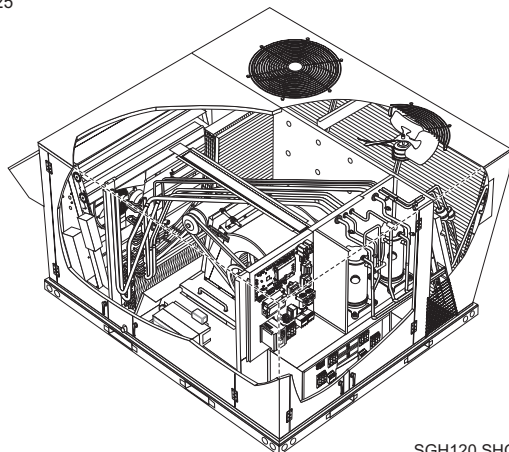




SGH120 SHOWN

⚠ IMPORTANT

Supply air VFD motor rotation is controlled independently from scroll compressor rotation. See Cooling Start-Up section for correct compressor rotation. Compressor damage due to improper rotation is the responsibility of the installer.

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INSTALLATION INSTRUCTIONS

SGH/SCH036 (3 TON)

SGH/SCH060 (5 TON)

SGH/SCH120 (10 TON)

SGH/SCH240 (20 TON)

GAS AND COOLING PACKAGED UNITS

508498-02

11/2025

Supersedes 508498-01

R-454B

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⚠ WARNING

To prevent serious injury or death:

- 1- Lock-out, tag-out before performing maintenance.
- 2- If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the OFF position before performing maintenance.
- 3- Always keep hands, hair, clothing, jewelry, tools, etc., away from moving parts.

RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCES

Attention!

Use this QR code to download the mobile service app. Follow the prompts to pair the app with the unit control system and configure the unit. The QR code is also available in the unit control area.



The app can be downloaded from the appropriate iOS or Android store. Look for the following icon.



CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

WARNING

Only manufacturer approved auxiliary devices are permitted to be installed in this unit.

WARNING

If this appliance is conditioning a space with an area smaller than T_{Amin} or stored in a space with an area smaller than A_{min} as defined by this instruction, then that space must be without continuously operating open flames (e.g. an operating gas appliance) or other potential ignition sources (e.g. an operating electric heater or similar hot surface). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest system.

CAUTION

Auxiliary devices which may be a potential ignition source shall not be installed in the duct work. Examples of such potential ignition sources are hot surfaces with a temperature exceeding 700°C and electric switching devices.

WARNING

Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent, service agency, or the gas supplier.

CAUTION

Any personnel installing, decommissioning, or performing maintenance on the unit must be properly trained with A2L refrigerants.

CAUTION

Leak Detection System installed. Unit must be powered except for service.

CAUTION

Servicing shall be performed only as recommended by the manufacturer.

WARNING

Ducts connected to an appliance shall not contain a potential ignition source.

WARNING

- This appliance must be installed in accordance with local and national wiring regulations.
- If the appliance is not fitted with an option for full disconnection from power, a means of disconnection must be incorporated in the fixed wiring in accordance with national and local wiring regulations.

WARNING

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.**
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).**
- Do not pierce or burn.**
- Be aware that refrigerants may not contain an odor**

CAUTION

The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.

CAUTION

Children should be supervised not to play with the appliance.

IMPORTANT

Pipe work, including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

IMPORTANT

Refrigerant sensors for refrigerant detection systems shall only be replaced with sensors specified by the appliance manufacture.

CAUTION

This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

A2L Refrigerant Considerations

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects, taking into account the effects of aging or continual vibration from sources such as compressors or fans.

Under no circumstances shall potential sources of ignition be used when searching for or detecting refrigerant leaks. **A halide torch (or any other detector using a naked flame) shall not be used.** Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. **Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected,**

all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practices be followed since flammability is a consideration. The following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations.

- Evacuate the circuit.

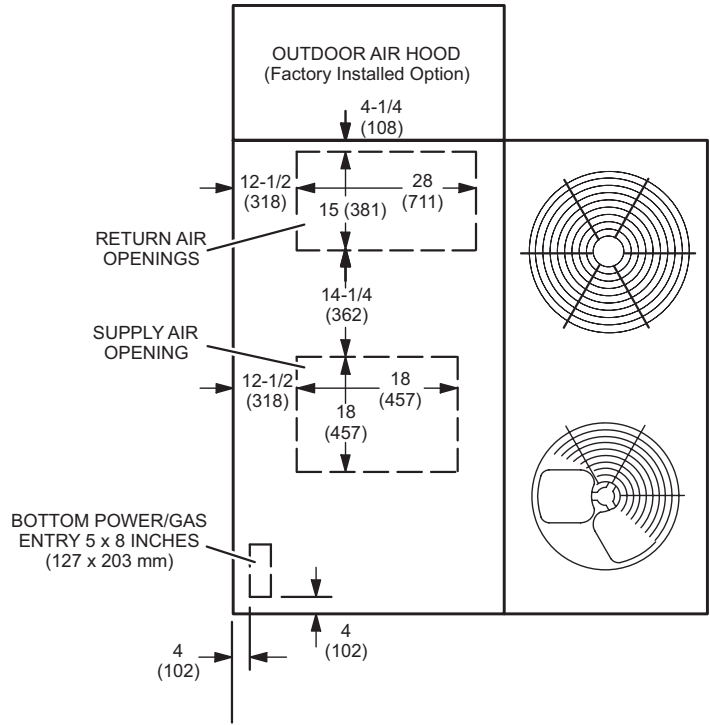
- Purge the circuit with inert gas.

- Evacuate.

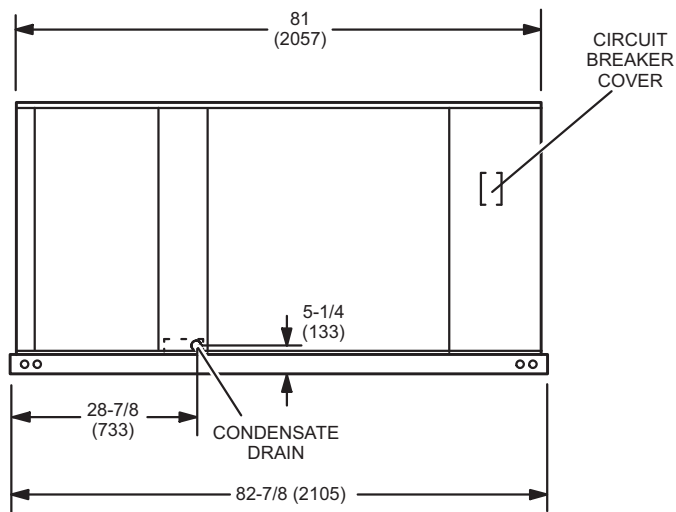
- Purge the circuit with inert gas.

- Open the circuit

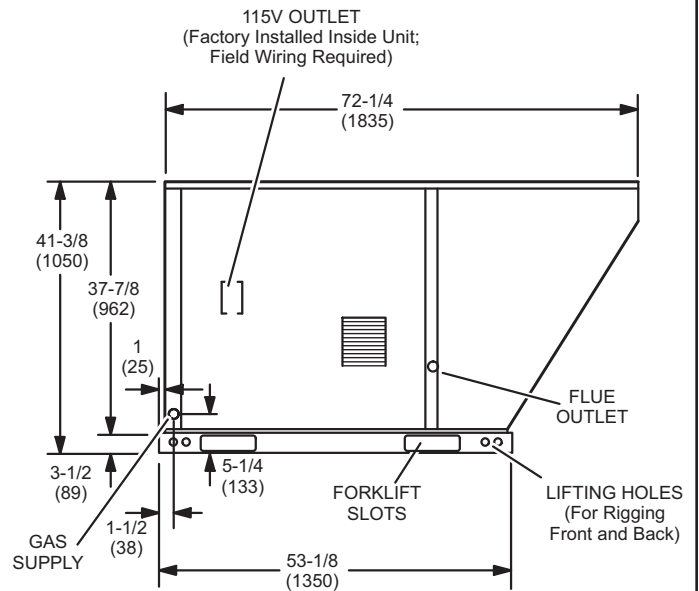
The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.



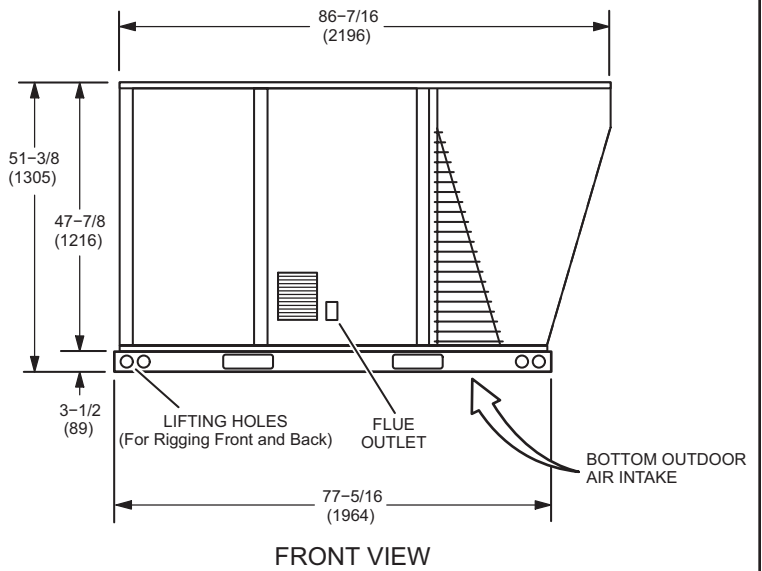
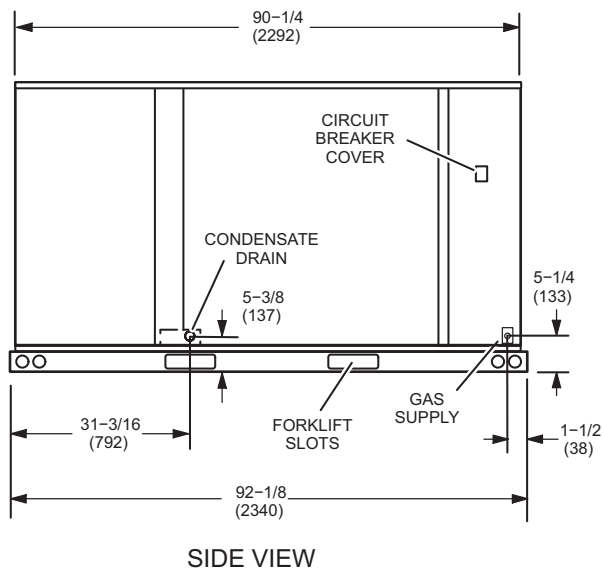
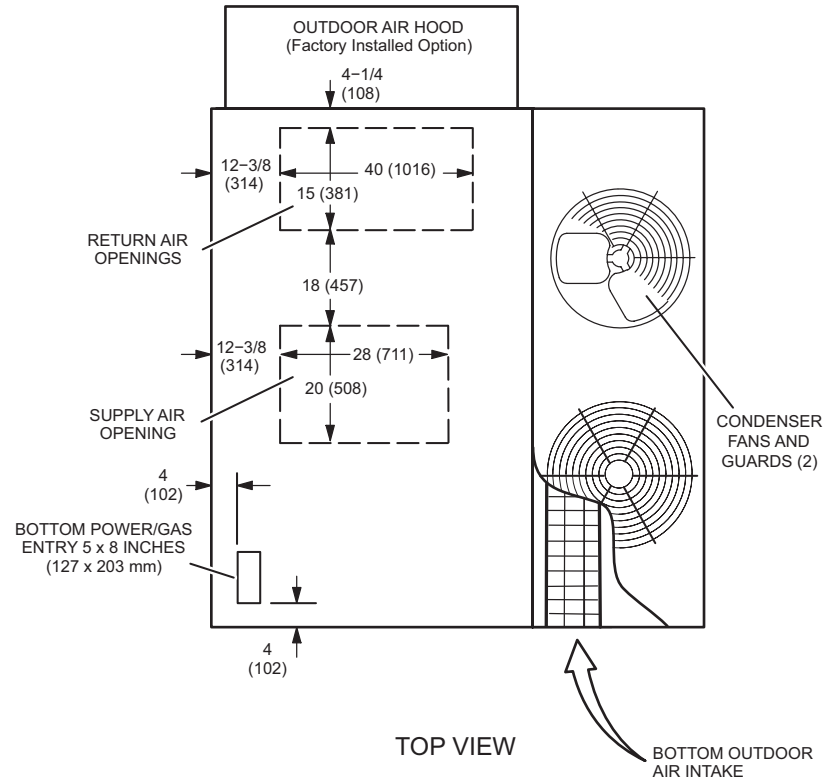
TOP VIEW



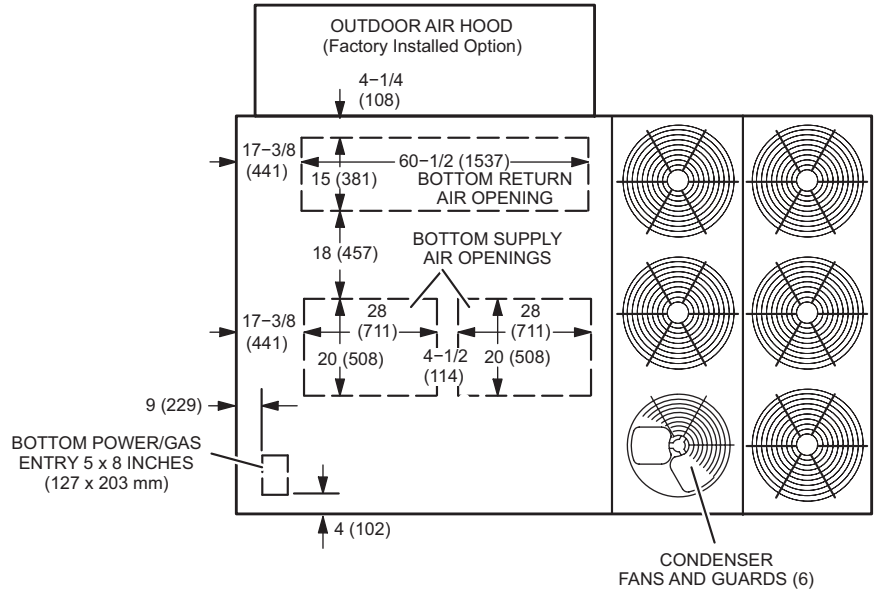
SIDE VIEW



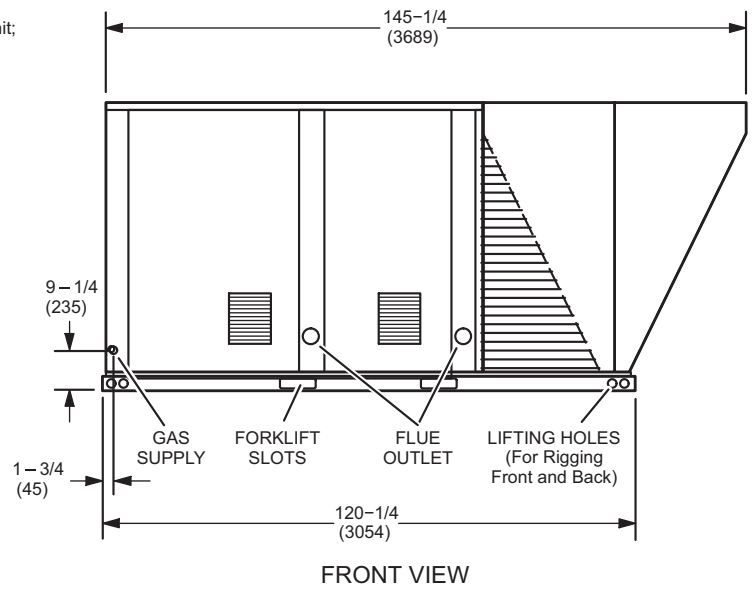
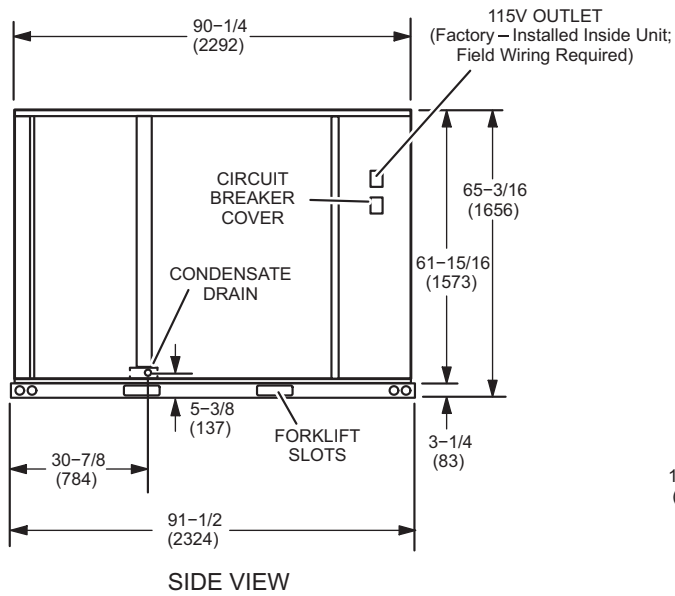
FRONT VIEW



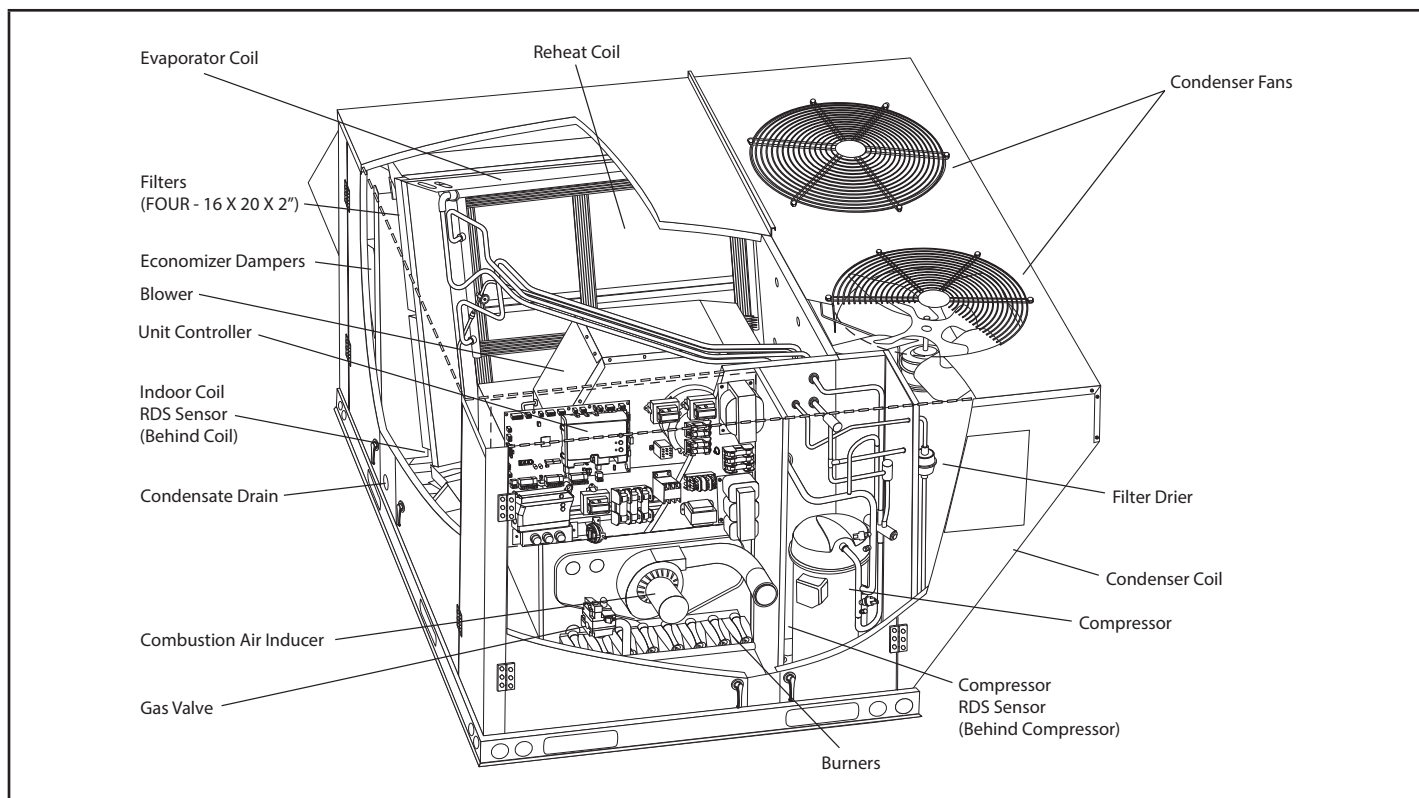
SG / SC 240 Dimensions - SG Heat Section Shown



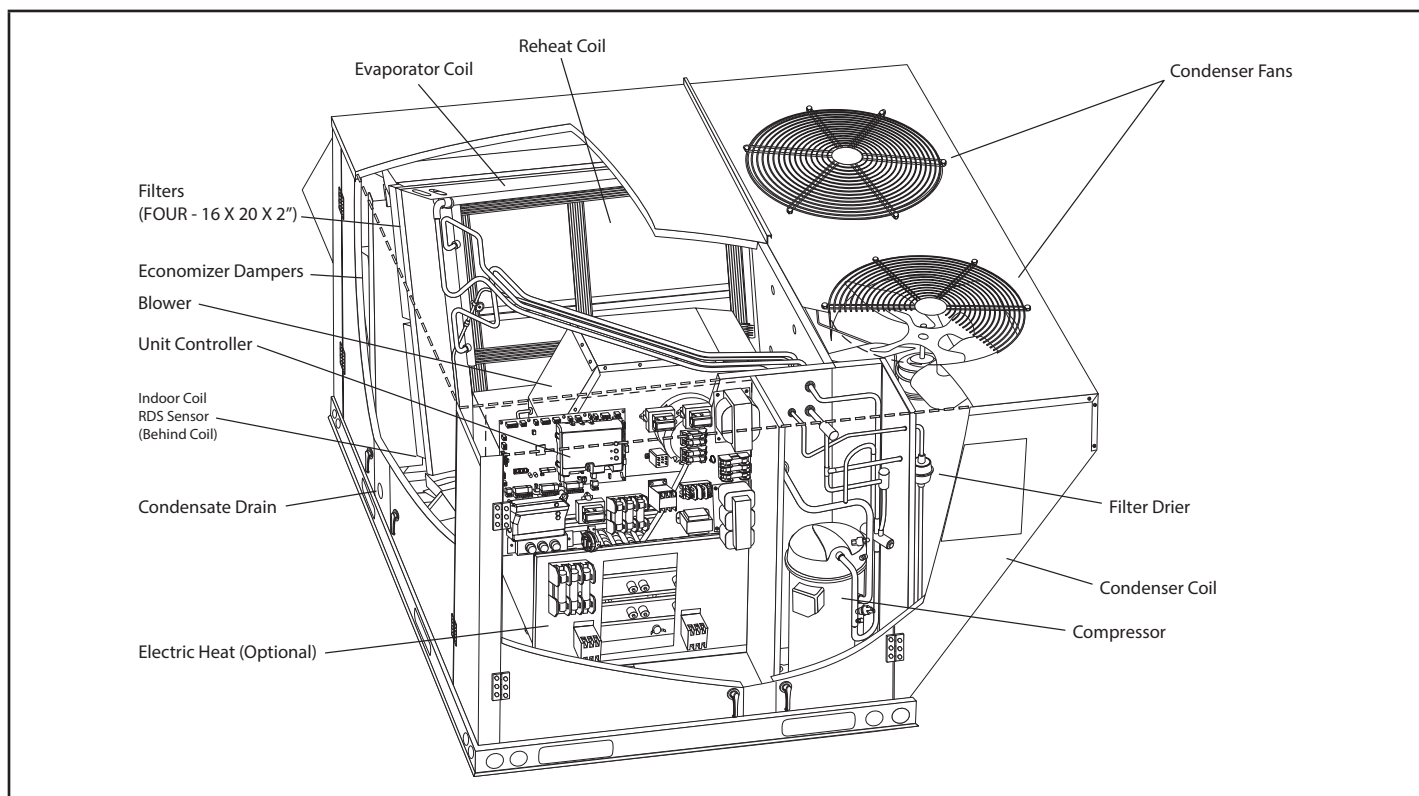
TOP VIEW



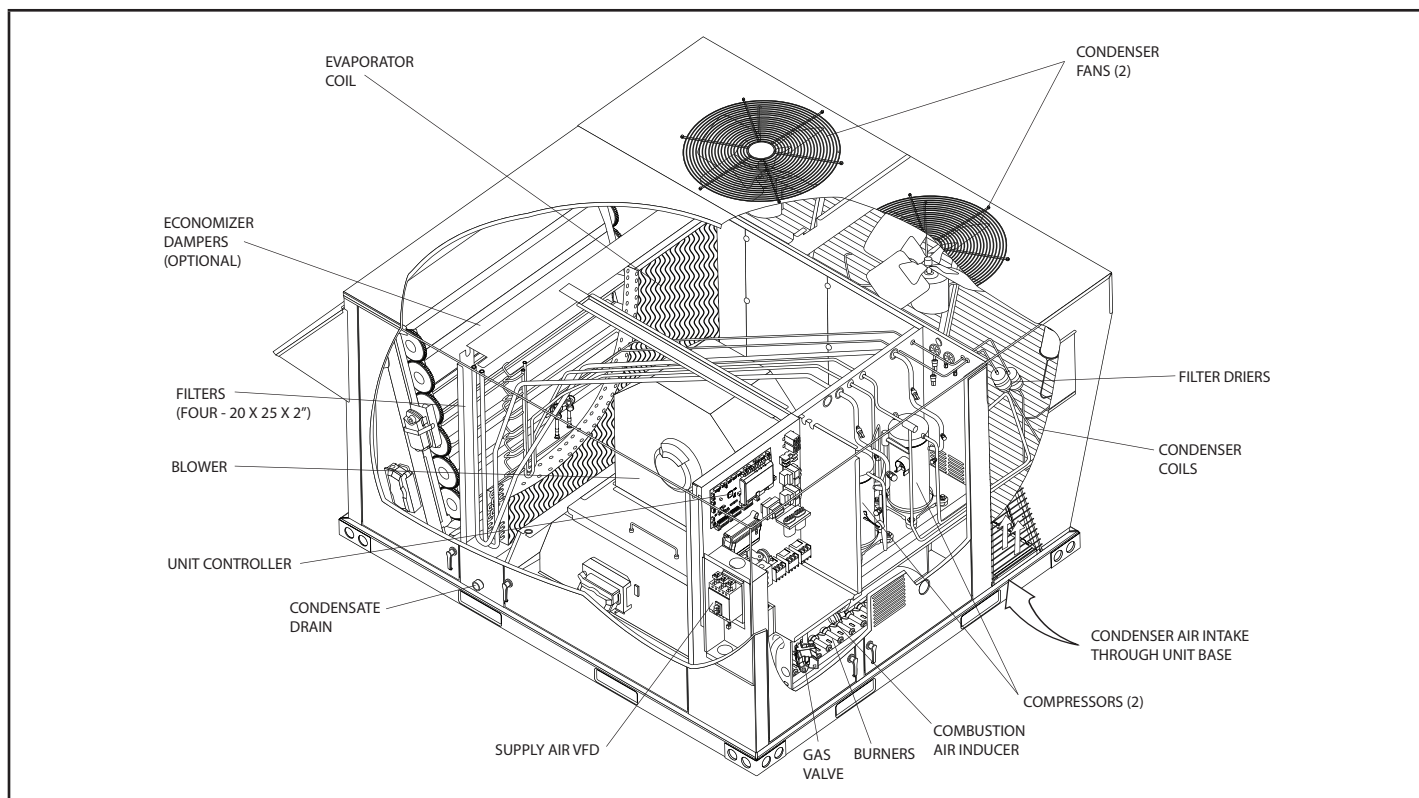
SG 036 & 060 Parts Arrangement



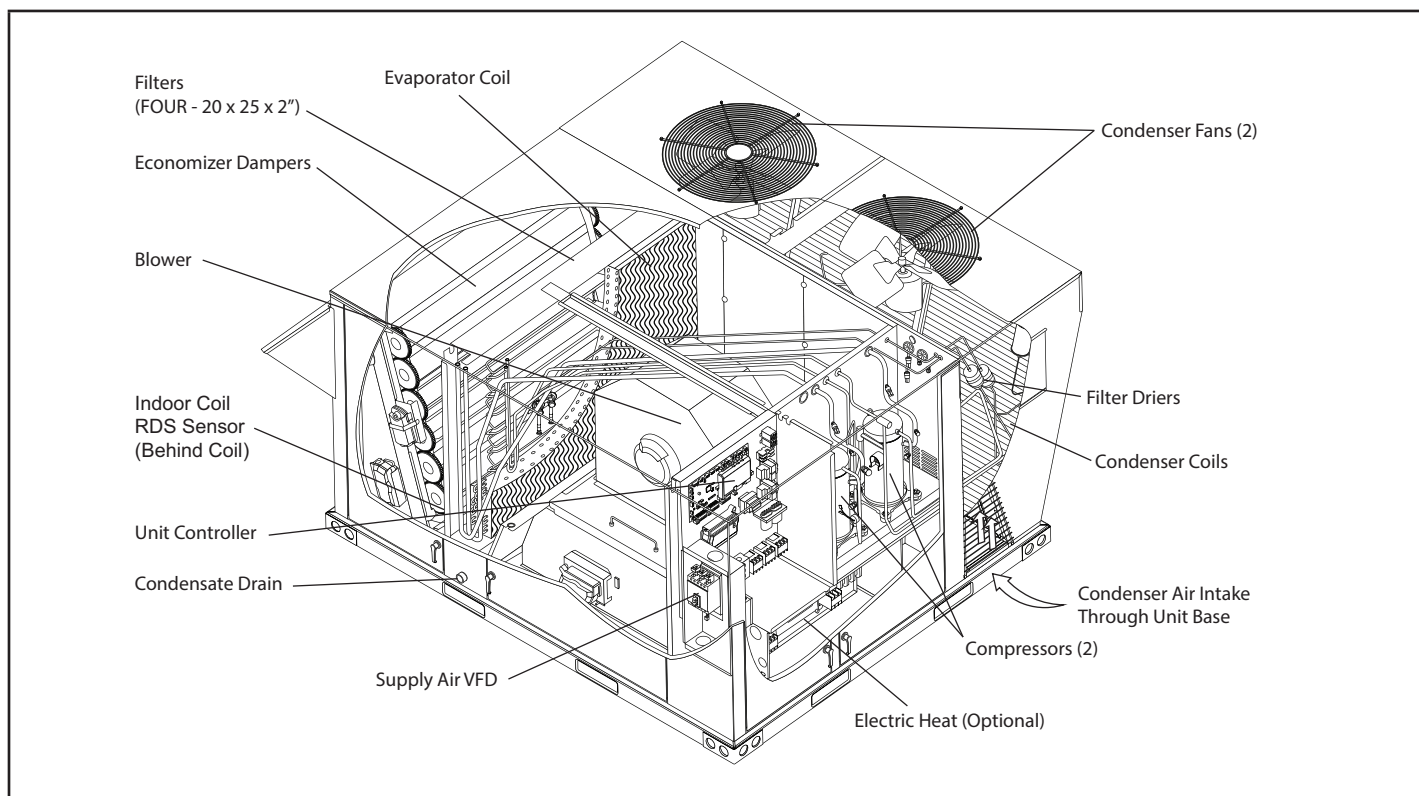
SC 036 & 060 Parts Arrangement



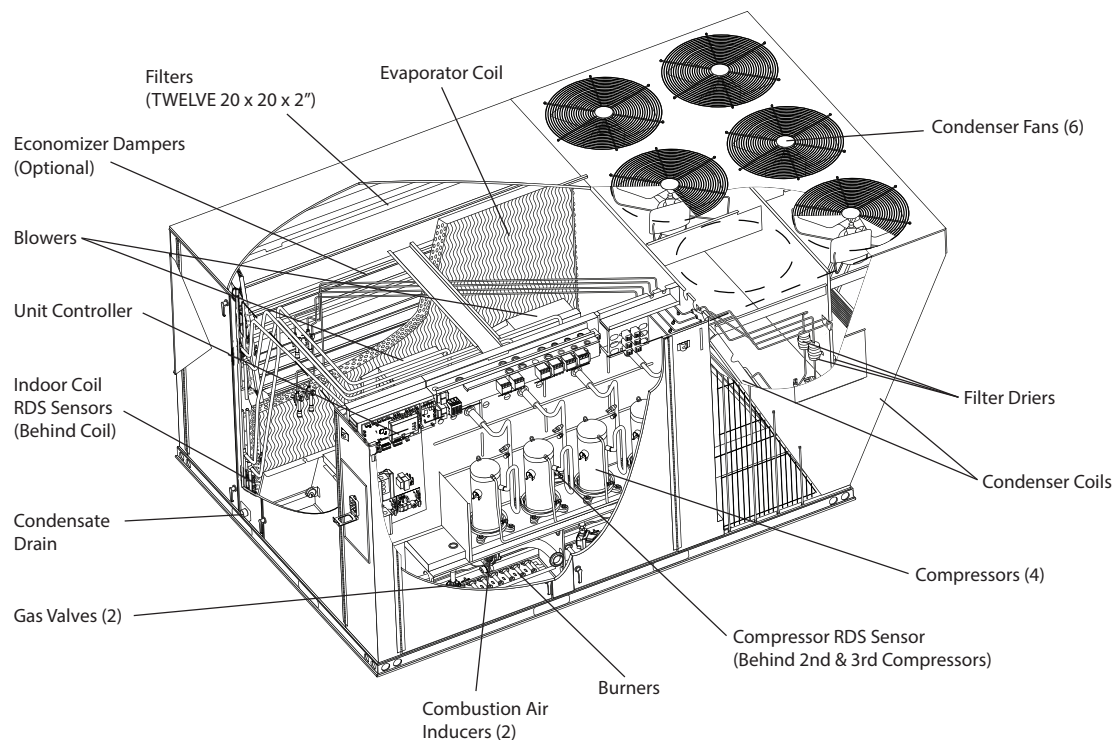
SG 120 Parts Arrangement



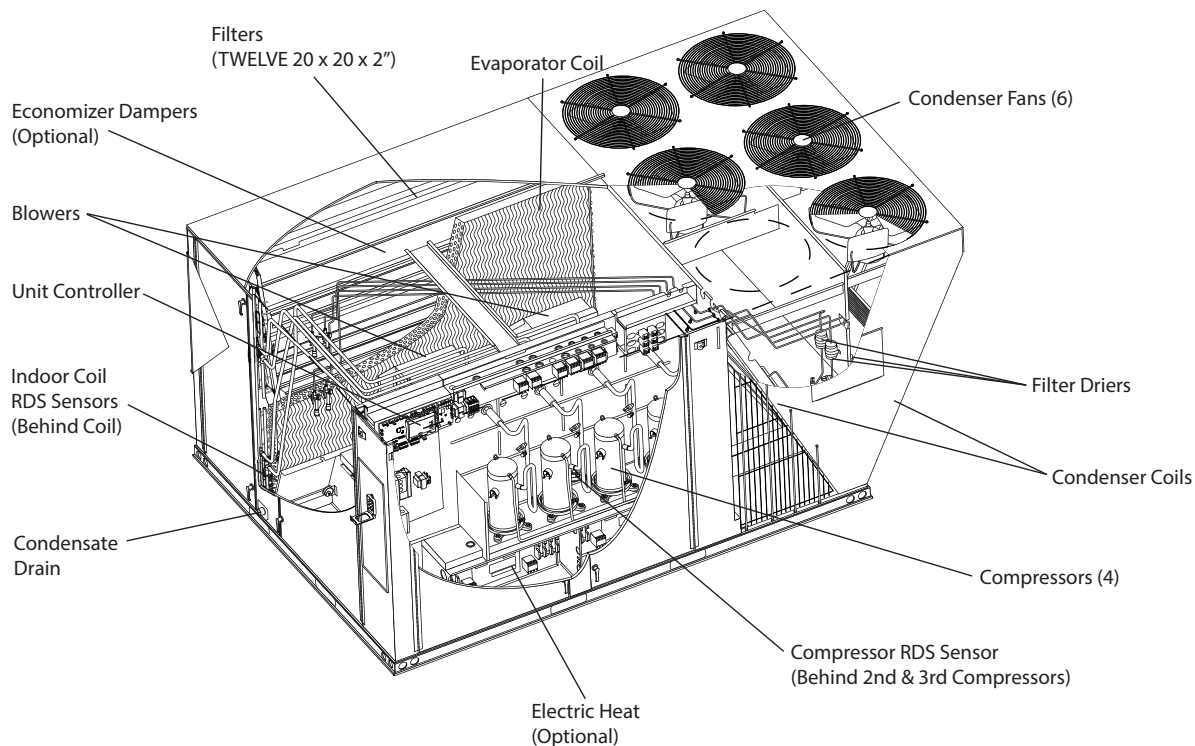
SC 120 Parts Arrangement



SG 240 Parts Arrangement



SC 240 Parts Arrangement



Shipping and Packing List

Package 1 of 1 contains:

- 1 - Assembled unit

Check unit for shipping damage. Receiving party should contact last carrier immediately if shipping damage is found.

⚠ CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

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.

The SG 036 gas/electric packaged rooftop unit is available in 70,000 and 108,000 Btuh heating input. The SC 036 cooling packaged rooftop unit is the same basic design as the SG 036 unit except for the heating section. Optional electric heat is factory-installed in SC units. SG and SC 036 units have identical refrigerant circuits with 3-ton cooling capacities.

The SG 060 gas/electric packaged rooftop unit is available in 70,000, 108,000, and 150,000 Btuh heating input. The SC 060 cooling packaged rooftop unit is the same basic design as the SG 060 unit except for the heating section. Optional electric heat is factory-installed in SC units. SG and SC 060 units have identical refrigerant circuits with 5-ton cooling capacities.

The SG 120 gas/electric packaged rooftop unit is available in 130,000, 180,000, or 240,000 Btuh heating inputs. The SC 120 cooling packaged rooftop unit is the same basic design as the SG 120 unit except for the heating section. Optional electric heat is factory-installed in SC units. SG and SC 120 units have identical refrigerant circuits with a total of 10-ton cooling capacities.

The SG 240 gas/electric packaged rooftop unit is available in (260,000, 360,000, or 480,000 Btuh heating inputs). The SC 240 cooling packaged rooftop unit is the same basic design as the SG 240 unit except for the heating section. Optional electric heat is factory-installed in SC units. SG and SC 240 units have identical refrigerant circuits with 20-ton cooling capacities.

Units are equipped with multi-stage air volume (MSAV™) supply air blowers.

Units are R454B, a low GWP refrigerant. Refer to the Cooling Start-Up section (page 36) for precautions when installing unit.

This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety

Safety

⚠ 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.

⚠ IMPORTANT

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFC's and HCFC's) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for non-compliance.

See FIGURE 1 for unit clearances.

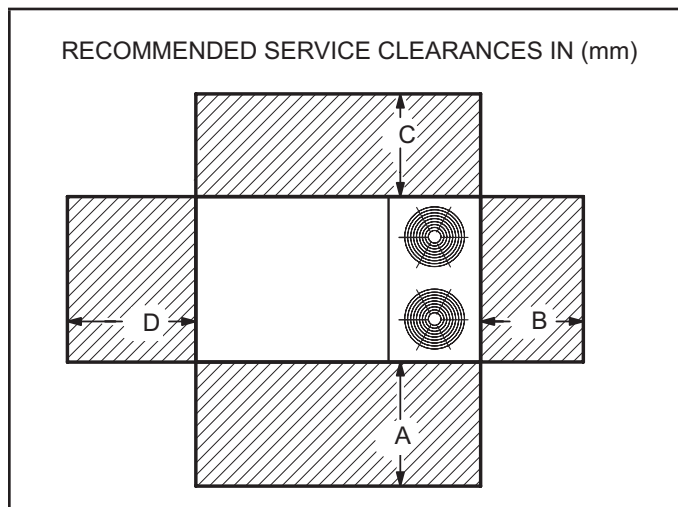


FIGURE 1

Unit Clearance		A		B		C		D		Top Clearance
		in.	mm.	in.	mm.	in.	mm.	in.	mm.	
Service Clearance	SG/SC 036, 060	48	1219	36	914	60	1524	60	1524	Unobstructed
Service Clearance	SG/SC 120	60	1524	36	914	60	1524	60	1524	
Service Clearance	SG/SC 240	72	1829	36	914	60	1524	96	2438	
Clearance to Combustibles	All	36	914	1	25	1	25	1	25	
Minimum Operation Clearance	All	36	914	36	914	36	914	36	914	

NOTE - Entire perimeter of unit base requires support when elevated above the mounting surface. 1-Service Clearance - Required for removal of serviceable parts. Clearance to Combustibles - Required clearance to combustible material. Minimum Operation Clearance - Required clearance for proper unit operation.

