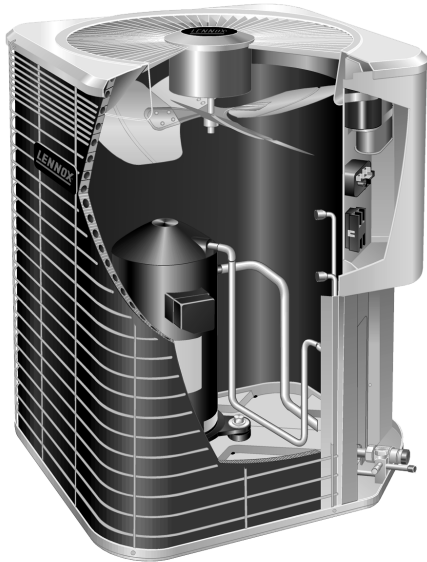




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Dallas, Texas, USA



INSTALLATION INSTRUCTIONS

HS40 SERIES UNITS

CONDENSING UNITS
504,186M
11/2002
Supersedes 4/2000

TP Technical
Publications
Litho U.S.A.

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**RETAIN THESE INSTRUCTIONS
FOR FUTURE REFERENCE**

HS40 Condensing Unit

HS40 condensing units use R407C which is an ozone friendly HFC refrigerant. This unit must be installed with a matching indoor coil and line set as outlined in the Lennox Engineering Handbook. HS40 condensing units are designed for use in expansion valve systems only. They are not designed to be used in RFC systems. An expansion valve and filter drier approved for use with R407C have been shipped with the unit. These components must be installed prior to unit operation.

Shipping and Packing List

- 1 - Assembled HS40 condensing unit
 - 1 - Bag assembly:
 - 1 - Sight glass
 - 1 - 5/16-3/8 inch adapter
 - 1 - 45° elbow
 - 1 - Expansion valve (approved for use with R407C)
 - 1 - Drier (approved for use with R407C systems)
- Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.

⚠ WARNING

Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly. Failure to follow this warning may result in personal injury or death.

⚠ WARNING

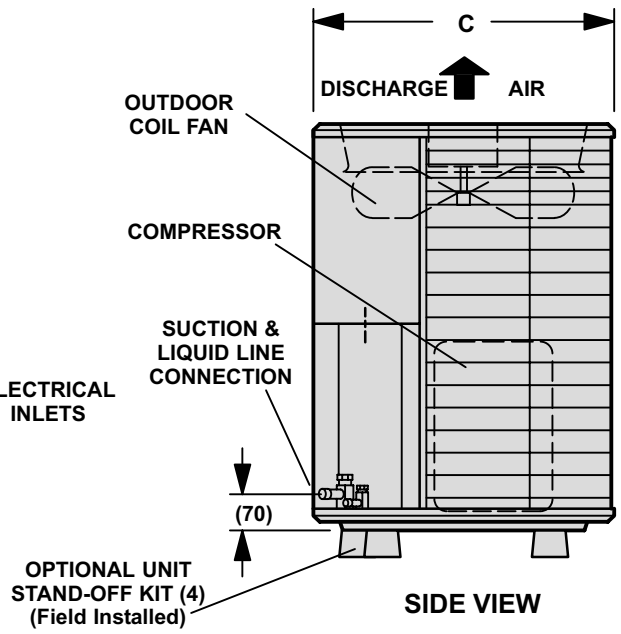
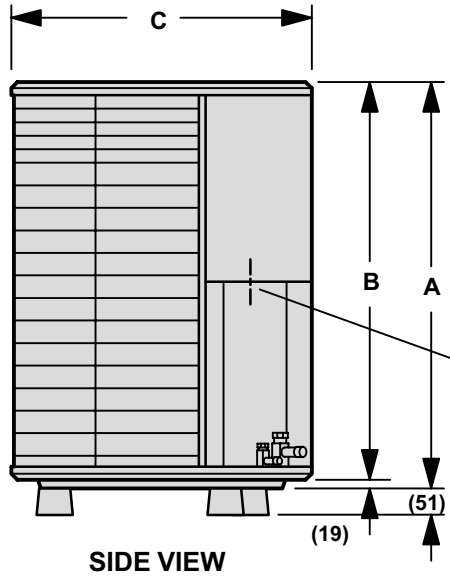
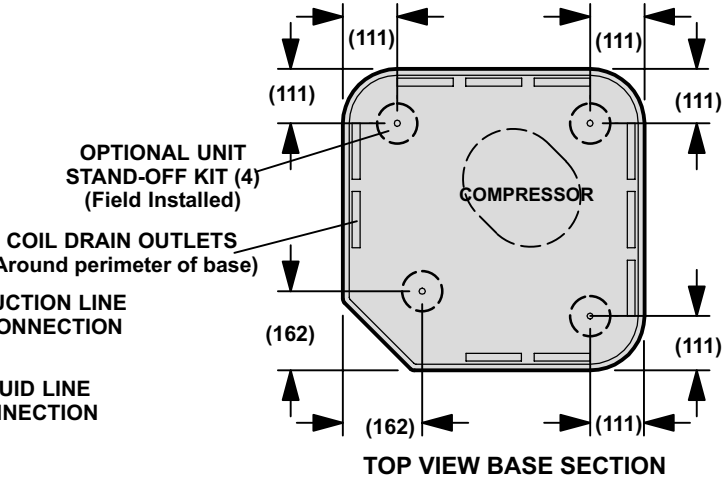
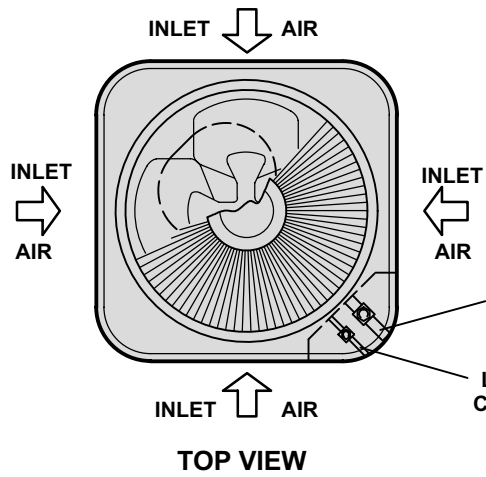
International legislation bans the intentional venting of refrigerant (CFCs and HCFCs). Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for noncompliance.

