installation
operation
and
maintenance
instructions

HP16 Series Units

HEAT PUMP UNIT

501,890M
7/85
Supersedes 12/84

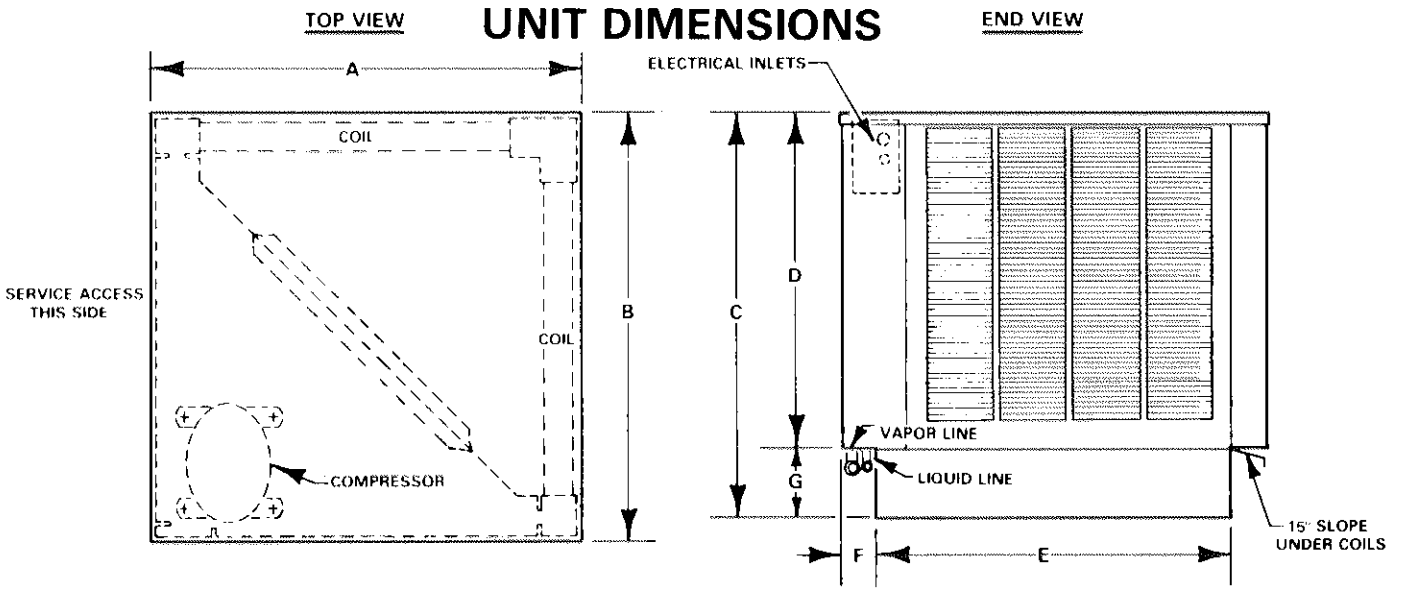
RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE

Litho USA

LENNOX Industries Inc.

TABLE OF CONTENTS

UNIT DIMENSIONS



HP 16

MODEL NO.	A		B		C		D		E		F		G	
	IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM
HP16-211V HP16-261V	32-1/8	816	32-1/8	816	29	736	24-1/4	616	25-1/2	648	3-1/4	83	4-3/4	121
HP16-311V	34-1/8	867	34-1/8	867	29	736	24-1/4	616	27-1/2	699	3-1/4	83	4-3/4	121
HP16-410V HP16-460V	36-1/8	918	36-1/8	918	33	838	28-1/4	718	29-1/2	749	3-1/4	83	4-3/4	121
HP16-510V HP16-650V	40	1016	40	1016	35	889	30-1/4	768	33-3/8	848	3-1/4	83	4-3/4	121

START-UP AND PERFORMANCE CHECK LIST

Job Name _____ Job No. _____ Date _____
Job Location _____ City _____ State _____
Installer _____ City _____ State _____
Unit Model No. _____ Serial No. _____ Serviceman _____

ELECTRICAL

Nameplate Voltage _____
Minimum Circuit Ampacity _____
Maximum Fuse Size _____
Electrical Connections Tight?
Supply Voltage (Unit Off) _____

HEAT PUMP SECTION

Refrigerant Lines:
Leak Checked Properly Insulated
Service Valves Backseated
Outdoor Fan Checked

Voltage with Compressor Operating _____
Amps:
Supply _____ Outdoor Fan _____
Compressor _____
Indoor Filter Clean? Indoor Blower RPM _____
S.P. Drop Over Indoor Coil (Dry) _____
Outdoor Coil Entering Air Temperature _____
Discharge Pressure _____ Suction Pressure _____

THERMOSTAT

Calibrated Level

REQUIREMENTS — APPLICATION — INSTALLATION

I - SHIPPING AND PACKING LIST

Package 1 of 1 contains:

1 - Assembled unit

1 - Compressor Warning Sticker

II - GENERAL

These instructions are intended as a general guide and do not supersede local codes in any way. Authorities having jurisdiction should be consulted before installation.

III - SHIPPING DAMAGE

Check unit for shipping damage. The receiving party should contact last carrier immediately if any damage is found.

IV - APPLICATION

HP16heat pump units are approved and warranted only for installation with specially matched indoor coils, L10 line sets, and refrigerant control devices as designated by Lennox. Refer to the Lennox Engineering Handbook for approved systems.

V - CLEARANCES

Refer to Figure 1 and provide service and air flow clearances as follows:

1 - Coil inlet - A minimum of 18 inches (457 mm) should be provided between the coil inlet and any building surfaces, fences or other vertical obstructions.

2 - Coil outlet - Provide at least 4 feet (1.22 mm) between the coil outlet and any building surfaces, fences or other vertical obstructions.

3 - Service access - Allow a minimum of 3 feet (0.91m) clearance on the service access side of unit.

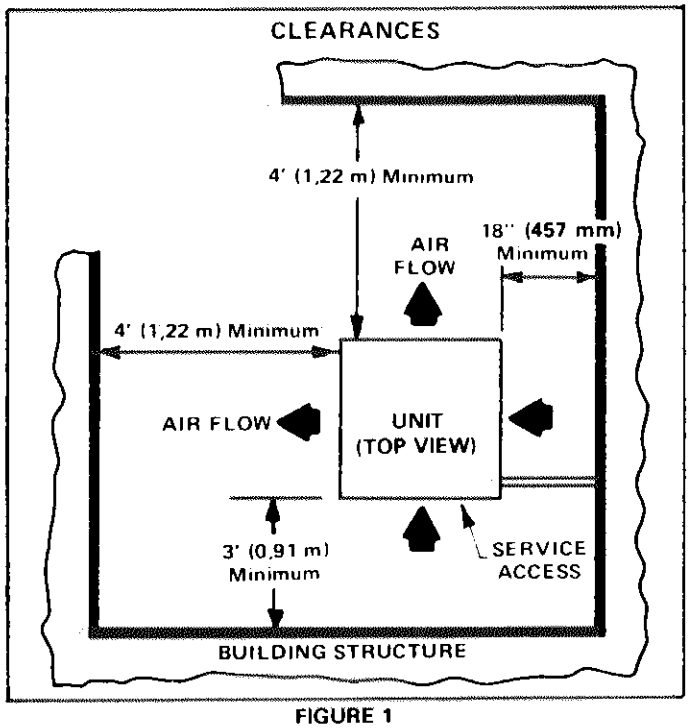


FIGURE 1

VI - SETTING THE UNIT

Heat pump units operate under a wide range of weather conditions, therefore, several factors must be considered when positioning the outdoor unit.

