

**⚠ 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**

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.

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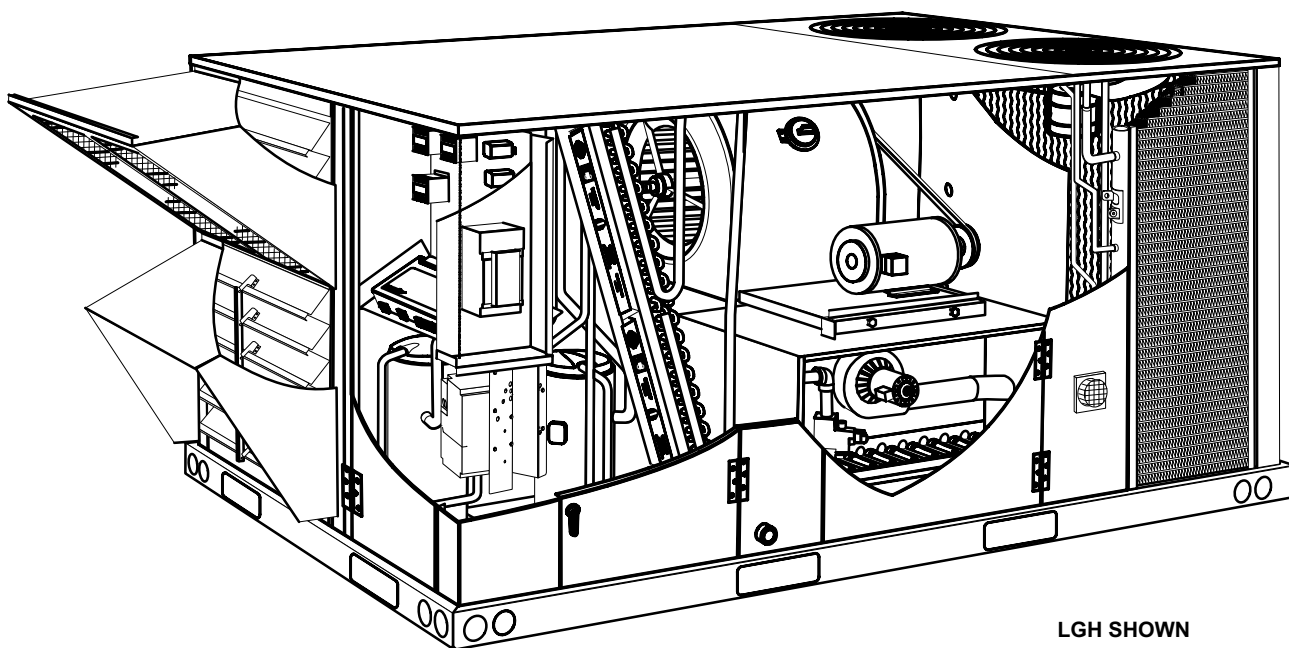
**INSTALLATION  
INSTRUCTIONS****LGH092H, LCH092H** (7.5 Ton)**LGH094U, LCH094U** (7.5 Ton)**LGH102H, LCH102H** (8.5 Ton)**LGH120H, LCH120H** (10 Ton)**LGH122U, LCH122U** (10 Ton)**LGH150H, LCH150H** (12.5 Ton)**LGH152U, LCH152U** (12.5 Ton)**PACKAGED UNITS**

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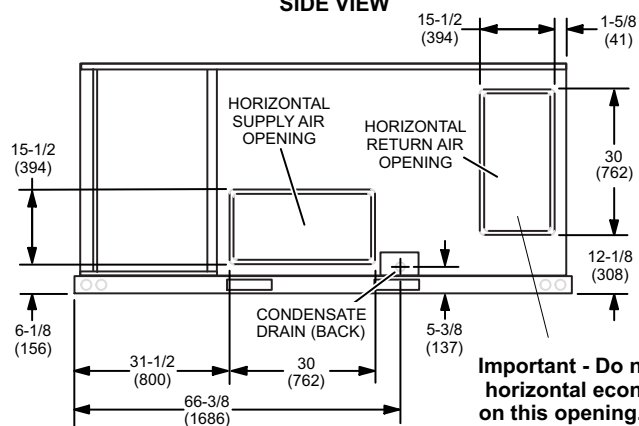
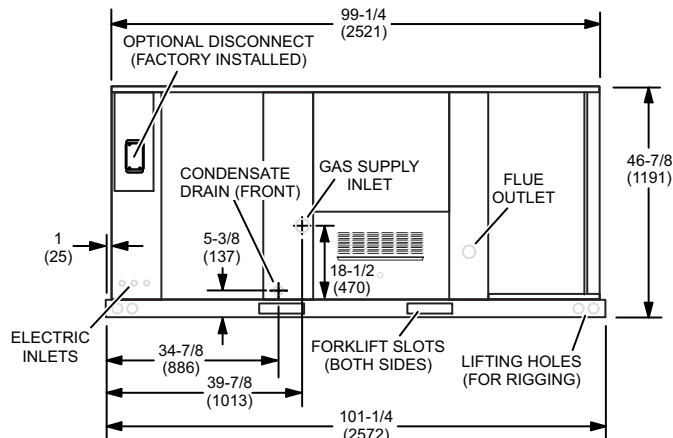
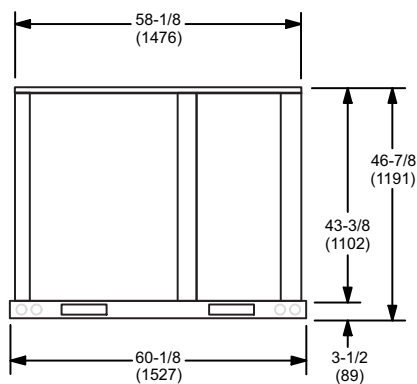
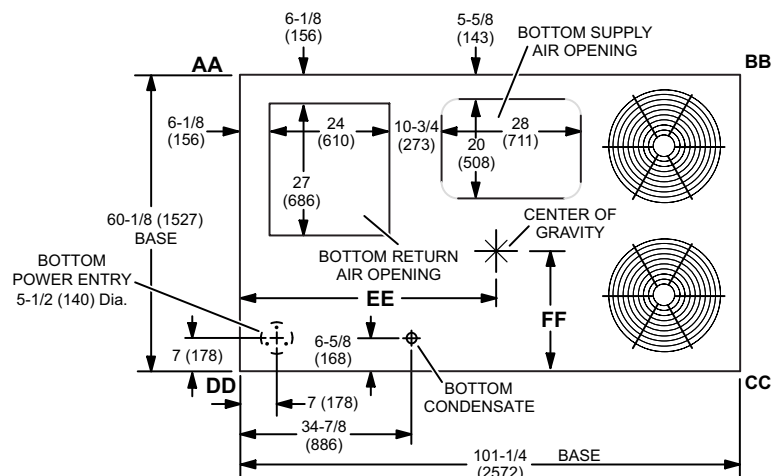
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Supersedes 7/2018

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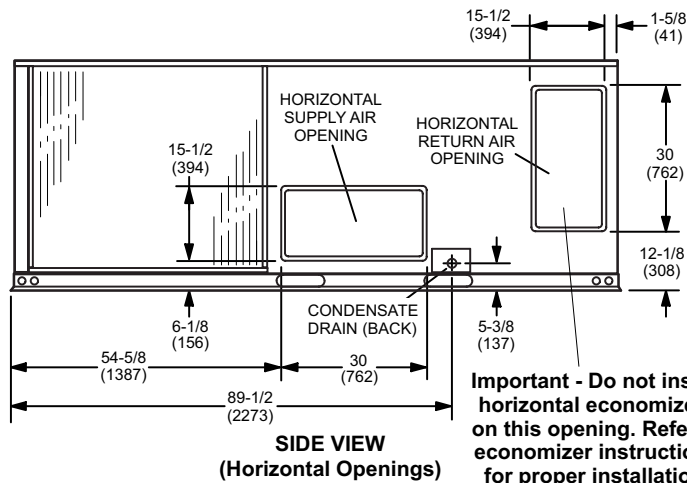
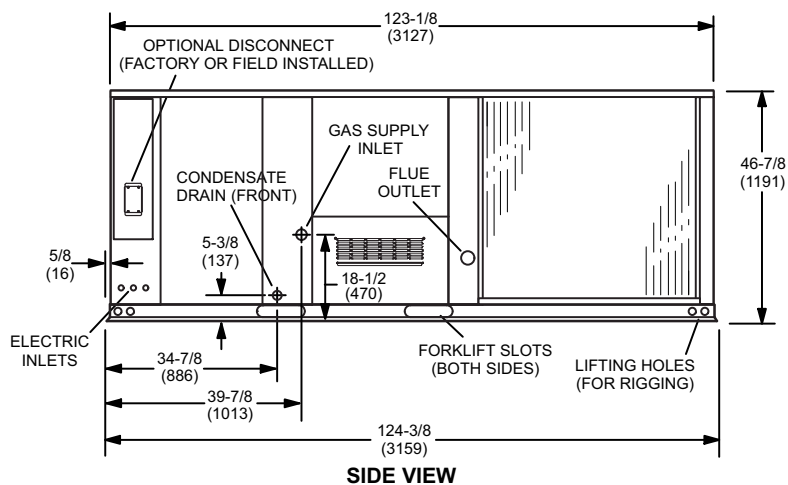
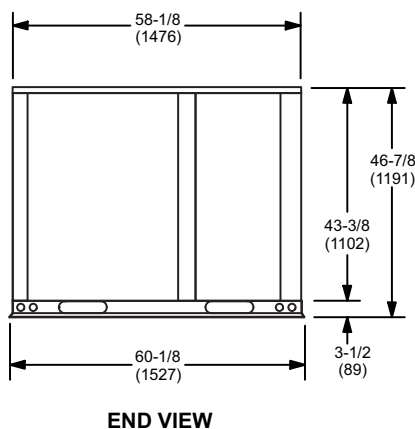
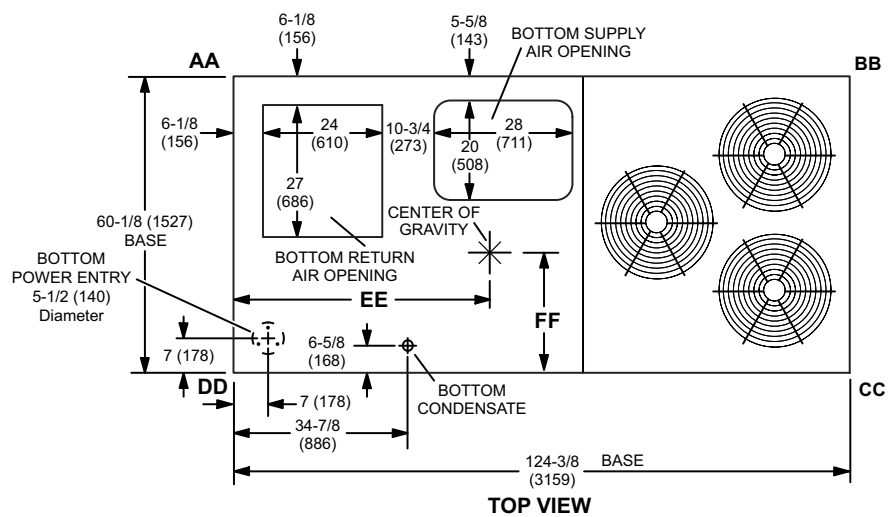
**RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE****LGH SHOWN**

# **LGH/LCH092, 102, 120, & 150 DIMENSIONS - GAS HEAT SECTION SHOWN**



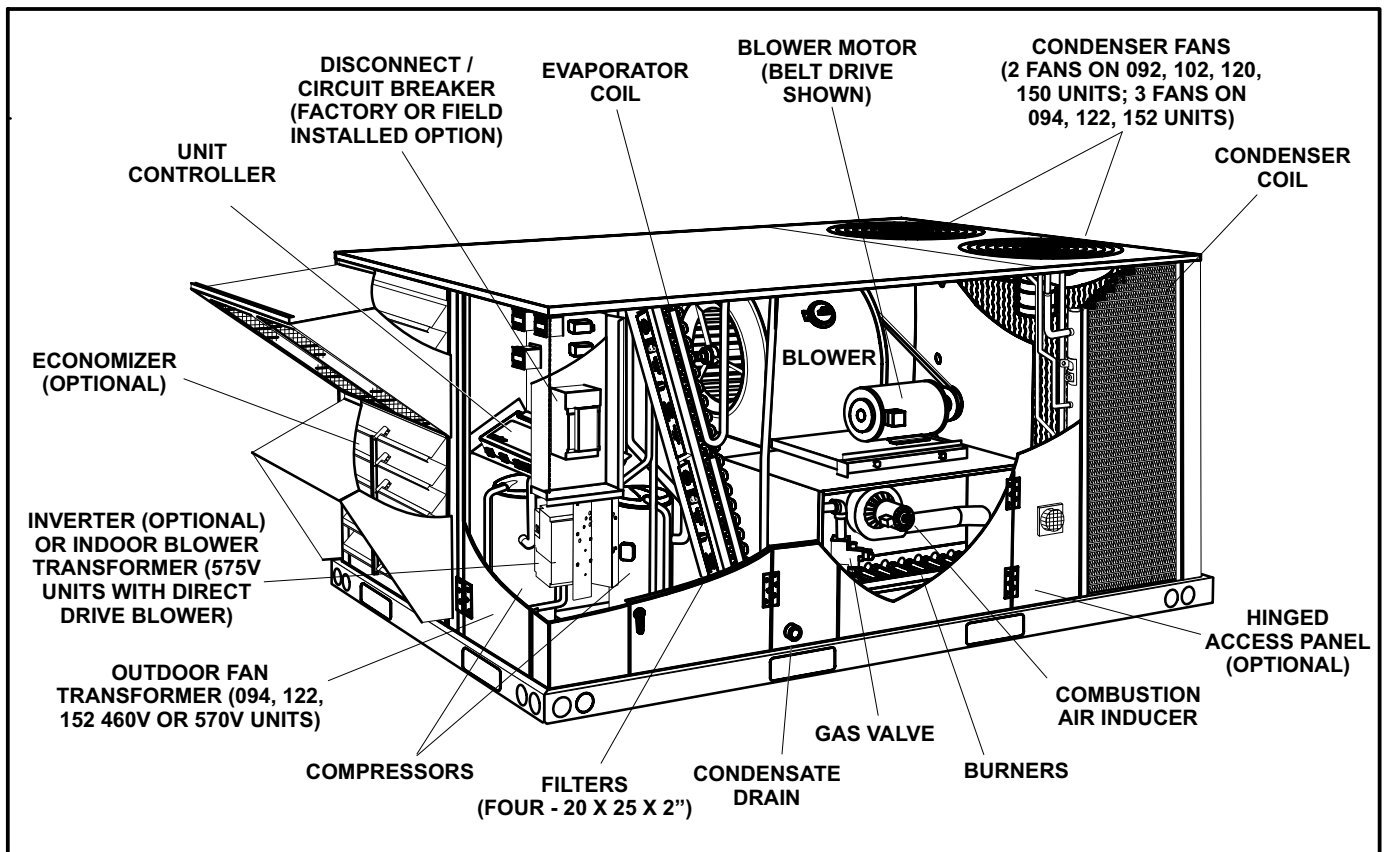
**Important - Do not install horizontal economizers on this opening. Refer to economizer instructions for proper installation.**

# LGH/LCH094, 122, & 152 DIMENSIONS - GAS HEAT SECTION SHOWN

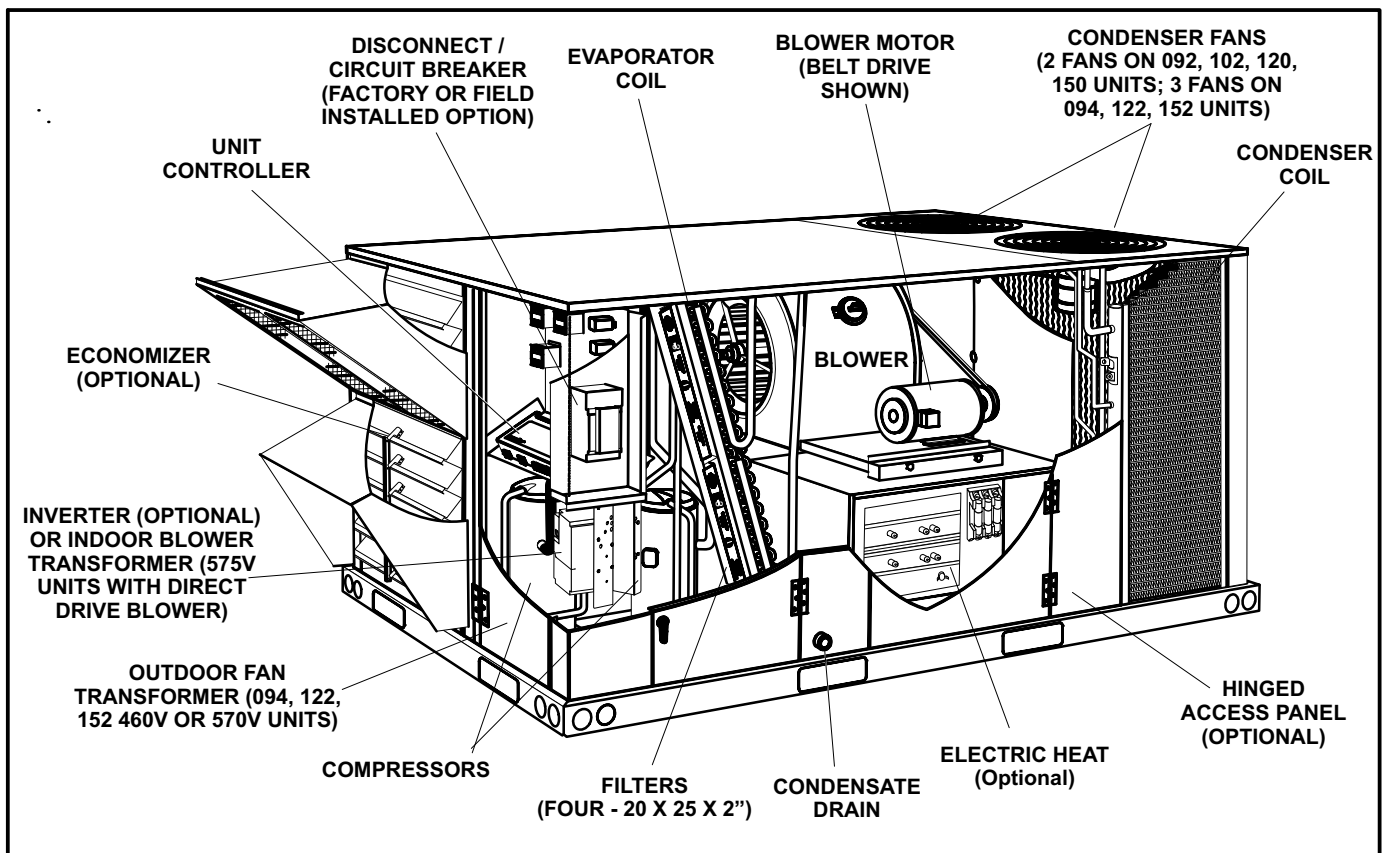


**Important - Do not install horizontal economizers on this opening. Refer to economizer instructions for proper installation.**

## LGH092, 094, 102, 120, 122, 150 & 152 PARTS ARRANGEMENT



## LCH092, 094, 102, 120, 122, 150 & 152 PARTS ARRANGEMENT



## Shipping and Packing List

### Package 1 of 1 contains:

1- Assembled unit

**IMPORTANT - Hot gas reheat units require a specific field-provided and installed humidity sensor.**

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

## 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 LGH092, 094, 102, 120, 122, 150 & 152 gas/electric packaged rooftop unit is available in 130,000, 180,000, or 240,000 Btuh heating inputs. The LCH092, 094, 102, 120, 122, 150 & 152 cooling packaged rooftop unit is the same basic design as the LGH unit except for the heating section. Optional electric heat is factory- or field-installed in LCH units. Ultra high efficiency units have a tandem refrigerant circuit. High efficiency units have two typical circuits.

