shooting procedure. The test should be performed in a clean room.

A. Acquire necessary tools and equipment.

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Vacuum Source (20 Inches Hg)		Commercially Available	General.
Mercury Manometer (0 to 31.5 inches Hg absolute)		Commercially Available	General.
Mercury Manometer (0 to 31.5 inches Hg)		Commercially Available	General.
Altimeter		Commercially Available	General.
Rate-of Climb Indicator		Commercially Available	General.
Vacuum Regulator (5.3 inches Hg Relief)	53892-3, Series I	Garrett-AiResearch Development	General
Differential Regulator	107312-1 PRI-5-1	Garrett-AiResearch Development	General
Orifice (0.040 [±0.001] inch diameter)		Commercially Available	General.
Electrical Test Fixture		Fabricate as shown in Figure 203.	
Hand Valves with Positive Shutoff (4 required)		Commercially Available	General.
Tubing		Commercially Available	General.
Stopwatch		Commercially Available	General.

B. Prepare a data sheet similar to Figure 205.

C. Place the pressurization module in the test setup shown in Figure 202.

D. Perform leak test as follows:

(1) Close valves V2 and V1. Using the vacuum bypass valve V4, establish 10,000 (±100) feet cabin altitude. Close the bypass valve V4. Record altimeter G1 reading.

(2) After two (2) minutes have elapsed, again record altimeter G1 reading; the leakage rate shall not exceed 50 feet per minute.
(3) Return the test setup to ambient pressure at 1000 feet per minute.
(4) Disconnect filter, static, and jet pump lines from the tee fitting.

E. Perform module leakage test as follows:
(1) Remove module inflow filter from module. Connect test setup filter, static, and jet pump lines to the corresponding ports on the module. Install altimeter G3 on the outflow valve port of the module.
(2) Select maximum altitude on the cabin altitude controller and maximum rate on the selector. Close valves V2 and V1. Using the valve V4, establish 10,000 (±100) feet cabin altitude. Close the valve V4. Record altimeter G1 reading.
(3) After two (2) minutes elapsed time, again record the altimeter G1 reading. The module leakage rate, excluding test setup leakage, shall not exceed 300 feet per minute. Rotate the cabin altitude controller and rate selector knobs to ensure no variable O-ring leakage.

NOTE: There will be a fluctuation when the cabin altitude controller is rotated, but it will dampen.

(4) Return the module and test setup to ambient pressure at a rate not to exceed 3000 feet per minute.
(5) Remove cover from the bleed fitting in the regulator.

F. Perform module cabin altitude test as follows:
(1) Select an altitude below the field elevation on the cabin altitude controller, maximum rate of climb on the rate selector, and position switches per condition "C" of Figure 204. Close valves V2 and V4 and open the vacuum supply valve V1.
(2) Select a 2000-foot altitude on the cabin altitude controller.

NOTE: A short period of time is required to obtain regulation before the cabin altitude will being to rate up.

(3) Allow cabin altitude to stabilize; record manometer M1 reading. The manometer reading shall be 27.82 (±0.36) inches Hg absolute. Also record cabin altitude as indicated on gage G1.

NOTE: Maximum rate may be selected for the transition between the following altitude controller reselections.

(4) Maintain the selected 2000-foot cabin. Select rate selector position 90° clockwise from the minimum stop.
(5) Observe the actual cabin altitude on gage G1 and reselect the cabin altitude controller to 5000 feet. Record the change in cabin altitude immediately after reselection, before cabin rates up smoothly, as indicated on the cabin rate-of-climb indicator G2. Cabin altitude shall not change more than 200 feet before smoothly rating up. Reset the rate selector to maximum and allow system to climb to 5000 feet.

(6) Allow cabin altitude to stabilize at 5000 feet selected altitude. Record manometer M1 reading; manometer M1 reading shall be 24.89 (±0.32) inches Hg absolute. Record cabin altitude shown on cabin altimeter gage G1.

(7) Maintain the selected 5000-foot cabin altitude and select rate selector position 90° clockwise from the minimum stop.

(8) Observe the actual cabin altitude on gage G1 and reselect the cabin altitude controller to 8000 feet. Record the change in cabin altitude immediately after reselection, before cabin rates up smoothly, as indicated on the cabin rate-of-climb indicator G2. Cabin altitude shall not change more than 200 feet before smoothly rating up. Reset rate selector to maximum and allow system to rate to 8000 feet.

(9) Allow cabin altitude to stabilize at 8000 feet selected altitude. Record manometer M1 reading; manometer M1 reading shall be 22.22 (±0.30) inches Hg absolute. Record cabin altitude shown on cabin altimeter gage G1.

(10) Set AUTO-MAN Switch to MAN position, condition "D" of Figure 204, and slowly move manual cabin altitude control valve to the UP position. The altitude on the altimeter gage G3 should increase as the manual valve is held in the UP position. Record the direction of altitude change.

(11) Slowly move the manual cabin altitude control valve to the DN position. The altitude on the altimeter gage G3 should decrease as the manual valve is held in the DN position. Record the direction of altitude change.

(12) Return AUTO-MAN switch to the AUTO position.

(13) Maintain a cabin altitude of 8000 feet. Select a rate selector position 90° clockwise from the minimum stop.

(14) Observe the actual cabin altitude gage G1 and reselect 5000 feet on the cabin altitude controller. Record the change in cabin altitude immediately after reselection, before cabin altitude rates down smoothly, as indicated on the rate-of-climb indicator G2. Cabin altitude shall not change more than 200 feet before smoothly rating down. Reset selector to maximum and allow system to rate to 5000 feet.

(15) Allow cabin altitude to stabilize at 5000 feet selected altitude and record manometer M1 reading; manometer M1 reading shall be 24.89 (±0.32) inches Hg absolute. Record cabin altitude shown on cabin altitude gage G1.

(16) Maintain the selected 5000 feet cabin and select rate selector position 90° clockwise from the minimum stop.

(17) Observe the actual cabin altitude gage G1 and select a 2000-foot cabin altitude on the cabin altitude controller. Record the change in cabin altitude immediately after reselection, as indicated on the cabin rate-of-climb indicator G2. Cabin altitude shall not change more than 200 feet before smoothly rating down. Reset rate selector to maximum and allow to rate to 2000 feet.

(18) Allow cabin altitude to stabilize at 2000 feet selected altitude and record manometer M1 reading; manometer M1 reading shall be 27.82 (±0.36) inches Hg absolute. Record cabin altitude shown on cabin altimeter gage G1.

G. Perform rate control test as follows:

NOTE: Rate controller "buzzing" is acceptable if cabin rate remains within specified limits during the functional test.

(1) Select the maximum rate of the selector position and select 8000 feet cabin altitude on the cabin altitude controller. Measure the amount of time required for the cabin altimeter gage G1 to change from 4500 to 5500 feet. Convert the measured time to rate. Record the maximum up rate obtained which shall not exceed 1250 feet per minute.

(2) Select 2000 feet cabin altitude on the cabin altitude controller. Measure the amount of time required for the cabin altimeter gage G1 to change from 5500 to 4500 feet. Convert the measured time to rate. Record the maximum down rate obtained which shall exceed 1250 feet per minute.

(3) Set the rate selector to a position 90° from the minimum stop and select 8000 feet cabin altitude on the cabin altitude controller. Observe the altitude change from an initial 4500 feet altitude during a 60-second time period. Record the nominal up rate obtained.

(4) Without changing the position of the rate selector, select 2000 feet cabin altitude on the cabin altitude controller. Observe the altitude change from an initial 5500 feet during a 60-second period. Record the nominal down rate obtained.

(5) Select 8000 feet cabin altitude on the cabin altitude controller and select a convenient rate on the rate selector. Allow the cabin altitude to approach 4500 feet, then select the minimum rate selector position. When the system stabilizes on minimum rate, observe the altitude change on the cabin altimeter gage G1 during a 60-second time period. Record the minimum up rate which shall not exceed 375 feet per minute.

(6) Rotate the rate selector knob to the maximum rate and allow the cabin altimeter gage G1 to approach 5500 feet. Reselect the minimum rate selector position and select 2000 feet cabin altitude on the cabin altitude selector. When the system stabilizes on the minimum rate, observe the altitude change on the cabin altimeter gage G1 during a 60-second period. Record the minimum down rate which shall not exceed 375 feet per minute.

H. Perform the differential pressure relief valve test as follows:

(1) Set the rate selector to a position 90° from the minimum stop and select 2000 feet cabin altitude on the cabin altitude controller.

(2) Slowly open valve V4 to allow vacuum to increase at the static port of the module. Observe the cabin-to-atmosphere manometer M3 and record the Delta P value as shown on manometer M3 when the system begins to operate on differential relief.

NOTE: The cabin altitude will begin to increase as shown on the cabin altimeter gage G1 and the cabin rate-of-climb indicator G2 when the system starts to operate on the differential relief valve.

(3) Increase the vacuum supply through valve V4 to increase the cabin altitude as shown on gage G1 to 3000 feet. Stabilize the cabin altitude G1 and permit cabin rate-of-climb indicator G2 to null.

(4) Slowly close valve V4 to return the module to isobaric operation; rate control should be operational to return system to selected cabin altitude (2000 feet).

(5) Select below field elevation on the altitude selector and allow system to return to room ambient pressure. Close vacuum supply valve V4.

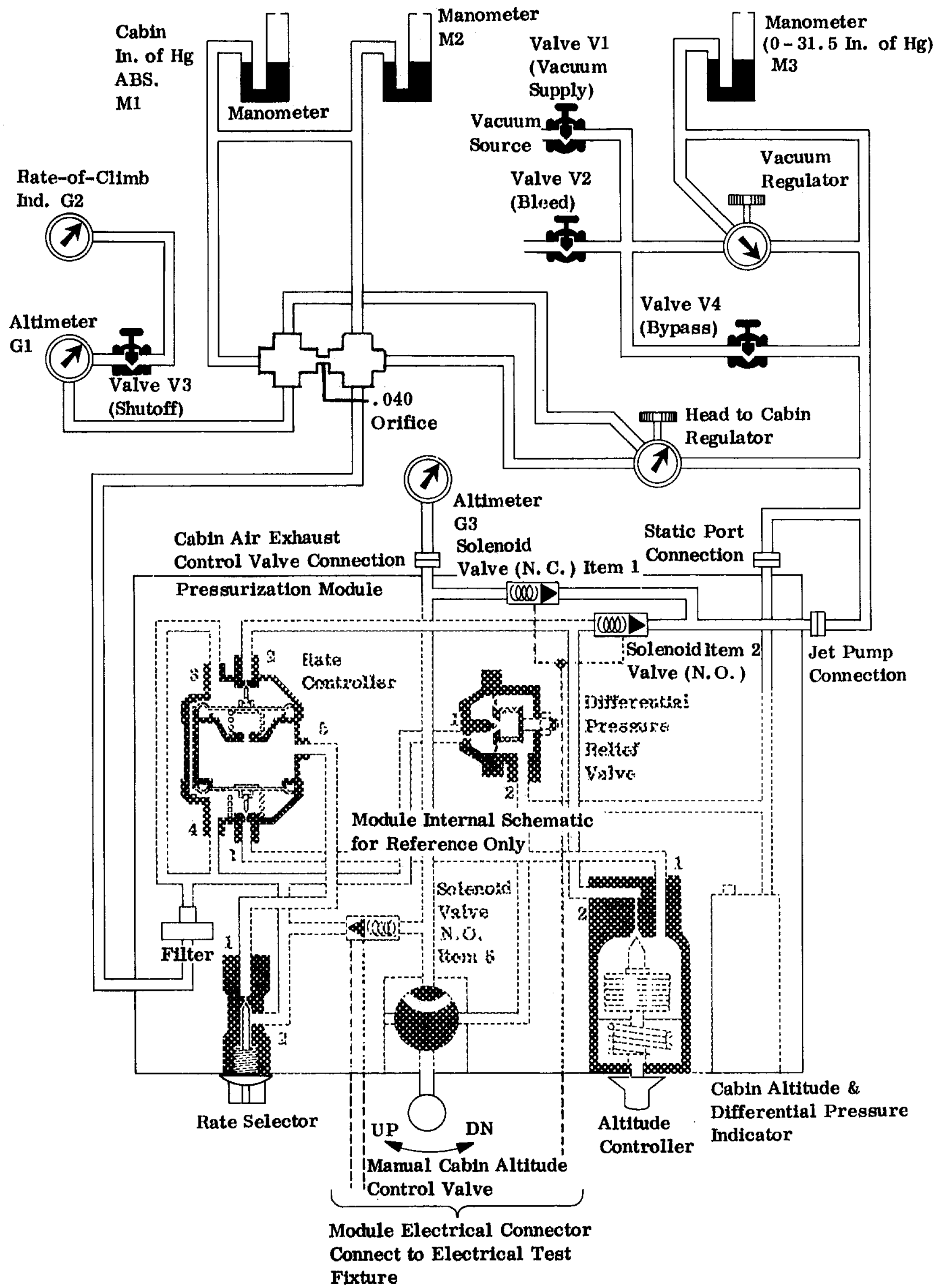
I. Check bleed air switch operation as follows:

(1) Ensure that the pressurization module is connected to the test fixture as shown in Figure 203. Place the air bleed switch in the "off" position. The OFF indicator light shall illuminate. The MAX indicator light shall not illuminate. Record results on the data sheet.

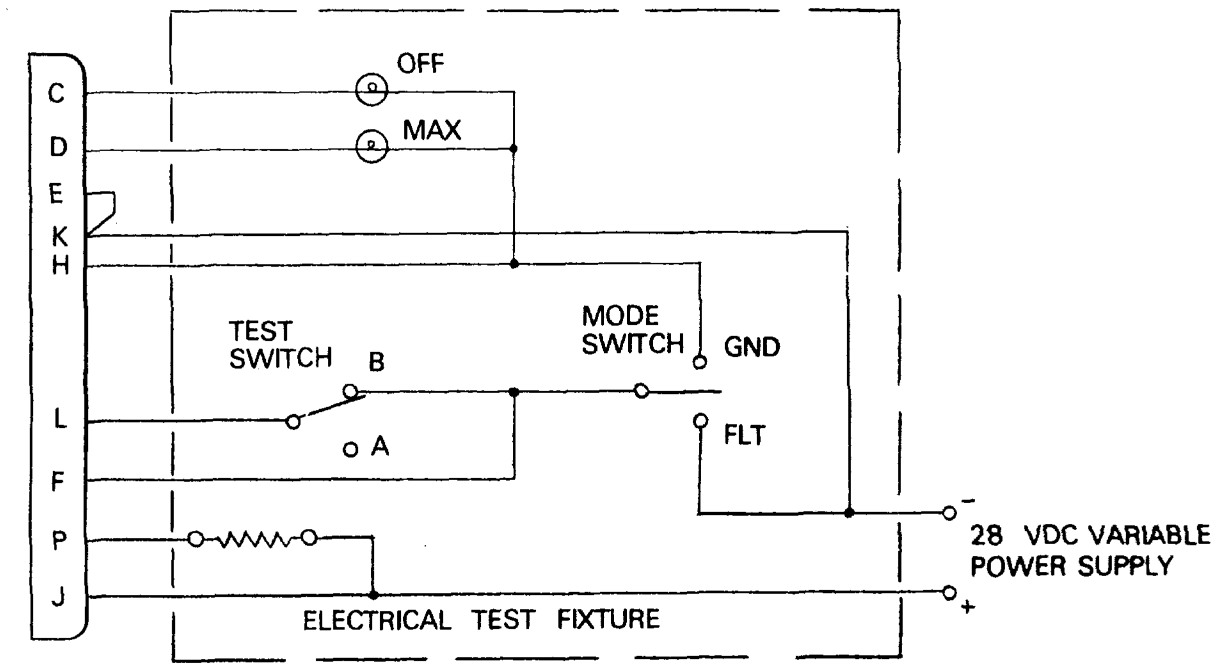
(2) Place the AIR BLEED Switch in NORM position; neither indicator light shall illuminate. Record results on the data sheet.

(3) Place the AIR BLEED Switch in the MAX position. The MAX indicator light shall illuminate. The OFF indicator light shall not illuminate. Record results on the data sheet.

(4) With the pressurization module still connected to the electrical fixture (Figure 203) and DC power applied to the electrical test fixture, check that all four post lights and all six panel lights are illuminated. Record results on data sheet.



Pressurization Module Test Hookup Schematic
Figure 202



PARTS LIST

Quantity	Nomenclature	Part Number	Vendor
(2)	Indicator Light	BEP62-CB	Cal-Glo
(1)	Resistor	20Ω 50 Watts	Ohmite
(1)	Switch (Test)	8810K15	C-H
(1)	Switch (Mode)	8800K16	C-H
(1)	Plug	S800-1TSNR	Learjet
A/R	Wire	AWG 20	Learjet

Test Fixture Fabrication
Figure 203

COND.	SWITCH POSITION				RESPONSE		
	Cabin Air	Auto -Man	Mode	Test Switch	N. C. Solenoid Item 1*	N. O. Solenoid Item 2*	N. O. Solenoid Item 3*
A	Norm	Auto	GND	Pos. "B"	Energized (open)	Energized (closed)	Energized (closed)
B	Norm	Man	GND	Pos. "A"	Deenergized (closed)	Energized (closed)	Energized (closed)
C	Norm	Auto	FLT	Pos. "B"	Deenergized (closed)	Deenergized (open)	Deenergized (open)
D	Norm	Man	FLT	Pos. "B"	Deenergized (closed)	Deenergized (open)	Energized (closed)
E	Norm	Auto	GND	Pos. "A"	Deenergized (closed)	Energized (closed)	Energized (closed)

*Item identification corresponds to item callouts in module test schematic

Pressurization Module Test Conditions
Figure 204

AIRCRAFT SERIAL NO. ____________

Step Ref	Item	M1, Inch of Hg		M3, Inch of Hg		Other	
		Actual	Req'd	Actual	Req'd	Actual	Req'd
C(2)	Leakage Test						50 fpm
D(3)	Leakage Test						300 fpm
E(3)	Cabin Altitude Up Test (2,000 ft)		27.82 (±.36)				
E(5)	Smooth Reselect Transient (Up)						200 feet
E(6)	Cabin Altitude Up Test (5,000 ft)		27.89 (±.32)				
E(8)	Smooth Reselect Transient (Up)						200 feet
E(9)	Cabin Altitude Up Test (8,000 ft)		22.22 (±.30)				
E(10)	Manual Test						Up
E(11)	Manual Test						Down
E(14)	Smooth Reselect Transient (Down)						200 feet
E(15)	Cabin Altitude Down Test (5,000 ft)		24.89 (±.32)				
E(17)	Smooth Reselect Transient (Down)						200 feet
E(18)	Cabin Altitude Down Test (2,000 ft)		27.82 (±.36)				
F(1)	Rate Control (Maximum Up)						1,250 fpm
F(2)	Rate Control (Maximum Down)						1,250 fpm
F(3)	Nominal Rate Up						
F(4)	Nominal Rate Down						
F(5)	Rate Control (Minimum Up)						375 fpm
F(6)	Rate Control (Minimum Down)						375 fpm
G(2)	Differential Operation				18.10 (±.25)		
H(1)	Bleed Air Switch OFF						OFF Ind. Light "on".
H(2)	Bleed Air Switch NORM						No Ind. Lights "on".
H(3)	Bleed Air Switch MAX						MAX Ind. Light "on".
H(4)	Instrument Lighting						Lights operate.

Pressurization Module Data Sheet
Figure 205

3. Repairs

A. Replacement of Bar Lights (See Figure 206.)

(1) Acquire necessary tools and equipment.

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Crimp Splice	MWS-22E-111	Commercially Available	Splice wires.
Bar Light	201310-4	Aerosonic Corp. Clearwater, FL	Indicator lights.

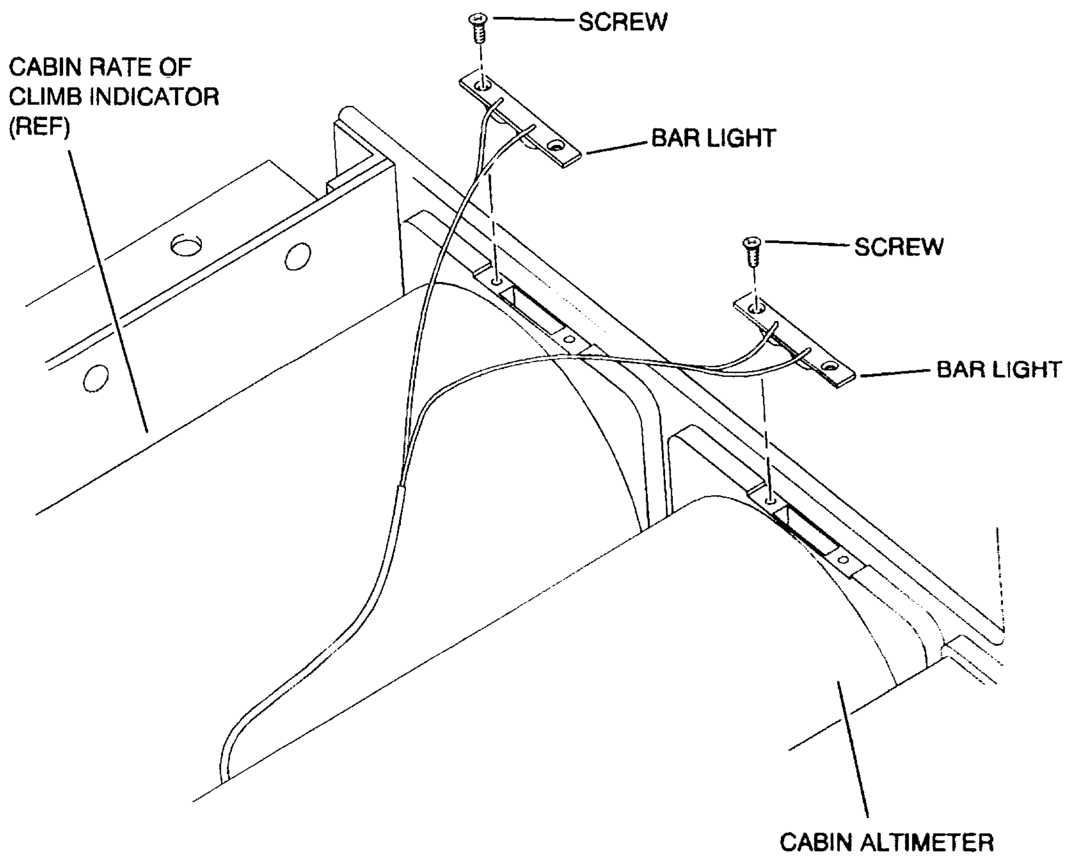
CAUTION: DO NOT ALLOW ANY MATERIAL TO FALL INTO PRESSURIZATION MODULE.

EXTREME CARE SHALL BE USED WHEN REPLACING BAR LIGHTS TO PREVENT DAMAGE TO PRESSURIZATION MODULE.

(2) Remove pressurization module. (Refer to Removal/Installation, this section.)

NOTE: All maintenance work shall be done in a clean room to maintain the integrity of the system.

(3) Identify wires to bar light(s).
(4) Cut wires approximately two (2) inches from bar lights.
(a) Strip wire ends for installation of crimp splice.
(5) Remove countersink screws securing bar light to cabin altimeter or cabin rate of climb indicator.
(6) Identify wiring and connect wiring from pressurization module to bar light with crimp splice.
(7) Verify wiring for proper security and routing.
(8) Install bar light to cabin altimeter or cabin rate of climb indicator.
(a) Secure bar light with countersink screws.
(9) Install pressurization module. (Refer to Removal/Installation, this section.)
(10) Perform operational check of copilot's instrument panel lights.
(a) Verify INSTR LTS circuit breaker is depressed on copilot's circuit breaker panel.
(b) Set Battery Switches on.
(c) Rotate instrument panel lighting potentiometer to full bright position.
(d) Verify pressurization module cabin altimeter and cabin rate of climb indicator are illuminated.
(e) Rotate instrument panel lighting potentiometer to off position.
(f) Set Battery Switches off.



Pressurization Module Bar Light Installation
Figure 206

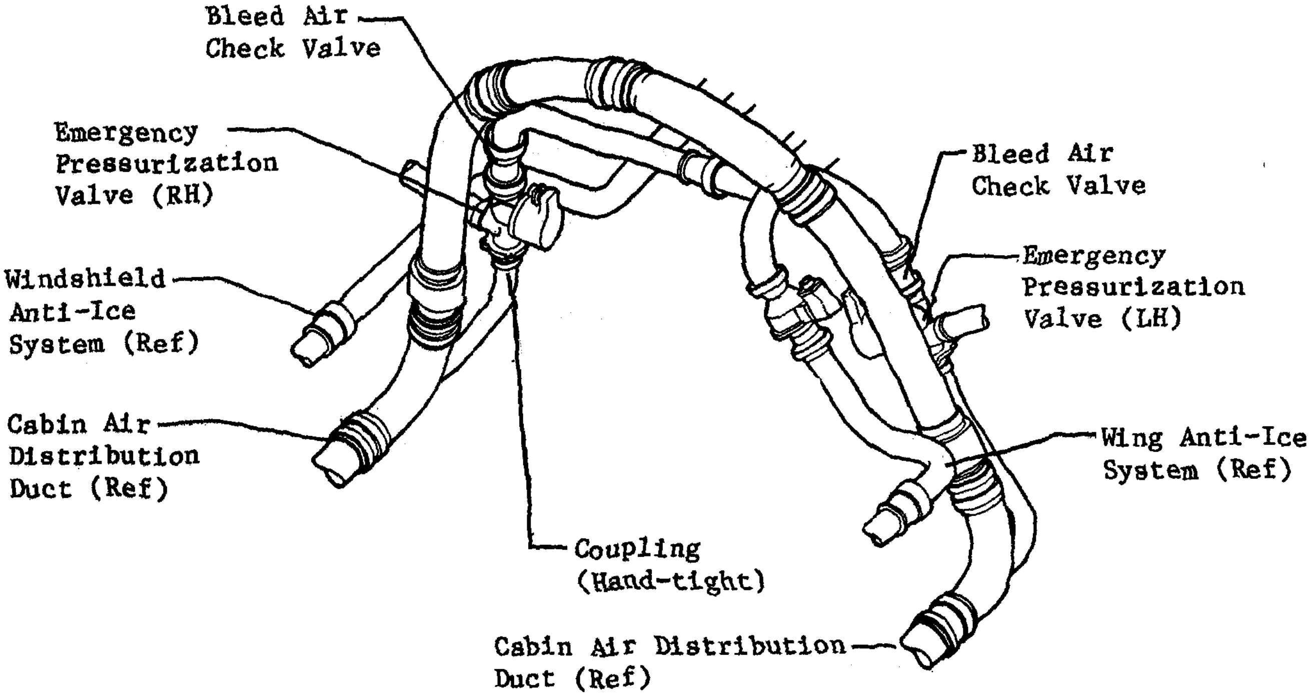
EMERGENCY PRESSURIZATION VALVE - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

NOTE: The following removal and installation procedures are applicable to either emergency valve.

A. **Remove Emergency Pressurization Valve** (See figure 201.)
   (1) Lower tailcone access door and disconnect aircraft batteries.
   (2) Disconnect electrical connector from valve.
   (3) Disconnect servo air pressure tube from valve. Cap all exposed fittings.
   (4) Remove safety wire from coupling half.
   (5) Loosen coupling halves and remove emergency valve from aircraft.

B. **Install Emergency Pressurization Valve** (See figure 201.)
   (1) Install emergency valve and secure with coupling halves. Tighten coupling halves hand tight and safety wire.
   (2) Remove caps from fittings and connect servo air pressure tube to valve.
   (3) Connect electrical connector to valve.
   (4) Connect aircraft batteries and secure tailcone access door.



Emergency Pressurization Valve Installation
Figure 201

PRESSURIZATION SYSTEM PRESSURE REGULATOR - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**

   A. **Remove Pressure Regulator** (See figure 201.)

      (1) Lower tailcone access door and disconnect aircraft batteries.

      (2) Disconnect tubing from pressure regulator. Cap all exposed fittings.

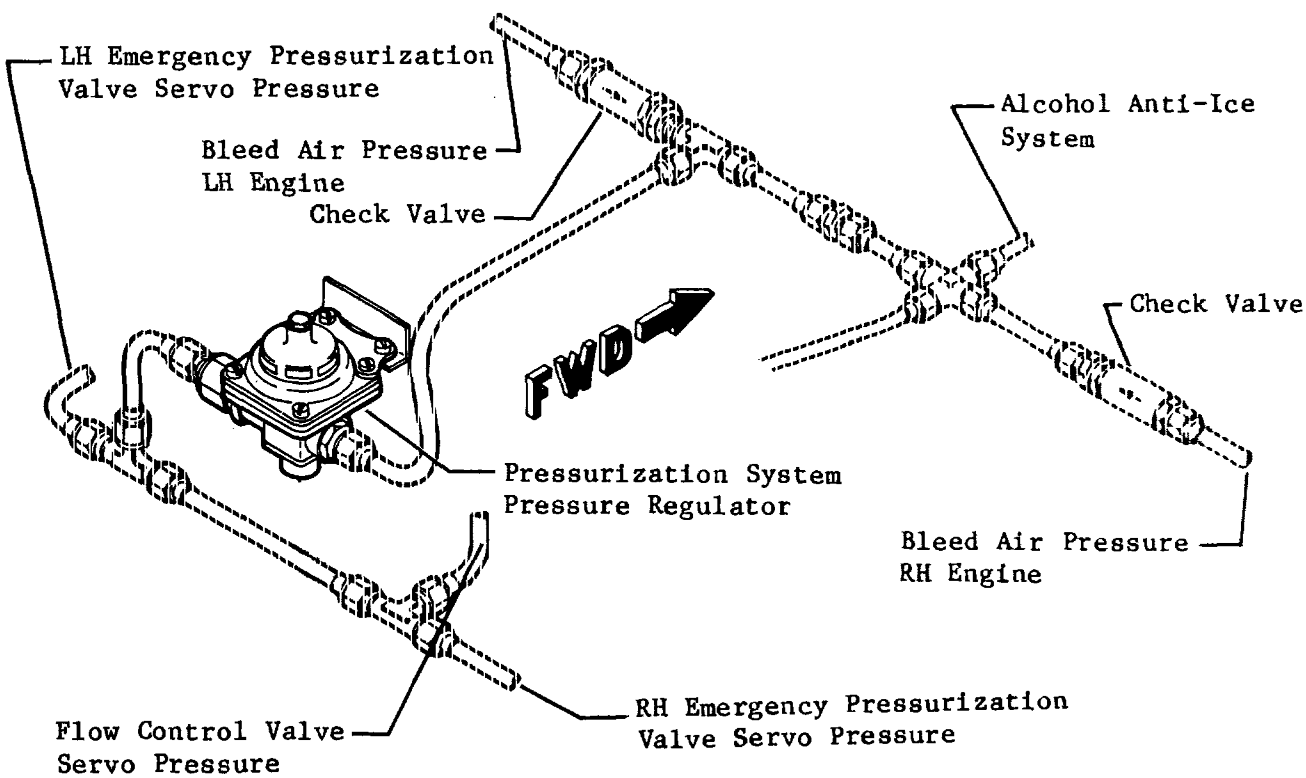
      (3) Remove attaching parts and pressure regulator from aircraft.

   B. **Install Pressure Regulator** (See figure 201.)

      (1) Install pressure regulator on bracket and secure with attaching parts.

      (2) Remove caps from fittings and connect tubing to pressure regulator.

      (3) Connect aircraft batteries and secure tailcone access door.



Pressure Regulator Installation
Figure 201

CABIN PRESSURE WARNING SYSTEM - DESCRIPTION AND OPERATION

1. Description

A. The cabin pressure aural warning system consists of a cabin pressure aneroid switch (S18 or PSW101) and utilizes the test switch and aural warning unit.

(1) On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031*, the cabin pressure aneroid switch (S18) (aural warning) is installed on the RH side of the cockpit aft of frame 5 adjacent to the Mach warning switch.

(2) On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, the cabin pressure aneroid switch (PSW101) (aural warning) is installed in the pressurization module.

B. *On Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, a CAB ALT annunciator is located on the glareshield warning light panel. The CAB ALT annunciator provides the crew with a visual warning that cabin altitude is increasing and that a solenoid in the pressurization module has been actuated to close the cabin air exhaust control valve to help prevent any further pressure loss.

2. Operation

A. On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031*, if the cabin altitude reaches 10,000 (±500) feet, the aneroid switch (S18) completes a ground circuit to the aural warning unit. A rotary test switch, located on the light and test switch panel, is used to test the aural warning circuit prior to takeoff.

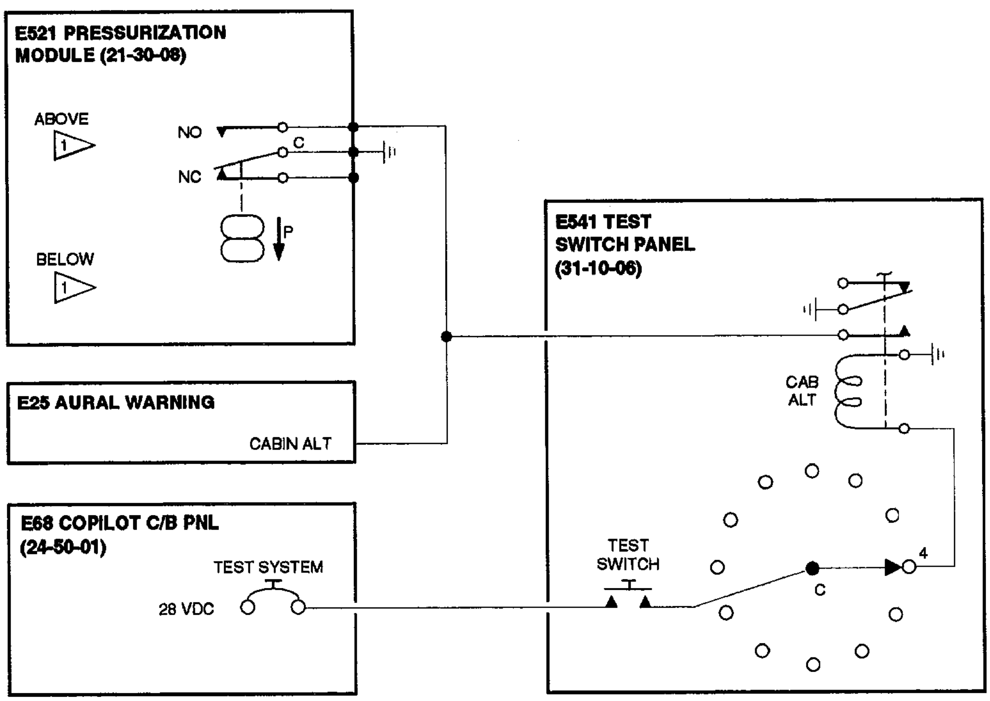
B. On *Aircraft 35-107, 35-113 thru 35-128 and 36-032*, if the cabin altitude reaches 10,050 (±250) feet, the aneroid switch (PSW101) completes a ground circuit to the aural warning unit. A rotary test switch, located on the light and test switch panel, is used to test the aural warning circuit prior to takeoff. *On Aircraft 35-129 and Subsequent and 36-033 and Subsequent*, the aneroid switch (PSW101) actuates at 10,100 (±250) feet.

C. On *Aircraft 35-107, 35-113 thru 35-128 and 36-032*, the aneroid switch (PSW100) controlling the cabin air exhaust valve (21-30-00 and 21-30-07) completes a power circuit to a relay in the squat switch relay panel when cabin altitude reaches 9000 (±250) feet. When the relay energizes, a ground circuit is completed to illuminate the CAB ALT caution light. *On Aircraft 35-129 and Subsequent and 36-033 and Subsequent*, the aneroid switch (PSW100) actuates at 8750 (±250) feet.

1 *On Aircraft 35-002 thru 35-112, except 35-107, and 36-002 thru 36-031*, the cabin pressure aneroid switch (S18) is located on the cockpit inner skin and actuates at 10,000 (±250) feet and resets at 7500 feet.

On Aircraft 35-107, 35-113 thru 35-128 and 36-032, the cabin pressure aneroid switch (PSW101 or S4) is located in the pressurization module and actuates at 10,050 (±250) feet and resets on or before 8600 feet minimum.

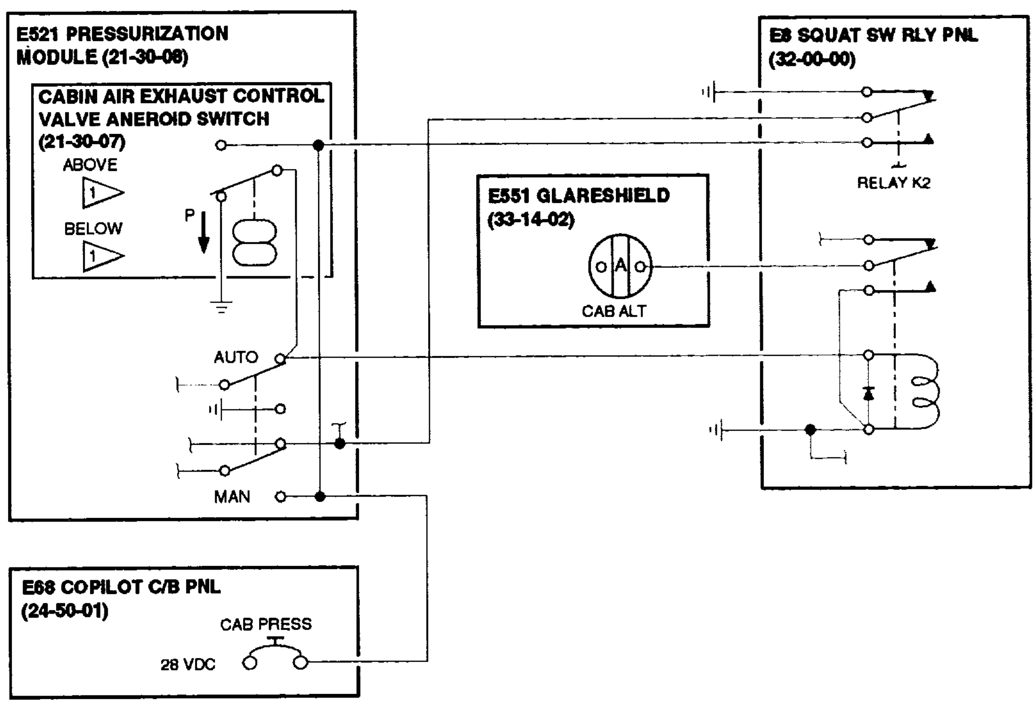
On Aircraft 35-129 and Subsequent and 36-033 and Subsequent, the cabin pressure aneroid switch (PSW101 or S4) is located in the pressurization module and actuates at 10,100 (±250) feet and resets on or before 8600 feet minimum.



Cabin PressureWarning System Electrical Control Schematic
Figure 1 (Sheet 1 of 2)

1 *On Aircraft 35-107, 35-113 thru 35-128 and 36-032*, the cabin air exhaust control valve aneroid switch (PSW100 or S3) actuates at 9000 (±250) feet and resets on or before 7570 feet.

On Aircraft 35-129 and Subsequent and 36-033 and Subsequent, the cabin air exhaust control valve aneroid switch (PSW100 or S3) actuates at 8700 (±250) feet and resets on or before 7200 feet minimum.



Cabin Pressure Warning System Electrical Control Schematic
Figure 1 (Sheet 2 of 2)

CABIN PRESSURE AURAL WARNING ANEROID SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation

A. Removal of the Cabin Aural Warning Aneroid Switch (S18) *(Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031)* (See Figure 201.)
  (1) Lower the copilot's instrument panel.
  (2) Disconnect and tag the electrical wiring from the aneroid switch.
  (3) Remove the aneroid switch from the aircraft.

B. Installation of the Cabin Aural Warning Aneroid Switch (S18) *(Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031)* (See Figure 201.)
  (1) Install the aneroid switch.
  (2) Connect the electrical wiring to the aneroid switch.
  (3) Do the Functional Test of the Cabin Aural Warning Aneroid Switch (S18). (Refer to 21-31-01.)
  (4) Raise the copilot's instrument panel.

C. Removal of the Cabin Aural Warning Aneroid Switch (PSW101/S4) *(Aircraft 35-107, 35-113 and subsequent, and 36-032 and subsequent)* (See Figure 201.)
  (1) Gain access to the cabin aural warning aneroid switch (PSW101/S4) located in the pressurization module. (Refer to 21-30-08.)
  (2) Remove the aneroid filter from the aneroid switch.
  (3) Remove the parts that attach the aneroid switch.
  (4) Disconnect and identify the electrical wiring from the aneroid switch.
  (5) Remove the aneroid switch from the aircraft.

D. Installation of the Cabin Aural Warning Aneroid Switch (PSW101/S4) *(Aircraft 35-107, 35-113 and subsequent, and 36-032 and subsequent)* (See Figure 201.)
  (1) Identify and connect the electrical wiring.
  (2) Put the aneroid switch in its proper position and install the aneroid switch.
  (3) Do the Functional Test of the Cabin Aural Warning Aneroid Switch (PSW101/S4). (Refer to 21-31-01.)
  (4) Install the aneroid filter in the aneroid switch.
  (5) Install the pressurization module. (Refer to 21-30-08.)

2. Adjustment/Test

A. Get the necessary tools and equipment.

NOTE: You can use equivalent alternatives for these items:

NAME	PART NUMBER	MANUFACTURER	USE
Pitot-Static System Tester	1811G	Barfield Instrument Co. Atlanta, GA	Test static system and components for proper operation.

NAME	PART NUMBER	MANUFACTURER	USE
Multimeter	Model 8000 or Model 77	Fluke Mfg. Inc. Everett, WA	Check continuity of electrical circuits.
Elbow	AN833-4D	Commercially Available	Connect to aneroid switch.
Nut	AN924-4D	Commercially Available	Connect to aneroid switch.
O-ring	MS28778-4	Commercially Available	Connect to aneroid switch.
Altimeter		Commercially Available	Show altitude.
Bell Jar		Commercially Available	Simulates the vaccuum chamber.

B. Functional Test of the Cabin Pressure Aural Warning Aneroid Switch (S18) _(Aircraft 35-002 thru 35-112, except 35-107, and 36-002 thru 36-031)_ (See Figure 202.)

(1) Set the test altimeter to 29.92 inches of mercury.
(2) Remove the aneroid switch from the RH cockpit skin.
(3) Install the switch in a vaccuum chamber.
(4) Connect the ohmmeter to wires C and N.O. Make sure that continuity does not exist.
(5) Slowly apply a vacuum while observing the ohmmeter and altimeter; the switch must operate at 10,000 (±500) feet. Make sure that the contact resistance is 2 ohms or less.
(6) Slowly release the vacuum while observing the ohmmeter and altimeter; the switch must reset on or before 7,500 feet minimum.
(7) Slowly release the vacuum until the tester shows the appropriate ground altitude.

WARNING: FIELD ADJUSTMENT OF THE ANEROID SWITCH IS PROHIBITED.

(8) If the aneroid switch is within 1500 feet of tolerance, remove the switch from service and return it to the manufacture for calibration.
(9) If the aneroid switch is more than 1500 feet out of tolerance, replace the switch.
(10) Remove the aneroid switch from the test setup.
(11) Install the switch. (Refer to 21-31-01.)

C. Functional Test of the Cabin Pressure Aural Warning Aneroid Switch (PSW101/S4) _(Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent)_ (See Figure 202.)

NOTE: Refer to Chapter 5 for the current inspection interval for the Cabin Pressure Aural Warning Aneroid Switch.

This procedure is for aircraft without system electrical power available. Aircraft with system electrical power may use an alternate method outlined in paragraph D.

(1) Set the test altimeter to 29.92 inches of mercury.
(2) Remove the filter from the aneroid switch (PSW101/S4).
(3) Install a 90° elbow on the aneroid switch.

(4) Install a vacuum line between the aneroid switch and the pitot-static tester and an inline altimeter as shown in Figure 202.
(5) Connect an ohmmeter across pins M and K. The circuit must be open.

CAUTION: TO AVOID DAMAGE TO THE TEST GAGE AND/OR ANEROID SWITCH, DO NOT EXCEED 2000 FEET PER MINUTE OR MAKE SUDDEN OR LARGE PRESSURE CHANGES ASCENDING OR DESCENDING WHEN FUNCTIONALLY TESTING THESE UNITS.

(6) Slowly apply a vacuum while observing the ohmmeter and altimeter; the aneroid switch must operate at 10,100 (±250) feet. *On Aircraft 35-107, 35-113 thru 35-128, and 36-032*, the aneroid switch must operate at 10,050 (±250) feet.
(7) Slowly release the vacuum while observing the ohmmeter and altimeter; the switch must reset on or before 8,600 feet minimum. *On Aircraft 35-107, 35-113 thru 35-128, and 36-032*, the aneroid switch must reset at 8,530 feet minimum.
(8) Slowly release the vacuum until the tester shows the appropriate ground altitude.

WARNING: FIELD ADJUSTMENT OF THE ANEROID SWITCH IS PROHIBITED.

(9) If the aneroid switch is within 1500 feet of tolerance, remove the switch from service and return it to the manufacture for calibration.
(10) If an aneroid switch is more than 1500 feet out of tolerance, replace the switch.
(11) Remove the test setup from the aneroid switch.
(12) Remove the 90° elbow from the aneroid switch.
(13) Install the aneroid switch filter.

D. Alternate Functional Test of the Cabin Pressure Aural Warning Aneroid Switch (PSW101/S4) *(Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent)* (See Figure 202.)

NOTE: Refer to Chapter 5 for the current inspection interval for the Cabin Pressure Aural Warning Aneroid Switch.

This is an alternate procedure for aircraft with system electrical power available. Aircraft without system electrical power available must use the procedure outlined in paragraph C.

(1) Set the test altimeter to 29.92 inches of mercury.
(2) Remove the filter from the aneroid switch (PSW101/S4).
(3) Install the 90° elbow on the aneroid switch.
(4) Connect a hose between the aneroid switch and the pitot-static tester and an inline altimeter as shown in Figure 202.

CAUTION: TO AVOID DAMAGE TO THE TEST GAGE AND/OR ANEROID SWITCH, DO NOT EXCEED 2000 FEET PER MINUTE OR MAKE SUDDEN OR EXCESSIVE PRES-

SURE CHANGES ASCENDING OR DESCENDING WHEN FUNCTIONALLY TESTING THESE UNITS.

(5) Slowly apply a vacuum while observing the altimeter; the switch must operate at 10,100 (±250) feet. _On Aircraft 35-107, 35-113 thru 35-128, and 36-032_, the switch must operate at 10,050 (±250) feet. The aural warning horn must sound the switch actuation.

(6) Slowly release the vacuum while observing the altimeter; the switch must reset on or before 8,600 feet minimum. _On Aircraft 35-107, 35-113 thru 35-128, and 36-032_, the switch must reset at 8,530 feet minimum. The aural warning horn must cease at switch reset.

(7) Slowly release the vacuum until the tester shows the appropriate ground altitude.

WARNING: FIELD ADJUSTMENT OF THE ANEROID SWITCH IS PROHIBITED.

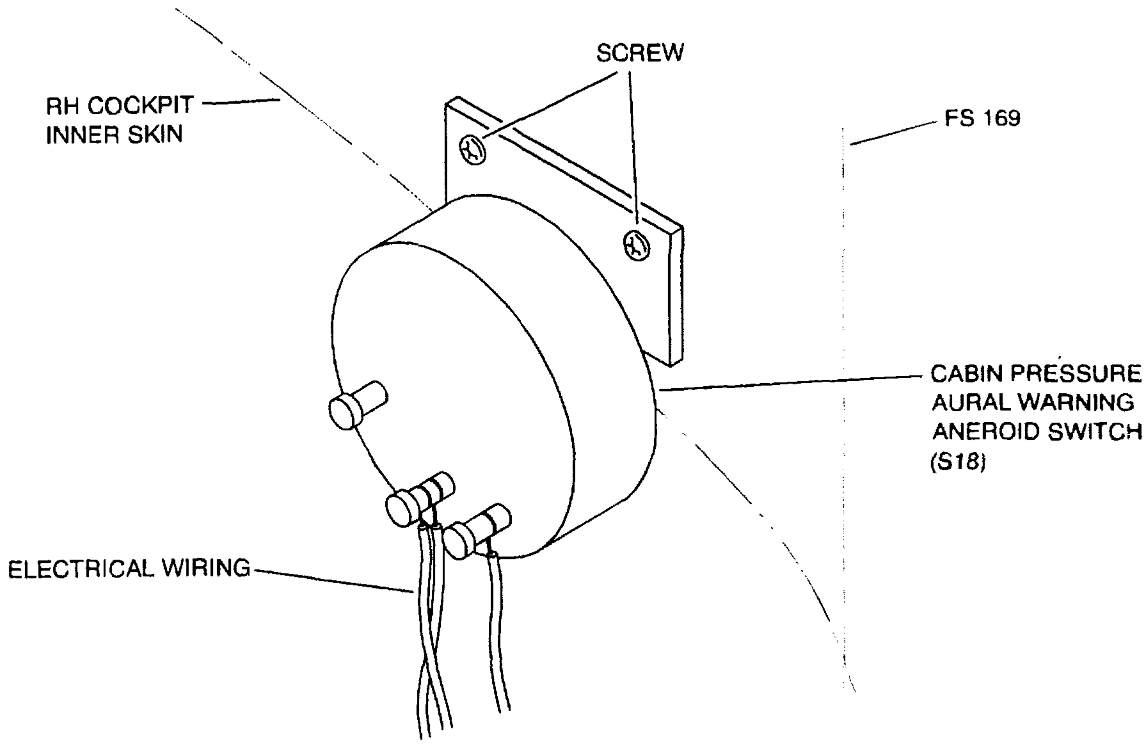
(8) If the aneroid switch is within 1500 feet of tolerance, remove the switch from service and return it to the manufacture for calibration.

(9) If the aneroid switch is more than 1500 feet out of tolerance, replace the switch.

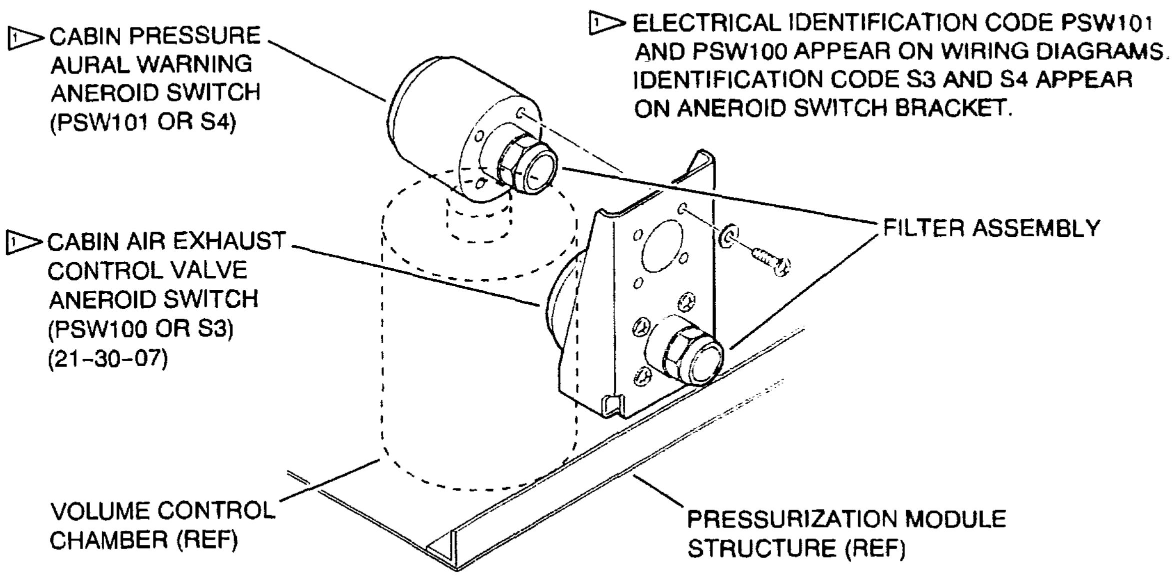
(10) Remove the test setup from the aneroid switch.

(11) Remove the 90° elbow from the aneroid switch.

(12) Install the aneroid switch filter.



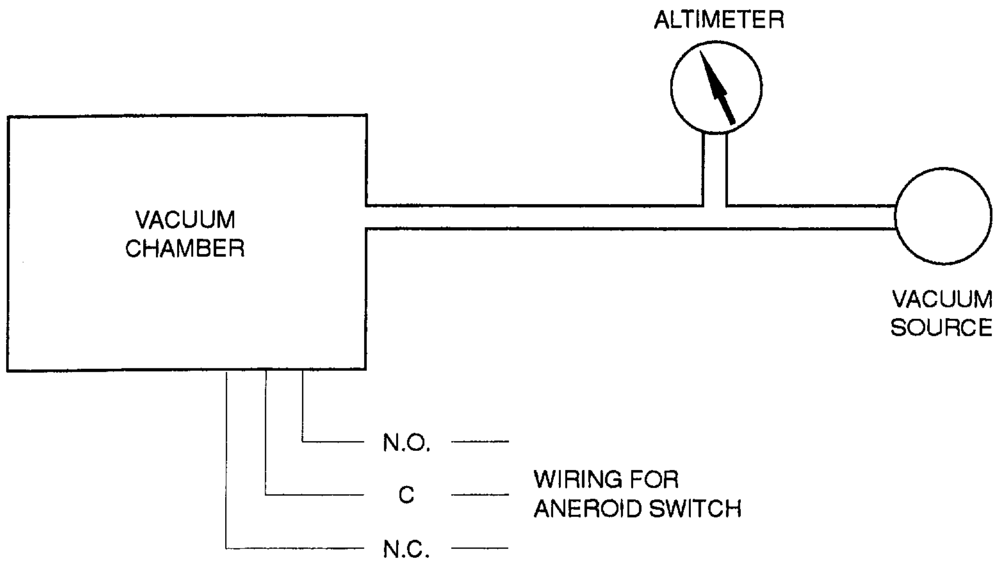
(35-002 THRU 35-112, EXCEPT 35-107, 36-002 THRU 36-031)



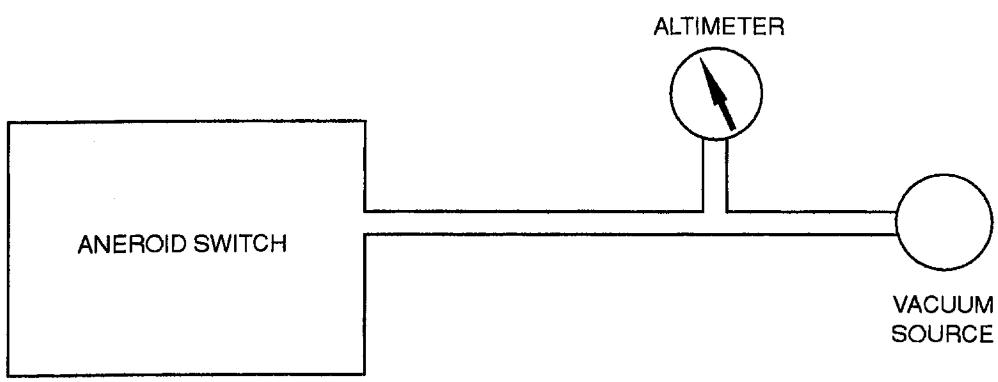
(35-107, 35-113 AND SUBSEQUENT, AND 36-032 AND SUBSEQUENT)

M35 213101 201 01

Aneroid Switch Installation
Figure 201



AIRCRAFT 35-002 THRU 35-106, 35-108 THRU 35-112 AND 36-002 THRU 36-031



AIRCRAFT 35-107, 35-113 AND SUBSEQUENT AND 36-032 AND SUBSEQUENT

Functional Test of the Pressurization Aneroid Switches
Figure 202

HEATING - DESCRIPTION AND OPERATION

1. DESCRIPTION
   A. The precooled engine bleed air that is utilized to provide cabin pressurization is also utilized for the primary source of cabin heating. The bleed air temperature is controlled by the temperature control system (21-60-00).
   B. An optional auxiliary cabin heater system, installed in the aft baggage compartment, provides the secondary source of cabin heat.
   C. External anti-ice systems and footwarmer heat is provided by precooled engine bleed air. For further information pertaining to anti-ice systems and footwarmer, refer to Chapter 30.

BLEED AIR HEATING - DESCRIPTION AND OPERATION

1. Description

A. Engine bleed air is precooled and used to heat the cabin. The pressurization system and bleed air heating system utilize the same components.

CAUTION: WITH THE AIRCRAFT ON THE GROUND, DO NOT PERFORM EXTENDED ENGINE OPERATION AT 70% TO 100% RPM WITH THE CABIN AIR SWITCH SET TO ON OR THE BLEED AIR (L AND R) SWITCHES SET TO ON. WITH THE AIRCRAFT STATIC, THERE IS NO COOLING OF THE ENGINE BLEED AIR AND POSSIBLE DAMAGE TO THE AIR CONDITIONING COMPONENTS COULD RESULT. CABIN OVERHEATING AND DAMAGE MAY ALSO OCCUR.

B. The bleed air heating system utilizes the flow control valve, hot air bypass valve, heat exchanger, and the Cabin Air Switch.

C. Component Description

(1) On *Aircraft 35-002 thru 35-081, 35-083 thru 35-086 and 36-002 thru 36-022*, the flow control valve is located in the bleed air ducting upstream of the hot air bypass valve. On *Aircraft 35-082, 35-087 thru 35-106, 35-108 thru 35-112 and 36-023 thru 36-031*, the flow control valve is located in the bleed air ducting downstream of the hot air bypass valve. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, the flow control valve is located in the bleed air ducting upstream of the hot air bypass valve.

(2) The hot air bypass valve is installed in both the bleed air and precooled air ducts adjacent to the heat exchanger. The bypass valve controls the amount of bleed air routed through the heat exchanger and the amount allowed to bypass.

(3) The heat exchanger, installed in the tailcone equipment section, is a high-effectiveness two-pass cross-counterflow plate-fin type unit. High pressure bleed air is ducted into the heat exchanger and routed through the core in cross-counterflow directions. Ram air is routed over the core channels and dumped into the tailcone resulting in a substantial reduction of bleed air temperature.

2. Operation

A. On *Aircraft 35-002 thru 35-081, 35-083 thru 35-086 and 36-002 thru 36-022*, with the Bleed Air Switches (L and R) set ON and the Cabin Air Switch set to NORM, engine bleed air is routed through the flow control valve to the heat exchanger. On *Aircraft 35-082, 35-087 thru 35-106, 35-108 thru 35-112 and 36-023 thru 36-031*, with the Bleed Air Switches set ON and Cabin Air Switch set to NORM, engine bleed air is routed directly to the heat exchanger. The bleed air is precooled in the heat exchanger by ram air entering the dorsal inlet, passing through the heat exchanger, and then dumping into the tailcone. The amount of cooling by the heat exchanger is dependent upon the position of the hot air bypass valve. The hot air bypass valve is controlled by the temperature control system (refer to 21-60-00). On *Aircraft 35-002 thru 35-081, 35-083 thru 35-086 and 36-002 and 36-022*, the precooled air is then ducted from the heat exchanger into the cabin area. On *Aircraft 35-082, 35-087 thru 35-106, 35-108 thru 35-112 and 36-023 thru 36-031*, the precooled air is then ducted through the flow control valve and venturi into the cabin area. The venturi controls the flow control valve to allow the required airflow into the cabin. If a large amount of airflow is desired to remove fumes or smoke from the cabin, the Cabin Air Switch is set to MAX. This energizes a solenoid on the flow control valve overriding the venturi and fully opening the flow control valve.

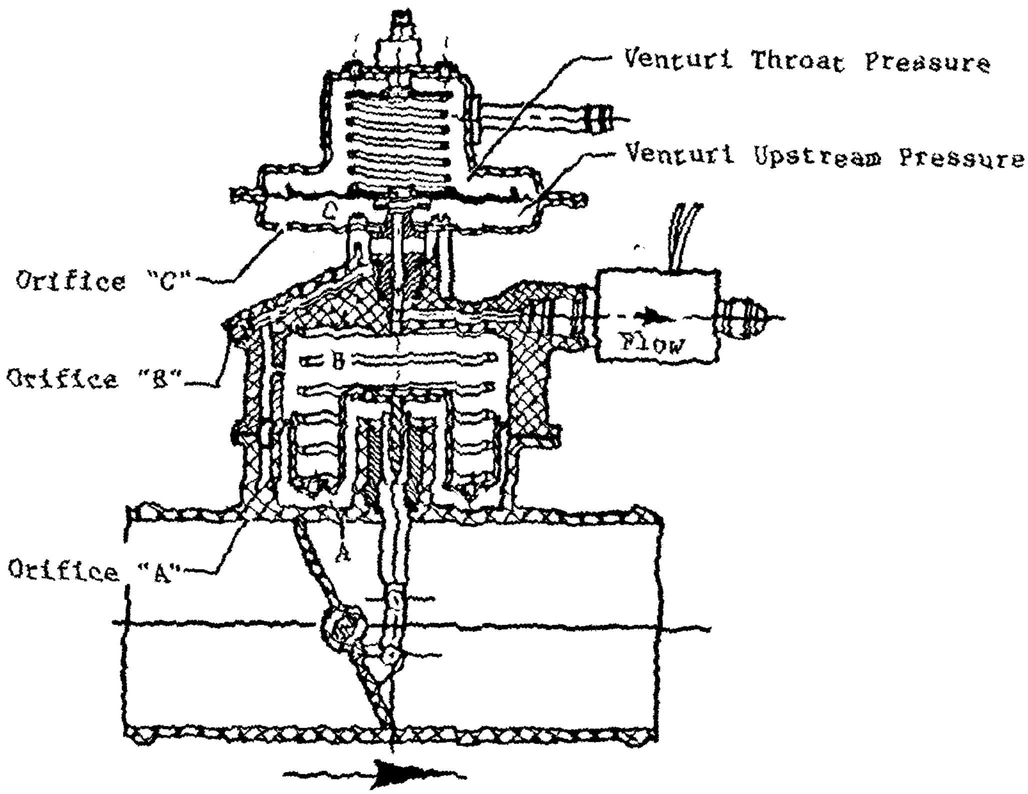
B. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, with the Cabin Air Switch set to ON and the Bleed Air Switches (L and R) set to ON, engine bleed air is admitted through the flow control valve to the heat exchanger. The engine bleed air is precooled in the heat exchanger by ram air entering the dorsal inlet, passing through the heat exchanger and dumping into the tailcone. The amount of cooling accomplished by the heat exchanger is dependent upon the position of the hot air bypass valve. The hot air bypass valve, controlled by the temperature control system, bypasses the required amount of hot bleed air to maintain the airflow heat at the desired temperature. For additional information on the temperature control system, refer to 21-60-00. The precooled air is then ducted into the cabin area. If a large amount of airflow is desired to remove fumes or smoke from the cabin, the Bleed Air Switches (L or R) may be set to EMER. This positions the emergency pressurization valves to direct bleed airflow directly into the cabin. Temperature control will not be available when the Bleed Air Switches are set to EMER.

C. Component Operation

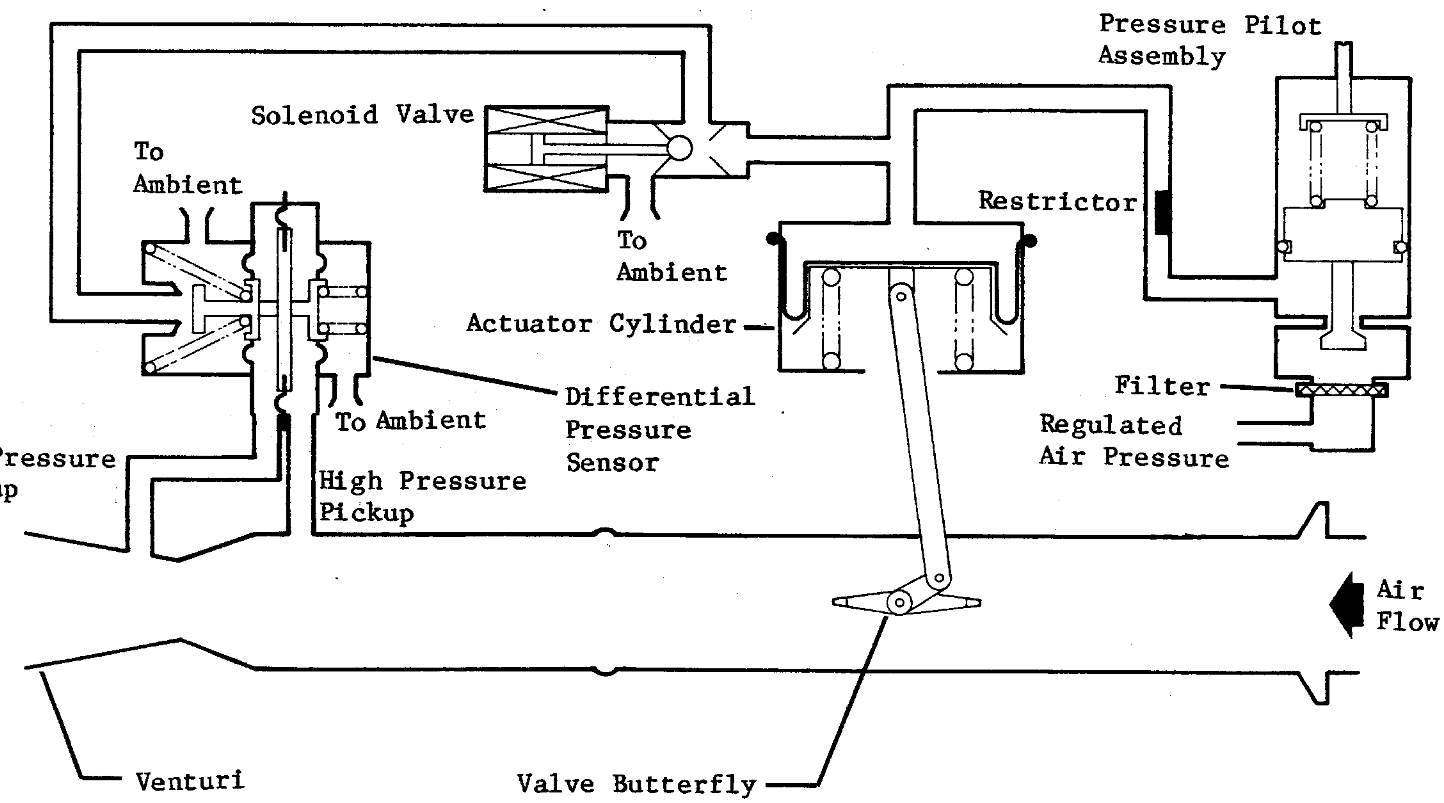
(1) On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031*, the valve is shown in the energized position (Cabin Air Switch set to OFF). (See figure 1.) The pressure in chamber A and B is equalized and the spring holds the valve in the closed position. When the Cabin Air Switch is set to NORM, the pressure in chamber B is less than in A and the valve moves to the open position. When the differential across the venturi reaches the setting of the pilot regulator, the pilot regulator opens to admit additional air to chamber B which holds the valve in the proper position to maintain flow. When the Cabin Air Switch is set to MAX, the solenoid valve in the upstream static line closes and stops airflow into chamber C. The trapped air escapes through orifice C, driving the valve to full open and allowing full airflow into the cabin.

(2) On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, the valve is shown in the deenergized position (Cabin Air Switch set to ON). (See figure 1.) With the solenoid valve deenergized, servo air pressure is admitted through the pressure pilot assembly filter into the pressure pilot assembly. The servo air pressure is sensed in the actuator chamber and in the differential pressure sensor, where the air pressure is vented overboard. As bleed air flows through the venturi, the negative pressure buildup is sensed on one side of the differential pressure sensor and a pressure is sensed on the opposite side. When this happens, the path for the air pressure, picked up through the pressure pilot, is restricted thus causing a buildup of pressure in the actuator cylinder. The increasing pressure causes the actuator to move the valve closed. This limits the airflow going through the venturi. When the Cabin Air Switch is set to OFF, the solenoid valve is energized (closed). This blocks the bleed path for the air pressure. The air pressure builds up within the cylinder actuator and drives the valve butterfly closed, stopping the airflow.

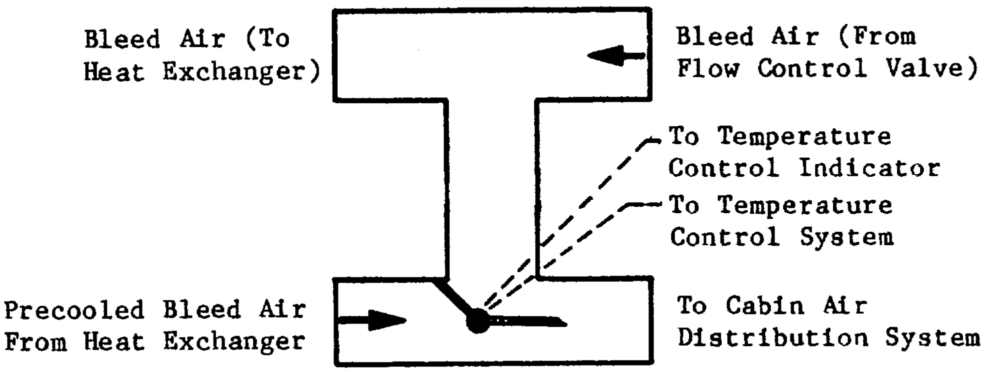
(3) The hot air bypass valve consists basically of three ducts: one directs engine bleed air to the heat exchanger, one directs precooled bleed air to the distribution system and incorporates an actuator with a butterfly-type valve, and the third duct connects the other two ducts. When a higher temperature is called for, the butterfly valve opens and higher temperature bleed air flows directly into the air distribution system bypassing the heat exchanger. On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031*, the bypass valve actuator is electrically operated by the temperature control circuit. A potentiometer, an integral part of the bypass valve and the temperature control circuit, provides a temperature control circuit balancing signal. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, the bypass valve is operated by a regulated pressure from the temperature control system. Normally (no pressure applied) the valve is held closed by spring pressure. The temperature controls provide a regulated pressure which overrides the valve spring pressure and positions the valve to bypass the required amount of hot air to maintain the cabin airflow at the desired level. A temperature control indicator, on the indicator panel, indicates the position of the hot air bypass valve. (For additional information on the temperature control system, refer to 21-60-00.)



