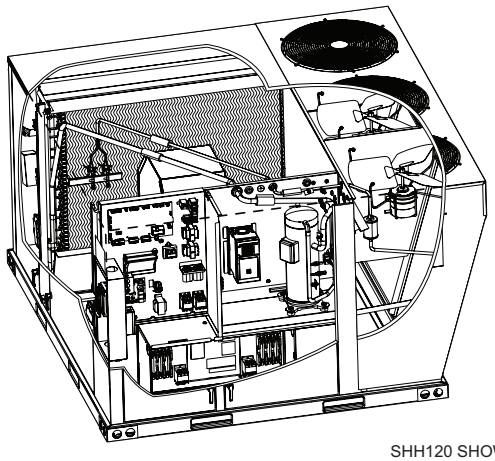
INSTALLATION INSTRUCTIONS



SHH120 SHOWN

SHH/SDH036 (3 TON)
SHH/SDH060 (5 TON)
SHH/SDH092 (7.5 TON)
SHH/SDH120 (10 TON)
SHH/SDH180 (15 TON)
SHH/SDH240 (20 TON)

Gas And Heat Pump Packaged Units

508744-01
04/2026
Supersedes 04/2025

R-454B

Table of Contents

RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCES

Attention!

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

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

⚠ CAUTION

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

⚠ WARNING

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

⚠ WARNING

If this appliance is conditioning a space with an area smaller than 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.

⚠ WARNING

After power is disabled, please wait 5 minutes for the VFD capacitors to discharge before performing maintenance.

⚠ 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.

⚠ WARNING

To prevent serious injury or death:

1- Lock-out/tag-out before performing maintenance.

2- If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the “OFF” position before performing maintenance.

3- Always keep hands, hair, clothing, jewelry, tools, etc., away from moving parts.

A2L Refrigerant Considerations

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

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

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

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

-Safely remove refrigerant following local and national regulations.

-Evacuate the circuit.

-Purge the circuit with inert gas.

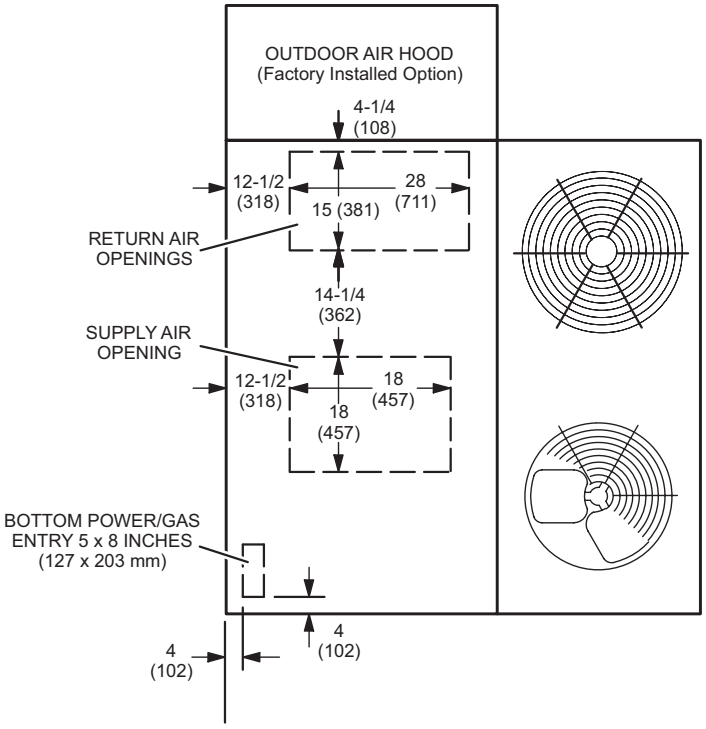
-Evacuate.

-Purge the circuit with inert gas.

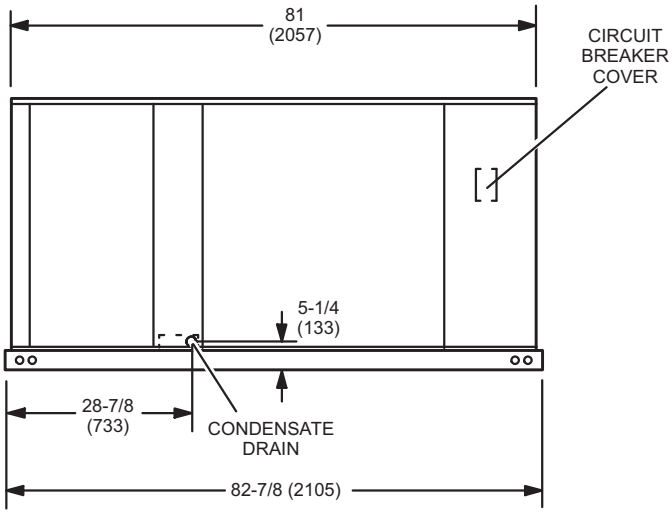
-Open the circuit

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

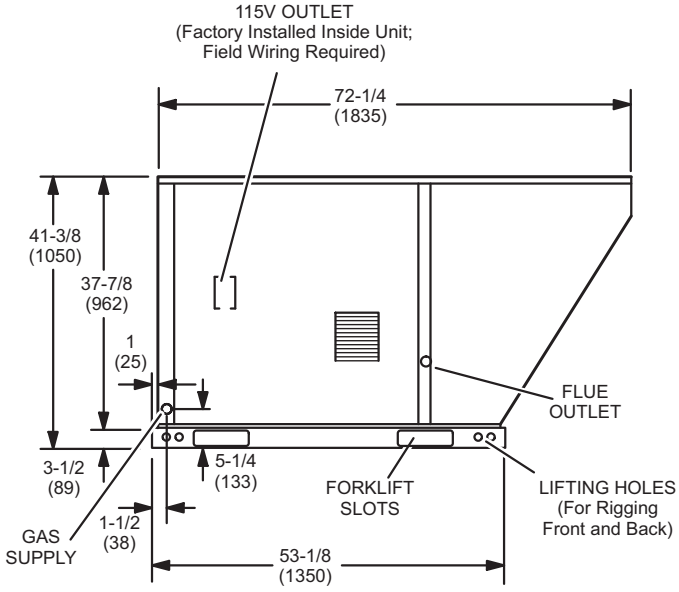
SHH/SDH 036 & 060 Dimensions - Gas Heat Section Shown



TOP VIEW

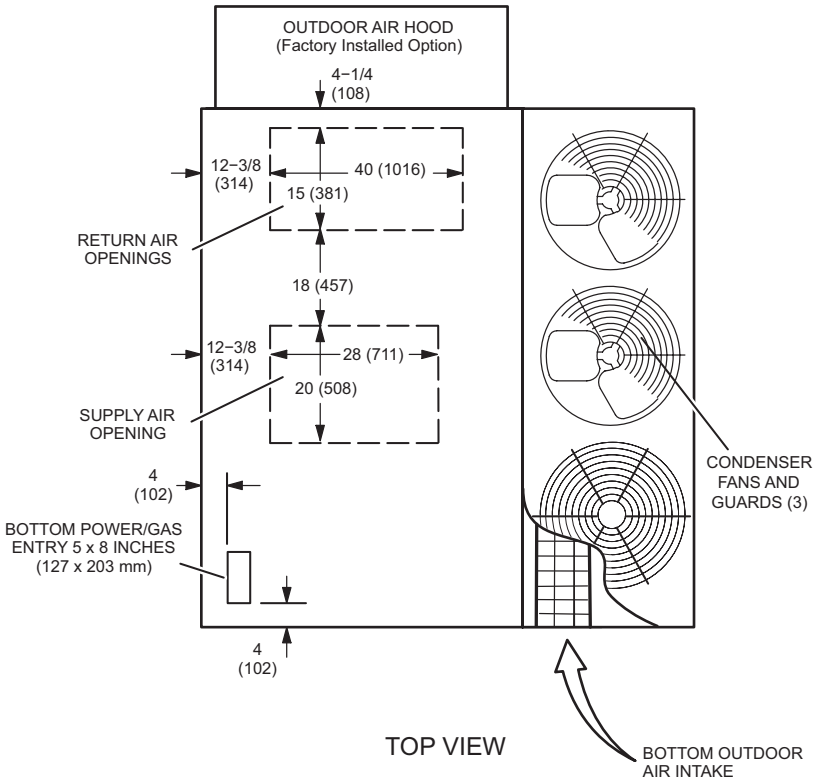


SIDE VIEW

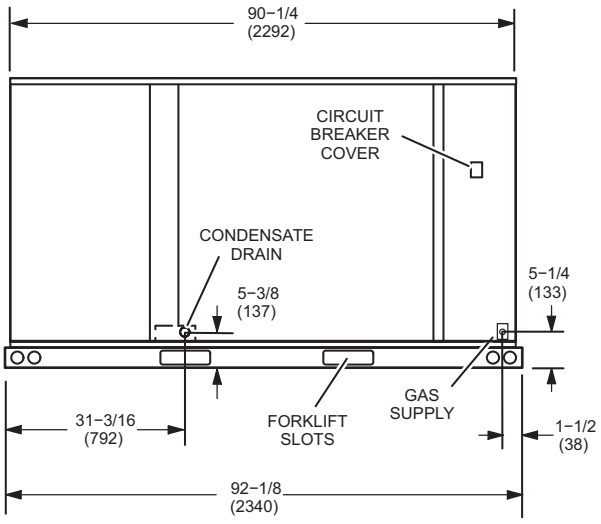


FRONT VIEW

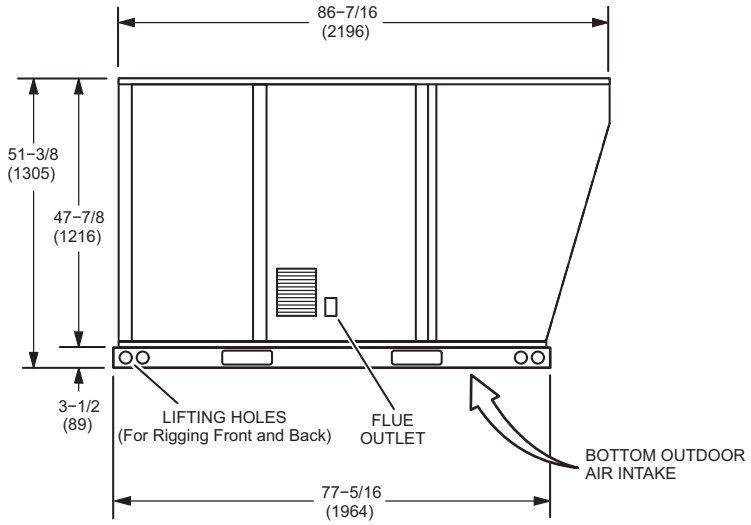
SHH/SDH 092-120 Dimensions - Gas Heat Section Shown



TOP VIEW

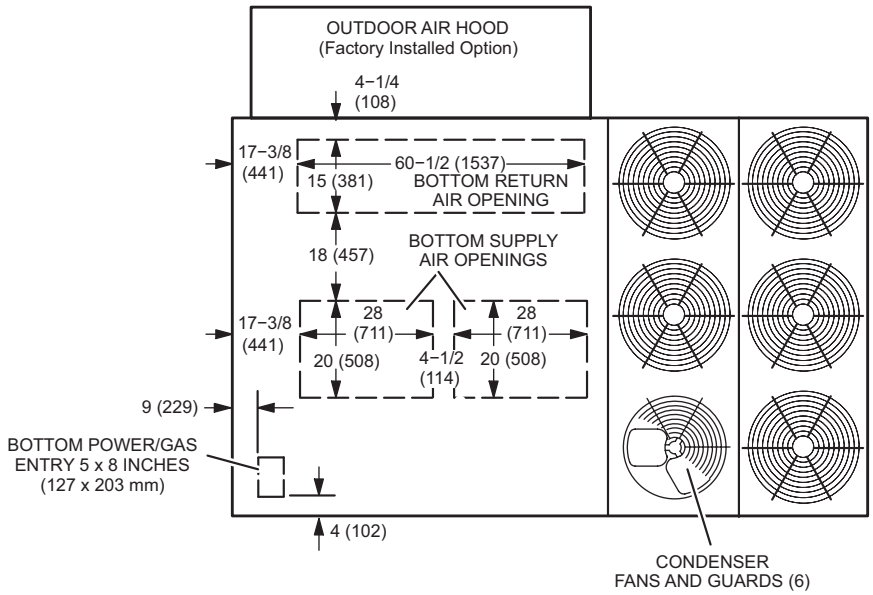


SIDE VIEW

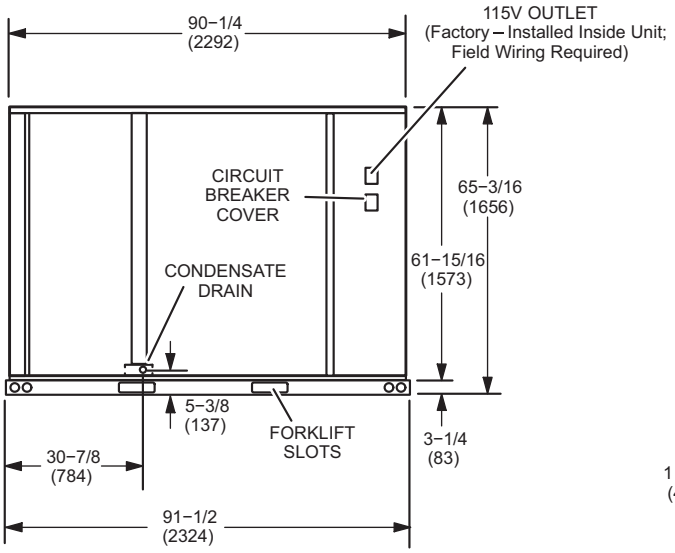


FRONT VIEW

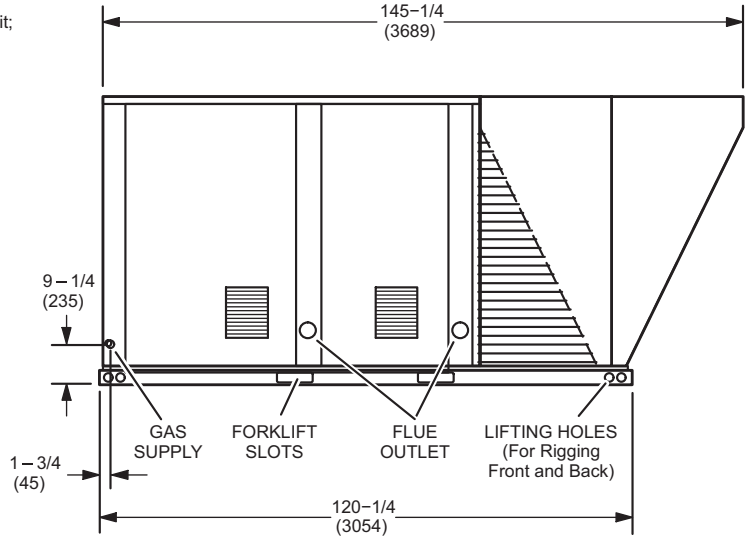
SHH/SDH 180-240 Dimensions - Gas Heat Section Shown