High efficiency units are equipped with a lightweight, all-aluminum condenser coil; an optional, traditional fin/tube condenser coil is available. Ultra high efficiency units are equipped with a traditional fin/tube condenser coil.

High efficiency units are available with an optional hot gas reheat coil which provides a dehumidifying mode of operation. Refer to Reheat Operation section.

Ultra high efficiency units are available with an optional direct drive blower or belt drive blower equipped with an optional supply air inverter. High efficiency units are available with a belt drive blower equipped with an optional supply air inverter. The blower will operate at lower speeds when demand is low and increase to higher speeds when demand is high. Refer to Inverter and Direct Drive Start-Up section.

The following examples show the model numbers of ten ton units with blower options.

LGH/LCH120H4B	Belt drive
LGH/LCH120H4M	Belt drive with inverter
LGH/LCH122U4M	Belt drive with inverter
LGH/LCH122U4E	Direct drive

All units are available using R410A, an ozone-friendly HFC refrigerant. Refer to the Cooling Start-Up section for precautions when installing unit.

## Safety

See table 1 for unit clearances.

## ⚠ 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.**

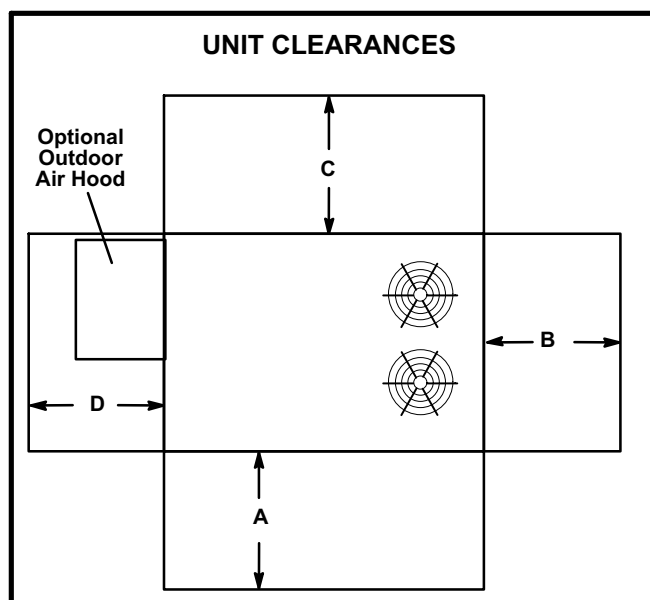


FIGURE 1

TABLE 1  
UNIT CLEARANCES

<sup>1</sup> Unit Clearance	A in.(mm)	B in.(mm)	C in.(mm)	D in.(mm)	Top Clearance
Service Clearance	60 (1524)	36 (914)	36 (914)	60 (1524)	Unob- structed
Clearance to Combustibles	36 (914)	1 (25)	1 (25)	1 (25)	Unob- structed
Minimum Operation Clearance	36 (914)	36 (914)	36 (914)	36 (914)	Unob- structed

Note - Entire perimeter of unit base requires support when elevated above mounting surface.

<sup>1</sup> **Service Clearance** - Required for removal of serviceable parts.

**Clearance to Combustibles** - Required clearance to combustible material (gas units).

**Minimum Operation Clearance** - Required clearance for proper unit operation.

## 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.**

## 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.**

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:

- 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.

## Unit Support

In downflow discharge installations, install the unit on a non-combustible surface only. Unit may be installed on combustible surfaces when used in horizontal discharge applications or in downflow discharge applications when installed on an C1CURB7\*B roof mounting frame.

*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.**

### A-Downflow Discharge Application

#### Roof Mounting with C1CURB7\*B

- 1- The C1CURB7\*B roof mounting frame must be installed, flashed and sealed in accordance with the instructions provided with the frame.
- 2- The C1CURB7\*B roof mounting frame should be square and level to 1/16" per linear foot (5mm per linear meter) in any direction.
- 3- 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.

#### Installer's Roof Mounting Frame

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

- 1- The base is fully enclosed and insulated, so an enclosed frame is not required.
- 2- The frames or supports must be constructed with non-combustible materials and should be square and level to 1/16" per linear foot (5mm per linear meter) in any direction.
- 3- Frame or supports must be high enough to prevent any form of moisture from entering unit. Recommended minimum frame height is 14" (356mm).
- 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, an C1CURB7\*B roof mounting frame is required.*

## B-Horizontal Discharge Applications

- 1- Units installed in horizontal airflow applications must use a horizontal conversion kit K1HECK00.
- 2- Specified installation clearances must be maintained when installing units. Refer to figure 1.
- 3- Top of support slab should be approximately 4" (102mm) above the finished grade and located so no run-off water from higher ground can collect around the unit.
- 4- Units require support along all four sides of unit base. Supports must be constructed of steel or suitably treated wood materials.

### Duct Connection

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

## CAUTION

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

### Rigging Unit For Lifting

Rig unit for lifting by attaching four cables to holes in unit base rail. See figure 2.

- 1- Detach wooden base protection before rigging.  
*Note - Remove all 7 (5 brackets on units with three outdoor fans) base protection brackets before setting unit.*
- 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.)

### Condensate Drains

Make drain connection to the 1" N.P.T. drain coupling provided on unit.

*Note - The drain pan is made with a glass reinforced engineered plastic capable of withstanding typical joint torque but can be damaged with excessive force. Tighten pipe nipple hand tight and turn an additional quarter turn.*

A trap must be installed between drain connection and an open vent for proper condensate removal. See figure 3 or 4. It is sometimes acceptable to drain condensate onto the roof or grade; however, a tee should be fitted to the trap to direct condensate downward. The condensate line must be vented. Check local codes concerning condensate disposal. Refer to pages 1 and 2 for condensate drain location.

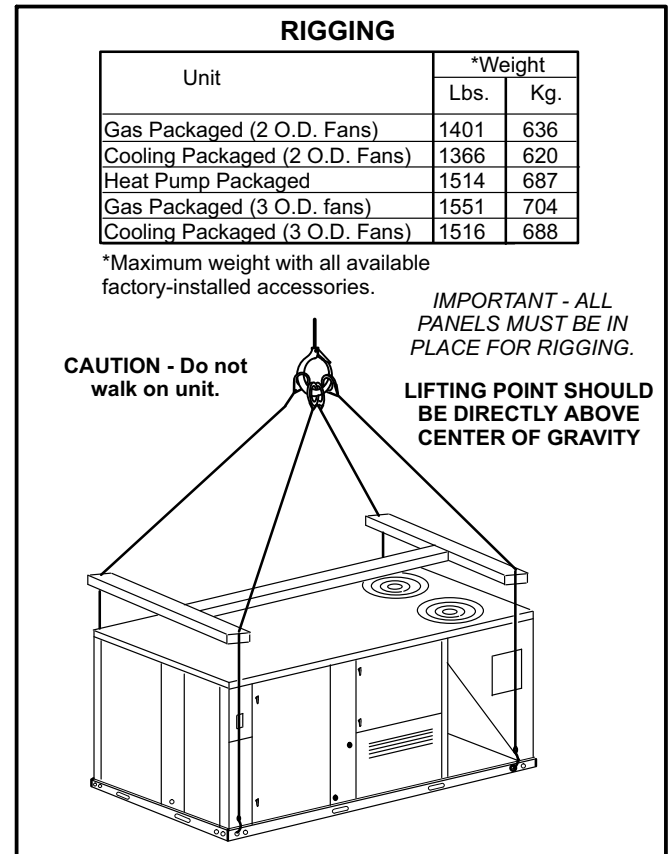


FIGURE 2

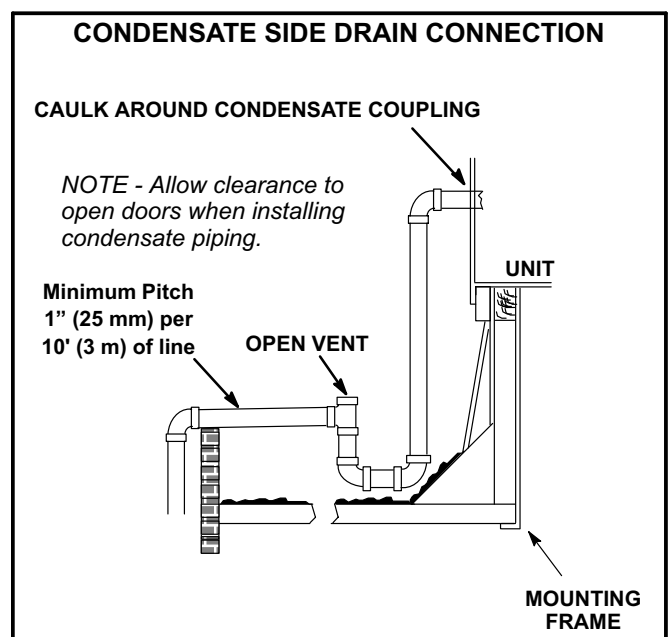
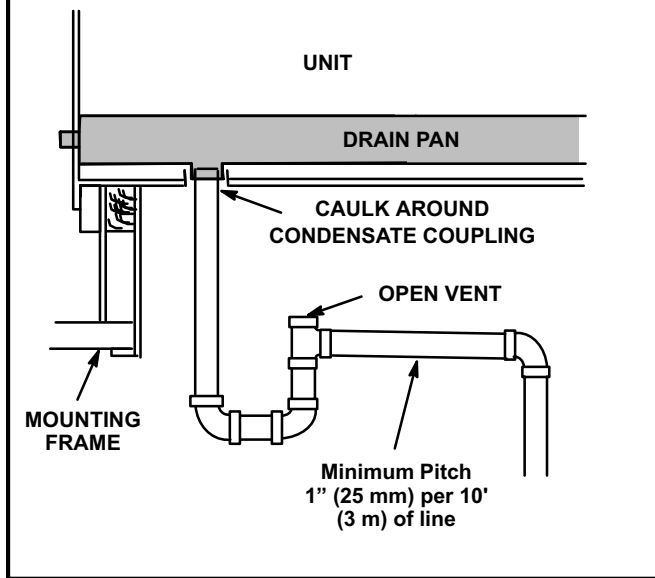


FIGURE 3

## CONDENSATE BOTTOM DRAIN CONNECTION

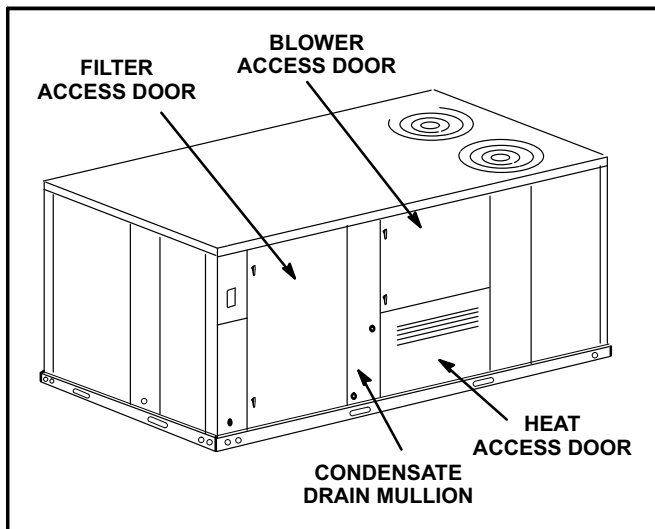


**FIGURE 4**

Units are shipped with the drain coupling facing the front of the unit. Condensate can be drained from the back or bottom of the unit with the following modifications. The unit can be installed in either downflow or horizontal air discharge regardless of condensate drain location.

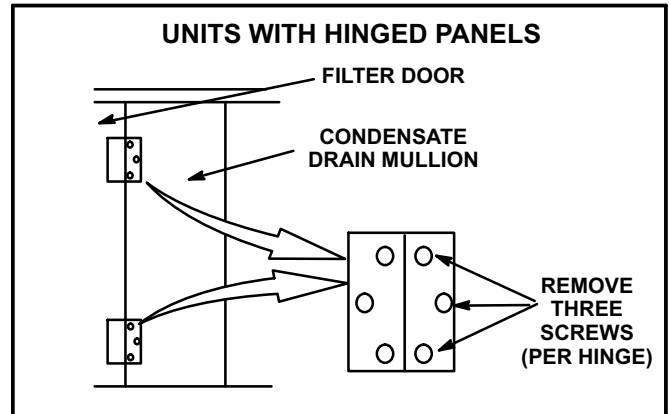
### Rear Drain Connection

1- Open blower and heat access doors. See figure 5.



**FIGURE 5**

2- Remove six screws from filter access door. Refer to figure 6.

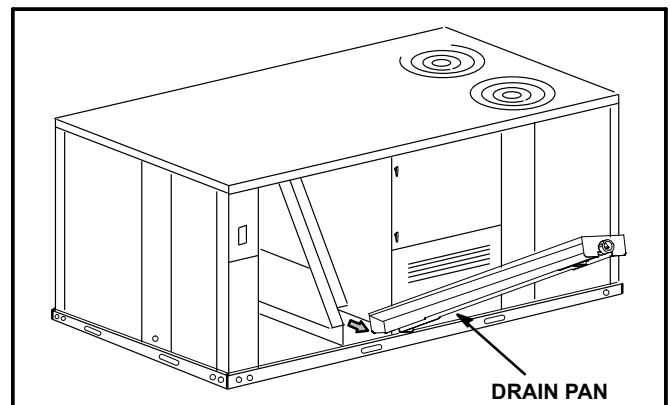


**FIGURE 6**

3- Open filter access door hinges and carefully remove door.

4- Remove eight screws holding condensate drain mullion and remove mullion.

5- Lift front edge of the drain pan (to clear bottom drain plug) and slide drain pan out of unit. See figure 7.



**FIGURE 7**

6- Make sure the cap over the unit bottom drain hole is secure.

7- Rotate the drain pan until the downward slope is toward the back of the unit. Slide the drain pan back into the unit. Be careful not to dislodge the cap over the bottom drain hole.

8- From the back side of the unit, pull the drain pan coupling through the rear condensate opening.

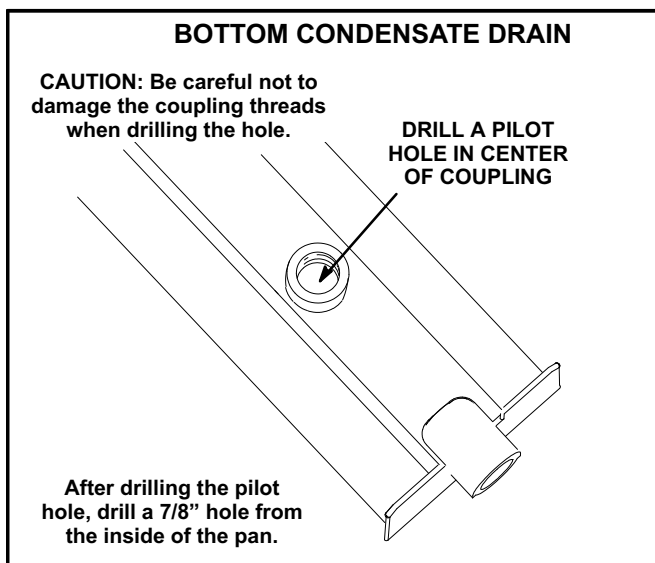
9- Replace the condensate drain mullion and reinstall eight screws.

10- Reinstall filter door on hinges.



## Bottom Drain Connection

- 1- Open blower and heat access doors. See figure 5.
- 2- Remove six screws from filter access door. Refer to figure 6.
- 3- Open filter access door hinges and carefully remove door.
- 4- Remove eight screws holding condensate drain mullion and remove mullion.
- 5- Lift front edge of the drain pan (to clear bottom drain plug) and slide drain pan out of unit. See figure 7.
- 6- Turn the drain pan upside down and drill a pilot hole through the bottom of the drain pan in the center of the coupling. See figure 8.



**FIGURE 8**

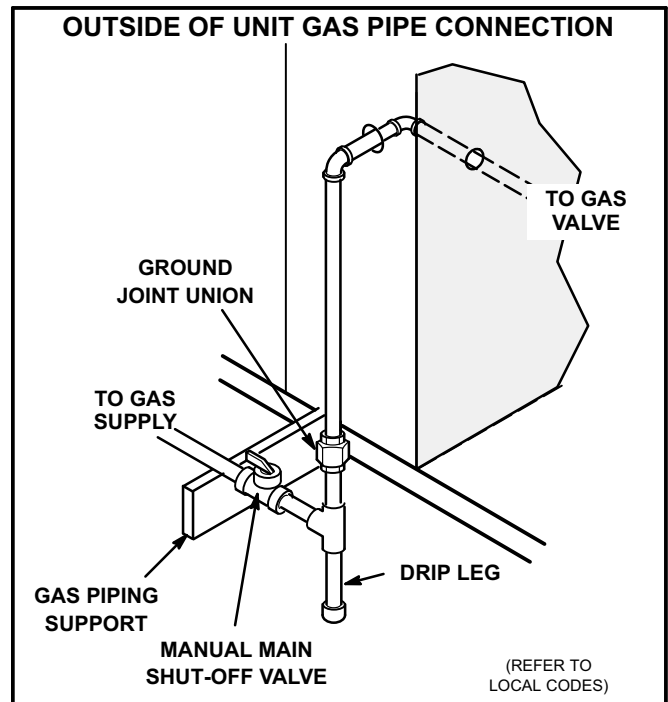
- 7- From the inside of the pan, use a Vari-Bit® bit to enlarge the hole to 7/8". Do not damage coupling threads.
- 8- Remove the cap over the unit bottom drain hole.
- 9- Slide the drain pan back into the unit.
- 10- From the back side of the unit, pull the drain pan coupling through the rear condensate opening.
- 11- From the front side of the unit, move the drain pan until the bottom coupling settles into the unit bottom drain opening. Once in place, check to make sure the coupling is still positioned through the rear condensate drain hole.
- 12- Use a field-provided 1" plug to seal side drain connection.
- 13- Replace the condensate drain mullion and reinstall eight screws.
- 14- Reinstall filter door on hinges.

## Connect Gas Piping (Gas Units)

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 4.7" w.c. (1.17kPa) and a maximum of 10.5" (2.60kPa) w.c. For LP/propane gas units, operating pressure at the unit gas connection must be a minimum of 10.5" w.c. (2.61kPa) 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. Refer to Heating Start-Up section for tap location. Install a ground joint union between the gas control manifold and the main manual shut-off valve. See figure 9 for gas supply piping entering outside the unit. Figure 10 shows bottom gas entry piping through the curb. Figure 11 shows bottom gas entry piping through the unit.

