LENNOX

©2024

INSTALLATION INSTRUCTIONS

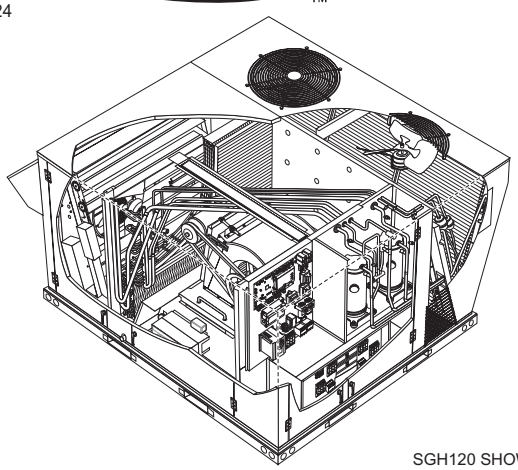
PFAS

SGH/SCH036 (3 TON)
SGH/SCH060 (5 TON)
SGH/SCH120 Belt Drive (10 TON)
SGH/SCH240 Belt Drive (20 TON)

GAS AND COOLING PACKAGED UNITS

508941-01
11/2024

R-454B



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.

Table of Contents

Dimensions 4
Parts Arrangement 7
Shipping and Packing List 10
General 10
Safety 10
Unit Support 12
Duct Connections 13
Rigging Units for Lifting 13
Condensate Drains 13
Connect Gas Piping 14
Pressure Test Gas Piping 14
High Altitude Derate 15
Optional Outdoor Air Hood 16
Electrical Connections 18
Mobile Service App 21
Blower Operation and Adjustments 24
Refrigerant Leak Detection System 36
Cooling Start-Up 36
Diagnostic Sensors 38
RDS Sensors 45
Cooling Operation And Adjustments 49
Gas Heat Start-Up 62
Electric Heat Start-Up 64
Heating Operation and Adjustments 64
MSAV™ Unit Start-Up 66
MSAV™ Operation 67
Direct Drive Blower Start-Up 68
Hot Gas Reheat Start-Up and Operation 70
Optional Economizer Settings 74
Preventative Maintenance / Repair 77
Factory Unit Controller Settings 83
Decommissioning 85

⚠ 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, jewelery, 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 in jury. 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 TAmin or stored in a space with an area smaller than Amin 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 performaing 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.

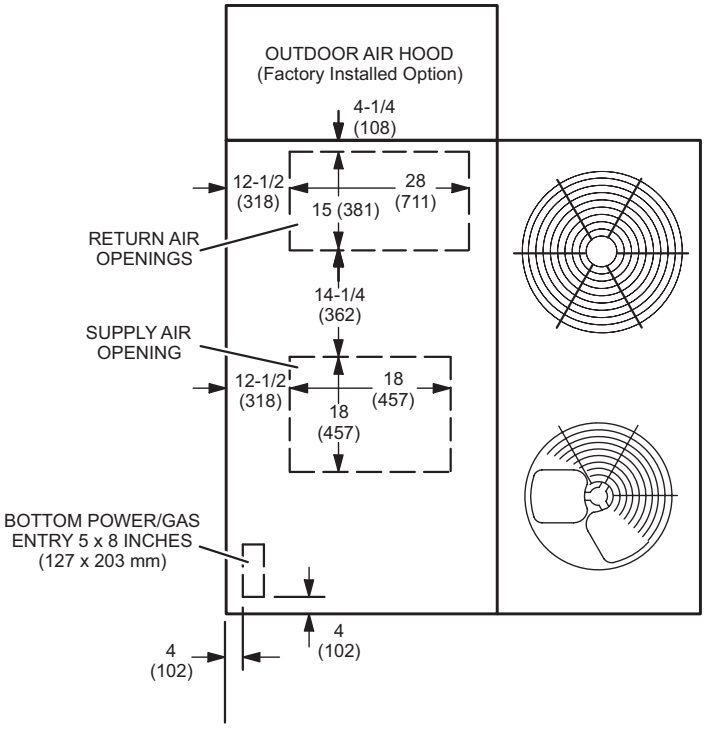
Under no circumstances shall potential sources of ignition be used when searching for or detection of refrigerant leaks. **A halide torch (or any other detector using a naked flame) shall not be used.** Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, 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 zlfollowing procedure shall be adhered to:

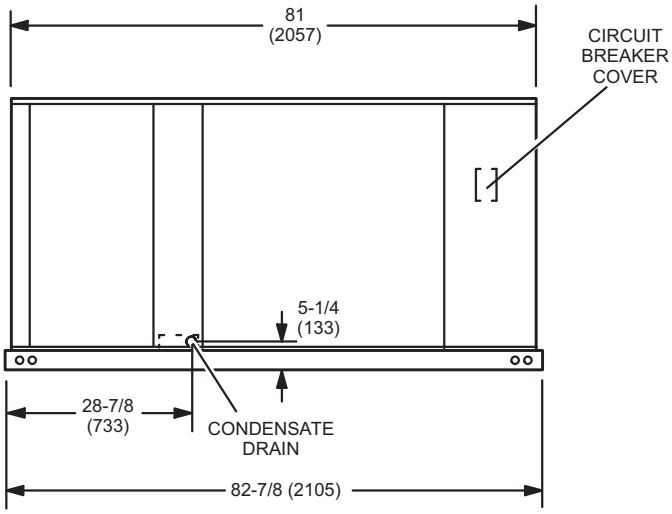
- Safely remove refrigerant following local and national regulations.
- Evacuate the circuit.
- Purge the circuit with inert gas.
- Evacuate.
- Purge the circuit with inert gas.
- Open the circuit

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.

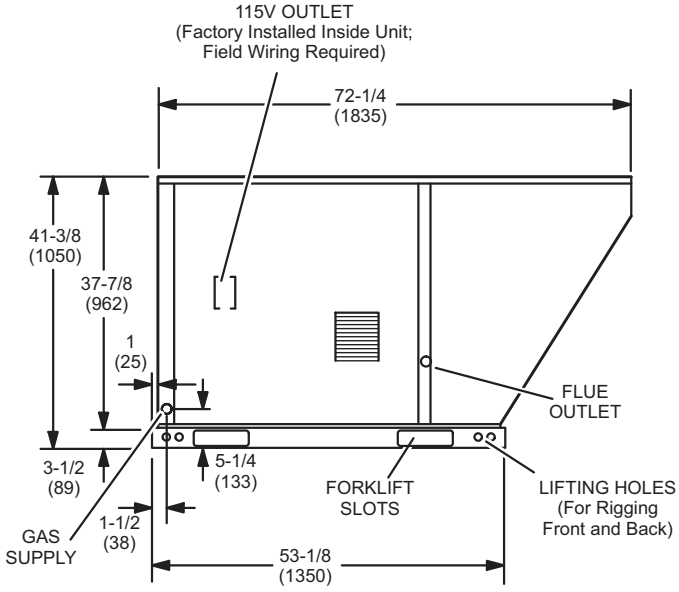
SG / SC 036 & 060 Dimensions - SG Heat Section Shown



TOP VIEW

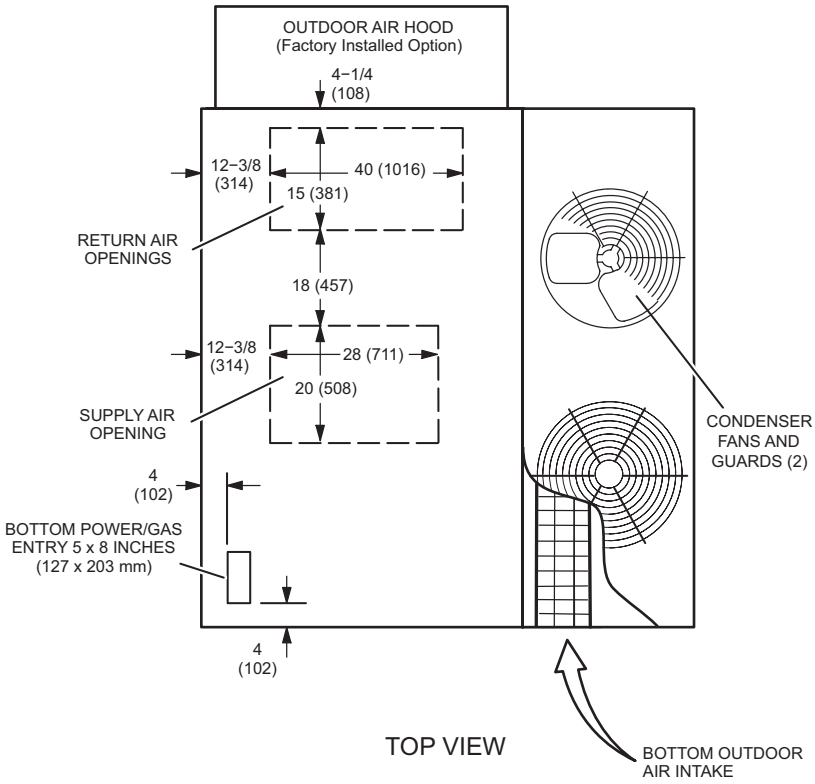


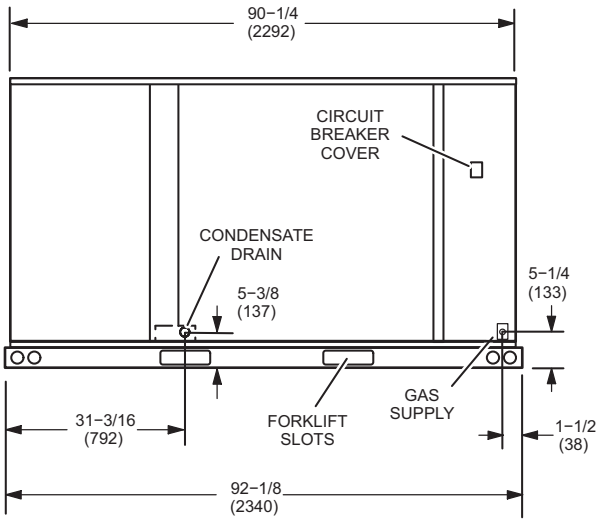
SIDE VIEW

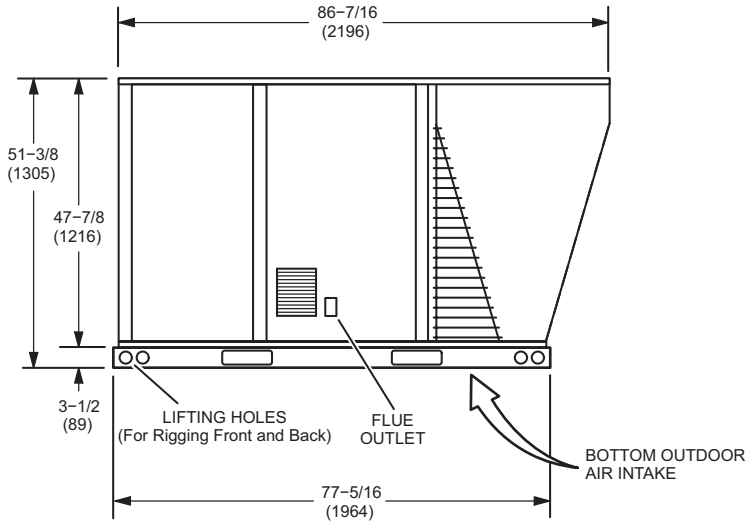


FRONT VIEW

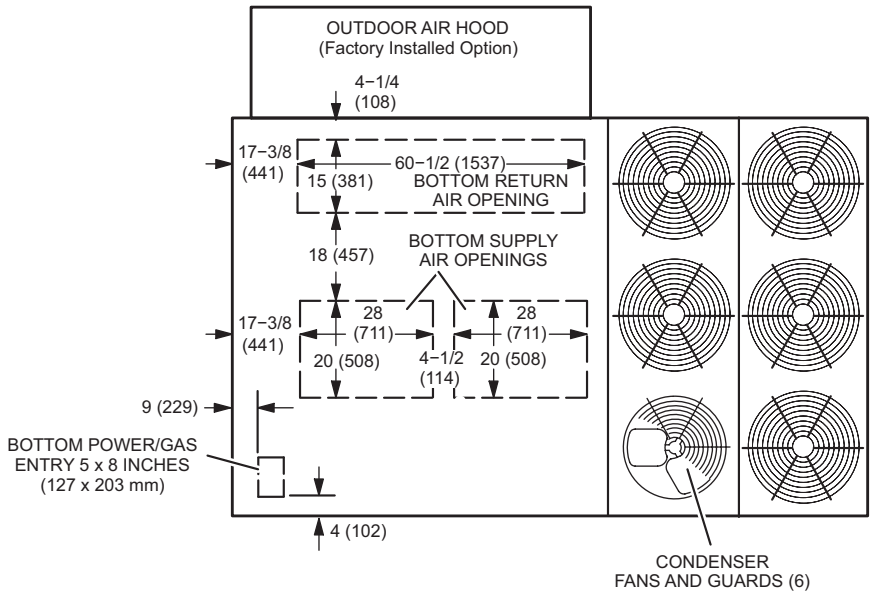
SG / SC 120 Dimensions - SG Heat Section Shown



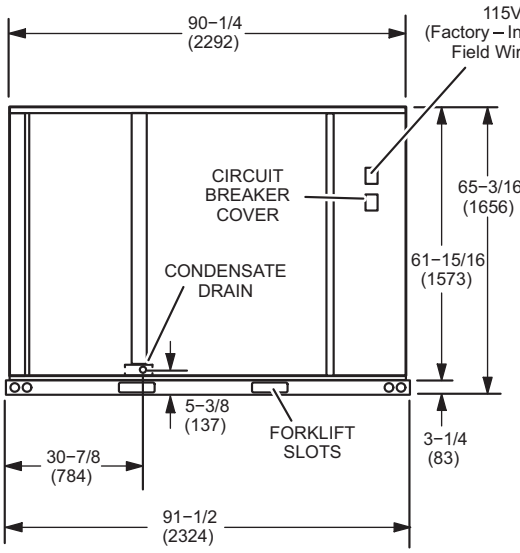




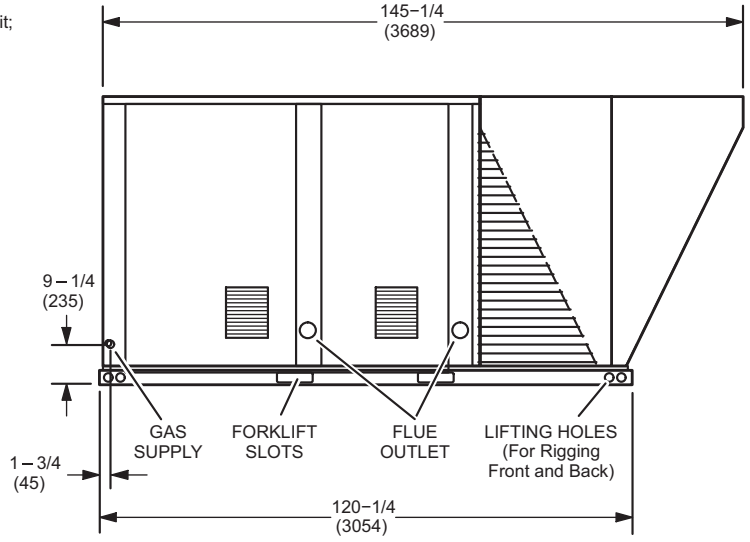
SG / SC 240 Dimensions - SG Heat Section Shown



TOP VIEW

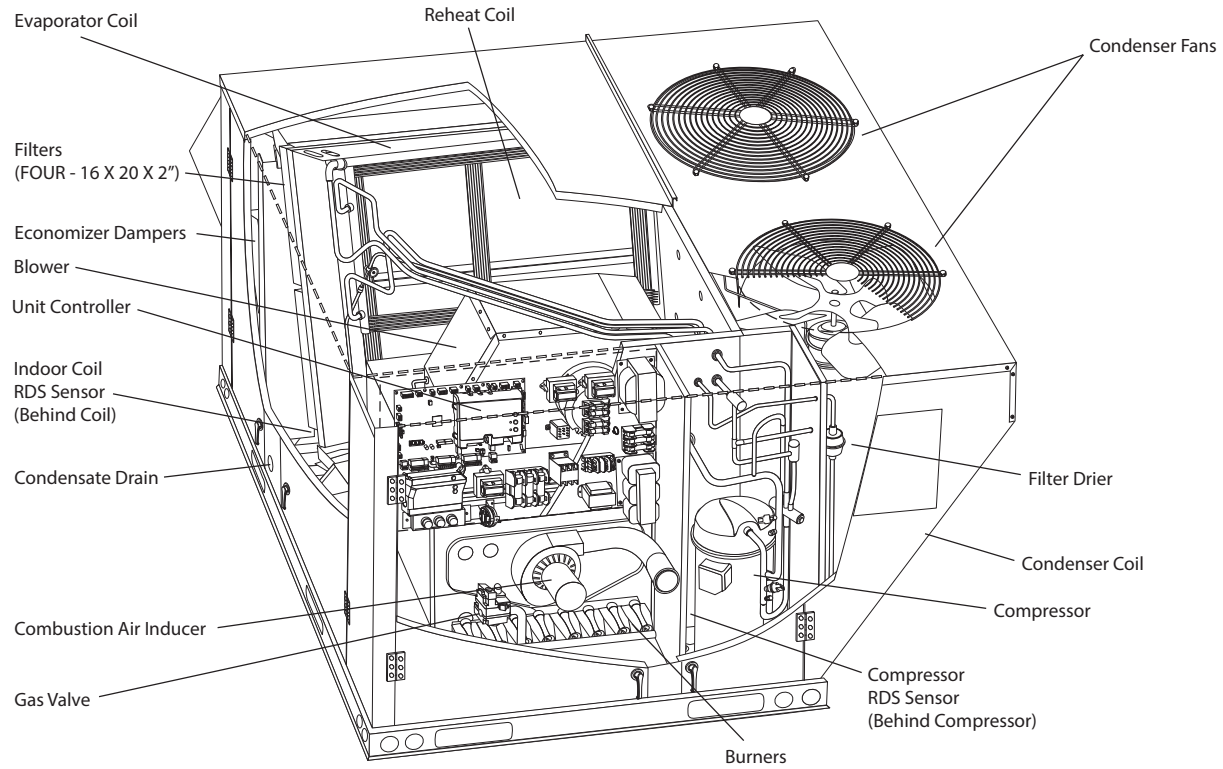


SIDE VIEW

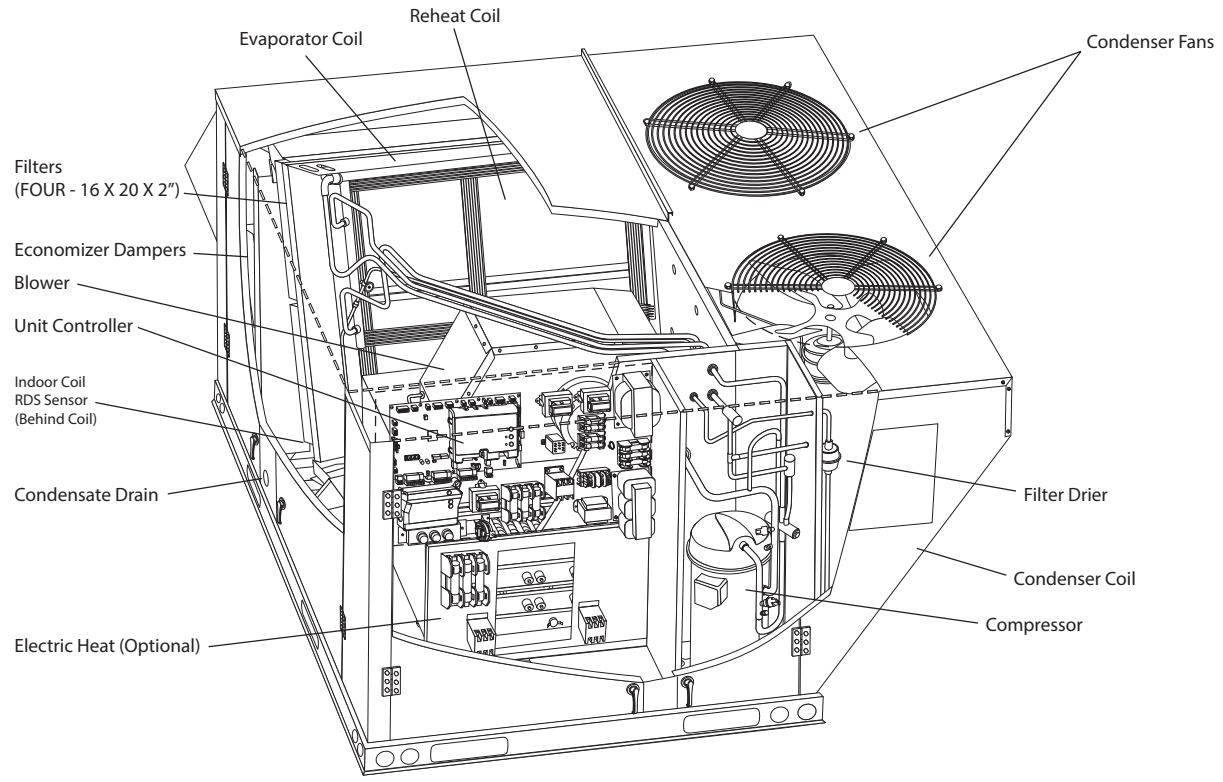


FRONT VIEW

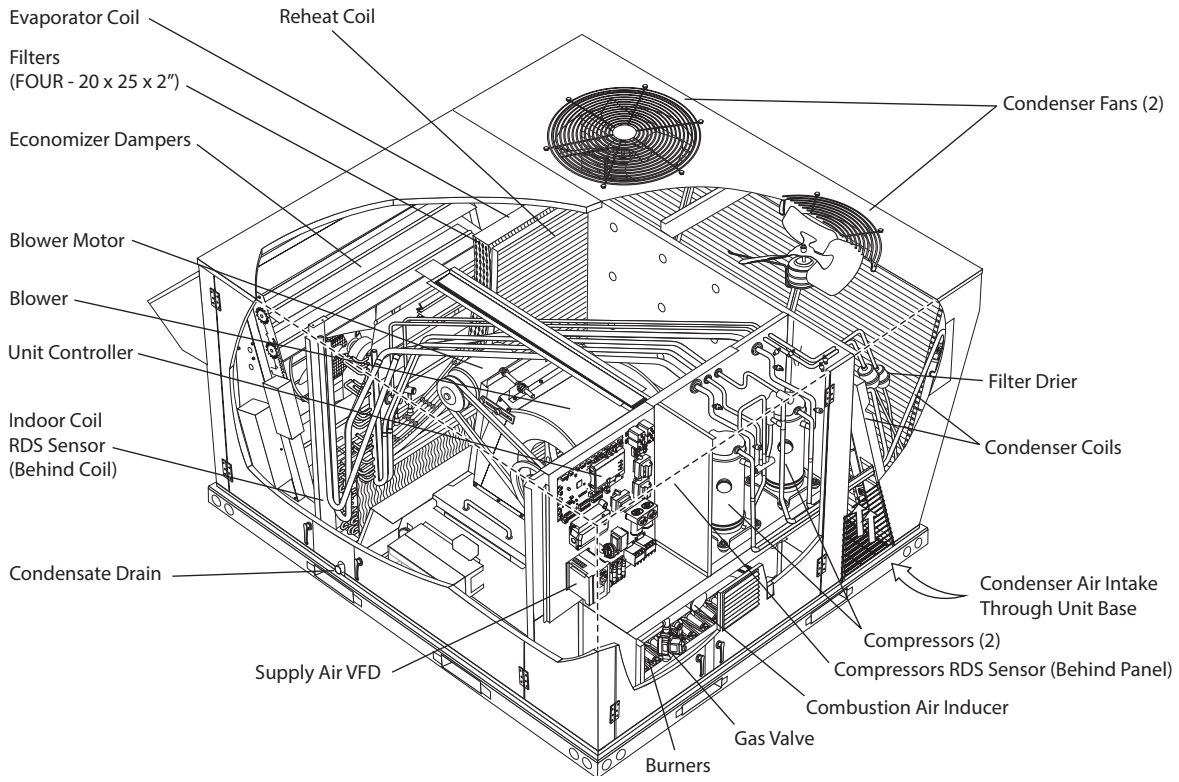
SG 036 & 060 Parts Arrangement



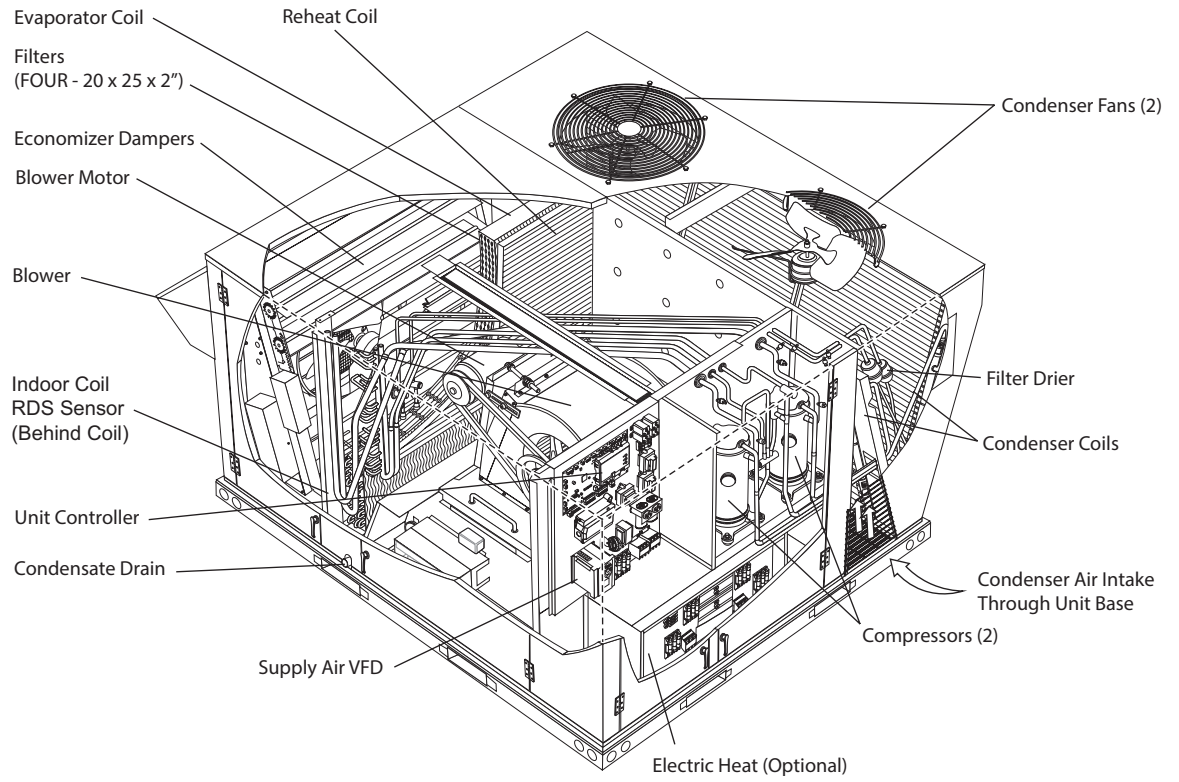
SC 036 & 060 Parts Arrangement



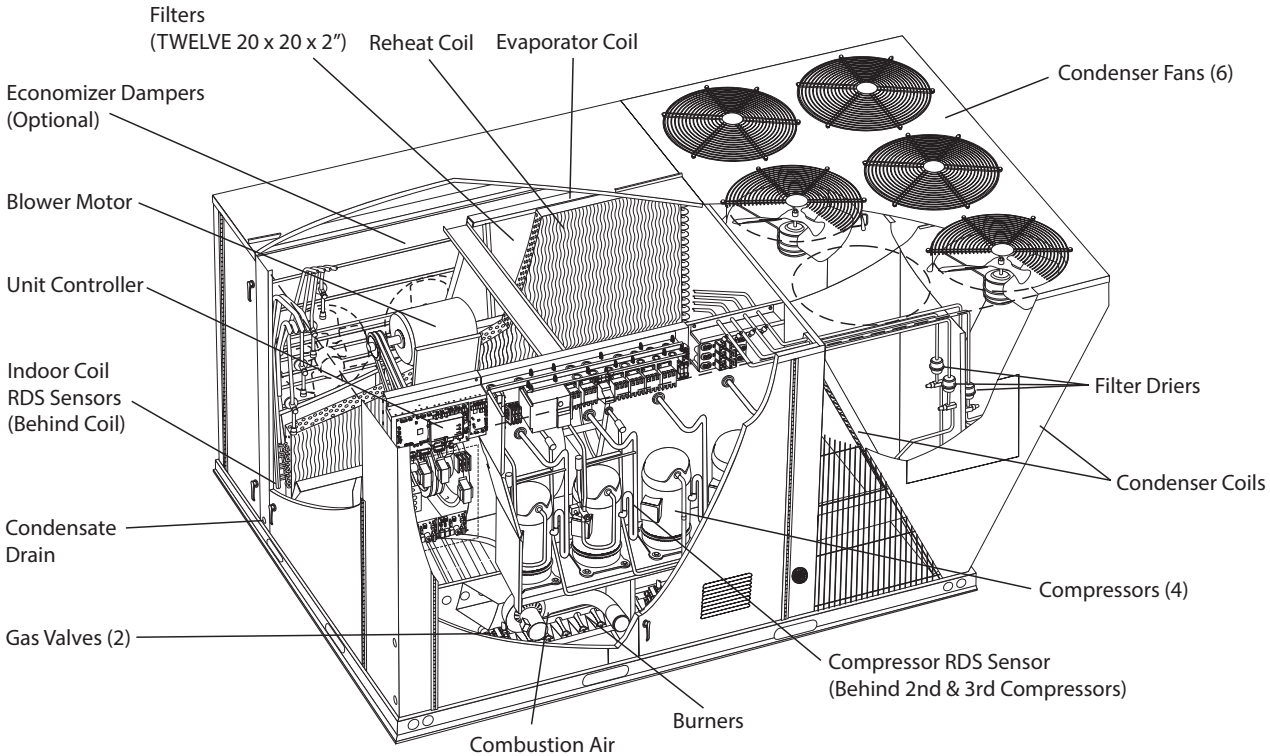
SG 120 Parts Arrangement



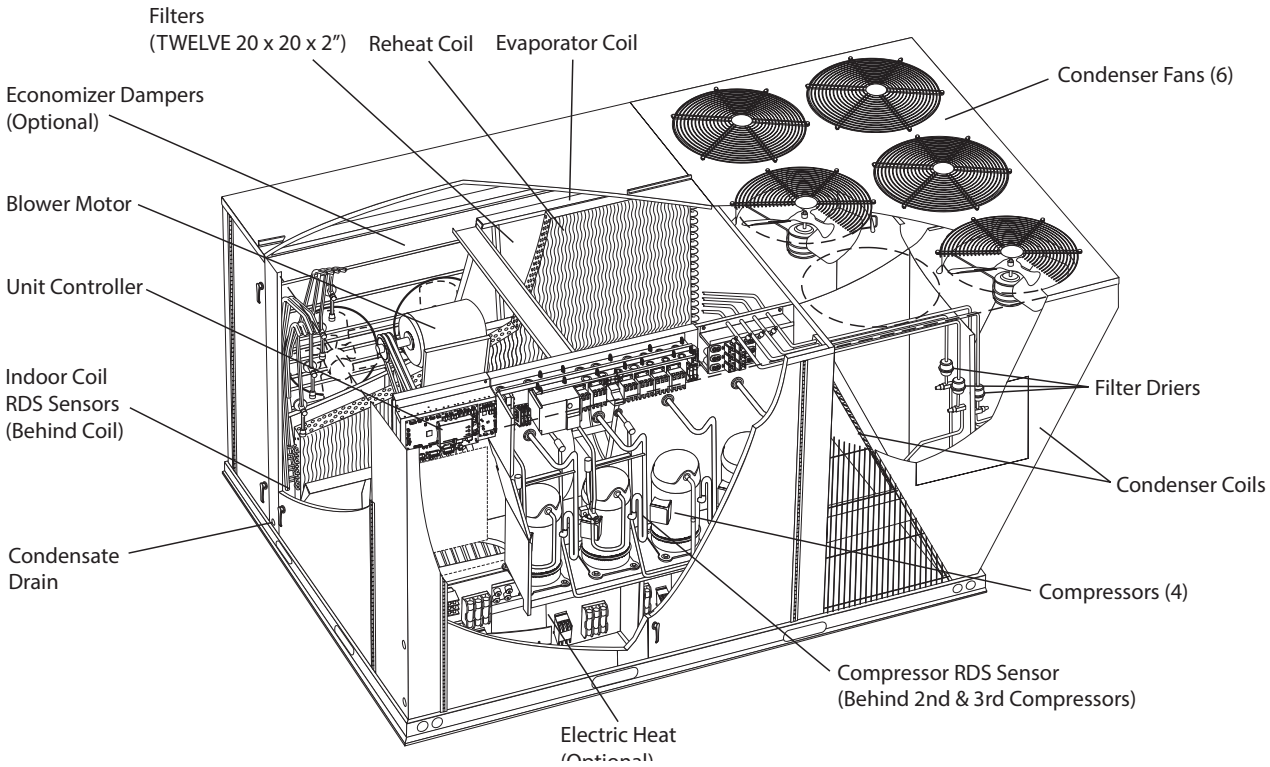
SC 120 Parts Arrangement



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 38) 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.

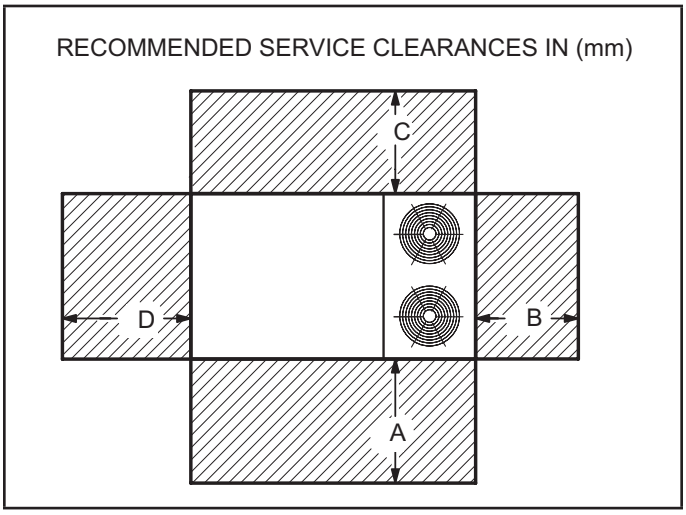


FIGURE 1

[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	
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	**Unobstructed**
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}(m^3h)**
SGH/SCH036	135	230
SGH/SCH060	142	241
SGH/SCH120	185	314
SGH/SCH036 W/ Humidtrol	145	247
SGH/SCH060 W/ Humidtrol	140	238
SGH/SCH120 circ 1W/ Humidtrol	185	314
SGH/SCH 240	177	300
SGH/SCH240 W/ Humiditrol	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}(ft^2)**	**TA_{min}(m^2)**
SGH/SCH036	76	6.97
SGH/SCH060	79	7.31
SGH/SCH120	103	9.53
SGH/SCH036 W/ Humidtrol	81	7.49
SGH/SCH060 W/ Humidtrol	78	7.21
SGH/SCH120 circ 1W/ Humidtrol	103	9.53
SGH/SCH 240	98	9.10
SGH/SCH240 W/ Humiditrol	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/ 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/ Humiditrol Stage 1	7.75	3.52
SGH/SCH240 W/ Humiditrol Stage 2	7.19	3.26
SGH/SCH240 W/ Humiditrol Stage 3	5.31	2.41
SGH/SCH240 W/ Humiditrol 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 see 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 - Donwflow 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 overhand the roof mounting frame as shown in FIGURE 2.

