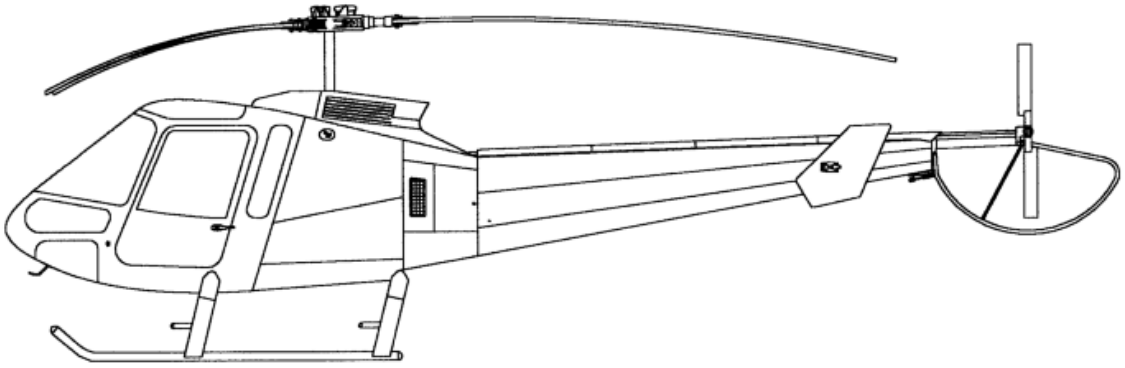
ENSTROM TH-28/480 SERIES MAINTENANCE MANUAL

SUPPLEMENT 1

ENSTROM 480/480B AIR CONDITIONING SYSTEM

P/N 4220176-( )



The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

This manual supplement supersedes all previous editions of the TH-28/480 Maintenance Manual Supplement 1 originally dated November 26, 1996.

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RECOMMENDED CHANGE REPORT

This maintenance manual is prepared and distributed by The Enstrom Helicopter Corporation and is intended for use by personnel responsible for maintaining Enstrom TH-28, 480, and 480B helicopters. This manual is periodically revised. If, in the opinion of the user, any information has been omitted or requires clarification, please direct your comments to Enstrom via this form (duplicate) or other similar form. Send the recommended changes to:

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ATTN: Technical Publications

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SECTION 1

INTRODUCTION

1-1. Aircraft Effectivity

A. The data presented in this TH-28/480 Series Maintenance Manual Supplement is applicable to all Enstrom 480 and 480B model helicopters equipped with the optional air conditioning system, Part Numbers 4222176-1, 4220176-2, 4220176-3, 4220176-5, 4220176-6, or 4220176-7.

1-2. Supplemental Changes and Revisions

A. Subsequent to the publication of the initial issue of this supplement, changes in the air conditioning equipment, support concepts and procedures, as well as information developed by experience may affect the contents of this supplement. To ensure that coverage in the supplement continues to reflect such changes, revised information is released by one of the following methods:

1. Revision - A revision alters portions of the manual by replacement, addition, and/or removal of pages.

2. Reissue - A reissue of this supplement will occur when the amount of changes warrants complete reissue.

1-3. Service Document Publications

1. Service Directive Bulletins - Used to direct the owner/operator and/or maintenance personnel to make mandatory changes, improvements, or inspections to the aircraft applicable to the entire or a segment of the aircraft fleet that are typically safety/airworthiness related. The information provided in the Service Directive Bulletins will be incorporated in the maintenance manual supplement as needed at a later date. At the time of incorporation, the Service Directive Bulletin is superseded by the maintenance manual supplement, and accomplishment or sign- off of the Service Directive Bulletin in the maintenance records book is no longer required. A detailed entry should be made in the maintenance records to indicate that the Service Directive Bulletin is superseded by the maintenance manual supplement.

2. Service Information Letters - Used to transmit information, recommendations, and general service instructions to the aircraft owner/operator and/or maintenance personnel applicable to the entire or a segment of the aircraft fleet. The information provided in the Service Information Letters will be incorporated into the maintenance manual supplement as needed at a later date.

3. Service Instructions – Used to provide the owner/operator and/or maintenance personnel with information that is applicable to specific aircraft and does not meet the criteria of a Service Information Letter or Service Directive Bulletin. Service Instructions will not be distributed to the entire fleet.

Service Information Letters and Service Directive Bulletins incorporated into the maintenance manual supplement are logged in the Service Information Letter Index or the Service Directive Bulletin Index (as appropriate) located on the Enstrom Helicopter website: www.enstromhelicopter.com (follow the applicable link under the Tech Publications section of the Technical Support page). Each index numerically lists all Service Information Letters and Service Directive Bulletins, respectively, and identifies those which have been incorporated into the maintenance manual supplement. All Service Information Letters and Service Directive Bulletins are also located under the Tech Publications section of the website.

Enstrom distributes maintenance manual supplement reissues and revisions in hardcopy form via mail to owners and operators who are registered with Enstrom. Notice of recently released Service Information Letters and Service Directive Bulletins is provided via a postcard mailing. Registration to receive publication mailings can be coordinated through Enstrom Product Support.

1-4. Application of Warnings, Cautions, and Notes

A. Throughout this supplement, it is necessary to highlight or emphasize important points to avoid injury to personnel, damage to equipment, or unnecessary confusion while performing maintenance procedures. The terms “WARNING”, “CAUTION”, and “NOTE” are used to draw attention to instructions or information deserving special consideration.

B.

WARNING

Calls attention to use of materials, processes, methods, procedures, or limits that must be followed to avoid injury to personnel.

C.

CAUTION

Calls attention to methods and procedures that must be followed to avoid damage to equipment.

D.

NOTE

Calls attention to information essential to highlight for clarification of procedures or to make a task easier.

SECTION 2

GENERAL INFORMATION

2-1. System Description

A. The air conditioning system, Part Number 4220176, is a vapor cycle type air conditioner consisting of a compressor, condenser, receiver/drier bottle, by-pass valve, two (4220176-1, -3, -5 or -7) or three (4220176-2 or -6) evaporator assemblies, plumbing, and electrical control equipment. The refrigerant used in this system is HFC R134a. Refer to Figure 2-1 for the general arrangement of the air conditioning system.

NOTE

Part numbers 4220176-1, -2, or -3 are applicable to aircraft with a 110 amp system (S/N 5133 and earlier). Part numbers 4220176-5, -6, or -7 are applicable to aircraft with a 150 amp system (S/N 5134 and subsequent).

B. The compressor, located on the left side of the lower pulley assembly, is a five cylinder, reed valve, wobble plate type air conditioner compressor. It is belt driven off the lower pulley assembly and is engaged electrically by a magnetic clutch. It is lubricated with oil carried by the refrigerant.

C. The condenser, located in the tail cone aft of the baggage box, is a tube-fin design with an axial flow cooling fan mounted directly above the condenser. The cooling fan draws fresh air supplied by two air scoops mounted on opposite sides of the tailcone. The condenser air exit is located at the bottom of the tailcone.

D. The receiver/drier bottle, located in the left side of the tailcone next to the condenser, is the system reservoir. The receiver/drier bottle contains a desiccant filter (silica gel) which serves to absorb moisture from the system.

E. The by-pass valve, located in the right side of the tailcone next to the condenser, is used to prevent evaporator heat exchanger freeze-up by controlling the minimum evaporator pressure (temperature). A thermally controlled switch, located in the left side forward evaporator assembly, controls the by-pass valve.

F. Two evaporator assemblies (4220176-1, -2, -5 and -6) are located in the nose of the helicopter. The evaporator assemblies are equipped with a centrifugal blower and a tube-fin heat exchanger. Cooled air is discharged via four adjustable vents, two located on each side of the instrument console. An optional third evaporator assembly (4220176-2 or -6) can be mounted behind the pilot's seat to provide additional cooling for occupants of the aft bench seat in the 480/480B. Cooling air from the third evaporator is ducted to vents located above the bench seat occupants. An optional single evaporator assembly (4220176-3 or -7) with a modified mount assembly allows compatibility of a litter installation in the nose of the helicopter. The litter compatible air conditioning option also consists of a second evaporator assembly (4220176-3 or -7) mounted behind the pilot’s seat to provide additional cooling.

G. The plumbing used in this air conditioning system consists of aluminum hard lines, medium pressure rubber flex lines, "B" nut pressure fittings, unions, and tees. Servicing ports are located on the left side of the aircraft above the aft crosstube. Plumbing schematic diagrams (A-1, A-2, and A-3) are located in the back of this supplement.

H. The air conditioner system is controlled by switches located in the center pedestal. The pilot can turn the system on, off, or select the evaporator blowers only. The pilot can also select high or low blower speeds. If the optional third evaporator assembly is installed, a separate switch for controlling blower speed is installed. Actual location of the air conditioning system switches in the 480B may change because of customer specified avionics installations.

The electrical system has a binary HI/LOW pressure switch, located on the receiver/drier bottle, wired in series with the compressor clutch. This switch is intended to protect the compressor in case of system over-pressure or loss of refrigerant. The switch operating pressures are:

Low pressure function -	opens at 30 psi (207 kPa) closes at 50 psi (345 kPa)
Hi pressure function -	opens at 335 psi (2310 kPa) closes at 280 psi (1931 kPa)

Electrical schematic diagrams (B-1, B-2, B-3, and B-4) are located in the back of this supplement.

2-2. Safety Precautions

A. The refrigerant used in the air conditioning system is HFC R134a. This refrigerant is non-explosive, non-flammable, non-corrosive, has practically no odor, and is heavier than air. Although R134a is classified as a safe refrigerant, certain precautions must be observed to protect parts involved and the person working on the unit.

B. Liquid R134a at normal atmospheric pressure and temperature evaporates so quickly that it tends to freeze anything that it contacts. Care must be taken to prevent any liquid refrigerant from coming in contact with the skin, especially the eyes. R134a is readily absorbed by most types of oil. Therefore, it is recommended a bottle of clean mineral oil and weak solution of boric acid be kept nearby when servicing the refrigerant system.