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



**FIGURE 9**

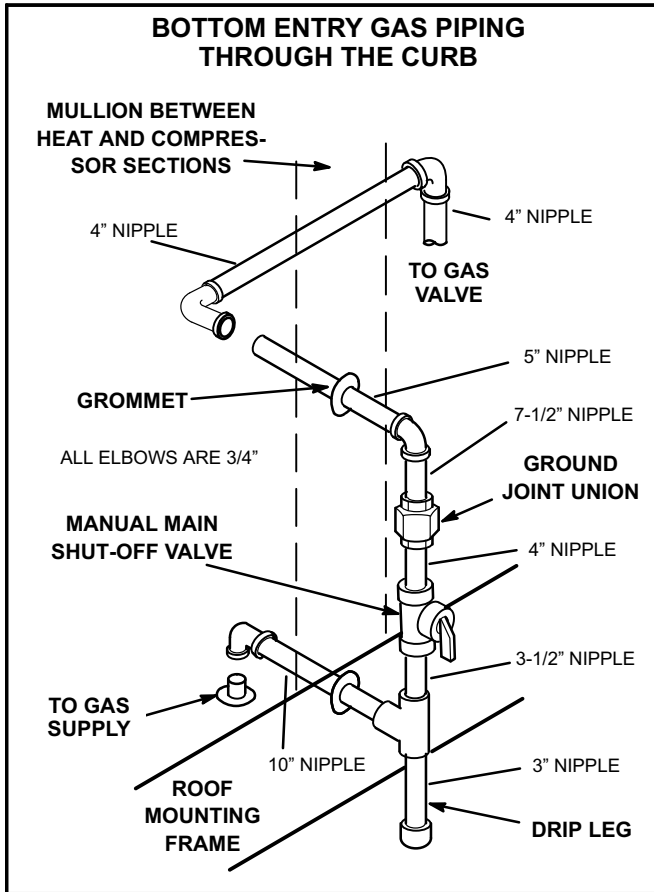


FIGURE 10

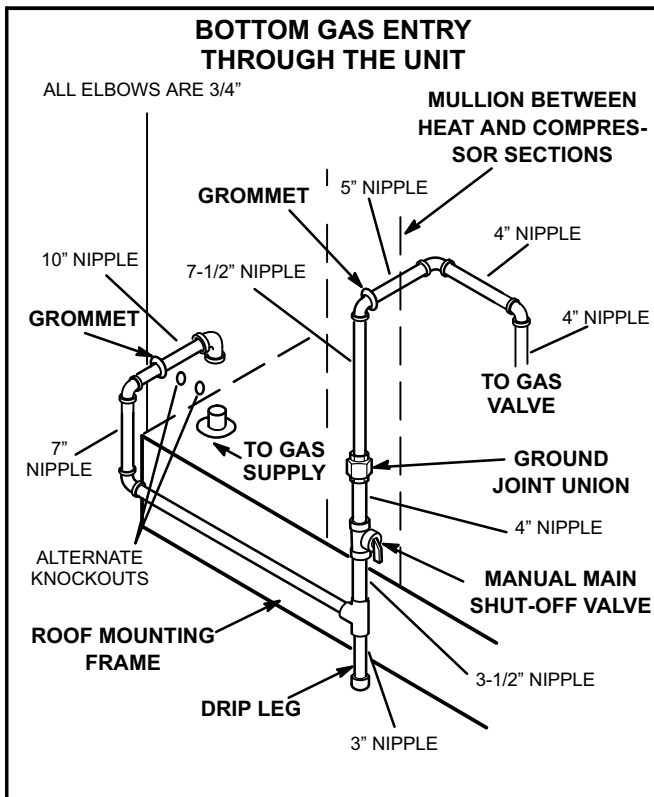


FIGURE 11

## Pressure Test Gas Piping (Gas 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 12.

*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.*

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

*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.*

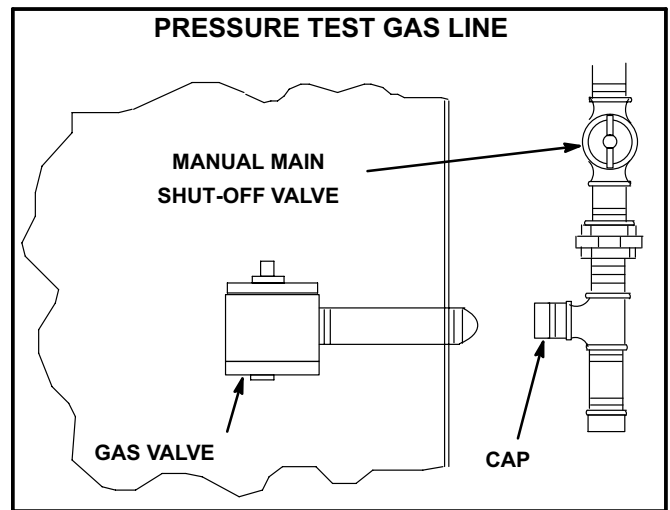


FIGURE 12

## ⚠ CAUTION

Some soaps used for leak detection are corrosive to certain metals. Carefully rinse piping thoroughly after leak test has been completed. Do not use matches, candles, flame or other sources of ignition to check for gas leaks.

## ⚠ WARNING



Danger of explosion. Can cause injury or product or property damage. Do not use matches, candles, flame or other sources of ignition to check for leaks.

## 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

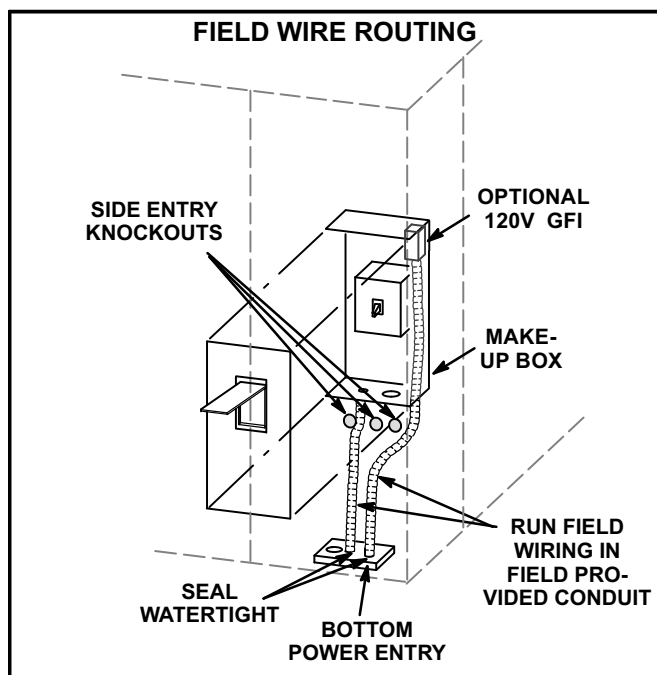
\*Units installed at 0-2000 feet do not need to be modified.

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

## Electrical Connections

### POWER SUPPLY

Route field wiring in conduit between bottom power entry disconnect. See figure 13. This does not supersede local codes or authorities having jurisdiction.



**FIGURE 13**

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- 230/460/575 volt units are factory wired. **For 208V supply**, disconnect the orange wire (230V) at all control power transformer(s). Reconnect the red wire (208V). Tape the exposed end of the 230V orange wire.

- 2- Route power through the bottom power entry area. On gas units or units with electric heat, connect power wiring to TB2. On cooling only units, connect power to F4. If unit contains an optional factory-installed circuit breaker or disconnect switch, connect line voltage to CB10 or S48. See unit wiring diagram.

- 3- Connect separate 120v wiring to optional GFCI outlet. Route field wiring in conduit between bottom power entry and GFCI. See figure 13.

### CONTROL WIRING

## ⚠ CAUTION

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

### A-Thermostat Location

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

Locate thermostat approximately 5 feet (1524mm) 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 room 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; SETTINGS > CONTROL. Options are: "WIRED THERMOSTAT" and "NETWORK".

### Thermostat Mode

- 1- Route thermostat cable or wires from subbase to control area above compressor (refer to unit dimensions to locate bottom and side power entry).

**IMPORTANT - Unless field thermostat wires are rated for maximum unit voltage, they must be routed away from line voltage wiring. Use wire ties located on the front border of the control panel to secure thermostat cable.**

Use 18 AWG wire for all applications using remotely installed electro-mechanical and electronic thermostats.

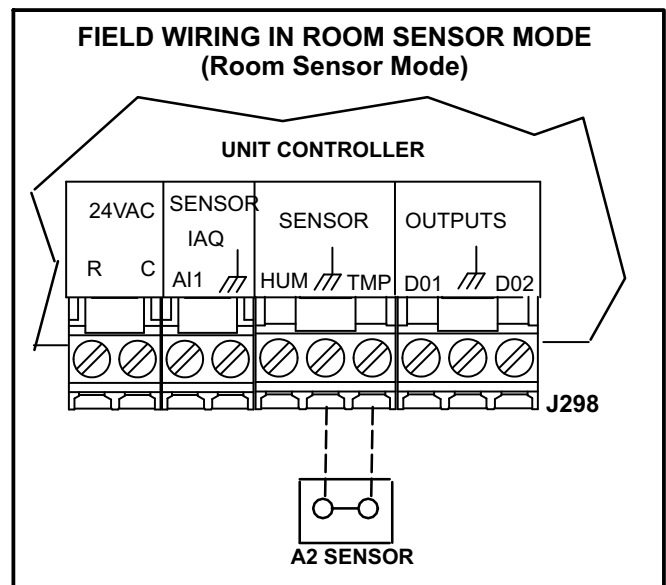
- 2- Install thermostat assembly in accordance with instructions provided with thermostat.
- 3- Connect thermostat wiring to the bottom of the Unit Controller.
- 4- Wire as shown in figure 15 for electro-mechanical and electronic thermostats. If using other temperature control devices or energy management systems see instructions and wiring diagram provided by manufacturer.

**IMPORTANT**-Terminal connections at the Unit Controller must be made securely. Loose control wire connections may allow unit to operate but not with proper response to room demand.

#### Room Sensor Mode

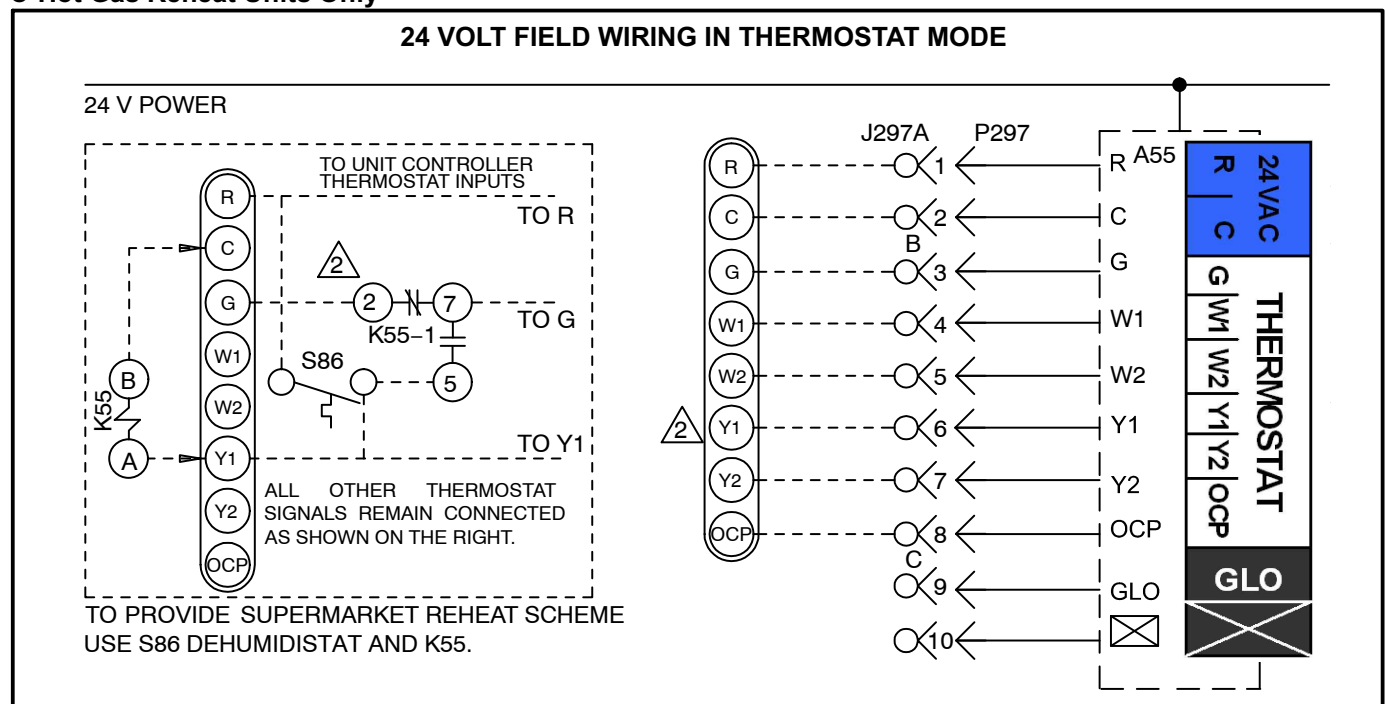
The Unit Controller will operate heating and cooling based on the Unit Controller internal setpoints and the temperature from the A2 room sensor. An optional Network Control Panel (NCP) can also be used to provide setpoints. A thermostat or return air sensor can be used as a back-up mode. Make room sensor wiring connections as shown in figure 14.

- 1- Install humidity sensor in accordance with instructions provided with sensor. A DDC input may be used to initiate dehumidification instead of a sensor.
- 2- Make wiring connections as shown in figure 15 for thermostat mode or figure 14 for room sensor mode. In addition, connect either a humidity sensor or a dehumidification input. See figure 16 or 17 for humidity sensor wiring or figure 18 for dehumidification input wiring.



**FIGURE 14**

#### C-Hot Gas Reheat Units Only -



**FIGURE 15**

## Humidity Sensor Cable Applications:

### Wire runs of 50 feet (mm) or less:

Use two separate shielded cables containing 20AWG minimum, twisted pair conductors with overall shield. Belden type 8762 or 88760 (plenum) or equivalent. Connect both cable shield drain wires to the Unit Controller as shown in figure 16.

### Wire runs of 150 feet (mm) or less:

Use two separate shielded cables containing 18AWG minimum, twisted pair conductors with overall shield. Belden type 8760 or 88760 (plenum) or equivalent. Connect both cable shield drain wires to the Unit Controller as shown in figure 16.

### Wire runs over 150 feet (mm):

Use a local, isolated 24VAC transformer such as Lennox cat #18M13 (20VA minimum) to supply power to RH sensor as shown in figure 17. Use two shielded cables containing 20AWG minimum, twisted pair conductors with overall shield. Belden type 8762 or 88760 (plenum) or equivalent.

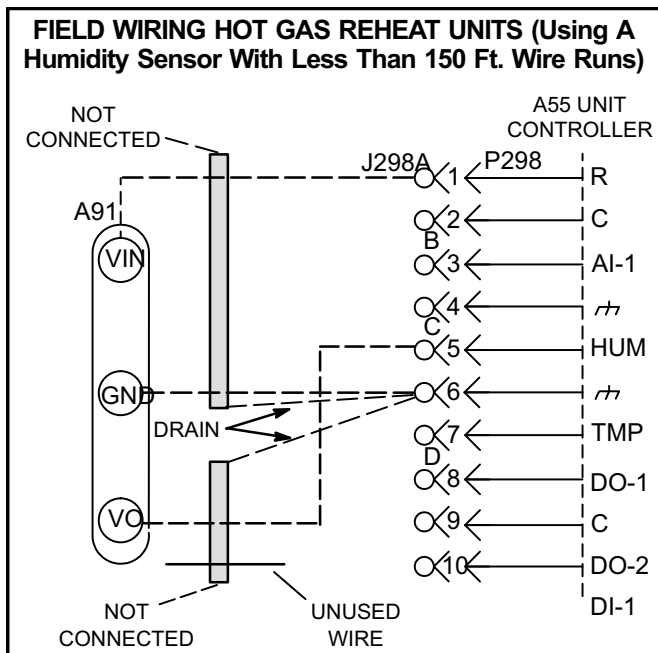


FIGURE 16

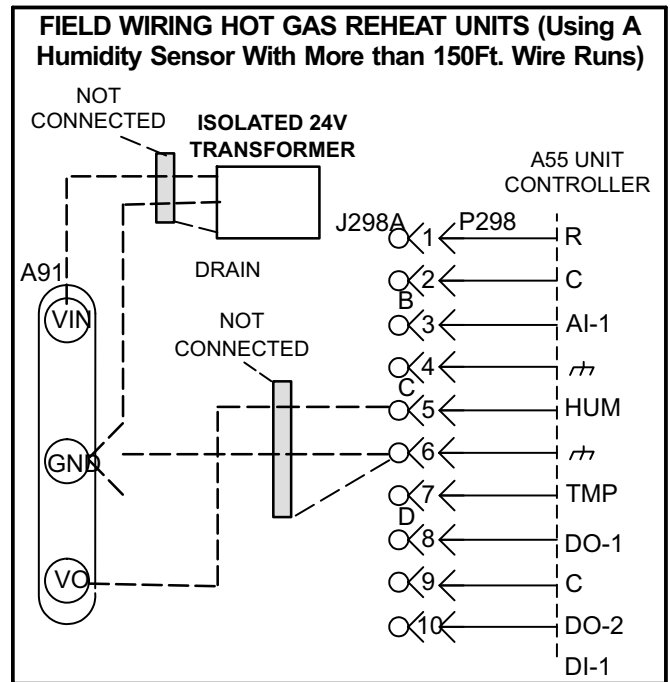


FIGURE 17

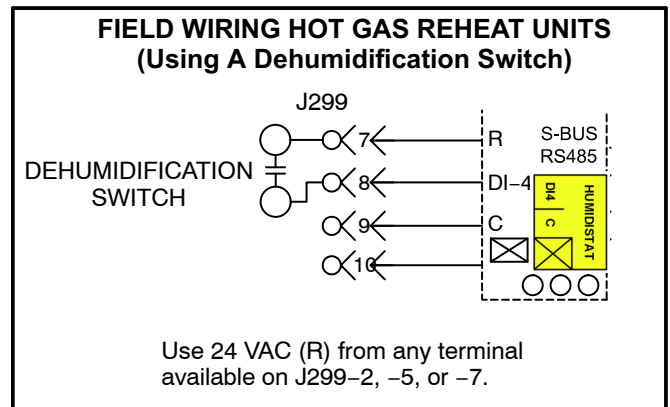


FIGURE 18

## Blower Operation and Adjustments

### Belt Drive With Supply Air Inverter or Direct Drive

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

## ⚠ IMPORTANT

### Three Phase Scroll Compressor Voltage Phasing

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

1-Observe suction and discharge pressures and blower\* rotation on unit start-up.

2-Suction pressure must drop, discharge pressure must rise and blower\* rotation must match rotation marking.

If pressure differential is not observed or blower\* rotation is not correct:

3-Disconnect all remote electrical power supplies.

4-Reverse any two field-installed wires connected to the line side of S48 disconnect or TB13 terminal strip. Do not reverse wires at blower contactor.

5-Make sure the connections are tight.

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

\*Supply air inverter driven motors should rotate in the correct direction; verify scroll compressor rotation separately. Contact technical support if the blower is rotating incorrectly.

**Units Equipped With Belt Drive Blowers Controlled by an Inverter OR Direct Drive Blowers Equipped With Optional Voltage or Phase Detection** - The Unit Controller checks the incoming power during start-up. If the voltage or phase is incorrect, the Unit Controller will display an alarm and the unit will not start.

### A-Blower Operation

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

Initiate blower only (G) 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 19, 20 or 21.

#### *Belt Drive Blowers*

- 1- Loosen the reusable wire tie which secures the blower wiring to the blower motor mounting plate.
- 2- Remove and retain screws on either side of sliding frame. 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.
- 4- Replace retained screws on either side of the sliding frame.

#### *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.
- 4- Replace retained screws in front and on either side of the blower housing.

# TO INCREASE BELT TENSION

- 1- Loosen four bolts securing motor mounting base to frame.
- 2- Turn adjusting bolt to the right, or clockwise, to move the motor away from the blower housing.

**IMPORTANT** - Gap between end of frame and motor mounting base should be equal at both ends, i.e. parallel along gap.

- 3- Tighten four bolts securing motor mounting base to frame.
- 4- Relieve tension on two adjusting bolts.