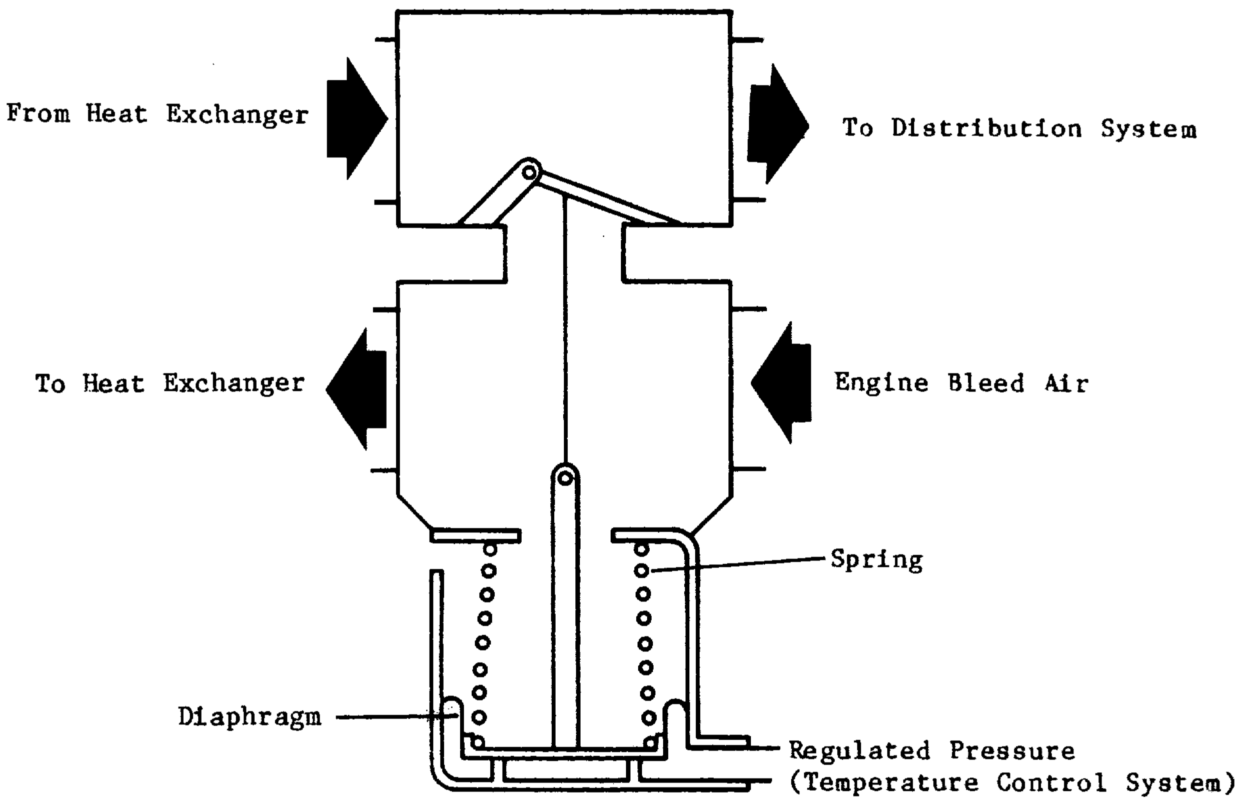
Flow Control Valve Schematic
Figure 1 (Sheet 1 of 2)



Flow Control Valve Schematic
Figure 1 (Sheet 2 of 2)



__Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031__



Shown in Normally Closed Position

__Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent__

Hot Air Bypass Valve Schematic
Figure 2

FLOW CONTROL VALVE - MAINTENANCE PRACTICES

1. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Anti-Seize Compound	C5-A	Fel-Pro Inc. Skokie, IL	Prevent seizing of elbows and B-nuts.

2. Removal/Installation

NOTE:
- Maintenance practices on the flow control valve consists of replacement of the valve or replacement of the shutoff solenoid on the valve.
- Coat threads of elbows and B-nuts with high temperature anti-seize compound (Fel-Pro, C5-A or equivalent) prior to installation.

A. Remove Valve (See Figure 201.)

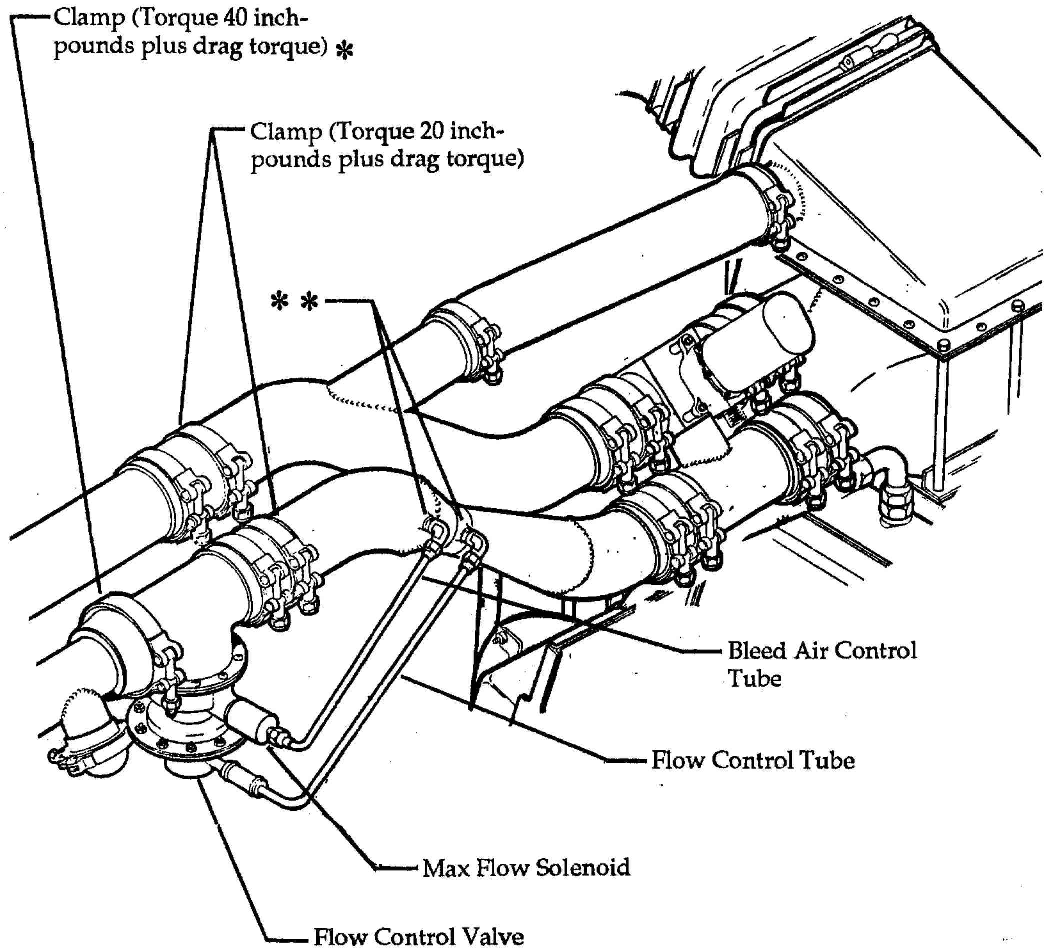
(1) Open tailcone access door and remove electrical power from aircraft.
(2) Disconnect bleed air control tube and flow control tube from venturi duct and flow control valve. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, disconnect servo pressure tube. Cap all exposed fittings.
(3) Disconnect electrical connector from flow control valve.
(4) Loosen clamps and sleeves securing flow control valve to venturi duct.
(5) Loosen coupling securing opposite end of flow control valve. Remove flow control valve and gasket from aircraft.

B. Install Valve (See Figure 201.)

(1) Install flow control valve and gasket and secure with coupling. Do not torque coupling at this time.
(2) Connect bleed air control tube and flow control tube to venturi duct assembly and flow control valve as shown. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, install and secure servo pressure tube.
(3) Position sleeve and secure flow control valve to venturi duct. Torque clamp 20 inch-pounds plus drag torque.
(4) Torque coupling, installed in step (1), 40 (±4) inch-pounds plus drag torque.

NOTE: Drag torque is the amount of torque required to overcome the friction of any self-locking nut. This nut friction (drag torque) must be added to the torque callout to assure proper torquing. The tailcone bleed air ducting incorporates stainless steel clamps, nuts, and bolts that require higher nut friction than the standard self-locking nuts. In some instances, nut friction may exceed the required torque values.

(5) Connect electrical connector to flow control valve.
(6) Restore electrical power to aircraft and secure tailcone access door.

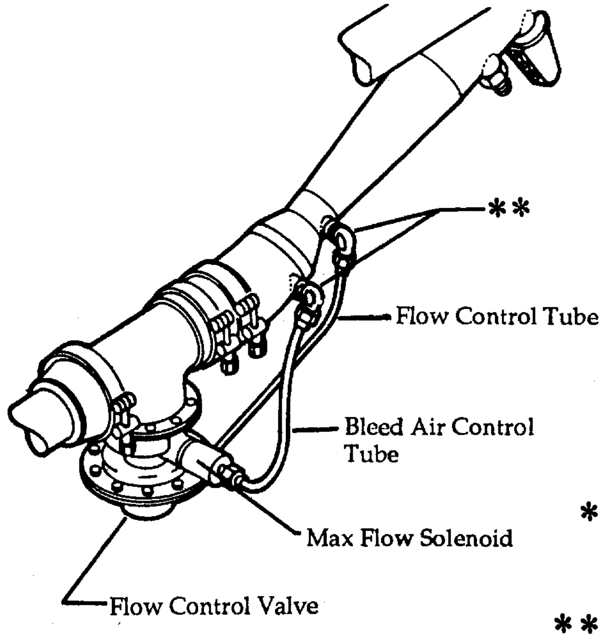


* **This special clamp is utilized where an orifice is installed between flanges of mating parts and requires a higher torque value.**

* * **Coat threads of elbows and B-nuts with high temperature anti-seize compound (Fel-Pro, C5A or equivalent) prior to installation.**

NOTE: **Drag torque is the amount of torque required to overcome the friction of any self-locking nut. This nut friction (drag torque) must be added to the torque callout to ensure proper torquing. The tailcone bleed air ducting incorporates stainless steel clamps, nuts, and bolts that require higher nut-friction than the standard self-locking nuts. In some instances, nut friction may exceed the required torque values.**

Flow Control Valve Installation
Figure 1 (Sheet 1 of 3)

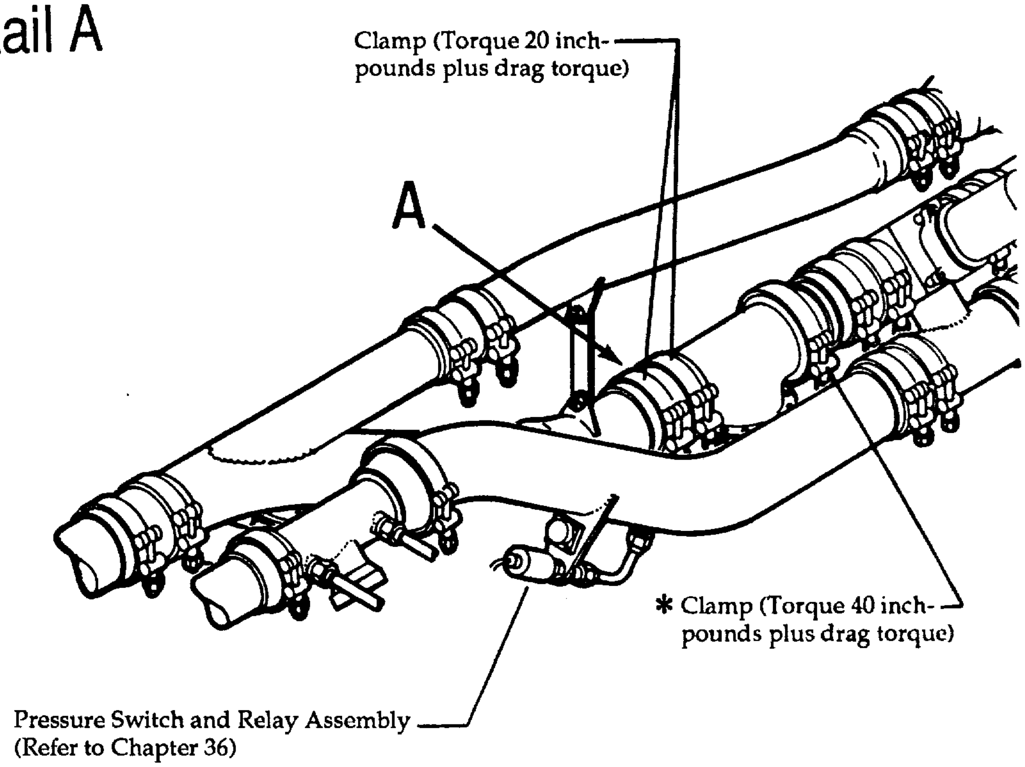


VIEW ROTATED 180°

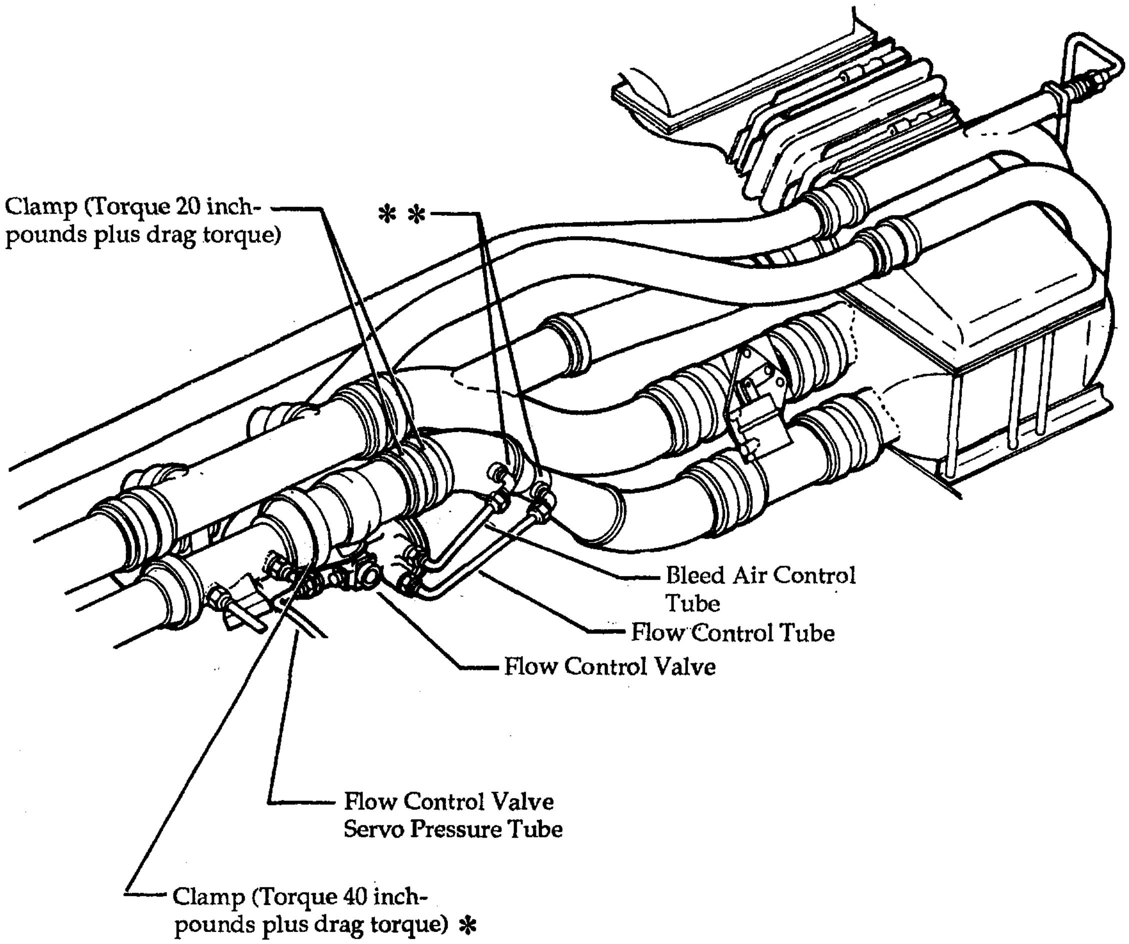
Detail A

✱ This special clamp is utilized where an orifice is installed between flanges of mating parts and requires a higher torque value.

✱✱ Coat threads of elbows and B-nuts with high temperature anti-seize compound (Fel-Pro, C5A or equivalent) prior to installation.



Flow Control Valve Installation
Figure 1 (Sheet 2 of 3)



*** This special clamp is utilized where an orifice is installed between flanges of mating parts and requires a higher torque value.**

*** * Coat threads of elbows and B-nuts with high temperature anti-seize compound (Fel-Pro, C5A or equivalent) prior to installation.**

Flow Control Valve Installation
Figure 201 (Sheet 3 of 3)

HOT AIR BYPASS VALVE - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**

   A. **Remove Valve** (See figure 201.)

      (1) Open tailcone access door and remove electrical power from aircraft.

      (2) Disconnect electrical connector from hot air bypass valve. On Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent, disconnect servo pressure tube from bypass valve. Cap exposed fittings.

      (3) Loosen clamps securing sleeves to both the venturi duct and precooled air ducts and bypass valve.

      (4) Loosen sleeves and remove bypass valve from aircraft.

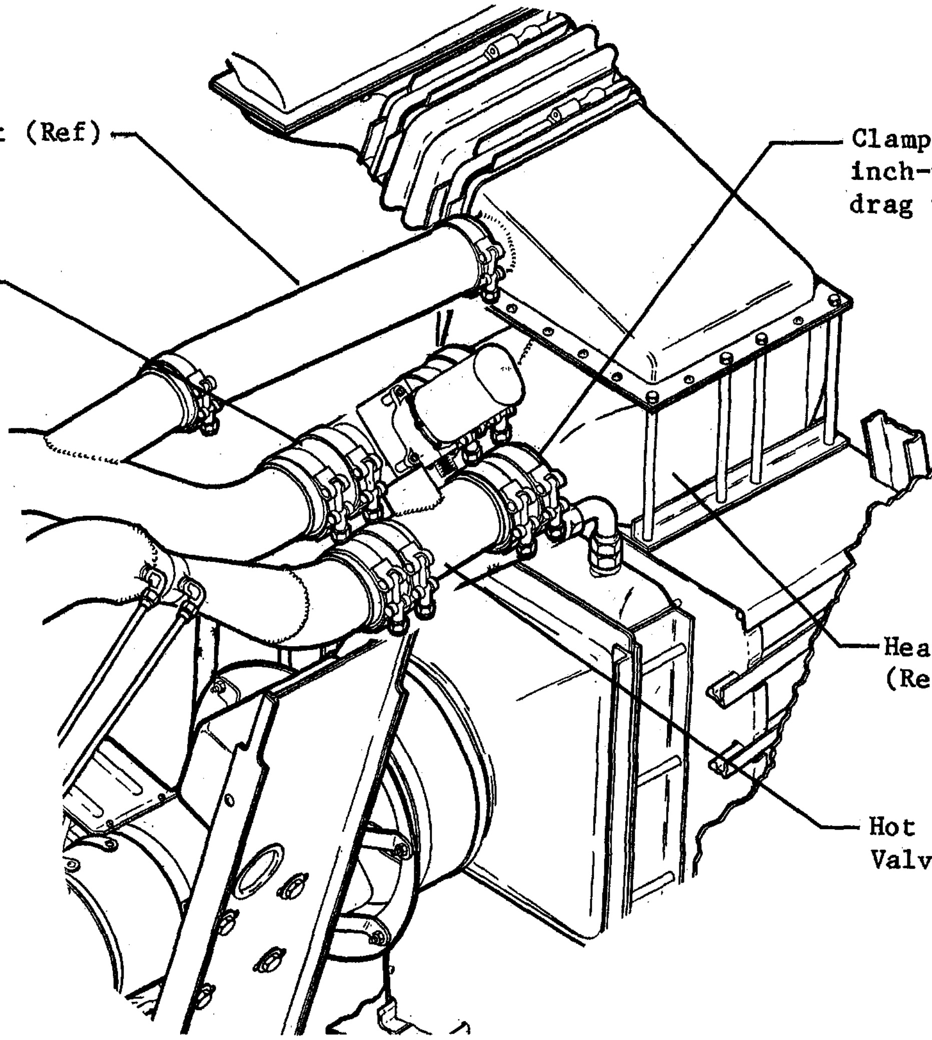
   B. **Install Valve** (See figure 201.)

      (1) Install bypass valve and sleeves and secure with clamps. Torque clamps 20 inch-pounds plus drag torque.

      (2) Connect electrical connector.

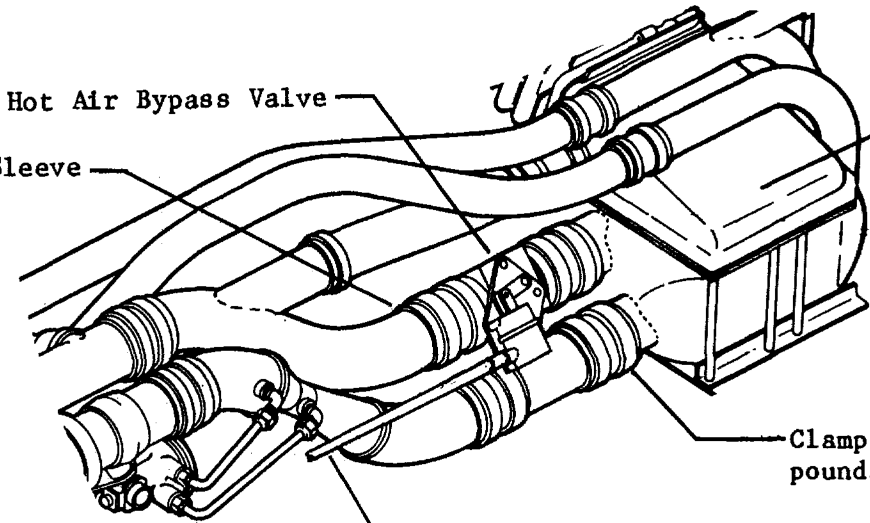
      (3) On Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent, connect servo pressure tube to bypass valve.

      (4) Restore electrical power to aircraft and secure tailcone access door.



NOTE: Drag torque is the amount of torque required to overcome the friction of any self-locking nut. This nut friction (drag torque) must be added to the torque callout to assure proper torquing. The tailcone bleed air ducting incorporates stainless steel clamps, nuts, and bolts that require higher nut-friction than the standard self-locking nuts. In some instances, nut friction may exceed the required torque values.

Hot Air Bypass Valve Installation
Figure 201 (Sheet 1 of 2)



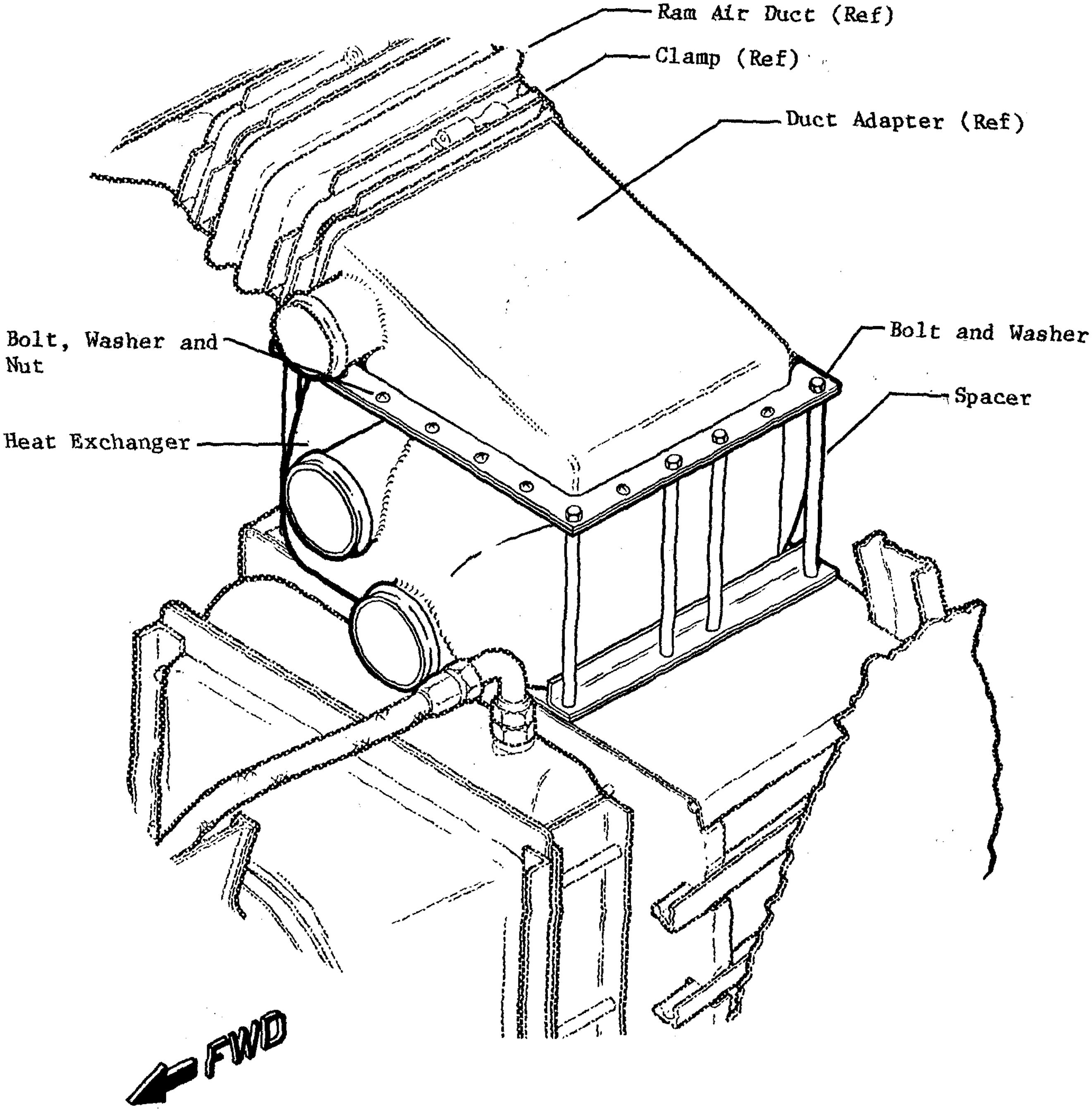
Hot Air Bypass Valve Installation
Figure 201 (Sheet 2 of 2)

HEAT EXCHANGER - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Heat Exchanger (See figure 201.)
      (1) Lower tailcone access door.
      (2) Remove hot air bypass valve. (Refer to 21-41-02.)
      (3) Loosen clamps and remove ram air duct.
      (4) Remove attaching parts and heat exchanger from aircraft.
   B. Install Heat Exchanger (See figure 201.)
      (1) Install heat exchanger and secure with attaching parts.
      (2) Install ram air duct and secure with clamps. Torque clamps 20 inch-pounds plus drag torque.

      NOTE: Drag torque is the amount of torque required to overcome the friction of any self-locking nut. This nut friction (drag torque) must be added to the torque callout to assure proper torquing. The tailcone bleed air ducting incorporates stainless steel clamps, nuts, and bolts, which require higher nut friction than the standard self-locking nuts. In some instances, nut friction may exceed the required torque values.

      (3) Install hot air bypass valve. (Refer to 21-41-02.)
      (4) Secure tailcone access door.

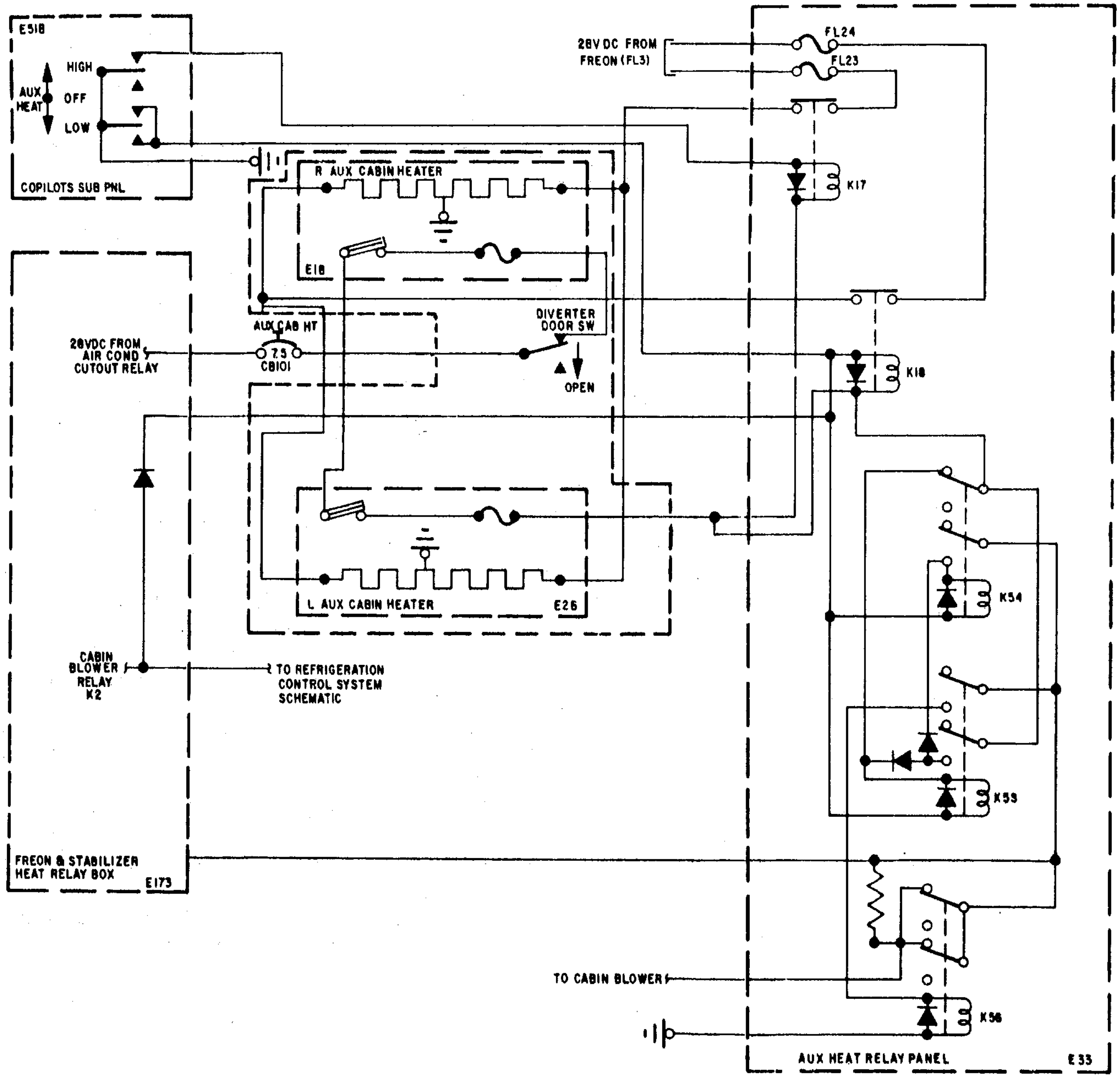


Heat Exchanger Installation
Figure 201

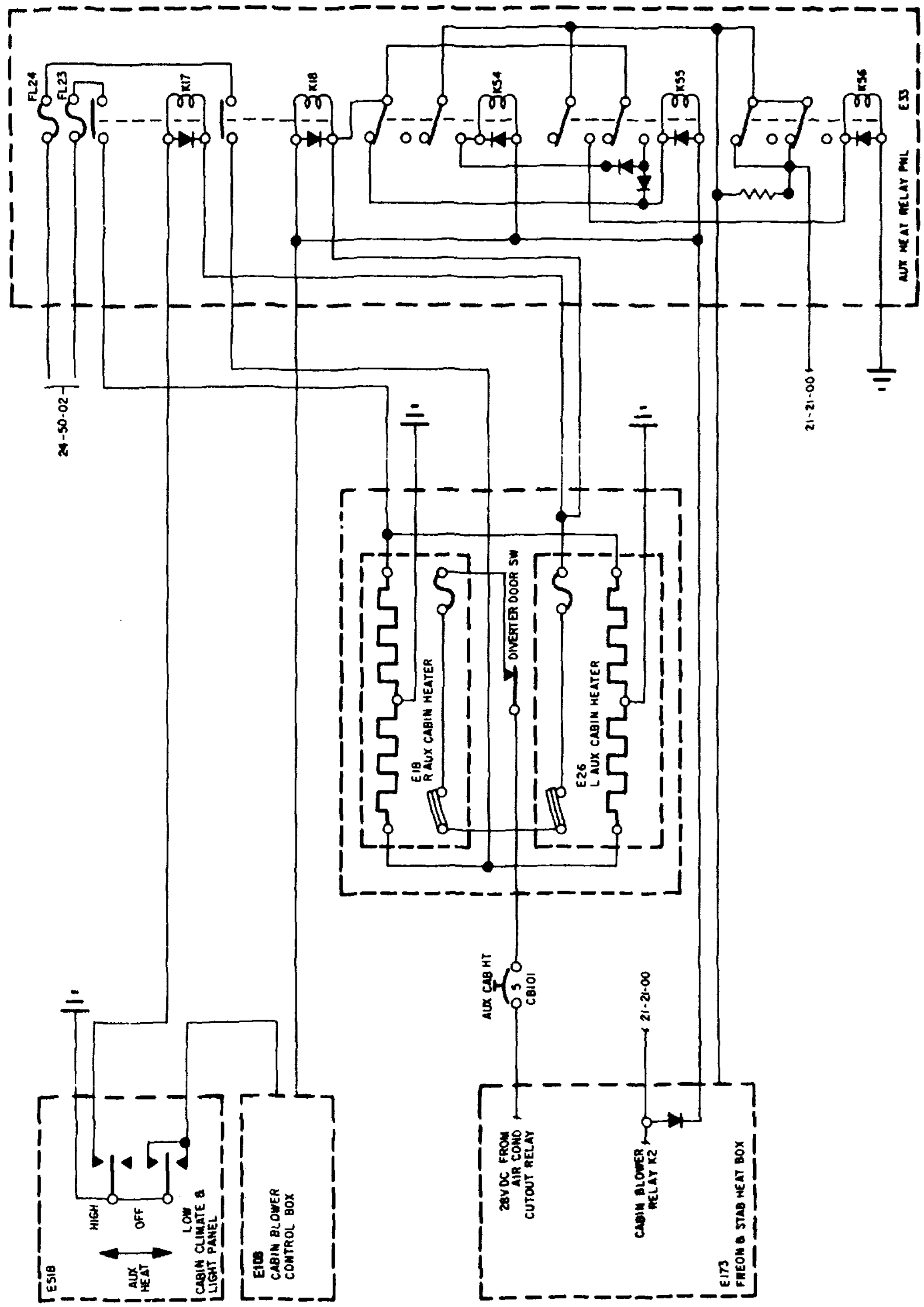
AUXILIARY CABIN HEATER - DESCRIPTION AND OPERATION

1. DESCRIPTION
   A. On *Aircraft 36-002 and Subsequent*, the heater assemblies are secured to the evaporator and blower assembly cover.
   B. On *Aircraft 35-002 and Subsequent*, the heater assemblies are installed in the lower portion of the evaporator duct.
   C. The heater system is powered by an external power source for ground operation or through the generator control box for inflight operation. The system consists basically of two heater circuits with a three-position system switch, a thermal switch, a thermal fuse, an auxiliary cabin heater safety switch *(Aircraft 35-002 thru 35-646 and 36-002 and Subsequent)*, and a circuit breaker common to both heater circuits.

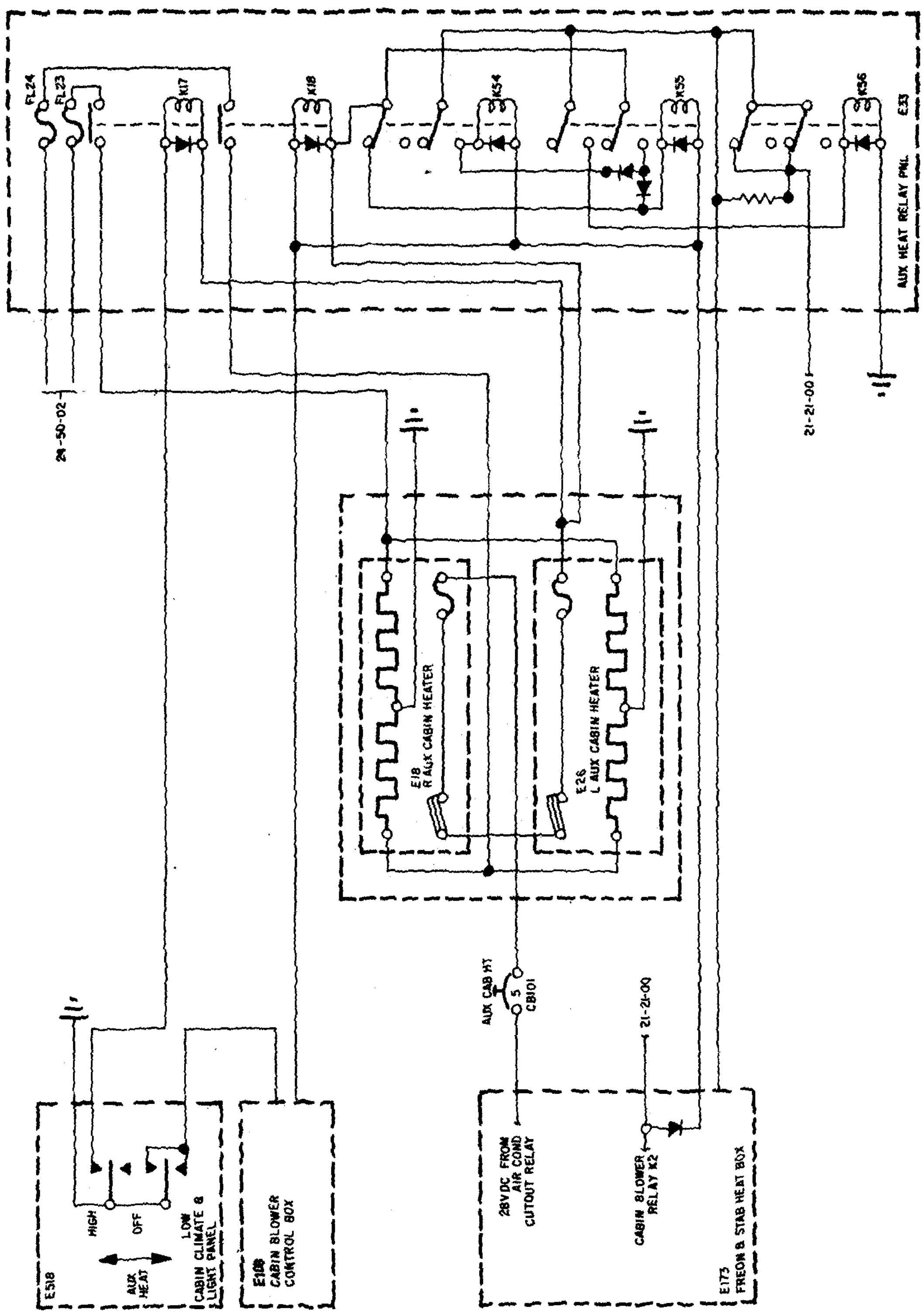
2. OPERATION (See figure 1.)
   A. Two circuits are completed when the Auxiliary Heat Switch is set to LOW and the diverter doors *(Aircraft 35-002 thru 35-646 and 36-002 and Subsequent)* are closed (allowing full airflow across the heater units): (1) a power circuit is completed through the diverter door switch *(Aircraft 35-002 thru 35-646 and 36-002 and Subsequent)*, the heater fuses, and the thermoswitches to the auxiliary heater low control relay (K18), and (2) a ground circuit is completed through the Auxiliary Heat Switch to energize the auxiliary heater low control relay (K18). On *Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent*, the cabin blower control box is part of the ground circuit (refer to 21-21-00). Relay K18 energizes and applies 28 vdc power to the RH and LH aft heater elements. The 28 vdc applied to the auxiliary heater low control relay (K18) is also applied to a set of contacts of the auxiliary heater start cutout relay (K54) and to a set of contacts of the auxiliary heater start relay (K55). Relay K55 energizes, providing 28 vdc to energize relay K54 and completes a power circuit from the evaporator blower motor circuit to energize relay K56. As relay K54 is energized, a locking voltage is applied to the coil of relay K54 from the evaporator blower motor circuit. Relay K56 energizes and completes a power circuit through a voltage-dropping resistor to the evaporator blower motor. This allows the motor to run at approximately 10% of the motor's full speed. When the heaters reach approximately 150°F, the thermoswitches will open and remove 28 vdc from the lower control relay (K18), start relay (K55), and start cutout relay (K54). Start cutout relay K54 will remain energized by 28 vdc from the evaporator blower motor circuit. Start relay K55 will deenergize and remove 28 vdc from blower relay K56. Blower relay K56 will deenergize and apply full 28 vdc to the evaporator motor (bypassing the voltage-dropping resistor). When the air temperature reaches approximately 125°F, the thermoswitches close and complete the 28 vdc circuit to the low control relay (K18). The relay energizes and applies 28 vdc to the RH and LH aft heater elements. Since start cutout relay K54 is energized, the circuit to start relay K55 is open and will not energize. The heater elements will continue to cycle as required and the evaporator blower motor will operate at normal speed.
   B. Operation of the system with the Auxiliary Heater Switch set to HIGH is the same as described above, except both auxiliary heater relays (K17 and K18) are energized so that all heater elements receive power.
   C. If the freon system is utilized during heater operation, the cutout relay is energized, removing power from the AUX CAB HT circuit breaker and deenergizing the auxiliary heater relays.



Auxiliary Cabin Heater System Electrical Control Schematic
Figure 1 (Sheet 1 of 3)



Auxiliary Cabin Heater System Electrical Control Schematic
Figure 1 (Sheet 2 of 3)



Auxiliary Cabin Heater System Electrical Control Schematic
Figure 1 (Sheet 3 of 3)

AUXILIARY CABIN HEATER - MAINTENANCE PRACTICES

1. Removal/Installation

A. Remove Heater Assembly (*Aircraft 36-002 and Subsequent*) (See figure 201.)
   (1) Remove equipment and upholstery as required to gain access to evaporator and blower installation.
   (2) Loosen clamp and disconnect drain tube from evaporator and blower assembly.
   (3) Disconnect electrical connector(s) from evaporator and blower assembly.
   (4) Loosen clamps and disconnect ducts from forward cockpit cooling fan transition.
   (5) Disconnect refrigeration quick-disconnects.
   (6) Support evaporator and blower assembly and remove screws from support brackets. Remove evaporator and blower assembly from aircraft.
   (7) Remove screws securing cover to evaporator and blower assembly.
   (8) Raise cover sufficiently to gain access to electrical connector and disconnect connector.
   (9) Remove cover from evaporator and blower assembly.
   (10) Disconnect wiring from heater. Tag wiring.
   (11) Remove screws and heater assembly from cover.

B. Install Heater Assembly (*Aircraft 36-002 and Subsequent*) (See figure 201.)
   (1) Install heater assembly on cover and secure with attaching parts.
   (2) Connect electrical wiring to heater assembly.
   (3) Place cover on evaporator and blower assembly and connect electrical connector.
   (4) Install cover on evaporator and blower assembly and secure with screws.
   (5) Install evaporator and blower assembly and secure with screws.
   (6) Connect refrigeration quick-disconnects.
   (7) Connect ducts to forward cockpit cooling fan transition and secure with clamps.
   (8) Connect electrical connector(s) to evaporator and blower assembly.
   (9) Connect drain tube and secure with clamp.
   (10) Install previously removed equipment and upholstery.
   (11) Check cabin heater safety switch adjustment.

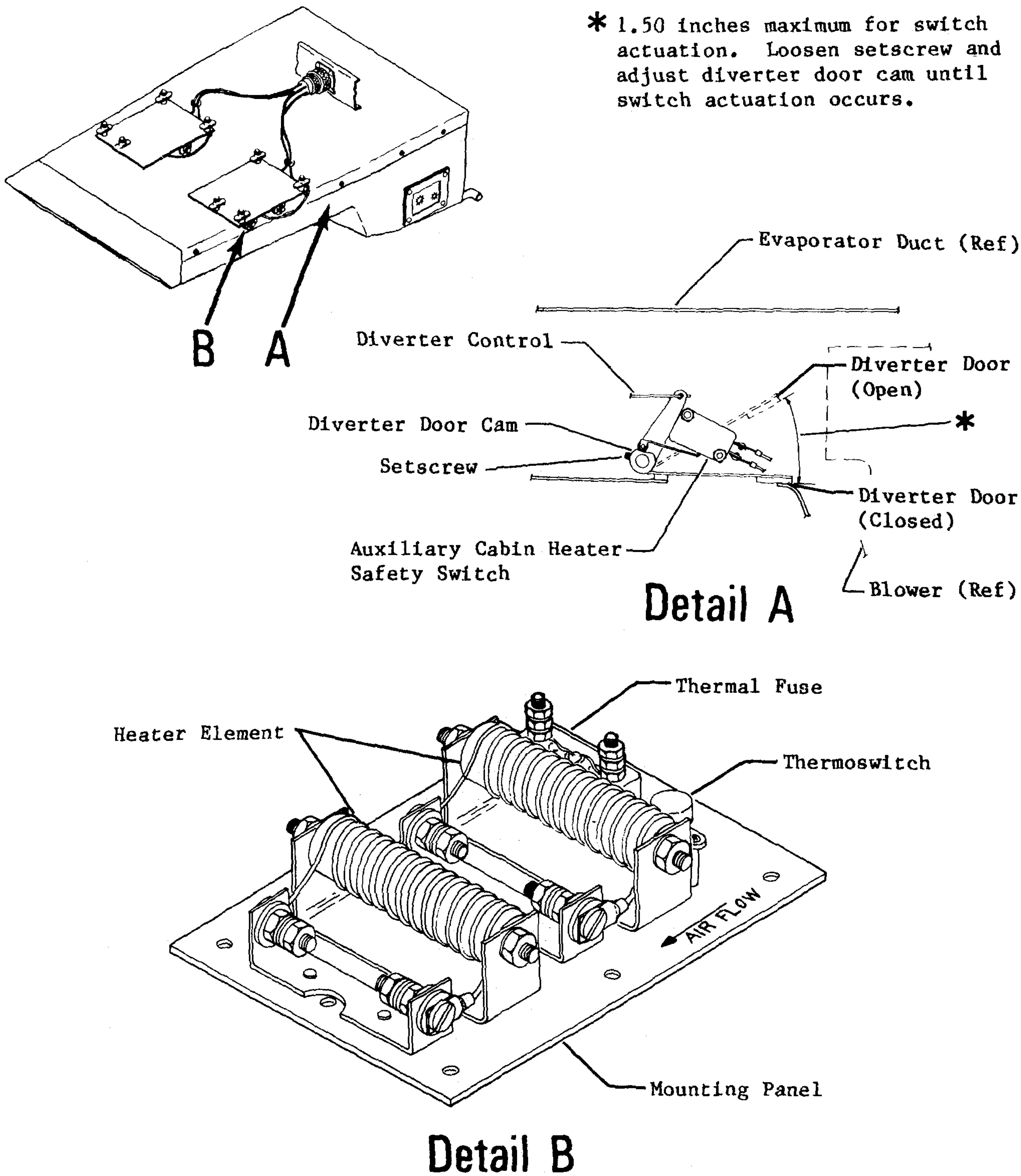
C. Remove Heater Assembly (*Aircraft 35-002 and Subsequent*) (See figure 202.)
   (1) Remove equipment and upholstery as required to gain access to evaporator and blower ducts.
   (2) Remove attaching parts and lower heater assembly sufficiently to gain access to electrical wiring.
   (3) Disconnect electrical wiring from defective heater assembly. Tag wiring.

D. Install Heater Assembly (*Aircraft 35-002 and Subsequent*) (See figure 202.)
   (1) Connect electrical wiring to heater assembly.
   (2) Install heater assembly and secure with screws.
   (3) Install previously removed equipment and upholstery.

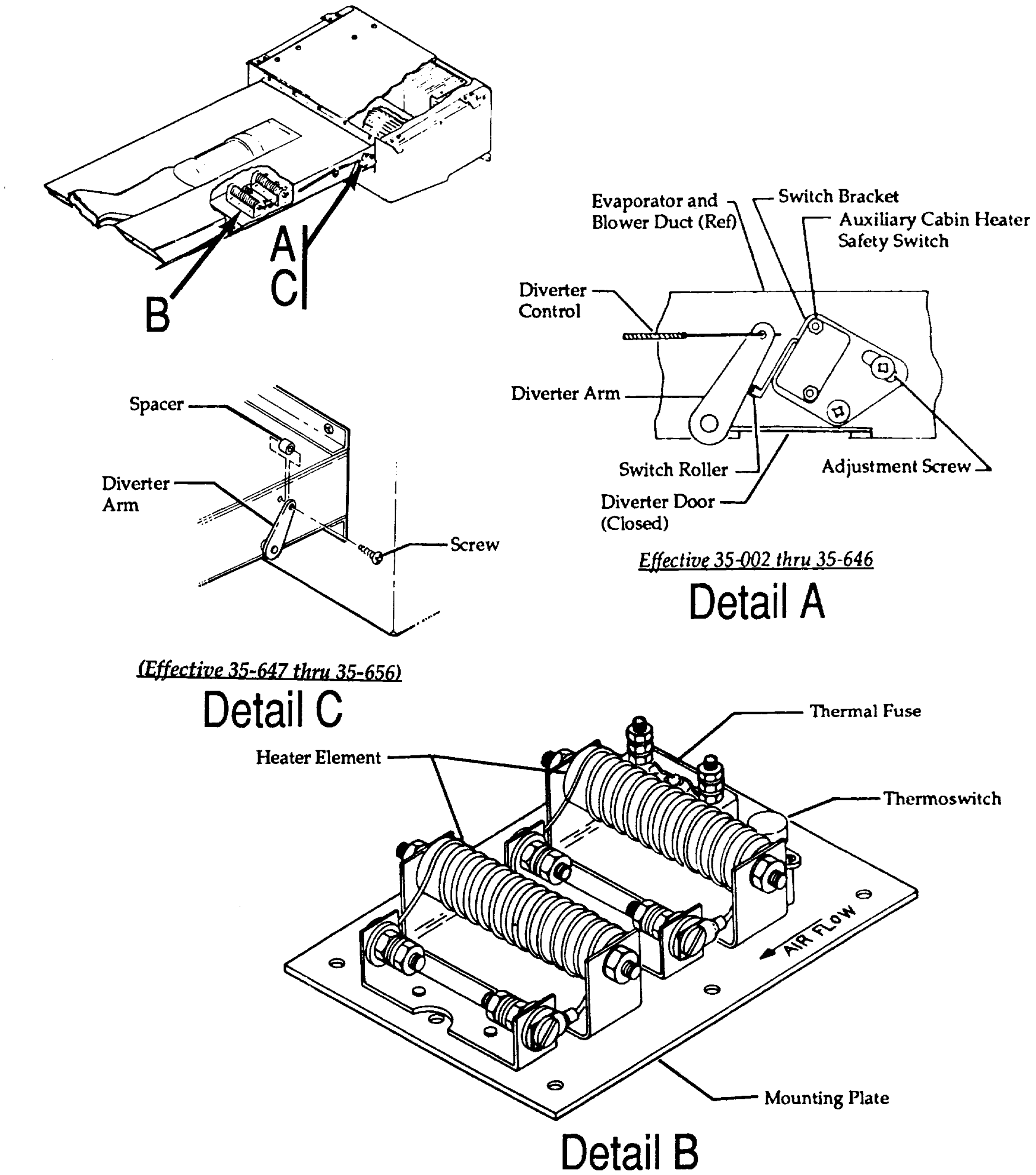
2. Adjustment/Test

A. Diverter Door Safety Switch Adjustment (*Aircraft 36-002 and Subsequent*) (See figure 201.)
   (1) Remove evaporator and blower assembly.
   (2) Remove attaching parts and cover from evaporator and blower assembly.
   (3) Set diverter door open a maximum of 1.50 inches as shown. Loosen setscrew and adjust diverter door cam until switch actuation occurs (no continuity between switch contacts "C" and "NC"). Tighten setscrew.
   (4) Cycle diverter doors to assure proper switch setting.
   (5) Install evaporator and blower assembly.

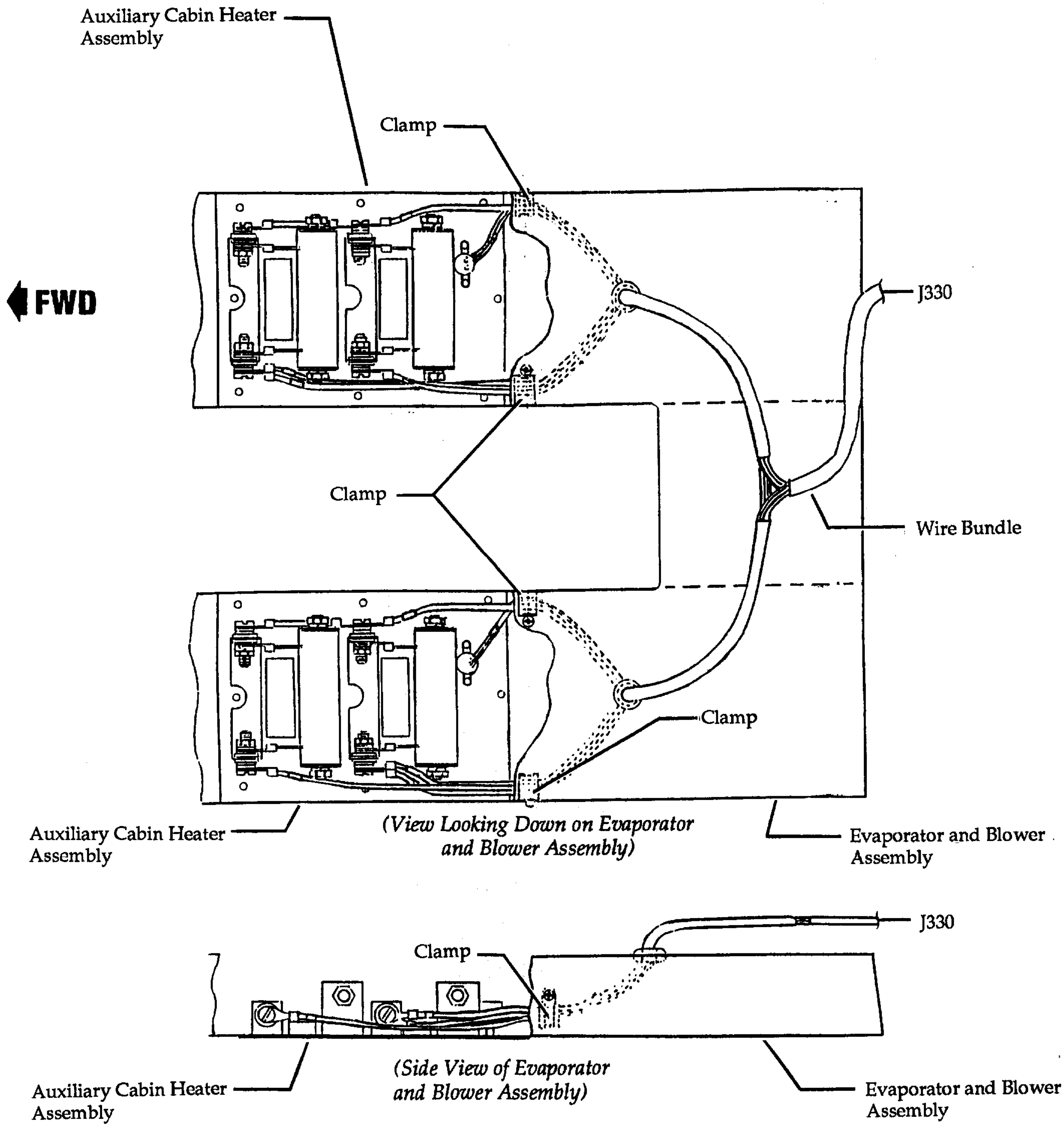
B. Diverter Door Safety Switch Adjustment (*Aircraft 35-002 thru 35-646*) (See figure 202.)
   (1) Assure that diverter doors are completely closed. Check for continuity between switch contacts "C" and "NC".
   (2) Open diverter doors a maximum of 1/8 inch. Loosen adjustment screw and adjust switch until switch actuation occurs (no continuity between switch contacts "C" and "NC"). Tighten adjustment screw.



Auxiliary Cabin Heater System Installation
Figure 201



Auxiliary Cabin Heater System Installation
Figure 202



Auxiliary Cabin Heater Wire Routing
Figure 203

C. Functional Test of Auxiliary Cabin Heater *(35-002 thru 35-646, 36-002 and Subsequent)*
   (1) Apply external power to aircraft.
   (2) Open diverter door.
   (3) Set AUX HEAT HIGH-LOW Switch to LOW. Verify that heater coils are not heating. Cabin blower should be operating at high speed. Check for airflow from diverter door opening on bottom of duct.
   (4) Close diverter doors. Verify that both rear heater coils are heating. Cabin blower should be operating at a low speed.

   NOTE: After either rear coil thermostat opens, the cabin blower should automatically switch to high speed.

   (5) When cabin blower is operating at high speed, turn cabin blower speed control to the "mid" position. This control should have no effect over blower speed.
   (6) Set AUX HEAT HIGH-LOW Switch to OFF.
   (7) After waiting a few moments, set AUX HEAT HIGH-LOW Switch to HIGH. Verify that both sets of front and rear heater coils are heating.

   WARNING: BEFORE PROCEEDING WITH THE NEXT STEP, CLEAR ALL PERSONNEL FROM THE TAILCONE.

   (8) Set COOL-FAN Switch to COOL. Verify that air conditioner starts and heating coils cut off.
   (9) Set COOL-FAN Switch to OFF position and disconnect the external power.
   (10) Verify that air conditioner and heating coils cut off.
   (11) Close diverter door.
   (12) Restore aircraft to normal.

D. Functional Test of Auxiliary Cabin Heater *(35-647 and Subsequent)*
   (1) Apply external power to aircraft.
   (2) Set AUX HEAT HIGH-LOW Switch to LOW.
   (3) Using overhead gasper, verify that cabin blower is operating at low speed and that rear heater coils are heating.

   NOTE: After either rear coil thermostat opens, the cabin blower should automatically switch to high speed.

   (4) When cabin blower is operating at high speed, turn cabin blower speed control to the "mid" position. This control should have no effect over blower speed.
   (5) Set AUX HEAT HIGH-LOW Switch to OFF.
   (6) After waiting a few moments, set AUX HEAT HIGH-LOW Switch to HIGH. Using overhead gasper, verify that both sets of front and rear heater coils are heating.

   WARNING: BEFORE PROCEEDING WITH THE NEXT STEP, CLEAR ALL PERSONNEL FROM THE TAILCONE.

   (7) Set COOL-FAN Switch to COOL. Verify that air conditioner starts and heating coils cut off.
   (8) Set COOL-FAN Switch to OFF position and disconnect the external power.
   (9) Verify that air conditioner and heating coils cut off.
   (10) Restore aircraft to normal.

WINDSHIELD AUXILIARY DEFOG HEATING SYSTEM - DESCRIPTION AND OPERATION

1. **Description** (See figure 1.)
   A. The windshield auxiliary defog heating system provides additional aircraft windshield clearing in high humidity situations.
   B. Components of the system include: two terminal boards and two relays inside the Cabin Climate and Lighting Panel, an aneroid switch, an auxiliary defog control box, two diverter doors on the blower evaporator (part of the air conditioning system), a defog fuse box, an electrical defog heater, a windshield diffuser (refer to 21-20-00), the Windshield Auxiliary Heat Defog Switch, a temperature sensor, and the AUX DEFOG Circuit Breaker on the Pilot's Circuit Breaker Panel. On *Aircraft 35-647 thru 35-670*, an auxiliary defog fuse box is installed.
   C. System Component Description
      (1) An aneroid switch (S215) is installed in the static line adjacent to the cabin differential pressure relief valve. The aneroid switch opens at pressure altitudes above 18,000 (± 500) feet to prevent operation of the auxiliary defog heating system diverter doors. This keeps humidified, conditioned air from being directed above the headliner to the area of the windshield. The aneroid switch is enabled when the COOL-FAN Switch (S630) is in the OFF or FAN position and the Windshield Auxiliary Heat Defog Switch (S5083) is in the W/S AUX HEAT DEFOG position.
      (2) The auxiliary defog control box (E620) is located at stringer 18, frame 13C. It contains a printed circuit board (PCB20) and two power switching transistors (Q200 and Q201). The box takes the output of temperature sensor RT30 and uses it to switch electrical defog heater (HR20) elements on and off, to control the temperature of the air at the windshield diffuser.
      (3) Diverter doors and actuators are mounted on the blower evaporator assembly at frames 20 and 21. The diverter doors are solenoid actuated. (Refer to 21-43-03.) When open, the doors direct dehumidified air above the aircraft headliner and into the cockpit. The doors open when the Windshield Auxiliary Heat Defog Switch (S5083) is in the W/S AUX HEAT DEFOG position, the COOL-FAN Switch (S630) is not in the COOL position, and the auxiliary defog aneroid switch (S215) is closed. On *Aircraft 35-647 thru 35-670*, a manual override switch (S7001) on the blower evaporator assembly opens the diverter doors regardless of the cabin switch settings.
      (4) A defog fuse box (E622) is mounted on the side of the Generator Control Panel (E43) at stringer 12, frame 26. It contains fuses (FL93 and FL94) for the heater elements of the electrical defog heater (HR20).
      (5) The electrical defog heater (HR20) is mounted in the air duct just forward of the right-hand cabin diffuser, between stringers 12 and 13R. It provides additional heating for the defog air. The heater operates only when the bleed air at temperature sensor (RT30) is too cool for proper operation of the windshield auxiliary defog heating system.
      (6) A windshield diffuser is located at the center of the aircraft windshield and provides a blanket of heated air across the inside surface of the windshield when the system is operating.
      (7) The Windshield Auxiliary Heat Defog Switch (W/S AUX HEAT DEFOG) (S5083) is located on the Pilot's Switch Panel (E500). It has three positions: OFF, CKPT, and W/S AUX HEAT DEFOG. The switch turns the windshield auxiliary defog heating system on and off and selects the operating mode.
      (8) The temperature sensor (RT30) is a thermistor mounted in the base of the windshield diffuser and beneath the glareshield mounting bracket. Its resistance varies with the air temperature at the base of the windshield diffuser.
      (9) The AUX DEFOG Circuit Breaker is located on the Pilot's Circuit Breaker Panel (E67). When pulled, it prevents operation of the windshield auxiliary defog heating system.
      (10) Terminal boards (TB5142 and TB5144) along with relays (K3 and K905) and the COOL-FAN Switch (S630) in the Cabin Climate and Lighting Panel provide switching for application of power to the diverter door actuators and defog control box (E620). They also enable/disable the aneroid switch (S215).

2. Operation (See figure 2.)

A. Selecting CKPT on the Windshield Auxiliary Heat Defog Switch (S5083) closes the circuit between the AUX DEFOG Circuit Breaker in the Pilot's Circuit Breaker Panel (E67) and the input voltage of the voltage regulator integrated circuit (IC1) in the auxiliary defog control box (E620). IC1 and a voltage divider, consisting of resistor (R1) and variable resistor (R2), provide a reference voltage to the input of difference amplifier (IC2). A thermistor (RT30) and resistors (R3 and R4) make up a voltage divider that provides a temperature-dependent voltage to the other input of the difference amplifier. One of the amplifier inputs is inverted and summed with the other to generate the output voltage. The output of the difference amplifier is equal to the difference between the two input voltages. When the temperature of RT30 is 160° (± 3°) F (71.1° [± 1.7°] C), the difference amplifier's output forward biases transistor Q1. The transistor Q1 pulls the anodes of diodes CR3 and CR4 to ground. With the anodes of the diodes at ground, the bases of Darlington pairs Q200 and Q201 are reverse-biased, removing ground from the elements of heater HR20. Below 155° (+4°,-1°) F (68.3° [+2.2°, -0.56°] C) temperature, the output of IC2 is not high enough to forward bias the bases of Darlington pairs Q200 and Q201. When forward biased, the Darlington pairs provide grounds for the heater, allowing 28 vdc to flow through the elements. When CKPT is selected on the Windshield Auxiliary Heat Defog Switch, operation of electrical defog heater HR20 is independent of the COOL-FAN Switch (S630) setting.

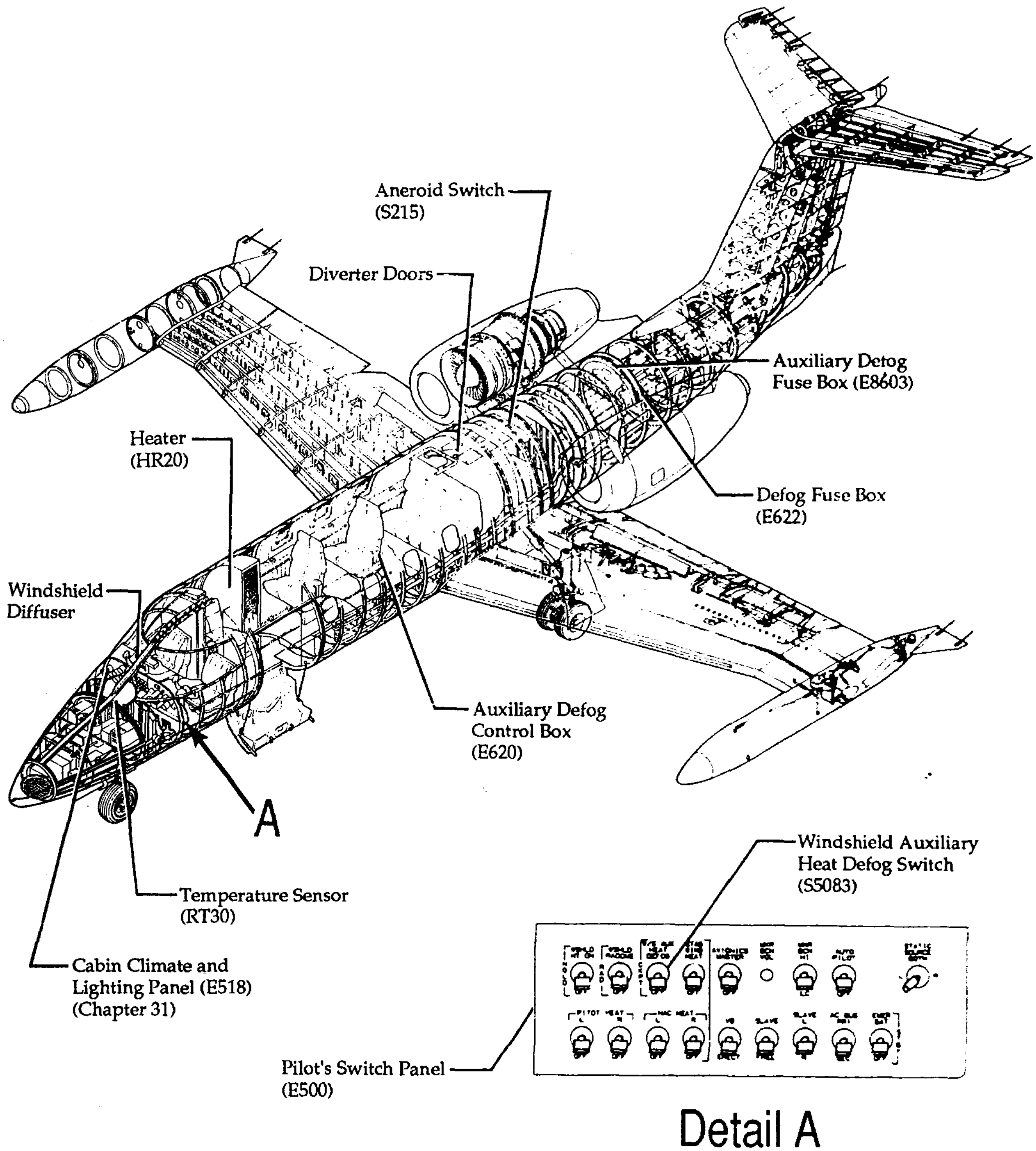
B. Selecting FAN on the COOL-FAN Switch (S630) causes air to move through the air conditioning ducts irrespective of the setting of the Windshield Auxiliary Heat Defog Switch (S5083).

C. Selecting W/S AUX HEAT DEFOG on the Windshield Auxiliary Heat Defog Switch (S5083) and FAN on the COOL-FAN Switch (S630) energizes the air conditioning system fan. In this mode, relay K3 (on PCB106 in the Cabin Climate and Lighting Panel) is not energized. When closed at altitudes below 17,000 (-0, +500) feet, the aneroid switch (S215) provides a ground to energize relay K905. With K905 energized, and the circuit closed by Windshield Auxiliary Heat Defog Switch (S5083) set to the W/S AUX HEAT DEFOG position, power is applied to the diverter door actuators through K905 and TB5144. The doors open and dehumidified air is directed above the headliner to the forward cockpit area. Above 18,000 (±500) feet, aneroid switch (S215) opens and relay K905 deenergizes. When this happens, the diverter doors close and the air conditioner continues to operate. Operation of the auxiliary control box (E620), heater, etc. is identical to the description given in paragraph A. Heater HR20 operates whether or not aneroid switch (S215) is open.