WARNING

This air conditioning system should only be serviced by qualified personnel.

WARNING

Always wear safety goggles when servicing any part of the refrigeration system. Should any liquid refrigerant get into the eyes, use a few drops of mineral oil to wash them out, then use a weak solution of boric acid to wash the eyes, and seek aid from a doctor immediately even though the irritation has ceased.

C. It is important to keep the system tightly sealed because the refrigerant system is always under pressure. Heat applied to any part of the refrigerant system would cause the pressure to build up excessively.

WARNING

To avoid explosion, never weld, use a flame-type leak detector, blow torch, solder, steam clean, bake an aircraft finish, or use excess amounts of heat on or in the immediate area of any part of the air conditioning system or refrigerant supply tank while they are closed to the atmosphere.

2-3. Equipment and Consumables

A. The proper equipment for maintaining and servicing the air conditioning system is required to keep the air conditioning system operating at peak efficiency. The following listed equipment is recommended for servicing the air conditioning system:

1) Recovery/Recycling/Recharging Station

Suggested Model: Robinair Model 34700 or equivalent
Montpelier, Ohio 43543
(800) 822-5561

2) HFC R134a Refrigerant Electronic Leak Detector

Suggested Model: Signstek Portable AC Refrigerant Halogen Gas Leakage Detector Tester with High Sensitivity
or equivalent

B. The following consumable items are required for properly maintaining and servicing the air conditioning system:

1) Refrigerant: DuPont HFC R-134a

CAUTION

Do not use PAG (polyalkylene glycol) lubrication oil in this air conditioning system. Only use polyester based lubrication oil.

NOTE

All polyester based lubricating oils may not be compatible with each other when mixed. Follow the oil manufacturer's instructions concerning mixing of oils.

NOTE

Refer to the "Log Record Sheets" provided with the aircraft and/or the maintenance records for the aircraft to determine the brand/type of lubricating oil used to service the air conditioning system.

2) Lubricating Oil: Texaco Capella HFC

NOTE

The green o-rings are used on the "Insert O-ring Fitting" type were the o-ring is installed on the male end of the fitting connection (line side with the "B" nut). The black o-rings are used on the "Face Seal O-ring Fitting" type were the o-ring is installed in the female side of the fitting connection.

3) O-rings: AIR 440-840 (Green) #6 size fitting
AIR 440-841 (Green) #8 size fitting
AIR 440-842 (Green) #10 size fitting
2-012-N1173 (Black) #6 size fitting
2-014-N1173 (Black) #8 size fitting

2-4. Suggested Spares List

A. The following spares list is for remote location operators or fleet aircraft equipped with the air conditioning system.

Table 2-1. Suggested Spares List

Item	Part Number
Condenser Blower	S-7050EC-5
Compressor	S-3008EC-6
Compressor Drive Belt (Gates)	7295
Receiver/Drier Bottle	804-279
Binary HI/LO Pressure Switch	ES57008-2

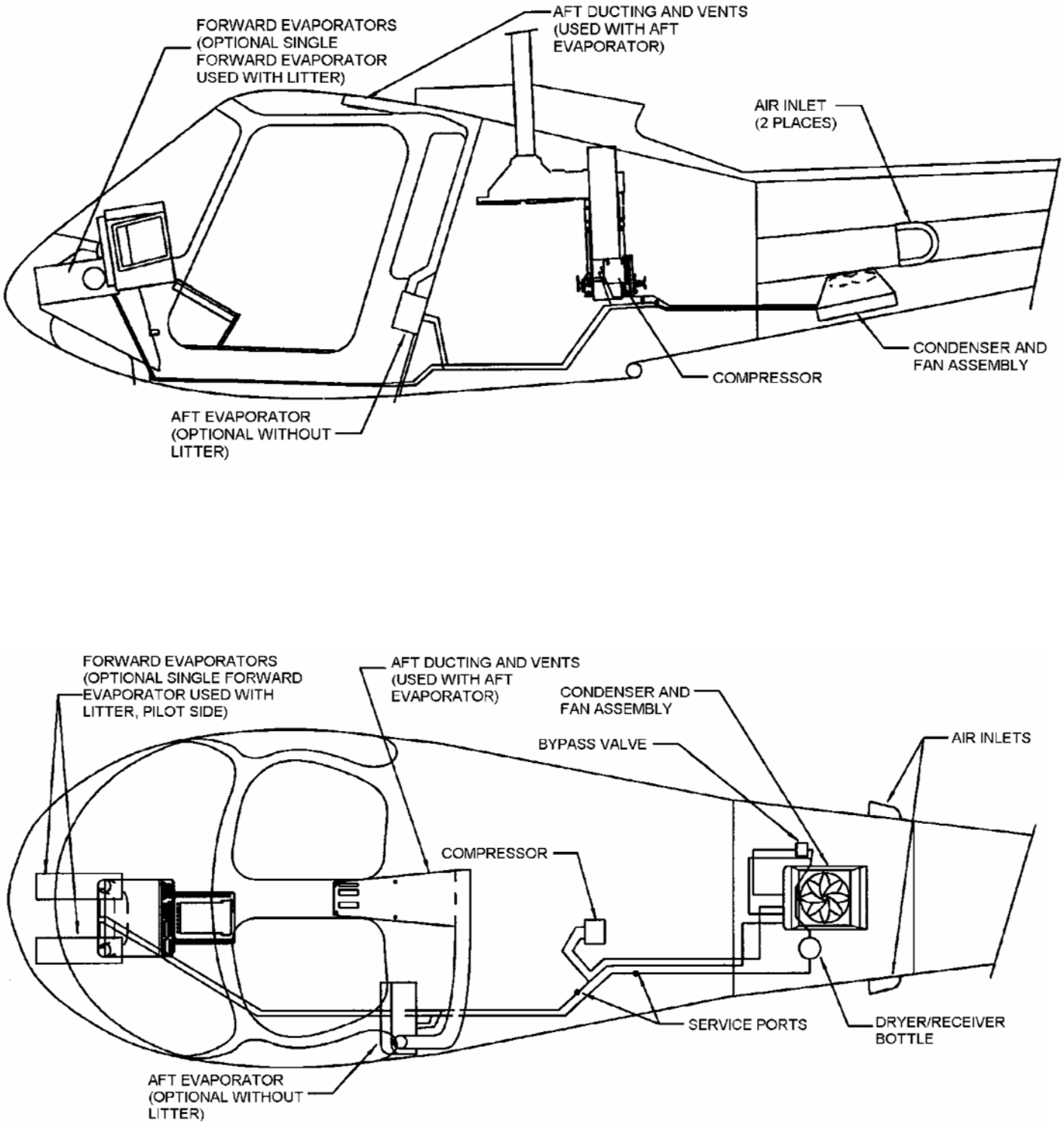
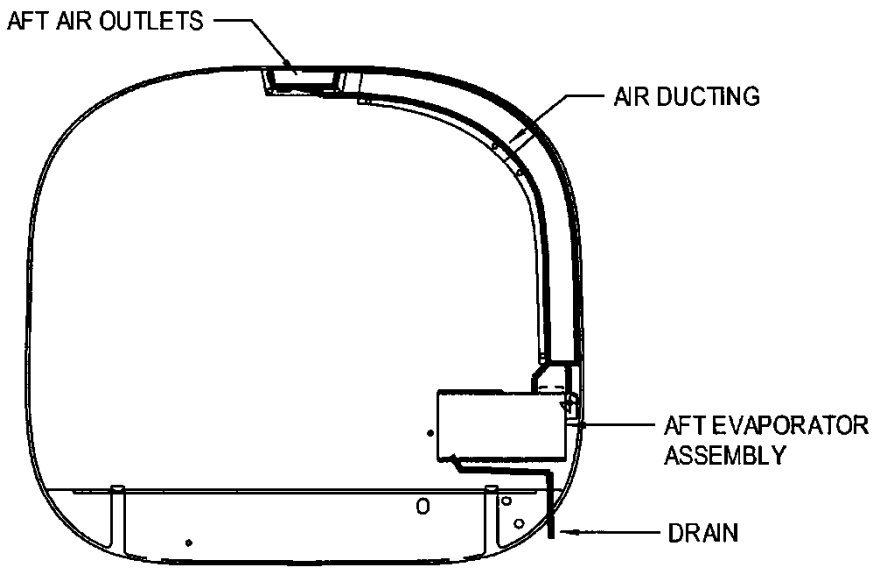


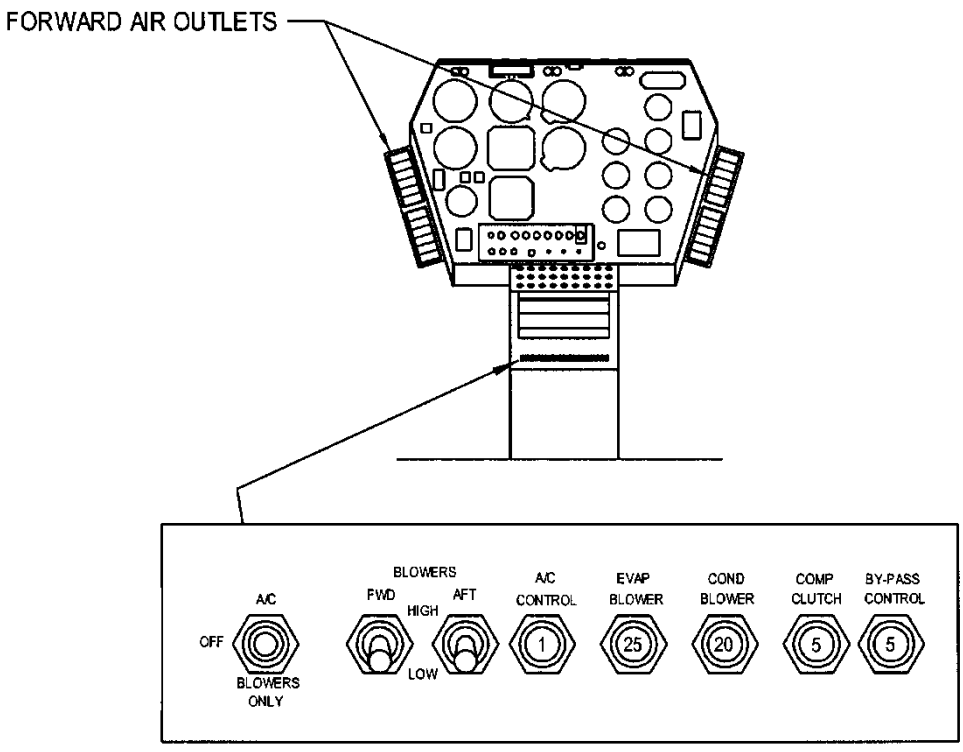
Figure 2-1. Air Conditioning System – General Arrangement