1 - A sound absorbing material, such as Isomode, should be used under a unit if it will be installed in a location or position that will transmit sound or vibration to the living area or adjacent buildings.

2 - Mount unit high enough above ground or roof to allow adequate drainage of defrost water and prevent ice build-up.

3 - In heavy snow areas do not locate unit where drifting will occur. The unit base should be elevated above the depth of average snows.

NOTE - Elevation of the unit may be accomplished by constructing a frame using suitable materials. If a support frame is constructed, it must not block drain holes in unit base.

4 - When installed in areas where low ambient temperature exist, unit should be located so winter prevailing winds do not blow directly into outdoor coils. See Figure 3.

5 - Locate unit away from overhanging roof lines which would allow water or ice to drop on, or in front of coils or inlet louvers.

A - Slab Mounting

When installing unit at grade level, top of slab should be high enough above grade so that water from higher ground will not collect around unit. Slab should have a slope tolerance away from building of 2 degrees or 2 inches per 5 feet (51 mm per 5 meters). This will prevent ice build-up under unit during a defrost cycle. Refer to roof mounting section for barrier construction if unit must face prevailing winter winds.

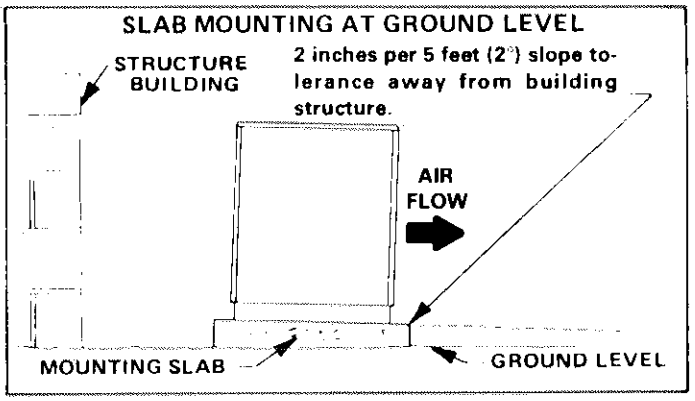


FIGURE 2

B - Roof Mounting

If unit coil cannot be mounted away from prevailing winter winds, a wind barrier should be constructed. Size barrier at least the same height and width as outdoor unit. Mount barrier 24 inches (610 mm) from inlet sides of unit in the direction of prevailing winds. Refer to Figure 3.

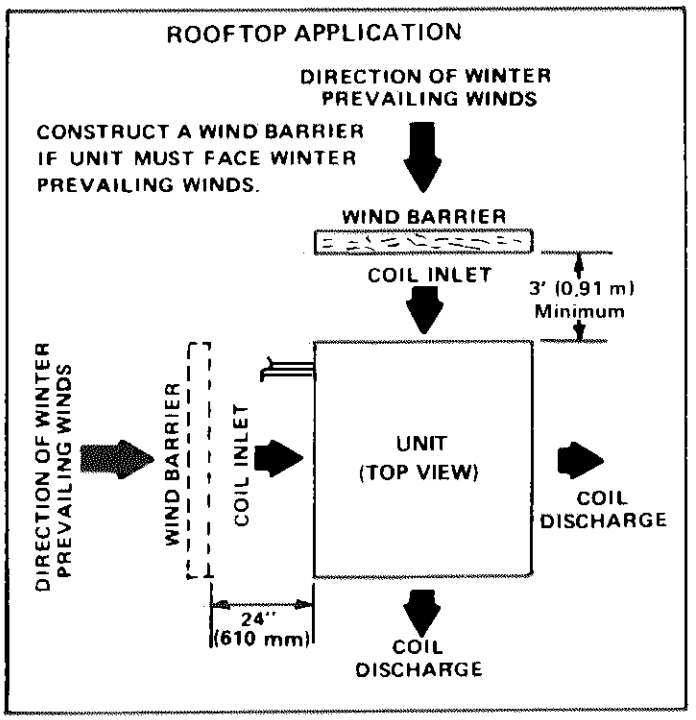


FIGURE 3

VII - ELECTRICAL

Wiring must conform to the National Electric Code (NEC) and local codes. Application diagrams are included at the back of this instruction and in indoor unit instructions.

Refer to unit rating plate for minimum circuit ampacity and maximum fuse size.

1 - Provide line voltage power supply to unit from a properly sized disconnect switch.

2 - Install room thermostat (provided with unit) in the conditioned area. Locate where it will not be effected by sunlight, drafts, or vibration. Do not install on an outside wall. A position approximately 5 feet (1.5 m) from the floor and near the center of the conditioned area is most desirable.

3 - Provide low voltage wiring from HP16 to indoor unit and from thermostat to indoor unit as indicated on the field diagram in this instruction.

4 - Ground unit either through supply wiring or with an earth ground.

5 - Mount compressor warning sticker on unit disconnect box.

VIII - REFRIGERANT PIPING

HP16 vapor and liquid line connections are located outside the cabinet and are made with sweat connections. The sheet metal guard protecting the refrigerant connections is for shipping only and should be removed and discarded before connecting lines.

L10 Refrigerant lines sets are available in several lengths. Refer to following Line Set Selection table. Lines are furnished with flare fittings on one end for indoor unit connections and stub connections on opposite for sweat connection to HP16 unit. Line Kits are not available for the HP16-650V and must be field fabricated.

NOTE - Line lengths should be no greater than 50 ft. (15.2m). Select line set diameters from table below to ensure oil return to compressor. Failure to follow these recommendations could result in poor compressor lubrication and will void compressor warranty.