# BELT DRIVE BLOWER ASSEMBLY

## SIDE VIEW

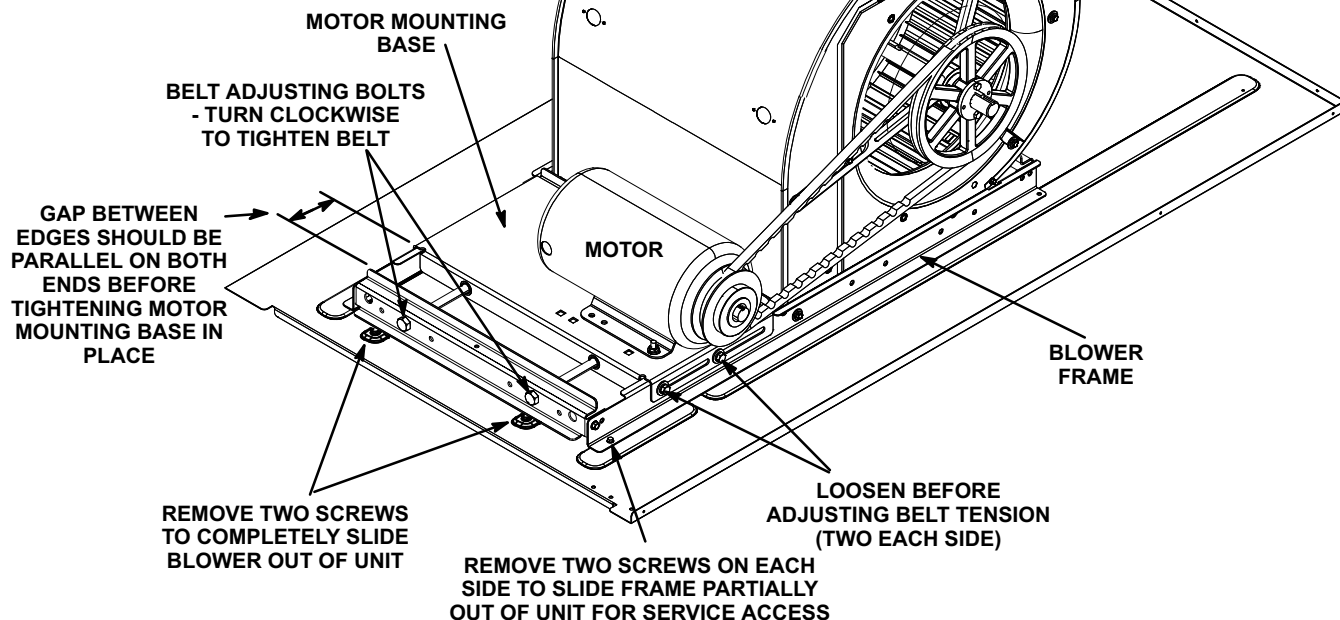
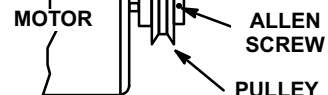


FIGURE 19

# BELT DRIVE BLOWER ASSEMBLY WITH TENSIONER (VIEW SHOWN WITHOUT BELT)

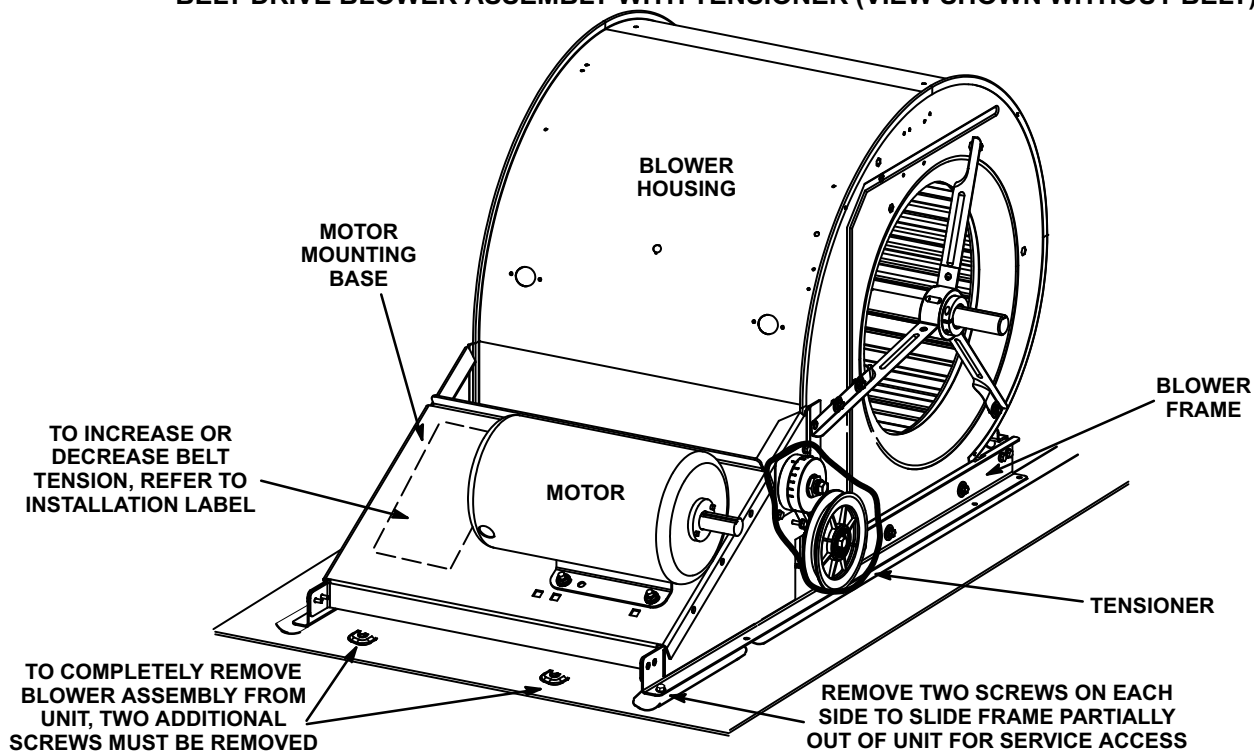


FIGURE 20

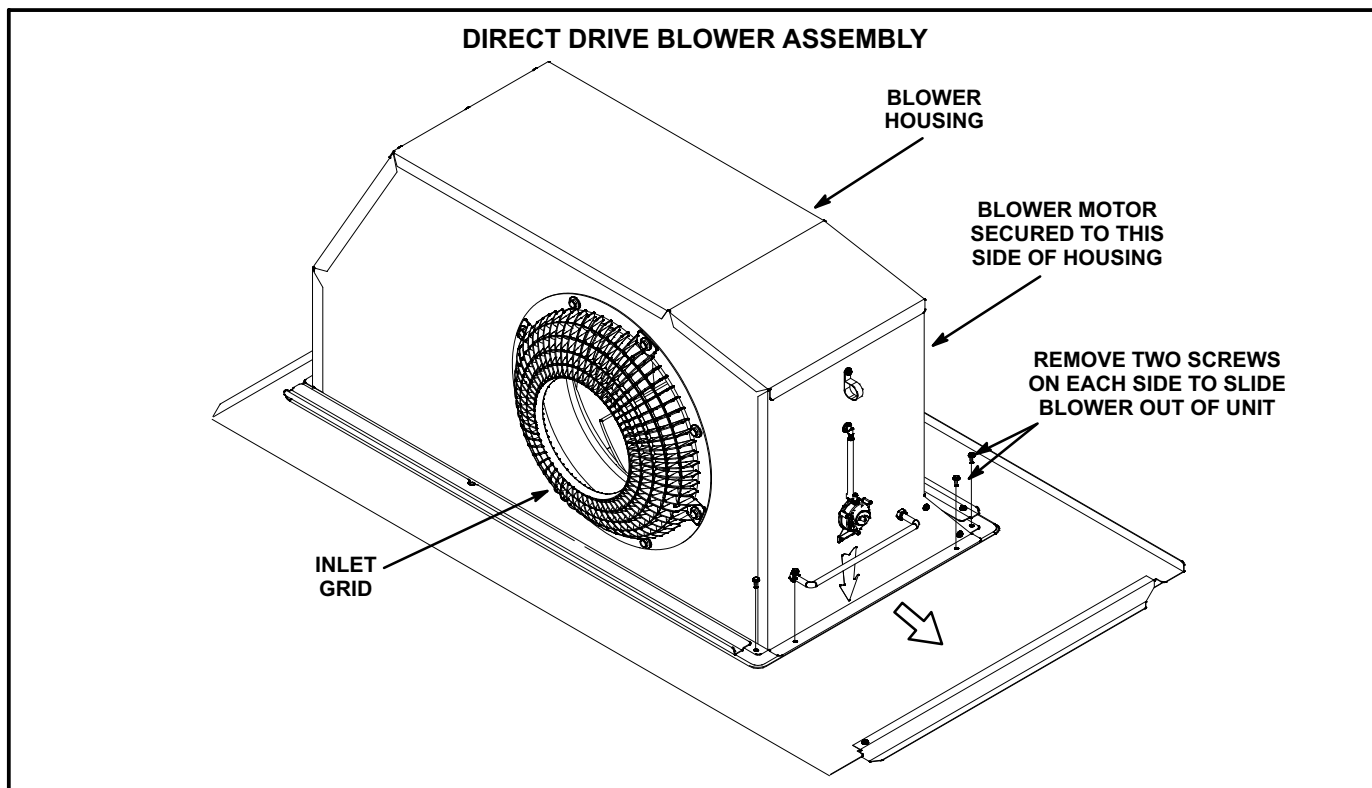


FIGURE 21

## C-Determining Unit CFM

### Belt Drive Blowers Controlled By An Inverter

**IMPORTANT** - Belt-driven inverter units are factory-set to run the blower at full speed (60Hz) when there is a blower (G) demand without a heating or cooling demand. Refer to the field-provided, design specified CFM for all modes of operation. Use the following procedure to adjust motor pulley to deliver the highest CFM called for in the design spec. See Inverter Start-Up section to set blower speeds for all modes once the motor pulley is set.

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

- 1- The following measurements must be made with a dry indoor coil. Run blower (G demand) without a cooling demand. Measure the indoor blower shaft RPM. Air filters must be in place when measurements are taken.
- 2- With all access panels in place, measure static pressure external to unit (from supply to return). Blower performance data is based on static pressure readings taken in locations shown in figure 22.

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

- 3- Referring to pages 19 through 22, use static pressure and RPM readings to determine unit CFM. Apply accessory air resistance tables when installing units with any of the optional accessories listed.

**NOTE** - The minimum air volume required for use with optional electric heat (maximum static pressure - 2.0 in.w.g) is 2800 CFM for 7.5Kw, 15Kw, 22.5Kw, 30Kw and 45Kw and 4000 CFM for 60Kw.

### 4- Blowers Without Belt Tensioner-

The blower RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. See figure 19. Do not exceed minimum and maximum number of pulley turns as shown in table 3.

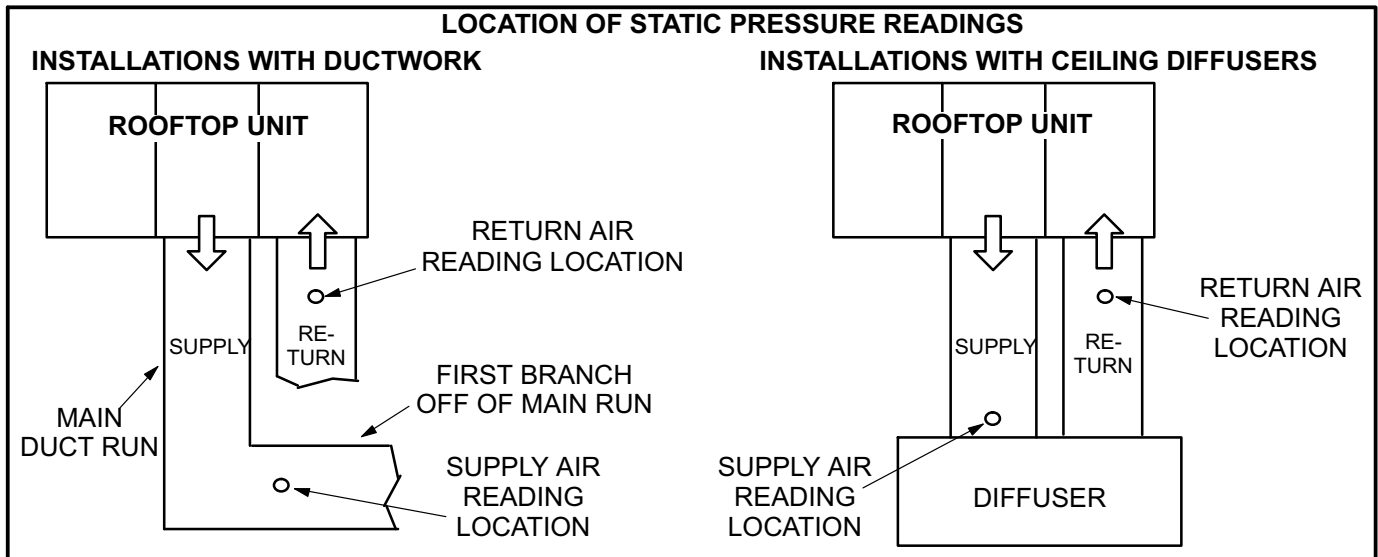
*Blowers Equipped With Belt Tensioner-*  
Refer to label on motor base. See figure 20.

**TABLE 3**  
**MINIMUM AND MAXIMUM PULLEY ADJUSTMENT**

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

\*No minimum turns open when B belt is used on pulleys 6" O.D. or larger.

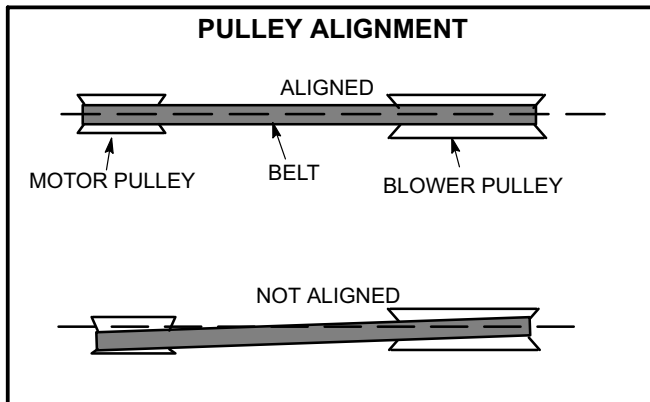




**FIGURE 22**

### D-Blower Belt Adjustment - No Tensioner

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belts after a 24-48 hour period of operation. This will allow belt to stretch and seat in the pulley grooves. Make sure blower and motor pulleys are aligned as shown in figure 23.



**FIGURE 23**

- 1- Loosen four bolts securing motor base to mounting frame. See figure 19.
- 2- *To increase belt tension -*  
Turn both adjusting bolts to the right, or clockwise, to move the motor outward and tighten the belt. This increases the distance between the blower motor and the blower housing.  
*To loosen belt tension -*  
Turn the adjusting bolt to the left, or counterclockwise to loosen belt tension.

**IMPORTANT** - Align edges of blower motor base and mounting frame base parallel before tightening four bolts on the side of base. Motor shaft and blower shaft must be parallel.

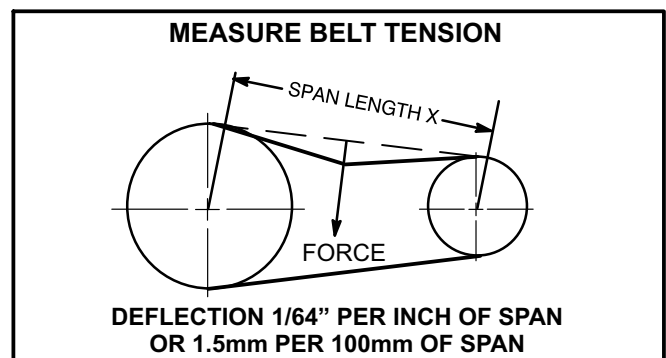
- 3- Tighten bolts on side of base.

### E-Check Belt Tension

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

- 1- Measure span length X. See figure 24.
- 2- Apply perpendicular force to center of span (X) with enough pressure to deflect belt  $1/64$ " for every inch of span length or 1.5mm per 100mm of span length.  
Example: Deflection distance of a 40" span would be  $40/64$ " or  $5/8$ ".  
Example: Deflection distance of a 400mm span would be 6mm.
- 3- Measure belt deflection force. For a new 2 and 3hp belt, the deflection force should be 5.0-7.0 lbs. (35-48kPa). For a new 5hp belt, the deflection force should be 7-10lbs. (48-69kPa).

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



**FIGURE 24**

### F-Field-Furnished Blower Drives

For field-furnished blower drives, use pages 18 through 20 to determine the drive kit number and table 4 or 5 for drive component manufacturer's numbers.

## BLOWER DATA

### 092, 094 AND 102 BELT DRIVE BLOWER – BASE UNIT

**BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY (NO HEAT SECTION) WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE. FOR ALL UNITS ADD:**

1 – Wet indoor coil air resistance of selected unit.

2 – Any factory installed options air resistance (heat section, economizer, etc.)

3 – Any field installed accessories air resistance (duct resistance, diffuser, etc.)

Then determine from blower table blower motor output required.

See page 21 for blower motors and drives. See page 21 for wet coil and option/accessory air resistance data.

**MAXIMUM STATIC PRESSURE WITH GAS HEAT - 2.0 in. w.g.**

**MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure - 2.0 in. w.g.)**

7.5 kW, 15 kW, 22.5 kW, 30 kW and 45 kW - 2800 cfm

Total Air Volume cfm	Total Static Pressure – in. w.g.																											
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0		2.2		2.4		2.6			
	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		
1750	481	0.21	549	0.4	618	0.57	688	0.7	758	0.82	824	0.93	885	1.08	941	1.23	991	1.39	1038	1.54	1082	1.68	1124	1.82	1166	1.95		
2000	493	0.29	561	0.47	629	0.64	700	0.77	768	0.9	832	1.02	892	1.17	946	1.33	995	1.49	1041	1.66	1085	1.81	1126	1.97	1167	2.12		
2250	507	0.37	574	0.56	643	0.72	712	0.86	779	0.99	842	1.13	900	1.28	953	1.44	1001	1.61	1045	1.78	1088	1.95	1128	2.12	1168	2.3		
2500	521	0.46	588	0.64	657	0.81	727	0.95	792	1.09	853	1.24	909	1.4	960	1.57	1007	1.74	1050	1.93	1091	2.11	1130	2.29	1170	2.48		
2750	537	0.56	604	0.74	674	0.91	743	1.06	806	1.21	865	1.36	920	1.53	969	1.71	1014	1.89	1055	2.08	1095	2.27	1133	2.47	1172	2.66		
3000	554	0.67	622	0.86	692	1.02	760	1.18	822	1.34	878	1.5	931	1.68	979	1.86	1021	2.06	1061	2.26	1099	2.46	1136	2.65	1174	2.85		
3250	572	0.78	641	0.98	712	1.15	778	1.32	838	1.49	892	1.66	943	1.84	989	2.03	1030	2.24	1068	2.45	1105	2.65	1141	2.85	1178	3.06		
3500	592	0.9	663	1.12	733	1.3	798	1.47	855	1.65	907	1.83	956	2.02	1000	2.22	1039	2.44	1076	2.65	1111	2.86	1146	3.07	1183	3.27		
3750	614	1.04	687	1.28	756	1.47	818	1.65	872	1.83	923	2.02	970	2.22	1011	2.43	1049	2.65	1084	2.87	1118	3.09	1152	3.29	1189	3.51		
4000	639	1.22	713	1.48	780	1.66	838	1.83	890	2.02	939	2.22	984	2.44	1023	2.66	1059	2.89	1093	3.11	1126	3.33	1160	3.54	1197	3.77		
4250	667	1.43	741	1.69	805	1.86	859	2.02	909	2.22	956	2.45	998	2.68	1036	2.92	1070	3.15	1103	3.37	1135	3.59	1169	3.81	1207	4.05		

## BLOWER DATA

### 120, 122, 150 AND 152 BELT DRIVE BLOWER – BASE UNIT

**BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY (NO HEAT SECTION) WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE. FOR ALL UNITS ADD:**

1 – Wet indoor coil air resistance of selected unit.

2 – Any factory installed options air resistance (heat section, economizer, etc.)

3 – Any field installed accessories air resistance (duct resistance, diffuser, etc.)

Then determine from blower table blower motor output required.

See page 21 for blower motors and drives. See page 21 for wet coil and option/accessory air resistance data.