⚠ WARNING

This equipment must only be installed and serviced by properly qualified personnel. Equipment contains dangerous voltages and moving parts. Always switch off power supply before opening any access panel. Electrical control panel doors and fan access door must be locked to prevent unauthorized access at beginning of instruction.



Unit Dimensions - mm



| Model No. | | A | B | C | |
|-----------|----------|----|-----|-----|-----|
| HS40-018 | HS40-024 | mm | 635 | 616 | 616 |
| HS40-036 | HS40-048 | mm | 838 | 819 | 616 |
| HS40-065 | | mm | 946 | 927 | 718 |

General Information

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

The HS40 unit is "CE marked" in accordance with the requirements of the latest European Directives for Electrical and Machinery Safety and Electromagnetic Compatibility. In addition HS40 units have type Approval Certification with the Gas Appliance Directive.

Setting the Unit

Refer to unit dimensions section for sizing mounting slab, platforms or supports. Refer to figure 2 for installation clearances.

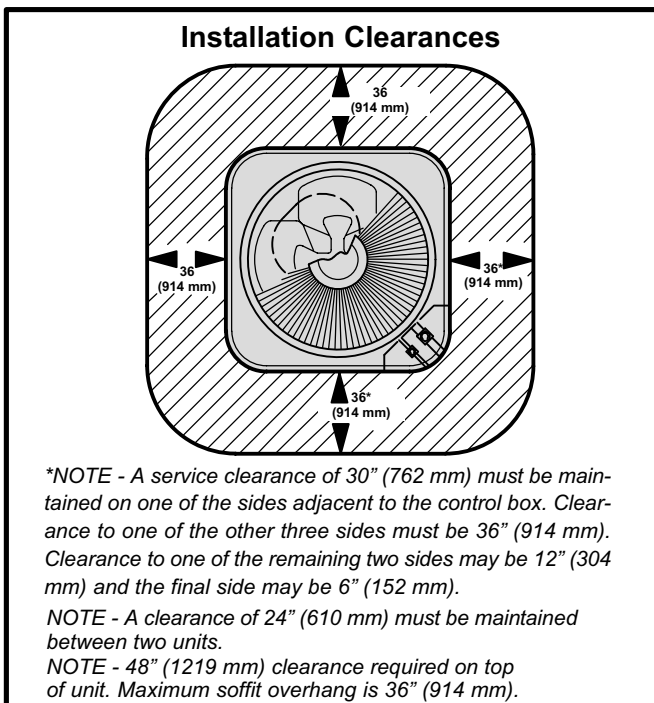


Figure 1

FIGURE 2

A - Slab Mounting

When installing the unit at grade level, install it on a level slab that is high enough above the grade to allow water to drain adequately. The top of slab should be located so run-off water from higher ground will not collect around the unit.

B - Roof Mounting

Install the unit at a minimum of 101 mm above the roof's surface. Ensure that the weight of the unit is properly distributed over roof joists and rafters. Either redwood or steel supports are recommended.

Electrical

The wiring must conform with current local codes and the current Canadian Electrical Code (CEC). Refer and comply with local electrical codes for field wiring rules and regulations.

Refer to the furnace or blower coil installation instructions for additional wiring application diagrams and refer to unit rating plate for minimum circuit ampacity and maximum overcurrent protection size.

⚠ WARNING

Unit must be grounded in accordance with national and local codes. ELECTRIC SHOCK HAZARD. Can cause injury or death.

Line Voltage

To facilitate conduit, a hole is provided in the bottom of the control box. Connect the conduit to the control box with the proper conduit fitting.

NOTE - Units are approved for use with copper conductors only.

24V, Class II Circuit

24V, Class II Circuit connections are made up in the low voltage junction box. Refer to figure 3 for the field wiring diagram.

NOTE - A complete unit wiring diagram is located inside the unit control box cover.