UNIT ON CURB LOCATION - SG/SC 120 - in (mm)

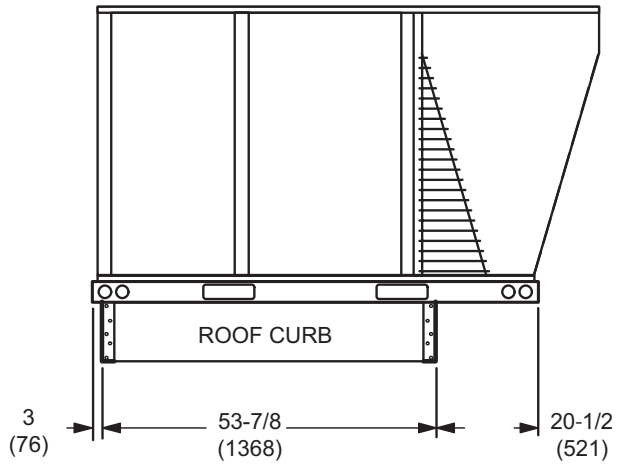
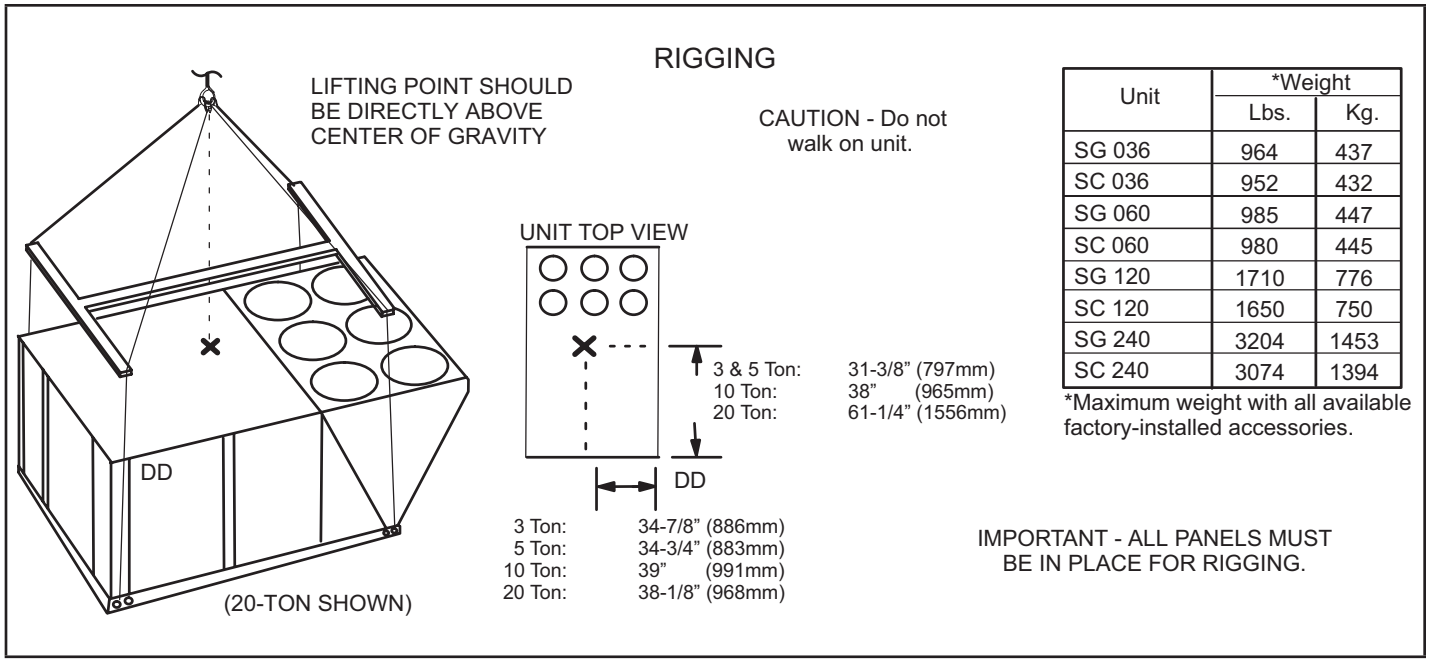


FIGURE 2



Unit	*Weight	
	Lbs.	Kg.
SG 036	964	437
SC 036	952	432
SG 060	985	447
SC 060	980	445
SG 120	1710	776
SC 120	1650	750
SG 240	3204	1453
SC 240	3074	1394

*Maximum weight with all available factory-installed accessories.

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 not. 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.

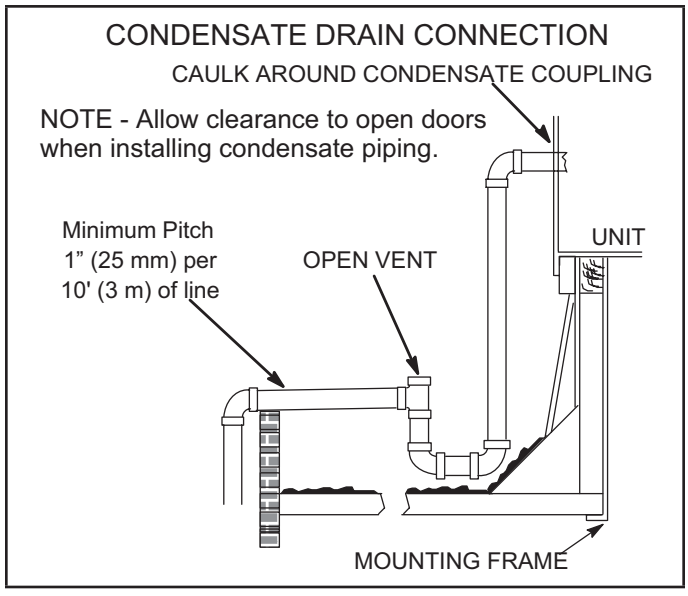


FIGURE 4

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. (.12kPa) 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 49 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 bottom 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.*

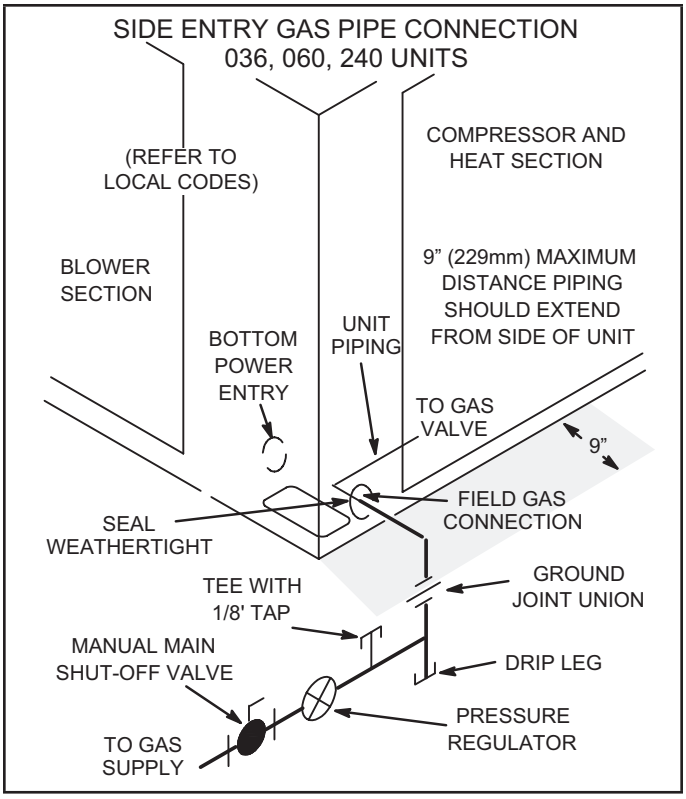


FIGURE 5

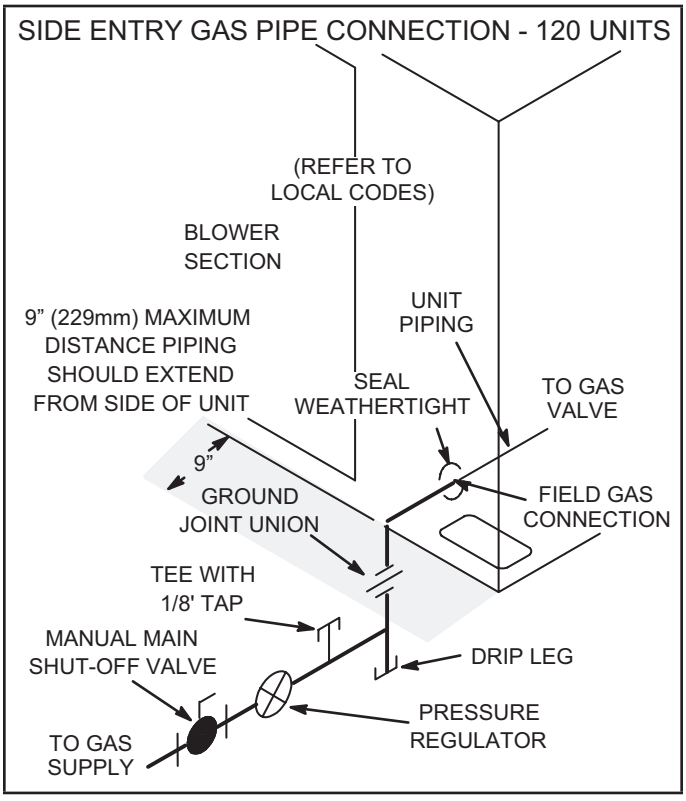


FIGURE 6

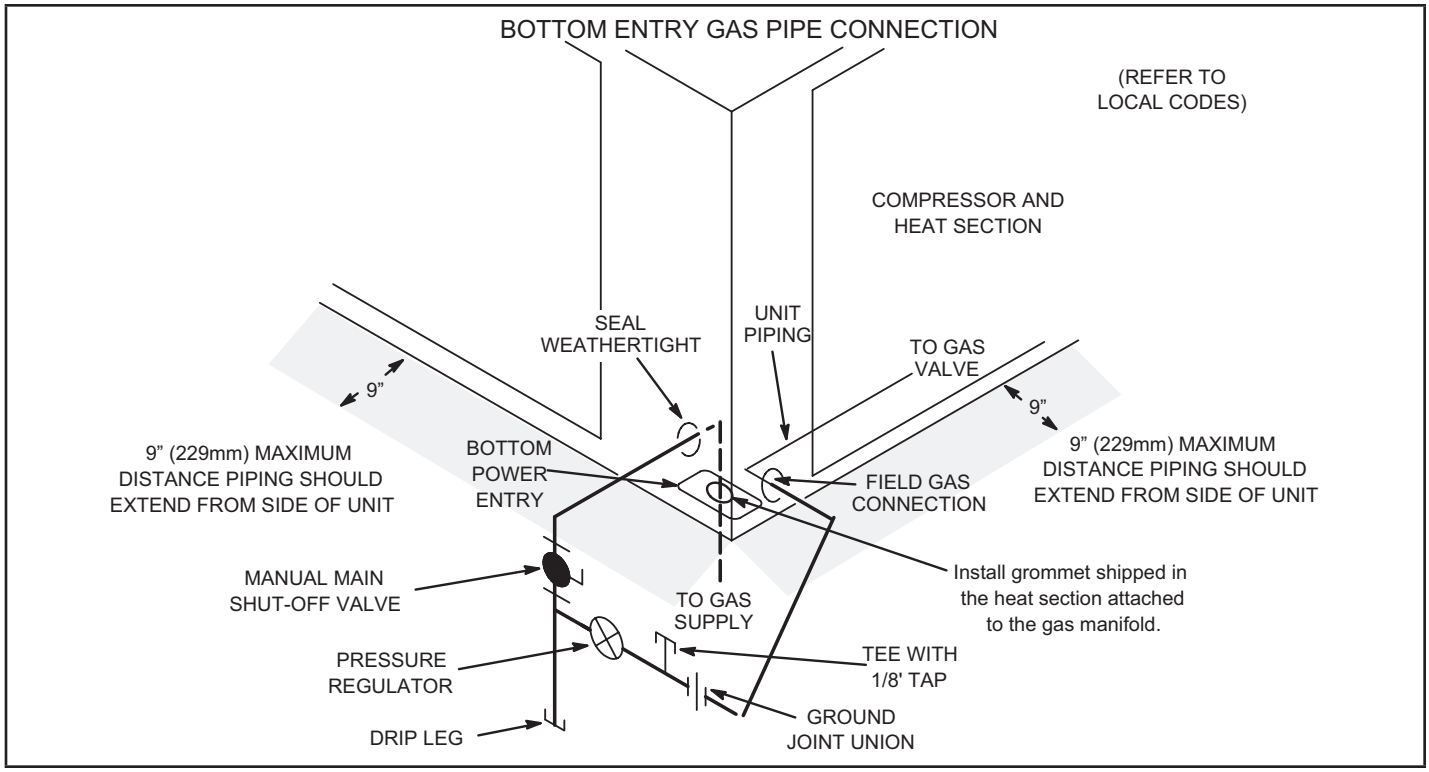


FIGURE 7

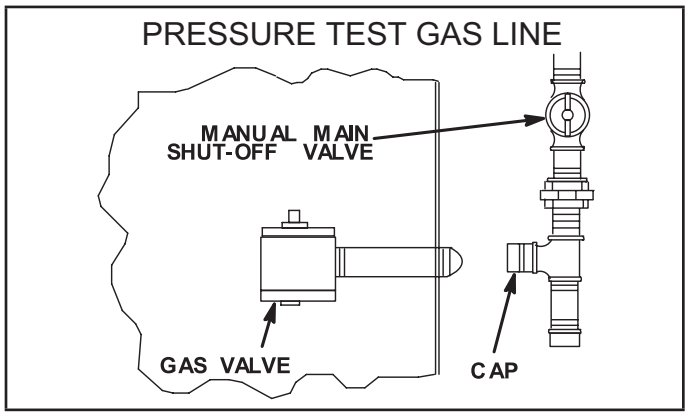


FIGURE 8

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.

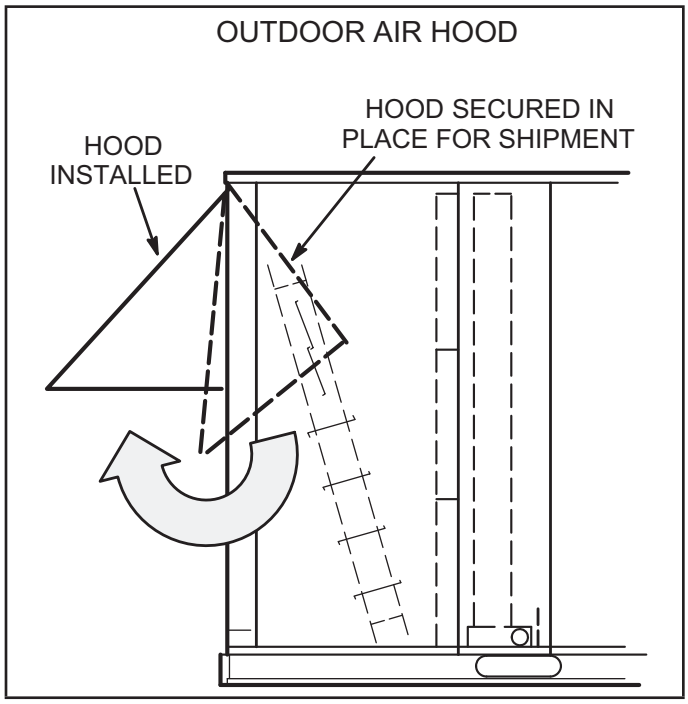


FIGURE 9

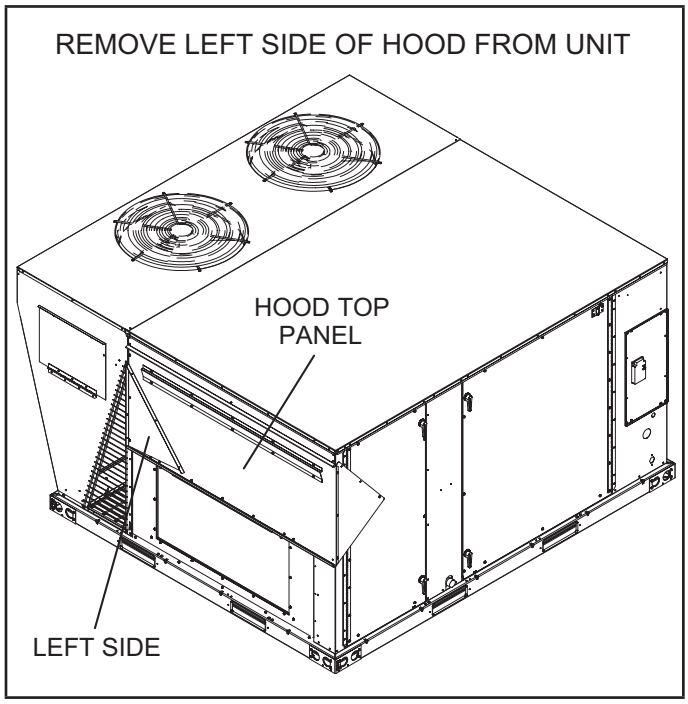


FIGURE 10

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.

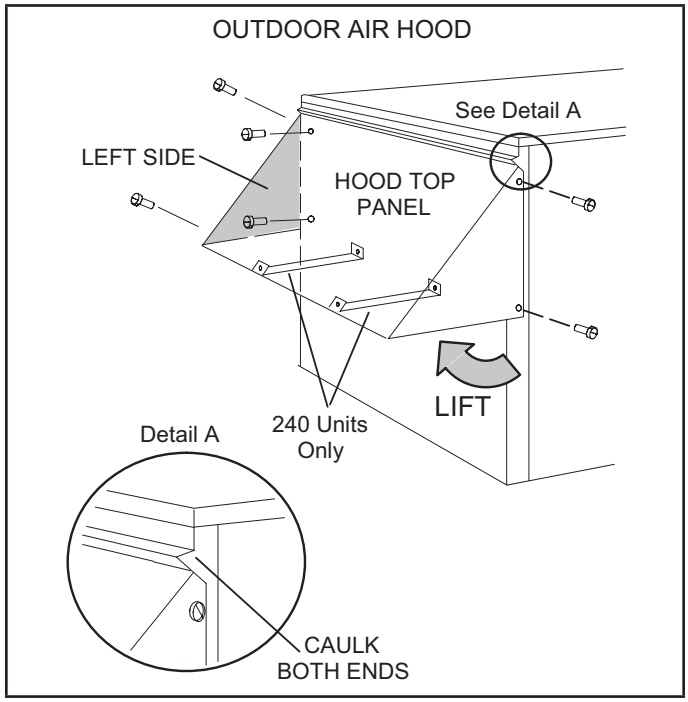


FIGURE 11

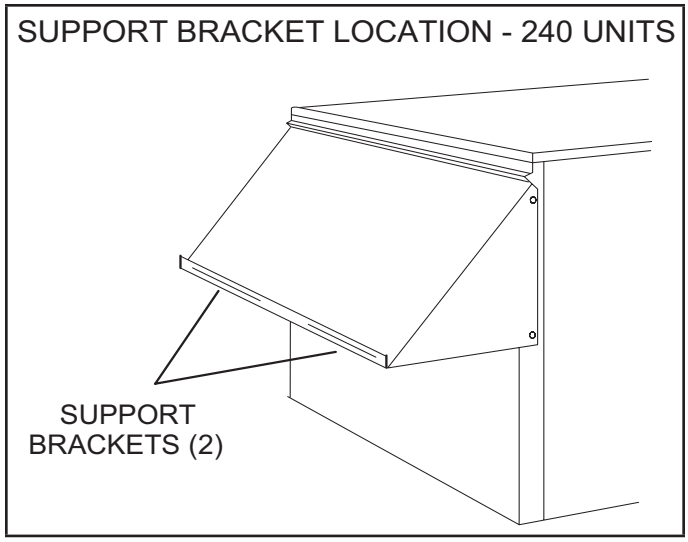


FIGURE 12

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.

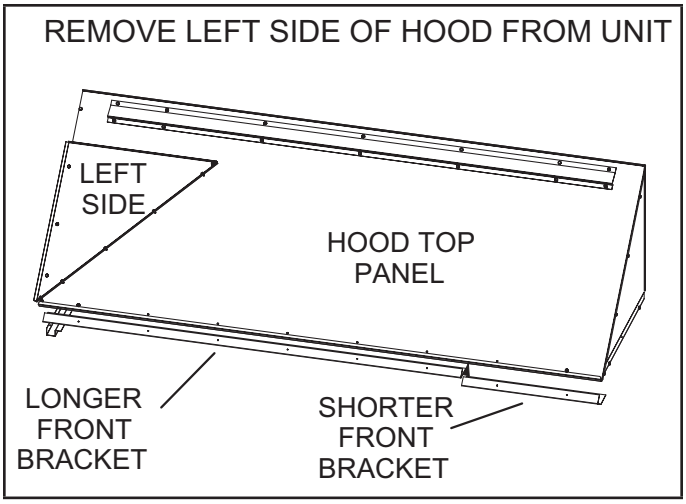


FIGURE 13

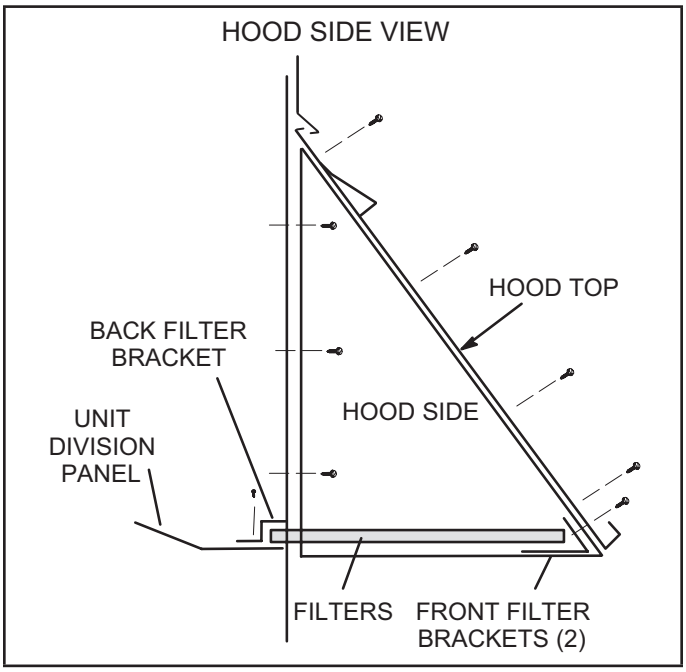


FIGURE 14

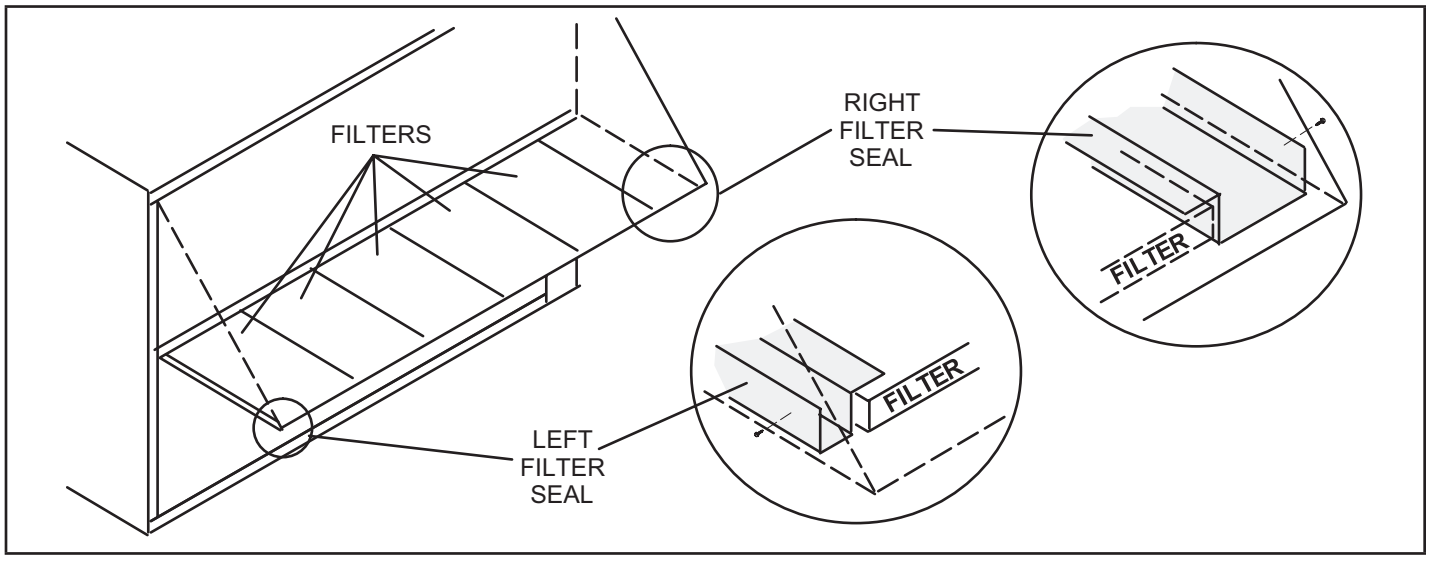


FIGURE 15

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 electro static 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.

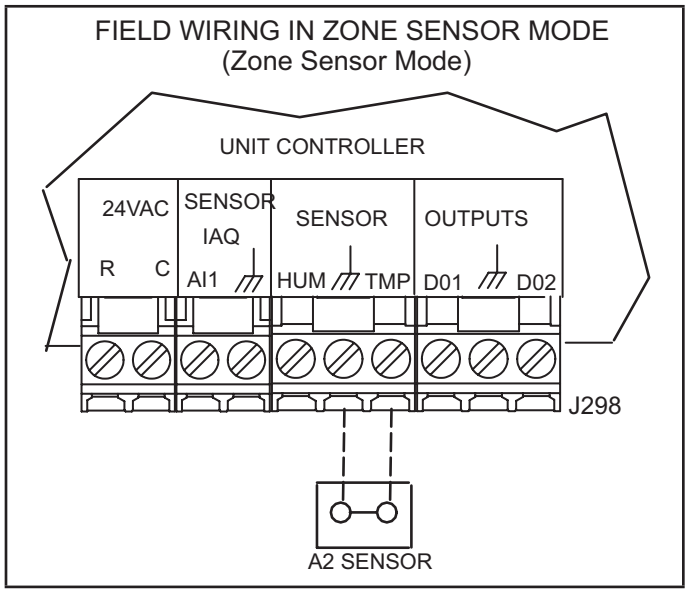


FIGURE 16

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.

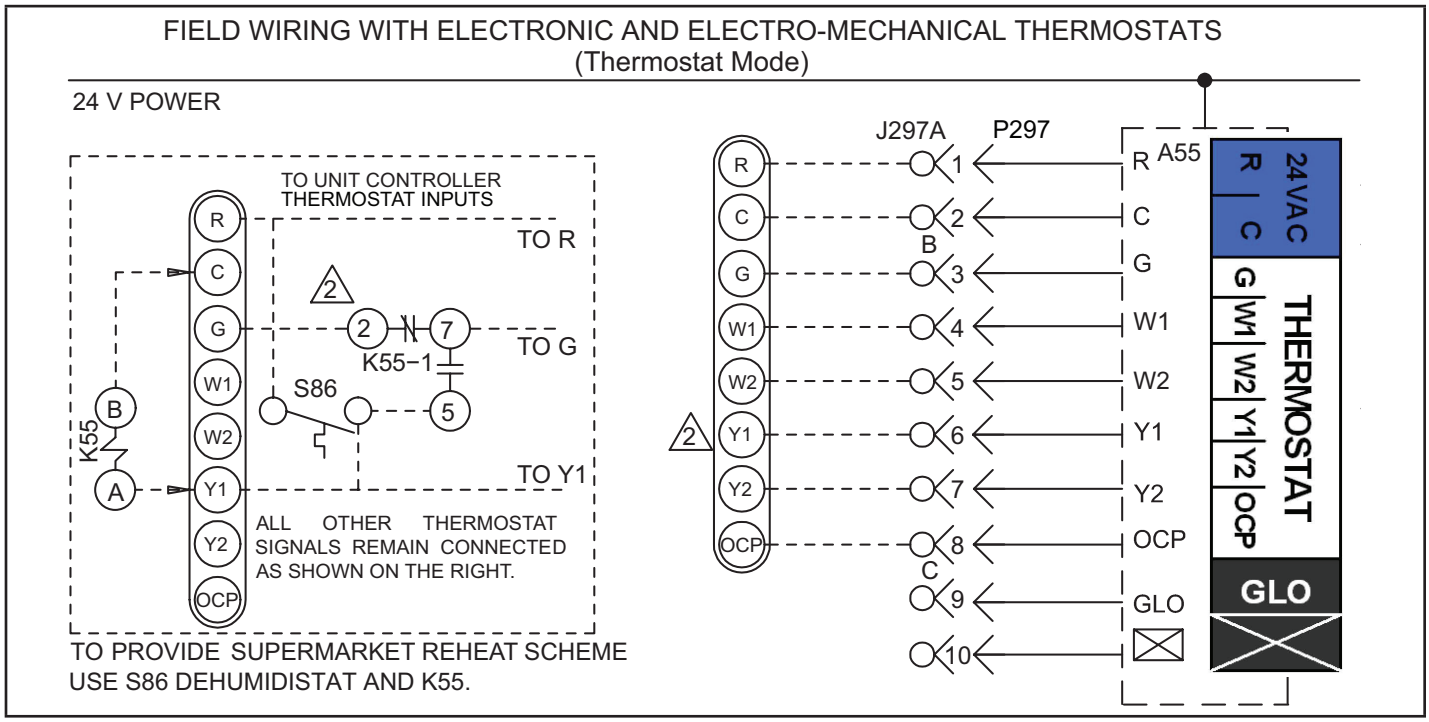


FIGURE 17

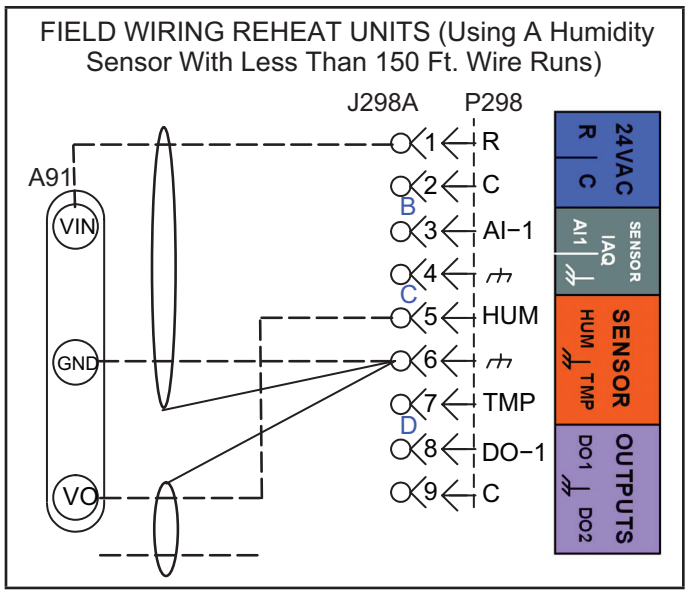


FIGURE 18

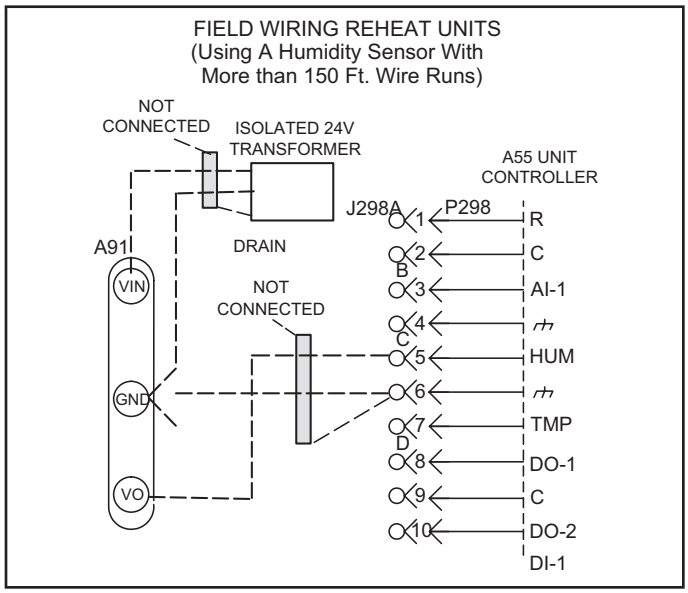


FIGURE 19

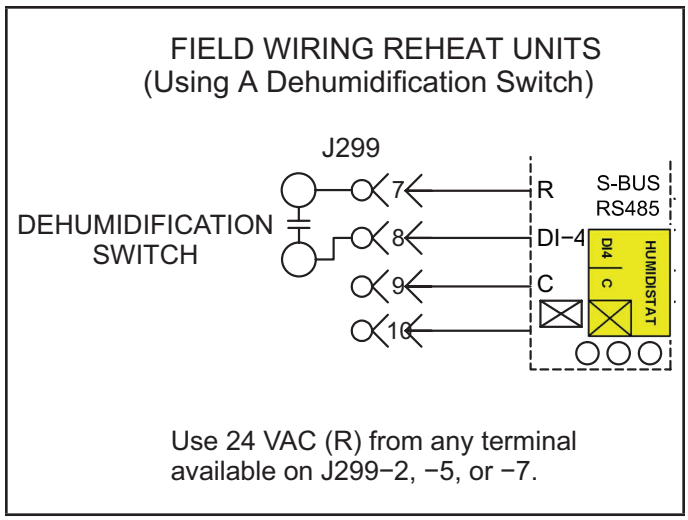


FIGURE 20

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.