Fig	Part Number	Component	Quantity	EFF Code‡
2-1				
	4220176-1	Air Conditioning System Installation (Two Forward Evaporators)	REF	A
	4220176-2	Air Conditioning System Installation (Two Forward Evaporators, One Aft Evaporator)	REF	B
	4220176-3	Air Conditioning System Installation (One Forward Evaporator, One Aft Evaporator)	REF	C
	4220176-5	Air Conditioning System Installation (Two Forward Evaporators) (150-Amp System)	REF	D
	4220176-6	Air Conditioning System Installation (Two Forward Evaporators, One Aft Evaporator) (150-Amp System)	REF	E
	4220176-7	Air Conditioning System Installation (One Forward Evaporator, One Aft Evaporator) (150-Amp System)	REF	F
	S-6014EC-1	. Forward Evaporator, LH	1	
	S-6014EC-2	. Forward Evaporator, RH	1	A,B,D,E
	S-6014EC-3	. Aft Evaporator	1	B,E
	S-6014EC-4	. Aft Evaporator	1	C,F
	E480-300-10	. Compressor Assembly	1	
*Δ	S-3008EC-6	. . Compressor	1	
*	7295	. . Compressor Drive Belt	1	
	ES73187-1	. Condenser and Fan Assembly	1	
*	S-7050EC-5	. . Condenser Blower Unit	1	
	AN525-832R6	. . . Screw (Bracket Attachment)	2	
	AN960-8L	. . . Washer	2	
	AN364-832	. . . Nut	2	
	AN3H6A	. . . Bolt (Fan Shroud Attachment)	4	
	AN960-10L	. . . Washer	8	
	4220111-15	. . . Spacer	4	
	MS20995C20	. . . Safety Wire	A/R	
*	804-297	. Dryer/Receiver Bottle	1	
*	ES57008-2	. . Binary HI/LO Pressure Switch	1	
	ES26112-8	. Bypass Valve	1	
	ES26112-2	. . Bypass Bottle	1	
	AN526-832R6	. . . Screw	2	
	AN935-8	. . . Lockwasher	2	
	AN960-8L	. . . Washer	2	

‡ Effective for all 4220176 configurations if blank.
* Refer to Table 2-1 – Suggested Spares
Δ Refer to Figure 2-2



CABIN BACKWALL LOOKING AFT - 480/480B



AIR CONDITIONING SYSTEM CONRTOLS - 480

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Figure 2-1. Air Conditioning System – General Arrangement

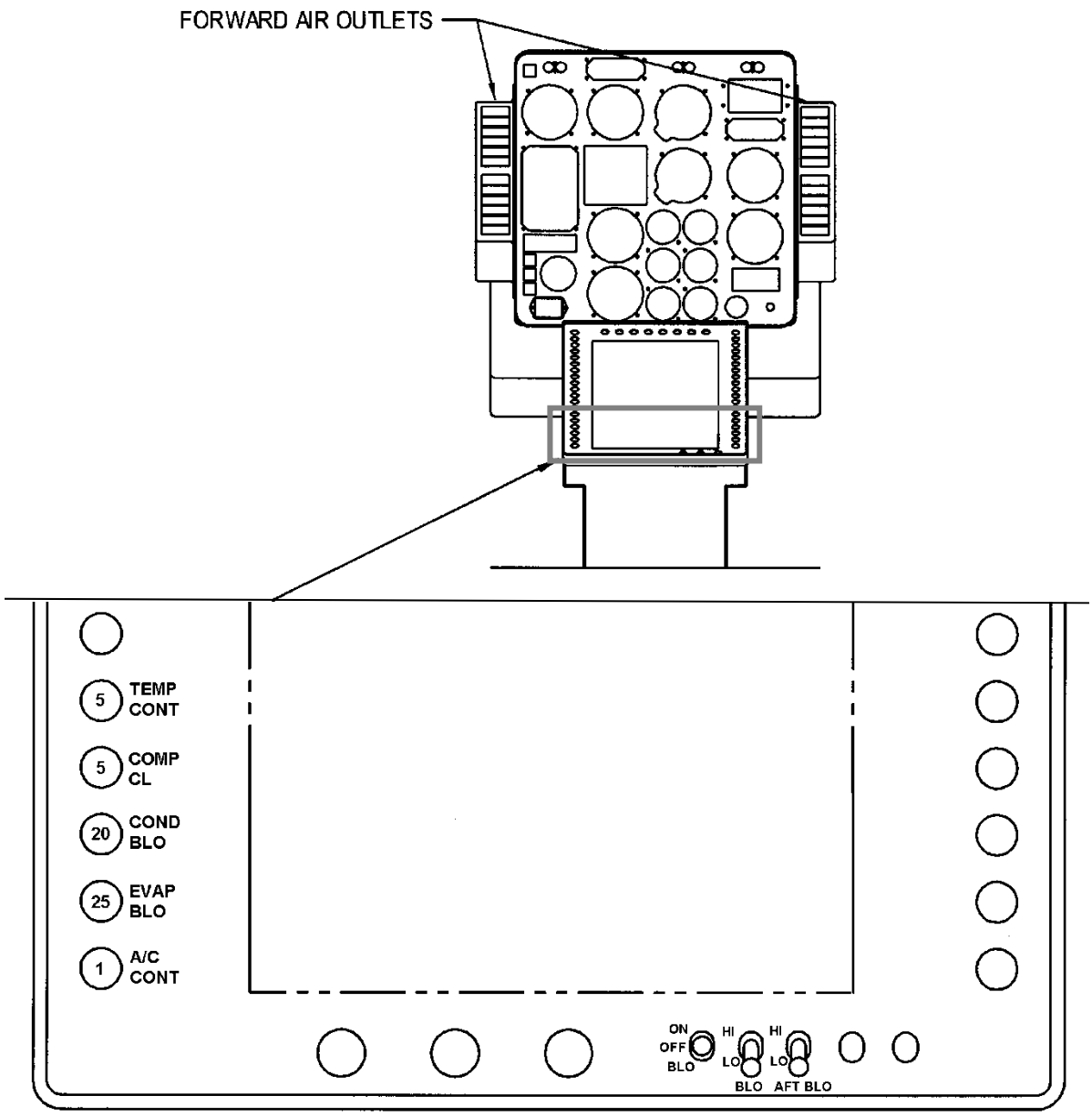

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Figure 2-1. Air Conditioning System – General Arrangement

