

## Installation and Start-Up Instructions

**NOTE:** Read the entire instruction manual before starting the installation.

This symbol → indicates a change since the last issue.

### SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and the national electric codes for special installation requirements.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit or in instructions and manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **would** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

### ⚠ WARNING

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label. Electrical shock can cause personal injury or death.

### INSTALLATION

#### Step 1—Check Equipment and Job Site

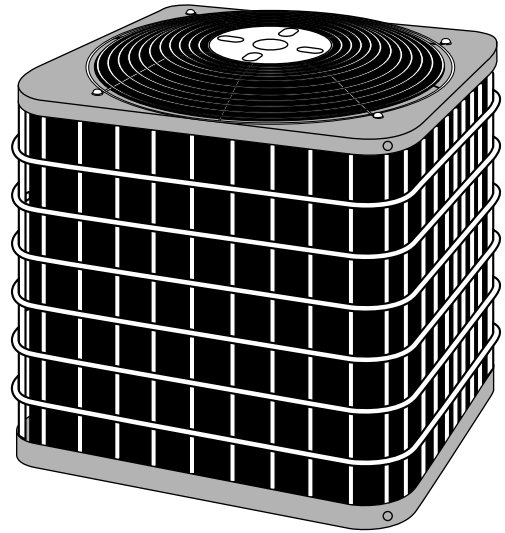
**UNPACK UNIT** — Move to final location. Remove carton taking care not to damage unit.

**INSPECT EQUIPMENT** — File claim with shipping company prior to installation if shipment is damaged or incomplete. Locate unit rating plate on unit corner panel. (See Fig. 2.) It contains information needed to properly install unit. Check rating plate to be sure unit matches job specifications.

#### Step 2—Install on a Solid, Level Mounting Pad

If conditions or local codes require the unit be attached to pad, tie down bolts should be used and fastened through knockouts provided in unit base pan. Refer to unit mounting pattern in Fig. 2 to determine base pan size and knockout hole location.

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**Fig. 1—Model 38YCX**

When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping, and service. Allow 30-in. (762mm) clearance to service end of unit and 48 in. (1219mm) above unit. For proper airflow, a 6-in. (152mm) clearance on 1 side of unit and 12 in. (305mm) on all remaining sides must be maintained. Maintain a distance of 24 in. (610mm) between units. Position so water, snow, or ice from roof or eaves cannot fall directly on unit.

On rooftop applications, locate unit at least 6 in. (152mm) above roof surface. Place unit above a load-bearing wall and isolate unit and tubing set from structure.

Arrange supporting members to adequately support unit and minimize transmission of vibration to building. Consult local codes governing rooftop applications.

#### Step 3—Elevate Unit

### ⚠ CAUTION

Accumulation of water and ice in base pan may cause equipment damage.