**MAXIMUM STATIC PRESSURE WITH GAS HEAT - 2.0 in. w.g.**

**MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure - 2.0 in. w.g.)**

15 kW, 22.5 kW, 30 kW and 45 kW - 2800 cfm

60 kW - 4000 cfm

Total Air Volume cfm	Total Static Pressure – in. w.g.																									
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0		2.2		2.4		2.6	
	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	497	0.25	558	0.44	624	0.6	694	0.74	764	0.85	830	0.99	889	1.16	943	1.34	994	1.52	1045	1.71	1096	1.89	1146	2.08	1197	2.27
2250	511	0.34	573	0.52	638	0.68	708	0.82	776	0.94	839	1.09	896	1.26	948	1.45	998	1.64	1048	1.83	1098	2.01	1149	2.2	1200	2.4
2500	527	0.44	589	0.62	654	0.78	723	0.91	789	1.05	850	1.21	904	1.39	955	1.58	1003	1.77	1052	1.96	1101	2.14	1152	2.33	1203	2.53
2750	545	0.55	606	0.72	672	0.88	740	1.03	804	1.17	861	1.34	914	1.53	962	1.72	1010	1.92	1057	2.10	1105	2.29	1154	2.47	1206	2.68
3000	564	0.66	626	0.84	692	1.01	759	1.16	819	1.32	874	1.49	924	1.68	971	1.88	1017	2.08	1063	2.26	1110	2.44	1158	2.63	1208	2.83
3250	585	0.79	648	0.98	714	1.14	778	1.31	836	1.48	887	1.66	935	1.86	981	2.06	1026	2.26	1071	2.45	1117	2.63	1163	2.80	1213	3.00
3500	607	0.93	672	1.13	737	1.31	798	1.48	852	1.66	901	1.85	948	2.05	993	2.26	1037	2.46	1081	2.65	1125	2.83	1171	3.01	1221	3.21
3750	632	1.10	698	1.31	762	1.50	819	1.67	869	1.86	915	2.05	961	2.25	1005	2.47	1049	2.68	1092	2.88	1136	3.05	1181	3.24	1231	3.45
4000	660	1.30	726	1.52	787	1.70	838	1.87	885	2.06	930	2.26	974	2.48	1018	2.71	1062	2.93	1105	3.12	1149	3.30	1194	3.49	1245	3.72
4250	691	1.53	755	1.75	810	1.91	857	2.07	901	2.27	945	2.50	990	2.74	1034	2.98	1077	3.20	1120	3.39	1163	3.58	1210	3.79	1262	4.03
4500	724	1.78	783	1.98	831	2.12	874	2.28	917	2.50	962	2.75	1006	3.02	1051	3.27	1094	3.49	1137	3.70	1181	3.89	1228	4.11	1281	4.38
4750	757	2.05	809	2.20	851	2.33	891	2.51	935	2.76	980	3.05	1025	3.33	1070	3.59	1113	3.82	1156	4.03	1201	4.24	1249	4.47	1303	4.75
5000	787	2.31	831	2.43	870	2.57	910	2.78	954	3.06	1000	3.38	1046	3.68	1091	3.95	1135	4.19	1178	4.40	1224	4.62	1272	4.86	1325	5.13
5250	814	2.55	852	2.66	889	2.83	930	3.09	975	3.41	1023	3.76	1070	4.08	1115	4.35	1159	4.59	1203	4.81	1248	5.03	1297	5.27	1350	5.53
5500	835	2.78	871	2.91	909	3.13	952	3.44	999	3.81	1049	4.18	1096	4.51	1142	4.79	1186	5.03	1229	5.24	1275	5.46	1324	5.69	---	---
5750	854	3.01	890	3.19	930	3.48	977	3.86	1027	4.27	1078	4.66	1126	4.99	1171	5.26	1214	5.49	1258	5.70	---	---	---	---	---	---
6000	871	3.26	910	3.53	955	3.90	1006	4.34	1060	4.80	1111	5.19	1158	5.51	---	---	---	---	---	---	---	---	---	---	---	---
6250	890	3.57	934	3.94	985	4.41	1041	4.91	1096	5.38	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

## BLOWER DATA

### 094, 122 AND 152 DIRECT DRIVE BLOWER ALL MODELS – BASE UNIT

**BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY (NO HEAT SECTION) WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.**

FOR ALL UNITS ADD:

- 1 – Wet indoor coil air resistance of selected unit.
  - 2 – Any factory installed options air resistance (heat section, economizer, etc.)
  - 3 – Any field installed accessories air resistance (duct resistance, diffuser, etc.)
- See page 21 for wet coil and option/accessory air resistance data.

**MAXIMUM STATIC PRESSURE WITH GAS HEAT - 2.0 in. w.g.**

**MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure - 2.0 in. w.g.)**

094 Models - 7.5 kW - 1750 cfm

All Models - 15 kW, 22.5 kW, 30 kW, 45 kW - 2750 cfm

122 and 152 Models - 60 kW - 3500 cfm

Total Air Volume cfm	Total Static Pressure - in. w.g.													
	0.2		0.4		0.6		0.8		1.0		1.2		1.4	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
1750	711	188	771	279	836	366	905	453	975	544	1044	640	1109	737
2000	752	242	812	332	876	420	944	510	1011	606	1075	709	1138	812
2250	799	300	860	389	923	479	988	575	1052	678	1113	787	1171	896
2500	853	362	914	453	976	548	1038	650	1097	761	1154	877	1209	990
2750	914	434	974	529	1033	629	1091	739	1146	858	1199	979	1250	1098
3000	980	513	1037	614	1092	720	1146	837	1198	961	1247	1088	1295	1215
3250	1048	598	1101	705	1153	819	1203	941	1251	1071	1298	1206	1343	1343
3500	1116	693	1166	809	1214	931	1261	1060	1307	1198	1351	1341	1395	1489
3750	1185	806	1232	931	1277	1063	1322	1201	1365	1348	1407	1499	1448	1657
4000	1254	937	1299	1072	1341	1214	1383	1363	1424	1518	1464	1679	1503	1844
4250	1324	1089	1366	1234	1406	1386	1445	1545	1484	1708	1522	1876	1559	2046
4500	1395	1262	1433	1417	1471	1579	1508	1745	1544	1913	1581	2084	1616	2256
4750	1465	1455	1501	1619	1536	1787	1571	1957	1606	2128	1641	2299	1675	2470
5000	1534	1666	1568	1834	1602	2004	1635	2174	1668	2345	1701	2514	1735	2682
5250	1603	1887	1635	2055	1667	2224	1699	2392	1731	2559	1763	2724	---	---
5500	1671	2110	1702	2275	1733	2441	1764	2605	---	---	---	---	---	---
5750	1738	2325	1768	2488	---	---	---	---	---	---	---	---	---	---

Total Air Volume cfm	Total Static Pressure - in. w.g.											
	1.6		1.8		2.0		2.2		2.4		2.6	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
1750	1172	833	1231	932	1287	1039	1340	1156	1391	1283	1442	1426
2000	1197	913	1253	1019	1306	1135	1357	1261	1407	1398	1457	1547
2250	1227	1003	1280	1117	1330	1242	1379	1378	1428	1525	1477	1680
2500	1261	1103	1311	1226	1360	1361	1407	1507	1454	1663	1501	1826
2750	1299	1219	1347	1350	1394	1494	1440	1649	1485	1813	1530	1982
3000	1342	1346	1388	1487	1432	1640	1476	1803	1520	1973	1563	2146
3250	1388	1485	1432	1638	1475	1800	1517	1969	1558	2143	1600	2319
3500	1437	1643	1479	1805	1519	1975	1560	2148	1600	2325	1640	2502
3750	1489	1821	1528	1990	1567	2164	1605	2340	1645	2517	1685	2693
4000	1541	2014	1579	2187	1616	2364	1654	2540	1693	2715	1732	2887
4250	1596	2218	1632	2393	1668	2569	1705	2742	1743	2913	---	---
4500	1652	2429	1687	2603	1722	2775	1759	2944	---	---	---	---
4750	1709	2641	1743	2811	1778	2979	---	---	---	---	---	---
5000	1768	2850	---	---	---	---	---	---	---	---	---	---
5250	---	---	---	---	---	---	---	---	---	---	---	---
5500	---	---	---	---	---	---	---	---	---	---	---	---
5750	---	---	---	---	---	---	---	---	---	---	---	---

## BLOWER DATA

### FACTORY INSTALLED BELT DRIVE KIT SPECIFICATIONS

Motor Efficiency	Nominal hp	Maximum hp	Drive Kit Number	RPM Range
Standard & High	2	2.3	1	590 - 890
Standard & High	2	2.3	2	800 - 1105
Standard & High	2	2.3	3	795 - 1195
Standard	3	3.45	4	730 - 970
Standard	3	3.45	5	940 - 1200
Standard	3	3.45	6	1015 - 1300
High	3	3.45	7	730 - 970
High	3	3.45	8	940 - 1200
High	3	3.45	9	1015 - 1300
Standard	5	5.75	10	900 - 1135
Standard	5	5.75	11	1040 - 1315
Standard	5	5.75	12	1125 - 1425

NOTE - Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE - Units equipped with a supply air inverter option are limited to a motor service factor of 1.0.

### POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0	3175
0.05	2955
0.10	2685
0.15	2410
0.20	2165
0.25	1920
0.30	1420
0.35	1200

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

Air Volume cfm	Wet Indoor Coil		Gas Heat Exchanger			Electric Heat	Econo-mizer	Humiditrol Condenser Reheat Coil	Filters		Return Air Adaptor Plate
			Standard Heat	Medium heat	High Heat				MERV 8	MERV 13	
	092, 094, 102	120, 122, 150, 152									
1750	0.04	0.04	0.06	0.02	0.02	0.03	0.05	0.02	0.01	0.03	0.00
2000	0.05	0.05	0.07	0.05	0.06	0.03	0.06	0.02	0.01	0.03	0.00
2250	0.06	0.06	0.07	0.07	0.08	0.04	0.08	0.02	0.01	0.04	0.00
2500	0.07	0.07	0.09	0.10	0.11	0.04	0.11	0.03	0.01	0.05	0.00
2750	0.08	0.08	0.09	0.11	0.12	0.05	0.12	0.03	0.02	0.05	0.00
3000	0.10	0.09	0.11	0.12	0.13	0.06	0.13	0.03	0.02	0.06	0.02
3250	0.11	0.10	0.12	0.15	0.16	0.06	0.15	0.04	0.02	0.06	0.02
3500	0.12	0.11	0.12	0.16	0.17	0.09	0.15	0.04	0.03	0.07	0.04
3750	0.14	0.13	0.14	0.19	0.20	0.09	0.15	0.05	0.03	0.08	0.07
4000	0.15	0.14	0.14	0.21	0.22	0.09	0.19	0.05	0.04	0.08	0.09
4250	0.17	0.15	0.14	0.24	0.28	0.13	0.19	0.06	0.04	0.09	0.11
4500	0.19	0.17	0.15	0.26	0.32	0.14	0.22	0.07	0.04	0.09	0.12
4750	0.20	0.18	0.16	0.29	0.37	0.17	0.25	0.07	0.05	0.10	0.16
5000	0.22	0.20	0.16	0.34	0.43	0.20	0.29	0.08	0.06	0.10	0.18
5250	0.24	0.22	0.16	0.37	0.47	0.22	0.32	0.08	0.06	0.11	0.19
5500	0.25	0.23	0.18	0.44	0.54	0.25	0.34	0.09	0.07	0.12	0.22
5750	0.27	0.25	0.19	0.49	0.59	0.31	0.45	0.10	0.07	0.12	0.25
6000	0.29	0.27	0.20	0.54	0.64	0.33	0.52	0.10	0.08	0.13	0.27

**TABLE 4  
MANUFACTURER'S NUMBERS - NO TENSIONER**

DRIVE NO.	DRIVE COMPONENTS					
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELT	
	BROWNING NO.	OEM PART NO.	BROWNING NO.	OEM PART NO.	BROWNING NO.	OEM PART NO.
1	1VP34x7/8	31K6901	AK61x1	100244-20	AX54	100245-25
2	1VP40x7/8	79J0301	AK59x1	31K6801	AX55	100245-26
3	1VP34x7/8	31K6901	AK46x1	100244-17	AX52	100245-33
4	1VP44x7/8	53J9601	AK74x1	100244-21	AX58	100245-34
5	1VP50x7/8	P-8-2187	AK69x1	37L4701	AX58	100245-34
6	1VP50x7/8	P-8-2187	AK64x1	12L2501	AX57	100245-28
7	1VP44x1-1/8	36C0701	AK74x1	100244-21	AX58	100245-34
8	1VP50x1-1/8	P-8-1977	AK69x1	37L4701	AX58	100245-34
9	1VP50x1-1/8	P-8-1977	AK64x1	12L2501	AX57	100245-28
10	1VP50x1-1/8	P-8-1977	BK77x1	49K4001	BX59	59A5001
11	1VP50x1-1/8	P-8-1977	BK67x1	100244-24	BX57	78L5301
12	1VP50x1-1/8	P-8-1977	BK62x1	100244-23	BX56	100245-11

**TABLE 5  
MANUFACTURER'S NUMBERS - WITH TENSIONER**

DRIVE NO.	DRIVE COMPONENTS					
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELT	
	BROWNING NO.	OEM PART NO.	BROWNING NO.	OEM PART NO.	BROWNING NO.	OEM PART NO.
1T	1VP44X7/8	P-8-1488	BK95X1	79J2701	BX68	88K3401
2T	1VP50X7/8	P-8-2187	BK90X1	P-8-9659	BX68	88K3401
3T	1VP56X7/8	P-8-1494	BK85X1	49K4101	BX69	100245-51
4T	1VP44X7/8	P-8-1488	BK77X1	49K4001	BK66	88K3301
5T	1VP56X7/8	P-8-1494	BK85X1	49K4101	BX69	100245-51
6T	1VP50X7/8	P-8-2187	BK67X1	100244-24	BX65	100245-08
7T	1VP44X1-1/8	100239-07	BK77X1	49K4001	BX68	88K3401
8T	1VP56X1-1/8	P-8-1492	BK85X1	49K4101	BX70	31K9601
9T	1VP50X1-1/8	P-8-1977	BK67X1	100244-24	BX66	88K3301
10T	1VP50X1-1/8	P-8-1977	BK77X1	49K4001	BX68	88K3401
11T	1VP50X1-1/8	P-8-1977	BK67X1	100244-24	BX66	88K3301
12T	1VP50X1-1/8	P-8-1977	BK62X1	100244-23	BX66	88K3301

## Cooling Start-Up

**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.

### 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

*Supply Air Inverter Units - Refer to the Belt Drive Supply Air Inverter Start-Up or Direct Drive Variable Blower section.*

- 1- Initiate first and second stage cooling demands according to instructions provided with thermostat.
- 2- First-stage thermostat demand will energize compressor 1. Second-stage thermostat demand will energize compressor 2. On units with an economizer, when outdoor air is acceptable, a first-stage demand

will energize the economizer; a second-stage demand will energize compressor 1.

- 3- Ultra high efficiency units have a tandem refrigerant circuit. High efficiency units have two typical circuits. See figure 25, 26, 27, or 28.
- 4- Each refrigerant circuit is charged with R410A refrigerant. See unit rating plate for correct amount of charge.
- 5- Refer to Cooling Operation and Adjustment section for proper method to check refrigerant charge.

#### C-R410A Refrigerant

Units charged with R410A refrigerant operate at much higher pressures than R22. The expansion valve and liquid line drier provided with the unit are approved for use with R410A. Do not replace them with components designed for use with R22.

R410A refrigerant is stored in a pink cylinder.

Manifold gauge sets used with systems charged with R410A refrigerant must be capable of handling the higher system operating pressures. The gauges should be rated for use with pressures of 0-800 on the high side and a low side of 30" vacuum to 250 psi with dampened speed to 500 psi. Gauge hoses must be rated for use at up to 800 psi of pressure with a 4000 psi burst rating.

## ⚠ IMPORTANT

**Mineral oils are not compatible with R410A. If oil must be added, it must be a polyol ester oil.**

### REFRIGERANT STAGES - 092H, 102H, 120H TRADITIONAL FIN/TUBE COIL

(BOTH FANS ARE ENERGIZED WITH A Y1 DEMAND)

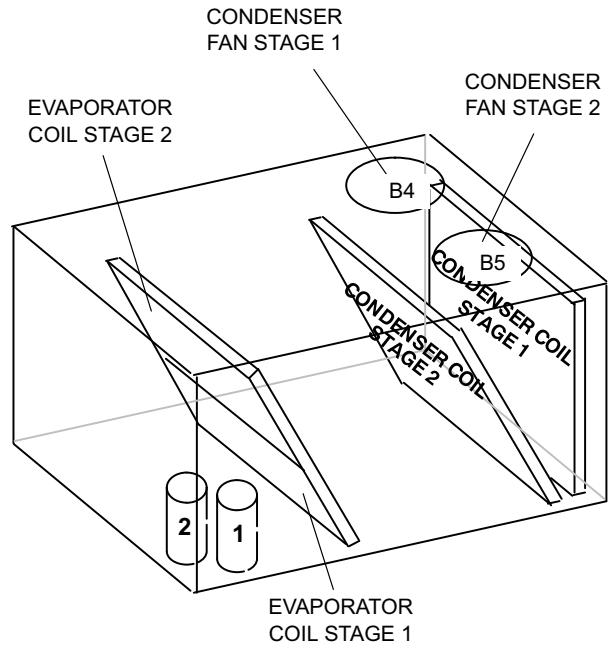


FIGURE 26

### REFRIGERANT STAGES - 092H, 102H, 120H ALL-ALUMINUM COIL

(BOTH FANS ARE ENERGIZED  
WITH A Y1 DEMAND)

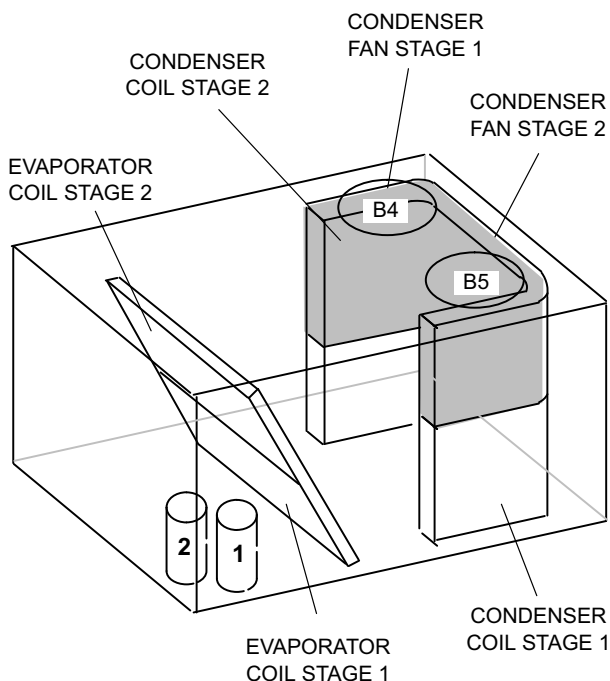


FIGURE 25

### REFRIGERANT STAGES - 150H TRADITIONAL FIN/TUBE COIL

(STAGE 1 FAN IS ENERGIZED WITH A Y1 DEMAND)

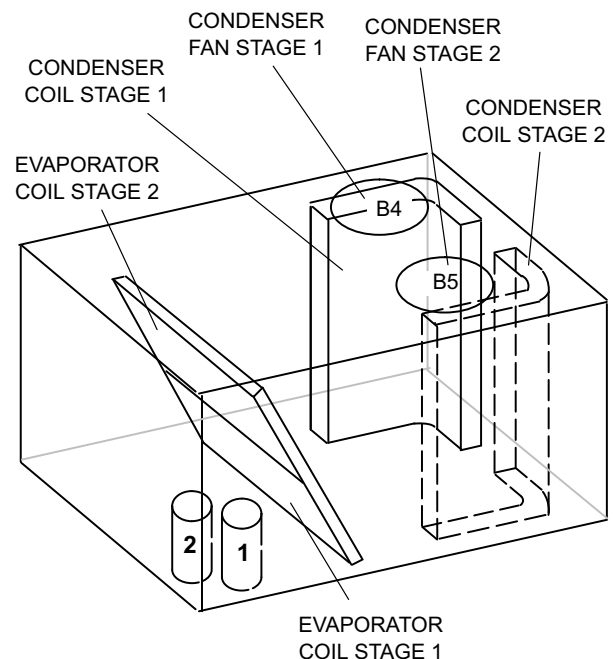
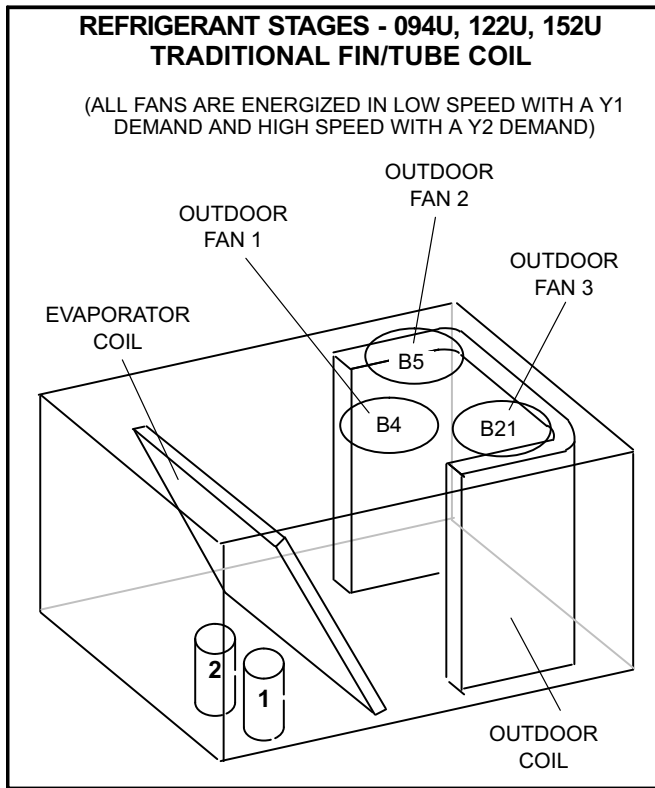


FIGURE 27



**FIGURE 28**

#### **D-Refrigerant Charge and Check - All-Aluminum Coil** **092H, 102H, 120H Units**

**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.

**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 tables 6 - 8) to the pressures obtained from the gauges. Check unit components if there are significant differences.
- 3- Measure the outdoor ambient temperature and the suction pressure. Refer to the appropriate circuit charging curve to determine a target liquid temperature.