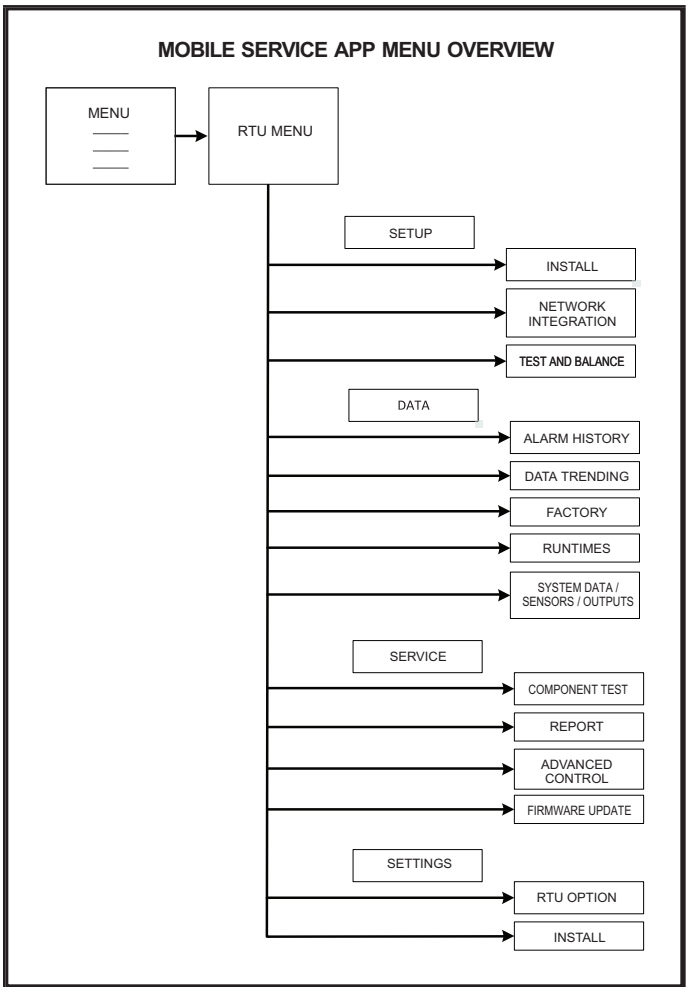


FIGURE 21

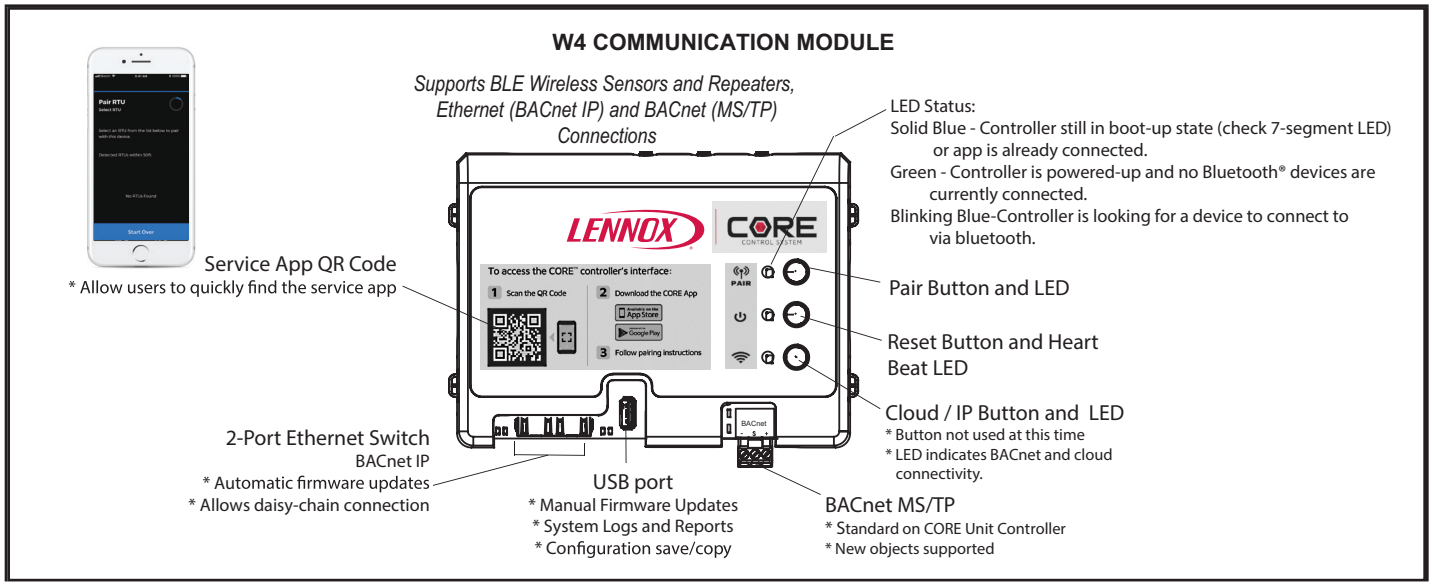


FIGURE 22

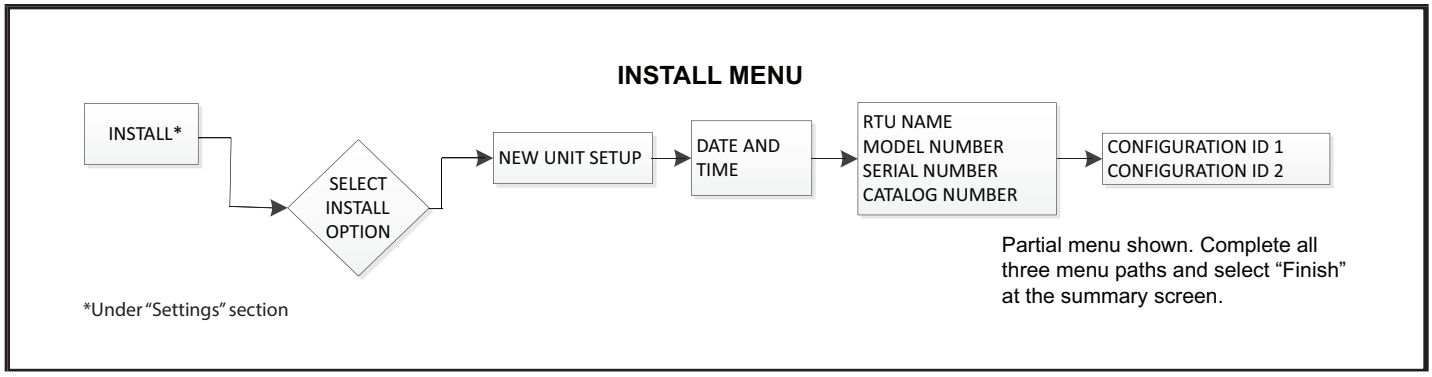


FIGURE 23

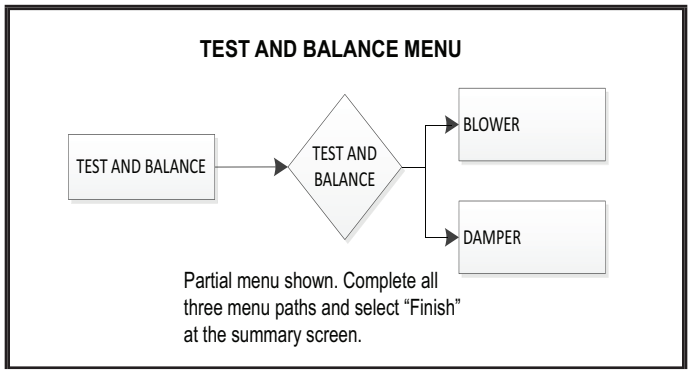


FIGURE 24

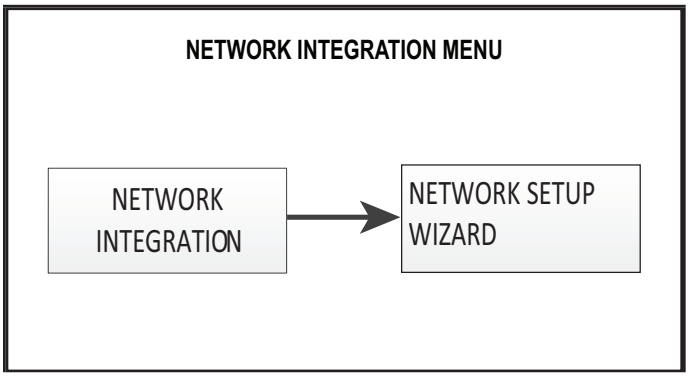


FIGURE 25

E-Unit Controller Components

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

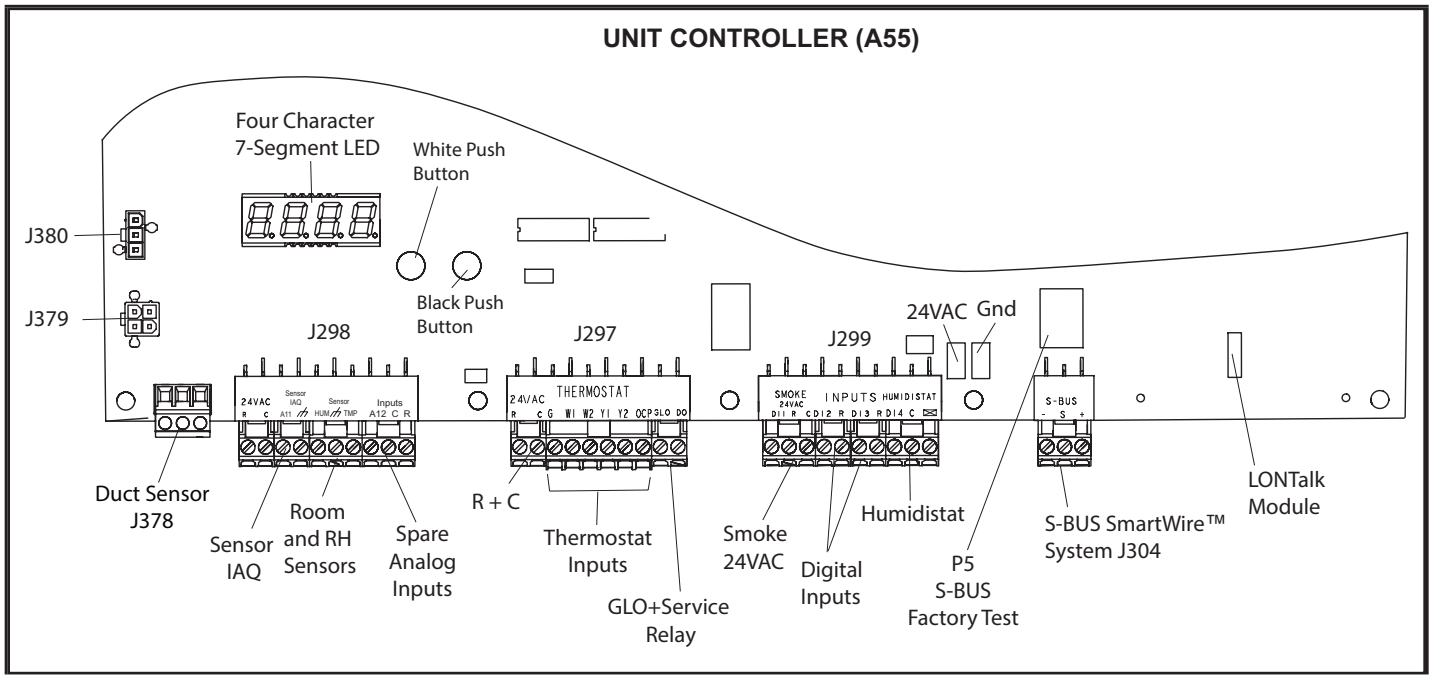
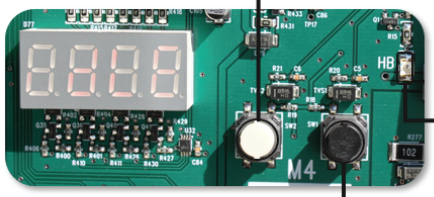


FIGURE 26



TEST BUTTON

* Short press will put the unit into test mode - tESt
* Long press will put the unit into setup mode for two-stage thermostat - StAt

HB LED – blinks while M4 is powered

RESET BUTTON

* Short press will clear unit delays (lockouts) - CLdL
* Long press will reset the M4 Unit Controller - rSt

* Short press is about 2 to 5 seconds in duration.
* Long press is about 5 to 8 seconds in duration

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

Belt Drive With Supply Air Inverter or Direct Drive Units - The blower rotation will always be correct on units equipped with an inverter or a direct drive blower. Checking blower rotation is not a valid method of determining voltage phasing for incoming power.

Units Equipped With Belt Drive Blowers Controlled by an Inverter OR Direct Drive Blowers Equipped With Optional 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-Blower Operation

NOTE - *On units with staged blowers, use the Unit Controller to start the blower. Refer to the appropriate start-up section.*

Initiate blower demand at thermostat according to instructions provided with thermostat. Unit will cycle on thermostat demand. The following steps apply to applications using a typical electro-mechanical thermostat. MSAV™ units refer to the Optional Supply Air VFD section.

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

The blower assembly is secured to a sliding frame which allows the blower motor assembly to be pulled out of the unit. See FIGURE 28, FIGURE 29, or FIGURE 30.

Belt Drive Blowers

1 - Disconnect wiring to heating limit switches and mixed air sensor (units with economizer).

2 - Remove screws on either side of blower assembly sliding base. See FIGURE 29 or FIGURE 30.

3 - Pull base toward outside of unit.

Direct Drive Blowers

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.

3 - Slide frame back into original position when finished servicing. Reattach the blower wiring in the previous location on the blower motor base using the wire tie.

Replace retained screws in front and on either side of the blower housing. See FIGURE 28.

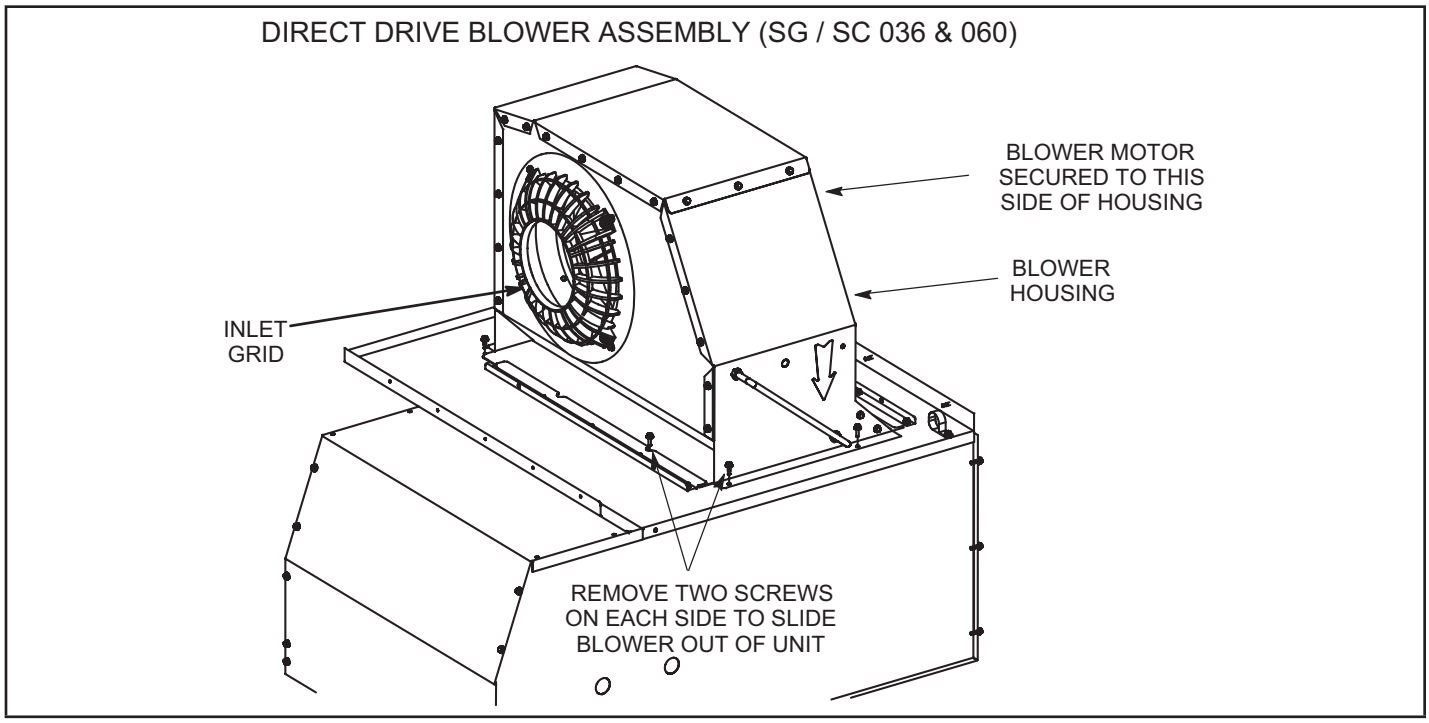


FIGURE 28

BLOWER ASSEMBLY (SG / SC 120)

TO INCREASE BELT TENSION

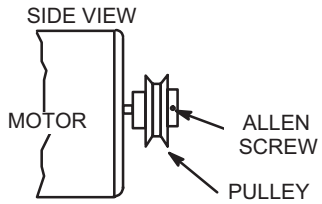
1-Loosen front and back screws securing pivoting motor base to slotted arm.

2-Turn adjusting bolt to the right, or clockwise, to move the motor outward and tighten the belt.

3-Tighten pivoting base screw on motor pulley (front) side.

IMPORTANT - Align top edges of pivoting motor base and mounting frame base parallel before tightening the screw on the back side of base. Motor shaft and blower shaft must be parallel.

4-Tighten pivoting base screw on back side of base.



TO INCREASE CFM
LOOSEN ALLEN SCREW & TURN PULLEY CLOCKWISE

TO DECREASE CFM
TURN PULLEY COUNTERCLOCKWISE

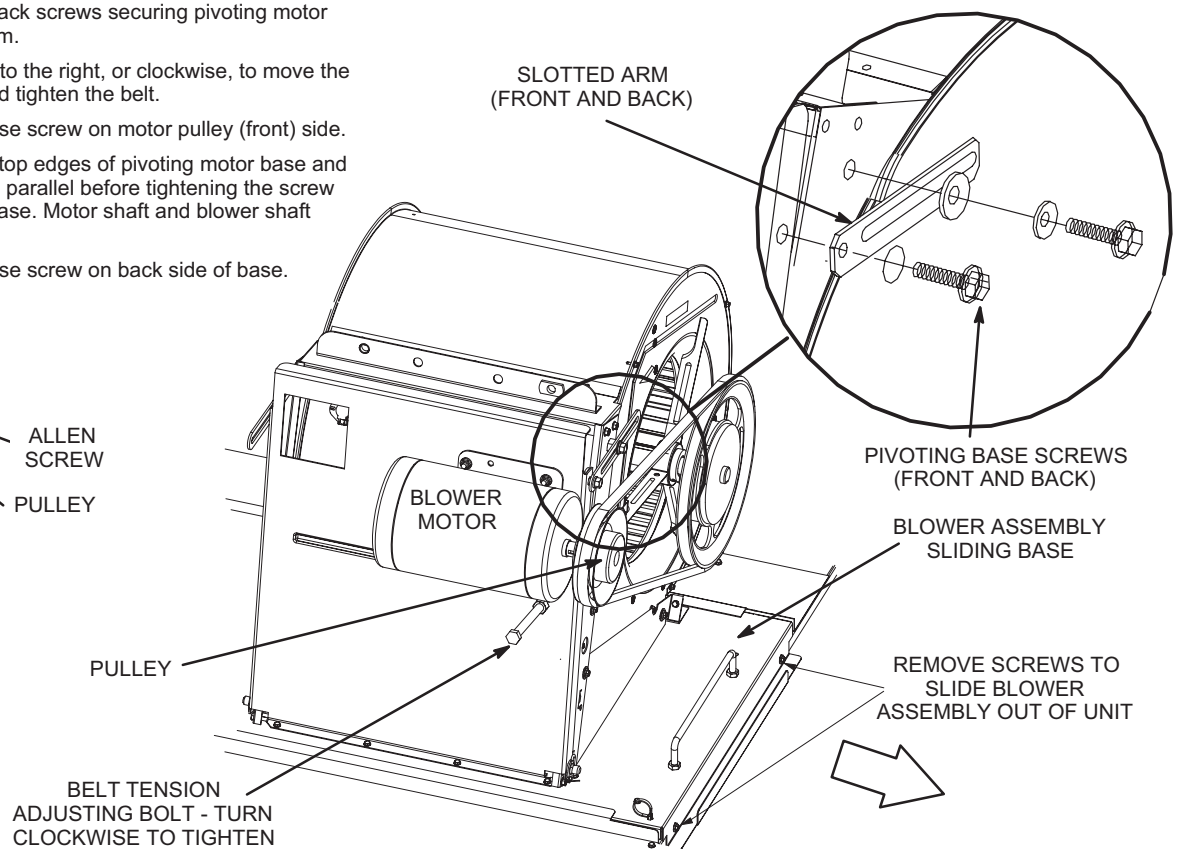


FIGURE 29

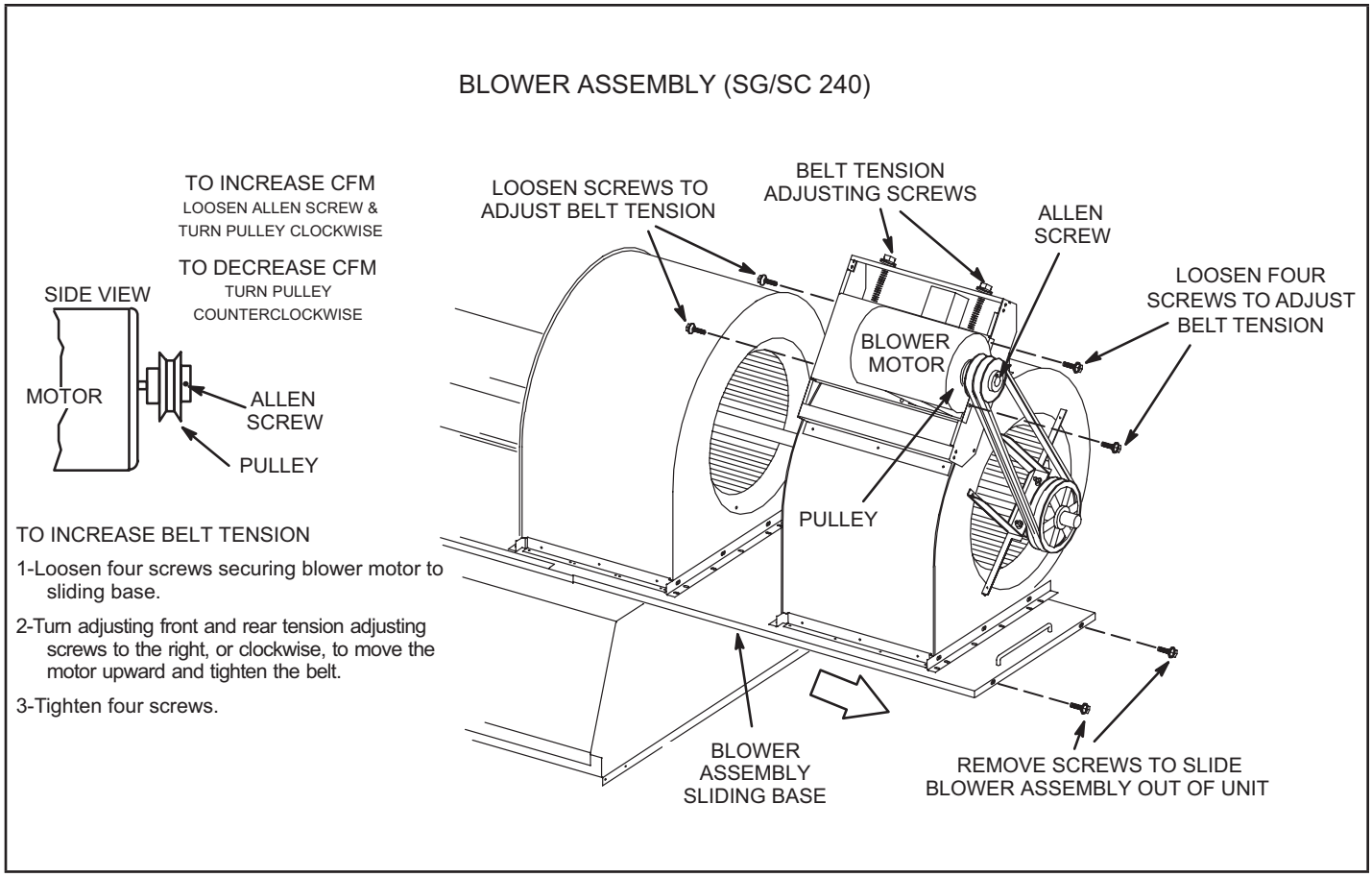


FIGURE 30

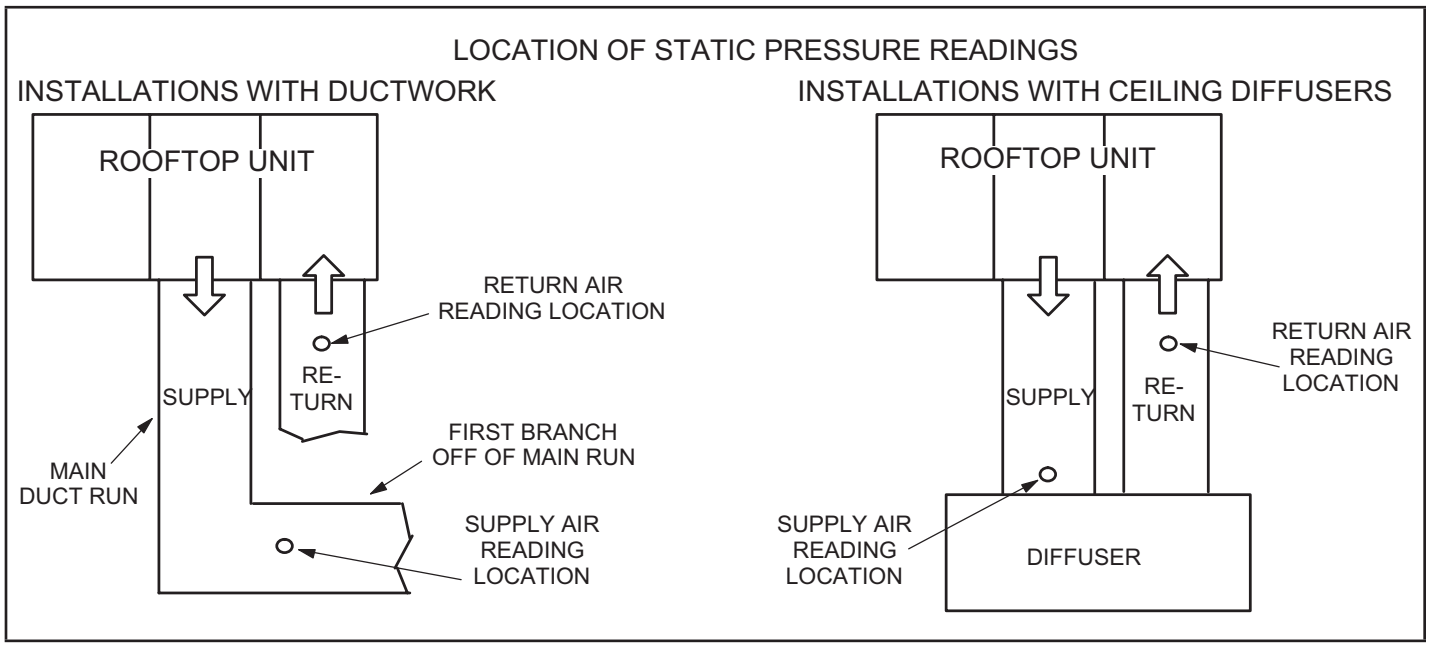


FIGURE 31

C-Determining Unit CFM (with wet coil)

Belt Drive Blowers Controlled by an Inverter

IMPORTANT - MSAV™ units are factory-set to run the blower at full speed when there is a blower (G) demand without a heating or cooling demand. Refer to the field-provided, design specified CFM for all modes of operation. Use the following procedure to adjust motor pulley to deliver the highest CFM called for in the design spec. See MSAV™ Start-Up section to set blower CFM for all modes once the motor pulley is set.

IMPORTANT - Direct drive variable blower unit CFM is determined by the Unit Controller. Refer to the Direct Drive Variable Speed Start-Up section.

1 - Measure the indoor blower motor RPM. 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 readings taken in locations shown in FIGURE 31.

NOTE - *Static pressure readings can vary if not taken where shown.*

3 - Referring to page 28 through page 34, use static pressure and RPM readings to determine unit CFM.

4 - The blower RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. See FIGURE 28, FIGURE 29, or FIGURE 30. Do not exceed minimum and maximum number of pulley turns as shown in TABLE 4.

TABLE 4

Mininum and Maximum Pulley Adjustment

Belt	Minimum Turns Open	Maximum Turns Open
A Section	0	5
B Section	1*	6

*No minimum number of turns open when B belt is used on pulleys 6-inch O.D. or larger.

D-Adjust Belt Tension

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belt after a 24-48 hour period of operation. This will allow belt to stretch and seat to grooves. Make sure blower and motor pulley are aligned as shown in FIGURE 32. See FIGURE 28, FIGURE 29 or FIGURE 30 to adjust belt tension.

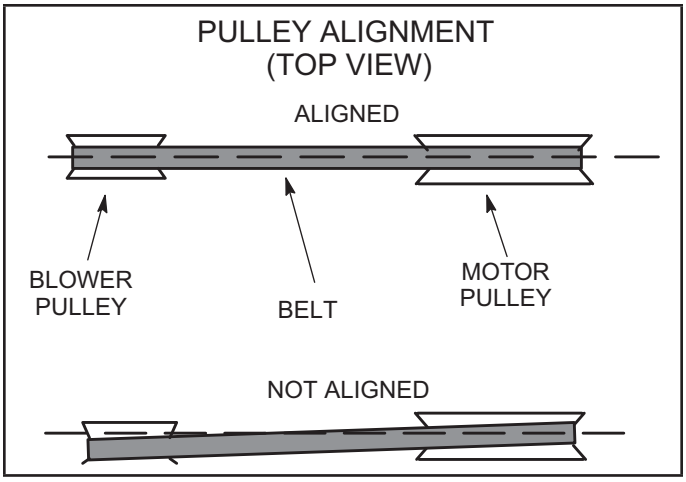


FIGURE 32

E-Check Belt Tension

Overtensioning belts shortens belt and bearing life. Check belt tension as follows:

1 - Measure span length (X). See FIGURE 33.

2 - Apply perpendicular force to center of span (X) with enough pressure to deflect belt 1/64" for every inch of span length or 0.4mm per 25.4mm of span length.

Example: Deflection distance of a 40" span would be 40/64" or 5/8".

Example: Deflection distance of a 1016mm span would be 16mm.

3 - Measure belt deflection force. The deflection force should be 7.0 lbs.

A force below these values indicates an undertensioned belt. A force above these values indicates an overtensioned belt.

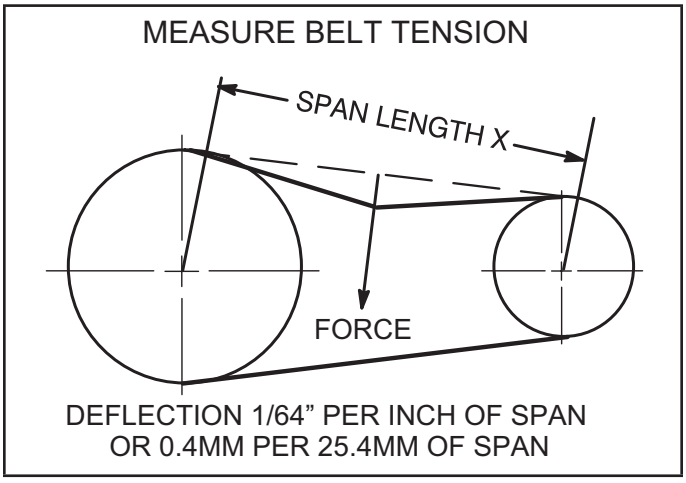


FIGURE 33

F-Blower Drives

Use the following belt drive tables to determine BHP and RPM required. Reference TABLE 15 to determine the drive numbers and TABLE 16 and TABLE 17 to determine the manufacturer's model number.

BLOWER DATA

SGH036H / SGH060H BLOWER PERFORMANCE

NOTE - Blower Table includes Resistance for base unit with Gas Heat, Wet Indoor Coil, and Air Filters in place.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH SGH036H MODELS WITH MEDIUM 2 STAGE HEAT OPTION - 1475 CFM

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	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

SGH036H / SGH060H BLOWER PERFORMANCE
NOTE - Blower Table includes Resistance for base unit with Gas Heat, Wet Indoor Coil, and Air Filters in place.
MINIMUM AIR VOLUME REQUIRED FOR USE WITH SGH036H MODELS WITH MEDIUM 2 STAGE HEAT OPTION - 1475 CFM

Air Volume cfm	EXTERNAL STATIC PRESSURE - in. w.g.																			
	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

SGH120HM BLOWER PERFORMANCE
NOTE - Blower Table includes Resistance for base unit with Gas Heat, Wet Indoor Coil, and Air Filters in place.
See Blower Motor / Drive Kit table on page 35 for Motor HP and Drive Kit RPM ranges available.

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	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	439	0.31	480	0.40	522	0.48	565	0.56	607	0.63	647	0.70	685	0.76	719	0.82	753	0.90	785	0.99	816	1.09	846	1.18	874	1.27
2200	454	0.38	496	0.47	538	0.56	581	0.63	622	0.71	661	0.78	698	0.84	732	0.92	765	1.01	798	1.11	830	1.21	859	1.31	887	1.41
2400	470	0.45	512	0.55	555	0.64	598	0.72	638	0.79	676	0.87	711	0.94	745	1.02	779	1.13	813	1.24	845	1.35	875	1.46	902	1.55
2600	487	0.53	530	0.63	573	0.72	615	0.81	655	0.89	691	0.97	726	1.05	760	1.14	795	1.26	829	1.39	861	1.51	892	1.62	920	1.71
2800	506	0.62	549	0.73	592	0.82	634	0.91	672	0.99	707	1.08	741	1.17	776	1.28	811	1.42	846	1.55	879	1.67	909	1.79	938	1.89
3000	525	0.72	569	0.83	613	0.93	653	1.02	689	1.11	724	1.20	758	1.31	793	1.44	829	1.58	864	1.72	897	1.85	928	1.97	956	2.08
3200	547	0.84	591	0.95	634	1.05	672	1.14	707	1.23	741	1.34	776	1.47	812	1.61	848	1.76	883	1.91	916	2.04	946	2.16	975	2.28
3400	570	0.96	614	1.07	655	1.18	692	1.28	726	1.38	759	1.51	794	1.65	831	1.81	867	1.96	901	2.11	934	2.25	965	2.37	993	2.48
3600	594	1.09	638	1.21	676	1.32	711	1.43	744	1.55	778	1.69	814	1.85	850	2.01	886	2.18	920	2.33	953	2.47	983	2.59	1011	2.70
3800	620	1.24	661	1.36	698	1.48	731	1.60	763	1.73	797	1.89	833	2.06	869	2.24	904	2.40	939	2.55	971	2.69	1001	2.81	1029	2.92
4000	647	1.40	685	1.53	719	1.66	751	1.79	782	1.94	816	2.11	852	2.29	887	2.47	923	2.63	957	2.78	988	2.91	1018	3.03	1047	3.14
4200	672	1.58	707	1.72	740	1.85	771	2.00	801	2.16	834	2.34	870	2.53	905	2.71	940	2.87	974	3.02	1005	3.14	1035	3.26	1064	3.36
4400	696	1.78	729	1.93	760	2.07	790	2.22	820	2.39	852	2.59	887	2.78	922	2.95	957	3.11	990	3.25	1021	3.37	1051	3.48	1080	3.58
4600	719	2.00	751	2.14	781	2.29	810	2.45	839	2.63	869	2.83	903	3.03	938	3.20	972	3.36	1005	3.49	1037	3.60	1067	3.71	1097	3.81
4800	742	2.23	772	2.37	801	2.52	829	2.69	857	2.87	886	3.08	919	3.28	953	3.45	987	3.60	1020	3.72	1052	3.83	1083	3.93	1113	4.03

NOTE - Multi-Stage Air Volume drive is capable of 350 - 1050 rpm.

SGH240HM BLOWER PERFORMANCE

NOTE - Blower Table includes Resistance for base unit with Gas Heat, Wet Indoor Coil, and Air Filters in place.

See Blower Motor / Drive Kit table on page 35 for Motor HP and Drive Kit RPM ranges available.