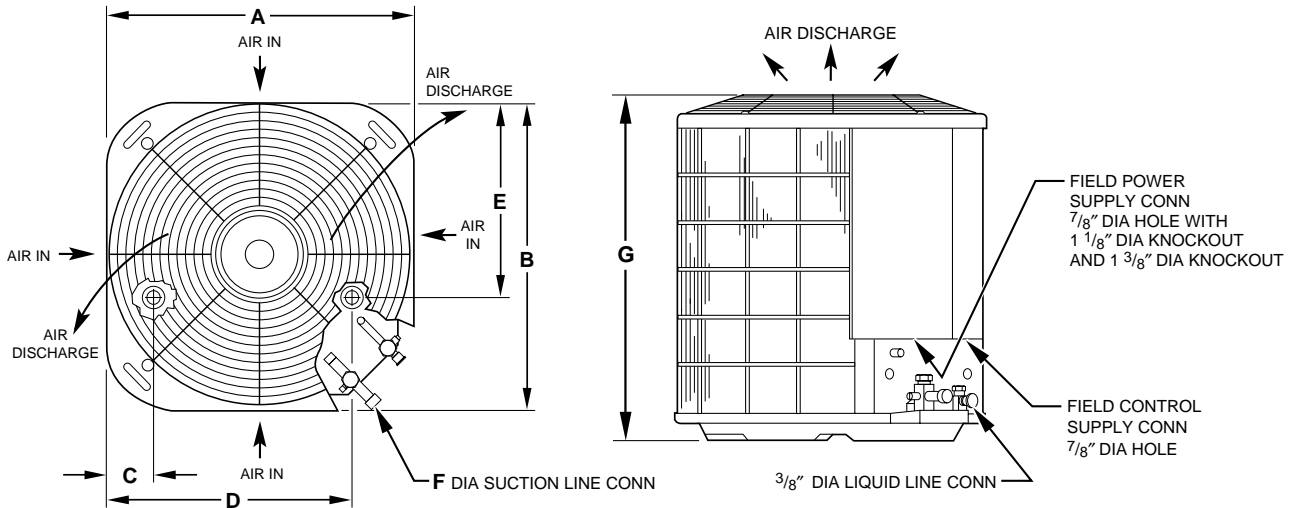
In areas where prolonged freezing temperatures are encountered, elevate unit per local climate and code requirements to provide clearance above estimated snowfall level and ensure adequate drainage of unit. (See Fig. 3.)

#### Step 4—Replace Indoor AccuRater® Piston (if required)

Check indoor coil piston to see if it matches the required piston shown on outdoor unit rating plate. (See Fig. 2.) If it does not

NOTES:

1. ALLOW 30" CLEARANCE TO SERVICE END OF UNIT, 48" ABOVE UNIT, 6" ON ONE SIDE, 12" ON REMAINING SIDE, AND 24" BETWEEN UNITS FOR PROPER AIRFLOW.
2. MINIMUM OUTDOOR OPERATING AMBIENT IN COOLING MODE IS 55° F (UNLESS LOW AMBIENT CONTROL IS USED) MAX. 115° F.
3. MAXIMUM OUTDOOR OPERATING AMBIENT IN HEATING MODE IS 66° F.
4. SERIES DESIGNATION IS THE 13TH POSITION OF THE UNIT MODEL NUMBER.



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UNIT SIZE	A/B		C		D		E		F		G	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
024	22-1/2	571.5	3-11/16	93.6	18-1/8	460.4	14-3/8	365.1	5/8	15.88	33-15/16	862.0
036	30	762.0	6-1/2	165.1	23-1/2	596.9	20	508.0	3/4	19.05	39-15/16	1014.4
048	30	762.0	6-1/2	165.1	23-1/2	596.9	20	508.0	7/8	22.23	33-15/16	862.0
060	30	762.0	6-1/2	165.1	23-1/2	596.9	20	508.0	7/8	22.23	33-15/16	862.0

Fig. 2—Unit Reference Drawing

match, replace indoor coil piston with piston shipped with outdoor unit. The piston shipped with outdoor unit is correct for any approved indoor coil combination.

**⚠ WARNING**

Do not operate unit in the vicinity of toxic or flammable material. Failure to follow this warning can result in personal injury, fire, or death.