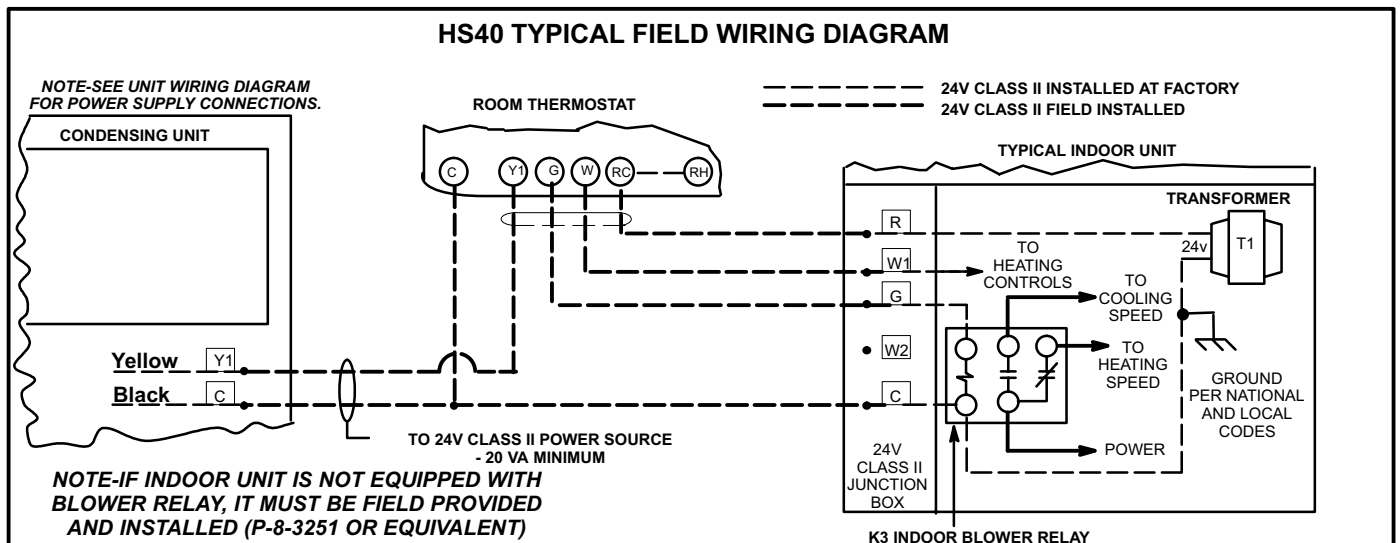


FIGURE 3

Plumbing

If the HS40 unit is being installed with a new indoor coil and line set, the plumbing connections should be made as outlined in this section. If an existing line set and/or indoor coil is going to be used to complete the HS40 system, refer to the following section which includes flushing procedures.

Field refrigerant piping consists of liquid and suction lines from the condensing unit to the indoor evaporator coil. Use Lennox L15 series line sets as shown in table 1 or use field-fabricated refrigerant lines. Refer to Refrigerant Piping Guide (Corp. 9351-L9) for proper size, type, and application of field-fabricated lines.

**TABLE 1
REFRIGERANT LINE KITS**

| HS40 UNIT | LIQUID LINE | SUCTION LINE | L15 LINE SETS |
|----------------------|--------------------|----------------------|---------------------------------------|
| HS40-018 HS40-024 | 5/16 in. (8 mm) | 5/8 in. (16 mm) | L15-21 15-50 ft. (4.6 m - 15 m) |
| HS40-036 | 3/8 in. (10 mm) | 3/4 in. (19 mm) | L15-41 15-50 ft. (4.6 m - 15 m) |
| HS40-048 | 3/8 in. (10 mm) | 7/8 in. (22 mm) | L15-65 15-50 ft. (4.6 m - 15 m) |
| HS40-065 | 3/8 in. (10 mm) | 1-1/8 in. (29 mm) | Field Fabricated |

⚠ WARNING

Polyol ester (POE) oils used with R407C refrigerant absorb moisture very quickly. It is very important that the refrigerant system be kept closed as much as possible. DO NOT remove line set caps or service valve stub caps until you are ready to make connections.

⚠ WARNING

Unit contains a NITROGEN holding charge. The holding charge must be purged and the system must be evacuated prior to charging with R407C.

Plumbing Connections

HS40 Matched with New Indoor Coil and Line Set

If an existing indoor coil which was equipped with an RFCI metering device is being replaced, the liquid line must also be replaced prior to the installation of the HS40 unit.

If refrigerant lines are routed through a wall, seal and isolate the opening so vibration is not transmitted to the building.

NOTE - Line length should be no greater than 15.2 m. Select line set diameters from table 1 to ensure oil return to the compressor.

Brazing Connection Procedure

- 1 - The end of the refrigerant line must be cut square and its internal shape must remain round. The line must be free of nicks or dents and must be deburred (I.D. and O.D.)
- 2 - Before making line set connections, use dry nitrogen to purge the refrigerant piping. This will help to prevent oxidation and the introduction of moisture into the system.
- 3 - Use silver alloy brazing rods (5 or 6 percent silver alloy for copper-to-copper brazing or 45 percent silver alloy for copper-to-brass or copper-to-steel brazing) which are rated for use with R407C refrigerant. Wrap a wet cloth around the valve body and the copper tube stub.
- 4 - Quench the joint with water or a wet cloth to prevent heat damage to the valve core and opening port.
IMPORTANT - The tube end must stay bottomed in the fitting during final assembly to ensure proper seating, sealing and rigidity.
- 5 - Install the provided thermal expansion valve (approved for use with R407C refrigerant) in the liquid line at the indoor coil.
- 6 - Install the provided filter drier (approved for use with R407C refrigerant) in the liquid line as close as possible to the expansion device. **Do not leave the drier uncapped for more than 10 to 15 minutes prior to brazing, evacuation and leak testing.**
- 7 - Install the sight glass on the liquid line at the outdoor unit. Wrap the sight glass with a wet rag to protect it during installation.

Flushing Existing Line Set and Indoor Coil

⚠ IMPORTANT

If this unit is being matched with an approved line set or indoor coil which was previously charged with R22 refrigerant, or if it is being matched with a coil which was manufactured before January of 1999, the coil and line set must be flushed prior to installation. Take care to empty all existing traps. Polyol ester (POE) oils are used in Lennox units charged with R407C refrigerant. Residual mineral oil can act as an insulator, preventing proper heat transfer. It can also clog the thermal expansion valve, reducing system performance and capacity. Failure to properly flush the system per the instructions below will void the warranty.

⚠ CAUTION

This procedure should not be performed on systems which contain contaminants (Example: compressor burn out).