TOP VIEW

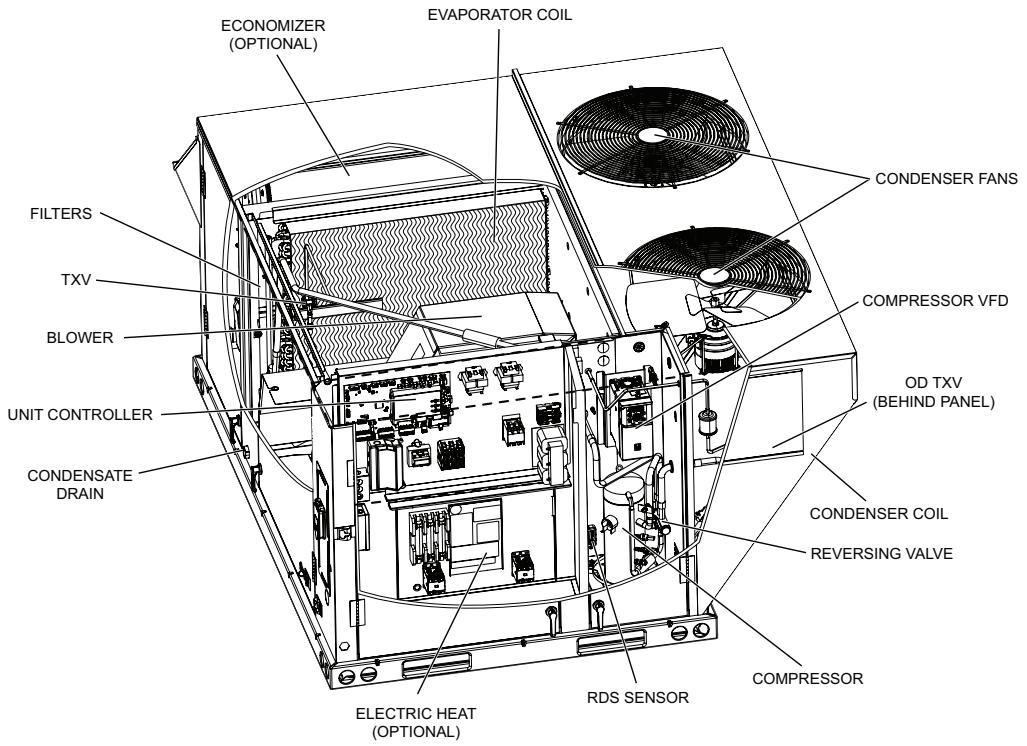


SIDE VIEW

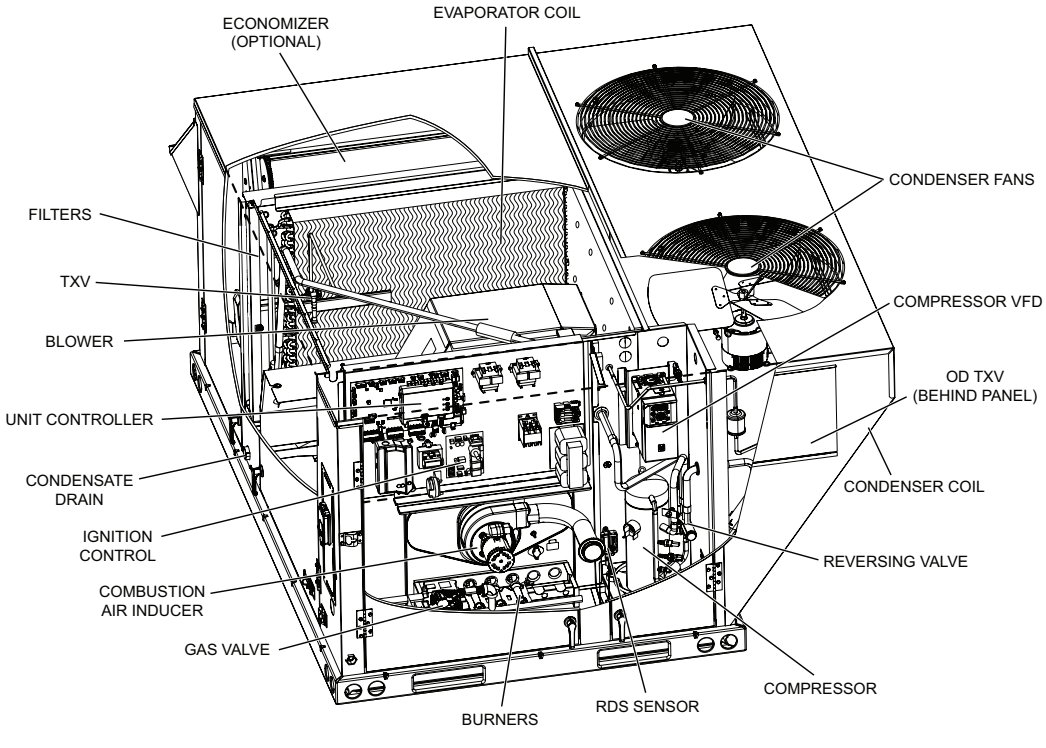


FRONT VIEW

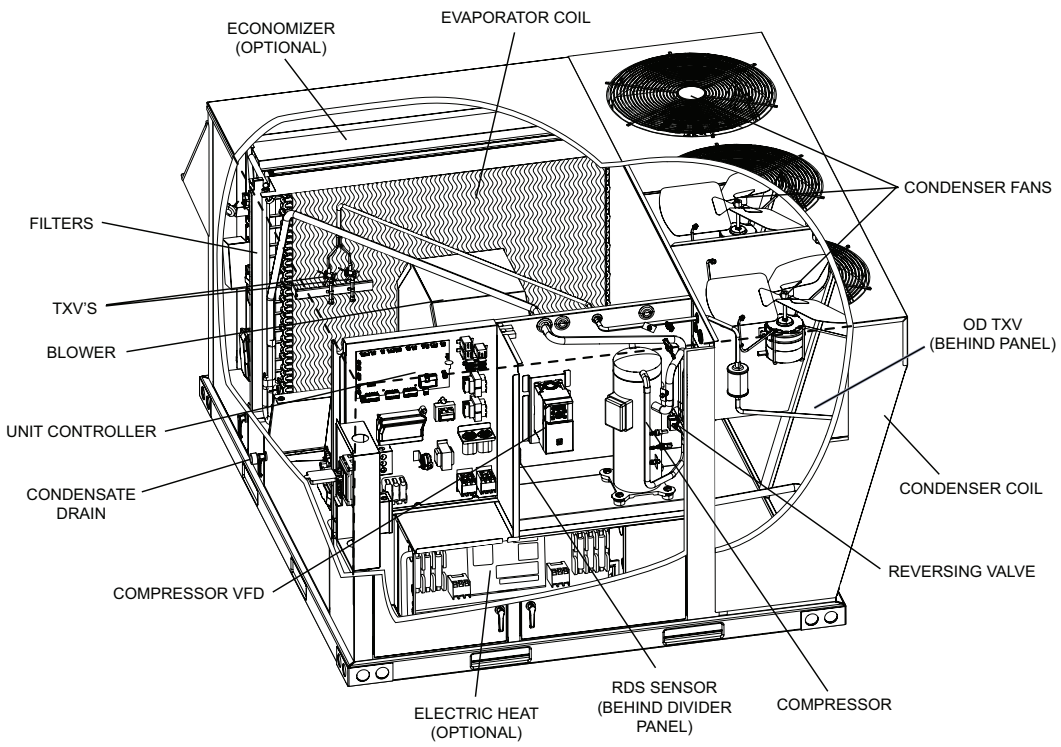
SHH 036 & 060 Parts Arrangement



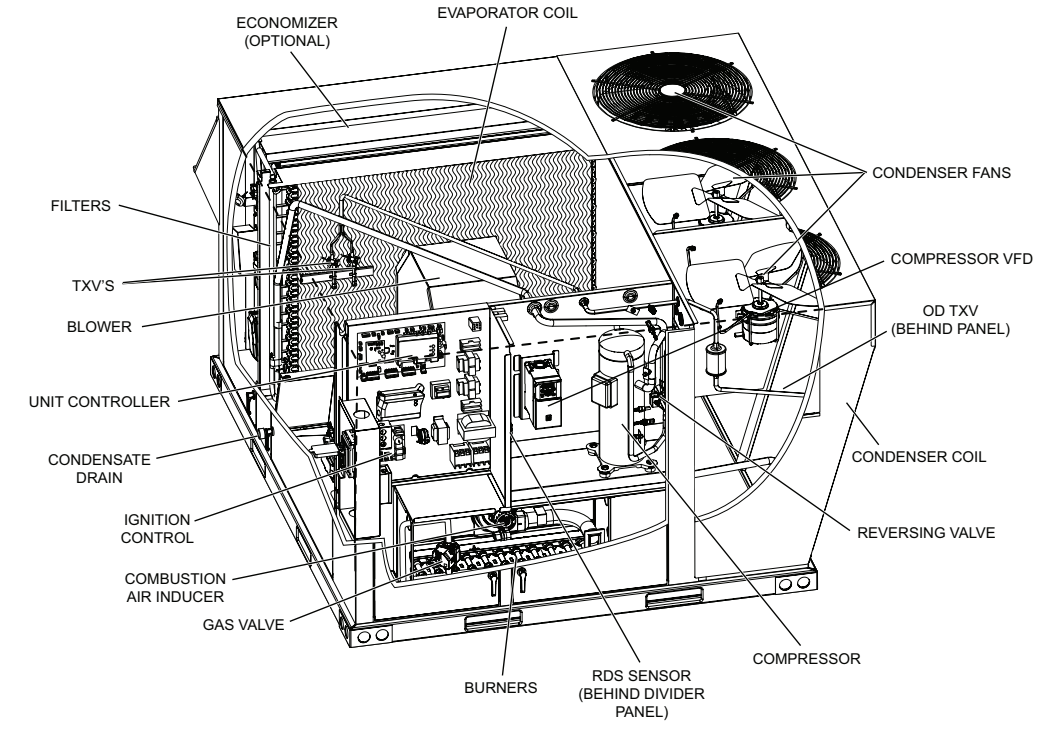
SDH 036 & 060 Parts Arrangement



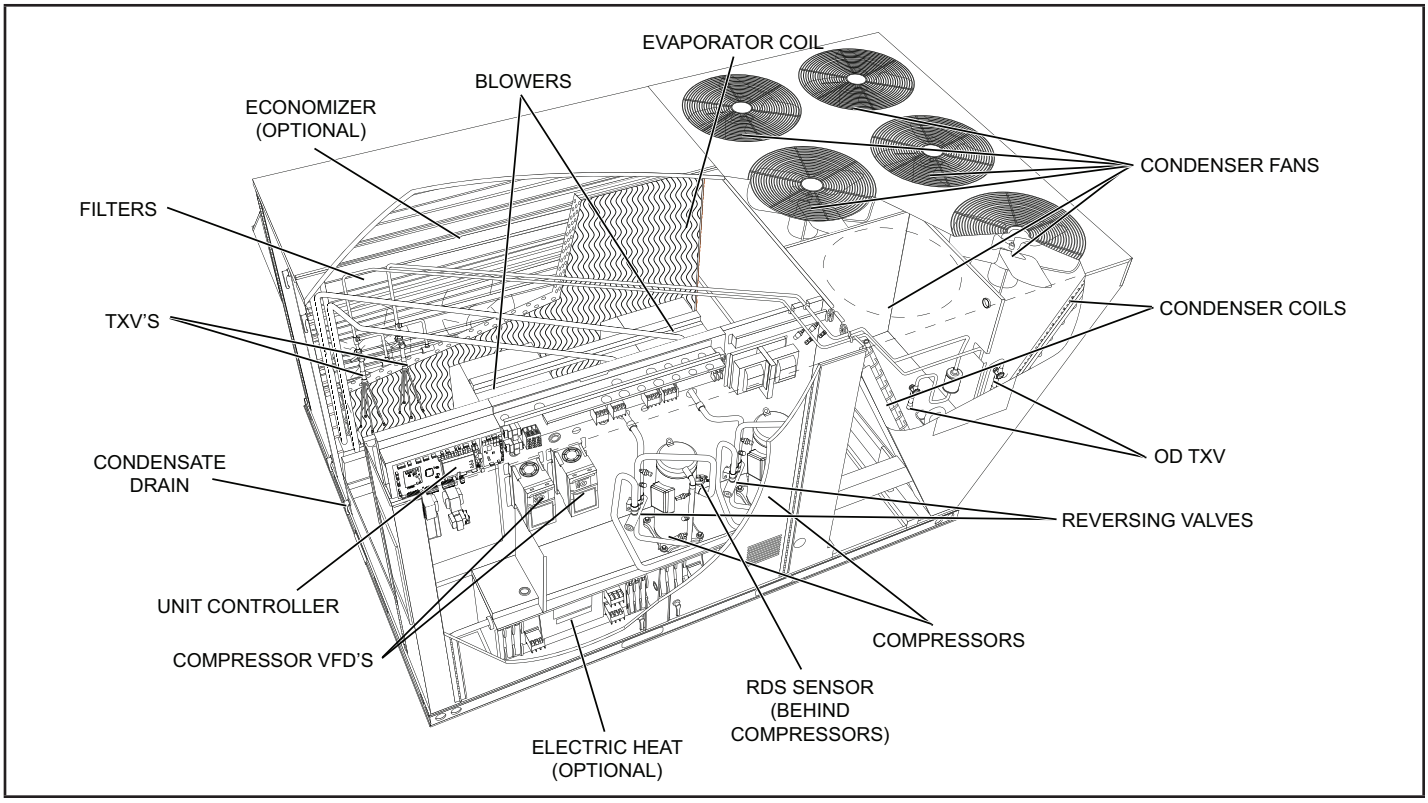
SHH 092-120 Parts Arrangement



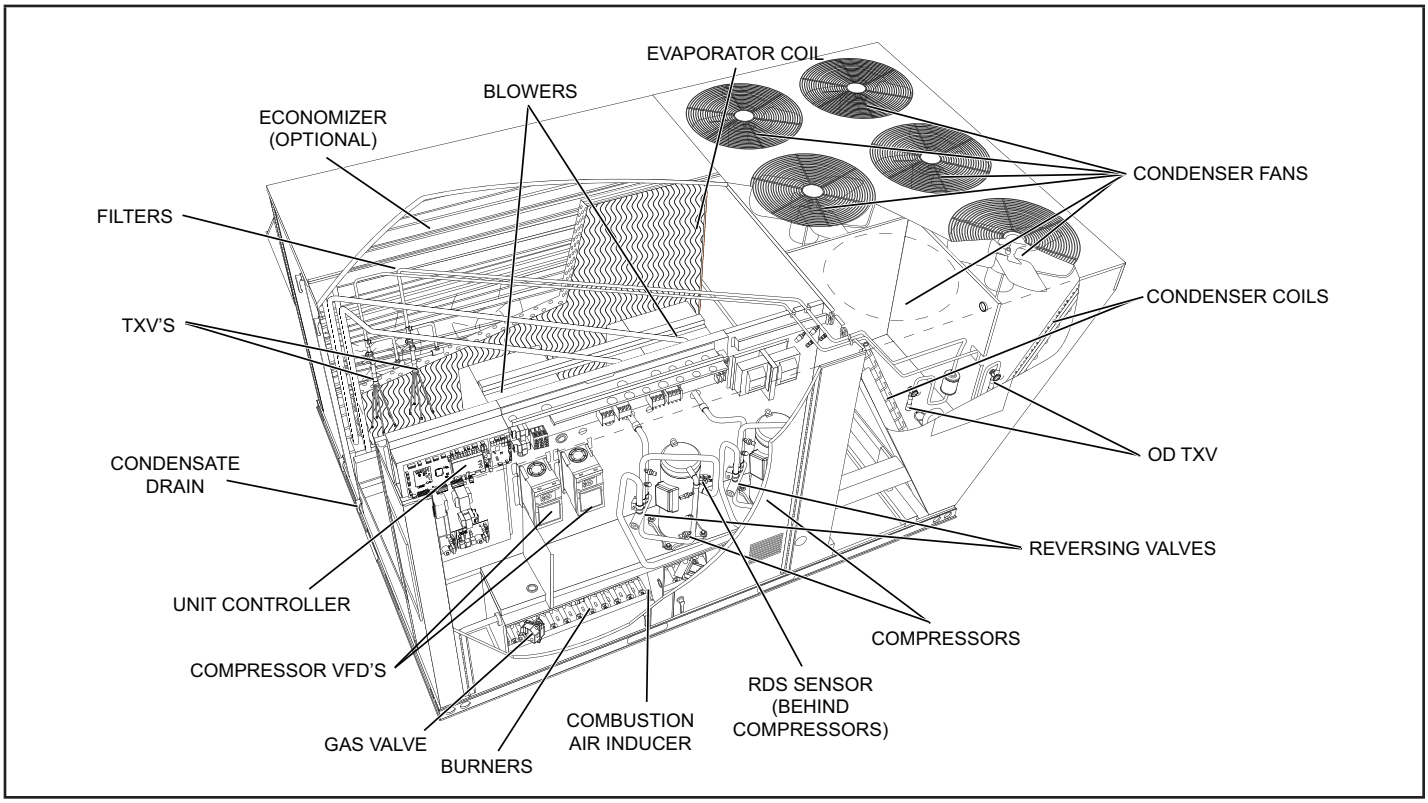
SDH 092-120 Parts Arrangement



SHH 180-240 Parts Arrangement



SDH 180-240 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 SD 036 dual fuel packaged rooftop unit is available in 70,000 and 108,000 Btuh heating input. The SH 036 heat pump packaged rooftop unit is the same basic design as the SD 036 unit except for the heating section. Optional electric heat is factory-installed in SH Units. SH and SD 036 units have identical refrigerant circuits with 3-ton cooling capacities.

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

The SD 092 dual fuel packaged rooftop unit is available in 130,000, 180,000 or 240,000 Btuh heating inputs. The SH 092 heat pump packaged rooftop unit is the same basic design as the SD 092 unit except for the heating section. Optional electric heat is factory-installed in SH Units. SH and SD 092 units have identical refrigerant circuits with a total of 7.5-ton cooling capacities.

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

The SD 180 dual fuel packaged rooftop unit is available in 260,000, 360,000, or 480,000 Btuh heating inputs. The SH 180 heat pump packaged rooftop unit is the same basic design as the SD 180 unit except for the heating section. Optional electric heat is factory-installed in SH Units. SH and SD 180 units have identical refrigerant circuits with a total of 15-ton cooling capacities.

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

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

Units use R454B, a low GWP refrigerant. Refer to the Cooling Start-Up section (page 37) 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 and TABLE 1 for unit clearances.

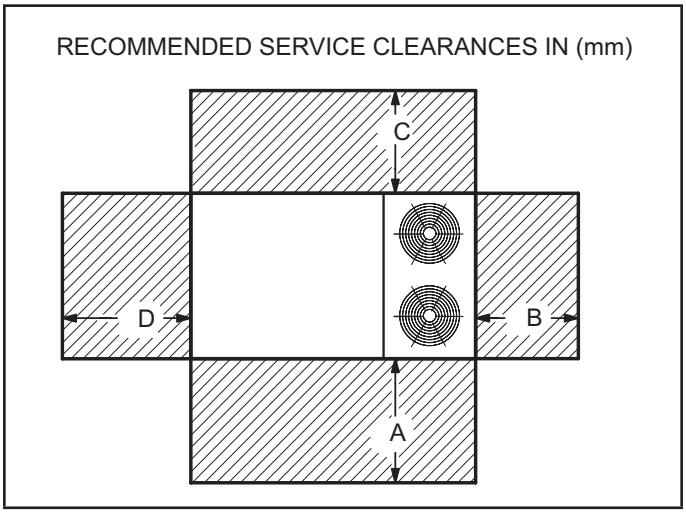


FIGURE 1

TABLE 1

[1]Unit Clearance		A		B		C		D		Top Clearance
		in.	mm.	in.	mm.	in.	mm.	in.	mm.	
Service Clearance	*SH/SD 036, 060*	48	1219	36	914	60	1524	60	1524	
Service Clearance	*SH/SD 092, 120*	60	1524	36	914	60	1524	60	1524	
Service Clearance	*SH/SD 180, 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)**
SHH/SDH036	509	865
SHH/SDH060	438	744
SHH/SDH092	692	1176
SHH/SDH120	634	1078
SHH/SDH180	674	1145
SHH/SDH240	740	1257

[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)**
SHH/SDH036	282	26.20
SHH/SDH060	243	22.54
SHH/SDH092	384	35.64
SHH/SDH120	352	32.66
SHH/SDH180	374	34.70
SHH/SDH240	411	38.11

[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)**
SHH/SDH036	19.25	8.73
SHH/SDH060	16.56	7.51
SHH/SDH092	26.19	11.88
SHH/SDH120	24.00	10.89
SHH/SDH180 Stage 1	25.50	11.57
SHH/SDH180 Stage 2	24.00	10.89
SHH/SDH240 Stage 1	28.00	12.70
SHH/SDH240 Stage 2	26.50	12.02

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 SHH/SDH036 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:

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 - 092-120 units will overhang the roof mounting frame as shown in FIGURE 2.

7 - 180-240 units will also overhang if mounted on C-box curb. See FIGURE 3 for details.

UNIT ON CURB LOCATION - SH/SD 092, 120 - in (mm)

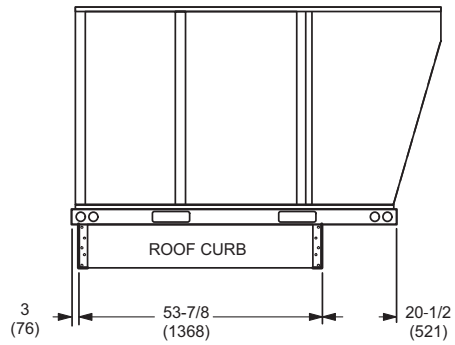


FIGURE 2

UNIT ON CURB LOCATION - SH/SD 180-240 - in (mm)

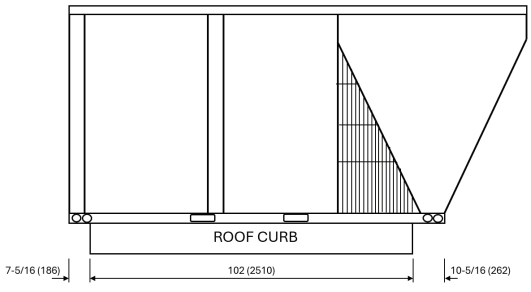


FIGURE 3

RIGGING

1 - Detach wooden base protection before rigging.

2 - All panels must be in place for rigging and lifting.

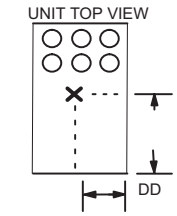
3 - Connect rigging to the unit base using both holes in each corner

4 - To prevent unit damage, lifting frame must be in place just above top of unit. Frame must be of adequate strength and length.

5 - Lifting point should be directly above center of gravity.

Unit	*Weight	
	Lbs.	Kg.
SD 036	1109	503
SH 036	1097	498
SD 060	1123	510
SH 060	1094	496
SD 092	1735	787
SH 092	1630	739
SD 120	1733	786
SH 120	1628	738
SD 180	3091	1402
SH 180	3008	1364
SD 240	3087	1400
SH 240	3004	1363

*Maximum weight with all available factory-installed accessories.



036:	38-1/4”	(971.55mm)
060:	38-1/4”	(971.55mm)
092 & 120:	42-1/4”	(1073.15mm)
180 & 240:	39-3/4”	(1009.65mm)

036 & 060:	33-1/4”	(844.55mm)
092 & 120:	40”	(1016mm)
180 & 240:	63-3/4”	(1619.25mm)

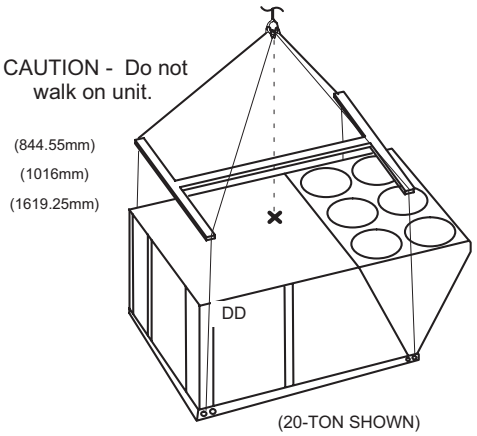


FIGURE 4

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 the unit base. 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 4.

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 4 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 5. 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.

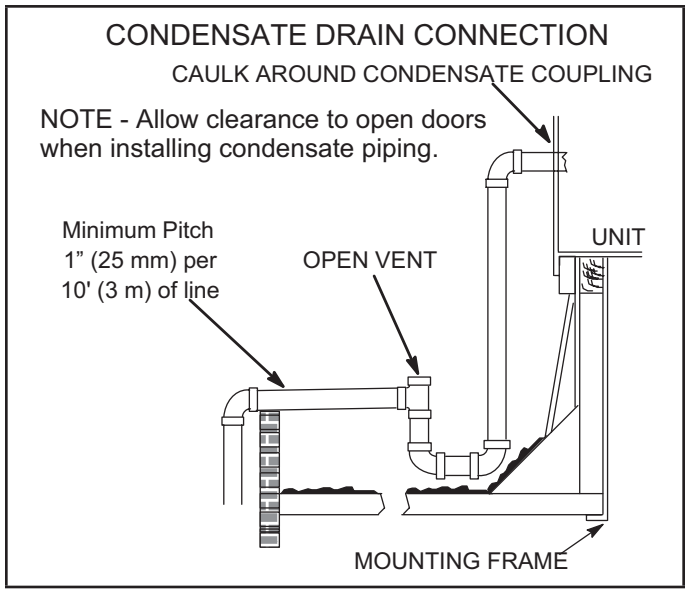


FIGURE 5

Connect Gas Piping - SD 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" w.c. (2.60kPa). 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 39 for tap location. Install a ground joint union between the gas control manifold and the main manual shut-off valve. See FIGURE 6 or FIGURE 7 for gas supply piping entering outside the unit. See FIGURE 8 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 - SD 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 9.