TABLE 1

Outdoor Unit Model	L10 LINE SETS										
	Line Set Numbers	Length		Suction Line Connections				Liquid Line Connections			
				Outdoor Unit (Sweat)		Indoor Coil (Flare)		Outdoor Unit (Sweat)		Indoor Coil (Flare)	
		ft.	m	in.	mm	in.	mm	in.	mm	in.	mm
HP16-211 HP16-261	L10-26-20	20	6.1	5/8	15.9	5/8	15.9	3/8	9.5	3/8	9.5
	L10-26-25	25	7.6								
	L10-26-35	35	10.7								
	L10-26-50	50	15.2								
HP16-311 HP16-410	L10-41-20	20	6.1	3/4	19.1	3/4	19.1	3/8	9.5	3/8	9.5
	L10-41-30	30	9.1								
	L10-41-40	40	12.2								
	L10-41-50	50	15.2								
HP16-460 HP16-510	L10-65-30	30	9.1	7/8	22.2	3/4*	19.1	3/8	9.5	3/8	9.5
	L10-65-40	40	12.2								
HP16-650	Field Fabricated	0	0	1-1/8	28.6	1-1/8	28.6	1/2	12.7	1/2	12.7

*To obtain maximum efficiency, remove the 3/4 inch reduction from the L10-65 series of line sets and the flare fitting from the indoor coil. Then, make a sweat connection using a 7/8 x 1-1/8 inch reducer coupling.

I - PROCESSING PROCEDURE

The unit is factory charged with the amount of R-22 refrigerant indicated on the unit rating plate. This charge is based on a matching indoor coil and outdoor coil with a 25 foot (7.62 m) line set. For varying lengths of line set refer to Table 1 for refrigerant charge adjustment. A blank space is provided on the unit rating plate to list actual field charge. All units are factory leak tested and evacuated making it necessary to keep unit free of dirt, moisture and air.

WARNING - Do not open (back-seat) valves on unit until leak testing and evacuating of line sets has been completed.

TABLE 1

Line Set Dia.		Ounce per foot adjustment from 25 foot lineset*
Suction	Liquid	
5/8	3/8	1 ounce
3/4	3/8	1 ounce
7/8	3/8	1 ounce
1-1/8	1/2	1-3/4 ounce

NOTE - If line set length is greater than 25 ft., add this amount. If line set length is less than 25 ft., subtract this amount.

A - Attaching Gauge Manifold

1 - Leak Testing or Evacuating - Connect high pressure side of gauge manifold to gauge port on liquid line service valve. Connect suction side of gauge manifold to gauge port on vapor line service valve.

2 - Checking Charge or Charging - Connect high pressure side of gauge manifold to discharge line gauge port. Connect suction side of gauge manifold to suction line gauge port. Refer to Figure 1.

B - Leak Testing Installed Line Set

1 - Attach gauge manifold as explained in Step 1 of section "A - Attaching Gauge Manifold." Connect a drum of dry nitrogen to center port of gauge manifold.

Caution - When using dry nitrogen, a pressure reducing regulator must be used to prevent excessive pressure in gauge manifold, connecting hoses and within the system. Regulator setting must not exceed 150 psig (1034 kPa).

2 - Open dry nitrogen valve and gauge manifold high pressure valve, and pressurize line set and indoor coil of system to 150 psig (1034 kPa).

3 - Close gauge manifold high pressure valve, and check all lines and connections for leaks.

Note - If electronic leak detector is used, add a trace of refrigerant to system for detection by the leak detector prior to charging with dry nitrogen.

4 - Release nitrogen pressure, correct any leaks in the system and recheck.

C - Evacuating System

When required, evacuate system as follows:

1 - Attach gauge manifold as explained in Step 1 of Section "A - Attaching Gauge Manifold." Connect vacuum pump (with vacuum gauge) to center port of gauge manifold. With both manifold service valves open, start pump and evacuate indoor coil and refrigerant lines.

NOTE - A temperature vacuum gauge, mercury vacuum (U tube), or thermocouple gauge should be used. The usual Bourdon tube gauges are not accurate enough in the vacuum range.