Required Equipment

You will need the following equipment in order to flush the existing line set and indoor coil: two clean R22 recovery bottles, an oilless recovery machine with a pump down feature, and two sets of gauges (one for use with R22 and one for use with the R407C).

Flushing Procedure

- 1 - Remove existing R22 refrigerant using the appropriate procedure below.

If the existing outdoor unit is not equipped with shut-off valves, or if the unit is not operational AND you plan to use the existing R22 refrigerant to flush the system -- Disconnect all power to the existing outdoor unit. Connect the existing unit, a **clean** recovery cylinder and the recovery machine according to the instructions provided with the recovery machine. Remove all R22 refrigerant from the existing system. Refer to gauges after shutdown to confirm that the entire system is completely void of refrigerant. Disconnect the liquid and suction lines from the existing outdoor unit.

If the existing outdoor unit is equipped with manual shut-off valves AND you plan to use NEW R22 refrigerant to flush the system -- Start the existing R22 system in the cooling mode and close the liquid line valve. Pump all of the existing R22 refrigerant back into the outdoor unit. (It may be necessary to bypass the low pressure switches to ensure complete refrigerant evacuation.) When the low side system pressures reach 0 psig, close the suction line valve. Disconnect all power to the existing outdoor unit. Refer to gauges after shutdown to confirm that the valves are not allowing refrigerant to flow back into the low side of the system. Disconnect the liquid and vapor lines from the existing outdoor unit.

- 2 - Remove the existing outdoor unit. Set the new R407C unit and follow the brazing connection procedure which begins on the previous page to make line set connections. **DO NOT install provided R407C expansion valve at this time.**

Make low voltage and line voltage connections to the new outdoor unit. **DO NOT turn on power to the unit or open the outdoor unit service valves at this time.**

- 3 - Remove the existing refrigerant flow control orifice or thermal expansion valve before continuing with flushing procedures. The existing devices are not approved for use with R407C refrigerant and may prevent proper flushing. Use a field-provided fitting to reconnect the lines.

⚠ IMPORTANT

The line set and indoor coil must be flushed with at least the same amount of clean refrigerant that previously charged the system. Check the charge in the flushing cylinder before proceeding.

- 4 - Remove the pressure tap valve cores from the HS40 unit's service valves. Connect an R22 cylinder with clean refrigerant to the suction service valve. Connect the R22 gauge set to the liquid line valve and connect a recovery machine with an empty recovery tank to the gauge set.
- 5 - Set the recovery machine for liquid recovery and start the recovery machine. Open the gauge set valves to allow the recovery machine to pull a vacuum on the existing system line set and indoor coil.
- 6 - Invert the cylinder of clean R22 and open its valve to allow liquid refrigerant to flow into the system through the suction line valve. Allow the refrigerant to pass from the cylinder and through the line set and the indoor coil before it enters the recovery machine.
- 7 - After all of the liquid refrigerant has been recovered, switch the recovery machine to vapor recovery so that all of the R22 vapor is recovered. All the recovery machine to pull a vacuum on the system.

NOTE - A single system flush should remove all of the mineral oil from the existing refrigerant lines and indoor coil. A second flushing may be done (using clean refrigerant) if insufficient amounts of mineral oil were removed during the first flush. Each time the system is flushed, you must allow the recovery machine to pull a vacuum on the system at the end of the procedure.

- 8 - Close the valve on the inverted R22 drum and the gauge set valves. Pump the remaining refrigerant out of the recovery machine and turn the machine off.
- 9 - Use nitrogen to break the vacuum on the refrigerant lines and indoor coil before removing the recovery machine, gauges and R22 refrigerant drum. Reinstall pressure tap valve cores into HS40 service valves.
- 10 - Install the provided expansion valve (approved for use with R407C refrigerant) in the liquid line at the indoor coil.