Air Volume	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	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	255	0.33	310	0.48	366	0.63	416	0.74	458	0.81	498	0.89	537	0.99	573	1.1	607	1.22	642	1.35	677	1.49	712	1.65	749	1.8
2200	258	0.37	313	0.52	369	0.67	418	0.78	460	0.85	500	0.92	538	1.03	574	1.15	609	1.27	643	1.4	678	1.55	714	1.7	751	1.86
2400	261	0.4	316	0.56	372	0.7	421	0.81	462	0.88	502	0.96	540	1.07	576	1.19	610	1.32	645	1.45	680	1.6	716	1.76	753	1.92
2600	265	0.44	319	0.6	375	0.74	423	0.85	464	0.92	505	1	542	1.11	578	1.24	612	1.37	646	1.51	682	1.66	718	1.82	755	1.98
2800	268	0.48	322	0.63	378	0.77	426	0.89	467	0.95	507	1.04	545	1.16	580	1.29	614	1.42	648	1.56	684	1.72	720	1.88	757	2.04
3000	272	0.51	326	0.67	382	0.81	429	0.92	470	0.99	510	1.09	547	1.21	582	1.34	616	1.48	650	1.63	686	1.78	723	1.94	759	2.1
3200	276	0.55	330	0.71	386	0.85	433	0.96	473	1.03	513	1.13	550	1.26	584	1.4	618	1.54	652	1.69	688	1.85	725	2.01	762	2.16
3400	280	0.59	335	0.74	391	0.88	437	1	477	1.08	516	1.18	552	1.32	587	1.46	620	1.61	655	1.76	691	1.91	727	2.07	764	2.23
3600	285	0.62	340	0.78	395	0.92	441	1.04	480	1.12	520	1.24	555	1.38	589	1.53	623	1.67	657	1.83	693	1.98	730	2.14	767	2.3
3800	290	0.66	345	0.81	400	0.96	445	1.08	484	1.17	523	1.29	559	1.44	592	1.59	626	1.74	660	1.9	696	2.06	733	2.22	770	2.38
4000	296	0.69	351	0.85	406	0.99	449	1.12	488	1.22	527	1.35	562	1.51	595	1.66	629	1.82	663	1.97	699	2.14	736	2.3	773	2.46
4200	301	0.73	358	0.88	411	1.03	453	1.17	493	1.27	531	1.41	565	1.57	599	1.73	632	1.89	666	2.05	702	2.22	739	2.39	776	2.56
4400	308	0.76	364	0.92	416	1.07	458	1.22	497	1.33	534	1.48	569	1.64	602	1.81	635	1.97	670	2.14	706	2.31	743	2.48	779	2.66
4600	315	0.8	371	0.95	422	1.12	463	1.26	502	1.39	539	1.54	573	1.71	606	1.88	639	2.05	673	2.22	710	2.4	746	2.58	783	2.76
4800	322	0.83	378	0.99	427	1.16	468	1.32	507	1.45	543	1.62	577	1.79	609	1.96	642	2.14	677	2.32	714	2.5	751	2.69	788	2.87
5000	330	0.86	386	1.03	433	1.21	473	1.38	512	1.52	547	1.69	581	1.87	613	2.05	647	2.22	682	2.41	718	2.6	755	2.79	792	2.98
5200	338	0.89	393	1.07	438	1.27	478	1.44	517	1.59	551	1.77	585	1.95	617	2.13	651	2.32	686	2.5	722	2.7	759	2.89	796	3.08
5400	346	0.92	400	1.12	444	1.33	484	1.51	522	1.67	556	1.86	589	2.04	622	2.23	655	2.41	690	2.6	727	2.79	764	2.98	801	3.17
5600	355	0.96	407	1.17	450	1.4	490	1.58	528	1.76	561	1.96	594	2.14	626	2.33	660	2.51	695	2.7	732	2.89	769	3.08	806	3.27
5800	364	1	414	1.23	457	1.47	496	1.65	533	1.85	566	2.06	599	2.24	631	2.43	665	2.61	701	2.81	737	3	774	3.19	811	3.38
6000	372	1.04	422	1.29	463	1.54	502	1.73	539	1.95	571	2.17	604	2.35	636	2.53	670	2.72	706	2.91	743	3.11	779	3.3	816	3.5
6200	381	1.08	429	1.36	470	1.62	508	1.82	544	2.05	576	2.28	609	2.46	641	2.64	676	2.82	712	3.02	749	3.22	785	3.42	822	3.62
6400	390	1.14	437	1.44	477	1.71	515	1.92	550	2.16	582	2.39	614	2.57	647	2.74	682	2.93	718	3.14	755	3.34	792	3.54	828	3.75
6600	399	1.2	444	1.53	484	1.8	521	2.02	556	2.28	587	2.51	620	2.68	653	2.85	688	3.04	725	3.25	762	3.46	798	3.67	835	3.87
6800	408	1.27	452	1.62	491	1.89	528	2.13	562	2.4	593	2.63	625	2.8	659	2.96	694	3.15	731	3.37	768	3.58	805	3.8	842	4.01
7000	417	1.35	460	1.71	498	1.99	535	2.24	568	2.52	599	2.74	631	2.91	665	3.08	700	3.27	737	3.48	775	3.7	812	3.92	848	4.14
7200	426	1.45	467	1.82	505	2.1	541	2.36	574	2.65	606	2.86	638	3.02	671	3.19	707	3.39	744	3.6	781	3.83	818	4.05	855	4.27
7400	435	1.55	475	1.93	513	2.22	548	2.49	580	2.77	612	2.98	644	3.14	677	3.31	713	3.5	750	3.72	788	3.94	825	4.17	861	4.39
7600	444	1.67	483	2.05	520	2.34	555	2.62	587	2.9	618	3.1	650	3.26	684	3.43	719	3.62	756	3.84	794	4.06	831	4.29	868	4.51
7800	452	1.8	491	2.18	528	2.47	562	2.75	594	3.02	625	3.22	657	3.38	690	3.55	726	3.74	763	3.96	800	4.18	837	4.4	874	4.62
8000	461	1.93	500	2.31	536	2.61	570	2.89	601	3.15	632	3.35	664	3.51	697	3.67	732	3.87	769	4.08	806	4.3	843	4.52	880	4.74
8200	470	2.08	508	2.45	544	2.75	577	3.03	608	3.29	639	3.47	671	3.63	704	3.8	739	3.99	775	4.2	812	4.42	849	4.64	886	4.86
8400	479	2.23	516	2.6	552	2.9	585	3.18	615	3.42	646	3.6	678	3.76	711	3.93	746	4.11	782	4.32	819	4.54	855	4.76	892	4.98
8600	488	2.39	525	2.76	560	3.05	592	3.33	623	3.56	653	3.74	685	3.89	718	4.06	752	4.24	788	4.44	825	4.66	862	4.88	898	5.1
8800	498	2.56	533	2.91	568	3.21	600	3.48	630	3.7	661	3.87	692	4.02	725	4.19	759	4.37	795	4.57	831	4.78	868	5	904	5.21
9000	507	2.73	542	3.08	576	3.37	608	3.63	638	3.85	668	4.01	699	4.16	732	4.32	766	4.5	802	4.69	838	4.9	874	5.12	911	5.33
9200	516	2.91	551	3.25	584	3.53	616	3.78	645	3.99	676	4.15	707	4.29	739	4.45	773	4.63	808	4.82	844	5.03	881	5.24	917	5.46
9400	526	3.09	560	3.42	593	3.69	623	3.94	653	4.13	683	4.28	714	4.43	746	4.58	780	4.76	815	4.95	851	5.15	887	5.36	923	5.58
9600	535	3.27	569	3.59	601	3.86	631	4.1	661	4.28	691	4.42	721	4.56	753	4.72	787	4.89	822	5.08	858	5.28	894	5.49	930	5.7

BLOWER DATA

SCH036H / SCH060H BLOWER PERFORMANCE

NOTE - Blower Table includes Resistance for base unit with Gas Heat, Wet Indoor Coil, and Air Filters in place.

NOTE - MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT:

SCH036H - 1020 CFM

SCH060H - 1650 CFM

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		1.4	
	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	RPM	Watts
900	1337.63	47.17	1407.38	72.97	1458.32	97.06	1502.54	121.09	1549.17	144.78	1595.02	169.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1000	1453.68	89.06	1516.86	114.04	1566.72	139.07	1612.91	165.45	1658.42	190.88	1702.17	218.17	1746.06	247.25	1787.01	280.18	-	-	-	-	-	-	-	-	-	-	-	-
1100	1570.44	131.16	1627.24	157.98	1677.13	184.63	1722.25	213.07	1768.78	240.73	1811.43	270.21	1853.24	301.68	1893.11	336.15	1933.04	365.86	-	-	-	-	-	-	-	-	-	-
1200	1683.60	174.90	1736.34	204.56	1785.32	235.21	1831.57	264.95	1878.12	294.76	1919.74	324.56	1960.49	357.28	1999.30	391.12	2039.18	419.94	2076.08	445.98	2111.01	470.96	-	-	-	-	-	-
1300	1791.14	224.05	1845.26	258.98	1893.43	291.88	1938.75	321.84	1985.37	349.77	2027.02	380.72	2066.74	411.60	2106.54	442.56	2145.37	471.55	2181.22	497.51	2218.12	521.42	2252.04	544.33	2283.00	568.42	-	-
1400	1893.31	280.18	1949.87	317.37	1998.29	350.33	2045.88	378.24	2091.53	407.32	2135.28	435.23	2175.00	466.25	2214.80	496.24	2252.61	523.08	2289.43	552.07	2325.28	576.88	2359.16	602.84	2391.07	628.78	2424.02	655.80
1500	1996.54	340.94	2054.44	379.19	2103.08	410.13	2149.77	435.99	2197.61	462.87	2241.41	492.84	2283.23	522.73	2322.00	553.71	2359.81	584.64	2397.67	614.54	2432.50	645.44	2465.34	675.30	2498.23	706.22	2528.11	739.25
1600	2101.92	403.85	2158.98	438.90	2209.87	468.86	2257.74	494.56	2303.62	524.42	2348.51	556.37	2390.38	590.40	2429.18	625.42	2467.01	660.39	2502.84	696.44	2537.68	732.45	2570.53	767.37	2600.36	803.36	2631.25	839.32
1700	2212.59	460.17	2267.69	496.32	2318.72	527.10	2366.70	557.91	2413.71	594.02	2455.57	632.23	2497.49	672.49	2536.34	712.69	2573.18	751.78	2608.02	790.96	2642.88	831.13	2673.69	869.16	2704.55	908.24	2733.39	946.22
1800	2325.38	509.30	2379.57	551.92	2428.61	591.14	2476.69	634.67	2521.69	679.18	2563.61	724.75	2603.54	770.32	2641.42	814.78	2677.28	858.20	2713.17	901.56	2746.02	942.73	2777.87	985.08	2808.73	1025.24	2836.56	1064.23
1900	2439.22	583.51	2490.39	633.63	2540.57	683.58	2586.65	735.77	2629.64	786.75	2672.68	836.67	2711.63	884.43	2747.50	931.10	2783.40	975.47	2818.31	1021.11	2852.19	1064.45	2885.10	1105.61	2914.96	1147.91	2944.83	1185.65
2000	2553.07	688.71	2604.34	745.38	2653.55	799.69	2699.69	854.14	2743.80	906.26	2784.81	956.21	2822.79	1003.96	2858.70	1050.65	2894.65	1096.21	2929.60	1140.66	2962.50	1185.14	2995.42	1226.14	3027.35	1267.14	3056.18	1303.70
2100	2670.06	800.12	2721.39	859.01	2769.63	916.80	2813.78	970.04	2858.98	1022.30	2899.02	1073.32	2938.08	1122.27	2974.06	1168.96	3010.05	1214.40	3045.03	1258.83	3080.03	1302.02	-	-	-	-	-	-
2200	2789.09	915.44	2840.50	976.58	2887.79	1033.27	2932.01	1087.71	2975.22	1139.91	3017.42	1189.85	3055.49	1239.94	3092.56	1287.76	-	-	-	-	-	-	-	-	-	-	-	-
2300	2910.21	1033.15	2960.69	1094.39	3008.05	1151.14	3052.34	1204.51	3095.63	1258.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2400	3033.43	1153.58	3081.94	1211.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SCH120HM BLOWER PERFORMANCE
NOTE - Blower Table includes Resistance for base unit with Gas Heat, Wet Indoor Coil, and Air Filters in place.
See page 36 for Minimum Air Volume Required For Use With Optional Electric Heat
See Blower Motor / Drive Kit table on page 35 for Motor HP and Drive Kit RPM ranges available.

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	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	418	0.26	453	0.33	490	0.41	530	0.48	573	0.55	617	0.62	658	0.68	697	0.76	734	0.84	767	0.93	797	1.01	825	1.09	852	1.17
2200	430	0.34	465	0.42	502	0.49	543	0.56	586	0.63	630	0.70	671	0.78	709	0.86	745	0.95	778	1.04	807	1.12	835	1.21	863	1.29
2400	444	0.44	478	0.50	516	0.57	557	0.65	601	0.72	644	0.80	683	0.88	721	0.97	757	1.07	789	1.16	818	1.25	847	1.33	875	1.41
2600	458	0.53	493	0.60	530	0.67	572	0.74	616	0.82	658	0.91	697	1.00	734	1.09	769	1.19	801	1.29	830	1.38	859	1.46	888	1.55
2800	473	0.63	508	0.70	547	0.77	589	0.85	632	0.93	673	1.03	711	1.13	747	1.23	781	1.33	813	1.43	843	1.52	872	1.60	902	1.69
3000	489	0.74	525	0.81	564	0.89	607	0.97	649	1.06	688	1.16	725	1.27	761	1.38	795	1.48	826	1.58	857	1.66	887	1.75	918	1.84
3200	506	0.86	543	0.93	583	1.01	625	1.10	666	1.20	703	1.31	740	1.42	775	1.53	809	1.64	841	1.73	871	1.82	902	1.91	934	2.01
3400	525	0.99	563	1.07	603	1.15	644	1.24	682	1.36	719	1.48	755	1.59	790	1.70	824	1.80	856	1.90	887	1.99	919	2.08	951	2.18
3600	545	1.13	583	1.21	623	1.30	662	1.41	699	1.53	735	1.65	771	1.77	806	1.87	840	1.97	872	2.07	903	2.16	936	2.25	969	2.36
3800	566	1.28	604	1.36	643	1.46	679	1.58	715	1.71	752	1.84	788	1.95	823	2.06	856	2.16	889	2.25	921	2.34	954	2.43	987	2.54
4000	587	1.44	625	1.53	661	1.64	697	1.78	733	1.91	770	2.03	806	2.15	841	2.25	874	2.34	906	2.43	938	2.52	971	2.61	1005	2.71
4200	609	1.60	645	1.71	680	1.85	715	1.99	751	2.12	788	2.24	825	2.35	859	2.44	892	2.53	924	2.62	957	2.71	989	2.80	1023	2.89
4400	629	1.79	664	1.92	698	2.07	734	2.21	771	2.34	808	2.45	844	2.55	878	2.64	911	2.73	943	2.81	975	2.89	1008	2.98	1041	3.08
4600	650	2.00	683	2.15	717	2.30	753	2.44	791	2.56	829	2.66	864	2.76	897	2.84	930	2.92	962	3.00	994	3.08	1026	3.17	1060	3.26
4800	669	2.23	702	2.39	737	2.55	774	2.67	813	2.78	850	2.88	884	2.97	917	3.05	949	3.12	981	3.20	1013	3.28	1045	3.36	1079	3.45

NOTE - Multi-Stage Air Volume drive is capable of 350 - 1050 rpm.

BLOWER DATA

SCH240HM BLOWER PERFORMANCE

NOTE - Blower Table includes Resistance for base unit with Gas Heat, Wet Indoor Coil, and Air Filters in place.

NOTE - MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRICAL HEAT - 8000 CFM

See Blower Motor / Drive Kit table on page 35 for Motor HP and Drive Kit RPM ranges available.

Air Volume	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	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	255	0.33	310	0.48	366	0.63	416	0.74	458	0.81	498	0.89	537	0.99	573	1.1	607	1.22	642	1.35	677	1.49	712	1.65	749	1.8
2200	258	0.37	313	0.52	369	0.67	418	0.78	460	0.85	500	0.92	538	1.03	574	1.15	609	1.27	643	1.4	678	1.55	714	1.7	751	1.86
2400	261	0.4	316	0.56	372	0.7	421	0.81	462	0.88	502	0.96	540	1.07	576	1.19	610	1.32	645	1.45	680	1.6	716	1.76	753	1.92
2600	265	0.44	319	0.6	375	0.74	423	0.85	464	0.92	505	1	542	1.11	578	1.24	612	1.37	646	1.51	682	1.66	718	1.82	755	1.98
2800	268	0.48	322	0.63	378	0.77	426	0.89	467	0.95	507	1.04	545	1.16	580	1.29	614	1.42	648	1.56	684	1.72	720	1.88	757	2.04
3000	272	0.51	326	0.67	382	0.81	429	0.92	470	0.99	510	1.09	547	1.21	582	1.34	616	1.48	650	1.63	686	1.78	723	1.94	759	2.1
3200	276	0.55	330	0.71	386	0.85	433	0.96	473	1.03	513	1.13	550	1.26	584	1.4	618	1.54	652	1.69	688	1.85	725	2.01	762	2.16
3400	280	0.59	335	0.74	391	0.88	437	1	477	1.08	516	1.18	552	1.32	587	1.46	620	1.61	655	1.76	691	1.91	727	2.07	764	2.23
3600	285	0.62	340	0.78	395	0.92	441	1.04	480	1.12	520	1.24	555	1.38	589	1.53	623	1.67	657	1.83	693	1.98	730	2.14	767	2.3
3800	290	0.66	345	0.81	400	0.96	445	1.08	484	1.17	523	1.29	559	1.44	592	1.59	626	1.74	660	1.9	696	2.06	733	2.22	770	2.38
4000	296	0.69	351	0.85	406	0.99	449	1.12	488	1.22	527	1.35	562	1.51	595	1.66	629	1.82	663	1.97	699	2.14	736	2.3	773	2.46
4200	301	0.73	358	0.88	411	1.03	453	1.17	493	1.27	531	1.41	565	1.57	599	1.73	632	1.89	666	2.05	702	2.22	739	2.39	776	2.56
4400	308	0.76	364	0.92	416	1.07	458	1.22	497	1.33	534	1.48	569	1.64	602	1.81	635	1.97	670	2.14	706	2.31	743	2.48	779	2.66
4600	315	0.8	371	0.95	422	1.12	463	1.26	502	1.39	539	1.54	573	1.71	606	1.88	639	2.05	673	2.22	710	2.4	746	2.58	783	2.76
4800	322	0.83	378	0.99	427	1.16	468	1.32	507	1.45	543	1.62	577	1.79	609	1.96	642	2.14	677	2.32	714	2.5	751	2.69	788	2.87
5000	330	0.86	386	1.03	433	1.21	473	1.38	512	1.52	547	1.69	581	1.87	613	2.05	647	2.22	682	2.41	718	2.6	755	2.79	792	2.98
5200	338	0.89	393	1.07	438	1.27	478	1.44	517	1.59	551	1.77	585	1.95	617	2.13	651	2.32	686	2.5	722	2.7	759	2.89	796	3.08
5400	346	0.92	400	1.12	444	1.33	484	1.51	522	1.67	556	1.86	589	2.04	622	2.23	655	2.41	690	2.6	727	2.79	764	2.98	801	3.17
5600	355	0.96	407	1.17	450	1.4	490	1.58	528	1.76	561	1.96	594	2.14	626	2.33	660	2.51	695	2.7	732	2.89	769	3.08	806	3.27
5800	364	1	414	1.23	457	1.47	496	1.65	533	1.85	566	2.06	599	2.24	631	2.43	665	2.61	701	2.81	737	3	774	3.19	811	3.38
6000	372	1.04	422	1.29	463	1.54	502	1.73	539	1.95	571	2.17	604	2.35	636	2.53	670	2.72	706	2.91	743	3.11	779	3.3	816	3.5
6200	381	1.08	429	1.36	470	1.62	508	1.82	544	2.05	576	2.28	609	2.46	641	2.64	676	2.82	712	3.02	749	3.22	785	3.42	822	3.62
6400	390	1.14	437	1.44	477	1.71	515	1.92	550	2.16	582	2.39	614	2.57	647	2.74	682	2.93	718	3.14	755	3.34	792	3.54	828	3.75
6600	399	1.2	444	1.53	484	1.8	521	2.02	556	2.28	587	2.51	620	2.68	653	2.85	688	3.04	725	3.25	762	3.46	798	3.67	835	3.87
6800	408	1.27	452	1.62	491	1.89	528	2.13	562	2.4	593	2.63	625	2.8	659	2.96	694	3.15	731	3.37	768	3.58	805	3.8	842	4.01
7000	417	1.35	460	1.71	498	1.99	535	2.24	568	2.52	599	2.74	631	2.91	665	3.08	700	3.27	737	3.48	775	3.7	812	3.92	848	4.14
7200	426	1.45	467	1.82	505	2.1	541	2.36	574	2.65	606	2.86	638	3.02	671	3.19	707	3.39	744	3.6	781	3.83	818	4.05	855	4.27
7400	435	1.55	475	1.93	513	2.22	548	2.49	580	2.77	612	2.98	644	3.14	677	3.31	713	3.5	750	3.72	788	3.94	825	4.17	861	4.39
7600	444	1.67	483	2.05	520	2.34	555	2.62	587	2.9	618	3.1	650	3.26	684	3.43	719	3.62	756	3.84	794	4.06	831	4.29	868	4.51
7800	452	1.8	491	2.18	528	2.47	562	2.75	594	3.02	625	3.22	657	3.38	690	3.55	726	3.74	763	3.96	800	4.18	837	4.4	874	4.62
8000	461	1.93	500	2.31	536	2.61	570	2.89	601	3.15	632	3.35	664	3.51	697	3.67	732	3.87	769	4.08	806	4.3	843	4.52	880	4.74
8200	470	2.08	508	2.45	544	2.75	577	3.03	608	3.29	639	3.47	671	3.63	704	3.8	739	3.99	775	4.2	812	4.42	849	4.64	886	4.86
8400	479	2.23	516	2.6	552	2.9	585	3.18	615	3.42	646	3.6	678	3.76	711	3.93	746	4.11	782	4.32	819	4.54	855	4.76	892	4.98
8600	488	2.39	525	2.76	560	3.05	592	3.33	623	3.56	653	3.74	685	3.89	718	4.06	752	4.24	788	4.44	825	4.66	862	4.88	898	5.1
8800	498	2.56	533	2.91	568	3.21	600	3.48	630	3.7	661	3.87	692	4.02	725	4.19	759	4.37	795	4.57	831	4.78	868	5	904	5.21
9000	507	2.73	542	3.08	576	3.37	608	3.63	638	3.85	668	4.01	699	4.16	732	4.32	766	4.5	802	4.69	838	4.9	874	5.12	911	5.33
9200	516	2.91	551	3.25	584	3.53	616	3.78	645	3.99	676	4.15	707	4.29	739	4.45	773	4.63	808	4.82	844	5.03	881	5.24	917	5.46
9400	526	3.09	560	3.42	593	3.69	623	3.94	653	4.13	683	4.28	714	4.43	746	4.58	780	4.76	815	4.95	851	5.15	887	5.36	923	5.58
9600	535	3.27	569	3.59	601	3.86	631	4.1	661	4.28	691	4.42	721	4.56	753	4.72	787	4.89	822	5.08	858	5.28	894	5.49	930	5.7

BLOWER DATA

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

036, 060 Models

Air Volume cfm	Humiditrol Dehumidification Coil	Electric Heat	Economizer	Filters MERV 13
800	0.00	0.01	0.04	0.05
1000	0.00	0.03	0.04	0.07
1200	0.01	0.06	0.04	0.07
1400	0.02	0.09	0.04	0.07
1600	0.03	0.12	0.04	0.07
1800	0.04	0.15	0.05	0.07
2000	0.04	0.18	0.05	0.08

120 Model

Air Volume cfm	Humiditrol Dehumidification Coil	Electric Heat	Economizer	Filters MERV 13
2000	0.03	0.09	0.06	0.03
2500	0.04	0.09	0.11	0.05
3000	0.05	0.12	0.13	0.06
3500	0.06	0.19	0.15	0.07
4000	0.08	0.20	0.19	0.08
4500	0.10	0.35	0.22	0.09
5000	0.12	0.40	0.29	0.10
5500	0.14	0.48	0.34	0.12
6000	0.15	- - -	0.52	0.13

240 Model

Air Volume cfm	Humiditrol Dehumidification Coil	Electric Heat	Economizer	Filters MERV 13
3000	0.02	0.01	0.00	0.00
3500	0.04	0.01	0.00	0.00
4000	0.04	0.01	0.00	0.00
4500	0.04	0.02	0.00	0.00
5000	0.04	0.03	0.00	0.00
5500	0.06	0.03	0.01	0.01
6000	0.06	0.03	0.01	0.02
6500	0.08	0.04	0.01	0.02
7000	0.08	0.04	0.02	0.03
7500	0.10	0.05	0.02	0.04
8000	0.10	0.05	0.02	0.04
8500	0.10	0.06	0.03	0.04
9000	0.12	0.07	0.04	0.04
9500	0.14	0.08	0.04	0.06

BLOWER DATA

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT

Size	Electric Heat kW	Minimum cfm
120	15	1375
	20	1685
	30	2300
	45	2600
	60	2800

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

TABLE 13
SG/SC 120H Power Exhaust Fans Standard Static Performance

Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0.05	4085
0.10	3685
0.15	3280
0.20	2880
0.25	2475

TABLE 14
SG/SC 240 Power Exhaust Fans Standard Static Performance

Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0.00	10,200
0.05	9700
0.10	9200
0.15	8600
0.20	8100
0.25	7600
0.30	6900
0.35	6000
0.40	5000
0.45	4150
0.50	- - -

TABLE 15
Factory Installed Drive Kit Specifications

Model No.	Nominal hp	Maximum hp	Drive Kit Number	RPM Range
120	3	3.45	#3 (staged)	660 - 900
			#4 (staged)	865 - 1080
240	5	5.75	#4 (staged)	520 - 685
			#5 (staged)	685 - 865
	7.5	8.63	#7 (staged)	770 - 965

TABLE 16
SG/SC 120 Manufacturer's Numbers

Drive No.	Drive Components					
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELTS	
3 (MSAV)	1VP40 X 7/8	79J0301	BK77 X 1	49K4001	BX57	78L5301
4 (MSAV)	1VP50 X 7/8	P-8-2187	BK80 X 1	53J9301	BX59	59A5001

TABLE 17
SG/SC 240 Manufacturer's Numbers

Drive No.	Drive Components							
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELTS		SPLIT BUSHING	
	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.
4 (MSAV)	1VP44 X 1-1/8	100239-07	BK110H	100788-06	BX68	88K3401	H-1-3/16	105616-02
5 (MSAV)	1VP50 X 1-1/8	P-8-1977	BK100H	100788-05	BX67	100245-09	H-1-3/16	105616-02
7 (MSAV)	1VP60 X 1-3/8	78L5501	BK110H	100788-06	BX71	31K9701	H-1-3/16	105616-02

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 (LGT 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 di rection; verify scroll compressor rotation separately. Contact technical support if the VFD blower is rotating incorrectly. The blower rotation will always be correct on MSAVTM units (120/240 units will always have VFD mo tors). Checking blower rotation is not a valid method of determining voltage phasing for incoming power.

3 - SG/SC 120 units contain two refrigerant circuits and two stages of cooling. See FIGURE 34.

4 - 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 35.

5 - Each refrigerant circuit is separately charged with R-454B refrigerant. See unit rating plate for correct amount of charge.

6 - 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.

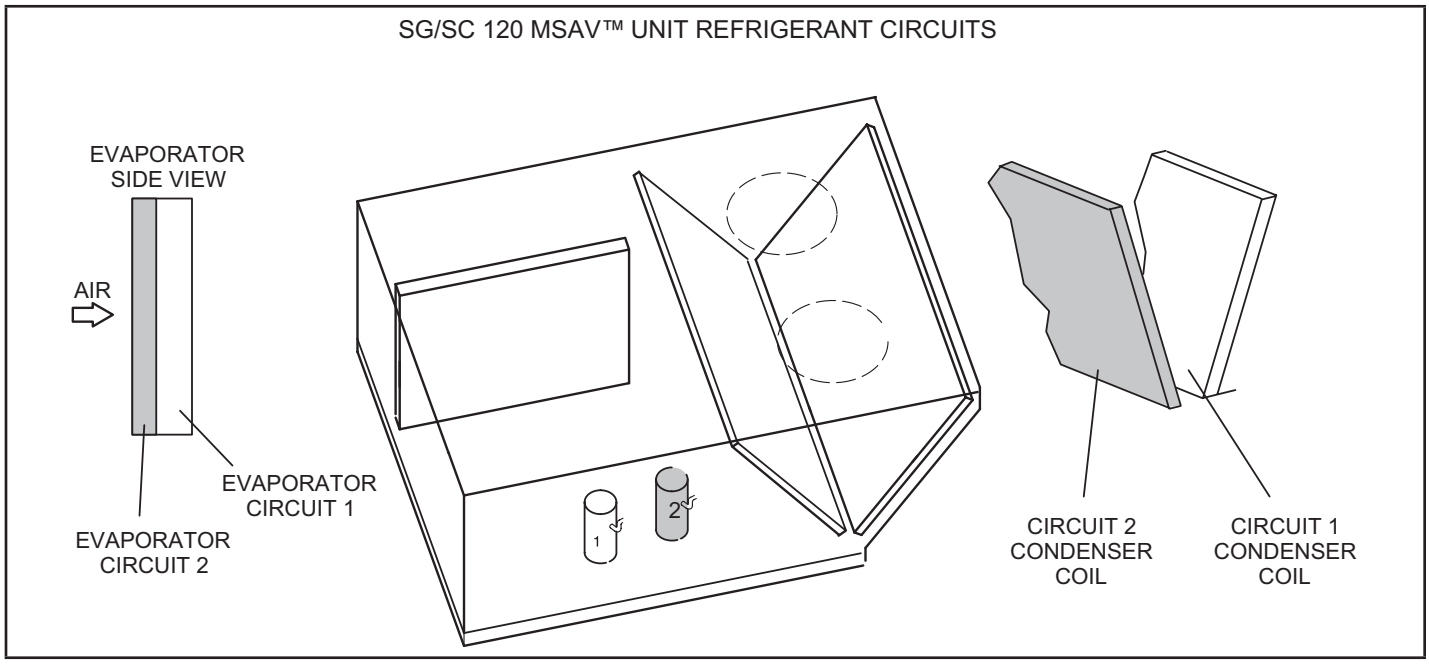


FIGURE 34

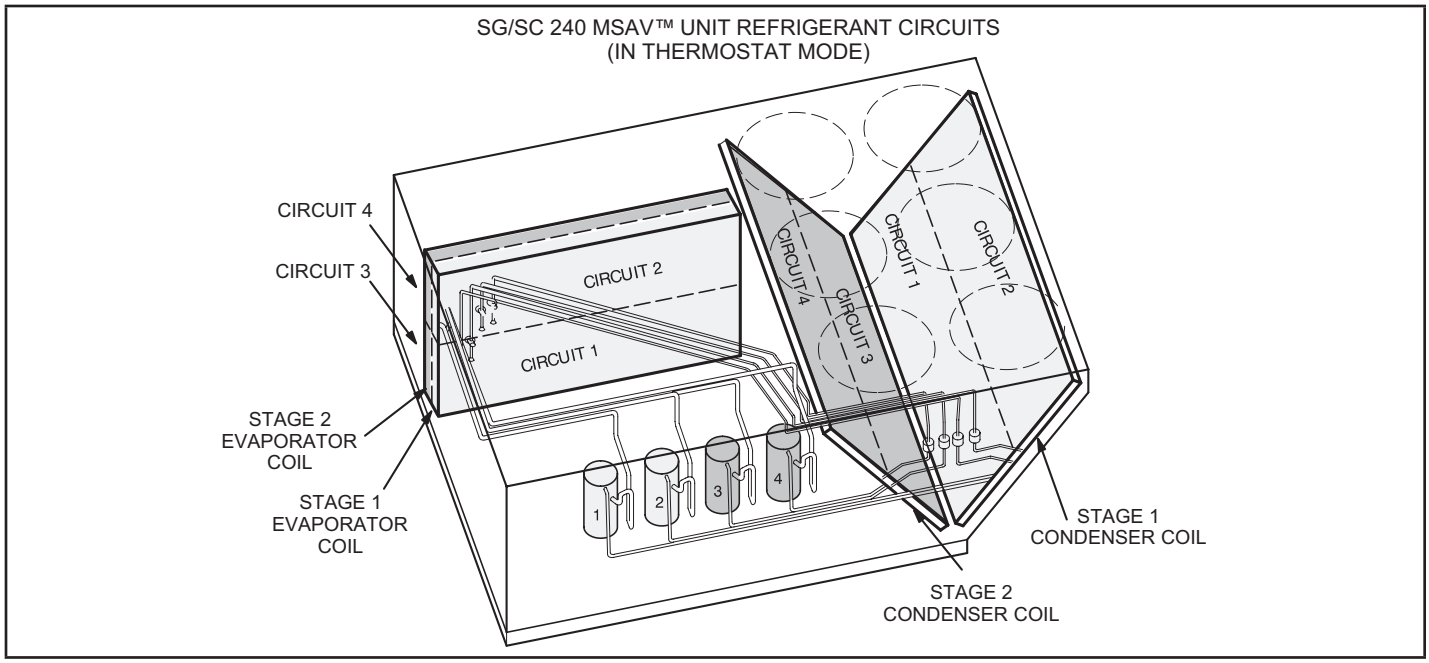


FIGURE 35

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 18 for proper locations.

TABLE 18

THERMISTOR LOCATION		
Unit	**Sensor**	**Figure**
036, 060 Indoor Coil	RT46	FIGURE 36
036, 060 Outdoor Coil	RT48	FIGURE 37
120 Indoor Coil	RT46, 47	FIGURE 38
120 Outdoor Coil	RT48, 49	FIGURE 39
240 Indoor Coil	RT46, 47, 50, 51	FIGURE 40
240 Outdoor Coil	RT48, 49, 52, 53	FIGURE 41

SGH/SCH036, 060
EVAPORATOR COIL
RT46

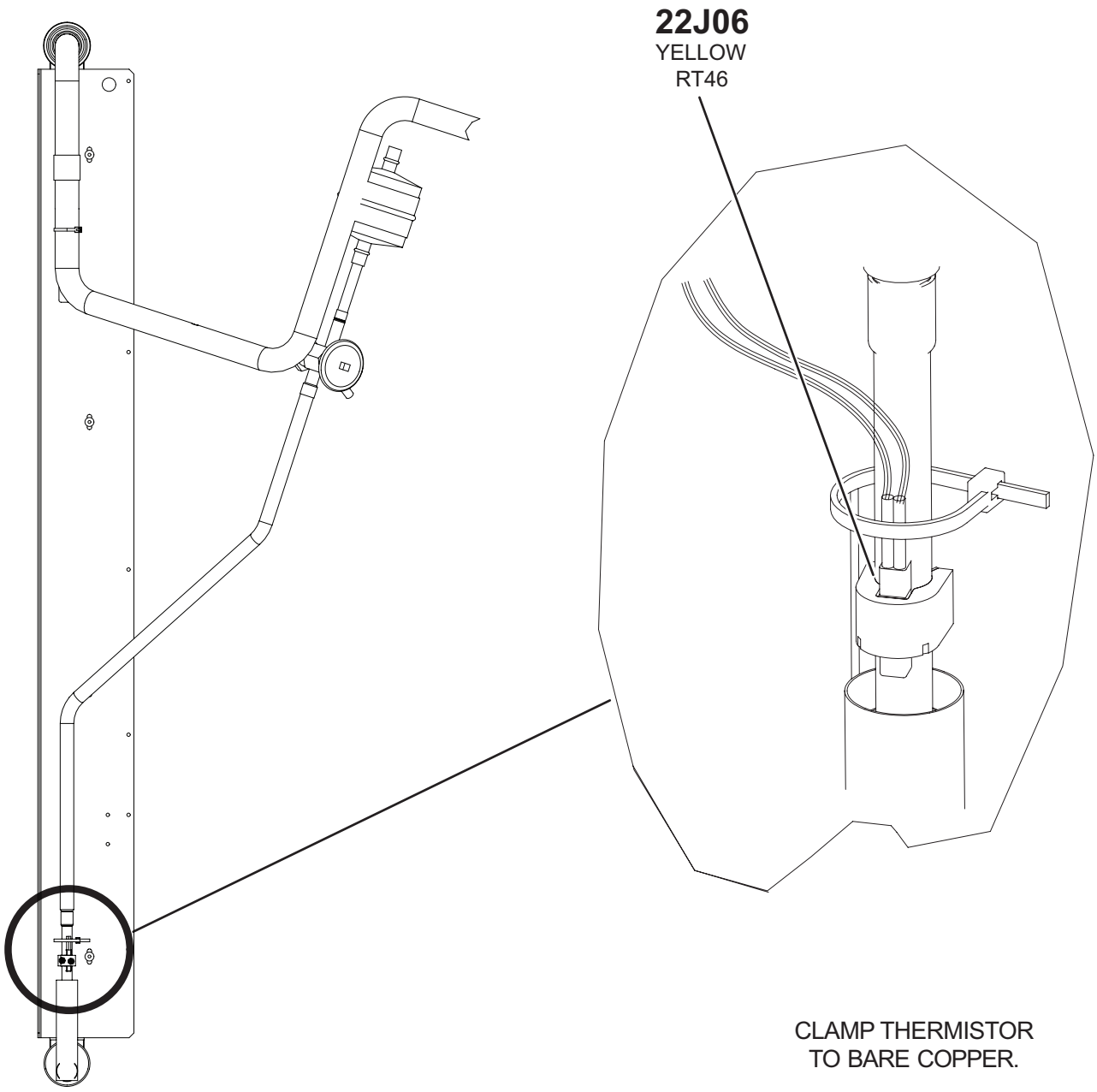


FIGURE 36

SGH/SCH036, 060
CONDENSER COIL
RT48

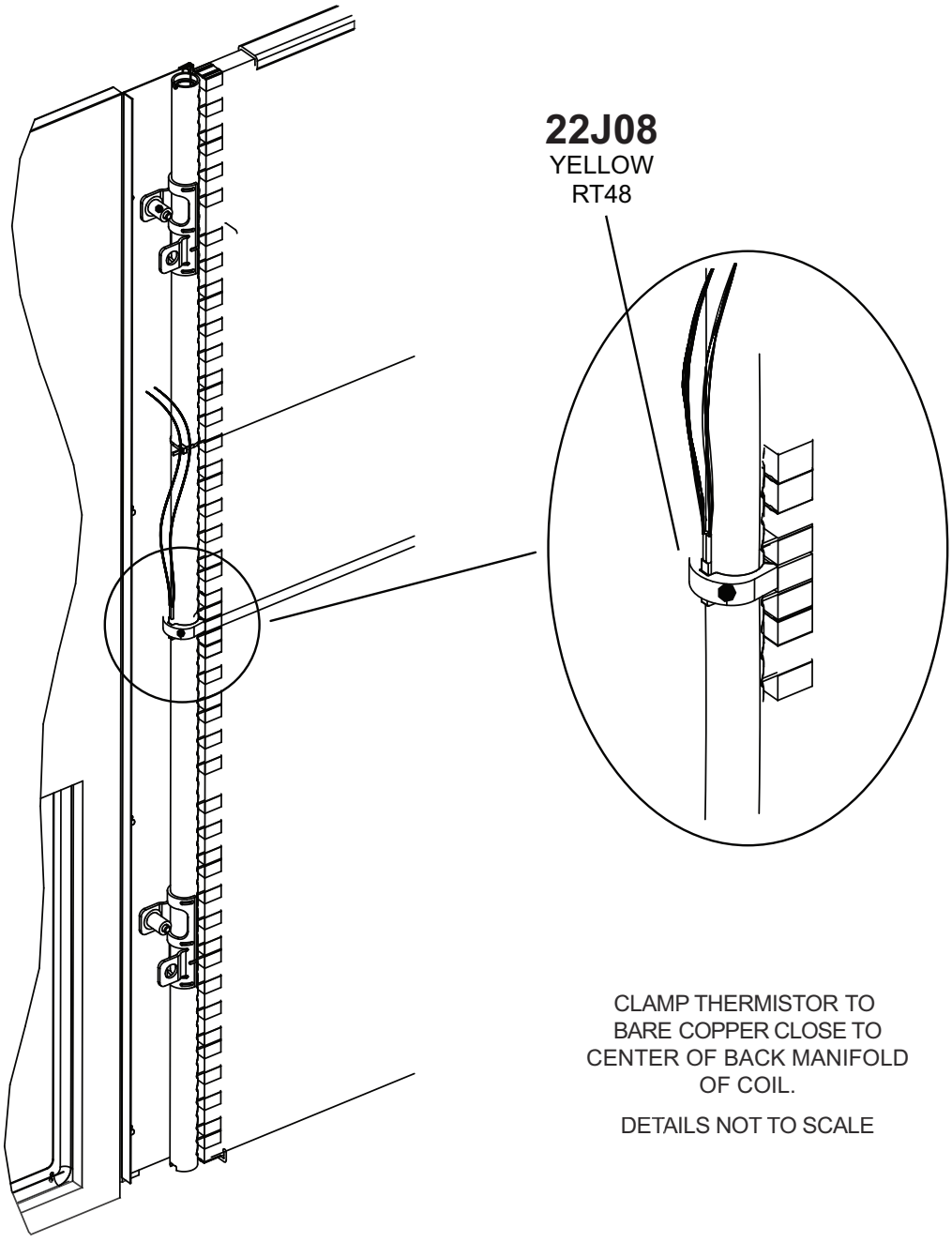


FIGURE 37

SGH/SCH120
EVAPORATOR COIL
(RT46, 47)