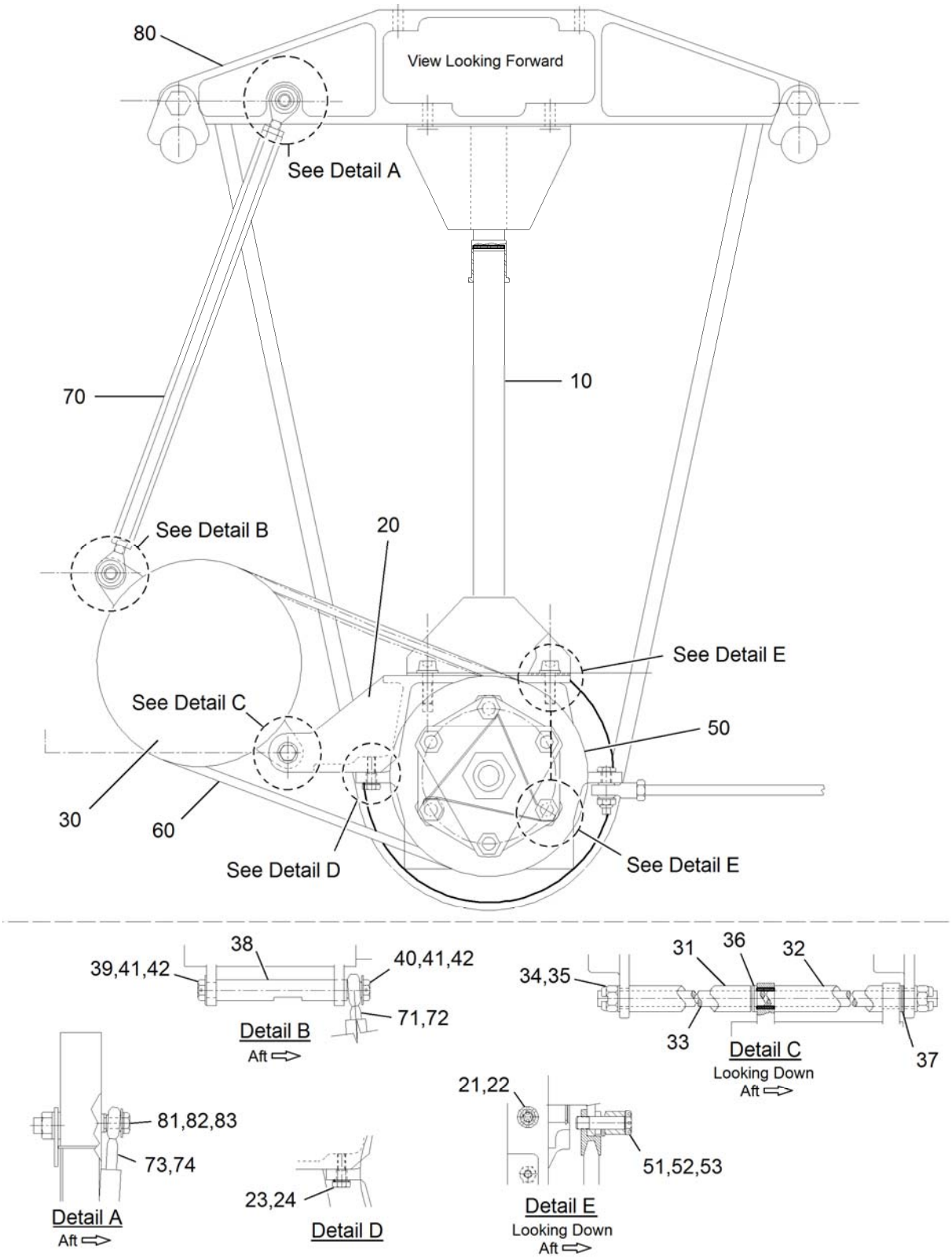

Figure 2-2. Compressor Installation

Fig Item	Part Number	Component	Quantity
2-2			
10	4130531-3	H-Strut Weldment	REF
20	4220175-1	. Bracket	2
21	NAS144DH-12	. . Bolt	4
22	MS20002C4	. . Washer	4
23	AN3-5	. . Bolt	2
24	AN960-10L	. . Washer	2
30	S-3008EC-6	. Compressor	REF
-	M81934/1-C014	. . Bushing	2
31	4220175-23	. . Spacer	1
32	4220175-21	. . Spacer	1
33	4220175-17	. . Threaded Rod	1
34	F12NE-4753-064	. . Slotted Nut	2
35	AN381-4-12	. . Cotter Pin	2
36	AN960-616	. . Washer	2
37	AN960616L	. . Washer (shim)	A/R
38	4220184-11	. . Shaft	1
39	AN4H3A	. . Bolt	1
40	AN4H10A	. . Bolt	1
41	¼ ID	. . Harper Washer	1
42	MS20995C20	. . Safety Wire	A/R
50	4220175-11	. Pulley	1
51	4220184-17	. . Bolt	3
52	4220184-15	. . Spacer	3
53	MS20995C32	. . Safety Wire	A/R
60*	7295	. . Belt	1
70	4220175-15	. Tie Rod	1
71	HMLVV-4M	. . Rod End	1
72	AN316-4L	. . Nut	1
73	HMVV-4M	. . Rod End	1
74	AN316-4R	. . Nut	1
80	4130511-3	. Truss Assembly	REF
81	AN4-7	. . Bolt	1
82	AN960-416L	. . Washer (truss side)	2
83	¼ ID	. . Harper Washer (under head)	1

- Item not illustrated
* Refer to Table 2-1 – Suggested Spares

SECTION 3

AIRWORTHINESS LIMITATIONS

3-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. All components of the air conditioning system are “on condition”.

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SECTION 4

LUBRICATION, SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

4-1. Lubrication

WARNING

This air conditioning system should only be serviced by qualified personnel.

A. The total system oil charge is 7.4 ± .5 oz. (219 ± 15 ml). The compressor is charged at the factory with 3.4 oz. (100.6 ml) of oil. An additional 4 oz. (118.4 ml) of oil should be added to the discharge line prior to system charging. The oil charge is continuously circulated by the refrigerant. Normally, it is not necessary to add additional oil unless a large amount of oil is lost due to sudden rupture of the line.

NOTE

Care should be taken to avoid spilling any of the compressor oil charge during installation. If this should occur, drain the oil and recharge the compressor to 3.4 oz. (100.6 ml).

NOTE

Refer to the "Log Record Sheets" provided with the aircraft and/or the maintenance records for the aircraft to determine the brand/type of lubricating oil used to service the air conditioning system.

4-2. Servicing

WARNING

This air conditioning system should only be serviced by qualified personnel.

WARNING

Always wear safety goggles when servicing any part of the refrigeration system. Should any liquid refrigerant get into the eyes, use a few drops of mineral oil to wash them out, then use a weak solution of boric acid to wash the eyes, and seek aid from a doctor immediately even though the irritation has ceased.

A. Connect the service manifold and vacuum pump to the service ports located on the left side of the helicopter near the aft crosstube.

B. Turn on the vacuum pump and open both valves on the service manifold to evacuate the system.

NOTE

When the pressure drops to 29.40 in Hg. (-1 bar) moisture vaporizes and is drawn out of the system. Complete removal of moisture is important to prevent blockage of the expansion valves by ice.

C. After the system has been evacuated, close both service manifold valves and then turn off the vacuum pump. If the system will not hold a vacuum, the system has a fitting leak. All fittings should be checked to insure that they are tight. It might be necessary to charge the system with 60-80 psi (414-552 kPa) of refrigerant and conduct a leak check survey with an electronic leak detector and/or soap solution.

NOTE

The system must be leak free to ensure trouble free operation of the air conditioning system.

D. After the system is proven "leak free", evacuate the system for at least 30 minutes.

E. Charge the system with HFC R-134a refrigerant. The two evaporator system (-1) uses approximately 2.4 lbs (1.1 kg) of refrigerant. The three evaporator system (-2) uses approximately 2.6 lbs (1.2 kg) of refrigerant.

F. Test run the air conditioning system after charging. Adjust the system charge if required to achieve the pressures shown in Table 4-1.

Table 4-1. System Pressures

Ambient Temp °F (°C)	High Pressure Gauge Reading PSI (kPa)	Suction (Low) Pressure Gauge Reading PSI (kPa)
55 (12.8)	95-115 (655-793)	30-40 (207-276)
60 (15.6)	105-125 (724-862)	30-40 (207-276)
65 (18.3)	115-135 (793-931)	30-40 (207-276)
70 (21.1)	130-150 (896-1034)	30-40 (207-276)
75 (23.9)	150-170 (1034-1172)	30-40 (207-276)
80 (26.7)	165-185 (1138-1276)	30-40 (207-276)
85 (29.4)	175-195 (1207-1345)	30-40 (207-276)
90 (32.2)	185-205 (1276-1413)	30-40 (207-276)
95 (35.0)	210-225 (1448-1551)	30-40 (207-276)
100 (37.8)	220-240 (1517-1655)	30-40 (207-276)
105 (40.6)	240-260 (1655-1793)	30-40 (207-276)

4-3. Troubleshooting

A. Prior to troubleshooting a defective system, conduct a visual inspection for general condition. Inspect the condenser fins for damage, comb out bent fins. Check the system circuit breakers located in the center pedestal.

B. The following step by step procedure lists the easiest checks and most likely problem sources for a system that is not working properly.

1) With the engine off, turn the system control switch to "BLOWERS ONLY" and make sure all the evaporator blowers work in "HIGH" and "LOW" modes. Pull the "EVAP BLOWER" circuit breaker, turn the system control switch to "A/C" and check that the condenser blower is working. Pull the "COND BLOWER" circuit breaker, position the control switch to "OFF" and then back to "A/C" and listen for engagement of the compressor clutch.

2) Connect the service manifold to the servicing station and purge the air from the manifold lines. The static pressure should read as shown in Table 4-1 for the appropriate temperature. If the pressure is 10 psi (69 kPa) or more lower than the table specifies, the system most likely has a leak. If the pressure is other than the table specifies, it should be checked with the compressor running. Start the aircraft and run at 101% N_2 with the air conditioner on. After several minutes, check the system pressures.

3) If the cooling loss is limited to only one evaporator, it is most likely a defective expansion valve. Loss of cooling in all evaporators (assuming no problems were found in steps 1 or 2) could be caused by a refrigerant flow blockage at the expansion valves. This blockage could be dirt or ice. Replacement of the receiver/drier bottle and a complete system evacuation might be a fix (remove the possibility of ice at the expansion valves).

4) If the system will not maintain the pressures and there are no system leaks, the problem could be a failed compressor. The compressor must then be replaced.

C. The following troubleshooting guide is for other problems associated with the air conditioning system.

Table 4-2. System Troubleshooting Guide

	Problem	Cause	Solution
1.	Premature belt failure or belt slipping off the pulley	a. Belt loose	a. Install new belt/adjust tension
		b. System over charged	b. Adjust system charge
		c. Compressor pulley is not aligned	c. Adjust pulley alignment
2.	Condenser blower circuit breaker blows	a. Probable cause - overheating of condenser blower motor	a. Replace condenser blower. Check for loose or rubbing fan
3.	Water (Condensate) in the area of the evaporators	a. Evaporator box not sealed	a. Seal evaporator box
		b. Drain line not properly installed	b. Properly install drain line
4.	Conditioned air outlet louvers broken/loose		a. Replace louvers
5.	Evaporator coil freeze up	a. Failure of by-pass valve or thermostat switch in left side evaporator assembly	a. Replace by-pass valve or left side evaporator assembly
6.	System not cooling	a. Loss of refrigerant	a. Evacuate system, leak check, and recharge
		b. Water in system	b. Replace receiver/drier bottle, evacuate system, and recharge

4-4. Periodic Inspections

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

4-5. Periodic Inspection Checklist

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	

AIR CONDITIONING SYSTEM PERIODIC INSPECTION GUIDE	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect evaporator assemblies for condition, security of installation, proper operation of blowers, and condition of drain lines.	_____
2. Inspect the ducting for condition and security of installation.	_____
3. Inspect the condenser blower for condition, security of installation, and proper operation.	_____
4. Inspect the condenser for condition and security of installation.	_____
5. Inspect the compressor and mount for condition and security of installation.	_____
6. Inspect the compressor drive belt for proper tension and wear.	_____
7. Check the alignment of the compressor drive belt pulley to the lower pulley.	_____
8. Inspect the receiver/drier bottle for condition and security of installation.	_____
9. Inspect the by-pass valve for condition and security of installation.	_____
10. Inspect the air conditioning lines for condition and security of installation.	_____
11. Inspect placards for installation and legibility.	_____
12. Inspect air conditioning electrical system for condition, security of installation, and proper operation.	_____

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SECTION 5

SYSTEM MAINTENANCE

5-1. Belt Replacement and Adjustment, Pulley Alignment

A. Replace the compressor drive belt using the following procedure.

NOTE

Refer to the TH-28/480 Series Maintenance Manual for maintenance procedures related to the airframe and/or aircraft systems.