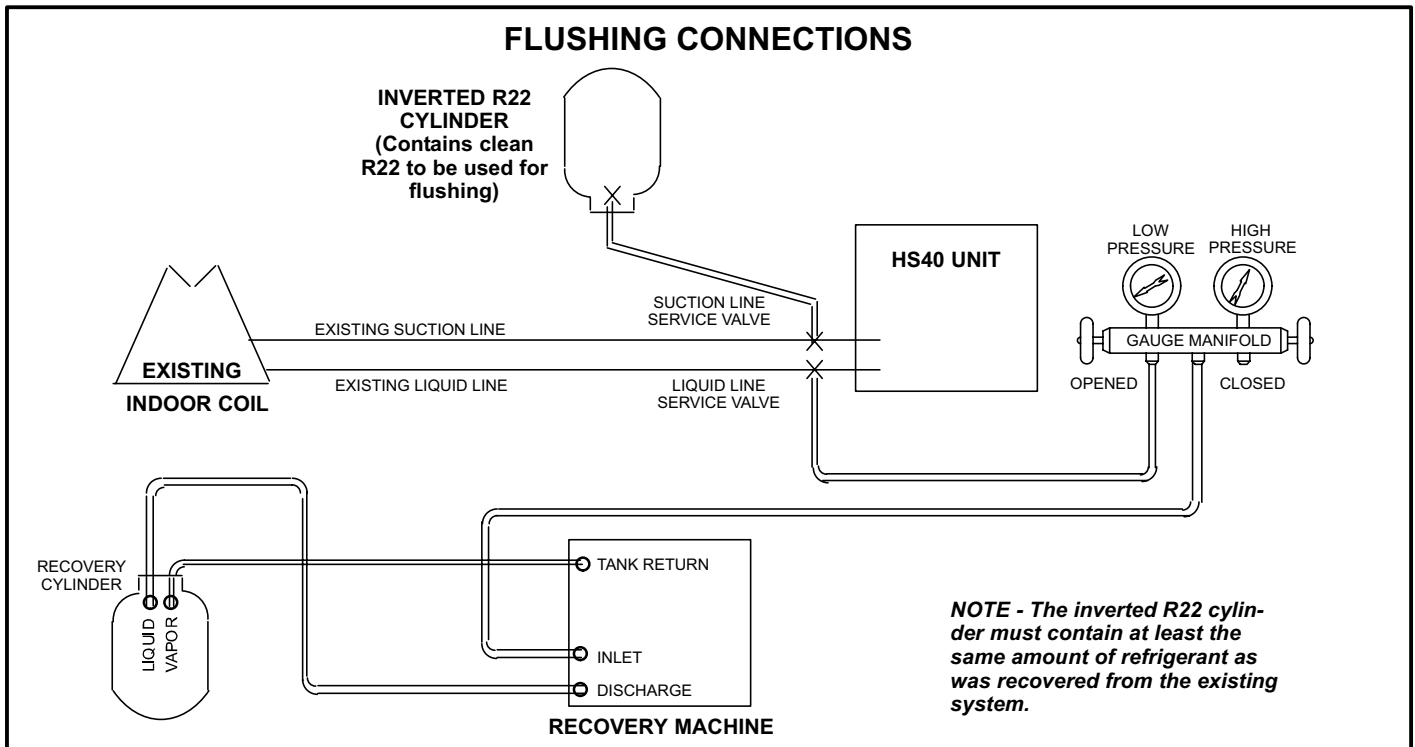


FIGURE 4

Liquid & Suction Line Service Valves

The liquid line and suction line service valves (figures 5 and 6) and gauge ports are accessible from outside the unit. The service ports are used for leak testing, evacuating, charging and checking charge.

The valves are equipped with a service port. A Schrader valve is factory-installed. A service port cap is supplied to protect the Schrader valve from contamination and to serve as the primary leak seal.

To Access Schrader Port:

- 1 - Remove the service port cap with an adjustable wrench.
- 2 - Connect gauge to the service port.
- 3 - When testing is completed, replace the service port cap. Tighten finger tight, then an additional 1/6 turn.

To Open Liquid or Suction Line Service Valve:

- 1 - Remove the stem cap with an adjustable wrench.
- 2 - Use a service wrench with a hex-head extension to back the stem out counterclockwise until the valve stem just touches the retaining ring.

⚠ DANGER

Do not attempt to backseat this valve. Attempts to backseat this valve will cause snap ring to explode from valve body under pressure of refrigerant. Personal injury and unit damage will result.

- 3 - Replace the stem cap. Tighten finger tight, then tighten an additional 1/6 turn.

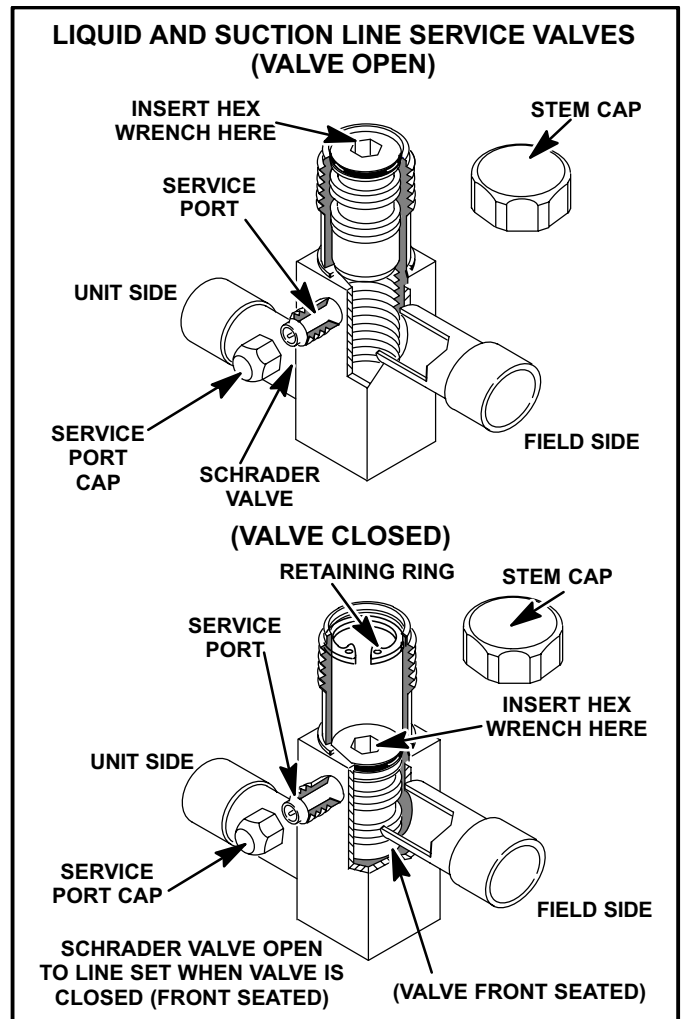


FIGURE 5

To Close Liquid or Suction Line Service Valve:

- 1 - Remove stem cap with an adjustable wrench.
- 2 - Use a service wrench with a hex-head extension to turn the stem clockwise to seat the valve. Tighten firmly.
- 3 - Replace the stem cap. Tighten finger tight, then tighten an additional 1/6 turn.

Five Ton Suction Line (Ball-Type) Service Valve

A ball-type full-service valve is used on five-ton HS40-065 units only. These suction line service valves function the same way, the differences are in the valve's construction. Valves are not rebuildable. If a valve has failed, it must be replaced. A ball valve valve is illustrated in figure 6.