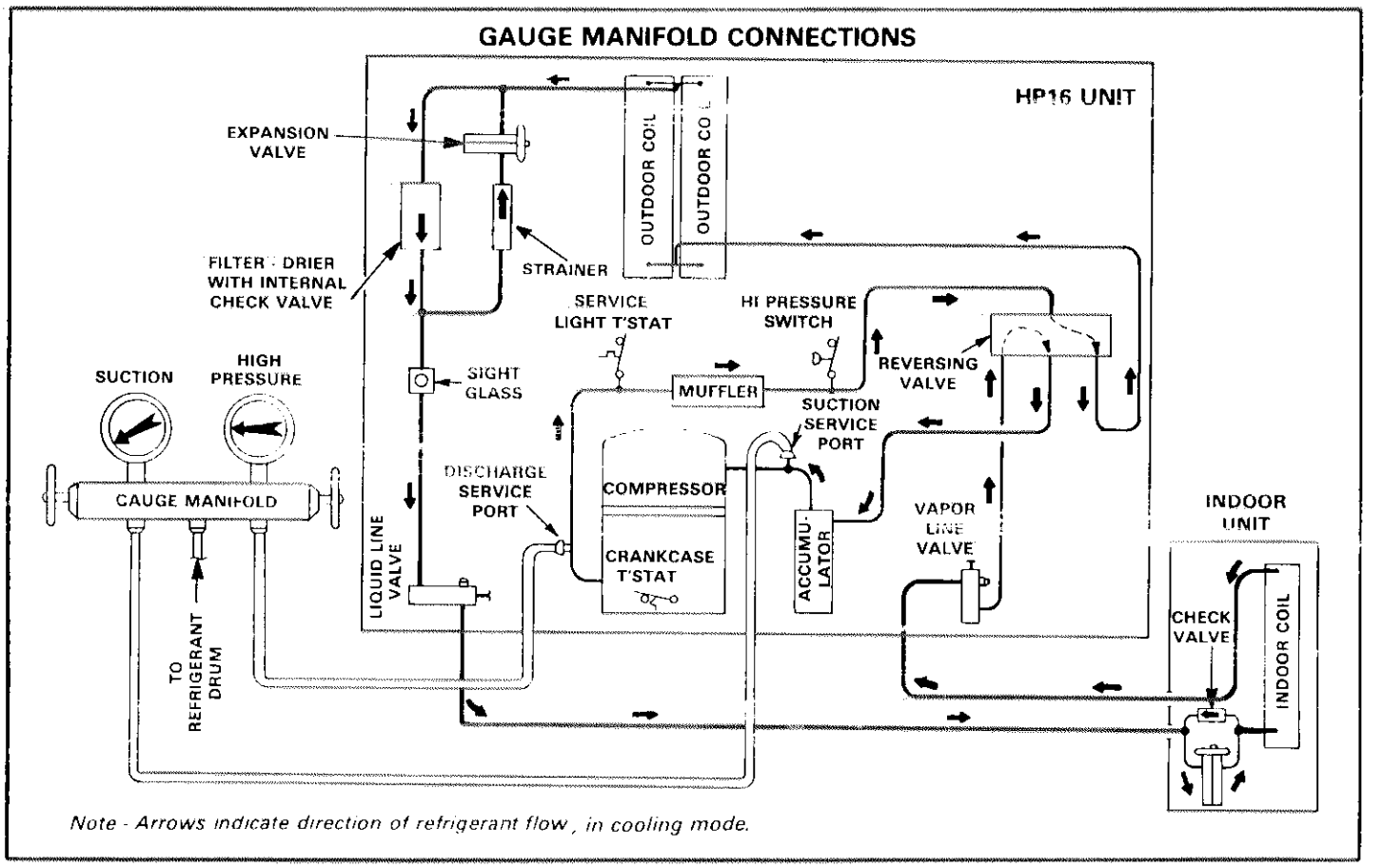


FIGURE 1

2 - Evacuate the system to 29 inches (737 mm) vacuum. During the early stages of evacuation, it is desirable to stop the vacuum pump at least once to determine if there is a rapid loss of vacuum. A rapid loss of vacuum would indicate a leak in the system and a repeat of Section "B - Leak Testing" would be necessary.

3 - After system has been evacuated to 29 inches (737 mm), close gauge manifold valves to center port, stop vacuum pump, and disconnect from gauge manifold. Attach an upright nitrogen drum to center port of gauge manifold and open drum valve slightly to purge line at manifold. Break vacuum in system with nitrogen pressure by opening manifold high pressure valve. Close manifold high pressure valve to center port.

4 - Close nitrogen drum valve and disconnect from gauge manifold center port. Release nitrogen pressure from system.

5 - Reconnect vacuum pump to gauge manifold center port. Evacuate system through manifold service valves until vacuum in system does not rise above 29.7 inches (754 mm) mercury (5 mm absolute pressure) within a 20 minute period after stopping vacuum pump.

6 - After evacuation is completed, close manifold service valves, disconnect vacuum pump from gauge manifold center port, and connect refrigerant drum. Pressurize system slightly with refrigerant to break vacuum.

D - Start-Up Procedure

1 - Rotate fan to check for frozen bearings or any binding.

2 - Inspect all wiring (both factory and field installed) for loose connections.

3 - Open liquid and vapor line service valves to release refrigerant charge (confined in heat pump unit) into the system.

4 - Check voltage supply at disconnect switch; voltage must be within the range listed on unit nameplate. If voltage is not in this range, do not start the equipment until the power company has been consulted and the voltage condition corrected.

5 - Set thermostat for a demand. Turn on power to indoor coil blower and close heat pump disconnect switch to start unit.

6 - Recheck unit voltage with unit running. Power must be within range shown on unit nameplate. Check amperage draw of unit. Refer to unit nameplate for correct running amps.

E - Charging

It is desirable to charge the system in the cooling cycle if weather conditions permit. However, if the unit must be charged in the heating season, one of the following procedures must be followed to ensure proper system charge.

If the system is completely void of refrigerant, the recommended and most accurate method of charging is to weigh the refrigerant into the unit according to the total amount show on the unit nameplate. Refer to the "Lennox Service Manual" for procedure. If weighing facilities are not available or if unit is just low on charge, use the following procedure:

1 - Connect gauge manifold as shown on page 4 "Gauge Manifold Connections." Connect an upright R-22 drum to center port of gauge manifold.

2 - Set room thermostat to 74° F (23° C) in EMERGENCY HEAT (If available) or HEAT position and allow unit to run until heating demand is satisfied. This will create the necessary load for proper charging of system in cooling. Change thermostat setting to 68° F (20° C) in COOL position. Allow unit to run in cooling until system pressures stabilize.

3 - To ensure proper system charge, it is necessary to maintain liquid line pressures in a range from 240 psig (1655 kPa) and 270 psig (1862 kPa). In order to obtain this pressure range, block off outdoor coil using a sheet of plastic or cardboard as shown in illustration below. If vapor bubbles are present in sight glass, slowly add refrigerant through suction port until sight glass clears. System charge should be correct. This procedure must be followed to prevent overcharging of system.

4 - When charging procedure has been completed, close valve on refrigerant container. Switch thermostat to HEAT position and double check pressures using charging curves. Vapor bubbles might be present in sight glass at low ambients.

5 - Charge should be rechecked in cooling season.

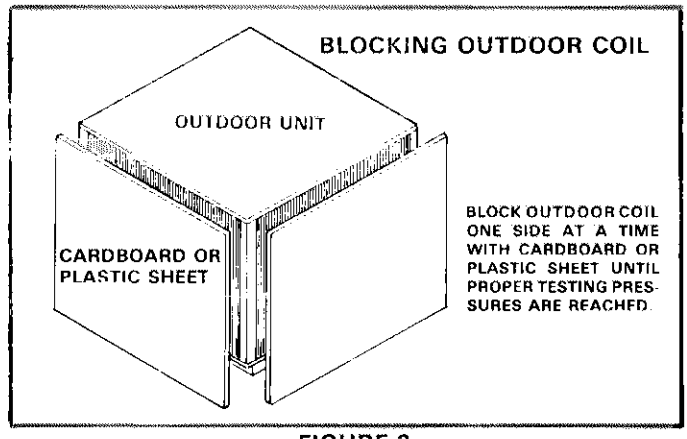


FIGURE 2

F - Checking Charge

Refrigerant charge is checked by use of "charging curves" mounted in each unit. Both cooling and heating cycle curves are provided. Gauge readings within the white area of these charging curves indicate a properly charged unit.

II - COMPRESSOR OIL CHARGE

Refer to "Lennox Cooling Service Handbook" for correct procedure to check and add compressor oil.

III - HIGH PRESSURE SWITCH

All units are equipped with a high pressure switch (manual reset type) mounted on the compressor discharge line. This switch has a "cut-out" point of 410 psig (2827 kPa) and must be manually reset when discharge pressure drops below 180 psig (1241 kPa).

IV - CRANKCASE TEMPERATURE LIMIT SWITCH

The units are equipped with a crankcase temperature limit switch which is mounted to the outside bottom of the compressor shell by means of a strap and fasteners. It prevents the compressor from operating at an exceedingly high oil temperature by opening control circuit at 190°F (87.8°C).

V - AIR PRESSURE DIFFERENTIAL DEMAND DEFROST SYSTEM

A pressure sensor mounted on the division panel between the outdoor coil and the orifice panel senses the buildup of static air pressure, caused by coil icing, across the outdoor coil. Refer to Figure 2. When static buildup exceeds the set point, the defrost cycle is activated: this stops condenser fans and activates the reversing valve. The temperature sensor bulb, located near the outdoor coil distributor, terminates the defrost cycle when liquid refrigerant temperature increases to 65°F (18°C). The defost control is factory set and should not be adjusted from these points.