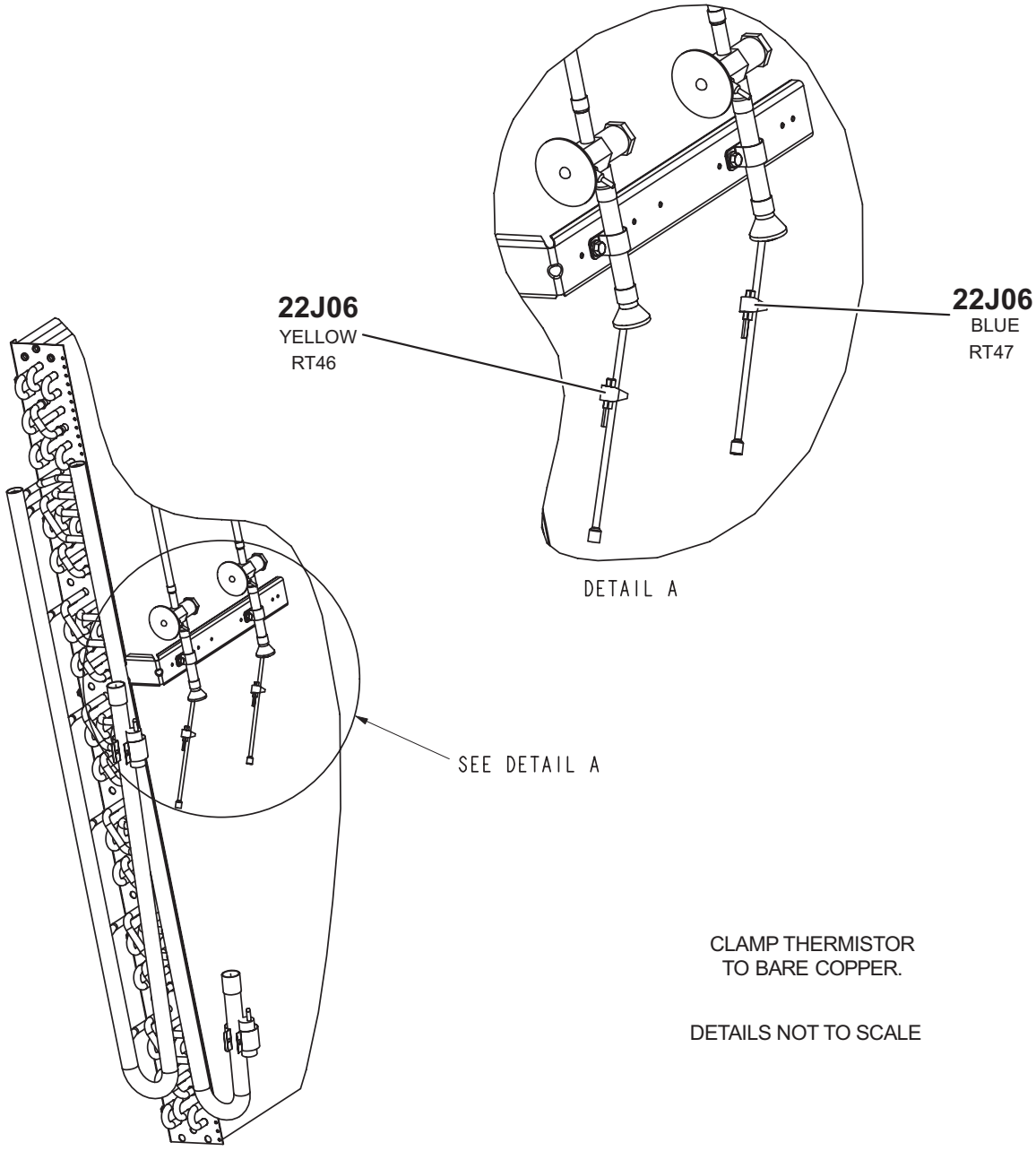
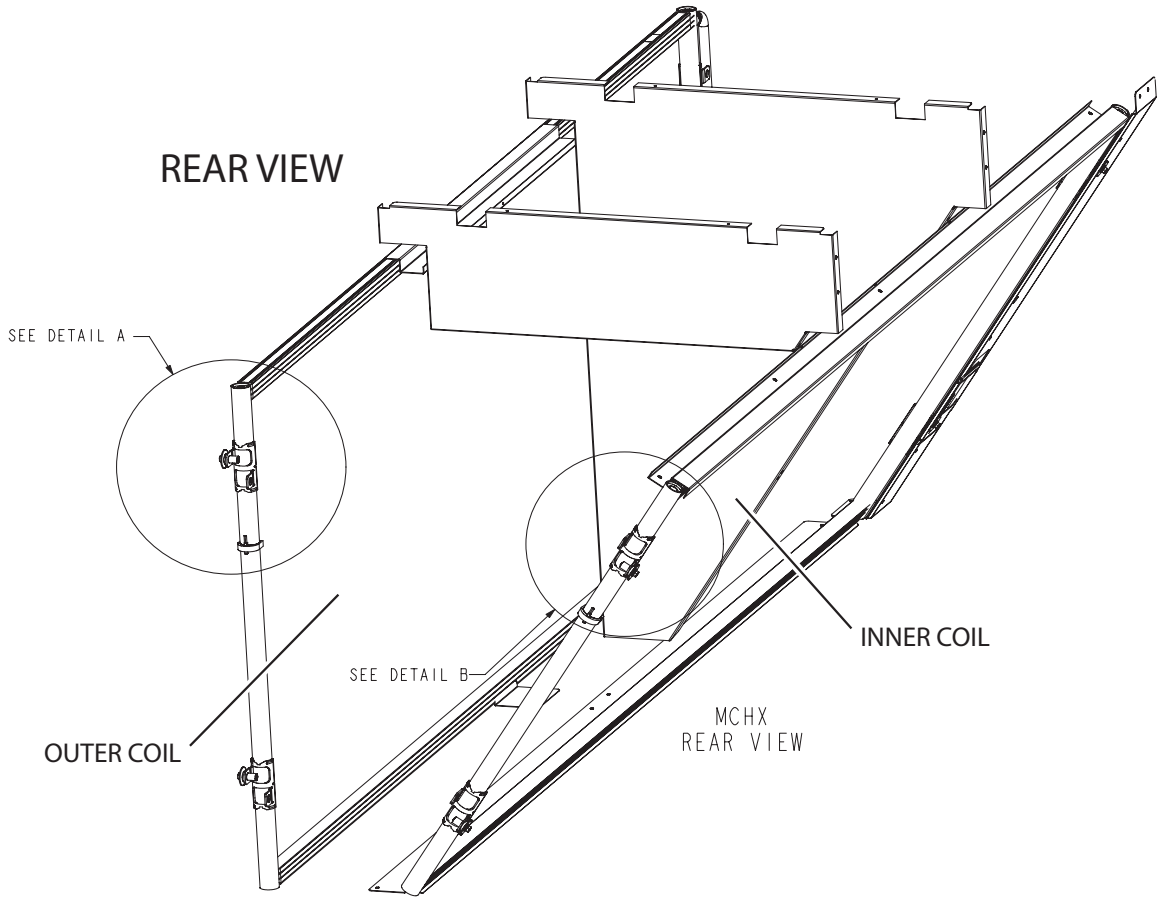
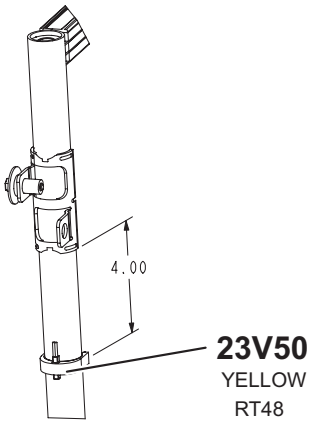


FIGURE 38

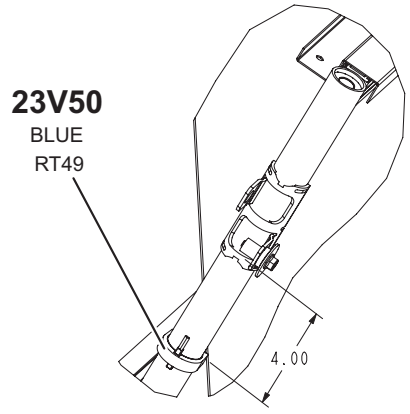
SGH/SCH120
CONDENSER / OUTDOOR COIL
(RT48, 49)





DETAIL A

CLAMP THERMISTOR
TO BARE COPPER
ON REAR OF MANIFOLD.



DETAIL B

DETAILS NOT TO SCALE

FIGURE 39

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

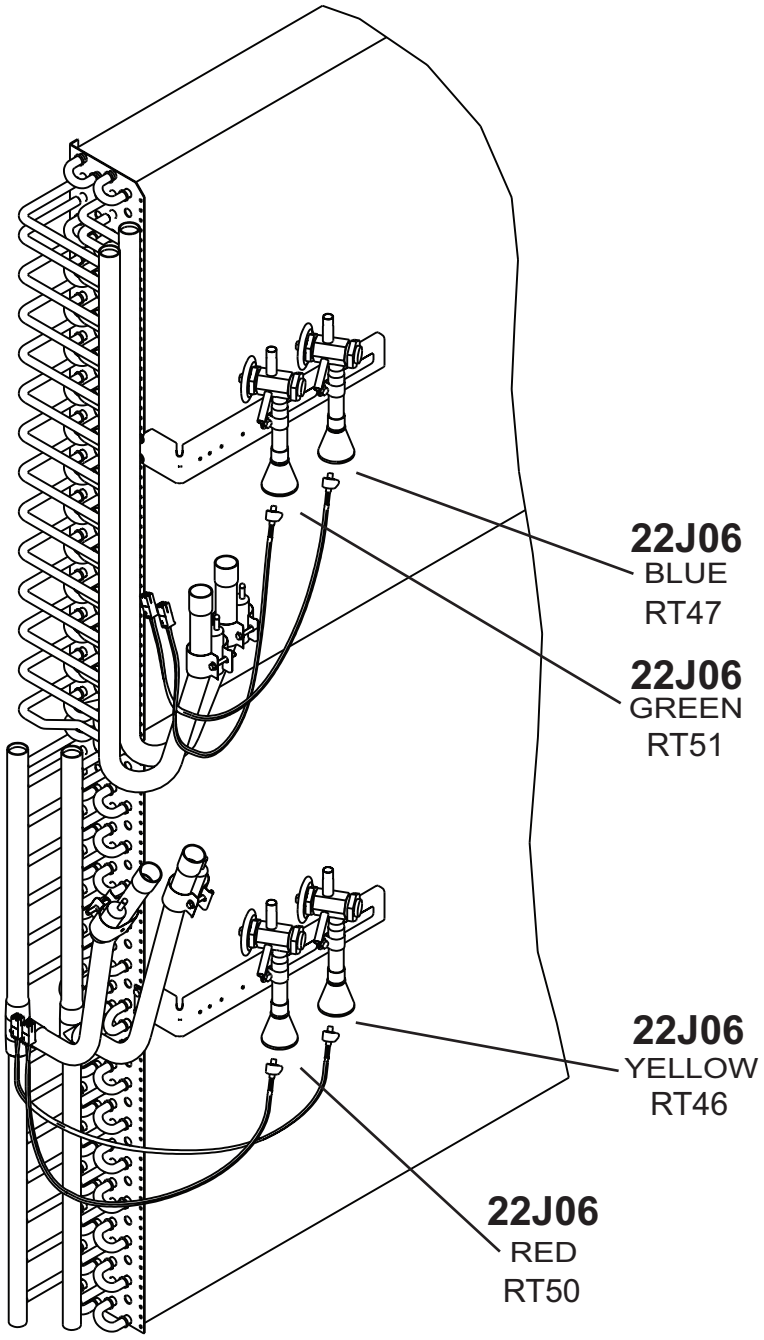
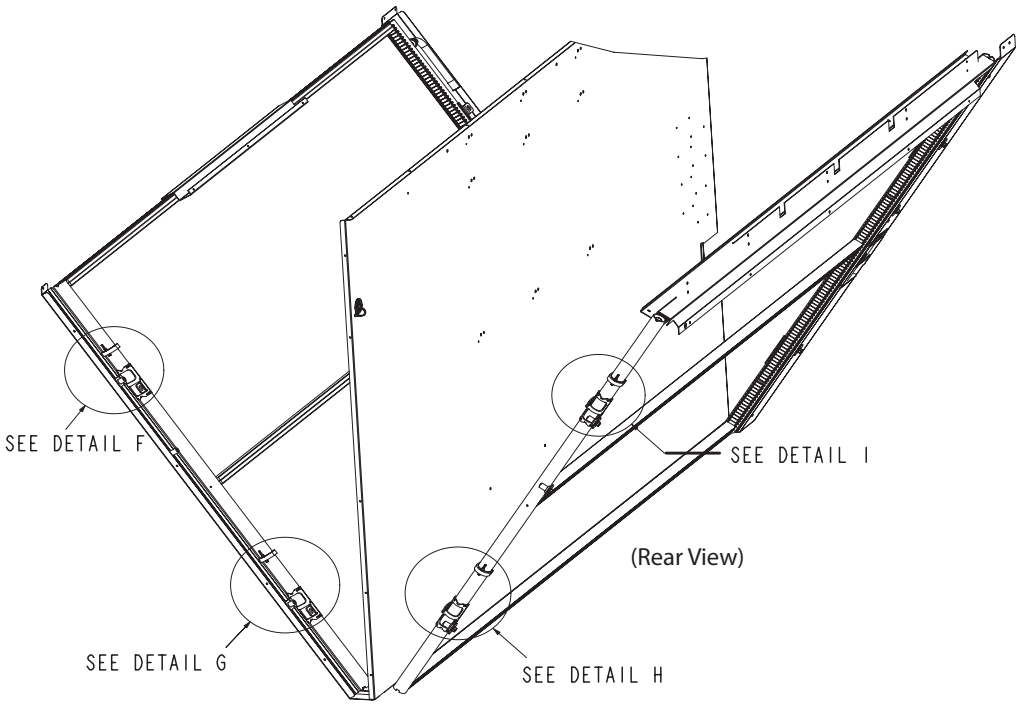
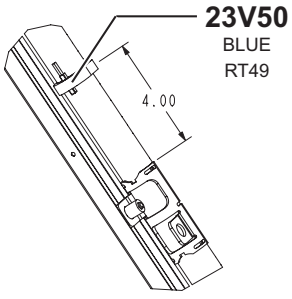


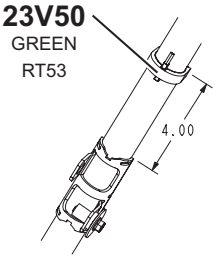
FIGURE 40

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

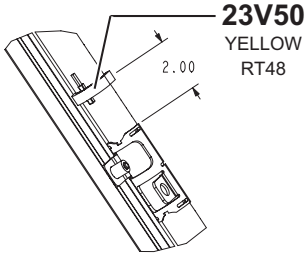




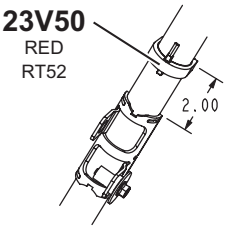
SEE DETAIL F



SEE DETAIL I



SEE DETAIL G



SEE DETAIL H

DETAILS NOT TO SCALE

FIGURE 41

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 19.

TABLE 19

RDS Sensor Figures

Model	Qty.	Type	Figure
SGH036-060	2 sensors	INDOOR SENSOR	FIGURE 42
		COMPRESSOR SENSOR	FIGURE 43
SCH036-060	1 sensor	INDOOR SENSOR	FIGURE 42
SGH120	2 sensors	INDOOR SENSOR	FIGURE 44
		COMPRESSOR SENSOR	FIGURE 45
SCH120	1 sensor	INDOOR SENSOR	FIGURE 44
SGH/ SCH240	2 sensors	INDOOR SENSOR	FIGURE 46
		COMPRESSOR SENSOR	FIGURE 47

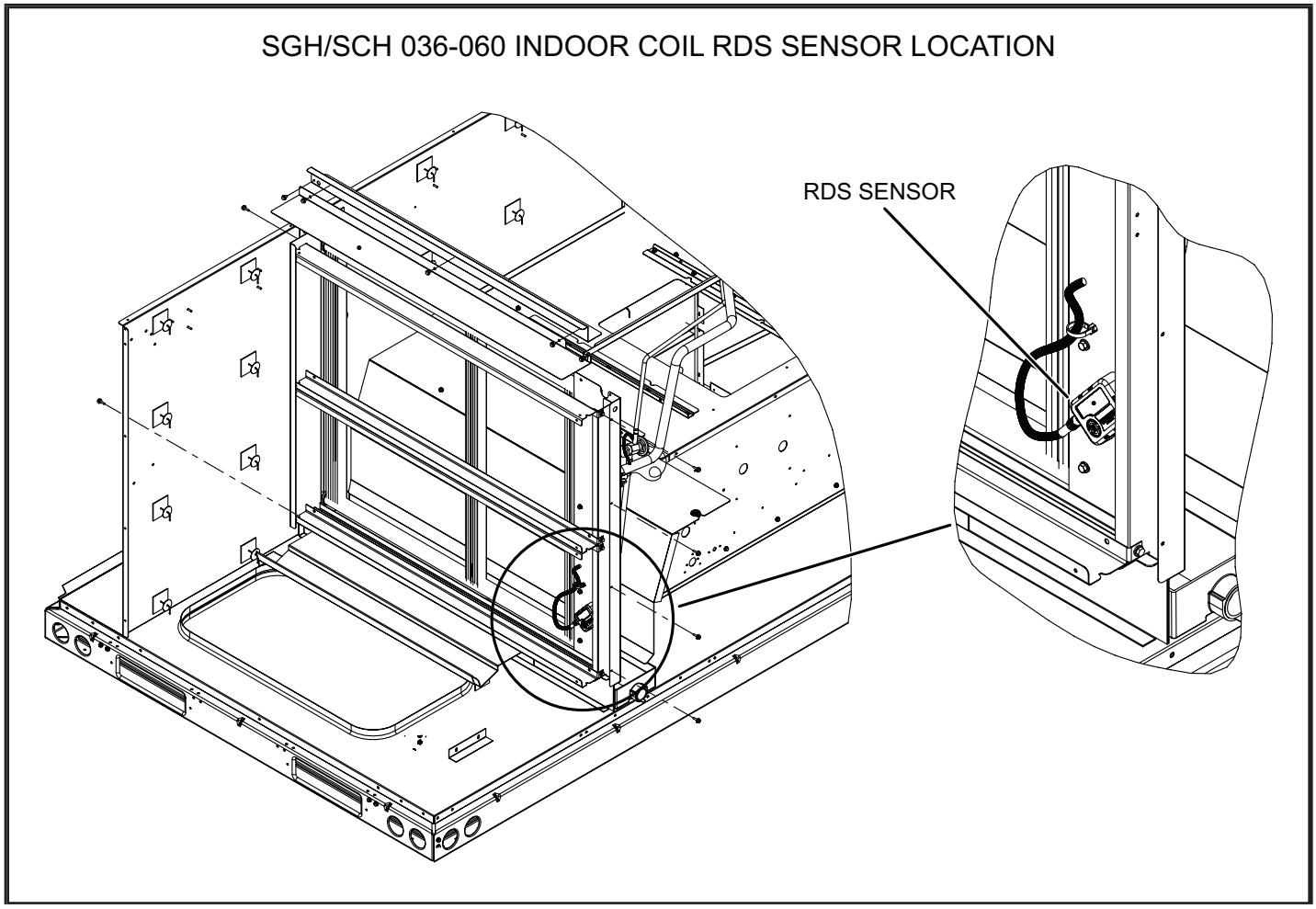


FIGURE 42

SGH 036-060 COMPRESSOR RDS SENSOR LOCATION

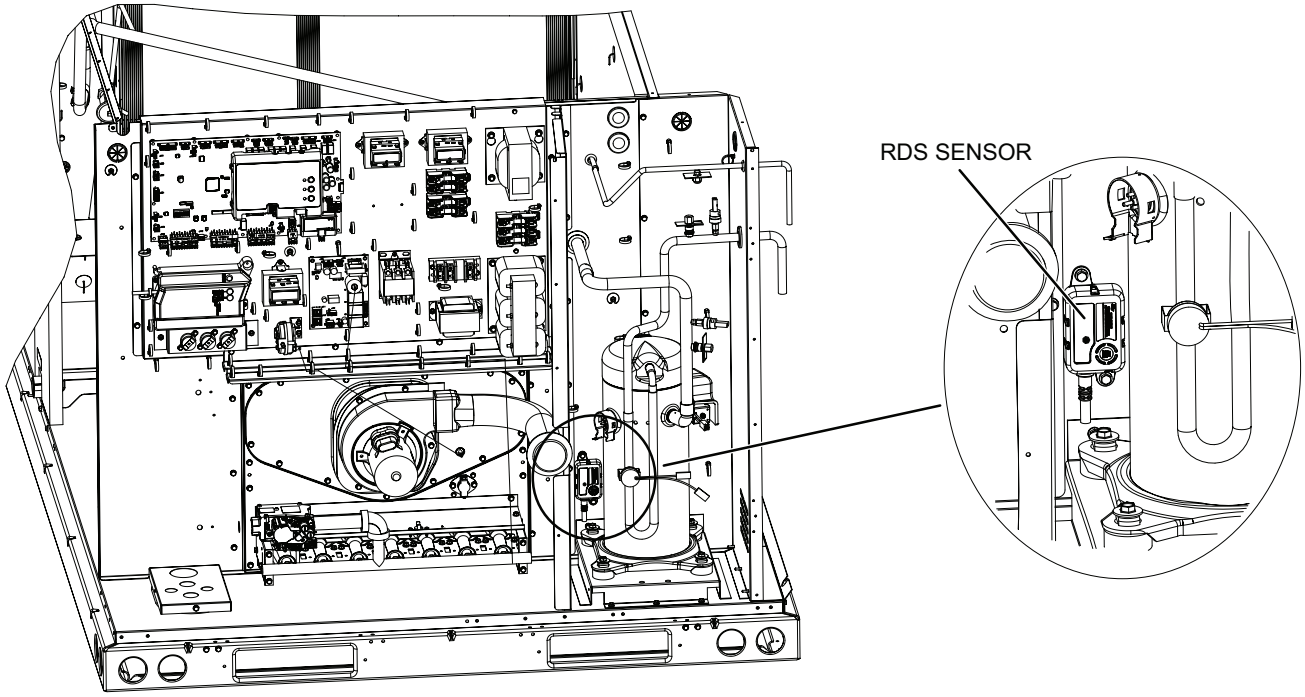


FIGURE 43

SCH/SGH INDOOR COIL 120 RDS SENSOR LOCATION

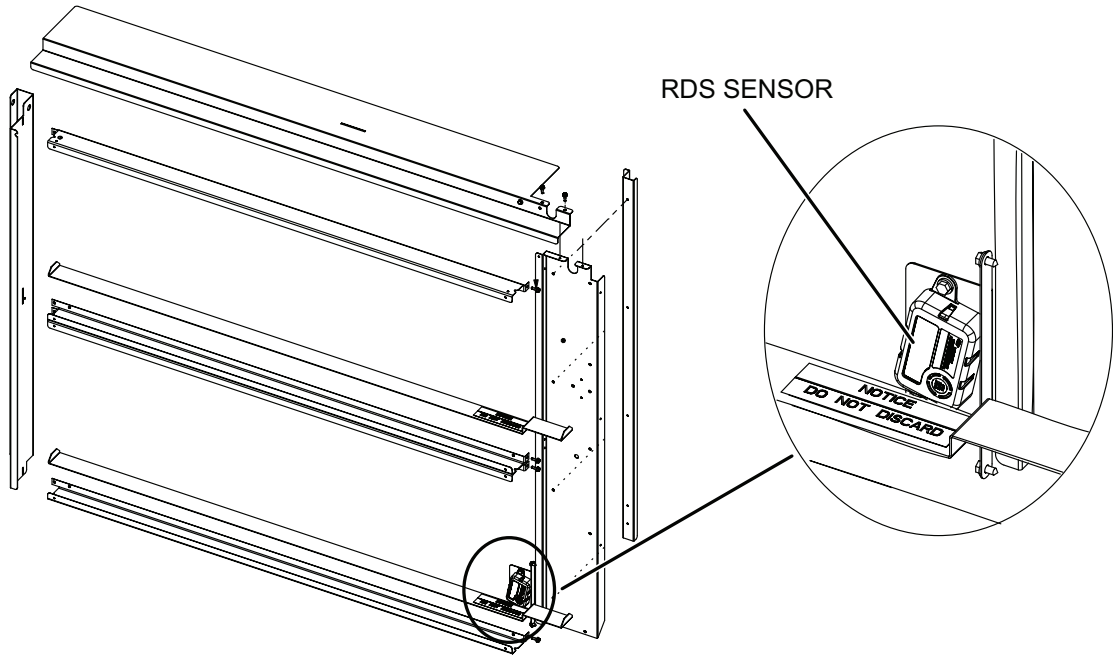


FIGURE 44

SGH 120 COMPRESSOR RDS SENSOR LOCATION

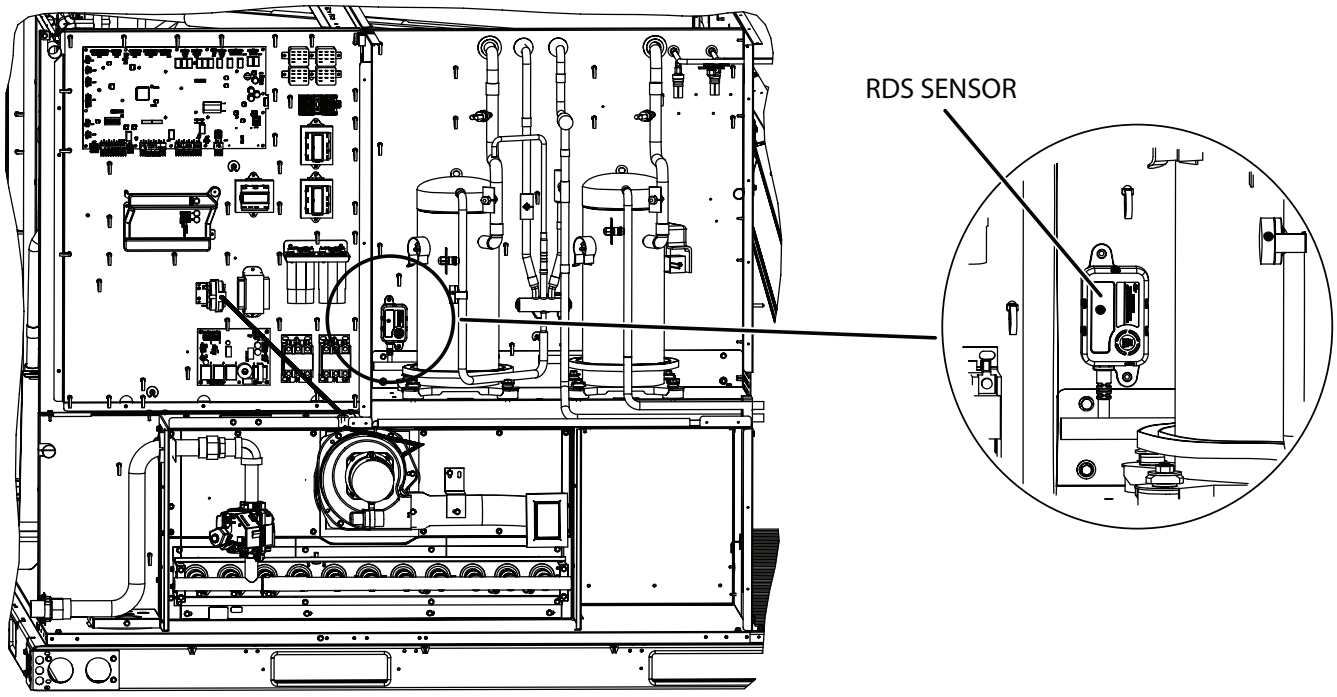


FIGURE 45

SGH/SCH 240 INDOOR COIL RDS SENSOR LOCATION

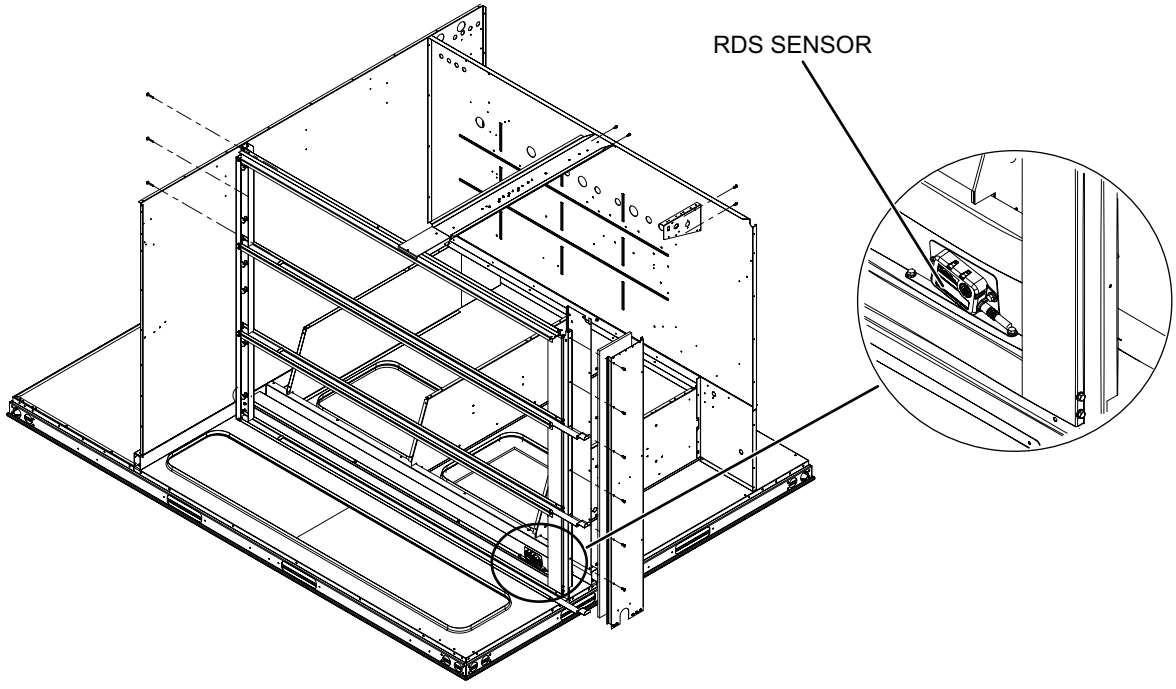


FIGURE 46

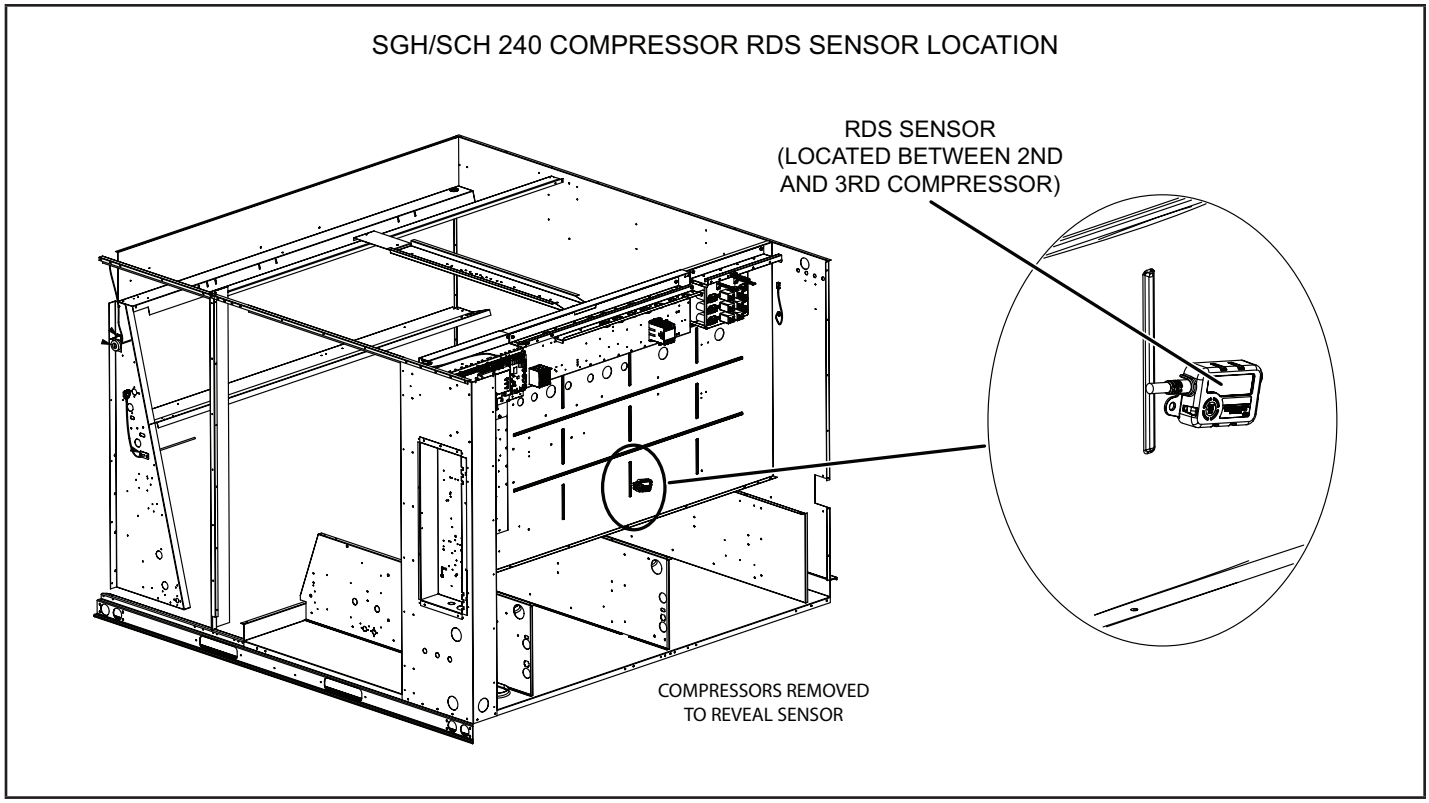

SGH/SCH 240 COMPRESSOR RDS SENSOR LOCATION
RDS SENSOR
(LOCATED BETWEEN 2ND
AND 3RD COMPRESSOR)
COMPRESSORS REMOVED
TO REVEAL SENSOR