The ball valve is equipped with a service port. A Schrader valve is factory installed. A service port cap is supplied to protect the Schrader valve from contamination and assure a leak free seal.

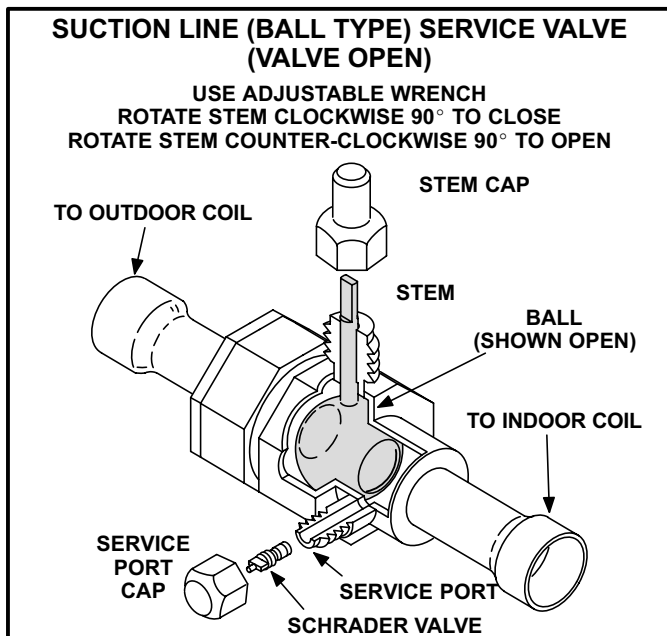


FIGURE 6

Leak Testing

After the line set has been connected to the indoor and outdoor units, the line set connections and indoor unit must be checked for leaks.

⚠ WARNING

Never use oxygen to pressurize refrigeration or air conditioning systems. Oxygen will explode on contact with oil and could cause personal injury. When using high pressure gas such as nitrogen for this purpose, be sure to use a regulator that can control the pressure down to 1 or 2 psig (6.9 to 13.8 kPa).

Using an Electronic Leak Detector

⚠ IMPORTANT

Leak detector must be capable of sensing HFC refrigerant.

- 1 - Connect the high pressure hose of the manifold gauge set to the suction valve service port. (Normally, the high pressure hose is connected to the liquid line port, however, connecting it to the suction port helps to protect the manifold gauge set from damage caused by high pressure.)
- 2 - With both manifold valves closed, connect the cylinder of R407C refrigerant. Open the valve on the R407C cylinder (vapor only).
- 3 - Open the high pressure side of the manifold to allow R407C into the line set and indoor unit. Weigh in a trace amount of R407C. [A trace amount is a maximum of 2 ounces (57 g) refrigerant or 3 pounds (31 kPa) pressure]. Close the valve on the R407C cylinder and the valve on the high pressure side of the manifold gauge set. Disconnect R407C cylinder.
- 4 - Connect a cylinder of nitrogen with a pressure regulating valve to the center port of the manifold gauge set.
- 5 - Adjust nitrogen pressure to 150 psig (1034 kPa). Open the valve on the high side of the manifold gauge set in order to pressurize the line set and the indoor coil.
- 6 - After a short period of time, open a refrigerant port to make sure that an adequate amount of refrigerant has been added for detection (refrigerant requirements will vary with line lengths). Check all joints for leaks. Purge nitrogen and R407C mixture. Correct any leaks and recheck.

Evacuation & Dehydration

Evacuating the system of non-condensables is critical for proper operation of the unit. Non-condensables are defined as any gas that will not condense under temperatures and pressures present during operation of an air conditioning system. Non-condensables and water vapor combine with refrigerant to produce substances that corrode copper piping and compressor parts.

- 1 - Connect the manifold gauge set to the service valve ports as follows: low pressure gauge to suction line service valve; high pressure gauge to liquid line service valve.

IMPORTANT - Compliant scroll compressors (as with any refrigerant compressor) should never be used to evacuate a refrigeration or air conditioning system.

NOTE - A temperature vacuum gauge, mercury vacuum or thermocouple gauge should be used. The usual Bourdon tube gauges are inaccurate in the vacuum range.

- 2 -The nitrogen holding charge in the unit must be released. Open both manifold valves to release the nitrogen from the unit. See page 5 for service valve operation.
- 3 -Connect the vacuum pump (with vacuum gauge) to the center port of the manifold gauge set.
- 4 -Open both manifold valves and start vacuum pump.
- 5 -Evacuate the line set, condensing unit, and indoor unit to an **absolute pressure** of 23 mm (23,000 microns) of mercury. During the early stages of evacuation, it is desirable to close the manifold gauge valve at least once to determine if there is a rapid rise in **absolute pressure**. A rapid rise in pressure indicates a relatively large leak. If this occurs, the leak testing procedure must be repeated.

*NOTE - The term **absolute pressure** means the total actual pressure within a given volume or system, above the absolute zero of pressure. Absolute pressure in a vacuum is equal to atmospheric pressure minus vacuum pressure.*

- 6 -When the absolute pressure reaches 23 mm (23,000 microns) of mercury, close the manifold gauge valves, turn off the vacuum pump and disconnect the manifold gauge center port hose from vacuum pump. Attach the manifold center port hose to a nitrogen cylinder with pressure regulator set to 150 psig (1034 kPa) and purge the hose. Open the manifold gauge valves to break the vacuum in the system. Close the manifold gauge valves.