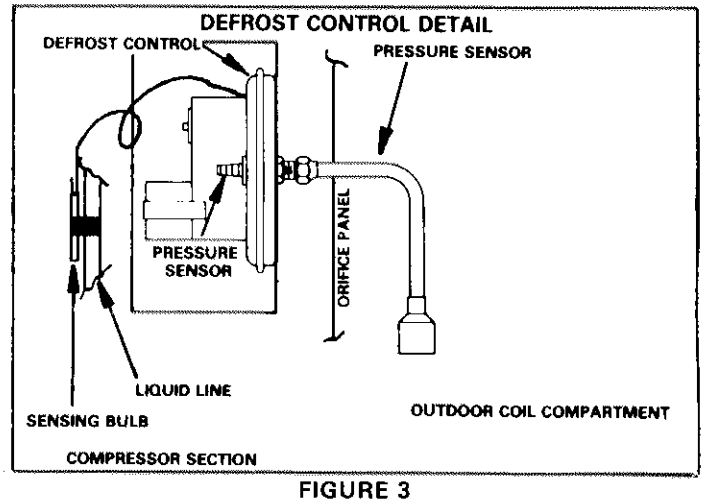


FIGURE 3

PROCESSING — START-UP — OPERATION — MAINTENANCE

I - PROCESSING PROCEDURE

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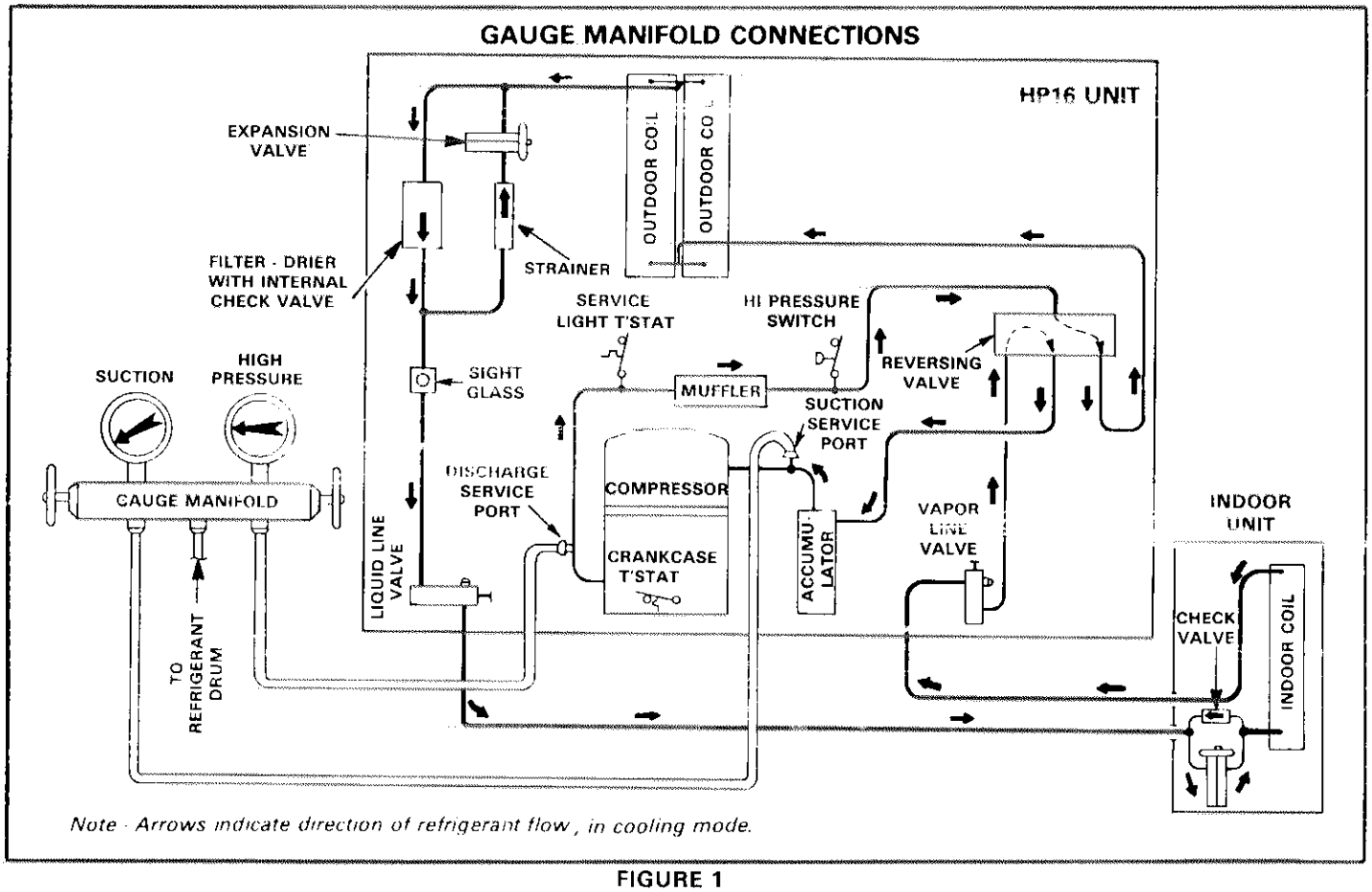

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5 Charge should be rechecked in cooling season.

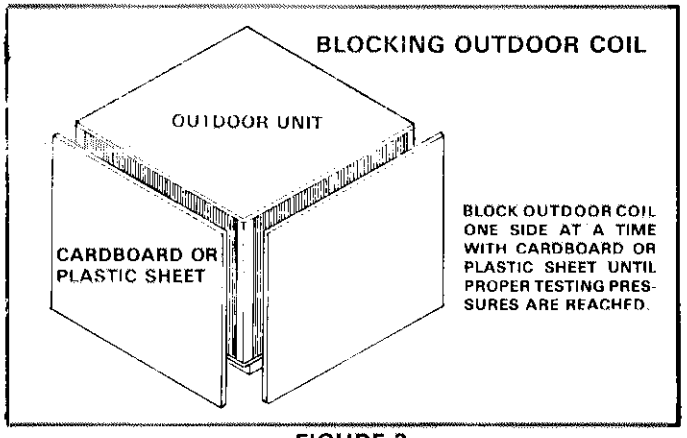

FIGURE 2

F - Checking Charge

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II - COMPRESSOR OIL CHARGE

Refer to "Lennox Cooling Service Handbook" for correct procedure to check and add compressor oil.

III - HIGH PRESSURE SWITCH

All units are equipped with a high pressure switch (manual reset type) mounted on the compressor discharge line. This switch has a "cut-out" point of 410 psig (2827 kPa) and must be manually reset when discharge pressure drops below 180 psig (1241 kPa).