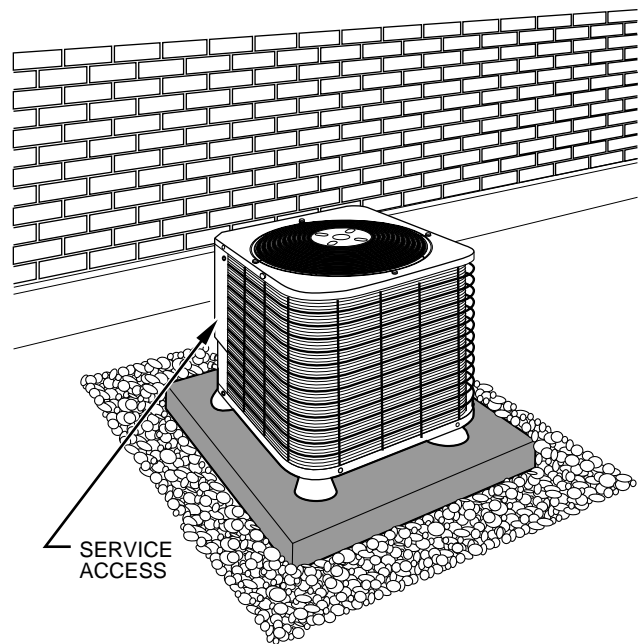
**⚠ CAUTION**

Remove indoor coil piston if unit is to be installed on system with a TXV metering device.

**Step 5—Make Piping Connections**

**⚠ WARNING**

Relieve pressure and recover all refrigerant before system repair or final unit disposal to avoid personal injury or death. Use all service ports and open all flow-control devices, including solenoid valves.



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Fig. 3—Accessory Heat Pump Feet

**Table 1—Refrigerant Connections and Recommended Liquid and Vapor Tube Diameters**

UNIT SIZE	LIQUID				VAPOR			
	Connection Dia.		Tube Dia.		Connection Dia.		Vapor Dia.	
	In.	mm	In.	mm	In.	mm	In.	mm
<b>024</b>	3/8	9.53	3/8	9.53	5/8	15.88	5/8	15.88
<b>036</b>	3/8	9.53	3/8	9.53	3/4	19.05	3/4	19.05
<b>048</b>	3/8	9.53	3/8	9.53	7/8	22.23	7/8	22.23
<b>060</b>	3/8	9.53	3/8	9.53	7/8	22.23	1-1/8	28.58

NOTES: 1. Tube diameters are for lengths up to 50 ft (15.24m). For tubing lengths greater than 50 ft (15.24m), consult Long-Line Application Guideline.  
 2. Do not apply capillary tube indoor coils to these units.

**CAUTION**

To prevent compressor damage DO NOT bury more than 36 in. of refrigerant tubing. If ANY tubing is buried, provide 6 in. vertical rise at service valve.

**CAUTION**

To prevent damage to unit or service valves observe the following:

- Use a brazing shield.
- Wrap service valves with wet cloth or use a heat sink material.

Outdoor units may be connected to indoor section using accessory tubing package or field-supplied refrigerant grade tubing of correct size and condition. For tubing requirements beyond 50 ft (15.24m), consult Long-Line Application Guideline which is available from your local distributor.

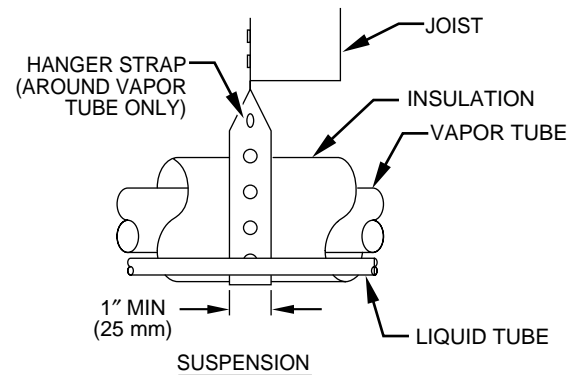
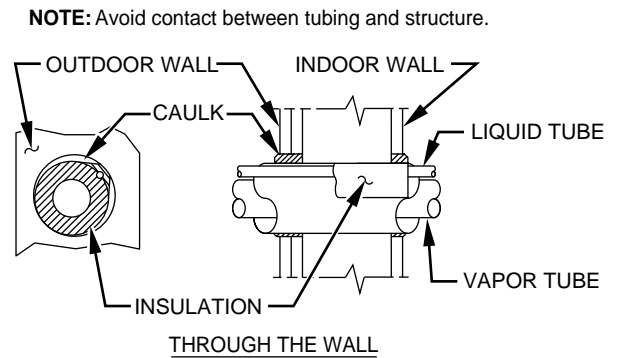
**NOTE:** In some cases noise in the living area has been traced to gas pulsations from improper installation of equipment.