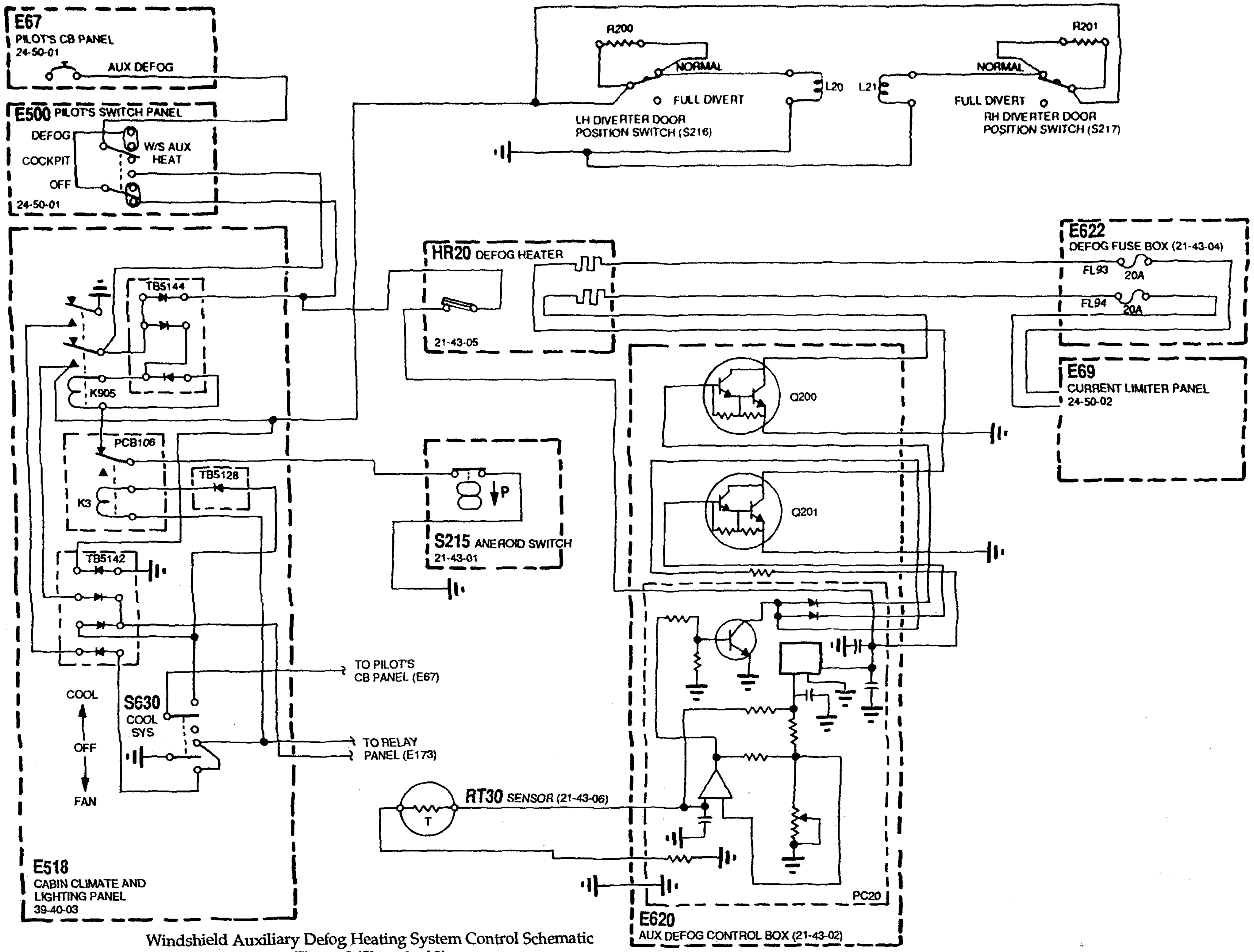
D. Selecting W/S AUX HEAT DEFOG on the Windshield Auxiliary Heat Defog Switch (S5083) and COOL on the COOL-FAN Switch (S630) energizes the diverter doors to close, causes heater HR20 to operate, and engages the air conditioning system. The diverter doors close because the COOL-FAN Switch (S630) energizes relay K3 on PCB106. When K3 energizes, ground for K905 is removed, deenergizing relay K905. Since K905 controls power to the diverter door actuators, they close. Operation of the auxiliary control box (E620), heater, etc. is identical to the description given in paragraph A.

E. When the COOL-FAN Switch (S630) is set to OFF, the air conditioning system will not operate. When the Windshield Auxiliary Heat Defog Switch (S5083) is set to either CKPT or W/S AUX HEAT DEFOG and the COOL-FAN Switch is set to OFF, electrical defog heater HR20 heats even though no air is moving through the air conditioning ducts. A thermal switch inside the heater provides thermal protection.

CAUTION: TO AVOID THE POSSIBILITY OF HEATER FAILURE, DO NOT OPERATE ELECTRIC HEATER UNLESS AIR IS FLOWING THROUGH AIR CONDITIONING DUCTS.

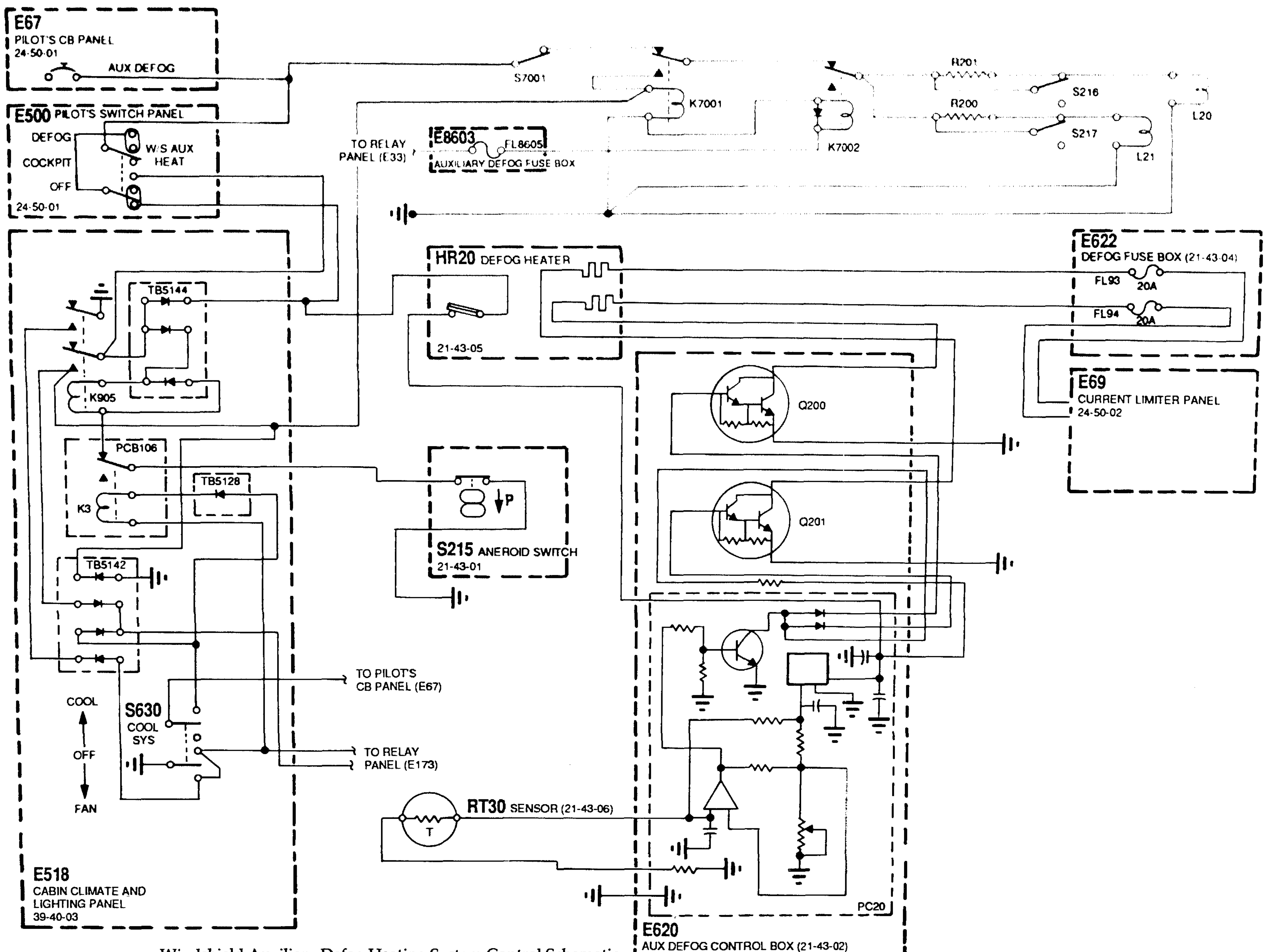


Windshield Auxiliary Defog Heating System Locator
Figure 1



20-36C

Windshield Auxiliary Defog Heating System Control Schematic
Figure 2 (Sheet 1 of 2)



Windshield Auxiliary Defog Heating System Control Schematic
Figure 2 (Sheet 2 of 2)

WINDSHIELD AUXILIARY DEFOG HEATING SYSTEM - TROUBLE SHOOTING

1. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Multimeter	Model 260	Simpson	General Resistance and Voltage Measurements
Multimeter	Model 3430	Hewlett Packard	General Resistance and Voltage Measurements
Digital Thermometer	Trendicator 400A	Doric Scientific Co. San Diego, CA	Temperature Measurements

2. Troubleshooting

A. The following trouble shooting procedures are provided as an aid to detecting possible troubles in the Windshield Auxiliary Defog Heating System.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
1. No Air From Windshield Diffuser.		
a. Obstruction in windshield diffuser.	Check diffuser for obstruction.	If found, remove obstruction.
b. Component or connector air leakage in distribution system.	Check lines and connectors for air leaks.	Replace leaky component or repair leak.
2. Air from Windshield Diffuser Does Not Reach 155° (+4°, -1°) F.		
a. Heater (HR20) is not operating properly.	Remove electrical power from aircraft and disconnect aircraft batteries. Remove heater and check for continuity between pins A and C, H and D, and F and B. If any pair is open, heater is bad.	If indicated, replace heater.
b. Fuses (FL93 and FL94) in defog fuse box (E622) are blown.	Remove electrical power from aircraft and disconnect aircraft batteries. Check fuses.	If indicated, find and repair cause of blown fuse(s). Replace blown fuse(s).

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
c. AUX DEFOG circuit breaker (CB111) on the Pilot's Circuit Breaker Panel (E67) is thrown.	Remove electrical power from aircraft and disconnect aircraft batteries. Use standard procedures to find cause of thrown breaker.	If indicated, repair cause of thrown circuit breaker. Reset circuit breaker.
d. Open temperature sensor (RT30).	Remove electrical power from aircraft. Disconnect aircraft batteries. Disconnect connector on RT30 and check for continuity between pins 6 and 7 of P113. If open, sensor is bad.	If indicated, replace sensor.
e. Defective auxiliary defog control box (E620).	Remove electrical power from aircraft and disconnect aircraft batteries.	Replace control box.
3. Air from Windshield Diffuser is Hotter than 160° (± 3°) F.		
a. Defective auxiliary defog control box (E620).	Remove electrical power from aircraft. Disconnect aircraft batteries.	Replace control box.
b. Defective temperature sensor (RT30).	Remove electrical power from aircraft. Disconnect aircraft batteries.	Replace temperature sensor.
4. Conditioned Air is Directed Above Cockpit Headliner at Altitudes Above 18,500 Feet.		
a. Defective aneroid switch (S215).	Remove electrical power from aircraft. Disconnect aircraft batteries.	Replace switch.
b. Diverter door not shutting properly.	Check for blockage of diverter door and actuator mechanism.	Remove blockage.
5. No Conditioned Air Above Headliner.		
a. Diverter door not opening due to blockage.	Remove electrical power from aircraft. Disconnect aircraft batteries. Check for blockage of diverter doors.	Remove blockage.
b. Defective diverter door actuator not opening door.	Remove electrical power from aircraft. Disconnect aircraft batteries.	Remove evaporator and blower assembly (refer to 21-50-06). Replace diverter door actuator.
c. Blocked air passage above headliner.	Check for blockage.	Remove blockage.

WINDSHIELD AUXILIARY DEFOG HEATING SYSTEM - MAINTENANCE PRACTICES

1. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Pitot-Static Tester	1811G	Barfield Instrument Co. Atlanta, GA	Test aneroid switch.
Accessories Kit	LSO 612	NAV-Aids Ltd. Montreal, Canada	Adapters for pitot-static tester.
Digital Thermometer	Trendicator 400A	Doric Scientific San Diego, CA	Temperature measurements.

2. Adjustment/Test *(LES-FT-1348A)*

NOTE: Peform Functional Test of Windshield Auxillary Defog Heating System in accordance with the current inspection interval specified in Chapter 5.

The following functional test procedure is provided as an aid in trouble shooting the Windshield Auxiliary Defog Heating System.

WARNING: ALL DRAIN HOLES AND VENTS NORMALLY LEFT OPEN DURING FLIGHT SHALL BE LEFT OPEN DURING THIS TEST.

A. Functional Test of Windshield Auxillary Defog Heating System
(1) Set Battery Switch(es) off and disconnect aircraft batteries.
(2) Set Windshield Auxiliary Heat Defog Switch (S5083) to OFF. Set Air Conditioning Switch (S630) to OFF.
(3) Remove auxiliary electrical heater fuses (FL93 and FL94) from defog fuse box (E622).
(4) Connect electcrical connectors to batteries and connect external electrical power source to aircraft.
(5) Verify AUX DEFOG Circuit Breaker, located on the Pilot's Circuit Breaker Panel (E67), is depressed.
(6) Position the digital thermometer's sensor so that it is directly in the airflow coming out of the windshield diffuser.
(7) Set the Windshield Auxiliary Heat Defog Switch (S5083) to CKPT.
(8) Verify auxiliary heater does not function.Verify aircraft air conditioning system is not operating.

CAUTION: DO NOT OPERATE ELECTRIC HEATER (HR20) UNLESS AIR IS FLOWING THROUGH AIR CONDITIONING DUCTS. AIR FLOWS WHEN AN ENGINE IS OPERATING AND BLEED AIR/CABIN AIR SWITCHES ARE SET TO ON.

(9) Verify diverter assembly doors are closed.
(10) Set Windshield Auxiliary Heat Defog Switch to WS AUX HEAT DEFOG.
(11) Verify air conditioning system is operating and air is flowing above headliner into the cabin.
(12) Set Air Conditioning Switch to COOL.

(13) Verify air conditioning system is operating and air is flowing above headliner into cabin. Verify cool air is directed into cabin. Verify diverter assembly doors are closed.
(14) Set Windshield Auxiliary Heat Defog Switch (S5083) to OFF.
(15) Verify air conditioning system is operating.
(16) Set Air Conditioning Switch (S630) to OFF.
(17) Disconnect external electrical power from aircraft. Disconnect aircraft batteries.

B. Aneroid Switch Test

CAUTION: USE NOTHING THAT WILL INTRODUCE FOREIGN MATTER INTO PITOT-STATIC SYSTEM.

BOTH PRESSURE AND VACUUM SOURCES SHALL HAVE GAGES INDICATING APPLIED PRESSURE OR VACUUM.

NOTE: Pitot-static tests shall be conducted by qualified personnel only.

(1) Disconnect static forward of aneroid switch (S215).
(2) Connect pitot-static tester, or vacuum source, as shown in Figure 201.
(3) Connect aircraft batteries and apply exterior electrical power to aircraft.
(4) Set Defog Switch (S5083) to W/S AUX HEAT DEFOG. Set Air Conditioning Switch (S630) to FAN.
(5) Use pitot-static tester to simulate a pressure altitude of 20,000 (+500; -0) feet.
(6) Verify aneroid switch activates (closes) at 18,000 (±500) feet by noting that the air conditioning compressor circuit activates.

NOTE: Aneroid switch (S215) shall be open at a pressure altitude of 21,000 feet. As altitude is decreased, switch will close at a pressure altitude of 18,000 (±500) feet. The closed aneroid switch enables the Windshield Auxiliary Defog Heating System.

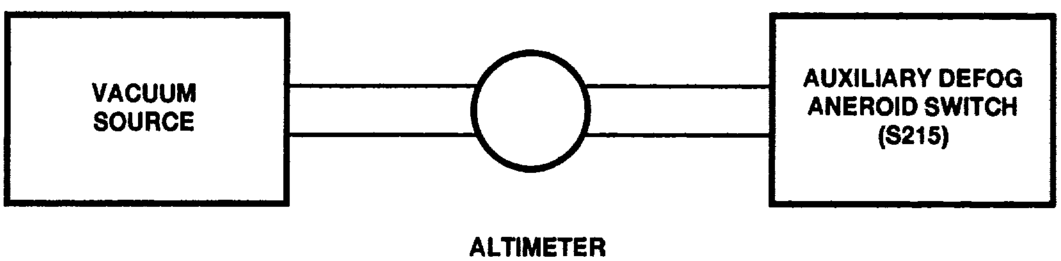
(7) Simulate a pressure altitude of 17,500 (+0; -500) feet with the pitot-static tester.
(8) Verify air conditioner operation. Verify diverter doors open. Verify cool air is directed above the cabin headliner.
(9) Set Defog Switch to CKPT.
(10) Verify air conditioner is not operating.
(11) Set Air Conditioning Switch (S630) to OFF.
(12) Remove external electrical power from aircraft. Disconnect aircraft batteries.
(13) Remove pitot-static tester from aircraft.
(14) Reconnect static line forward of aneroid switch.

C. Defog Heater Test
(1) Install fuses (FL93 and FL94) in defog fuse box (E622).
(2) Connect aircraft batteries and apply external electrical power to aircraft.

NOTE: Aircraft engines shall be operated by qualified personnel only.

(3) Start one or both aircraft engines. (Refer to FAA Approved Airplane Flight Manual.)
(4) Set Bleed Air Switches (S342 and S343), on Cabin Climate and Lighting Panel (E518), to ON.
(5) Set Cabin Air Switch (S100), on pressurization module (E521), to ON.
(6) Set generator switch(es) to GEN.
(7) Set Windshield Defog Switch (S5083), on Pilot's Switch Panel (E500), to CKPT.
(8) Verify air conditioning system is not running.
(9) Note, on digital thermometer, a windshield-air temperature increase. Temperature increase verifies that heater (HR20) is operating.

(10) Verify there is no airflow above cabin headliner. Air does not flow above headliner when diverter doors are closed.
(11) Set Defog Switch (S5063) to W/S AUX HEAT DEFOG.
(12) Verify air conditioning system is operating.
(13) Verify diverter doors are open by noting flow of air above headliner into cockpit area.
(14) Verify heater (HR20) is operating by using a digital thermometer to note a flow of hot air from the diffuser.
(15) Verify heater (HR20) turns off after airflow reaches a temperature of 160 (±3)°F [71.1 (±1.7)°C].
(16) Verify, with a digital thermometer, that heater (HR20) turns on at a temperature of 155 (+4; -1)°F [68.3 (+2.2; - 0.5)° C].
(17) Allow system to cycle heater on and off two or three times to verify that system is working properly.
(18) Set Air Conditioning Switch to COOL.
(19) Verify diverter doors close and air conditioned air comes into the cabin.
(20) Set Air Conditioning Switch (S630) to OFF.
(21) Set Defog Switch (S5083) to OFF.
(22) Shutdown aircraft engines.
(23) Set generator switch(es) to OFF.
(24) Remove external electrical power from aircraft.
(25) Remove digital thermometer from aircraft.



Test Setup
Figure 201

AUXILIARY DEFOG ANEROID SWITCH - MAINTENANCE PRACTICES

1. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Altimeter		Commercially Available	Substitute for pitot-static tester.
Vacuum Source		Commercially Available	Substitute for pitot-static tester.
Pitot-Static Tester	Model 1811	Barfield Instrument Co. Atlanta, GA	Test aneroid switch.
Multimeter	Model 260	Simpson	Resistance and voltage measurements.

2. Removal/Installation

A. Remove Auxiliary Defog Aneroid Switch (S215) (See Figure 201.)
   (1) Remove electrical power from aircraft.
   (2) Remove baggage compartment headliner.
   (3) Disconnect electrical connector (P1109) from aneroid switch.
   (4) Remove aneroid switch and O-ring from union. Cap all openings in union.

B. Install Auxiliary Defog Aneroid Switch (S215) (See Figure 201.)

   NOTE: Perform functional test of aneroid switch (paragraph 3.A.) before installation.

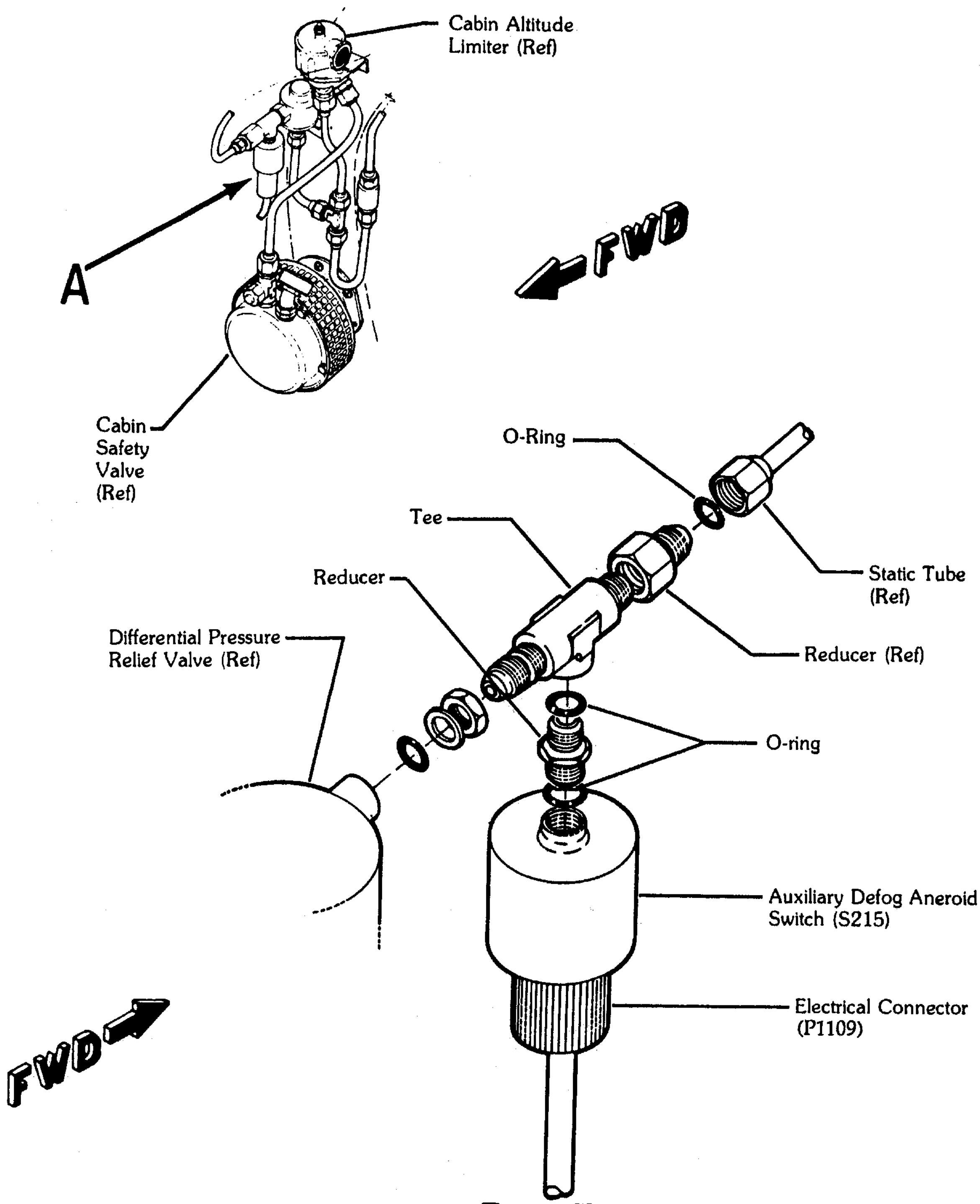
   (1) Install aneroid switch and O-ring in union.
   (2) Connect electrical connector (P1109) to aneroid switch.
   (3) Perform functional test of Windshield Auxiliary Heating Defog System. (Refer to 21-43-00.)
   (4) Reinstall baggage compartment headliner.

3. Adjustment/Test

A. Functional Test of Auxiliary Defog Aneroid Switch (S215) (See Figure 202.)
   (1) Remove aneroid switch (S215). (Refer to paragraph 2.A.)
   (2) On *Aircraft 35-643 thru 35-646*, connect multimeter across pins B and C of switch. On *Aircraft 35-647 thru 35-670*, connect multimeter across pins A and C of switch. Check for continuity.

   CAUTION: TO AVOID DAMAGE TO TEST EQUIPMENT AND/OR ANEROID SWITCH, DO NOT EXCEED 2,000 FEET PER MINUTE, OR MAKE SUDDEN OR EXCESSIVE PRESSURE CHANGES ASCENDING OR DESCENDING.

   (3) Slowly apply vacuum while observing multimeter and altimeter. Aneroid switch shall open at 18,000 (±500) feet of pressure altitude.
   (4) Slowly decrease vacuum. Aneroid switch shall close on or before 17,000 feet.
   (5) Slowly release vacuum.
   (6) Disconnect aneroid switch from test setup.
   (7) Install aneroid switch. (Refer to paragraph 2.B.)



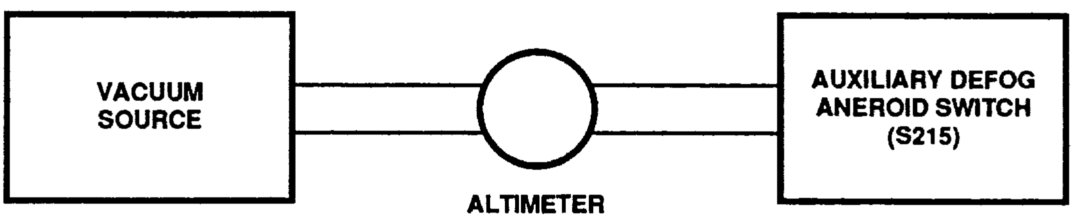
Detail A

(TYPICAL)

Auxiliary Defog Aneroid Switch Installation
Figure 201

13-34A-1

FUNCTIONAL TEST USING PITOT-STATIC TESTER



FUNCTIONAL TEST USING ALTIMETER AND VACUUM SOURCE

Auxiliary Defog Aneroid Switch Test Setup
Figure 202

AUXILIARY DEFOG CONTROL BOX - MAINTENANCE PRACTICES

1. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Multimeter	Model 260	Simpson	Continuity Checks
Milliohmeter	Model 670A	Shallcross, Inc. Selma, NC	Check Bonding
Thermal Conductive Compound	340	Dow Corning Co. Midland, MI	Install Transistor
Silicone Rubber Adhesive	RTV 162	Dow Corning Co. Midland, MI	Install Transistor

2. Removal/Installation

A. Remove Auxiliary Defog Control Box (E620) (Refer to figure 201.)
   (1) Remove electrical power from aircraft.
   (2) Remove cabin furnishings, upholstery, and floorboards to gain access to control box.
   (3) Disconnect electrical connectors (P111 and P113) from control box.
   (4) Remove screws attaching control box to stringers.
   (5) Remove control box from aircraft.

B. Remove Printed Circuit Board (PCB20) (Refer to figure 201.)
   (1) Remove screws securing box assembly to control box assembly. Remove box assembly.
   (2) Remove attaching parts securing printed circuit board (PCB20) to box assembly.

C. Remove Transistor (Q200 or Q201) (Refer to figure 201.)
   (1) Label and unplug wires on transistor socket.
   (2) Remove attaching parts securing heat sink to control box assembly.
   (3) Remove heat sink assembly.
   (4) Remove hardware securing transistor, cover, wafer insulator, and socket to heat sink.
   (5) Being careful not to damage wafer insulator, remove cover, transistor, wafer insulator, and socket from heat sink.

D. Install Auxiliary Defog Control Box (E620) (Refer to figure 201.)
   (1) Position control box at its appropriate location on stringers 18 and 19, and secure with screws.
   (2) Check electrical resistance between control box and aircraft structure. Resistance shall not be greater than value specified in Chapter 20 of wiring manual.
   (3) Connect electrical connector (P111 and P113) to control box.
   (4) Perform Functional Test of Windshield Auxiliary Defog Heating System. (Refer to 21-43-00.)
   (5) Install all previously removed cabin floorboards, upholstery and furnishings.
   (6) Restore aircraft to normal.

E. Install Printed Circuit Board (PCB20) (Refer to figure 201.)
   (1) Secure printed circuit board (PCB20) to box assembly with attaching parts.
   (2) Secure box assembly to control box assembly with screws.

F. Install Transistor (Q200 or Q201) (Refer to figure 201.)

(1) Place transistor in cover.

(2) Coat both sides of insulator with a thin, even coating of thermal conductive compound.

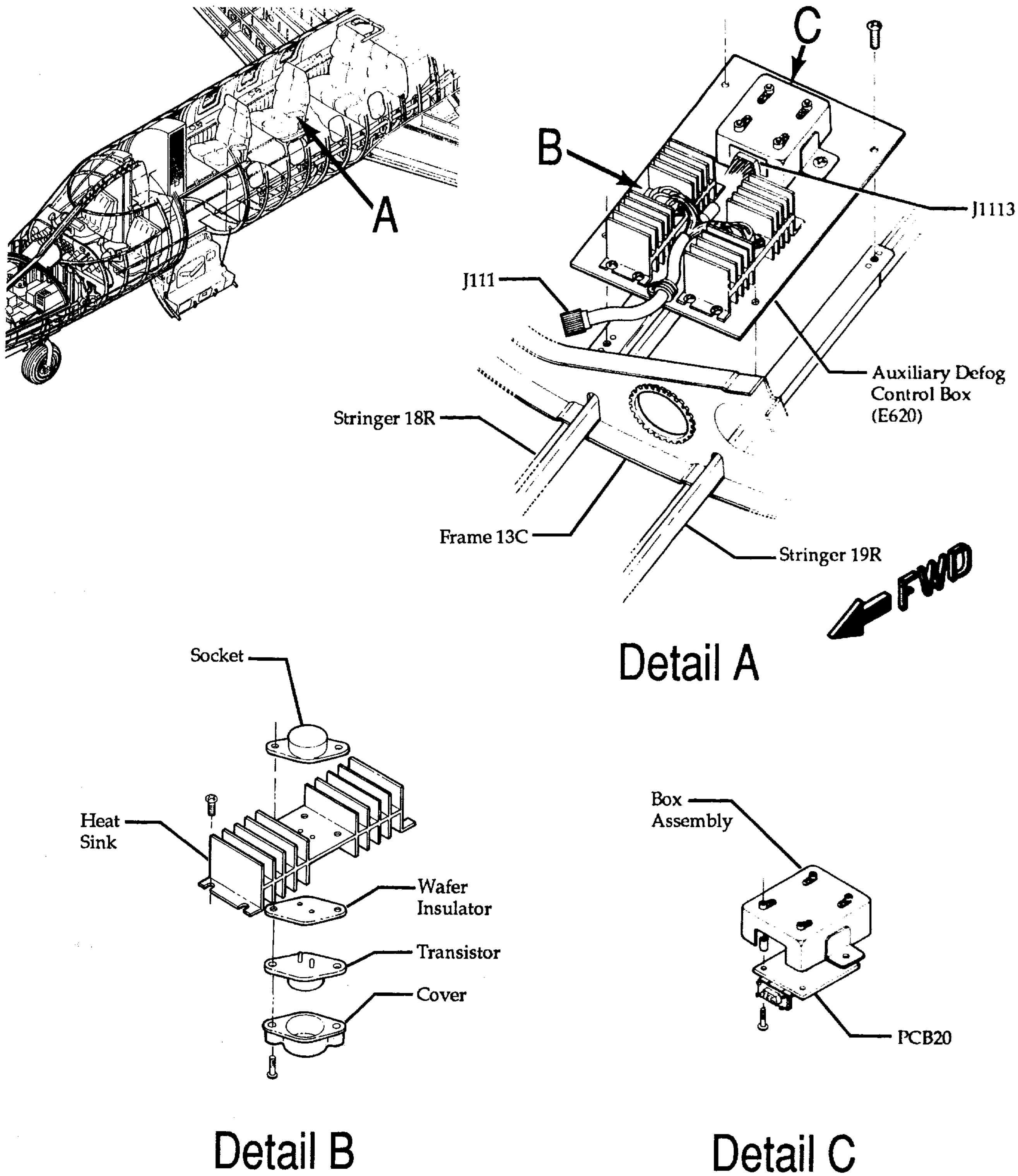
CAUTION: INSULATOR CAN BE VERY FRAGILE. HANDLE INSULATOR WITH CARE OR DAMAGE MAY RESULT.

(3) Install insulator on transistor.

(4) Secure cover, transistor, insulator and socket onto heat sink with mounting hardware.

(5) Use multimeter to check for continuity between transistor pins and heat sink. There should be no contact. If necessary loosen mounting hardware and slightly reposition transistor so that there is no contact between it and heat sink.

(6) Plug labeled wires onto socket pins. Insulate pins with heat shrink tubing, or silicone rubber adhesive.

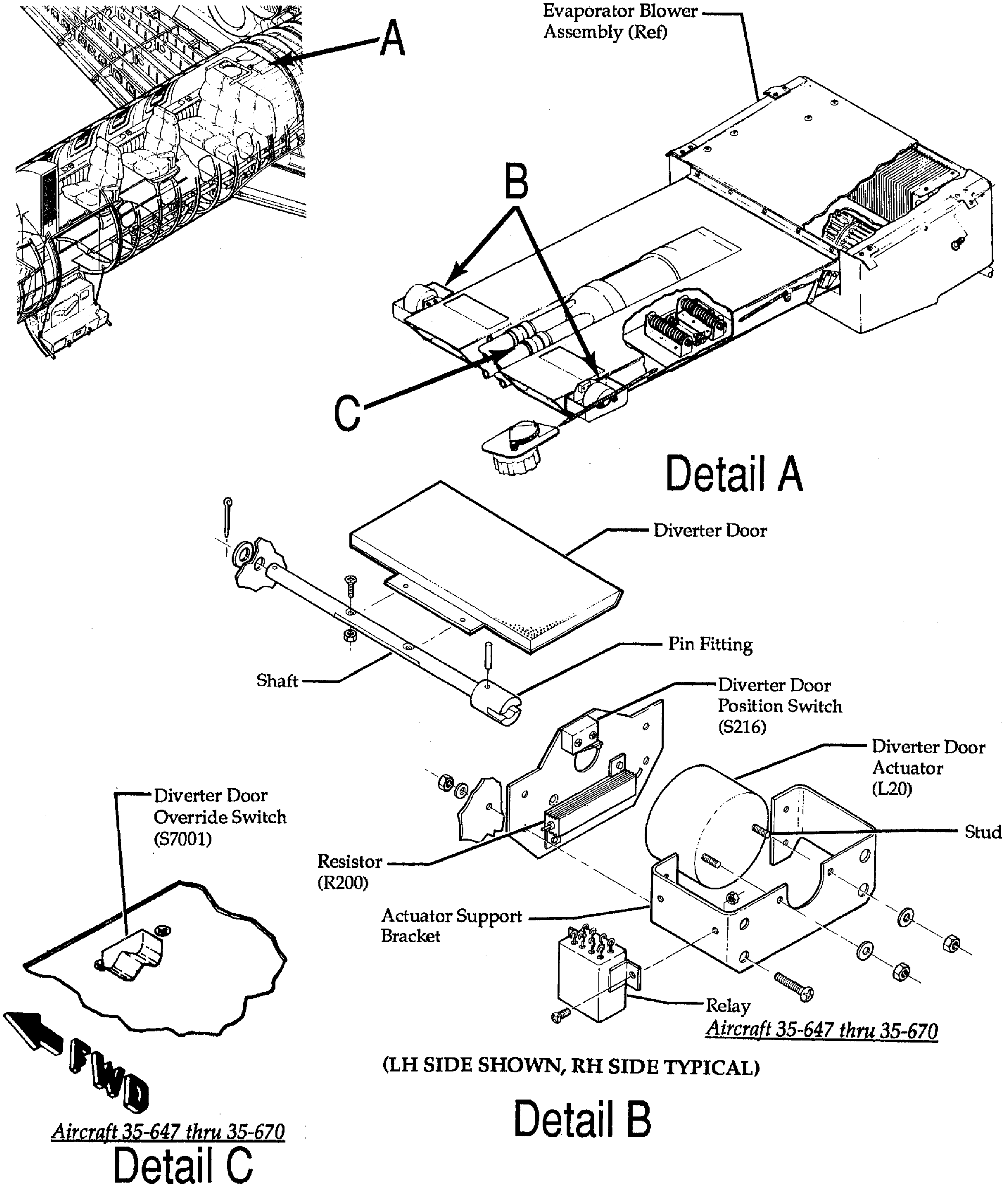


Auxiliary Defog Control Box Installation
Figure 201

9-221B-3

DIVERTER DOOR ACTUATOR - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Diverter Door Actuator (Refer to figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Remove evaporator and blower assembly. (Refer to 21-50-06.)
      (3) Disconnect and tag wires from actuator.
      (4) Remove nuts from actuator studs.
      (5) Remove actuator.
   B. Install Diverter Door Actuator (Refer to figure 201.)
      (1) Place end of actuator rod into slotted end of shaft.
      (2) Insert actuator studs into bracket holes. Secure actuator to bracket with nuts.
      (3) Connect actuator wiring.
      (4) Install evaporator and blower assembly. (Refer to 21-50-06.)
      (5) Perform Functional Test of Windshield Auxiliary Defog Heating System. (Refer to 21-43-00.)
      (6) Restore aircraft to normal configuration.

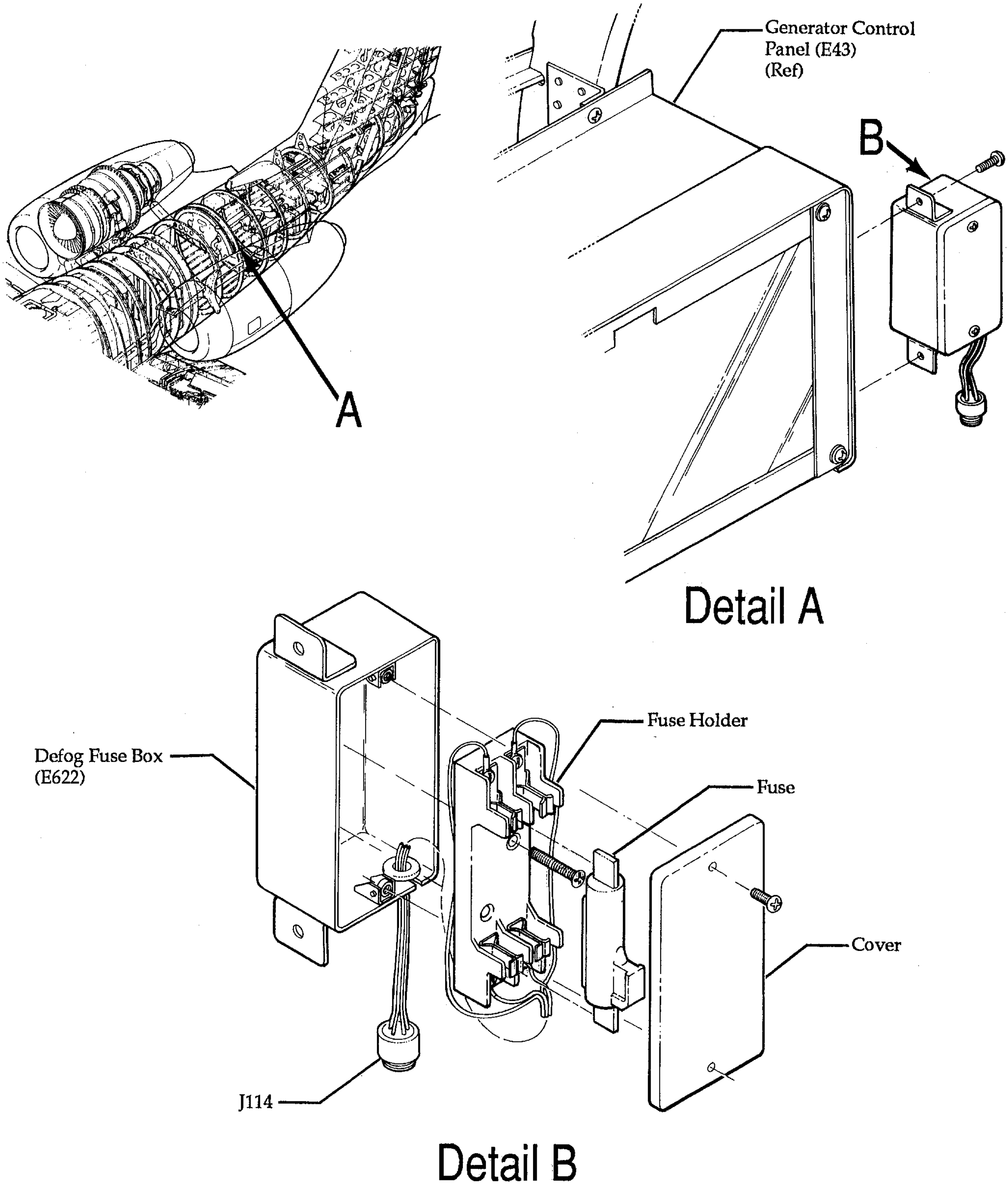


Diverter Door Actuator Installation (Typical)
Figure 201

13-51C-5
13-41B-2

DEFOG FUSE BOX - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Defog Fuse Box (E622) (Refer to figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Disconnect electrical connector (P1114) from fuse box electrical connector (J1114).
      (3) Remove screws securing fuse box to Generator Control Panel (E43).
      (4) Remove fuse box.
   B. Install Defog Fuse Box (E622) (Refer to figure 201.)
      (1) Position fuse box on Generator Control Panel (E43), and secure with attaching parts.
      (2) Connect electrical connector (P1114) to fuse box connector (J1114).
      (3) Perform Functional Test of Windshield Auxiliary Defog Heating System. (Refer to 21-43-00.)

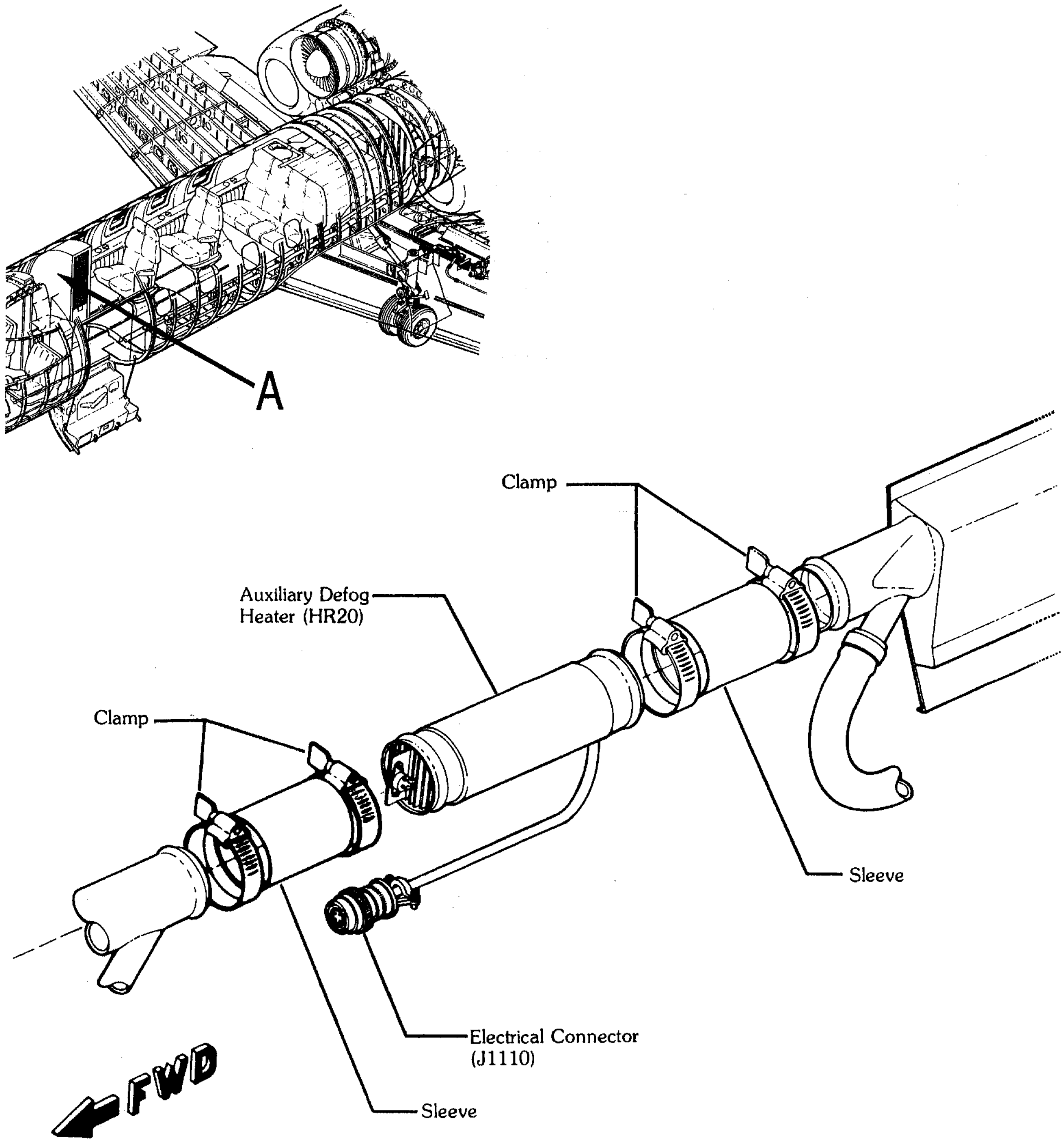


9-426B

Defog Fuse Box Installation
Figure 201

DEFOG HEATER - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Electrical Defog Heater (HR20) (Refer to figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Remove cabin furnishings and upholstery as required to gain access to heater.
      (3) Disconnect electrical connector (P1110) from heater.
      (4) Loosen clamps securing heater and remove heater.
   B. Install Electrical Defog Heater (HR20) (Refer to figure 201.)
      (1) Position heater at its approximate location in the conditioned air ducting. Position ducting sleeves approximately equal amount over ends of heater.
      (2) Secure heater to ducting sleeves with clamps. Secure clamps holding ducting sleeves.
      (3) Connect electrical connector (P1110) to heater.
      (4) Perform Functional Test of Windshield Auxiliary Defog Heating System. (Refer to 21-43-00.)
      (5) Install all previously removed cabin furnishings and upholstery.
      (6) Restore aircraft to normal.



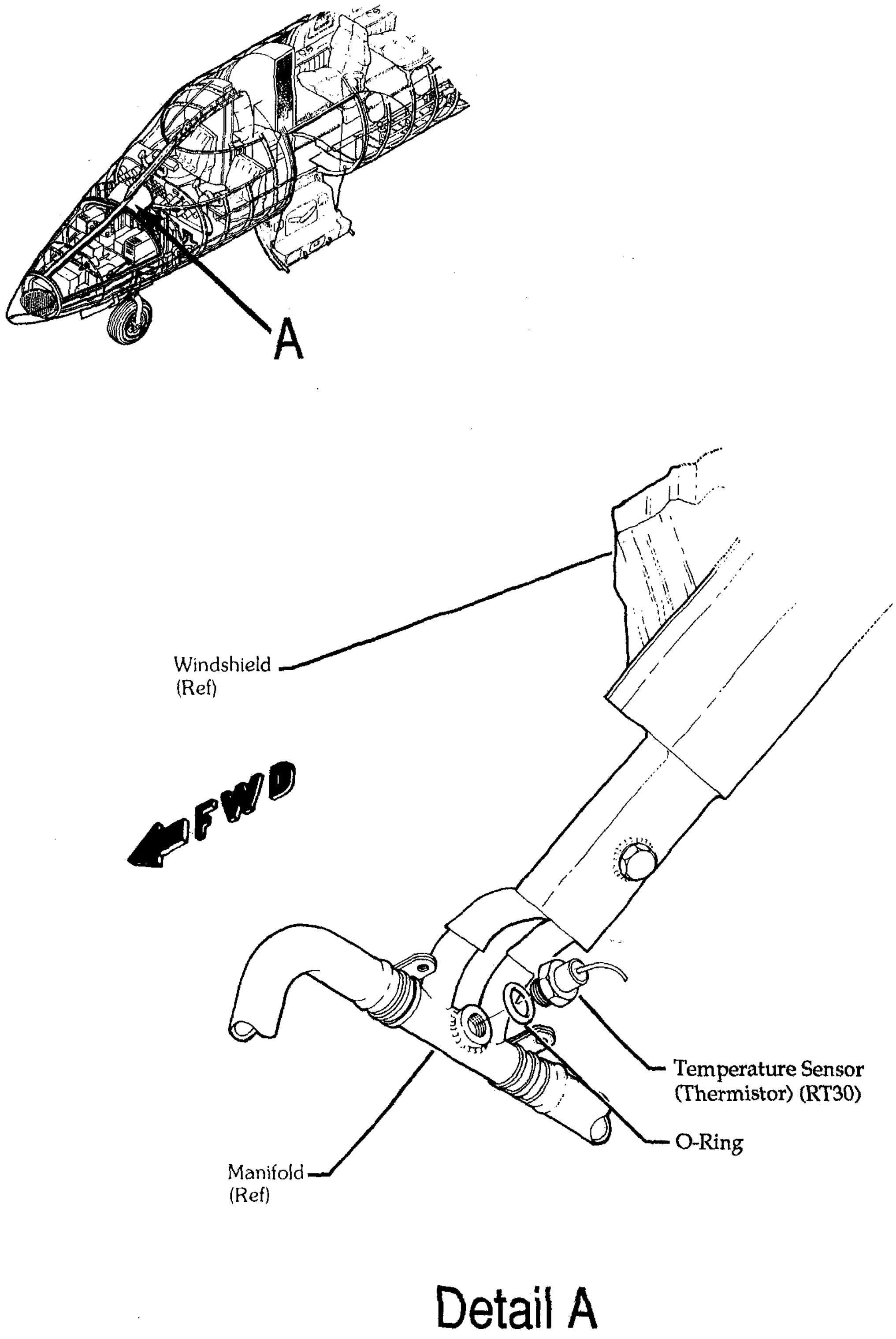
Detail A

13-34C-8

Defog Heater Installation
Figure 201

TEMPERATURE SENSOR - MAINTENANCE PRACTICES

1. **Removal/ Installation**
   A. Remove Windshield Auxiliary Defog Heating System Temperature Sensor (RT30) (Refer to figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Remove engine instrument cluster, instrument cluster, and other equipment from center instrument panel, as required to gain access to sensor.
      (3) Disconnect electrical connector (P1115) from sensor.
      (4) Remove sensor and O-ring from manifold.
   B. Install Windshield Auxiliary Defog Heating System Temperature Sensor (RT30) (Refer to figure 201.)
      (1) Install new O-ring on sensor and install sensor in manifold.
      (2) Connect electrical connector (P1115) to sensor.
      (3) Install previously removed equipment in center instrument panel.
      (4) Perform Functional Test of Windshield Auxiliary Defog Heating System. (Refer to 21-43-00.)
      (5) Restore aircraft to normal configuration.

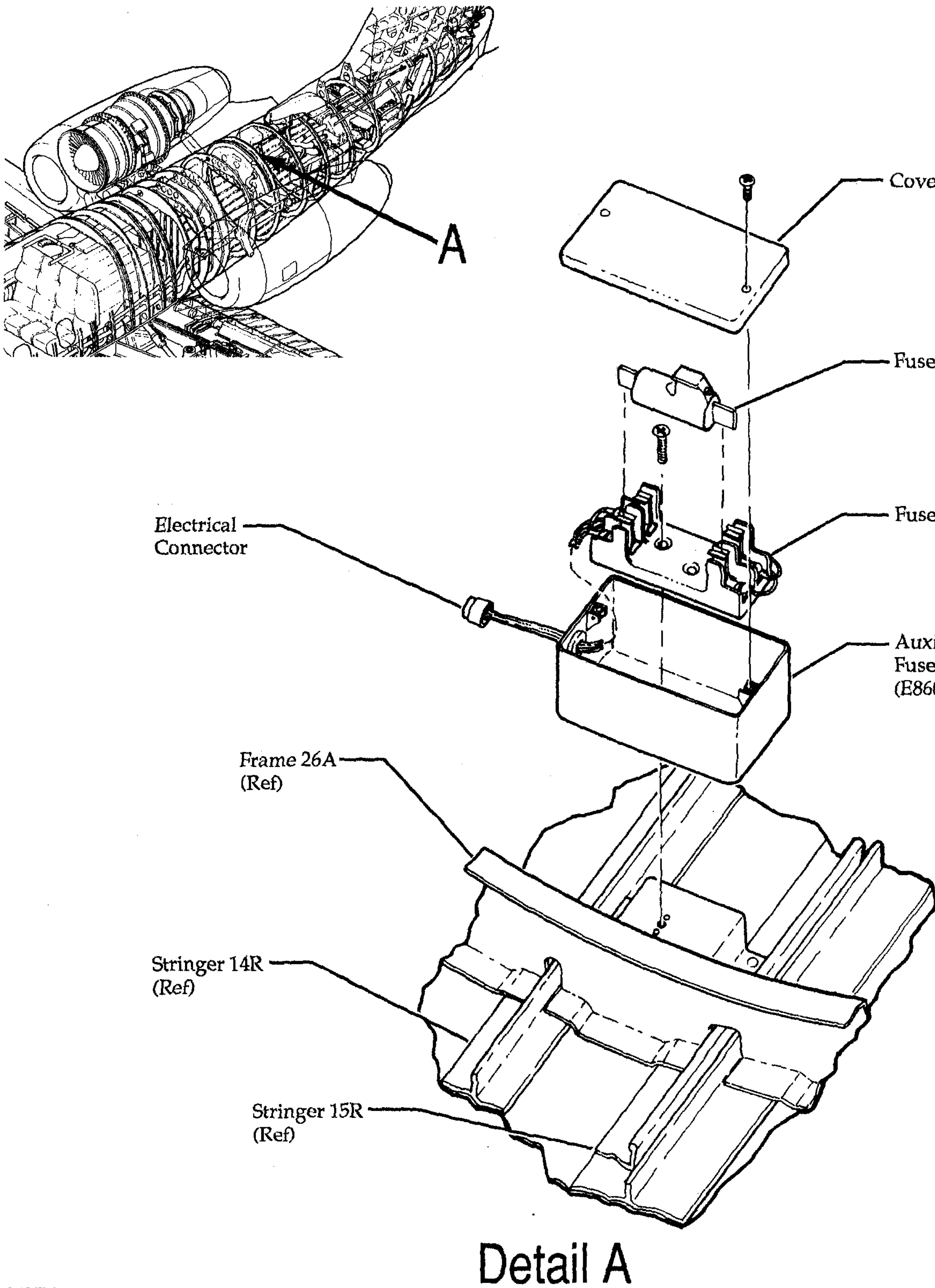


Windshield Auxiliary Defog Temperature Sensor (Thermistor) Installation
Figure 201

13-179B

AUXILIARY DEFOG FUSE BOX - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Auxiliary Defog Fuse Box (E8603) (See figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Disconnect electrical connector from fuse box.
      (3) Remove screws attaching cover to fuse box.
      (4) Remove fuses from fuse holders.
      (5) Remove screws and fuse box from aircraft.
   B. Install Auxiliary Defog Fuse Box (E8603) (See figure 201.)
      (1) Position fuse box on bracket and secure with attaching parts.
      (2) Install fuses in fuse holders.
      (3) Position cover on fuse box and secure with attaching parts.
      (4) Connect electrical connector.
      (5) Perform functional test of windshield auxiliary defog heating system. (Refer to 21-43-00.)
      (6) Restore aircraft to normal.
   C. Replace Auxiliary Defog Fuse (FL8605) (See figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Remove screws attaching cover to fuse box.
      (3) Remove old fuse and install new fuse.
      (4) Position cover on fuse box and secure with attaching parts.
      (5) Perform functional test of windshield auxiliary defog heating system. (Refer to 21-43-00.)
      (6) Restore aircraft to normal.

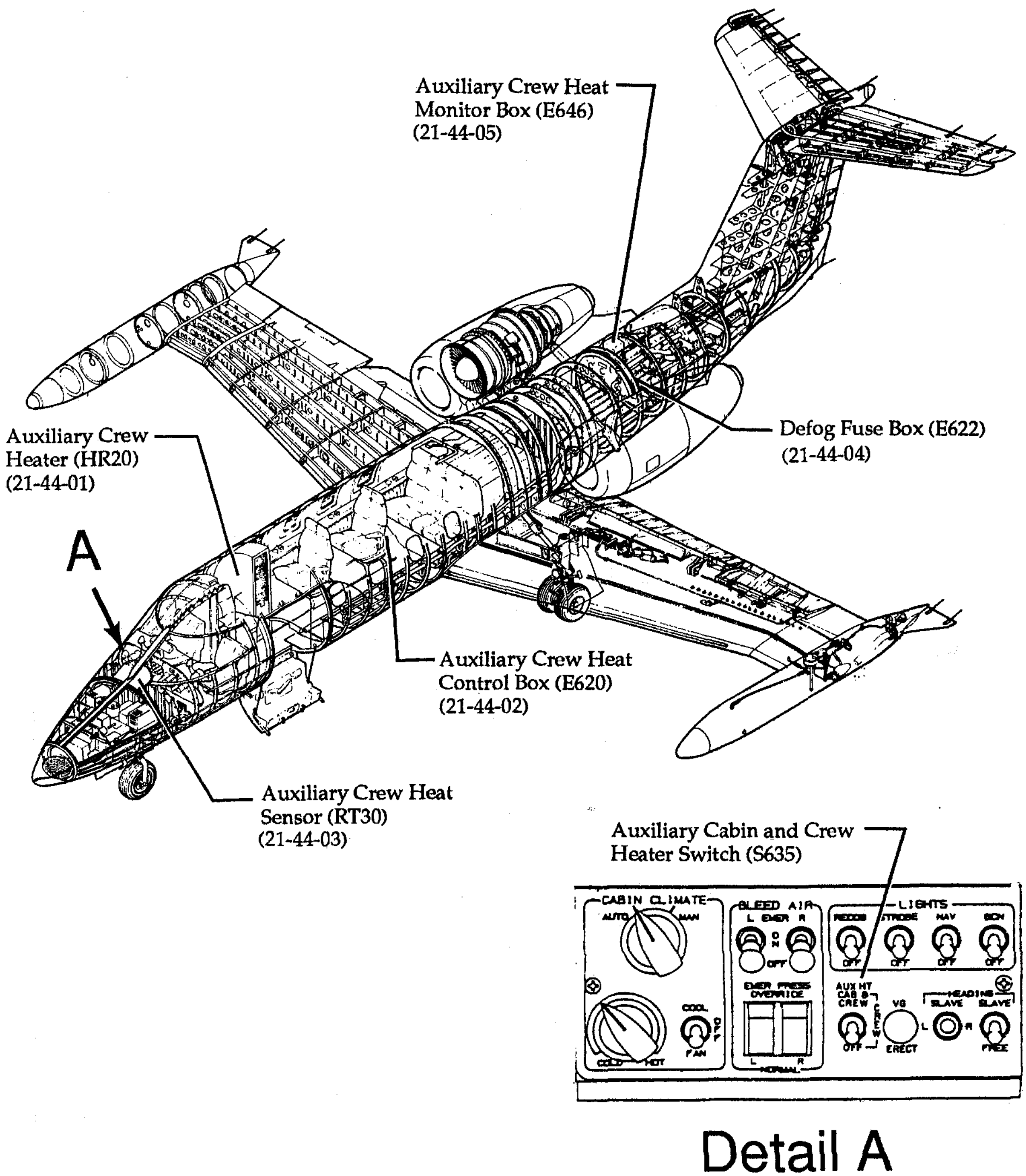


Auxiliary Defog Fuse Box Installation
Figure 201

AUXILIARY CREW HEAT SYSTEM - DESCRIPTION AND OPERATION

1. **Description (See figure 1.)**
   A. The auxiliary crew heat system is used to provide additional cockpit heating as needed.
   B. The auxiliary crew heat system utilizes an Auxiliary Heat Switch, a heater, a control assembly, a temperature sensor (thermistor), a defog fuse box, and an auxiliary crew heat monitor box.
   C. Component Description
      (1) The Auxiliary Heat Switch is a three position (CREW & CAB-CREW-OFF) switch, located on the copilot's switch panel.
      (2) The auxiliary crew heater (HR20) is located adjacent to frame 10 and stringers 12 and 13R.
      (3) The auxiliary crew heat control assembly (E620) is located between frames 13D and C, and stringers 18 and 19R. The control assembly consists of a printed circuit board (PCB20), two transistors (Q200 and Q201) and heatsink assemblies, and associated electrical wiring, all fastened to a support assembly that attaches to the aircraft structure.
      (4) The auxiliary crew heat temperature sensor (RT30) is located in the windshield diffuser manifold at the base of the windshield at BL 0.0 and beneath the glareshield mounting bracket. As temperature changes occur, the sensor changes the resistance in the electrical circuit which controls the auxiliary crew heater.
      (5) A defog fuse box (E622) is mounted on the side of the Generator Control Panel (E43) at stringer 12, frame 26. It contains fuses (FL93 and FL94) for the heater elements of the auxiliary crew heater (HR20).
      (6) The auxiliary heat monitor box (E646) is located on the RH side of the aicraft, between frames 26 and 27. The monitor circuit consists of a printed circuit board (PCB1) and associated electrical wiring.

2. **Operation**
   A. The auxiliary crew heat system is installed to provide additional heating to the conditioned air coming from the cabin air distribution system. The system will heat the air to 160°F (71°C) at the windshield center post diffuser, foot warmer, shoulder outlets, and ankle outlets for crew comfort.
   B. The auxiliary crew heater is installed in the cockpit air supply duct. The auxiliary crew heater has a thermal switch mounted at the heater outlet which actuates at 295°F (146°C) to cut off power to the heating elements. To protect the system in case the normal temperature control and thermal switch should fail, thermal fuses, with a melting temperature of 414°F (212.8°C), are mounted in the center of the heating element.
   C. The auxiliary crew heater is powered by 28 vdc from the AUX CREW HT circuit breaker, located on the pilot's circuit breaker panel. When the Auxiliary Heat Switch is set to CREW or CAB & CREW, the relay is energized providing electrical power to the auxiliary crew heater (HR20.) The power circuit is interrupted by the auxiliary crew heater monitor relay (K1.)
   D. The auxiliary crew heat monitor box (E646) monitors discrete inputs to ensure conditioned air flow is present when the auxiliary crew heater is operating. When bleed air is supplied by the left engine, the following conditions exist; the LH emergency pressure valve is closed (energized), the left oil pressure switch (S37) is energized, and the LH modulator valve (E241) is de-energized. When bleed air is supplied by the right engine, the following conditions exist; the right oil pressure switch (S38) is energized and the RH modulator valve (E242) is de-energized. When the conditions of either engine are met, inputs to the auxiliary crew heat monitor de-energizes the transistor (Q1) and allows the auxiliary crew heat assembly (E620) to activate the auxiliary crew heater (HR20). When the conditions of either engine are not met, transistor (Q1) is energized and the auxiliary crew heat monitor prevents the auxiliary crew heat assembly (E620) from activating the auxiliary crew heater by driving the control signal to ground.



Auxiliary Crew Heat System Locator
Figure 1

E. Component Operation

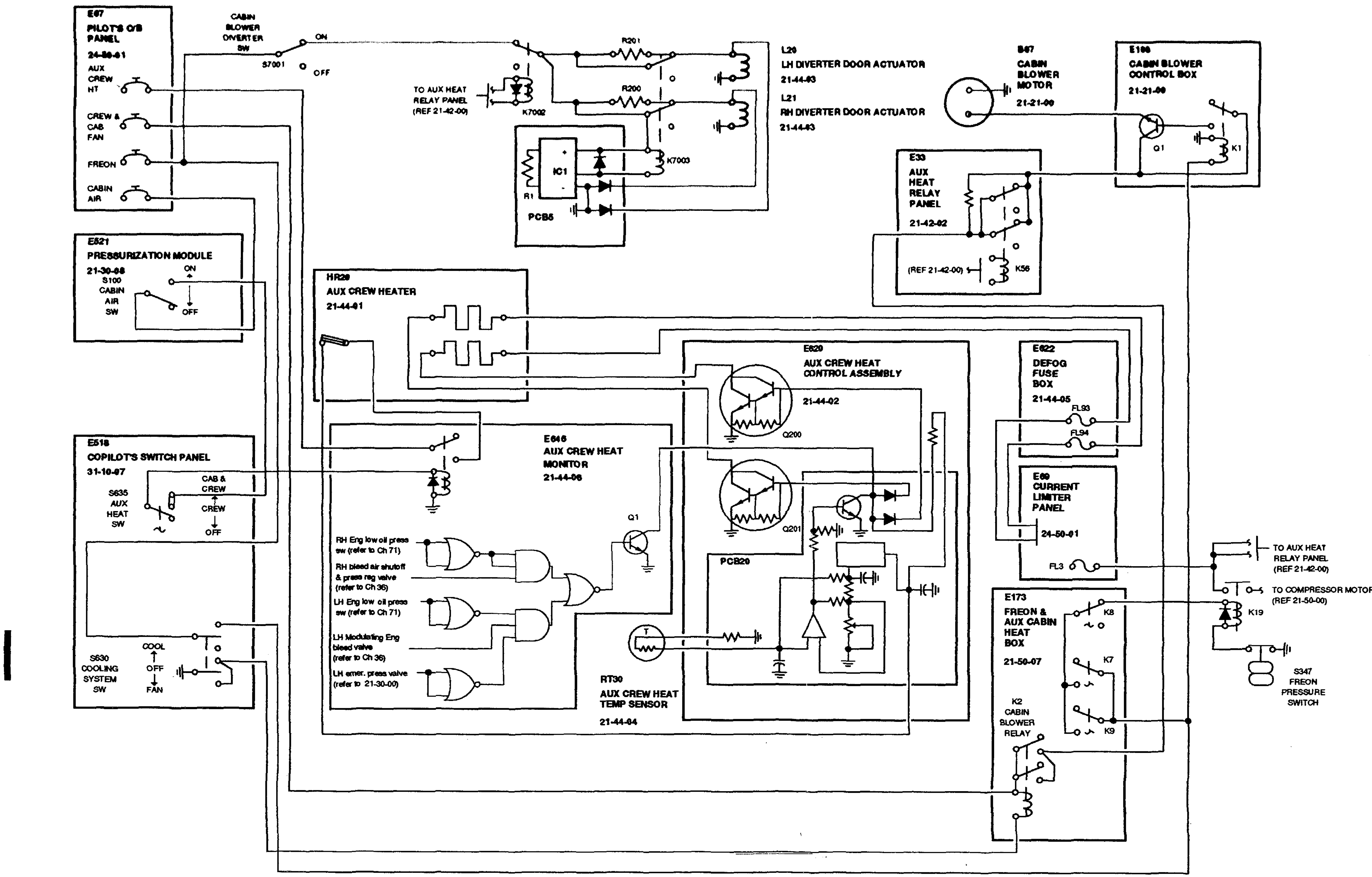
(1) The auxiliary crew heater (HR20) is installed in the cockpit air supply duct to add additional heat to the cockpit air supply for crew comfort.

(2) The auxiliary crew heat assembly (E620) provides the control circuitry to the auxiliary crew heat system for system operation and shutdown. The control assembly uses the auxiliary crew heat temperature sensor as the temperature transducer.

(3) The auxiliary crew heat temperature sensor (RT30) monitors air flowing onto the windshield from the auxiliary crew heat system and changes resistivity to signal the auxiliary crew heat control assembly.

(4) The defog fuse box contains fuses (FL93 and FL94) for the heater elements of the auxiliary crew heater (HR20.)

(5) The auxiliary heat monitor box (E646) monitors discrete inputs to ensure conditioned air flow is present when the auxiliary crew heater is operating.



Auxiliary Crew Heat System Schematic
Figure 2

AUXILIARY CREW HEAT SYSTEM - TROUBLE SHOOTING

1. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Digital Thermometer	Trendicator 400A	Doric Scientific Co. San Diego, CA	Temperature Measurements
Multimeter	Model 260	Simpson	General Resistance and Voltage Measurements

2. Troubleshooting

A. The following trouble shooting procedures are provided as an aid to detecting possible troubles in the Auxiliary Crew Heat System.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
1. Air from Windshield Diffuser Does Not Reach 155° (+4°, -1°) F.		
a. Heater (HR20) is not operating properly.	Remove electrical power from aircraft and disconnect aircraft batteries. Remove heater and check for continuity between pins A and C, H and D, and F and B. If any pair is open, heater is bad.	If indicated, replace heater.
b. Fuses (FL93 and FL94) in defog fuse box (E622) are blown.	Remove electrical power from aircraft and disconnect aircraft batteries. Check fuses.	If indicated, find and repair cause of blown fuse(s). Replace blown fuse(s).
c. AUX CREW HEAT circuit breaker (CB113) on the Pilot's Circuit Breaker Panel (E67) is thrown.	Remove electrical power from aircraft and disconnect aircraft batteries. Use standard procedures to find cause of thrown breaker.	If indicated, repair cause of thrown circuit breaker. Reset circuit breaker.
d. Open temperature sensor (RT30).	Remove electrical power from aircraft. Disconnect aircraft batteries. Disconnect connector on RT30 and check for continuity between pins 6 and 7 of P113. If open, sensor is bad.	If indicated, replace sensor.

e. Defective auxiliary crew heat control box (E620).	Remove electrical power from aircraft. Disconnect aircraft batteries.	Replace control box.
f. Defective auxiliary crew heat monitor box (E646).	Remove electrical power from aircraft. Disconnect aircraft batteries.	Replace monitor box.

2. Air from Windshield Diffuser is Hotter than 160° (± 3°) F.

a. Defective auxiliary crew heat control box (E620).	Remove electrical power from aircraft. Disconnect aircraft batteries.	Replace control box.
b. Defective temperature sensor (RT30).	Remove electrical power from aircraft. Disconnect aircraft batteries.	Replace temperature sensor.