Refer to the unit nameplate for the correct liquid charge. If you can not measure in the total amount, refer to the start-up section and set the final system charge according to the charging instructions. **The R407C refrigerant cylinder should be chocolate brown.**

Start-Up

- 1 - Rotate the fan to check for frozen bearings or binding.
- 2 - Inspect all factory and field-installed wiring for loose connections.
- 3 - Check voltage supply at the disconnect switch. The voltage must be within range listed on unit nameplate. If not, do not start equipment until the power company has been consulted and the voltage condition corrected.
- 4 - Set thermostat for a cooling demand, turn on power to blower and close condensing unit disconnect switch to start.
- 5 - 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.

Charging

Charge the unit with the amount of liquid R407C refrigerant that is indicated on the unit nameplate. This charge is based on a matching indoor coil and outdoor coil with 4.6 m line set. For varying lengths of line set, refer to table 2 for refrigerant charge adjustment.

TABLE 2

| Liquid Line Set Diameter | Grams per 1.5 m adjust from 4.6 m line set* |
|--------------------------|---|
| 5/16 in. (8 mm) | 57 g per 1.5 m |
| 3/8 in. (10 mm) | 85 g per 1.5 m |

*If line length is greater than 4.6 m, add this amount. If line length is less than 4.6 m, subtract this amount.

⚠ WARNING

Danger of Equipment Damage. Avoid deep vacuum operation. Do not use compressors to evacuate a system. Extremely low vacuums can cause internal arcing and compressor failure. Damage caused by deep vacuum operation will void warranty.

- 7 -Shut off the nitrogen cylinder and remove the manifold gauge hose from the cylinder. Open the manifold gauge valves to release the nitrogen from the system.
- 8 -Reconnect the manifold gauge to the vacuum pump, turn the pump on and continue to evacuate the system until the absolute pressure does not rise above .5 mm (500 microns) of mercury within a 20-minute period after shutting off the vacuum pump and closing the manifold gauge valves.
- 9 -When the absolute pressure requirement from step 9 has been met, disconnect the manifold gauge hose from the vacuum pump. Then, weigh in a LIQUID charge of R407C through the liquid and suction service valves.

⚠ IMPORTANT

Mineral oils are not compatible with R407C. If oil must be added, it must be a polyol ester oil.

The compressor is charged with sufficient polyol ester oil for line set lengths up to 15 m. If line set lengths longer than 15 m will be required, add 1 ounce (28 gm) of oil for every additional 3 m of line set. Do not add any more than 207 ml of oil. Copeland has approved Mobil EAL™ Arctic 22CC and ICI EMKARATE™ RL32CF for use with these compressors when oil must be added in the field.

The following procedure is intended as a general guide and is for use on expansion valve systems only. For best results, the indoor temperature must range from 21°C to 26°C. Be sure to monitor system pressures while charging.

TABLE 3
R407C Saturated Liquid Temperature and Pressure Chart
Use this chart for subcooling only, not superheat

| Saturated Liquid Temperature °C | Liquid Line Pressure | | Saturated Liquid Temperature °C | Liquid Line Pressure | |
|---------------------------------|----------------------|----------------|---------------------------------|----------------------|----------------|
| | R407C Psig (kPa) | R22 Psig (kPa) | | R407C Psig (kPa) | R22 Psig (kPa) |
| 15 | 116 (799) | 102 (703) | 33 | 197 (1358) | 174 (1199) |
| 16 | 118 (813) | 104 (717) | 33 | 200 (1378) | 176 (1213) |
| 16 | 120 (827) | 105 (723) | 34 | 203 (1399) | 179 (1234) |
| 17 | 123 (848) | 107 (737) | 35 | 206 (1420) | 182 (1254) |
| 17 | 125 (861) | 109 (751) | 35 | 210 (1447) | 184 (1268) |
| 18 | 127 (875) | 111 (765) | 36 | 213 (1468) | 187 (1289) |
| 18 | 129 (889) | 113 (779) | 36 | 216 (1489) | 190 (1310) |
| 19 | 131 (903) | 115 (792) | 37 | 219 (1509) | 193 (1330) |
| 20 | 134 (923) | 117 (806) | 37 | 222 (1530) | 196 (1351) |
| 20 | 136 (937) | 119 (820) | 38 | 226 (1558) | 199 (1372) |
| 21 | 138 (951) | 121 (834) | 38 | 229 (1578) | 202 (1392) |
| 21 | 141 (972) | 123 (848) | 39 | 232 (1599) | 205 (1413) |
| 22 | 143 (985) | 126 (868) | 40 | 236 (1627) | 208 (1431) |
| 22 | 146 (1006) | 128 (882) | 40 | 239 (1647) | 211 (1454) |
| 23 | 148 (1020) | 130 (896) | 41 | 242 (1668) | 214 (1475) |
| 23 | 151 (1041) | 132 (910) | 41 | 246 (1696) | 217 (1496) |
| 24 | 153 (1054) | 134 (923) | 42 | 249 (1716) | 220 (1516) |
| 25 | 156 (1075) | 137 (944) | 42 | 253 (1744) | 223 (1537) |
| 25 | 158 (1089) | 139 (958) | 43 | 257 (1771) | 226 (1558) |
| 26 | 161 (1110) | 141 (972) | 43 | 260 (1792) | 229 (1578) |
| 26 | 163 (1123) | 144 (992) | 44 | 264 (1820) | 233 (1606) |
| 27 | 166 (1144) | 146 (1006) | 45 | 268 (1847) | 236 (1627) |
| 27 | 169 (1165) | 148 (1020) | 45 | 271 (1868) | 239 (1647) |
| 28 | 171 (1179) | 151 (1041) | 46 | 275 (1896) | 243 (1675) |
| 28 | 174 (1199) | 153 (1054) | 47 | 279 (1923) | 246 (1696) |
| 29 | 177 (1220) | 156 (1075) | 47 | 283 (1951) | 250 (1723) |
| 30 | 180 (1241) | 158 (1089) | 47 | 287 (1978) | 253 (1744) |
| 30 | 183 (1261) | 161 (1110) | 48 | 290 (1999) | 256 (1765) |
| 31 | 186 (1282) | 163 (1123) | 48 | 294 (2027) | 260 (1792) |
| 31 | 188 (1296) | 166 (1144) | 51 | 315 (2171) | 278 (1916) |
| 32 | 191 (1316) | 168 (1158) | 54 | 336 (2316) | 297 (2047) |
| 32 | 194 (1337) | 171 (1179) | 57 | 358 (2468) | 317 (2185) |