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.*

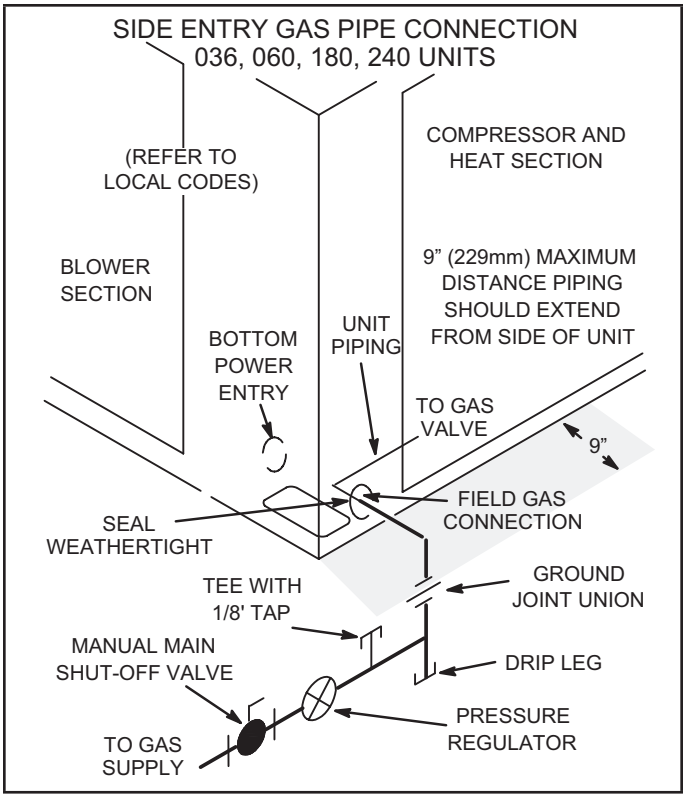


FIGURE 6

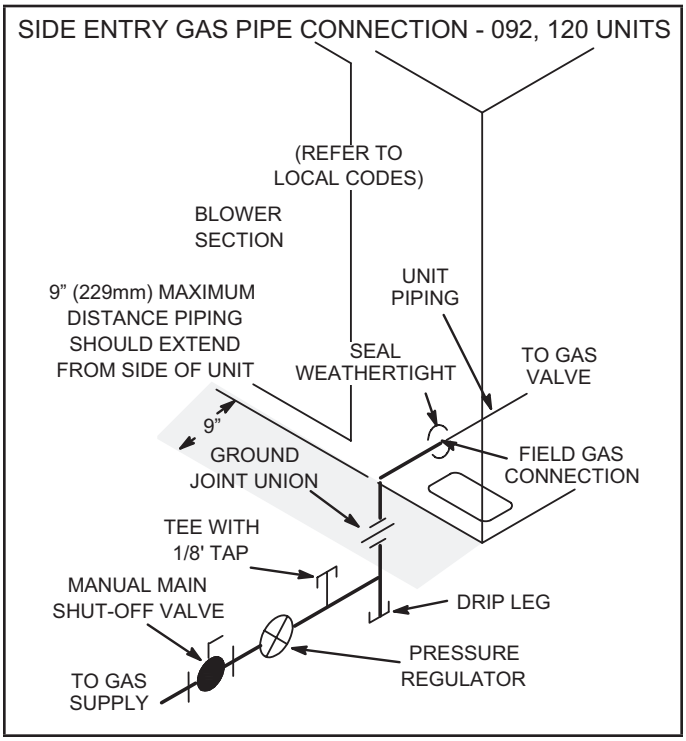


FIGURE 7

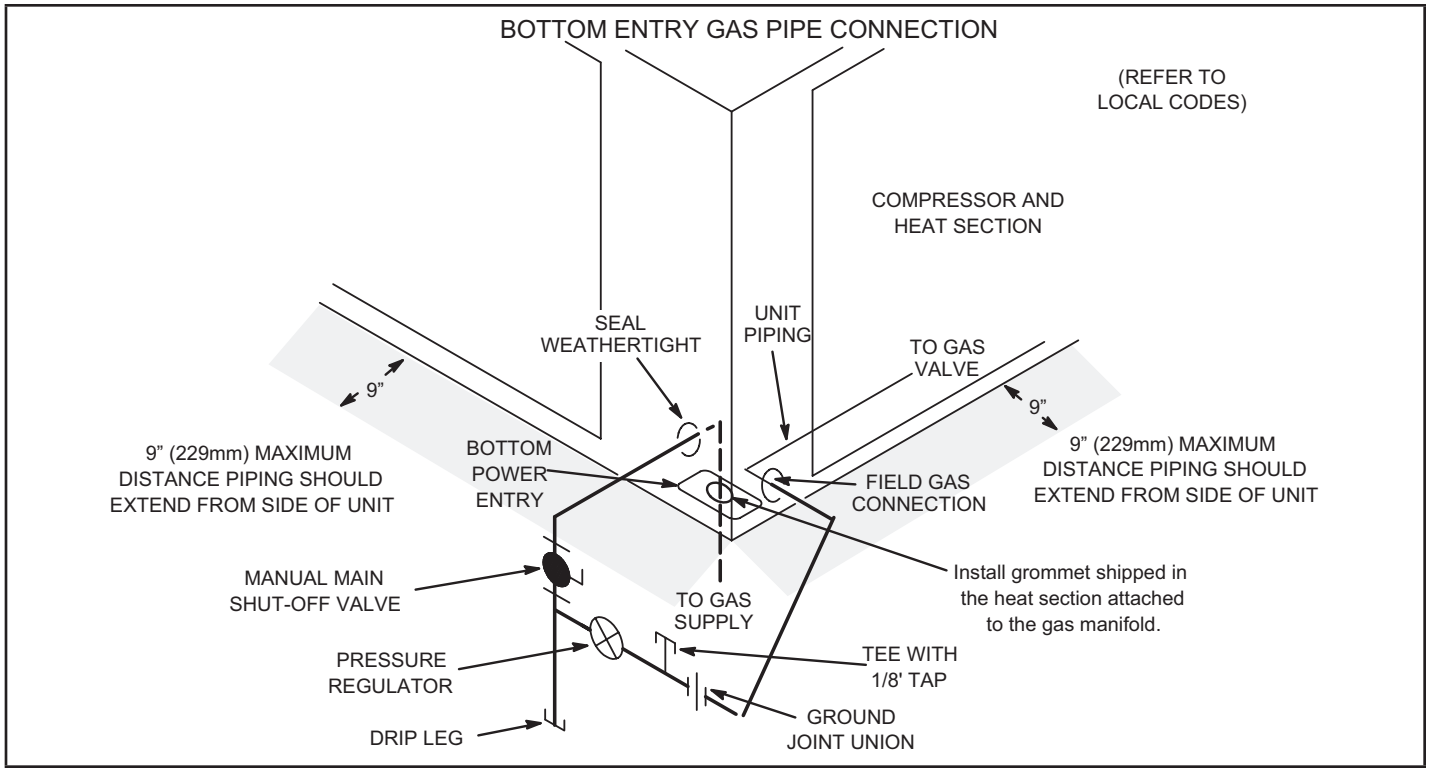


FIGURE 8

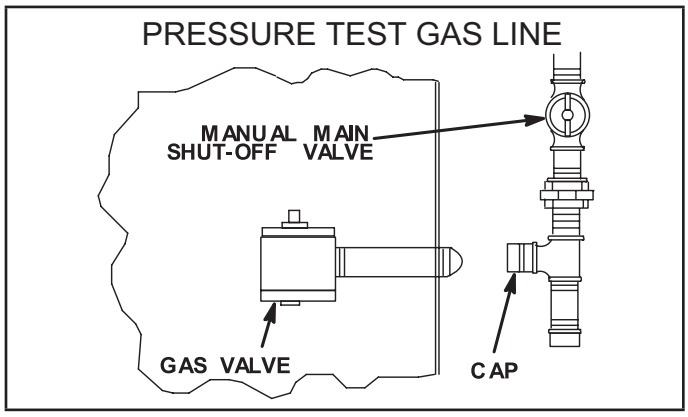


FIGURE 9

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 2 for high altitude adjustments.

TABLE 2
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 10 and secure sides of hood to unit mullions with two sheet metal screws on each side.

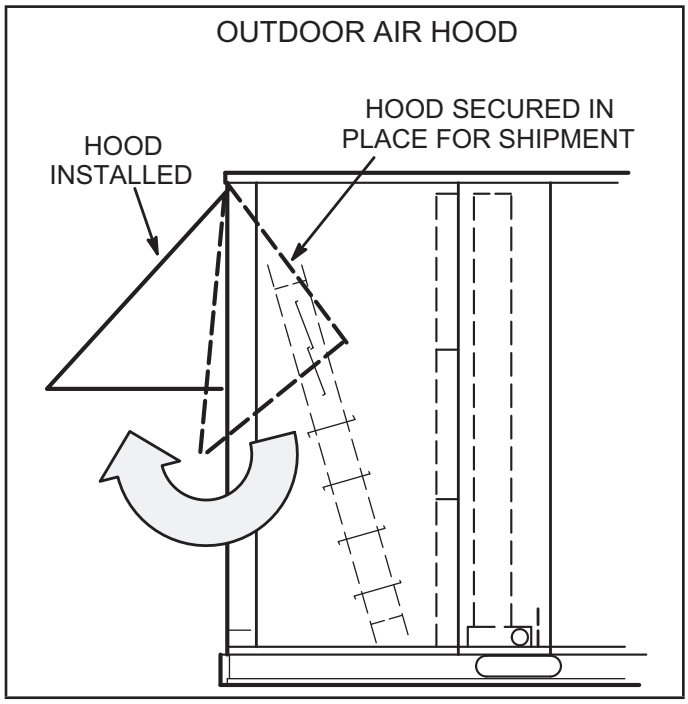


FIGURE 10

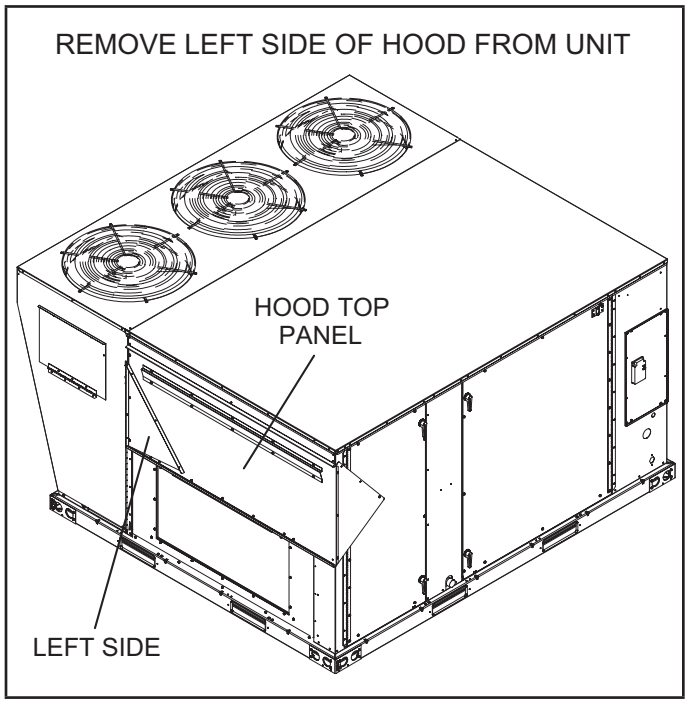


FIGURE 11

092, 120, 180, 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 11.

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 12.

4 - Secure sides of hood to unit mullions with retained screws.

5 - Caulk hinge opening on each end of air hood.

6 - 180-240 Units Only - Remove two support brackets from hood top panel flange. See FIGURE 13. Install as shown in FIGURE 12.

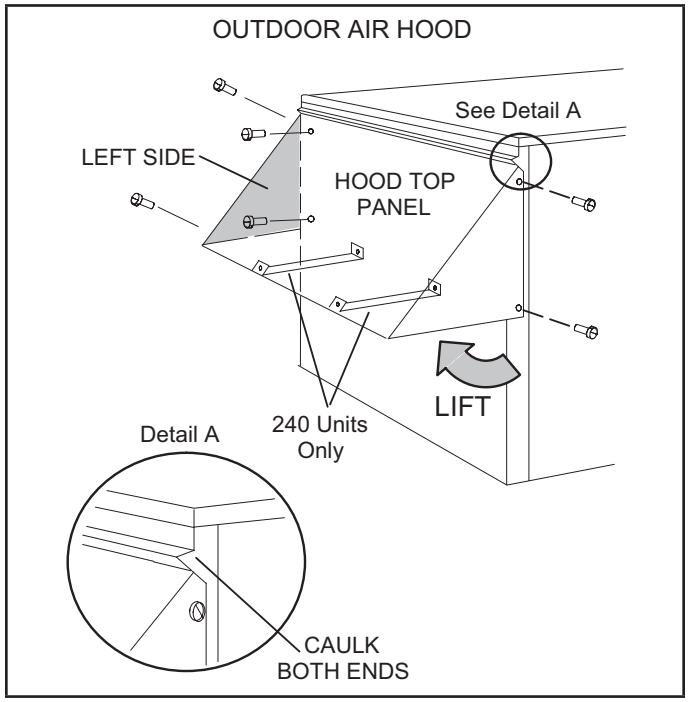


FIGURE 12

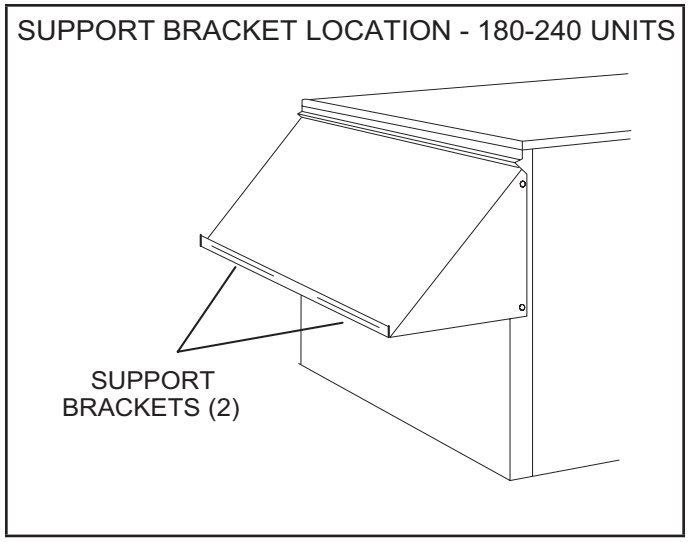


FIGURE 13

180-240 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 11.

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 12.

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 15.

7 - Secure side seals to the hood sides as shown in FIGURE 16.

8 - Install longer front filter bracket on hood top as shown in FIGURE 14 and FIGURE 15. 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.

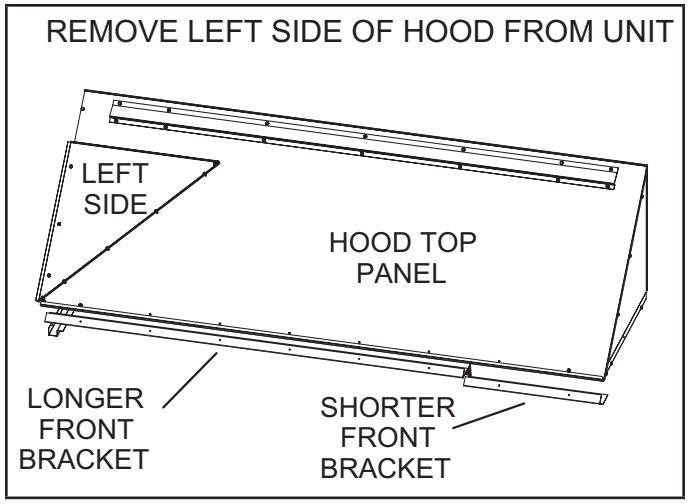


FIGURE 14

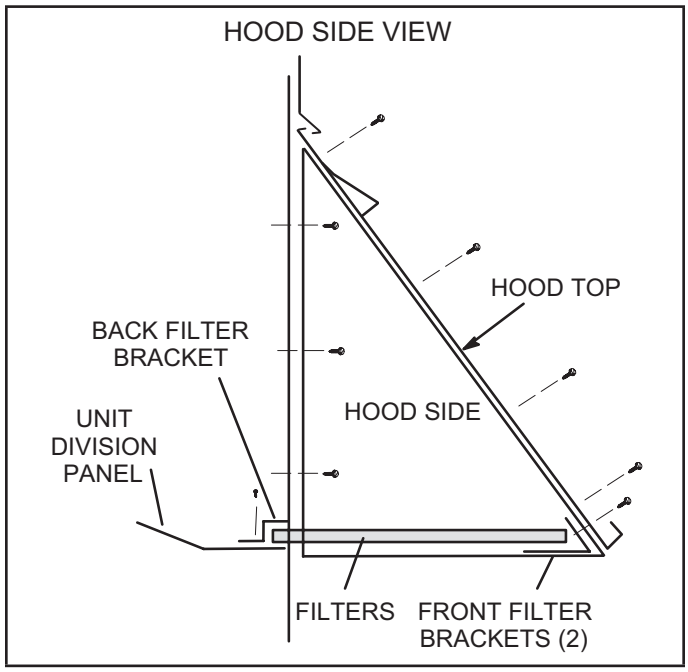


FIGURE 15

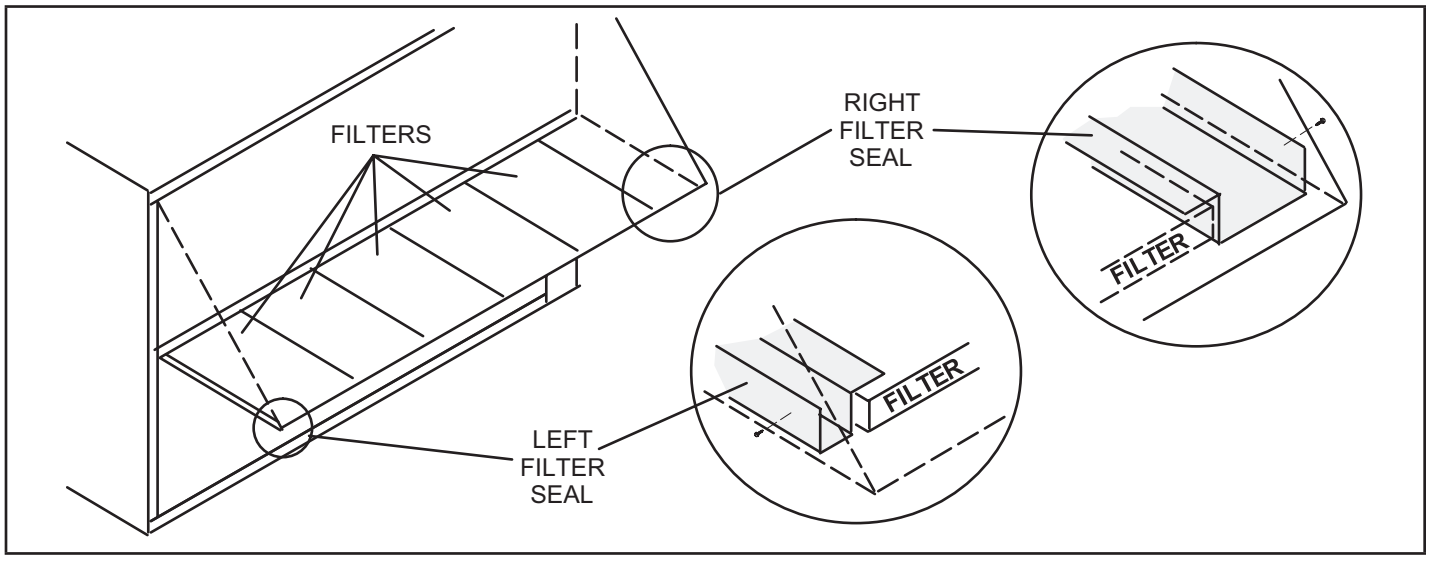


FIGURE 16

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.

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 18 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 17.

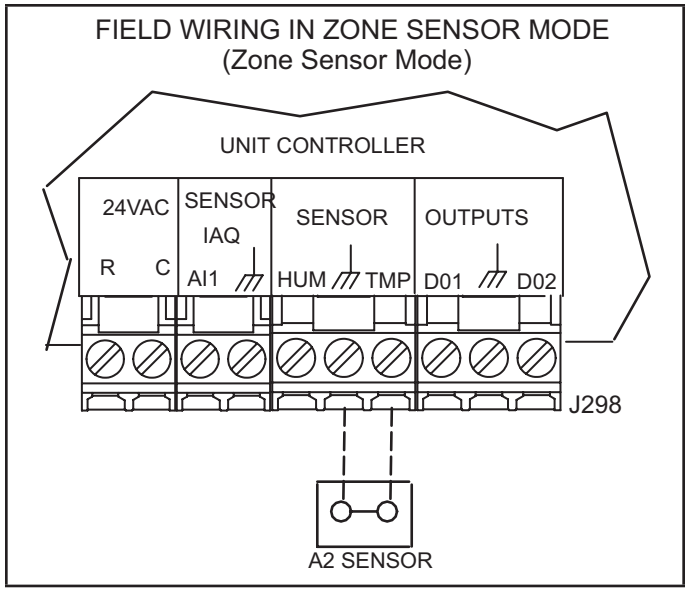


FIGURE 17

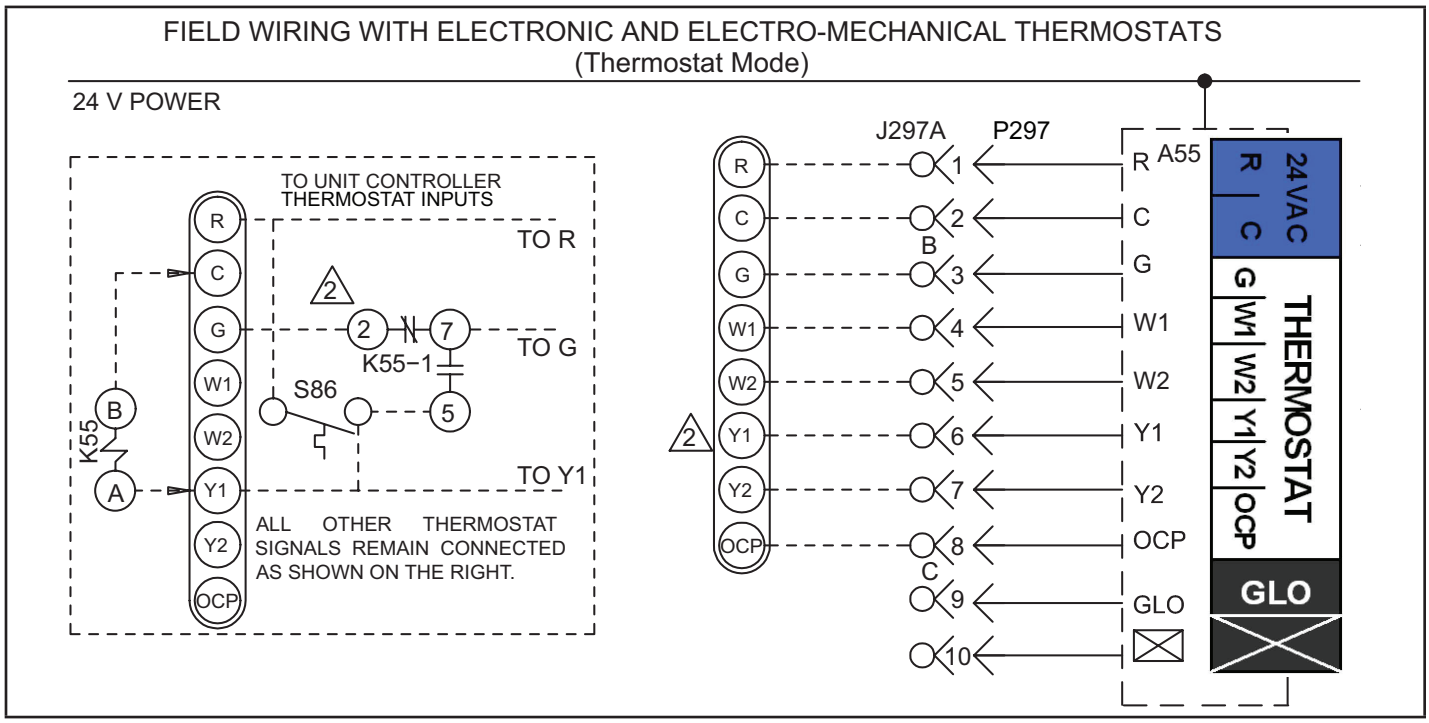


FIGURE 18

Balance Point Setpoint

When outdoor air temperature is above setpoint (35°F default), the unit will operate in heat pump mode. When outdoor air temperature falls below setpoint, the unit will operate in gas heat mode.