3. Heater Continues to Cycle Between 155° (+4° , -1°) and 160° (±3°) After Bleed Air Switches are set to OFF.

a. Defective auxiliary crew heat monitor box (E646).	Remove electrical power from aircraft. Disconnect aircraft batteries.	Replace monitor box.

AUXILIARY CREW HEAT SYSTEM - MAINTENANCE PRACTICES

1. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Digital Thermometer	Trendicator 400A	Doric Scientific San Diego, CA	Temperature Measurements

2. Adjustment/Test

A. Test Setup

(1) Remove electrical power from aircraft.

(2) Set Aux Heat Cabin and Crew Switch (S635) to OFF. Set Cooling System and Fan Switch (S630) to OFF.

(3) Apply external electrical power to aircraft.

(4) Verify that the AUX CREW HEAT Circuit Breaker, located on the pilot's Circuit Breaker Panel (E67), is pushed in.

(5) Position the digital thermometer's sensor so that it is directly in the airflow coming out of the windshield diffuser.

(6) Start both aircraft engines.

NOTE: Aircraft engines shall be operated by qualified personnel only.

(7) Set Left and Right Bleed Air Switches to the ON position.

(8) Set the Cabin Air Switch to ON.

(9) Set the Aux Heat Cabin and Crew Switch to CREW.

(10) Verify that Heater (HR20) is operating by using the digital thermometer to note a flow of hot air from the diffuser.

(11) Verify that Heater (HR20) turns off after airflow reaches a temperature of 160° (±3°) F.

(12) Verify that Heater (HR20) turns on at a temperature of 155° (+4° , -1°) F.

(13) Allow system to cycle heater on and off two or three times to verify that system is working properly.

(14) Set both Bleed Air Switches to OFF.

(15) Verify that the Heater (HR20) turns off and remains off.

NOTE: Heater is off when the flow of hot air from the diffuser is not noted on digital thermometer.

(16) Set both Bleed Air Switches to ON.

(17) Verify that the Heater (HR20) operates as in steps 10 thru 13.

(18) Set the Cabin Air Switch to OFF.

(19) Verify that the Heater (HR20) is off and remains off.

(20) Set the Cabin Air Switch to ON.

(21) Set the RT Bleed Air Switch to the OFF position.

(22) Set the LT Bleed Air Switch to the EMER position.

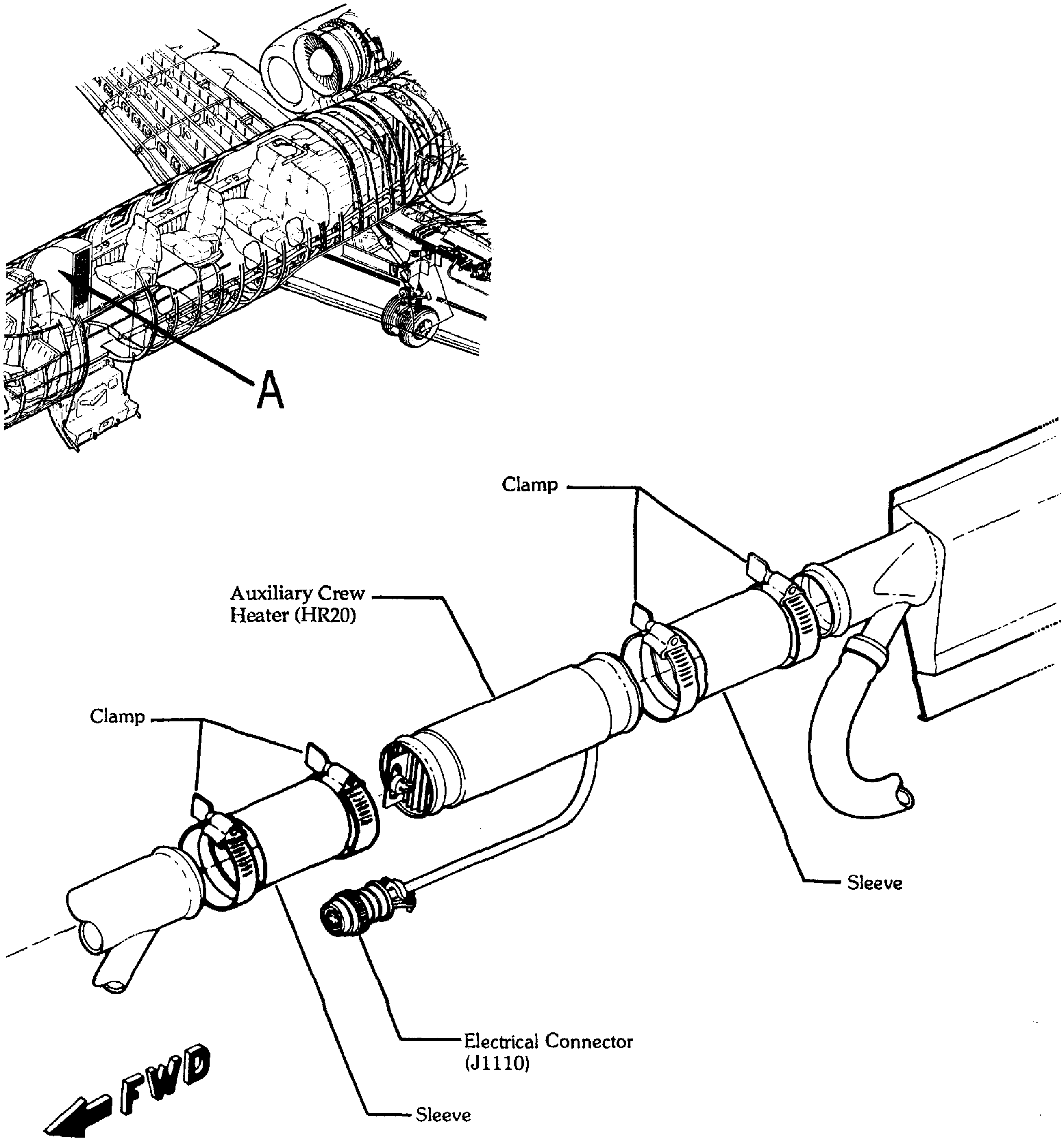
(23) Verify the Heater (HR20) is off and remains off.

(24) Set the LT Bleed Air Switch to OFF.

(25) Set the Cabin Air Switch to OFF.
(26) Set the Aux Heat Cabin and Crew Switch to OFF.
(27) Shut down aircraft engines.
(28) Disconnect electrical power from aircraft.
(29) Return aircraft to normal.

AUXILIARY CREW HEATER - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Electrical Defog Heater (HR20) (Refer to figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Remove cabin furnishings and upholstery as required to gain access to heater.
      (3) Disconnect electrical connector (P1110) from heater.
      (4) Loosen clamps securing heater and remove heater.
   B. Install Electrical Defog Heater (HR20) (Refer to figure 201.)
      (1) Position heater at its approximate location in the conditioned air ducting. Position ducting sleeves approximately equal amount over ends of heater.
      (2) Secure heater to ducting sleeves with clamps. Secure clamps holding ducting sleeves.
      (3) Connect electrical connector (P1110) to heater.
      (4) Perform Functional Test of Auxiliary Crew Heat System. (Refer to 21-44-00.)
      (5) Install all previously removed cabin furnishings and upholstery.
      (6) Restore aircraft to normal.



13-34C-8

Auxiliary Crew Heater Installation
Figure 201

AUXILIARY CREW HEAT CONTROL BOX - MAINTENANCE PRACTICES

1. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Multimeter	Model 260	Simpson	Continuity Checks
Milliohmeter	Model 670A	Shallcross, Inc. Selma, NC	Check Bonding
Thermal Conductive Compound	340	Dow Corning Co. Midland, MI	Install Transistor
Silicone Rubber Adhesive	RTV 162	Dow Corning Co. Midland, MI	Install Transistor

2. Removal/Installation

A. Remove Auxiliary Crew Heat Control Box (E620) (Refer to figure 201.)
   (1) Remove electrical power from aircraft.
   (2) Remove cabin furnishings, upholstery, and floorboards to gain access to control box.
   (3) Disconnect electrical connectors (P111 and P113) from control box.
   (4) Remove screws attaching control box to stringers.
   (5) Remove control box from aircraft.

B. Remove Printed Circuit Board (PCB20) (Refer to figure 201.)
   (1) Remove screws securing box assembly to control box assembly. Remove box assembly.
   (2) Remove attaching parts securing printed circuit board (PCB20) to box assembly.

C. Remove Transistor (Q200 or Q201) (Refer to figure 201.)
   (1) Label and unplug wires on transistor socket.
   (2) Remove attaching parts securing heat sink to control box assembly.
   (3) Remove heat sink assembly.
   (4) Remove hardware securing transistor, cover, wafer insulator, and socket to heat sink.
   (5) Being careful not to damage wafer insulator, remove cover, transistor, wafer insulator, and socket from heat sink.

D. Install Auxiliary Crew Heat Control Box (E620) (Refer to figure 201.)
   (1) Position control box at its appropriate location on stringers 18 and 19, and secure with screws.
   (2) Check electrical resistance between control box and aircraft structure. Resistance shall not be greater than value specified in Chapter 20 of wiring manual.
   (3) Connect electrical connector (P111 and P113) to control box.
   (4) Perform Functional Test of Auxiliary Crew Heat System. (Refer to 21-44-00.)
   (5) Install all previously removed cabin floorboards, upholstery and furnishings.
   (6) Restore aircraft to normal.

E. Install Printed Circuit Board (PCB20) (Refer to figure 201.)
   (1) Secure printed circuit board (PCB20) to box assembly with attaching parts.
   (2) Secure box assembly to control box assembly with screws.

F. Install Transistor (Q200 or Q201) (Refer to figure 201.)

(1) Place transistor in cover.

(2) Coat both sides of insulator with a thin, even coating of thermal conductive compound.

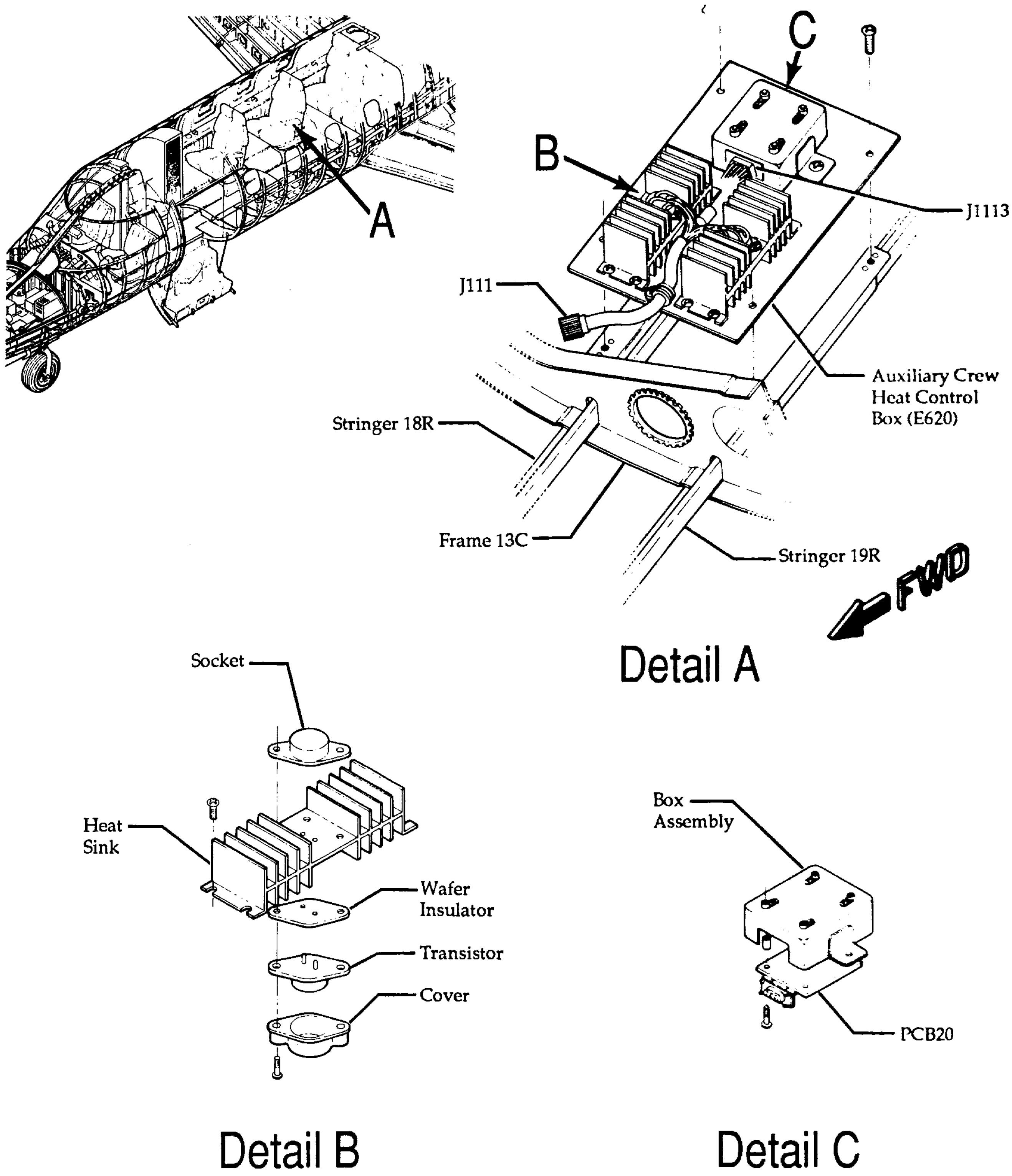
CAUTION: INSULATOR IS VERY FRAGILE. HANDLE INSULATOR WITH CARE OR DAMAGE MAY RESULT.

(3) Install insulator on transistor.

(4) Secure cover, transistor, insulator and socket onto heat sink with mounting hardware.

(5) Use multimeter to check for continuity between transistor pins and heat sink. There should be no contact. If necessary, loosen mounting hardware and slightly reposition transistor so that there is no contact between it and heat sink.

(6) Plug labeled wires onto socket pins. Insulate pins with heat shrink tubing, or silicone rubber adhesive.

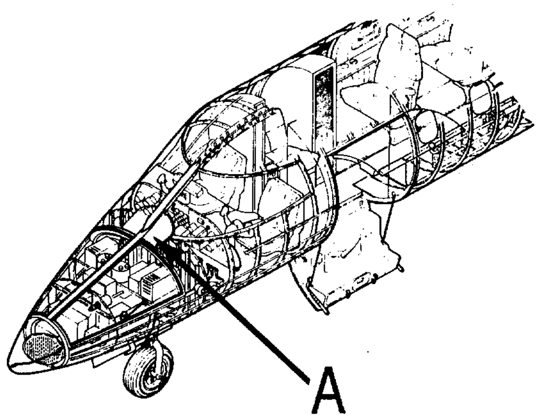


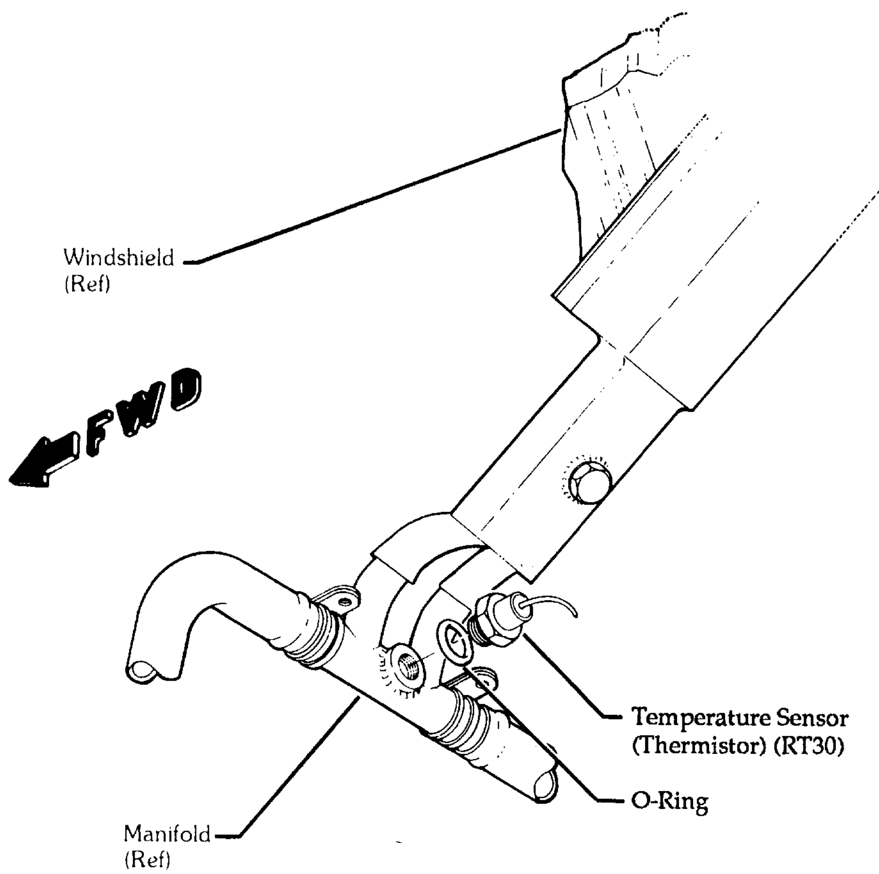
Auxiliary Crew Heat Control Box Installation
Figure 201

9-221B-3

AUXILIARY CREW HEAT SENSOR - MAINTENANCE PRACTICES

1. **Removal/ Installation**
   A. Remove Auxiliary Crew Heat Sensor (RT30) (Refer to figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Remove engine instrument cluster, instrument cluster, and other equipment from center instrument panel, as required to gain access to sensor.
      (3) Disconnect electrical connector (P1115) from sensor.
      (4) Remove sensor and O-ring from manifold.
   B. Install Auxiliary Crew Heat Sensor (RT30) (Refer to figure 201.)
      (1) Install new O-ring on sensor and install sensor in manifold.
      (2) Connect electrical connector (P1115) to sensor.
      (3) Install previously removed equipment in center instrument panel.
      (4) Perform Functional Test of Auxiliary Crew Heat System. (Refer to 21-43-00.)
      (5) Restore aircraft to normal configuration.





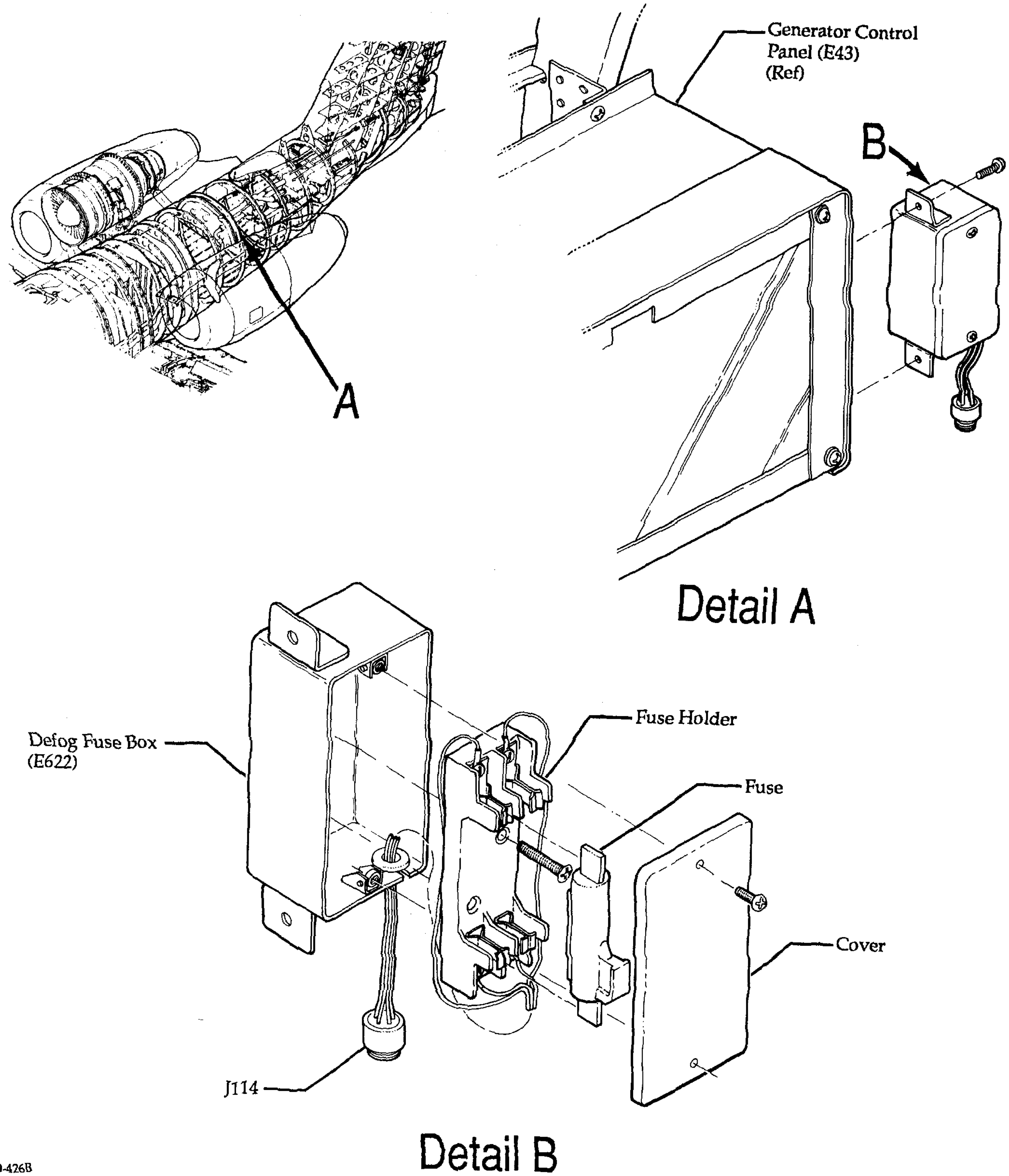
Detail A

Auxiliary Crew Heat Sensor (Thermistor) Installation
Figure 201

13-179B

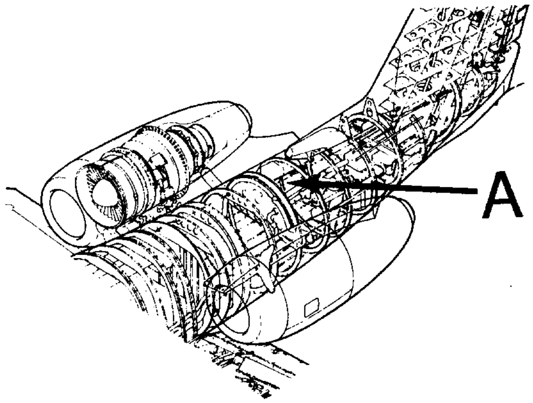
DEFOG FUSE BOX - MAINTENANCE PRACTICES

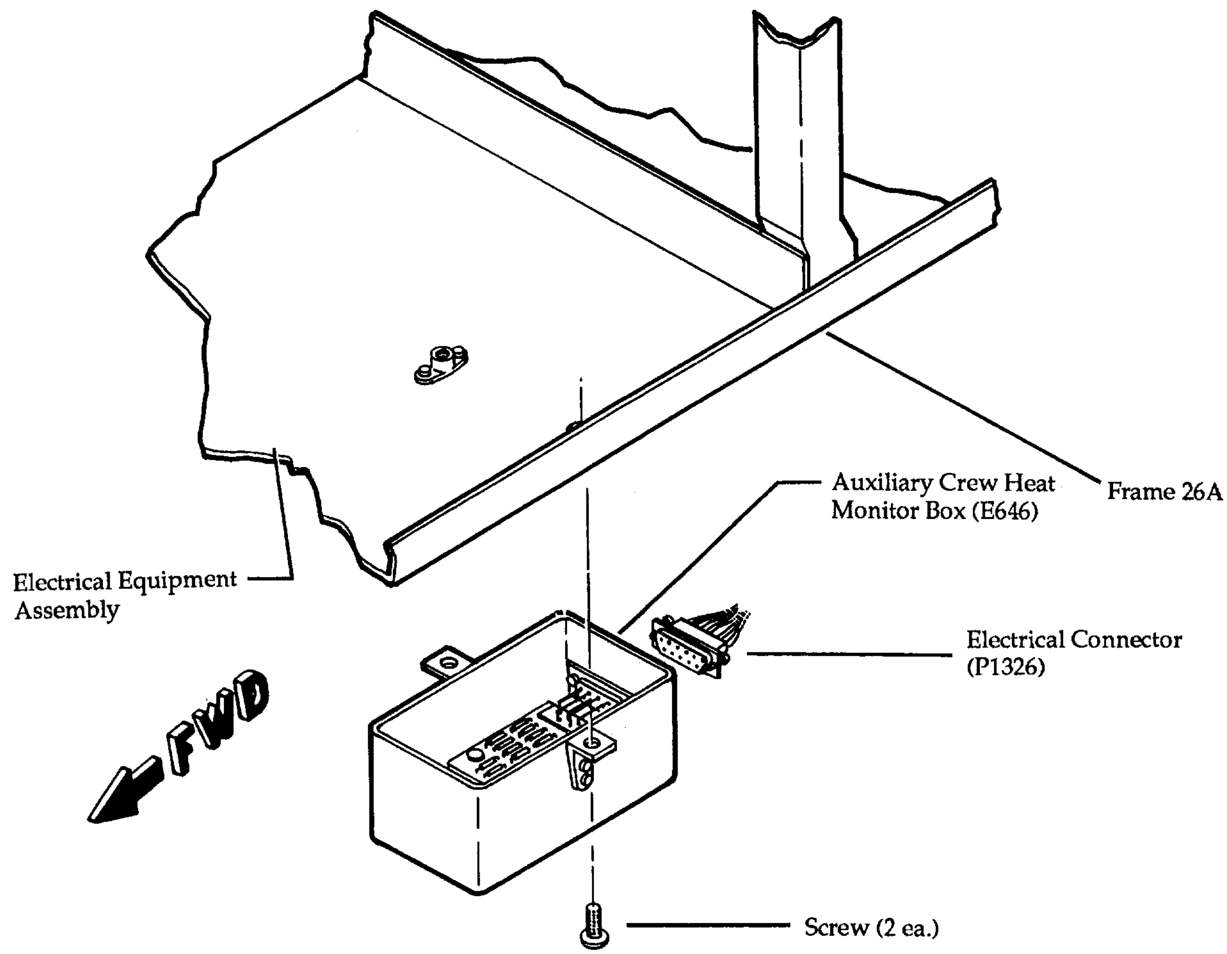
1. **Removal/Installation**
   A. Remove Defog Fuse Box (E622) (Refer to figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Disconnect electrical connector (P1114) from fuse box electrical connector (J1114).
      (3) Remove screws securing fuse box to Generator Control Panel (E43).
      (4) Remove fuse box.
   B. Install Defog Fuse Box (E622) (Refer to figure 201.)
      (1) Position fuse box on Generator Control Panel (E43), and secure with attaching parts.
      (2) Connect electrical connector (P1114) to fuse box connector (J1114).
      (3) Perform Functional Test of Auxiliary Crew Heat System. (Refer to 21-43-00.)



Defog Fuse Box Installation
Figure 201

1. **Removal/Installation**
   A. Remove Auxiliary Crew Heat Monitor (See figure 201.)
      (1) Open tailcone access door.
      (2) Remove electrical power from aircraft and disconnect both battery quick-disconnects.
      (3) Disconnect electrical connector (P1326) from monitor.
      (4) Remove screws securing monitor to equipment rack.
      (5) Remove monitor.
   B. Install Auxiliary Crew Heat Monitor (See figure 201.)
      (1) Position auxiliary heater at its appropriate location and secure with screws.
      (2) Connect electrical connector (P1326) to monitor.
      (3) Restore electrical power to aircraft and connect both battery quick-disconnects.
      (4) Perform functional test of Auxiliary Crew Heat System (refer to 21-44-00, Adjustment/Test).
      (5) Close tailcone access door.





Detail A

Auxiliary Crew Heat Monitor Box Installation (Typical)
Figure 201

COOLING - DESCRIPTION AND OPERATION

1. Description

WARNING: DO NOT OPERATE REFRIGERATION SYSTEM WITH CONDENSER AIR OUTLET BLOCKED.

CAUTION: DO NOT OPERATE REFRIGERATION SYSTEM UNLESS:
Aircraft 35-002 thru 35-147 and 36-002 thru 36-035.
1. With one (1) engine operating, the ammeter reads below 200 amperes.
2. With two (2) engines operating, the ammeter reads below 250 amperes.
Aircraft 35-148 and Subsequent and 36-036 and Subsequent.
1. With one (1) engine operating, the ammeter reads below 150 amperes.
2. With two (2) engines operating, the ammeter reads below 250 amperes.

A. The refrigeration system is installed for ground cooling, inflight cooling at lower altitudes, and cabin dehumidification.

B. The system must be powered by operating one engine at idle or by an auxiliary power unit.

C. The system consists of a compressor, compressor motor, condenser, dehydrator, pressure switch, an evaporator and blower assembly, cockpit cooling fan, freon control relay, and system switches. *On Aircraft 35-643 and Subsequent and 36-059 and Subsequent*, a pressure regulator is installed to improve evaporator operation. *On Aircraft 35-107, 35-113 and Subsequent, 36-032 and Subsequent, and prior aircraft modified per AAK 77-4, "Installation of Variable Speed Control for Cabin Blower,"* a rheostat-type CABIN BLOWER Switch is installed. The system utilizes relays within the freon and cabin heater relay box. (Refer to 21-50-07.)

D. Component Description

(1) On *Aircraft 35-002 thru 35-416 and 36-002 thru 36-047 not modified per SB 35/36-21-25*, the compressor is a two-cylinder unit used to pump and compress refrigerant vapor. The compressor is belt-driven by the compressor motor. The pistons draw refrigerant vapor into the suction port on the intake strokes. On the compression strokes, the vapor is compressed and discharged out the discharge port into the discharge line. Two (2) port adapters are installed on the compressor cylinder head. The adapters provide a connection for the discharge and suction lines and service connections. The word DISCHARGE on the cylinder head designates the discharge service valve port. The word SUCTION on the cylinder head designates the suction service valve port. The compressor is attached to the motor/compressor mounting panel with four (4) bolts which are torqued to 14 foot-pounds [19 Nm]. The refrigerant system must be discharged prior to oil level check. (Refer to Chapter 12.) *On Aircraft 35-417 and Subsequent and 36-048 and Subsequent and prior Aircraft modified per SB 35/36-21-25*, the compressor is a five-cylinder, wobble-plate unit, belt-driven by the compressor motor. The pistons draw refrigerant vapor into the suction port on intake strokes. On compression strokes, the vapor is compressed and discharged through the discharge port into the discharge line. A refrigerant pressure switch is installed in the discharge service port of the compressor. The compressor is attached to the motor/compressor mounting panel with a brace and four (4) bolts torqued to 14 foot-pounds [19 Nm]. The system refrigerant charge must be discharged prior to checking oil level. (Refer to Chapter 12.)

(2) The compressor motor is a 28-vdc unit which drives the refrigerant compressor via a V-belt. The motor has a 3-3/4 hp rating at 7000 rpm and is powered through a 150-ampere current limiter. The motor is secured to the mounting panel by four (4) bolts. The bolts are torqued to 14 foot-pounds [19 Nm].

(3) The refrigerant condenser is a plate-and-fin type unit. High-pressure, high-temperature vapor enters the condenser from the compressor. This vapor, being much hotter than the air passing over the condenser surface, changes to a liquid. Heat from the condenser is removed by a fan mounted on the compressor motor shaft. Two (2) ports, designated IN and OUT, are installed in the condenser. The IN port is connected to the refrigerant compressor DISCHARGE port by a high pressure flexible hose. The OUT port is connected to the dehydrator by metal tubing.

(4) The dehydrator removes small traces of moisture that may remain in the system after purging and evacuating. A sight glass to observe refrigerant flow is located in the top of the dehydrator assembly. *On Aircraft 35-297 and Subsequent and 36-045 and Subsequent*, an additional sight glass is installed in the dehydrator outlet tube which runs from the dehydrator assembly, above the cabin headliner, and forward to the air conditioner evaporator. The additional sight glass located at approximately FS 484, is used to help facilitate refrigerant check. Liquid refrigerant and occasionally some refrigerant vapor from the condenser enters the dehydrator reservoir. The liquid is heavier than the vapor and therefore drops to the bottom of the dehydrator where it passes through a 100-mesh screen and enters the outlet tube. As the outlet tube is open at the bottom only, liquid refrigerant will flow through it during normal operation. At temperatures above 70°F [21°C], the sight glass may indicate whether the refrigerant is sufficient. A shortage of liquid refrigerant is indicated after several minutes of compressor operation by the appearance of slow moving bubbles (vapor) or a broken column of refrigerant under the glass. If the sight glass is generally clear and performance is satisfactory, occasional bubbles do not indicate refrigerant shortage. Restrictions in the dehydrator can also cause system malfunctioning. If the outlet tube is blocked, suction may be normal or low and there will be little or no cooling. A restriction may cause the refrigerant to vaporize as it leaves the dehydrator, making the outlet excessively cold. In case of malfunction, the dehydrator should be replaced. *On Aircraft 35-334 and Subsequent and 36-046 and Subsequent*, an access fitting is installed at the dehydrator to aid in servicing the refrigerant system. Do not remove the shipping caps from a new unit until immediately prior to installation.

(5) The pressure switch is installed in the compressor discharge system and must be removed and functionally checked in accordance with current inspection requirements specified in Chapter 5.

(6) The evaporator and blower is installed to cool, dry, and clean the air in the cabin section. Refrigerant enters the evaporator as a low-pressure mixture of liquid and vapor. The liquid vaporizes at this low pressure, absorbing large quantities of heat. The heat comes from the air that passes through the evaporator fins, thus cooling the air being recirculated by the blower. As the heat is transferred through the walls of the evaporator from warm air passing over them, moisture in the air condenses and is drained overboard. Dirt or other foreign matter on the core surfaces or in the evaporator case will restrict airflow and decrease cooling efficiency. Assure that the evaporator is kept clean and the condensate drain line is unrestricted. The blower assembly is shock-mounted immediately forward of the evaporator. The blower consists of a single 28 vdc motor with a rotor fan mounted on each end of the motor shaft.

(7) The freon relay box (E173), located on the LH side of the tailcone equipment section just forward of frame 27, contains the relays which control the operation of the refrigeration and auxiliary cabin heater systems during different modes of aircraft operation.

   (a) Generator Relay - This relay, when energized, completes a circuit from the Cool System Switch to the compressor motor power relay.

   (b) External Power Relay - This relay is energized when external power is connected to the aircraft and either or both Battery Switches are set on. The relay, when energized, completes two (2) circuits: (1) from the Cool System Switch to the compressor motor power relay, bypassing the generator relay; and (2) a power circuit through the deenergized auxiliary heat cutout relay to the auxiliary heater circuit breaker.

(c) Start Cutout Relay - This relay is energized when the Starter Switches are set to START. When energized, the circuit from the Cool System Switch to the compressor motor power relay is opened. This prevents the refrigeration system from operating during engine start.

(d) Cabin Blower Relay - This relay is energized when the Cool System Switch is in either the COOL SYS or FAN position. When energized, the relay completes 28 vdc power circuit to the evaporator blower motor.

(e) Auxiliary Heater Cutout Relay - This relay, when deenergized, completes a power circuit from the energized generator relay to the AUX CAB HT circuit breaker. (Refer to 21-42-00.) The relay is energized when the Cool System Switch is set to COOL SYS. This prevents the refrigeration system and the auxiliary cabin heater system from operating at the same time.

(8) The pressure regulator is installed in the low pressure vapor line. This regulator provides back pressure to the evaporator, which prevents any evaporator condensation from freezing.

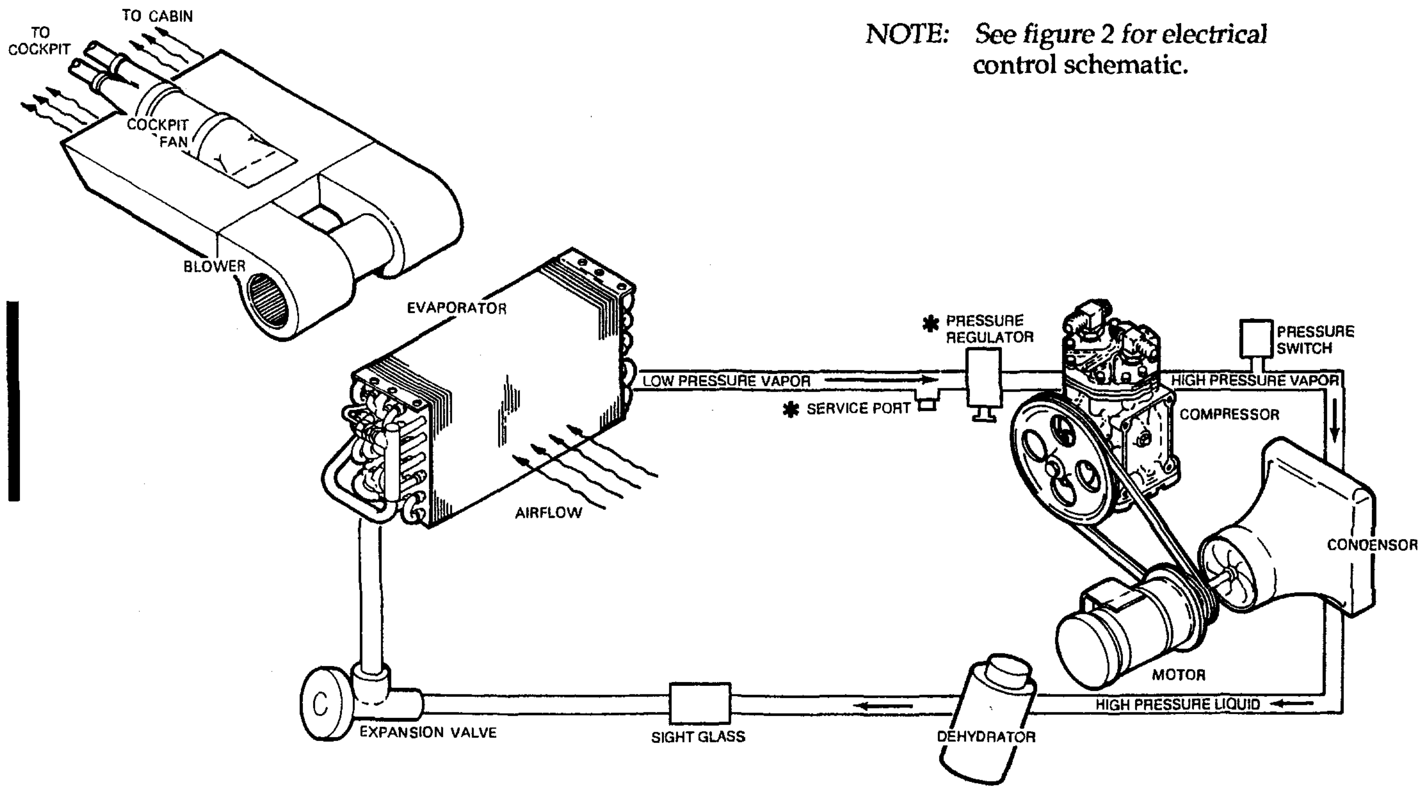
2. **Operation** (See figures 1 and 2.)

NOTE: The refrigeration system will disengage when the Starter-Generator Switch is set to START.

A. The cooling system is controlled by the COOL/FAN Switch located on the cabin climate control panel. When the COOL/FAN Switch is set to COOL, 28 vdc is applied to the freon control relay through the energized generator relay and the deenergized start cutout relay. A ground circuit to the freon control relay is completed through the freon pressure switch when the pressure in the system is normal. When the freon control relay is energized, 28 vdc power from the freon current limiter (FL3, 150-ampere) is applied to the compressor motor. Under this condition, refrigerant R-12 is being compressed and circulated throughout the system while the evaporator blower is circulating cabin air through the evaporator for cooling. Under high-humidity conditions, additional cabin heat may be required to offset operation of the refrigeration system to maintain desired cabin temperature. If cabin air circulation only is desired, the evaporator blower can be operated independently of the compressor by setting the Cooling System Switch to FAN. Protection against system overpressurization is provided by a refrigerant pressure switch plumbed to the compressor discharge port. If compressor discharge pressure reaches approximately 335 (±10) psi, the switch contacts open, deenergizing the freon control relay and disengaging the compressor motor. When discharge pressure drops to approximately 205 (±40) psi, the switch contacts close, energizing the freon control relay and engaging the compressor motor. Actuation of the pressure switch does not affect evaporator blower operation. A cockpit blower fan, installed in the forward portion of the evaporator and blower assembly, provides additional cabin and cockpit cooling. (Refer to 21-21-00 for additional information on the cabin and cockpit blower system.)

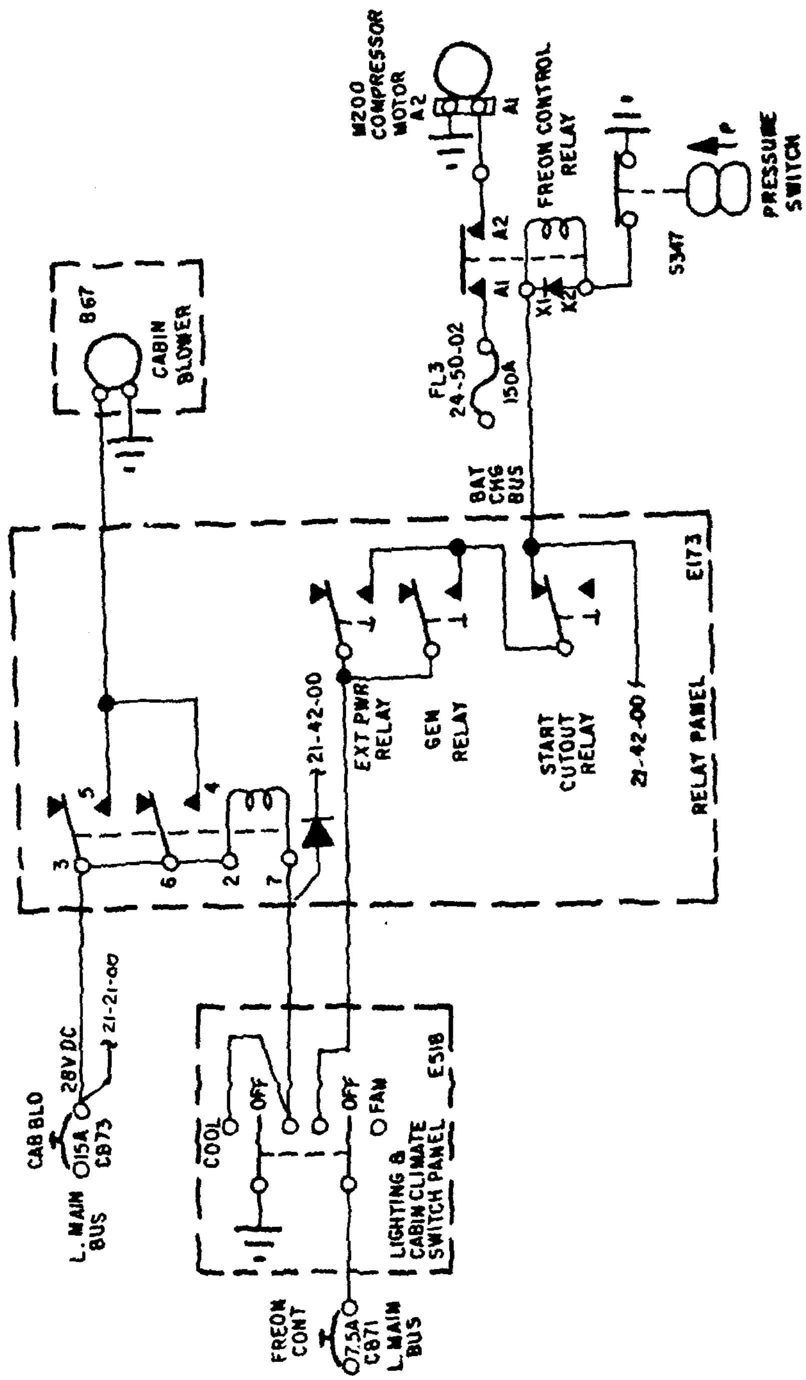
B. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, a rheostat-type CABIN BLOWER Switch is used to control the speed of the cabin blower when the Cool System Switch is set to FAN.

NOTE: *See figure 2 for electrical control schematic.*

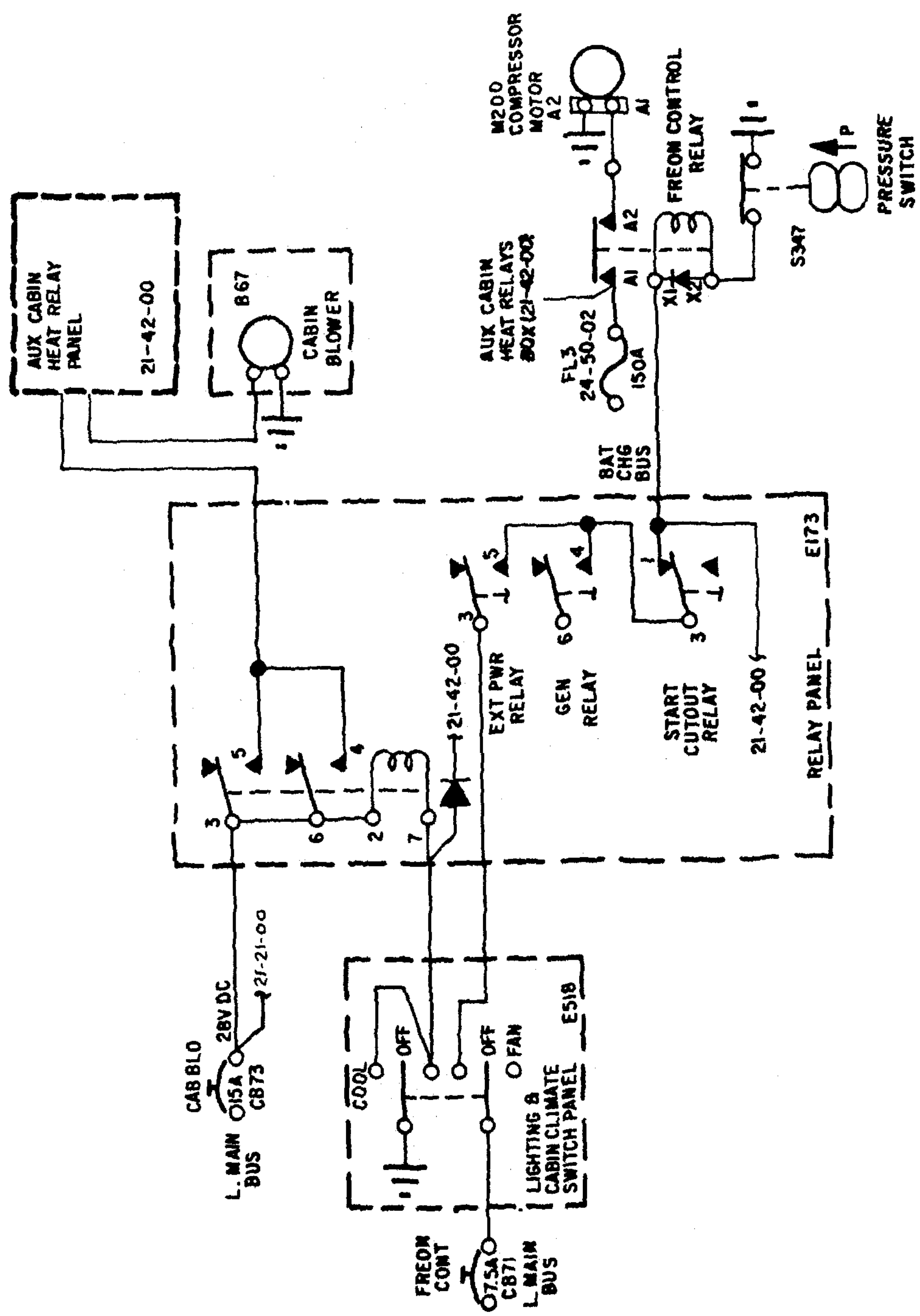


* *Effective 35-643 and Subsequent, 36-059 and Subsequent*

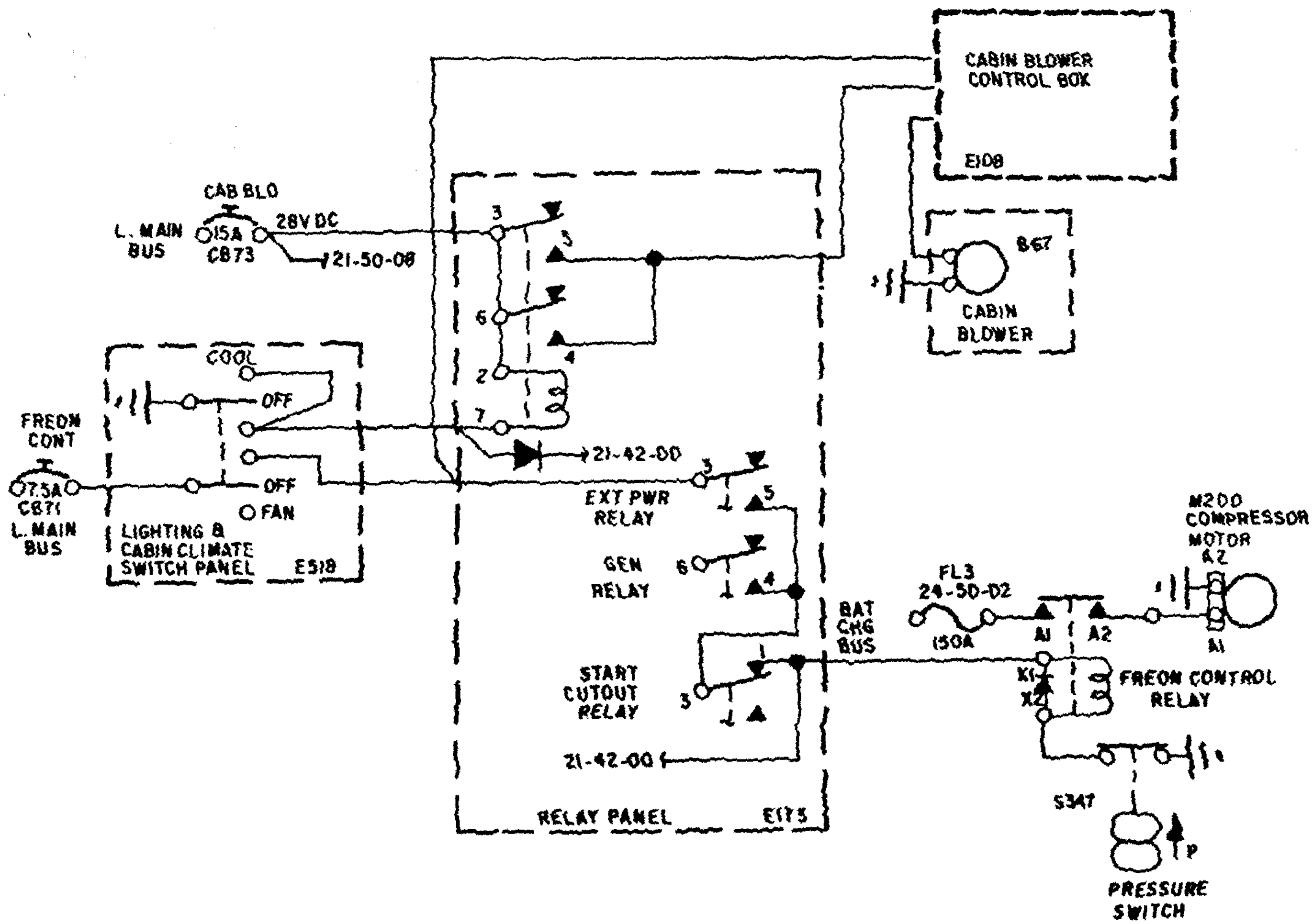
Refrigeration System Schematic
Figure 1



Refrigeration (Freon) System Electrical Control Schematic
Figure 2 (Sheet 1 of 4)

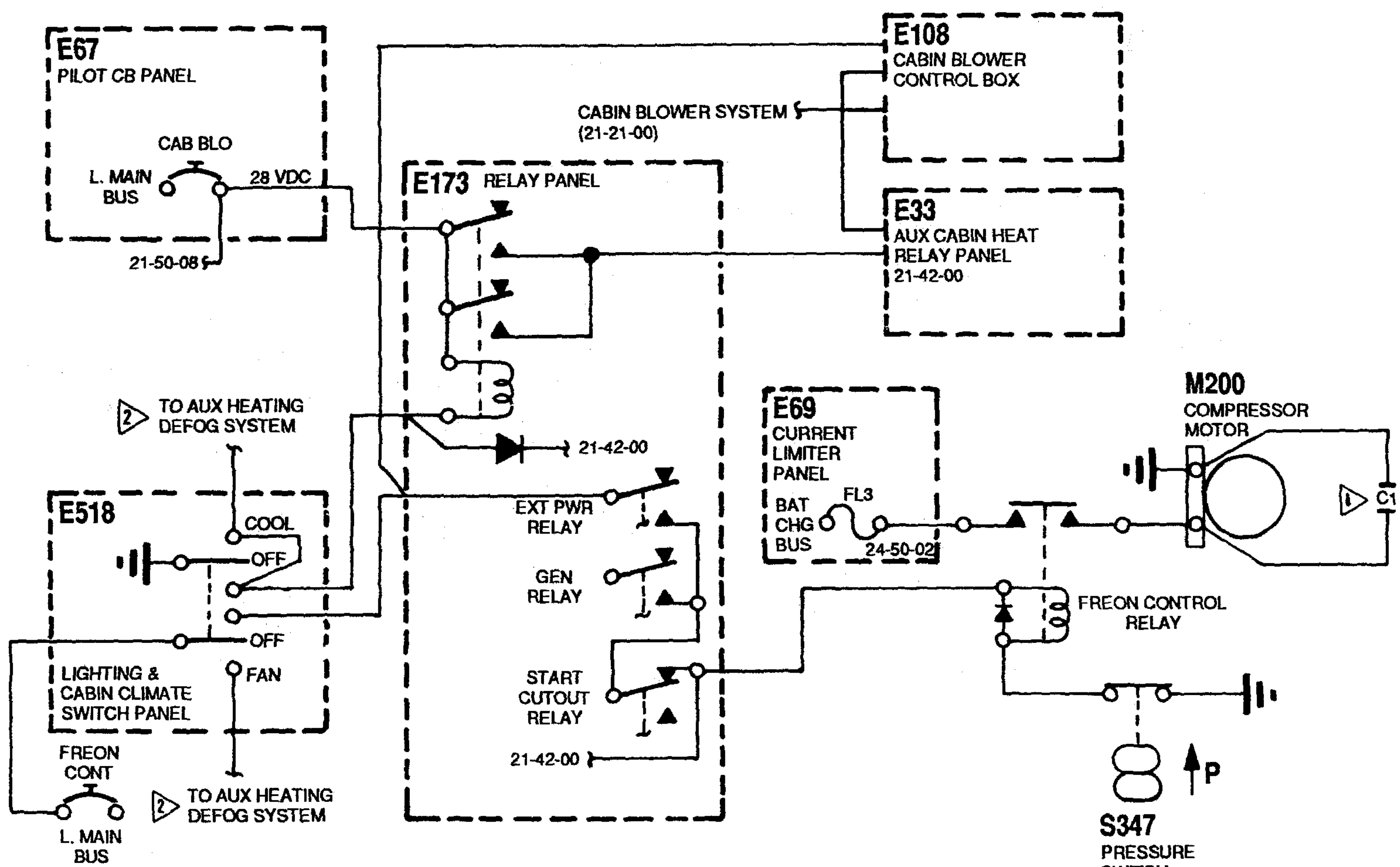


Refrigeration (Freon) System Electrical Control Schematic
Figure 2 (Sheet 2 of 4)



Refrigeration (Freon) System Electrical Control Schematic
Figure 2 (Sheet 3 of 4)

EFFECTIVITY: 35-107, 35-113 THRU 35-129, AND 36-032 WITHOUT AUXILIARY CABIN HEATER SYSTEM



1 *Aircraft 35-618 and Subsequent, 36-054, 36-056 and Subsequent*

2 *Aircraft 35-643 and Subsequent*

Refrigeration (Freon) System Electrical Control Schematic
Figure 2 (Sheet 4 of 4)

1. **Troubleshooting**
   A. Tools and Equipment

      NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Multimeter	Model 260	Simpson	Check circuits.

   B. Refrigeration System Troubleshooting (Refer to Chapter 21 of Wiring Manual for refrigeration control system wiring diagram.)
      (1) During ground operation, power the refrigeration system by operating one engine at idle or with an auxiliary power unit.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
1. Freon System Compressor Does Not Start.		
a. Loss of power to cooling system switch.	Visually inspect FREON CONT circuit breaker on pilot's circuit breaker panel.	Ensure that circuit breaker is depressed.
b. Defective cooling system switch.	Verify continuity between pin H of P269 and pin A of P619 on cabin climate and lighting panel (E518). With cooling system switch set to COOL, check for 28 vdc at pin B* of P619. Verify continuity to GND at pin C.	If power does not exist, replace switch.
c. Loss of power to compressor motor.	Visually inspect FL3 on current limiter panel.	Ensure that continuity exists at fuse.
	Ensure that wiring connections to motor are secure.	Repair wiring as applicable.
d. Defective compressor motor.	With battery switches set to off, verify continuity of motor wiring. With battery switches set to on and the cooling system switch set to COOL, check for 28 vdc from terminal A1 on motor to ground.	If power exists, replace motor. (Refer to 21-50-02.)

* On *Aircraft 35-643 and Subsequent,* use pin H of P619 instead of pin B.

Refrigeration System Troubleshooting
Figure 101 (Sheet 1 of 3)

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
1. Freon System Compressor Does Not Start (Cont).		
e. Defective freon pressure switch.	Verify continuity from freon control relay coil (terminal X2 on K19) through pressure switch (S347).	If continuity does not exist, replace switch.
f. Defective freon control relay.	Verify continuity from pin A of P189 on relay box (E173) to terminal X1 on relay (K19). Check for 28 vdc from terminal X1 to ground.	If power does not exist, replace relay.
g. Defective freon and cabin heater relay box.	Verify continuity from pin B* of P619 on cabin climate and lighting panel (E518) to pin J of P189 on relay box (E173).	Replace defective relay box. (Refer to 21-50-07.)
2. Insufficient Cooling (Less Than 20°F Difference Between Evaporator Inlet Air Temperature and Outlet Air Temperature).		
a. Binding compressor.	Check compressor for free rotation (except during normal compression stroke).	If rough or erratic movement is noted, replace compressor. (Refer to 21-50-01.)
b. Insufficient airflow through evaporator.	Check air flow through evaporator.	If flow is sufficient, go to step f. If flow is insufficient, proceed with step c.
c. Stuck or blocked diverter doors *(Effective on Aircraft 35-643 and Subsequent)*	Check diverter doors on evaporator and blower assembly.	Remove blockage or replace evaporator and blower assembly. (Refer to 21-50-06.)
d. Loss of power to blower motor, defective blower control box, or defective blower assembly.	Check voltage at terminals on blower motor (B67). Voltage shall not be less than 24 vdc.	If correct voltage does not exist, trouble shoot inoperative cabin blower in accordance with 21-20-00.
e. Restrictions in evaporator core.	Visually inspect evaporator core for restrictions.	Remove restrictions.

* On *Aircraft 35-643 and Subsequent,* use pin H of P619 instead of pin B.

Refrigeration System Troubleshooting
Figure 101 (Sheet 2 of 3)

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
2. Insufficient Cooling (Less Than 20°F Difference Between Evaporator Inlet Air Temperature and Outlet Air Temperature) (Cont).		
f. Defective V-belt.	Check sight glass in receiver dehydrator.	If vapor bubbles are *not* present, check and adjust V-belt tension. (Refer to Maintenance Practices, this section.)
g. Restricted liquid line.	Check for restrictions in line between condenser and evaporator. (A notable temperature drop occurs across any effective restriction.)	Replace defective line.
h. Evaporator inlet blocked.	Check for blockage at evaporator air inlet.	Clean off or remove any blockage as required.

Refrigeration System Troubleshooting
Figure 101 (Sheet 3 of 3)

COOLING - MAINTENANCE PRACTICES

1. **Inspection/Check**
   A. Check Compressor Oil Level
      (1) The compressor oil level shall be checked only when adding refrigerant to the system, or after the vapor system has been discharged. *On Aircraft 35-002 thru 35-416 and 36-002 thru 36-047 not modified per SB 35/36-21-25*, the compressor oil reservoir is factory-filled with 10 fluid ounces [295.7 ml] of refrigeration oil. *On Aircraft 35-417 and Subsequent and 36-048 and Subsequent and prior Aircraft modified per SB 35/36-21-25*, the compressor oil reservoir is factory-filled with six (6) fluid ounces [177.4 ml] of refrigeration oil. Only Texaco Capella D grade refrigerant oil or the equivalent shall be used when adding oil to the compressor. (Refer to Chapter 12.)

   B. Operational Check of Refrigeration System

      CAUTION: DO NOT OPERATE REFRIGERATION SYSTEM WITH CONDENSER AIR OUTLET BLOCKED.

      NOTE: Perform Operational Check of Refrigeration System in accordance with current inspection intervals in Chapter 5.

      (1) Connect a 300 to 400 psi [2068 to 2758 kPa] gage to compressor (DISCHARGE) and a 150 to 250 psi [1034 to 1724 kPa] gage to compressor (SUCTION) service valve connections.

         CAUTION: ON *AIRCRAFT 35-643 AND SUBSEQUENT, 36-059 AND SUBSEQUENT AND PREVIOUS AIRCRAFT MODIFIED PER SSK 980, "REPLACEMENT OF AIR CONDITIONER EVAPORATOR ASSEMBLY"*, ATTACH LOW PRESSURE GAGE TO REFRIGERATION PRESSURE REGULATOR SERVICE PORT, NOT COMPRESSOR SUCTION SERVICE VALVE.

      (2) Connect external electrical power source to aircraft.
      (3) Set Battery Switches on and Cooling System Switch to COOL SYS. Operate cooling system until appropriate discharge and suction pressures to ambient air temperature readings are obtained (see Figure 201). If appropriate readings are obtained, the cooling system is operating properly. If pressure gage indication is too low, proceed to step (4). If pressure gage indication is too high, proceed to step (6).
      (4) Set Cooling System Switch to OFF and observe cooling rate of discharge line and warming rate of suction line.
      (5) If discharge line cools quickly and suction line heats quickly, replace compressor.
      (6) Pull CAB BLO circuit breaker and observe suction pressure. Suction pressure should drop to five (5) psig [34.5 kPa] within five (5) minutes. If suction pressure does not drop to five (5) psig [34.5 kPa], the expansion valve is defective and should be replaced.
      (7) Reset CAB BLO circuit breaker and allow system pressures to return to normal. (See Figure 201.)
      (8) Pull FREON CONT circuit breaker and observe rise in suction pressure. Suction pressure should rise rapidly to 45 (+10; -5) psig [310 (+69.0; -34.5) kPa], then stop or continue to rise at a slower rate. If rate of suction pressure rise has not decreased when pressure exceeds 55 psig [379 kPa], the expansion valve is defective and should be replaced.
      (9) Restore system to normal.

   C. Check and Adjust V-Belt Tension
      (1) Place a straightedge on the V-belt.
      (2) Apply a 5 to 6 pound [2.3 to 2.7 Kg] load to V-belt at its midpoint; deflection from straightedge should be 0.1875 inch [4.8 mm] or less.

(3) If deflection is more than 0.1875 inch [4.8 mm], loosen compressor attaching bolts and adjust compressor until desired tension is obtained.
(4) Tighten compressor attaching bolts and check pulley alignment.
(5) Torque compressor attaching bolts to 14 foot-pounds [19 Nm].

D. Check Pulley Alignment

(1) Pulley alignment may be checked by holding a 1/2-inch [1.27 cm] rod (2 or 3 feet [61 to 91 cm] long) firmly in V-groove of compressor pulley and making sure rod falls squarely in compressor motor pulley grooves. A further check may be made by seeing that the belt, as it goes from pulley to pulley, comes off the pulley grooves perfectly straight and there are no sideways bends in the belt as it approaches or leaves the pulleys. Alignment adjustments are made by loosening compressor motor attaching bolts and adjusting compressor motor forward or aft until pulleys are aligned. Torque compressor motor attachment bolts to 14 foot-pounds [19 Nm].

2. Repairs

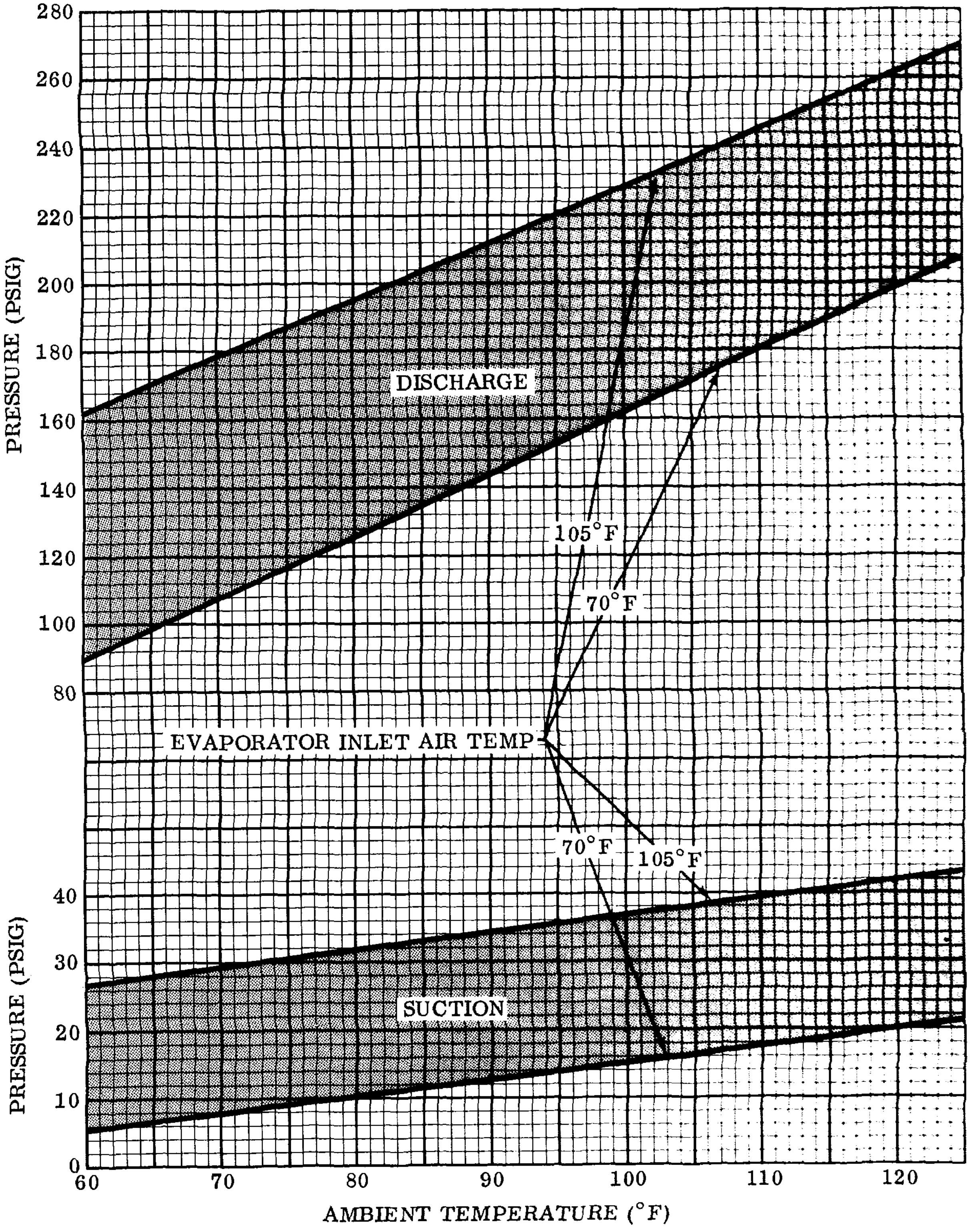
A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Stoddard Solvent	P-D-680	Commercially Available	Flush plumbing.
Dry Nitrogen Source		Commercially Available	Purge plumbing.

B. Purging Refrigeration Plumbing

(1) Disconnect contaminated plumbing from refrigeration components.
(2) Force solvent through contaminated plumbing.
(3) Purge plumbing with dry nitrogen.
(4) Connect plumbing to refrigeration components.
(5) Recharge system. (Refer to Chapter 12.)
(6) Perform Operational Check of Cooling System. (Refer to Inspection/Check, this section.)



Ambient Air Temperature/Pressure Chart
Figure 201

COMPRESSOR - MAINTENANCE PRACTICES

1. **Removal/Installation**

A. Removal of Compressor *(Aircraft 35-002 thru 35-416 and 36-002 thru 36-047 not modified per SB 35/36-21-25)* (See Figure 202.)

(1) Set Battery Switch(es) off and disconnect aircraft batteries.

(2) Disconnect electrical wiring from refrigeration pressure switch.

(3) Discharge refrigeration system. (Refer to Chapter 12.) Disconnect hoses from compressor and discard aluminum seals. Cap all exposed openings.

(4) Loosen compressor attaching bolts. Slide compressor up and remove belt from compressor pulley.

(5) Remove compressor attaching bolts and compressor from aircraft.

(6) If compressor is to be replaced with a new unit, remove the following parts from the compressor.

(a) Remove adapters from compressor. Discard seals.

(b) Remove bolt and compressor pulley from compressor assembly.

B. Installation of Compressor *(Aircraft 35-002 thru 35-416 and 36-002 thru 36-047 not modified per SB 35/36-21-25)* (See Figure 202.)

(1) Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Sealing tape	No. 48 Teflon	Commercially Available	Seal switch installation.