Checking Unit Charge Using Subcooling when Outdoor Temperature is $\geq 16^{\circ}\text{C}$

- 1 - After the pressures have stabilized, attach the manifold gauge hose to the liquid service port, and record the liquid pressure. At the same time, use a digital thermometer to record the liquid line temperature.
- 2 - Use table 3 to determine the saturation temperature that corresponds with the liquid line pressure reading.
- 3 - To determine subcooling, subtract the liquid line temperature from the saturation temperature (table 3):

Saturation Temperature

-Liquid Line Temperature

=Subcooling

- 4 - If the system is operating at subcooling values **higher** than $4.4 - 5.5^{\circ}\text{C}$, recover refrigerant.
- 5 - If the system is operating at subcooling values **lower** than $4.4 - 5.5^{\circ}\text{C}$, add refrigerant through the suction valve in the liquid state. **Some R407C cylinders are equipped with a dip tube which allows you to draw liquid refrigerant from the bottom of the cylinder without turning the cylinder upside-down. The cylinder will be marked if it is equipped with a dip tube.**

System Operation

The condensing unit and the indoor blower cycle on demand from room thermostat. When the thermostat blower switch is switched to the ON position, the indoor blower operates continuously.

Timed-Off Control

Units include a timed-off control which helps equalize system pressures. The timed-off control delays compressor start-up for five minutes on thermostat demand. This allows the compressor to start in an unloaded condition and prevents compressor short-cycling. The control is located in the control box and is wired between thermostat terminal "Y" and the compressor contactor.

High Pressure and Low Pressure Switches

Units include a high pressure switch and a low pressure switch. The pressure switches are located on valve cores in the liquid line to allow for easy access. The manually reset high pressure switch protects the system from high pressure conditions which result from a fan failure or a blocked or dirty coil. The low pressure switch (SPST, NO) protects the system compressor from damage due to a loss of charge. The loss of charge switch trips at 25 ± 5 psig (172 ± 34 kPa) and automatically resets at 55 ± 5 psig (379 ± 34 kPa).

Refrigerant Sight Glass

A refrigerant sight glass is provided (in the bag assembly) with the unit. The sight glass should be field-installed in the liquid line to monitor the system refrigerant.

Maintenance

⚠ WARNING



Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

At the beginning of each cooling season, the system should be checked as follows:

- 1 - Clean and inspect condenser coil. Coil may be flushed with a water hose. Make sure power is off before cleaning.
- 2 - Visually inspect connecting lines and coils for evidence of oil leaks.
- 3 - Check wiring for loose connections.
- 4 - Check for correct voltage at unit (unit operating).
- 5 - Check condenser fan motor amp-draw.
Unit nameplate _____ Actual _____ .

NOTE - If owner complains of insufficient cooling, the unit should be gauged and refrigerant charge checked. Refer to section on refrigerant charging in this instruction.

Evaporator Coil

- 1 - If necessary, clean coil.
- 2 - Check connecting lines and coils for evidence of oil leaks.
- 3 - Check condensate line and clean, if necessary.

Indoor Unit

- 1 - Clean or change filters.
- 2 - Adjust blower speed for cooling. The pressure drop over the coil should be measured to determine the correct blower CFM. Refer to the unit information service manual for pressure drop tables and procedure.
- 3 - Belt Drive Blowers — Check belt for wear and proper tension.
- 4 - Check all wiring for loose connections
- 5 - Check for correct voltage at unit (blower operating).
- 6 - Check amp-draw on blower motor
Unit nameplate _____ Actual _____ .

Start-Up & Performance Check List

Job Name _____ Job No. _____ Date _____

Job Location _____ City _____ State _____

Installer _____ City _____ State _____

Unit Model No. _____ Serial No. _____ Service technician _____

Nameplate Voltage _____ Amps: _____

Minimum Circuit Ampacity _____ Supply _____ Condenser Fan _____

Maximum Overcurrent Protection Size _____ Compressor _____

Electrical Connections Tight? Indoor Filter Clean?

Indoor Blower CFM _____

Supply Voltage (Unit Off) _____ S.P. Drop Over Evaporator (Dry) _____

COOLING SECTION

Refrigerant Lines:

Leak Checked?

Condenser Entering Air Temperature _____

Service Valves Fully Opened?

Discharge Pressure _____ Suction Pressure _____

Properly Insulated?

Refrigerant Charge Checked?

Service Valve Caps Tight?

Condenser Fan Checked?

Voltage With Compressor Operating _____

THERMOSTAT

Properly Set?

Level?

Calibrated?

LENNOX[®]

Lennox Industries
P.O. Box 174, Westgate Interchange,
Northampton NN5 5AG

Telephone: 01604 591159
Facsimile: 01604 587536