**INSTALLATION RECOMMENDATIONS**

1. Locate unit away from windows.
2. Ensure that vapor and liquid tube diameters are appropriate to capacity of unit. (See Table 1.)
3. Run refrigerant tubes as directly as possible by avoiding unnecessary turns and bends.
4. Leave some slack between structure and unit to absorb vibration.
5. When passing refrigerant tubes through the wall, seal opening with RTV or other pliable silicon-based caulk. (See Fig. 4.)
6. Avoid direct tubing contact with water pipes, ductwork, floor joists, wall studs, floors, and walls.
7. Do not suspend refrigerant tubing from joists and studs with a rigid wire or strap which comes in direct contact with tubing. (See Fig. 4.)
8. Ensure that tubing insulation is pliable and completely surrounds vapor tube.
9. When necessary, use hanger straps which are 1 in. (25mm) wide and conform to shape of tubing insulation. (See Fig. 4.)
10. Isolate hanger straps from insulation by using metal sleeves bent to conform to shape of insulation.

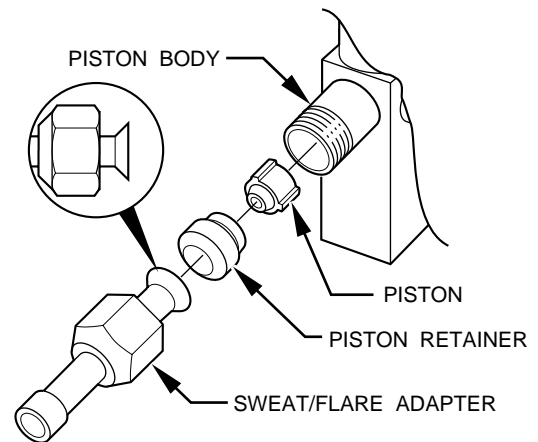
If refrigerant tubes or indoor coil is exposed to atmosphere, it must be evacuated to 500 microns to eliminate contamination and moisture in the system.

**OUTDOOR UNIT CONNECTED TO FACTORY-APPROVED INDOOR UNIT** — Outdoor unit contains correct system refrigerant charge for operation with indoor unit of same size when connected by 15 ft (4.55m) of field-supplied or factory-accessory tubing. Check refrigerant charge for maximum efficiency.



**Fig. 4—Piping Installation**

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**Fig. 5—Service Valve with Sweat Adapter Tube**

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**REFRIGERANT TUBING** — Connect tubing to fittings on outdoor unit vapor and liquid service valves. (See Fig. 2 and 5.)

**SWEAT CONNECTION** — Use refrigerant grade tubing. Service valves are closed from factory and ready for brazing. After wrapping service valve with a wet cloth, tubing set can be brazed to service valve using either silver bearing or non-silver bearing brazing material. Consult local code requirements. Refrigerant tubing and indoor coil are now ready for leak testing. This check should include all field and factory joints.

**Step 6—Make Electrical Connections**

**⚠ WARNING**

To avoid personal injury or death, do not supply power to unit with compressor terminal box cover removed.

Be sure field wiring complies with local and national fire, safety, and electrical codes, and voltage to system is within limits shown on unit rating plate. Contact local power company for correction of improper voltage. See unit rating plate for recommended circuit protection device.