(2) When installing replacement compressor, install the following parts on the compressor assembly:

(a) Install seal and adapter (one with elbow) in compressor SUCTION port. Torque adapter 35 foot-pounds [47.5 Nm] with adapter positioned as shown.

NOTE: If elbow is being reinstalled in discharge port adapter, apply sealing tape (0.5 inch [1.27 cm] wide) to elbow threads and torque elbow to position shown.

(b) Install seal and remaining adapter in compressor DISCHARGE port. Torque adapter 25 to 30 foot-pounds [33.9 to 40.7 Nm] with adapter positioned as shown.

(c) Install compressor pulley on compressor assembly and torque bolt 22 foot-pounds [29.8 Nm].

(3) Install and secure compressor assembly to mounting panel. Do not torque bolts at this time.

(4) Install V-belt on compressor pulley. Adjust V-belt tension. (Refer to 21-50-00, Inspection/Check.)

(5) Remove caps from refrigerant lines, install new aluminum seals, and connect lines to adapters.

(6) Charge refrigeration system. (Refer to Chapter 12.)

(7) Connect electrical wiring to refrigeration pressure switch.

(8) Connect electrical connectors to aircraft batteries.

NOTE: Since the compressor shaft seals depend upon oil for sealing it is normal to find a slight oil leakage in the shaft seal cavity. Do not condemn and replace the compressor until the seal has been given an opportunity to "run in" and until there is definite proof that replacement is necessary.

C. Removal of Compressor _(Aircraft 35-417 and Subsequent, 36-048 and Subsequent, and prior Aircraft modified per SB 35/36-21-25)_ (See Figure 201.)
(1) Set Battery Switch(es) off and disconnect aircraft batteries.
(2) Disconnect electrical connector from refrigeration pressure switch. (Refer to 21-50-05, Removal/Installation.)
(3) Discharge refrigeration system. (Refer to Chapter 12.)
(4) Disconnect suction hose tee and discharge hose tee from compressor. Discard seals. Cap all openings.
(5) Remove V-belt shield, with tubes attached, from compressor.
(6) Loosen compressor attaching parts. Rotate compressor toward motor and remove V-belt from compressor pulley.
(7) Remove attaching parts and compressor from aircraft.
(8) If compressor is to be replaced with a new unit, proceed as follows:
(a) Remove attaching parts.
(b) Remove compressor pulley. (Refer to Repairs, this section.)
(c) Remove refrigeration pressure switch from compressor assembly. (Refer to 21-50-05, Removal/Installation.)

D. Installation of Compressor _(Aircraft 35-417 and Subsequent, 36-048 and Subsequent, and prior Aircraft modified per SB 35/36-21-25)_ (See Figure 201.)
(1) When installing replacement compressor, install compressor pulley. (Refer to Repairs, this section.)
(2) Install refrigeration pressure switch on discharge service port. (Refer to 21-50-05, Removal/Installation.)
(3) Position compressor assembly at its appropriate location on motor/compressor support assembly, and secure with attaching parts. DO NOT torque bolts at this time.
(4) Install V-belt on compressor pulley. Check pulley alignment and adjust V-belt tension. (Refer to 21-50-00, Inspection/Check.)
(5) Install V-belt shield, with tubes attached, on compressor.
(6) Remove caps from suction line and discharge line, install new seals, and connect lines to compressor ports.
(7) Charge refrigeration system. (Refer to Chapter 12.)
(8) Connect electrical connector to refrigeration pressure switch.
(9) Connect electrical connectors to aircraft batteries.
(10) Perform Operational Check of Cooling System. (Refer to21-50-00, Inspection/Check.)

NOTE: A slight oil leakage at the compressor shaft seal could be normal. Do not condemn and replace the compressor until the seal has been given an opportunity to "run in" and until there is definite proof that replacement is necessary. Run the compressor for a minimum of one hour to see if the leak stops before removing for leaking.

2. **Inspection/Check**

A. Sankyo Compressor Free-Running Torque Check *(Aircraft 35-417 and Subsequent, 36-048 and Subsequent, and prior Aircraft modified per SB 35/36-21-25)*

NOTE: Wait a minimum of 30 minutes after refrigeration system shutdown to perform this check so that system pressure will be equalized.

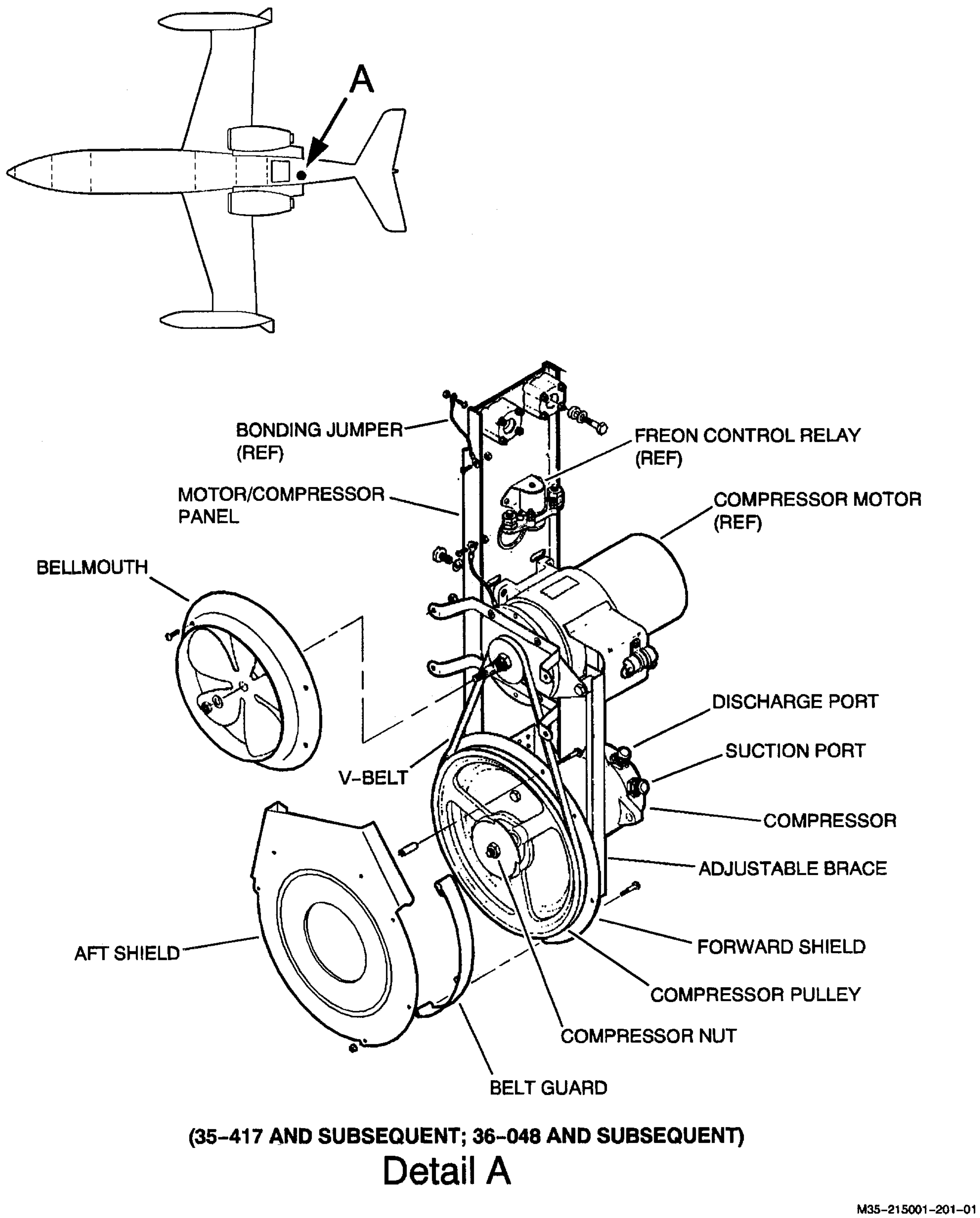
Check free-running torque at ramp/hangar ambient temperature.

(1) Apply a suitable torque wrench directly to compressor pulley retaining nut. Check torque.
(2) If torque required to turn compressor is 80 inch-pounds [9 Nm] or less, internal seizure is not indicated and compressor is acceptable for service.
(3) If torque required to turn compressor exceeds 80 inch-pounds [9 Nm], remove drive belt, bleed off system refrigerant charge and repeat step 2.A.(1).
(4) If torque required to turn compressor is 80 inch-pounds [9 Nm] or less, install drive belt and recharge refrigerant. (Refer to Chapter 12.) Compressor is acceptable for service.

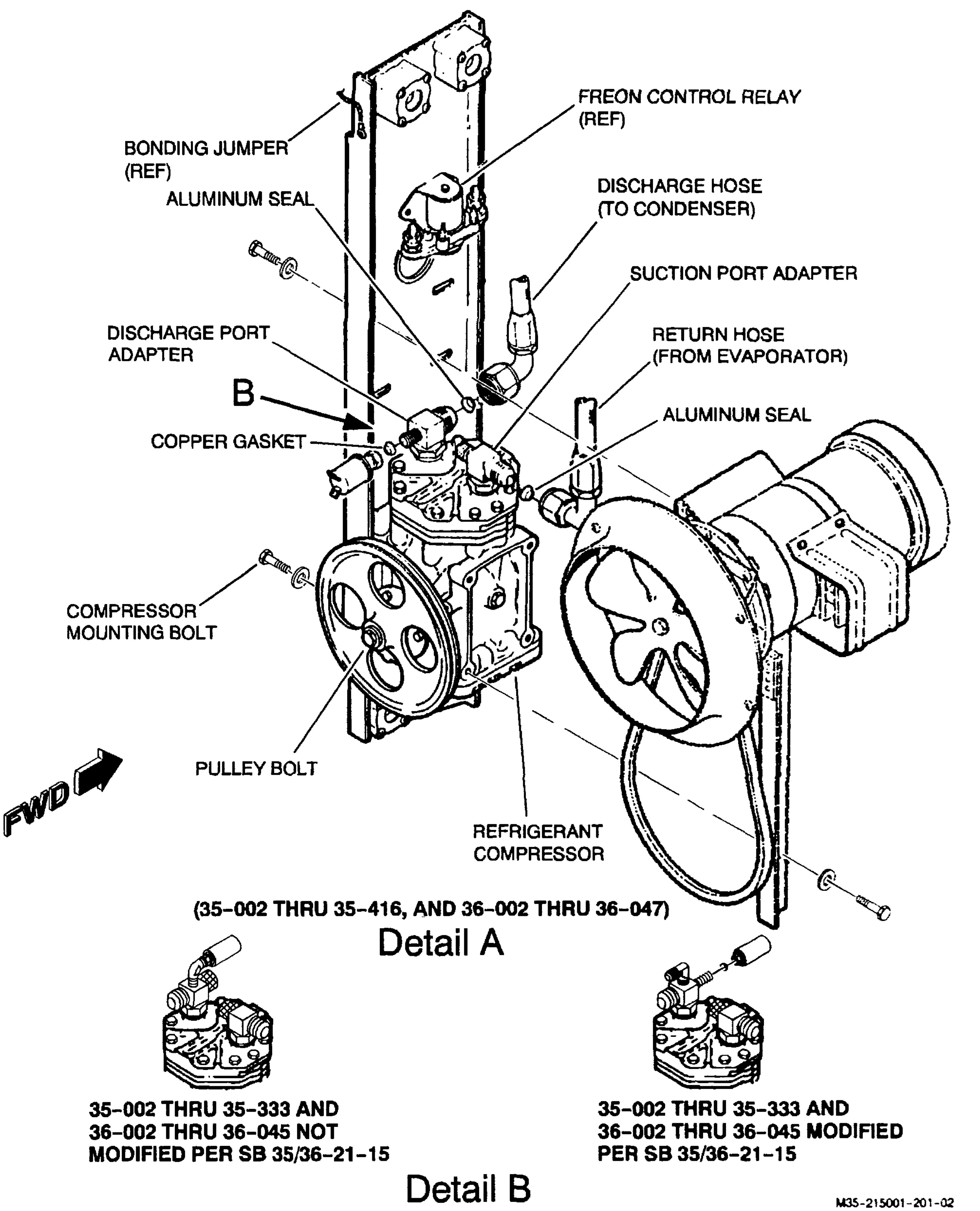
3. **Repairs**

A. Sankyo Compressor Pulley Removal *(Aircraft 35-417 and Subsequent, 36-048 and Subsequent, and prior Aircraft modified per SB 35/36-21-25)* (See Figure 201.)
(1) Remove compressor nut and discard.
(2) Slide driver assembly off shaft. Driver assembly is keyed to shaft. Discard key.
(3) Remove shim washers and discard.
(4) Remove snap ring and discard.
(5) Remove compressor pulley assembly.
(6) If further disassembly of compressor pulley is required, proceed as follows:
(a) Remove retainer ring and discard.
(b) Press bearings out and discard.
(c) Drive spring pins out and discard.
(7) Remove attaching hardware and forward shield.

B. Sankyo Compressor Pulley Installation *(Aircraft 35-417 and Subsequent, 36-048 and Subsequent, and prior Aircraft modified per SB 35/36-21-25)* (See Figure 201.)
(1) Install forward shield on compressor.
(2) When installing a replacement compressor pulley, proceed as follows:
(a) Press in new bearings.
(b) Install new retainer ring.
(c) Drive in new spring pins.
(3) Position compressor pulley on compressor.
(4) Install new snap ring.
(5) Install new shim washers.
(6) Position new key on shaft and slide driver assembly in to position.
(7) Install compressor nut and torque 25 to 30 foot-pounds [33.9 to 40.7 Nm].
(8) Check clearance between driver assembly and compressor pulley assembly is 0.030 to 0.040 inch [0.76 to 1.02 mm].

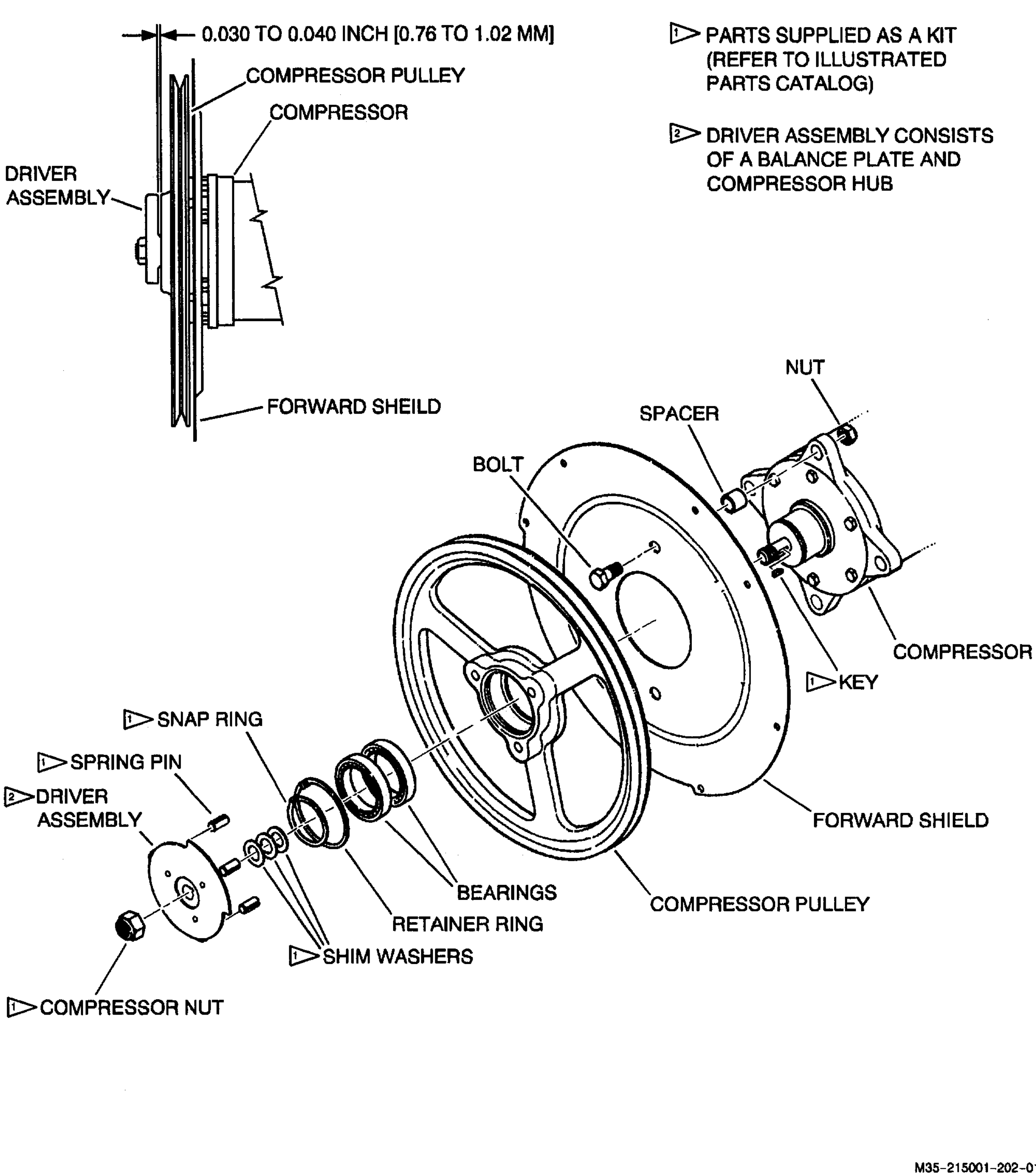


Compressor Installation
Figure 201 (Sheet 1 of 2)



Compressor Installation
Figure 201 (Sheet 2 of 2)

NOTE: IT IS RECOMMENDED THAT PARTS MARKED BY 1 BE USED IN LIEU OF THE OLD PARTS



Sankyo Compressor Pulley Installation
Figure 202

COMPRESSOR MOTOR - MAINTENANCE PRACTICES

1. Removal/Installation

A. Removal of Compressor Motor (See Figure 201.)

(1) Set Battery Switch(es) off and disconnect aircraft batteries.

CAUTION: WHEN NECESSARY TO DISCONNECT AN ELECTRICAL BONDING JUMPER, ENSURE THAT IT IS CORRECTLY REINSTALLED. ELECTRICAL BONDING INTEGRITY IS ESSENTIAL TO THE PROPER OPERATION AND SAFETY OF AIRCRAFT ELECTRICAL AND AVIONICS EQUIPMENT.

(2) *On Aircraft 35-417 and Subsequent, 36-048 and Subsequent, and prior Aircraft modified per SB 35/36-21-25,* remove attaching parts, aft shield, and belt guard.

(3) Remove terminal cover, disconnect and tag compressor motor wiring.

(4) *On Aircraft 35-285 and Subsequent and 36-045 and Subsequent,* disconnect compressor motor electrical bonding jumper from bellmouth support.

(5) Loosen compressor mounting bolts sufficiently allowing compressor to be pushed upward. Remove V-belt from compressor pulley.

(6) Loosen and remove bellmouth support screws from bellmouth supports and bellmouth.

(7) Remove compressor motor mounting bolts and compressor motor from aircraft.

(8) If replacement compressor motor is to be installed, proceed as follows:

(a) Remove screws and bellmouth supports from compressor motor housing.

(b) Remove fan bolt or nut.

(c) Loosen fan set screws and slide fan from compressor motor shaft.

B. Installation of Compressor Motor (See Figure 201.)

(1) Acquire necessary tools and equipment.

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Thread Compound	No. 222	Loctite Newington, CT	Secure screws.
Torque Wrench		Commercially Available	Tighten bolts.

(2) If installing a replacement compressor motor, proceed as follows:

(a) Secure bellmouth supports to compressor motor housing.

(b) Slide fan onto compressor motor shaft. Fan boss faces compressor motor.

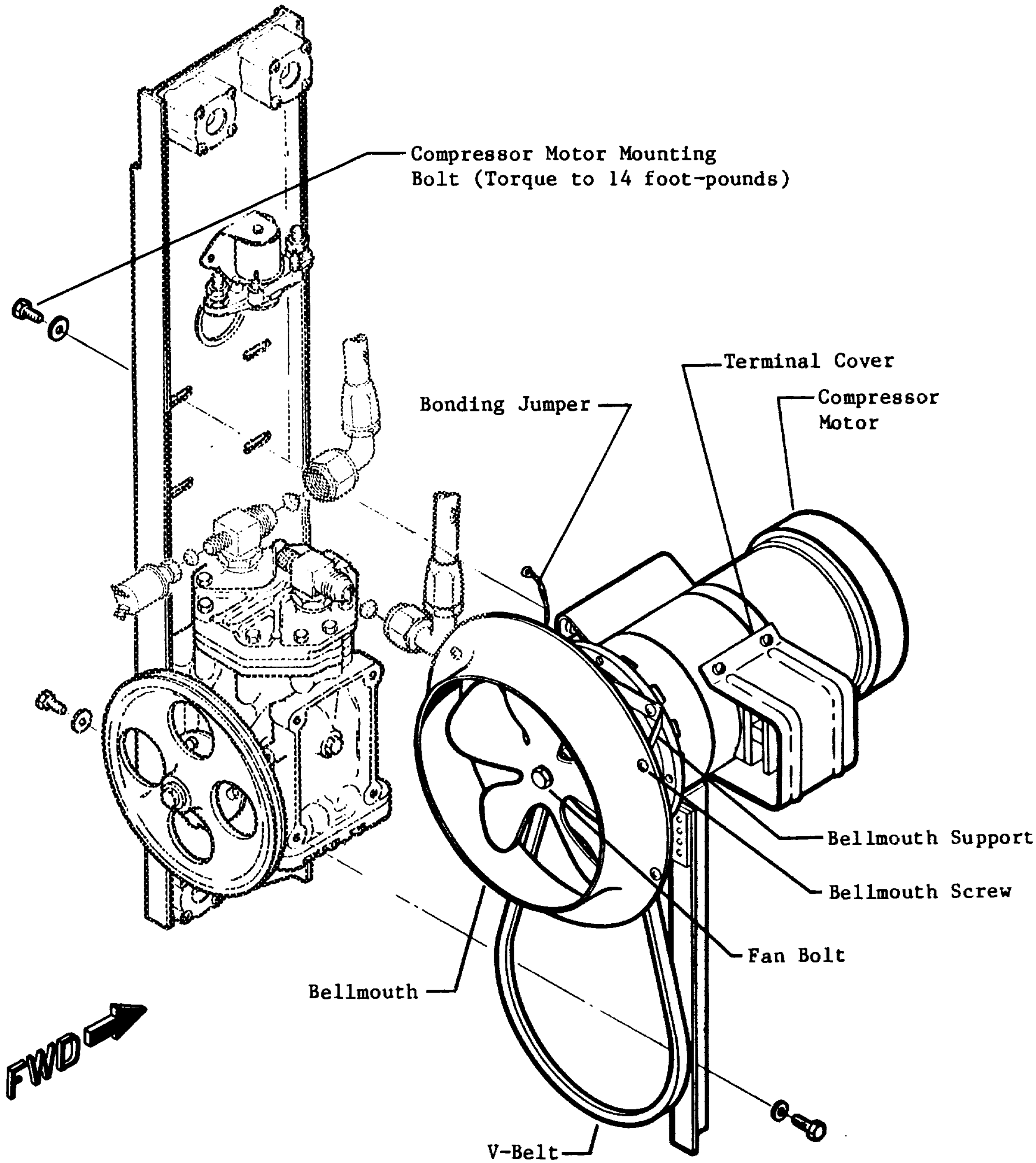
(c) Install fan bolt or nut, apply thread compound, and torque 160 to 190 inch-pounds [18.1 to 21.5 Nm].

(d) Apply thread compound to fan set screws and tighten.

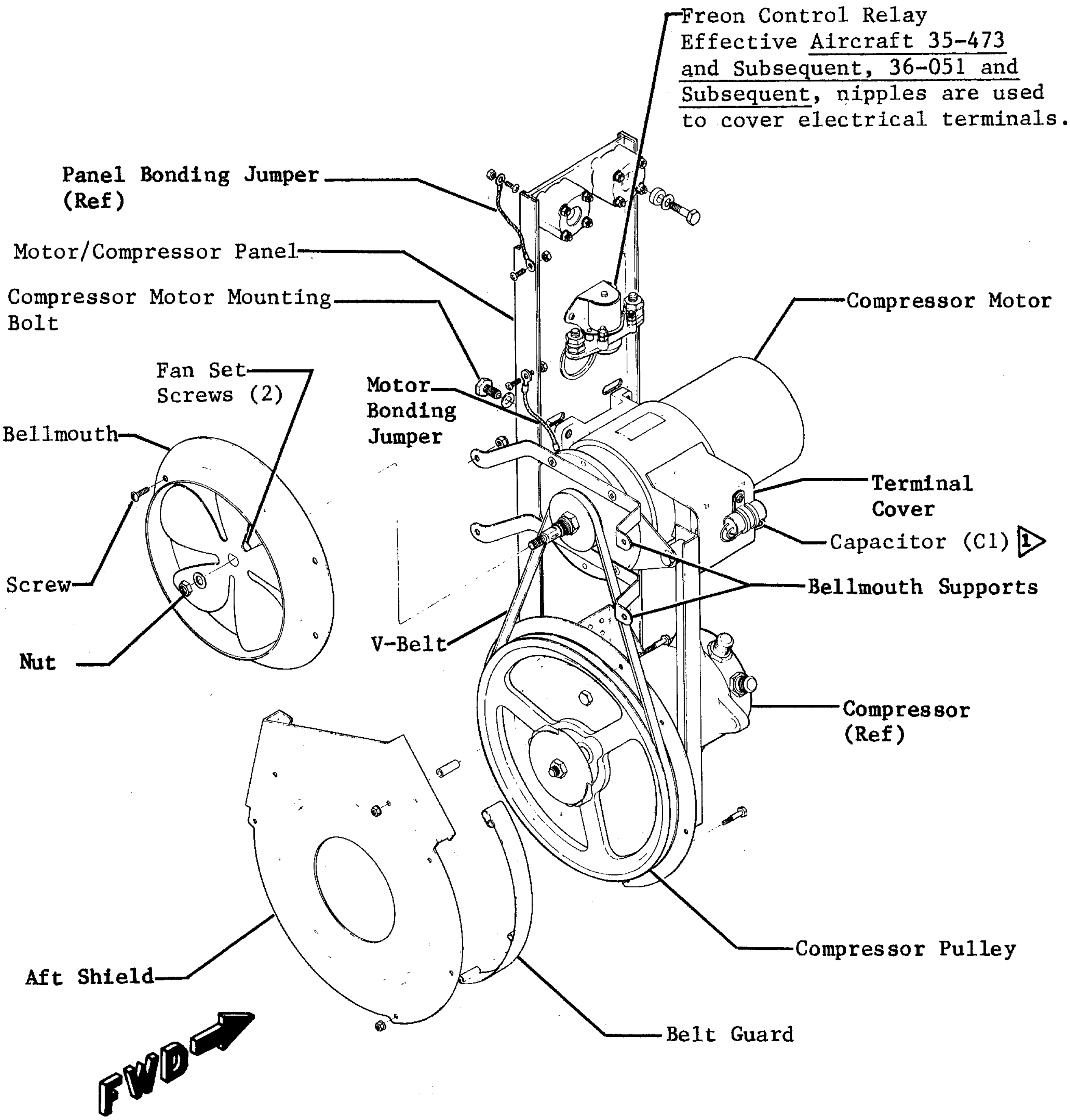
(3) Install compressor motor on mounting panel and secure with bolts. Do not torque bolts at this time.

(4) Put V-belt on compressor pulley and adjust V-belt tension. (Refer to 21-50-00, Inspection/Check.)

(5) Torque compressor motor attaching bolts to 14 foot-pounds [19 Nm] and check pulley alignment. (Refer to 21-50-00, Inspection/Check.)
(6) Secure bellmouth to bellmouth supports. Adjust for 0.05 inch [1.3 mm] minimum clearance around fan.
(7) Secure compressor motor electrical bonding jumper to bellmouth support.
(8) Remove tags and connect electrical wiring to compressor motor.
(9) Install terminal cover.
(10) *On Aircraft 35-417 and Subsequent, 36-048 and Subsequent, and prior Aircraft modified per SB 35/36-21-25,* set belt guard and shield over compressor pulley and secure with attaching parts.
(11) Connect electrical connectors to aircraft batteries.



Compressor Motor Installation
Figure 201 (Sheet 1 of 2)



1 Aircraft 35-618 and Subsequent and 36-054, 36-056 and Subsequent.

Compressor Motor Installation
Figure 201 (Sheet 2 of 2)

2. Inspection /Check

A. Check Compressor Motor Brush Length *(Aircraft equipped with Electro Mech Motor)* (See Figure 202.)

NOTE: Check Compressor Motor Brush Length in accordance with the current inspection interval specified in Chapter 5.

(1) Set Battery Switch(es) off and disconnect aircraft batteries.
(2) *On Aircraft 35-497 and Subsequent, 36-053 and Subsequent and prior aircraft modified per AAK 83-3, "Replacement of Air Conditioner Compressor Motor Brush Cover,"* remove upper screws, then loosen lower screws. Rotate motor brush cover counterclockwise and slide off.

NOTE: *On Aircraft 35-002 thru 35-496 and 36-002 thru 36-052 not modified per AAK 83-3, "Replacement of Air Conditioner Compressor Motor Brush Cover,"* upper and lower screws must be removed before motor brush cover can be removed.

(3) Disconnect brush lead from motor.

CAUTION: WHEN REMOVING BRUSHES FROM MOTOR USE EXTREME CAUTION NOT TO DAMAGE BRUSHES. SIDE PRESSURE MAY CRACK, CHIP OR BREAK BRUSHES.

(4) Disengage spring tension and pull brushes out of motor.
(5) Measure brush length. If brush length is 0.75 inch [1.9 cm] or less, not including the resilient cap, or if any of the contact edges are chipped, pitted, or broken, the brushes shall be replaced.
(6) Inspect commutator for damage. If commutator is pitted, scored or badly worn, the motor must be replaced.

CAUTION: WHEN INSTALLING BRUSHES, ENSURE THAT BRUSH LEADS ARE FORMED SO THEY CAN FLEX WITH BRUSH WEAR AND HAVE NO CHANCE OF COMING IN CONTACT WITH THE CASE, END BELL OR COVER CAN.

(7) Install brushes in motor.
(8) Brushes must be run-in, under a no load condition, until a minimum of 75% of brush face is in contact with commutator.
(9) Clean brush dust from motor using compressed air.
(10) Install cover can and secure with attaching parts.
(11) Connect electrical connectors to aircraft batteries.
(12) Perform Refrigeration System Operational Check. (Refer to 21-50-00, Inspection/Check.)
(13) Close tailcone access door.

B. Check Compressor Motor Brush Length *(Aircraft equipped with G.E. Motor)* (See Figure 202.)

(1) Open tailcone access door and remove electrical power from aircraft.
(2) Remove attaching parts, brush cover, and spring (four places) from compressor motor.
(3) Disconnect brush lead from motor.

CAUTION: WHEN REMOVING BRUSHES FROM MOTOR USE EXTREME CAUTION NOT TO DAMAGE BRUSHES. SIDE PRESSURE MAY CRACK, CHIP OR BREAK BRUSHES.

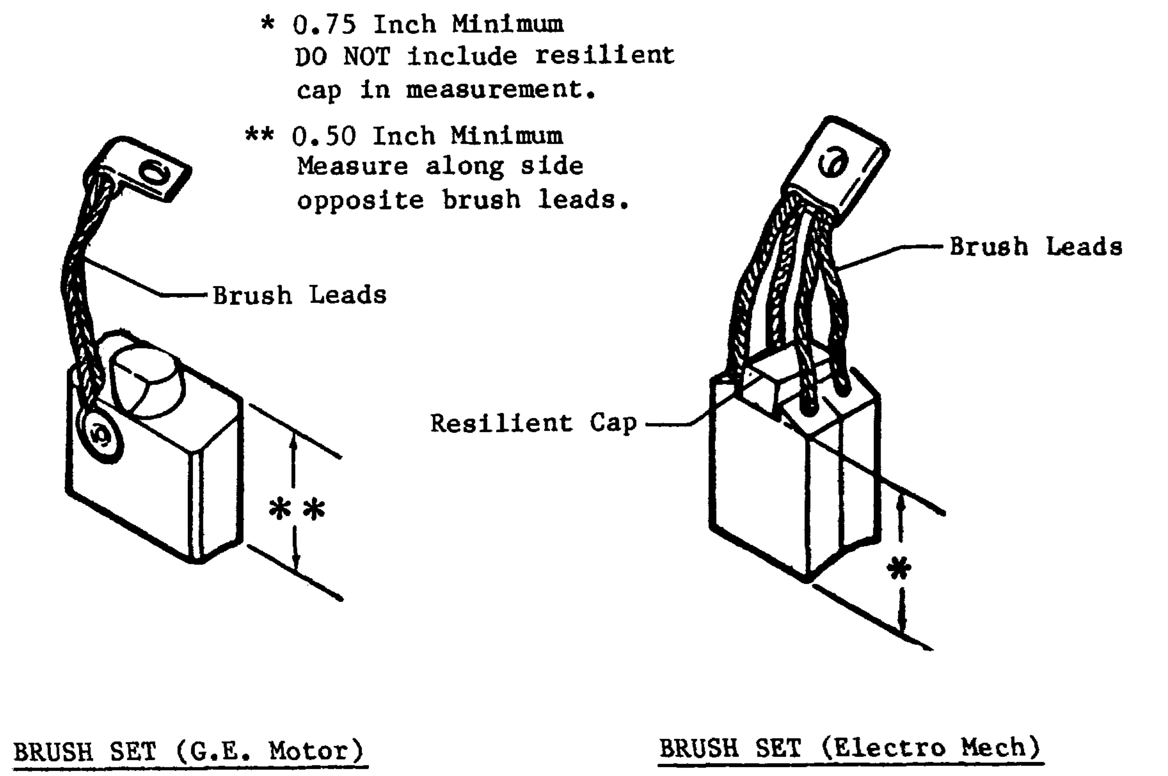
(4) Remove brushes from motor.
(5) Measure brush length. If brush length is 0.50 inch [1.5 cm] or less or if any of the contact edges are chipped, pitted or broken, the brush shall be replaced.
(6) Inspect commutator for damage. If commutator is pitted, scored or badly worn, the motor must be replaced.

CAUTION: WHEN INSTALLING BRUSHES ENSURE THAT BRUSH LEADS ARE FORMED SO THAT THEY CAN FLEX WITH BRUSH WEAR AND HAVE NO CHANCE OF COMING IN CONTACT WITH THE MOTOR CASE.

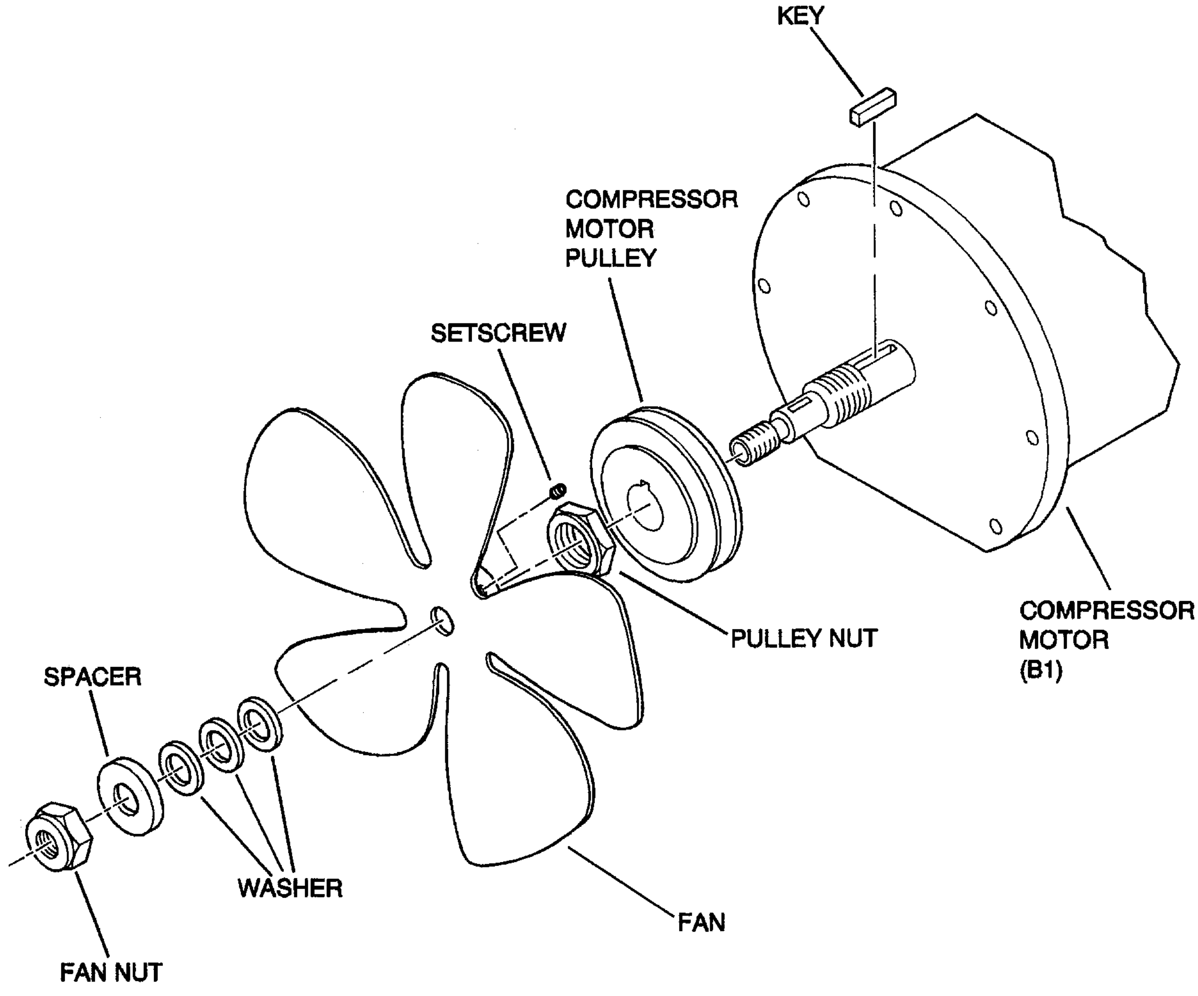
(7) Install brushes in motor.
(8) Brushes must be run-in, under a no load condition, until a minimum of 75% of brush face is in contact with commutator.
(9) Clean brush dust from motor using compressed air.
(10) Restore electrical power to aircraft.
(11) Perform Refrigeration System Operational Check. (Refer to 21-50-00, Inspection/Check.)
(12) Close tailcone access door.

3. Repairs

A. Compressor Motor Pulley Replacement (See Figure 203.)
(1) Remove compressor motor. (Refer to 21-50-02.)
(2) Remove pulley nut.
(3) Remove compressor motor pulley.
(4) Remove key from compressor motor shaft.
(5) Install new key in compressor motor shaft.
(6) Install replacement compressor motor pulley.
(7) Install pulley nut. Torque nut to 35 to 45 foot-pounds [45.7 to 61.0 Nm].
(8) Install compressor motor. (Refer to 21-50-02.)



Brush Measurement
Figure 202



Compressor Motor Pulley Replacement
Figure 203

CONDENSER - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**

   A. **Remove Condenser** (See figure 201.)

      (1) Open tailcone access door and remove electrical power from aircraft.

      (2) Discharge refrigeration system. (Refer to Chapter 12.)

      (3) Remove compressor motor. (Refer to 21-50-02.)

      (4) Disconnect compressor discharge hose and dehydrator tube from condenser and discard aluminum seals. Cap all exposed openings.

      (5) Remove attaching parts and condenser from aircraft.

   B. **Install Condenser** (See figure 201.)

      (1) Install condenser and secure with attaching parts.

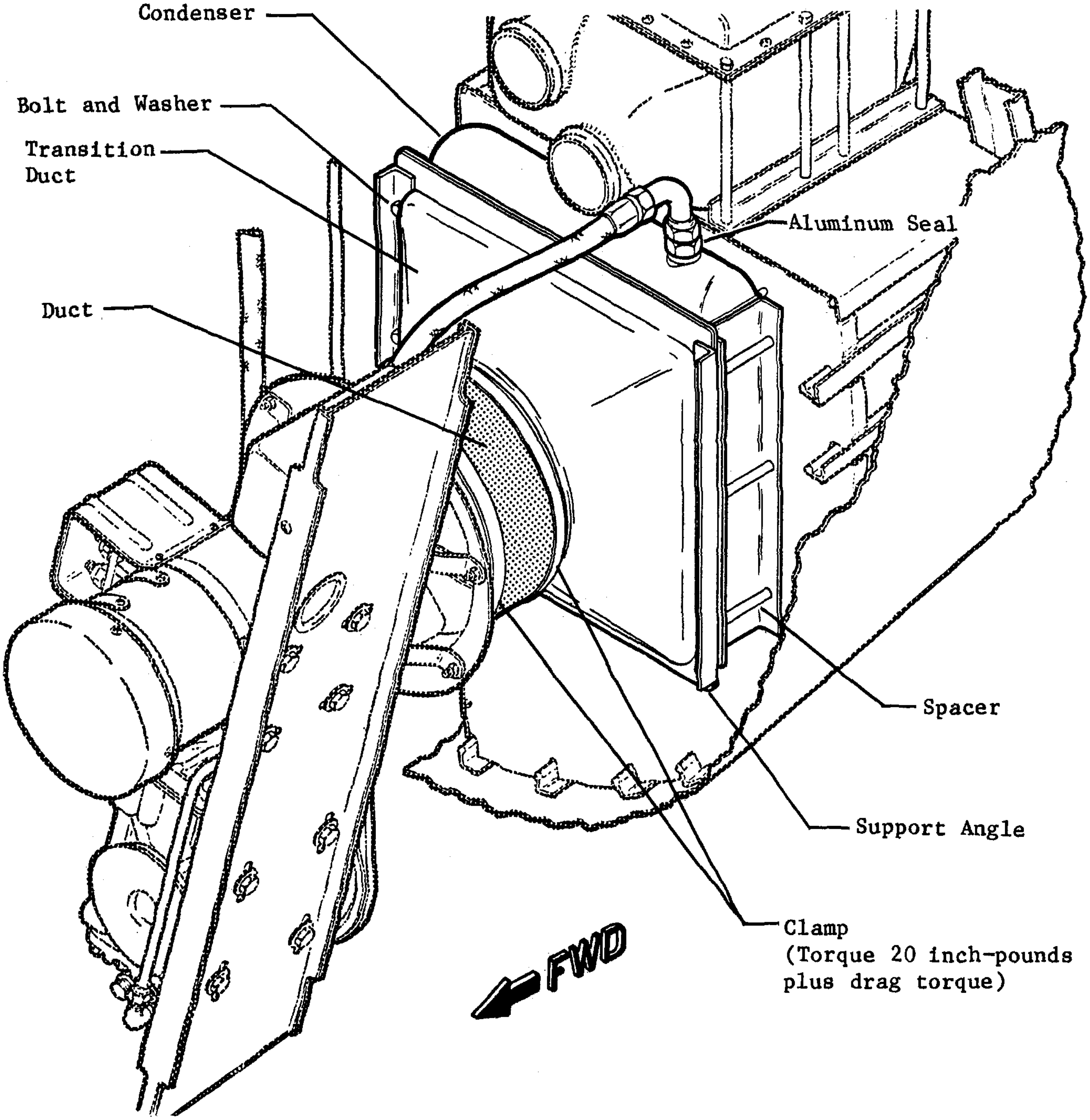
      (2) Remove caps, install new aluminum seals, and connect compressor discharge hose and dehydrator tube to condenser.

      (3) Install compressor motor. (Refer to 21-50-02.)

      (4) Charge refrigeration system. (Refer to Chapter 12.)

      (5) Restore electrical power to aircraft and close tailcone access door.

NOTE: Drag torque is the amount of torque required to overcome the friction of the self-locking nuts.

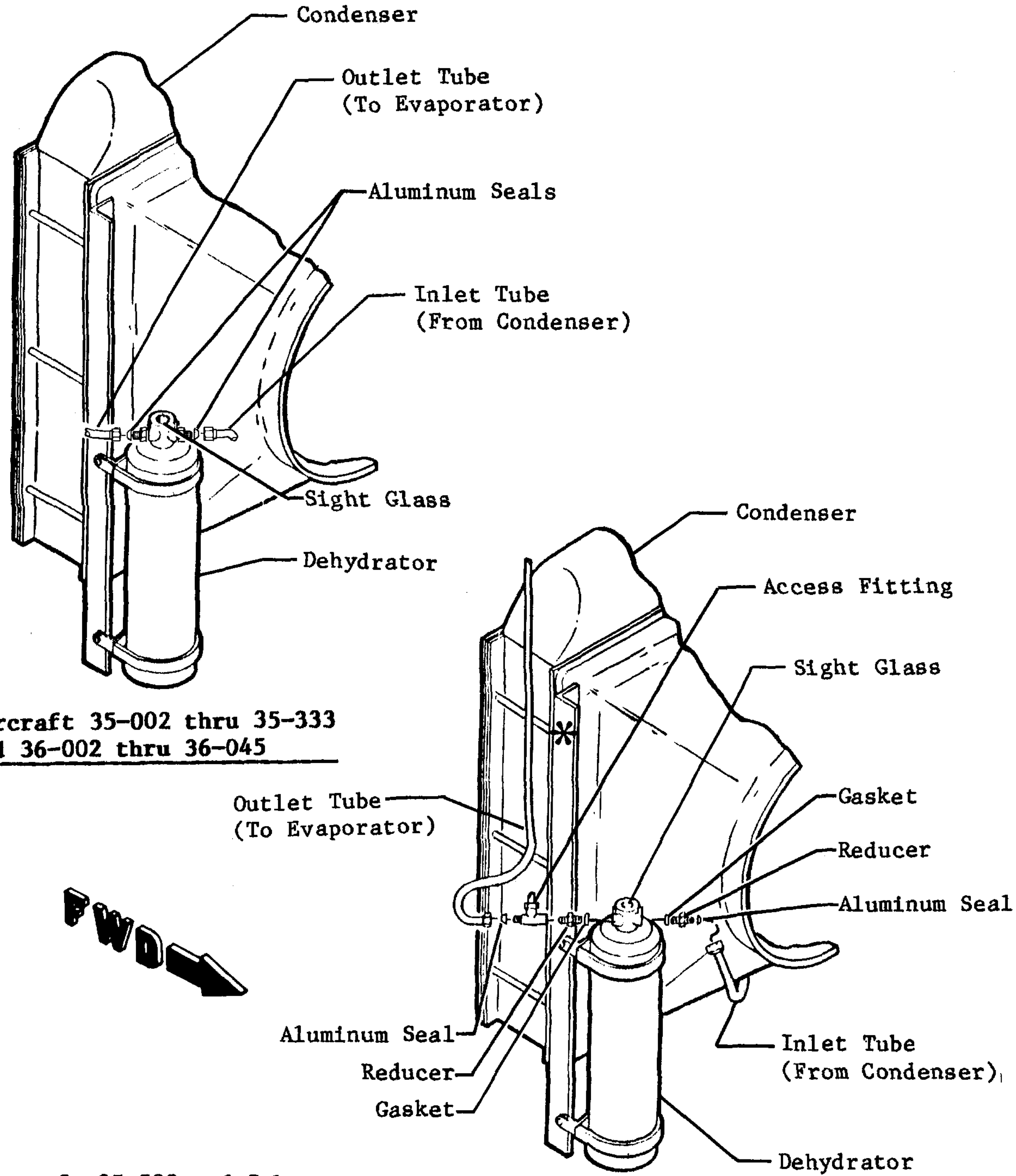


13-38D-1

Condenser Installation
Figure 201

DEHYDRATOR - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   A. **Remove Dehydrator** (See figure 201.)
      (1) Open tailcone access door and remove electrical power from aircraft.
      (2) Discharge refrigeration system. (Refer to Chapter 12.)
      (3) Disconnect refigeration lines from dehydrator, discard aluminum seals, and cap exposed lines.
      (4) Remove attaching parts and dehydrator from aircraft.
   B. **Install Dehydrator** (See figure 201.)
      (1) Install and secure dehydrator.
      (2) Remove caps, install new gaskets, new aluminum seals, and connect lines to dehydrator.
      (3) Charge refrigeration system. (Refer to Chapter 12.)
      (4) Restore electrical power to aircraft and close tailcone access door.



Aircraft 35-002 thru 35-333 and 36-002 thru 36-045

***On Aircraft 35-509 and Subsequent, 36-054 and Subsequent, the dehydrator is located near the top on the angle assembly.**

Aircraft 35-334 thru 35-508 and 36-046 thru 35-053

13-59A

Dehydrator Installation
Figure 201 (Sheet 1 of 2)

REFRIGERATION PRESSURE SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation

CAUTION: DO NOT OPERATE REFRIGERATION SYSTEM WITH REFRIGERATION PRESSURE SWITCH REMOVED. DAMAGE TO COMPRESSOR COULD RESULT.

NOTE: The refrigeration pressure switch is installed in the compressor discharge system.

A. Removal of Refrigeration Pressure Switch *(Aircraft 35-002 thru 35-416, 36-002 thru 36-047 not modified per SB 35/36-21-25)* (See Figure 201.)

(1) Set Battery Switch(es) OFF, open tailcone access door and disconnect aircraft batteries.

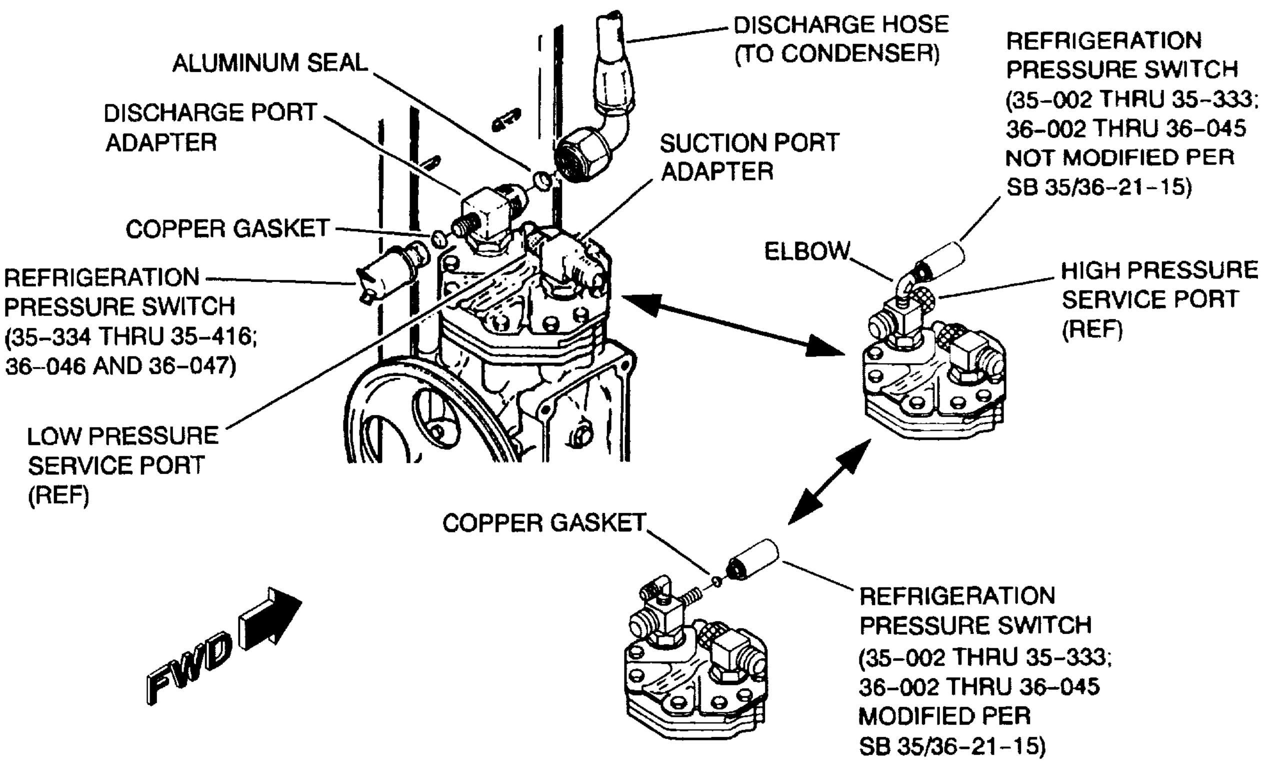
(2) *On Aircraft 35-002 thru 35-333, 36-002 thru 36-045 not modified per SB 35/36-21-15*, discharge refrigeration system. (Refer to Chapter 12.)

(3) Disconnect electrical wiring from refrigeration pressure switch.

(4) Remove refrigeration switch as follows:

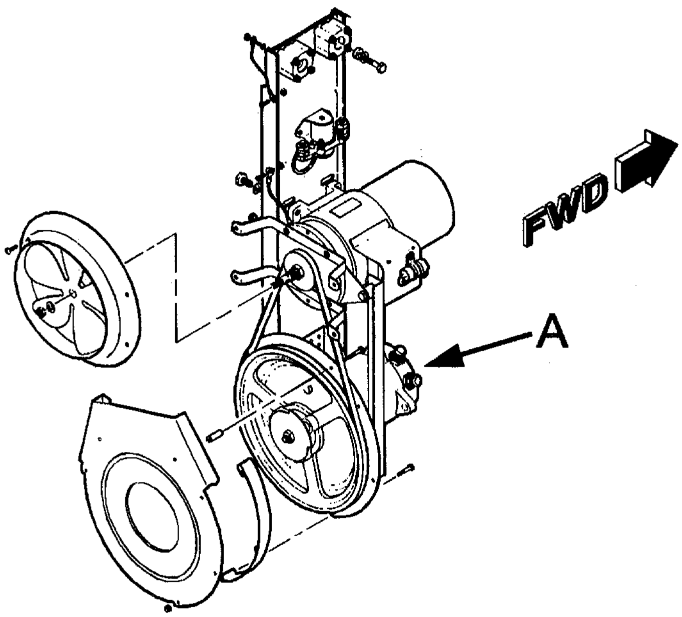
(a) *On Aircraft 35-002 thru 35-333, 36-002 thru 36-045 not modified per SB 35/36-21-15*, remove refrigeration pressure switch from elbow on discharge port adapter.

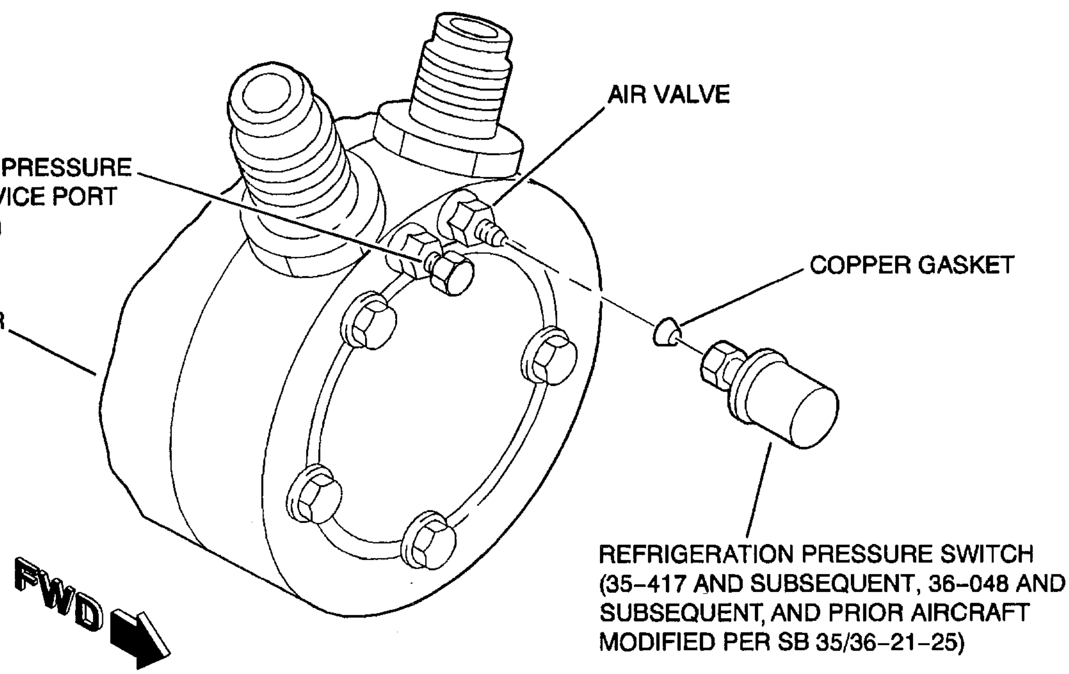
(b) *On Aircraft 35-334 thru 35-416, 36-046 and 36-047, and prior Aircraft modified per SB 35/36-21-15*, remove refrigeration pressure switch from discharge port adapter. Discard copper gasket.



(35-002 thru 35-416 and 36-002 thru 36-047 not modified per SB 35/36-21-25)

Refrigeration Pressure Switch Installation
Figure 201 (Sheet 1 of 2)





Detail A

M35-215005-201-02

Refrigeration Pressure Switch Installation
Figure 201 (Sheet 2 of 2)

B. Installation of Refrigeration Pressure Switch *(Aircraft 35-002 thru 35-416, 36-002 thru 36-047 not modified per SB 35/36-21-25)* (See Figure 201.)
(1) Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Sealing tape	Teflon No. 48	Commercially Available	Seal switch installation.

(1) Install refrigeration pressure switch as follows:
(a) *On Aircraft 35-002 thru 35-333, 36-002 thru 36-045 not modified per SB 35/36-21-15,* install refrigeration pressure switch on elbow. Apply sealing tape (0.5 inch [1.3 cm] wide) to elbow threads and torque elbow to position shown.
(b) *On Aircraft 35-334 thru 35-416, 36-046 and 36-047, and prior Aircraft modified per SB 35/36-21-15,* install new copper gasket in refrigeration pressure switch and tighten on discharge adapter.
(2) Connect electrical wiring to refrigeration pressure switch.
(3) *On Aircraft 35-002 thru 35-333, 36-002 thru 36-045 not modified per SB 35/36-21-15,* recharge refrigeration system. (Refer to Chapter 12.)
(4) Connect electrical connectors to aircraft batteries and close tailcone access door.

C. Removal of Refrigeration Pressure Switch *(Aircraft 35-417 and Subsequent, 36-048 and Subsequent, and prior Aircraft modified per SB 35/36-21-25)* (See Figure 201.)
(1) Set Battery Switch(es) OFF, open tailcone access door and disconnect aircraft batteries.
(2) Disconnect electrical wiring from refrigeration pressure switch.
(3) Remove refrigeration pressure switch from discharge service port. Discard copper gasket.

NOTE: The discharge service port contains an air valve that allows removal of the refrigeration pressure switch without discharging the refrigeration system.

CAUTION: DO NOT OPERATE THE REFRIGERATION SYSTEM WITH THE REFRIGERATION PRESSURE SWITCH REMOVED. DAMAGE TO THE COMPRESSOR COULD RESULT.

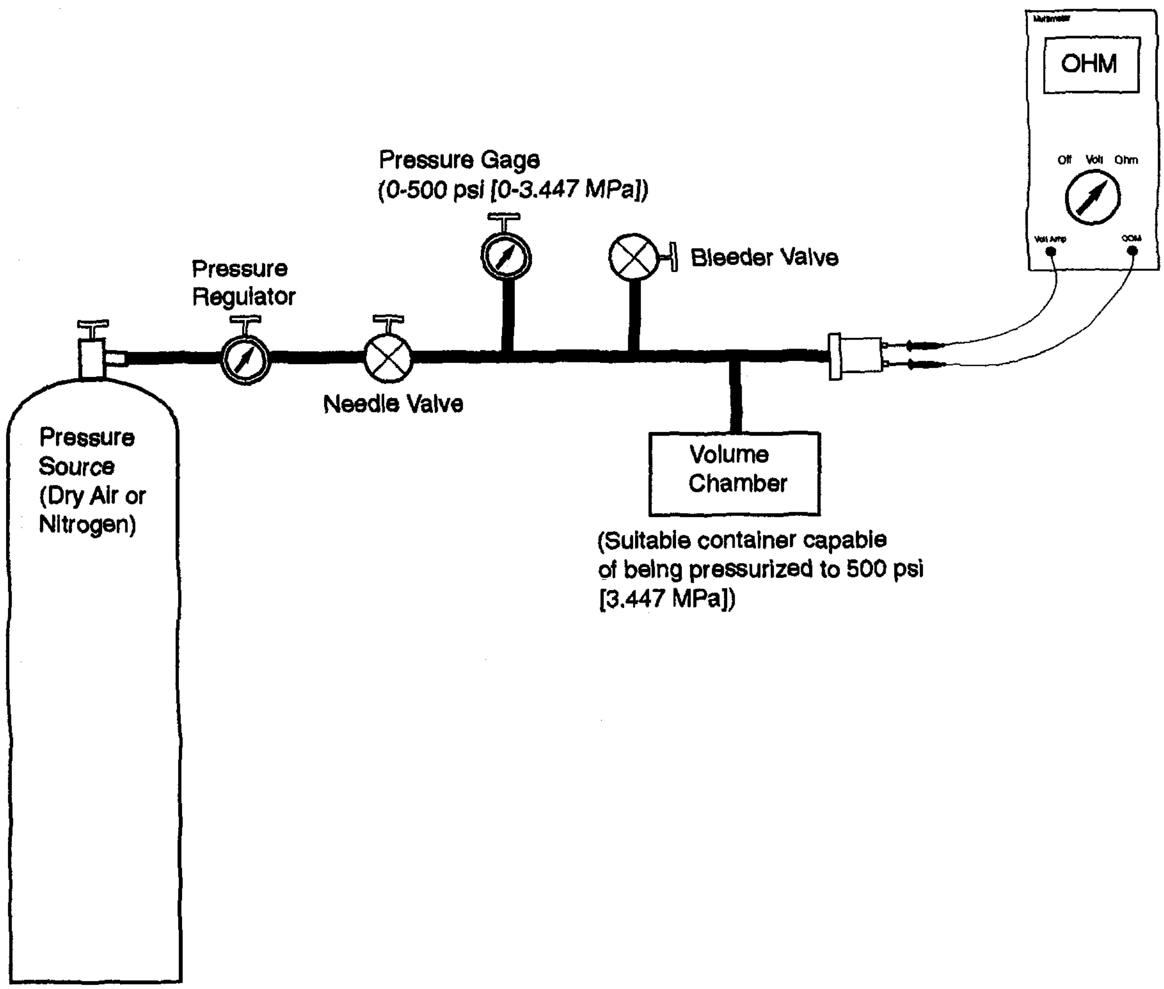
D. Installation of Refrigeration Pressure Switch *(Aircraft 35-417 and Subsequent, 36-048 and Subsequent, and prior Aircraft modified per SB 35/36-21-25)* (See Figure 201.)
(1) Install new copper gasket in refrigeration pressure switch.
(2) Install refrigeration pressure switch on discharge service port and tighten.
(3) Connect electrical wiring to refrigeration pressure switch.
(4) Connect electrical connectors to aircraft batteries and close tailcone access door.

2. Adjustment/Test

A. Functional Test of Refrigeration Pressure Switch

NOTE: Perform Functional Test of Refrigeration Pressure Switch in accordance with the current inspection intervals specified in Chapter 5.

(1) Remove refrigeration pressure switch. (Refer to Removal/Installation, this section.)
(2) Connect refrigeration pressure switch to test equipment as shown in Figure 202.
(3) Connect ohmmeter to contacts of refrigeration pressure switch and slowly apply pressure. Switch contacts shall open at 335 (±10) psi [2310 (±69) kPa].
(4) Slowly release pressure; contacts shall close at 205 (±40) psi [1413 (±276) kPa].
(5) Remove refrigeration pressure switch from test equipment and install switch in aircraft. (Refer to Removal/Installation, this section.)



Refrigeration Pressure Switch Functional Test
Figure 202

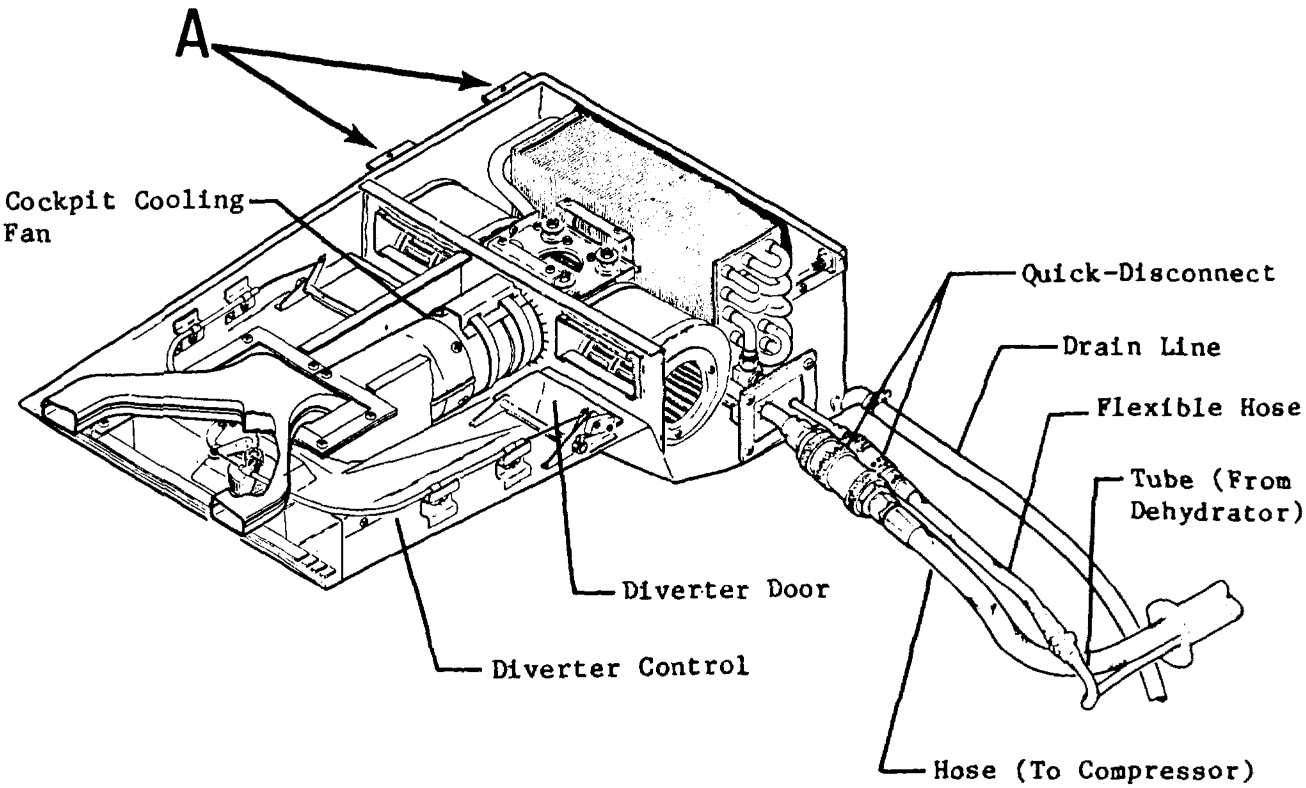
EVAPORATOR AND BLOWER - MAINTENANCE PRACTICES

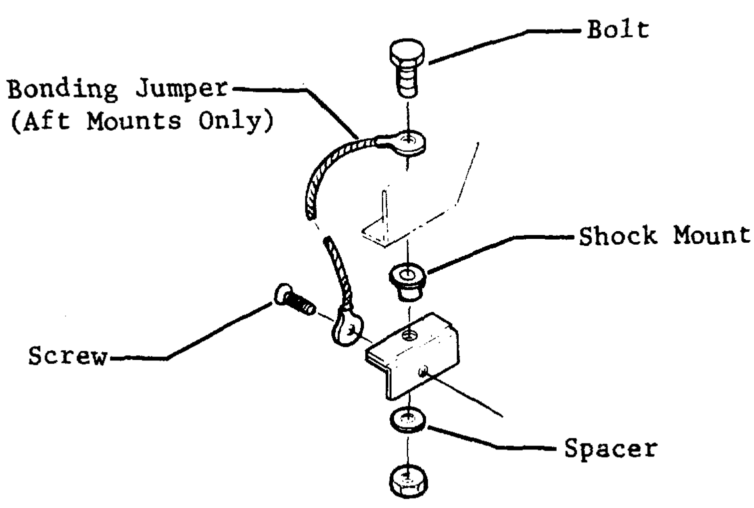
1. REMOVAL/INSTALLATION
   A. Remove Evaporator and Blower Assembly (*Aircraft 36-002 and Subsequent*) (See figure 201.)
      (1) Open tailcone access door and remove electrical power from aircraft.
      (2) Remove upholstery as required to gain access to evaporator and blower installation.
      (3) Loosen clamp and disconnect drain tube from evaporator and blower assembly.
      (4) Disconnect electrical connector from evaporator and blower assembly. If auxiliary cabin heater is installed, disconnect electrical connector from connector bracket assembly.
      (5) Loosen clamps and disconnect ducts from forward cockpit cooling fan transition.
      (6) Disconnect refrigeration quick-disconnect.
      (7) Support evaporator and blower assembly and remove screws from support brackets. Remove evaporator and blower assembly from aircraft.

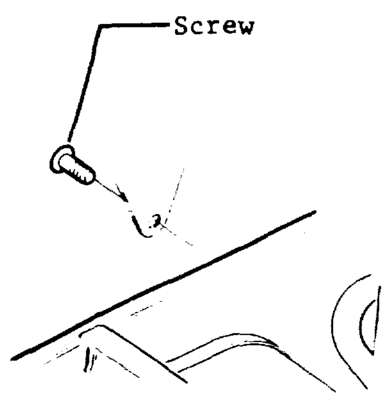
      NOTE: On *Aircraft 36-025 and Subsequent*, check condition of shock mount. Replace worn or damaged shock mounts.