Minimum R454B Space and CFM Requirements

Minimum Airflow ¹		
Unit	Q _{min} (CFM)	Q _{min} (m³/h)
SGH/SCH036	135	230
SGH/SCH060	142	241
SGH/SCH120	185	314
SGH/SCH036 W/ Humidrol	145	247
SGH/SCH060 W/ Humidrol	140	238
SGH/SCH120 circ 1W/ Humidrol	185	314
SGH/SCH 240	177	300
SGH/SCH240 W/ Humidrol	205	348

¹ **NOTE** - The minimum airflow is the lowest CFM allowed during venting operation (leak mitigation).

Minimum Room Area of Conditioned Space ²		
Unit	TA _{min} (ft²)	TA _{min} (m²)
SGH/SCH036	76	6.97
SGH/SCH060	79	7.31
SGH/SCH120	103	9.53
SGH/SCH036 W/ Humidrol	81	7.49
SGH/SCH060 W/ Humidrol	78	7.21
SGH/SCH120 circ 1W/ Humidrol	103	9.53
SGH/SCH 240	98	9.10
SGH/SCH240 W/ Humidrol	114	10.55

² **NOTE** - The minimum room area of conditioned space is the smallest area the unit can service.

Refrigerant Charge R-454B		
Unit	M _c (lbs)	M _c (kg)
SGH/SCH036	5.13	2.32
SGH/SCH060	5.38	2.44
SGH/SCH120 Stage 1	7.00	3.18
SGH/SCH120 Stage 2	4.81	2.18
SGH/SCH036 W/ Humidrol	5.50	2.49
SGH/SCH060 W/ Humidrol	5.30	2.40
SGH/SCH120 Stage 1W/ Humidrol	7.00	3.18
SGH/SCH120 Stage2 W/ Humidrol	5.13	2.32
SGH/SCH240 Stage 1	6.69	3.03
SGH/SCH240 Stage 2	6.06	2.75
SGH/SCH240 Stage 3	5.06	2.30
SGH/SCH240 Stage 4	5.19	2.35
SGH/SCH240 W/ Humidrol Stage 1	7.75	3.52
SGH/SCH240 W/ Humidrol Stage 2	7.19	3.26
SGH/SCH240 W/ Humidrol Stage 3	5.31	2.41
SGH/SCH240 W/ Humidrol Stage 4	5.38	2.44

Altitude Adjustment Factor ³									
Halt	0	200	400	600	800	1000	1200	1400	1600
AF	1	1	1	1	1.02	1.05	1.04	1.1	1.12
Halt	1600	1800	2000	2200	2400	2600	2800	3000	3200
AF	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.4

³ **NOTE** - Use the Altitude Adjustment Factor to adjust the values in the tables above to different altitudes. Find the relevant altitude above sea level in the two "Halt" rows and then multiply the value needed from the tables above by the altitude factor number. Example: For the minimum airflow in CFM for an SGH/SCH036 at 1000 ft. above sea level, multiply 135 by 1.05 to get 141.75 CFM as the new Q_{min}.

NOTICE

Roof Damage!

This system contains both refrigerant and oil. Some rubber roofing material may absorb oil, causing the rubber to swell. Bubbles in the rubber roofing material can cause leaks. Protect the roof surface to avoid exposure to refrigerant and oil during service and installation. Failure to follow this notice could result in damage to roof surface.

Use of this unit as a construction heater or air conditioner is not recommended during any phase of construction. Very low return air temperatures, harmful vapors and operation of the unit with clogged or misplaced filters will damage the unit.

If this unit has been used for heating or cooling of buildings or structures under construction, the following conditions must be met or the warranty will be void:

- The vent hood must be installed per these installation instructions.
- A room thermostat must control the unit. The use of fixed jumpers that will provide continuous heating or cooling is not allowed.
- A pre-filter must be installed at the entry to the return air duct.
- The return air duct must be provided and sealed to the unit.
- Return air temperature range between 55°F (13°C) and 80°F (27°C) must be maintained.
- Air filters must be replaced and pre-filters must be removed upon construction completion.
- The input rate and temperature rise must be set per the unit rating plate.
- The heat exchanger, components, duct system, air filters and evaporator coil must be thoroughly cleaned following final construction clean-up.
- The unit operating conditions (including airflow, cooling operation, ignition, input rate, temperature rise and venting) must be verified according to these installation instructions.

NOTE - The Commonwealth of Massachusetts stipulates these additional requirements:

- Gas units shall be installed by a licensed plumber or gas fitter only.
- The gas cock must be "T handle" type.

Unit Support - Downflow Discharge Applications

Installer's Roof Mounting Frame

Many types of roof frames can be used to install the unit depending upon different roof structures. Items to keep in mind when using the building frame or supports are:

- 1 - The base is fully enclosed and insulated, so an enclosed frame is not required.
- 2 - The frames or supports must be constructed with non-combustible materials and should be square and level to 1/16-inch per linear foot (5mm per linear meter) in any direction.
Exception: 1/16-inch per linear foot to 3/8-inch per linear foot roof pitch (5-mm per linear meter to 20-mm per linear meter) — Roof curb can be installed level to the roof pitch only if the unit outdoor air intake is oriented toward the higher side of the roof pitch.
- 3 - Frame or supports must be high enough to prevent any form of moisture from entering unit. Recommended minimum frame height is 14-inch (356-mm).
- 4 - Duct must be attached to the roof mounting frame and not to the unit. Supply and return plenums must be installed before setting the unit.
- 5 - Units require support along all four sides of unit base. Supports must be constructed of steel or suitably treated wood materials.

NOTE - When installing a unit on a combustible surface for downflow discharge applications, a Lennox® roof mounting frame is required.

NOTE - Securely fasten roof frame to roof per local codes.

CAUTION

To reduce the likelihood of supply / return air bypass and promote a proper seal with the RTU, duct work / duct drops / diffuser assemblies must be supported independently to the building structure.

- 6 - 120 units will overhang the roof mounting frame as shown in FIGURE 2.

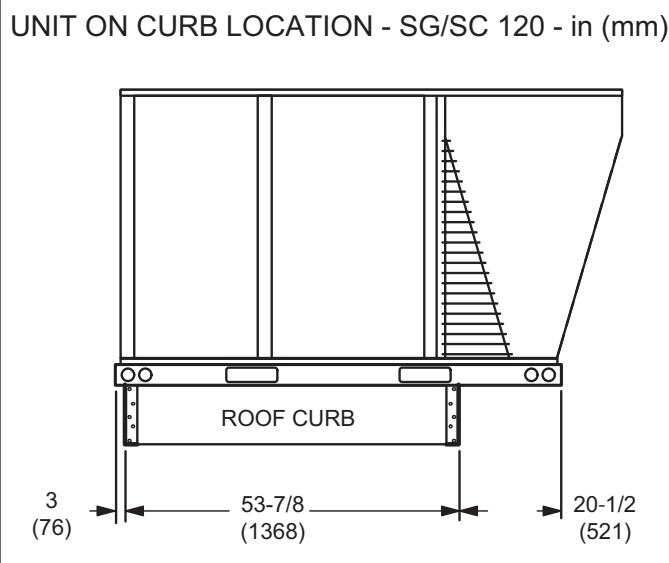


FIGURE 2

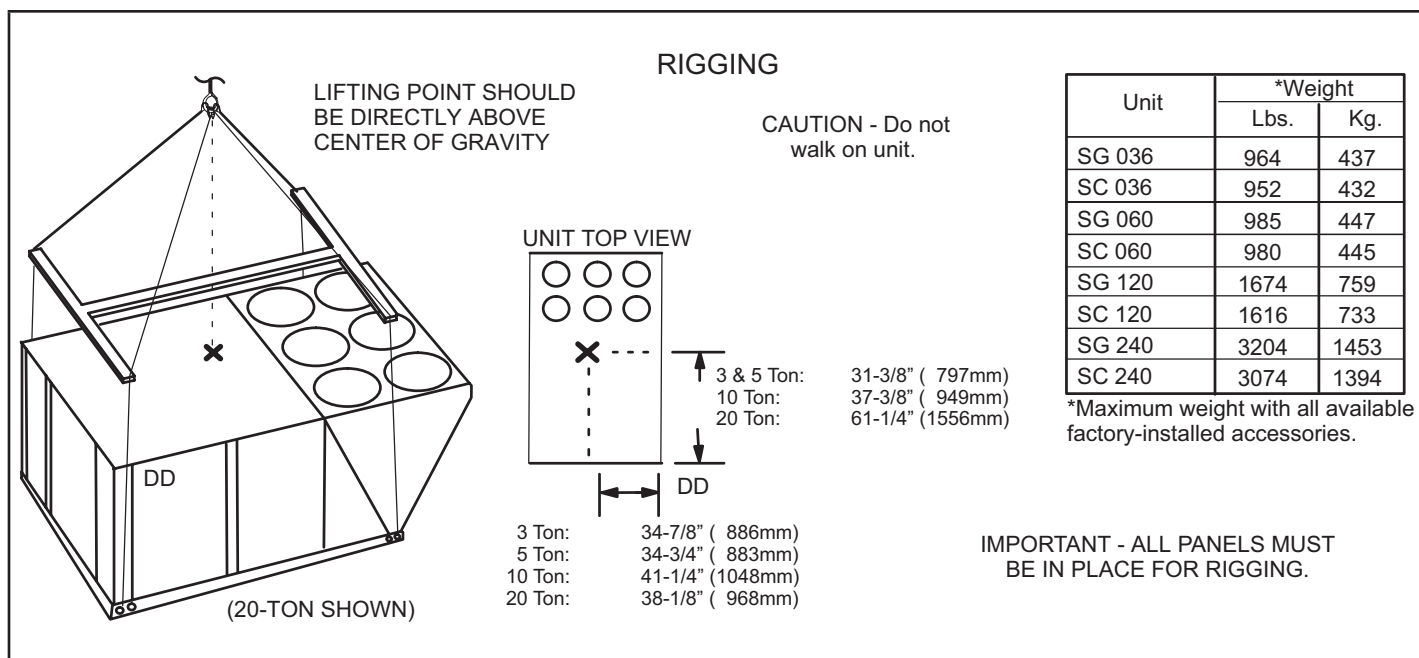


FIGURE 3

Duct Connections

All exterior ducts, joints, openings in roof or building walls must be insulated and weather-proofed with flashing and sealing compounds in accordance with applicable codes. Any duct passing through an unconditioned space must be insulated.

CAUTION

In downflow applications, do not drill or punch holes in base of unit. Leaking in roof may occur if unit base is punctured.

Rigging Units for Lifting

Rig unit for lifting by attaching four cables to holes in unit base rail. See FIGURE 3.

- 1 - Detach wooden base protection before rigging.
- 2 - Connect rigging to the unit base using both holes in each corner.
- 3 - All panels must be in place for rigging.
- 4 - Place field-provided H-style pick in place just above top edge of unit. Frame must be of adequate strength and length. (H-style pick prevents damage to unit.)
- 5 - Lifting point should be directly above center of gravity. See FIGURE 3 for center of gravity dimensions. Corner "DD" is on the left corner when facing compressors and heat section.

Condensate Drains

Make drain connection to the 1" N.P.T. drain coupling provided on unit. A trap must be installed between drain connection and an open vent for proper condensate removal. See FIGURE 4. It is sometimes acceptable to drain condensate onto the roof or grade; however, a tee should be fitted to the trap to direct condensate downward. The condensate line must be vented. Check local codes concerning condensate disposal. Refer to page 1 through page 5 for condensate drain location.

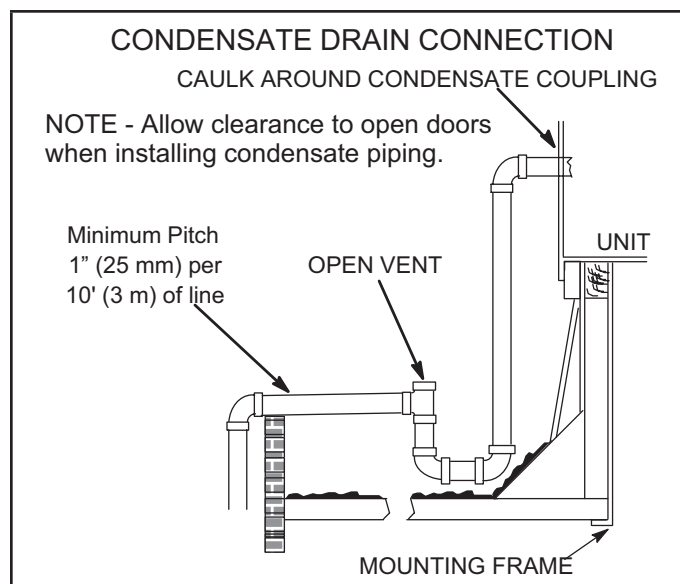


FIGURE 4

Connect Gas Piping - SG Units

NOTE - Remove the cardboard shipping brace from the flexible gas line in the power entry area before operating the unit.

Before connecting piping, check with gas company or authorities having jurisdiction for local code requirements. When installing gas supply piping, length of run from gas meter must be considered in determining pipe size for 0.5" w.c. (1.2kPa) maximum pressure drop. Do not use supply pipe smaller than unit gas connection. For natural gas units, operating pressure at the unit gas connection must be a minimum of 4.5" w.c. (1.12kPa) and a maximum of 10.5" (2.60kPa) w.c. For LP/propane gas units, operating pressure at the unit gas connection must be a minimum of 11" w.c. (2.74kPa) and a maximum of 13.0" w.c. (3.23kPa).

When making piping connections a drip leg should be installed on vertical pipe runs to serve as a trap for sediment or condensate. A 1/8" N.P.T. plugged tap is located on gas valve for test gauge connection. See FIGURE 48 for tap location. Install a ground joint union between the gas control manifold and the main manual shut-off valve. See FIGURE 5 or FIGURE 6 for gas supply piping entering outside the unit. See FIGURE 7 for gas supply piping entering the bottom of the unit.

Compounds used on threaded joints of gas piping shall be resistant to the action of liquefied petroleum gases.

Pressure Test Gas Piping - SG Units

When pressure testing gas lines, the gas valve must be disconnected and isolated. Gas valves can be damaged if subjected to more than 0.5 psig (3.48kPa). See FIGURE 8.

NOTE - Codes may require that manual main shut-off valve and union (furnished by installer) be installed in gas line external to unit. Union must be of the ground joint type.

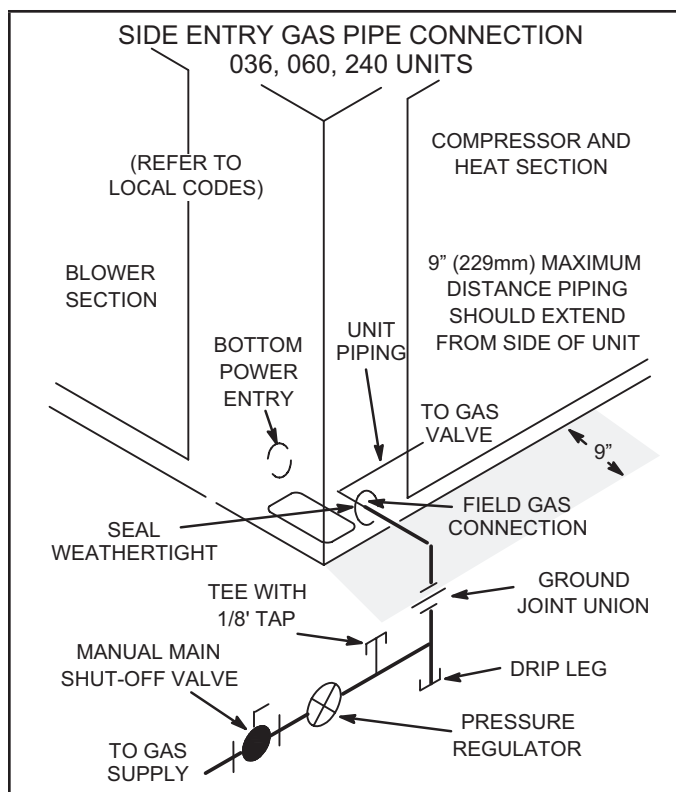


FIGURE 5

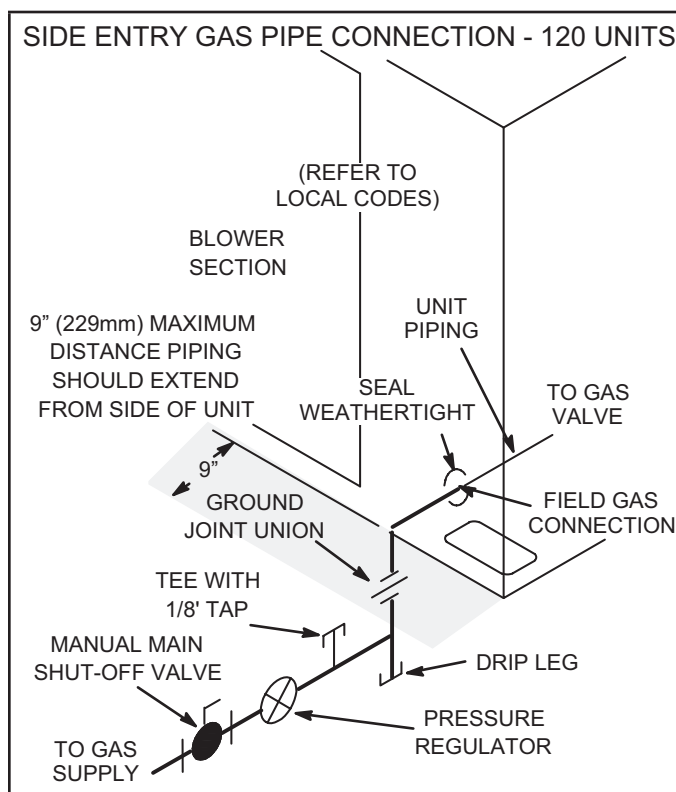


FIGURE 6

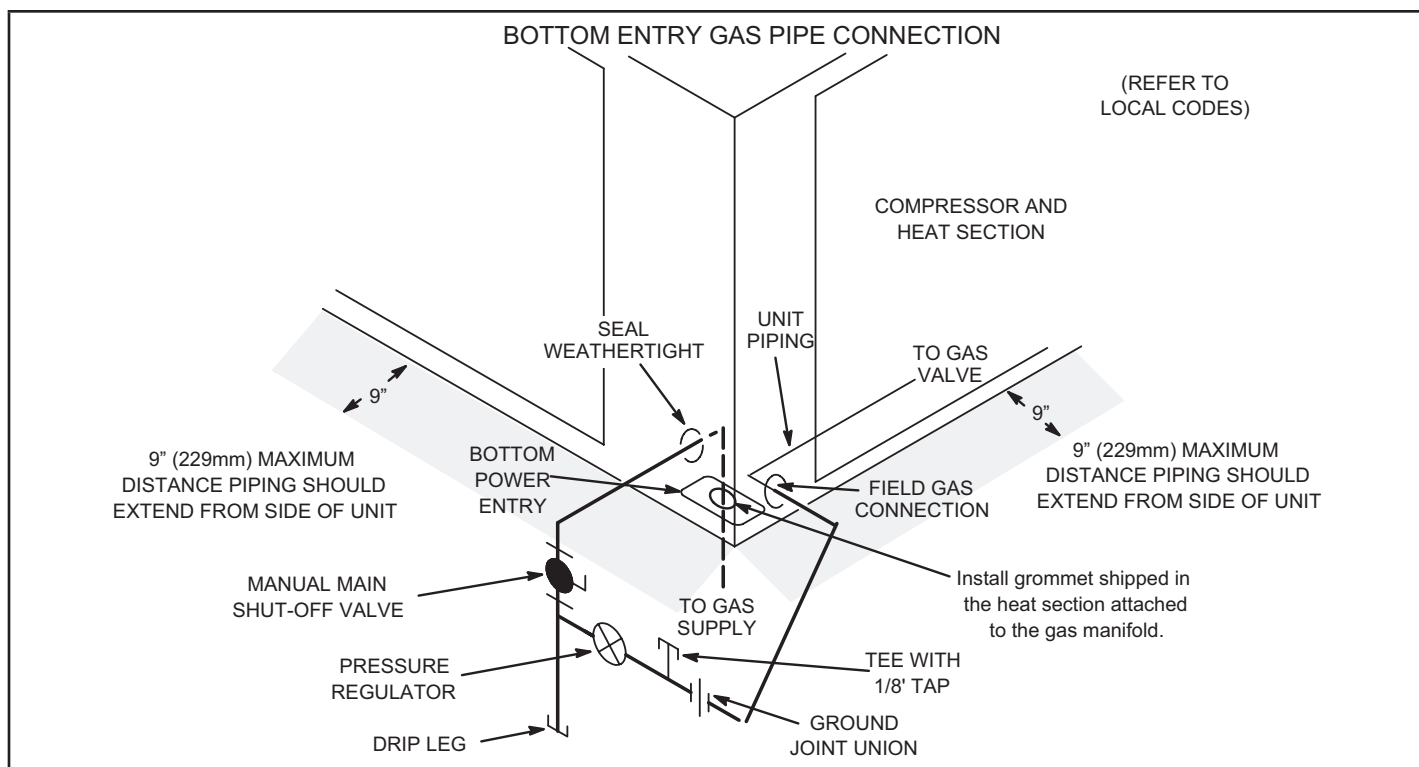


FIGURE 7

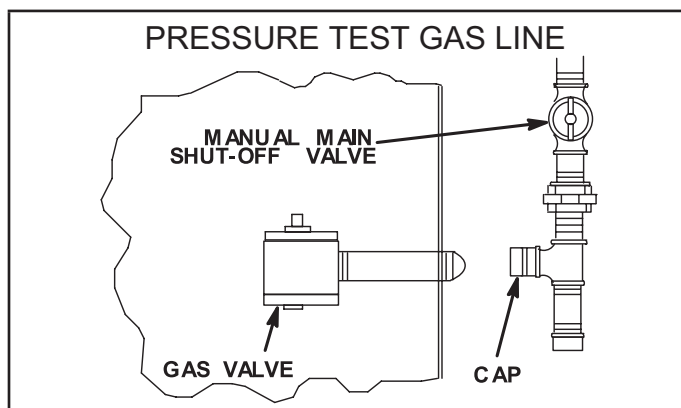


FIGURE 8

After all connections have been made, check all piping connections for gas leaks. Also check existing gas connections up to the gas valve; loosening may occur during installation. Use a soap solution or other preferred means. Do not use matches candles or other sources of ignition to check for gas leaks.

⚠ WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow the safety warnings exactly could result in serious injury, death or property damage.

Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections. A fire or explosion may result causing property damage, personal injury or loss of life.

NOTE - In case emergency shut down is required, turn off the main manual shut-off valve and disconnect main power to unit. These devices should be properly labeled by the installer.

High Altitude Derate

Locate the high altitude conversion sticker in the unit literature bag. Fill out the conversion sticker and affix next to the unit nameplate.

Refer to TABLE 1 for high altitude adjustments.

**TABLE 1
HIGH ALTITUDE DERATE**

Altitude Ft.*	Gas Manifold Pressure
2000-4500	See Unit Nameplate
4500 And Above	Derate 2% / 1000 Ft. Above Sea Level

*Units installed at 0-2000 feet do not need to be modified.

NOTE - This is the only permissible derate for these units.

Optional Outdoor Air Hood

036 & 060 Units

Intake hood is shipped folded down over the horizontal supply air opening. Secure hood into place as follows.

Remove shipping screws securing sides of hood to unit.

Pivot hood as shown in FIGURE 9 and secure sides of hood to unit mullions with two sheet metal screws on each side.

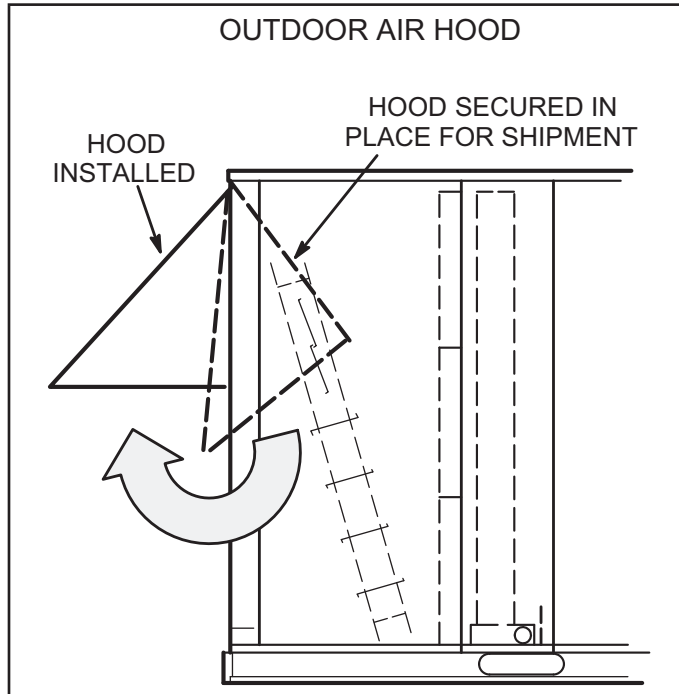


FIGURE 9

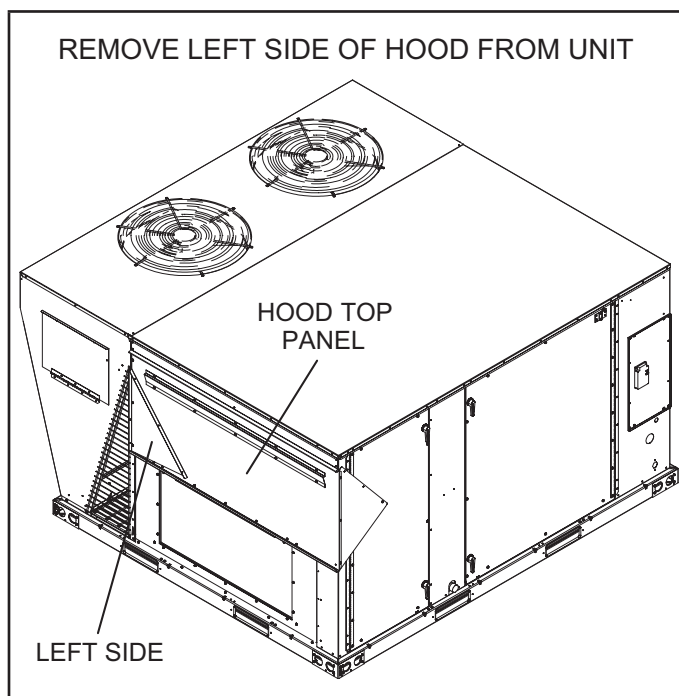


FIGURE 10

120, 240 Units with Bird Screen Option

Outdoor air hood is shipped folded down over the horizontal supply air opening. Install hood as follows:

- 1 - Remove left side from hood top panel. See FIGURE 10.
- 2 - Remove and retain screws securing hood to unit.
- 3 - Lift (rotate) the bottom of the hood top panel and attach left side to hood top panel. See FIGURE 11.
- 4 - Secure sides of hood to unit mullions with retained screws.
- 5 - Caulk hinge opening on each end of air hood.
- 6 - 240 Units Only - Remove two support brackets from hood top panel flange. See FIGURE 12. Install as shown in FIGURE 11.

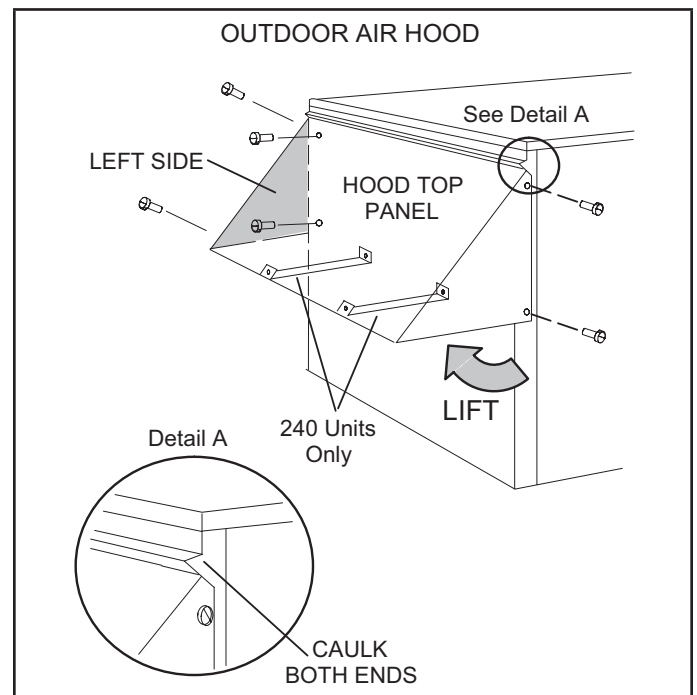


FIGURE 11

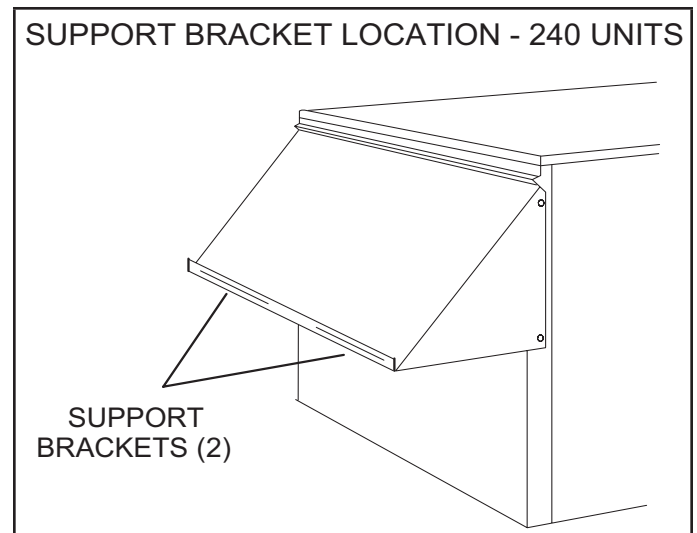


FIGURE 12

240 Units with Hood Filter Option

Outdoor air hood is shipped folded down over the horizontal supply air opening. The intake hood filters and support brackets are shipped unassembled in the blower compartment. Install as follows:

- 1 - Remove left side from hood top panel. See FIGURE 10.
- 2 - Remove and retain screws securing hood to unit.
- 3 - Lift (rotate) the bottom of the hood top panel and attach left side to hood top panel. See FIGURE 11.
- 4 - Secure sides of hood to unit mullions with retained screws.
- 5 - Caulk hinge opening on each end of air hood.
- 6 - Install back filter bracket on unit division panel as shown in FIGURE 14.
- 7 - Secure side seals to the hood sides as shown in FIGURE 15.
- 8 - Install longer front filter bracket on hood top as shown in FIGURE 13 and FIGURE 14. Insert four filters.
- 9 - Slide fifth filter into back filter bracket and hold in place at the top of the opening with the shorter front bracket. Align holes on hood with bracket holes and secure filter bracket with sheet metal screws.

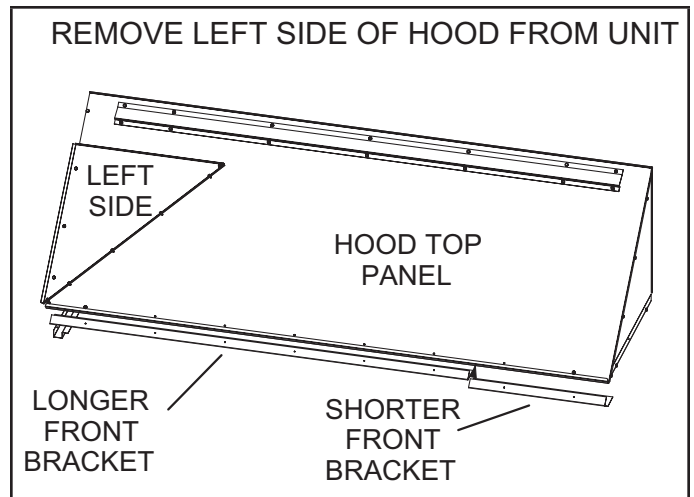


FIGURE 13

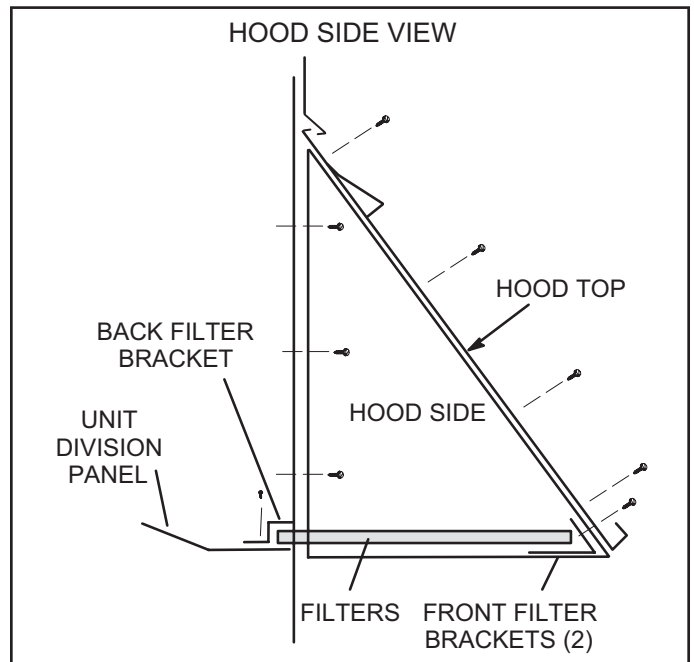


FIGURE 14

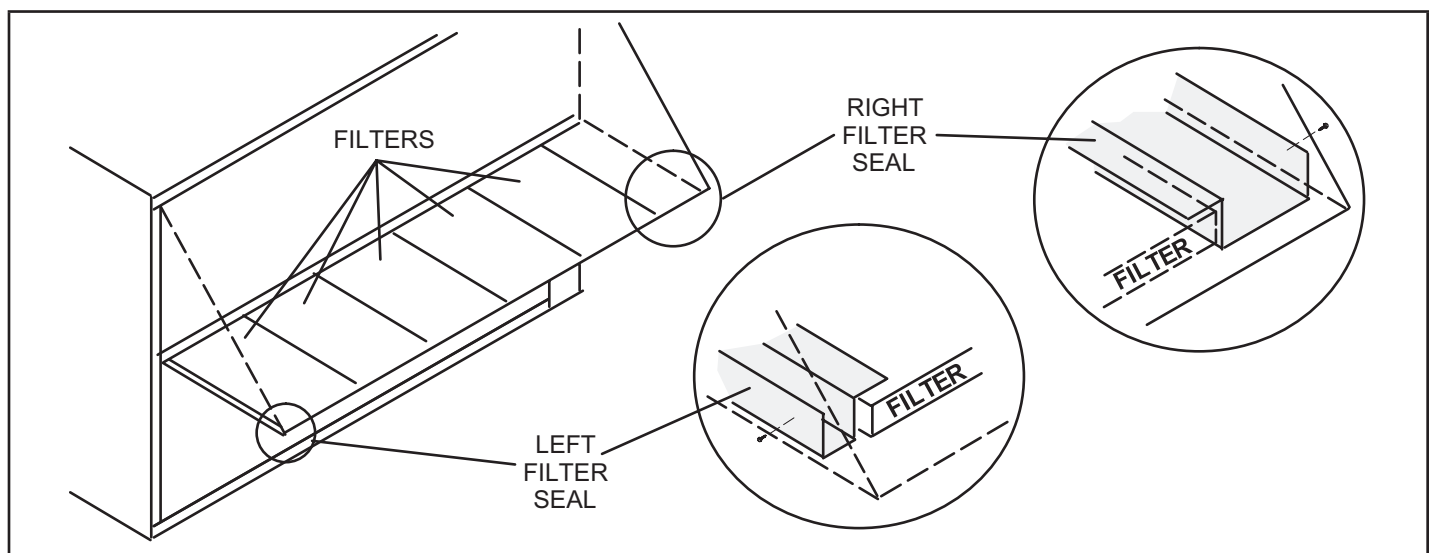


FIGURE 15

Electrical Connections

POWER SUPPLY

A-Wiring

Do not apply power or close disconnect switch until installation is complete. Refer to start-up directions. Refer closely to unit wiring diagram.

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

- 1 - Units are factory-wired for 460 & 575 volt supply.
- 2 - Route power through the bottom power entry area and connect to line side of unit circuit breaker. See unit wiring diagram.
- 3 - Connect separate 120v wiring to GFCI outlet terminal strip in bottom power entry area.

B-Unbalanced Three-Phase Voltage - VFD Units Only

Units equipped with an optional inverter (VFD) are designed to operate on balanced, three-phase power. Operating units on unbalanced three-phase power will reduce the reliability of all electrical components in the unit. Unbalanced power is a result of the power delivery system supplied by the local utility company.

Factory-installed inverters are sized to drive blower motors with an equivalent current rating using balanced three-phase power. When unbalanced three-phase power is supplied; the installer must replace the existing factory-installed inverter with an inverter that has a higher current rating to allow for the imbalance. Use TABLE 2 to determine the appropriate replacement inverter.

TABLE 2
INVERTER UP-SIZING

Factory-Installed Inverter HP	Replacement Inverter HP
2	5
3	7-1/2
5	10
7-1/2	*
10	*

*Contact customer support.

CONTROL WIRING

Connect either a thermostat, room/zone sensor, or direct digital controller; one of the three are required for unit function. Refer to the literature provided with each device and the following information.

NOTE - Optional wireless sensors are available for use with this unit.

CAUTION

Electrostatic discharge can affect electronic components. Take precautions during unit installation and service to protect the electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Neutralize electrostatic charge by touching hands and all tools on an unpainted unit surface, such as the gas valve or blower deck, before performing any service procedure.

A-Thermostat Location

Room thermostat mounts vertically on a standard 2" X 4" handy box or on any non-conductive flat surface.

Locate thermostat approximately 5 feet (1524 mm) above the floor in an area with good air circulation at average temperature. Avoid locating the room thermostat where it might be affected by:

- Drafts or dead spots behind doors and in corners
- Hot or cold air from ducts
- Radiant heat from sun or appliances
- Concealed pipes and chimneys

B-Control Wiring

The Unit Controller will operate the unit from a thermostat or zone sensor based on the System Mode. The default System Mode is the thermostat mode. Refer to the Unit Controller Installation and Setup Guide to change the System Mode. Use the menu navigation arrows and select button; see *Settings - Install*.

Thermostat Mode

- 1 - Route thermostat cable or wires from subbase through knockout provided in unit. For thermostat wire runs up to 60 feet, use 18 gauge wire. For 60 to 90 feet runs, use 16 gauge wire.

IMPORTANT - Unless field thermostat wires are rated for maximum unit voltage, they must be routed away from line voltage wiring. Use wire ties located near the lower left corner of the controls mounting panel to secure thermostat cable.

- 2 - Install thermostat assembly in accordance with instructions provided with thermostat.
- 3 - Connect thermostat wiring to Unit Controller on the lower side of the controls hat section.
- 4 - Wire as shown in FIGURE 17 for electro-mechanical and electronic thermostats. If using other temperature control devices or energy management systems see instructions and wiring diagram provided by manufacturer.

IMPORTANT - Terminal connections at the wall plate or subbase must be made securely. Loose control wire connections may allow unit to operate but not with proper response to room demand.

Zone Sensor Mode

The Unit Controller will operate heating and cooling based on the Unit Controller internal setpoints and the temperature from the A2 zone sensor. An optional Network Control Panel (NCP) can also be used to provide setpoints. A thermostat or return air sensor can be used as a back-up mode. Make zone sensor wiring connections as shown in FIGURE 16.

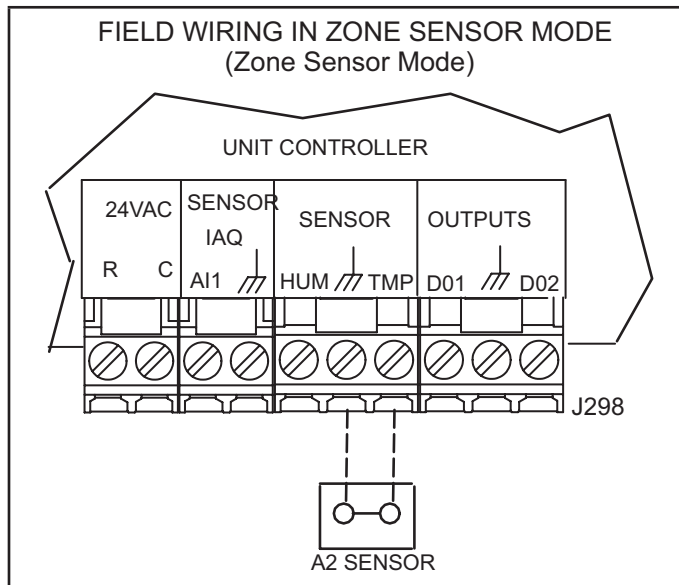


FIGURE 16

C-Hot Gas Reheat or Ultra High Efficiency Units Only

- 1 - Install humidity sensor in accordance with instructions provided with sensor. A DDC input may be used to initiate dehumidification instead of a sensor.
- 2 - Make wiring connections as shown in FIGURE 17 for Thermostat Mode or FIGURE 16 for Zone Sensor Mode. In addition, connect either a humidity sensor or a dehumidification input. See FIGURE 18 or FIGURE 19 for humidity sensor wiring or FIGURE 20 for dehumidification input wiring.

Humidity Sensor Cable Applications

Wire runs of 50 feet (15 m) or less:

Use two separate shielded cables containing 20AWG minimum, twisted pair conductors with overall shield. Belden type 8762 or 88760 (plenum) or equivalent. Connect both cable shield drain wires to the Unit Controller as shown in FIGURE 18.