NOTE - *Only stage one is used; stage 2 is not used.*

Although the recommended balance point setpoint is 35°F, the setpoint can be adjusted. Weigh the comfort / cost benefit when changing the setpoint.

Unit Power-Up

A-General

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 main unit power connection. 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.

6 - Make sure there is no heating, cooling, or blower demand from thermostat. Apply power to unit.

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 20.

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 19 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 21, FIGURE 22, and FIGURE 23.

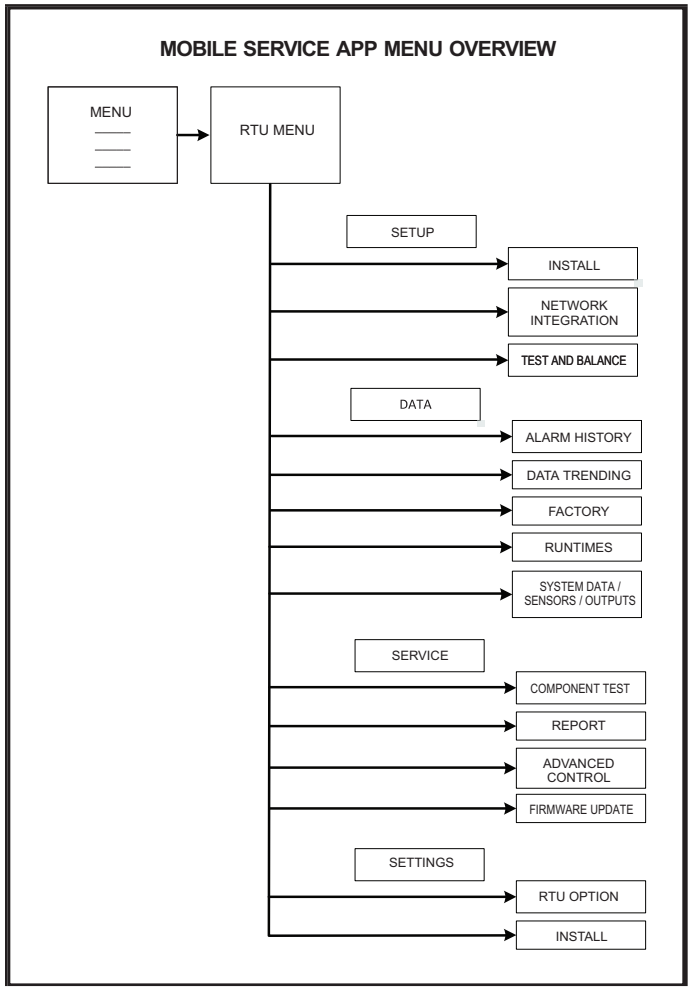


FIGURE 19

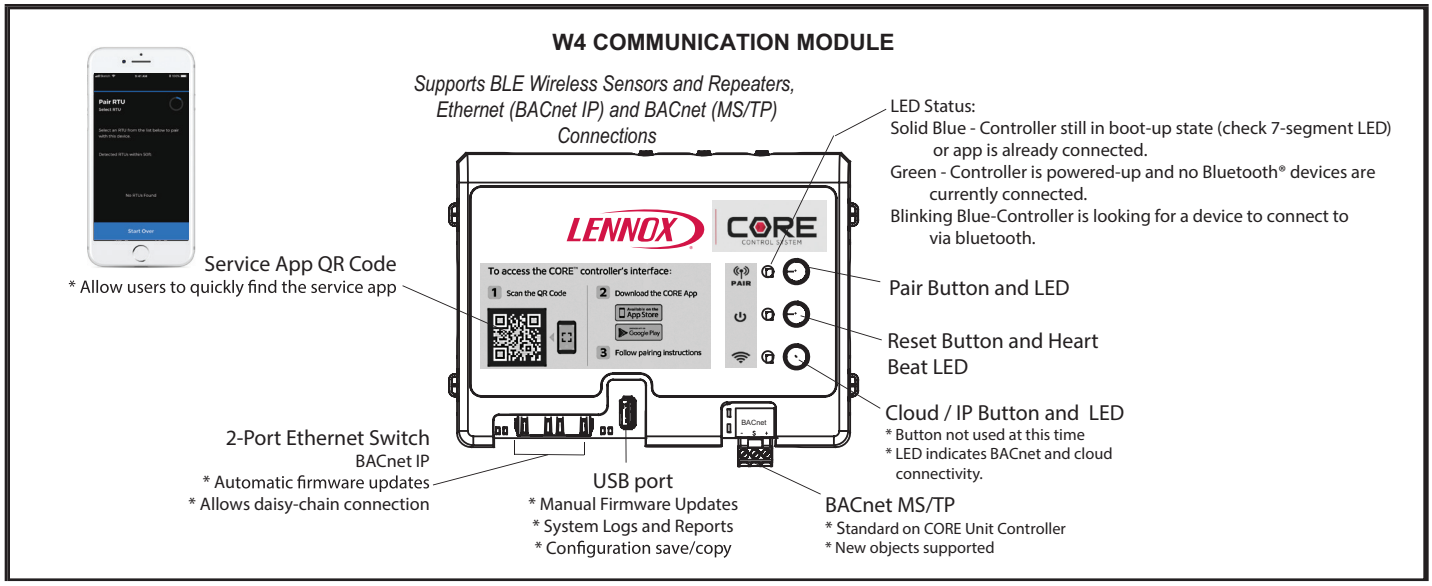


FIGURE 20

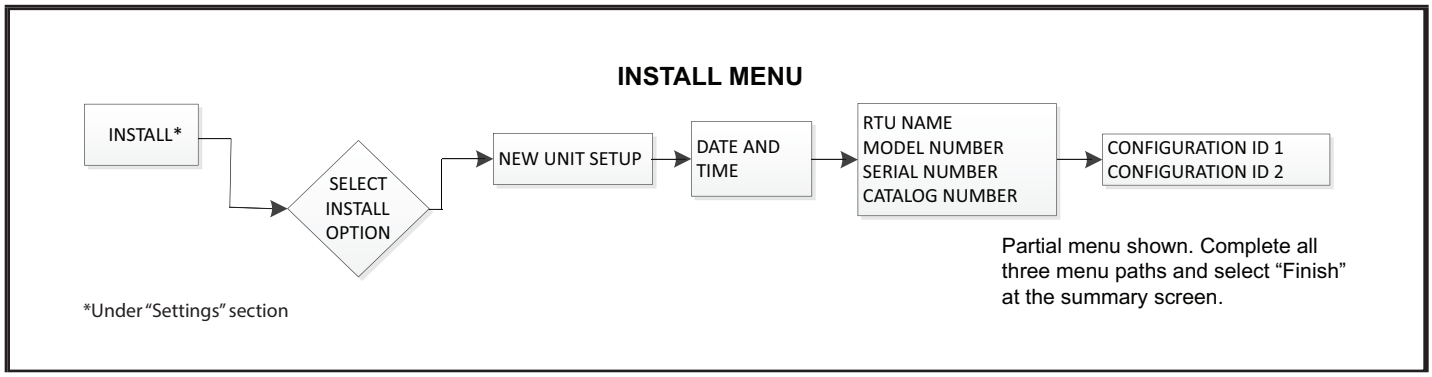


FIGURE 21

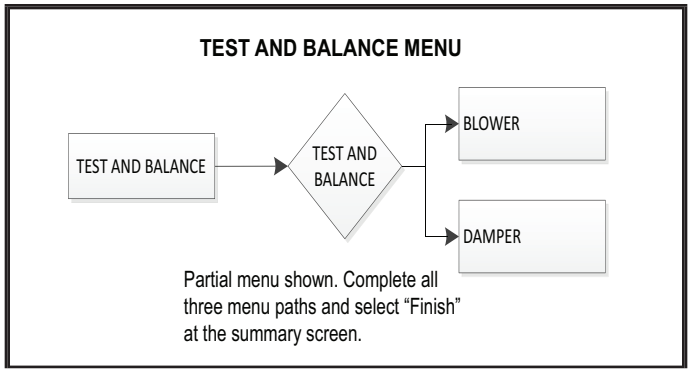


FIGURE 22

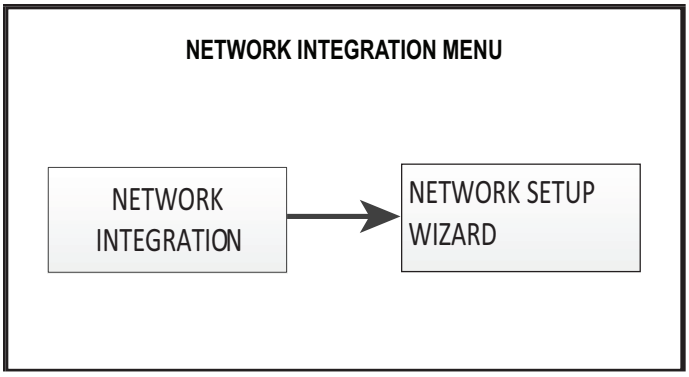


FIGURE 23

E-Unit Controller Components

See FIGURE 24 for Unit Controller components. See FIGURE 25 and TABLE 3 for pushbutton and LED functions.

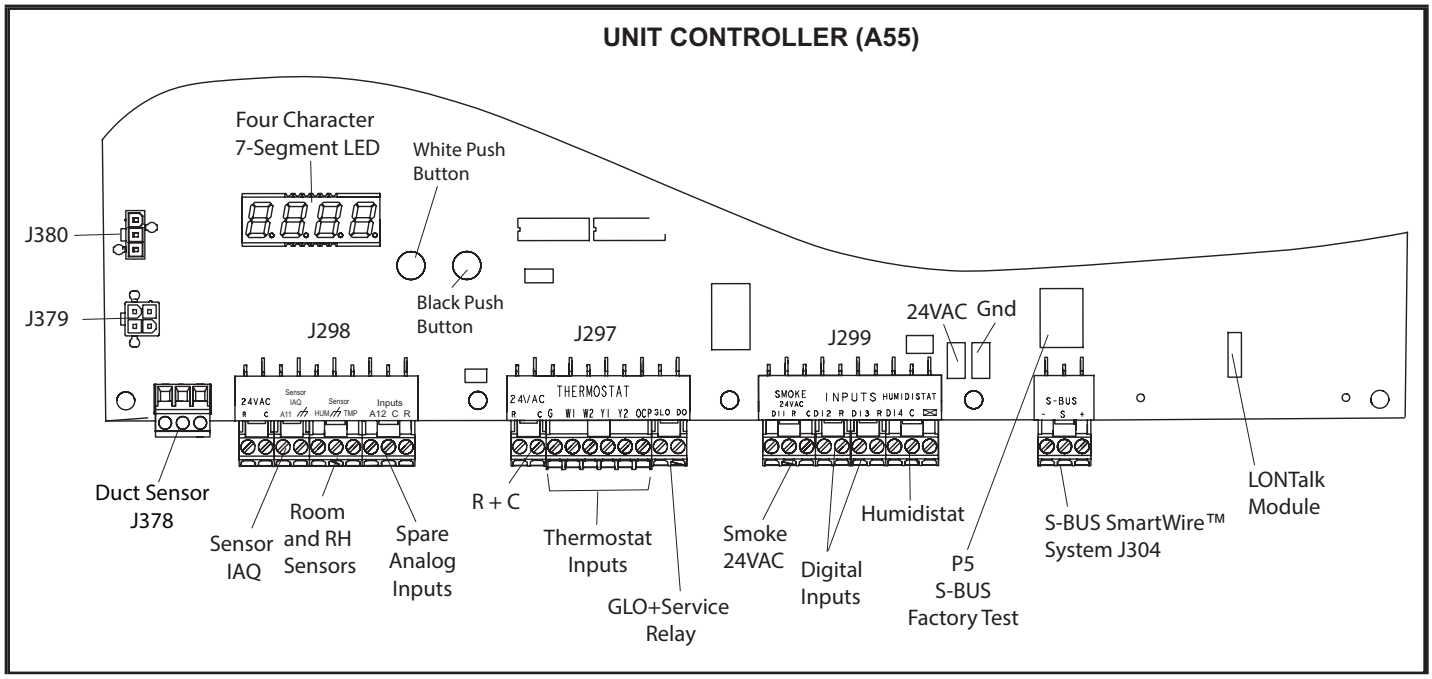
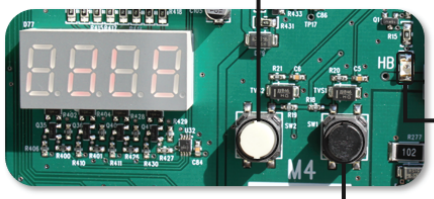


FIGURE 24



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 25

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

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.

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.

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 26, FIGURE 27, or FIGURE 28.

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 26, FIGURE 27, or FIGURE 28.

DIRECT DRIVE BLOWER ASSEMBLY (SH / SD 036 & 060)

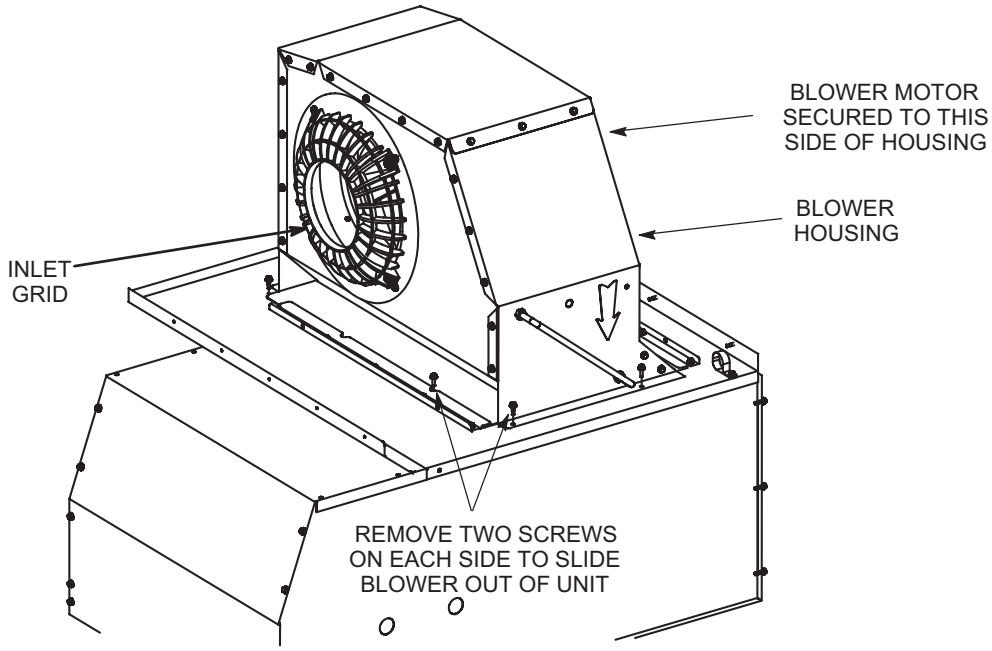


FIGURE 26

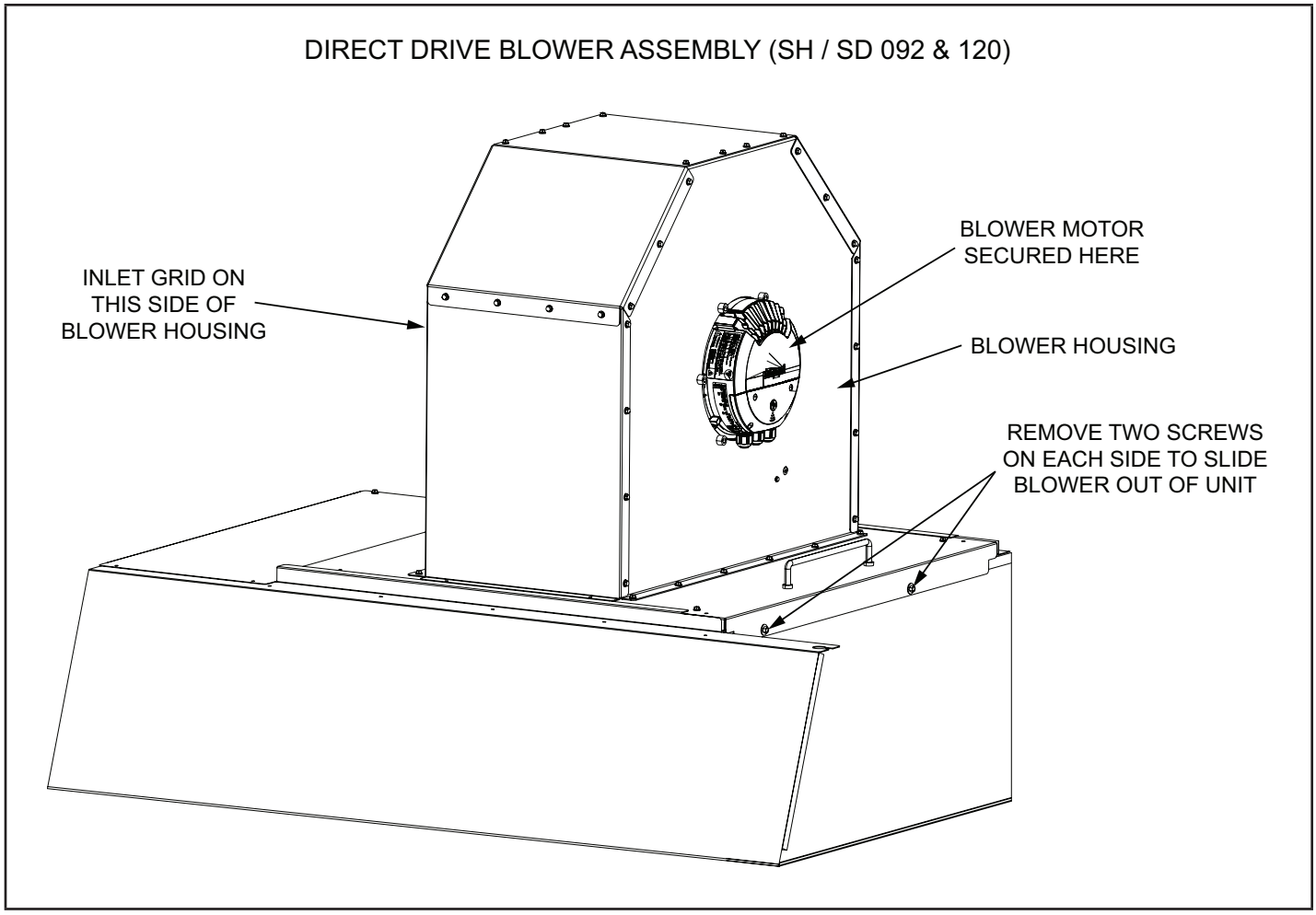

DIRECT DRIVE BLOWER ASSEMBLY (SH / SD 092 & 120)
INLET GRID ON THIS SIDE OF BLOWER HOUSING
BLOWER MOTOR SECURED HERE
BLOWER HOUSING
REMOVE TWO SCREWS ON EACH SIDE TO SLIDE BLOWER OUT OF UNIT