   B. Install Evaporator and Blower Assembly (*Aircraft 36-002 and Subsequent*) (See figure 201.)
      (1) Install evaporator and secure with screws.
      (2) Install blower assembly and secure with screws.
      (3) Install cover on evaporator and blower assembly and secure with attaching parts.
      (4) Install evaporator and blower assembly and secure with screws.
      (5) Connect refrigeration quick-disconnects.
      (6) Connect ducts to forward cockpit cooling fan transition and secure with clamps.
      (7) Connect electrical connector to evaporator and blower assembly. If auxiliary cabin heater is installed, connect electrical connector to connector bracket assembly.
      (8) Connect drain tube to evaporator and blower assembly and secure with clamps.
      (9) Install upholstery.
      (10) Restore electrical power to aircraft and close tailcone access door.
   C. Remove Evaporator and Blower Assembly (*Aircraft 35-002 and Subsequent*) (See figure 201.)
      (1) Remove equipment and upholstery as required to gain access to evaporator and blower installation above baggage compartment.
      (2) Open tailcone access door and remove electrical power from aircraft.
      (3) On *Aircraft 35-002 thru 35-495*, perform the following:
         (a) Discharge refrigeration system. (Refer to Chapter 12.)
         (b) Disconnect refrigeration lines from evaporator, discard aluminum seals, and cap exposed lines.
      (4) On *Aircraft 35-496 and Subsequent*, disconnect refrigeration quick-disconnects.
      (5) Loosen clamp and disconnect evaporator drain line.
      (6) Disconnect blower motor electrical connector.
      (7) On *Aircraft 35-643 and Subsequent*, disconnect defog diverter door electrical connector.
      (8) Remove screws attaching evaporator duct to evaporator and blower assembly.
      (9) Remove attaching parts and evaporator and blower assembly from the aircraft.
      (10) Remove plungers, grommets, and evaporator and blower cover.
      (11) Remove screws and evaporator from evaporator and blower assembly.

D. Install Evaporator and Blower Assembly (*Aircraft 35-002 and Subsequent*) (See figure 201.)
   (1) Install evaporator in evaporator and blower assembly and secure with screws.
   (2) Install evaporator and blower cover and secure with plungers and grommets.
   (3) Install evaporator and blower assembly and secure with attaching parts.
   (4) Connect evaporator drain line and secure with clamp.
   (5) Secure evaporator duct to evaporator and blower assembly with attaching parts.
   (6) On *Aircraft 35-002 thru 35-495*, perform the following:
      (a) Remove caps.
      (b) Install new aluminum seals and connect refrigeration lines.
   (7) On *Aircraft 35-496 and Subsequent*, connect refrigeration quick-disconnects.
   (8) Connect blower motor electrical connector.
   (9) On *Aircraft 35-643 and Subsequent*, connect defog diverter door electrical connector.
   (10) Charge refrigeration system. (Refer to Chapter 12.)
   (11) Restore electrical power to aircraft and close tailcone access door.
   (12) Install upholstery and equipment previously removed.





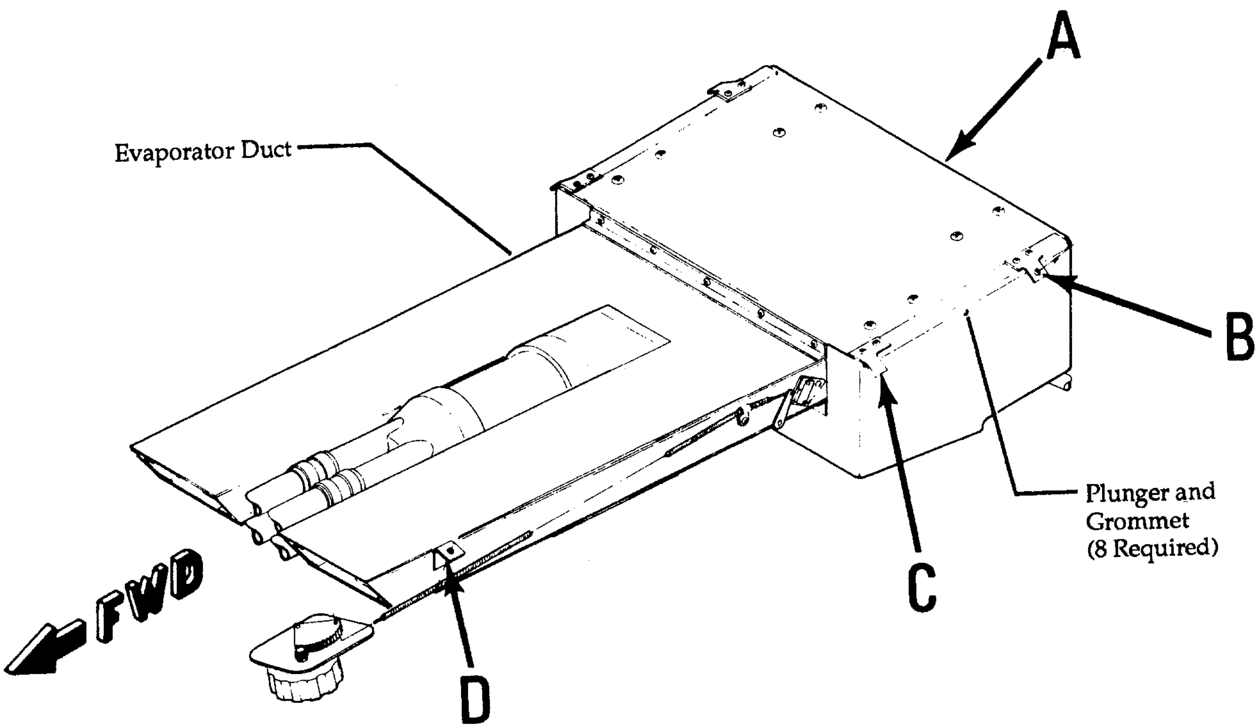


(36-025 and Subsequent) *(36-002 thru 36-024)*

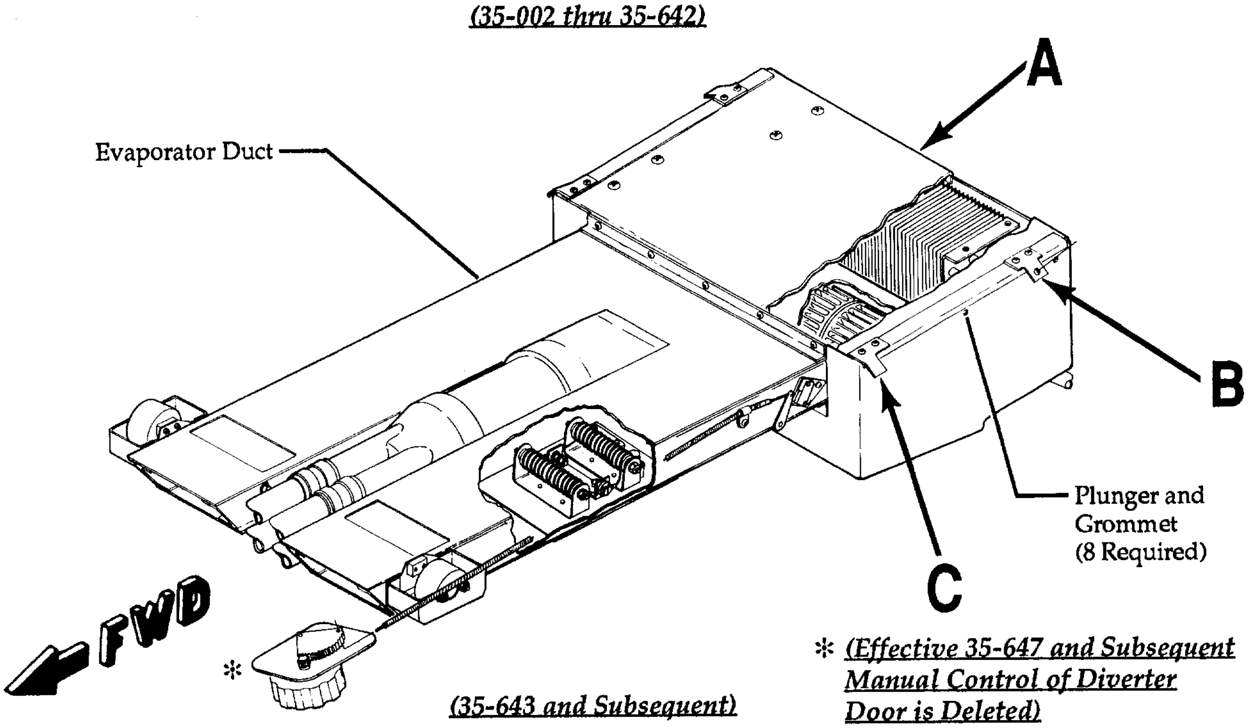
Detail A

13-53C
13-178B

Evaporator and Blower Assembly Installation
Figure 201 (Sheet 1 of 4)



(35-002 thru 35-642)

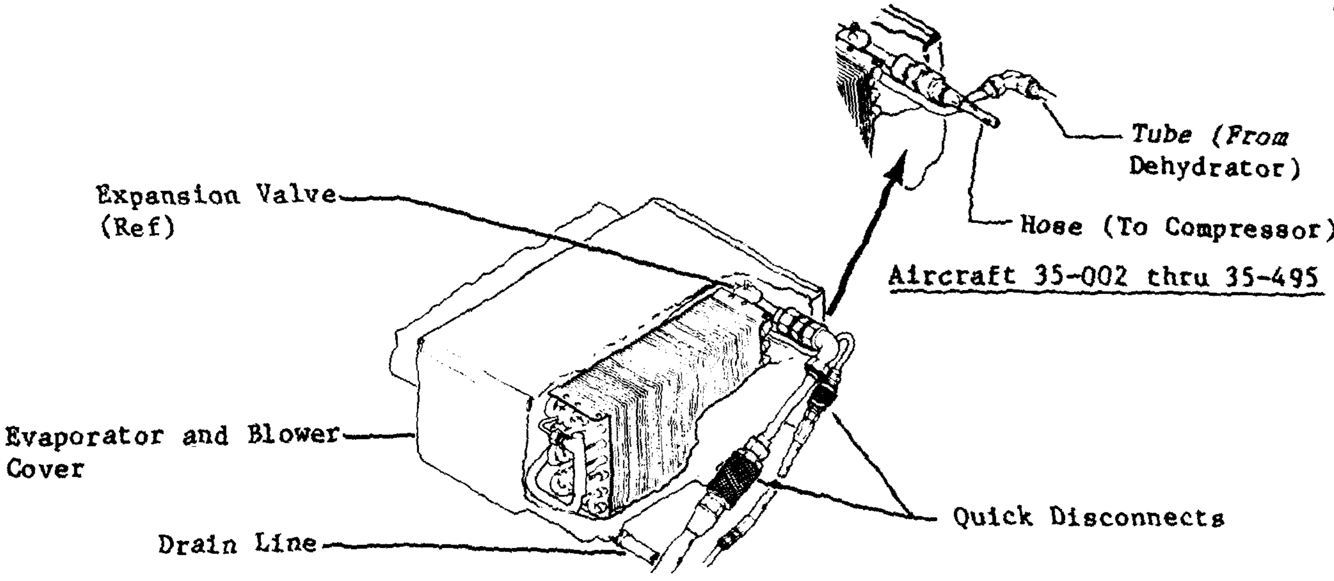


(35-643 and Subsequent)

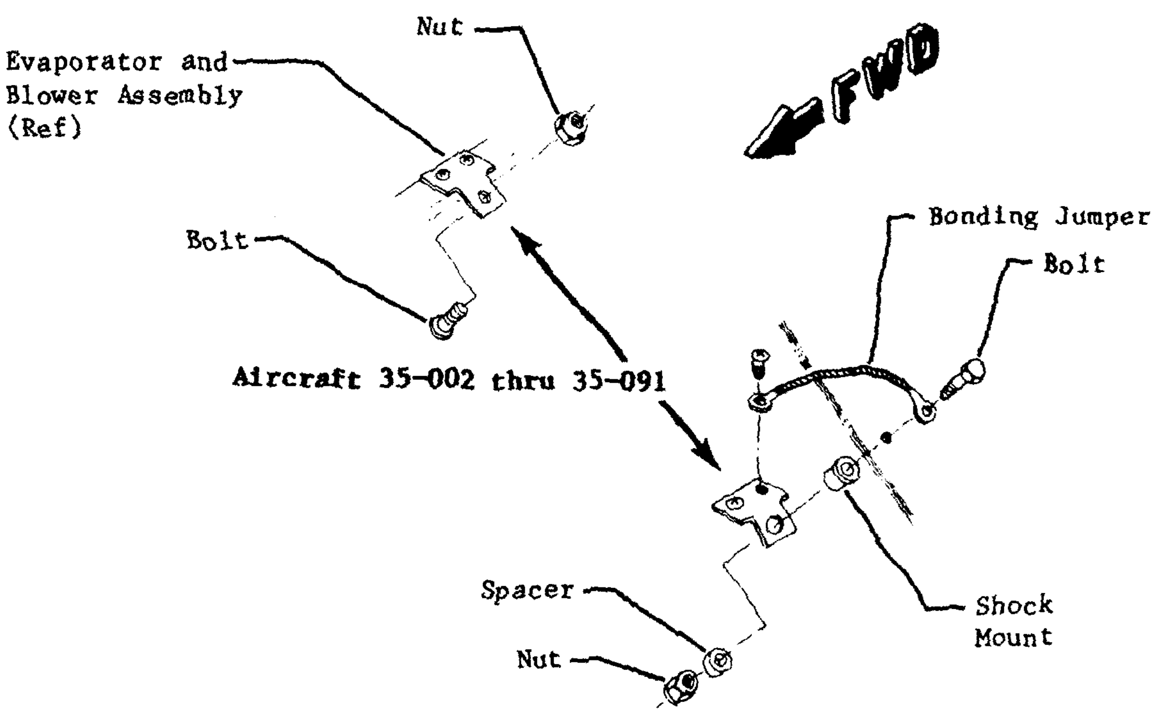
* (Effective 35-647 and Subsequent Manual Control of Diverter Door is Deleted)

13-51C-5

Evaporator and Blower Assembly Installation
Figure 201 (Sheet 2 of 4)

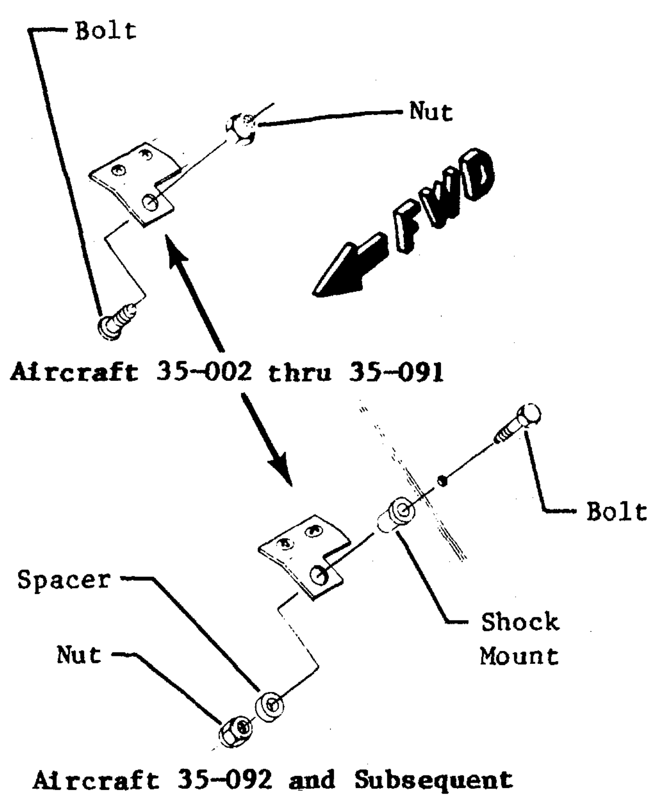


Detail A

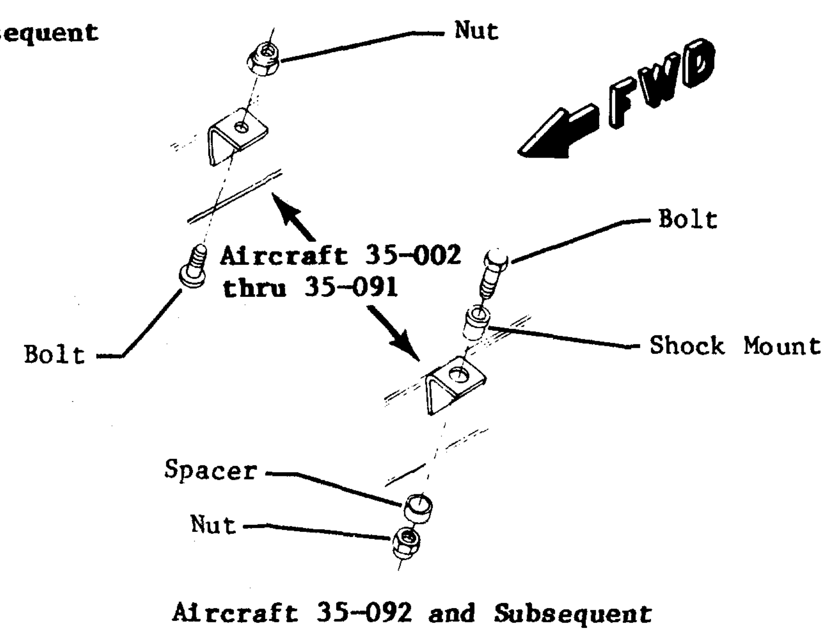


Detail B

Evaporator and Blower Assembly Installation
Figure 201 (Sheet 3 of 4)



Detail C



Detail D

Evaporator and Blower Assembly Installation
Figure 201 (Sheet 4 of 4)

FREON AND CABIN HEATER RELAY BOX - MAINTENANCE PRACTICES

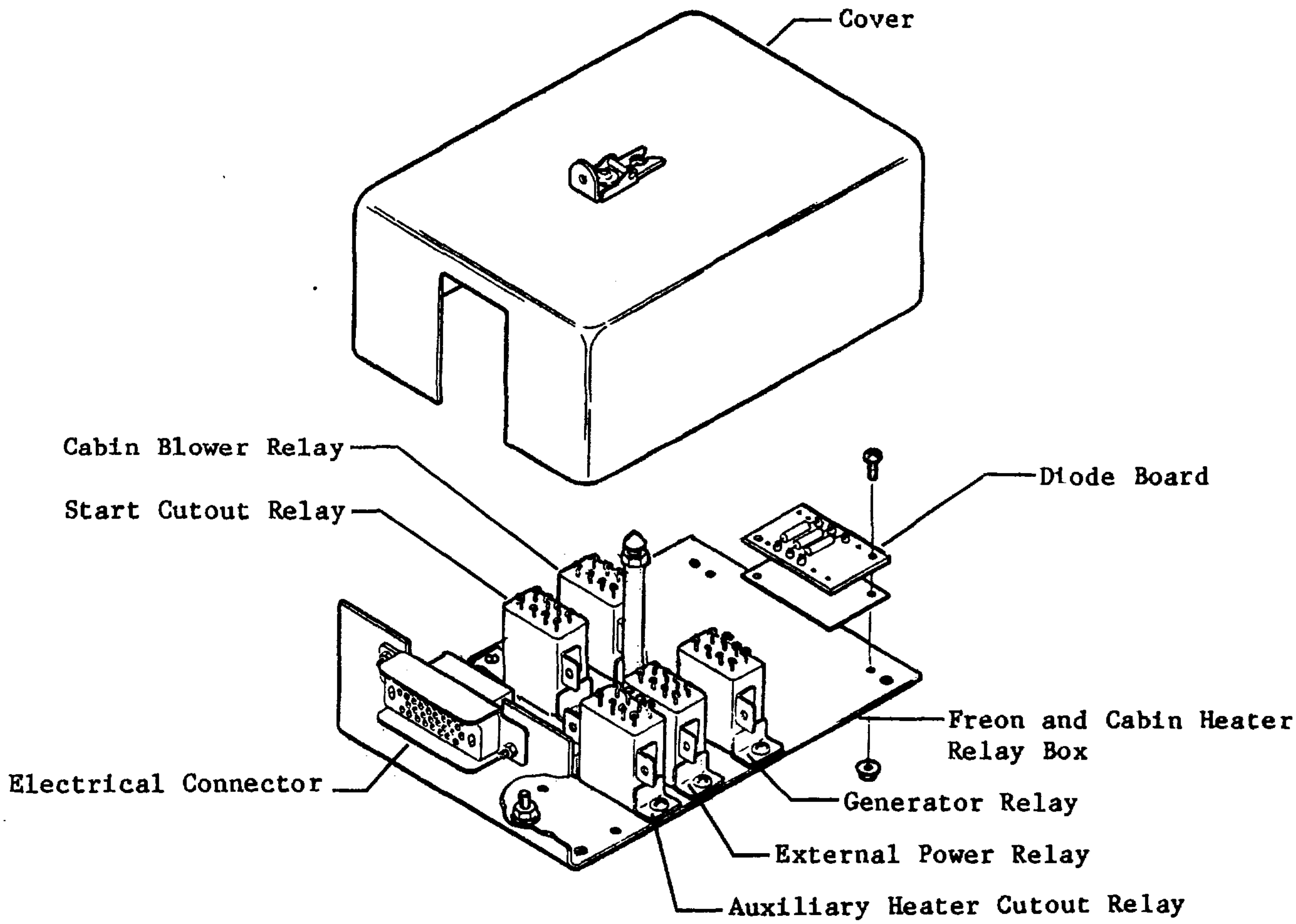
1. **REMOVAL/INSTALLATION**

   A. **Remove Freon and Cabin Heater Relay Box** (See figure 201.)

      (1) Lower tailcone access door.
      (2) Disconnect aircraft batteries.
      (3) Disconnect electrical connector from relay box.
      (4) Release cover latch and remove cover.
      (5) Loosen and remove attaching parts and relay box from aircraft.

   B. **Install Freon and Cabin Heater Relay Box** (See figure 201.)

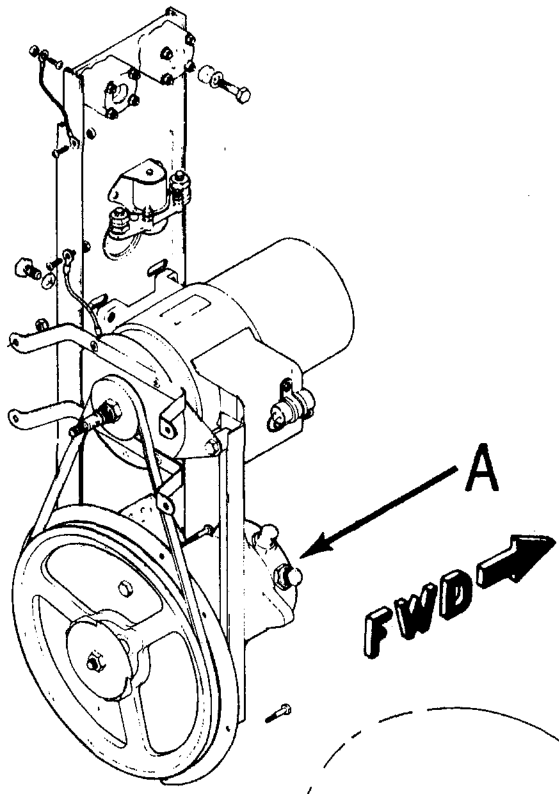
      (1) Install relay box and secure with attaching parts.
      (2) Install and secure cover.
      (3) Connect electrical connector to relay box.
      (4) Connect aircraft batteries.
      (5) Raise and secure tailcone access door.

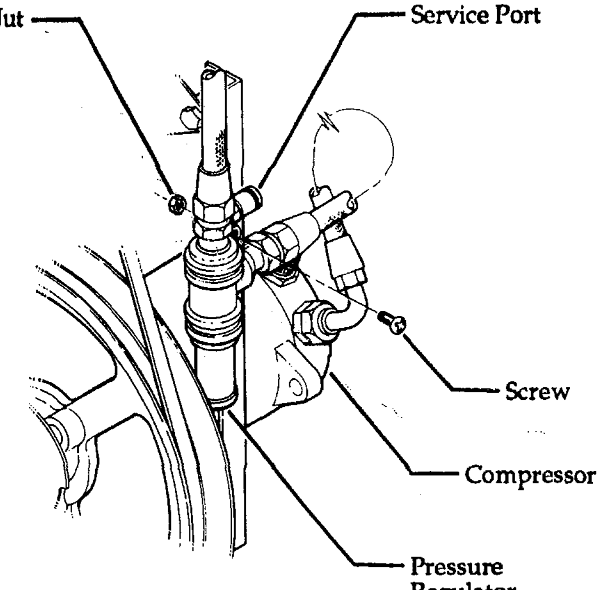


Freon and Cabin Heater Relay Box
Figure 201

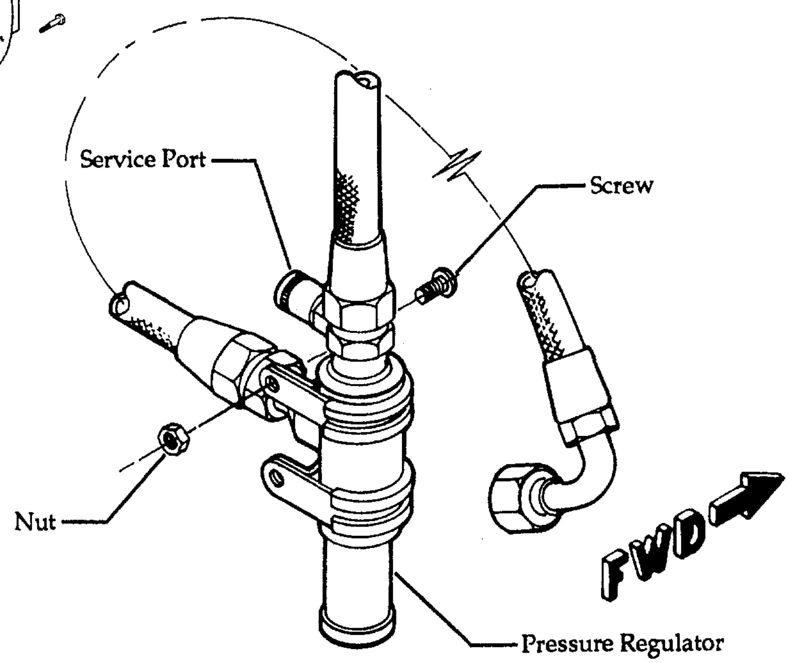
PRESSURE REGULATOR - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION
   A. Remove Pressure Regulator (See figure 201.)
      (1) Open tailcone access door and disconnect both battery quick-disconnects.
      (2) Discharge refrigeration system in accordance with procedures outlined in Chapter 12.
      (3) Remove fittings and cap openings.
      (4) Remove attaching parts from regulator and regulator from aircraft.
   B. Install Pressure Regulator (See figure 201.)
      (1) Install fittings and secure regulator with attaching parts.
      (2) Connect both battery quick-disconnects.
      (3) Charge refrigeration system in accordance with procedures outlined in Chapter 12.
      (4) Operationally check refrigeration system. (Refer to Inspection/Check, 21-50-00.)
      (5) Restore aircraft to normal.





35-643 thru 35-645,
if equipped with original hose



On *35-646 and Subsequent, 36-059 and Subsequent, and 35-643 thru 35-645 if equipped with replacement hose,* pressure regulator and service port are oriented outboard.

Detail A

Pressure Regulator Installation
Figure 201

13-39A-6
13-39C-7

TEMPERATURE CONTROLS - DESCRIPTION AND OPERATION

1. Description
   A. On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031*, the temperature controls consist of a Manual-Auto-Hot temperature selector, a temperature control unit, a cabin temperature sensor, a high temperature limit thermostat, a Hot-Cold switch, a duct temperature sensor, a hot air bypass valve, a hot air bypass valve potentiometer, and a cabin skin temperature sensor. The temperature control unit is located beneath the copilot's seat or in the outboard portion of the right service compartment.
   B. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, the temperature controls consist of a MAN-AUTO temperature selector, a cabin temperature sensor, duct temperature limiter, a hot air bypass valve, and a pressure regulator.
   C. Component Description
      (1) The temperature control unit is located beneath the copilot's seat adjacent to the cabin temperature sensor.
      (2) On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031*, the cabin temperature sensor is installed beneath the copilot's seat. The sensor assembly consists of a permanent magnet DC motor, rated at 24 vdc, 0.25 amperes and 10,500 rpm; a blower secured to the motor shaft by a setscrew; and two thermistors mounted below the blower. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, the cabin temperature sensor is located on the aft side of frame 13E at the top centerline. The sensor assembly consists of a permanent magnet DC motor, rated at 28 vdc, 0.10 amperes and 5300 rpm and the temperature sensor. A blower secured to the motor shaft is utilized to direct air across the sensor.
      (3) The skin temperature sensor is bonded to the inner surface of RH skin aft of frame 8 between stringers 11 and 12.
      (4) The duct temperature sensor is installed in the duct upstream of the cabin air manifold. The duct temperature monitors the temperature of the air entering the cabin.
      (5) The high limit thermostat is installed in the duct upstream of the cabin air manifold. The high limit thermostat protects the system from overheating.
      (6) The duct temperature limiter is installed upstream of the duct temperature sensor. The limiter is installed to protect the system from overheating.
      (7) The temperature control indicator (M509) is installed in the indicator panel. The indicator is a vertical reading dial graduated from COLD to HOT. The indicator is electrically controlled by an externally mounted potentiometer, mechanically connected to the hot air bypass valve shaft. For more information on the hot air bypass valve, refer to 21-41-00.
      (8) The temperature control system pressure regulator is installed in the tailcone compartment on the aft engine beam.

2. Operation (See Figure 1.)
   A. On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031*, the temperature control system is based on a temperature-sensitive resistance bridge circuit using a comparator circuit as the bridge unbalance detector. The temperature selector switch, temperature control unit, cabin temperature sensor, duct temperature sensor, cabin skin temperature sensor, and hot air bypass valve potentiometer form this bridge circuit. The relative resistance of the cabin temperature sensor, the duct temperature sensor, and the cabin skin temperature determines the amplitude and polarity of the unbalance signal applied to the comparator circuit. The comparator circuit senses the amplitude and polarity of the unbalance input signal and automatically moves the hot air bypass valve in the proper direction. A potentiometer, mechanically connected to the hot air bypass valve shaft, also moves and rebalances the bridge circuit. When the bridge circuit is rebalanced, the hot air bypass valve will stop in its new position. In case of temperature control system malfunction, the high limit thermostat acts

as a protective device. On *Aircraft 35-002 thru 35-035 and 36-002 thru 36-013, 36-015 and 36-016*, the thermostat removes power from the bridge circuit and completes a power circuit to the closed side of the hot air bypass valve. *On Aircraft 35-036 thru 35-106, 35-108 thru 35-112 and 36-014 and 36-017 thru 36-031*, the thermostat is normally an open circuit; when it closes, it completes a power circuit to the closed side of the hot air bypass valve. The system also incorporates two indicator lights located in the temperature control unit.

B. On *Aircraft 35-107, 35-113 thru 35-156; 36-032 thru 36-038 not modified per AMK 77-12*, the temperature control system is operated by a regulated pressure. The regulated pressure is controlled by the temperature sensor, the cabin temperature selector, the duct temperature sensor, and duct temperature limiter which act as bleed-off regulators to modify the regulated pressure. The pressure in the temperature control system positions the hot air bypass valve to obtain the desired airflow temperature. The temperature selector is used to vary the pressure in the system. With the mode selector in AUTO and the temperature selector set to cold (C), the temperature selector needle valve opens and reduces the pressure to the cabin temperature sensor. The decreased pressure in the control chamber of the cabin temperature sensor opens the bleed path and allows the sensor to vent more of the pressure to ambient. The decreased pressure allows the bypass valve to close and routes bleed air through the heat exchanger, then into the cabin at a lower temperature. When the temperature selector is set to hot (H), the temperature selector needle valve closes and raises the pressure to the cabin temperature sensor. The increased pressure in the control chamber of the cabin temperature sensor closes the bleed-off path and increases pressure to the bypass valve. The increased pressure allows the hot air bypass valve to open and bypass more hot air into the cabin distribution system. The cabin temperature sensor blower blows cabin air across the sensor and causes the sensor to meter more or less pressure, depending upon the temperature of the air, to ambient. The cabin temperature sensor blower will be inoperative when the Cool System Switch is set to either COOL SYS or FAN or the Auxiliary Cabin Heat Switch is set to either HIGH or LOW. When either the Cool System or Auxiliary Cabin Heat Switch is utilized, a control relay is energized which opens the ground circuit to the cabin temperature sensor blower. *On Aircraft 35-157 and Subsequent and 36-039 and Subsequent and Aircraft 35-107, 35-113 thru 35-156 and 36-032 thru 36-038 modified per AMK 77-12*, the temperature sensor blower will be operative when the Cool System switch is in the FAN position. When the mode selector is set to MAN, the cabin temperature sensor is removed from the system and the pressure to the bypass valve is controlled directly by the temperature selector. Setting the temperature selector to cold bleeds off a greater amount of the regulated pressure and allows the hot air bypass valve to route more bleed air through the heat exchanger. Setting the temperature selector to hot closes the bleed-off path and increases the pressure at the hot air bypass valve. The valve opens and bypasses more bleed air directly into the cabin air distribution ducts.

C. Component Operation

(1) The cabin temperature sensor blower (see Figure 2) draws sufficient air through the louvered front of the unit to obtain a representative cabin air sampling across the thermistors. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, the blower draws cabin air across the temperature sensor. The temperature sensor meters more or less regulated pressure to ambient, depending on the air temperature across the sensor. These changes in pressure position the hot air bypass valve. On *Aircraft 35-107, 35-113 thru 35-156; 36-032 thru 36-038 not modified per AMK 77-12*, the blower is inoperative when the Cool System Switch is set to either COOL SYS or FAN or the Auxiliary Cabin Heater Switch is set to either HIGH or LOW. On *Aircraft 35-157 and Subsequent; 36-039 and Subsequent and Aircraft 35-107, 35-113 thru 35-156 and 36-032 thru 36-038 modified per AMK 77-12*, the blower will be operative when the Cool System Switch is set to FAN.

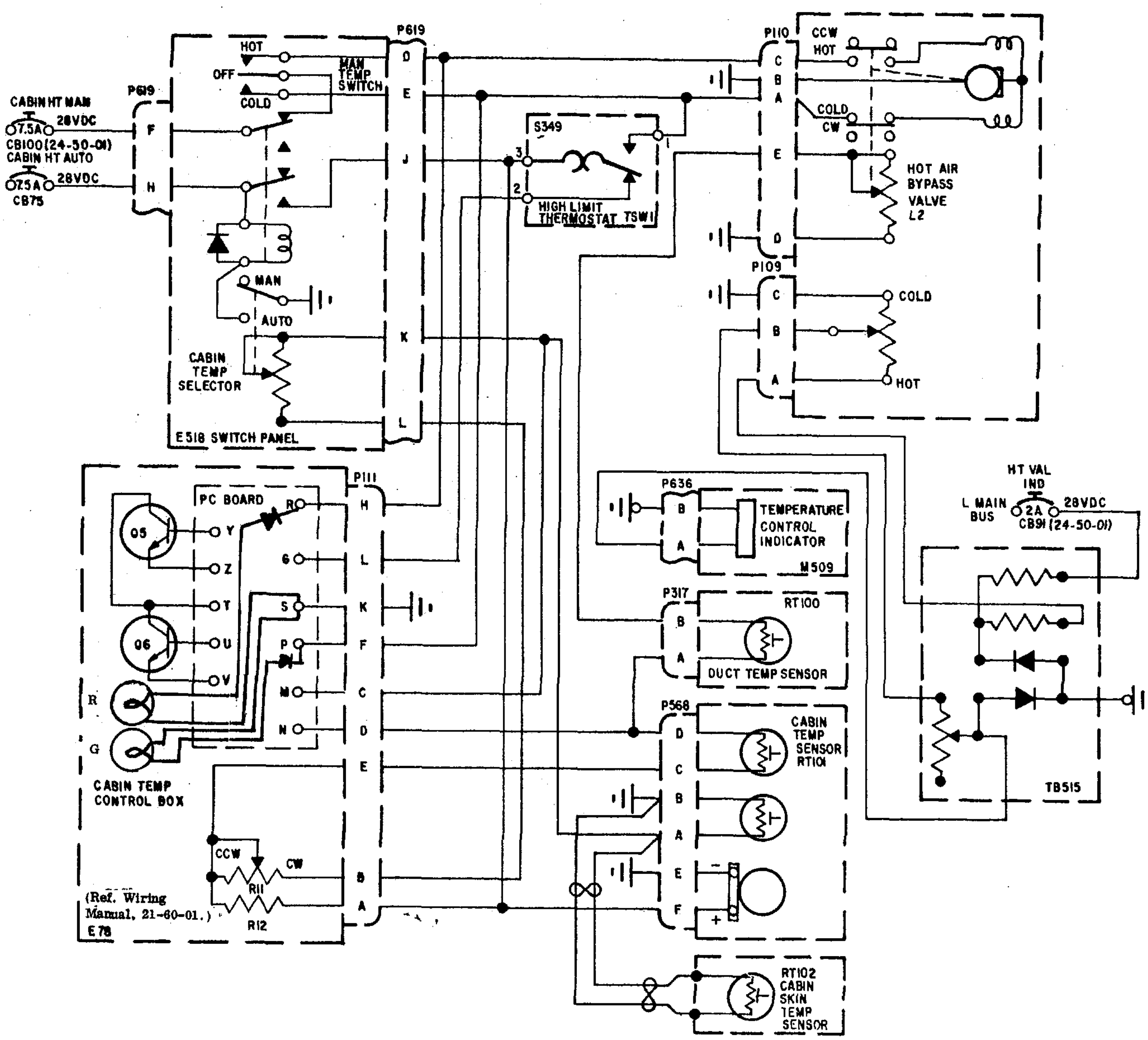
(2) On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031*, the duct temperature sensor senses the duct air temperature and provides a signal to the temperature control comparator circuit. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, the duct temperature sensor senses duct temperature and acts as a bleed-off regulator for the hot air bypass valve actuator pressure. The duct temperature sensor control pressure is biased by the cabin temperature sensor.

(3) The duct temperature limiter is basically a poppet-type valve employed as a variable orifice and is actuated by a bimetal sensing element. If the duct temperature reaches the preset temperature limit (approximately 350°F), the bimetal sensing element becomes concave and moves the poppet off its seat and bleeds regulated pressure to ambient. This repositions the hot air bypass valve for cooler airflow.

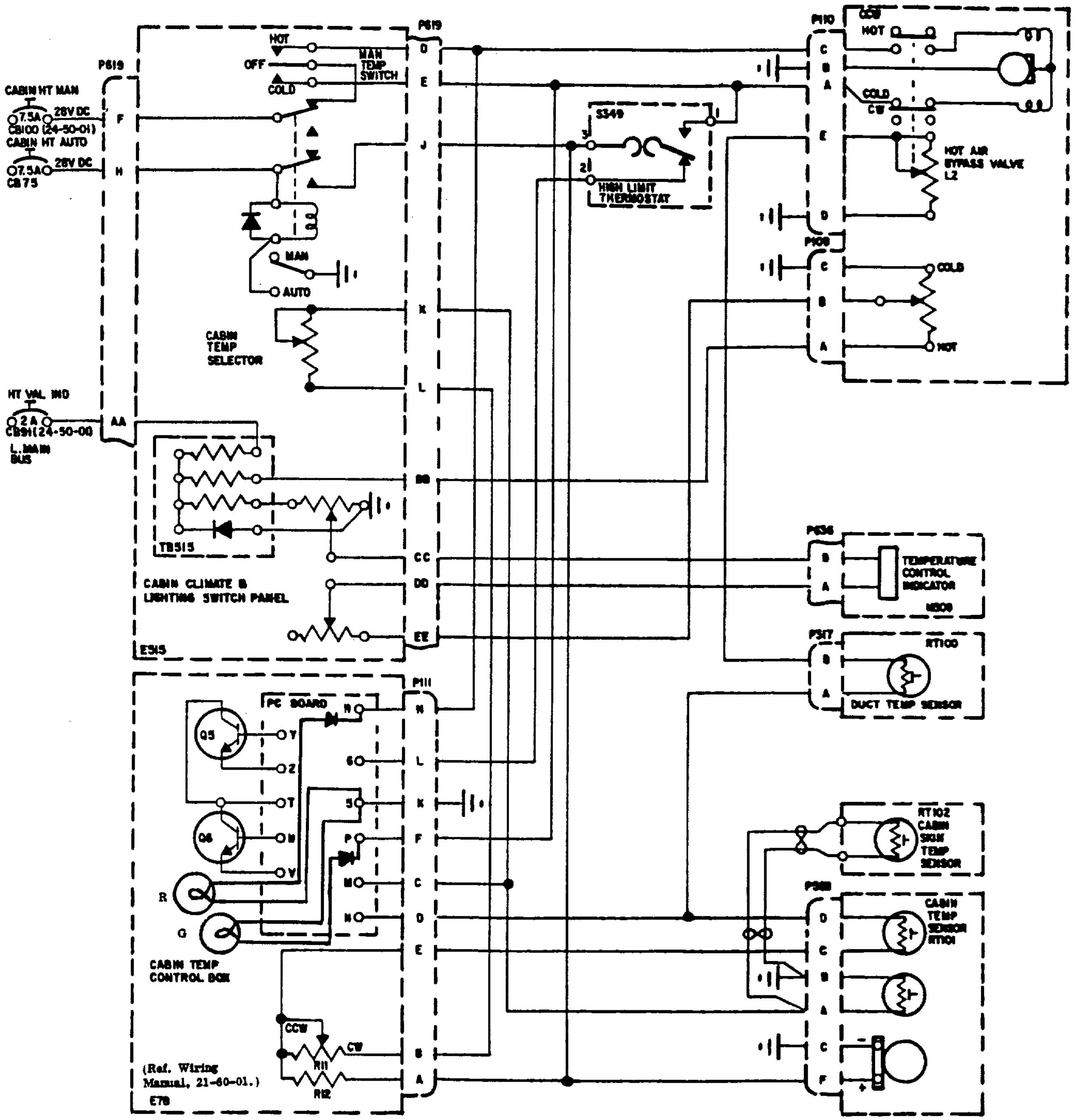
(4) Temperature Control System Pressure Regulator (See figure 3.)

(a) On *Aircraft 35-107, 35-113 thru 35-151 and 36-002 thru 36-036*, the pressure regulator is plumbed through the check valves to both engine bleed air ducts. The regulator is basically a spring-loaded, poppet-type valve held open by a spring-loaded diaphram. As the pressure increases to the preset level, the diaphram is moved off the poppet and allows the poppet to close.

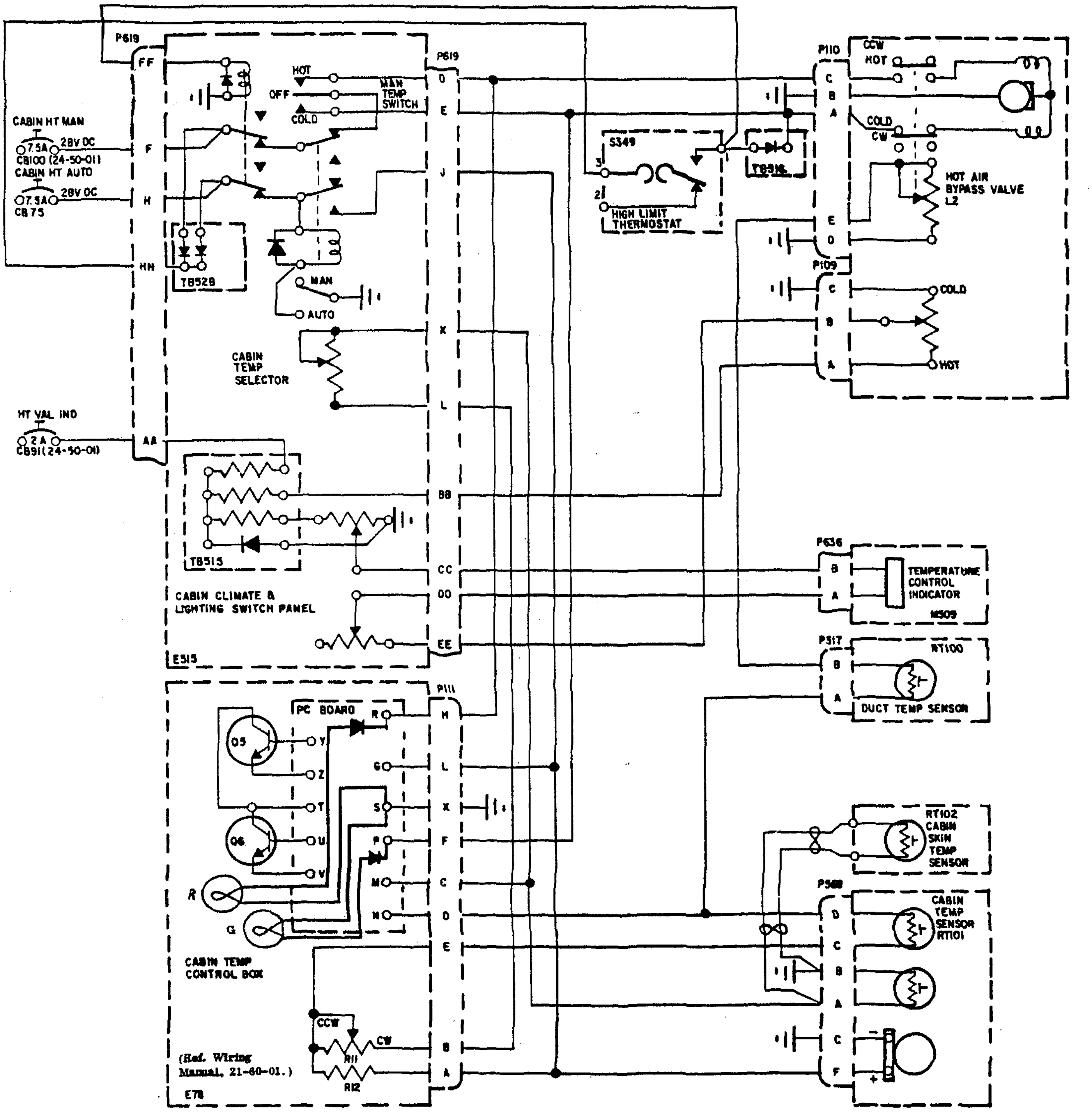
(b) On *Aircraft 35-152 and Subsequent and 36-037 and Subsequent*, unregulated bleed air pressure is ported through the bleed-on metering valve into the system. The air pressure increase sensed in the diaphragm control chamber moves the diaphragm off the spring-loaded metering valve and allows the metering valve to modulate the air pressure. If the regulated pressure should exceed the preset pressure, the bleed-on regulator will close and the bleed-off regulator will move to bleed off the excess pressure to ambient. The pressure regulator incorporates a secondary back up diaphragm.



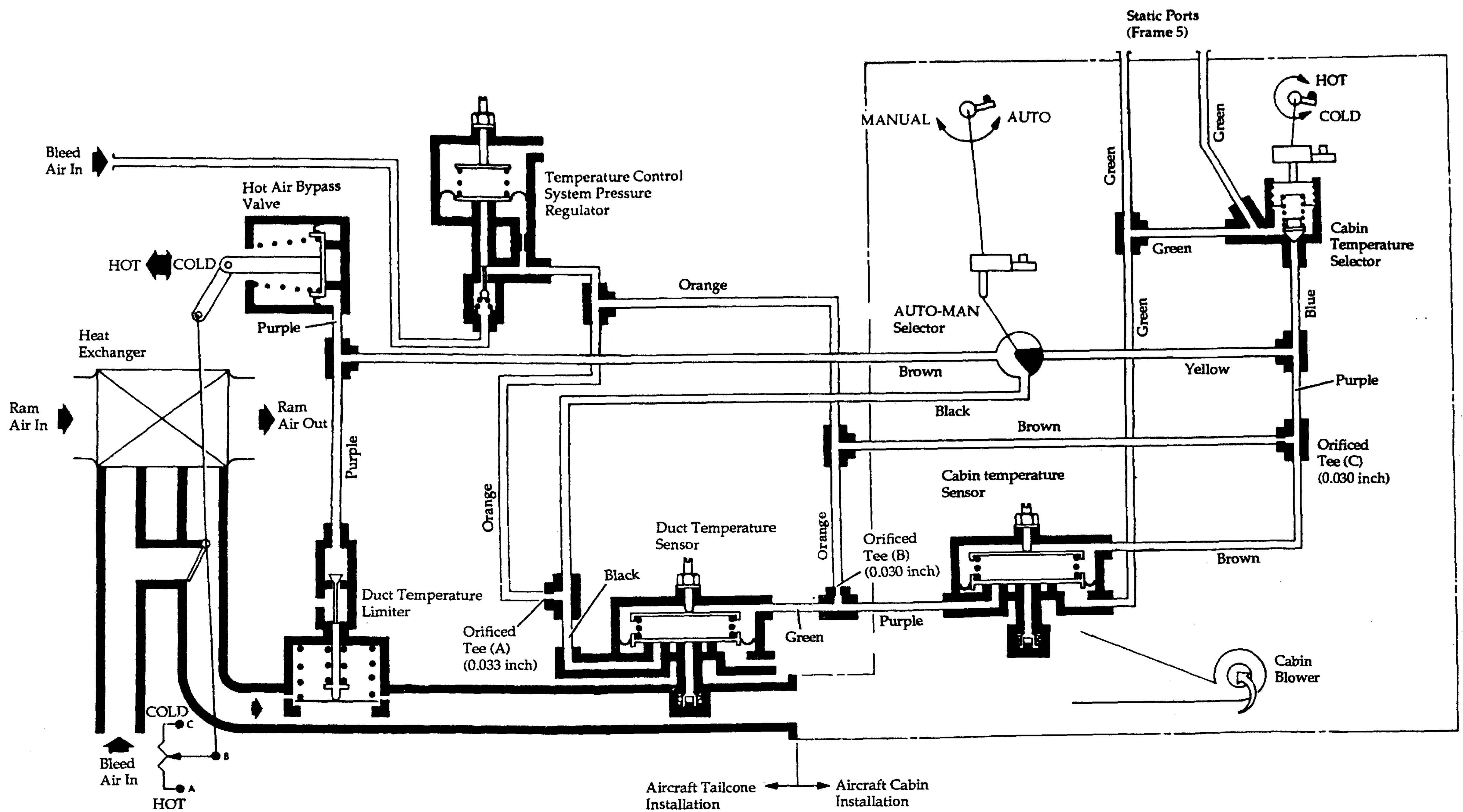
Temperature Control System Schematic
Figure 1 (Sheet 1 of 5)



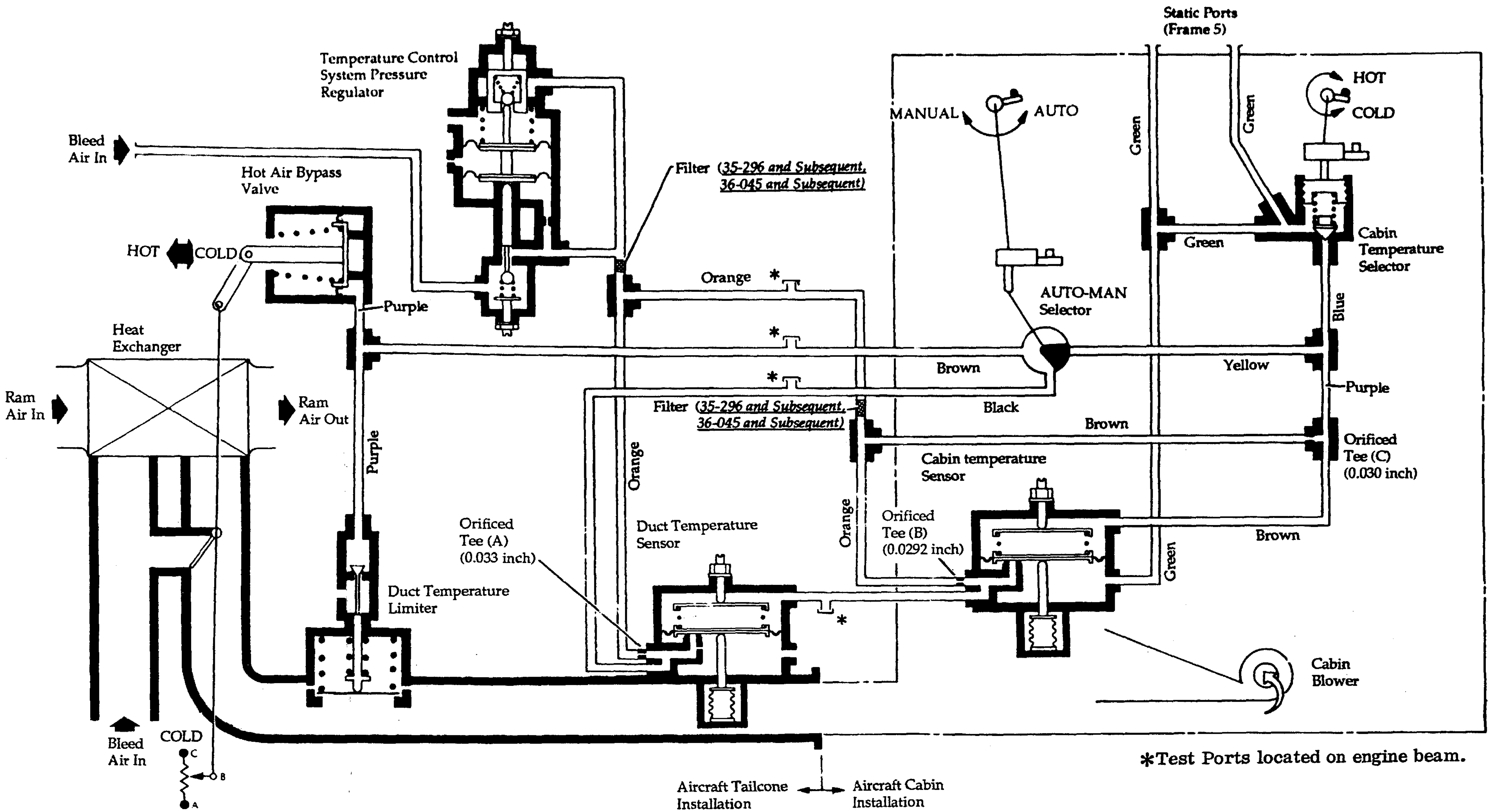
Temperature Control System Schematic
Figure 1 (Sheet 2 of 5)



Temperature Control System Schematic
Figure 1 (Sheet 3 of 5)



Temperature Control System Schematic
Figure 1 (Sheet 4 of 5)

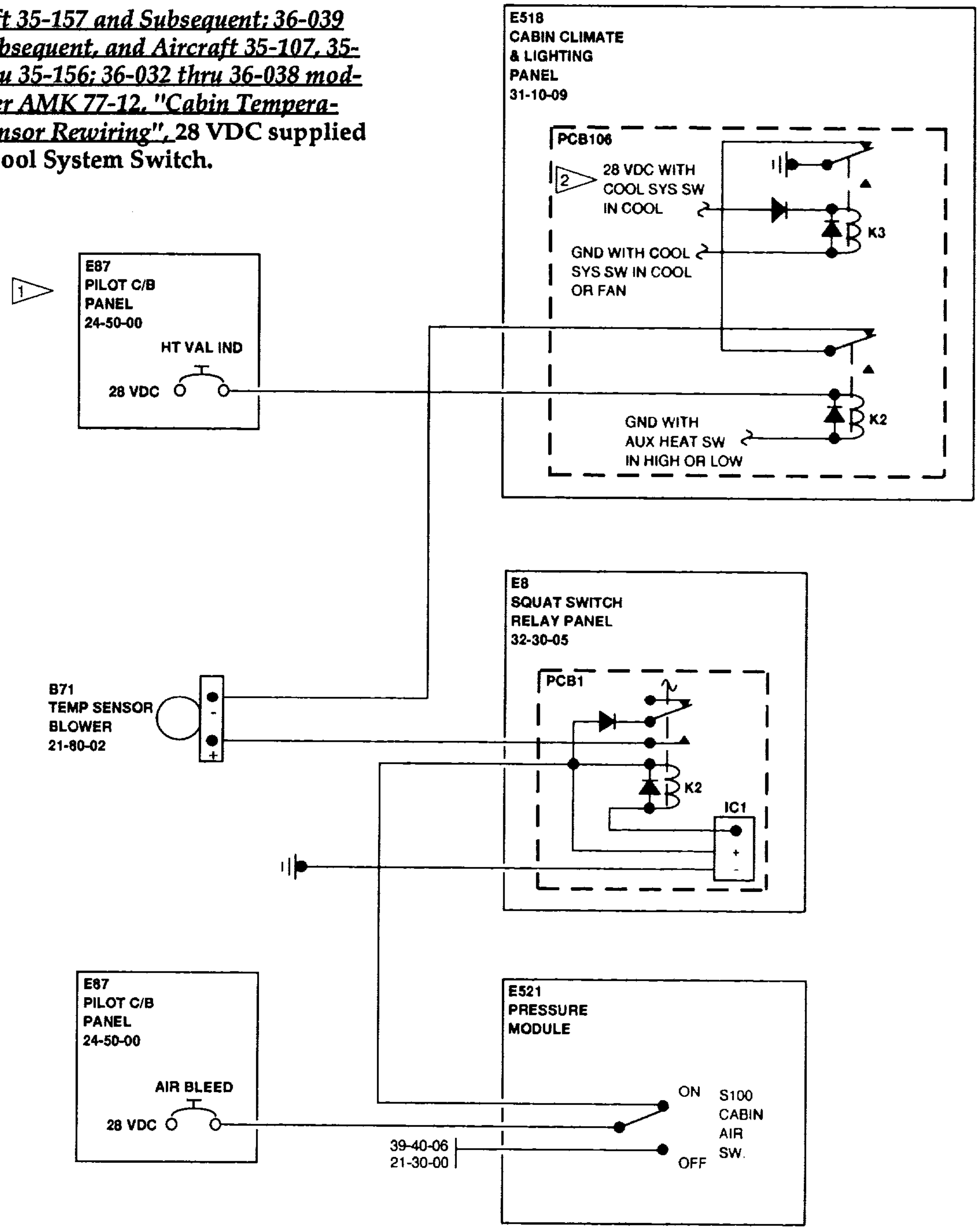


*Test Ports located on engine beam.

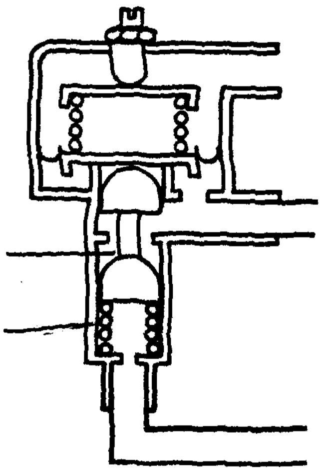
Temperature Control System Schematic
Figure 1 (Sheet 5 of 5)

1 *Aircraft 35-107, 35-113 thru 35-156; 36-032 thru 36-038 not modified per AMK 77-12, "Cabin Temperature Sensor Re-wiring",* 28 VDC supplied from HT VAL IND.

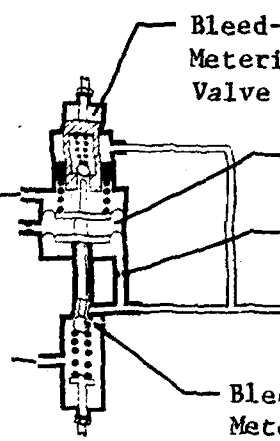
2 *Aircraft 35-157 and Subsequent; 36-039 and Subsequent, and Aircraft 35-107, 35-113 thru 35-156; 36-032 thru 36-038 modified per AMK 77-12, "Cabin Temperature Sensor Rewiring",* 28 VDC supplied from Cool System Switch.



Cabin Temperature Sensor Blower Electrical Control Schematic
Figure 2



Aircraft 35-107, 35-113 thru 35-151; 36-032 thru 36-036



Aircraft 35-152 and Subsequent; 36-037 and Subsequent

Temperature Control System Pressure Regulator Schematic
Figure 3

TEMPERATURE CONTROLS - TROUBLE SHOOTING

1. TROUBLE SHOOTING

A. Trouble shooting of the temperature control system consists basically of checking pressure levels at specified locations, replacing defective components, repairing leaking air line connections, cleaning obstructed in-line orifices, and cleaning obstructed atmospheric vents.

B. On Aircraft 35-296 and Subsequent, 36-045 and Subsequent, and prior aircraft modified per AAK 82-2, "Installation of Cabin Temperature Control System Filters," a filter is installed downstream of the pressure regulator. If trouble should develop in the temperature control system, the filter should be removed and cleaned. (Refer to 21-60-08.)

C. Tools and Equipment

NAME	PART NUMBER	MANUFACTURER
Pressure Gage (3) 0 to 50 psig (0.5 psi increments)		Commercially Available
Nitrogen Source (Regulated to 50 psig)		Commercially Available

D. Set up Trouble Shooting Test Procedure as follows:

(1) Install a pressure gage (0 to 50 psig) between temperature control system pressure regulator and tee fitting. Label as gage No. 1.

(2) Install a pressure gage (0 to 50 psig) between hot air bypass valve and tee fitting. Label as gage No. 2.

(3) Install a pressure gage (0 to 50 psig) between duct temperature sensor and orificed tee fiting. Label as gage No. 3.

(4) Connect the regulated nitrogen source to the temperature control system pressure regulator.

(5) Set Cabin Temperature Selector to full COLD.

(6) Set MAN-AUTO Selector to MANUAL.

(7) Adjust nitrogen source to obtain 45 (±5) psig.

(8) Record pressure gage indications. Indications shall be as follows:
Gage No. 1: 14 to 17 psig,
Gage No. 2: 0.5 to 2.0 psig, and
Gage No. 3: Not relevant.

(9) If pressures are not within limits specified, the following troubles may be suspected.

(a) If gage No. 1 indication is not within limits, replace temperature control system pressure regulator.

(b) If gage No. 2 indication exceeds 2.0 psig, check for obstructed atmospheric vent from Cabin Temperature Selector. If vent is not obstructed, check for missing orifice C. If orifice is not missing, replace Cabin Temperature Selector.

(c) If gage No. 2 indication is less than 0.5 psig, check for obstructed orifice C. If orifice is not obstructed, check for connecting air line leakage.

(10) Set Cabin Temperature Selector to full HOT.

(11) Record pressure gage indications. Indications shall be as follows:
Gage No. 1: 14 to 17 psig,
Gage No. 2: 11 to 14 psig, and
Gage No. 3: Not relevant.

(12) If pressures are not within limits specified, the following troubles may be suspected.

(a) If pressure at gage No. 2 is less than 11 psig, check for connecting air line leakage from the cabin temperature sensor to Cabin Temperature Selector and from Hot Air Bypass Valve to duct temperature limiter. If no leakage is evident, check for obstructed orifice C.

(b) If gage No. 2 indication exceeds 14 psig, check for missing orifice C. Replace orificed tee assembly if orifice is missing.

(13) Set Cabin Temperature Selector to full COLD.

(14) Set Manual Selector to AUTO.

(15) Record pressure gage indications. Indications shall be as follows:
Gage No. 1: 14 to 17 psig,
Gage No. 2: 1.0 to 3.0 psig, and
Gage No. 3: 1.0 to 3.0 psig.

(16) If pressures are not within limits specified, the following troubles may be suspected.

(a) If gage No. 2 indication exceeds 3.0 psig, check for missing orifice A. If orifice is not missing, check for obstructed duct temperature sensor vent. If vent is not obstructed, but sensor is not venting, check gage No. 3 pressure. If pressure is within limits, replace sensor.

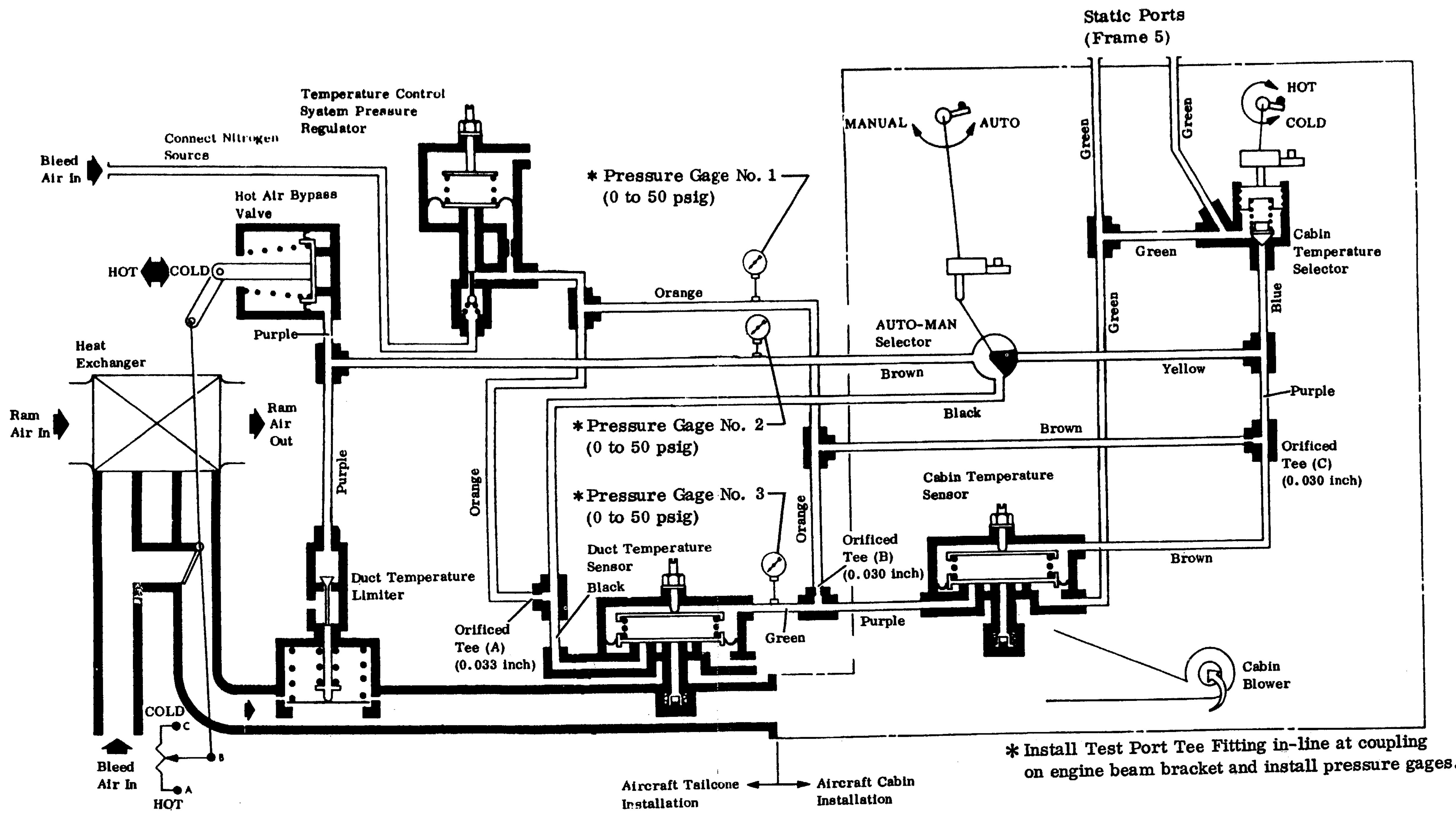
(b) If gage No. 2 indication is less than 1.0 psig, check for obstructed orifice A. If orifice is not obstructed, check for connecting air line leakage.

(c) If gage No. 3 indication exceeds 3.0 psig, check for obstructed atmospheric vent from cabin temperature sensor. If vent is not obstructed, check for missing orifice B. If orifice is not missing, replace cabin temperature sensor.

(d) If gage No. 3 indication is less than 1.0 psig, check for obstructed orifice B. If orifice is not obstructed, check for connecting air line leakage.

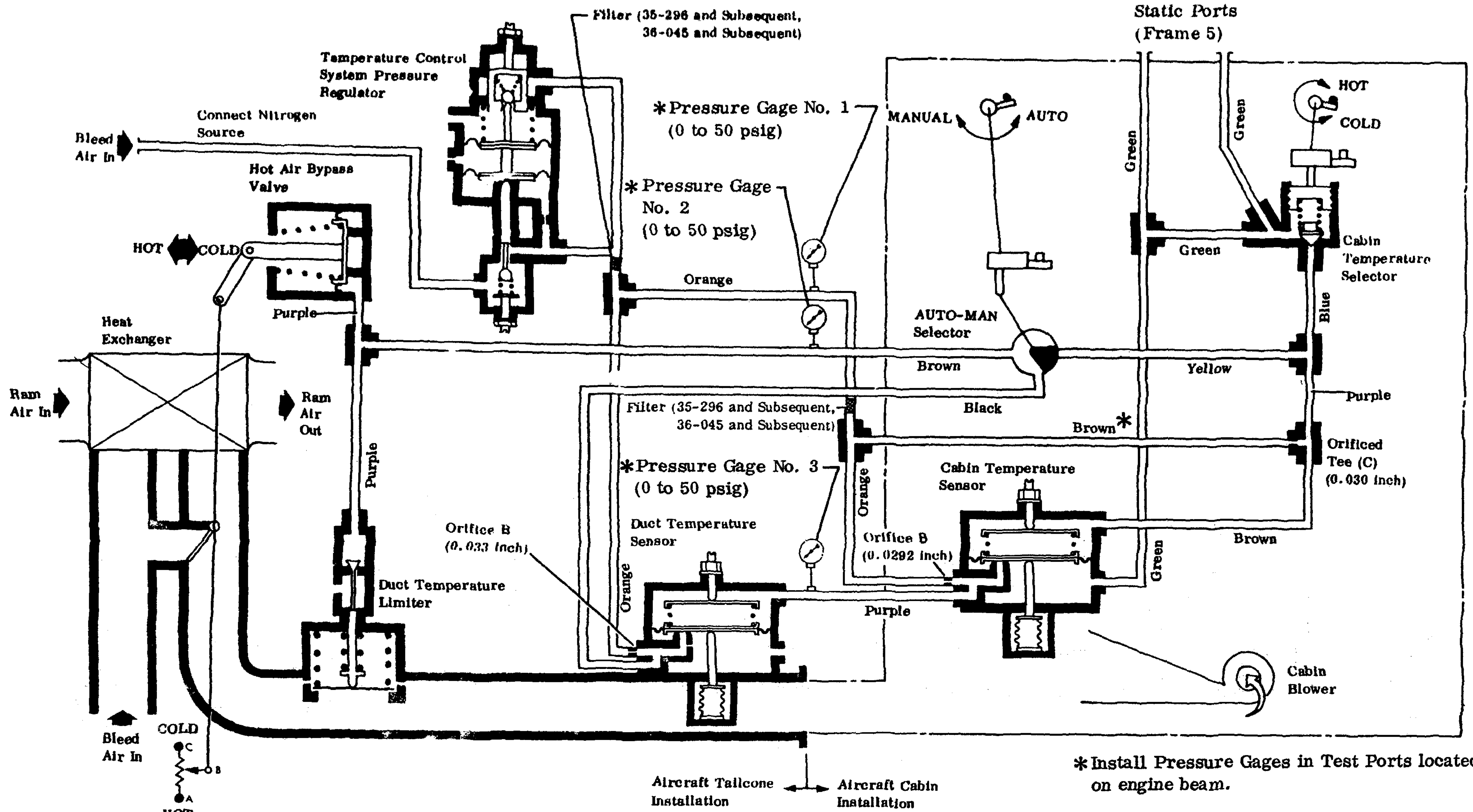
(17) Set Cabin Temprature Selector to full HOT.