1) Remove the baggage compartment access door, transfer duct access panel, and the forward sheet metal panels from the baggage compartment.

2) Remove the left side transfer duct and the intermediate drive shaft from between the lower pulley assembly and the oil cooler blower.

3) Loosen the jam nuts on the tie rod located between the compressor and the support truss, remove the upper bolt from the tie rod end to the support truss, and remove the tension from the drive belt (Figure 2-2).

4) Remove the drive belt from the compressor pulley and the pulley on the lower pulley assembly (Figure 2-2).

5) Install the new belt by reversing the removal process.

6) Verify the compressor pulley alignment (para. 5-1,C).

7) Adjust the belt tension (para. 5-1,B).

8) Verify the compressor pulley alignment (para. 5-1,C).

NOTE

Reset the belt tension after two hours of operation with a new belt.

9) Reinstall the transfer duct, intermediate drive shaft, and access panels.

WARNING

The following checks are to be performed by authorized personnel.

10) Ground run the aircraft and perform a functional check of the air conditioning system.

NOTE

Refer to the air conditioning supplement in the applicable Rotorcraft Flight Manual.

B. Proper compressor drive belt tension is important to insure long belt service life. Use the following procedure to set the belt tension.

NOTE

Refer to the TH-28/480 Series Maintenance Manual for maintenance procedures related to the airframe and/or aircraft systems.

1) Remove the baggage compartment access door, transfer duct access panel, and the forward sheet metal panels from the baggage compartment.

2) Remove the left side transfer duct.

3) Using a spring scale and a straight edge, adjust the belt tension using the tie rod, located between the compressor and support truss, until the belt deflection is approximately .1" (2.5 mm) with 3 lbs. (1.4 kg) of force applied with the spring scale (Refer to Figure 5-1).

4) Reinstall the transfer duct and access panels.

WARNING

The following checks are to be performed by authorized personnel.

5) Ground run the aircraft and perform a functional check of the air conditioning system.

NOTE

Refer to the air conditioning supplement in the applicable Rotorcraft Flight Manual.

NOTE

Check/Reset the belt tension after two hours of operation with a new belt.

C. Proper compressor pulley alignment is important to insure long belt service life. Use the following procedure to adjust the pulley alignment.

1) Position the pulley alignment tool, T-0184-11, along the aft surfaces the compressor pulley and the drive pulley (Figure 5-2).

2) If a gap is present between the compressor pulley and the tool, shim at locations **A** or **B** with AN960616L washers, as required. To add shims, remove the nuts on the lower compressor support rod. Remove rod and spacers and add shims. Ensure that the spacers are positioned properly when reassembling (longer spacer is forward and the shorter spacer is aft) (Refer to Figure 5-2).

NOTE

After the compressor pulley alignment is accomplished, the nuts installed on the lower compressor support rod must be torqued (Figure 5-2, Item 34).

3) Torque the nuts to 160-190 in-lb/18.1-21.4 Nm and safety.

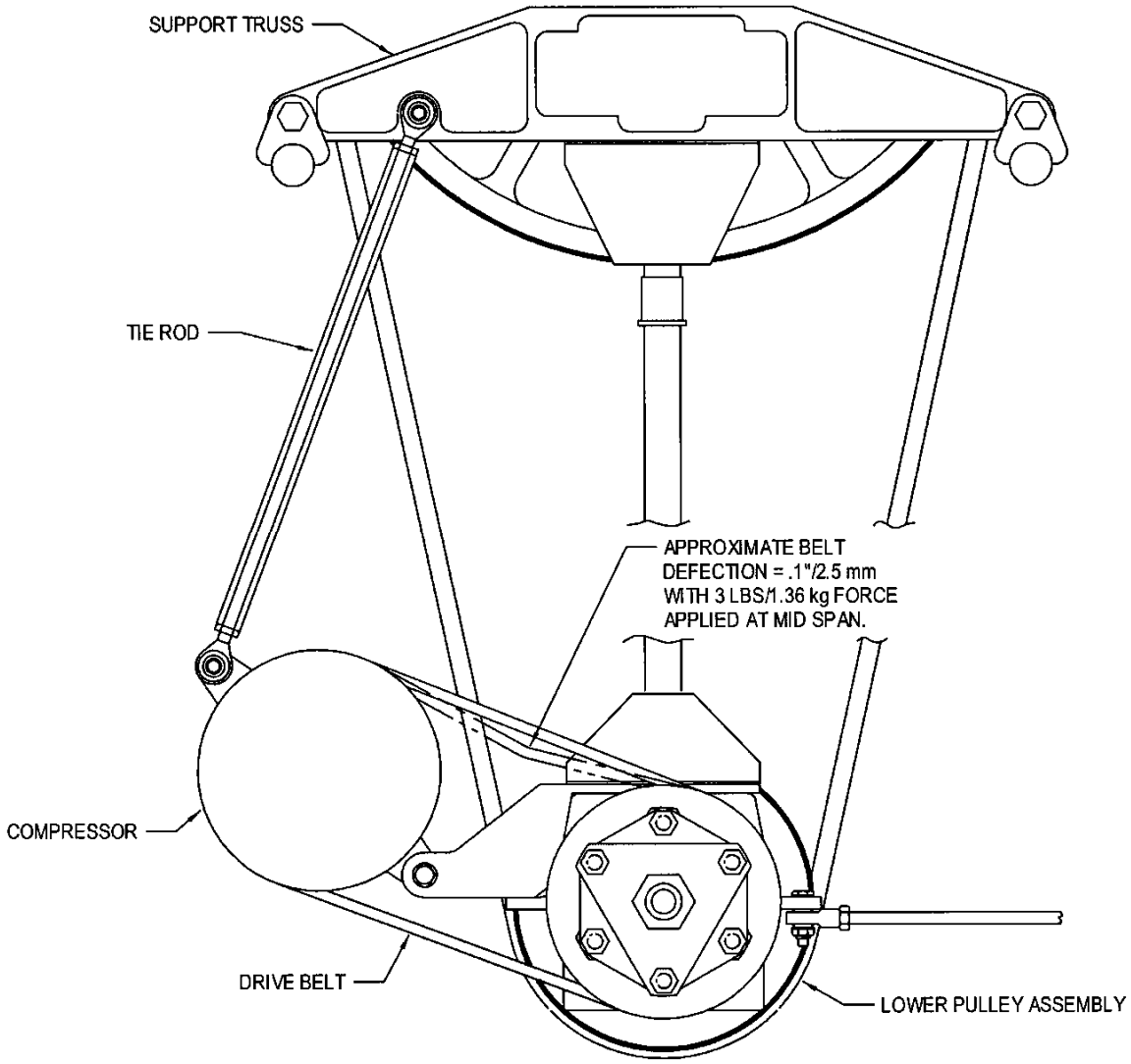


Figure 5-1. Belt Tensioning

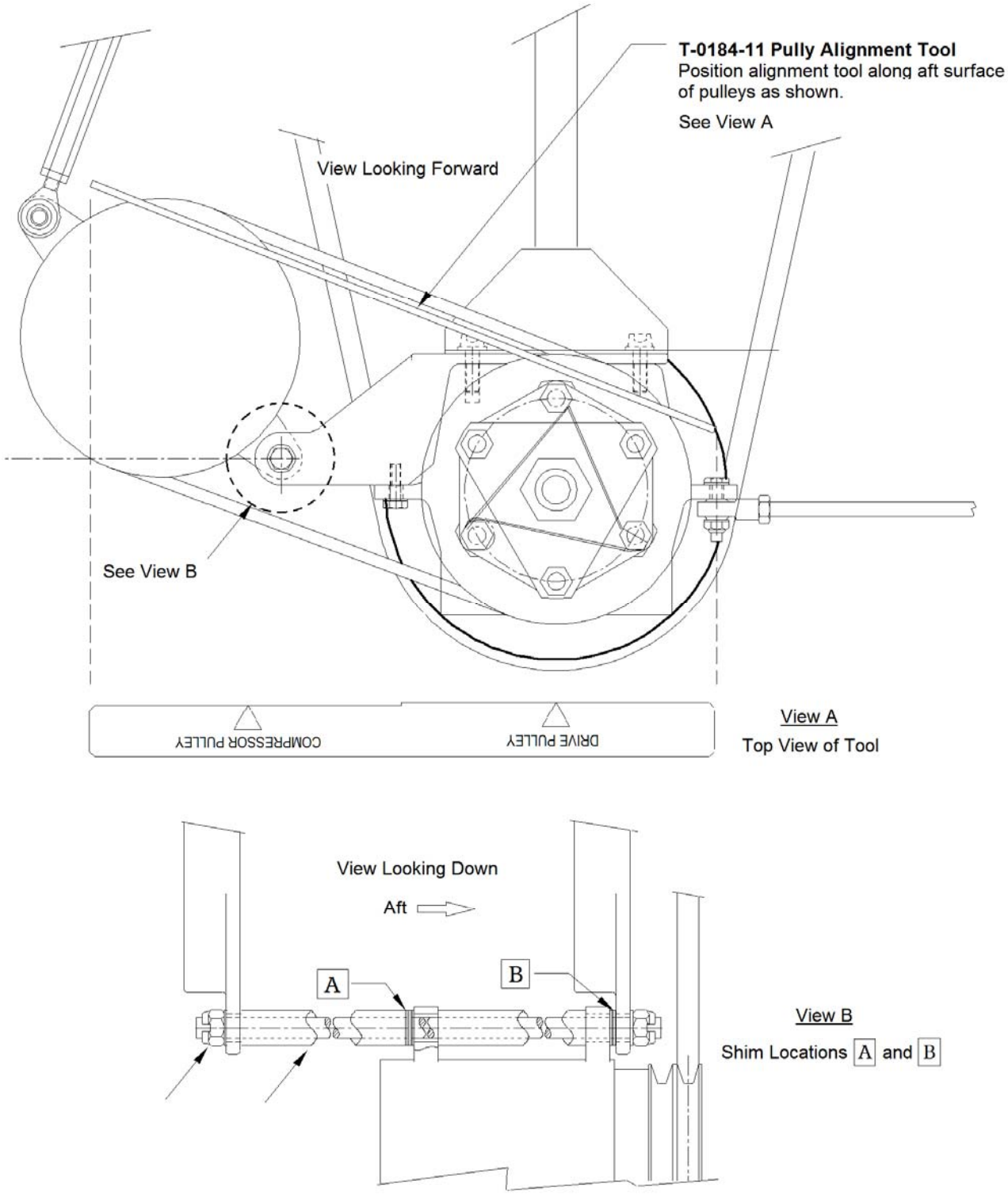


Figure 5-2. Pulley Alignment Tool Position, Shim Locations

5-2. Refrigerant Fitting Installation

A. Two types of refrigerant plumbing fittings are used in the air conditioning system. The first is an "Insert O-ring Fitting". The location of this type of fitting is marked by this symbol "●" on the plumbing schematics in Appendix A. The other type of fitting is a "Face Seal O-ring Fitting". The location of this type of fitting is marked by this symbol " ¤ ". Refer to the following paragraphs for instructions on installing the fittings.