*Note - Pressures are listed for sea level applications.*

- 4- Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).
  - If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
  - If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system.
- 5- Add or remove charge in increments. Allow the system to stabilize each time refrigerant is added or removed.
- 6- Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.
- 7- Example LGH/LCH092 Circuit 1: At 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 95.5°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.



**TABLE 6**

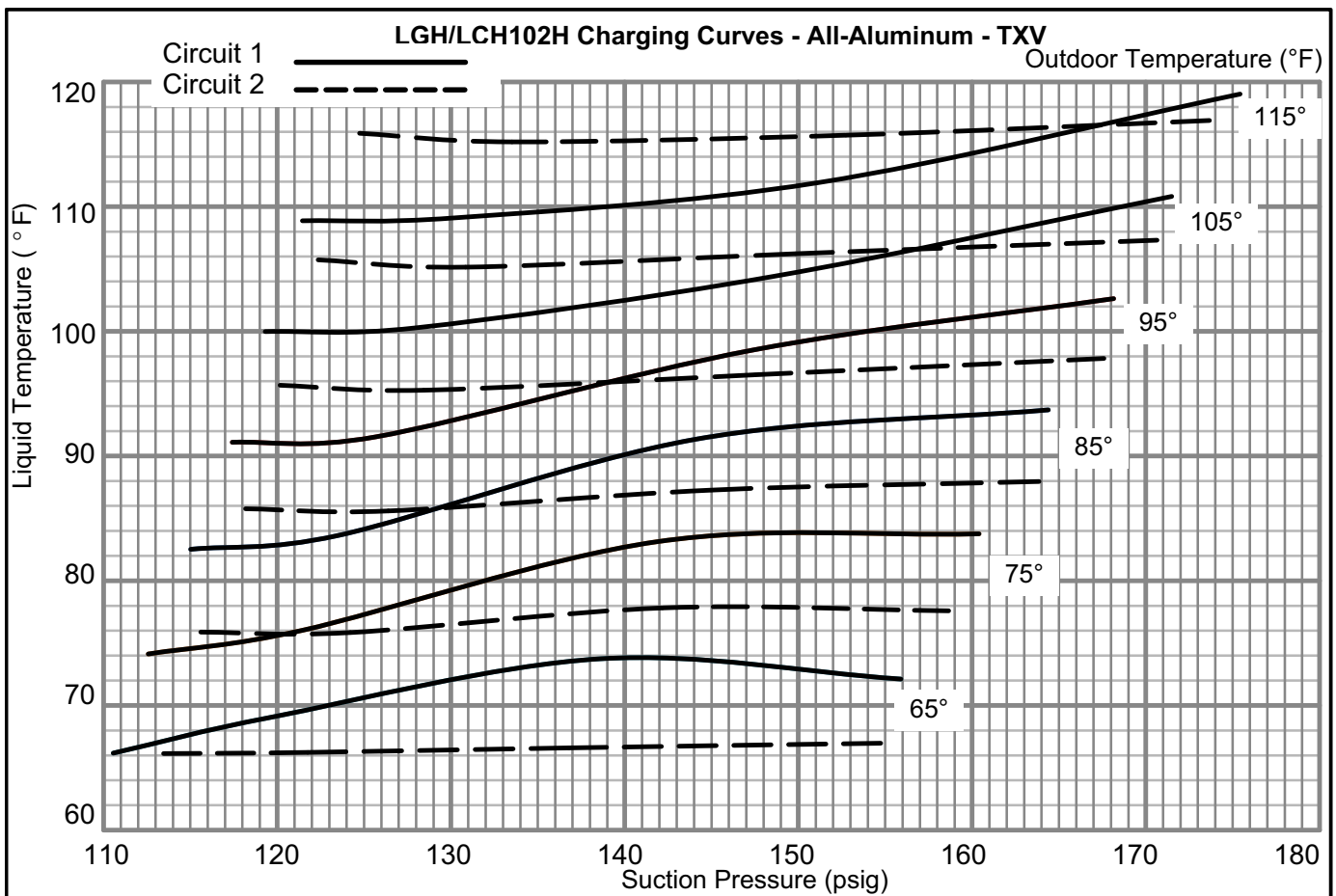
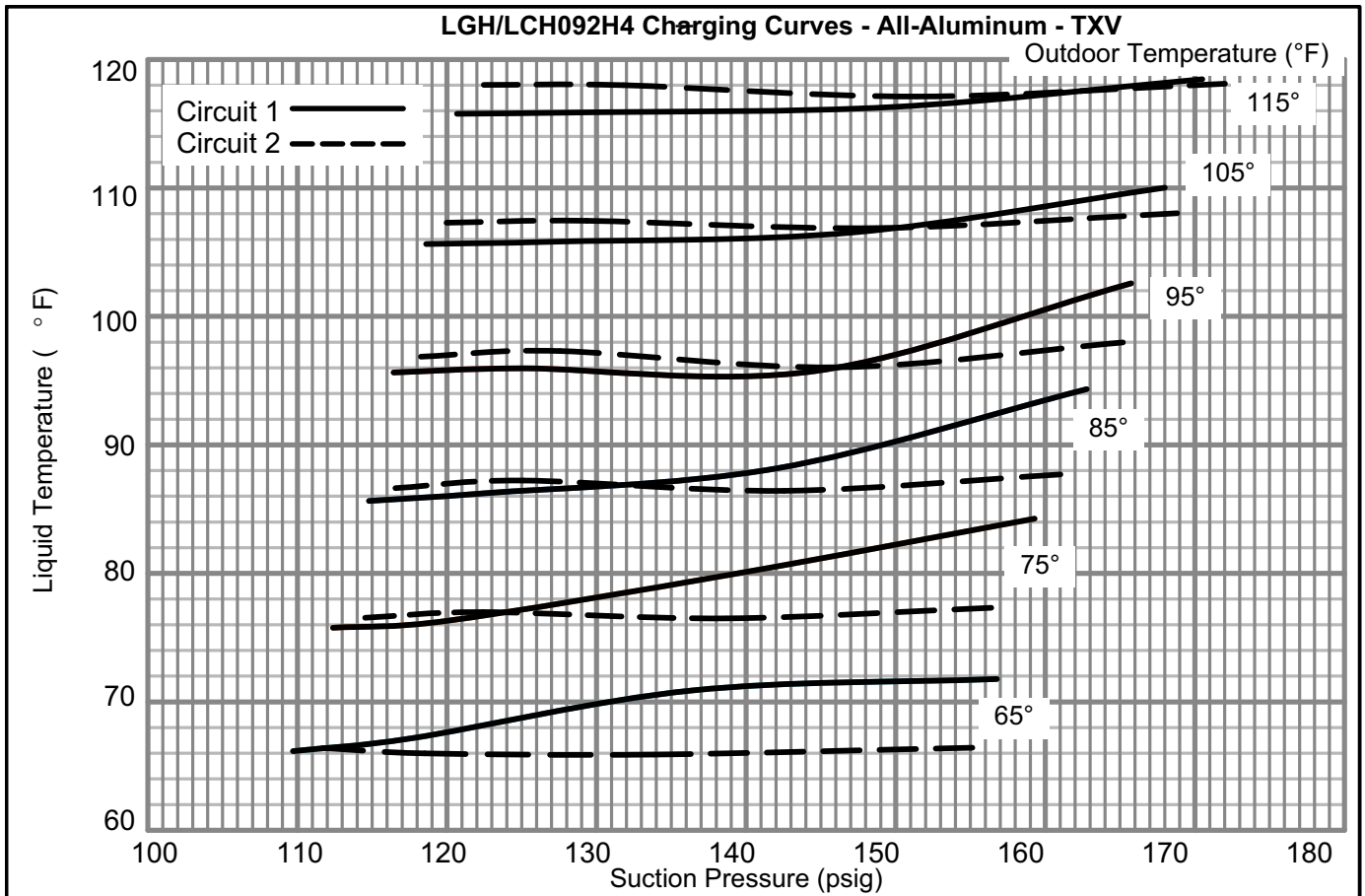
<b>LGH/LCH092H Normal Operating Pressures - All-Aluminum - TXV</b>												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	110	234	112	273	115	317	116	367	119	428	121	503
	118	236	120	275	123	319	125	369	127	426	130	497
	136	240	139	278	142	320	145	369	147	422	150	483
	157	248	159	284	163	325	166	373	168	424	171	482
Circuit 2	112	232	115	269	117	313	118	371	120	441	122	523
	119	237	122	273	125	316	128	367	129	431	132	508
	134	243	139	279	143	320	146	370	149	424	151	488
	155	253	156	287	161	328	165	376	169	427	172	487

**TABLE 7**

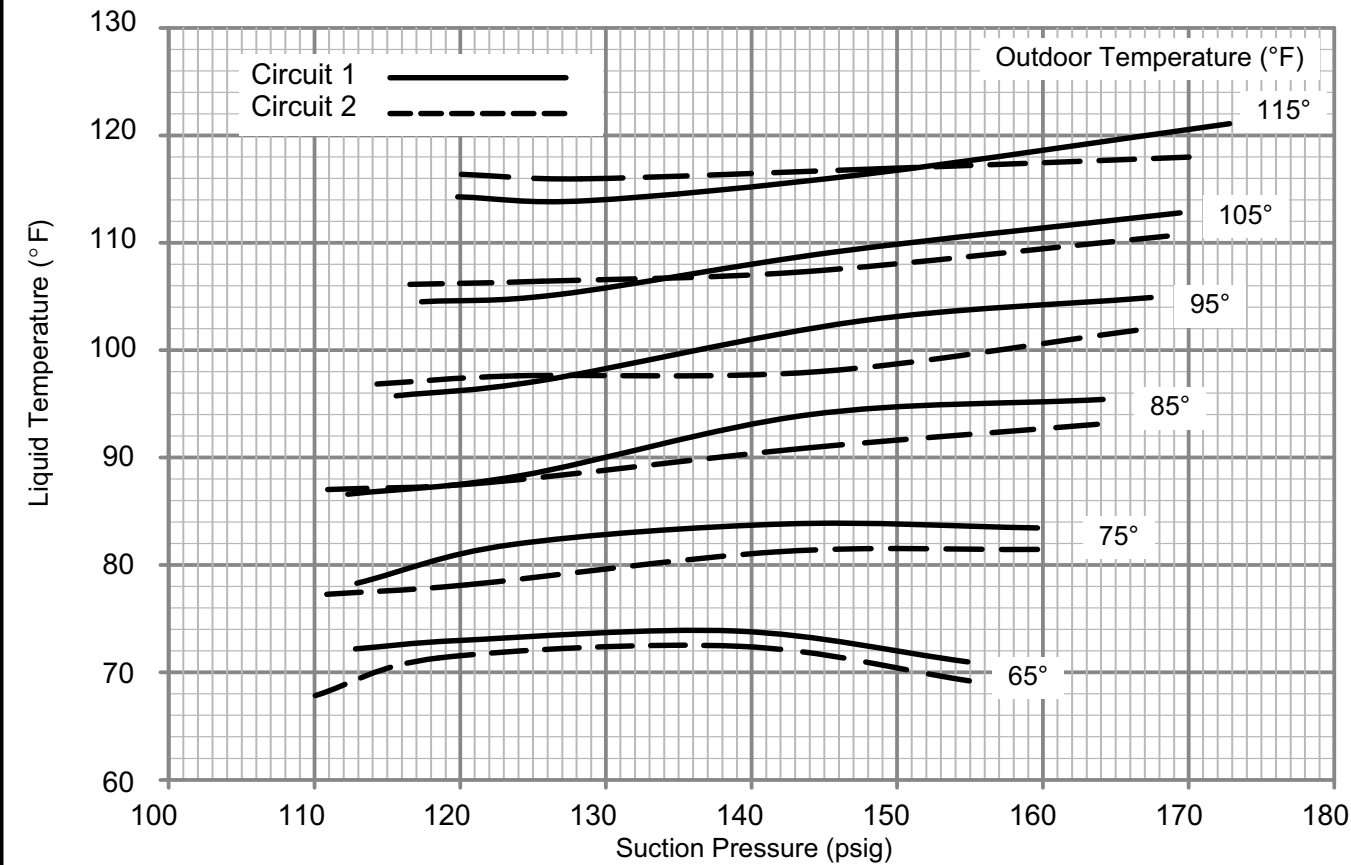
<b>LGH/LCH102H Normal Operating Pressures - All-Aluminum - TXV</b>												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	111	234	113	273	115	316	117	365	119	419	121	480
	120	236	121	275	124	317	126	365	128	417	130	476
	139	241	142	279	144	321	147	367	148	420	151	476
	156	251	160	287	164	328	168	374	171	424	175	480
Circuit 2	113	233	116	273	118	317	120	371	122	439	125	530
	122	233	124	273	126	317	128	369	131	428	134	502
	137	242	142	278	145	320	148	369	150	426	153	489
	155	251	159	288	164	328	168	375	171	429	174	488

**TABLE 8**

<b>LGH/LCH120H Normal Operating Pressures - All-Aluminum - TXV</b>												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	113	251	113	290	112	331	116	383	117	439	120	520
	120	254	123	293	124	338	126	388	127	441	129	510
	139	264	142	303	144	345	147	393	146	445	148	510
	155	278	160	314	164	357	167	403	169	456	173	512
Circuit 2	110	251	111	287	111	329	114	388	117	454	120	538
	119	249	120	291	122	336	124	389	126	447	128	520
	139	259	142	297	143	337	145	390	144	444	149	514
	155	274	160	307	164	349	166	393	169	448	170	510



LGH/LCH120H Charging Curves - All-Aluminum - TXV



## E-Refrigerant Charge and Check - Fin/Tube Coil & TXV

### LGH/LCH092H, 102H, 120H, 150H

**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.

**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- Attach gauge manifolds and operate unit in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure outdoor air dampers are closed.
- 2- Check each system separately with all stages operating.
- 3- Use a thermometer to accurately measure the outdoor ambient temperature.
- 4- Apply the outdoor temperature to tables 9 through 16 to determine normal operating pressures. Pressures are listed for sea level applications at 80°F dry bulb and 67°F wet bulb return air.
- 5- Compare the normal operating pressures to the pressures obtained from the gauges. Minor variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system. **Correct any system problems before proceeding.**
- 6- If discharge pressure is high, remove refrigerant from the system. If discharge pressure is low, add refrigerant to the system.
  - Add or remove charge in increments.
  - Allow the system to stabilize each time refrigerant is added or removed.
- 7- Use the following approach method along with the normal operating pressures to confirm readings.

**TABLE 9**  
**LGH/LCH092H Fin/Tube - TXV**

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis-charge ±10 psig	Suction ±5 psig	Dis-charge ±10 psig	Suction ±5 psig
65°F	235	137	262	137
75 °F	272	139	298	141
85 °F	312	142	338	144
95 °F	357	146	380	146
105 °F	407	149	428	149
115 °F	460	154	477	153

**TABLE 10**  
**LGH/LCH092H Fin/Tube Hot Gas Reheat - TXV**

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis-charge ±10 psig	Suction ±5 psig	Dis-charge ±10 psig	Suction ±5 psig
65 °F	242	134	262	139
75 °F	279	137	297	143
85 °F	319	140	338	146
95 °F	364	143	379	148
105 °F	414	146	427	151
115 °F	467	151	476	155

**TABLE 11**  
**LGH/LCH102H Fin/Tube - TXV**

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis-charge ±10 psig	Suction ±5 psig	Dis-charge ±10 psig	Suction ±5 psig
65 °F	241	139	273	141
75 °F	277	141	307	144
85 °F	318	143	348	147
95 °F	362	145	389	149
105 °F	411	148	437	151
115 °F	464	150	486	152

**TABLE 12**  
**LGH/LCH102H Fin/Tube Hot Gas Reheat - TXV**

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis-charge ±10 psig	Suction ±5 psig	Dis-charge ±10 psig	Suction ±5 psig
65 °F	249	137	272	142
75 °F	285	139	306	145
85 °F	327	141	347	148
95 °F	370	143	389	150
105 °F	420	146	436	152
115 °F	473	148	485	154

**TABLE 13**  
**LGH/LCH120H Fin/Tube - TXV**

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis- charge ±10 psig	Suction ±5 psig	Dis- charge ±10 psig	Suction ±5 psig
65° F	259	137	283	139
75° F	297	140	321	142
85° F	338	143	360	144
95° F	382	146	406	146
105° F	431	149	453	148
115° F	486	151	505	151

**TABLE 14**  
**LGH/LCH120H Fin/Tube Hot Gas Reheat - TXV**

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis- charge ±10 psig	Suction ±5 psig	Dis- charge ±10 psig	Suction ±5 psig
65° F	266	134	281	139
75° F	303	137	310	141
85° F	344	140	358	143
95° F	391	143	403	145
105° F	443	146	450	146
115° F	499	149	497	148

**TABLE 15**  
**LGH/LCH150H Fin/Tube - TXV**

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis- charge ±10 psig	Suction ±5 psig	Dis- charge ±10 psig	Suction ±5 psig
65°F	276	131	275	125
75°F	317	133	314	128
85°F	357	136	363	131
95°F	399	139	408	136
105°F	450	142	457	140
115°F	502	145	509	142

**TABLE 16**  
**LGH/LCH150H Fin/Tube Hot Gas Reheat - TXV**

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis- charge ±10 psig	Suction ±5 psig	Dis- charge ±10 psig	Suction ±5 psig
65° F	296	135	286	135
75° F	334	137	318	136
85° F	378	139	364	138
95° F	422	142	409	140
105° F	470	144	458	142
115° F	520	147	509	146

**Charge Verification - Approach Method - AHRI Testing  
(Fin/Tube Coil Continued)**

- 1- Using the same thermometer, compare liquid temperature to outdoor ambient temperature.  
Approach Temperature = Liquid temperature (at condenser outlet) minus ambient temperature.
- 2- Approach temperature should match values in table 17. An approach temperature greater than value shown indicates an undercharge. An approach temperature less than value shown indicates an overcharge.
- 3- The approach method is not valid for grossly over or undercharged systems. Use tables 9 through 16 as a guide for typical operating pressures.