(18) Record pressure gage indications. Indications shall be as follows:
Gage No. 1: 14 to 17 psig,
Gage No. 2: 11 to 14 psig, and
Gage No. 3: 11 to 14 psig



* Install Test Port Tee Fitting in-line at coupling on engine beam bracket and install pressure gages.

Temperature Control System Test Schematic
Figure 101 (Sheet 1 of 2)



*Install Pressure Gages in Test Ports located on engine beam.

*On Aircraft 35-195 and Subsequent, 36-041 and Subsequent, a fitting is installed between orificed tee (C) and the filter-equipped tee. On prior aircraft modified per SSK 942, 943, 944, or 945, a brown code tube assembly is installed.

Temperature Control System Test Schematic
Figure 101 (Sheet 2 of 2)

(19) If pressures are not within limits specified, the following troubles may be suspected.
   (a) If gage No. 2 indication is less than 11 psig, check for connecting air line leakage from duct temperature sensor to MAN-AUTO Selector. If no leakage is evident and gage No. 3 pressure is within limits, replace duct temperature sensor.
   (b) If gage No. 3 indication is less than 11 psig, check for connecting air line leakage from cabin temperature sensor to duct temperature sensor.

(20) Disconnect nitrogen source from temperature control system pressure regulator.

(21) Remove pressure gages and restore system for normal operation.

TEMPERATURE CONTROLS - MAINTENANCE PRACTICES

1. Adjustment/Test

NOTE: *On Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent*, no adjustments of temperature control components are allowed. Replace defective components.

A. *On Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002, and 36-031*, if cabin temperature cannot be effectively controlled in the automatic mode, but functions properly in manual mode, an adjustment of the temperature control unit may be required. All adjustments are made at the temperature control unit and must be accomplished in flight. Three (3) holes are provided in the temperature control unit for the indicator lights and the potentiometer. These lights (one [1] red and one [2] green) are illuminated when the comparator circuit is in an unbalanced condition. The red indicator light, when illuminated, indicates the bridge circuit is unbalanced in a heating direction. The green indicator light, when illuminated, indicates the bridge circuit is unbalanced in a cooling direction. It must be noted that a slight unbalance condition will only dimly illuminated the indicator light and will not move the hot air bypass valve. The unbalance condition must be of sufficient amplitude to overcome bypass valve motor inertia. As the amplitude of the unbalanced condition increases, the indicator lights will become brighter. When motor inertia is overcome, the indicator lights dim. Proceed as follows:

NOTE: The following procedure is for increasing the cabin heat. If a cooler cabin is desired, follow the same procedure except turn the potentiometer counterclockwise and monitor the green indicator light.

(1) Gain access to temperature control unit.
(2) Turn cabin temperature selector on instrument panel to its mid range.

NOTE: Either indicator light may be illuminated depending on polarity of the unbalance condition in the comparator circuit.

(3) Turn potentiometer slowly clockwise; red indicator light shall brighten, then dim. This indicates the bypass valve is opening. When the bridge circuit is rebalanced, the red indicator light shall extinguish.
(4) Turn cabin temperature selector clockwise and check for desired temperature control. Allow sufficient time for cabin temperature to stabilize.
(5) Repeat procedure as necessary until desired temperature control can be maintained.

2. Inspection/Check

A. *On Aircraft 35-002 thru 35-106, 35-108 thru 35-112, and 36-002 thru 36-031*, the aircraft temperature control system may be functionally tested prior to engine runup as follows:
(1) Set Battery Switches on.
(2) Rotate cabin temperature selector switch counterclockwise to MAN.
(3) Hold Hot-Cold Switch to HOT until bypass valve fully opens; temperature control indicator shall move to HOT.
(4) Hold Hot-Cold Switch to COLD until bypass valve fully closes; temperature control indicator shall move to COLD in approximately 35 to 55 seconds.
(5) Rotate cabin temperature selector switch to AUTO, then full clockwise to HOT; bypass valve shall fully open (temperature control indicator moves to HOT).

(6) Rotate cabin temperature selector counterclockwise to COLD and avoid positioning the selector switch in the MAN position; bypass valve shall fully close (temperature control indicator moves to COLD).

NOTE: The checkout in the automatic position will function correctly with temperatures in the area of the cabin temperature sensors between 70° and 90°F [21.1° and 32.2°C]. At temperatures above or below this range, it is possible that the bypass valve will move in one direction only.

(7) Set Battery Switches to OFF.

B. *On Aircraft 35-107, 35-113 and Subsequent, and 36-032 and Subsequent*, the temperature control system may be functionally tested as follows:

(1) Set Battery Switches to BAT 1 and BAT 2 and start one (1) engine.
(2) Turn cabin temperature mode selector switch to MAN.
(3) Turn cabin temperature selector switch to HOT until bypass valve fully opens; temperature control indicator shall move to HOT.
(4) Turn cabin temperature selector switch to COLD until bypass valve fully closes; temperature control indicator shall move to COLD in approximately 5 seconds.
(5) Turn cabin temperature mode selector switch to AUTO.
(6) Turn cabin temperature selector switch to HOT; bypass valve should fully open (temperature control indicator moves to OPEN).
(7) Turn cabin temperature selector switch to COLD; bypass valve shall fully close (temperature control indicator moves to COLD).

NOTE: The checkout in the automatic position will function correctly with temperatures in the area of the cabin temperature sensors between 60° and 90° [15.6° and 32.2°C]. At temperatures above or below this range, it is possible that the bypass valve will move in one direction only.

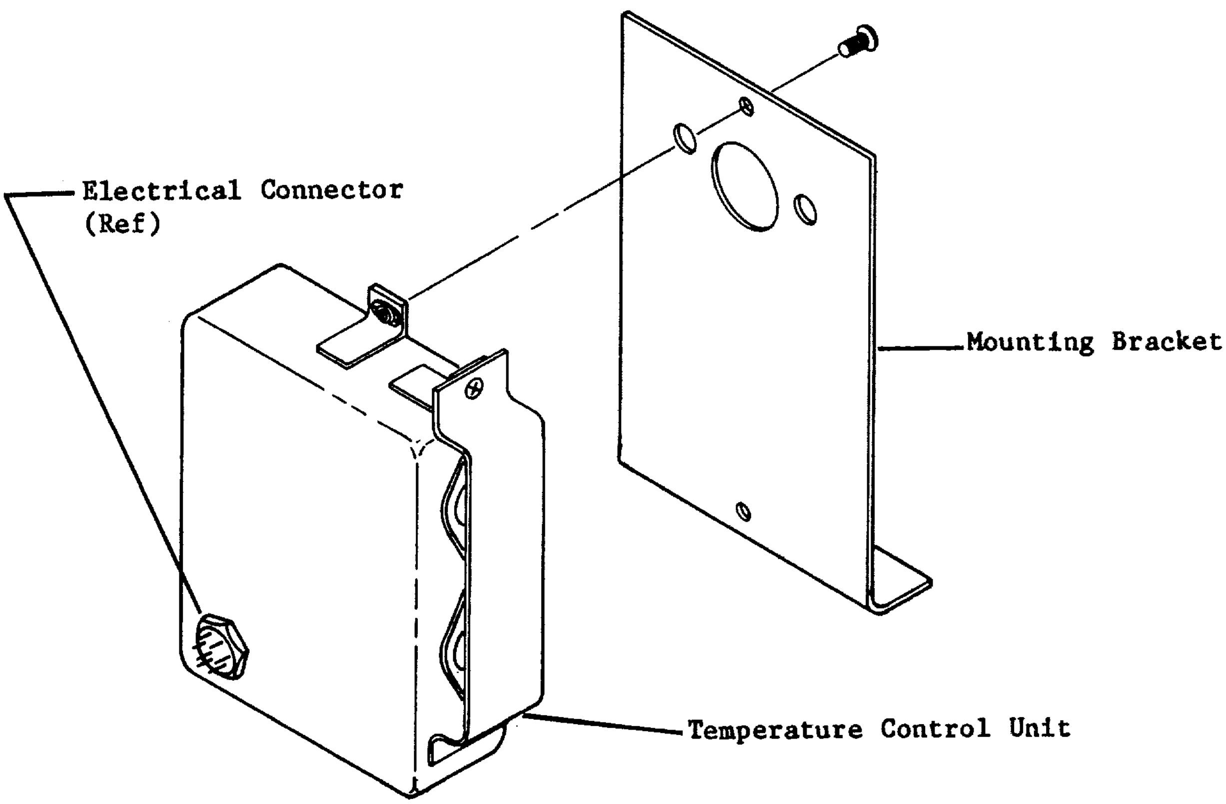
(8) Shut down engine and set Battery Switches to OFF.

C. Perform Cool System Switch and Cabin Temperature Sensor Fan Operational Check on *Aircraft 35-107, 35-113 thru 35-156, and 36-032 thru 36-038 modified per AMK 77-12* as follows:

(1) Set Battery Switches to BAT 1 and BAT 2.
(2) Set Cabin Air Switch, located on pressurization module, to ON; after a short time delay, cabin temperature sensor fan shall operate.
(3) Position Cool System Switch to FAN; cabin temperature sensor fan shall continue to operate.
(4) Position Cool System Switch to COOL; cabin temperature sensor fan shall not operate.
(5) Position Cool System Switch to OFF; cabin temperature sensor fan shall operate.
(6) Position Auxiliary Heat Switch (if installed) to HI; cabin temperature sensor fan shall not operate.
(7) Set Auxiliary Heat, Cabin Air, and Battery Switches to OFF.

TEMPERATURE CONTROL UNIT - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - A. **Remove Control Unit** (See figure 201.)
     - (1) Disconnect electrical connector from control unit.
     - (2) Remove screws and control unit from aircraft.
   - B. **Install Control Unit** (See figure 201.)
     - (1) Install control unit and secure with attaching parts.
     - (2) Connect electrical connector.



3-73A

Temperature Control Unit Installation
Figure 201

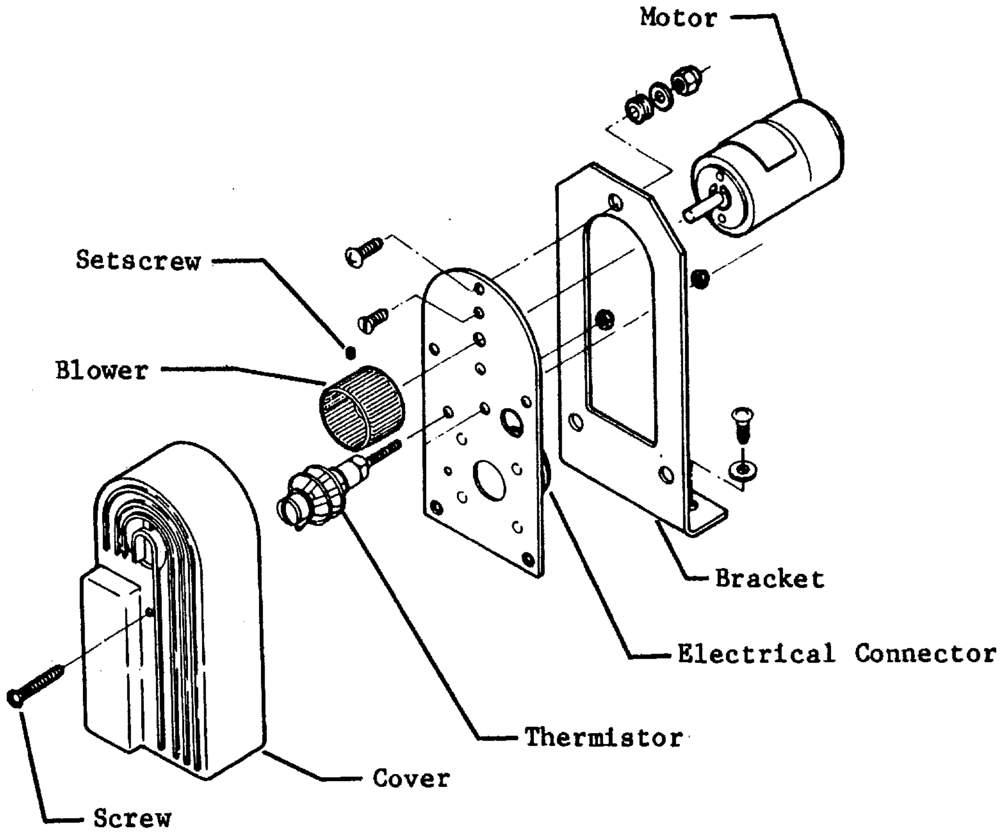
CABIN TEMPERATURE SENSOR - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   A. **Remove Temperature Sensor Assembly** (Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031) (See figure 201.)
      (1) Disconnect electrical connector from temperature sensor.
      (2) Remove screws and temperature sensor from aircraft.
   B. **Install Temperature Sensor Assembly** (Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031) (See figure 201.)
      (1) Install temperature sensor and secure with attaching parts.
      (2) Connect electrical connector to temperature sensor.
   C. **Remove Temperature Sensor Assembly** (Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent) (See figure 201.)
      (1) Remove upper center panel in the area of frame 13E.
      (2) Disconnect pneumatic hoses from cabin temperature sensor. Cap all exposed fittings and hoses.
      (3) Disconnect electrical wiring from blower motor.
      (4) Loosen and remove attaching parts and temperature sensor from aircraft.
   D. **Install Temperature Sensor Assembly** (Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent) (See figure 201.)
      (1) Install temperature sensor assembly on frame 13E and secure with attaching parts. Slip duct on fitting and secure with clamp.
      (2) Connect electrical wiring to motor. Assure that wires are connected correctly.
      (3) Remove connectors from sensor fittings and hose. Connect hoses to sensor fittings and secure with attaching parts.
      (4) Install upper center panel.

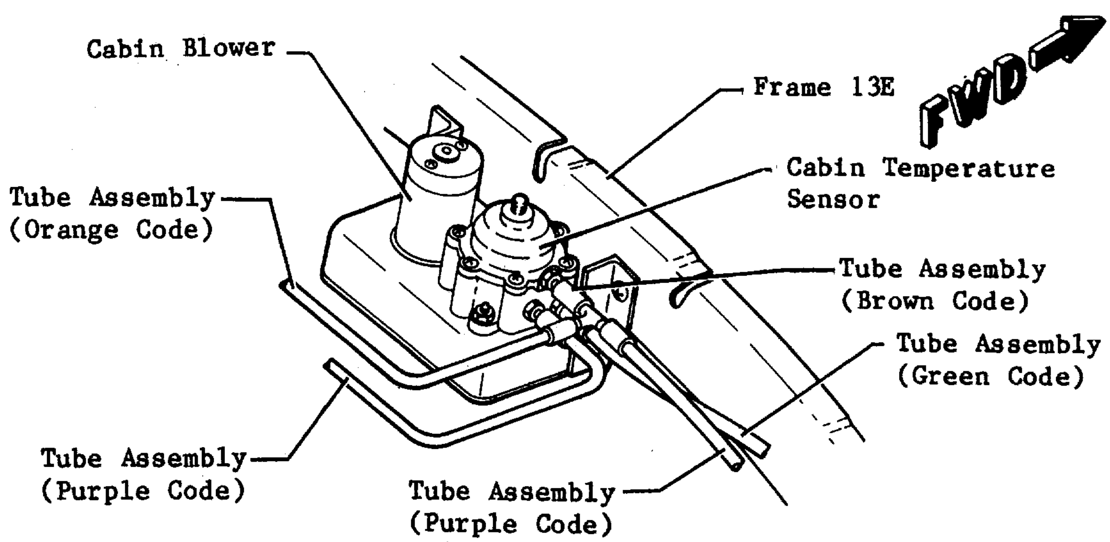
2. **INSPECTION/CHECK**
   A. **Temperature Sensor Electrical Check**
      (1) On Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031, to ensure proper temperature control operation, an electrical check should be made on the temperature sensor periodically or when difficulty is experienced in the control system. Perform check as follows:
         (a) Using a wheatstone bridge or equivalent (low current type to keep self-heating to a minimum), measure resistance between pins C and D and A and B. Resistance shall be 220 (±6) ohms. The resistance may slowly decrease. This is due to the potential applied with the resistance-measuring device.
         (b) Check resistance between each pin and the connector shell at 500 vdc. Minimum resistance shall be 5 megohms.
   B. **Electrical Bonding Check**
      (1) To ensure proper function of electrical bonds, all jumpers, grounds, and matching surfaces must be clean, free of corrosion, and tight. See Wiring Manual Chapter 20 for electrical resistance values.

3. **CLEANING/PAINTING**

A. On Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031, to ensure proper temperature control operation, the unit should be removed and cleaned periodically. Clean blower in a mild detergent solution and dry with compressed air. Clean thermistor with a clean, dry, lint-free cloth.

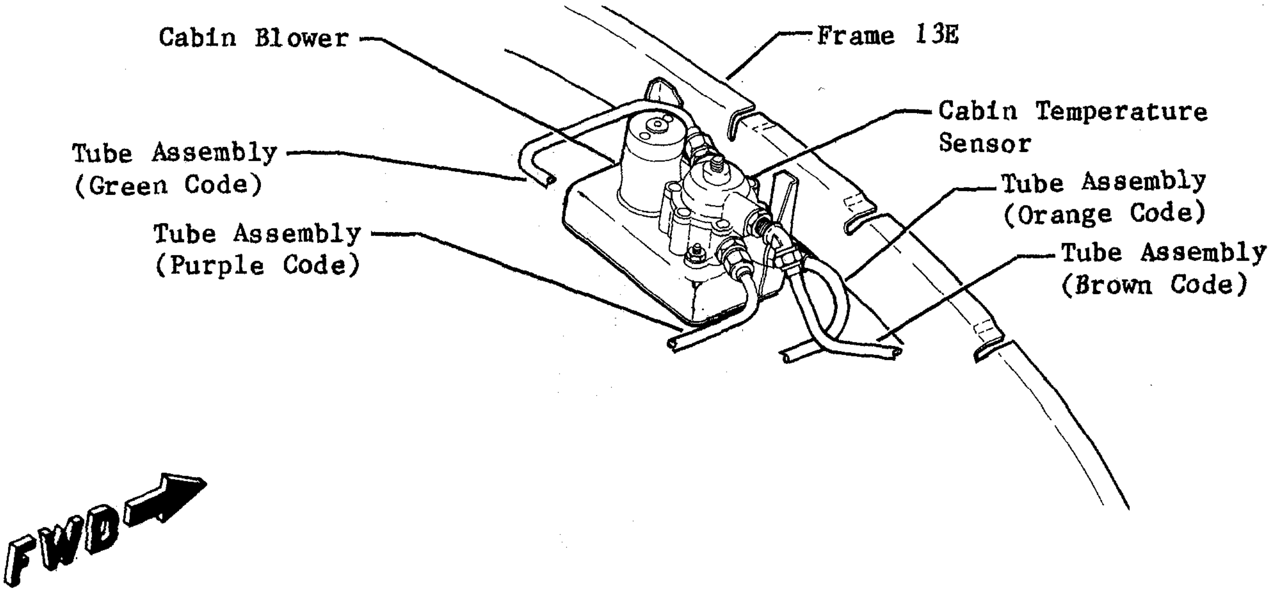


Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031

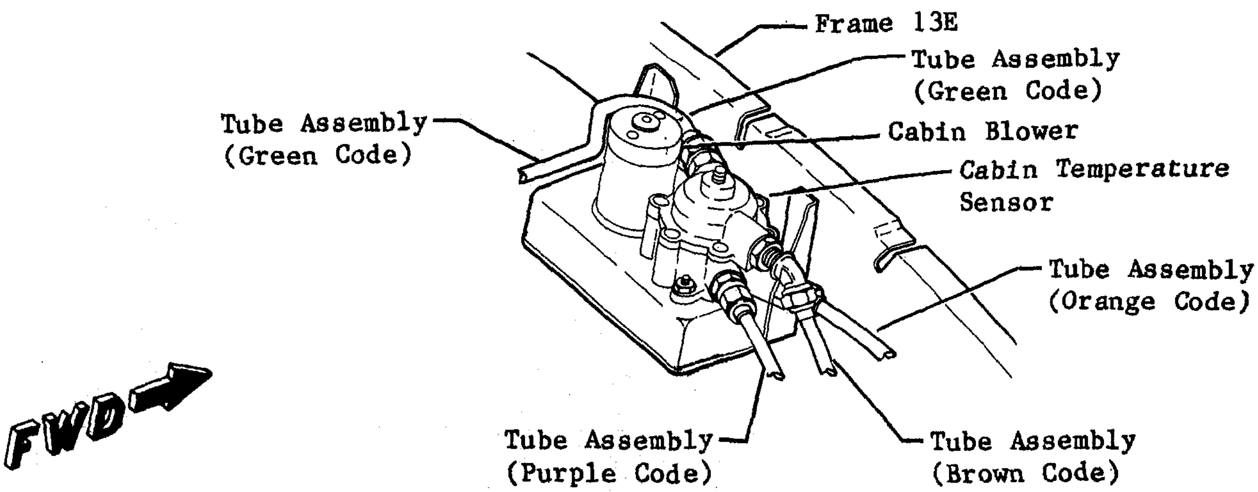


Aircraft 35-107, 35-113 thru 35-194, 36-032 thru 36-040 not modified per SSK 942

Cabin Temperature Sensor
Figure 201 (Sheet 1 of 2)



Aircraft 35-107, 35-113 thru 35-194, 36-032 thru 36-040 modified per SSK 942



Aircraft 35-195 and Subsequent, 36-041 and Subsequent

Cabin Temperature Sensor
Figure 201 (Sheet 2 of 2)

CABIN SKIN TEMPERATURE SENSOR - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**

   A. **Tools and Equipment**

   NOTE: Equivalent substitutes may be used in lieu of the following items.

NAME	PART NUMBER	MANUFACTURER	USE
Adhesive	Delta Bond No. 152	Wakefield Engr., Wakefield, Mass.	Bonding sensor to skin
Stafome	AA 1802	Available Gates Learjet Spares Dept.	Refoaming inner surface of skin
Methyl Ethyl Ketone		Commercially Available	

   A. **Remove Skin Temperature Sensor** (See figure 201.)

      (1) Gain access to skin temperature sensor installation and remove foam from around sensor.

      (2) Disconnect skin temperature sensor wiring from cabin temperature sensor connector.

      (3) Break bond and remove skin temperature sensor from aircraft.

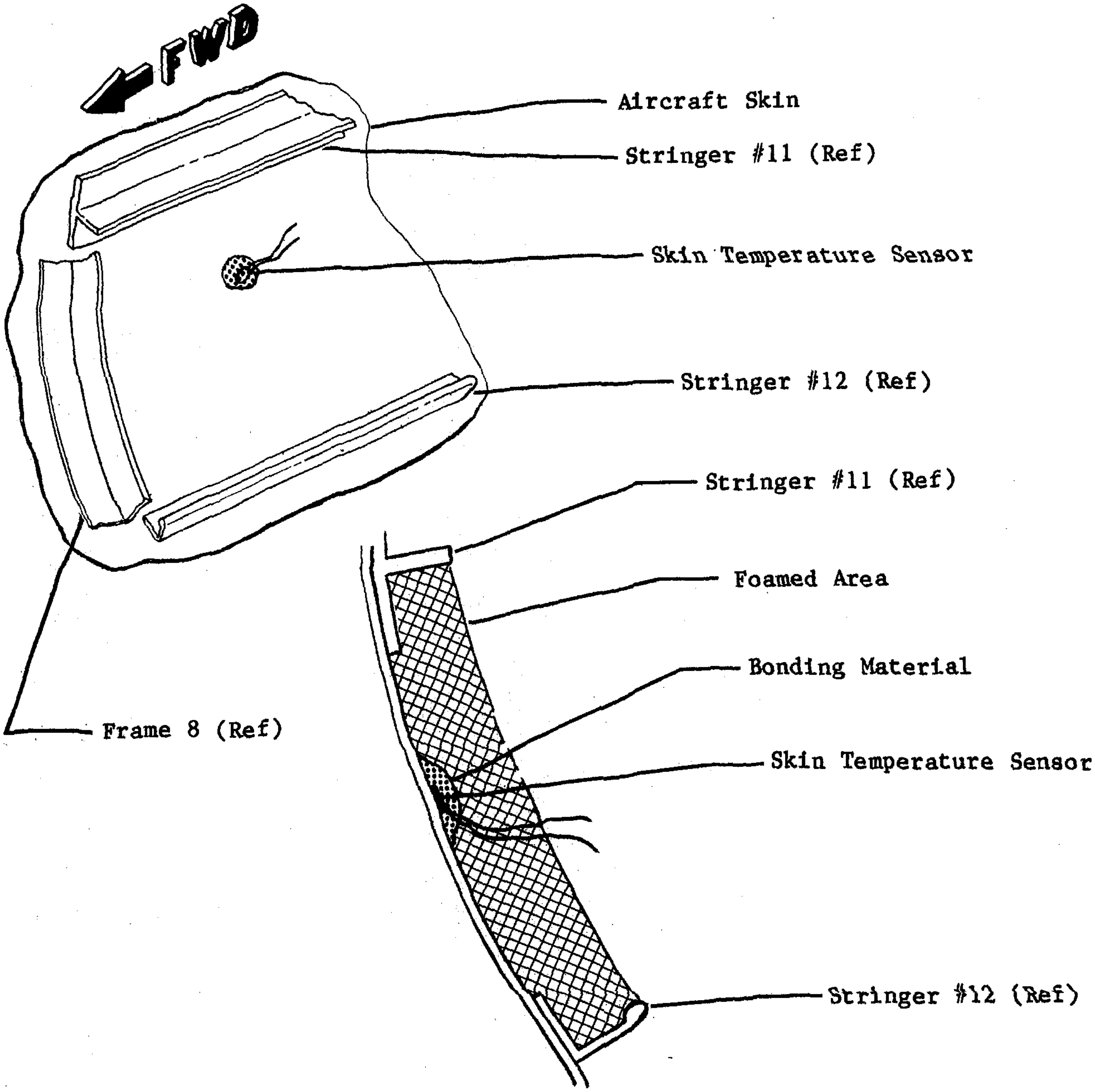
   B. **Install Skin Temperature Sensor** (See figure 201.)

      (1) Clean area where skin temperature sensor is to be installed with MEK (methyl ethyl ketone).

      (2) Bond temperature sensor with negative sensor to skin surface using Delta Bond No. 152. Refer to manufacturer's instructions for proper cure time. Area of bond material is to be approximately 1.50-inches diameter by 0.50-inch thick.

      (3) Connect electrical wiring to cabin temperature sensor.

      (4) Refoam area around skin temperature sensor. Refer to manufacturer's instructions for application.



Cabin Skin Temperature Sensor Installation
Figure 201

DUCT TEMPERATURE SENSOR - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**

   A. **Remove Duct Temperature Sensor** (Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031) (See figure 201.)

      (1) Open tailcone access door and remove electrical power from aircraft.

      (2) Disconnect electrical connector from sensor.

      (3) Remove sensor from duct.

   B. **Install Duct Temperature Sensor** (Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031) (See figure 201.)

      (1) Install sensor in duct.

      (2) Connect electrical connector to sensor.

      (3) Restore electrical power to aircraft and close tailcone access door.

   C. **Remove Duct Temperature Sensor** (Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent) (See figure 201.)

      (1) Open tailcone access door and remove electrical power from aircraft.

      (2) Disconnect tubing from duct temperature sensor. Cap all exposed fittings and tubes.

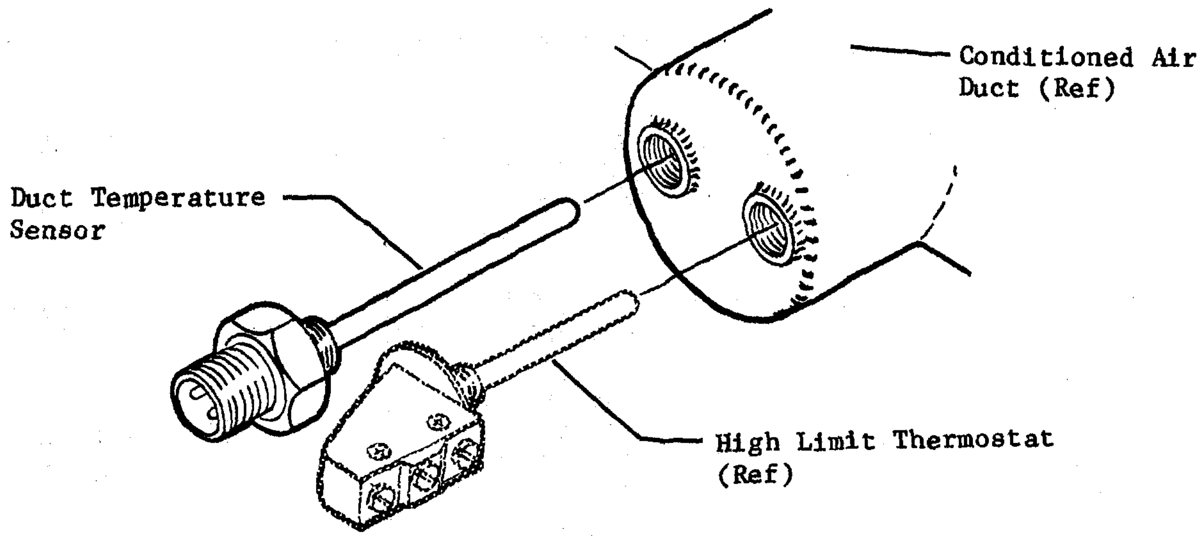
      (3) Remove attaching parts and sensor from duct assembly.

   D. **Install Duct Temperature Sensor** (Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent) (See figure 201.)

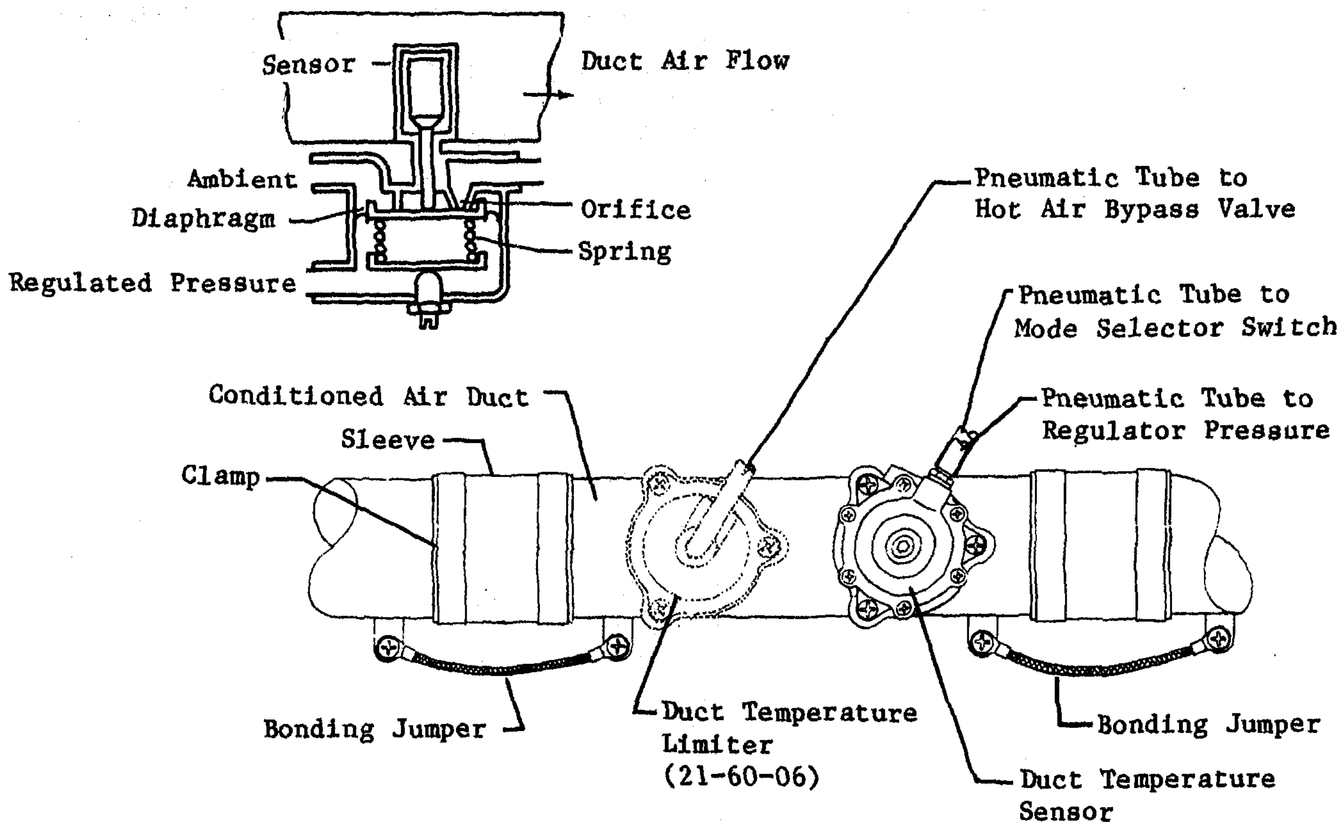
      (1) Install sensor on duct assembly and secure with attaching parts.

      (2) Remove caps from fittings and hoses and connect hoses to sensor. Assure that hoses are connected to the proper fittings.

      (3) Restore electrical power to aircraft and close tailcone access door.

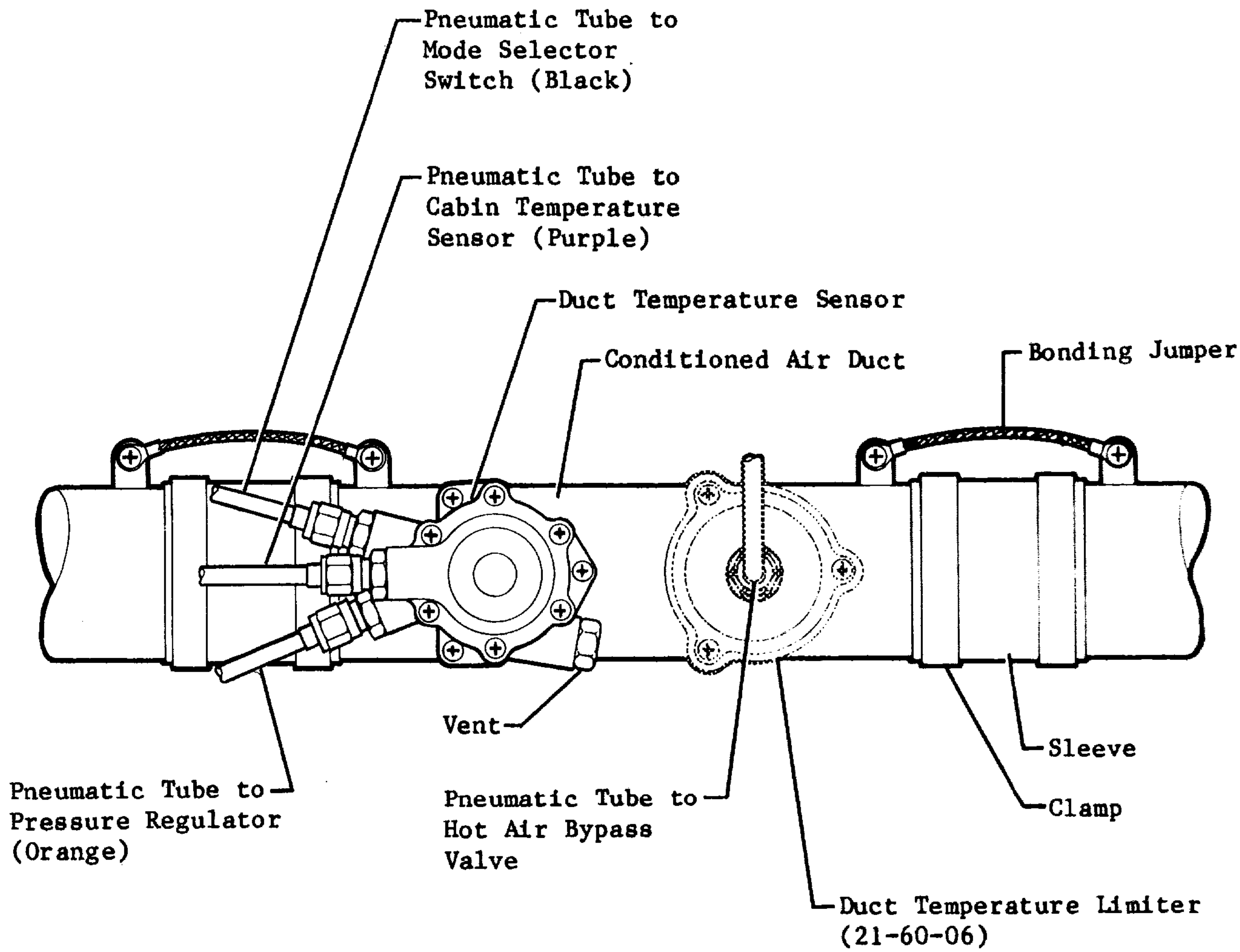


Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031



Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent not modified per SSK 943

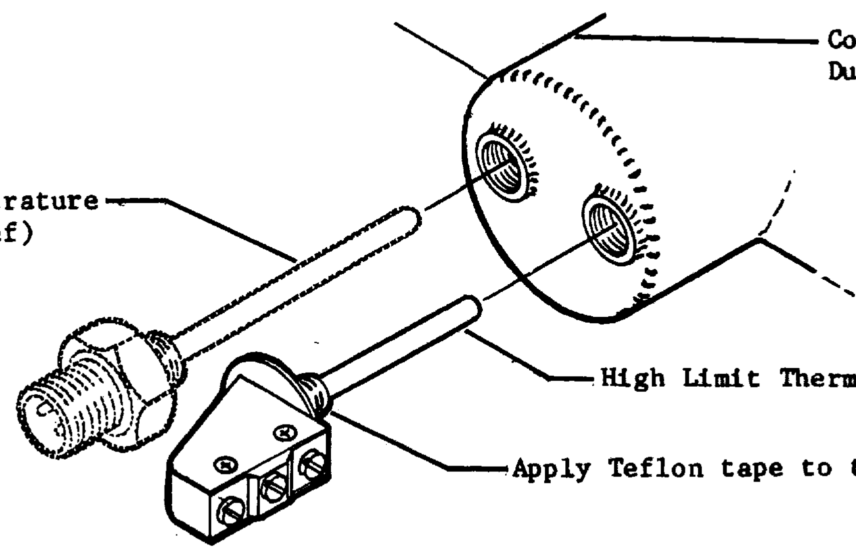
Duct Temperature Sensor Installation
Figure 201 (Sheet 1 of 2)



Duct Temperature Sensor Installation
Figure 201 (Sheet 2 of 2)

HIGH LIMIT THERMOSTAT - MAINTENANCE PRACTICES

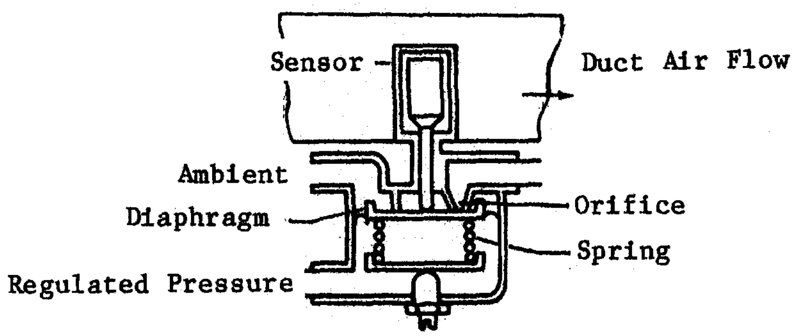
1. **REMOVAL/INSTALLATION**
   - A. **Remove High Limit Thermostat** (See figure 201.)
     - (1) Lower tailcone access door.
     - (2) Disconnect wiring from thermostat.
     - (3) Remove thermostat from aircraft.
   - B. **Install High Limit Thermostat** (See figure 201.)
     - (1) Apply teflon tape to threads of thermostat.
     - (2) Install thermostat in duct.
     - (3) Connect electrical wiring to thermostat.
     - (4) Secure tailcone access door.

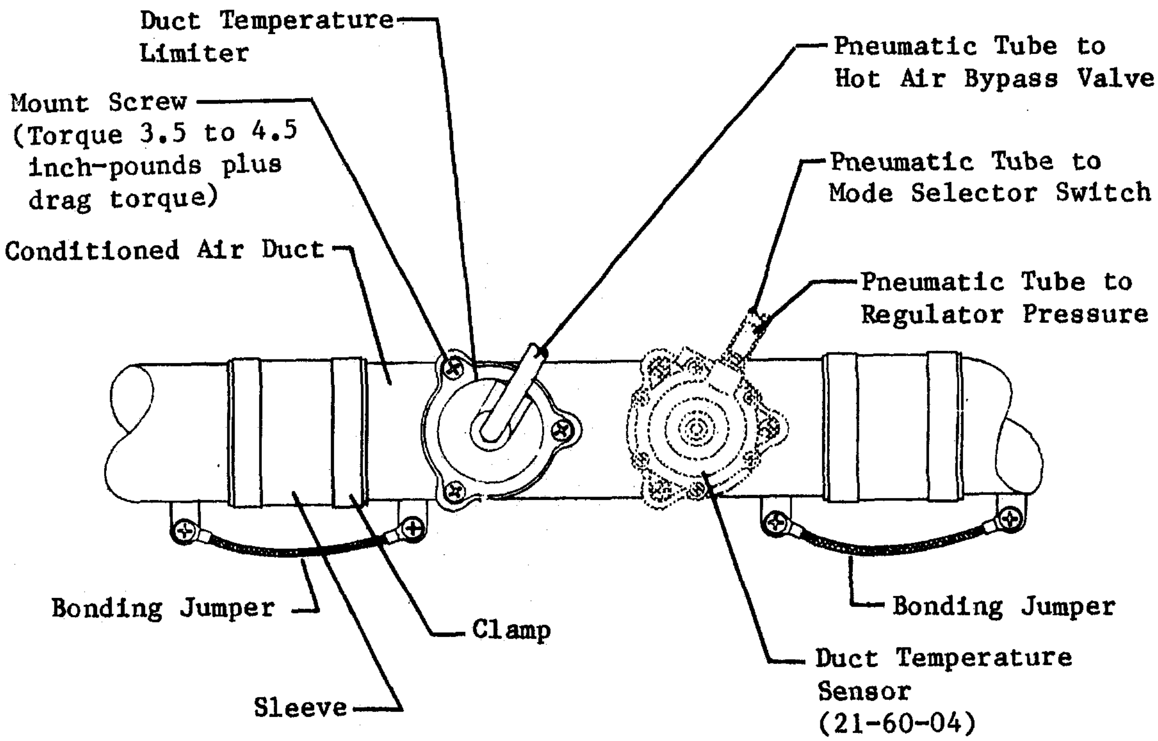


High Limit Thermostat Installation
Figure 201

DUCT TEMPERATURE LIMITER - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   A. **Remove Duct Temperature Limiter** (See figure 201.)
      (1) Open tailcone access door and remove electrical power from aircraft.
      (2) Disconnect tubing from temperature limiter. Cap exposed fittings and tubing.
      (3) Remove attaching parts and temperature limiter from aircraft.
   B. **Install Duct Temperature Limiter** (See figure 201.)
      (1) Install temperature limiter and secure with attaching parts. Torque mounting screws 3.5 to 4.5 inch-pounds plus drag torque.
      (2) Connect tubing to limiter.
      (3) Restore electrical power to aircraft and close tailcone access doors.





Duct Temperature Limiter Installation
Figure 201

TEMPERATURE CONTROL INDICATOR - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Temperature Control Indicator (See figure 201.)
      (1) Remove attaching parts securing overlay and indicator panel assembly to instrument panel structure.
      (2) Disconnect electrical connector (P636) from indicator.
      (3) Remove attaching parts and indicator from indicator panel assembly.
   B. Install Temperature Control Indicator (See figure 201.)
      (1) Position temperature control indicator in indicator panel assembly and secure with attaching parts.
      (2) Connect electrical connector (P636) to indicator.
      (3) Position indicator assembly and overlay in instrument panel structure and secure with attaching parts.

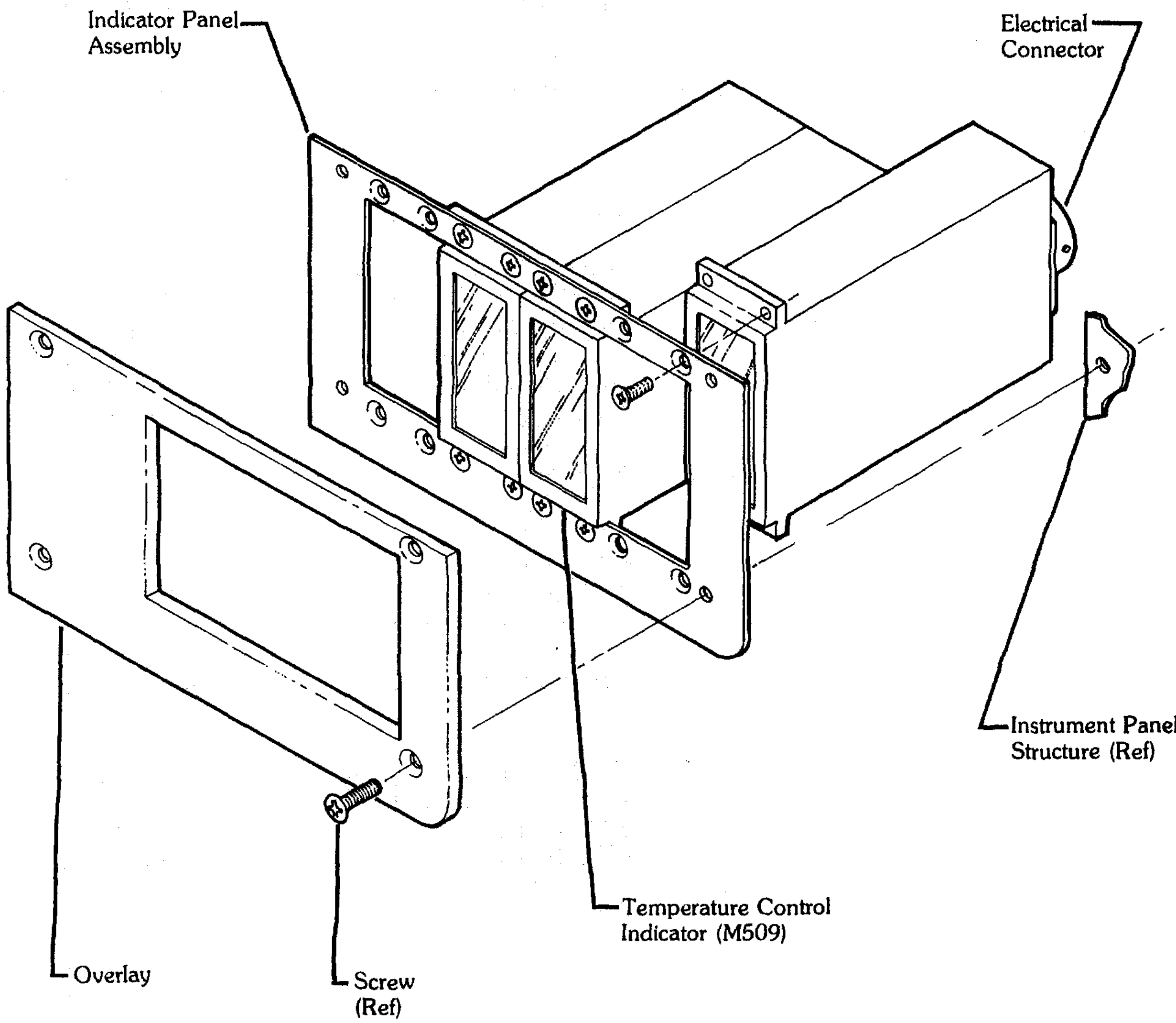
2. **Adjustment/Test**
   A. Adjustment of Position Indicator

NOTE: Adjustment of the temperature control indicator is accomplished on *Aircraft 35-002 thru 35-004 and 36-002*, by adjusting potentiometer (R580). The potentiometer (R580) is located on the inside RH pedestal wall directly below the fuel control panel. On *Aircraft 35-005 and Subsequent and 36-003 and Subsequent*, adjustment of the temperature control indicator is accomplished by adjusting potentiometer (R580 and R590) located on the copilot's switch panel (E518) (see figure 202.) When adjusting the indicator, the aft potentiometer is used to adjust the high (hot) indication of the indicator and the forward potentiometer is used to adjust the low (cold) indication of the indicator.

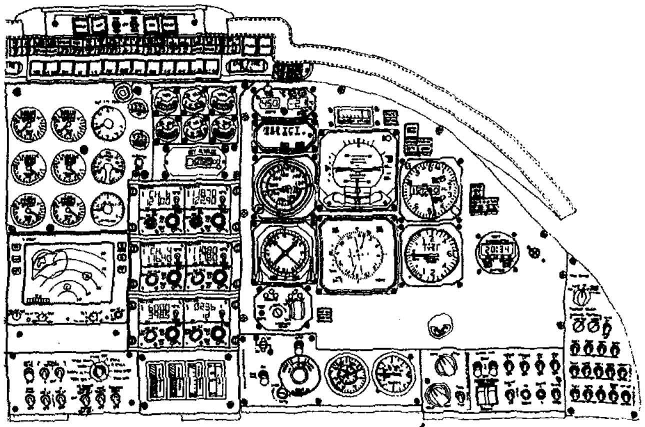
(1) Set Battery Switches on.
(2) Rotate Cabin Temperature Mode Selector Switch to MAN.
(3) Set and holdCabin Temperature Selector Switch to HOT until the bypass valve fully opens.
(4) Adjust potentiometer (R580) until the indicator on indicator panel reads HOT.

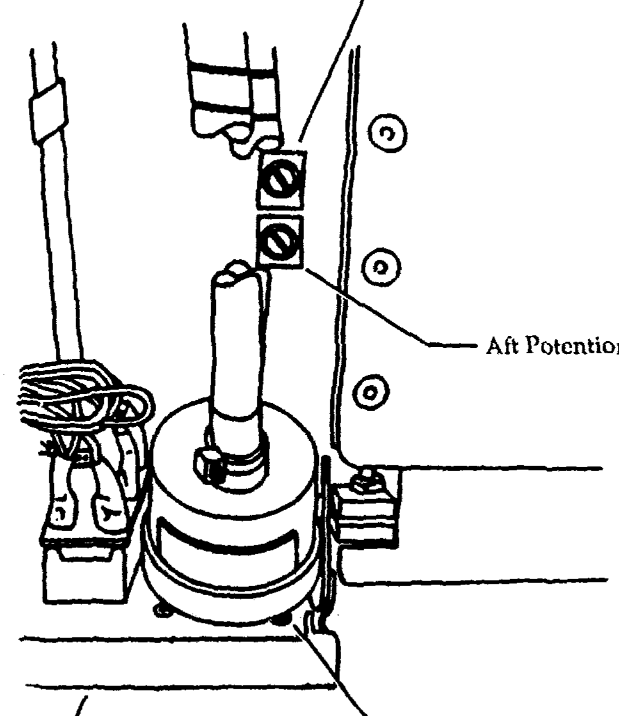
NOTE: No adjustment is required for the cold side of the indicator *(Aircraft 35-002 thru 35-004 and 36-002 Only).*

(5) Set and hold Cabin Temperature Selector Switch to COLD until bypass valve fully closes.
(6) Adjust potentiometer (R590) until the indicator on the indicator panel reads cold.
(7) Repeat step (3). If indicator still reads HOT, Adjustment/Test is complete. If indicator does not read HOT, continue to adjust and check until desired reading is obtained. If desired reading cannot be obtained, replace indicator.



Temperature Control Indicator Installation
Figure 201

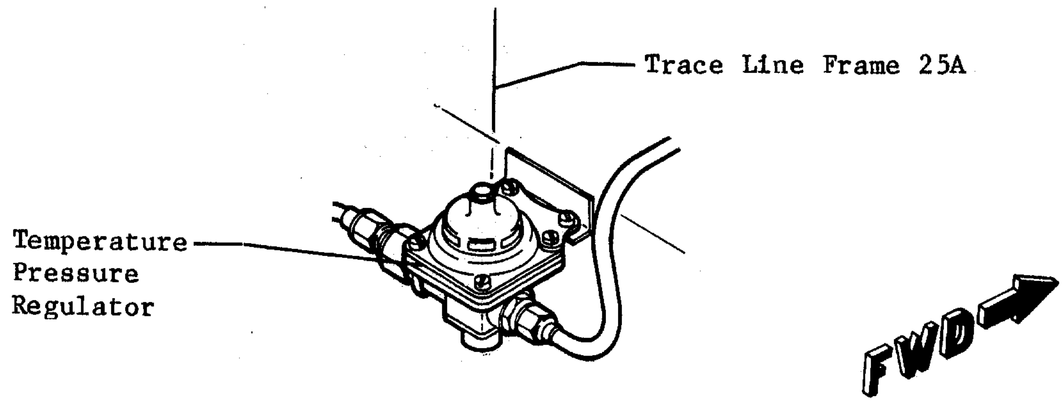




Temperature Control Indicator Potentiometer Installation
Figure 202

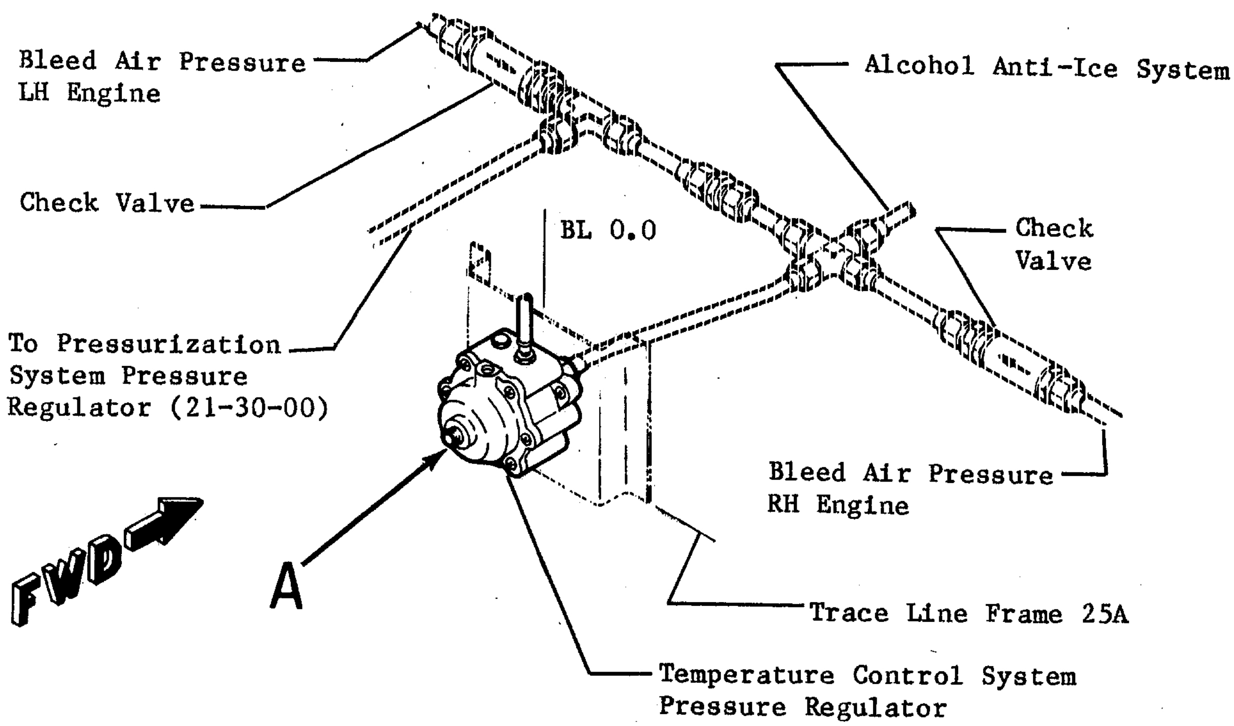
TEMPERATURE CONTROL SYSTEM PRESSURE REGULATOR - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Temperature Control System Pressure Regulator (See figure 201.)
      (1) Lower tailcone access door.
      (2) Disconnect aircraft batteries.
      (3) Disconnect tubing from regulator. Cap all exposed fittings and tubes.
      (4) Remove attaching parts and regulator from aircraft.
   B. Install Temperature Control System Pressure Regulator (See figure 201.)
      (1) Install pressure regulator and secure with attaching parts.
      (2) Connect tubing to pressure regulator.
      (3) Connect aircraft batteries.
      (4) Secure tailcone access door.



Aircraft 35-152 and Subsequent and 36-037 and Subsequent

Detail A



Temperature Control System Pressure Regulator Installation
Figure 201

TEMPERATURE CONTROL SYSTEM FILTERS - MAINTENANCE PRACTICES

1. Removal/Installation

NOTE: On _Aircraft 35-296 and Subsequent, 36-045 and Subsequent, and prior aircraft modified per AAK 82-2, "Installation of Cabin Temperature Control System Filters,"_ remove and clean the temperature control system filters in accordance with the current inspection interval specified in Chapter 5.

A. Remove Filter Assembly (See figure 201.)

NOTE: One filter is located in the tee at approximately FS 474 and LBL 3. The other filter is located in a tee between frames 13D and 13E and RBL 6.0 (top of cabin).

(1) Gain access to filter installation.
(2) Disconnect tubing from filter. Cap exposed tubing.
(3) Loosen and remove filter and O-ring from tee.
(4) Check filter for contamination and clean if necessary. Discard O-ring.

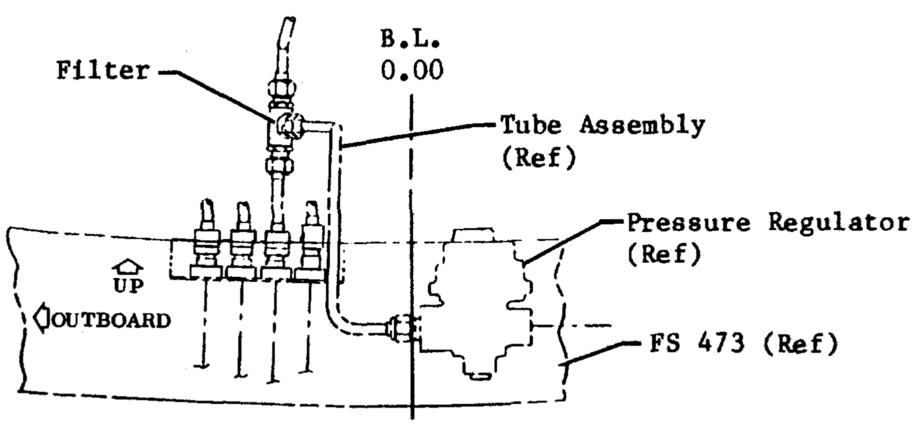
B. Install Filter Assembly (See figure 201.)

(1) Install new O-ring and filter in tee.
(2) Remove cap from tubing and connect tubing.
(3) Install previously removed equipment if applicable.

2. Cleaning/Painting

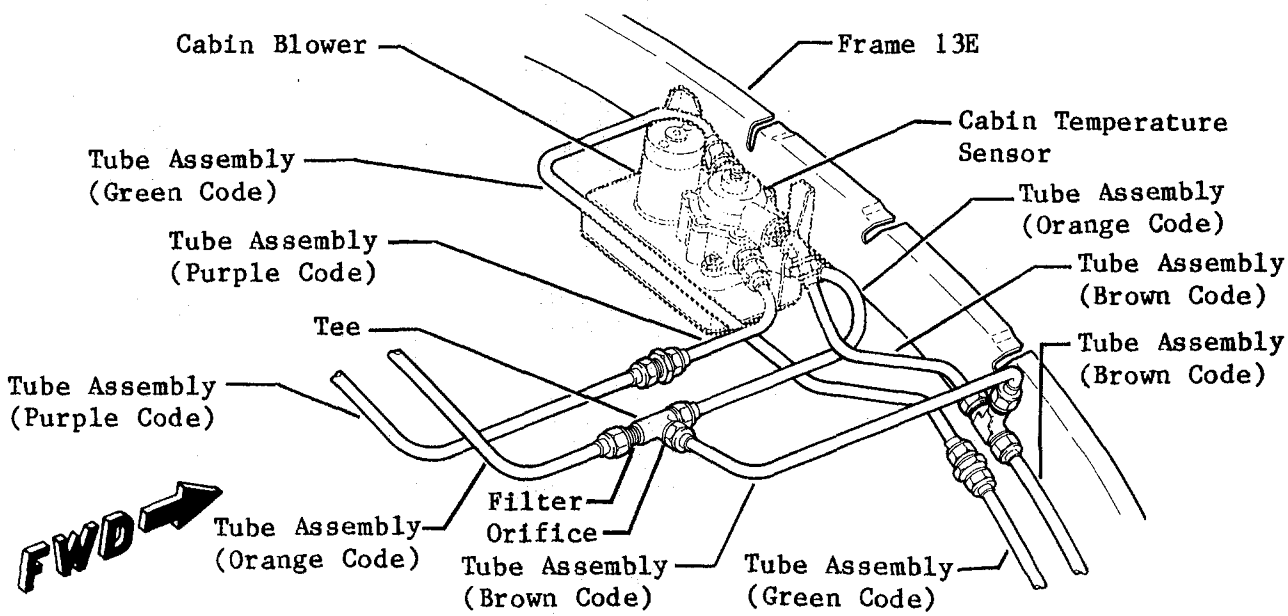
A. Clean Filters

(1) Remove filter from aircraft.
(2) Clean filter with Methyl Ethyl Ketone (MEK).
(3) Air dry filter.
(4) Install filter in aircraft.

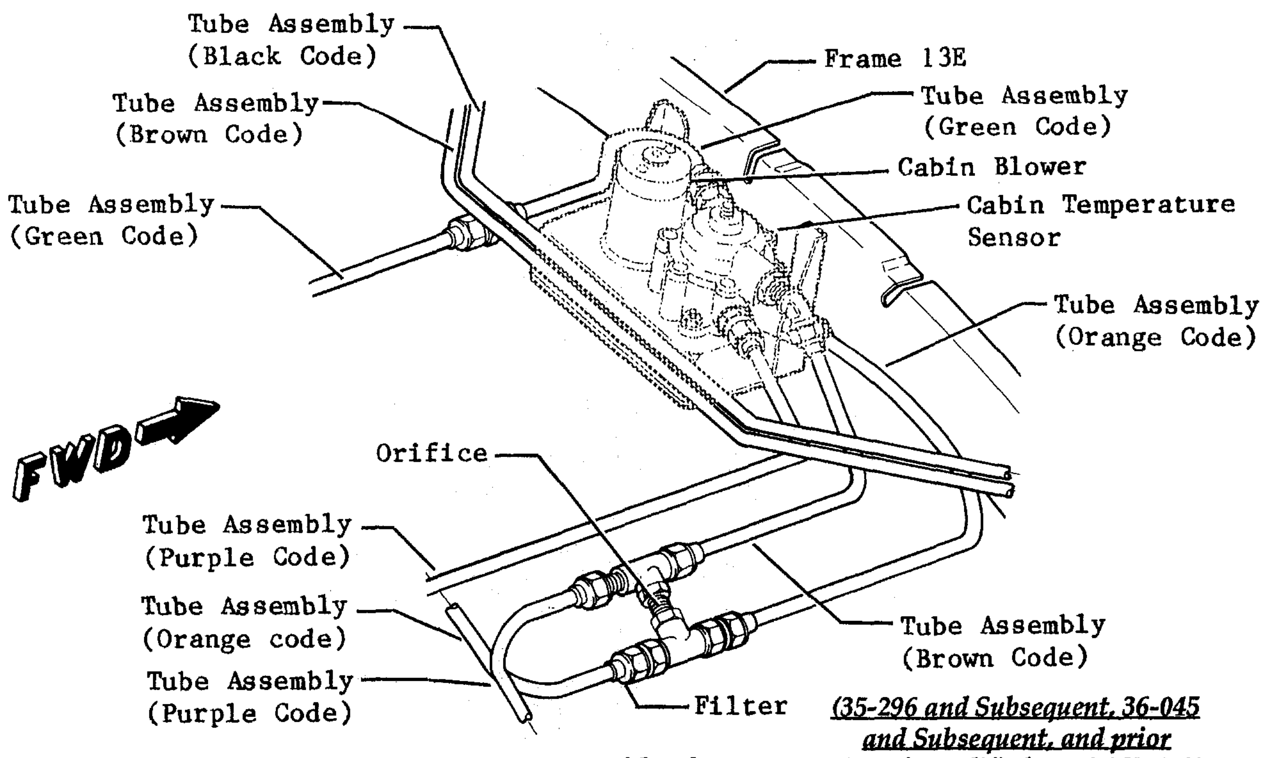


Tailcone Filter Installation

Temperature Control System Filters
Figure 201 (Sheet 1 of 2)



Aircraft 35-107, 35-113 thru 35-194, 36-032 thru 36-040 modified per AAK 82-2 and SSK 942



(35-296 and Subsequent, 36-045 and Subsequent, and prior aircraft modified per AAK 82-2)

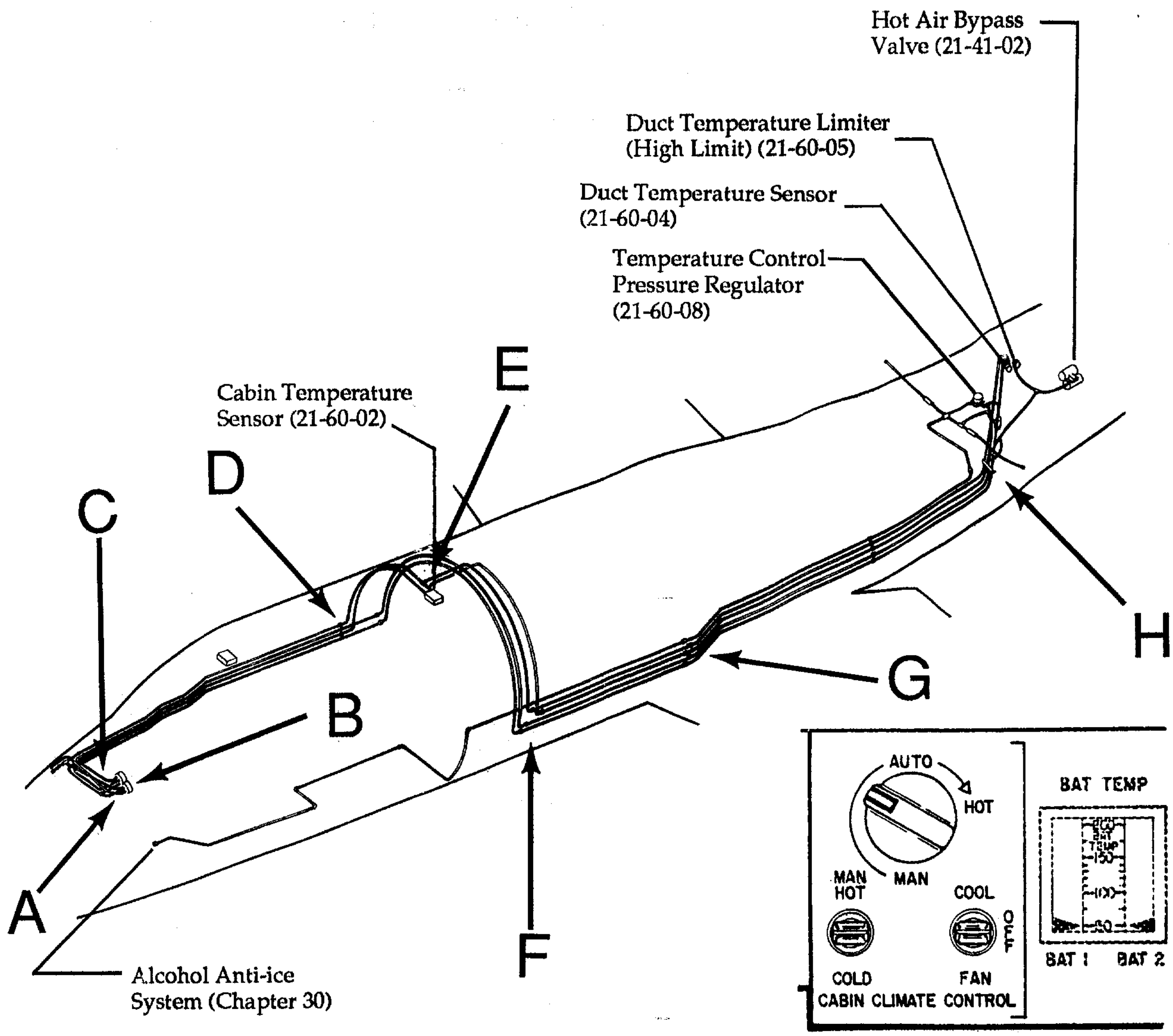
Cabin Filter Installation

Aircraft 35-195 and Subsequent, 36-041 and Subsequent

Temperature Control System Filters
Figure 201 (Sheet 2 of 2)

TEMPERATURE CONTROL SYSTEM PLUMBING - MAINTENANCE PRACTICES

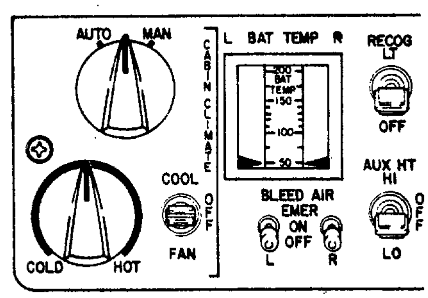
1. **Removal/Installation**
   A. This section covers the Temperature Control System Plumbing installation throughout the 35/36 aircraft. Refer to 21-60-00 for Removal/Installation instructions of the various components shown.