Wire runs of 150 feet (46 m) or less:

Use two separate shielded cables containing 18AWG minimum, twisted pair conductors with overall shield. Belden type 8760 or 88760 (plenum) or equivalent. Connect both cable shield drain wires to the Unit Controller as shown in FIGURE 18.

Wire runs over 150 feet (46 m):

Use a local, isolated 24VAC transformer such as Lennox cat #18M13 (20VA minimum) to supply power to RH sensor as shown in FIGURE 19. Use two shielded cables containing 20AWG minimum, twisted pair conductors with overall shield. Belden type 8762 or 88760 (plenum) or equivalent.

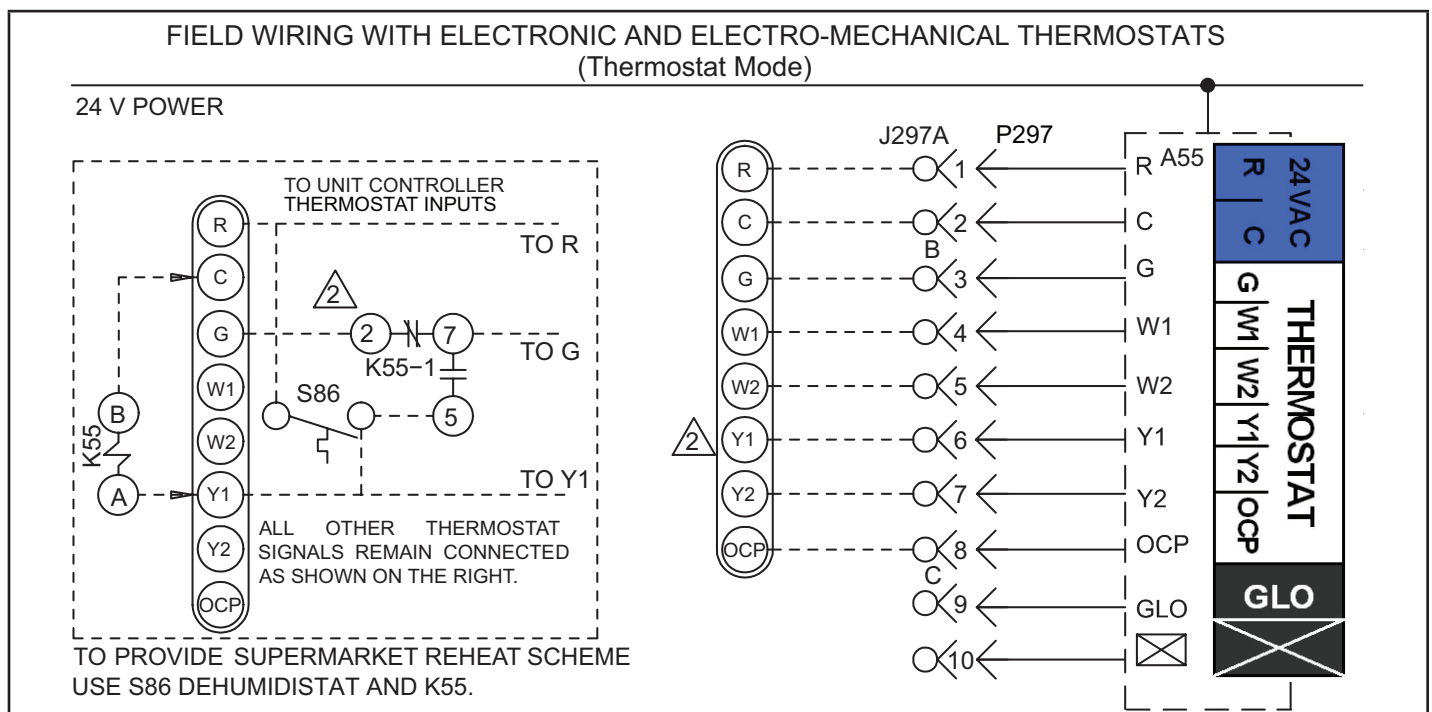


FIGURE 17

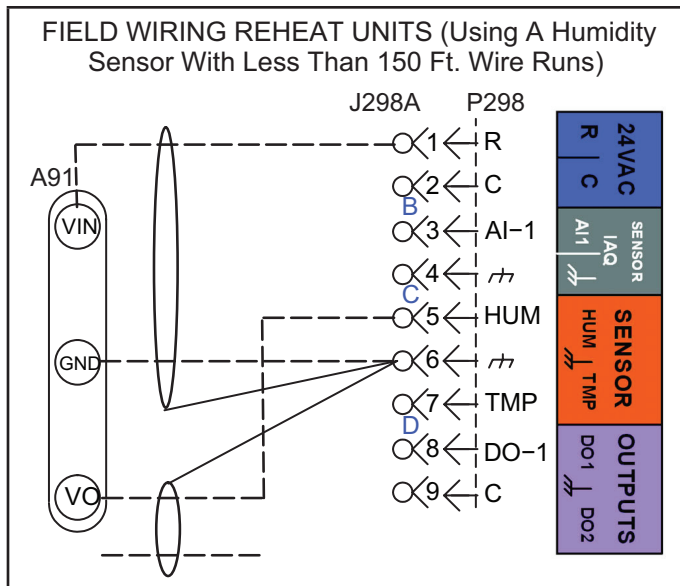


FIGURE 18

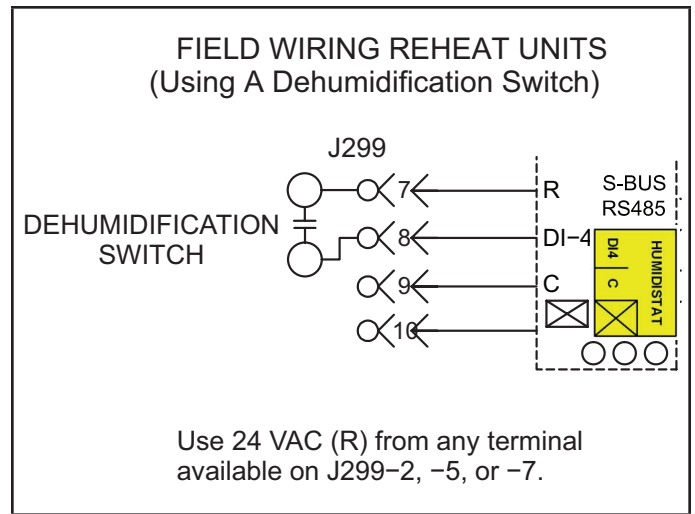


FIGURE 20

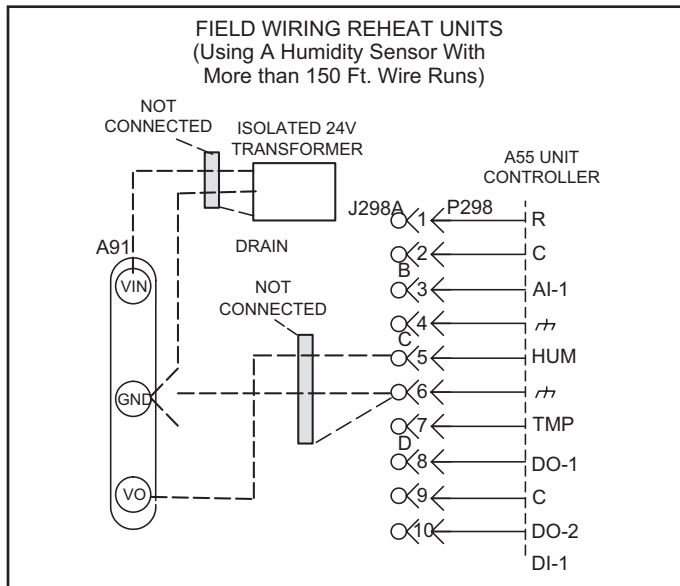


FIGURE 19

Mobile Service App

Setup and configure each rooftop unit using the mobile service app (Android or iOS devices supported).

A-Mobile Device Requirements

- Bluetooth connection.
- Android hardware requires 2GB RAM and a 2Ghz core processor. Tablets are supported.
- The app is available for both iOS 11.0 or higher (App Store) and Android 9.0 or higher (Google Play).

B-Download the App

Use your mobile device to scan the QR code from the cover page and download the mobile service app to your mobile device.

C-Pair the App to the Unit Controller

- 1 - Apply power to the unit and wait until the Unit Controller has booted-up (approximately two minutes).
- 2 - Press and hold the pair button for five seconds. See FIGURE 22.
- 3 - The unit (or list of units) will appear; select the appropriate unit. When the app code matches the four-character code on the Unit Controller display, the unit is paired (within 10 seconds). Note the following:
 - The app will list the units by signal strength; the RTU name will be displayed.
 - Once paired, the RTU name, model number, serial number and firmware version will be displayed.

Please refer to the manufacturer's website for additional technical information and self-help support.

D-App Menus

See FIGURE 21 for the menu overview. Follow the app prompts in the Install, Network Integration, and Test and Balance menus. Verify the app is setup properly for the unit application (including the date and time). Refer to FIGURE 23, FIGURE 24, and FIGURE 25.

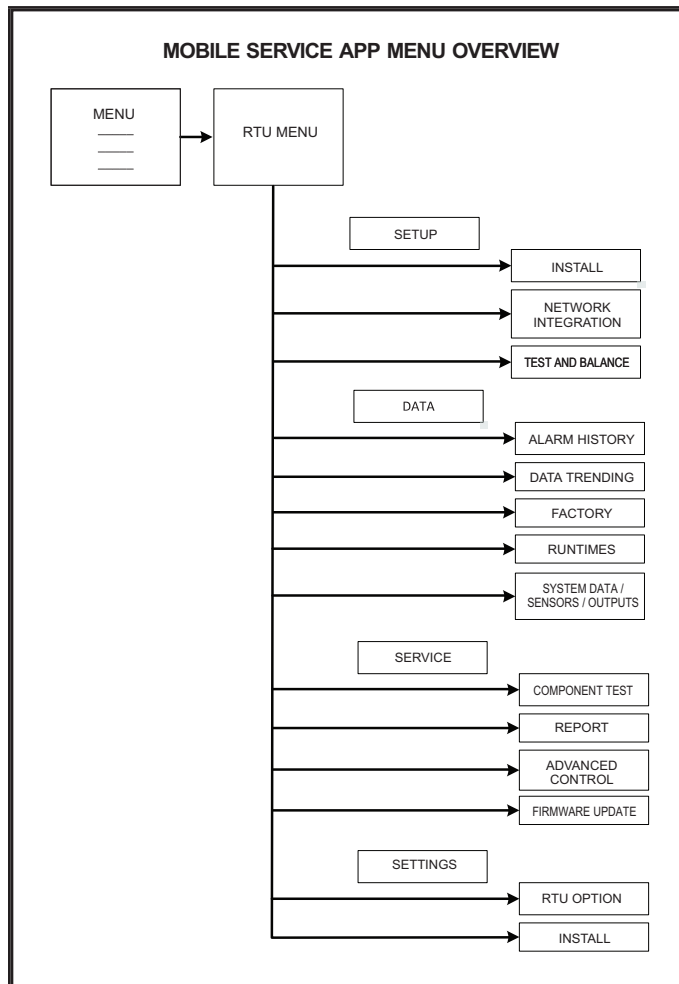


FIGURE 21

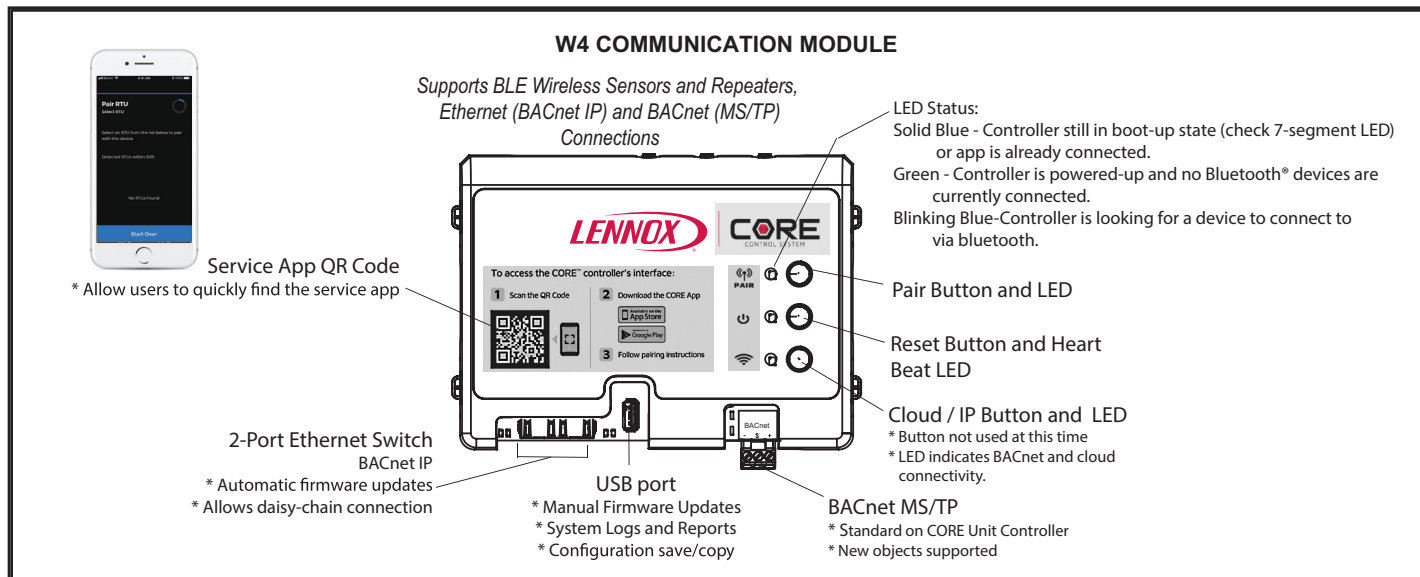


FIGURE 22

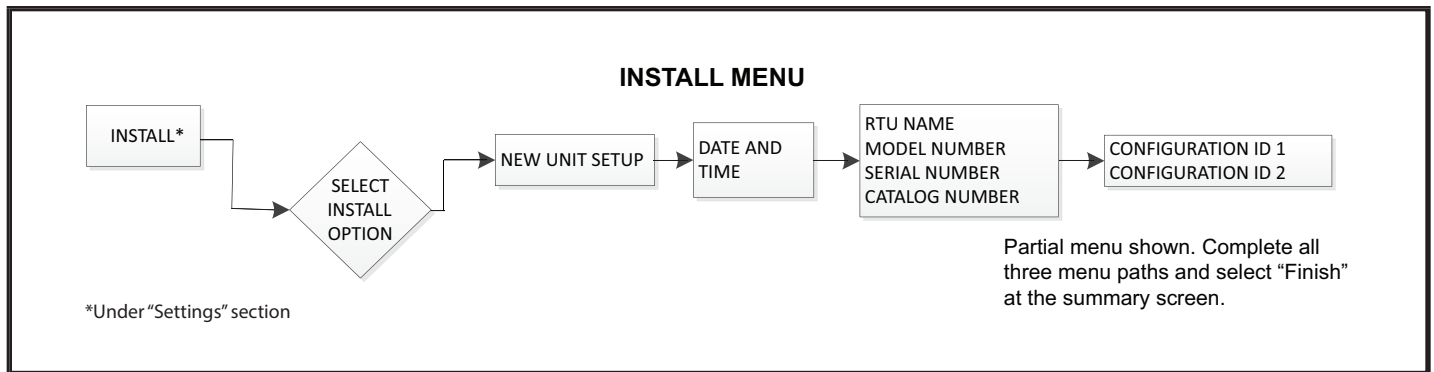


FIGURE 23

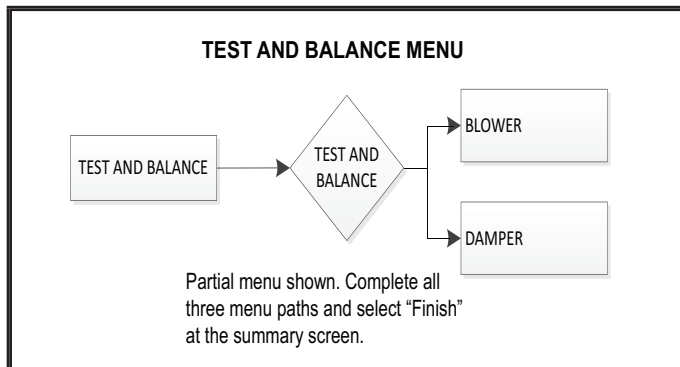


FIGURE 24

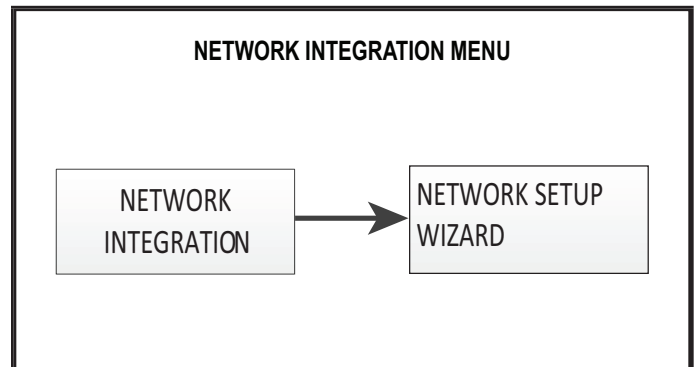


FIGURE 25

E-Unit Controller Components

See FIGURE 26 for Unit Controller components. See FIGURE 27 and TABLE 3 for pushbutton and LED functions.

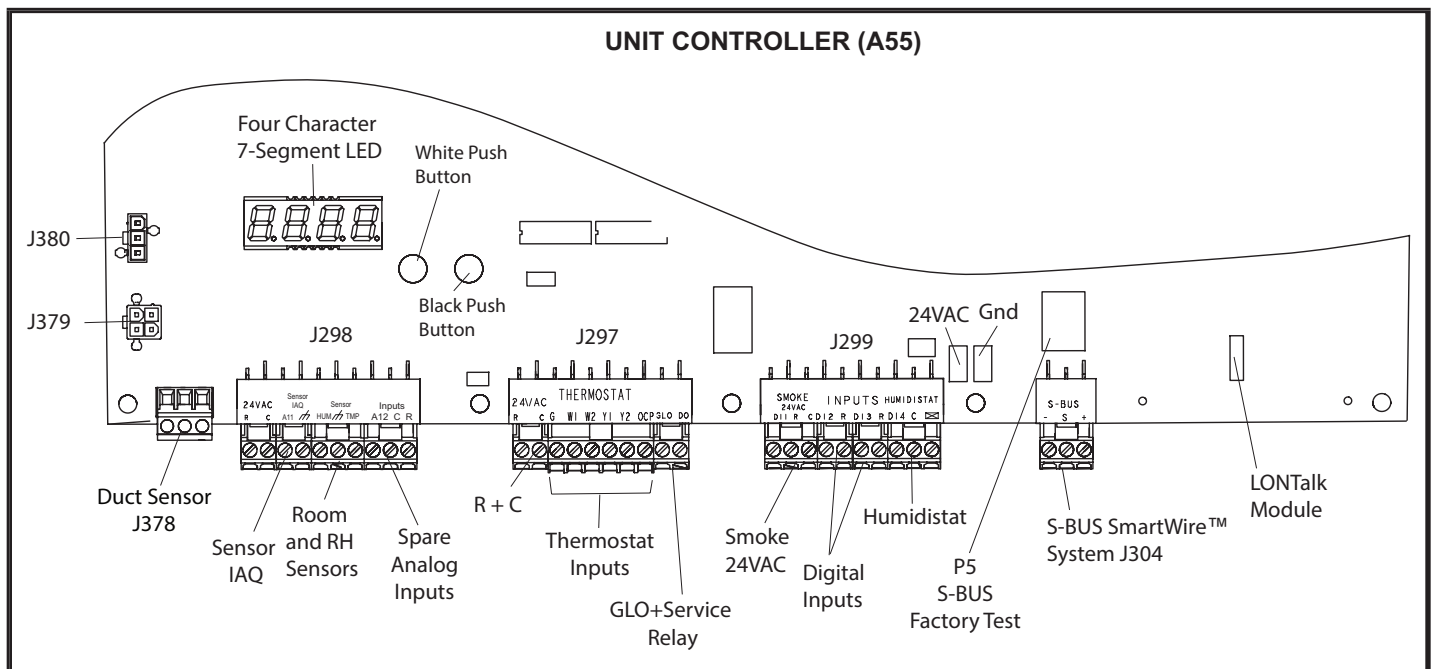


FIGURE 26

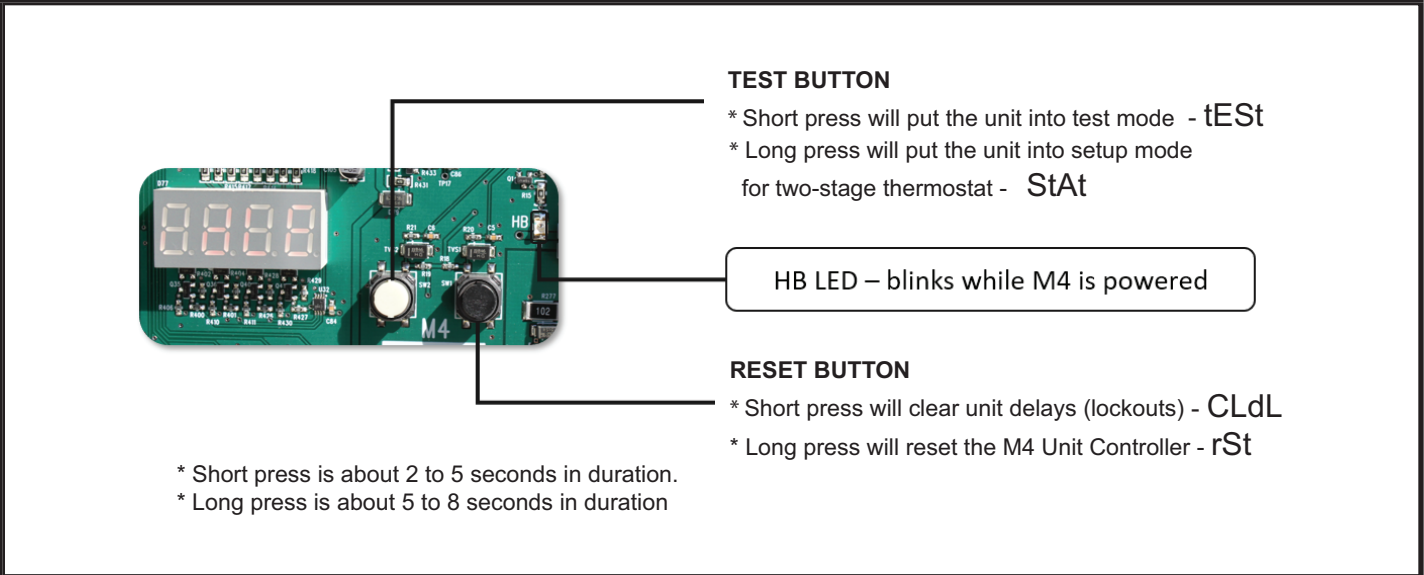


FIGURE 27

TABLE 3

UNIT CONTROLLER PUSHBUTTON CODES		
Code	Cause	Action
CLdL	Black Button: Short Press	Clear Delays
rSt	Black Button: Long Press	Reset
tEst	White Button: Short Press	TSTAT Test
StAt	White Button: Long Press (In Pre-Install state)	TSTAT Override
tEst	White Button: Long Press (NOT in Pre-Install State)	TSTAT Test
Short Press : 2 to 5 seconds. Long Press : 5 to 8 seconds.		

Blower Operation and Adjustments

The blower housings can be removed for cleaning and inspection. In addition, removing blower allows access to the heat exchanger tubes for inspection.

Line and low voltage make-up in all models is located in the upper corner of the blower compartment. Electrical entrance is made through the base pan of the unit or through the corner mullion for horizontal position units. Low voltage connections can be accessed by removing the blower compartment front panel. High voltage can be accessed through the makeup box cover on corner mullion.

In all models, the evaporator coil, expansion valve and drain pan can be accessed by removing the blower compartment end panel.

1-Blower Wheels

036-120 units are equipped with one direct drive blower assembly with a backward inclined blower wheel. 240 units are equipped with two drive blower assemblies with backward inclined blower wheels.

2-Indoor Blower Motor B3, B14-(180 & 240 ONLY)

Units are equipped with a direct drive blower assembly with a three-phase, variable speed, direct drive blower motor.



IMPORTANT

Three phase scroll compressors must be phased sequentially for correct compressor and blower rotation.

Follow "COOLING START-UP" section of installation instructions to ensure proper compressor and blower operation.

A-Blower Operation

Direct Drive Units - To check for proper voltage phasing, measure compressor suction and discharge pressures. Make sure suction pressure decreases and discharge pressure increases on start-up. Checking blower rotation is not a valid method of determining voltage phasing for incoming power.

Units Equipped With Factory-Installed Voltage or Phase Detection -

The Unit Controller checks the incoming power during start-up (A55 P394-1 and P394-3). If the voltage, phase, or frequency is incorrect, the Unit Controller will display an alarm and the unit will not start. After line voltage is corrected, the Unit Controller will energize the unit after five (default) minutes.

While line voltage is continually checked by the Unit Controller, the voltage phasing is not. If one or more phases is interrupted, power to one or more transformers is interrupted and the unit is shut down by either the Unit Controller or the corresponding transformer.

Initiate blower demand at thermostat according to instructions provided with thermostat. Unit will cycle on thermostat demand.

- 1 - Blower operation is manually set at the thermostat subbase fan switch. With fan switch in ON position, blowers will operate continuously.
- 2 - With fan switch in AUTO position, the blowers will cycle with demand. Blowers and entire unit will be off when system switch is in OFF position.

B-Blower Access

- 1 - Loosen the reusable wire tie which secures the controls and high voltage blower wiring to the blower housing.
- 2 - Remove and retain screws in front and on either side of blower housing. Pull frame toward outside of unit. See FIGURE 28, FIGURE 29, and FIGURE 30.

240 Units ONLY

There are 2 tandem blowers. If access to second blower motor electronics is required, the assembly can be pulled up to 3.5' ONLY from edge of blower deck. Do not stand on the deck once pulled out. If access is needed beyond 3.5' for cleaning and inspection, the whole blower tandem assembly will have to come out of the unit.

- 3 - Slide frame back into original position when finished servicing. Reattach the blower wiring in the previous location on the blower housing using the wire tie.
- 4 - Replace retained screws in front and on either side of the blower housing.

C-Determining Unit CFM

- 1 - Find the indoor blower motor RPM under the Core App. Air filters must be in place when measurements are taken.
- 2 - With all access panels in place, measure static pressure external to unit (from supply to return). Blower performance data is based on static pressure taken in locations shown in FIGURE 31.
NOTE - Static pressure readings can vary if not taken where shown.
- 3 - Referring to BLOWER DATA tables (table of contents), use static pressure and RPM readings to determine unit CFM.

DIRECT DRIVE BLOWER ASSEMBLY - 036 & 060

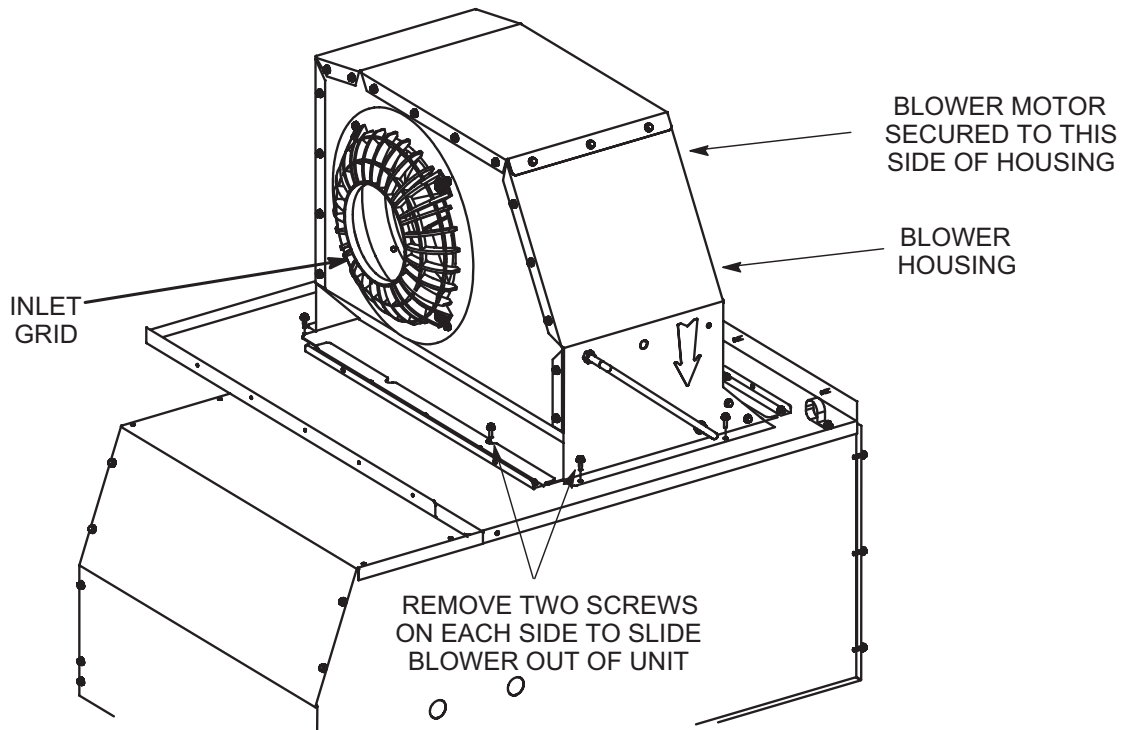


FIGURE 28

DIRECT DRIVE BLOWER ASSEMBLY - 092 & 120

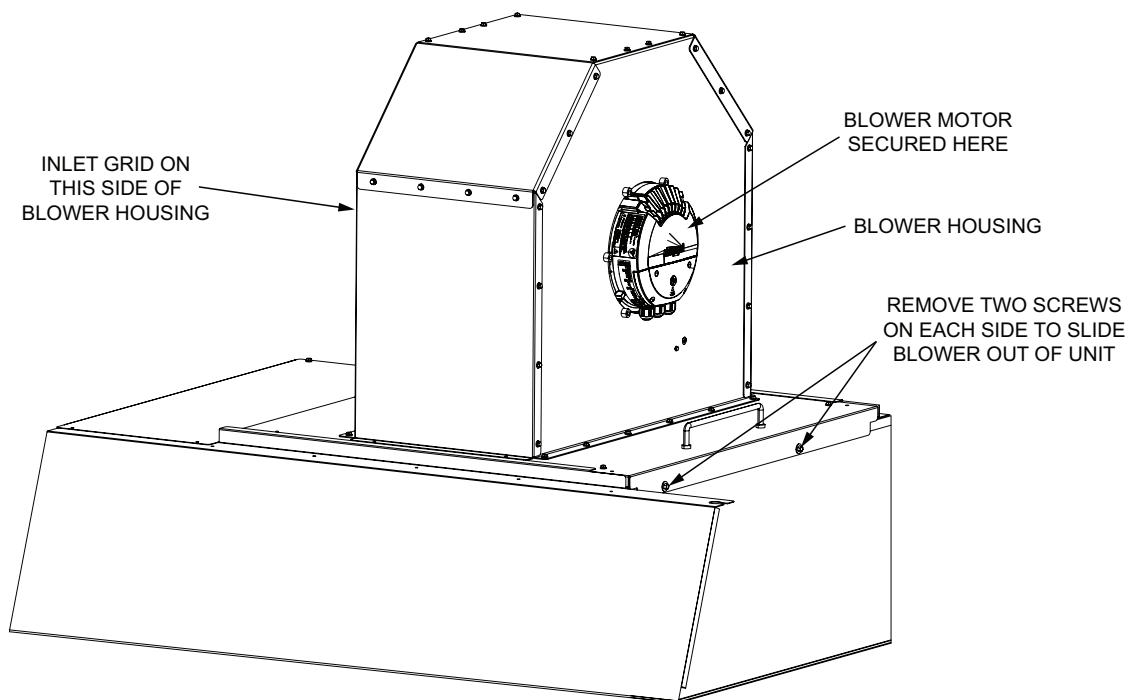


FIGURE 29

DIRECT DRIVE BLOWER ASSEMBLY - 180 & 240

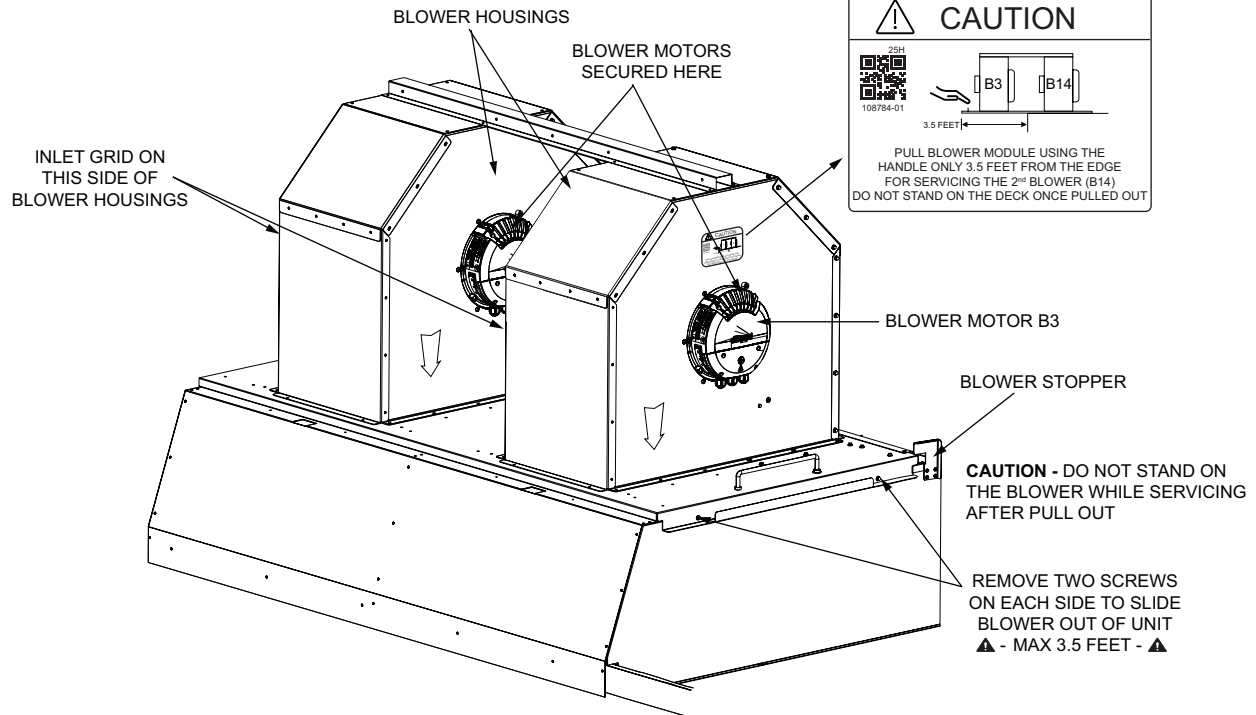
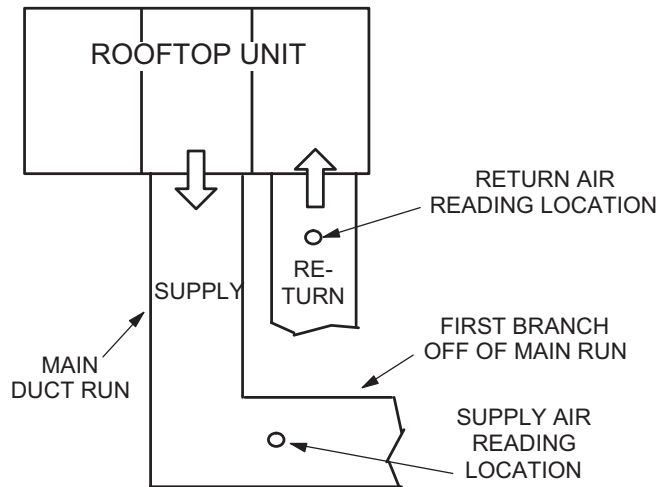


FIGURE 30

LOCATION OF STATIC PRESSURE READINGS

INSTALLATIONS WITH DUCTWORK



INSTALLATIONS WITH CEILING DIFFUSERS

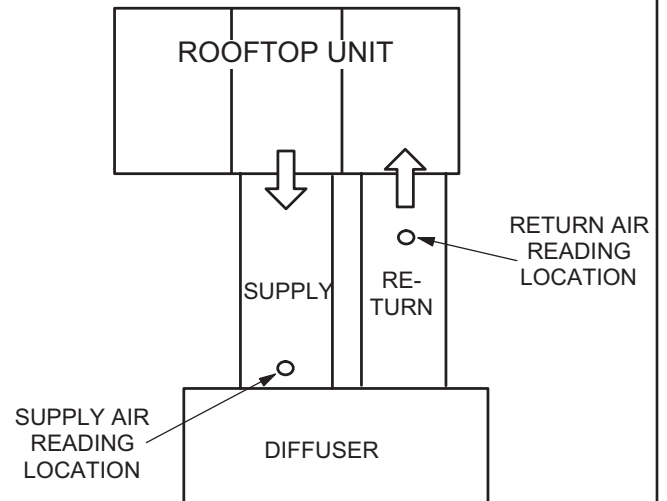


FIGURE 31

D-Adjusting Unit CFM

The supply CFM can be adjusted by changing Unit Controller settings. Refer to TABLE 4 for menu paths and default settings. Record any CFM changes on the parameter settings label located on the inside of the compressor access panel.

CAUTION

The **BLOWER CALIBRATION** process starts the indoor blower at operational speeds and moves the economizer damper blades. Before starting this process, replace any access panels and close all unit doors except compressor compartment door.

Blower calibration is required only on units that are newly installed or if there is a change in the duct work or air filters after installation. Use the mobile service app to navigate to the **SETUP>TEST & BALANCE>BLOWER** menu. After the new CFM values are entered, select **START CALIBRATION**. The blower calibration status is displayed as a % complete. Upon successful completion, the mobile service app will display **CALIBRATION SUCCESS** and go back to the blower calibration screen.

IMPORTANT - The default value for Cooling Low CFM is lower than a traditional single- or two-speed blower. If operating the unit with a 2- or 3-stage controller (2- or 3-stage thermostat, DDC controller, etc.), it is recommended to increase the Cooling Low CFM default value to a suitable level for part load cooling (typically 60% of full load CFM)

TABLE 4

S*H036-240 Staged Direct Drive Blower Parameters

Para-meter #	Staged Blower Parameters	Default Factory Settings (SC,SG / SH,SD)						Field-Set CFM Value
	Description	036	060	092	120	180	240	
	SETTINGS > RTU OPTIONS > EDIT PARAMETERS							
12	Blower Smoke % *	68/69	72/80	76	87/95	72	85/80	%
	SETUP > TEST & BALANCE > BLOWER							
13	Heating High	68/69	72/80	76	87/95	72	85/80	%
380	Heating Low (SH/SD models only)	31	39	40	49	36	39	%
14	Cool High	54/64	69/87	76	78/84	67	76/76	%
17	Cool Low	38/20	52/20	20	57/24	21	55/21	%
18	Vent CFM	68/69	72/80	76	87/95	72	85/80	%
	SETTINGS > RTU OPTIONS > DAMPER or SETTINGS > RTU OPTIONS > EDIT PARAMETERS							
9	Damper min. position during LOW blower operation.						0%	%
132	Damper min. position during HIGH blower operation.						0%	%
215	Min. damper % for stage 1 power exhaust operation.						50%	%
29	Damper minimum position during G blower operation.***						101%	%
219	Min. damper % for stg 2 power exhaust operation. (180 -240 models only)						75%	%
216	Deadband % for stage 1 power exhaust operation.						10%	%
220	Deadband % for stage 2 power exhaust operation. (180 -240 models only)						10%	%
224	Stage 1 power exhaust off-delay in seconds. (180 -240 models only)						100%	%
30	Minimum blower speed % for stage 2 power exhaust operation. (180 -240 models only)						70%	%
	SETTINGS > RTU OPTIONS > EDIT PARAMETERS							
606	Defrost 0 = Blower ON during DEFROST 1 = No Blower during DEFROST		0					
	*Any changes to Smoke CFM setting must be adjusted before the other CFM settings. *** Setting parameter 29 to "101" disables parameter 29 and passes control to parameter 9 or 132							

BLOWER DATA

SGH036H5E / SGH060H5E BLOWER PERFORMANCE

NOTE - Blower Table Includes Resistance For Base Unit With Wet Indoor Coil And Air Filters In Place.

See page 34 for Factory Installed Options/Accessory Air Resistance Data.

See page 35 for Minimum Air Volume Required For Use With Gas Heat.