FIGURE 27

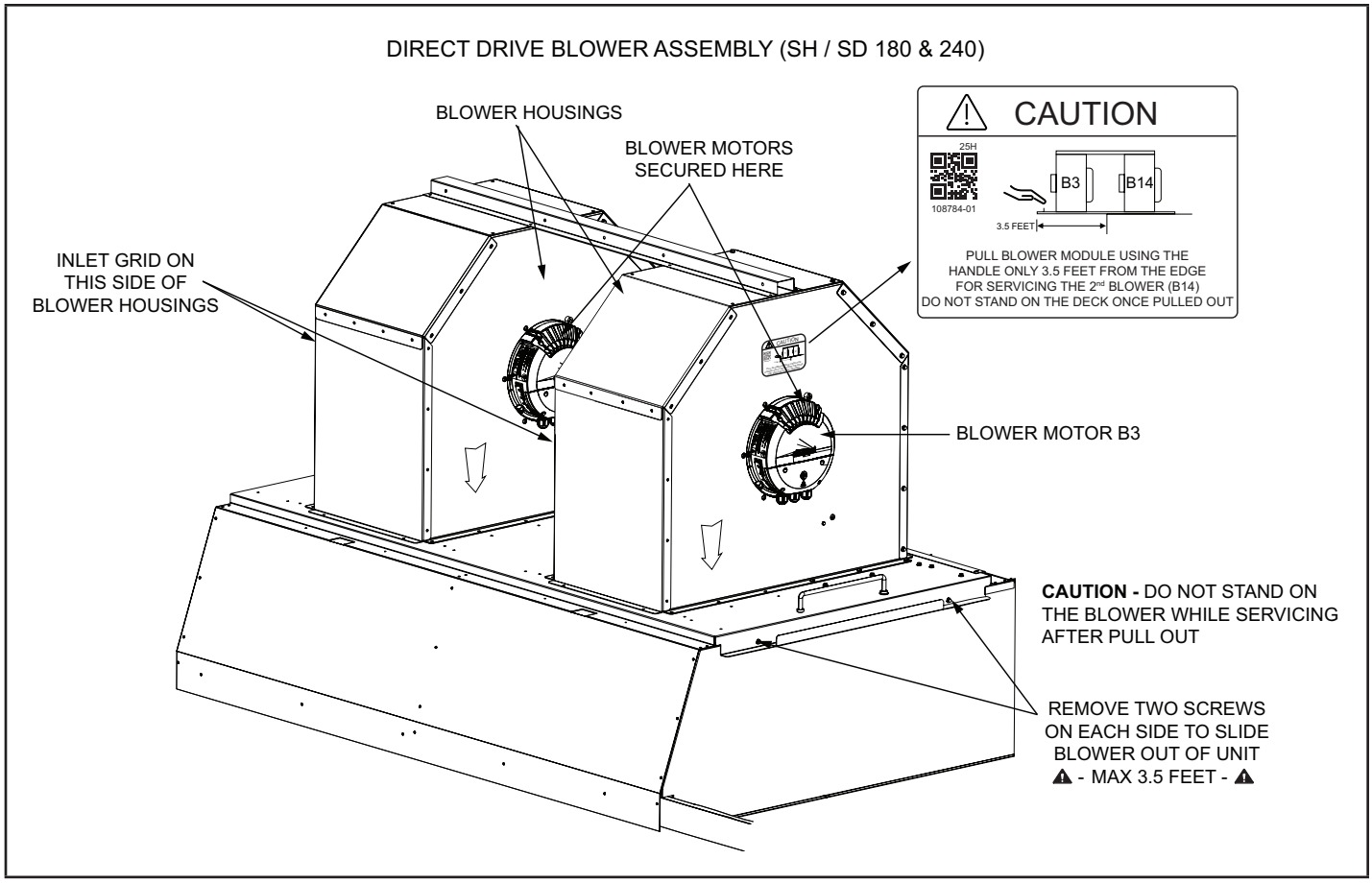


FIGURE 28

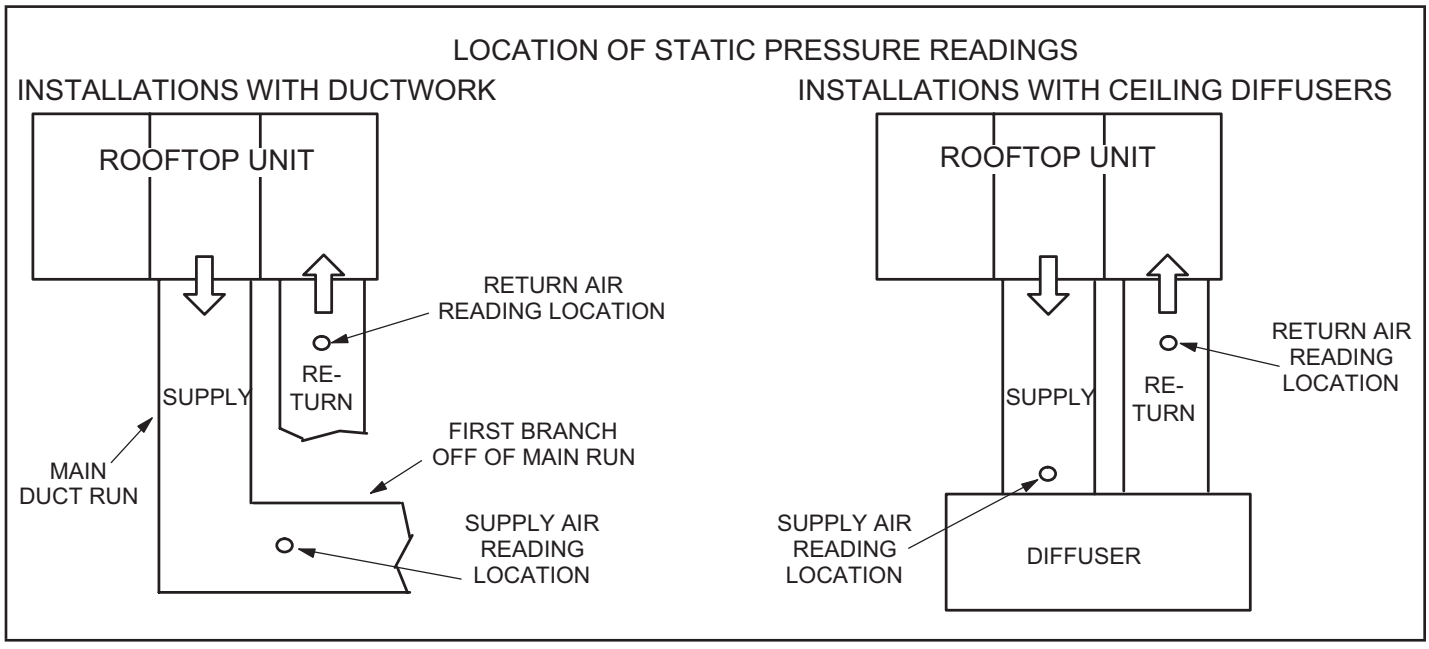


FIGURE 29

SHH036U5E / SHH060U5E BLOWER PERFORMANCE
NOTE - Blower Table Includes Resistance For Base Unit With Electric Heat, Wet Indoor Coil And Air Filters In Place
MINIMUM AIR VOLUME REQUIRED FOR USE WITH ELECTRIC HEAT OPTION:

Refer to MINIMUM AND MAXIMUM CFM DIRECT DRIVE BLOWERS 036-240 - TABLE 23

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	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
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

SHH036U5E / SHH060U5E BLOWER PERFORMANCE

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

MINIMUM AIR VOLUME REQUIRED FOR USE WITH ELECTRIC HEAT OPTION:

Refer to MINIMUM AND MAXIMUM CFM DIRECT DRIVE BLOWERS 036-240 - TABLE 23

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	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
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

SDH036U5E / SDH060U5E BLOWER PERFORMANCE
NOTE - Blower Table Includes Resistance For Base Unit With Wet Indoor Coil And Air Filters In Place.
MINIMUM AIR VOLUME REQUIRED FOR USE WITH GAS HEAT OPTION:

Refer to MINIMUM AND MAXIMUM CFM DIRECT DRIVE BLOWERS 036-240 - TABLE 23

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	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
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

BLOWER DATA

DIRECT DRIVE | 3 TON - 5 TON DF (CONTINUED)

SDH036U5E / SDH060U5E BLOWER PERFORMANCE
NOTE - Blower Table Includes Resistance For Base Unit With Wet Indoor Coil And Air Filters In Place.
MINIMUM AIR VOLUME REQUIRED FOR USE WITH GAS HEAT OPTION:

Refer to MINIMUM AND MAXIMUM CFM DIRECT DRIVE BLOWERS 036-240 - TABLE 23

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	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
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

SHH092U5E / SHH120U5E BLOWER PERFORMANCE
NOTE - Blower Table includes Resistance for base unit with Wet Indoor Coil and Air Filters in place.
MINIMUM AIR VOLUME REQUIRED FOR USE WITH ELECTRIC HEAT OPTION:

Refer to MINIMUM AND MAXIMUM CFM DIRECT DRIVE BLOWERS 036-240 - TABLE 23

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

BLOWER DATA

SDH092U5E / SDH120U5E BLOWER PERFORMANCE
NOTE - Blower Table includes Resistance for base unit with Wet Indoor Coil and Air Filters in place.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH GAS HEAT OPTION:

Refer to MINIMUM AND MAXIMUM CFM DIRECT DRIVE BLOWERS 036-240 - TABLE 23

Air Volume cfm	EXTERNAL STATIC PRESSURE - in. w.g.													
	0.1		0.2		0.3		0.4		0.5		0.6		0.7	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	731	241	775	292	820	342	865	392	910	443	954	494	998	547
2200	772	289	818	342	863	395	908	447	953	500	996	554	1038	610
2400	819	344	865	398	910	453	955	508	998	563	1040	620	1081	679
2600	871	403	916	460	960	516	1003	574	1046	632	1086	692	1125	755
2800	926	466	969	525	1012	584	1054	645	1095	706	1134	770	1171	836
3000	982	534	1024	596	1066	659	1106	723	1145	788	1182	856	1218	926
3200	1040	610	1081	676	1121	743	1159	811	1197	881	1232	953	1267	1026
3400	1099	697	1138	767	1177	838	1214	911	1249	985	1283	1061	1316	1138
3600	1158	796	1196	870	1233	946	1268	1023	1302	1101	1334	1180	1365	1261
3800	1219	908	1255	986	1290	1065	1323	1146	1355	1228	1385	1311	1415	1395
4000	1280	1034	1314	1114	1346	1196	1377	1280	1407	1365	1436	1451	1464	1539
4200	1340	1171	1372	1254	1402	1339	1431	1425	1459	1513	1486	1602	1512	1693
4400	1400	1318	1429	1404	1457	1491	1484	1580	1509	1670	1534	1762	1559	1854
4600	1457	1473	1484	1562	1509	1652	1534	1743	1558	1835	1582	1927	1605	2020
4800	1511	1635	1536	1726	1559	1818	1582	1910	1605	2002	1628	2095	1651	2186

SDH092U5E / SDH120U5E BLOWER PERFORMANCE
NOTE - Blower Table includes Resistance for base unit with Wet Indoor Coil and Air Filters in place.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH GAS HEAT OPTION:

Refer to MINIMUM AND MAXIMUM CFM DIRECT DRIVE BLOWERS 036-240 - TABLE 23

Air Volume cfm	EXTERNAL STATIC PRESSURE - in. w.g.											
	0.8		0.9		1.0		1.1		1.2		1.3	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	1040	602	1080	660	1119	720	1156	782	1192	844	1227	904
2200	1079	668	1118	730	1155	794	1191	859	1226	924	1260	988
2400	1120	741	1158	807	1193	875	1228	943	1261	1010	1294	1077
2600	1163	820	1199	889	1233	959	1267	1030	1299	1101	1330	1171
2800	1207	905	1242	976	1275	1050	1307	1123	1338	1198	1369	1272
3000	1253	998	1286	1072	1318	1148	1348	1225	1379	1303	1408	1381
3200	1300	1102	1331	1179	1362	1258	1391	1338	1421	1419	1449	1501
3400	1347	1217	1377	1298	1407	1380	1435	1463	1464	1548	1491	1634
3600	1395	1343	1424	1427	1452	1513	1480	1599	1507	1688	1533	1778
3800	1443	1480	1470	1567	1497	1656	1524	1746	1550	1838	1575	1930
4000	1490	1628	1516	1718	1542	1809	1567	1902	1592	1995	1617	2088
4200	1537	1784	1562	1876	1587	1969	1611	2062	1636	2155	1660	2248
4400	1583	1947	1607	2040	1631	2132	1655	2225	1679	2316	1703	2407
4600	1629	2112	1652	2204	1676	2296	1699	2386	1723	2475	1747	2564
4800	1674	2277	1698	2367	1721	2457	1745	2545	1768	2632	1791	2719

BLOWER DATA

SHH180H5M / SHH240H5M BLOWER PERFORMANCE

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

MINIMUM AIR VOLUME REQUIRED FOR USE WITH ELECTRIC HEAT OPTION:

Refer to MINIMUM AND MAXIMUM CFM DIRECT DRIVE BLOWERS 036-240 - TABLE 23

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	475	38	524	144	574	249	626	352	676	451	723	536	768	608	813	667	858	720								
2200	486	64	535	170	586	275	637	379	688	479	735	565	781	637	827	697	872	752	917	808	962	873	1004	952		
2400	499	91	548	197	598	303	650	408	700	508	748	595	795	668	840	729	886	784	931	843	976	912	1018	994	1059	1082
2600	512	118	561	225	612	332	663	437	713	538	762	626	809	699	855	761	901	819	946	880	990	952	1032	1038	1073	1132
2800	525	147	575	255	626	362	677	468	727	570	776	658	824	732	870	794	916	854	961	919	1005	995	1046	1085	1086	1184
3000	540	178	590	286	641	394	692	500	742	602	791	691	839	765	885	829	931	891	976	959	1019	1039	1060	1135	1100	1238
3200	556	209	606	318	657	427	708	534	758	637	807	726	855	800	902	866	947	930	992	1001	1035	1087	1075	1186	1113	1295
3400	572	242	622	352	673	462	724	569	774	672	824	762	872	837	918	904	964	970	1008	1046	1050	1136	1090	1241	1128	1354
3600	589	276	640	388	691	498	742	606	792	709	841	799	889	875	936	943	981	1013	1024	1093	1066	1188	1105	1298	1142	1416
3800	608	313	659	425	710	536	760	644	810	747	859	837	907	914	953	984	998	1057	1041	1142	1082	1243	1121	1358	1157	1481
4000	627	352	678	464	729	575	779	683	829	787	878	877	925	955	972	1027	1016	1104	1058	1194	1099	1301	1136	1422	1172	1549
4200	648	393	699	505	749	616	799	724	848	828	897	918	945	997	990	1071	1034	1152	1076	1248	1115	1362	1152	1489	1187	1620
4400	670	436	720	548	770	659	820	767	868	870	917	961	964	1040	1010	1118	1053	1203	1094	1305	1132	1426	1168	1559	1203	1694
4600	695	469	744	581	794	693	843	802	890	906	938	998	985	1081	1029	1163	1072	1256	1112	1365	1149	1494	1185	1632	1218	1770
4800	725	476	773	592	821	707	868	819	915	928	961	1026	1007	1116	1050	1208	1091	1310	1130	1430	1166	1566	1201	1709	1234	1850
5000	758	470	804	591	850	711	896	830	940	945	985	1052	1029	1153	1071	1256	1110	1370	1148	1499	1183	1642	1217	1788	1250	1930
5200	792	459	836	587	880	715	923	841	966	964	1009	1082	1051	1195	1091	1311	1129	1436	1165	1572	1200	1720	1233	1868	1266	2011
5400	826	451	868	587	910	724	951	859	992	992	1033	1120	1072	1247	1111	1374	1148	1508	1183	1650	1216	1799	1250	1947	1282	2090
5600	859	453	899	598	938	743	978	887	1016	1030	1055	1170	1093	1308	1130	1446	1166	1586	1200	1730	1233	1878	1266	2025	1298	2169
5800	890	470	928	623	965	777	1003	930	1040	1082	1077	1233	1113	1380	1149	1525	1184	1669	1217	1812	1251	1958	1283	2103	1315	2247
6000	918	504	954	665	990	827	1026	987	1062	1148	1097	1307	1133	1462	1167	1611	1202	1755	1235	1897	1268	2038	1301	2182	1333	2327
6200	944	559	978	725	1013	892	1048	1060	1083	1226	1117	1392	1152	1551	1186	1701	1220	1844	1253	1982	1286	2120	1319	2264	1351	2411
6400	967	633	1000	803	1034	973	1068	1144	1103	1315	1137	1483	1171	1643	1205	1793	1239	1933	1272	2069	1305	2205	1338	2350	1370	2500
6600	987	723	1021	894	1055	1065	1089	1237	1123	1408	1157	1575	1191	1734	1225	1882	1259	2021	1292	2156	1325	2294	1357	2442	1389	2596
6800	1008	817	1041	988	1075	1159	1109	1331	1144	1502	1178	1668	1212	1825	1246	1971	1279	2110	1312	2246	1345	2387	1377	2538	1408	2697
7000	1028	912	1062	1083	1096	1255	1131	1427	1166	1597	1200	1762	1234	1917	1267	2062	1300	2201	1333	2340	1366	2484	1397	2640	1428	2803
7200	1049	1008	1083	1180	1118	1351	1153	1522	1188	1692	1222	1855	1256	2009	1289	2154	1322	2294	1354	2436	1386	2586	1417	2746	1447	2915
7400	1071	1106	1106	1277	1141	1448	1176	1617	1211	1785	1246	1947	1279	2100	1312	2247	1344	2390	1376	2537	1407	2692	1438	2858	1467	3033
7600	1093	1204	1129	1374	1164	1543	1200	1711	1235	1877	1269	2038	1302	2192	1335	2341	1366	2489	1398	2641	1428	2803	1458	2975	1487	3158
7800	1117	1302	1152	1470	1188	1637	1224	1803	1259	1968	1293	2128	1326	2284	1358	2436	1389	2590	1419	2750	1449	2918	1478	3098	1506	3288
8000	1141	1399	1177	1565	1213	1730	1248	1895	1283	2058	1317	2219	1349	2378	1381	2535	1411	2696	1441	2863	1470	3039	1498	3226	1526	3423
8200	1166	1494	1202	1658	1238	1822	1273	1986	1308	2150	1341	2313	1373	2475	1403	2638	1433	2806	1463	2982	1491	3166	1519	3361	1545	3564
8400	1192	1589	1228	1752	1264	1915	1298	2079	1332	2244	1365	2410	1396	2577	1426	2748	1455	2923	1484	3107	1512	3300	1539	3501	1565	3710
8600	1218	1684	1254	1847	1289	2011	1324	2176	1357	2344	1389	2514	1419	2687	1448	2864	1477	3048	1505	3240	1533	3440	1559	3646	1585	3860
8800	1245	1781	1280	1945	1315	2111	1349	2280	1381	2451	1412	2626	1442	2805	1471	2990	1499	3182	1527	3381	1553	3586	1580	3797		
9000	1272	1881	1307	2048	1341	2218	1373	2390	1405	2565	1436	2745	1465	2931	1493	3123	1521	3322	1548	3528	1574	3738	1600	3953		
9200	1299	1985	1333	2155	1366	2329	1398	2505	1429	2686	1459	2872	1488	3065	1515	3264	1543	3470	1569	3680	1595	3895				
9400	1326	2093	1360	2267	1392	2445	1423	2627	1454	2814	1482	3007	1510	3206	1538	3412	1564	3623	1591	3838						
9600	1354	2205	1386	2384	1418	2567	1448	2755	1478	2949	1506	3149	1533	3355	1560	3567	1586	3782								

SDH180H5M / SDH240H5M BLOWER PERFORMANCE

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

MINIMUM AIR VOLUME REQUIRED FOR USE WITH GAS HEAT OPTION:

Refer to MINIMUM AND MAXIMUM CFM DIRECT DRIVE BLOWERS 036-240 - TABLE 23

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	475	38	524	144	574	249	626	352	676	451	723	536	768	608	813	667	858	720	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
2200	486	64	535	170	586	275	637	379	688	479	735	565	781	637	827	697	872	752	917	808	962	873	1004	- - -	- - -	- - -
2400	499	91	548	197	598	303	650	408	700	508	748	595	795	668	840	729	886	784	931	843	976	912	1018	994	1059	1082
2600	512	118	561	225	612	332	663	437	713	538	762	626	809	699	855	761	901	819	946	880	990	952	1032	1038	1073	1132
2800	525	147	575	255	626	362	677	468	727	570	776	658	824	732	870	794	916	854	961	919	1005	995	1046	1085	1086	1184
3000	540	178	590	286	641	394	692	500	742	602	791	691	839	765	885	829	931	891	976	959	1019	1039	1060	1135	1100	1238
3200	556	209	606	318	657	427	708	534	758	637	807	726	855	800	902	866	947	930	992	1001	1035	1087	1075	1186	1113	1295
3400	572	242	622	352	673	462	724	569	774	672	824	762	872	837	918	904	964	970	1008	1046	1050	1136	1090	1241	1128	1354
3600	589	276	640	388	691	498	742	606	792	709	841	799	889	875	936	943	981	1013	1024	1093	1066	1188	1105	1298	1142	1416
3800	608	313	659	425	710	536	760	644	810	747	859	837	907	914	953	984	998	1057	1041	1142	1082	1243	1121	1358	1157	1481
4000	627	352	678	464	729	575	779	683	829	787	878	877	925	955	972	1027	1016	1104	1058	1194	1099	1301	1136	1422	1172	1549
4200	648	393	699	505	749	616	799	724	848	828	897	918	945	997	990	1071	1034	1152	1076	1248	1115	1362	1152	1489	1187	1620
4400	670	436	720	548	770	659	820	767	868	870	917	961	964	1040	1010	1118	1053	1203	1094	1305	1132	1426	1168	1559	1203	1694
4600	695	469	744	581	794	693	843	802	890	906	938	998	985	1081	1029	1163	1072	1256	1112	1365	1149	1494	1185	1632	1218	1770
4800	725	476	773	592	821	707	868	819	915	928	961	1026	1007	1116	1050	1208	1091	1310	1130	1430	1166	1566	1201	1709	1234	1850
5000	758	470	804	591	850	711	896	830	940	945	985	1052	1029	1153	1071	1256	1110	1370	1148	1499	1183	1642	1217	1788	1250	1930
5200	792	459	836	587	880	715	923	841	966	964	1009	1082	1051	1195	1091	1311	1129	1436	1165	1572	1200	1720	1233	1868	1266	2011
5400	826	451	868	587	910	724	951	859	992	992	1033	1120	1072	1247	1111	1374	1148	1508	1183	1650	1216	1799	1250	1947	1282	2090
5600	859	453	899	598	938	743	978	887	1016	1030	1055	1170	1093	1308	1130	1446	1166	1586	1200	1730	1233	1878	1266	2025	1298	2169
5800	890	470	928	623	965	777	1003	930	1040	1082	1077	1233	1113	1380	1149	1525	1184	1669	1217	1812	1251	1958	1283	2103	1315	2247
6000	918	504	954	665	990	827	1026	987	1062	1148	1097	1307	1133	1462	1167	1611	1202	1755	1235	1897	1268	2038	1301	2182	1333	2327
6200	944	559	978	725	1013	892	1048	1060	1083	1226	1117	1392	1152	1551	1186	1701	1220	1844	1253	1982	1286	2120	1319	2264	1351	2411
6400	967	633	1000	803	1034	973	1068	1144	1103	1315	1137	1483	1171	1643	1205	1793	1239	1933	1272	2069	1305	2205	1338	2350	1370	2500
6600	987	723	1021	894	1055	1065	1089	1237	1123	1408	1157	1575	1191	1734	1225	1882	1259	2021	1292	2156	1325	2294	1357	2442	1389	2596
6800	1008	817	1041	988	1075	1159	1109	1331	1144	1502	1178	1668	1212	1825	1246	1971	1279	2110	1312	2246	1345	2387	1377	2538	1408	2697
7000	1028	912	1062	1083	1096	1255	1131	1427	1166	1597	1200	1762	1234	1917	1267	2062	1300	2201	1333	2340	1366	2484	1397	2640	1428	2803
7200	1049	1008	1083	1180	1118	1351	1153	1522	1188	1692	1222	1855	1256	2009	1289	2154	1322	2294	1354	2436	1386	2586	1417	2746	1447	2915
7400	1071	1106	1106	1277	1141	1448	1176	1617	1211	1785	1246	1947	1279	2100	1312	2247	1344	2390	1376	2537	1407	2692	1438	2858	1467	3033
7600	1093	1204	1129	1374	1164	1543	1200	1711	1235	1877	1269	2038	1302	2192	1335	2341	1366	2489	1398	2641	1428	2803	1458	2975	1487	3158
7800	1117	1302	1152	1470	1188	1637	1224	1803	1259	1968	1293	2128	1326	2284	1358	2436	1389	2590	1419	2750	1449	2918	1478	3098	1506	3288
8000	1141	1399	1177	1565	1213	1730	1248	1895	1283	2058	1317	2219	1349	2378	1381	2535	1411	2696	1441	2863	1470	3039	1498	3226	1526	3423
8200	1166	1494	1202	1658	1238	1822	1273	1986	1308	2150	1341	2313	1373	2475	1403	2638	1433	2806	1463	2982	1491	3166	1519	3361	1545	3564
8400	1192	1589	1228	1752	1264	1915	1298	2079	1332	2244	1365	2410	1396	2577	1426	2748	1455	2923	1484	3107	1512	3300	1539	3501	1565	3710
8600	1218	1684	1254	1847	1289	2011	1324	2176	1357	2344	1389	2514	1419	2687	1448	2864	1477	3048	1505	3240	1533	3440	1559	3646	1585	3860
8800	1245	1781	1280	1945	1315	2111	1349	2280	1381	2451	1412	2626	1442	2805	1471	2990	1499	3182	1527	3381	1553	3586	1580	3797	- - -	- - -
9000	1272	1881	1307	2048	1341	2218	1373	2390	1405	2565	1436	2745	1465	2931	1493	3123	1521	3322	1548	3528	1574	3738	1600	3953	- - -	- - -
9200	1299	1985	1333	2155	1366	2329	1398	2505	1429	2686	1459	2872	1488	3065	1515	3264	1543	3470	1569	3680	1595	3895	- - -	- - -	- - -	- - -
9400	1326	2093	1360	2267	1392	2445	1423	2627	1454	2814	1482	3007	1510	3206	1538	3412	1564	3623	1591	3838	- - -	- - -	- - -	- - -	- - -	- - -
9600	1354	2205	1386	2384	1418	2567	1448	2755	1478	2949	1506	3149	1533	3355	1560	3567	1586	3782	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

BLOWER DATA

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

Air Volume cfm	Gas Heating			Electric Heat	Economizer	Filters MERV 13
	Standard Heat	Medium Heat	High Heat			
036, 060 MODELS						
800	0.02	0.02	0.02	0.01	0.04	0.05
1000	0.02	0.02	0.02	0.03	0.04	0.07
1200	0.02	0.02	0.02	0.06	0.04	0.07
1400	0.02	0.02	0.03	0.09	0.04	0.07
1600	0.02	0.03	0.04	0.12	0.04	0.07
1800	0.03	0.04	0.05	0.15	0.05	0.07
2000	0.03	0.04	0.06	0.18	0.05	0.08
092, 120 MODEL						
2000	0.07	0.05	0.06	0.03	0.06	0.03
2500	0.09	0.10	0.11	0.03	0.11	0.05
3000	0.11	0.12	0.13	0.02	0.13	0.06
3500	0.12	0.16	0.17	0.05	0.15	0.07
4000	0.14	0.21	0.22	0.05	0.19	0.08
4500	0.15	0.26	0.32	0.10	0.22	0.09
5000	0.16	0.34	0.43	0.10	0.29	0.10
5500	0.18	0.44	0.54	0.16	0.34	0.12
6000	0.20	0.54	0.64	0.21	0.52	0.13
180, 240 MODEL						
3000	0.03	0.04	0.05	0.01	0.00	0.00
3500	0.03	0.05	0.06	0.01	0.00	0.00
4000	0.04	0.06	0.07	0.01	0.00	0.00
4500	0.05	0.07	0.09	0.02	0.00	0.00
5000	0.05	0.09	0.11	0.03	0.00	0.00
5500	0.06	0.10	0.13	0.03	0.01	0.01
6000	0.07	0.12	0.15	0.03	0.01	0.02
6500	0.08	0.13	0.17	0.04	0.01	0.02
7000	0.09	0.15	0.19	0.04	0.02	0.03
7500	0.10	0.17	0.21	0.05	0.02	0.04
8000	0.11	0.19	0.24	0.05	0.02	0.04
8500	0.12	0.20	0.26	0.06	0.03	0.04
9000	0.13	0.23	0.29	0.07	0.04	0.04
9500	0.14	0.25	0.32	0.08	0.04	0.06

POWER EXHAUST FANS STANDARD STATIC PERFORMANCE

092, 120 Model		180, 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	0.00	10200
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

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 (SDH 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.

2 - First-stage thermostat demand (Y1) will energize the blower on low speed, the compressor(s) along with the condenser fans will respond as required to maintain discharge air temperature (DAT) as demand requires. An increased cooling demand (Y2) will increase the blower to high speed.

On units with an economizer, when outdoor air is acceptable, a first-stage demand (Y1) will also energize the economizer and blower. An increased demand (Y2) will energize the compressor and the condenser fan.

3 - SH/SD 036-120 units contain one refrigerant circuit. See FIGURE 30.

4 - SH/SD 180 and 240 units contain two refrigerant circuits or systems. See FIGURE 31.

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 polyolester oil.

SH/SD 036-120 MSAV™ UNIT REFRIGERANT CIRCUITS

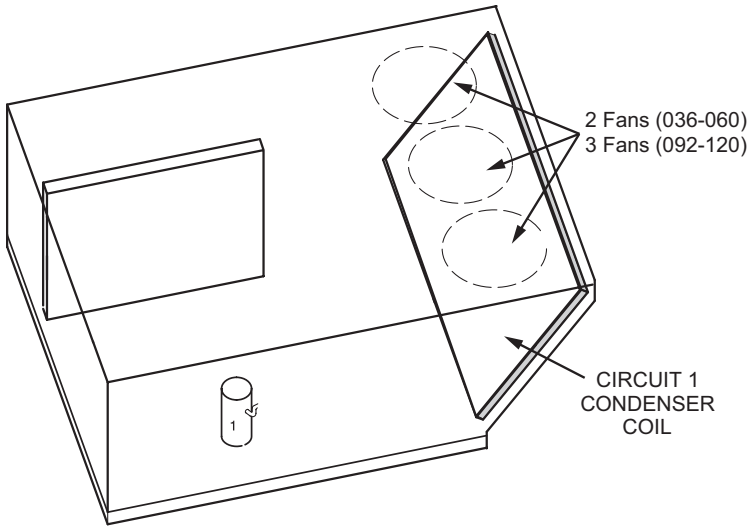


FIGURE 30

SH/SD 180 & 240 MSAV™ UNIT REFRIGERANT CIRCUITS

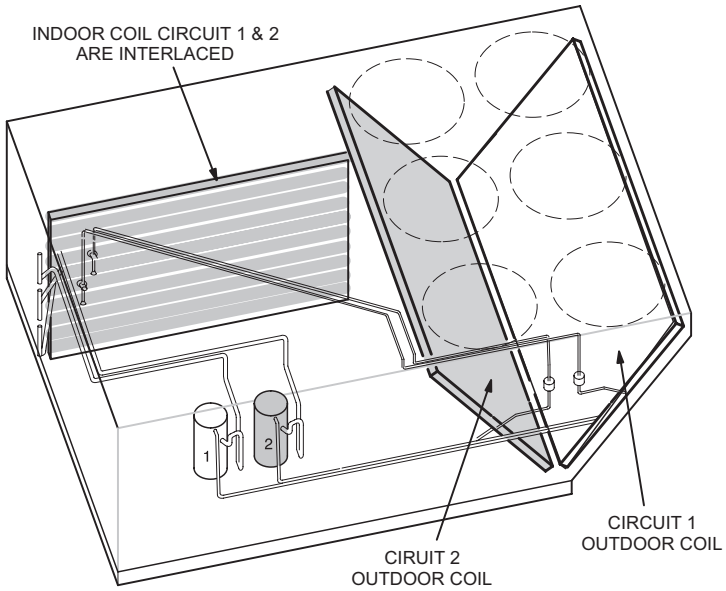


FIGURE 31

Defrost Control

The defrost control ensures that the heat pump outdoor coil does not ice excessively during the heating mode. The defrost control uses input from the coil and ambient sensor to issue demand defrost controls from the Unit Controller. If the system fails to calibrate or obtain readings for demand defrost, defrost will run-time at field setting.

Low gas heat (SDH) or Auxiliary electric heat (optional) is energized during defrost. Some SHH units equipped with Emergency Electric Heat have the option of Defrost without heat ON to satisfy electrical load limitations.

Defrost Test or Forced Defrost Option

A TEST option is provided for troubleshooting. The TEST mode may be started at any time using the mobile service app. Defrost mode may be started by entering the Defrost Mode in the Component Test Menu. When defrost is started, unit will run in Defrost Mode for a maximum of 5 minutes or when the outdoor coil reaches 95°F, whichever occurs first.

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 12.

TABLE 12

RDS Sensor Figures

Model	Qty.	Type	Figure
SDH036-060	2	Compressor Sensor	FIGURE 32
		Indoor Sensor	FIGURE 33
SHH036-060	1	Indoor Sensor	FIGURE 33
SDH092-120	2	Compressor Sensor	FIGURE 34
		Indoor Sensor	FIGURE 35
SHH092-120	1	Indoor Sensor	FIGURE 35
SDH/SHH180-240	2	Compressor Sensor	FIGURE 36
		Indoor Sensor	FIGURE 37