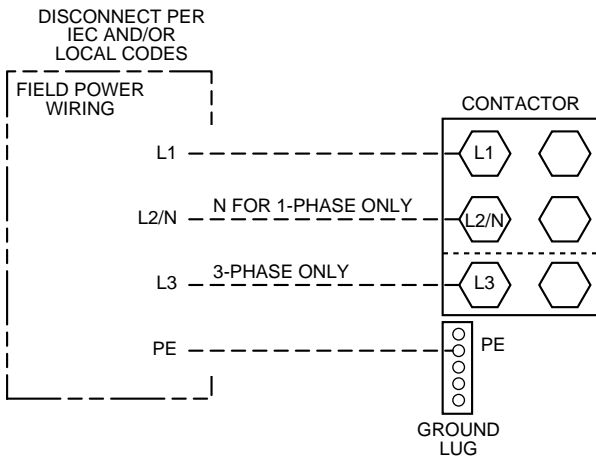
**NOTE:** Operation of unit on improper line voltage constitutes abuse and could affect unit reliability. See unit rating plate. Do not install unit in system where voltage may fluctuate above or below permissible limits.

**NOTE:** Use copper wire only between disconnect switch and unit.

**NOTE:** Install branch circuit disconnect per local codes to handle unit starting current. Locate disconnect within sight from and readily accessible from unit per local codes.

**ROUTE GROUND AND POWER WIRES** — Remove access panel and control box cover to gain access to unit wiring. Extend wires from disconnect through power wiring hole provided and into unit control box. (See Fig. 2.) Size wires per local codes but not smaller than minimum wire size shown on unit rating plate.

**CONNECT GROUND AND POWER WIRES** — Connect ground wire to ground connection in control box for safety. Connect power wiring to contactor as shown in Fig. 6.



**Fig. 6—Line Power Connections**

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**⚠ WARNING**

The unit cabinet must have an uninterrupted or unbroken ground to minimize personal injury if an electrical fault should occur. The ground may consist of electrical wire or metal conduit when installed in accordance with existing electrical codes. Failure to follow this warning can result in an electric shock, fire, or death.

**NOTE:** Use No. 18 AWG (American Wire Gage) color-coded, insulated (35°C minimum) wires. If thermostat is located more than 100 ft (30.5m) from unit (as measured along the control voltage wires), use No. 16 AWG color-coded wires to avoid excessive voltage drop.

**CONNECT CONTROL WIRING** — Route 24-v control wires through control wiring grommet and connect leads to control wiring terminal board. (See Fig. 7.)

Use furnace transformer, fan coil transformer, or accessory transformer for control power, 24-v/40-va minimum.

**NOTE:** Use of available 24-v accessories may exceed the minimum 40-va power requirement. Determine total transformer loading and increase the transformer capacity or split the load with an accessory transformer as required.

**NOTE:** The defrost timer is factory set for 90-minute cycles. The timer can be field set for 30- and 50-minute cycles depending on defrost conditions in your geographic location.

**Step 7—Compressor Crankcase Heater**

When equipped with a crankcase heater, energize heater a minimum of 24 hr before starting unit. To energize heater only, set thermostat to OFF and close electrical disconnect to outdoor unit.

A crankcase heater is required if the refrigerant tubing is longer than 50 ft.

**Step 8—Install Electrical Accessories**

Refer to the individual instructions packaged with the kits or accessories when installing.

**Step 9—Start-up and Check Charge**

**⚠ CAUTION**

To prevent compressor damage or personal injury, observe the following:

- Do not overcharge system with refrigerant.
- Do not operate unit in a vacuum or at negative pressure.
- Do not disable low-pressure switch

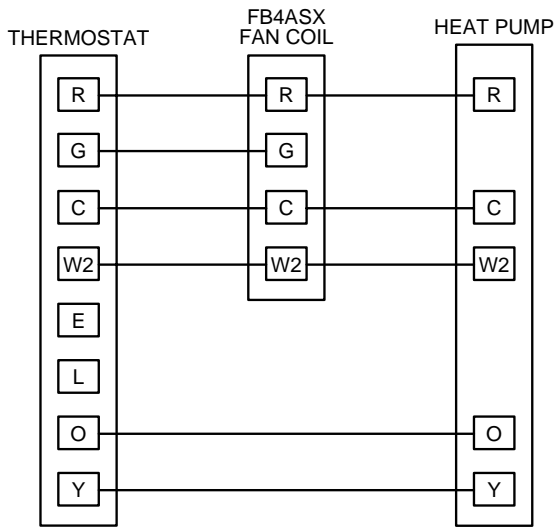
In scroll compressor applications:

- Dome temperatures may be hot.