EXTERNAL STATIC PRESSURE - In. w.g.																				
Air Volume cfm	0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
900	1163	129	1253	148	1341	165	1428	181	1512	191	1587	206	1653	232	1714	266	1775	301	1835	333
1000	1315	129	1396	152	1475	174	1552	195	1626	216	1692	242	1752	277	1810	316	1870	351	1928	382
1100	1463	131	1531	164	1599	197	1666	229	1730	261	1791	295	1850	331	1907	367	1964	400	2021	432
1200	1576	173	1640	210	1705	247	1769	283	1832	319	1893	353	1952	387	2010	420	2067	452	2124	485
1300	1683	225	1749	263	1814	300	1878	337	1941	372	2002	407	2061	441	2119	474	2176	507	2235	538
1400	1796	279	1862	317	1927	354	1991	391	2054	427	2114	463	2173	497	2231	530	2289	563	2345	595
1500	1912	332	1977	371	2042	409	2105	446	2168	482	2228	517	2287	552	2345	585	2401	618	2453	652
1600	2037	368	2100	410	2163	452	2224	492	2284	532	2343	570	2399	607	2454	643	2507	679	2553	716
1700	2161	403	2221	453	2280	502	2338	548	2393	594	2445	637	2496	678	2545	718	2592	757	2633	798
1800	2271	463	2329	519	2384	574	2437	625	2487	674	2533	721	2578	765	2621	808	2663	851	2701	892
1900	2372	545	2429	602	2482	657	2533	709	2579	758	2623	805	2665	850	2705	893	2745	936	2782	977
2000	2475	631	2530	687	2582	741	2631	792	2676	840	2718	886	2758	930	2797	973	2836	1015	2872	1056
2100	2582	719	2635	774	2684	827	2731	876	2774	923	2814	968	2853	1011	2892	1054	2928	1095	2964	1136
2200	2694	811	2742	863	2789	914	2833	962	2874	1007	2913	1051	2951	1094	2987	1136	3023	1176	3058	1216
2300	2807	904	2852	954	2896	1002	2937	1048	2976	1093	3013	1136	3050	1177	3085	1218	3119	1258	3153	1298
2400	2921	998	2963	1045	3003	1091	3042	1136	3079	1179	3114	1220	3149	1261	3183	1301	3216	1341	3249	1379
Air Volume cfm	1.1		1.2		1.3		1.4		1.5		1.6		1.7		1.8		1.9		2.0	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
900	1892	364	1946	393	1997	422	2047	449	2095	476	2141	501	2186	524	2229	546	2271	569	2313	592
1000	1983	413	2036	442	2086	471	2136	498	2184	525	2232	550	2278	575	2322	600	2364	625	2403	653
1100	2076	462	2128	492	2179	521	2229	549	2279	576	2328	603	2375	630	2418	659	2456	689	2489	721
1200	2180	516	2233	546	2285	575	2336	604	2386	632	2434	660	2477	690	2515	721	2547	755	2574	791
1300	2291	569	2343	600	2392	632	2437	663	2482	694	2524	726	2562	759	2595	793	2623	829	2648	866
1400	2397	628	2440	663	2477	701	2511	739	2549	775	2585	810	2619	845	2651	880	2680	916	2709	952
1500	2496	690	2529	732	2554	776	2580	820	2614	858	2648	895	2682	931	2715	965	2747	1000	2779	1034
1600	2589	758	2616	803	2638	851	2662	895	2696	932	2735	958	2775	977	2814	996	2852	1018	2887	1046
1700	2667	841	2694	886	2720	931	2747	974	2782	1008	2825	1022	2870	1026	2913	1035	2951	1056	2982	1096
1800	2736	933	2769	974	2801	1014	2833	1054	2869	1087	2911	1102	2952	1115	2988	1143	3015	1195	3031	1277
1900	2818	1017	2852	1055	2887	1094	2921	1132	2955	1167	2991	1197	3023	1238	3045	1303	3055	1400	3053	1529
2000	2907	1095	2942	1134	2976	1173	3010	1211	3043	1248	3072	1295	3092	1366	3100	1469	3094	1608	3076	1780
2100	2999	1175	3033	1214	3067	1252	3100	1290	3132	1330	3155	1394	3163	1494	3156	1635	3134	1817	3100	2032
2200	3092	1255	3125	1294	3158	1331	3191	1369	3222	1411	3238	1492	3235	1622	3213	1801	3175	2026	3124	2283
2300	3186	1336	3218	1373	3250	1411	3283	1448	3312	1493	3321	1590	3307	1750	3270	1967	3215	2234	3147	2535
2400	3280	1417	3311	1453	3342	1490	3374	1526	3402	1574	3405	1689	3379	1878	3327	2134	3256	2443	3171	2787

BLOWER DATA

10 TON

SGH120H5E BLOWER PERFORMANCE

NOTE - Blower Table Includes Resistance For Base Unit With Wet Indoor Coil And Air Filters In Place.

See page 34 for Factory Installed Options/Accessory Air Resistance Data.

See page 35 for Minimum Air Volume Required For Use With Gas Heat

Air Volume cfm		EXTERNAL STATIC PRESSURE - In. w.g.											
		0.1		0.2		0.3		0.4		0.5		0.6	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
2000		731	241	775	292	820	342	865	392	910	443	954	494
2200		772	289	818	342	863	395	908	447	953	500	996	554
2400		819	344	865	398	910	453	955	508	998	563	1040	620
2600		871	403	916	460	960	516	1003	574	1046	632	1086	692
2800		926	466	969	525	1012	584	1054	645	1095	706	1134	770
3000		982	534	1024	596	1066	659	1106	723	1145	788	1182	856
3200		1040	610	1081	676	1121	743	1159	811	1197	881	1232	953
3400		1099	697	1138	767	1177	838	1214	911	1249	985	1283	1061
3600		1158	796	1196	870	1233	946	1268	1023	1302	1101	1334	1180
3800		1219	908	1255	986	1290	1065	1323	1146	1355	1228	1385	1311
4000		1280	1034	1314	1114	1346	1196	1377	1280	1407	1365	1436	1451
4200		1340	1171	1372	1254	1402	1339	1431	1425	1459	1513	1486	1602
4400		1400	1318	1429	1404	1457	1491	1484	1580	1509	1670	1534	1762
4600		1457	1473	1484	1562	1509	1652	1534	1743	1558	1835	1582	1927
4800		1511	1635	1536	1726	1559	1818	1582	1910	1605	2002	1628	2095
Air Volume cfm		0.8		0.9		1.0		1.1		1.2		1.3	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
2000		1040	602	1080	660	1119	720	1156	782	1192	844	1227	904
2200		1079	668	1118	730	1155	794	1191	859	1226	924	1260	988
2400		1120	741	1158	807	1193	875	1228	943	1261	1010	1294	1077
2600		1163	820	1199	889	1233	959	1267	1030	1299	1101	1330	1171
2800		1207	905	1242	976	1275	1050	1307	1123	1338	1198	1369	1272
3000		1253	998	1286	1072	1318	1148	1348	1225	1379	1303	1408	1381
3200		1300	1102	1331	1179	1362	1258	1391	1338	1421	1419	1449	1501
3400		1347	1217	1377	1298	1407	1380	1435	1463	1464	1548	1491	1634
3600		1395	1343	1424	1427	1452	1513	1480	1599	1507	1688	1533	1778
3800		1443	1480	1470	1567	1497	1656	1524	1746	1550	1838	1575	1930
4000		1490	1628	1516	1718	1542	1809	1567	1902	1592	1995	1617	2088
4200		1537	1784	1562	1876	1587	1969	1611	2062	1636	2155	1660	2248
4400		1583	1947	1607	2040	1631	2132	1655	2225	1679	2316	1703	2407
4600		1629	2112	1652	2204	1676	2296	1699	2386	1723	2475	1747	2564
4800		1674	2277	1698	2367	1721	2457	1745	2545	1768	2632	1791	2719

BLOWER DATA

BLOWER DATA

NOTE - Blower Table Includes Resistance For Base Unit With Wet Indoor Coil And Air Filters In Place.

See page 34 for Factory Installed Options/Accessory Air Resistance Data.

See page 35 for Minimum Air Volume Required For Use With Gas Heat

Air Volume cfm	EXTERNAL STATIC PRESSURE - In. w.g.																											
	0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0		1.1		1.2		1.3			
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts		
2000	474	8	516	102	562	199	611	301	662	401	710	490	758	566	805	628	852	684	---	---	---	---	---	---	---	---	---	
2200	486	35	527	127	573	225	622	328	673	428	722	519	770	595	818	658	865	715	913	773	960	840	---	---	---	---	---	
2400	499	62	540	155	586	254	635	356	685	458	735	549	783	626	831	690	879	748	927	808	973	878	1018	961	1061	1052	1086	
2600	512	91	554	185	599	284	648	387	698	489	748	581	797	657	845	722	893	782	941	844	987	917	1031	1005	1074	1101	1153	
2800	527	122	569	217	614	317	663	420	713	522	762	614	811	690	860	756	908	817	955	882	1001	960	1045	1052	1086	1153	1208	
3000	542	155	585	251	631	352	679	455	728	557	778	648	827	725	875	791	923	854	970	923	1016	1004	1059	1102	1099	1208	1266	
3200	559	190	602	287	648	388	696	491	744	593	794	684	843	761	891	828	939	893	985	965	1030	1052	1073	1154	1113	1266	1327	
3400	578	227	621	325	666	426	713	529	762	631	811	722	859	798	907	866	955	933	1001	1009	1045	1101	1087	1209	1126	1327	1390	
3600	597	267	640	365	685	466	732	569	780	670	828	761	877	837	925	906	972	976	1017	1056	1061	1154	1102	1268	1141	1390	1457	
3800	617	308	660	406	705	508	751	610	799	711	847	801	895	878	942	948	989	1021	1034	1106	1077	1209	1117	1329	1155	1457	1527	
4000	638	350	681	449	725	550	771	652	818	753	866	843	914	919	961	991	1007	1067	1051	1158	1093	1268	1133	1394	1170	1527	1600	
4200	660	394	702	493	747	594	792	696	838	796	886	886	933	963	979	1036	1025	1116	1068	1213	1110	1330	1148	1463	1185	1600	1677	
4400	682	440	724	538	768	639	814	740	859	841	906	929	953	1007	999	1083	1043	1168	1086	1271	1126	1396	1164	1535	1201	1677	1757	
4600	705	485	747	584	791	684	836	785	881	885	927	974	973	1052	1018	1131	1062	1222	1104	1333	1144	1466	1181	1611	1216	1757	1841	
4800	730	510	772	611	815	714	859	817	904	919	949	1010	994	1093	1039	1178	1082	1277	1122	1398	1161	1540	1198	1692	1232	1841	1929	
5000	757	506	799	614	842	722	885	831	928	938	972	1037	1016	1129	1059	1225	1101	1336	1141	1468	1178	1619	1214	1777	1249	1929	2018	
5200	787	487	828	603	869	720	911	838	953	954	996	1063	1038	1168	1080	1277	1120	1401	1159	1544	1196	1703	1231	1864	1265	2018	2188	
5400	817	464	857	591	897	718	937	846	978	972	1019	1094	1060	1213	1101	1337	1140	1473	1177	1626	1213	1790	1248	1953	1282	2108	2288	
5600	846	446	885	585	924	723	963	862	1003	1000	1042	1135	1082	1269	1121	1407	1158	1554	1195	1712	1231	1878	1265	2042	1299	2198	2378	
5800	874	441	912	591	950	741	988	892	1026	1042	1064	1190	1102	1337	1140	1486	1177	1641	1213	1803	1249	1969	1283	2131	1317	2288	2471	
6000	901	454	938	615	975	776	1011	937	1048	1098	1086	1258	1123	1417	1159	1575	1196	1735	1232	1897	1267	2060	1302	2221	1335	2378	2566	
6200	926	489	962	659	998	829	1034	1000	1070	1171	1106	1341	1143	1508	1179	1671	1215	1832	1251	1992	1286	2152	1321	2312	1354	2471	2665	
6400	950	548	985	724	1020	901	1055	1079	1091	1257	1127	1433	1163	1606	1198	1772	1234	1932	1270	2089	1306	2246	1340	2405	1373	2566	2770	
6600	972	629	1006	809	1041	990	1076	1171	1112	1352	1147	1532	1183	1706	1219	1872	1255	2031	1291	2187	1326	2343	1360	2503	1393	2665	2879	
6800	993	727	1027	907	1062	1088	1097	1270	1133	1452	1169	1631	1204	1804	1240	1969	1276	2128	1312	2284	1347	2442	1380	2604	1413	2770	2991	
7000	1014	827	1049	1007	1084	1189	1119	1371	1155	1553	1190	1732	1226	1903	1262	2068	1298	2227	1333	2384	1368	2544	1401	2710	1432	2879	3108	
7200	1036	928	1071	1109	1106	1291	1141	1473	1177	1654	1213	1832	1249	2004	1284	2168	1320	2328	1355	2487	1389	2650	1421	2819	1452	2991	3228	
7400	1058	1031	1093	1212	1129	1393	1165	1575	1201	1756	1237	1933	1272	2104	1308	2269	1343	2431	1377	2593	1410	2759	1442	2931	1472	3108	3328	
7600	1081	1134	1116	1315	1152	1496	1188	1677	1225	1857	1261	2034	1296	2205	1331	2371	1366	2535	1399	2701	1432	2872	1462	3048	1491	3228	3452	
7800	1104	1238	1140	1418	1176	1597	1213	1777	1249	1957	1285	2133	1320	2306	1355	2474	1389	2642	1421	2812	1453	2987	1482	3167	1510	3352	3479	
8000	1128	1341	1165	1519	1201	1698	1238	1877	1274	2056	1310	2233	1345	2407	1378	2579	1411	2751	1443	2926	1473	3105	1502	3290	1529	3479	3609	
8200	1153	1443	1190	1619	1226	1797	1263	1976	1296	2155	1335	2333	1369	2510	1402	2686	1434	2862	1464	3042	1494	3227	1521	3416	1547	3609	3742	
8400	1179	1543	1215	1718	1252	1896	1288	2075	1324	2255	1359	2436	1393	2616	1425	2796	1456	2978	1486	3163	1514	3353	1540	3546	1566	3742	3879	
8600	1205	1641	1241	1817	1278	1995	1314	2176	1349	2358	1383	2542	1416	2726	1447	2911	1477	3099	1506	3289	1533	3483	1559	3680	1584	3879	4009	
8800	1231	1740	1267	1917	1303	2097	1339	2280	1374	2465	1407	2653	1439	2841	1469	3032	1499	3225	1526	3420	1553	3618	1578	3817	---	---	---	
9000	1257	1840	1293	2020	1329	2203	1364	2390	1422	2579	1431	2770	1462	2963	1491	3159	1520	3357	1547	3556	1572	3757	1597	3958	---	---	---	
9200	1284	1943	1319	2127	1354	2314	1389	2504	1422	2697	1454	2893	1484	3091	1513	3291	1540	3493	1567	3696	1592	3899	---	---	---	---	---	
9400	1310	2050	1345	2238	1380	2429	1414	2624	1446	2821	1477	3022	1506	3224	1534	3429	1561	3634	1586	3840	---	---	---	---	---	---	---	
9600	1337	2160	1371	2353	1405	2549	1438	2748	1470	2951	1500	3156	1528	3363	1555	3571	1581	3779	---	---	---	---	---	---	---	---	---	

BLOWER DATA

3 TON | 5 TON

SCH036H5E / SCH060H5E BLOWER PERFORMANCE

NOTE - Blower Table Includes Resistance For Base Unit With Wet Indoor Coil And Air Filters In Place.

See page 34 for Factory Installed Options/Accessory Air Resistance Data.

See page 35 for Minimum Air Volume Required For Use With Optional Electric Heat.

Air Volume cfm		EXTERNAL STATIC PRESSURE - In. w.g.																			
		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
900	1163	129	148	1253	148	1341	165	1428	181	1512	191	1587	206	1653	232	1714	266	1775	301	1835	333
1000	1315	129	1396	152	1475	174	1552	195	1666	229	1730	261	1791	295	1850	331	1907	367	1964	400	2021
1100	1463	131	1531	164	1599	197	1666	229	1769	283	1832	319	1893	353	1952	387	2010	420	2067	452	2124
1200	1576	173	1640	210	1705	247	1769	283	337	391	2054	427	2114	463	2173	497	2231	530	2289	563	2345
1300	1683	225	1749	263	1814	300	1878	337	1991	391	2054	427	2114	463	2173	497	2231	530	2289	563	2345
1400	1796	279	1862	317	1927	354	1991	391	2105	446	2168	482	2228	517	2287	552	2345	585	2401	618	2453
1500	1912	332	1977	371	2042	409	2105	446	2224	492	2284	532	2343	570	2399	607	2454	643	2507	679	2553
1600	2037	368	2100	410	2163	452	2224	492	2338	548	2393	594	2445	637	2496	678	2545	718	2592	757	2633
1700	2161	403	2221	453	2280	502	2338	548	2437	625	2487	674	2533	721	2578	765	2621	808	2663	851	2701
1800	2271	463	2329	519	2384	574	2437	625	2533	709	2579	758	2623	805	2665	850	2705	893	2745	936	2782
1900	2372	545	2429	602	2482	657	2533	709	2631	792	2676	840	2718	886	2758	930	2797	973	2836	1015	2872
2000	2475	631	2530	687	2582	741	2631	792	2731	876	2774	923	2814	968	2853	1011	2892	1054	2928	1095	2964
2100	2582	719	2635	774	2684	827	2731	876	2833	962	2874	1007	2913	1051	2951	1094	2987	1136	3023	1176	3058
2200	2694	811	2742	863	2789	914	2833	962	2937	1048	2976	1093	3013	1136	3050	1177	3085	1218	3119	1258	1298
2300	2807	904	2852	954	2896	1002	2937	1048	3042	1136	3079	1179	3114	1220	3149	1261	3183	1301	3216	1341	1379
2400	2921	998	2963	1045	3003	1091	3042	1136													
Air Volume cfm	1.1		1.2		1.3		1.4		1.5		1.6		1.7		1.8		1.9		2.0		
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	
	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
900	1892	364	1946	393	1997	422	2047	449	2095	476	2141	501	2186	524	2229	546	2271	569	2313	592	2345
1000	1983	413	2036	442	2086	471	2136	498	2184	525	2232	550	2278	575	2322	600	2364	625	2403	653	2489
1100	2076	462	2128	492	2179	521	2229	549	2279	576	2328	603	2375	630	2418	659	2456	689	2489	721	2574
1200	2180	516	2233	546	2285	575	2336	604	2386	632	2434	660	2477	690	2515	721	2547	755	2574	791	2648
1300	2291	569	2343	600	2392	632	2437	663	2482	694	2524	726	2562	759	2595	793	2623	829	2648	866	2709
1400	2397	628	2440	663	2477	701	2511	739	2549	775	2585	810	2619	845	2651	880	2680	916	2709	952	2779
1500	2496	690	2529	732	2554	776	2580	820	2614	858	2648	895	2682	931	2715	965	2747	1000	2779	1034	2887
1600	2589	758	2616	803	2638	851	2662	895	2696	932	2735	958	2775	977	2814	996	2852	1018	2887	1046	2982
1700	2667	841	2694	886	2720	931	2747	974	2782	1008	2825	1022	2870	1026	2913	1035	2951	1056	2982	1096	3031
1800	2736	933	2769	974	2801	1014	2833	1054	2869	1087	2911	1102	2952	1115	2988	1143	3015	1195	3031	1277	3053
1900	2818	1017	2852	1055	2887	1094	2921	1132	2955	1167	2991	1197	3023	1238	3045	1303	3055	1400	3053	1529	3076
2000	2907	1095	2942	1134	2976	1173	3010	1211	3043	1248	3072	1295	3092	1366	3100	1469	3094	1608	3076	1780	3100
2100	2999	1175	3033	1214	3067	1252	3100	1290	3132	1330	3155	1394	3163	1494	3156	1635	3134	1817	3100	2032	3147
2200	3092	1255	3125	1294	3158	1331	3191	1369	3222	1411	3238	1492	3235	1622	3213	1801	3175	2026	3124	2283	3256
2300	3186	1336	3218	1373	3250	1411	3283	1448	3312	1493	3321	1590	3307	1750	3270	1967	3215	2234	3147	2535	3327
2400	3280	1417	3311	1453	3342	1490	3374	1526	3402	1574	3405	1689	3379	1878	3327	2134	3256	2443	3171	2787	3356

BLOWER DATA

10 TON

SCH120H5E BLOWER PERFORMANCE

NOTE - Blower Table Includes Resistance For Base Unit With Wet Indoor Coil And Air Filters In Place.

See page 34 for Factory Installed Options/Accessory Air Resistance Data.

See page 35 for Minimum Air Volume Required For Use With Optional Electric Heat.

EXTERNAL STATIC PRESSURE - In. w.g.															
Air Volume cfm	0.1		0.2		0.3		0.4		0.5		0.6		0.7		
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	
2000	731	241	775	292	820	342	865	392	910	443	954	494	998	547	
2200	772	289	818	342	863	395	908	447	953	500	996	554	1038	610	
2400	819	344	865	398	910	453	955	508	998	563	1040	620	1081	679	
2600	871	403	916	460	960	516	1003	574	1046	632	1086	692	1125	755	
2800	926	466	969	525	1012	584	1054	645	1095	706	1134	770	1171	836	
3000	982	534	1024	596	1066	659	1106	723	1145	788	1182	856	1218	926	
3200	1040	610	1081	676	1121	743	1159	811	1197	881	1232	953	1267	1026	
3400	1099	697	1138	767	1177	838	1214	911	1249	985	1283	1061	1316	1138	
3600	1158	796	1196	870	1233	946	1268	1023	1302	1101	1334	1180	1365	1261	
3800	1219	908	1255	986	1290	1065	1323	1146	1355	1228	1385	1311	1415	1395	
4000	1280	1034	1314	1114	1346	1196	1377	1280	1407	1365	1436	1451	1464	1539	
4200	1340	1171	1372	1254	1402	1339	1431	1425	1459	1513	1486	1602	1512	1693	
4400	1400	1318	1429	1404	1457	1491	1484	1580	1509	1670	1534	1762	1559	1854	
4600	1457	1473	1484	1562	1509	1652	1534	1743	1558	1835	1582	1927	1605	2020	
4800	1511	1635	1536	1726	1559	1818	1582	1910	1605	2002	1628	2095	1651	2186	
Air Volume cfm	0.8		0.9		1.0		1.1		1.2		1.3				
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts			
2000	1040	602	1080	660	1119	720	1156	782	1192	844	1227	904			
2200	1079	668	1118	730	1155	794	1191	859	1226	924	1260	988			
2400	1120	741	1158	807	1193	875	1228	943	1261	1010	1294	1077			
2600	1163	820	1199	889	1233	959	1267	1030	1299	1101	1330	1171			
2800	1207	905	1242	976	1275	1050	1307	1123	1338	1198	1369	1272			
3000	1253	998	1286	1072	1318	1148	1348	1225	1379	1303	1408	1381			
3200	1300	1102	1331	1179	1362	1258	1391	1338	1421	1419	1449	1501			
3400	1347	1217	1377	1298	1407	1380	1435	1463	1464	1548	1491	1634			
3600	1395	1343	1424	1427	1452	1513	1480	1599	1507	1688	1533	1778			
3800	1443	1480	1470	1567	1497	1656	1524	1746	1550	1838	1575	1930			
4000	1490	1628	1516	1718	1542	1809	1567	1902	1592	1995	1617	2088			
4200	1537	1784	1562	1876	1587	1969	1611	2062	1636	2155	1660	2248			
4400	1583	1947	1607	2040	1631	2132	1655	2225	1679	2316	1703	2407			
4600	1629	2112	1652	2204	1676	2296	1699	2386	1723	2475	1747	2564			
4800	1674	2277	1698	2367	1721	2457	1745	2545	1768	2632	1791	2719			

20 TON

6SCH240H5E BLOWER PERFORMANCE
NOTE - Blower Table Includes Resistance For Base Unit With Wet Indoor Coil And Air Filters In Place.

See page 34 for Factory Installed Options/Accessory Air Resistance Data.

Air Volume cfm	EXTERNAL STATIC PRESSURE - In. w.g.																										
	0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0		1.1		1.2		1.3		
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	
2000	474	8	516	102	562	199	611	301	662	401	710	490	758	566	805	628	852	684	---	---	---	---	---	---	---	---	---
2200	486	35	527	127	573	225	622	328	673	428	722	519	770	595	818	658	865	715	913	773	960	840	---	---	---	---	---
2400	499	62	540	155	586	254	635	356	685	458	735	549	783	626	831	690	879	748	927	808	973	878	1018	961	1061	1052	1052
2600	512	91	554	185	599	284	648	387	698	489	748	581	797	657	845	722	893	782	941	844	987	917	1031	1005	1074	1101	1101
2800	527	122	569	217	614	317	663	420	713	522	762	614	811	690	860	756	908	817	955	882	1001	960	1045	1052	1086	1153	1153
3000	542	155	585	251	631	352	679	455	728	557	778	648	827	725	875	791	923	854	970	923	1016	1004	1059	1102	1099	1208	1208
3200	559	190	602	287	648	388	696	491	744	593	794	684	843	761	891	828	939	893	985	965	1030	1052	1073	1154	1113	1266	1266
3400	578	227	621	325	666	426	713	529	762	631	811	722	859	798	907	866	955	933	1001	1009	1045	1101	1087	1209	1126	1327	1327
3600	597	267	640	365	685	466	732	569	780	670	828	761	877	837	925	906	972	936	1017	1056	1061	1154	1102	1268	1141	1390	1390
3800	617	308	660	406	705	508	751	610	799	711	847	801	895	878	942	948	989	1021	1034	1106	1077	1209	1117	1329	1155	1457	1457
4000	638	350	681	449	725	550	771	652	818	753	866	843	914	919	961	991	1007	1067	1051	1158	1093	1268	1133	1394	1170	1527	1527
4200	660	394	702	493	747	594	792	696	838	796	886	886	933	963	979	1036	1025	1116	1068	1213	1110	1330	1148	1463	1185	1600	1600
4400	682	440	724	538	768	639	814	740	859	841	906	929	953	1007	999	1083	1043	1168	1086	1271	1126	1396	1164	1535	1201	1677	1677
4600	705	485	747	584	791	684	836	785	881	885	927	974	973	1052	1018	1131	1062	1222	1104	1333	1144	1466	1181	1611	1216	1757	1757
4800	730	510	772	611	815	714	859	817	904	919	949	1010	994	1093	1039	1178	1082	1277	1122	1398	1161	1540	1198	1692	1232	1841	1841
5000	757	506	799	614	842	722	885	831	928	938	972	1037	1016	1129	1059	1225	1101	1336	1141	1468	1178	1619	1214	1777	1249	1929	1929
5200	787	487	828	603	869	720	911	838	953	954	996	1063	1038	1168	1080	1277	1120	1401	1159	1544	1196	1703	1231	1864	1265	2018	2018
5400	817	464	857	591	897	718	937	846	978	972	1019	1094	1060	1213	1101	1337	1140	1473	1177	1626	1213	1790	1248	1953	1282	2108	2108
5600	846	446	885	585	924	723	963	862	1003	1000	1042	1135	1082	1269	1121	1407	1158	1554	1195	1712	1231	1878	1265	2042	1299	2198	2198
5800	874	441	912	591	950	741	988	892	1026	1042	1064	1190	1102	1337	1140	1486	1177	1641	1213	1803	1249	1969	1283	2131	1317	2288	2288
6000	901	454	938	615	975	776	1011	937	1048	1098	1086	1258	1123	1417	1159	1575	1196	1735	1232	1897	1267	2060	1302	2221	1335	2378	2378
6200	926	489	962	659	998	829	1034	1000	1070	1171	1106	1341	1143	1508	1179	1671	1215	1832	1251	1992	1286	2152	1321	2312	1354	2471	2471
6400	950	548	985	724	1020	901	1055	1079	1091	1257	1127	1433	1163	1606	1198	1772	1234	1932	1270	2089	1306	2246	1340	2405	1373	2566	2566
6600	972	629	1006	809	1041	990	1076	1171	1112	1352	1147	1532	1183	1706	1219	1872	1255	2031	1291	2187	1326	2343	1360	2503	1393	2665	2665
6800	993	727	1027	907	1062	1088	1097	1270	1133	1452	1169	1631	1204	1804	1240	1969	1276	2128	1312	2284	1347	2442	1380	2604	1413	2770	2770
7000	1014	827	1049	1007	1084	1189	1119	1371	1155	1553	1190	1732	1226	1903	1262	2068	1298	2227	1333	2384	1368	2544	1401	2710	1432	2879	2879
7200	1036	928	1071	1109	1106	1291	1141	1473	1177	1654	1213	1832	1249	2004	1284	2168	1320	2328	1355	2487	1389	2850	1421	2819	1452	2991	2991
7400	1058	1031	1093	1212	1129	1393	1165	1575	1201	1756	1237	1933	1272	2104	1308	2269	1343	2431	1377	2593	1410	2759	1442	2931	1472	3108	3108
7600	1081	1134	1116	1315	1152	1496	1188	1677	1225	1857	1261	2034	1296	2205	1331	2371	1366	2535	1399	2701	1432	2872	1462	3048	1491	3228	3228
7800	1104	1238	1140	1418	1176	1597	1213	1777	1249	1957	1285	2133	1320	2306	1355	2474	1389	2642	1421	2812	1453	2987	1482	3167	1510	3352	3352
8000	1128	1341	1165	1519	1201	1698	1238	1877	1274	2056	1310	2233	1345	2407	1378	2579	1411	2751	1443	2926	1473	3105	1502	3290	1529	3479	3479
8200	1153	1443	1190	1619	1226	1797	1263	1976	1299	2155	1335	2333	1369	2510	1402	2686	1434	2862	1464	3042	1494	3227	1521	3416	1547	3609	3609
8400	1179	1543	1215	1718	1252	1896	1288	2075	1324	2255	1359	2436	1393	2616	1425	2796	1456	2978	1486	3163	1514	3353	1540	3546	1566	3742	3742
8600	1205	1641	1241	1817	1278	1995	1314	2176	1349	2358	1383	2542	1416	2726	1447	2911	1477	3099	1506	3289	1533	3483	1559	3680	1584	3879	3879
8800	1231	1740	1267	1917	1303	2097	1339	2280	1374	2465	1407	2653	1439	2841	1469	3032	1499	3225	1526	3420	1553	3618	1578	3817	---	---	---
9000	1257	1840	1293	2020	1329	2203	1364	2390	1398	2579	1431	2770	1462	2963	1491	3159	1520	3357	1547	3556	1572	3757	1597	3958	---	---	---
9200	1284	1943	1319	2127	1354	2314	1389	2504	1422	2697	1454	2893	1484	3091	1513	3291	1540	3493	1567	3696	1592	3899	---	---	---	---	---
9400	1310	2050	1345	2238	1380	2429	1414	2624	1446	2821	1477	3022	1506	3224	1534	3429	1561	3634	1586	3840	---	---	---	---	---	---	---
9600	1337	2160	1371	2353	1405	2549	1438	2748	1470	2951	1500	3156	1528	3363	1555	3571	1581	3779	---	---	---	---	---	---	---	---	---

BLOWER DATA

FACTORY INSTALLED OPTIONS/FIELD INSTALLED ACCESSORY AIR RESISTANCE - in. w.g.

Air Volume cfm	Gas Heating			Dehumidification Coil	Electric Heat	Economizer	Filters MERV 13
	Standard Heat	Medium Heat	High Heat				
036, 060 MODELS							
800	0.02	0.02	0.02	0.00	0.01	0.04	0.05
1000	0.02	0.02	0.02	0.00	0.03	0.04	0.07
1200	0.02	0.02	0.02	0.01	0.06	0.04	0.07
1400	0.02	0.02	0.03	0.02	0.09	0.04	0.07
1600	0.02	0.03	0.04	0.03	0.12	0.04	0.07
1800	0.03	0.04	0.05	0.04	0.15	0.05	0.07
2000	0.03	0.04	0.06	0.04	0.18	0.05	0.08
120 MODEL							
2000	0.07	0.05	0.06	0.03	0.03	0.06	0.03
2500	0.09	0.10	0.11	0.04	0.03	0.11	0.05
3000	0.11	0.12	0.13	0.05	0.02	0.13	0.06
3500	0.12	0.16	0.17	0.06	0.05	0.15	0.07
4000	0.14	0.21	0.22	0.08	0.05	0.19	0.08
4500	0.15	0.26	0.32	0.10	0.10	0.22	0.09
5000	0.16	0.34	0.43	0.12	0.10	0.29	0.10
5500	0.18	0.44	0.54	0.14	0.16	0.34	0.12
6000	0.2	0.54	- - -	0.15	0.21	0.52	0.13
240 MODEL							
3000	0.03	0.04	0.05	0.02	0.01	0.00	0.00
3500	0.03	0.05	0.06	0.04	0.01	0.00	0.00
4000	0.04	0.06	0.07	0.04	0.01	0.00	0.00
4500	0.05	0.07	0.09	0.04	0.02	0.00	0.00
5000	0.05	0.09	0.11	0.04	0.03	0.00	0.00
5500	0.06	0.10	0.13	0.06	0.03	0.01	0.01
6000	0.07	0.12	0.15	0.06	0.03	0.01	0.02
6500	0.08	0.13	0.17	0.08	0.04	0.01	0.02
7000	0.09	0.15	0.19	0.08	0.04	0.02	0.03
7500	0.10	0.17	0.21	0.10	0.05	0.02	0.04
8000	0.11	0.19	0.24	0.10	0.05	0.02	0.04
8500	0.12	0.20	0.26	0.10	0.06	0.03	0.04
9000	0.13	0.23	0.29	0.12	0.07	0.04	0.04
9500	0.14	0.25	0.32	0.14	0.08	0.04	0.06

POWER EXHAUST FANS STANDARD STATIC PERFORMANCE

120 Model		240 Model	
Return Air System Static Pressure	Air Volume Exhausted	Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm	in. w.g.	cfm
0.05	4085	0	10,200
0.10	3685	0.05	9700
0.15	3280	0.10	9200
0.20	2880	0.15	8600
0.25	2475	0.20	8100
---	---	0.25	7600
---	---	0.30	6900
---	---	0.35	6000
---	---	0.40	5000
---	---	0.45	4150

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT

Size	Electric Heat kW	Minimum cfm
036	10	950
	15	700
060	10	1225
	15	1225
	20	1225
	30	1425
120	15	1300
	20	2600
	30	2600
	45	2600
	60	2800
240	25	3300
	40	5200
	60	6000
	90	7000

MINIMUM AIR VOLUME REQUIRED FOR USE WITH GAS HEAT

Size	Gas Heat	Minimum cfm
036	Standard	1175
	Medium	1475
060	Standard	1175
	Medium	1475
	High	1625
120	Standard	2175
	Medium	2250
	High	2575
240	Standard	4350
	Medium	4500
	High	5150

Refrigerant Leak Detection System

A-System Test

- 1 - Initiate Refrigerant Leak Detection System Test by using the following mobile service app menu path:

RTU MENU > COMPONENT TEST > LEAK DETECTION > START TEST

- 2 - Ensure that indoor blower, outdoor fan, and combustion air blower (SGH only) are energized.

Cooling Start-Up

⚠ 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.

IMPORTANT- The crankcase heater must be energized for 24 hours before attempting to start compressor. Set thermostat so there is no demand to prevent compressors from cycling. Apply power to unit.

MSAV™ Units and Units Equipped With Voltage or Phase Detection - The Unit Controller checks the incoming power during start-up. If the voltage or phase is incorrect, the Unit Controller will display an alarm and the unit will not start.

A-Preliminary Checks

- 1 - Make sure that unit is installed in accordance with the installation instructions and applicable codes.
- 2 - Inspect all electrical wiring, both field and factory-installed, for loose connections. Tighten as required.
- 3 - Check to ensure that refrigerant lines do not rub against the cabinet or against other refrigerant lines.
- 4 - Check voltage at disconnect switch. Voltage must be within range listed on nameplate. If not, consult power company and have voltage condition corrected before starting unit.
- 5 - Make sure filters are in place before start-up.

B-Start-Up

- 1 - Initiate first and second stage cooling demands according to instructions provided with thermostat. Refer to the Optional Supply Air VFD section on MSAV™ units.
- 2 - **SG/SC 036 & 060 Units** - First-stage thermostat demand (Y1) will energize the compressor and blower on low speed along with the condenser fan. An increased cooling demand (Y2) will increase the blower and compressor to high speed. On units with an economizer, when outdoor air is acceptable, a first-stage demand (Y1) will energize the economizer. An increased demand (Y2) will

energize the compressor and blower on low speed along with the condenser fan.

SG/SC 120 Units - First-stage thermostat demand will energize compressor 1. Second-stage thermostat demand will energize compressor 2. On units with an economizer, when outdoor air is acceptable, a first-stage demand will energize the economizer; a second-stage demand will energize compressor 1.

SG/SC 240 Units - First-stage thermostat demand will energize compressors 1 and 2. Second-stage thermostat demand will energize compressors 3 and 4. On units with an economizer, when outdoor air is acceptable, a first-stage demand will energize the economizer; a second-stage demand will energize compressors 1 and 2.

⚠ IMPORTANT

Three Phase Scroll Compressor Voltage Phasing

Three phase scroll compressors must be phased sequentially to ensure correct compressor and blower* rotation and operation. Compressor and blower are wired in phase at the factory. Power wires are color-coded as follows: line 1-red, line 2-yellow, line 3-blue.

- 1- Observe suction and discharge pressures and blower* rotation on unit start-up.
- 2- Suction pressure must drop, discharge pressure must rise and blower* rotation must match rotation marking. If pressure differential is not observed or blower* rotation is not correct:
- 3- Disconnect all remote electrical power supplies.
- 4- Reverse any two field-installed wires connected to the line side of S48 disconnect or TB13 terminal strip. Do not reverse wires at blower contactor.
- 5- Make sure the connections are tight.

Discharge and suction pressures should operate at their normal start-up ranges.

*Supply air VFD motors should rotate in the correct direction; verify scroll compressor rotation separately. Contact technical support if the VFD blower is rotating incorrectly. The blower rotation will always be correct on MSAV™ units (120/240 units will always have VFD motors). Checking blower rotation is not a valid method of determining voltage phasing for incoming power.

- 3 - SG/SC 036-060 units contain one refrigerant circuit and one stage of cooling. See FIGURE 32.
- 4 - SG/SC 120 units contain two refrigerant circuits and two stages of cooling. See FIGURE 33.
- 5 - SG/SC 240 units contain four refrigerant circuits or systems. Evaporator and condenser coil refrigerant circuits 1 and 2 make up stage 1 cooling in thermostat mode. Evaporator and condenser refrigerant circuits 3 and 4 make up stage 2 cooling in thermostat mode. See FIGURE 34.

- 6 - Each refrigerant circuit is separately charged with R-454B refrigerant. See unit rating plate for correct amount of charge.
- 7 - Refer to Cooling Operation and Adjustment section for proper method to check refrigerant charge.

! IMPORTANT

Mineral oils are not compatible with R454B. If oil must be added, it must be a polyol ester oil.