**TABLE 17**  
**APPROACH TEMPERATURE - Fin/Tube - TXV**

Unit	Liquid Temp. Minus Ambient Temp.	
	1st Stage	2nd Stage
<b>092, 102</b>	8°F ± 1 (4.4°C ± 0.5)	10°F ± 1 (5.6°C ± 0.5)
<b>120</b>	6°F ± 1 (3.3°C ± 0.5)	10°F ± 1 (5.6°C ± 0.5)
<b>150H</b>	4°F ± 1 (2.2°C ± 0.5)	6°F ± 1 (3.3°C ± 0.5)
<b>092 Reheat</b>	8°F ± 1 (4.4°C ± 0.5)	11°F ± 1 (6.1°C ± 0.5)
<b>102 Reheat</b>	8°F ± 1 (4.4°C ± 0.5)	10°F ± 1 (5.6°C ± 0.5)
<b>120 Reheat 150 Reheat</b>	6°F ± 1 (3.3°C ± 0.5)	8°F ± 1 (4.4°C ± 0.5)

## F-Refrigerant Charge and Check - Fin/Tube Coil & TXV

### LGH/LCH094U, 122U, 152U

**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. This unit is equipped with solenoid valves which do not allow refrigerant flow between the high side and the low side when the unit is de-energized. When reclaiming/evacuating the system, make sure refrigerant/vacuum is pulled from both the suction and discharge lines. When adding nameplate charge, add 1/3 to the suction line and 2/3 to the discharge line.

**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- Attach gauge manifolds and operate unit in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure outdoor air dampers are closed.
- 2- Make sure both compressors are operating.
- 3- Use a thermometer to accurately measure the outdoor ambient temperature.
- 4- Apply the outdoor temperature to tables 18 through 20 to determine normal operating pressures. Pressures are listed for sea level applications at 80°F dry bulb and 67°F wet bulb return air.
- 5- Compare the normal operating pressures to the pressures obtained from the gauges. Minor variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system. **Correct any system problems before proceeding.**
- 6- If discharge pressure is high, remove refrigerant from the system. If discharge pressure is low, add refrigerant to the system.
  - Add or remove charge in increments.
  - Allow the system to stabilize each time refrigerant is added or removed.
- 7- Use the following approach method along with the normal operating pressures to confirm readings.

**TABLE 18  
LGH/LCH094U**

Outdoor Coil Entering Air Temp	Discharge $\pm 10$ psig	Suction $\pm 5$ psig
65° F	238	136
75° F	273	141
85° F	313	143
95° F	361	146
105° F	396	149
115° F	448	152

**TABLE 19  
LGH/LCH122U**

Outdoor Coil Entering Air Temp	Discharge $\pm 10$ psig	Suction $\pm 5$ psig
65° F	250	134
75° F	288	138
85° F	331	141
95° F	378	143
105° F	412	144
115° F	463	147

**TABLE 20  
LGH/LCH152U**

Outdoor Coil Entering Air Temp	Discharge $\pm 10$ psig	Suction $\pm 5$ psig
65° F	266	129
75° F	305	132
85° F	346	134
95° F	391	138
105° F	443	141
115° F	498	143

#### Charge Verification - Approach Method - AHRI Testing (Fin/Tube Coil Continued)

- 1- Using the same thermometer, compare liquid temperature to outdoor ambient temperature.  
 Approach Temperature = Liquid temperature (at condenser outlet) minus ambient temperature.
- 2- Approach temperature should match values in table 17. An approach temperature greater than value shown indicates an undercharge. An approach temperature less than value shown indicates an overcharge.
- 3- The approach method is not valid for grossly over or undercharged systems. Use tables 18 through 20 as a guide for typical operating pressures.

**TABLE 21  
APPROACH TEMPERATURE - 094, 122, 152**

Unit	Liquid Temp. Minus Ambient Temp.
	Full Load (Both Compressors)
094	5°F $\pm 1$ (2.8°C $\pm 0.5$ )
122, 152	4°F $\pm 1$ (2.2°C $\pm 0.5$ )

## G-Compressor Controls

See unit wiring diagram to determine which controls are used on each unit.

### 1- Units Equipped With All-Aluminum Coils -

#### High Pressure Switch (S4, S7)

The compressor circuit is protected by a high pressure switch which opens at 610 psig  $\pm$  15 psig (4206 kPa  $\pm$  103 kPa) and automatically resets at 475 psig  $\pm$  15 psig (3275 kPa  $\pm$  103 kPa).

### 2- Units Equipped With Traditional Fin/Tube Coil -

#### High Pressure Switch (S4) (S7 on 092H, 102H, 120H, 150H only)

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

### 3- Low Pressure Switch (S87) (S88 on 092H, 102H, 120H, 150H only)

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

### 4- Crankcase Heater (HR1, HR2)

Compressors have belly band compressor oil heaters 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.

### 5- Low Ambient Pressure Switch (S11) (S84 on 092H, 102H, 120H, 150H only)

Switch maintains adequate discharge pressure by de-energizing condenser fans when liquid pressure falls below 240 psig  $\pm$  10 (1655 kPa  $\pm$  69). S11 is installed in the liquid line. Switch closes to energize condenser fan when pressure rises to 450 psig  $\pm$  10 (3103 kPa  $\pm$  69).

### Units Equipped With Two Fans -

On 092-120H units, the Unit Controller de-energizes condenser fan 2 when outdoor temperature drops below 55°F (13°C). Fan 1 will continue to cycle with liquid pressure.

On 150H units, both fans will operate in low speed when outdoor temperature drops below 55°F (13°C).

### Units Equipped With Three Fans -

The Unit Controller de-energizes condenser fan 2 and 3 when outdoor temperature drops below 55°F (13°C). Fan 1 continues to operate based on outdoor ambient temperature and liquid pressure.

### 6- Freezestats (S49, S50)

Switches de-energize compressors when evaporator coil temperature falls below 29°F (-2°C) to prevent evaporator freeze-up. Switches reset when evaporator coil temperature reaches 58°F (15°C).

### 7- Thermal Protector (S5, S8)

The compressors used on 094U, 122U and 152U units are protected by an external temperature switch. The n.c. switch opens at 248°F  $\pm$  9 (120°C  $\pm$  5) and automatically resets at 169°F  $\pm$  18 (76°C  $\pm$  10).

### 8- Pressure Transducer (A185)

The compressor circuit on 094U, 122U and 152U units are monitored by the Unit Controller via the suction pressure transducer.

### 9- Compressor Temperature sensor (RT37, RT38)

The compressor circuit on models 094U, 122U and 152U units are monitored by the Unit Controller via compressor bottom thermistors.

## Gas Heat Start-Up (Gas Units)

FOR YOUR SAFETY READ BEFORE LIGHTING

### ⚠ 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.

### ⚠ WARNING



Danger of explosion. Can cause injury or product or property damage. If overheating occurs or if gas supply fails to shut off, shut off the manual gas valve to the appliance before shutting off electrical supply.

### ⚠ 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

#### 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.

BEFORE LIGHTING smell all around the appliance 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 push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

### ⚠ WARNING



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

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.

#### 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 for Honeywell VR8205Q/VR8305Q and White Rodgers 36H54 (figure 29 and 30).

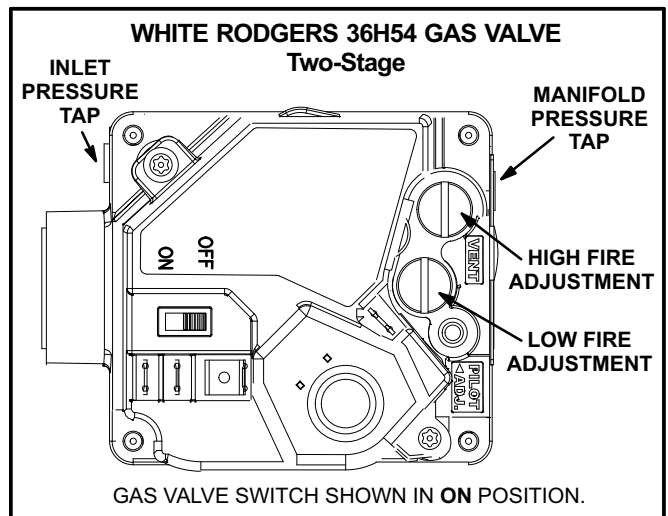


FIGURE 29

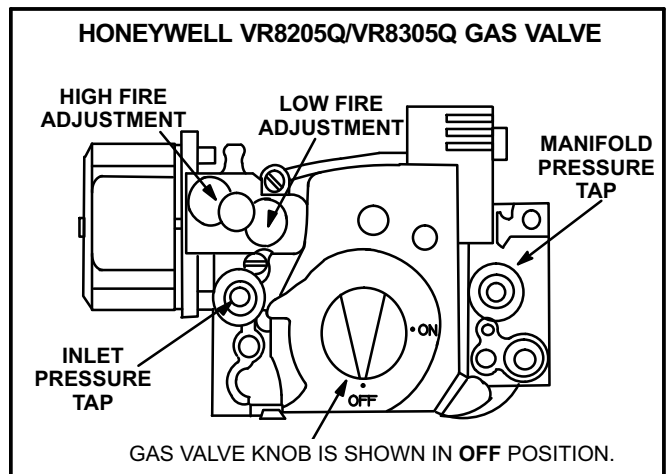


FIGURE 30

- 1- Set thermostat to lowest setting.
- 2- Turn off all electrical power to appliance.
- 3- This appliance 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- Turn gas valve switch to **OFF**. See figure 29. On Honeywell VR8305Q gas valves, turn the knob on the gas valve clockwise ➡ to “OFF”. Do not force. See figure 30.
- 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- Turn gas valve switch to **ON**. See figure 29. On Honeywell VR8305Q gas valves, turn the knob on the gas valve counterclockwise ⬅ to “ON”. Do not force. See figure 30.
- 8- Close or replace the heat section access panel.
- 9- Turn on all electrical power to appliance.
- 10- Set thermostat to desired setting.
- 11- The ignition sequence will start.
- 12- If the appliance 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 appliance will not operate, follow the instructions “Turning Off Gas to Appliance” and call your service technician or gas supplier.

#### Turning Off Gas to Unit

- 1- If using an electromechanical thermostat, set to the lowest setting.
- 2- Before performing any service, turn off all electrical power to the appliance.
- 3- Open or remove the heat section access panel.
- 4- Turn gas valve switch to **OFF**. On Honeywell VR8305Q gas valves, turn the knob on the gas valve clockwise ➡ to “OFF”. Do not force.
- 5- Close or replace the heat section access panel.

## ⚠ WARNING



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

### Heating Operation and Adjustments

#### (Gas 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 first ignition trial, ignition control will repeat steps 3 and 4 two more times before locking out the gas valve.
- 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.

#### B-Limit Controls

Limit controls are factory-set and are not adjustable. The primary limit is located on the blower deck to the right of the blower housing.

#### C-Heating Adjustment

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

The following manifold pressures are listed on the gas valve.

Natural Gas Units - Low Fire - 1.6” w.c. (not adjustable)

Natural Gas Units - High Fire - 3.7” w.c.

LP Gas Units - Low Fire - 5.5” w.c. (not adjustable)

LP Gas Units - High Fire - 10.5” w.c.

### Electric Heat Start-Up (Cooling Units)

#### Factory- or Field-Installed Option

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.

### SCR Electric Heat Controller (LCH Units)

Optional factory-installed SCR (A38) will provide small amounts of power to the electric heat elements to efficiently maintain warm duct air temperatures when there is no heating demand. The SCR maintains duct air temperature based on input from a field-provided and installed thermostat (A104) and duct sensor (RT20). SCR is located in the electric heat compartment in front of the elements. Use only with a thermostat or Novar control system.

Use the instructions provided with the thermostat to set DIP switches as follows: S1 On, S2 Off, S3 Off. Use the instructions provided with the duct sensor to install sensor away from electric element radiant heat and in a location where discharge air is a mixed average temperature.

Once power is supplied to unit, zero SCR as follows:

- 1- Adjust thermostat (A104) to minimum position.
- 2- Use a small screwdriver to slowly turn the ZERO potentiometer on the SCR until the LED turns solid red.
- 3- Very slowly adjust the potentiometer the opposite direction until the LED turns off.

## Belt Drive Supply Air Inverter Start-Up

### A-Design Specifications

Use table 22 to fill in field-provided, design specified blower CFM.

### B-Set Maximum CFM

Use table 22 to determine highest blower CFM for appropriate unit. Adjust the blower pulley to deliver that amount of CFM with only the blower operating. See *Determining Unit CFM* in the Blower Operation and Adjustment section.

**TABLE 22**  
**Blower CFM Design Specifications**

Blower Speed	Design Specified CFM
Heating	
Cooling High	
Cooling Low	
Ventilation	

### C-Enter Design Specifications Into Controller

Use the following menu to enter the blower design specified CFM into the Unit Controller. Make sure blower CFM is within limitations shown in table 23 or 24. Refer to the Unit Controller manual provided with unit.

*SETUP > TEST & BALANCE > BLOWER >*

Enter the Heating, Cooling High, Cooling Low and Ventilation speed per table 22. Adjust the blower RPM to deliver the target CFM based on the measured static pressure using the blower table.

After adjusting the RPM, read the static pressure again and apply the RPM/static to blower tables to determine adjusted CFM. Repeat adjustments until design CFM is reached.

### D-Set Damper Minimum Position

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

The Unit Controller will calculate the “midpoint” CFM.

#### Set Minimum Position 1

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

*SETTINGS > 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.

*SETTINGS > RTU OPTIONS > DAMPER > MIN DAMPER POSITION BLOWER ON HIGH = 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.*

### E-Inverter Bypass Option

Units equipped with a supply air inverter are factory-set to by-pass the inverter manually. To by-pass the inverter and operate the blower in the constant air volume mode, use the following Unit Controller menu and set to “YES”:

*SETTINGS>RTU OPTIONS>BLOWER>VFD BYPASS*

To configure the unit to by-pass the VFD automatically, use the following Unit Controller menu and set to “automatic”:

*SETUP > INSTALL > PRESS SAVE UNTIL THE MENU READS CONFIGURATION ID 1 > CHANGE CHARACTER POSITION 6<sup>TH</sup> TO “A” FOR AUTOMATIC BYPASS OPTION AND SAVE*

*Caution - Units not equipped with an inverter will be set to SETUP > INSTALL > CONFIGURATION ID 1 (CHARACTER POSITION 6<sup>TH</sup>) TO “N” NOT APPLICABLE. The blower motor could be damaged and/or result in product or property damage if the setting is changed to automatic or manual.*

**TABLE 23  
MINIMUM AND MAXIMUM CFM  
BELT DRIVE STD. & HIGH EFFICIENCY UNITS**

Gas Heat Minimum CFM		
Unit	Gas Heat Size	Airflow CFM
LGH092-120, 150	Std., Med.	2225
LGH092-120, 150	High	2550
Electric Heat Minimum CFM		
Unit	Heat Size (kW)	Airflow CFM
LCH092-102	0	2800
LCH092-150	15, 22.5, 30, 45	2800
LCH120-150	0, 60	4000
Cooling Low Minimum CFM - 220 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH092	Low	1650
LGH/LCH102	Low	1870
LGH/LCH120	Low	2200
LGH/LCH150	Low	2750
Cooling High Minimum CFM - 280 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH092	High	2100
LGH/LCH102	High	2380
LGH/LCH120	High	2800
LGH/LCH150	High	3500
Smoke and Ventilation Minimum CFM - 150 CFM/ton		
Unit	Not Applicable	Airflow CFM
LGH/LCH092	NA	1125
LGH/LCH102	NA	1275
LGH/LCH120	NA	1500
LGH/LCH150	NA	1875
Heating and Cooling Maximum CFM - 480 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH092	High	3600
LGH/LCH102	High	4080
LGH/LCH120	High	4800
LGH/LCH150	High	6000

**TABLE 24  
MINIMUM AND MAXIMUM CFM  
BELT DRIVE ULTRA HIGH EFFICIENCY BLOWERS  
094U4M, 122U4M, 152U4M**

Gas Heat Minimum CFM		
Unit	Gas Heat Size	Airflow CFM*
LGH094-152	Std. , Med.	2225
LGH094-152	High	2550
Electric Heat Minimum CFM		
Unit	Heat Size (kW)	Airflow CFM
LCH094	7.5, 15, 22.5, 30, 45	2800
LCH122, 152	15, 22.5, 30, 45	2800
LCH122, 152	0, 60	4000
Cooling Low Minimum CFM - 160 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH094	Low	1200
LGH/LCH122	Low	1600
LGH/LCH152	Low	2000
Cooling High Minimum CFM - 280 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH094	High	2100
LGH/LCH122	High	2800
LGH/LCH152	High	3500
Smoke and Ventilation Minimum CFM - 150 CFM/ton		
Unit	Not Applicable	Airflow CFM
LGH/LCH094	NA	1125
LGH/LCH122	NA	1500
LGH/LCH152	NA	1875
Heating and Cooling Maximum CFM - 480 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH094	High	3600
LGH/LCH122	High	4800
LGH/LCH152	High	6000

\*Rounded to nearest 25 CFM.

## Supply Air Inverter and Direct Drive Operation

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

*Note - During a dehumidification demand the blower operates at the highest speed. Free cooling is locked-out during reheat operation. Refer to hot gas reheat start-up and operation section for details.*

### A-Two-Stage Thermostat

#### 1-Economizer With Outdoor Air Suitable

##### Y1 Demand -

Compressors Off  
Blower Cooling Low  
Dampers modulate

##### Y2 Demand -

Compressors Off  
Blower Cooling High  
Dampers Modulate

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

#### 2-No Economizer or Outdoor Air Not Suitable

##### Y1 Demand -

Compressor 1 On  
Blower Cooling Low  
Dampers Minimum Position

##### Y2 Demand -

Compressor 1 and 2 On  
Blower Cooling High  
Dampers Minimum Position

### B-Three-Stage Thermostat OR Room Sensor

#### 1-Economizer With Outdoor Air Suitable

##### Y1 Demand -

Compressors Off  
Blower Cooling Low  
Dampers modulate

##### Y2 Demand -

Compressors Off  
Blower Cooling High  
Dampers Modulate

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

##### Y3 Demand -

Compressors 1 and 2 On  
Blower Cooling High  
Dampers Maximum Open

## Direct Drive Blower Start-Up

### A-Set Blower Speed

- 1- Use table 25 to fill in field-provided, design specified blower CFM.

**TABLE 25**  
**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 26. Refer to the Unit Controller manual provided with unit.

SETUP > 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 22.

- 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.

*SETTINGS > 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.

*SETTINGS > RTU OPTIONS > DAMPER > MIN DAMPER POSITION BLOWER ON HIGH = 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 26  
MINIMUM AND MAXIMUM CFM  
DIRECT DRIVE BLOWERS  
094U4E, 122U4E, 152U4E**

Gas Heat Minimum CFM		
Unit	Gas Heat Size	Airflow CFM*
LGH094-152	Std. , Med.	2225
LGH094-152	High	2550
Electric Heat Minimum CFM		
Unit	Heat Size (kW)	Airflow CFM
LCH094	7.5	1750
LCH094	0, 15, 22.5, 30, 45	2750
LCH122, 152	15, 22.5, 30, 45	2750
LCH122, 152	0, 60	3500
Cooling Low Minimum CFM - 160 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH094	Low	1200
LGH/LCH122	Low	1600
LGH/LCH152	Low	2000
Cooling High Minimum CFM - 220 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH094	High	1650
LGH/LCH122	High	2200
LGH/LCH152	High	2750
Smoke and Ventilation Minimum CFM - 150 CFM/ton		
Unit	Not Applicable	Airflow CFM
LGH/LCH094	NA	1125
LGH/LCH122	NA	1500
LGH/LCH152	NA	1875
Heating and Cooling Maximum CFM - 480 CFM/ton		
Unit	Blower Speed	Airflow CFM
LGH/LCH094	High	3600
LGH/LCH122	High	4800
LGH/LCH152	High	6000

\*Rounded to nearest 25 CFM.

## Hot Gas Reheat Start-Up And Operation

### General

Hot gas reheat units provide a dehumidifying mode of operation. These units contain a reheat coil adjacent to and downstream of the evaporator coil. Reheat coil

solenoid valve, L14, routes hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air. See figure 31 for reheat refrigerant routing and figure 32 for standard cooling refrigerant routing.