**⚠ CAUTION**

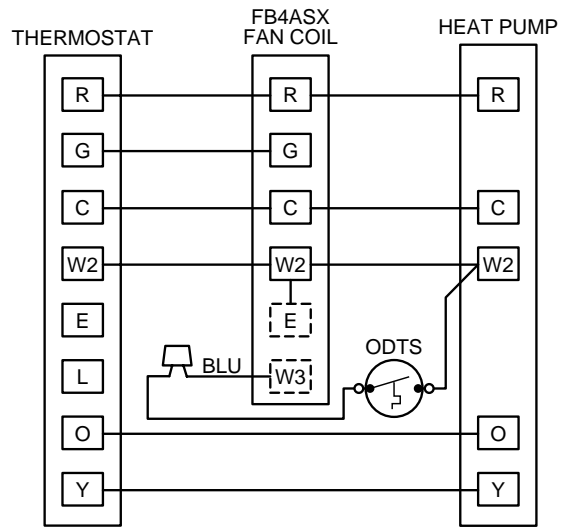
To prevent personal injury wear safety glasses, protective clothing, and gloves when handling refrigerant and observe the following:

- Back seating service valves are not equipped with Schrader valves. Fully back seat (counter clockwise) valve stem before removing gage port cap.
- Front seating service valves are equipped with Schrader valves.



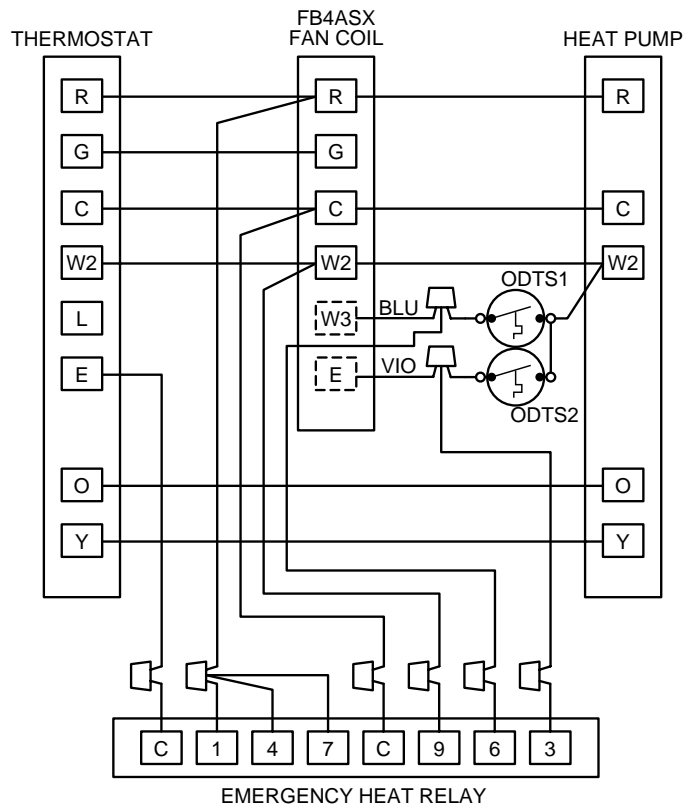
SYSTEMS WITHOUT  
OUTDOOR THERMOSTAT

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SYSTEMS WITH ONE  
OUTDOOR THERMOSTAT

A97054



EMERGENCY HEAT RELAY

SYSTEMS WITH TWO  
OUTDOOR THERMOSTATS

A97052

**Fig. 7—24-v Control Circuit Connections**

## ⚠ CAUTION

Do not vent refrigerant to atmosphere. Recover during system repair or final unit disposal.