IV - CRANKCASE TEMPERATURE LIMIT SWITCH

The units are equipped with a crankcase temperature limit switch which is mounted to the outside bottom of the compressor shell by means of a strap and fasteners. It prevents the compressor from operating at an exceedingly high oil temperature by opening control circuit at 190°F (87.8°C).

V - AIR PRESSURE DIFFERENTIAL DEMAND DEFROST SYSTEM

A pressure sensor mounted on the division panel between the outdoor coil and the orifice panel senses the buildup of static air pressure, caused by coil icing, across the outdoor coil. Refer to Figure 2. When static buildup exceeds the set point, the defrost cycle is activated: this stops condenser fans and activates the reversing valve. The temperature sensor bulb, located near the outdoor coil distributor, terminates the defrost cycle when liquid refrigerant temperature increases to 65°F (18°C). The defost control is factory set and should not be adjusted from these points.

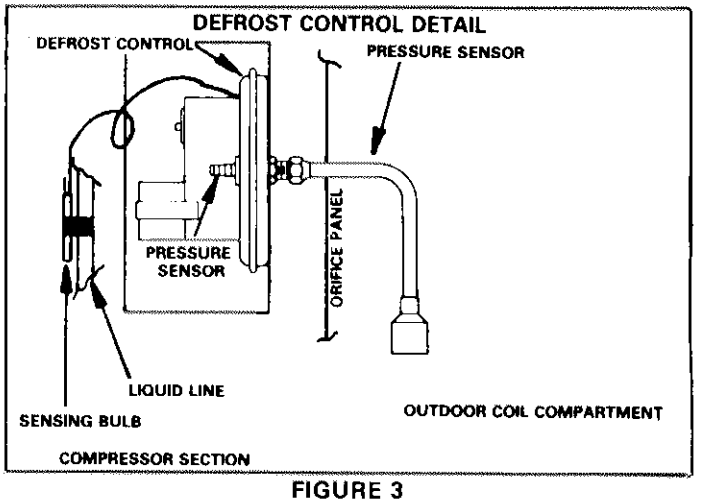


FIGURE 3

IMPORTANT - It is important that the placement and cleanliness of the defrost pressure sensor be maintained for proper unit operation. Inspect both sides of the outdoor coil periodically and remove any grass, leaves, or other obstructions.

The defrost system may be checked for proper operation by blocking the air flow through the outdoor coil on the outlet side. The defrost cycle should be activated when approximately 85% of the coil is blocked. The following procedure should be used when checking the defrost control system.

Field Checking Air Pressure Defrost Control (Heating Cycle)

1 - Cut two pieces of cardboard to cover the outdoor coils and remove front condenser guard.
2 - Mark position of defrost termination sensing bulb on refrigerant line; remove bulb from line and immerse in ice bath.
3 - Start unit by adjusting room thermostat to call for heat.
4 - Block coil outlet with cardboard from Step 1. Unit should start defrost cycle.

NOTE: Coil temperature (sensing bulb) must be at least 23°F below the defrost control temperature setting or control will not initiate.

5 - After unit starts defrost cycle, remove sensing bulb from ice bath and warm bulb by holding in hand or immersing in warm water bath. Unit defrost cycle should terminate.
6 - After termination of defrost cycle, re-mount sensing bulb on refrigerant line in original location and secure clamp. Use caution to avoid damaging sensing bulb when installing.

VI - DEFROST TIMER

This control will initiate a defrost every 90 minutes. The unit will go into defrost only if the defrost thermostat (located on liquid line between expansion valve and distributor) senses the liquid line temperature to be 35°F (2°C) or lower. This defrost thermostat also terminates the defrost cycle when the liquid line temperature reaches 60°F (16°C). The defrost timer will not allow any defrost cycle to last longer than 10 minutes. The defrost timer can be field adjusted from a 90-minute to a 45-minute defrost interval, if warranted by climatic conditions.

VII - ELECTRONIC DEMAND DEFROST CONTROL

[Used on Canadian Standards Association (C.S.A.) certified units only.]

A pressure sensor mounted on the division panel between the outdoor coil and the orifice panel senses the buildup of static air pressure, caused by coil icing, across the outdoor coil. Refer to figure 4. Once defrost control is installed and electrically connected, a built-in 20 to 25 minute delay will take place before defrost initiation is permitted. This delay will occur any time electrical power to the control is interrupted and subsequently resumed.

Defrost is initiated when control diaphragm senses a particular pressure differential, provided that coil temperature is within a certain range. Both pressure differential and coil temperature are set to ensure maximum efficiency of the system. Defrost initiation pressure and temperature must be maintained for a 20 to 25 second period before control will initiate a defrost. This prevents inefficient "wind gust" cycles.

Defrost cycle is terminated when temperature sensor detects temperature warmer than 55°F. System then returns to normal heating cycle. If the coil does not rise to the preset termination temperature within the time override period (approximately 10 minutes), the defrost cycle is terminated by the control circuit.

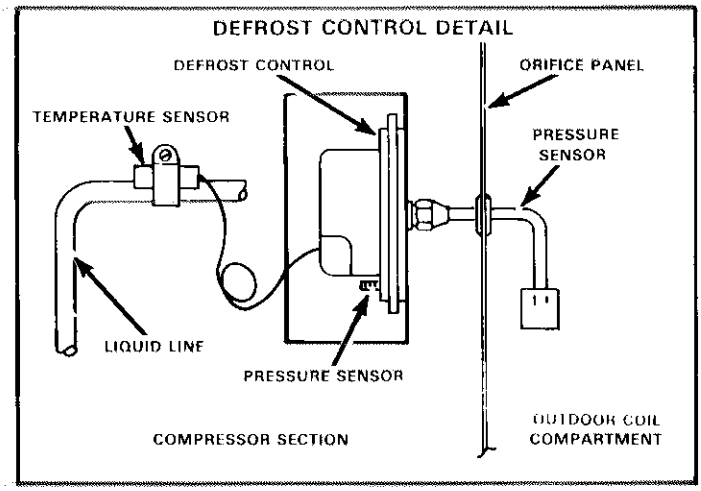


FIGURE 4

NOTE - Termination of the defrost cycle, whether by rising temperature or by control circuit override, begins another 20 to 25 minute period in which defrost is not permitted.

IMPORTANT - It is important that the placement and cleanliness of the defrost pressure sensor be maintained for proper unit operation. Inspect both sides of the outdoor coil periodically and remove any grass, leaves, or other obstructions.

Field Checking Electronic Demand Defrost Control (Heating Cycle)

The defrost system may be checked for proper operation by blocking the air flow through the outdoor coil on the outlet side. The defrost cycle should be activated when approximately 85 percent of the coil is blocked. The following procedure should be used when checking the defrost control system. Refer to figure 2.

In order to test the control without waiting through a complete timing cycle, follow the procedures listed below:

WARNING - Power supply to any electronic control should be removed before attempting any alteration to its connections.