SDH 036-060 Compressor RDS Sensor Location

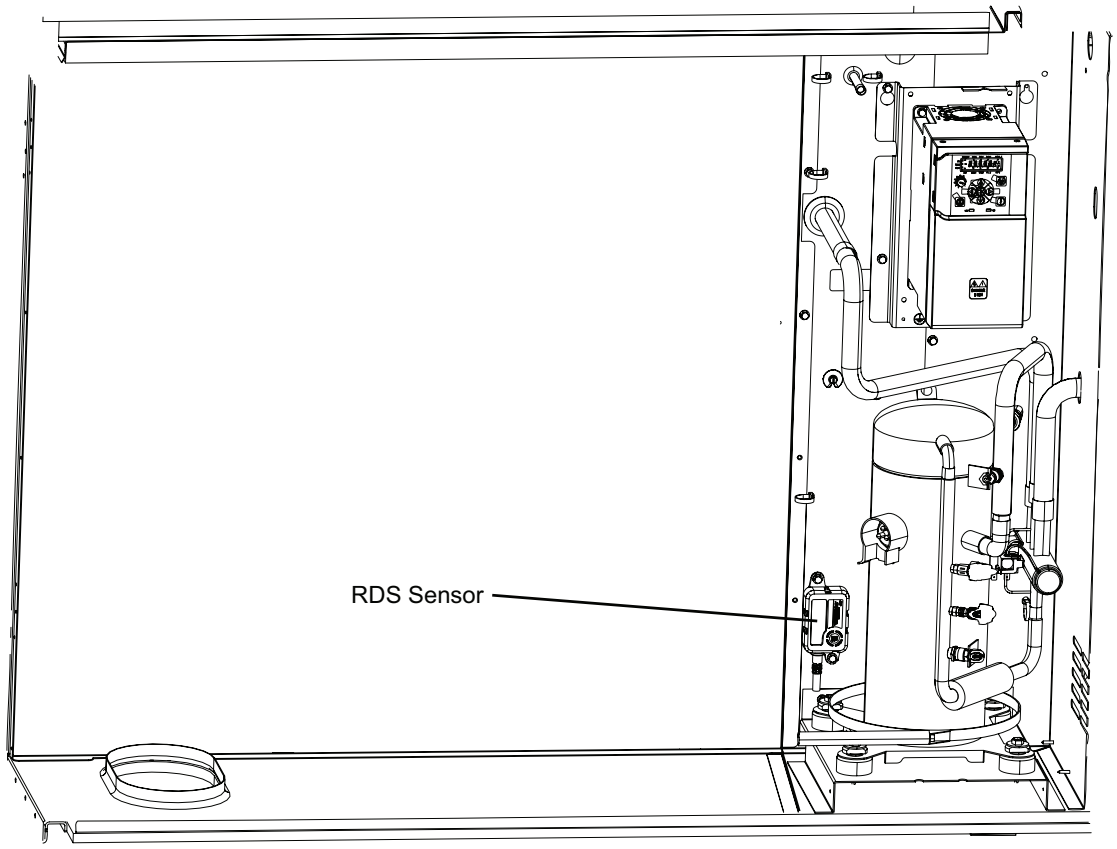


FIGURE 32

SHH/SDH 036-060 Indoor Coil RDS Sensor Location

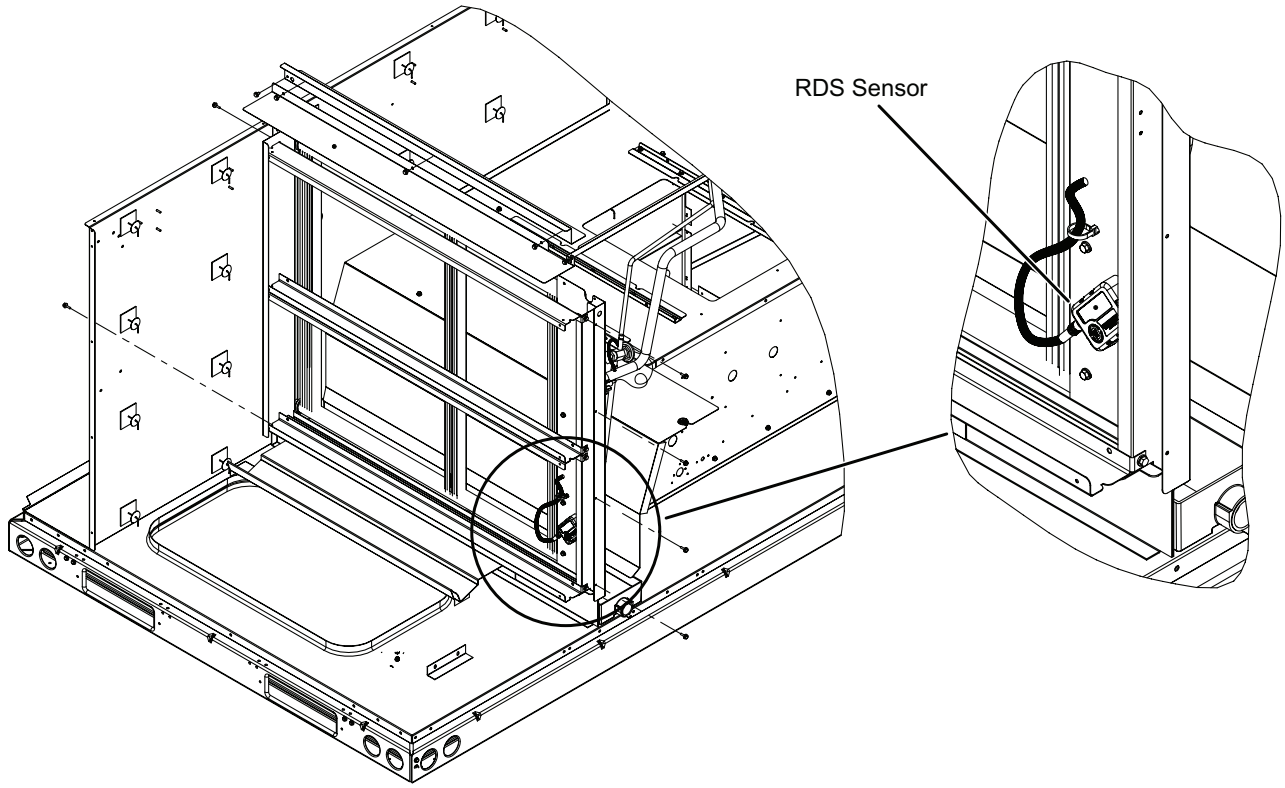


FIGURE 33

SDH 092-120 Compressor RDS Sensor Location

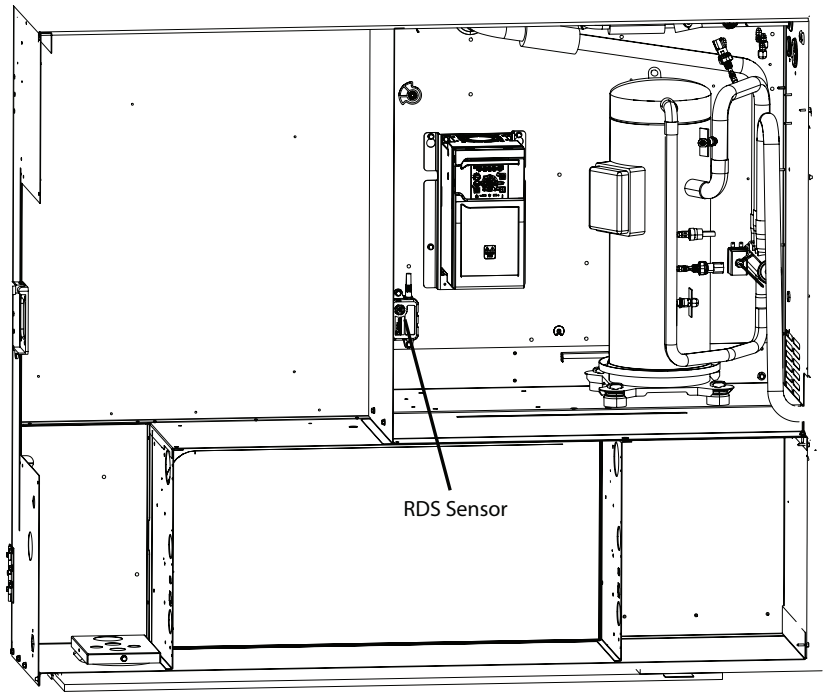


FIGURE 34

SHH/SDH Indoor Coil 120 RDS Sensor Location

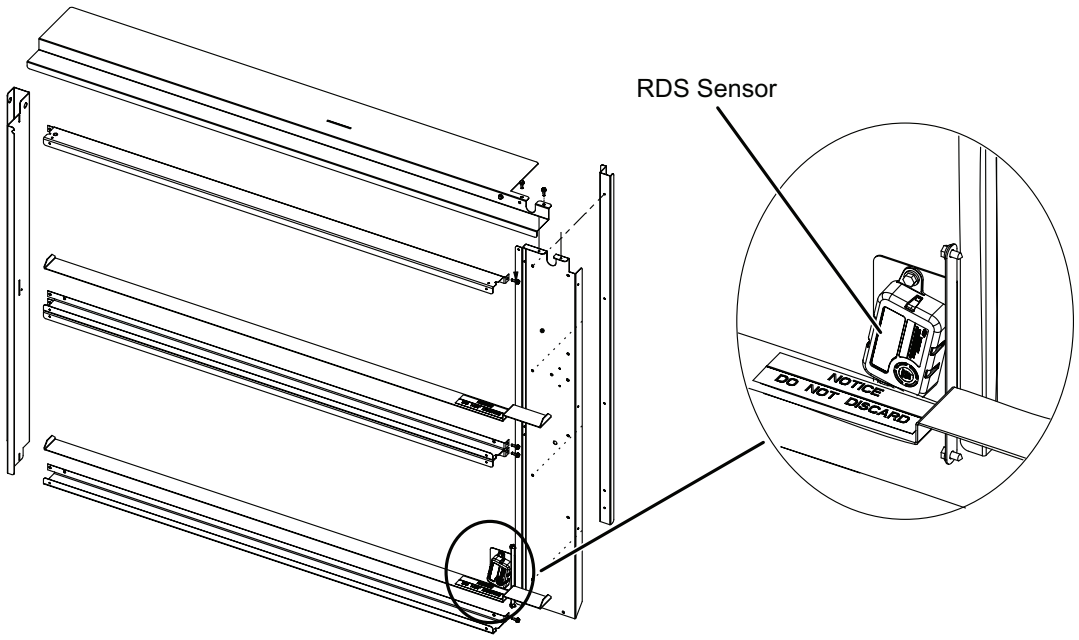


FIGURE 35

SHH/SDH 180-240 Compressor RDS Sensor Location

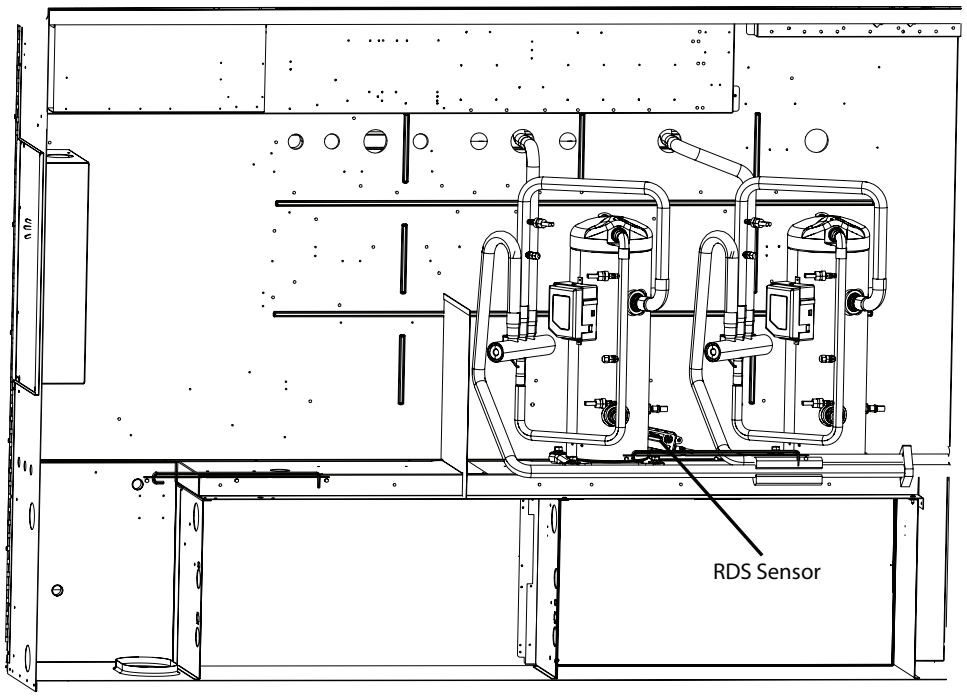


FIGURE 36

SHH/SDH 180-240 Indoor Coil RDS Sensor Location

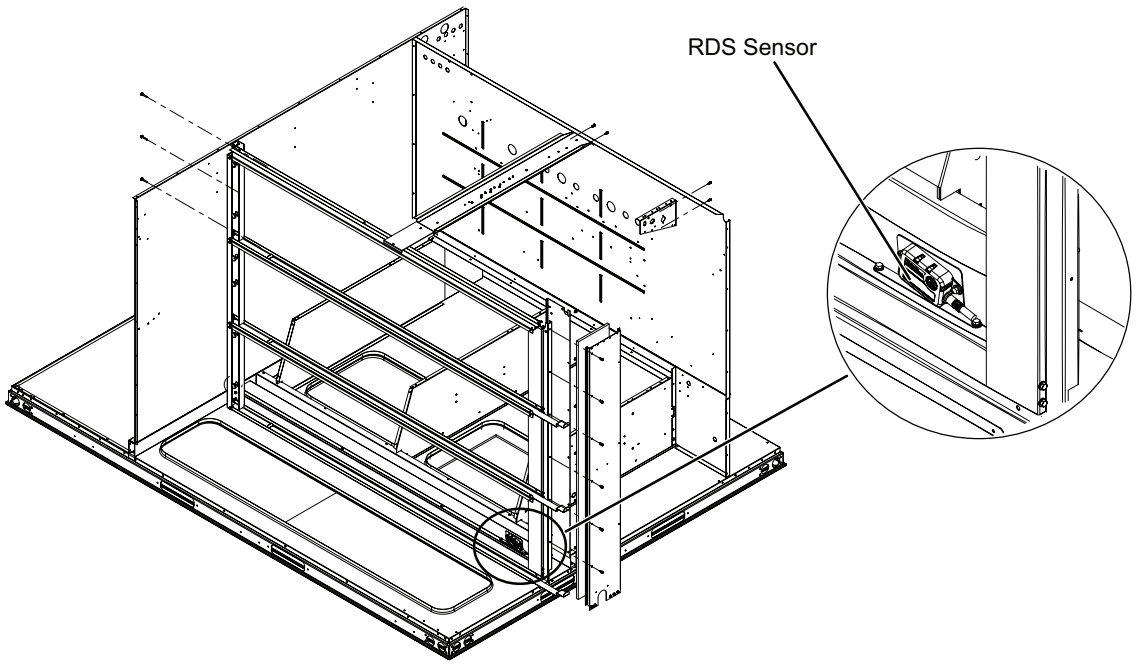


FIGURE 37

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)
SHH/SDH036	19.25	8.73
SHH/SDH060	16.56	7.51
SHH/SDH092	26.19	11.88
SHH/SDH120	24.00	10.89
SHH/SDH180 Stage 1	25.50	11.57
SHH/SDH180 Stage 2	24.00	10.89
SHH/SDH240 Stage 1	28.00	12.70
SHH/SDH240 Stage 2	26.50	12.02

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

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

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

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
- 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. Initiate full load cooling operation using the following mobile service app menu path:

SERVICE > COMPONENT TEST > COOLING > START

(set Cooling Speed to 100% and set Blower Speed to high speed as test and balance)

2 - Compare the normal operating pressures to the pressures obtained from the gauges or in the app under component test mode, discharge, suction and sub-cooling will be displayed. 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 13 through TABLE 18) 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.

TABLE 13 581396-01
036 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp.	Discharge ± 10	Suction ± 5
65°F	217	136
75°F	256	139
85°F	293	141
95°F	332	140
100°F	387	145
115°F	441	148

TABLE 14 581397-01
060 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp.	Discharge ± 10	Suction ± 5
65°F	227	124
75°F	263	126
85°F	304	129
95°F	350	131
100°F	398	133
115°F	453	135

TABLE 15 581398-01
092 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp.	Discharge ± 10	Suction ± 5
65°F	231	128
75°F	270	135
85°F	313	139
95°F	357	141
100°F	408	144
115°F	463	146

TABLE 16 581399-01
120 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp.	Discharge ± 10	Suction ± 5
65°F	244	123
75°F	284	127
85°F	325	129
95°F	367	133
100°F	424	133
115°F	483	136

TABLE 17 581402-01 180 NORMAL OPERATING PRESSURES				
OD Coil Entering Air Temp.	Discharge ± 10		Suction ± 5	
	Circuit 1	Circuit 2	Circuit 1	Circuit 2
65°F	224	228	133	135
75°F	260	265	134	137
85°F	301	307	134	139
95°F	344	352	134	139
105°F	397	401	137	142
115°F	450	453	140	145

TABLE 18 581401-01 240 NORMAL OPERATING PRESSURES				
OD Coil Entering Air Temp.	Discharge ± 10		Suction ± 5	
	Circuit 1	Circuit 2	Circuit 1	Circuit 2
65°F	250	263	122	124
75°F	290	304	123	127
85°F	335	345	125	128
95°F	381	400	127	130
105°F	438	448	128	131
115°F	499	507	130	133

TABLE 19 SUBCOOLING TEMPERATURE		
Unit	Outdoor Coil Entering Temp	Subcooling Temp
036	95°F	3.3°F ±1 (1.8°C ± 0.5)
060	95°F	3.3°F ±1 (1.8°C ± 0.5)
092	95°F	6.1°F ±1 (3.4°C ± 0.5)
120	95°F	6.4°F ±1 (3.6°C ± 0.5)
180 Circuit 1	95°F	8.3°F ±1 (4.6°C ± 0.5)
180 Circuit 2	95°F	6.1°F ±1 (3.4°C ± 0.5)
240 Circuit 1	95°F	10.0°F ±1 (5.6°C ± 0.5)
240 Circuit 2	95°F	10.0°F ±1 (5.6°C ± 0.5)

B-Compressor Controls

1 - Crankcase Heater (HR1, HR2)

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)

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 - 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).

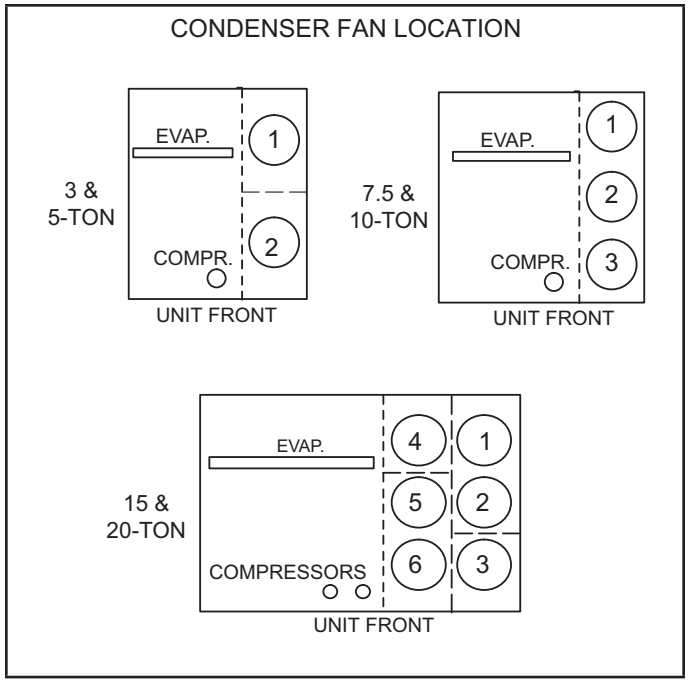


FIGURE 38

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 39 and FIGURE 40)

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.

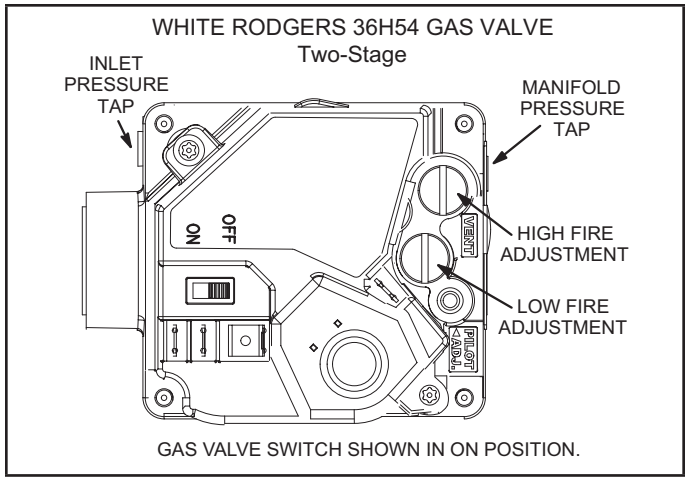


FIGURE 39

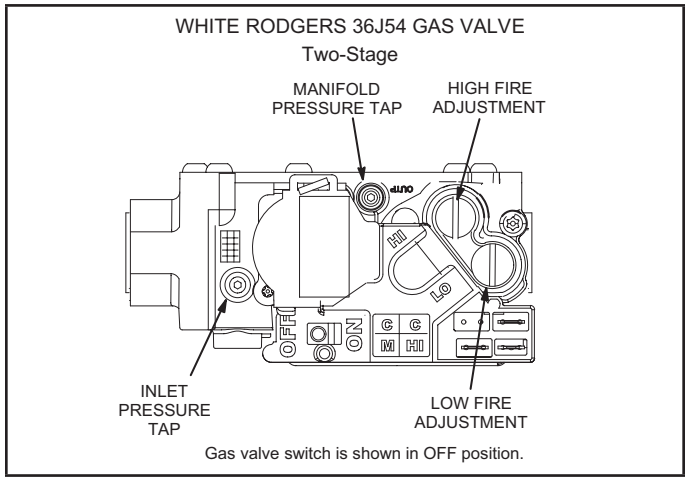


FIGURE 40

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

(SD 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.

SD 036 & 060 - On the vestibule to the right of the combustion air inducer. See FIGURE 41.

SD 092 & 120 - Upper right corner of blower support wall.

SD 180 & 240 - See FIGURE 42.

Secondary Limit Location
(*none on 3, 5, 20-ton units*)

SD 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 20.

Gas manifold pressures should match pressures shown in TABLE 20. 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.

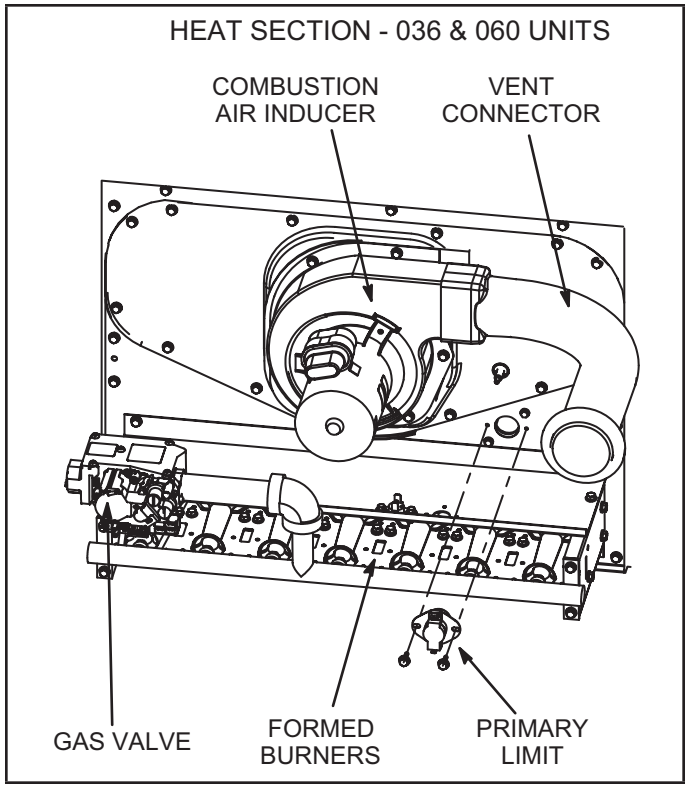


FIGURE 41

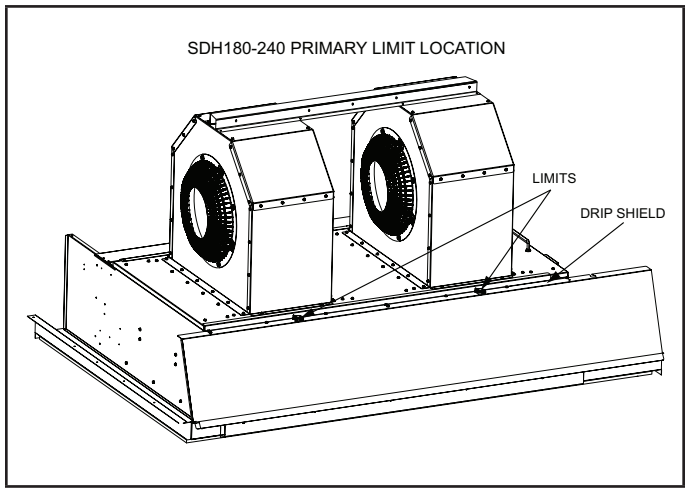


FIGURE 42

TABLE 20
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)
092, 120, 180, 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 21. 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 21

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.*

Direct Drive Blower Start-Up

A-Set Blower Speed

1 - Use TABLE 22 to fill in field-provided, design specified blower CFM

TABLE 22
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 23. 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 29.

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 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 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 23

MINIMUM AND MAXIMUM CFM
DIRECT DRIVE BLOWERS
036-240

A-D Box - Direct Plus - Strategos HP				Cooling High Speed		Cooling Low Speed	Heating High Speed		Vent Speed	Smoke Speed
Model Number	Tonnage	Heat Option	Heat Code	CFM		CFM	CFM		CFM	CFM
				Min	Max	Min	Min	Max	Min	Min
SDH036U	3	Std	B	750	1440	500	1175	1500	500	500
		Med	Q	750	1440	500	1475	1500	500	500
SHH036U		No Heat	N	750	1440	500	700	1500	500	500
		7.5kW(E)	3	750	1440	500	700	1500	500	500
		10kW	D	750	1440	500	950	1500	500	500
		15kW	E	750	1440	500	1375	1500	500	500
SDH060U	5	Std	B	1250	2400	500	1175	2400	750	750
		Med	Q	1250	2400	500	1475	2400	750	750
		High	X	1250	2400	500	1625	2400	750	750
SHH060U		No Heat	N	1250	2400	500	950	2400	750	750
		10kW(E), 10kW	4, D	1250	2400	500	950	2400	750	750
		15kW	E	1250	2400	500	1375	2400	750	750
		20kW	F	1250	2400	500	1425	2400	750	750
		30kW	J	1250	2400	500	1550	2400	750	750
SDH092U	7.5	Std	S	1875	3600	850	2175	3600	1125	1125
		Med	M	1875	3600	850	2250	3600	1125	1125
		High	H	1875	3600	850	2575	3600	1125	1125
SHH092U		No Heat	N	1875	3600	850	1300	3600	1125	1125
		15kW(E), 15kW	5, E	1875	3600	850	1300	3600	1125	1125
		20kW	F	1875	3600	850	1300	3600	1125	1125
		30kW	J	1875	3600	850	2600	3600	1125	1125
		45kW	K	1875	3600	850	2600	3600	1125	1125
SDH120U	10	Std	S	2500	4800	1000	2175	4800	1500	1500
		Med	M	2500	4800	1000	2250	4800	1500	1500
		High	H	2500	4800	1000	2575	4800	1500	1500
SHH120U		No Heat	N	2500	4800	1000	1300	4800	1500	1500
		15kW(E), 15kW	5, E	2500	4800	1000	1300	4800	1500	1500
		20kW	F	2500	4800	1000	1300	4800	1500	1500
		30kW	J	2500	4800	1000	2600	4800	1500	1500
		45kW	K	2500	4800	1000	2600	4800	1500	1500
SDH180U	15	Std	S	3750	7200	1400	4350	7200	2250	2250
		Med	M	3750	7200	1400	4500	7200	2250	2250
		High	H	3750	7200	1400	5150	7200	2250	2250
SHH180U		No Heat	N	3750	7200	1400	3300	7200	2250	2250
		25kW (E), 25kW	6, H	3750	7200	1400	3300	7200	2250	2250
		40kW	A	3750	7200	1400	5200	7200	2250	2250
		60kW	L	3750	7200	1400	6000	7200	2250	2250
SDH240U	20	Std	S	5000	9600	1775	4350	9600	3000	3000
		Med	M	5000	9600	1775	4500	9600	3000	3000
		High	H	5000	9600	1775	5150	9600	3000	3000
SHH240U		No Heat	N	5000	9600	1775	3300	9600	3000	3000
		25kW (E), 25kW	6, H	5000	9600	1775	3300	9600	3000	3000
		40kW	A	5000	9600	1775	5200	9600	3000	3000
		60kW	L	5000	9600	1775	6000	9600	3000	3000

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 24. 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 24. See FIGURE 43 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 24
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.