SG/SC 036-060 MSAV™ UNIT REFRIGERANT CIRCUITS

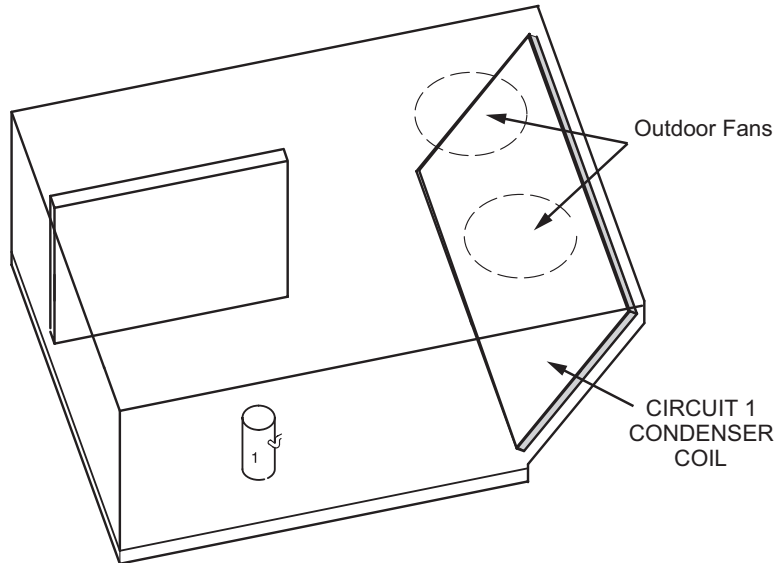


FIGURE 32

SG/SC 120 MSAV™ UNIT REFRIGERANT CIRCUITS

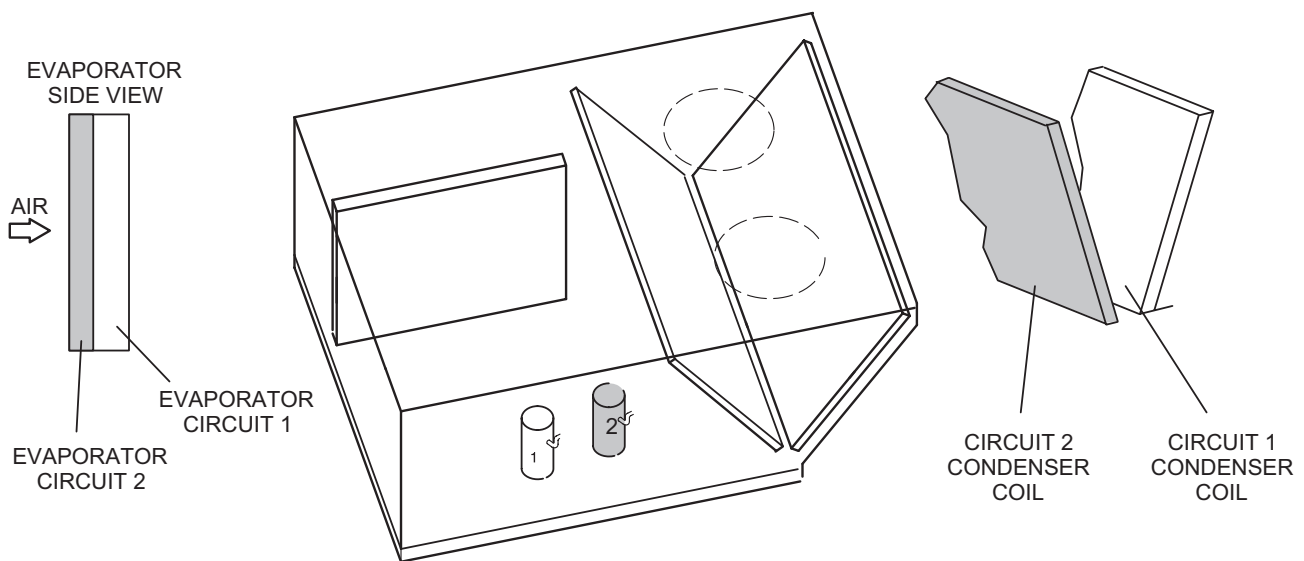


FIGURE 33

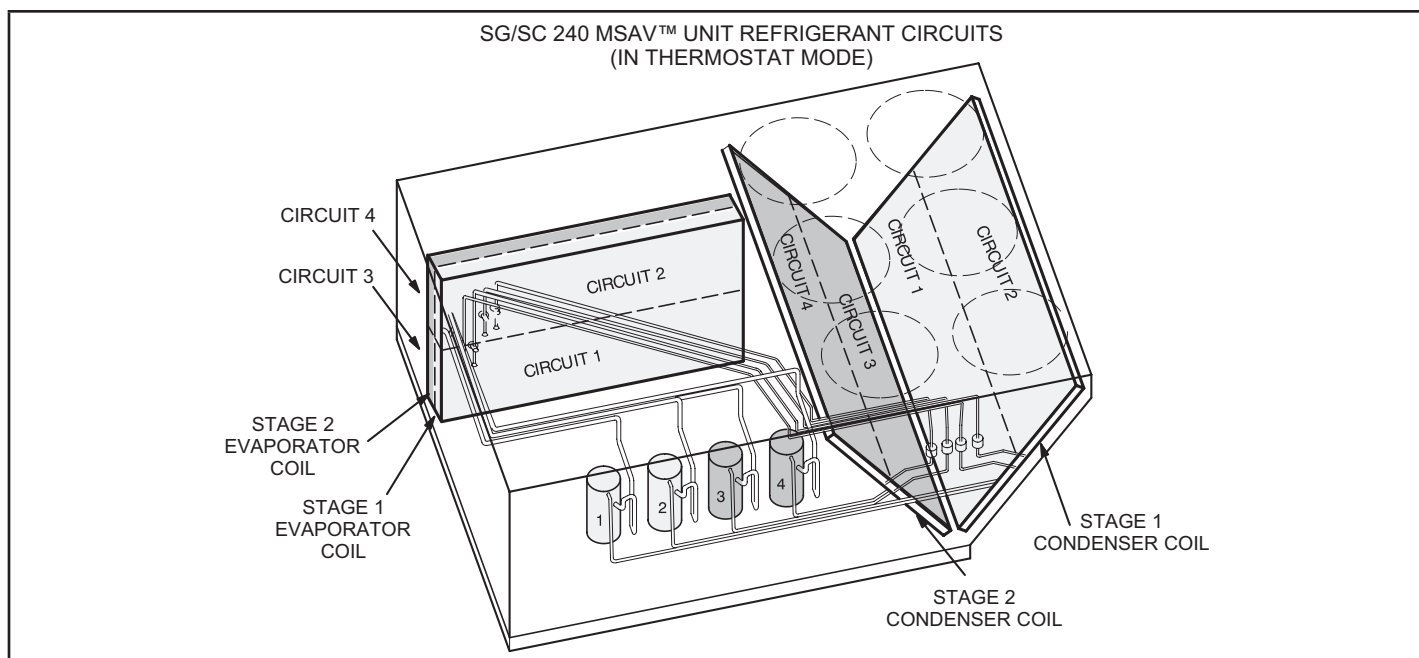


FIGURE 34

Diagnostic Sensors

Units are equipped with two factory-installed thermistors (RT46 and RT48) located on different points on the refrigerant circuit.

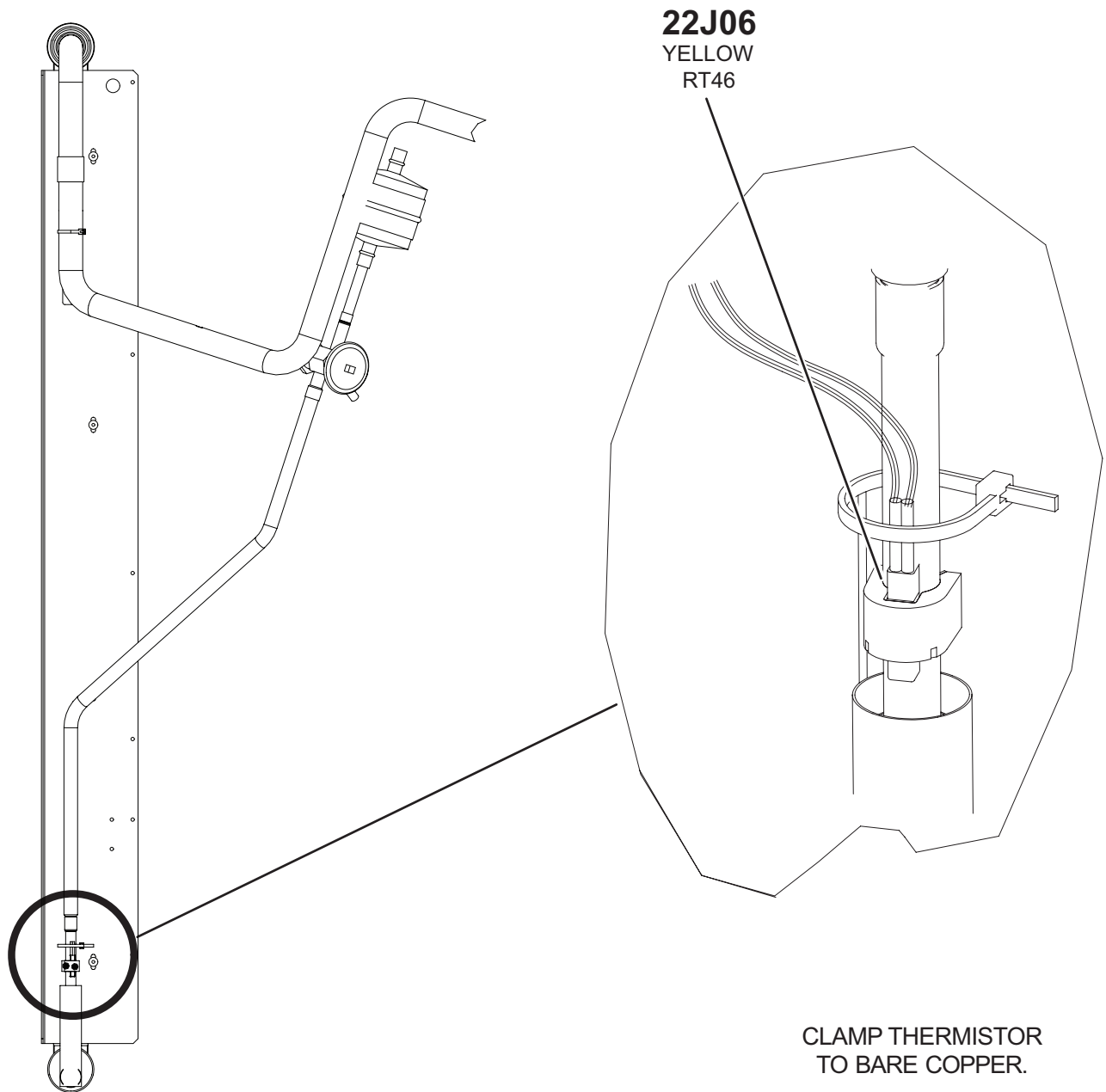
The thermistors provide the Unit Controller with constant temperature readings of two specific locations on the refrigeration circuit. These temperatures are used as feedback in certain modes of unit operation. In addition, the Unit Controller uses these temperatures to initiate alarms such as loss of condenser or evaporator airflow and loss of charge.

Each thermistor must be specifically placed for proper unit operation and to initiate valid alarms. See TABLE 6 for proper locations.

TABLE 6

THERMISTOR LOCATION		
Unit	Sensor	Figure
036, 060 Indoor Coil	RT46	FIGURE 35
036, 060 Outdoor Coil	RT48	FIGURE 36
120 Indoor Coil	RT46, 47	FIGURE 37
120 Outdoor Coil	RT48, 49	FIGURE 38
240 Indoor Coil	RT46, 47, 50, 51	FIGURE 39
240 Outdoor Coil	RT48, 49, 52, 53	FIGURE 40

SGH/SCH036, 060
EVAPORATOR COIL
RT46



DETAILS NOT TO SCALE

FIGURE 35

SGH/SCH036, 060
CONDENSER COIL
RT48

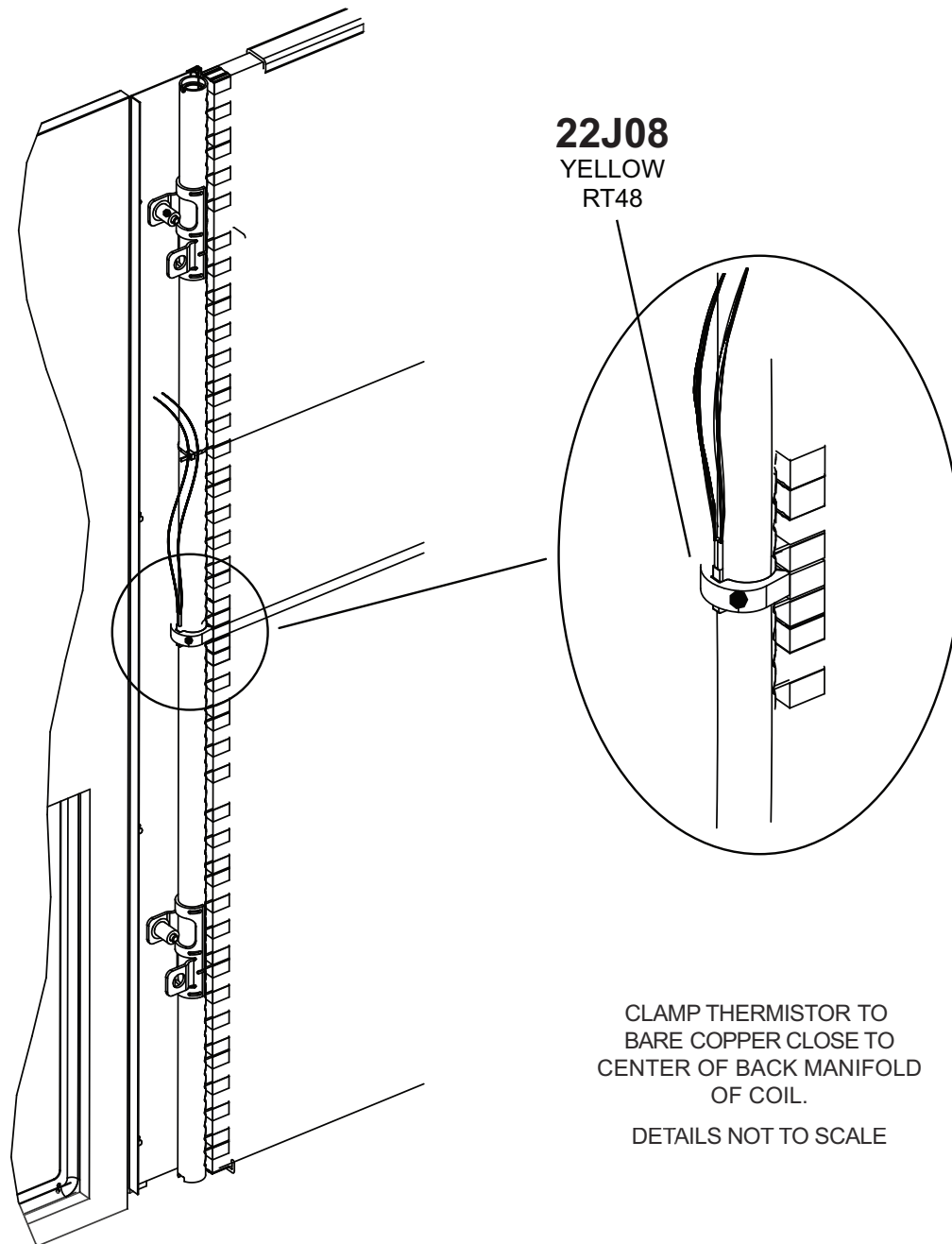


FIGURE 36

SGH/SCH120
EVAPORATOR COIL
(RT46, 47)

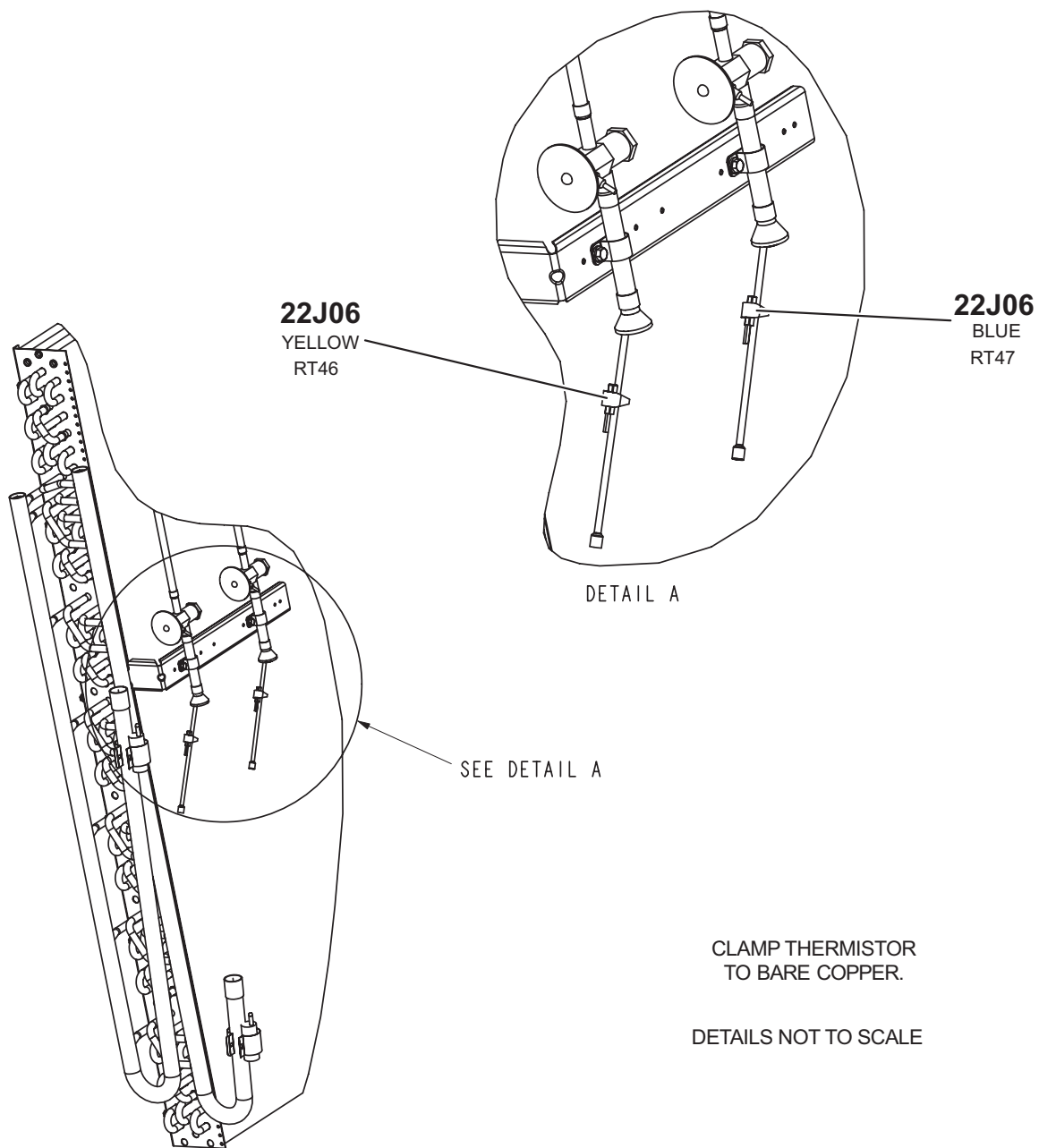


FIGURE 37

SGH/SCH120
CONDENSER / OUTDOOR COIL
(RT48, 49)

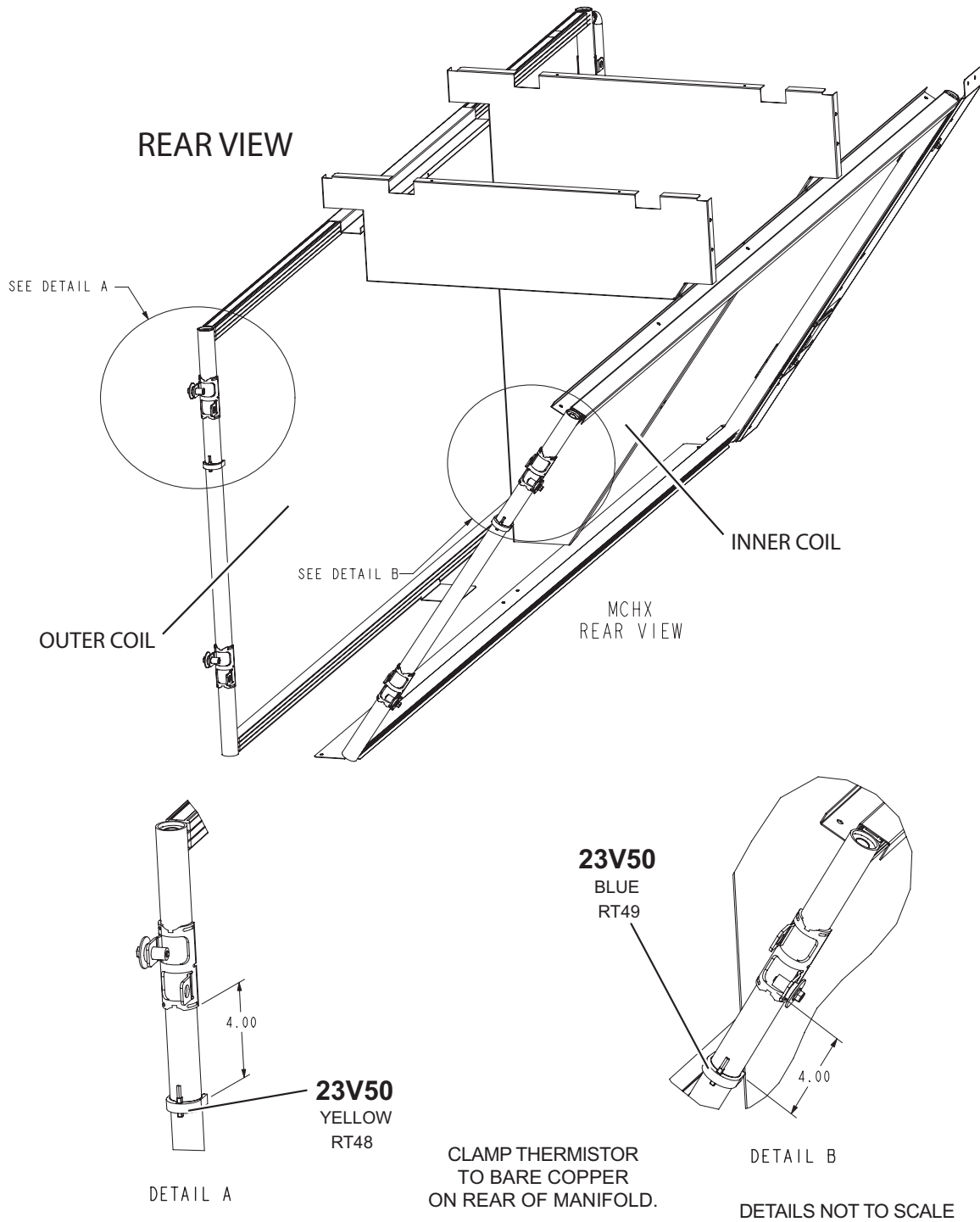


FIGURE 38

SGH/SCH240
EVAPORATOR COIL
(RT46, 47, 50, 51)

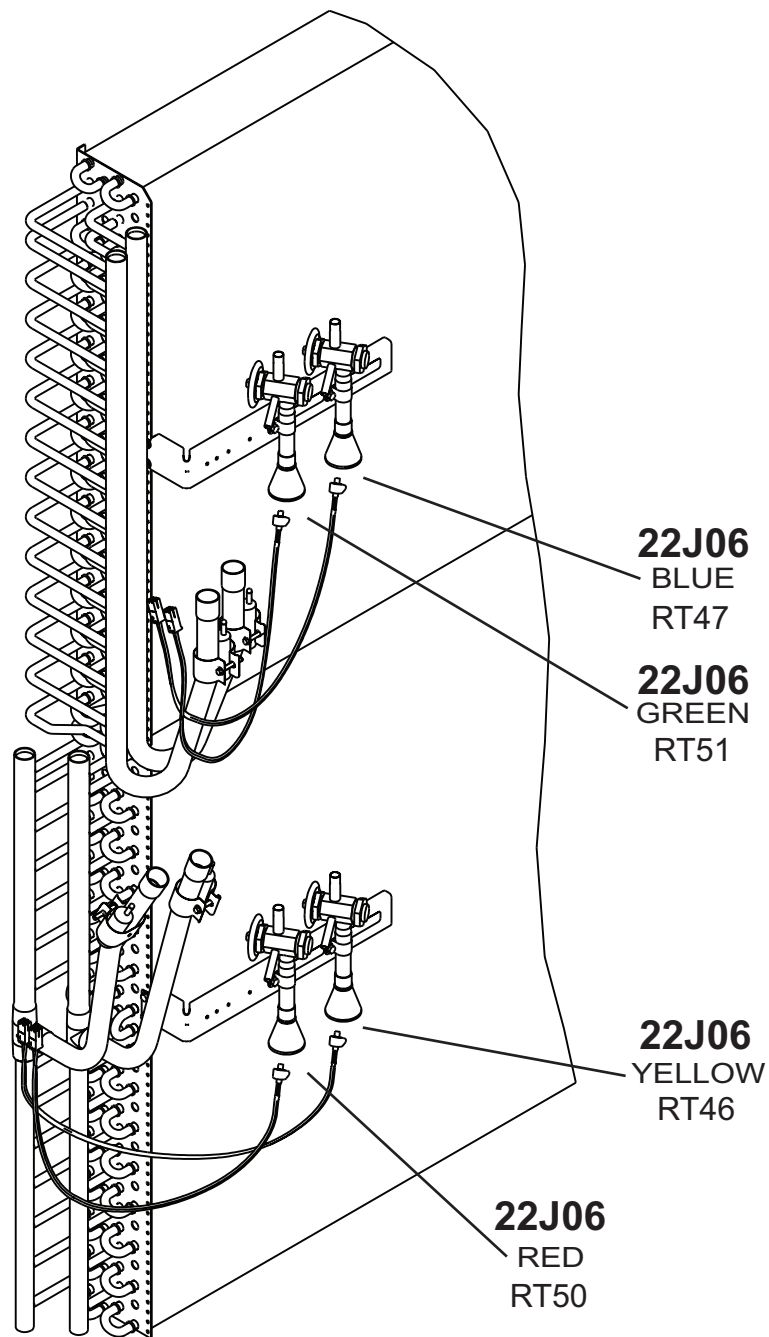
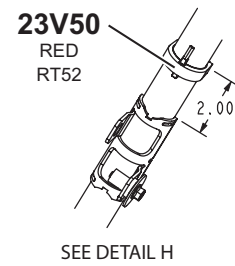
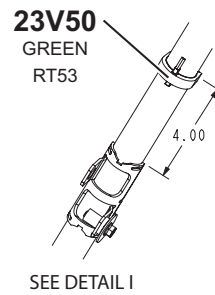
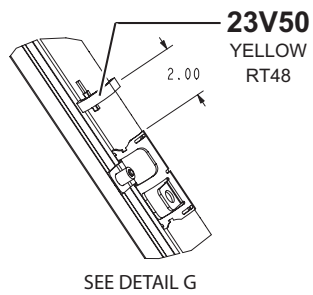
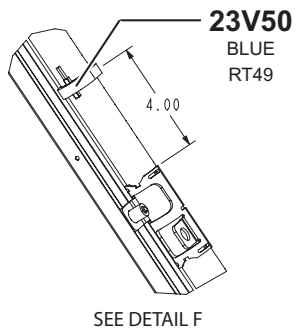
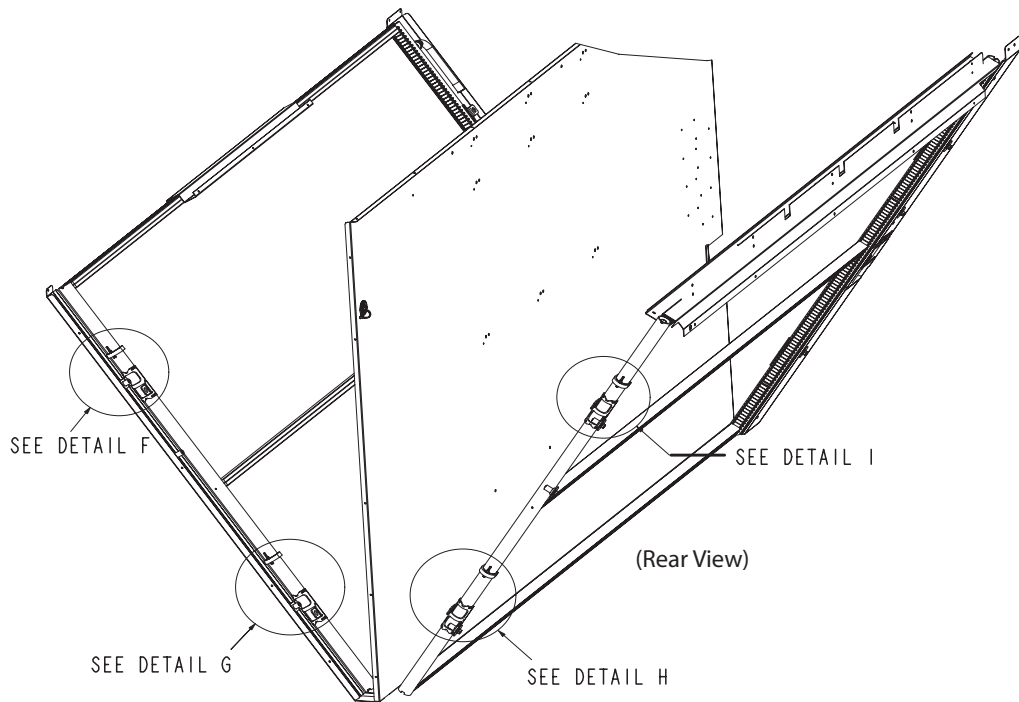


FIGURE 39

SGH/SCH240
CONDENSER COIL
RT48, 49, 52, 53



DETAILS NOT TO SCALE

FIGURE 40

RDS Sensors

Units are equipped with factory-installed RDS Sensors located on different points on the unit. The RDS sensors provide the Unit Controller with continuous readings for leaked refrigerant concentration levels and sensor health status (Good or Fault). These readings are used to modify unit operation to disperse the leaked refrigerant and to remove possible ignition sources. In addition, the Unit Controller uses these readings to initiate alarms to alert the operator of a refrigerant leak or faulty sensor(s).

Each sensor must be specifically placed for proper unit operation and to initiate valid alarms. To identify sensor locations see TABLE 7.

TABLE 7

RDS Sensor Figures

Model	Qty.	Type	Figure
SGH036-060	2 sensors	INDOOR SENSOR	FIGURE 41
		COMPRESSOR SENSOR	FIGURE 42
SCH036-060	1 sensor	INDOOR SENSOR	FIGURE 41
SGH120	2 sensors	INDOOR SENSOR	FIGURE 43
		COMPRESSOR SENSOR	FIGURE 44
SCH120	1 sensor	INDOOR SENSOR	FIGURE 43
SGH/SCH240	2 sensors	INDOOR SENSOR	FIGURE 45
		COMPRESSOR SENSOR	FIGURE 46

SGH/SCH 036-060 INDOOR COIL RDS SENSOR LOCATION

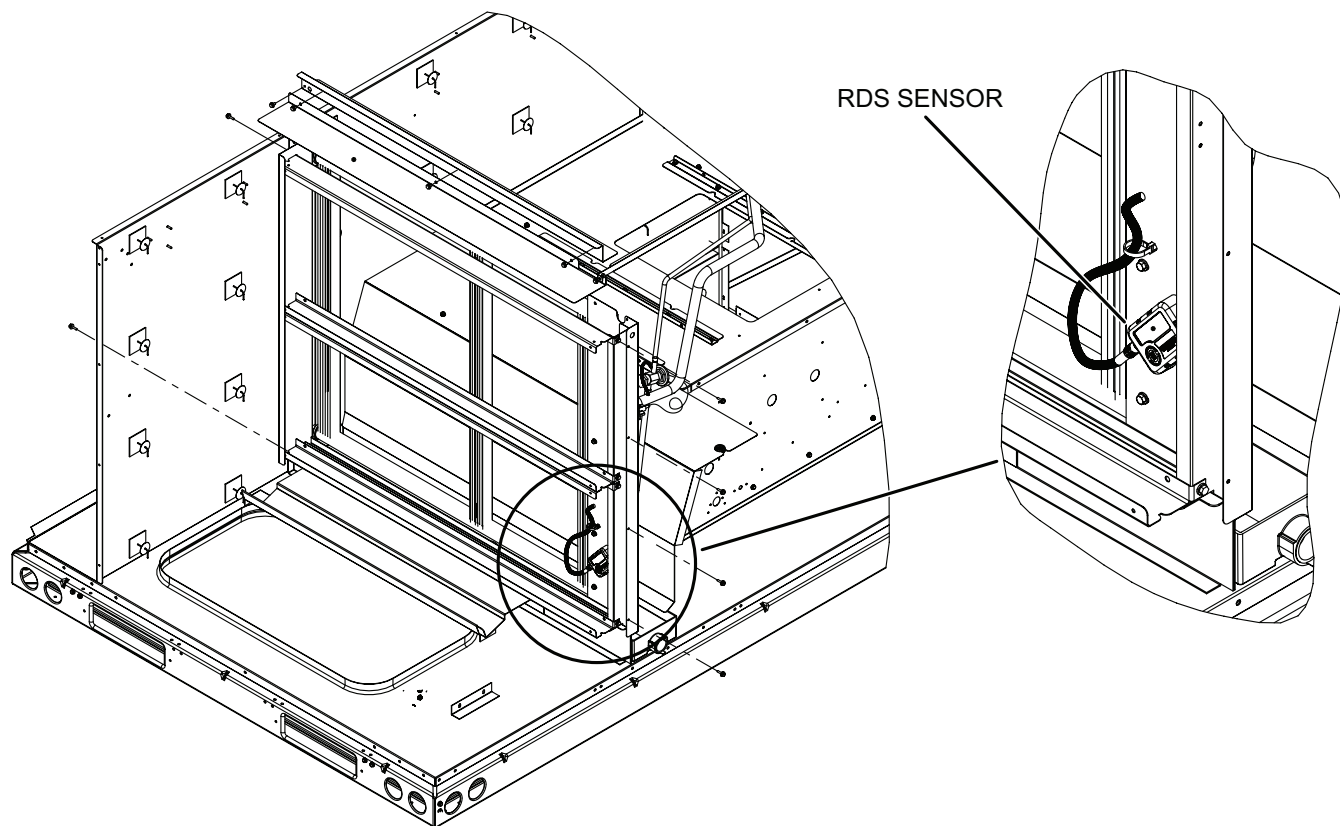


FIGURE 41

SGH/SCH 036-060 COMPRESSOR RDS SENSOR LOCATION

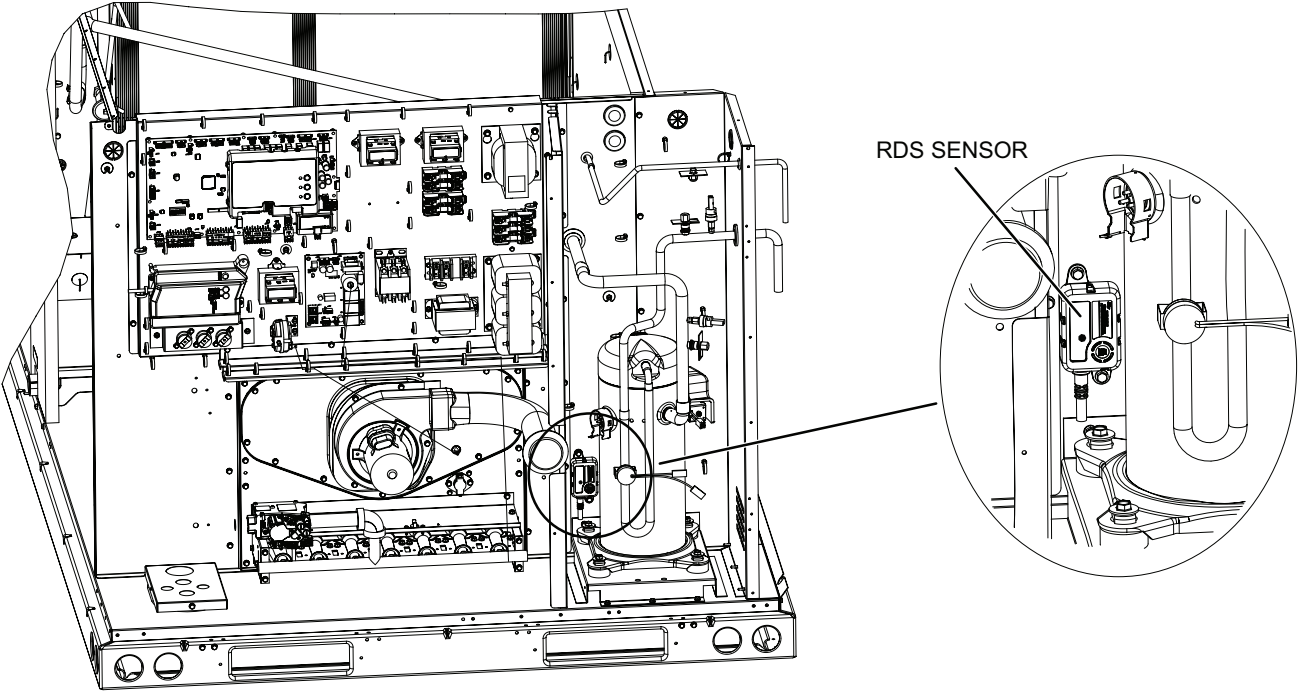


FIGURE 42

SCH/SGH INDOOR COIL 120 RDS SENSOR LOCATION

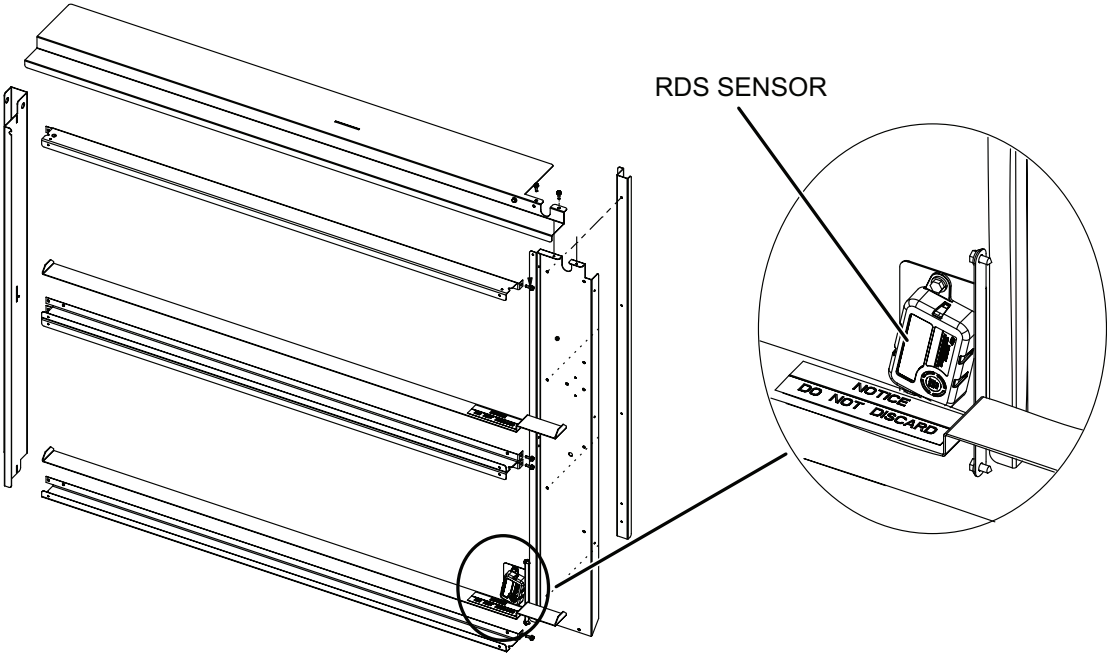


FIGURE 43

SGH/SCH 120 COMPRESSOR RDS SENSOR LOCATION

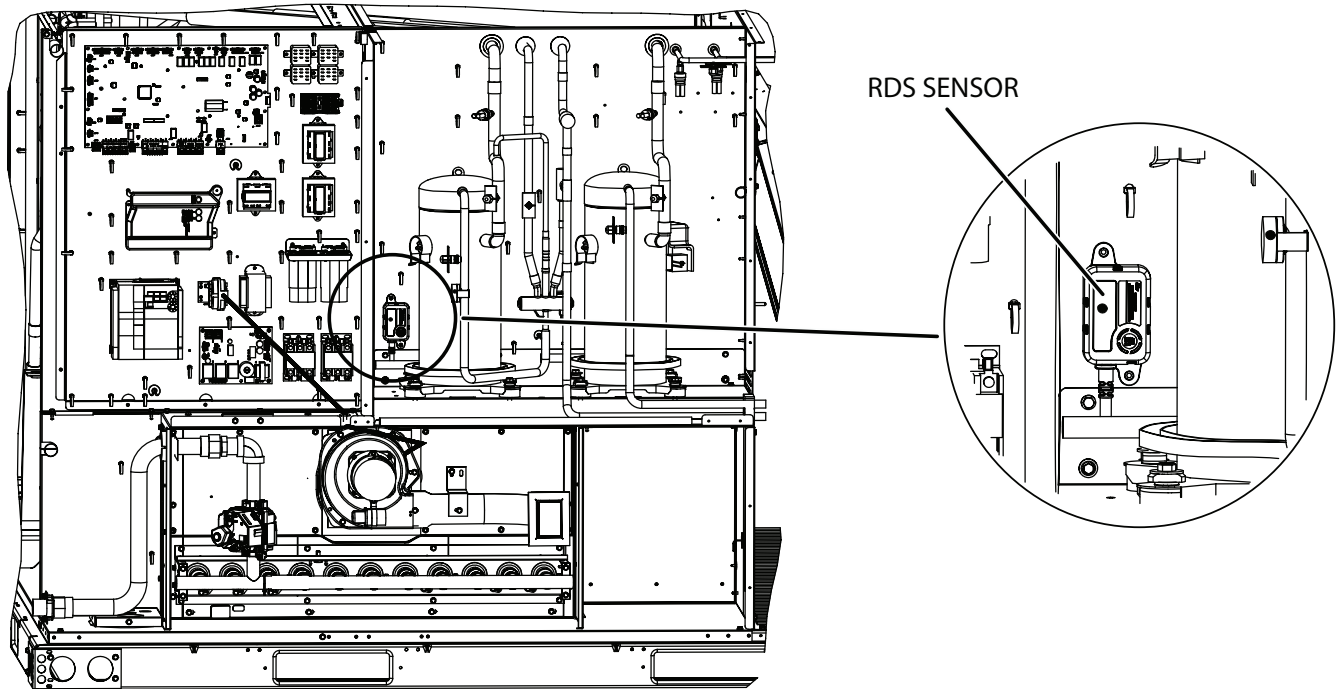


FIGURE 44

SGH/SCH 240 INDOOR COIL RDS SENSOR LOCATION

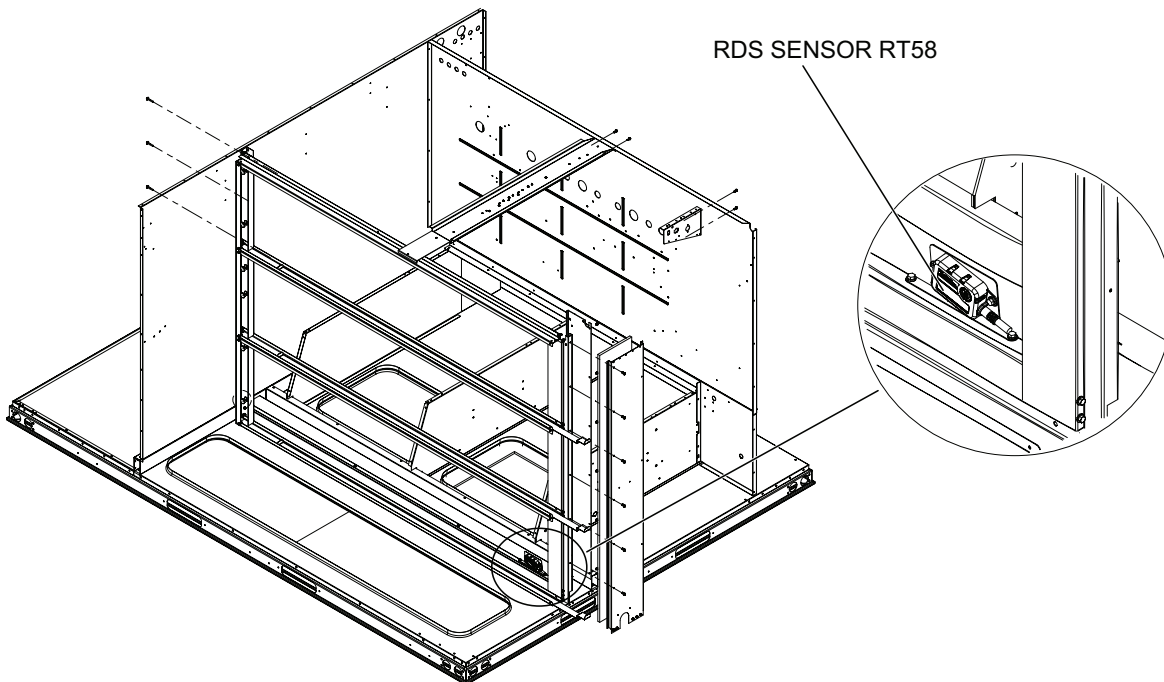


FIGURE 45

SGH/SCH 240 COMPRESSOR RDS SENSOR LOCATION

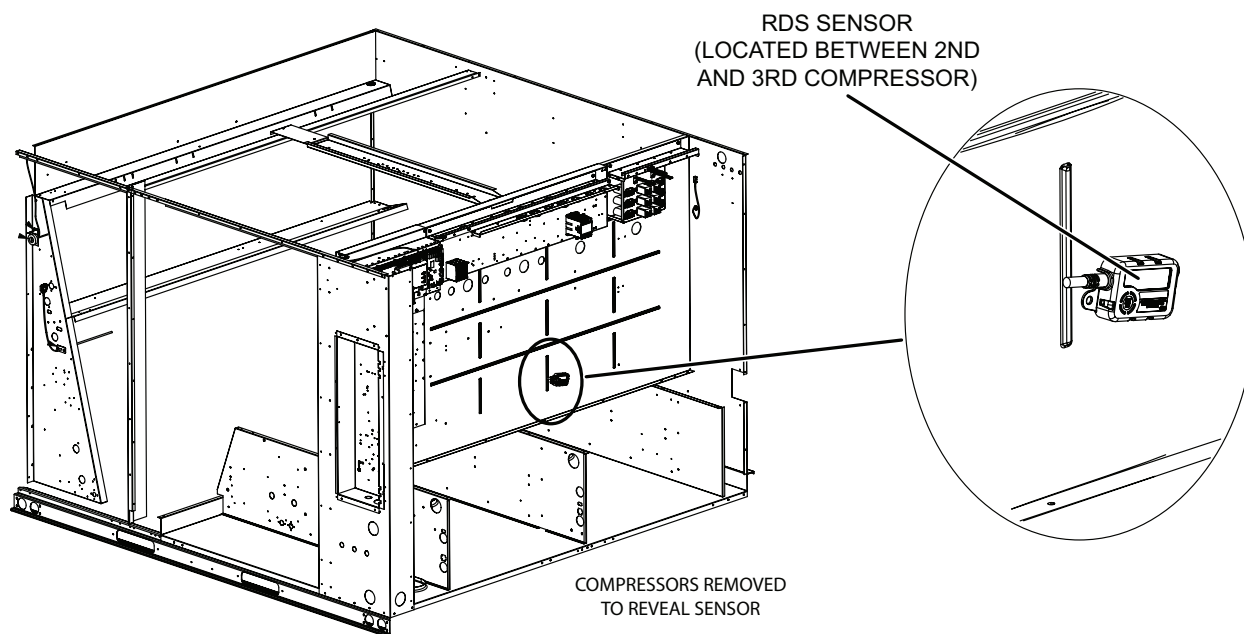


FIGURE 46

Cooling Operation And Adjustments

A-Refrigerant Charge and Check

WARNING

Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires additional refrigerant, reclaim the charge, evacuate the system, and add required nameplate charge.