1. If equipped with a crankcase heater, energize a minimum of 24 hr before starting unit. To energize heater only, set thermostat OFF and close electrical disconnect to outdoor unit.
2. Fully open liquid and vapor service valves.
3. Unit is shipped with valve stem(s) front seated and caps installed. Replace stem caps after system is opened to refrigerant flow. Replace caps finger tight and tighten additional 1/6 turn using a backup wrench on valve body flats to prevent distortion of sheet metal.
4. Close electrical disconnects to energize system.
5. Set room thermostat at desired temperature.
6. Set room thermostat to HEAT or COOL and fan to ON or AUTO mode, as desired. Operate unit for 15 minutes. Check system refrigerant charge.
7. Factory charge is shown on unit rating plate. Adjust charge in cooling mode by following procedure shown in charging table. Check charge in heating mode by following procedure shown on heating check chart. Both are located on unit.

## ⚠ CAUTION

- 3-phase scroll compressors are rotation sensitive.
- A flashing LED on phase monitor indicates reverse rotation. (See Fig. 8 and Table 2.)
- This will not allow contactor to be energized.
- Disconnect power to unit and interchange 2 field wiring leads on unit contactor.

**SEQUENCE OF OPERATION** — With power supplied to indoor and outdoor units, transformer is energized. Defrost control board is equipped with 5-minute lockout timer which may be initiated upon any interruption of power.

### Cooling

On a call for cooling, the thermostat makes circuits R-O, R-Y, and R-G. Circuit R-O energizes reversing valve, switching it to cooling position. On three phase models with scroll compressors, the units are equipped with a phase monitor to detect if the incoming power is correctly phased for compressor operation. (See Fig. 8 and Table 2.) If phasing is correct, circuit R-Y energizes contactor, starting outdoor fan motor and compressor circuit. R-G energizes indoor unit blower relay, starting indoor blower motor on high speed.

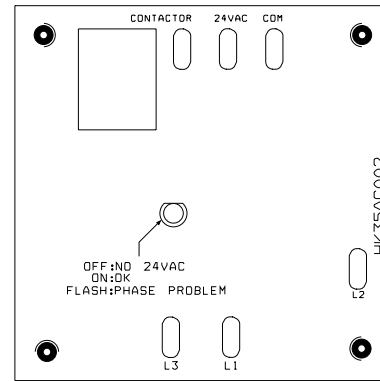
**NOTE:** If the phasing is incorrect, the contactor will not be energized. To correct the phasing, interchange any two of the three power connections on the field side.

When thermostat is satisfied, its contacts open, de-energizing contactor and blower relay. Compressor and motors stop.

**NOTE:** If indoor unit is equipped with a time-delay relay circuit, the blower runs an additional 90 sec to increase system efficiency.

### Heating

On a call for heating, the thermostat makes circuits R-Y and R-G. If phasing is correct, circuit R-Y energizes contactor, starting outdoor fan motor and compressor. Circuit R-G energizes indoor blower relay, starting blower motor on high speed.



A00010

**Fig. 8—Phase Monitor Control**

**Table 2—Phase Monitor LED Indicators**

LED	STATUS
OFF	No call for compressor operation
FLASHING	Reversed phase
ON	Normal

Should the temperature continue to fall, R-W2 is made through the second-stage room thermostat bulb. Circuit R-W2 energizes a sequencer, bringing on the first bank supplemental electric heat and providing electrical potential to the second heater sequencer (if used). If outdoor temperature falls below the setting of the outdoor thermostat (field-installed option), contacts close to complete the circuit and bring on the second bank of supplemental electric heat.

When the thermostat is satisfied, its contacts open, de-energizing contactor and sequencer. All heaters and motors should stop.