FIGURE 47

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/ Humiditrol Stage 1	7.75	3.52
SGH/SCH240 W/ Humiditrol Stage 2	7.19	3.26
SGH/SCH240 W/ Humiditrol Stage 3	5.31	2.41
SGH/SCH240 W/ Humiditrol 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-of f 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 20 through TABLE 27) 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 20

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 21

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 22

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 23

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 24

	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 25

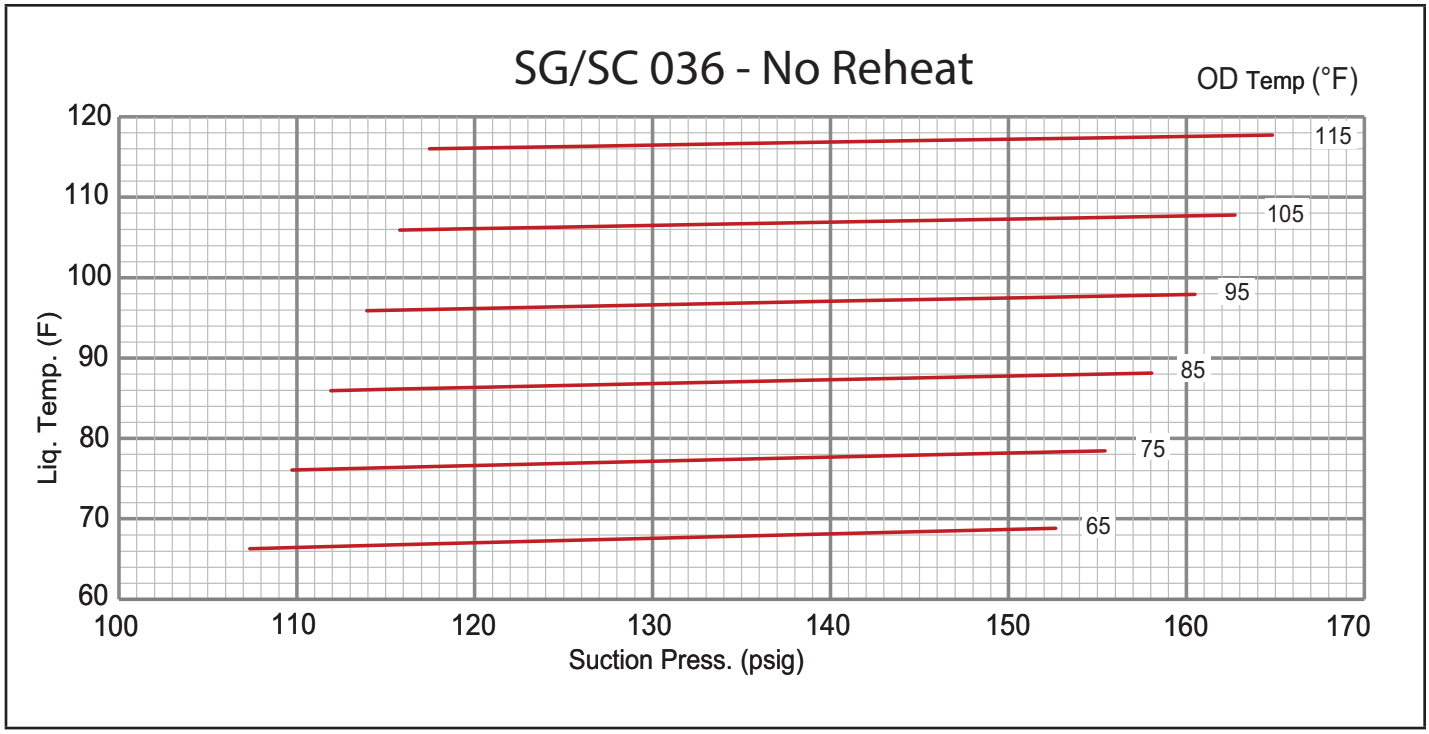
	SG/SC 120 Normal Operating Pressures - Reheat - 581283-01											
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
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

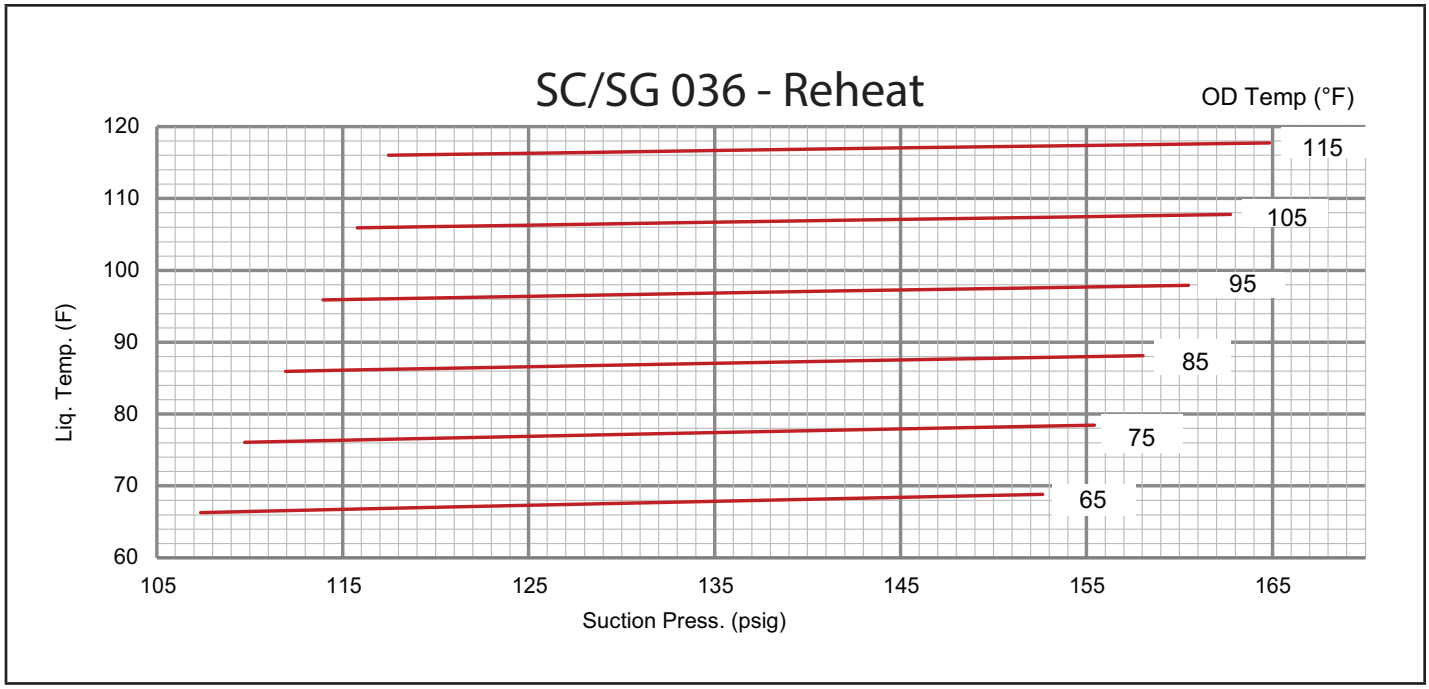
TABLE 26

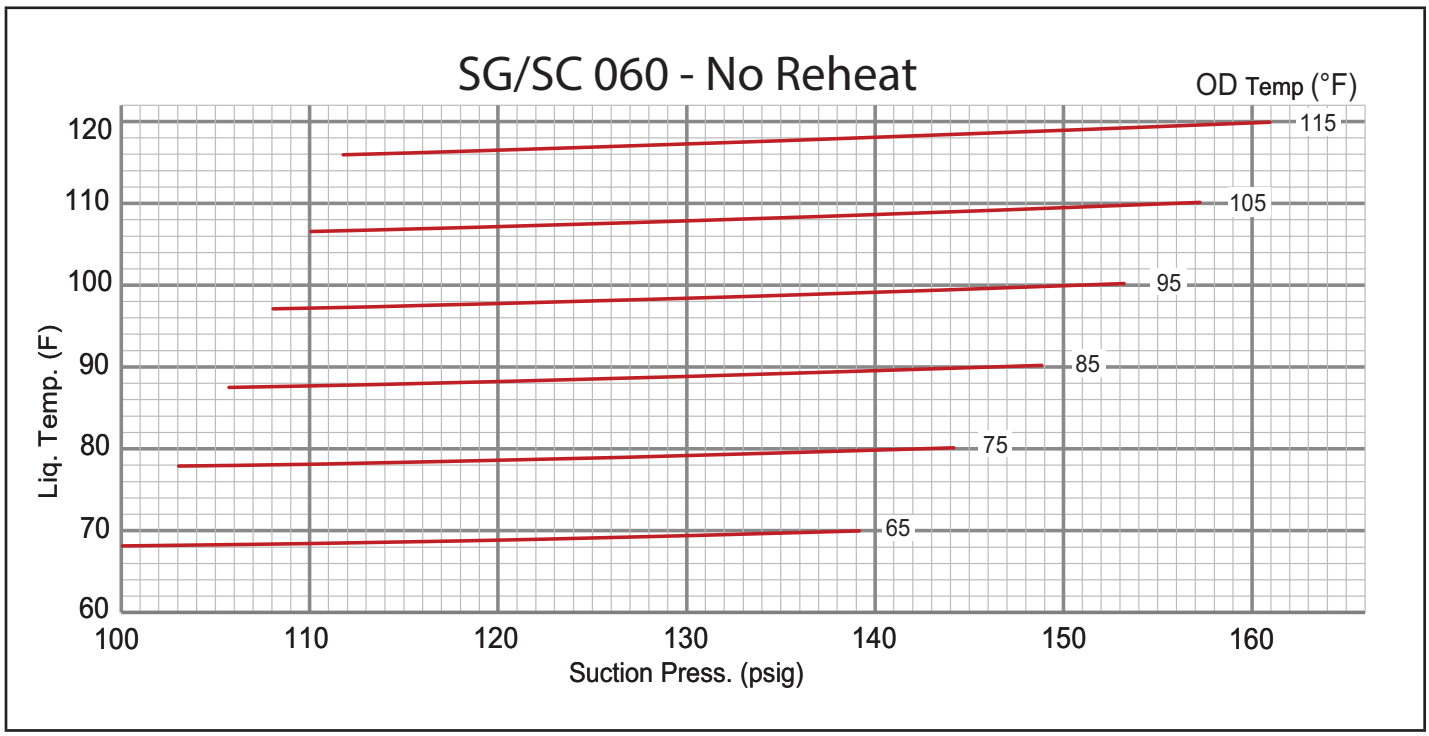
	SG/SC 240 Normal Operating Pressures - No Reheat - 581198-01											
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
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

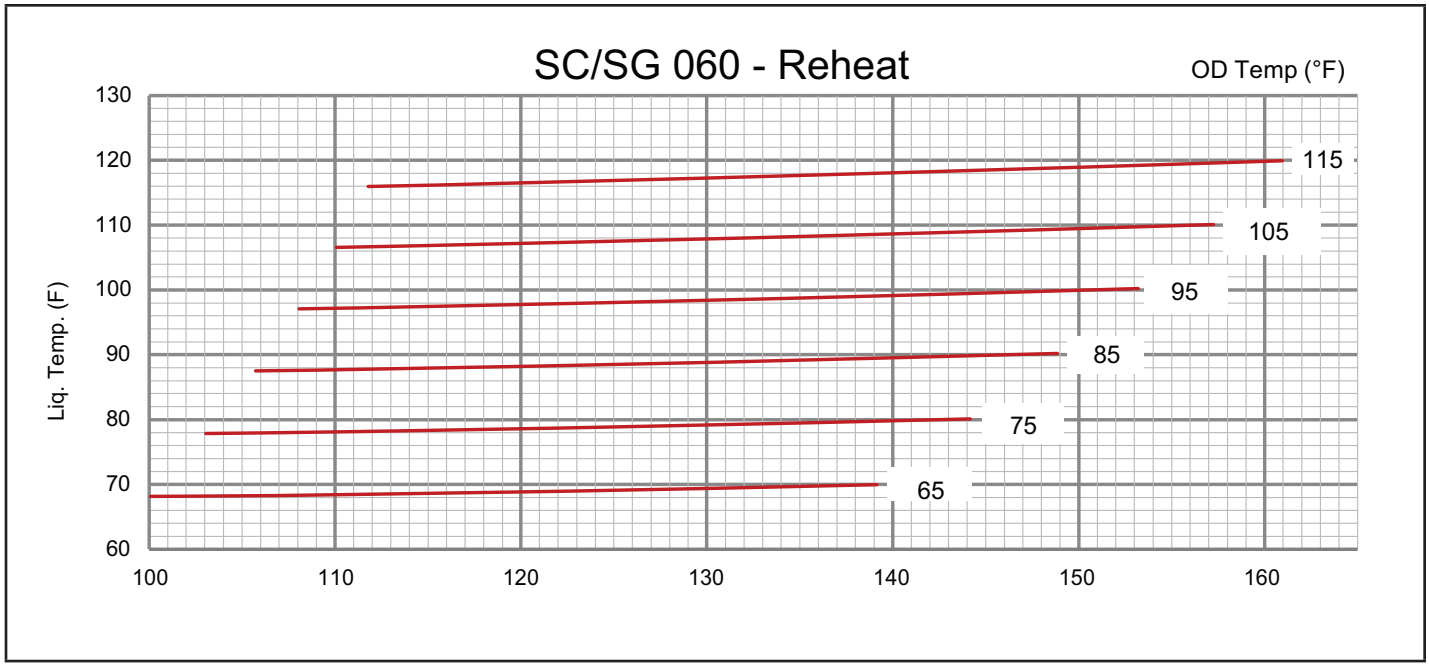
TABLE 27

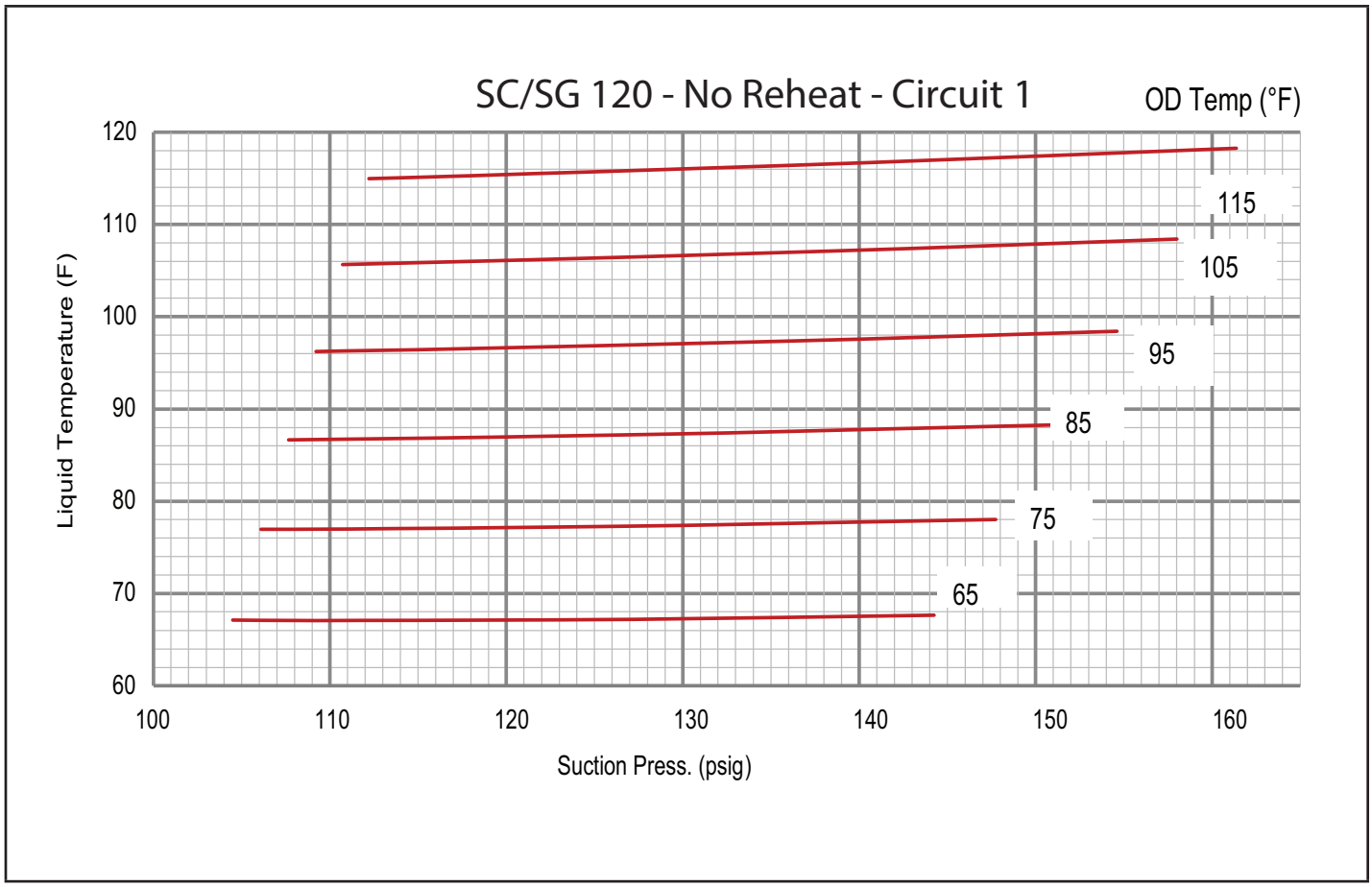
	SG/SC 240 Normal Operating Pressures - Reheat - 581200-01											
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
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

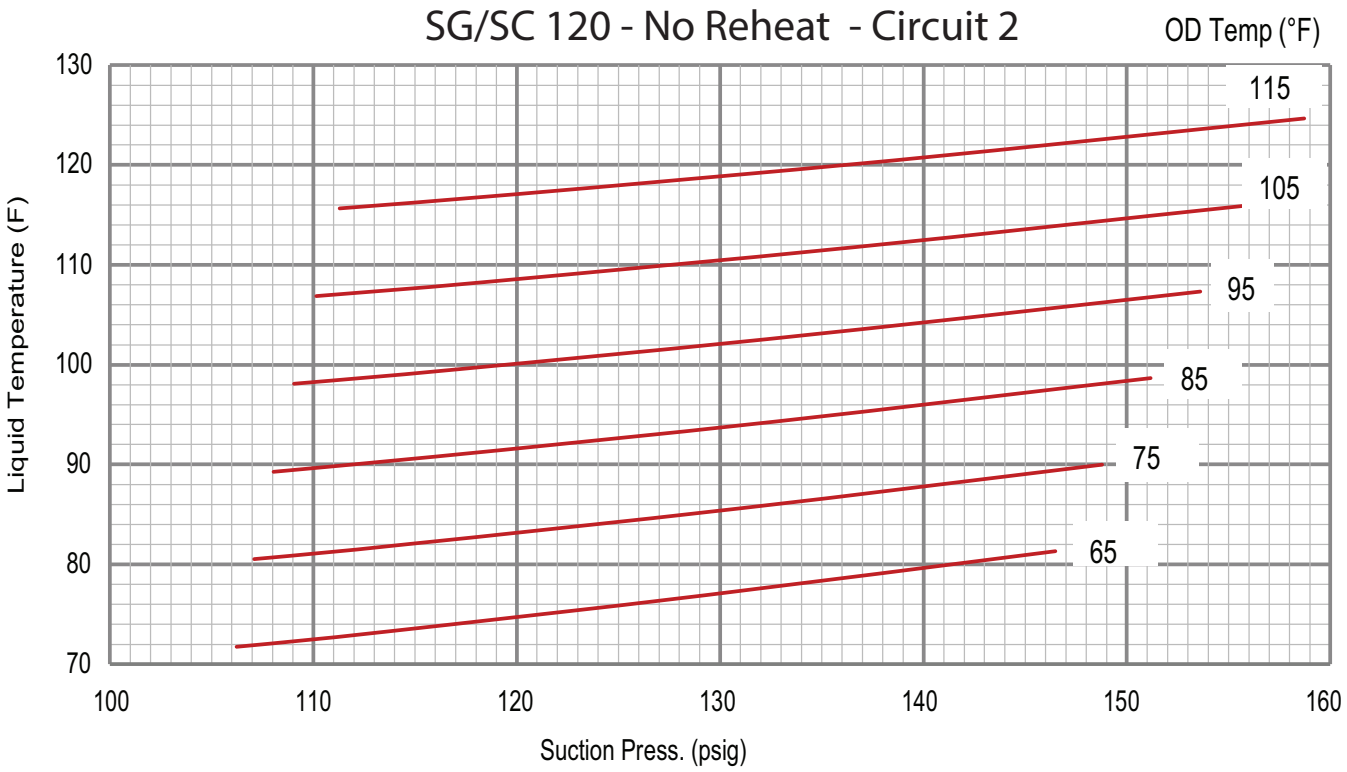


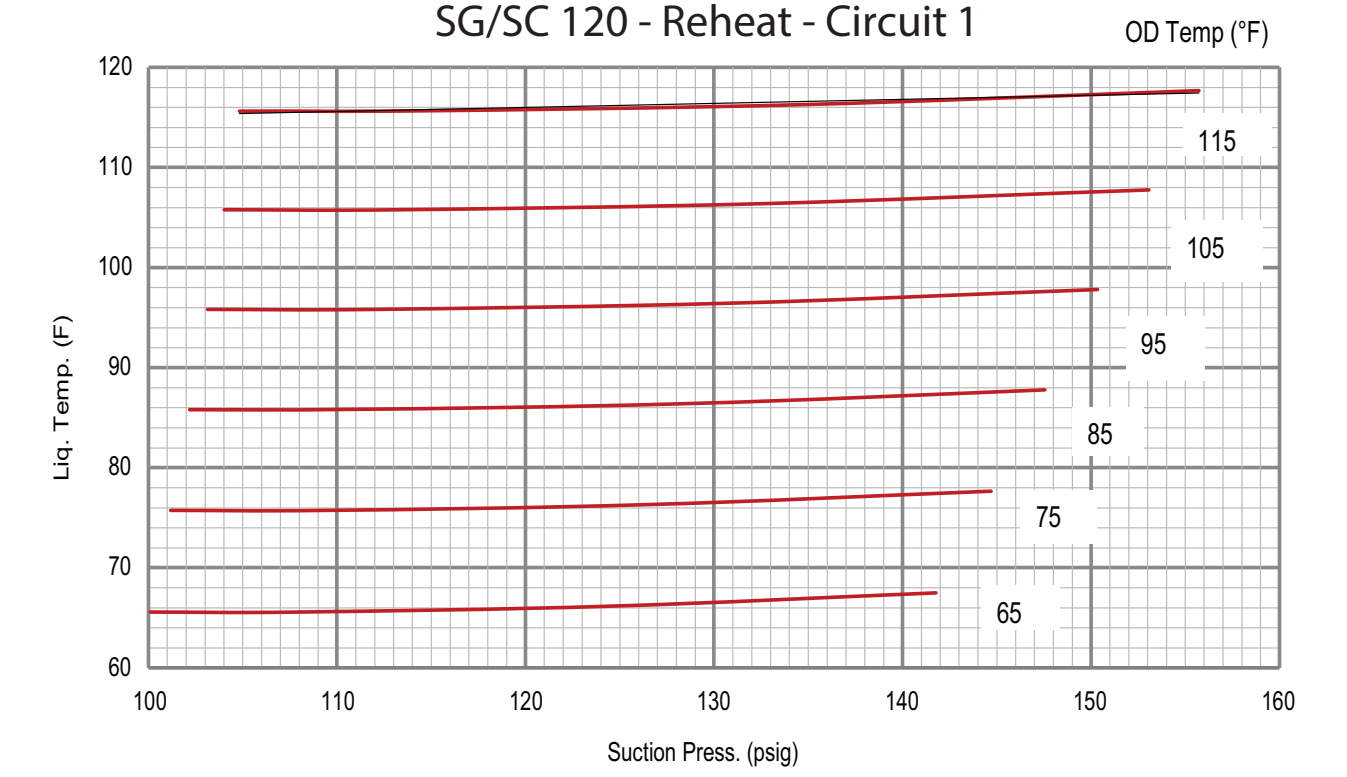

SC/SG 036 - Reheat
OD Temp (°F)
115
105
95
85
75
65
Liq. Temp. (F)
120
110
100
90
80
70
60
105
115
125
135
145
155
165
Suction Press. (psig)

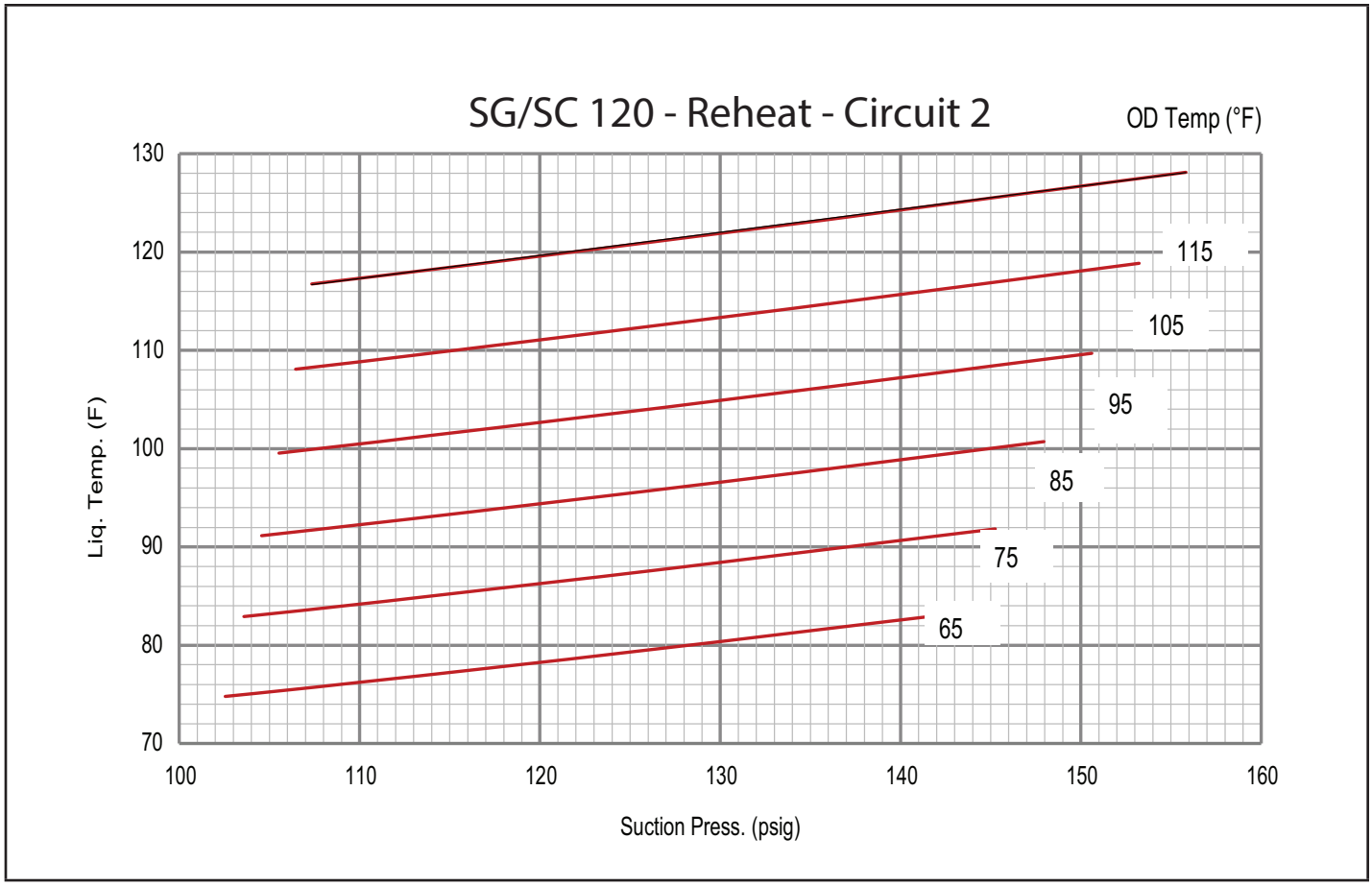

SG/SC 060 - No Reheat
OD Temp (°F)
115
105
95
85
75
65
Liq. Temp. (F)
120
110
100
90
80
70
60
100
110
120
130
140
150
160
Suction Press. (psig)

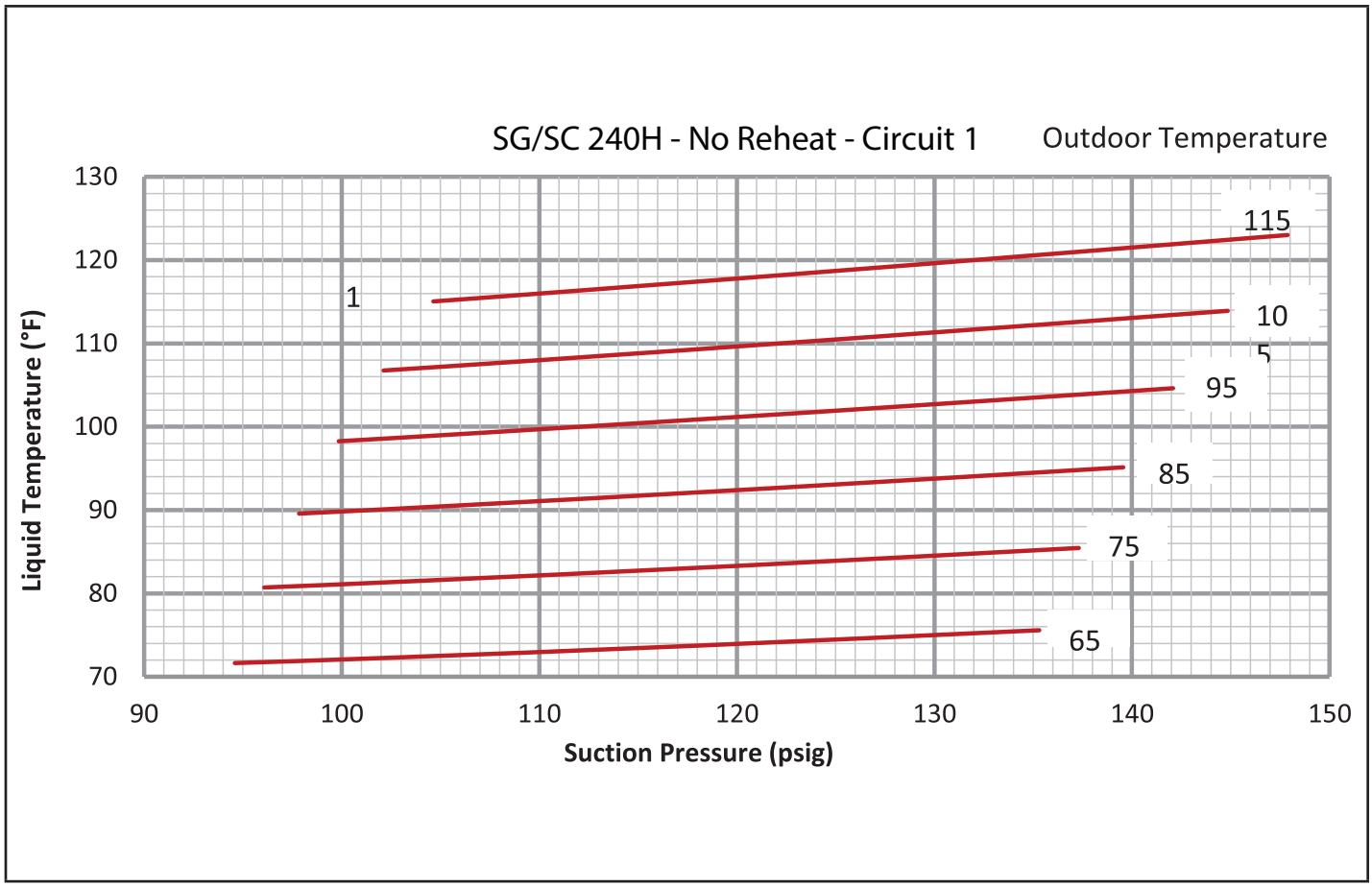

SC/SG 060 - Reheat
OD Temp (°F)
Liq. Temp. (F)
130
120
110
100
90
80
70
60
100
110
120
130
140
150
160
115
105
95
85
75
65

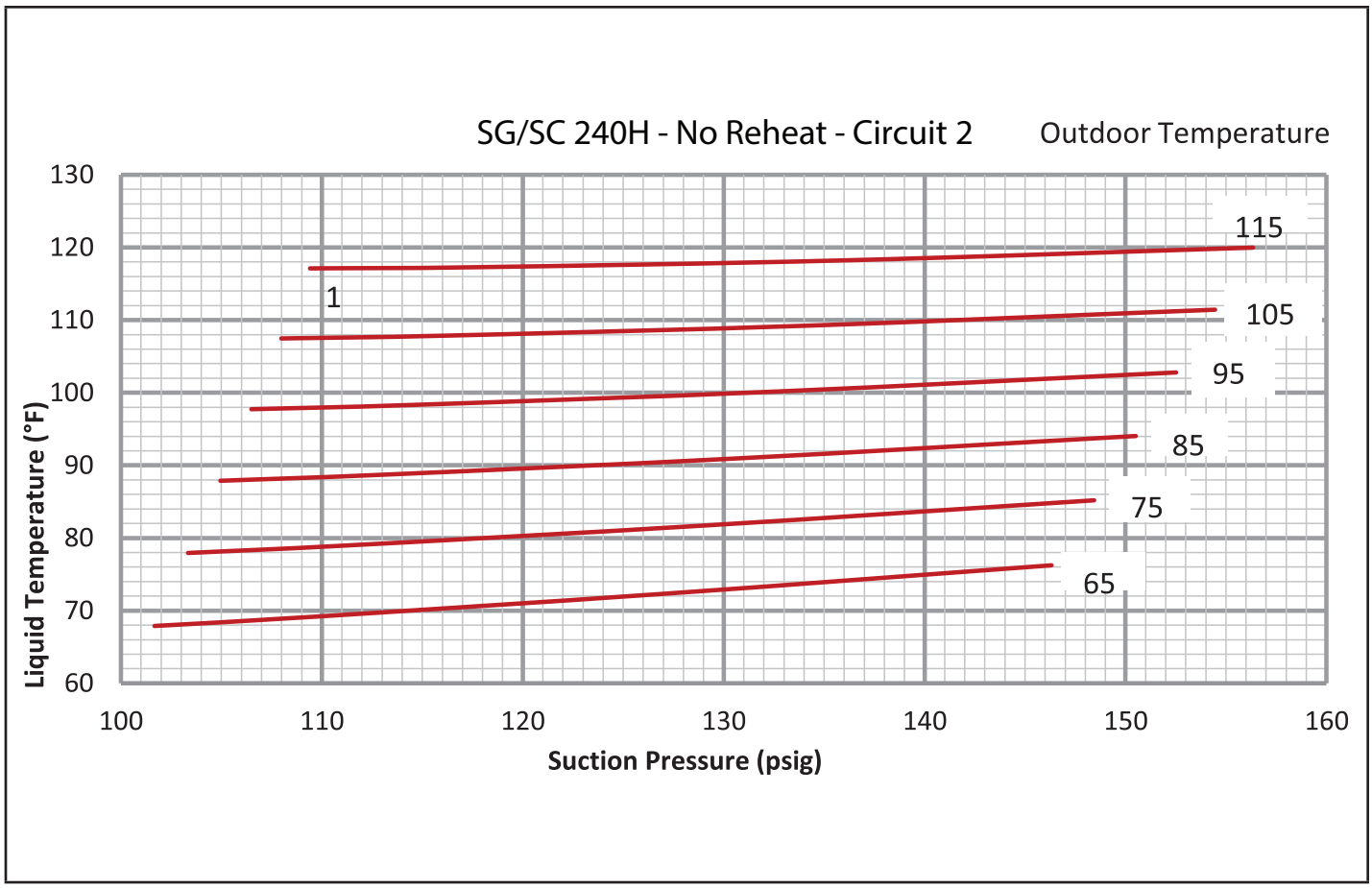

SC/SG 120 - No Reheat - Circuit 1
OD Temp (°F)
Liquid Temperature (F)
120
110
100
90
80
70
60
100
110
120
130
140
150
160
Suction Press. (psig)
115
105
95
85
75
65