NOTE

A light coat of refrigerant oil should be applied to all O-rings and to the face of the flare fittings prior to assembly.

B. Install the “Insert O-ring Fitting” as follows:

NOTE

The O-rings used with the "Insert O-ring Fitting" are green in color.

1) Apply a light coat of refrigerant oil to the O-ring and the female fitting.

2) Install the O-ring onto the male side of the fitting (hose).

3) Slide the "B" nut back away from the male fitting and carefully insert the male fitting into the female fitting. Be careful to maintain alignment and do not pinch the O-ring when connecting the fittings.

NOTE

The male fitting should seat fully against the female fitting without the O-ring being pinched between.

4) Hold the fittings together while sliding the "B" nut forward and engaging the threads. Tighten the "B" nut and torque to the specifications in Table 5-1.

Table 5-1. Fitting Torque Specifications

Fitting Size	Torque
#6	30-35 in-lbs (3.4-3.9 Nm)
#8	40-45 in-lbs (4.5-5.1 Nm)
#10	50-55 in-lbs (5.7-6.2 Nm)

C. Install the "Face Seal O-ring Fitting" as follows:

NOTE

The O-rings used with the "Face Seal O-ring Fitting" are black in color.

1) Apply a light coat of refrigerant oil to the O-ring and install the O-ring into the female fitting.

2) Assemble and tighten the fitting. Torque the fitting as specified in the previous sub-paragraph.

D. Leak check the system after the fittings are assembled. Torque seal (paint stripe) the "B" nuts after the system is sealed.

5-3. Leak Check

NOTE

Identification and elimination of any system fitting leaks is extremely important to insure a trouble free system.

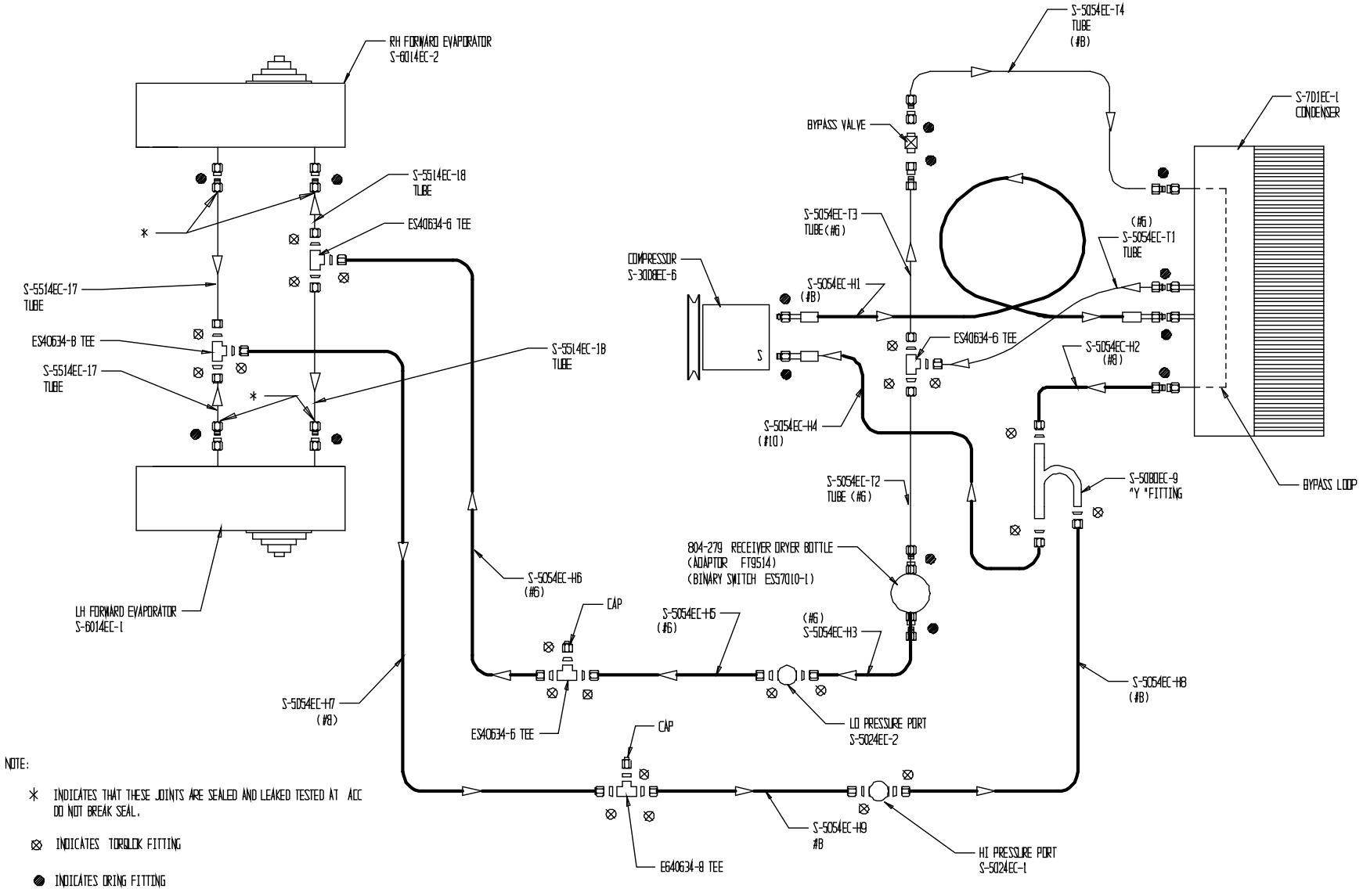
A. A system which contains a partial charge can be leak tested and recharged without evacuating the system. The system can be pressurized with nitrogen or R134a refrigerant. An evacuated system should be filled to a pressure of 60-80 psi (414-552 kPa) of refrigerant or 150 psi (1034 kPa) of nitrogen prior to leak testing. The system should be leak tested using a combination of soap solution and an electronic leak detector.

NOTE

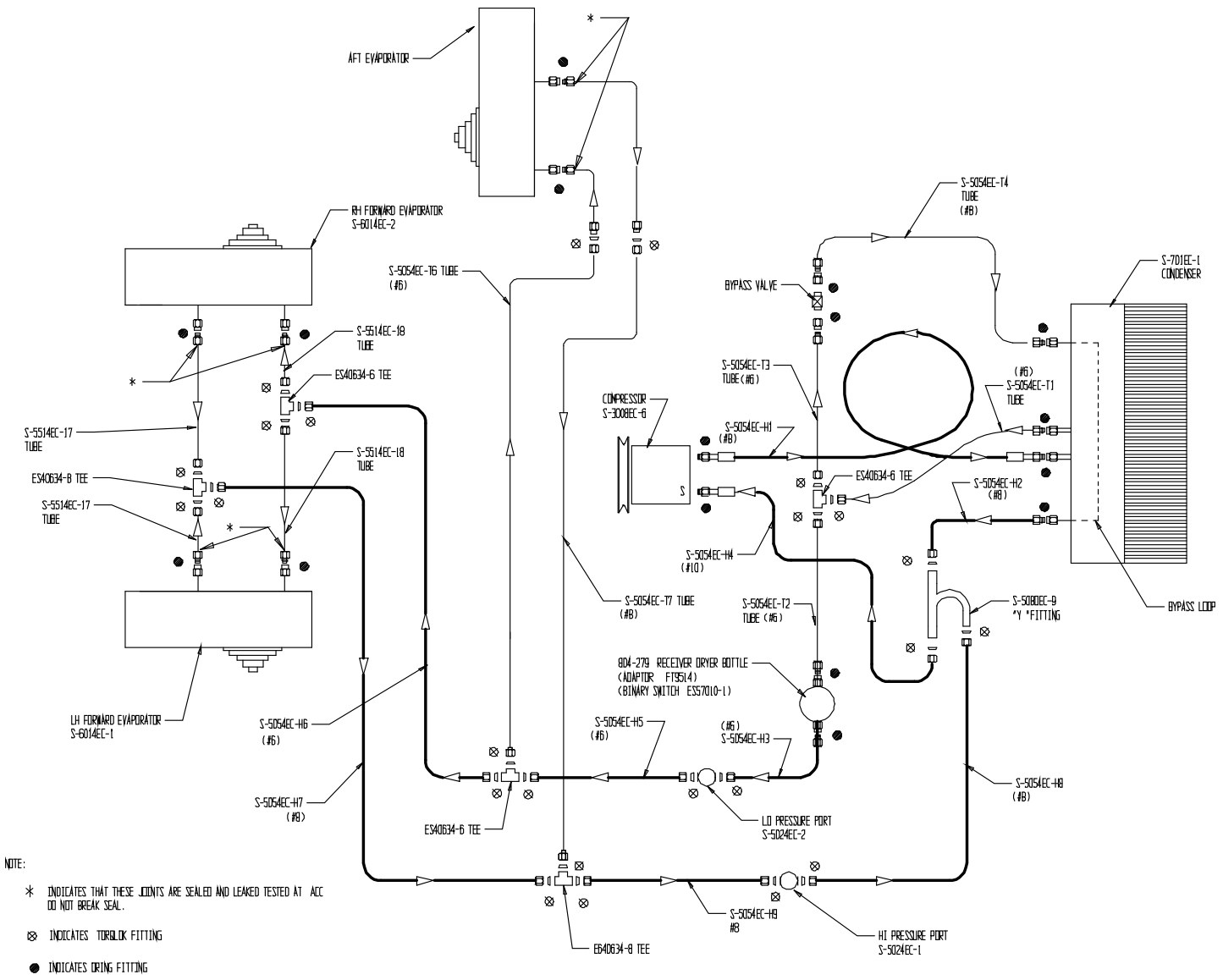
Do not use compressed air for the leak check. Compressed air can introduce moisture into the system which will cause it to operate poorly or not at all.