Detail A

(35-002 thru 106, 35-108 thru 112,
36-002 thru 36-031)

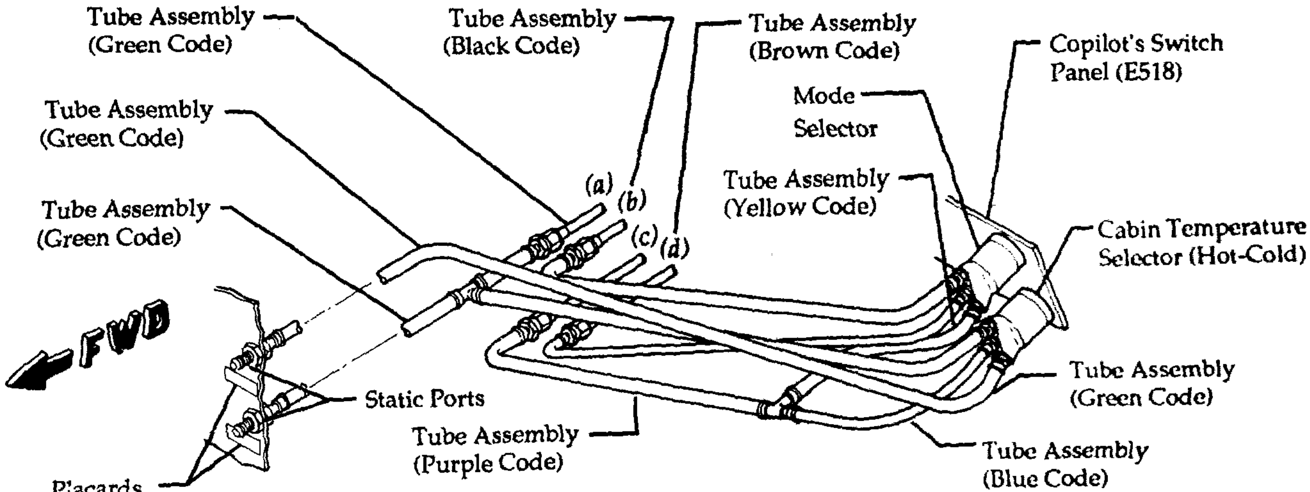
PLUMBING CODES	
COLOR CODE	CONTINUATION CODE
GREEN	*(a)*
BLACK	*(b)*
PURPLE	*(c)*
BROWN	*(d)*
ORANGE	*(e)*



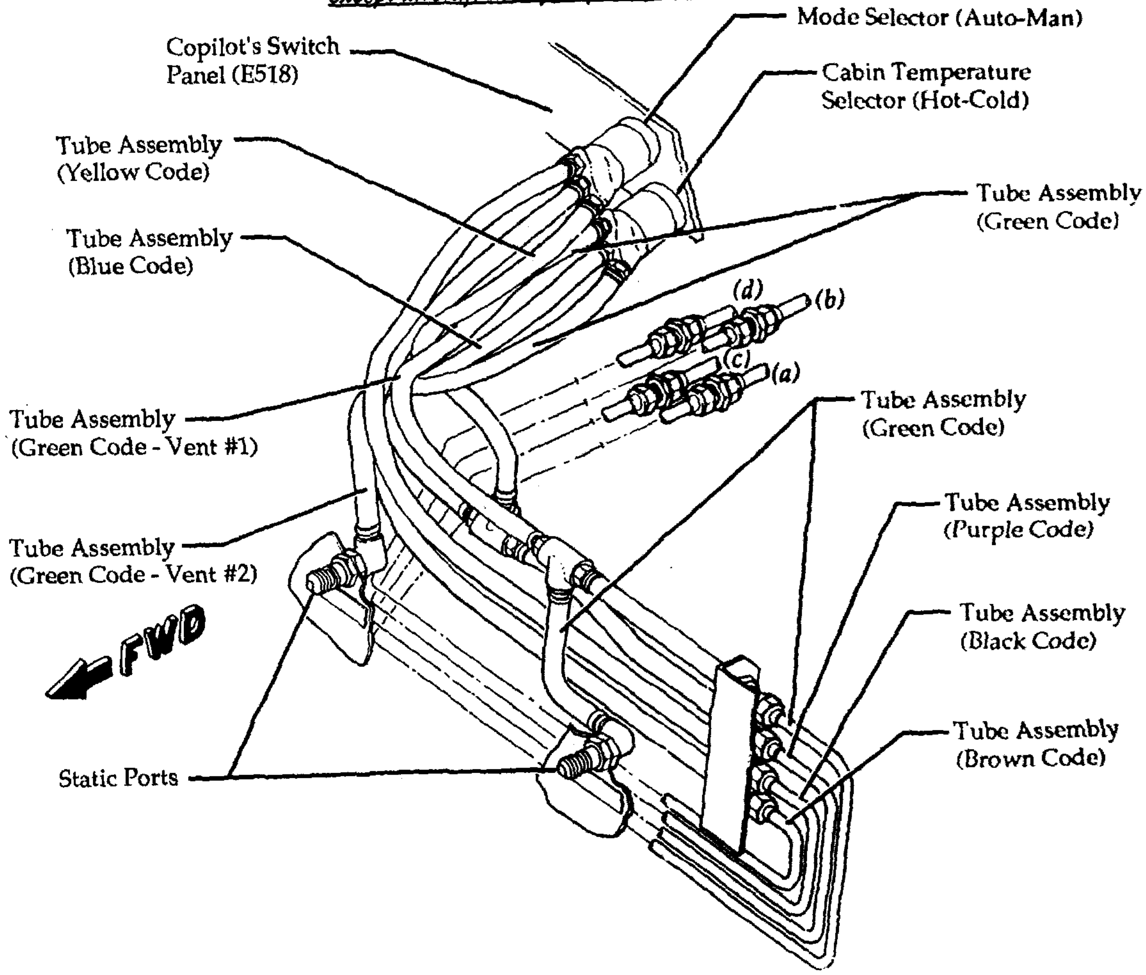
Detail B

(35-107, 35-113 and Sub.,
36-032 and Sub.)

Temperature Control System Plumbing
Figure 201 (Sheet 1 of 9)



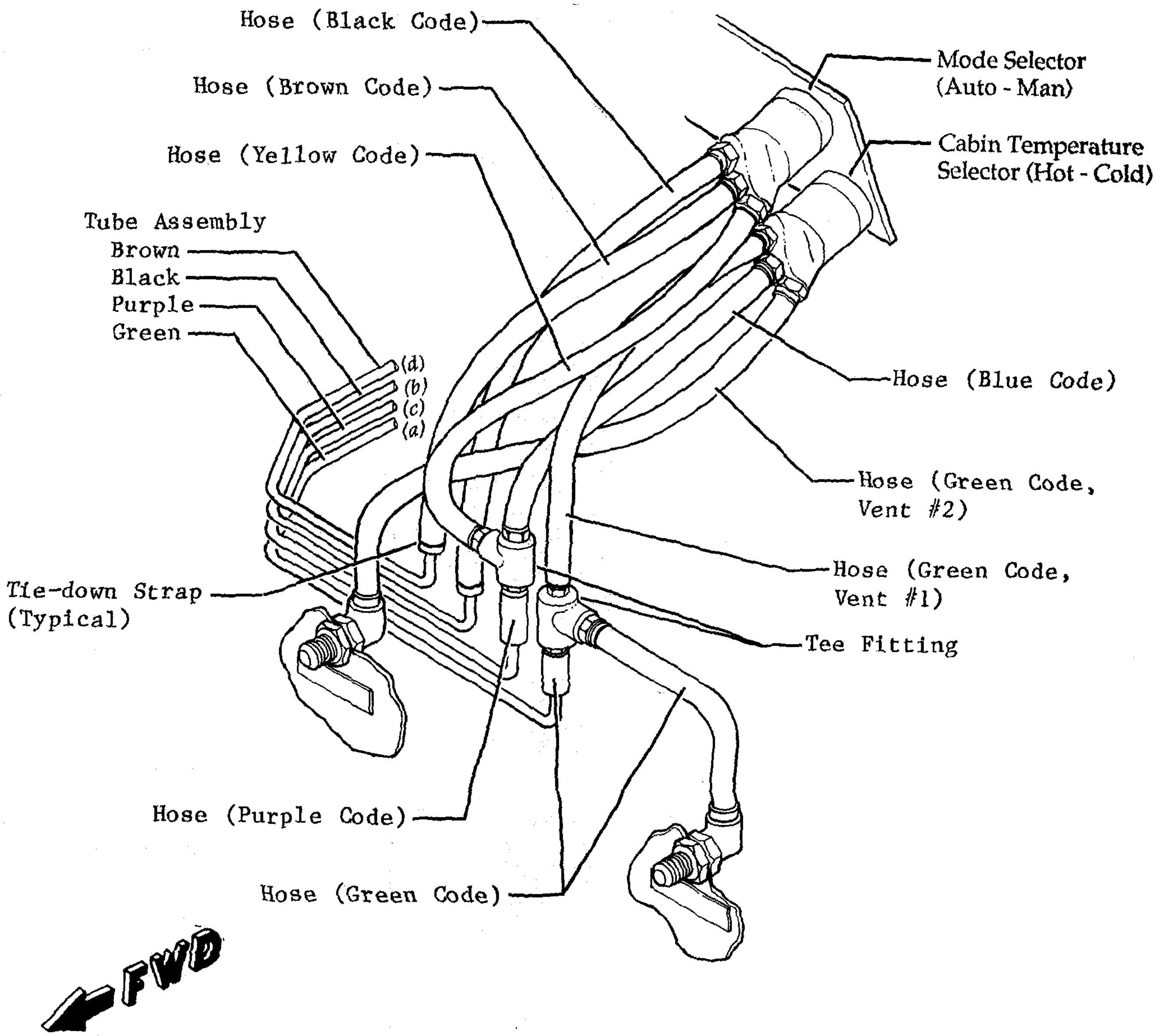
(35-107, 35-113 thru 35-194, 36-032 thru 36-040 except aircraft modified per SSK 945)



(35-195 thru 35-530, 36-041 thru 36-053, and prior aircraft modified per SSK 945)

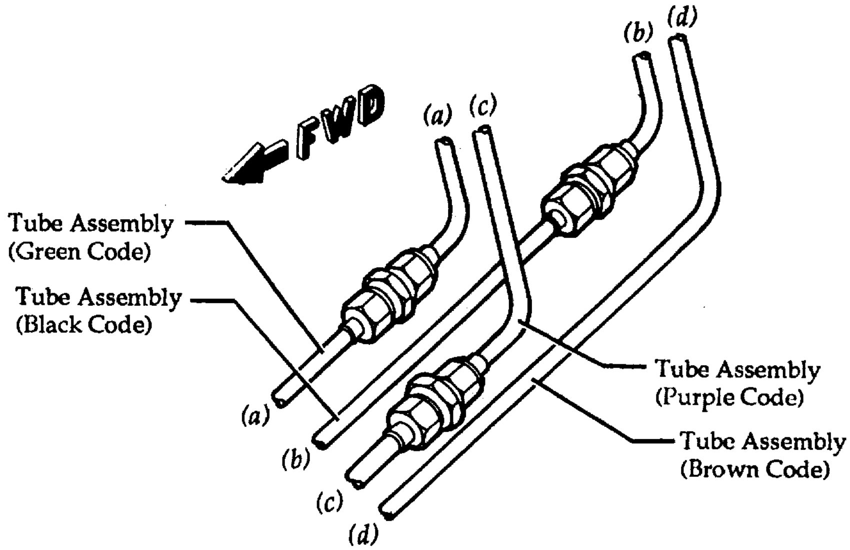
DETAIL C

Temperature Control System Plumbing
Figure 201 (Sheet 2 of 9)

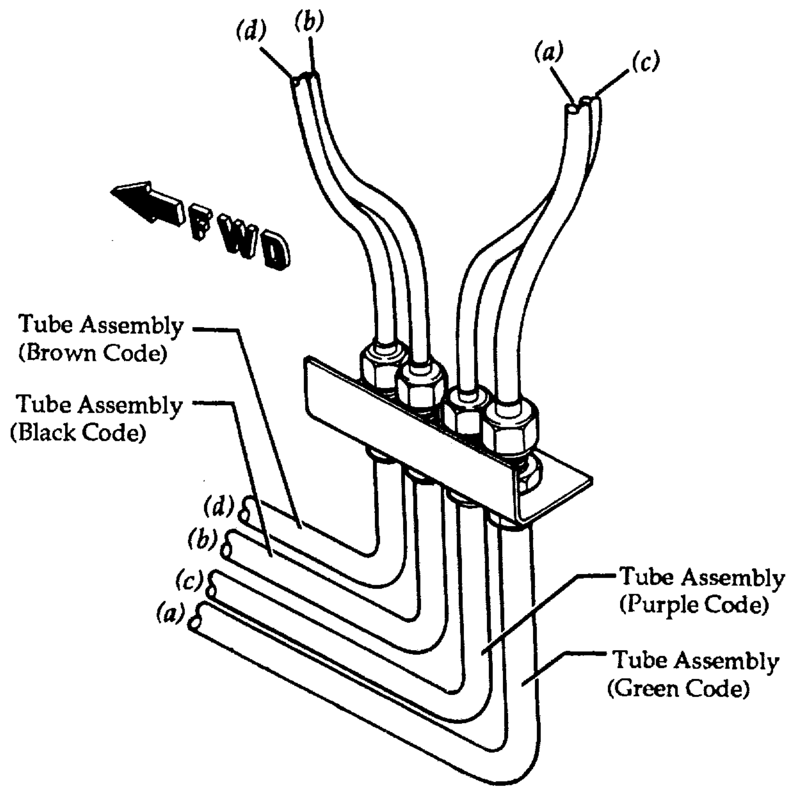


DETAIL C

Temperature Control System Plumbing
Figure 201 (Sheet 3 of 9)



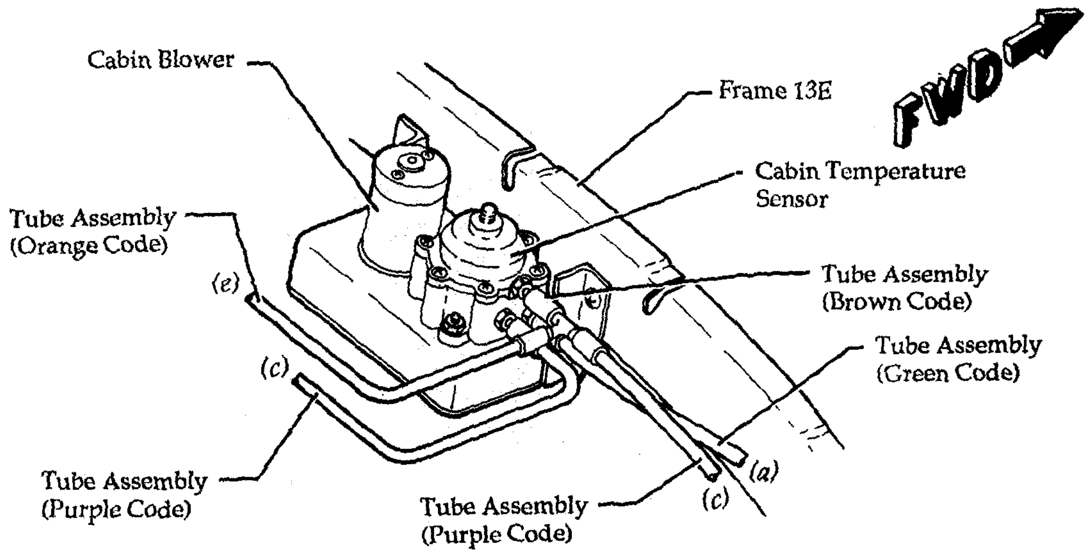
(35-107, 35-113 thru 35-194, 36-032 thru 36-040)



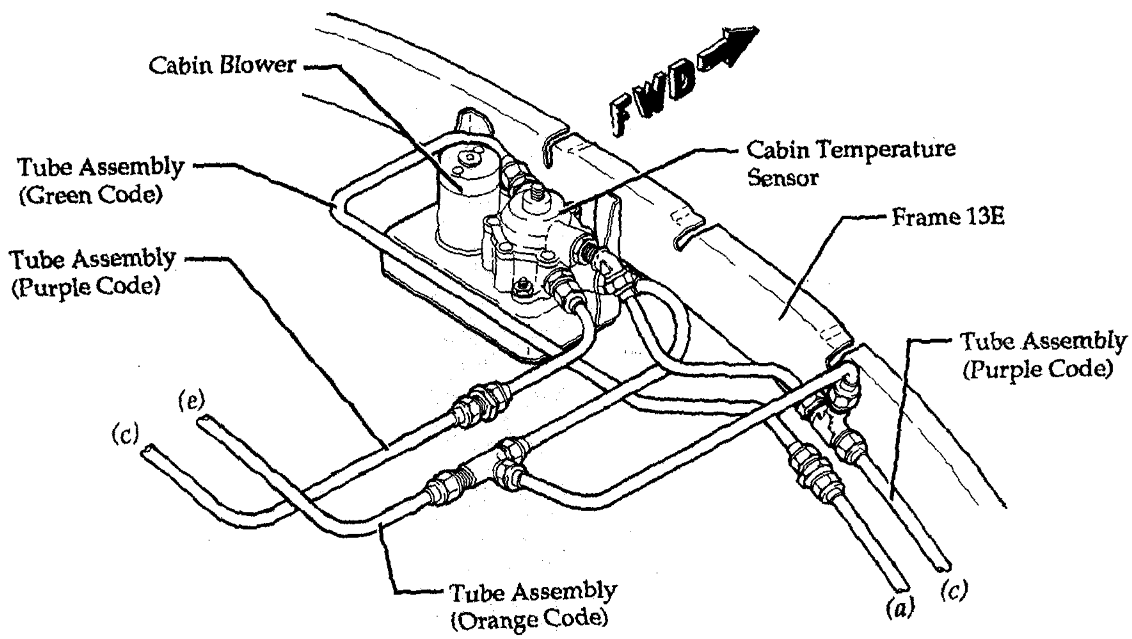
(35-195 and Subsequent; 36-041 and Subsequent)

DETAIL D

Temperature Control System Plumbing
Figure 201 (Sheet 4 of 9)



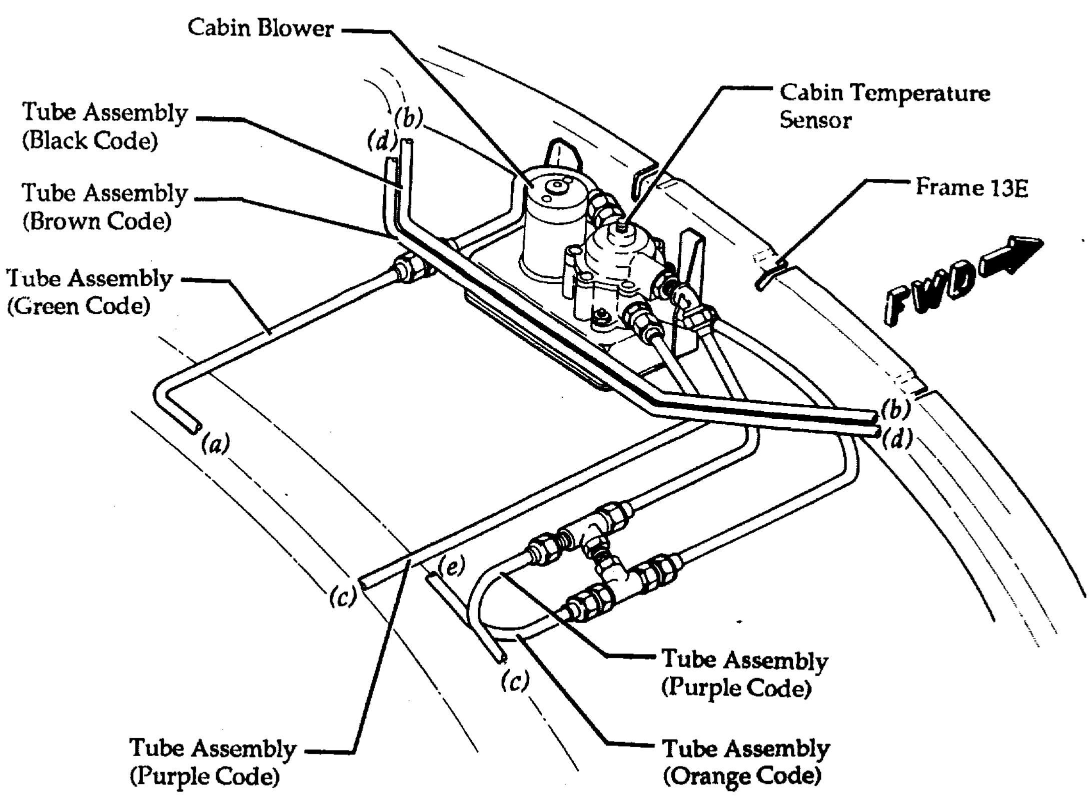
(35-107, 35-113 thru 35-194, 36-032 thru 36-040 except aircraft modified per SSK 942)



(35-107, 113 thru 194, 36-032 thru 36-040 and aircraft modified per SSK 942, 943, 944, or 945)

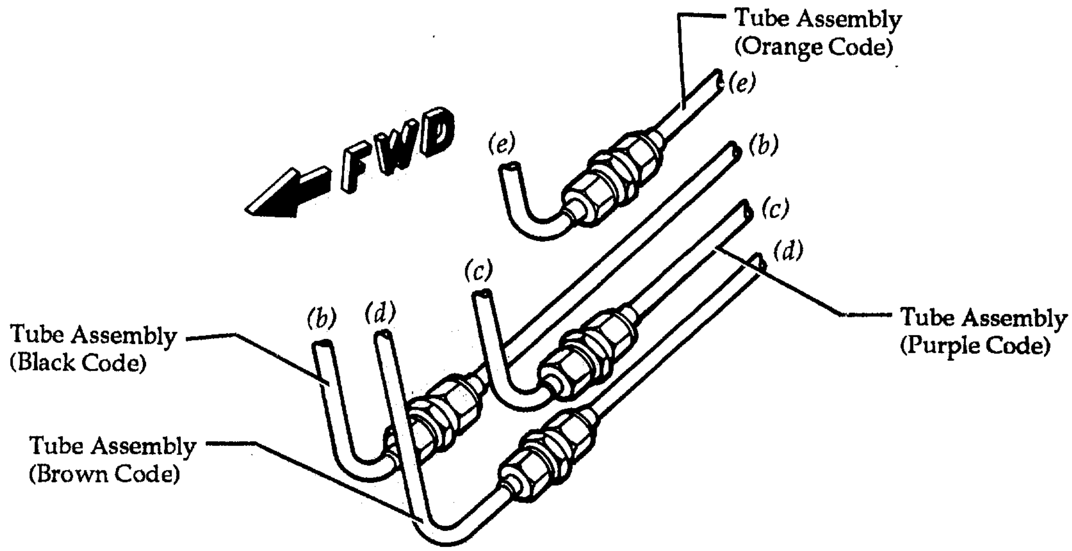
DETAIL E

Temperature Control System Plumbing
Figure 201 (Sheet 5 of 9)

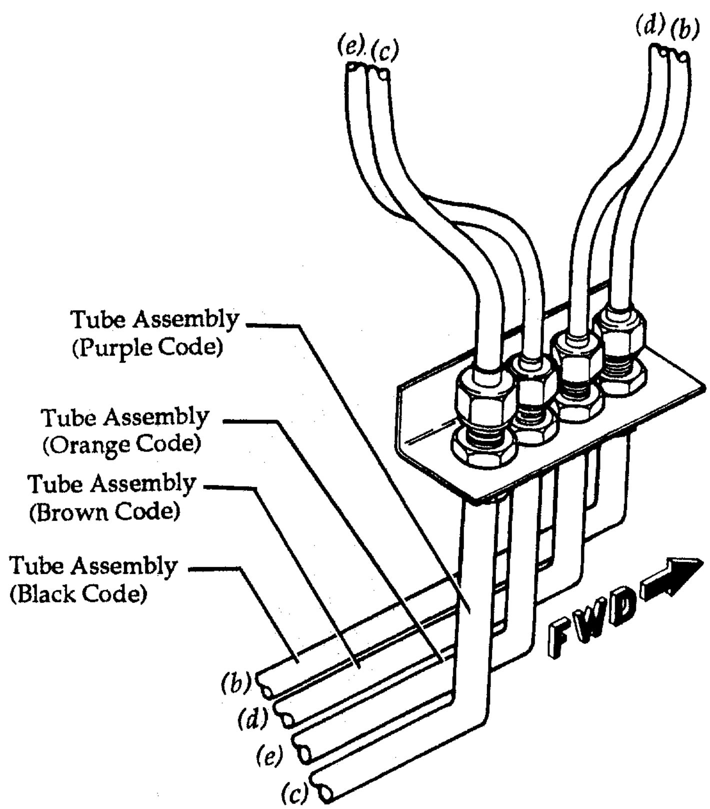


DETAIL E

Temperature Control System Plumbing
Figure 201 (Sheet 6 of 9)



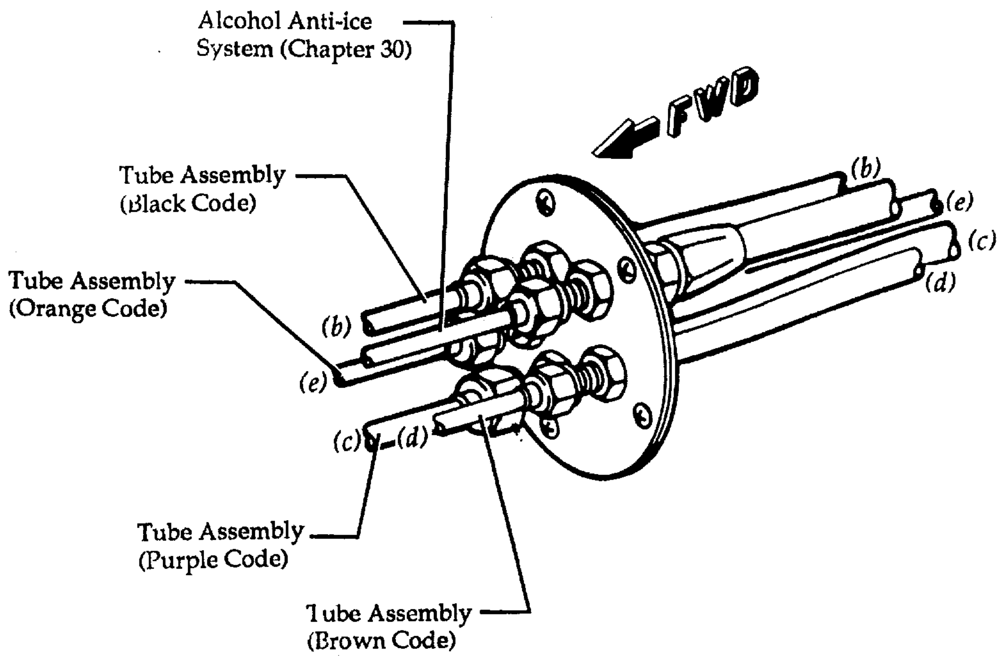
(35-107, 113 thru 194, 36-032 thru 36-040)



(35-195 and Subsequent; 36-041 and Subsequent)

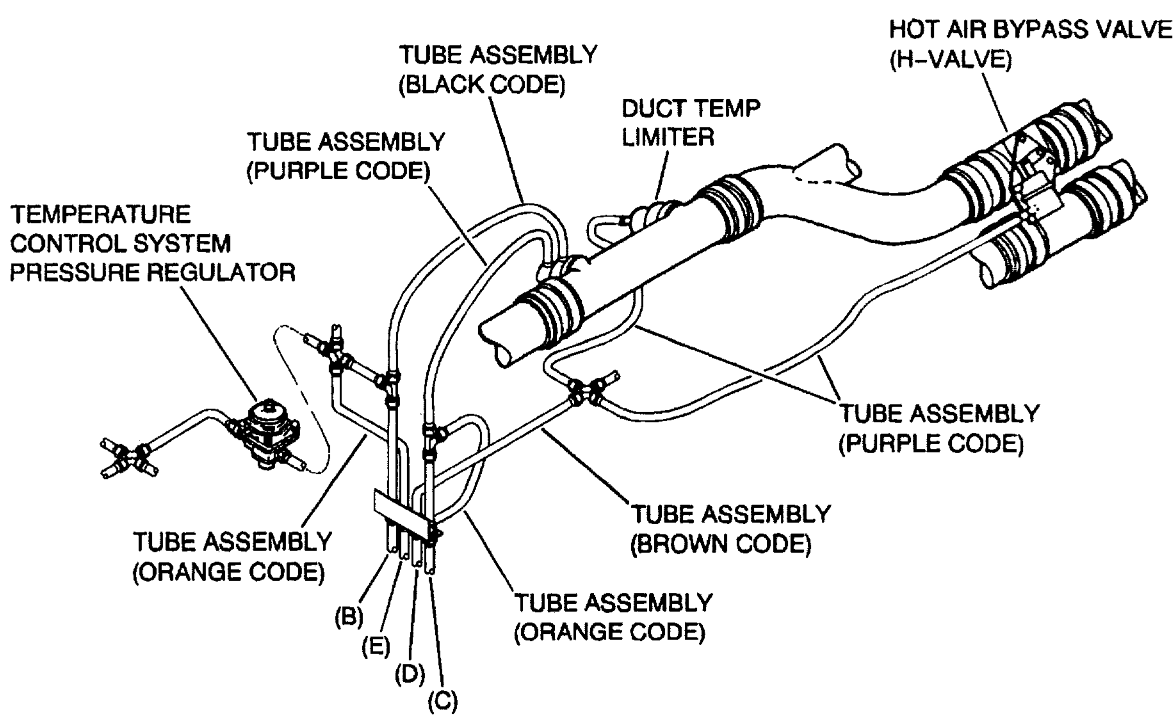
DETAIL F

Temperature Control System Plumbing
Figure 201 (Sheet 7 of 9)



(35-107, 35-113 and Subsequent; 36-032 and Subsequent)

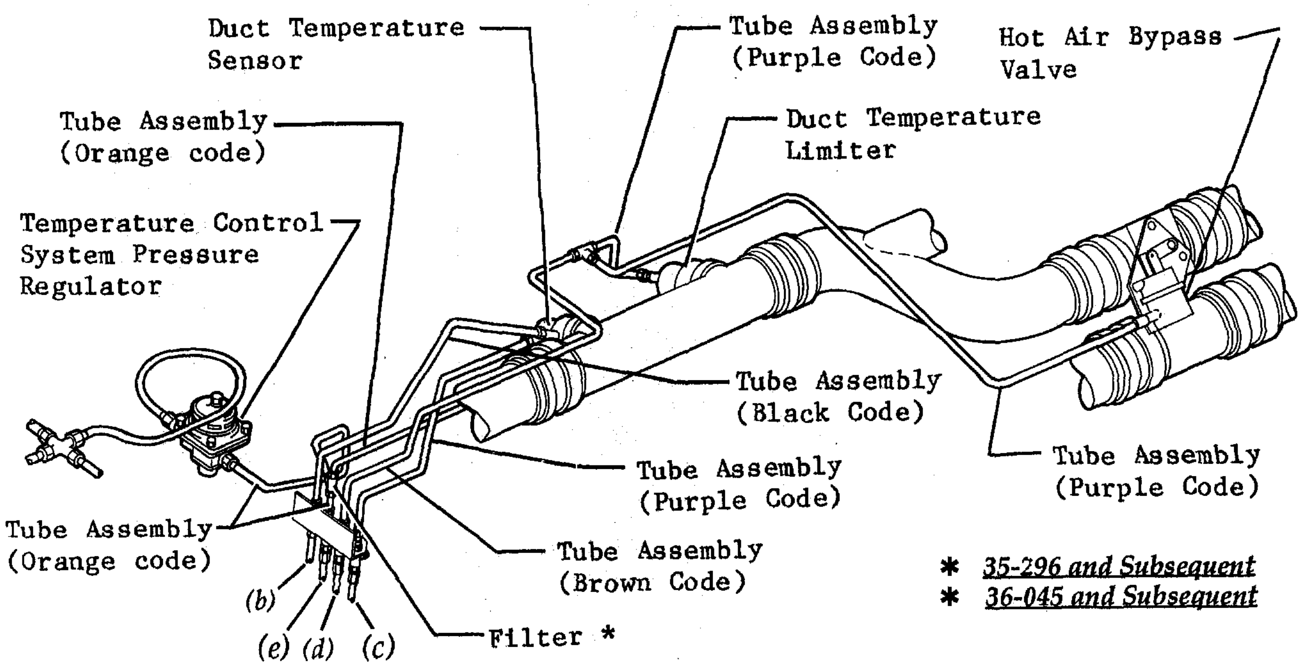
Detail G



(35-107, 35-113 thru 35-194, 36-032 thru 36-040, except aircraft modified per SSK 943)

Detail H

Temperature Control System Plumbing
Figure 201 (Sheet 8 of 9)



Detail H

13-107C

Temperature Control System Plumbing
Figure 201 (Sheet 9 of 9)

CABIN TEMPERATURE INDICATOR SYSTEM - DESCRIPTION AND OPERATION

1. **Description**

   A. On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031*, the optional cabin temperature indicator system consists of a temperature indicator mounted on the copilot's panel, a temperature sensor in the LH forward cabinet and, on some aircraft, an instrument amplifier installed on the RH side of the cockpit on frame 9. The system is powered by 28 vdc through a 2-ampere circuit breaker.

   B. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent*, the cabin temperature indicator consists of an indicator installed on the center pedestal or copilot's instrument panel, a temperature sensor installed on the RH side of frame 15 on Model 36A and the RH side of frame 13E on Model 35A. The indicator is lighted by a post light located adjacent to the indicator. On *Aircraft 35-162 and Subsequent and 36-039 and Subsequent,* the indicator is internally lighted and the sensor is located in the cabin temperature sensor box. (Refer to 21-60-02.) The system is powered by 28 vdc through a 2-ampere circuit breaker.

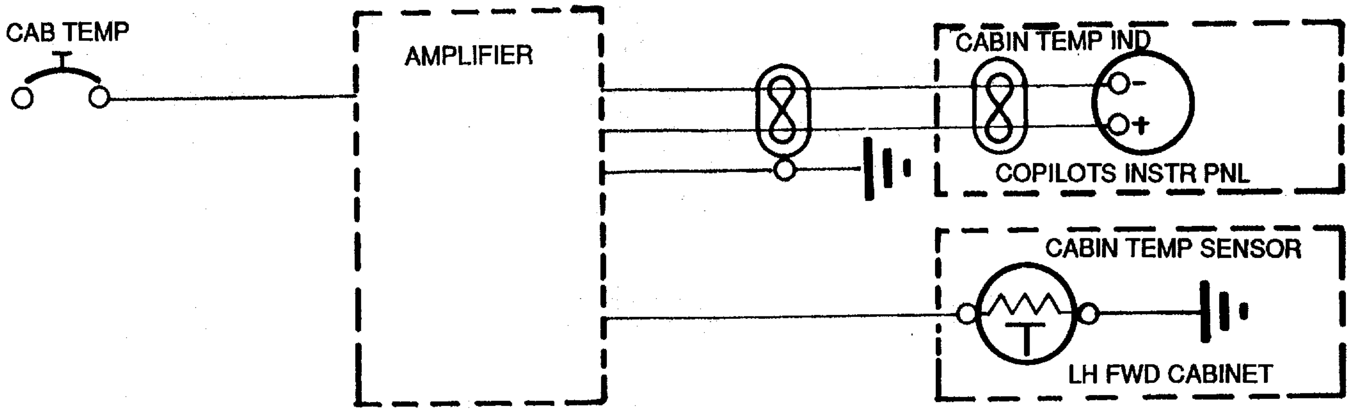
   C. The indicator is calibrated from 60° to 90°F as follows: 60° to 70°F - Blue; 70° to 80°F - Green; and 80° to 90°F - Orange.

   D. Component Description

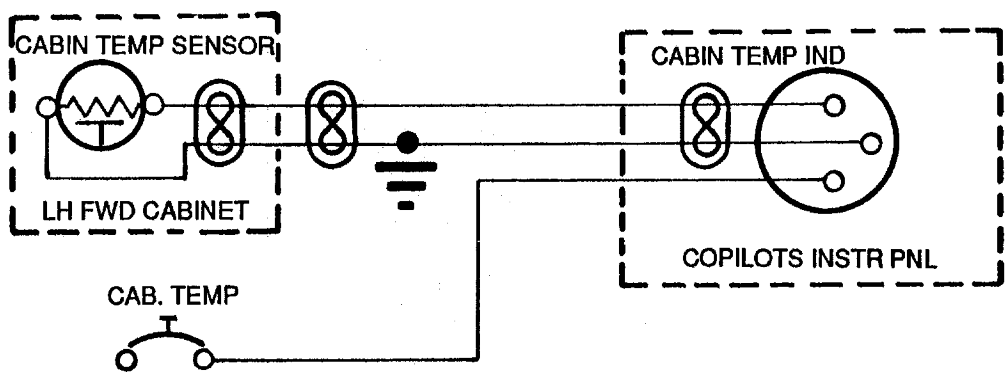
      (1) The indicator is installed in the copilot's instrument panel. On *Aircraft 35-107, 35-113 and Subsequent and 36-032 and Subsequent,* the indicator is installed in the center pedestal or copilot's instrument panel.

      (2) The amplifier is installed on the forward side of frame 9 on the RH side of the cockpit at WL 28.

      (3) On *Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031,* the temperature sensor is installed in the LH service cabinet. The sensor is mounted in a styrofoam block which is inserted into a cutout in the aft cabinet wall. The sensor is exposed to cabin air by holes drilled through the aft cabinet wall. On *Aircraft 35-107, 35-113 thru 35-161 and 36-032 thru 36-038*, are located in the aft cabin area. On *36A Aircraft,* the box assembly is located on the RH side of frame 15 and on *35A Aircraft,* the box assembly is located on the RH side of frame 13E. The sensor is exposed to cabin air through cutouts in the sides of the box. On *Aircraft 35-162 and Subsequent and 36-039 and Subsequent,* the sensor is located in the cabin temperature sensor box. (Refer to 21-60-02.) The sensor is exposed to cabin air being blown across it and the normal temperature system sensor by the blower.



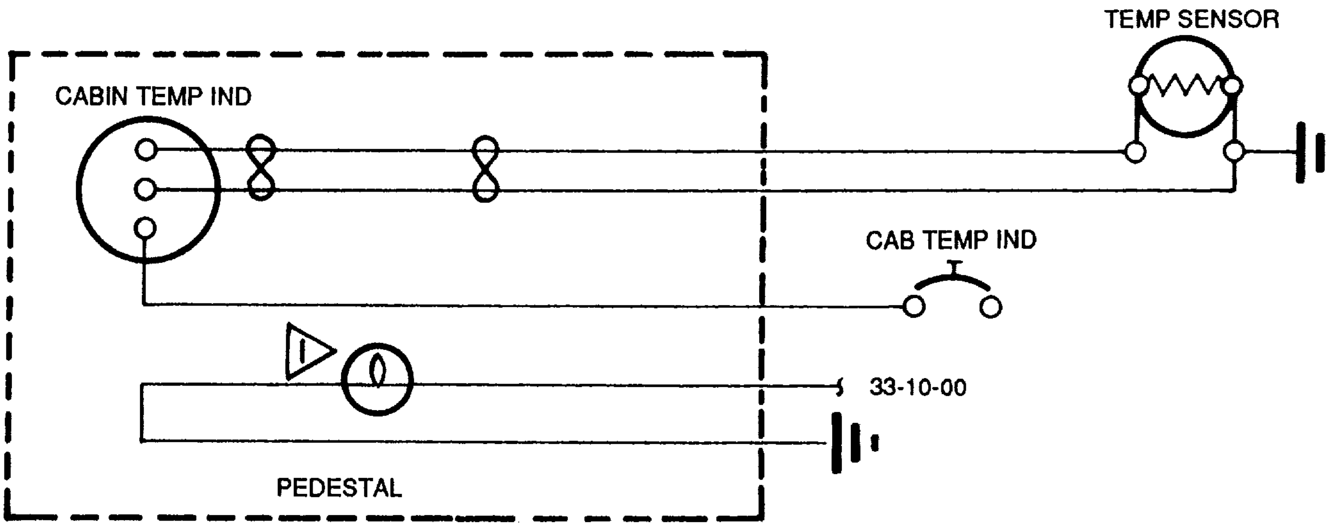
Aircraft Equipped with Instrument Amplifier

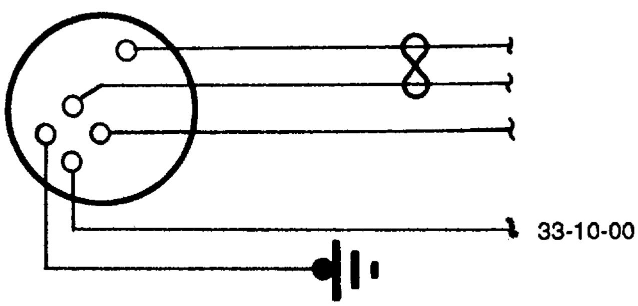


Aircraft NOT Equipped with Instrument Amplifier

Cabin Temperature Indicator System Electrical Control Schematic
Figure 1 (Sheet 1 of 2)

20-32A

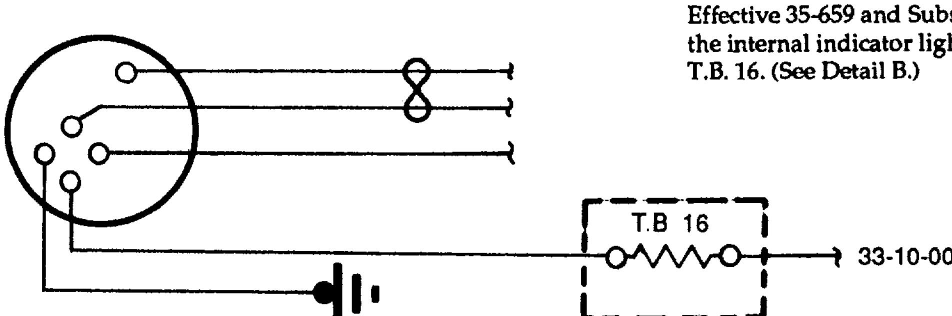




Detail A

1 Effective 35-162 and Subsequent, 36-039 and Subsequent, the indicator is internally lighted. (See Detail A.)

Effective 35-659 and Subsequent, 36-064 and Subsequent, the internal indicator light dimming is controlled by T.B. 16. (See Detail B.)



Detail B

Aircraft 35-107, 35-113 and Subsequent, 36-032 and Subsequent

Cabin Temperature Indicator System Electrical Control Schematic
Figure 1 (Sheet 2 of 2)

20-32A

CABIN TEMPERATURE INDICATOR - MAINTENANCE PRACTICES

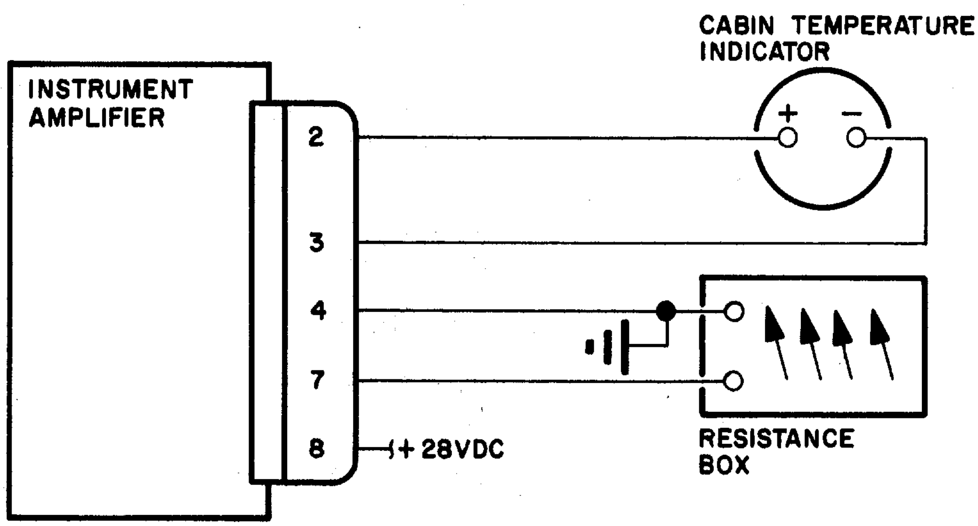
1. REMOVAL/INSTALLATION
   A. Remove Cabin Temperature Indicator (Copilot's Instrument Panel)
      (1) Assure that Battery and Stall Warning Switches are set to OFF.
      (2) Lower copilot's instrument panel.
      (3) Disconnect wiring from indicator.
      (4) Loosen and remove screws, plate assembly, spacers, and indicator from panel.
   B. Install Cabin Temperature Indicator (Copilot's Instrument Panel)
      (1) Position indicator on panel with spacers.
      (2) Secure indicator to panel with screws and plate assembly.
      (3) Connect wiring to indicator.
      (4) Raise and secure copilot's instrument panel.
   C. Remove Cabin Temperature Indicator (Pedestal)
      (1) Assure that Battery Switches are set to OFF.
      (2) Loosen quick-release fasteners and raise panel assembly sufficiently to gain access to electrical connectors.
      (3) Disconnect electrical connector(s).
      (4) Loosen and remove serrated locknut securing indicator to panel.
      (5) Remove indicator from panel.

2. ADJUSTMENT/TEST

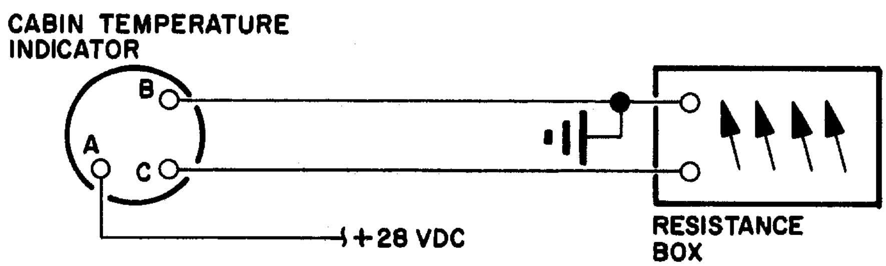
NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
28V DC Power Supply		Commercially Available	Provide power
Variable Resistance Box	Type 1432-T	General Radio	Simulate temperatures
ITT Cannon Plug	DE-9S	Commercially Available	Connect test equipment

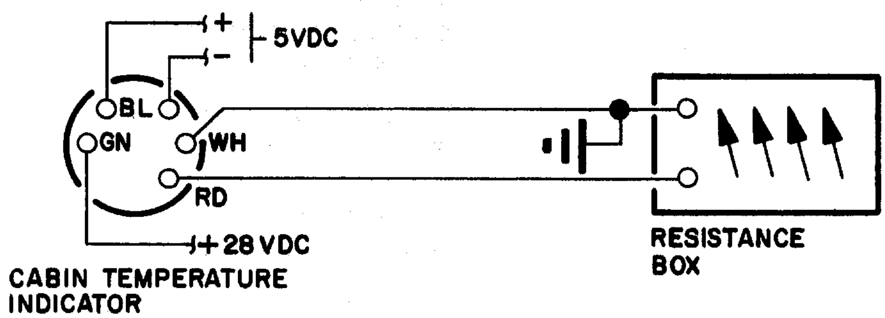
   A. Perform the test as follows:
      (1) Place cabin temperature indicator in test setup as shown in figure 201.
      (2) Adjust the resistance box to 1063 ohms. Note the position of the indicator needle. Adjust the resistance until the indicator needle is at 60°F. Record the resistance. The resistance at this point shall be 1063 (±5) ohms.
      (3) Adjust the resistance box to 1086 ohms. Note the position of the indicator needle. Adjust the resistance until the indicator needle is at 70°F. Record the resistance. The resistance at this point shall be 1086 (±3) ohms.
      (4) Adjust the resistance box to 1109 ohms. Note the position of the indicator needle. Adjust the resistance until the needle is at 80°F. Record the resistance. The resistance at this point shall be 1109 (±3) ohms.
      (5) Adjust the resistance box to 1131 ohms. Note the position of the indicator needle. Adjust the resistance until the needle is at 90°F. Record the resistance. The resistance at this point shall be 1131 (±5) ohms.
      (6) Test the lamp in internally illuminated indicators by applying 5 vdc as shown in figure 201. The lamp should illuminate.



Aircraft Equipped with Instrument Amplifier



Aircraft NOT Equipped with Instrument Amplifier



Aircraft Equipped with Internally Illuminated Cabin Temperature Indicator

Cabin Temperature Indicator Test Setup
Figure 201

CABIN TEMPERATURE AMPLIFIER - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   A. **Remove Amplifier**
      (1) Remove upholstery as required to gain access to the amplifier installation.
      (2) Disconnect electrical connector from amplifier.
      (3) Remove attaching parts and amplifier from frame 9.
   B. **Install Amplifier**
      (1) Install amplifier on frame 9 and secure with attaching parts.
      (2) Connect electrical connector to amplifier.
      (3) Install previously removed upholstery.

TEMPERATURE SENSOR - MAINTENANCE PRACTICES

1. TOOLS AND EQUIPMENT

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Epoxy Adhesive*	Delta Bond #152	Tylan Corp. Torrance, CA	Secure Sensor to Channel
Adhesive**	EC 2216	3M Co. St. Paul, MN	Bond Cover to Plate

* _Effective on Aircraft 35-107, 35-109 and Subsequent, and 36-032 and Subsequent_
** _Effective on Aircraft 35-107, 35-113 thru 35-161, and 36-032 thru 36-038_

2. REMOVAL/INSTALLATION

A. Remove Temperature Sensor (_Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-032_) (See figure 201.)
   (1) Gain access to sensor installation in LH cabinet.
   (2) Free the styrofoam block from cabinet wall.
   (3) Remove sensor from styrofoam block.
   (4) Disconnect sensor electrical wiring from electrical connector.

B. Install Temperature Sensor (_Aircraft 35-002 thru 35-106, 35-108 thru 35-112 and 36-002 thru 36-031_) (See figure 201.)
   (1) Connect sensor electrical wiring to electrical connector.
   (2) Install sensor in styrofoam block.
   (3) Install styrofoam block in cabinet wall.

C. Remove Temperature Sensor (_Aircraft 35-107, 35-113 thru 35-161 and 36-032 thru 36-038_) (See figure 201.)
   (1) Remove attaching parts and remove cover assembly sufficiently to gain access to sensor wiring.
   (2) Disconnect sensor wiring at splice.

   NOTE: Sensor is bonded to a plate which is bonded to the cover assembly.

   (3) Loosen plate from cover assembly.
   (4) Remove sensor from plate. Remove old bonding material from plate and cover.

D. Install Temperature Sensor (_Aircraft 35-107, 35-113 thru 35-161 and 36-032 thru 36-038_) (See figure 201.)
   (1) Install new sensor to plate, using Delta Bond #152 epoxy manufactured by the Tylan Corporation, Torrance, Calif.
   (2) Bond plate to cover using EC 2216 adhesive, manufactured by 3M Company.
   (3) Connect sensor electrical wiring to aircraft wiring.
   (4) Install cover assembly and secure with attaching parts.

E. Remove Temperature Sensor (*Aircraft 35-162 thru 35-633 and 36-039 thru 36-057*) (See figure 201.)

NOTE: The sensor is secured to a channel in the box assembly. A pad is bonded to each edge of the channel so that when the temperature sensor box cover is in place, the channel is held firmly in place.

(1) Gain access to the temperature sensor box.
(2) Remove attaching parts and cover from temperature sensor box.

NOTE: When cover is removed, the channel with the sensor attached will fall free of the box and be held only by the sensor wiring.

(3) Disconnect sensor wiring at splice.
(4) Loosen and remove sensor from channel. Remove old bonding material from channel.

F. Install Temperature Sensor (*Aircraft 35-162 thru 35-633 and 36-039 thru 36-057*) (See figure 201.)

(1) Secure new sensor to channel using Delta Bond #152 epoxy manufactured by Tylan Corporation, Torrance, Calif.
(2) Position sensor in temperature sensor box as shown and install cover. When the cover is in place, the channel pads will hold the channel in place. Assure that channel is positioned as shown.
(3) Connect electrical wiring at splices.
(4) Install previously removed equipment.

G. Remove Temperature Sensor (*Aircraft 35-634 and Subsequent, and 36-058 and Subsequent*) (See figure 201.)

NOTE: The sensor is secured to a channel in the box assembly. A pad is bonded to each edge of the channel so that when the temperature sensor box cover is in place, the channel is held firmly in place.

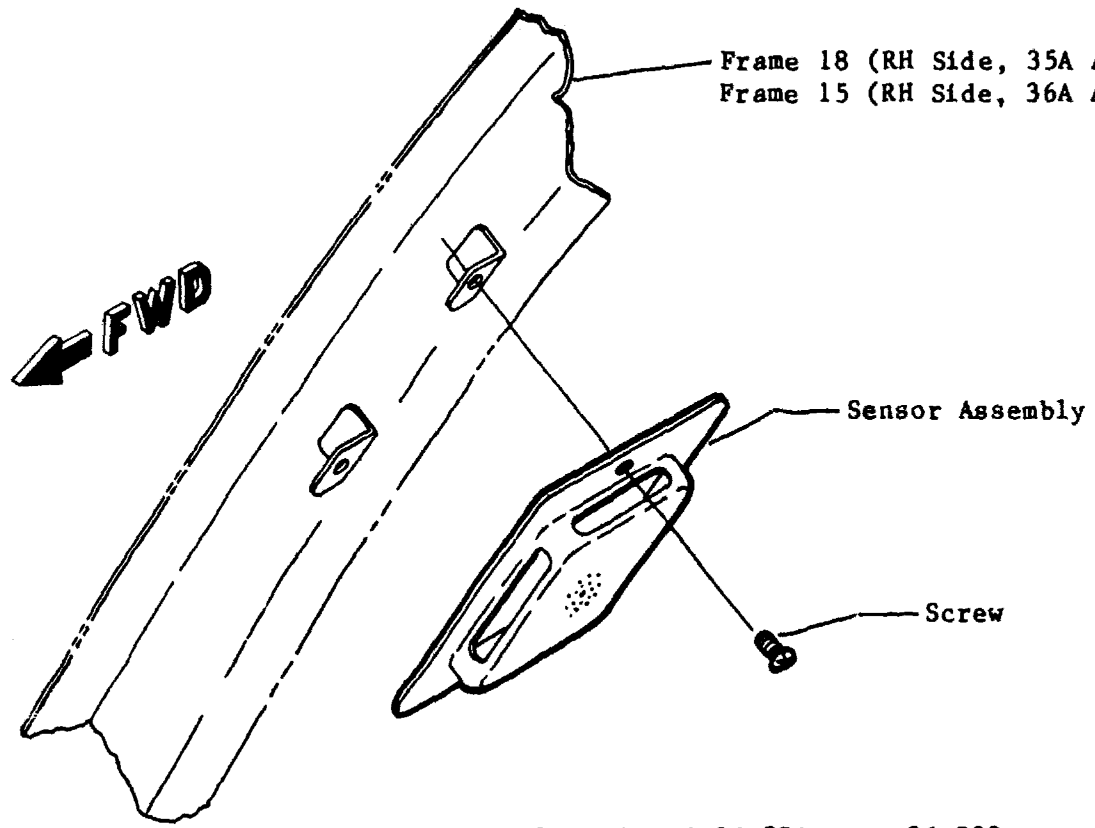
(1) Gain access to the temperature sensor box.
(2) Remove gasket, attaching parts and cover from sensor box.

NOTE: When cover is removed, the channel with the sensor attached will fall free of the box and be held only by the sensor wiring.

(3) Disconnect sensor wiring at splice.
(4) Loosen and remove sensor from channel. Remove old bonding material from channel and sensor box.

H. Install Temperature Sensor (*Aircraft 35-634 and Subsequent, and 36-058 and Subsequent*) (See figure 201.)

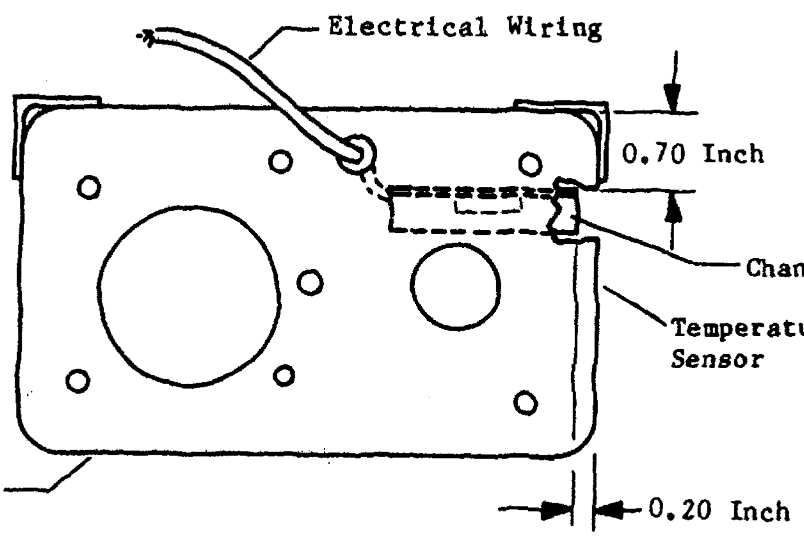
(1) Bond gasket to sensor box cover with type III or type IV adhesives as given in Chapter 20. Opening in gasket shall be over the opening in the temperature sensor box cover.
(2) Secure new sensor to channel using Delta Bond #152 epoxy manufactured by Tylan Corporation, Torrance, CA.
(3) Position the sensor in the temperature sensor box as shown in figure 201. Install cover. When cover is in place, the channel pads will hold the channel in place. Ensure that the channel is positioned as shown.
(4) Connect electrical wiring at splices.
(5) Install previously removed equipment.



35-107, 35-113 thru 35-161 and 36-032 thru 36-038

NOTE: Temperature sensor assembly gasket not shown for clarity.

35-634 and Subsequent, and 36-058 and Subsequent



Temperature Sensor Assembly (Ref)

View Looking Down on Sensor Assembly

35-162 and Subsequent and 36-039 and Subsequent

Temperature Sensor Installation
Figure 201

CABIN TEMPERATURE INDICATOR LIGHT CONTROL TERMINAL BOARD (TB 16) - MAINTENANCE PRACTICES

1. **Removal/Installation**

   A. Remove Terminal Board TB 16. _(Aircraft 35-659 thru 35-661)_ (See Figure 201.)

      (1) Remove electrical power from aircraft.

      (2) Remove equipment and furnishings as required to gain access to RH floorboards between frames 10 and 13.

      (3) Remove RH floorboards between frames 10 and 13 to access terminal board electrical box, mounted on forward side of frame 11.

      (4) Remove nuts securing terminal board electrical box to aircraft.

      (5) Remove screw and nut securing ground wire to frame 11.

      (6) Remove nuts securing TB 16 in box and using care not to lose insulator, remove TB 16 from box.

      (7) Tag electrical wires attached to terminals 9 and 10 of TB 16 and desolder wires.

      (8) Remove TB 16 and attaching parts from aircraft.

   B. Install Terminal Board TB 16. _(Aircraft 35-659 thru 35-661)_ (See Figure 201.)

      (1) Solder wires to terminals 9 and 10 of TB 16.

      (2) Install TB 16 and terminal board insulator into terminal board electrical box and secure with attaching hardware.

      (3) Secure terminal board electrical box to forward side of frame 11 with attaching hardware.

      (4) Using screw and nut secure ground wire to frame 11. Check electrical resistance between wire terminal and aircraft structure. Resistance shall not be greater than value specified in Chapter 20 of the Wiring Manual.

      (5) Restore electrical power to aircraft.

      (6) Perform operational check of pilot's instrument panel lighting and dimming control. (Refer to Chapter 33.)

      (7) Install RH floorboards and all removed equipment and furnishings.

   C. Remove Terminal Board TB 16. _(Aircraft 35-662 and Subsequent, 36-064 and Subsequent)_ (See Figure 202.)

      (1) Remove electrical power from aircraft.

      (2) Remove copilot's instrument panel. (Refer to Chapter 31.)

      (3) Remove nuts and screws securing TB 16 to right side of copilot's instrument panel pan.

      (4) Identify and tag electrical wires attached to terminals 9 and 10 of TB 16 and desolder wires.

      (5) Remove TB 16 and attaching hardware from aircraft, using care not to lose terminal board insulator.

   D. Install Terminal Board TB 16. _(Aircraft 35-662 and Subsequent, 36-064 and Subsequent)_ (See Figure 202.)

      (1) Solder wires to terminals 9 and 10 of TB 16.

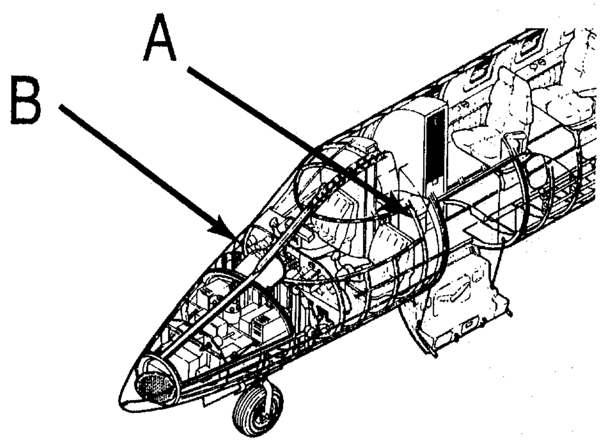
      (2) Install TB 16 and terminal board insulator on instrument panel and secure with attaching hardware.

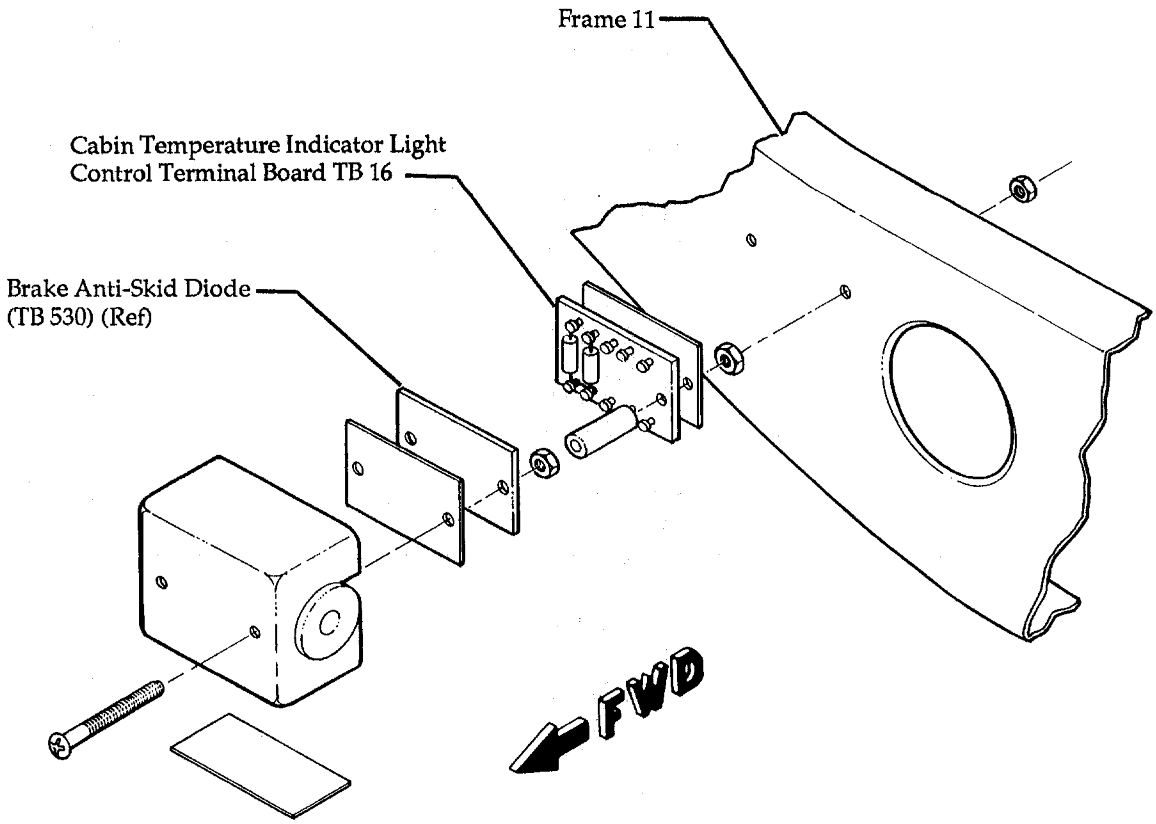
      (3) Install copilot's instrument panel. (Refer to Chapter 31.)

      (4) Restore electrical power to aircraft.

      (5) Perform operational check of copilot's instrument panel lighting and dimming control. (Refer to Chapter 33.)

      (6) Restore aircraft to normal.

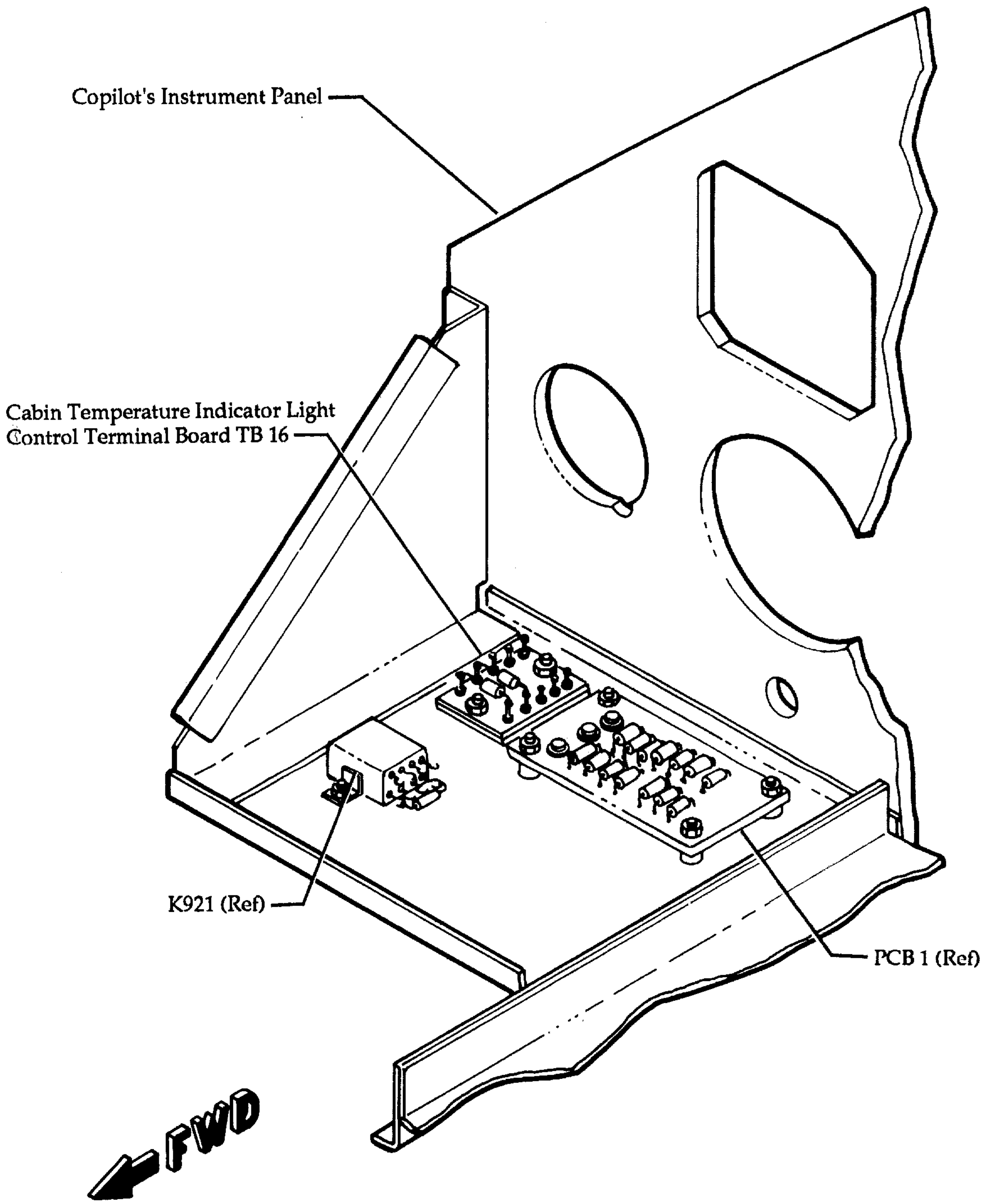




Detail A

9-198B

Cabin Temperature Indicator Light Control Terminal Board Installation
Figure 201



Detail B

9-445A

Cabin Temperature Indicator Light Control Terminal Board Installation
Figure 202

EFFECTIVITY: 35-662 AND SUBSEQUENT
36-064 AND SUBSEQUENT