### → Quiet Shift

Quiet Shift is a field-selectable defrost mode, which will eliminate occasional noise that could be heard at the start of the defrost cycle and restarting of heating cycle. It is selected by placing DIP switch 3 (on defrost board) in ON position.

When Quiet Shift switch is placed in ON position, and a defrost is initiated, the following sequence of operation will occur. Reversing valve will energize, compressor will turn off for 30 sec, then turn back on to complete defrost. At the start of heating cycle after conclusion of defrost mode, reversing valve will de-energize, the compressor will turn off for another 30 sec, and the fan will turn off for 40 sec, before starting in the heating mode.

### → Defrost

The defrost control is a time/temperature control which includes a field-selectable time period (DIP switch 1 and 2 on the board) between defrost cycles of 30, 60, 90, or 120 minutes (factory set at 90 minutes).

To initiate a forced defrost, two options are available depending on the status of the defrost thermostat.

If defrost thermostat is closed, speedup pins (J1) must be shorted by placing a flat head screwdriver in between for 5 sec and releasing, to observe a complete defrost cycle. When the Quiet Shift switch is selected, compressor will be turned off for two 30 sec intervals during this complete defrost cycle as explained previously. When Quiet Shift switch is in factory default OFF position, a normal and complete defrost cycle will be observed.

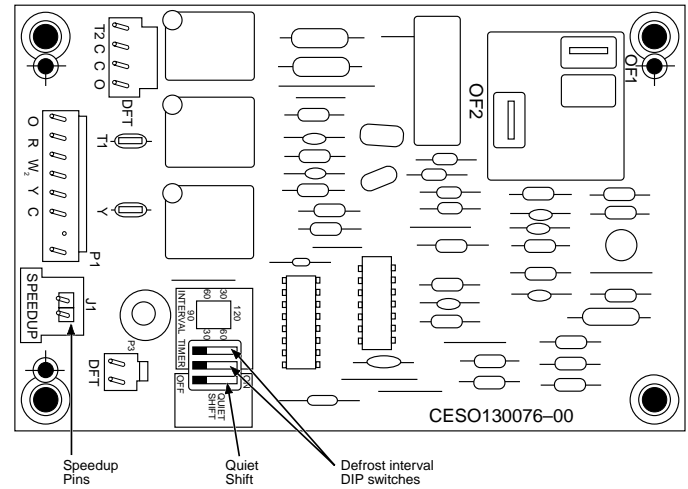
If defrost thermostat is in open position, and speedup pins are shorted (with a flat head screwdriver) for 5 sec and released, a short defrost cycle will be observed (actual length is dependent upon the selected Quiet Shift position). When Quiet Shift switch is in ON position, the length of defrost is 1 minute (30 sec compressor off period followed by 30 sec of defrost with compressor operation). On return to heating operation, compressor will again turn off for an additional 30 sec and the fan for 40 sec. When the Quiet Shift is in OFF position, only a brief 30 sec cycle will be observed.

If it is desirable to observe a complete defrost in warmer weather, the thermostat must be closed as follows:

1. Turn off power to outdoor unit.
2. Disconnect outdoor fan motor lead from OF2 on control board (See Fig. 9.) Tape to prevent grounding.
3. Restart unit in heating mode, allowing frost to accumulate on outdoor coil.
4. After a few minutes in heating mode, liquid line temperature should drop below closing point of defrost thermostat (approximately 30°F).

**NOTE:** Unit will remain in defrost until defrost thermostat reopens at approximately 80°F coil temperature at liquid line or remainder of defrost cycle time.

5. Turn off power to outdoor and reconnect fan motor lead to OF2 on control board after above forced defrost cycle.



**Fig. 9—Defrost Control**

### CARE AND MAINTENANCE

For continuing high performance and to minimize possible equipment failure, periodic maintenance must be performed on this equipment.

Leave User's Manual with owner. Explain system operation and periodic maintenance requirements outlined in manual. Frequency of maintenance may vary depending upon geographic areas, such as coastal applications.

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**Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.**



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