B. The initial leak check can be accomplished using a nitrogen pressure charge and a soap solution. Each fitting should be checked and repaired prior to charging the system with refrigerant.

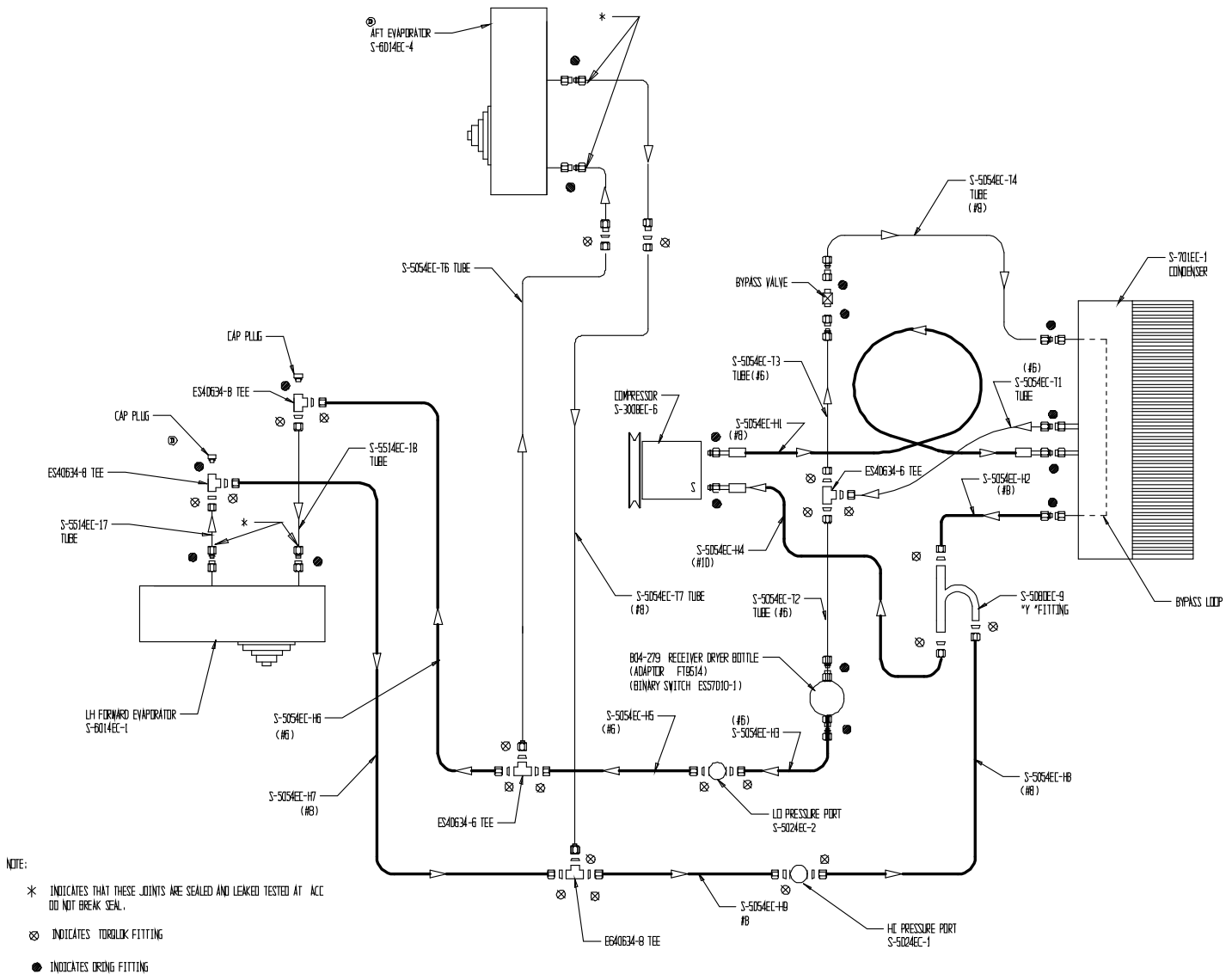
C. Once the nitrogen check is complete, the system must be checked with a refrigerant charge. Evacuate the system and service to 60-80 psi (414-552 kPa) with refrigerant. Use an electronic leak detector to check each connection in the system. Since the refrigerant is heavier than air, leaks are most likely detected on the underside of hoses and fittings. Refrigerant will also collect in low areas and give an erroneous leak indication. Directing a stream of shop air through the area just prior to testing will help to eliminate any erroneous indications. If a leak is detected at an O-ring fitting, reclaim the system and install a new O-ring. A small amount of leakage, about one ounce (.03 kg) per year, past the compressor shaft seal is normal. Most electronic leak detectors are sensitive enough to show a leak of this magnitude.



A-1. Plumbing Schematic Diagram – Two Evaporator System (Two Forward), P/N 4220176-1



A-2. Plumbing Schematic Diagram – Three Evaporator System (Two Forward, One Aft), P/N 4220176-2



A-3. Plumbing Schematic Diagram – Two Evaporator, Litter Compatible System (One Forward, One Aft), P/N 4220176-3