Refrigerant Charge R-454B		
Unit	M _c (lbs)	M _c (kg)
SGH/SCH036	5.13	2.32
SGH/SCH060	5.38	2.44
SGH/SCH120 Stage 1	7.00	3.18
SGH/SCH120 Stage 2	4.81	2.18
SGH/SCH036 W/ Humidtrol	5.50	2.49
SGH/SCH060 W/ Humidtrol	5.30	2.40
SGH/SCH120 Stage 1W/ Humidtrol	7.00	3.18
SGH/SCH120 Stage2 W/ Humidtrol	5.13	2.32
SGH/SCH240 Stage 1	6.69	3.03
SGH/SCH240 Stage 2	6.06	2.75
SGH/SCH240 Stage 3	5.06	2.30
SGH/SCH240 Stage 4	5.19	2.35
SGH/SCH240 W/ Humidtrol Stage 1	7.75	3.52
SGH/SCH240 W/ Humidtrol Stage 2	7.19	3.26
SGH/SCH240 W/ Humidtrol Stage 3	5.31	2.41
SGH/SCH240 W/ Humidtrol Stage 4	5.38	2.44

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the unit is earth grounded prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the unit.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
- When transferring refrigerant into cylinders, ensure

that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery

- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

NOTE - System charging is not recommended below 60°F (15°C). In temperatures below 60°F (15°C), the charge must be weighed into the system.

If weighing facilities are not available, or to check the charge, use the following procedure:

- 1 - Make sure outdoor coil is clean. Attach gauge manifolds and operate unit at full CFM in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure all outdoor air dampers are closed.
- 2 - Compare the normal operating pressures to the pressures obtained from the gauges. Check unit components if there are significant differences.
- 3 - Measure the outdoor ambient temperature and the suction pressure. Refer to the charging curve to determine a target liquid temperature.

NOTE - Pressures are listed for sea level applications.

- 4 - Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).

- If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
 - If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system..
- 5 - Add or remove charge in increments. Allow the system to stabilize each time refrigerant is added or removed.
 - 6 - Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.
 - 7 - Example: At 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 97°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

NOTE - System charging is not recommended below 60°F (15°C). In temperatures below 60°F (15°C), the charge must be weighed into the system.

If weighing facilities are not available, or to check the charge, use the following procedure:

IMPORTANT - Charge unit in standard cooling mode.

- 1 - Make sure outdoor coil is clean. Attach gauge manifolds and operate unit at full CFM in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure all outdoor air dampers are closed.

- 2 - Check each system separately with all stages operating. Compare the normal operating pressures (see TABLE 8 through TABLE 15) to the pressures obtained from the gauges. Check unit components if there are significant differences.
- 3 - Measure the outdoor ambient temperature and the suction pressure. Refer to the appropriate circuit charging curve to determine a target liquid temperature.

NOTE - Pressures are listed for sea level applications.

- 4 - Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).
 - If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
 - If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system.
- 5 - Add or remove charge in increments. Allow the system to stabilize each time refrigerant is added or removed.
- 6 - Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.
- 7 - Example: SG/SC 240 Circuit 1: At 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 97°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 8

SG/SC 036 Normal Operating Pressures - No Reheat - 581193-01											
Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
107	220	110	256	112	297	114	342	116	392	117	447
116	222	118	259	121	300	123	345	125	396	126	451
134	227	136	264	139	306	141	352	143	403	145	459
153	232	155	270	158	312	160	359	163	411	165	467

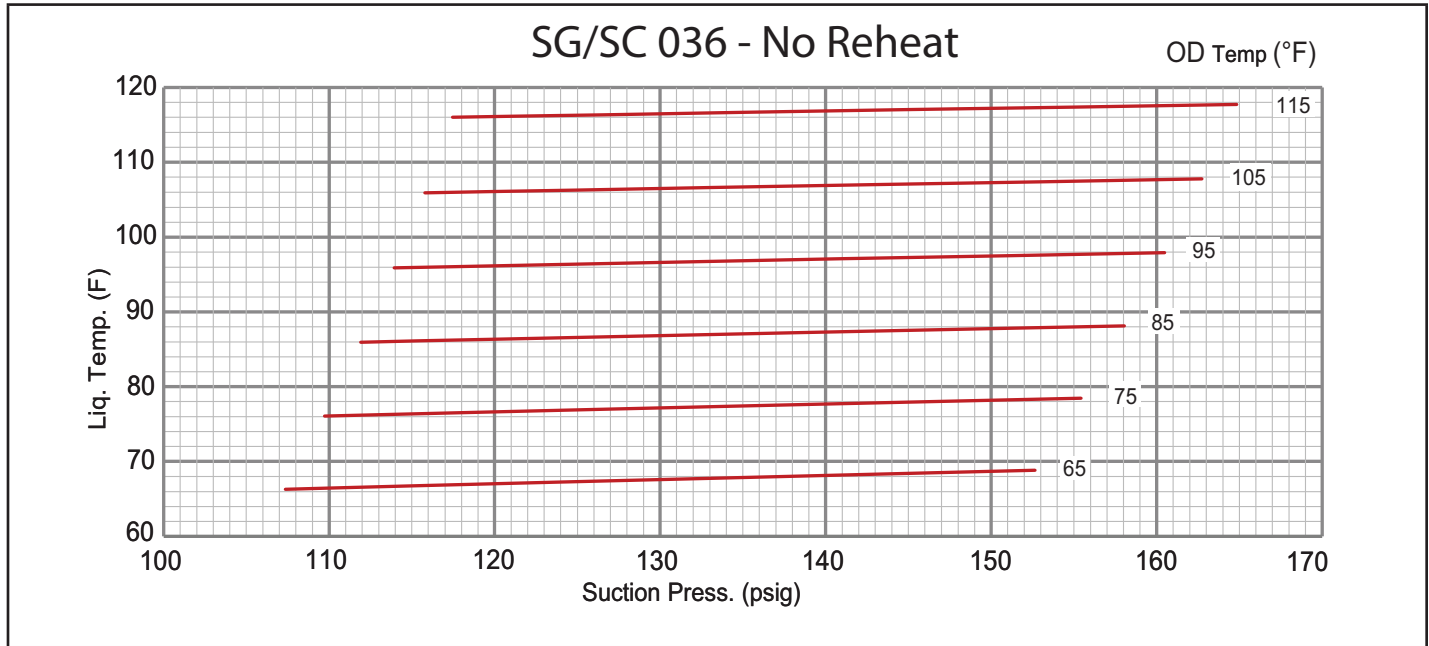


TABLE 9

SG/SC 036 Normal Operating Pressures - Reheat - 581194-01											
Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
107	220	110	256	112	297	114	342	116	392	117	447
116	222	118	259	121	300	123	345	125	396	126	451
134	227	136	264	139	306	141	352	143	403	145	459
153	232	155	270	158	312	160	359	163	411	165	467

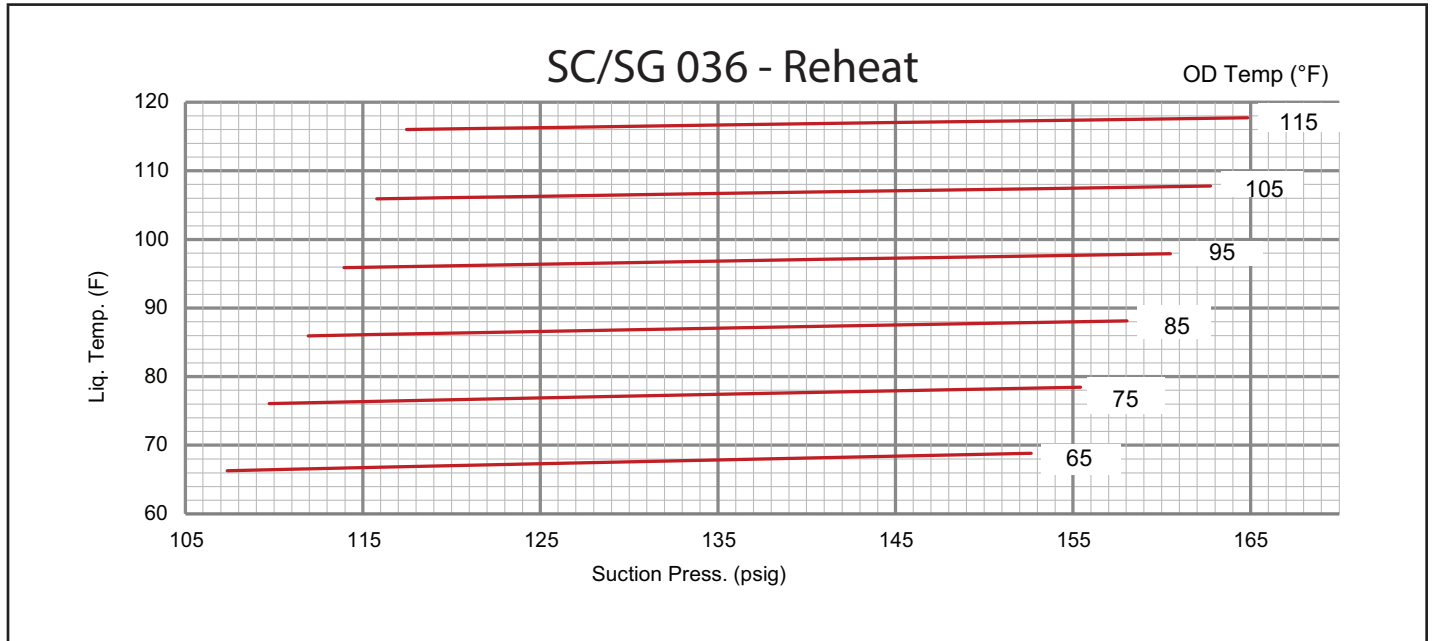


TABLE 10

SG/SC 060 Normal Operating Pressures - No Reheat - 581195-01											
Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
100	229	103	265	106	306	108	352	110	404	112	462
107	230	110	266	114	308	116	354	119	406	121	464
122	236	127	272	130	313	134	360	137	412	140	470
139	243	144	280	149	322	153	369	157	421	161	479

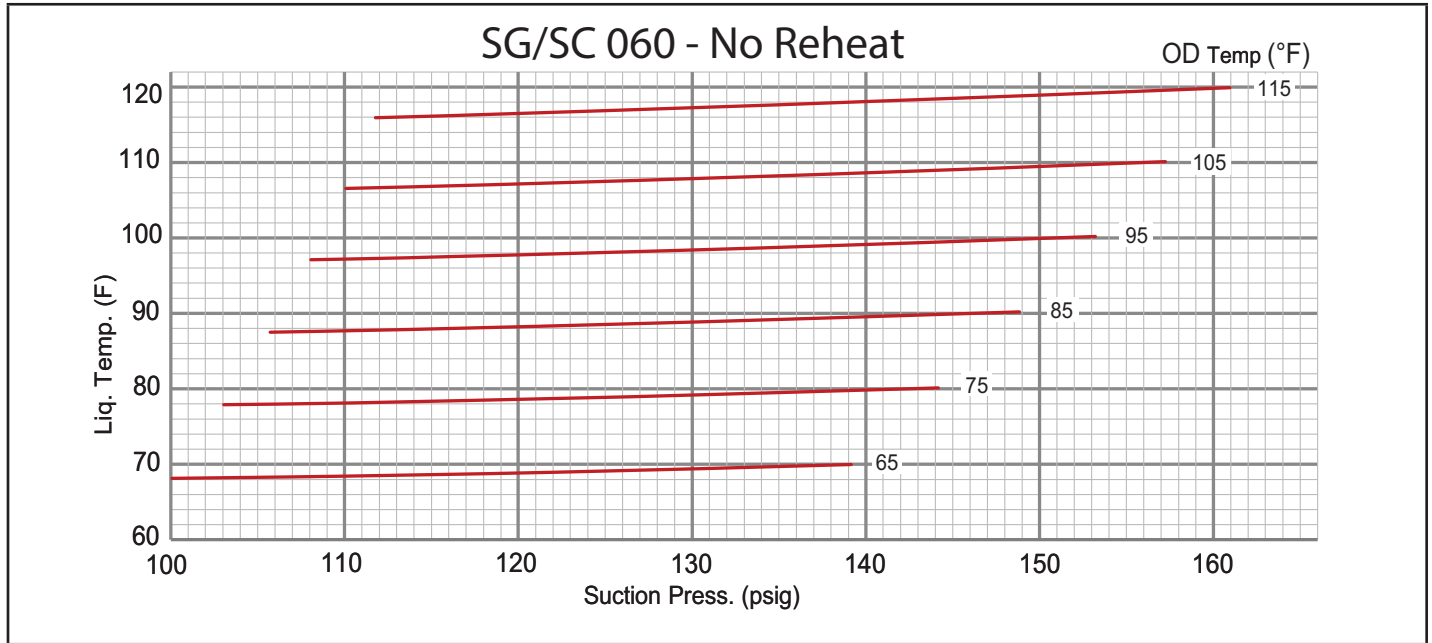


TABLE 11

SG/SC 060 Normal Operating Pressures - Reheat - 581196-01											
Outdoor Coil Entering Air Temperature											
65°F		75°F		85°F		95°F		105°F		115°F	
Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
100	229	103	265	106	306	108	352	110	404	112	462
107	230	110	266	114	308	116	354	119	406	121	464
122	236	127	272	130	313	134	360	137	412	140	470
139	243	144	280	149	322	153	369	157	421	161	479

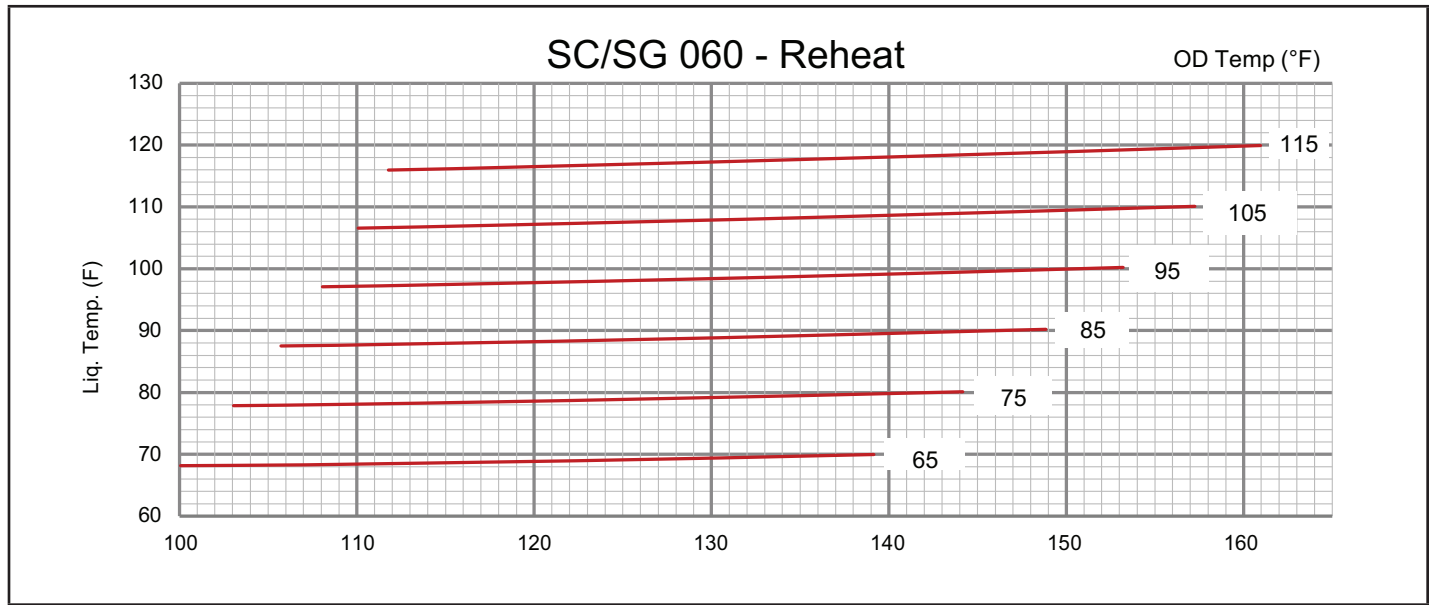


TABLE 12

	SG/SC 120 Normal Operating Pressures - No Reheat - 581197-01											
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	104	220	106	259	108	304	109	356	111	415	112	480
	112	222	114	259	116	303	118	353	119	410	121	474
	127	229	130	263	133	304	135	351	138	405	141	465
	144	242	148	273	151	310	155	355	158	405	161	462
Circuit 2	106	242	107	279	108	321	109	366	110	415	111	469
	114	245	115	282	116	324	117	369	119	419	120	472
	129	252	131	290	133	332	135	377	137	427	139	480
	146	261	149	299	151	341	154	386	156	436	159	489

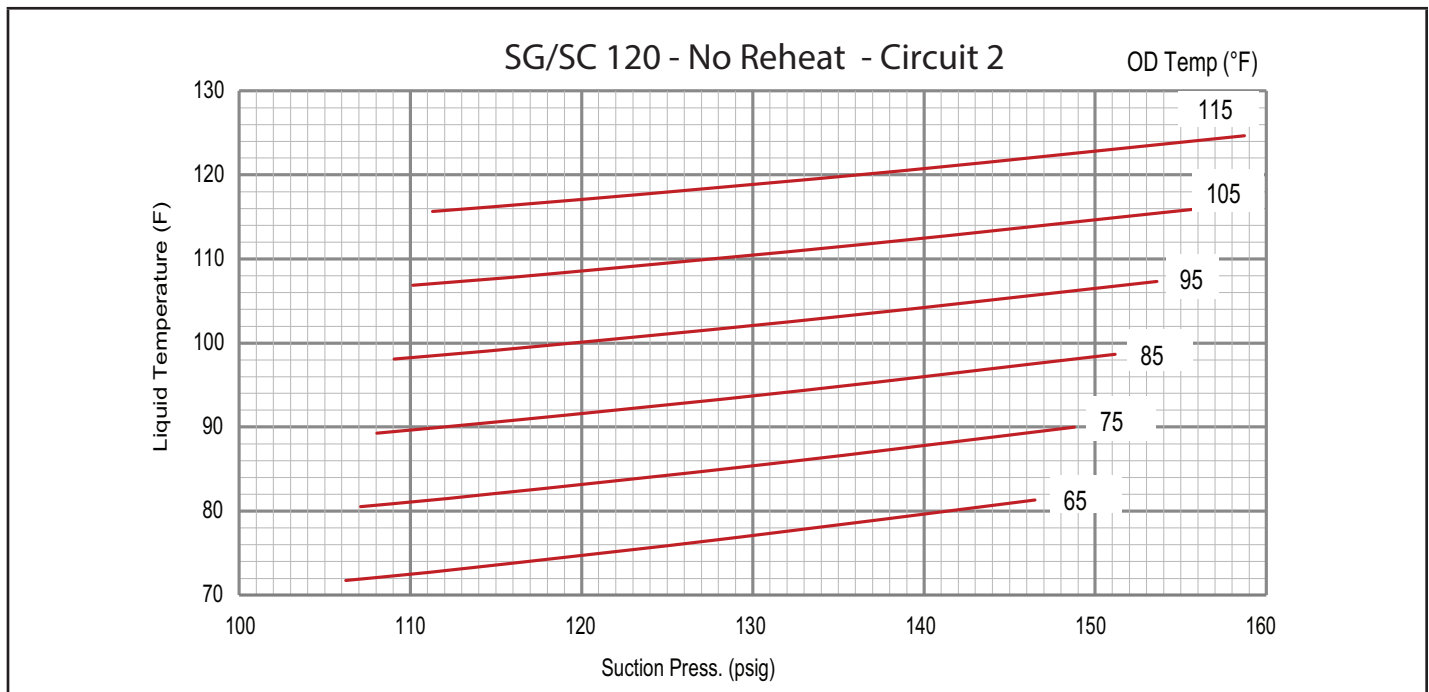
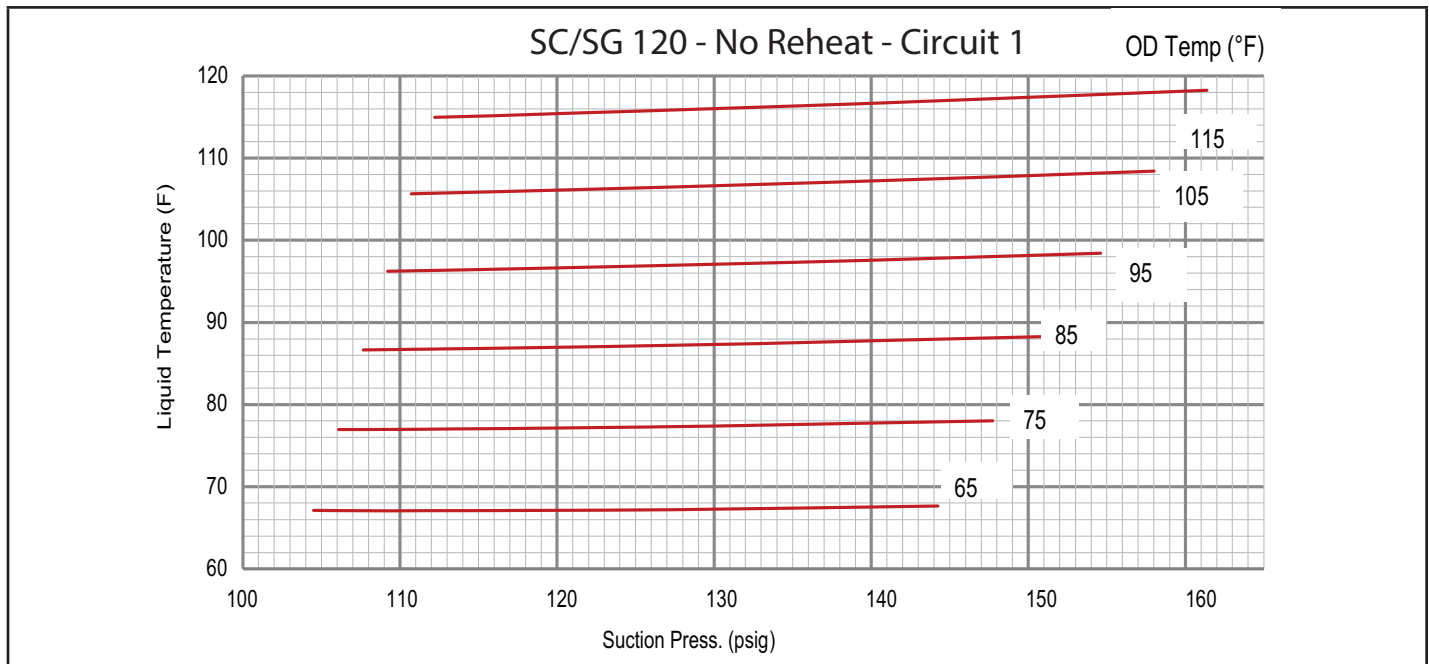


TABLE 13

	SG/SC 120 Normal Operating Pressures - Reheat - 581283-01											
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	100	230	101	269	102	314	103	367	104	426	105	493
	108	232	109	268	111	312	112	363	113	420	115	485
	124	239	127	272	129	312	131	359	133	413	135	474
	142	254	145	283	148	320	150	363	153	413	156	471
Circuit 2	103	236	104	272	105	312	106	358	106	408	107	462
	110	239	111	275	113	315	114	361	115	411	117	465
	126	246	128	282	130	323	132	368	134	418	136	473
	143	256	145	292	148	333	151	378	153	428	156	483

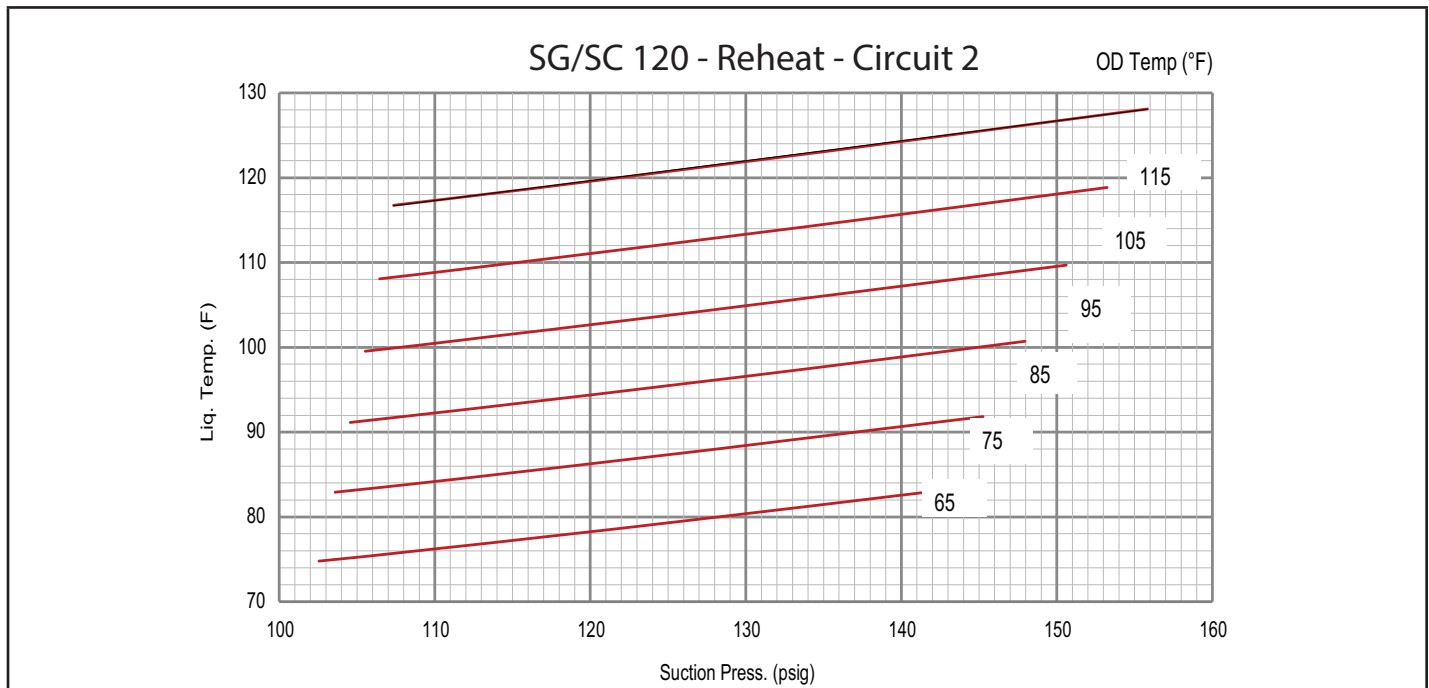
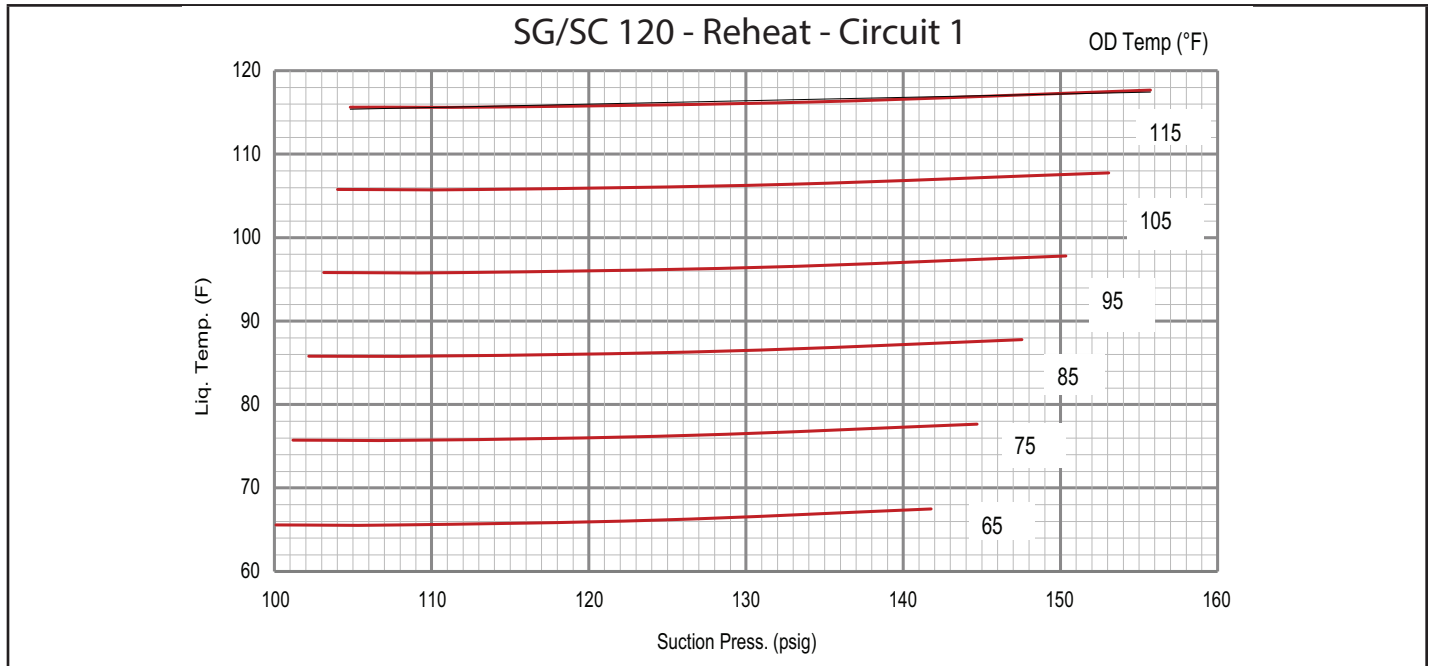
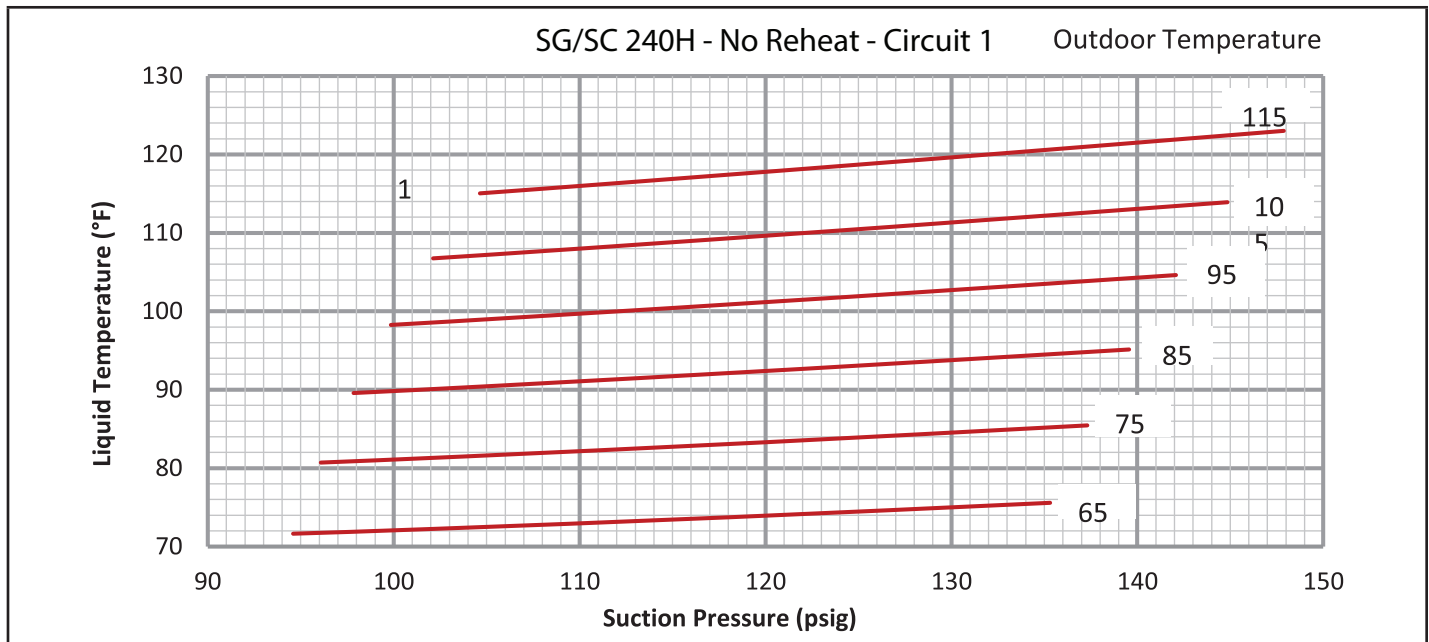
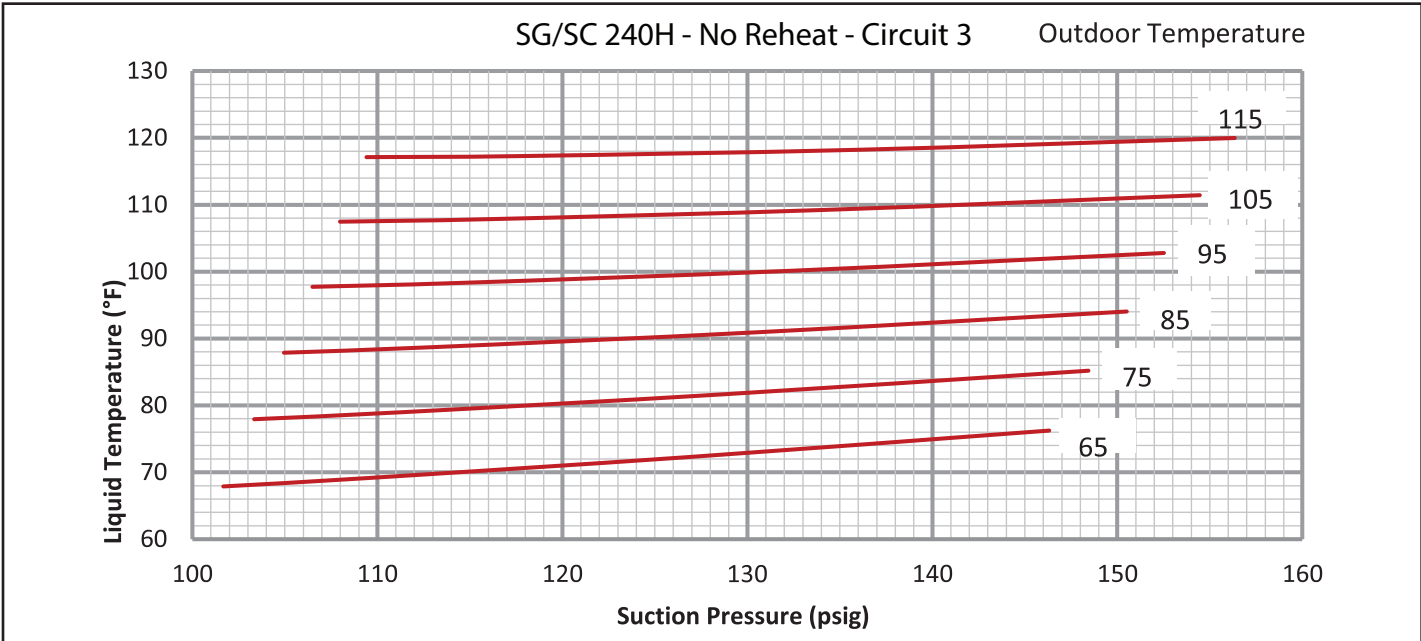
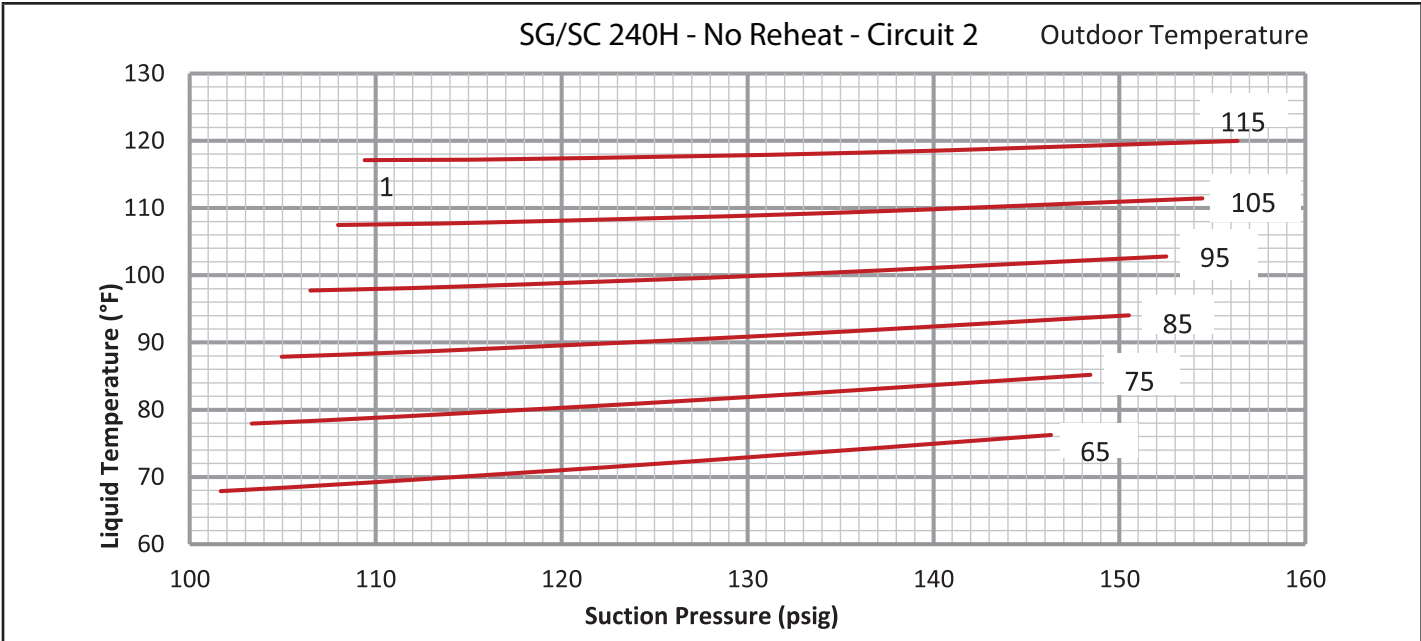