1 - Disconnect 24 VAC input connections and temperature sensor leads from defrost control.
2 - Place a jumper wire across terminals marked "TEST" and reconnect 24 VAC power leads.

NOTE - In test mode, all sequential operations of timing cycle are shortened to a nominal 20 second interval.

3 - Block off outdoor coil until initiation pressure is reached and indicator lamp is lighted. Static pressure between the fan and the coil should read approximately .27 in. w.g. at initiation.
4 - Defrost should run approximately 20 seconds and terminate automatically.
5 - Disconnect 24 VAC power supply. Disconnect test lead.
6 - Reconnect temperature sensor leads.
7 - Reconnect 24 VAC power supply.

IMPORTANT-Remove jumper wire after testing to return control to normal operation.

Refer to figures 5 and 6 for defrost cycle.

NORMAL OPERATION: TEMPERATURE-TERMINATED DEFROST CYCLE

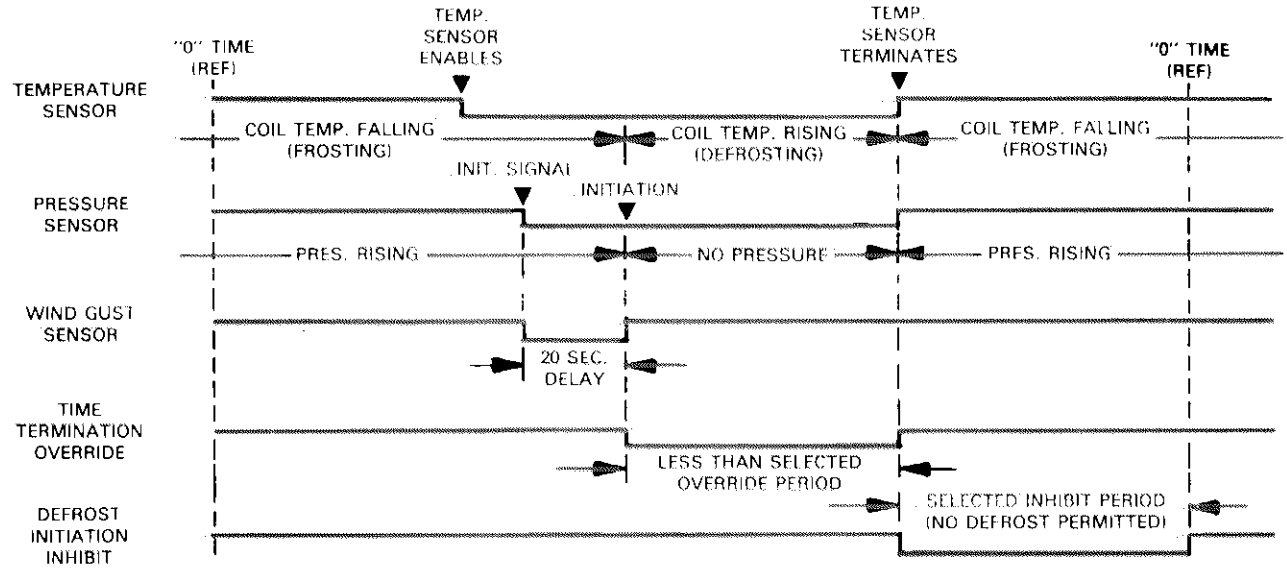


FIGURE 5

OVERRIDE OPERATION: TIME-TERMINATED DEFROST CYCLE

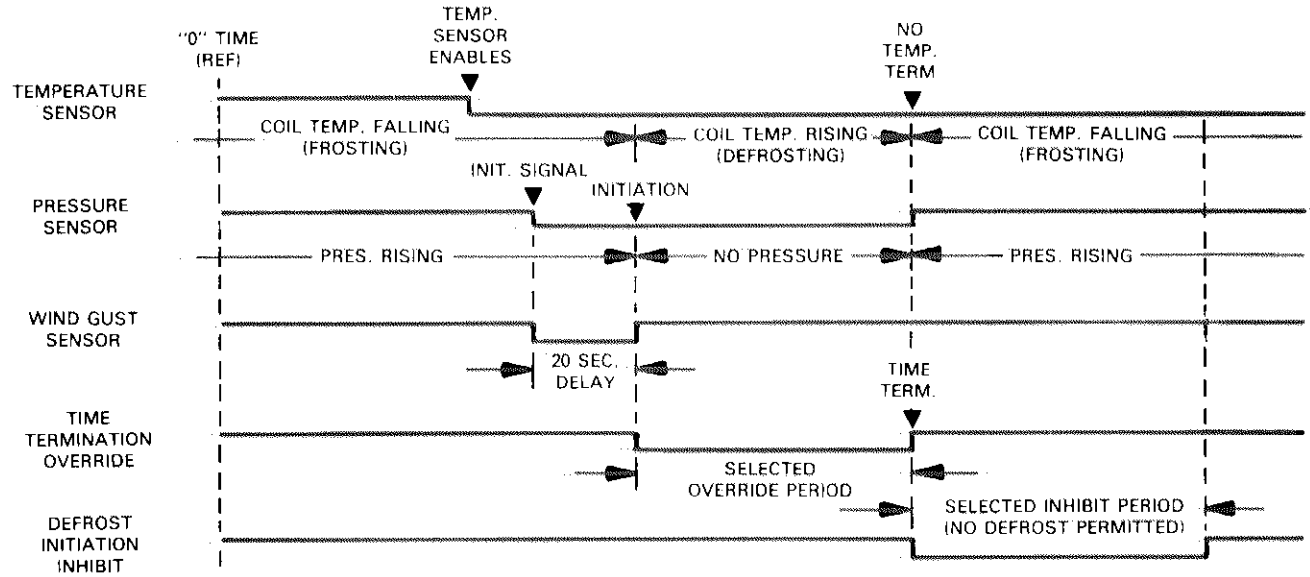


FIGURE 6

VIII-THERMOSTAT OPERATION

Heat pump thermostat (ordered separately) should incorporate isolating contacts and an emergency heat function (which includes an amber indicating light). Thermostats used with HP16 series heat pumps should also utilize an additional (red) service light and an ambient compensating thermistor. Each feature is explained below.

1 - Isolating Contacts

The thermostat supplied with the unit can be used in dual transformer control circuit systems. However, the HP16 uses control circuit power supplied by the indoor unit transformer only. During use of the emergency heat function the outdoor unit will be isolated from control circuit power while the indoor unit continues to operate.

2 - Emergency Heat (Amber Light)

An Emergency heat function is designed into the thermostat. This feature is applicable to systems using auxilary electric heat staged by outdoor thermostats. When the thermostat is placed in the emergency heat position, the outdoor unit control circuit is isolated from power and field provided relays by-pass the outdoor thermostats. An amber indicating light simultaneously comes on to remind the homeowner that he is operating in the emergency heat mode.