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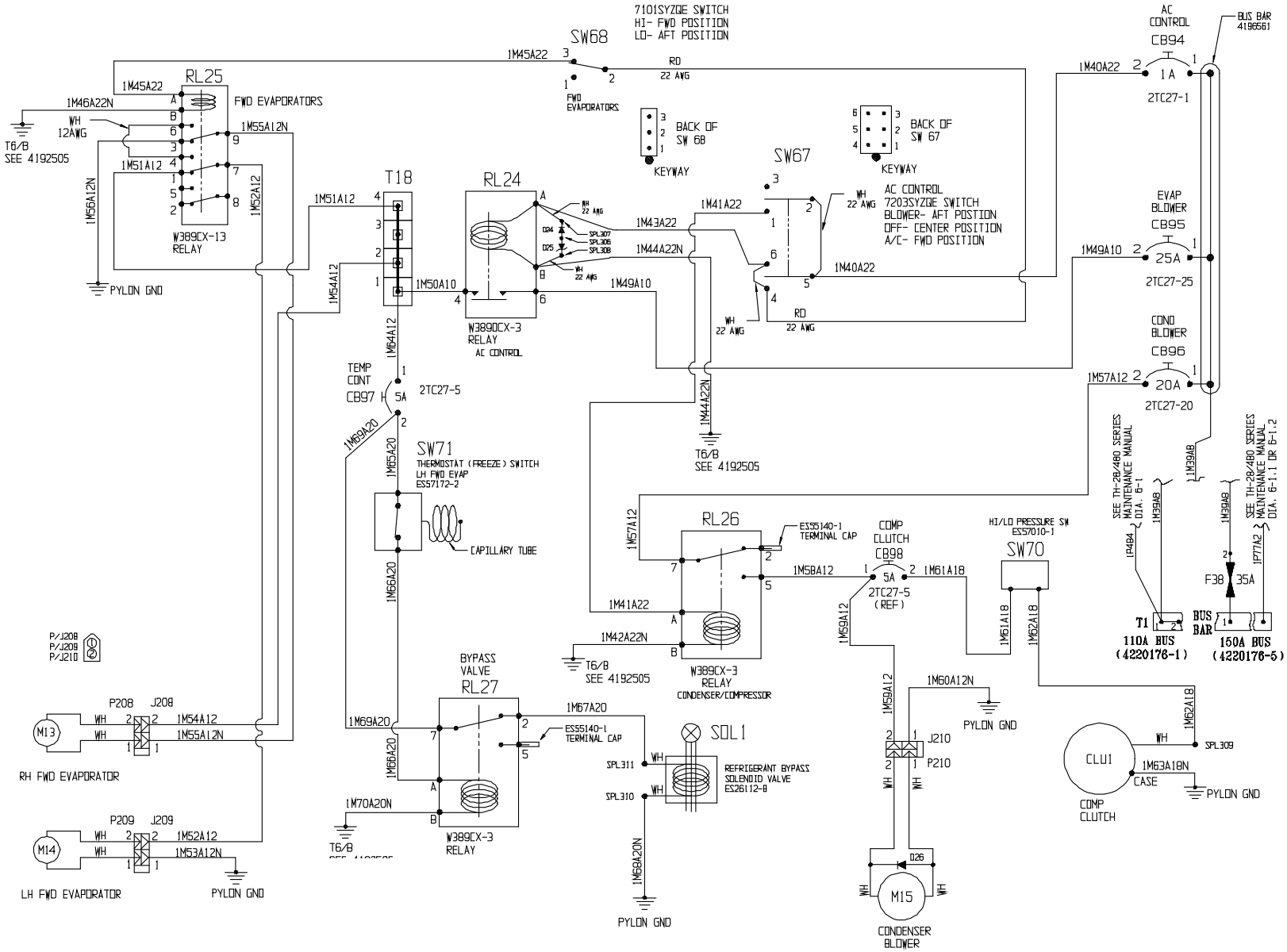
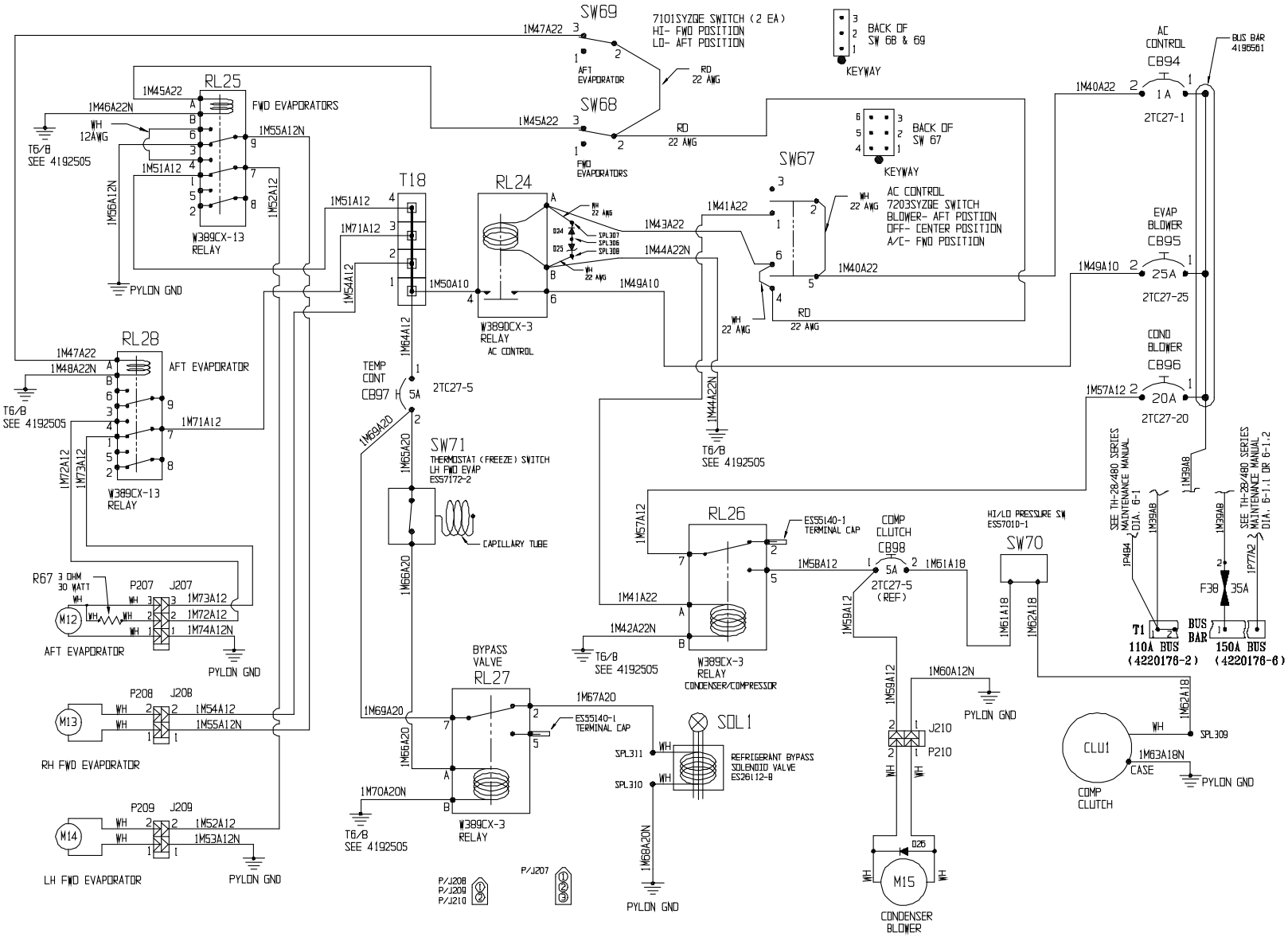
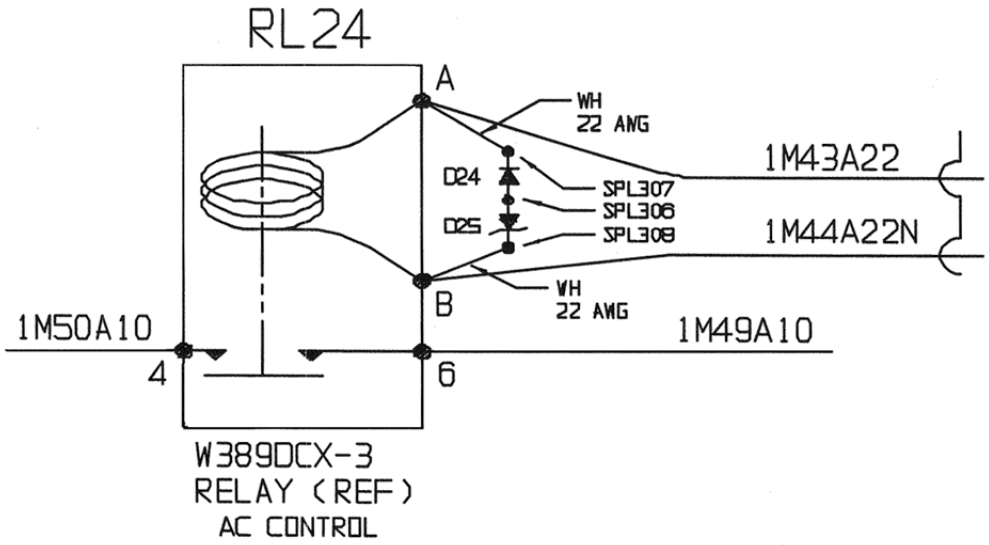


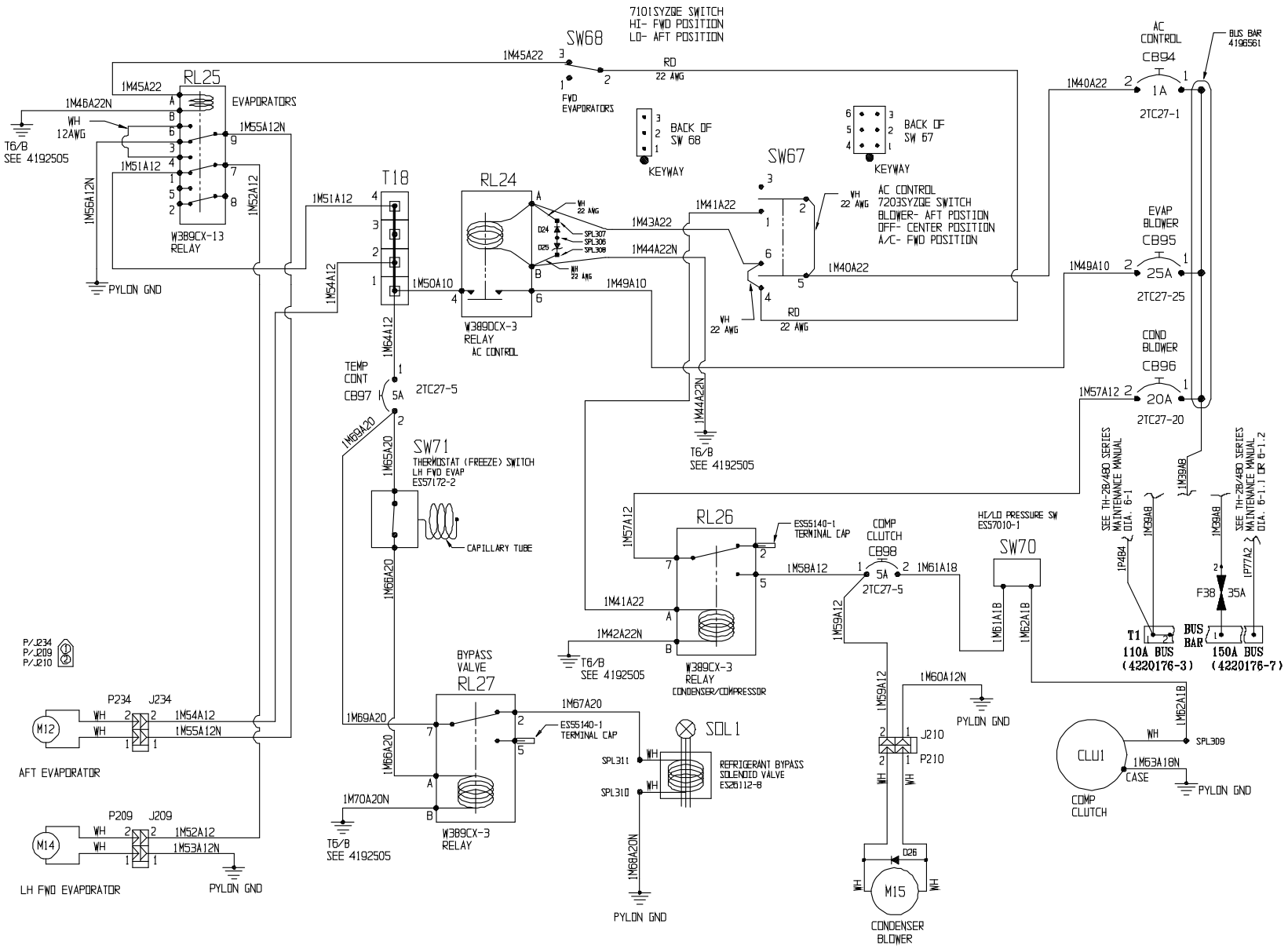
B-1. Electrical Schematic Diagram – Two Evaporator System (Two Forward), P/N 4220176-1 or 4220176-5



B-2. Electrical Schematic Diagram – Three Evaporator System (Two Forward, One Aft), P/N 4220176-2 or 4220176-6



B-3. Electrical Schematic Diagram – Transient Suppression Circuitry



B-4. Electrical Schematic Diagram – Two Evaporator, Litter Compatible System (One Forward, One Aft), P/N 4220176-3 or 4220176-7