TABLE 14

	SG/SC 240 Normal Operating Pressures - No Reheat - 581198-01											
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	95	216	96	251	98	290	100	335	102	384	105	438
	102	218	104	253	106	293	108	337	110	387	113	441
	118	224	120	259	122	299	124	344	127	393	130	447
	135	232	137	267	140	306	142	351	145	401	148	455
Circuit 2	102	214	103	249	105	289	106	334	108	385	109	441
	110	216	111	251	113	291	115	336	116	387	118	443
	127	220	129	255	131	295	133	340	134	391	136	446
	146	225	148	260	151	300	153	345	154	395	156	451
Circuit 3	104	223	105	260	107	300	108	344	110	392	112	444
	111	226	113	263	114	303	116	348	118	396	120	448
	127	233	129	270	131	310	133	355	135	403	137	455
	145	241	147	278	149	318	151	363	154	412	156	464
Circuit 4	101	217	102	252	104	292	106	336	107	385	109	438
	108	219	110	255	112	295	114	339	116	387	118	440
	125	225	127	260	129	300	131	344	134	393	136	445
	145	231	147	267	149	307	151	351	154	399	156	452





SG/SC 240H - No Reheat - Circuit 4

Outdoor Temperature

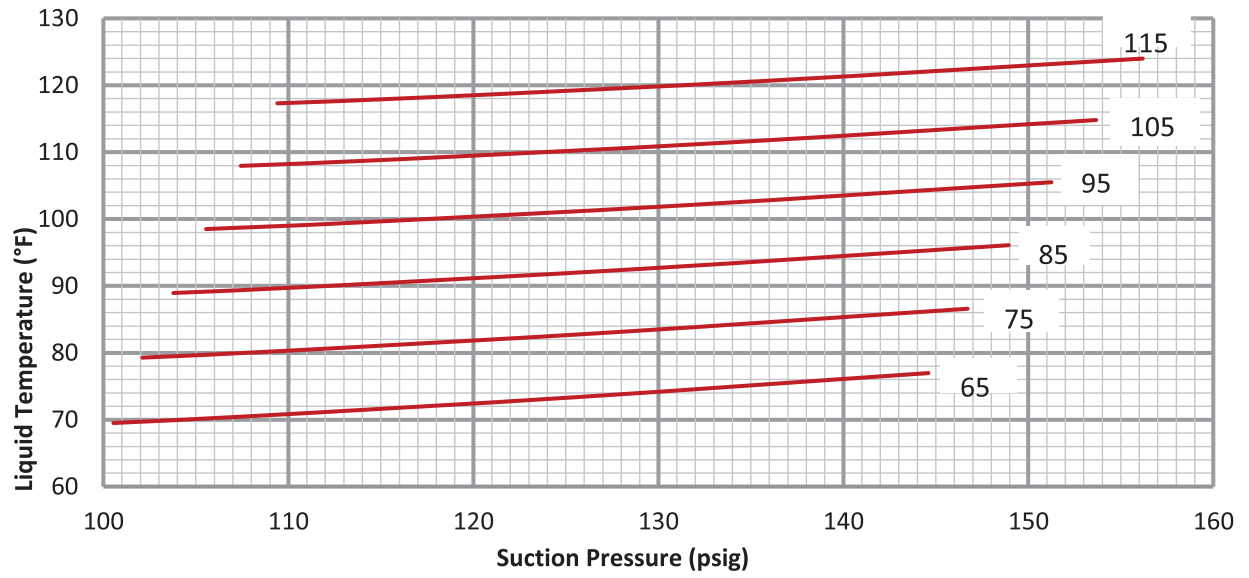
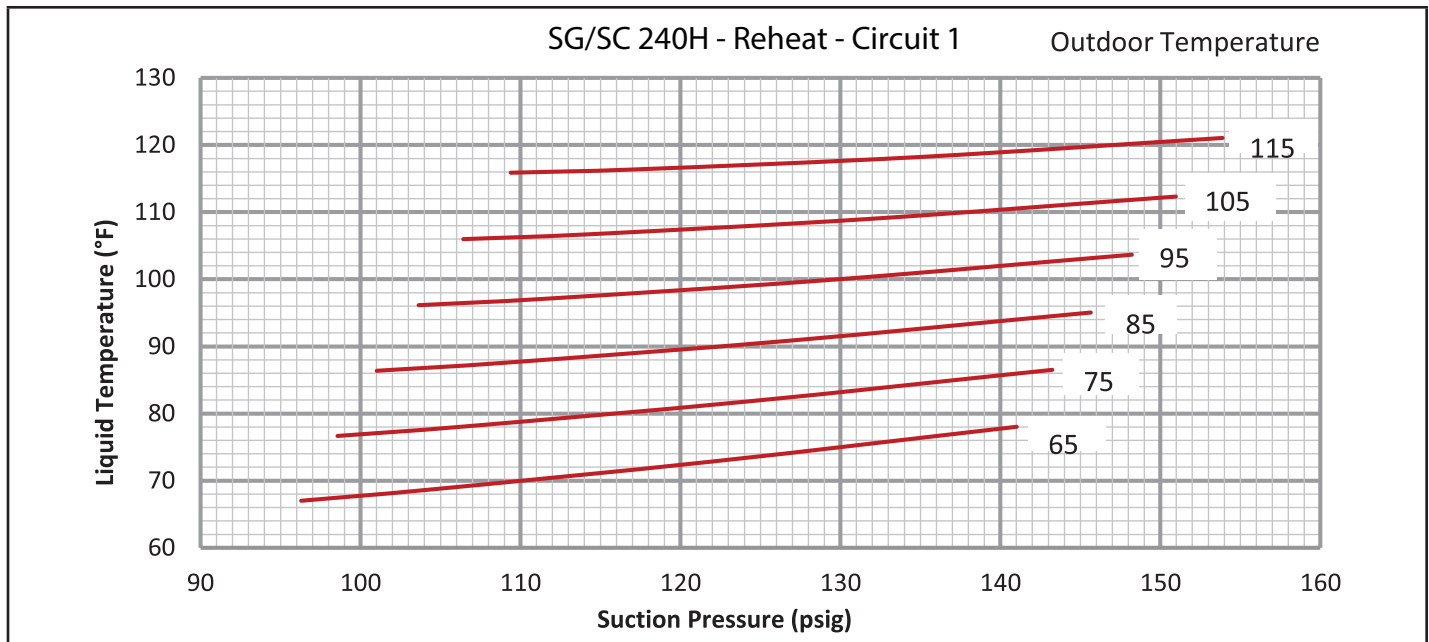
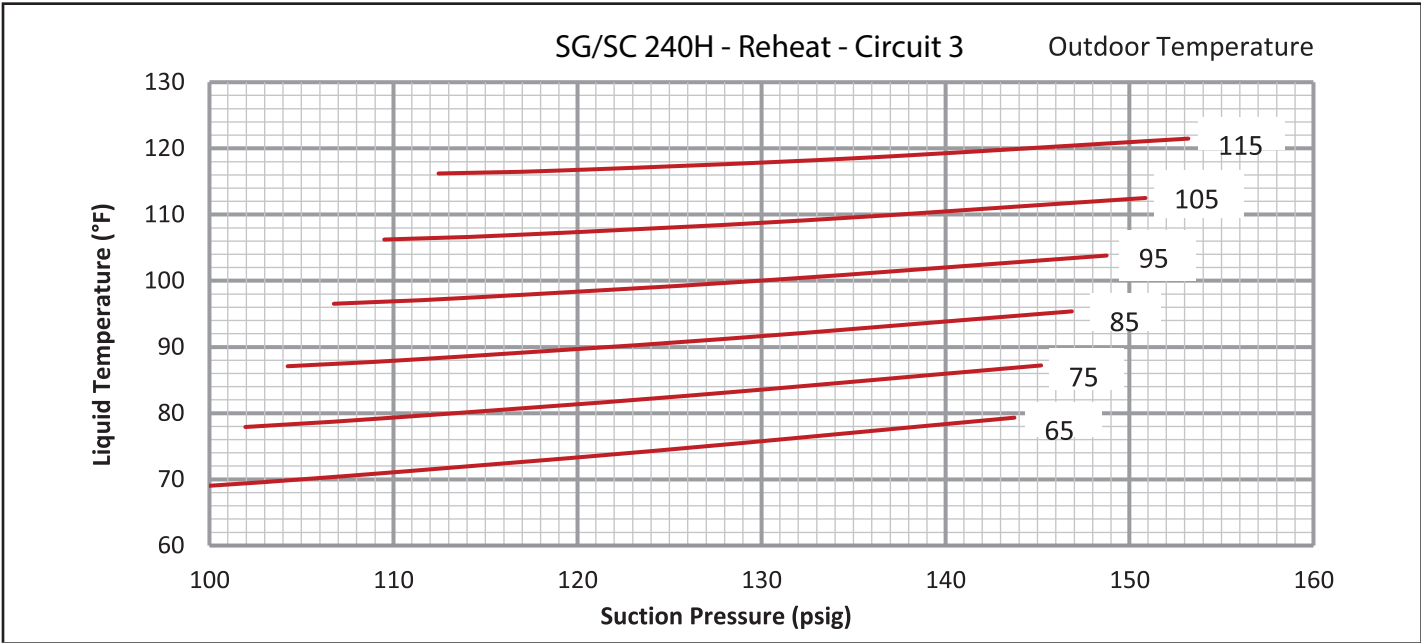
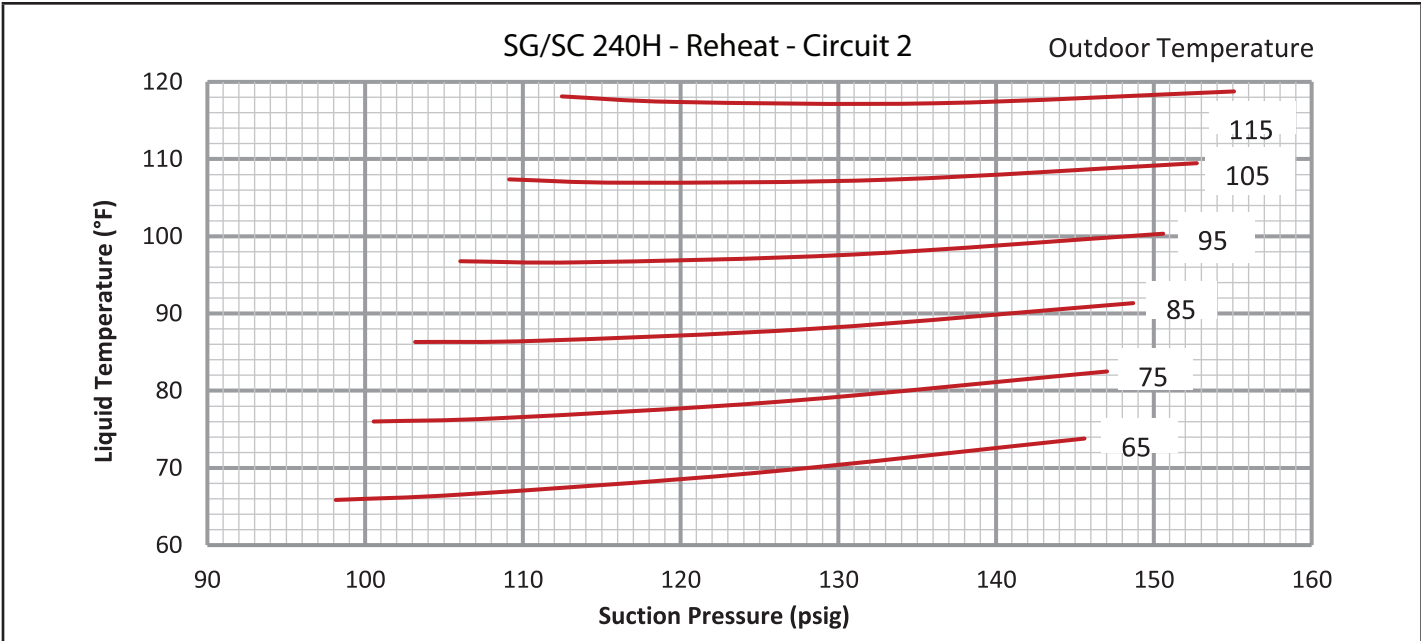


TABLE 15

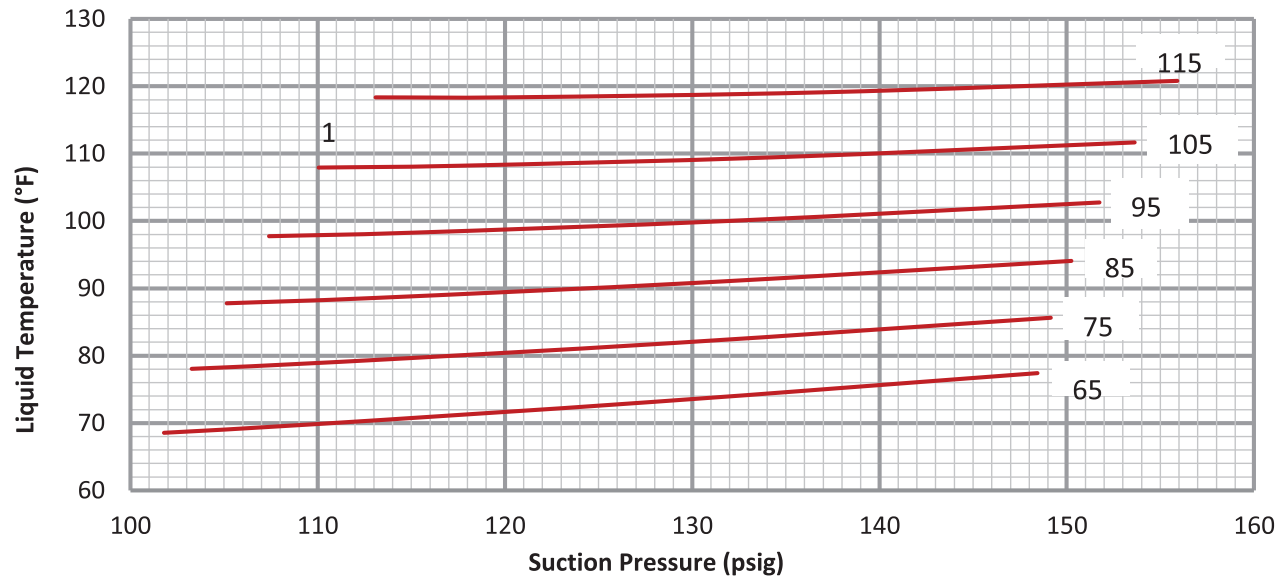
	SG/SC 240 Normal Operating Pressures - Reheat - 581200-01											
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	96	231	99	268	101	310	104	358	106	410	109	468
	105	233	107	270	109	311	112	358	115	410	118	468
	122	240	124	276	127	316	129	362	132	413	135	469
	141	251	143	286	146	325	148	370	151	420	154	475
Circuit 2	98	224	101	260	103	300	106	346	109	397	112	453
	106	227	109	262	111	303	114	348	117	399	120	455
	125	234	127	269	129	309	131	354	133	404	136	459
	146	241	147	275	149	315	151	360	153	410	155	464
Circuit 3	100	227	102	264	104	306	107	351	110	401	112	456
	107	231	109	268	111	309	114	355	116	405	119	459
	124	238	126	275	128	316	130	362	132	412	135	466
	144	245	145	282	147	324	149	369	151	419	153	473
Circuit 4	102	225	103	261	105	301	107	346	110	396	113	450
	110	227	111	263	113	303	115	348	118	398	120	452
	128	232	129	268	130	309	132	354	134	404	137	458
	148	240	149	276	150	317	152	362	154	412	156	466





SG/SC 240H - Reheat - Circuit 4

Outdoor Temperature



B-Compressor Controls

1 - Crankcase Heater (HR1, HR2, HR5, HR11)

The compressor contains a belly band compressor oil heater which must be on 24 hours before running compressors. Energize by setting thermostat so that there is no cooling demand, to prevent compressor from cycling and apply power to unit.

2 - High Pressure Switch (S4, S7, S28, S96)

The compressor circuit is protected by a high pressure switch which opens at 640 psig +/- 10 psig (4413 kPa +/- 70 kPa) and automatically resets at 475 psig +/- 20 psig (3275kPa +/- 138 kPa).

3 - Low Pressure Switch (S87, S88, S97, S98)

The compressor circuit is protected by a loss of charge switch. Switch opens at 40 psig +/- 5 psig (276 +/- 34 kPa) and automatically resets at 90 psig +/- 5 psig (621 kPa +/- 34 kPa).

4 - Outdoor Fan Relays (K10, K68)

Relays de-energize outdoor fan when temperature drops below 55°F.

5 - Diagnostics Sensors (RT46, RT47, RT50, RT51, RT48, RT49, RT52, RT53)

Two thermistors are located on specific points in the refrigeration circuit. The thermistors provide constant temperature feedback to the Unit Controller to protect the compressor. Thermistors take the place of the freeze-stat and low ambient pressure switch.

6 - Crankcase Heater Switches (S40, S162)

Switches de-energize crankcase heaters when discharge temperature rises above 94°F±5 (34.4°C±5). Switch opens to energize crankcase heaters when discharge temperature drops below 74°F±5 (23.2°C±5).

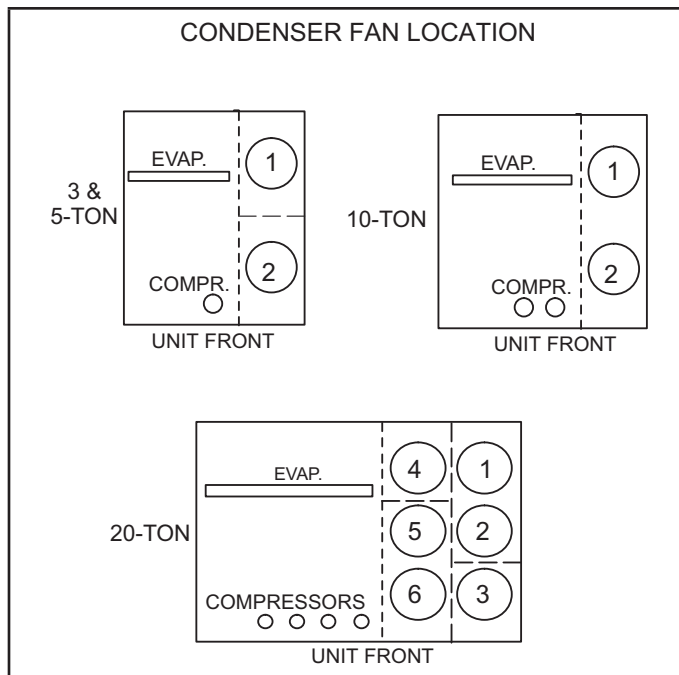


FIGURE 47

Gas Heat Start-Up

FOR YOUR SAFETY READ BEFORE LIGHTING

BEFORE LIGHTING smell all around the furnace area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

Use only your hand to move the gas valve lever. Never use tools. If the lever will not move, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

This unit is equipped with an automatic spark ignition system. There is no pilot. In case of a safety shutdown, move thermostat switch to **OFF** and return the thermostat switch to **HEAT** to reset ignition control.

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.

WARNING



Danger of explosion. Can cause injury or death. Do not attempt to light manually. Unit has a direct spark ignition system.

⚠ IMPORTANT

SMOKE POTENTIAL

The heat exchanger in this unit could be a source of smoke on initial firing. Take precautions with respect to building occupants and property. Vent initial supply air outside when possible.

⚠ WARNING



Electric shock hazard. Can cause injury or death. Do not use this unit if any part has been under water. Immediately call a qualified service technician to inspect the unit and to replace any part of the control system and any gas control which has been under water.

A-Placing Unit in Operation

⚠ WARNING



Danger of explosion and fire.
Can cause injury or product or property damage.
You must follow these instructions exactly.

Gas Valve Operation (FIGURE 48 and FIGURE 49)

- 1 - Set thermostat to lowest setting.
- 2 - Turn off all electrical power to furnace.
- 3 - This unit is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- 4 - Open or remove the heat section access panel.
- 5 - Move the gas valve lever to **OFF**. Do not force.
- 6 - Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP!** Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you do not smell gas, go to the next step.
- 7 - Move the gas valve lever to **ON**. Do not force.
- 8 - Close or replace the heat section access panel.

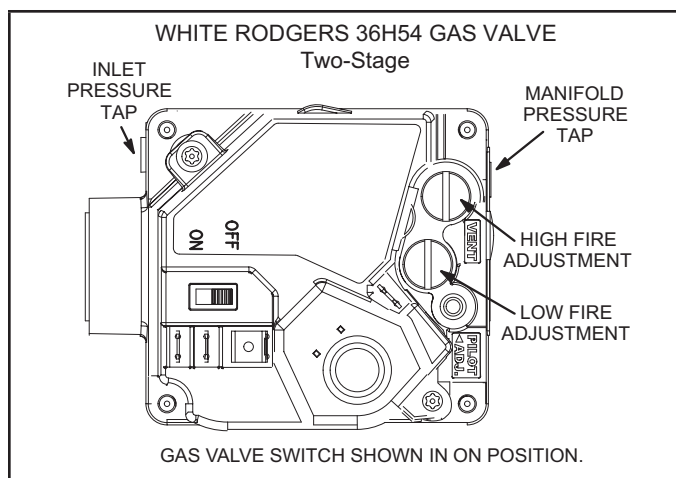


FIGURE 48

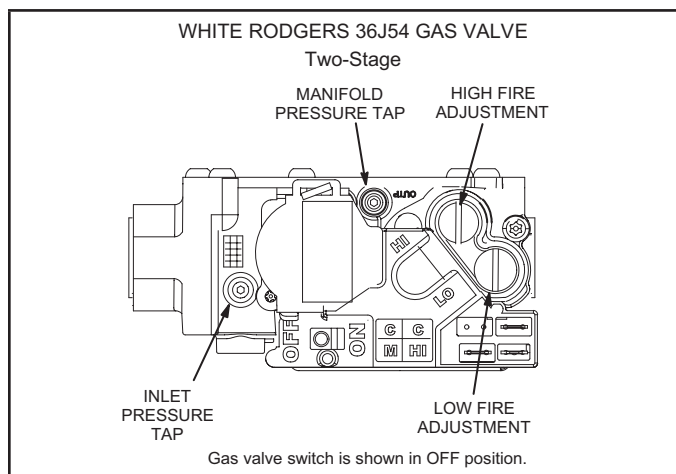


FIGURE 49

- 9 - Turn on all electrical power to furnace.
- 10 - Set thermostat to desired setting.
- 11 - The ignition sequence will start.
- 12 - If the furnace does not light the first time (gas line not fully purged), it will attempt up to two more ignitions before locking out.
- 13 - If lockout occurs, repeat steps 1 through 10.
- 14 - If the furnace will not operate, follow the instructions "Turning Off Gas to Furnace" and call your service technician or gas supplier.

Turning Off Gas to Furnace

- 1 - If using an electromechanical thermostat, set to the lowest setting.
- 2 - Before performing any service, turn off all electrical power to the furnace.
- 3 - Open or remove the heat section access panel.
- 4 - Move the gas valve lever to **OFF**. Do not force.
- 5 - Replace heat section access panel.

Electric Heat Start-Up

Electric heat will stage on and cycle with thermostat demand. Number of stages of electric heat will vary depending on electric heat assembly. See electric heat wiring diagram on unit for sequence of operation.

Heating Operation and Adjustments

(SG Units)

A-Heating Sequence of Operation

- 1 - On a heating demand the combustion air inducer starts immediately.
- 2 - Combustion air pressure switch proves inducer operation. After a 30-second pre-purge, power is allowed to ignition control. Switch is factory set and requires no adjustment.
- 3 - Spark ignitor energizes and gas valve solenoid opens.
- 4 - Spark ignites gas, ignition sensor proves the flame and combustion continues.
- 5 - If flame is not detected after 8 seconds, the ignition control will repeat steps 3 and 4 two more times. The ignition control will wait 5 minutes before the ignition attempt recycles.
- 6 - For troubleshooting purposes, an ignition attempt after lock out may be re-established manually. Move thermostat to "OFF" and return thermostat switch to "HEAT" position.

Primary Limit Location

Limit controls are factory-set and are not adjustable.

SG 036 & 060 - On the vestibule to the right of the combustion air inducer. See FIGURE 50.

SG 120 - Upper right corner of blower support wall.

SG 240 - See FIGURE 51.

Secondary Limit Location

(none on 3, 5, 20-ton units)

SG 120 - Top back side of blower housing.

B-Heating Adjustment

Main burners are factory-set and do not require adjustment.

C-Two-Stage Gas Manifold Pressure Adjustment

IMPORTANT - Do not set low fire pressure lower than the certified minimum input rating listed in TABLE 16.

Gas manifold pressures should match pressures shown in TABLE 16. On two stage gas valves, initiate a W2 thermostat demand to check high fire pressure before low fire pressure. With high fire operating, reduce the thermostat demand to W1 and check the low fire pressure.

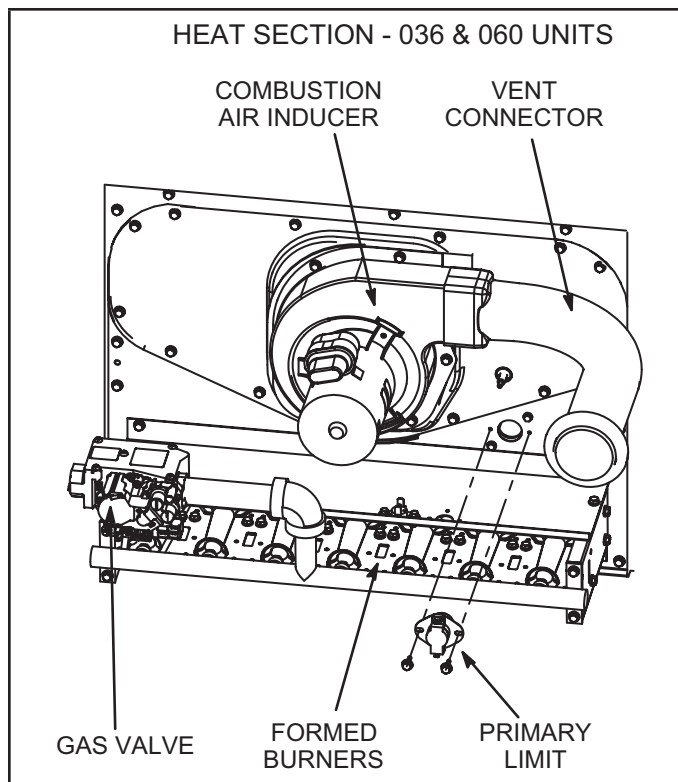


FIGURE 50

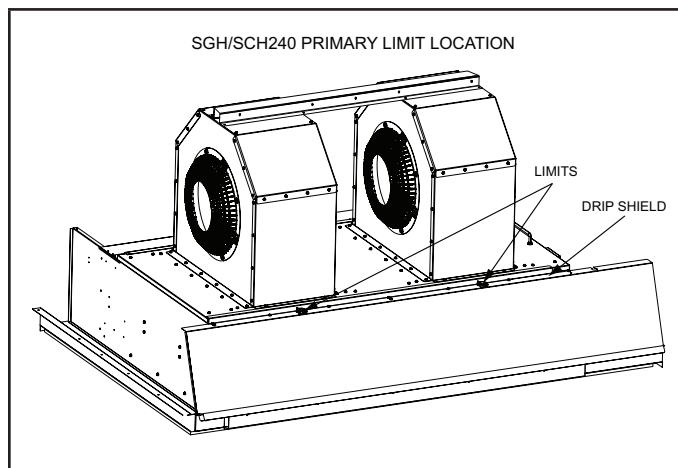


FIGURE 51

TABLE 16
Manifold Input Pressures - in. w.g. (kPa)

Unit	Natural Gas		Propane (LP) Gas	
	1st Stage ± 0.2 (±.05)	2nd Stage ± 0.3 (±.08)	1st Stage ± 0.2 (±.05)	2nd Stage ± 0.3 (±.08)
036, 060	2.0 (0.50)	3.5 (0.87)	5.9 (1.47)	10.5 (2.61)
120, 240	1.6 (0.40)	3.7 (0.92)	5.5 (1.37)	10.5 (2.61)

D-Proper Gas Flow (Approximate)

- 1 - Operate unit at least 15 minutes before checking gas flow. Determine the time in seconds for two revolutions of gas through the meter. (Two revolutions assures a more accurate time.) A portable LP gas meter (17Y44) is available for LP applications.
- 2 - Divide the number of seconds by two and compare to the time in TABLE 17. If manifold pressure is correct and rate is incorrect, check gas orifices for proper size and restriction.
- 3 - Remove temporary gas meter if installed.

NOTE - To obtain accurate reading, shut off all other gas appliances connected to meter.

TABLE 17

GAS METER CLOCKING CHART				
Unit Input Rate (Btuh)	Seconds for One Revolution			
	Natural		LP	
	1 cu ft Dial	2 cu ft Dial	1 cu ft Dial	2 cu ft Dial
70,000	51	103	129	257
108,000	33	67	83	167
150,000	24	48	60	120
130,000	28	55	69	138
180,000	20	40	50	100
240,000	15	30	38	75
260,000	14	28	35	69
360,000	10	20	25	50
480,000	8	15	19	38
Natural - 1000 btu/cu ft			LP - 2500 btu/cu ft	

NOTE - Table assumes standard temperature (60°F), pressure (30 in. Hg), and fuel heating values (Btuh/Ft.³). Apply pressure corrections in altitudes above 2000 ft.

Hot Gas Reheat Start-Up and Operation

General

Hot gas reheat units provide a dehumidifying mode of operation. These units contain a reheat coil adjacent to and downstream of the evaporator coil. Reheat coil solenoid valve, L14 (and L30 on 240 units), routes hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air.

See FIGURE 52 through FIGURE 54 for reheat refrigerant routing.

L14/L30 Reheat Coil Solenoid Valve

When Unit Controller input (Unit Controller J298-5 or J299-8) indicates room conditions require dehumidification, L14/L30 reheat valve is energized (Unit Controller P269-3 or P269-4) and refrigerant is routed to the reheat coil.

Reheat Setpoint

Reheat is factory-set to energize when indoor relative humidity rises above 60% (default). The reheat setpoint can be adjusted by changing Unit Controller Settings - Control menu. A setting of 100% will operate reheat from an energy management system digital output.

Reheat will terminate when the indoor relative humidity falls 3% (57% default) or the digital output de-energizes. The reheat deadband can be adjusted at Settings - Control menu.

A91 Humidity Sensor (120 & 240 Units)

Relative humidity should correspond to the sensor (A91) output voltage listed in TABLE 18. For example: if indoor air relative humidity is $80\% \pm 3\%$, the humidity sensor output should read 8.00VDC.

Check the sensor output annually for accuracy. Keep the air intake openings on the sensor clean and free of obstructions and debris.

TABLE 18

Relative Humidity (%RH $\pm 3\%$)	Sensor Output (VDC)
20	2.00
30	3.00
40	4.00
50	5.00
60	6.00
70	7.00
80	8.00
90	9.00

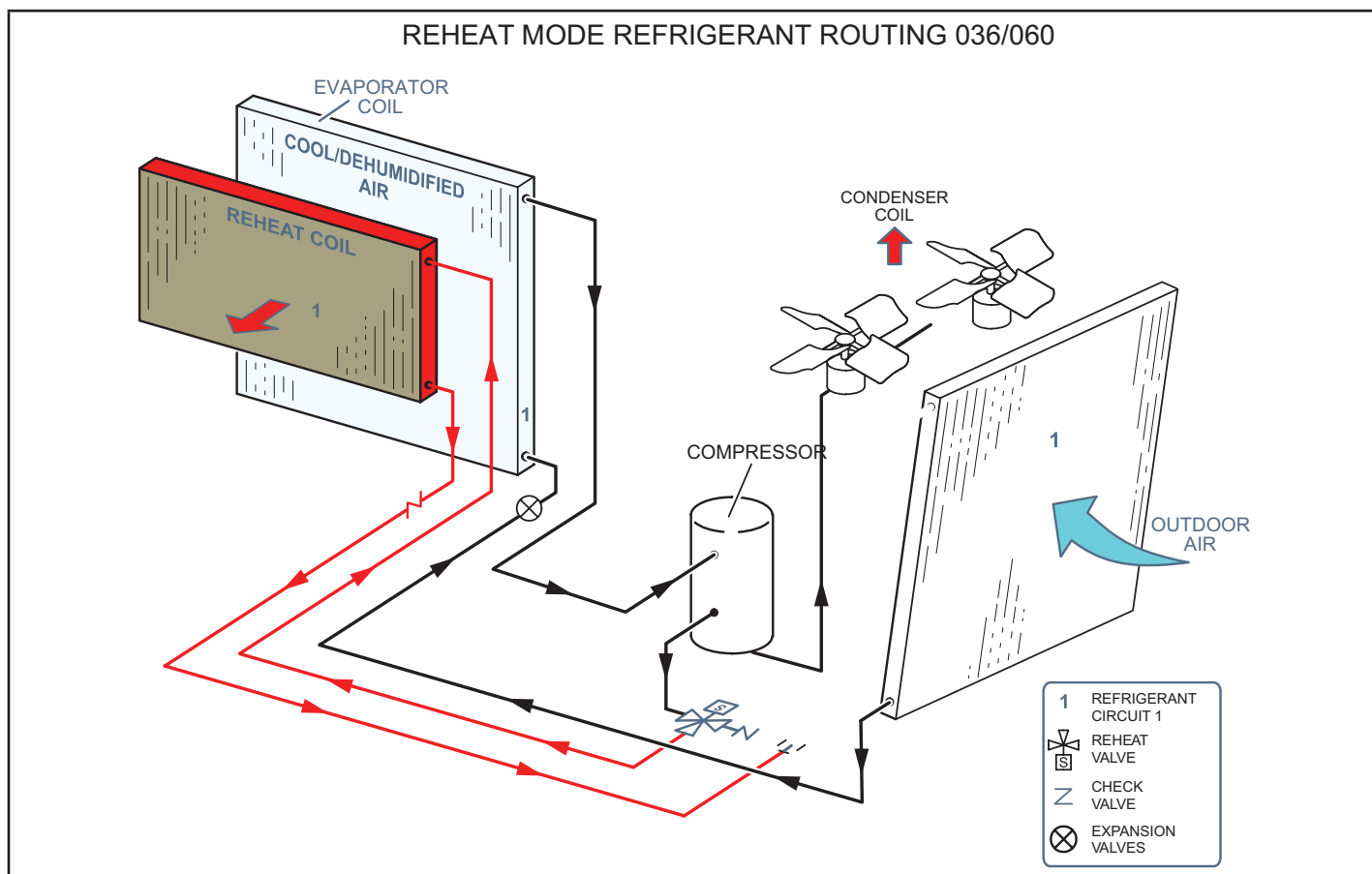
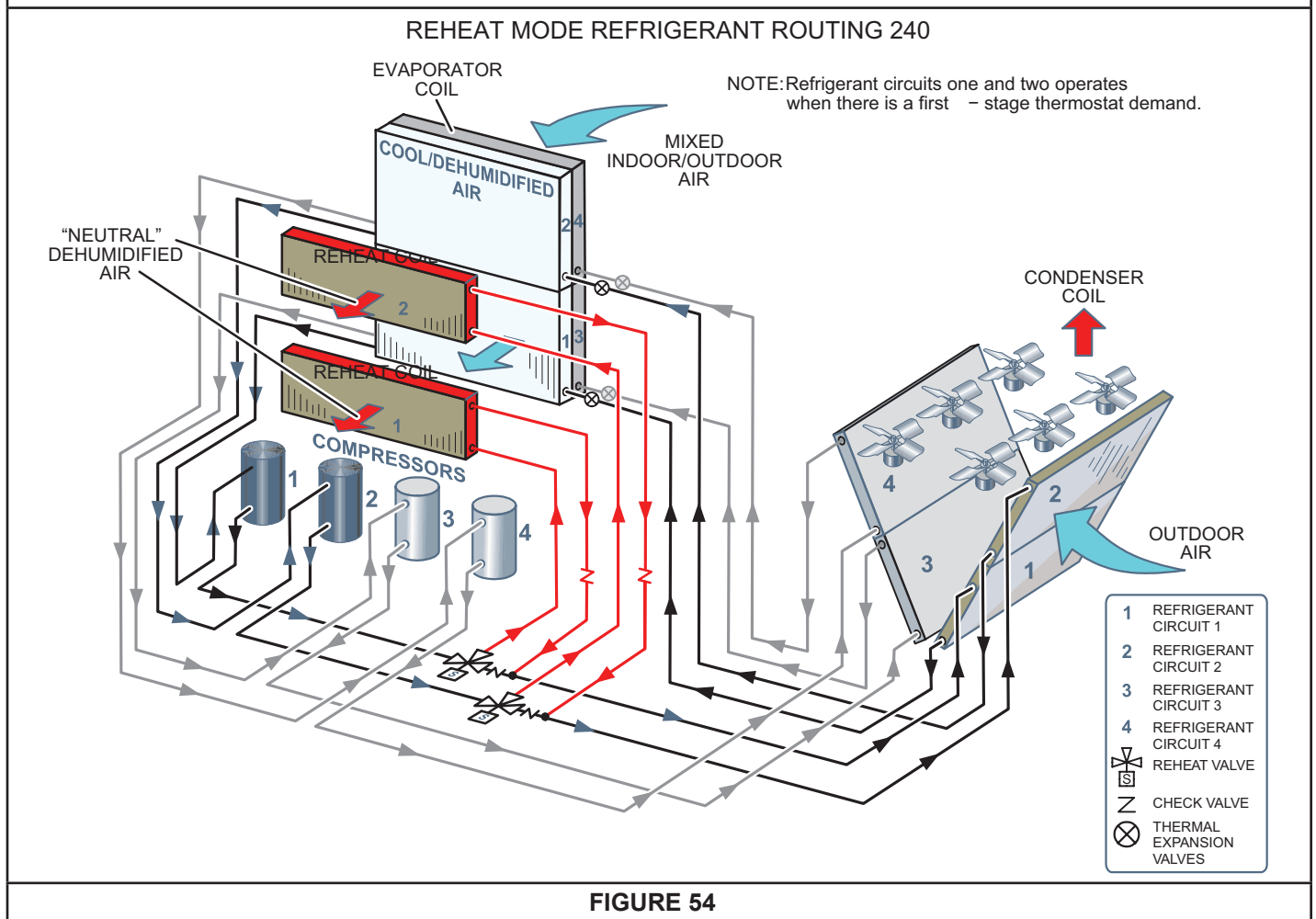
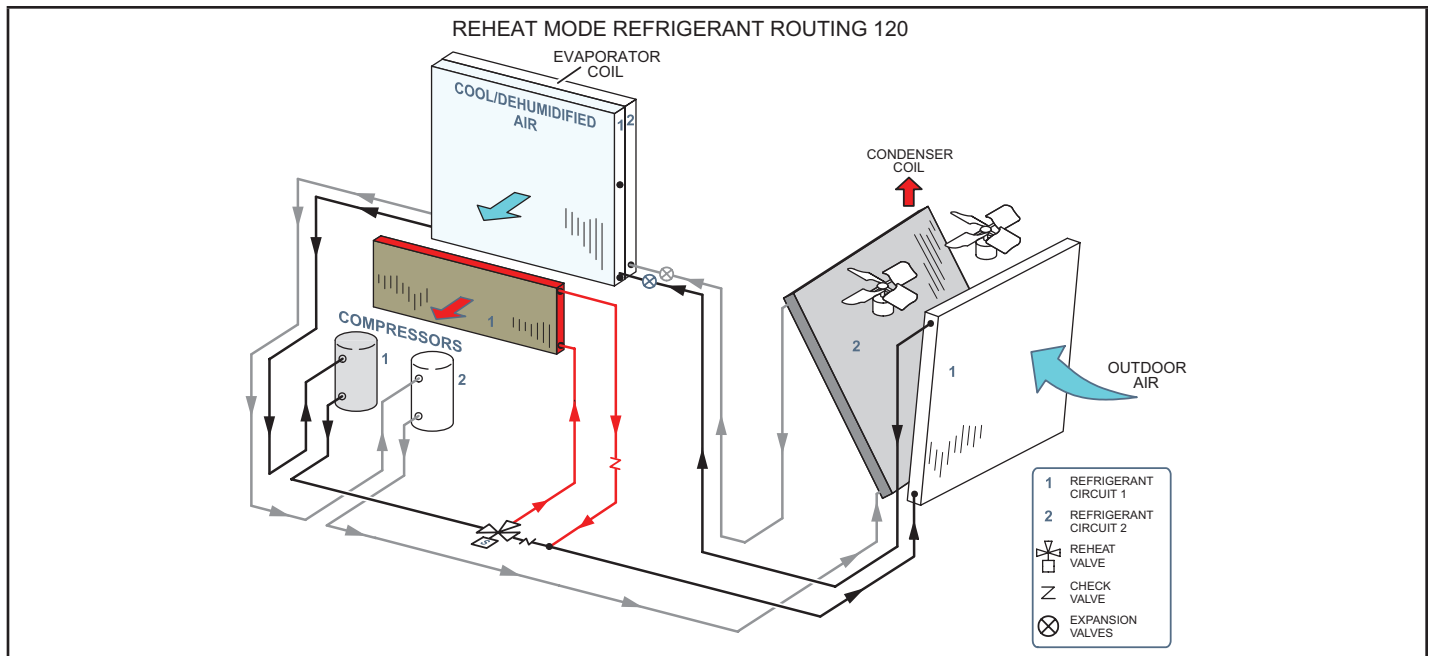


FIGURE 52



Check-Out

Test reheat operation using the following procedure.