Emergency heat is usually used during a heat pump shutdown, but it should also be used following a power outage if power has been off over an hour and the outdoor temperature is below 50°F. System should be left in emergency heat mode at least 6 hours to allow the crankcase heater sufficient time to prevent compressor slugging.

3 - Service Light (Red)

The service light is wired in series with the second stage heat bulb of the room thermostat and a thermal sensor that is strapped to the compressor discharge line. The sensor monitors discharge temperature and closes on a temperature fall which indicates the compressor is not operating properly and that service is required. A red light represents a heat pump malfunction during the heating mode. It warns the homeowner that the electric elements are providing all the heat.

If the red light comes on, place the room thermostat into emergency heat to bypass any outdoor thermostat(s) making all the auxilary heat available. Under these conditions, the amber light will be energized continuously and the red light will cycle with the indoor unit.

4 - The ambient compensating thermistor (located in the outdoor unit) cuts down thermostat droop to improve the operating characteristics of the heat pump system.

VIII - CRANKCASE HEATERS

All units are provided with crankcase heaters (oil rectifiers). This heater must always be energized to prevent compressor damage as a result of slugging. A warning sticker (provided with instructions) should be applied to the main disconnect switch at the time of installation.

IX - FILTER-DRIER

The drier is equipped with an internal check valve for correct refrigerant flow. Refer to Figure 1. If replacement is necessary, order another of like design and capacity. A strainer in the liquid line gives additional protection.

X - MAINTENANCE

At the beginning of each heating or cooling season the system should be cleaned as follows:

A - HEAT PUMP UNIT

1 - Clean and inspect both sides of outdoor coil. Coil may be flushed with water hose if necessary.

2 - Clean and inspect defrost pressure sensors.

3 - Oil outdoor fan motor: always relubricate motor according to manufacturers lubrication instructions on each motor. If no instructions are provided, use the following as a guide.

a - Motors With Oiling Ports - Prelubricated for an extended period of operation. For extended bearing life, relubricate with a few drops of SAE No. 10 non-detergent oil once every two years.

b - Motors Without Oiling Ports - Prelubricated and sealed. No further lubrication required.

4 - Visually inspect all connecting lines, joints and coils for evidence of oil leaks.

5 - Check all wiring for loose connections.

6 - Check for correct voltage at unit (unit operating).

7 - Check amp - draw on heat pump fan motor.
Unit nameplate _____ Actual _____

8 - Inspect drain holes in coil compartment base and clean if necessary.

NOTE - If insufficient heating or cooling occurs, the unit should be gauged and refrigerant charge checked.

B - Indoor Coil

1 - Clean coil if necessary.

2 - Check connecting lines, joints and coil for evidence of oil leaks.

3 - Check condensate line and clean if necessary.

C - Indoor Unit

1 - Clean or change filters.

2 - Lubricate blower motor:
Always relubricate motor according to manufacturers lubrication instructions on motor. If no instructions are provided, use the following as a guide.

a - Motors Without Oiling Ports - Prelubricated and sealed. No further lubrication required.

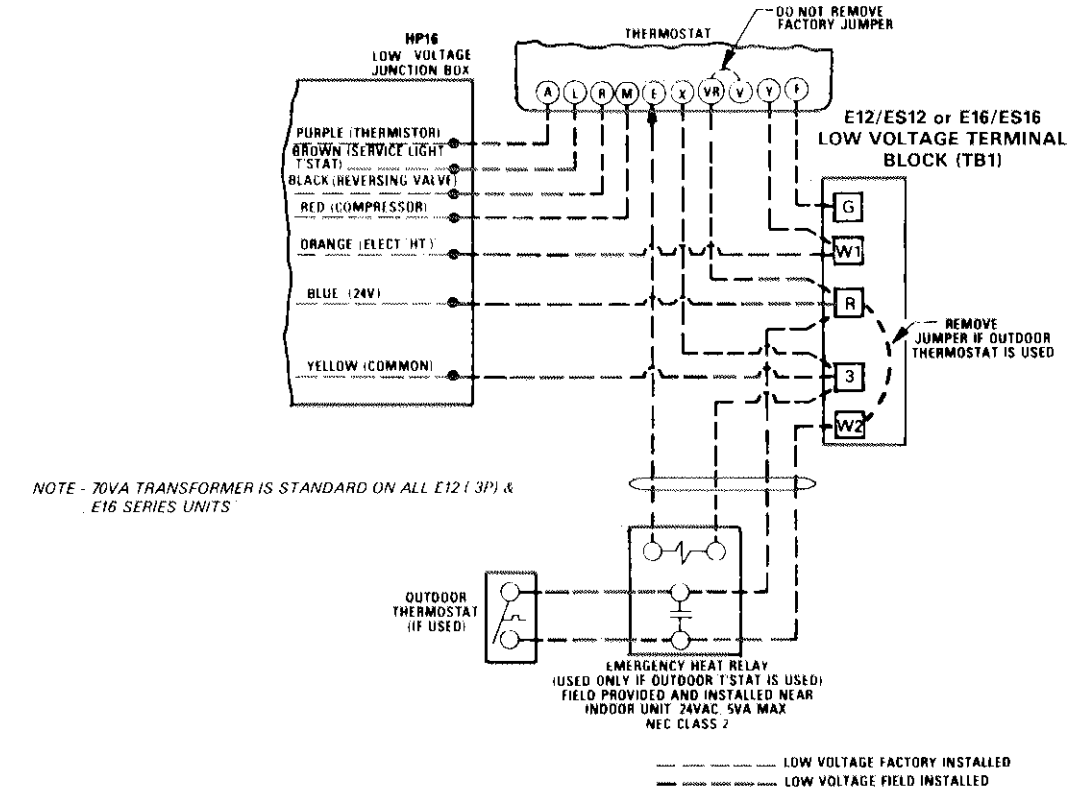
b - Direct Drive Motors With Oiling Ports - Prelubricated for an extended period of operation. For extended bearing life, relubricate with a few drops of SAE No. 10 non-detergent oil once every two years. It may be necessary to remove blower assembly for access to oiling ports.

3 - Adjust blower speed for cooling. The pressure drop over the coil should be checked to determine the correct blower CFM. Refer to the "Lennox Cooling Service Handbook" for pressure drop tables and procedures.

4 - Check all wiring for loose connections.

5 - Check for correct voltage at unit.

6 - Check amp draw on blower motor.
Motor nameplate _____ Actual _____



NOTE - SEE HP16 AND E12/ES12 AND E16/ES16 UNIT WIRING DIAGRAMS FOR POWER SUPPLY CONNECTIONS.

HP16 WITH E12/ES12 OR E16/ES16 FIELD WIRING DIAGRAM