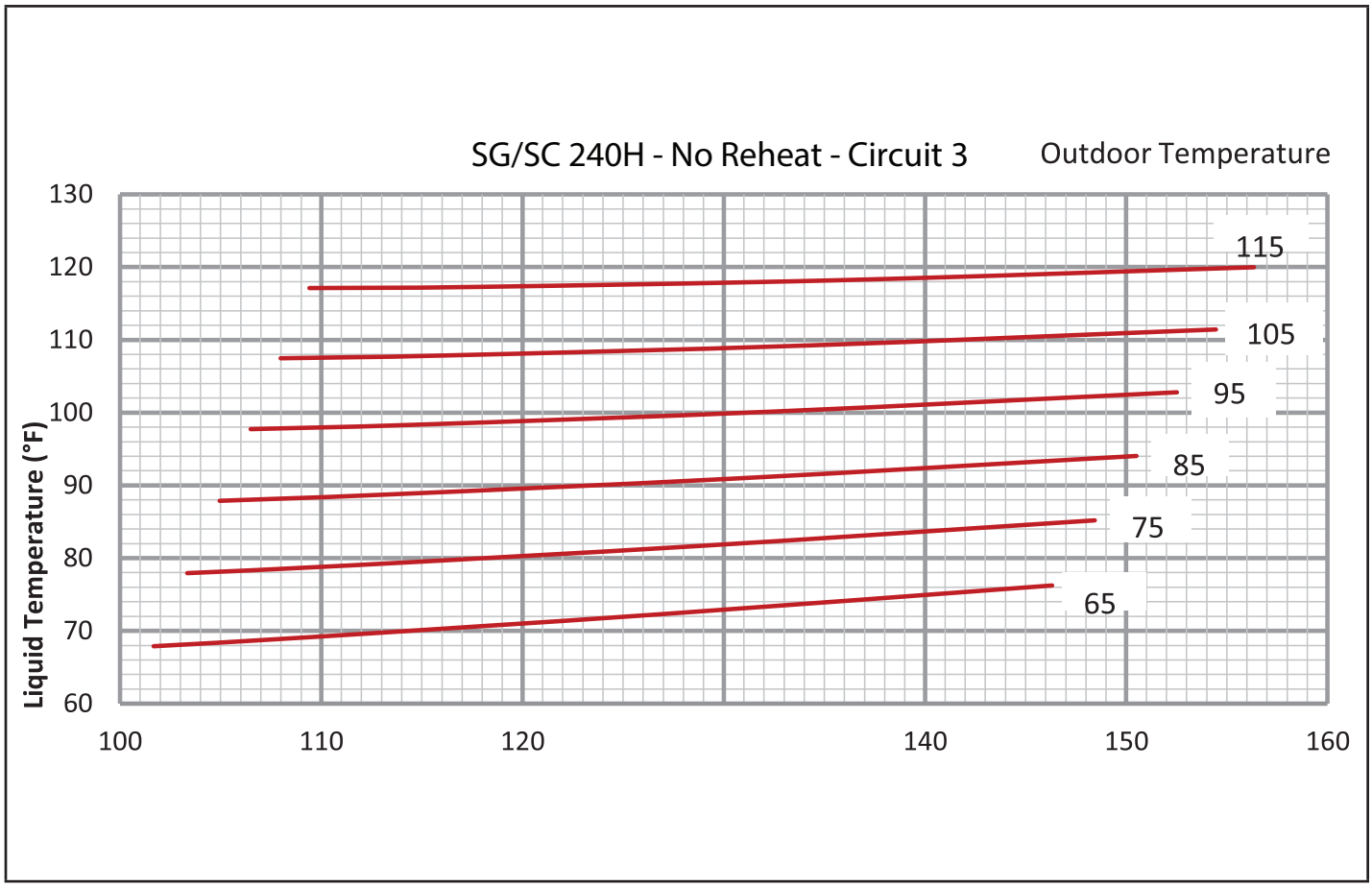

SG/SC 120 - No Reheat - Circuit 2
OD Temp (°F)
115
105
95
85
75
65
Liquid Temperature (F)
130
120
110
100
90
80
70
100
110
120
130
140
150
160
Suction Press. (psig)

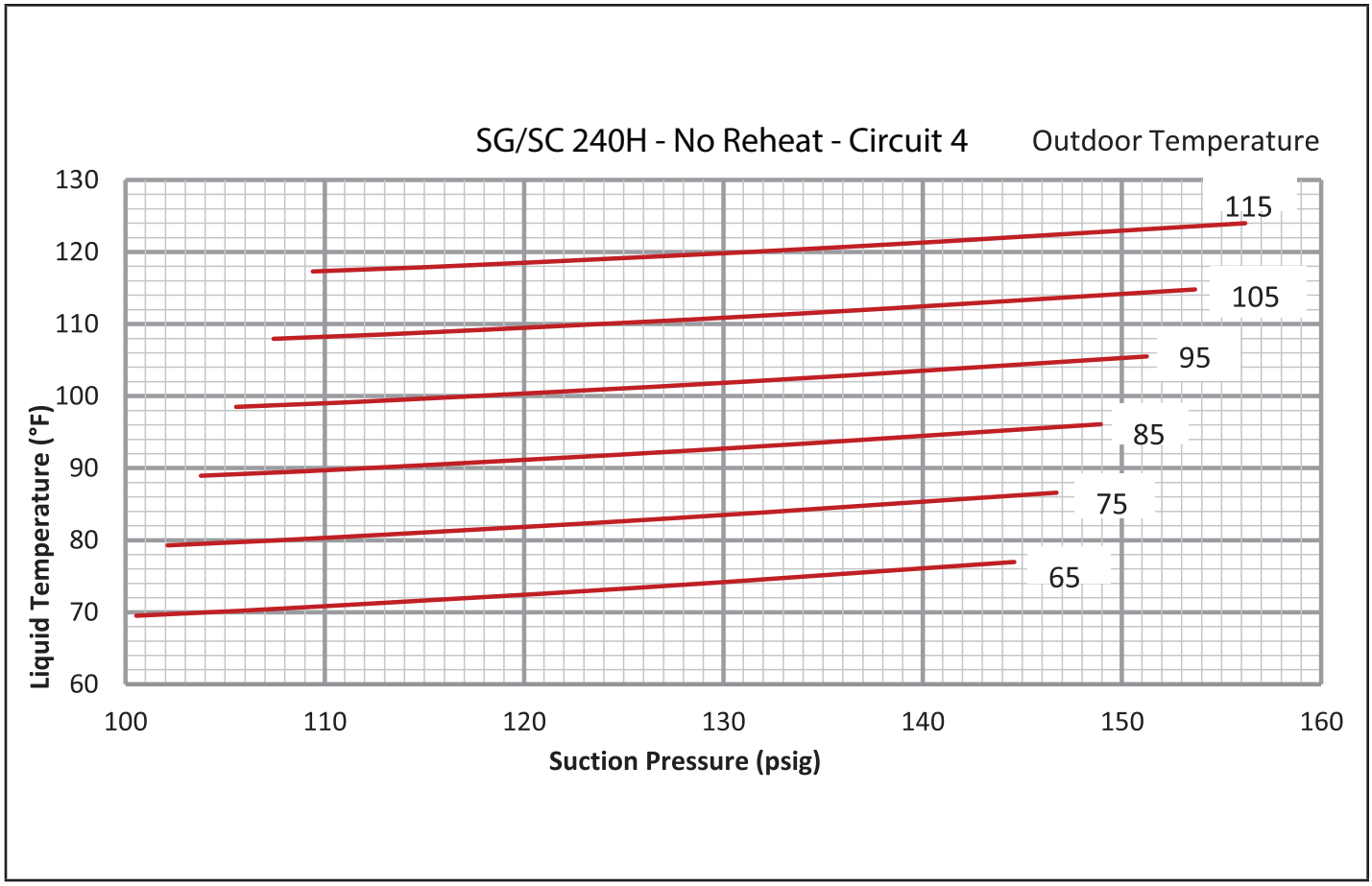

SG/SC 120 - Reheat - Circuit 1
OD Temp (°F)
115
105
95
85
75
65
Liq. Temp. (F)
120
110
100
90
80
70
60
100
110
120
130
140
150
160
Suction Press. (psig)

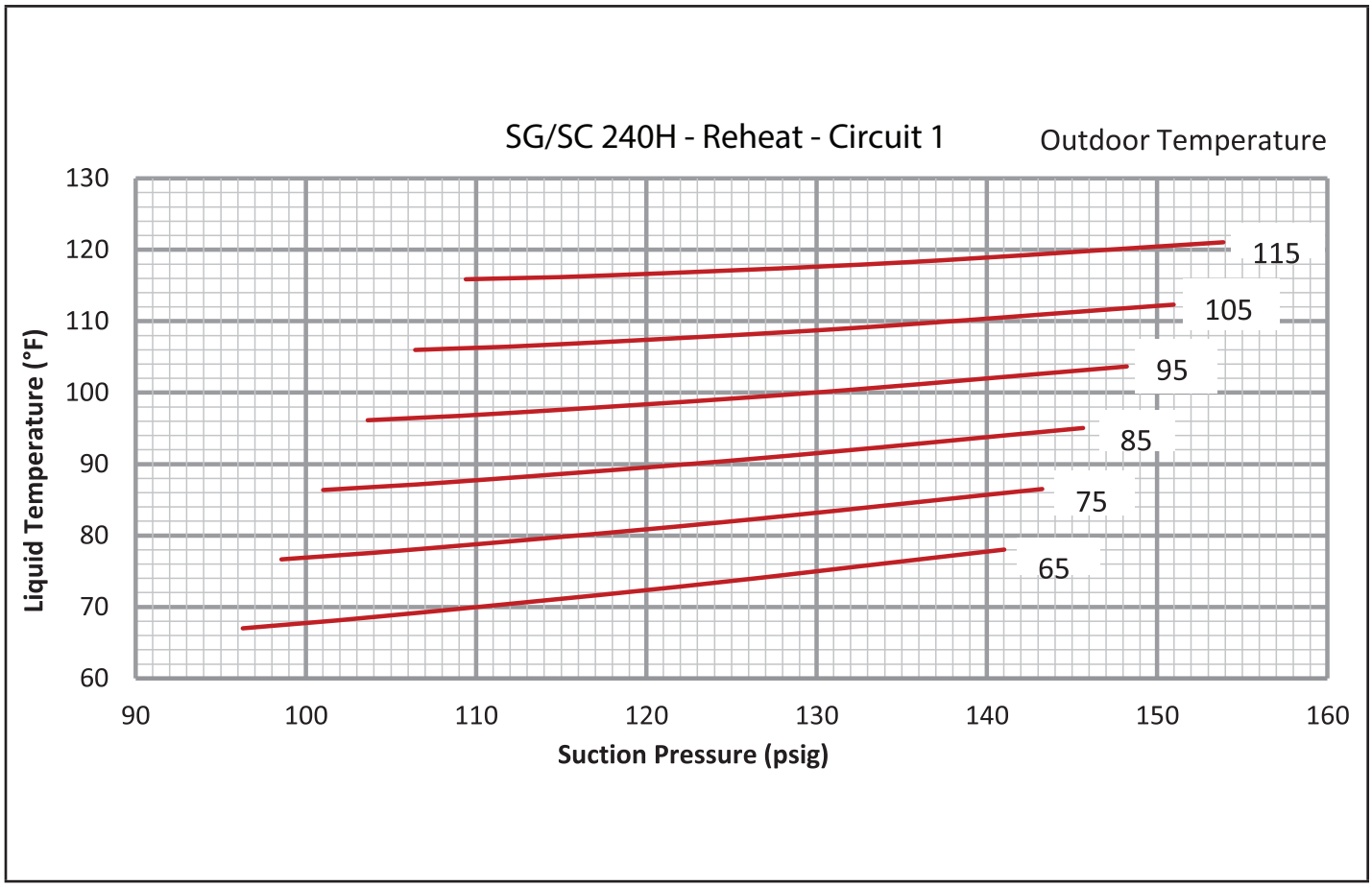

SG/SC 120 - Reheat - Circuit 2
OD Temp (°F)
Liq. Temp. (F)
130
120
110
100
90
80
70
115
105
95
85
75
65
100
110
120
130
140
150
160
Suction Press. (psig)

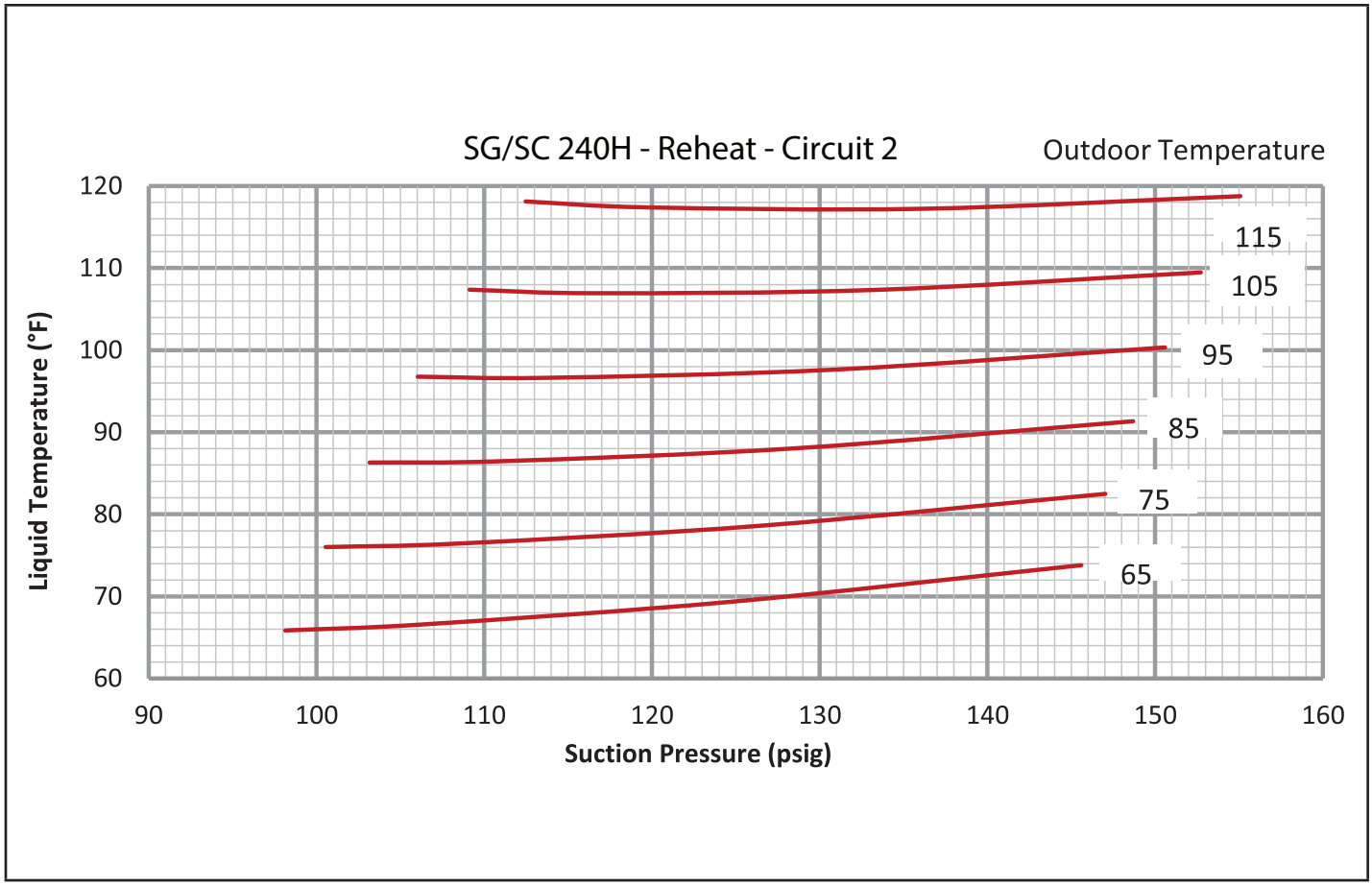

SG/SC 240H - No Reheat - Circuit 1
Outdoor Temperature
Liquid Temperature (°F)
130
120
110
100
90
80
70
115
1
10
5
95
85
75
65
90
100
110
120
130
140
150
Suction Pressure (psig)

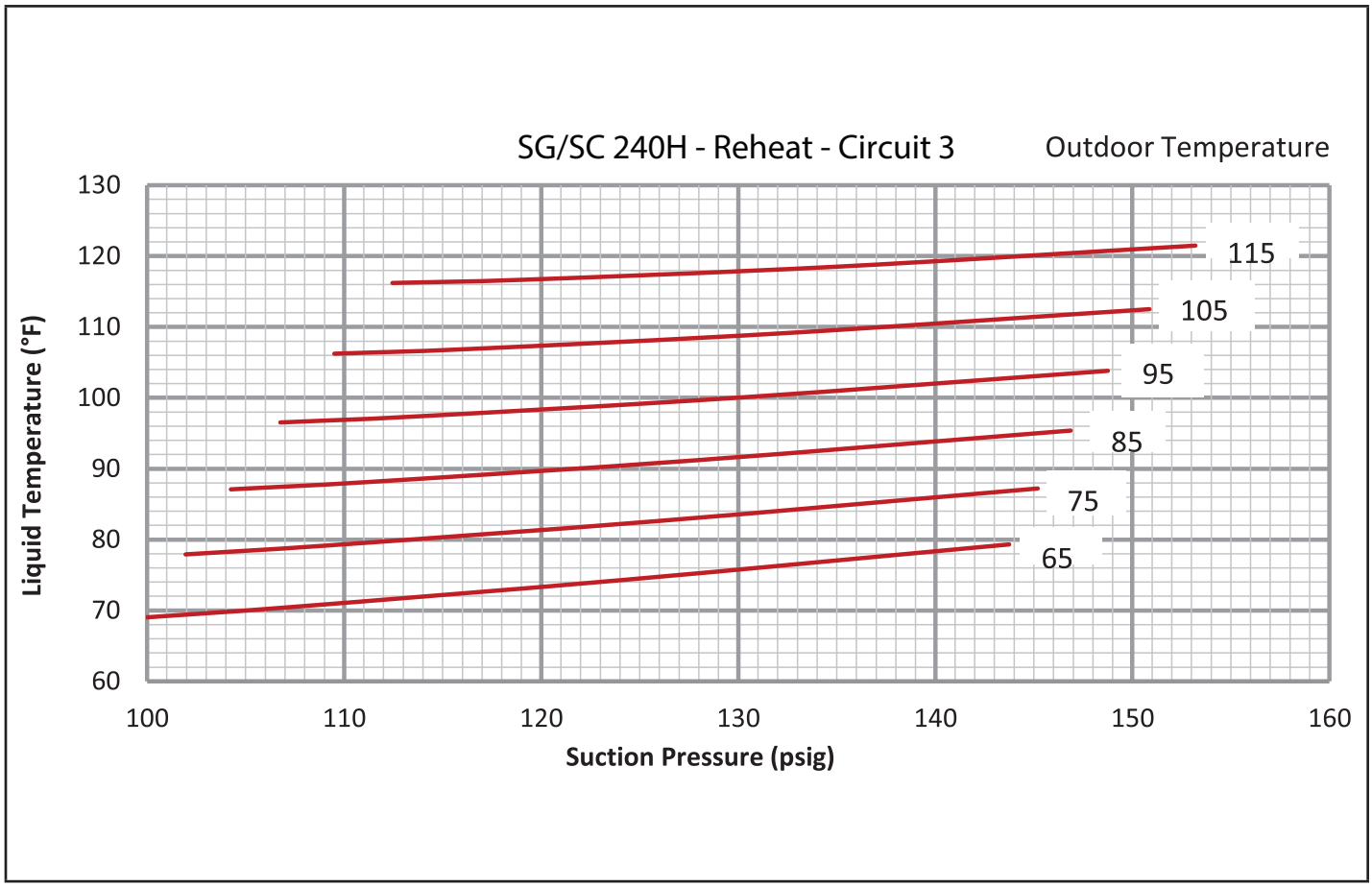

SG/SC 240H - No Reheat - Circuit 2
Outdoor Temperature
130
120
110
100
90
80
70
60
Liquid Temperature (°F)
100
110
120
130
140
150
160
Suction Pressure (psig)
115
105
95
85
75
65
1

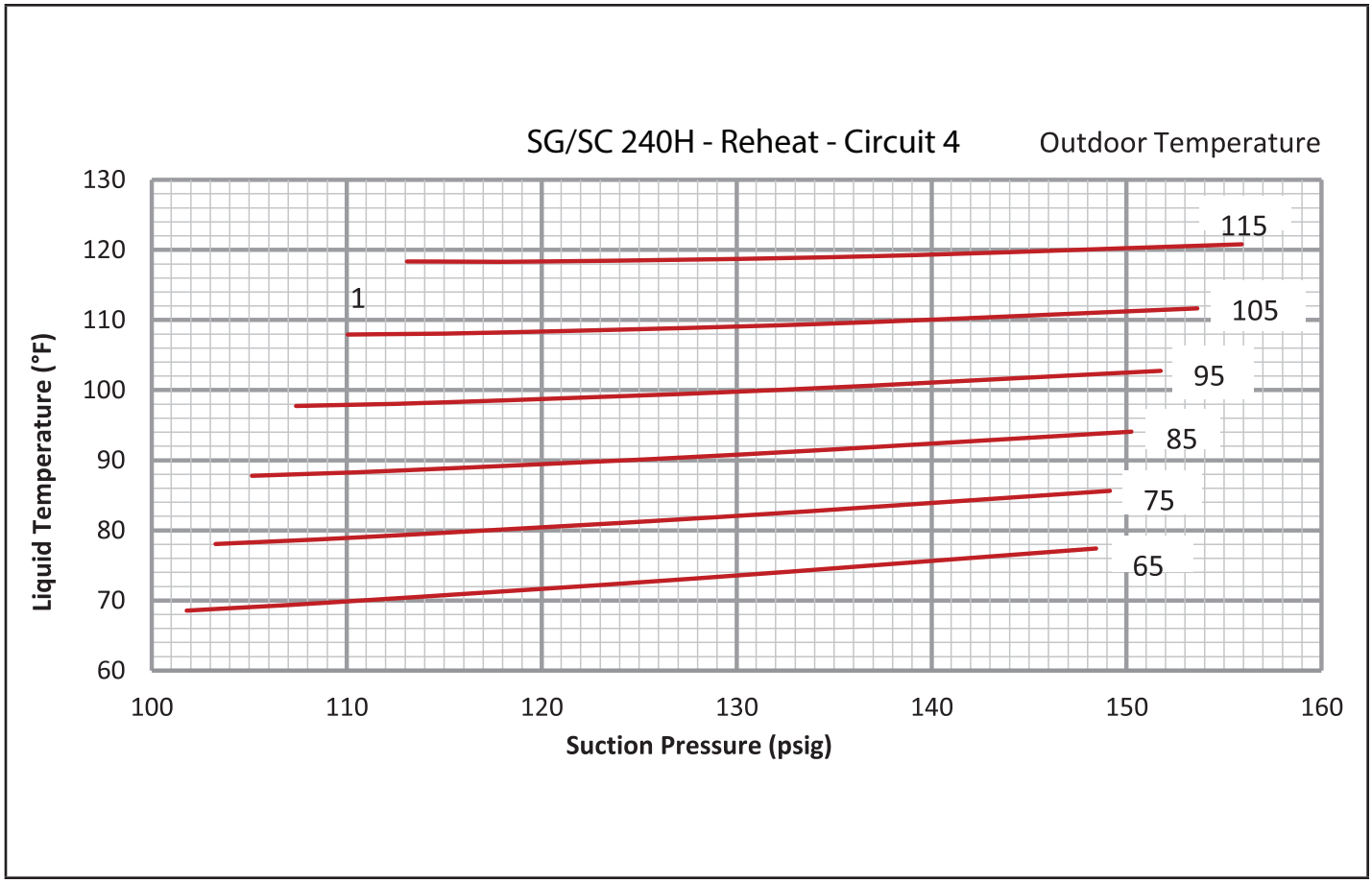

SG/SC 240H - No Reheat - Circuit 3
Outdoor Temperature
130
120
110
100
90
80
70
60
Liquid Temperature (°F)
100
110
120
140
150
160
115
105
95
85
75
65


SG/SC 240H - No Reheat - Circuit 4
Outdoor Temperature
115
105
95
85
75
65
Liquid Temperature (°F)
130
120
110
100
90
80
70
60
100
110
120
130
140
150
160
Suction Pressure (psig)


SG/SC 240H - Reheat - Circuit 1
Outdoor Temperature
115
105
95
85
75
65
Liquid Temperature (°F)
130
120
110
100
90
80
70
60
90
100
110
120
130
140
150
160
Suction Pressure (psig)


SG/SC 240H - Reheat - Circuit 2
Outdoor Temperature
115
105
95
85
75
65
120
110
100
90
80
70
60
90
100
110
120
130
140
150
160
Liquid Temperature (°F)
Suction Pressure (psig)


SG/SC 240H - Reheat - Circuit 3
Outdoor Temperature
115
105
95
85
75
65
130
120
110
100
90
80
70
60
100
110
120
130
140
150
160
Liquid Temperature (°F)
Suction Pressure (psig)


SG/SC 240H - Reheat - Circuit 4
Outdoor Temperature
Liquid Temperature (°F)
130
120
110
100
90
80
70
60
100
110
120
130
140
150
160
Suction Pressure (psig)
1
115
105
95
85
75
65

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 freezestat 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).

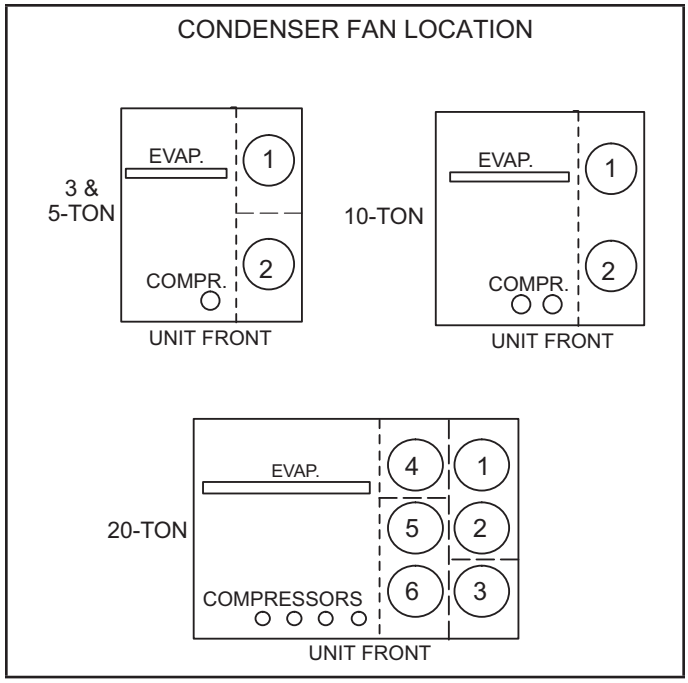


FIGURE 48

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 49 and FIGURE 50)

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.

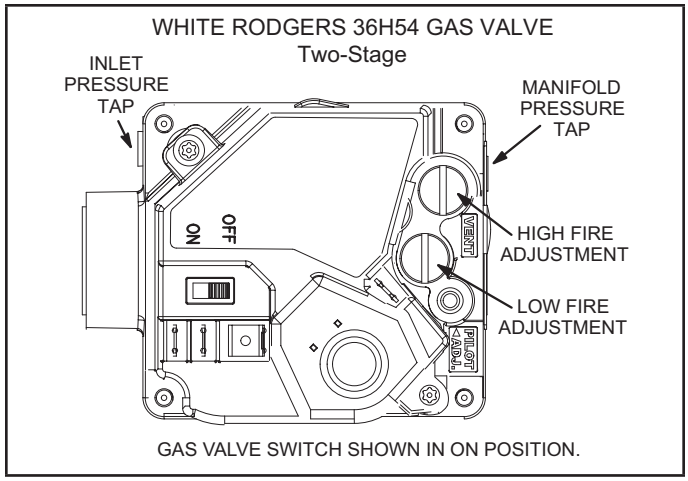


FIGURE 49

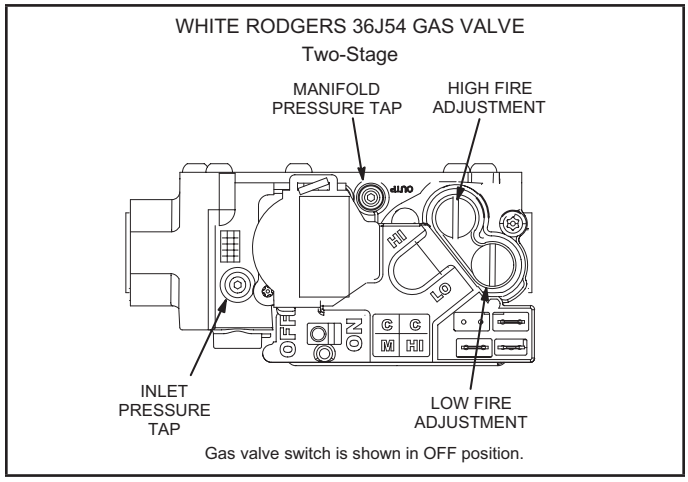


FIGURE 50

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 51.

SG 120 - Upper right corner of blower support wall.

SG 240 - See FIGURE 52.

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 28.

Gas manifold pressures should match pressures shown in TABLE 28. 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.

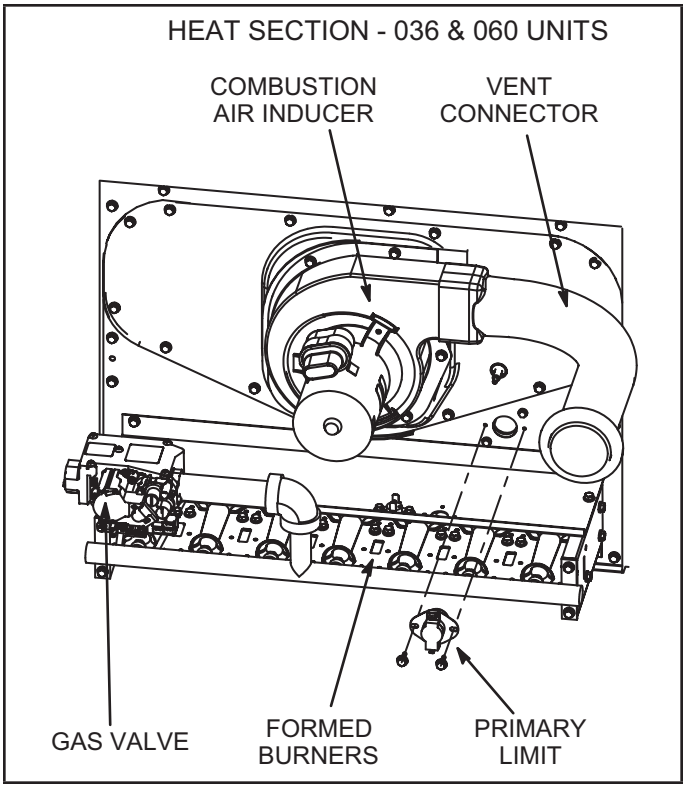


FIGURE 51

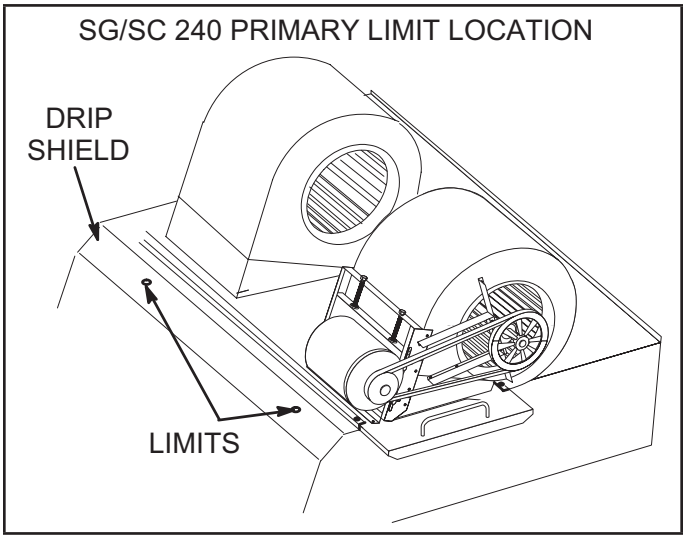


FIGURE 52

TABLE 28
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 29. 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 29

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.*

MSAV™ Unit Start-Up

Units may contain a supply air blower equipped with a variable frequency drive A96 (VFD) which stages supply air CFM.

The supply air VFD (A96) is located near the compressors. See FIGURE 53.

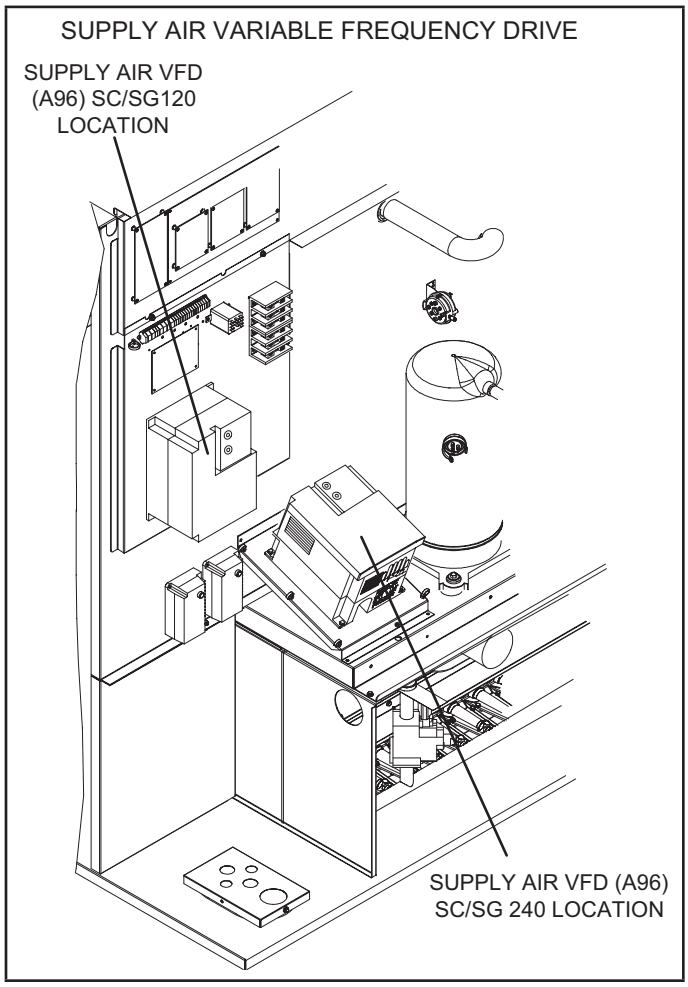


FIGURE 53

A-Design Specifications

Use TABLE 30 to fill in field-provided, design specified blower CFM for appropriate unit.

If only high and low cooling design specifications are provided, set the medium cooling CFM at the high or low cooling design spec or any CFM between.

B-Set Maximum CFM

Use TABLE 31 to determine highest blower CFM for appropriate unit. Adjust the blower pulley to deliver that amount of CFM with only the blower operating. See *Determining Unit CFM* in the Blower Operation and Adjustment section.

C-Enter Design Specifications Into Controller

1 - Use the following menu to enter the blower design specified CFM into the Unit Controller. Make sure blower CFM is within limitations shown in TABLE 31. Refer to the Unit Controller manual provided with unit.

TEST & BALANCE > BLOWER (enter information as prompted by the Unit Controller if not already done).

2 - Enter the following design specifications as shown in TABLE 30.

Blower / Heat CFM
Cooling High CFM[1]
Cooling Low CFM[1]
Vent CFM

[1]The Unit Controller will prompt when more cooling stages are available depending on the number of compressors and the control mode.