- 1 - Make sure reheat is wired as shown in wiring section.
- 2 - Make sure unit is in local thermostat mode.
- 3 - Use Unit Controller application to elect :

SERVICE > TEST > DEHUMIDIFIER

036, 060, 120 -

The blower and compressor (reheat) should be operating. **DEHUMIDIFIER 1 ON** will be appear on the Unit Controller display.

240 -

The blower, compressor 1, and compressor 2 (reheat) should be operating. L14 and L30 LEDs on the Unit Controller should also be **ON**, indicating the reheat valves are energized. **REHEAT MODE** will be appear on the Unit Controller display.

- 4 - Press **BACK** on the Unit Controller display to stop the testing mode.

Default Reheat Operation - 036 & 060

During reheat mode free cooling is locked out.

No Y1 demand but a call for dehumidification:

Compressor is operating, blower is on low, and the reheat valve is energized.

Y1 demand:

Compressor is operating, blower is on low, and the reheat valve is de-energized.

Y2 demand:

Compressor is operating, blower is on high, and the reheat valve is de-energized.

Default Reheat Operation - 120

TABLE 19

Reheat Operation - Two Cooling Stages - Default

T'stat and Humidity Demands	Operation
Reheat Only	Compressor 1 Reheat & Blower Low Speed
Reheat & Y1	Compressor 1 Reheat & Compressor 2 Cooling* & Blower High Speed
Reheat & Y1 & Y2	Compressor 1 Cooling & Compressor 2 Cooling** & Blower High Speed

*If there is no reheat demand and outdoor air is suitable, free cooling will operate.

**If there is no reheat demand and outdoor air is suitable free cooling and compressor 1 will operate.

Default Reheat Operation - 240

Reheat will operate as shown in TABLE 20 once three conditions are met:

- 1 - Blower must be operating.
- 2 - System must be in occupied mode.
- 3 - System must NOT be operating in heating mode.

IMPORTANT - Free cooling does not operate during reheat.

For other reheat control options, refer to the Unit Controller manual.

Additional Cooling Stages

Units are shipped from the factory to provide two stages of cooling.

Three stages of cooling is available in zone sensor mode. Three stages of cooling is also available by installing a transfer relay and a three-stage thermostat. Refer to the Main Control Operation section in the Unit Controller manual when using the transfer relay.

Additional Cooling Stages - 240

Four stages of cooling is available in zone sensor mode on units with four compressors.

Compressors are not de-energized when unit operation changes from cooling to reheat or from reheat to cooling. Instead, L14 and L30 reheat valves are energized (reheat) or de-energized (cooling).

NOTE - Another thermostat staging option is available which allows both compressors to be energized during free cooling. See Unit Controller manual for details.

**TABLE 20
REHEAT OPERATION**

Two-Stage Thermostat - Default	
T'stat and Humidity Demands	Operation
	240 (4-Compressors)
Reheat Only	Compressor 1 & 2 Reheat
Reheat & Y1	Compressor 1 & 2 Reheat Compressor 3 & 4 Cooling ¹
Reheat & Y1 & Y2	Compressor 1, 2, 3, & 4 Cooling ³
Three-Stage Thermostat (Transfer relay required)	
T'stat and Humidity Demands	Operation
	240 (4-Compressors)
Reheat Only	Compressor 1 & 2 Reheat
Reheat & Y1	Compressor 1 & 2 Reheat Compressor 3 & 4 Cooling ²
Reheat & Y1 & Y2	Compressor 1 & 2 Reheat Compressor 3 & 4 Cooling ³
Reheat Y1 & Y2 & Y3	Compressor 1, 2, 3, & 4 Cooling ⁴
Four-Stage Zone Sensor Mode	
Cooling* and Humidity** Demands	Operation
	240 (4-Compressors)
Reheat Only	Compressor 1 & 2 Reheat
Reheat & Y1	Compressor 1 & 2 Reheat Compressor 3 Cooling ¹
Reheat & Y1 & Y2	Compressor 1 & 2 Reheat Compressor 3 & 4 Cooling ²
Reheat Y1 & Y2 & Y3	Compressor 1 Reheat, Compressor 2, 3, & 4 Cooling ³
Reheat Y1 & Y2 & Y3 & Y4	Compressor 1, 2, 3, & 4 Cooling ⁵

*Cooling stage is initiated when zone temperature is higher than the cooling setpoint plus the appropriate stage differential.

**Reheat demand is initiated when relative humidity is higher than relative humidity setpoint.

¹If there is no reheat demand and outdoor air is suitable, free cooling will operate.

²If there is no reheat demand and outdoor air is suitable, free cooling and compressor 1 will operate.

³If there is no reheat demand and outdoor air is suitable, free cooling and compressor 1 and 2 will operate.

⁴If there is no reheat demand and outdoor air is suitable, free cooling, compressor 1, 2 and 3 will operate.

⁵If there is no reheat demand and outdoor air is suitable, free cooling, compressor 1, 2, 3 and 4 will operate.

**The following conditions must be met before reheat will be energized:
(factory-default; see Unit Controller manual for other options)**

- 1 - Blower must be operating.
- 2 - System must be in occupied mode.
- 3 - System must NOT be operating in heating mode.

Optional Economizer Settings

A-General

The economizer allows outdoor air to be used for free cooling or ventilation requirements.

B-Configure Economizer

Use the following menu and go through the installation wizard.

SETUP > INSTALL

When prompted, set Configuration ID 1, position 2 to the applicable economizer option. Economizer options are shown in TABLE 21. Once the option is set, the installation wizard prompts will vary depending on the option selected.

NOTE - Some setup information is factory-set, such as the unit model number. Verify that each setting is correct before advancing to the next prompt.

Sensors are used to determine outdoor air suitability for free cooling. Some economizer options require field-installed sensors. See TABLE 21. See FIGURE 55, FIGURE 56, and FIGURE 57 for sensor locations.

Use the following menu to make adjustments to the economizer option once configured. Refer to the Menu Interface tables in the Unit Controller Setup Guide provided with this unit.

TEST & BALANCE > DAMPER CONFIGURATION

TABLE 21
ECONOMIZER CONFIGURATION OPTIONS

Option	Description	Required Sensors	Dampers will modulate to 55°F* (default) discharge air when outdoor air is suitable:	Parameter**
M	MOTORIZED OUTDOOR AIR DAMPERS	None	Dampers do not modulate; dampers will open to minimum position during the occupied time period and close during the unoccupied time period.	NA
T	ECONOMIZER FREE COOLING TEMPERATURE OFFSET	Factory-installed	Outdoor air temperature (RT17) is less than return air temperature (RT16) by at least the OFFSET value (10°F default).	161
	ECONOMIZER FREE COOLING TEMPERATURE SETPOINT	Factory-installed	Outdoor air temperature (RT17) is less than the free cooling setpoint (60°F default).	160
G	GLOBAL	NA	Dampers will modulate to maintain 55°F* (default) discharge air when a 24VAC signal is provided to the GLO input (P297-9). Global input also brings on the blower. Refer to Energy Management System manufacturer's instructions for required sensors.	NA
S	ECONOMIZER FREE COOLING ENTHALPY SETPOINT	C7400	Outdoor air enthalpy (A7) is less than free cooling setpoint (73°F default).	162
D	ECONOMIZER FREE COOLING ENTHALPY OFFSET	(Two) C7400	Outdoor air enthalpy (A7) is less than return air enthalpy (A62) by at least the OFFSET value.	163

*RT6 discharge air sensor is factory-installed. See parameter 159 in the Unit Controller Setup Guide.

**Refer to the Menu Interface tables in the Unit Controller Setup Guide provided with this unit.

036-060 SENSOR LOCATIONS

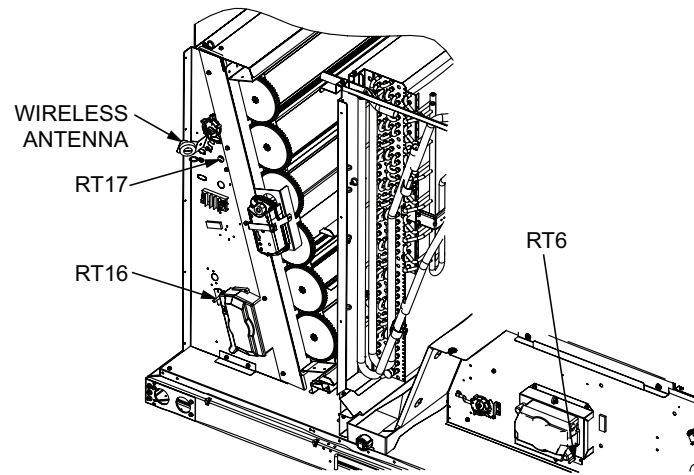


FIGURE 55

120 SENSOR LOCATIONS

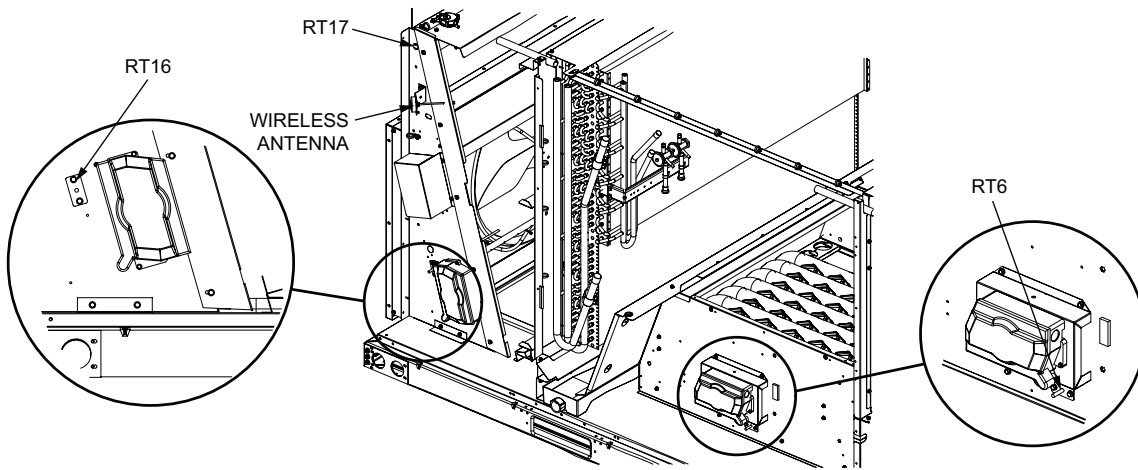


FIGURE 56

180-240 SENSOR LOCATIONS

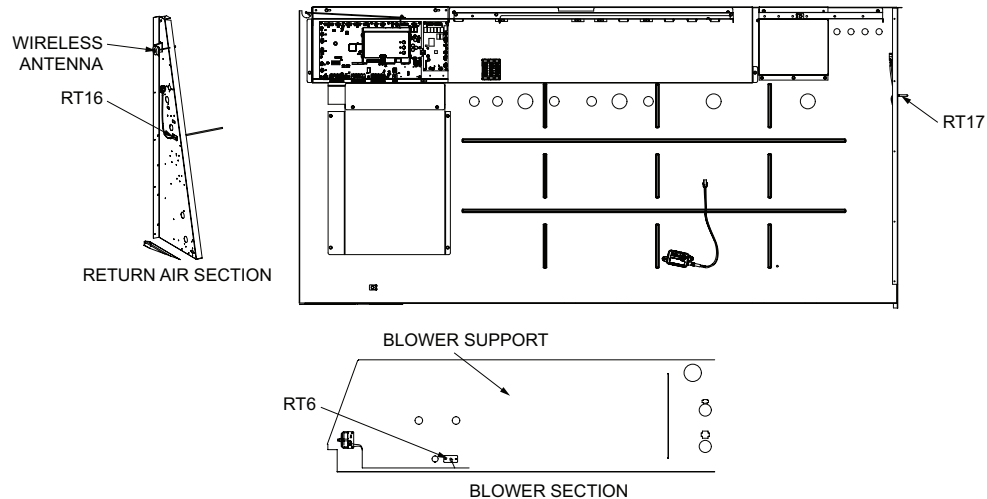


FIGURE 57

C-Economizer Operation

NOTE- Use indicating lights on Unit Controller to determine thermostat demand.

See TABLE 22 for economizer operation with a standard two-stage thermostat

D-Damper Minimum Position Setting

Use the following menu path to modify the minimum damper positions for both high and low operations.

TEST&BALANCE>DAMPER CALIBRATION>BLOWER SPEED HIGH>MINIMUM DAMPER POSITION X.X%

TEST&BALANCE>DAMPER CALIBRATION>BLOWER SPEED LOW>MINIMUM DAMPER POSITION X.X%

TABLE 23 shows economizer operation with an energy management system which uses a global sensor.

Both tables show the occupied and unoccupied time period. The occupied time period is determined by the thermostat or energy management system.

TABLE 24 shows economizer operation in zone sensor mode.

E-IAQ Damper Operation

The Unit Controller has a 0-10VDC IAQ input for a standard 0-2000ppm CO₂ sensor. The economizer starts opening at a CO₂ level of 700 ppm (default) and reaches full open at a CO₂ level of 1200ppm. Adjustments may be made to the indoor air quality parameters to alter operation or meet required specifications (parameters 117 through 119). Go to:

TEST & BALANCE > DAMPER CONFIGURATION

If the economizer is operating in the free cooling mode and the IAQ sensor demands more fresh air, the IAQ demand will override the free cooling demand to open the dampers further or to keep them open.

The IAQ function is not energized during the unoccupied or night time period.

TABLE 22
ECONOMIZER OPERATION - Standard Two-Stage Thermostat (Default Option)

THERMOSTAT DEMAND	DAMPER POSITION UNOCC.	DAMPER POSITION OCCUPIED	MECHANICAL COOLING
OUTDOOR AIR IS NOT SUITABLE FOR FREE COOLING			
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Y1	CLOSED	MINIMUM	STAGE 1
Y2	CLOSED	MINIMUM	STAGES 1 AND 2
OUTDOOR AIR IS SUITABLE FOR FREE COOLING			
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Y1	MODULATING	MODULATING	NO
Y2	MODULATING	MODULATING (1)	STAGE 1

NOTE - Modulating dampers adjust to control supply air (RT6) to 55°F (13°C). (1) The Unit Controller goes into a "cool down" or "warm-up" mode when the occupied time period starts. (2) Units with two-stage compressor operation will operate only stage 1 with a Y2 demand.

TABLE 23
ECONOMIZER OPERATION WITH GLOBAL SENSING - Energy Management System (Default Option)

THERMOSTAT DEMAND	DAMPER POSITION UNOCC.	DAMPER POSITION OCCUPIED	MECHANICAL COOLING
GLOBAL INPUT OFF			
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Y1	CLOSED	MINIMUM	STAGE 1
Y2	CLOSED	MINIMUM	STAGES 1 AND 2
GLOBAL INPUT ON			
OFF	MODULATING	MODULATING	NO
G	MODULATING	MODULATING	NO
Y1	MODULATING	MODULATING	STAGE 1
Y2	MODULATING	MODULATING (1)	STAGES 1 AND 2 (2)

NOTE - Modulating dampers adjust to control supply air (RT6) to 55°F (13°C). (1) The Unit Controller goes into a "cool down" or "warm-up" mode when the occupied time period starts. (2) Units with two-stage compressor operation will operate only stage 1 with a Y2 demand (default).

TABLE 24
ECONOMIZER OPERATION - Zone Sensor Mode

DEMAND	DAMPER POSITION UNOCC.	DAMPER POSITION OCCUPIED	MECHANICAL COOLING
OUTDOOR AIR IS NOT SUITABLE FOR FREE COOLING			
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Cooling Stage 1	CLOSED	MINIMUM	COMPRESSOR 1
Cooling Stage 2	CLOSED	MINIMUM	COMPRESSOR 1 & 2
Cooling Stage 3	CLOSED	MINIMUM	COMPRESSOR 1, 2, & 3
Cooling Stage 4	CLOSED	MINIMUM	COMPRESSOR 1, 2, 3, & 4
OUTDOOR AIR IS SUITABLE FOR FREE COOLING			
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Cooling Stage 1	MODULATING	MODULATING	NO
Cooling Stage 2	FULL OPEN*	FULL OPEN*	COMPRESSOR 1
Cooling Stage 3	FULL OPEN*	FULL OPEN*	COMPRESSORS 1 & 2
Cooling Stage 4	FULL OPEN*	FULL OPEN*	COMPRESSORS 1, 2, 3, & 4

Damper will modulate to maintain 55°F supply air when parameter 164 is changed to setting "0". Note - Modulating dampers adjust to control supply air (RT6) to 55°F (13°C).

Factory Unit Controller Settings

Use the Unit Controller to adjust parameter settings. See the following tables for the appropriate menu path. Refer to the Unit Controller manual provided with each unit.

TABLE 25 shows factory settings. Record adjusted settings on the parameter label located inside the compressor access panel.

TABLE 25
580902-01

45°F Compressor Lockout W/Economizer or Motorized OAD Settings			
RTU OPTIONS > EDIT PARAMETERS			
Parameter	Factory Setting	Field Setting	Description
85	45		Low ambient lockout for compr 1.
86	45		Low ambient lockout for compr 2.
87	45		Low ambient lockout for compr 3.
88	45		Low ambient lockout for compr 4.
89	400		Sets damper to start open ing at 2VDC on CO2 input.

Preventative Maintenance / Repair

IMPORTANT MAINTENANCE / REPAIR SAFETY INSTRUCTIONS

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized.

Work shall be undertaken under a controlled procedure to minimize the risk of a flammable gas or vapor being present while the work is being performed.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times, the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking
- that no live electrical components and wiring are exposed while charging, recovering or purging the system
- that there is continuity of earth bonding

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

During repairs to sealed electrical components, the components shall be replaced. Replacement parts shall be in accordance with the manufacturer's specifications.

During repairs to intrinsically safe components, the components must be replaced. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

To maintain efficiency and longevity, your equipment must be serviced yearly by a qualified service technician. Failure to provide proof of service can void warranty.

A-Lubrication

All motor bearings are prelubricated. No further lubrication is required.

B-Filters

Units are equipped with filters as shown in TABLE 26. Units will accept 4" filters. Filters should be checked monthly and replaced when necessary with filters of like kind and size. Take note of air flow direction marking on filter frame when reinstalling filters.

NOTE - Filters must be U.L.C. certified or equivalent for use in Canada.

TABLE 26
Number and Size of Filter by Unit

SG/SC Unit	Qty	Filter Size - inches (mm)
036, 060	4	16 X 20 X 2 (406 X 508 X 51)
120	4	20 X 25 X 2 (508 X 635 X 51)
240	12	20 X 20 X 2 (508 X 508 X 51)

WARNING



Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

WARNING



Electric shock hazard and danger of explosion. Can cause injury, death or product or property damage. Turn off gas and electrical power to unit before performing any maintenance or servicing operations on the unit. Follow lighting instructions attached to unit when putting unit back into operation and after service or maintenance.

C-Burners (SG Units)

Periodically examine burner flames for proper appearance during the heating season. Before each heating season examine the burners for any deposits or blockage which may have occurred.

- 1 - Turn off both electrical power and gas supply to unit.
- 2 - Open burner compartment access panel.
- 3 - Remove and retain screws securing burner box top cap.
- 4 - Remove and retain two screws securing burners to burner support and lift the individual burners or the entire burner assembly from the orifices. See FIGURE 58 for 036 & 060 units and FIGURE 59 for 120, 240 units. Clean burners as necessary.
- 5 - Locate the ignitor under the right burner for 036 and 060 units. See FIGURE 60. Locate the ignitor under the left burner for 120 and 240 units. See FIGURE 62 and TABLE 27. Use appropriately sized twist drills or feeler gauges to check the spark gap as shown in FIGURE 61.
- 6 - Replace burners and secure with retained screws.
- 7 - Replace access panel.
- 8 - Restore electrical power and gas supply. Follow lighting instructions attached to unit and use inspection port in access panel to check flame.

WARNING



Danger of explosion. Can cause injury or death. Do not overtighten main burner mounting screws. Snug tighten only.

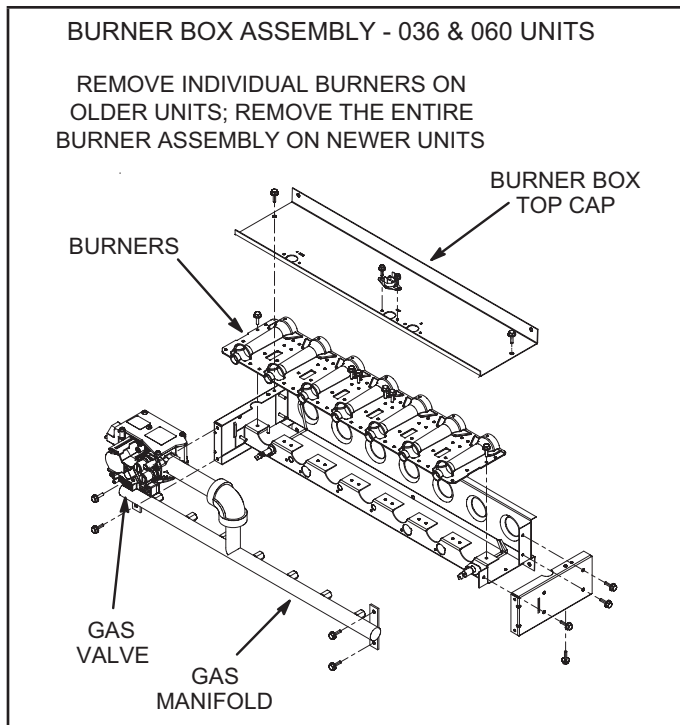


FIGURE 58

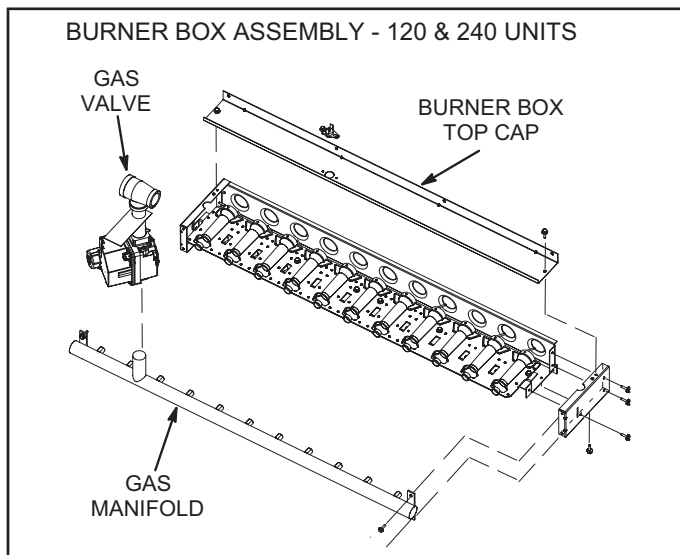


FIGURE 59

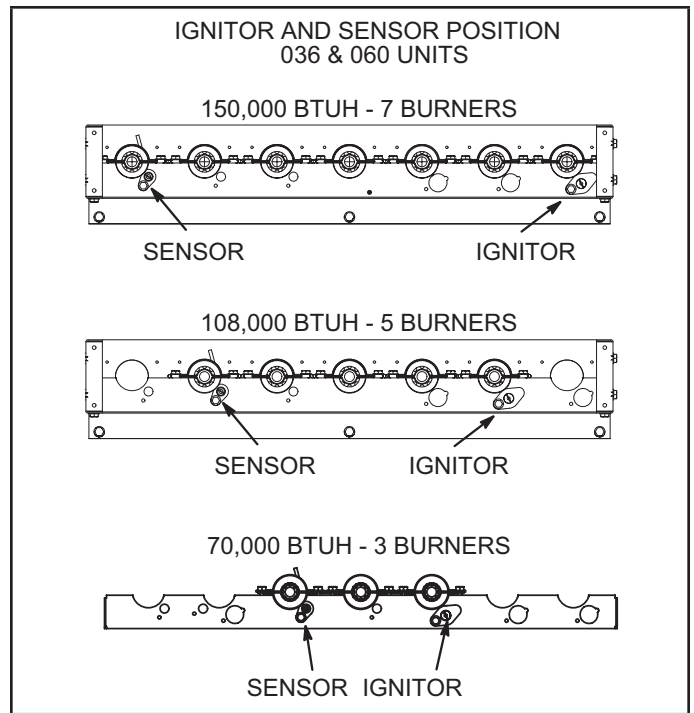


FIGURE 60

D-Combustion Air Inducer (SG Units)

A combustion air proving switch checks combustion air inducer operation before allowing power to the gas controller. Gas controller will not operate if inducer is obstructed.

Under normal operating conditions, the combustion air blower wheel should be checked and cleaned prior to the heating season. However, it should be examined periodically during the heating season to establish an ideal cleaning schedule. With power supply disconnected, the condition of the blower wheel can be determined by looking through the vent opening.

TABLE 27

Dimension	Unit Btuh Input	Length - in. (mm)	
		Ignitor	Sensor
A	130/260K	7-3/4 (197)	11 (279)
B	180/360K	5 (127)	5-1/2 (140)
C	240/480K	2-1/4 (57)	2-3/4 (70)

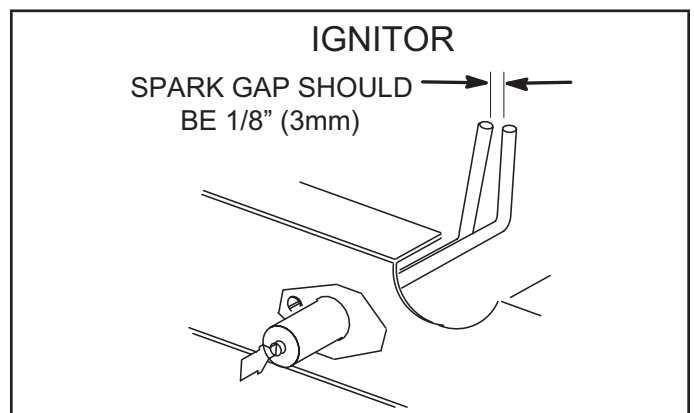


FIGURE 61

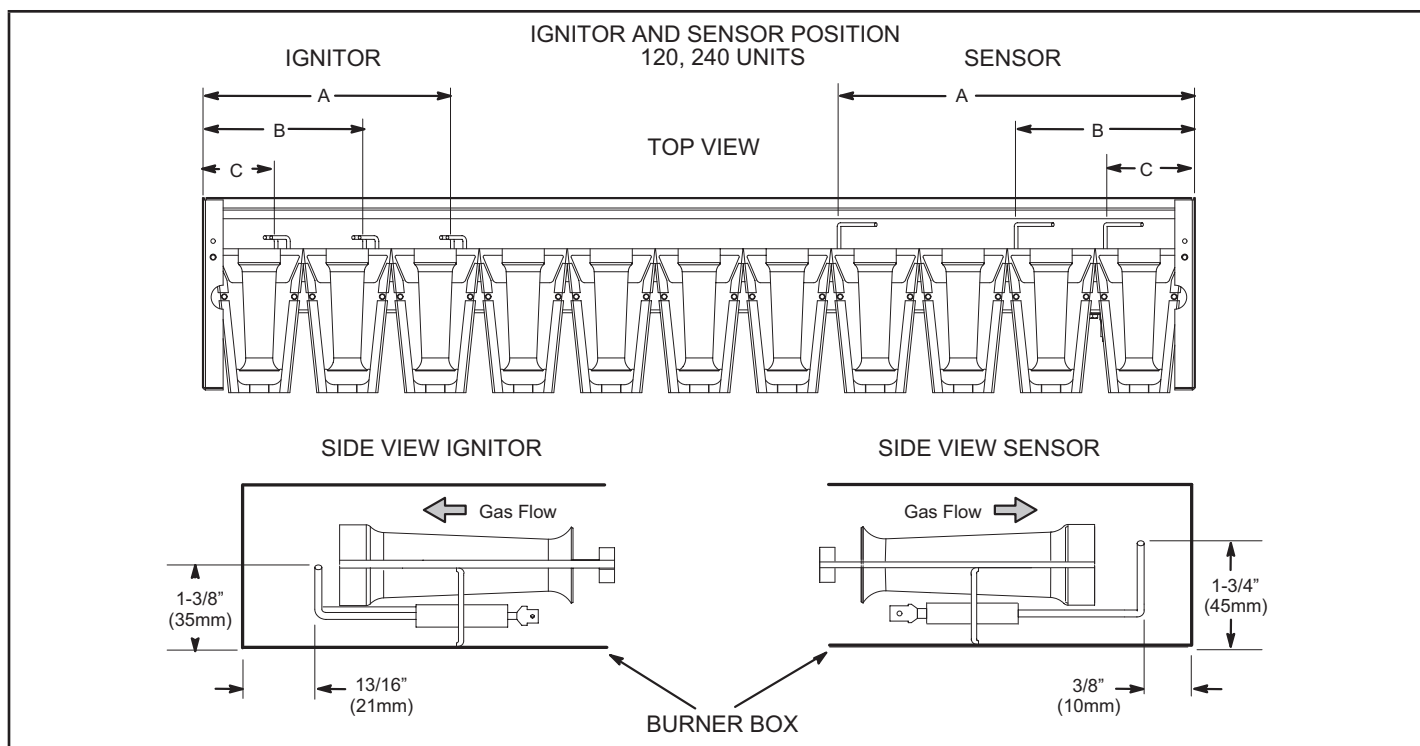


FIGURE 62

Cleaning Combustion Air Inducer

- 1 - Shut off power supply and gas to unit.
- 2 - Disconnect pressure switch air tubing from combustion air inducer port.
- 3 - Remove and retain screws securing combustion air inducer to flue box. Remove vent connector. See FIGURE 50 for 036 and 060 units and FIGURE 63 for 120, and 240 units.
- 4 - Clean blower wheel blades with a small brush and wipe off any dust from housing. Clean accumulated dust from front of flue box cover.
- 5 - Return combustion air blower motor and vent connector to original location and secure with retained screws. It is recommended that the combustion air inducer gasket be replaced during reassembly.
- 6 - Clean combustion air inlet louvers on heat access panel using a small brush.

E-Flue Passageway and Flue Box (SG Units)

- 1 - Remove combustion air inducer assembly as described in section D.
- 2 - Remove flue box cover. Clean with a wire brush as required.
- 3 - Clean tubes with a wire brush.
- 4 - Reassemble the unit. The flue box cover gasket and combustion air inducer gasket also be replaced during reassembly.

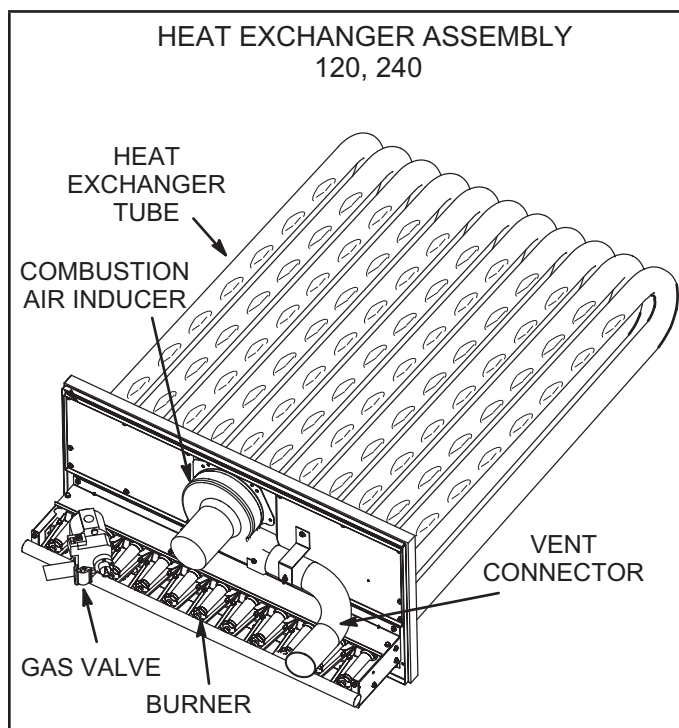


FIGURE 63

F-Evaporator Coil

Inspect and clean coil at beginning of each cooling season. Clean using mild detergent or commercial coil cleanser. Flush coil and condensate drain with water taking care not to get insulation, filters and return air ducts wet.

G-Condenser Coil

Clean condenser coil annually with mild detergent or commercial coil cleaner and inspect monthly during the cooling season.

H-Supply Air Blower Wheel

Annually inspect supply air blower wheel for accumulated dirt or dust. Turn off power before removing access panel or cleaning blower wheel.

M-Replacement Fuses

See the following tables for the proper replacement fuse sizes.

TABLE 28
REPLACEMENT FUSE TABLE
EHS-A, EHS-B, EHS-D SERIES

UNIT	QTY	RATING	
		AMP	VOLT
EHS-A-7.5-1G	3	15	600
EHS-A-10-1G	3	15	600
EHS-A-15-1G	3	25	600
EHS-A-15-1J	3	20	600
EHS-A-20-1G	3	35	600
EHS-A-30-1G	3	50	600
EHS-A-30-1J	3	40	600
EHS-B-15-1G	3	40	600
EHS-B-15-1J	3	20	600
EHS-B-20-1G	3/3	15/15	600
EHS-B-30-1G	3/3	40/40	600
EHS-B-30-1J	3/3	20/20	600
EHS-B-45-1G	3/3	50/40	600
EHS-B-45-1J	3/3	40/20	600
EHS-B-60-1G	3/3	50/50	600
EHS-B-60-1J	3/3	40/40	600
EHS-D-12.5S-1G	-	-	-
EHS-D-12.5S-1J	-	-	-
EHS-D-12.5-1G	3/3	20/20	600
EHS-D-12.5-1J	3/3	20/20	600
EHS-D-20-1G	3/3	15/15	600
EHS-D-30-1G	3/3	25/25	600
EHS-D-30-1J	3/3	20/20	600
EHS-D-45-1G	3/3	50/25	600
EHS-D-45-1J	3/3	40/20	600

TABLE 30
SCH240 Replacement Fuses

Unit Voltage				460V - 3Ph		575V - 3Ph	
Power Exhaust Option				W/ P.E.	W/O P.E.	W/ P.E.	W/O P.E.
Diagram Key	Model	Class	Blower HP	Amps			
F4	SCH240	J	5	50	50	40	35
F4	SCH240	J	7.5	60	50	45	45
F6	SCH240	CC	ALL	10	-	10	-
F10	SCH240	CC	ALL	12			

TABLE 29

SGH/SCH036, 060, 120 REPLACEMENT FUSES

Unit Type			SC/SG			
Unit Voltage			460V - 3Ph		575V - 3 Ph	
Power Exhaust Option			W/ P.E.	W/O P.E.	W/ P.E.	W/O P.E.
Diagram Key	Class	Model	Amps (A)			
F4 ¹	J	036	-	15	-	15
F4 ¹	J	060	-	15	-	15
F4 ¹	J	120	30	25	20	20
F10	CC	036, 060	-	3	-	3
F10	CC	120	7.5	7.5	7.5	7.5
F27	CC	036, 060	-	-	8	8
F57	CC	036, 060	-	3.5	-	5

¹F4 is only used on SCH units

TABLE 31
SCH/SGH CB10 Fuse Table

Model			SCH/SGH036H5E		SCH/SGH060H5E	
UNIT Voltage - 60Hz			575V-3ph	575V-3ph	460V-3ph	575V-3ph
¹ CB10	Unit Only		15	15	15	15
Model			SCH/SGH120H5E		SCH/SGH240H5E	
¹ CB10	Unit Only		30	50	45	35
	With (1) 0.5 HP Power Exhaust		35	60	---	---
	With (3) 0.33 HP Power Exhaust		---	---	50	35
Model			SCH036H5E		SCH060H5E	
Electric Heat Voltage			480V	575V	480V	575V
¹ CB10	Unit + Electric Heat	10 kW	20	---	20	---
		15 kW	30	25	30	25
		20 kW	---	---	35	---
		30 kW	---	---	50	40
Model			SCH120U5E			
Electric Heat Voltage			480V		575V	
¹ CB10	Unit + Electric Heat	15 kW	30		25	
		20 kW	40		---	
		30 kW	60		45	
		45 kW	80		60	
		60 kW	80		70	
	Unit + Electric Heat and (1) 0.5 HP Power Exhaust	15 kW	30		25	
		20 kW	40		---	
		30 kW	60		45	
		45 kW	80		70	
		60 kW	80		70	
Model			SCH240U5			
Electric Heat Voltage			480V		600V	
¹ CB10	Unit + Electric Heat	25 kW	45		40	
		40 kW	70		- - -	
		60 kW	80		70	
		90 kW	125		100	
¹ CB10	Unit Blower + Electric Heat and (3) 0.33 HP Power Exhaust	25 kW	50		40	
		40 kW	80		- - -	
		60 kW	90		70	
		90 kW	125		100	

¹ HACR type breaker or fuse.

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before starting decommissioning.

- a) Become familiar with the equipment and its operation.
- b) Isolate system electrically.
- c) Before attempting the procedure, ensure that:
 - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
 - all personal protective equipment is available and being used correctly;
 - the recovery process is supervised at all times by a competent person;
 - recovery equipment and cylinders conform to the appropriate standards.
- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with instructions.

h) Do not overfill cylinders (no more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.



IMPORTANT

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be signed and dated. Ensure that there are labels on the equipment that state the flammability of the refrigerant used.

START-UP REPORT

Job Name: _____

Store No. _____ Start-Up Date: _____

Address: _____

City: _____ State: _____

Start-Up Contractor: _____

Technician: _____

Model No.: _____

Serial No.: _____

RTU No.: _____ Catalog No.: _____

Inspections and Checks

Damage? Yes No R454B ☐

If yes, reported to: _____

Verify factory and field-installed accessories.

Check electrical connections. Tighten if necessary.

Supply voltage: L1-L2 _____ L1-L3 _____ L2-L3 _____

If unit contains a 208-230/240 volt transformer:

Check primary transformer tap ☐

Transformer secondary voltage: _____

Cooling Checks

Compressor Rotation ☐ Ambient Temp. _____ Return Air Temp. _____ Supply Air Temp. _____

	Compressor Amps			Compressor Volts			Pressures		Condenser Fan Amps			CC Heater Amps
	L1	L2	L3	L1-L2	L1-L3	L2-L3	Disch.	Suct.	L1	L2	L3	L1
1												
2												
3												
4												

Blower Checks

Pulley/Belt Alignment ☐ Blower Rotation ☐

Set Screws Tight ☐ Belt Tension ☐

Nameplate Amps: _____ Volts: _____

Motor	Amps	Volts
L1	_____	L1-L2 _____
L2	_____	L1-L3 _____
L3	_____	L2-L3 _____

Heating Checks - Gas

Fuel type: Nat. ☐ LP ☐ Inlet Pressure: _____ in. w.c.

Return Air Temp.: _____ Supply Air Temp.: _____

Altitude: _____ Primary Limits Operate: ☐

CO₂%: _____

Gas Valve	Manifold Pressure	
	Low Fire	High Fire
GV1		
GV2		

Control Type

Heating Checks - Electric

Return Air Temp.: _____ Supply Air Temp.: _____

Limits Operate: ☐

	Amps						
	L1	L2	L3		L1	L2	L3
1				10			
2				11			
3				12			
4				13			
5				14			
6				15			
7				16			
8				17			
9				18			

Accessory Checks

Power Exhaust Amps

1 _____ 2 _____ None ☐

Economizer Operation

Min. Pos. ☐ Motor travel full open/close ☐