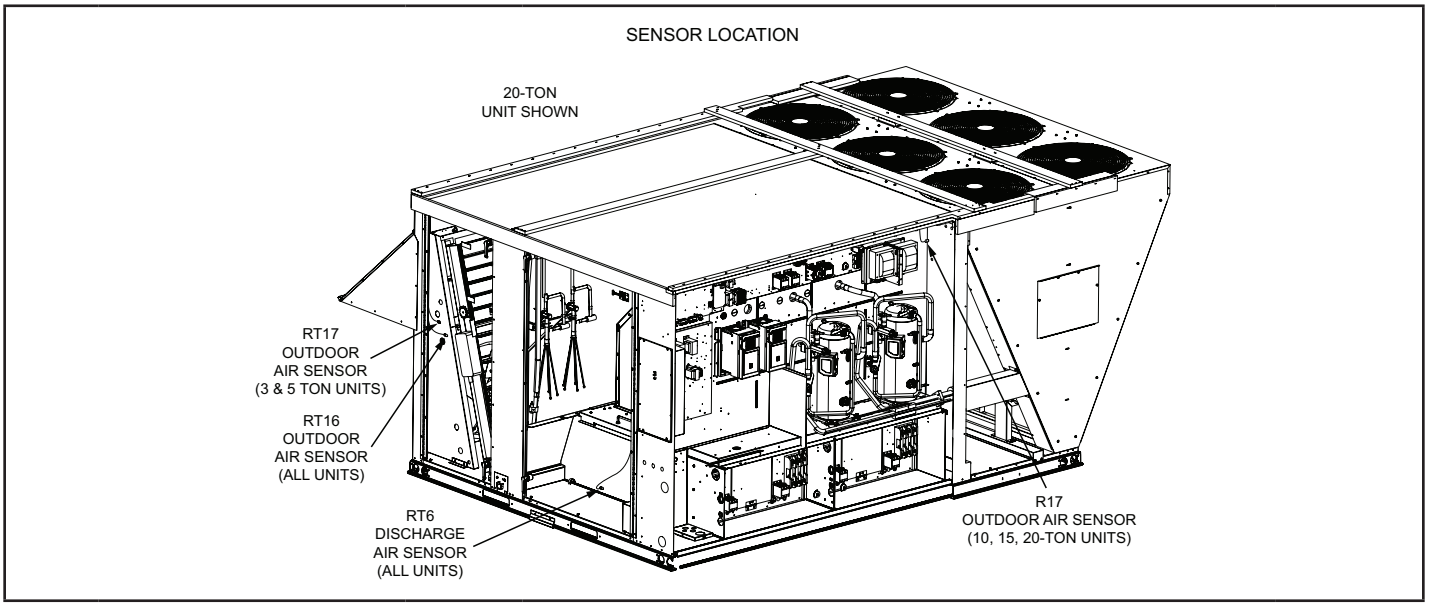


FIGURE 43

C-Economizer Operation

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

See TABLE 25 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 26 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 27 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 25

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 26

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 (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 27
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
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

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.

⚠ WARNING

After power is disabled, please wait 5 minutes for the VFD capacitors to discharge before performing maintenance.

A-Lubrication

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

B-Filters

Units are equipped with filters as shown in TABLE 28. 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 28
Number and Size of Filter by Unit

SH/SD Unit	Qty	Filter Size - inches (mm)
036, 060	4	16 X 20 X 2 (406 X 508 X 51)
092, 120	4	20 X 25 X 2 (508 X 635 X 51)
180, 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 (SD 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 44 for 036 & 060 units and FIGURE 45 for 092-240 units. Clean burners as necessary.

5 - Locate the ignitor under the right burner for 036 and 060 units. See FIGURE 46. Locate the ignitor under the left burner for 092-240 units. See FIGURE 48 and TABLE 29. Use appropriately sized twist drills or feeler gauges to check the spark gap as shown in FIGURE 47.

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.

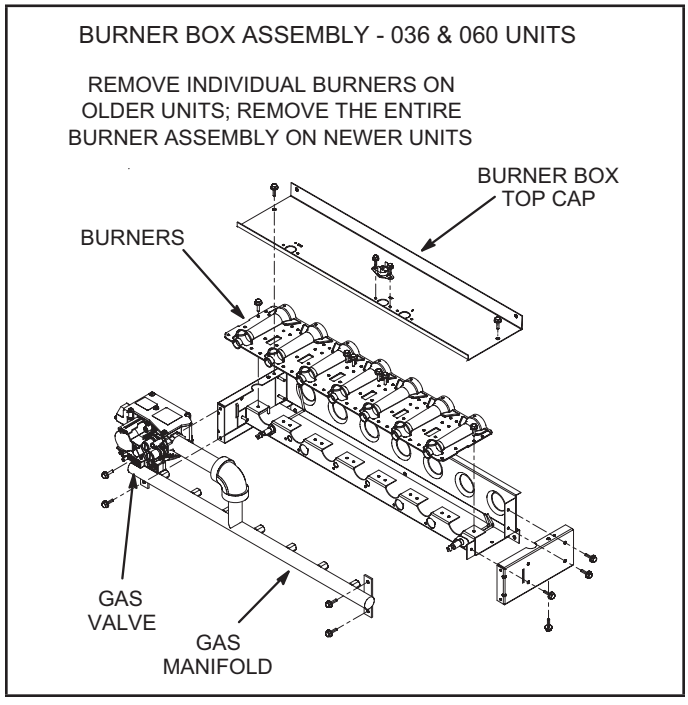


FIGURE 44

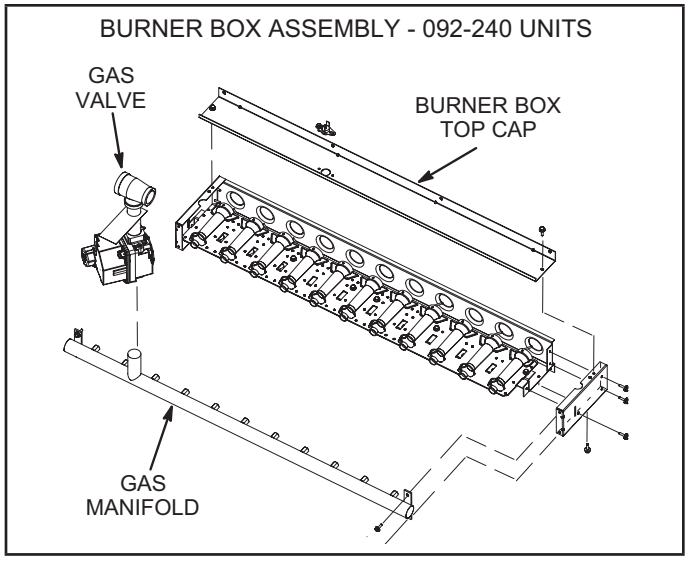


FIGURE 45

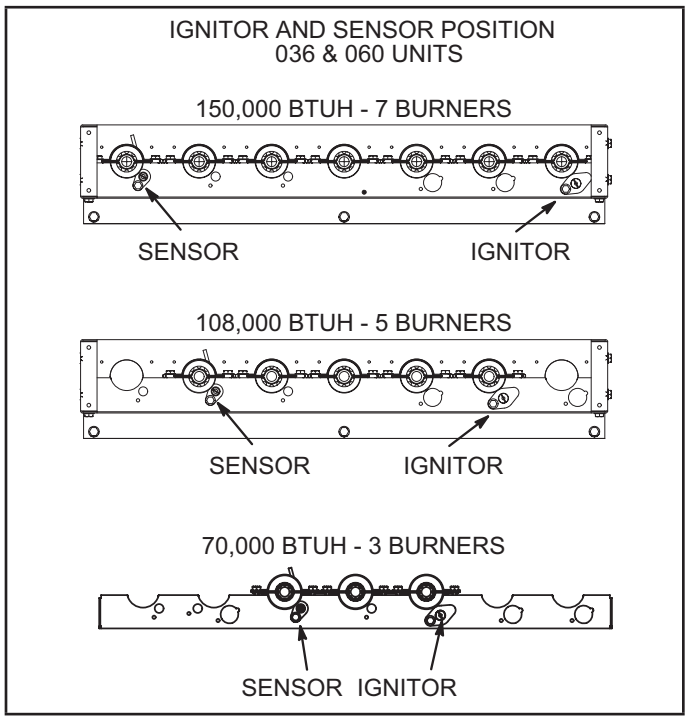


FIGURE 46

D-Combustion Air Inducer (SD 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 29

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)

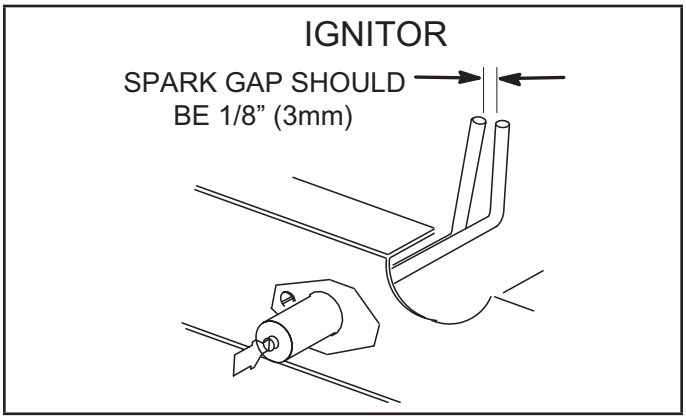


FIGURE 47

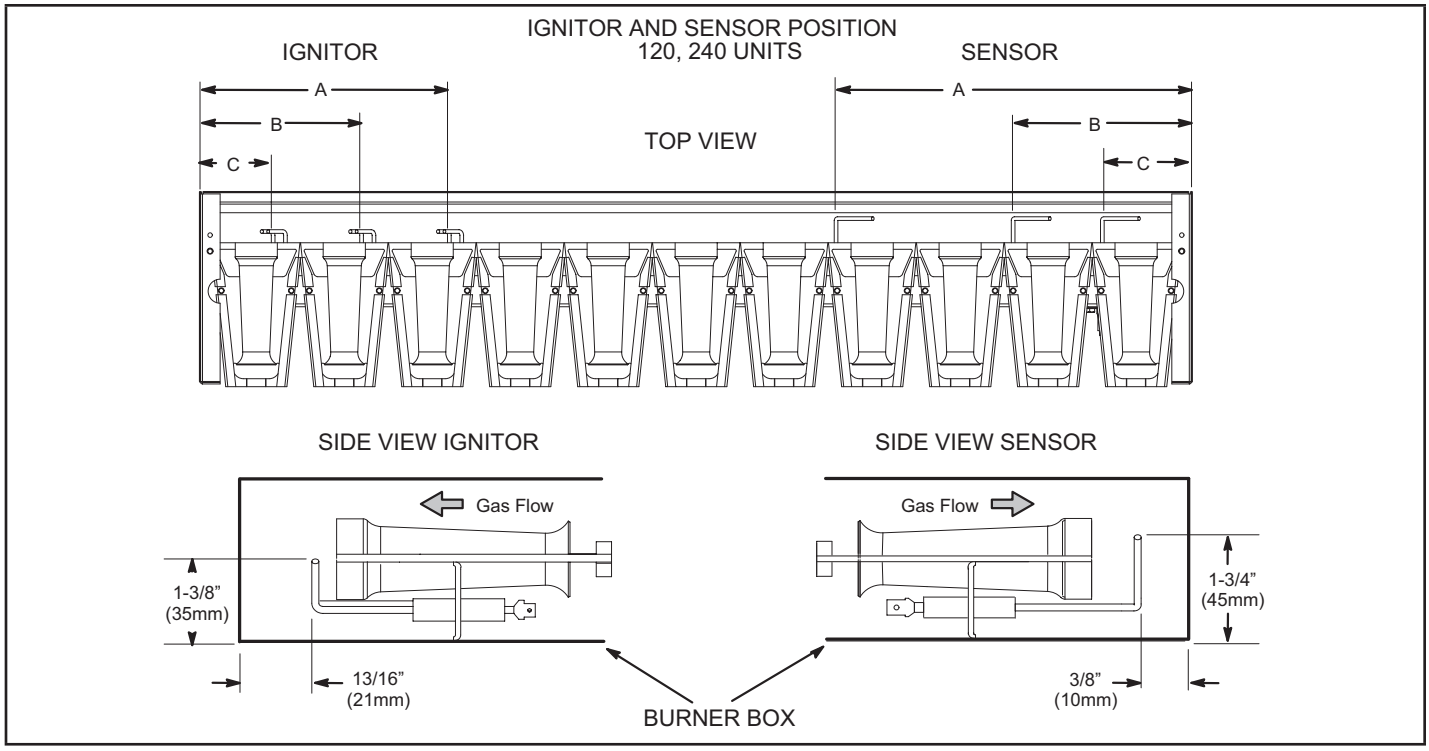


FIGURE 48

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 41 for 036 and 060 units and FIGURE 49 for 092-240 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 (SD 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 should also be replaced during reassembly.

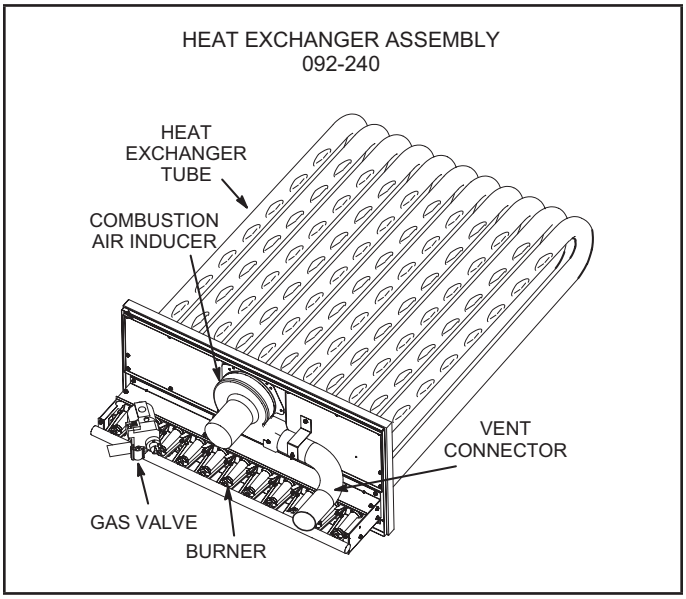


FIGURE 49

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 30

STRATEGOS 036-060 - 581404-01 - EHS-A-SERIES				
	Electric Heat	Qty.	Rating	
			Amp	Volt
1	EHS-A-7.5-1G	3	15	600
2	EHS-A-10-1G	3	15	600
3	EHS-A-15-1G	3	25	600
4	EHS-A-15-1J	3	20	600
5	EHS-A-20-1G	3	35	600
6	EHS-A-30-1G	3	50	600
7	EHS-A-30-1J	3	40	600

TABLE 31

STRATEGOS 092-120 - 581404-01 - EHS-B-SERIES				
	Electric Heat	Qty.	Rating	
			Amp	Volt
1	EHS-B-15-1G	3	40	600
2	EHS-B-15-1J	3	20	600
3	EHS-B-20-1G	3 / 3	15 / 15	600
4	EHS-B-30-1G	3 / 3	40 / 40	600
5	EHS-B-30-1J	3 / 3	20 / 20	600
6	EHS-B-45-1G	3 / 3	50 / 40	600
7	EHS-B-45-1J	3 / 3	40 / 20	600
8	EHS-B-60-1G	3 / 3	50 / 50	600
9	EHS-B-60-1J	3 / 3	40 / 40	600

TABLE 32

STRATEGOS 180-240 - 581404-01 - EHS-D SERIES				
	Electric Heat	Qty.	Rating	
			Amp	Volt
1	EHS-D-12.5S-1G	-	-	-
2	EHS-D-12.5S-1J	-	-	-
3	EHS-D-12.5-1G	3 / 3	20 / 20	600
4	EHS-D-12.5-1J	3 / 3	20 / 20	600
5	EHS-D-20-1G	3 / 3	15 / 15	600
6	EHS-D-30-1G	3 / 3	25 / 25	600
7	EHS-D-30-1J	3 / 3	20 / 20	600
8	EHS-D-45-1G	3 / 3	50 / 25	600
9	EHS-D-45-1J	3 / 3	40 / 20	600

TABLE 33

SHH/SDH036-120 - 581272-02 - REPLACEMENT FUSES						
Unit Type			SH/SD			
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	092	25	25	20	20
F4[1]	J	120	30	30	25	25
F10	CC	036, 060	-	3	-	3
F10	CC	092	7.5	7.5	7.5	7.5
F10	CC	120	7.5	7.5	7.5	7.5
F27	CC	036, 060	-	-	8	8
F57	CC	036, 060	-	3.5	-	5
F57	CC	092, 120	10	10	7.5	7.5

[1]F4 is only used on SCH/SHH units

TABLE 34

SDH/SHH180-240 - 581333-02 - REPLACEMENT FUSES										
Electric Heat Size				0 kW						
Unit Voltage				208/230V - 3Ph		460V - 3Ph		575V - 3Ph		
Power Exhaust Option				W/ P.E.	W/O P.E	W/ P.E.	W/O P.E	W/ P.E.	W/O P.E	
Diagram Key	Model	Class	Blower HP	Amps (A)						
F4	SHH180	J	5	-	-	45	40	35	35	
F4	SHH240	J	5	-	-	60	50	45	40	
F57	SHH180/24	CC	5	-	-	10	10	7.5	7.5	
F58	SHH180/240	CC	5	-	-	10	10	7.5	7.5	
F6	SHH180/240	CC	ALL	-	-	10	-	10	-	
CB10	SDH/SHH180	-	5	-	-	45	40	35	35	
CB10	SDH/SHH240	-	5	-	-	60	50	45	40	
F10[1]	SHH180/240	CC	ALL	12						

[1] Fuse F10 IS only used on units with SCCR installed.

TABLE 35

SHH/SDH CB10 Fuse Table

Model			**SHH/SDH036U5E**		**SHH/SDH060U5E**	
UNIT Voltage - 60Hz			**460V-3ph**	**575V-3ph**	**460V-3ph**	**575V-3ph**
[1]CB10	Unit Only		15	15	15	15
Model			**SHH/SDH092U5E**		**SHH/SDH120U5E**	
[1]CB10	Unit Only		25	20	30	25
	With (1) 0.5 HP Power Exhaust		30	25	35	25
Model			**SHH/SDH180U5E**		**SHH/SDH240U5E**	
[1]CB10	Unit Only		40	35	50	40
	With (1) 0.5 HP Power Exhaust		45	35	60	45
Model			**SHH036U5E**		**SHH060U5E**	
Electric Heat Voltage			**480V**	**575V**	**480V**	**575V**
[1]CB10	Unit Blower + Emergency Heat	**7.5 kW**	15	- - -	- - -	- - -
		10 kW	- - -	- - -	20	- - -
	Unit + Auxiliary Electric Heat	**10 kW**	30	---	30	---
		15 kW	40	30	40	35
		20 kW	---	---	45	---
		30 kW	---	---	60	50
Model			**SHH092U5E**		**SHH120U5E**	
Electric Heat Voltage			**480V**	**575V**	**480V**	**575V**
[1]CB10	Unit Blower + Emergency Heat	**15 kW**	30	25	30	25
	Unit + Auxiliary Electric Heat	**15 kW**	50	40	50	45
		20 kW	60	---	60	---
		30 kW	70	60	80	60
		45 kW	100	80	100	80
[1]CB10	Unit Blower + Emergency Heat and (1) 0.5 HP Power Exhaust	**15 kW**	30	25	35	25
	Unit + Auxiliary Electric Heat and (1) 0.5 HP Power Exhaust	**15 kW**	50	40	60	45
		20 kW	60	---	60	---
		30 kW	80	60	80	60
		45 kW	100	80	100	80
Model			**SHH180U5**		**SHH240U5**	
Electric Heat Voltage			**480V**	**600V**	**480V**	**600V**
[1]CB10	Unit Blower + Emergency Heat	**25 kW**	45	40	50	40
	Unit + Auxiliary Electric Heat	**25 kW**	80	70	90	70
		40 kW	100	- - -	110	- - -
		60 kW	125	90	125	100
[1]CB10	Unit Blower + Emergency Heat and (3) 0.33 HP Power Exhaust	**25 kW**	50	40	60	45
	Unit + Auxiliary Electric Heat and (3) 0.33 HP Power Exhaust	**25 kW**	80	70	100	80
		40 kW	100	- - -	125	- - -
		60 kW	125	100	150	100

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

TABLE 36
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 opening at 2VDC on CO2 input.

TABLE 37

SHH/SDH036-240 Staged Direct Drive Blower Parameters - 581284-02

Para-meter #	SHH/SDH036-240 Staged Blower Parameters	Default Factory Settings (SC,SG / SH,SD)						Field-Set CFM Value
	Description	036	060	092	120	180	240	
	SETTINGS > RTU OPTIONS > EDIT PARAMETERS							
12	Blower Smoke % *	68/69	72/80	76	87/95	72	85/80	%
	SETUP > TEST & BALANCE > BLOWER							
13	Heating High	68/69	72/80	76	87/95	72	85/80	%
380	Heating Low (SH/SD models only)	31	39	40	49	36	39	%
14	Cool High	54/64	69/87	76	78/84	67	76/76	%
17	Cool Low	38/20	52/20	20	57/24	21	55/21	%
18	Vent CFM	68/69	72/80	76	87/95	72	85/80	%
	SETTINGS > RTU OPTIONS > DAMPER or SETTINGS > RTU OPTIONS > EDIT PARAMETERS							
9	*Damper min. position during LOW blower operation.*						*0%*	%
132	*Damper min. position during HIGH blower operation.*						*0%*	%
215	*Min. damper % for stage 1 power exhaust operation.*						*50%*	%
29	*Damper minimum position during G blower operation.****						*101%*	%
219	*Min. damper % for stg 2 power exhaust operation. (180 -240 models only)*						*75%*	%
216	*Deadband % for stage 1 power exhaust operation.*						*10%*	%
220	*Deadband % for stage 2 power exhaust operation. (180 -240 models only)*						*10%*	%
224	*Stage 1 power exhaust off-delay in seconds. (180 -240 models only)*						*100%*	%
30	*Minimum blower speed % for stage 2 power exhaust operation. (180 -240 models only)*						*70%*	%
	SETTINGS > RTU OPTIONS > EDIT PARAMETERS							
606	*Defrost* *0 = Blower ON during DEFROST* *1 = No Blower during DEFROST*	*0*						
	Any changes to Smoke CFM setting must be adjusted before the other CFM settings.** ** Setting parameter 29 to "101" disables parameter 29 and passes control to parameter 9 or 132**							

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

Set Blower Deck Screws Tight ☐

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 ☐