3 - Adjust the blower RPM to deliver the target CFM based on the measured static pressure using the blower table.

4 - Measure the static pressure again and apply the static pressure and RPM to the tables to determine adjusted CFM.

5 - Repeat adjustments until design CFM is reached.

D-Set Damper Minimum Position

To maintain required minimum ventilation air volumes when the unit is in the occupied mode, two minimum damper positions must be set. The Unit Controller will open the dampers to “Min OCP Blwr Low” when blower CFM is BELOW a “midpoint” CFM. The Unit Controller will open the damper to “Min OCP Blwr High” when blower CFM is at or ABOVE the “midpoint” CFM.

The Unit Controller will calculate the “midpoint” CFM.

Set Minimum Position 1

Use the following menu in the Unit Controller to set “Min OCP Blwr Low” for the blower CFM below the “midpoint” CFM. When navigating into this menu, the Unit Controller will bring on the corresponding blower speed and allow damper position adjustment.

RTU OPTION > DAMPER > MIN DAMPER POSITION BLOWER ON HIGH = X.X%

TABLE 30
Blower CFM Design Specifications

Unit	T’Stat or Zone Control Stages	Blower Speed	Design Specified CFM
120, 240	2	Htg.	
		Clg. High	
		Clg. Low	
		Ventilation	
240	4	Htg.	
		Clg. High	
		Clg. Med. High	
		Clg. Med. Low	
		Clg. Low	
		Ventilation	

**Available blower speeds very by unit and thermostat stages*

Measure the intake air CFM. If the CFM is lower than the design specified CFM for ventilation air, use the Unit Controller to increase the damper percent open. If the CFM is higher than specified, decrease the damper percent open.

NOTE - *Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.*

TABLE 31
MINIMUM AND MAXIMUM CFM

Gas Heat Minimum CFM		
Unit	**Gas Heat Size**	**Airflow CFM**
SG 120	Std. , Med.	2225
SG 120	High	2550
SG 240	Std. , Med.	4450
SG 240	High	5075
Electric Heat Minimum CFM		
Unit	**Heat Size (kW)**	**Airflow CFM**
SC 120	15, 20, 30, 45, 60	See page 36
SC 240	20, 30, 40, 60, 80, 90	8000
Cooling Minimum CFM - 220 CFM/ton		
Unit	**Blower Speed**	**Airflow CFM**
SG/SC 120	Low, Med. Low, Med. High	2200
SG/SC 240	Low, Med. Low, Med. High	4400
Cooling Minimum CFM - 280 CFM/ton		
Unit	**Blower Speed**	**Airflow CFM**
SG/SC 120	High	2800
SG/SC 240	High	5600
Smoke and Ventilation Minimum CFM - 150 CFM/ton		
Unit	**Not Applicable**	**Airflow CFM**
SG/SC 120	NA	1500
SG/SC 240	NA	3000
Heating and Cooling Maximum CF< - 480 CFM/ton		
Unit	**Blower Speed**	**Airflow CFM**
SG/SC 120	High	4800
SG/SC 240	High	9600

Set Minimum Position 2

Use the same menu in the Unit Controller to set “Min OCP Blwr High” for the blower CFM above the “midpoint” CFM. When navigating into this menu, the Unit Controller will bring on the corresponding blower speed and allow damper position adjustment.

Settings / Control / MSAV / Damper / High Speed

Measure the intake air CFM. If the CFM is lower than the design specified CFM for ventilation air, use the Unit Controller to increase the damper percent open. If the CFM is higher than specified, decrease the damper percent open.

NOTE - *Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.*

MSAV™ Operation

This is a summary of cooling operation. Refer to the sequence of operation provided in the Engineering Handbook or Service Manual for more detail.

A-Two-Stage T’Stat; 2 and 4-Compressor Units

1 - Economizer With Outdoor Air Suitable

Y1 Demand -

Compressors Off
Blower Cooling Low
Dampers modulate

Y2 Demand -

Compressors Off
Blower Cooling High
Dampers Modulate

NOTE - *If dampers are at maximum open for three minutes, compressor 1 and 2 are energized and blower stays on cooling high.*

2 - No Economizer or Outdoor Air Not Suitable

Y1 Demand -

First-stage Compressors On (compressor 1 on 120 units, compressor 1 & 2 on 240 units)
Blower Cooling Low
Dampers Minimum Position

Y2 Demand -

All Compressors On
Blower Cooling High
Dampers Minimum Position

B-Zone Sensor (4 Clg. Stages), 4-Compressor Units (240 Units)

1 - Economizer with Outdoor Air Suitable

Y1 Demand -

Compressors Off
Blower Cooling Medium High
Dampers modulate

Y2 Demand -

Compressors Off
Blower Cooling High
Dampers Modulate

NOTE - *If dampers are at maximum open for three minutes, compressor 1 is energized and blower stays on cooling high.*

Y3 Demand -

Compressors 1 and 2 On
Blower Cooling High
Dampers Maximum Open

Y4 Demand -

All Compressors On
Blower Cooling High
Dampers Maximum Open

2 - No Economizer or Outdoor Air Not Suitable

Y1 Demand -

Compressor 1 On
Blower Cooling Low

Y2 Demand -

Compressor 1 and 2 On
Blower Cooling Medium Low

Y3 Demand -

Compressors 1, 2, and 3 On
Blower Cooling Medium High

Y4 Demand -

All Compressors On
Blower Cooling High

Direct Drive Blower Start-Up

A-Set Blower Speed

1 - Use TABLE 32 to fill in field-provided, design specified blower CFM

TABLE 32
Blower CFM Design Specifications

Blower Speed	Design Specified CFM
Heating	
Cooling High	
Cooling Low	
Ventilation	

2 - Use the following menu to enter the blower design specified CFM into the Unit Controller. Don't press **SAVE** until all CFM are entered. Make sure blower CFM is within limitations shown in TABLE 33. Refer to the Unit Controller manual provided with unit.

TEST & BALANCE > BLOWER

3 - Once all four speeds are entered, the target (highest of the heating and cooling settings) CFM and default RPM will be displayed.

NOTE - *When units are not equipped with heat, the Blower Heat speed will not be displayed. Blower Cooling High will be the first blower speed to appear.*

4 - Measure the static pressure as shown in the Blower Start-Up section. Use the static pressure, target CFM and blower tables to determine the RPM needed. Values in the blower table reflect the static pressures taken in locations shown in FIGURE 31.

5 - Enter the RPM and repeat the previous step until the design CFM is reached.

6 - Press SAVE followed by **MAIN MENU**.

NOTE - *Once the CFM settings are saved, the Unit Controller will set all other blower CFM.*

B-Set Damper Minimum Position

To maintain required minimum ventilation air volumes when the unit is in the occupied mode, two minimum damper positions must be set. The Unit Controller will open the dampers to "Min OCP Blwr Low" when blower CFM is BELOW a "midpoint" CFM. The Unit Controller will open the damper to "Min OCP Blwr High" when blower CFM is at or ABOVE the "midpoint" CFM.

The Unit Controller will calculate the “midpoint” CFM.

Set Minimum Position 1

Use the followiing menu in the Unit Controller to set “Min OCP Blwr Low” for the blower CFM below the “midpoint” CFM. When navigating into this menu, the Unit Controller will being on the corresponding blower speed and allow damper position adjustment.

RTU Options > EDIT PARAMETER > ENTER DATA ID - 9 > MIN DAMPER LOW BLOWER = X.X%

Measure the intake air CFM. If the CFM is lower than the design specified CFM for ventilation air, use the Unit Controller to increase the damper percent open. If the CFM is higher than specified, decrease the damper percent open.

NOTE - *Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.*

Set Minimum Position 2

Use the same menu in the Unit Controller to set “Min OCP Blwr High” for the blower CFM above the “midpoint” CFM. When navigating into this menu, the Unit Controller will bring on the corresponding blower speed and allow damper position adjustment.

RTU Options > EDIT PARAMETER > ENTER DATA ID -132 > MIN DAMPER LOW BLOWER = X.X %

Measure the intake air CFM. If the CFM is lower than the design specified CFM for ventilation air, use the Unit Controller to increase the damper percent open. If the CFM is higher than specified, decrease the damper percent open.

NOTE - *Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.*

TABLE 33
MINIMUM AND MAXIMUM CFM
DIRECT DRIVE BLOWERS
036 & 060

Gas Heat Minimum CFM		
Unit	**Gas Heat Size**	**Airflow CFM**
SG 036, 060	Std.	1175
SG 036	Med.	1475
SG 060	Med.	1500
SG 060	High	1625
Electric Heat Minimum CFM		
Unit	**Heat Size (kW)**	**Airflow CFM**
SC 036	0, 10, 15	1025
SC 060	0, 10, 15, 20, 30	1650
Cooling Low Minimum - CFM		
Unit	**Blower Speed**	**Airflow CFM**
SG/SC 036	Low	600
SG/SC 060	Low	750
Cooling High Minimum - CFM		
Unit	**Blower Speed**	**Airflow CFM**
SG/SC 036	High	600
SG/SC 060	High	750
Smoke and Ventilation Minimum - CFM		
Unit	**Blower Speed**	**Airflow CFM**
SG/SC 036	High	600
SG/SC 060	High	750
Cooling Maximum CFM - 480 CFM/ton		
Unit	**Blower Speed**	**Airflow CFM**
SG/SC 036	High	1450
SG/SC 060	High	2400
Electric Heat Maximum CFM		
Unit	**Blower Speed**	**Airflow CFM**
SC 036	High	1450
SC 060	High	2400
Gas Heat Maximum CFM		
Unit	**Gas Heat Size**	**Airflow CFM**
SG 036	Std.	1450
SG 036	Med.	1475
SG 060	Std., Med., High	2400

*Rounded to nearest 25 CFM.

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 54 through FIGURE 56 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 34. For example: if indoor air relative humidity is 80% ± 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 34

Relative Humidity (%RH ± 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

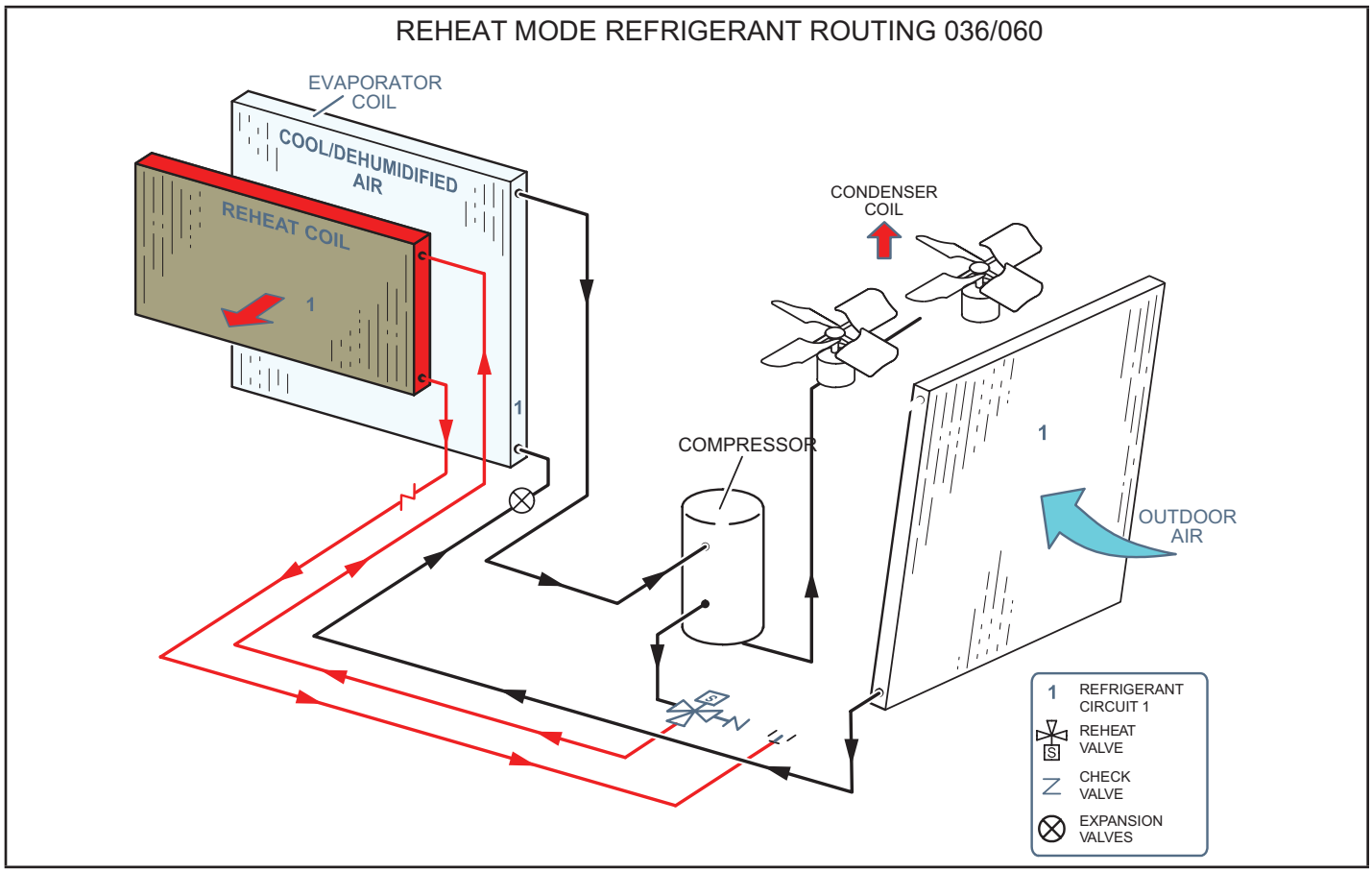


FIGURE 54

REHEAT MODE REFRIGERANT ROUTING 120

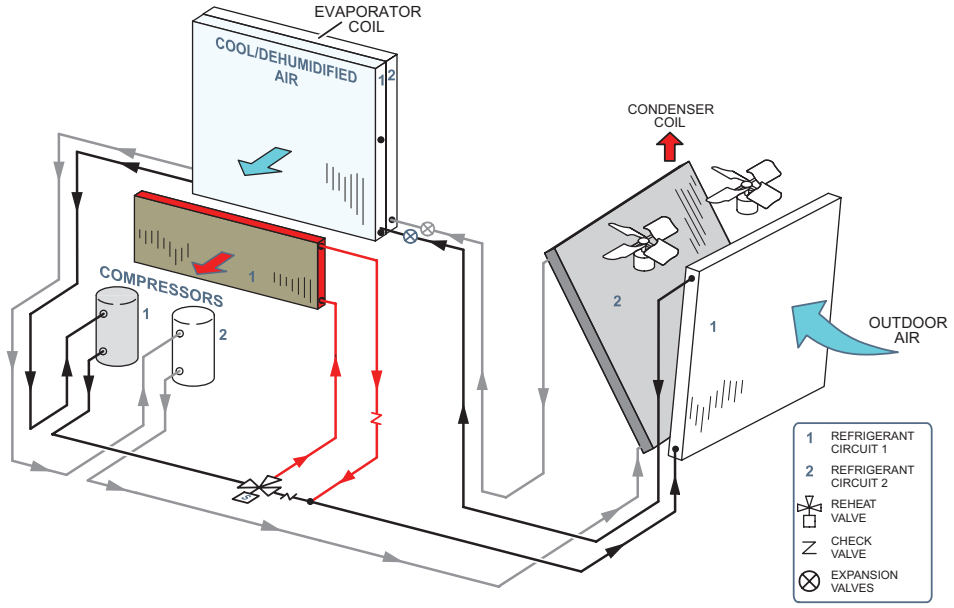


FIGURE 55

REHEAT MODE REFRIGERANT ROUTING 240

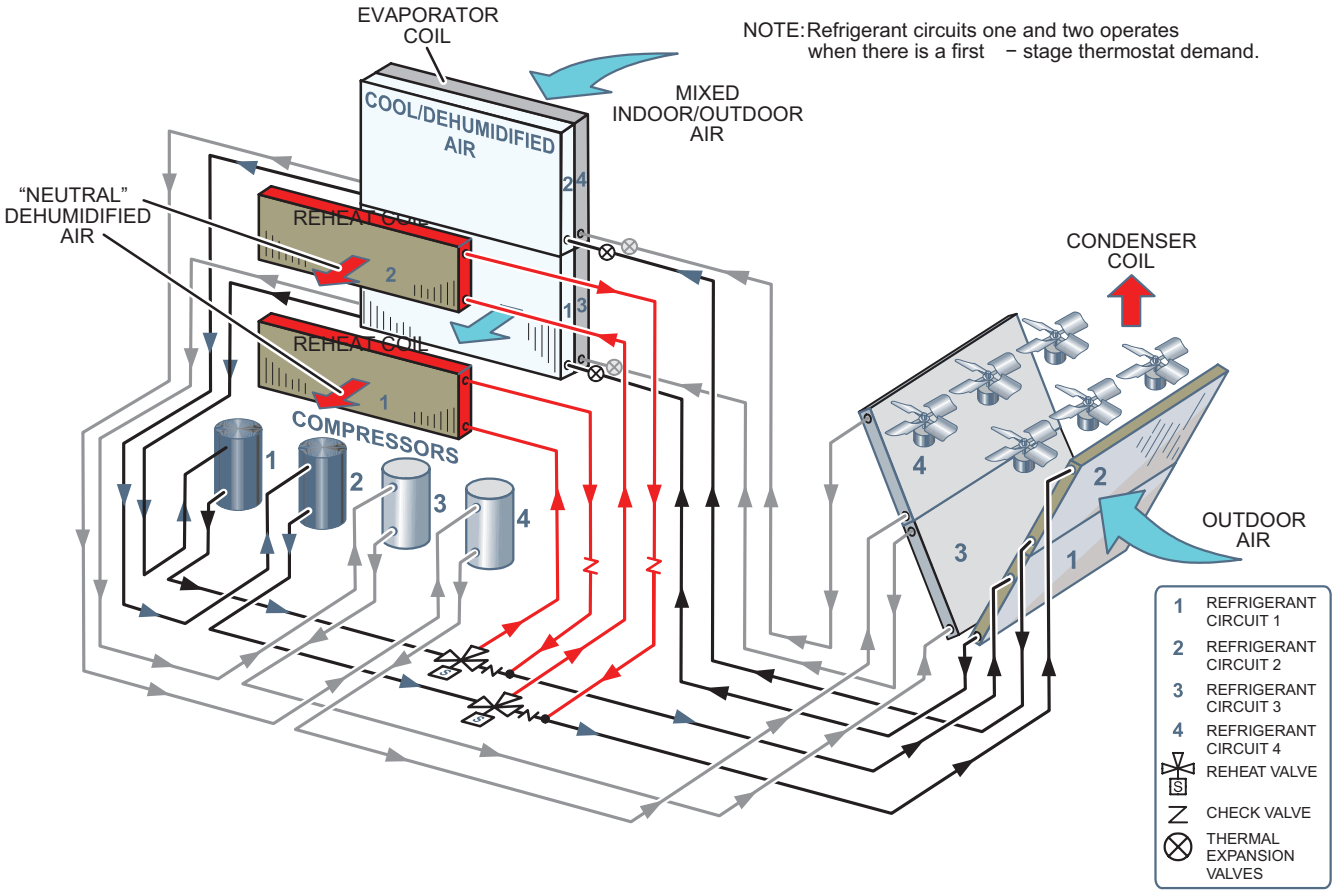


FIGURE 56

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 35
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 36 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 36
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 Cooling1
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.

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

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

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

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

[5]If 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 37. 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 37. See 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 37
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.

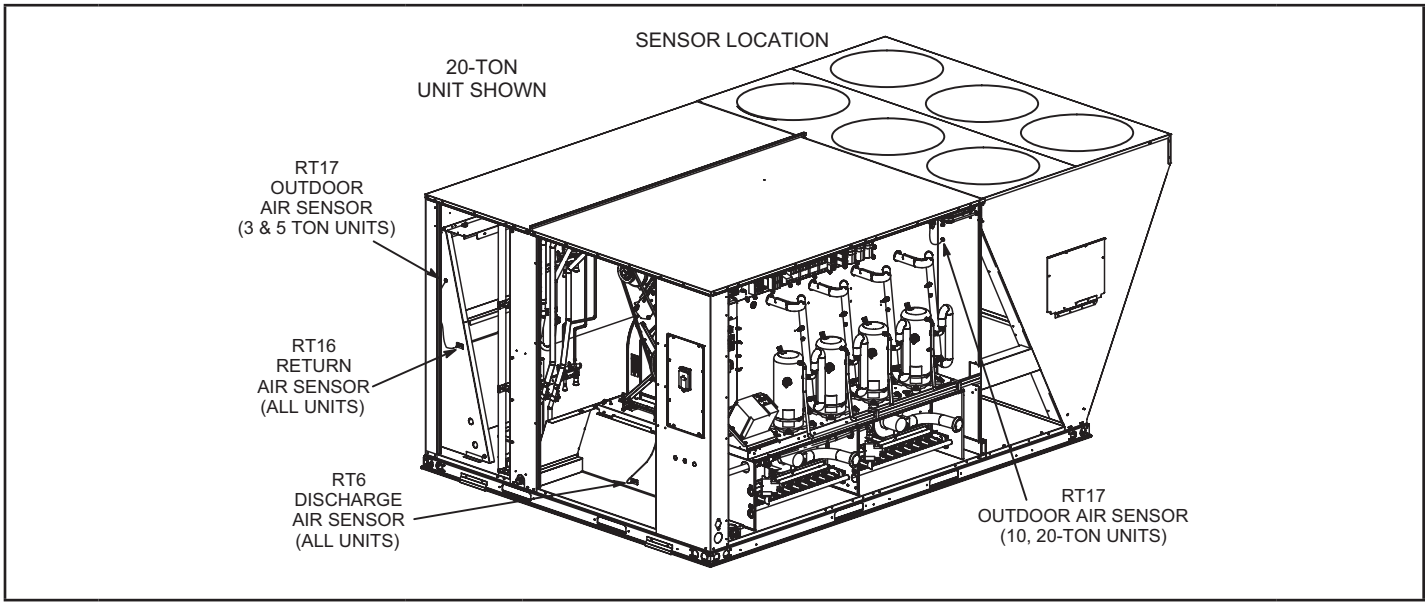


FIGURE 57

C-Economizer Operation

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

See TABLE 38 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 39 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 40 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 38

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 39

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 40
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).

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 41. 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 41
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 42. 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.

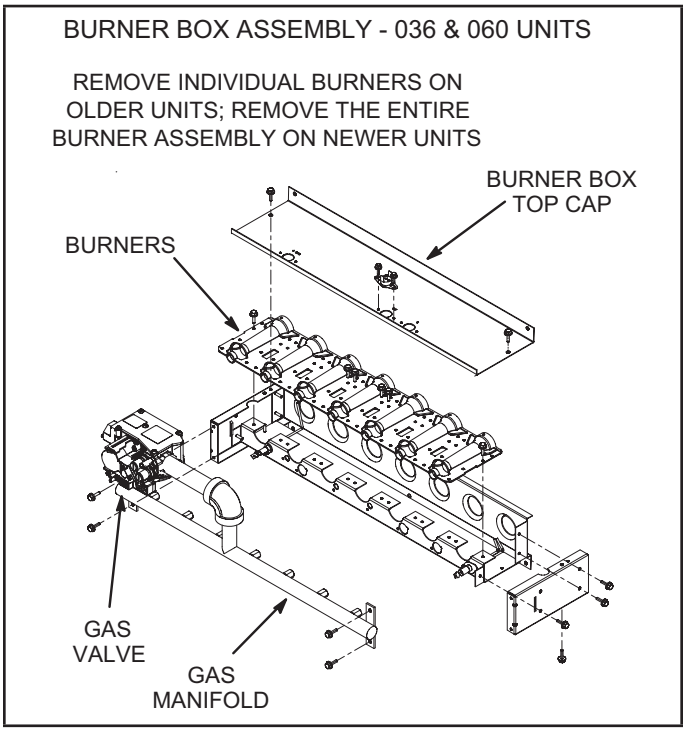


FIGURE 58

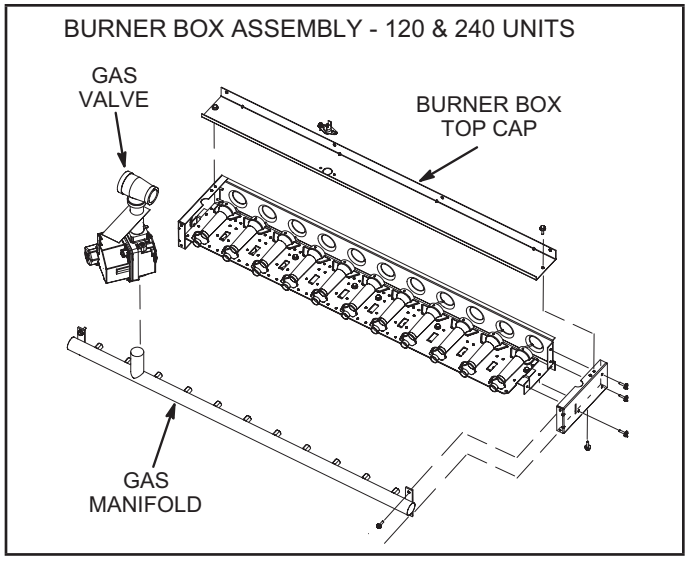


FIGURE 59

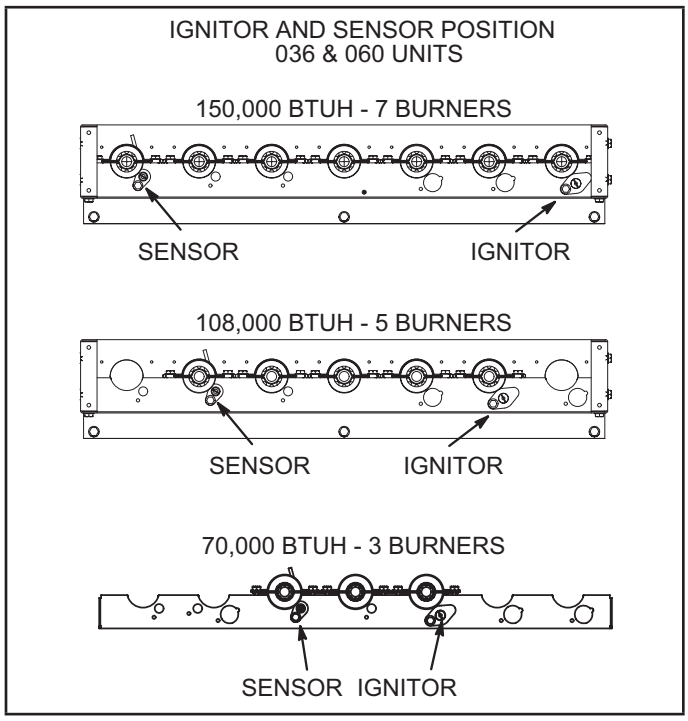


FIGURE 60

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 42

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)

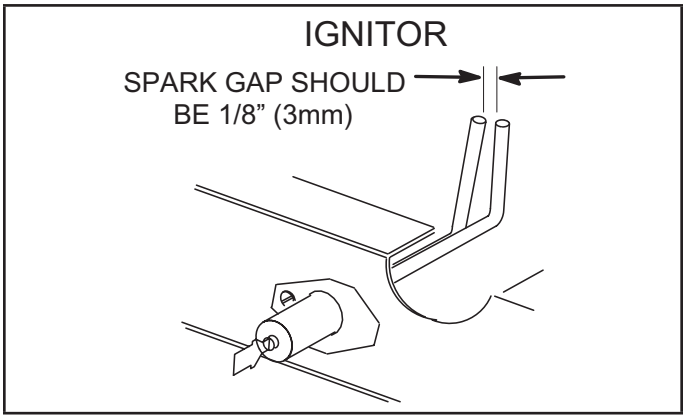


FIGURE 61

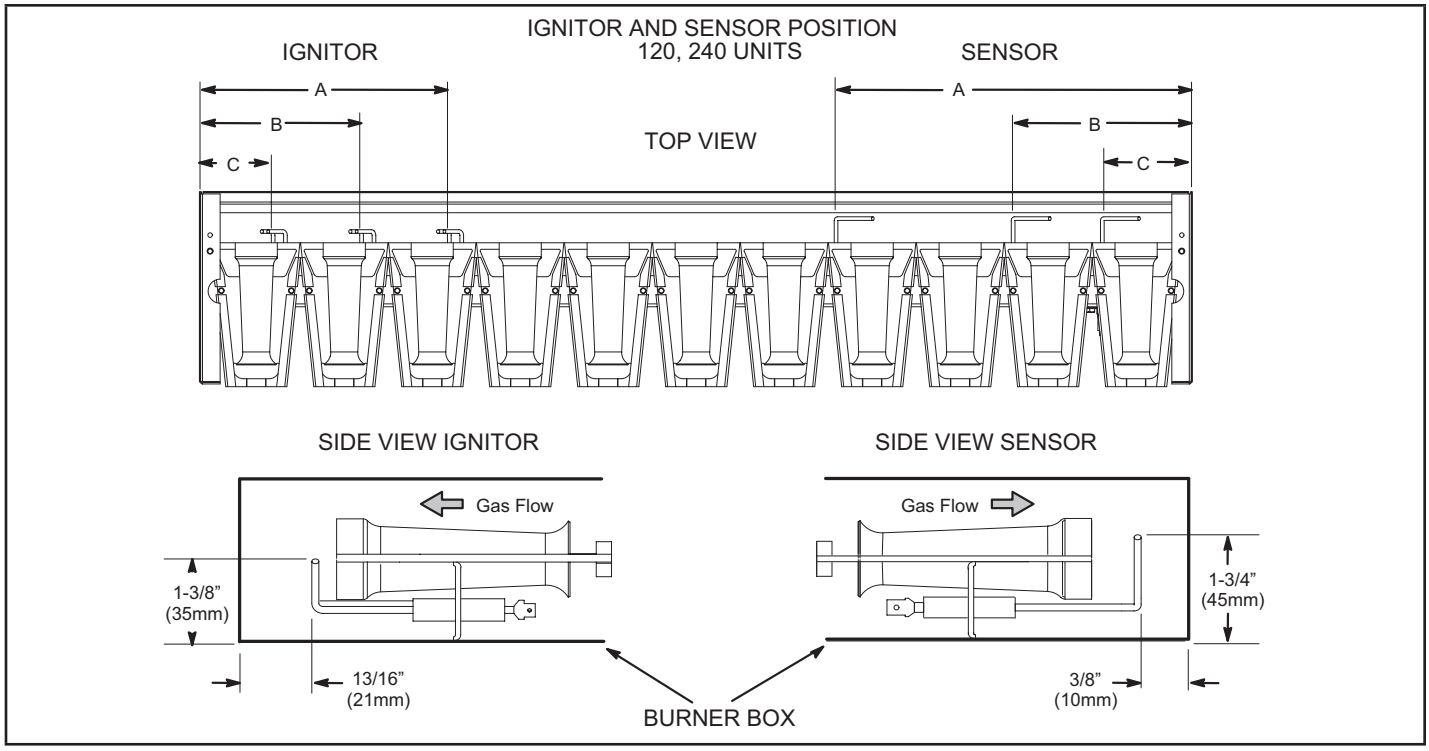


FIGURE 62

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 51 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.

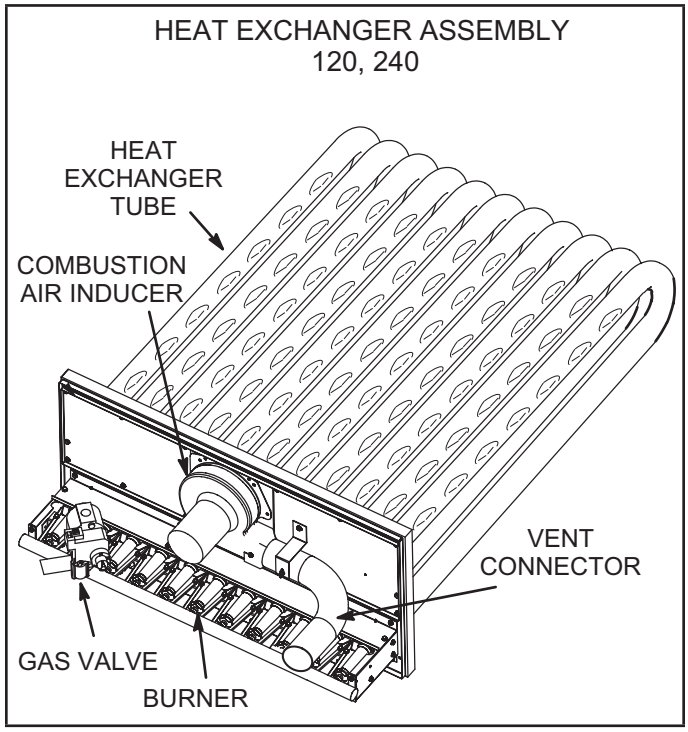


FIGURE 63

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 43

REPLACEMENT FUSE TABLE

EHS-A, EHS-B 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

TABLE 44

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

[1]F4 is only used on SCH units

TABLE 45

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 46

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/SGH120H5M**		**SCH/SGH240H5M**	
[1]CB10	Unit Only		25	20	45	35
	With (1) 0.5 HP Power Exhaust		30	20	---	---
	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			**SCH120H5M**			
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**	35		25	
		20 kW	40		---	
		30 kW	60		45	
		45 kW	80		70	
		60 kW	90		70	

[1] HACR type breaker or fuse.

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

TABLE 47
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.

TABLE 48
580903-01

SG/SC 120 Staged Blower			
Parameter	**Factory Setting**	**Field Setting**	**Description**
NOTE - *Any changes to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS > RTU OPTIONS > EDIT PARAMETERS.*			
12	4000 CFM	CFM	Blower CFM during smoke detection
TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > BLOWER > SPEEDS)			
	4000 CFM	CFM	Blower CFM during heating.
	3600 CFM	CFM	Blower CFM during high speed cooling (2 compressor) operation.
	2600 CFM	CFM	Blower CFM during low speed cooling (1 compressor) operation.
	4000 CFM	CFM	Blower CFM during ventilation.
*Once all four blower settings are entered, the target (highest of the heating and cooling settings) CFM will be displayed. Once the RPM is saved for the target CFM, all other blower RPM values are set by the Unit Controller according to the field CFM setting.			
TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > DAMPER)			
	0%	%	Damper min. position during LOW blower operation.
	0%	%	Damper min. position during HIGH blower operation.
	50%	%	Min. damper % for stage 1 power exhaust operation.
RTU OPTION > EDIT PARAMETERS			
29	101%	%Open	Damper minimum position during G blower operation. (Setting parameter 29 to “101” disables parameter 29 and passes control to parameter 9 or 132).
216	5%	%	Deadband % for stage 1 power exhaust operation.

TABLE 49
580904-01

SG/SC 240 Staged Blower			
Parameter	**Factory Setting**	**Field Setting**	**Description**
NOTE - *Any changed to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS > RTU OPTIONS > EDIT PARAMETERS.*			
12	8000 CFM	CFM	Blower CFM during smoke detection.
TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > BLOWER > SPEEDS)			
	8000 CFM	CFM	Blower CFM during heating.
	7200 CFM	CFM	Blower CFM during compressor 4 operation.
	5200 CFM	CFM	Blower CFM during compressor 3 operation. This parameter is inactive for thermostats with 2-stage cooling.
	5200 CFM	CFM	Blower CFM during compressor 2 operation.
	5200 CFM	CFM	Blower CFM during compressor 1 operation. This parameter is inactive for thermostats with 2-stage or 3-stage cooling.
	8000 CFM	CFM	Blower CFM during ventilation.
TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > DAMPER)			
	0%	%	Damper min. position during LOW blower occupied operation.
	0%	%	Damper min. position during HIGH blower operation.
	50%	%	Min. damper % for stage 1 power exhaust operation.
RTU OPTION > EDIT PARAMETERS			
29	101%	%	Damper minimum position during G blower operation. (Setting parameter 29 to “101” disables parameter 29 and passes control to parameter 9 or 132).
219	70%	%	Min. damper % for stage 2 power exhaust operation.
216	10%	%	Deadband % for stage 1 power exhaust operation.
220	10%	%	Deadband % for stage 2 power exhaust operation.
224	100	Sec	Stage 1 power exhaust off-delay in seconds.
30	70%	% Speed	Min. blower speed % for stage 2 power exhaust operation.

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: ☐

CO_2%:

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 ☐