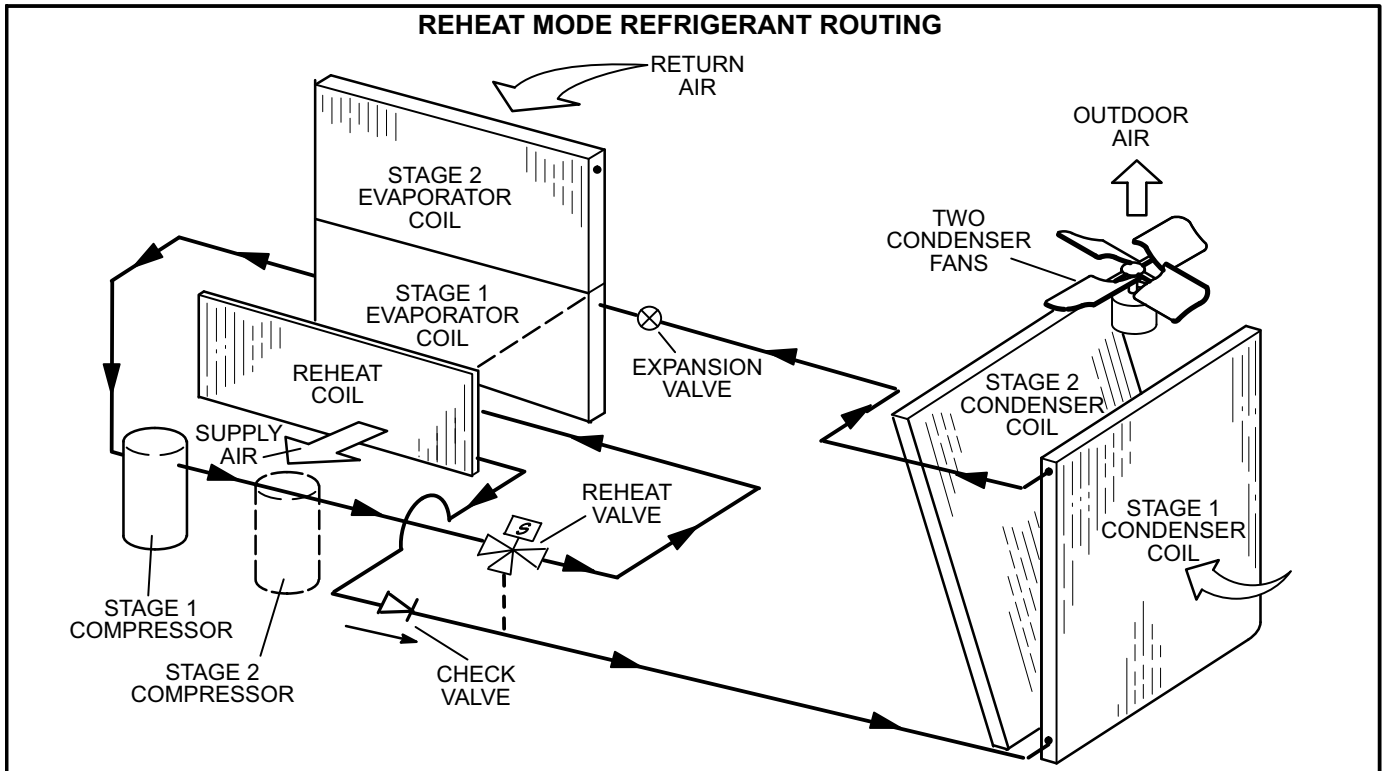


FIGURE 31

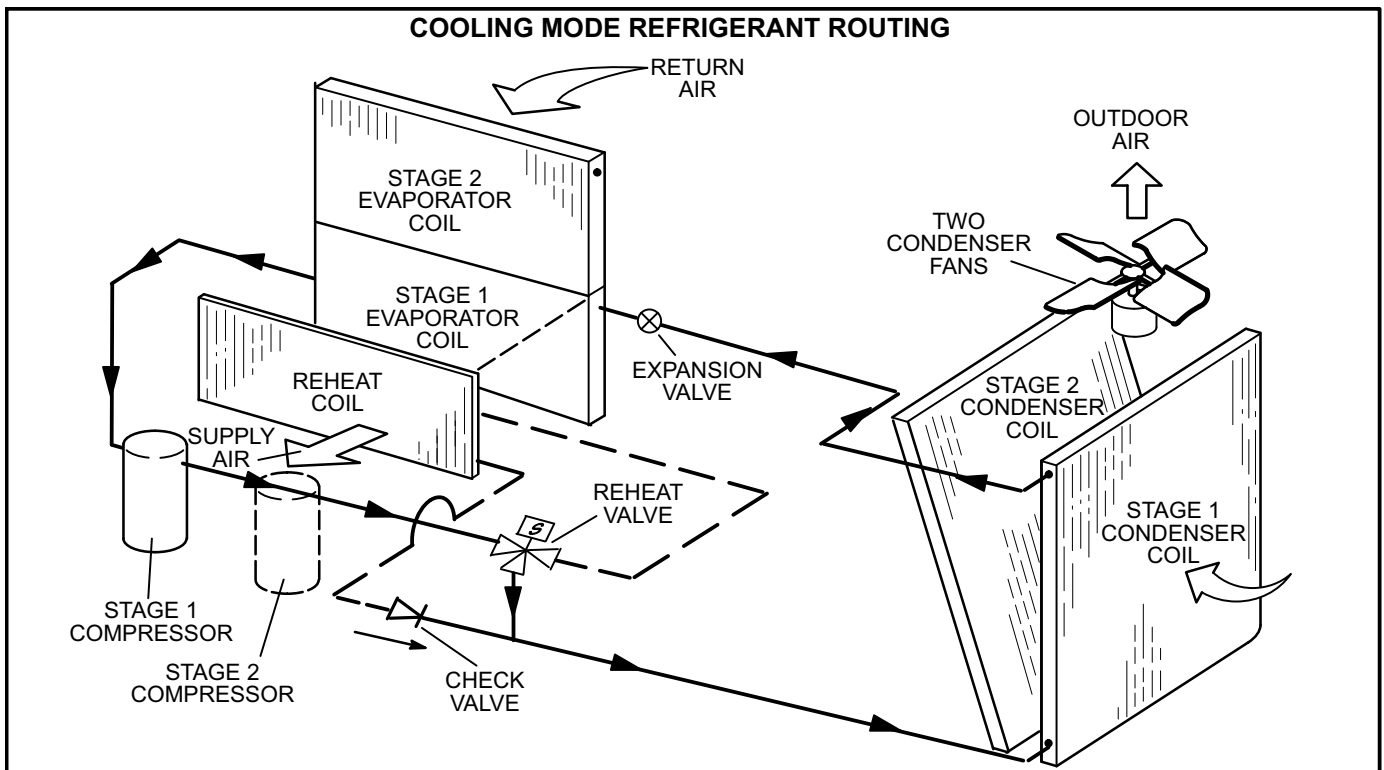


FIGURE 32

## L14 Reheat Coil Solenoid Valve

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

### Reheat Setpoint

Reheat is factory-set to energize when indoor relative humidity rises above 60% (default). Reheat will terminate when the indoor relative humidity falls 3% (57% default) or the digital output de-energizes.

Adjust reheat options using Unit Controller menu SETTINGS > RTU OPTIONS > DEHUMIDIFIER.

### Check-Out

Test hot gas reheat operation using the following procedure.

- 1- Make sure reheat is wired as shown in wiring section.
- 2- Make sure unit is in local thermostat mode.
- 3- Select Unit Controller menu SERVICE > TEST > DEHUMIDIFIER

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

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

*Compressor 1 (reheat) and blower should de-energize.*

### Default Reheat Operation

**TABLE 27**

**Reheat Operation - Two Cooling Stages - Default**

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

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

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

## Service

The unit should be inspected once a year by a qualified service technician.

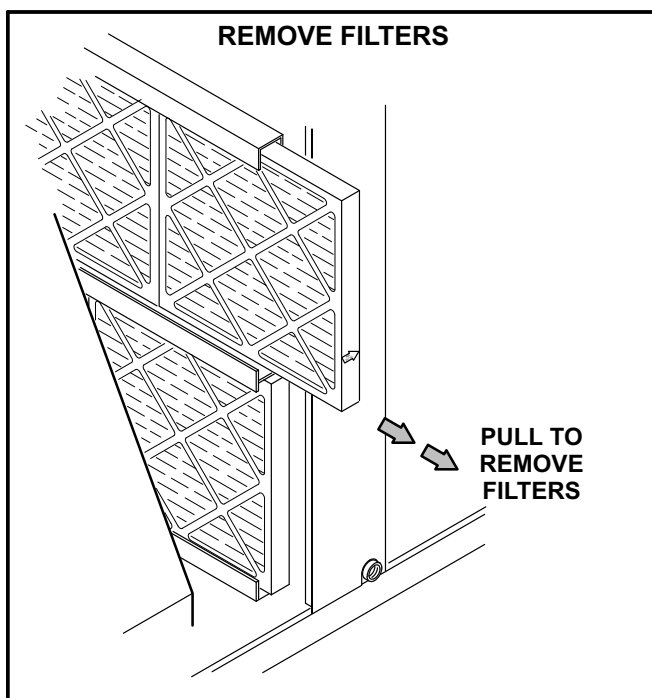
## ⚠ CAUTION

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

### A-Filters

Units are equipped with four 20 X 25 X 2" 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. See figure 33.

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



**FIGURE 33**

### B-Lubrication

All motors are lubricated at the factory. No further lubrication is required.

## C-Burners (Gas 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.

Clean burners as follows:

- 1- Turn off both electrical power and gas supply to unit.
- 2- Remove burner compartment access panel.
- 3- Remove screws securing burner assembly to burner support and remove assembly. See figure 34. Clean as necessary.
- 4- Locate the ignitor under the left burners. Check ignitor spark gap with appropriately sized twist drills or feeler gauges. See figure 35.

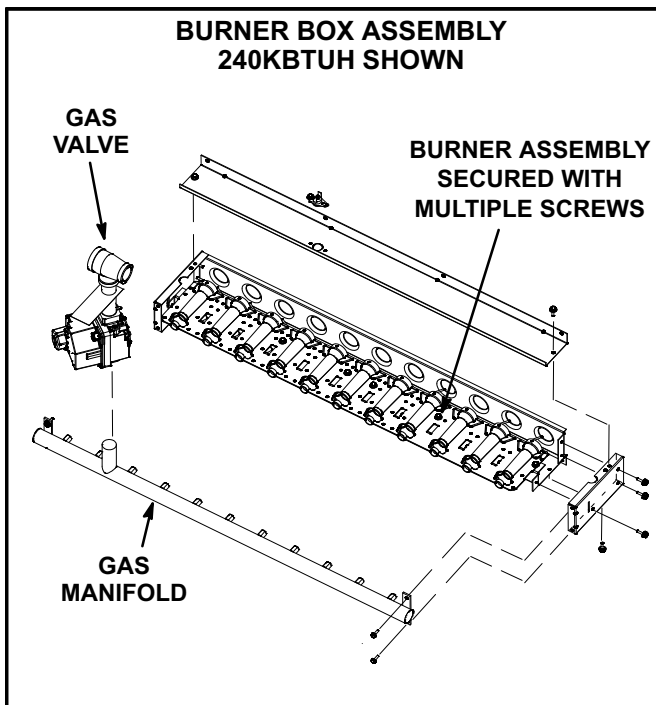


FIGURE 34

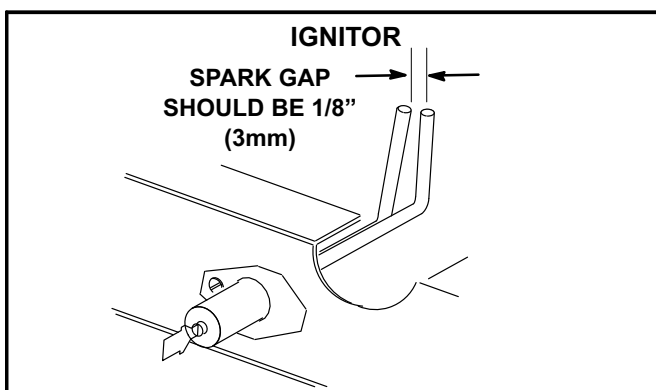


FIGURE 35

- 5- Check the alignment of the ignitor and the sensor as shown in figure 36 and table 28.
- 6- Replace burners and screws securing burner.
- 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.

TABLE 28

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

## D-Combustion Air Inducer (Gas 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.

### WARNING



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

Under normal operating conditions, the combustion air inducer 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 inducer wheel can be determined by looking through the vent opening.

Clean combustion air inducer as follows:

- 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 37.
- 4- Clean inducer 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 inducer 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.



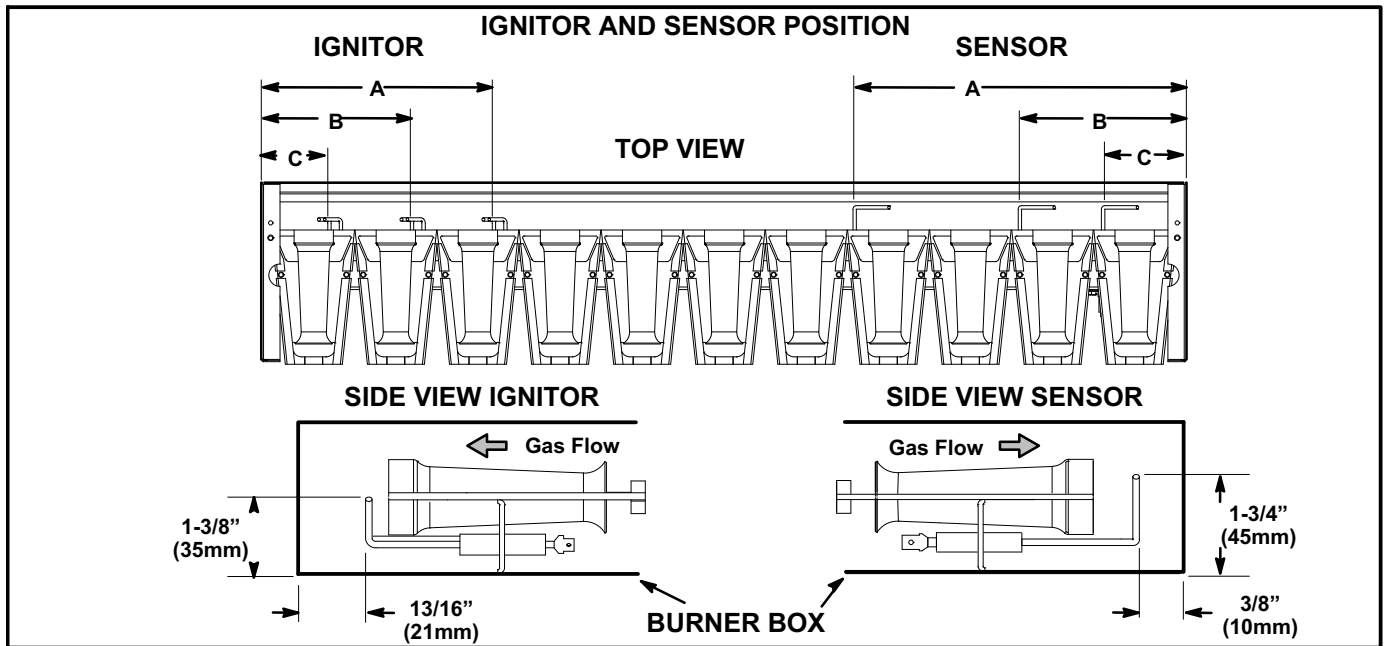


FIGURE 36

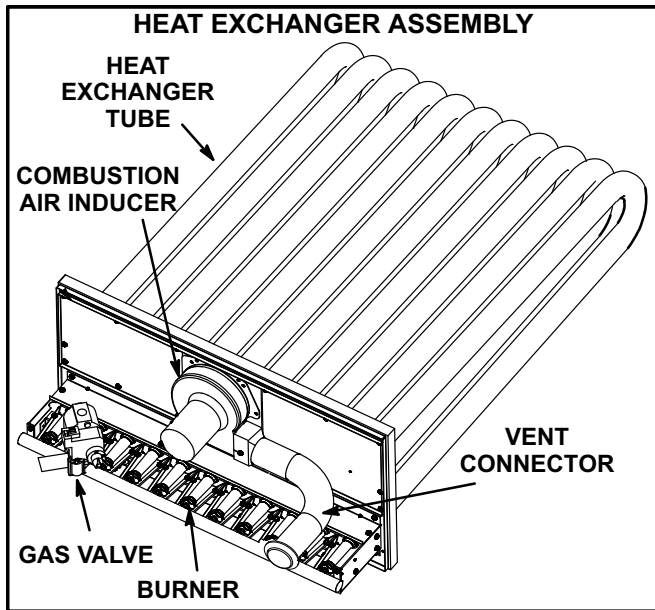


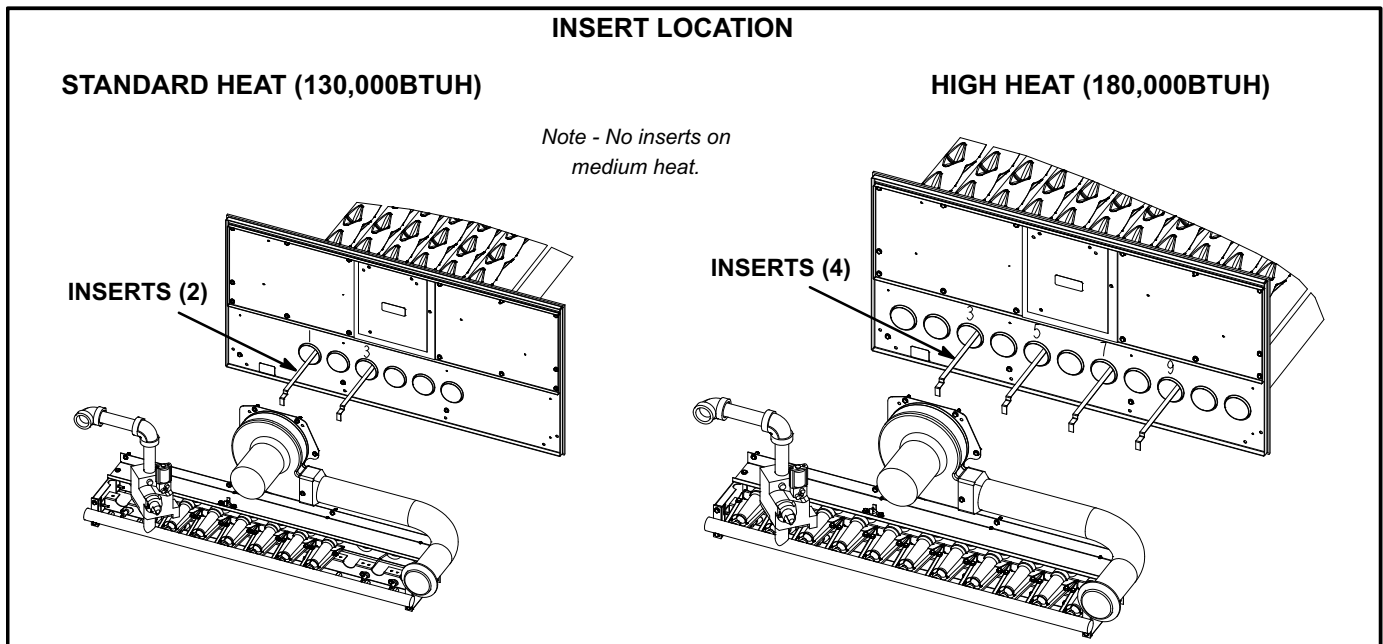
FIGURE 37

#### E-Flue Passageway and Flue Box (Gas 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- Remove inserts if installed. See figure 38.
- 4- Clean tubes with a wire brush.
- 5- Reassemble the unit. The flue box cover gasket and combustion air inducer gasket should also be replaced during reassembly.

#### F-Gas Heat Exchanger Inserts

- 1- Inserts are installed on standard (130,000Btuh) and high (240,000Btuh) heat exchangers. Medium heat exchangers do not require inserts. See figure 38.



**FIGURE 38**

### **G-Evaporator Coil**

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

### **H-Supply Air Blower Wheel**

Annually inspect supply air blower wheel for accumulated dirt or dust. Turn off power before attempting to remove access panel or to clean blower wheel.

### **J-Condenser Coil**

**All-Aluminum Coils -**

Clean condenser coil annually with water and inspect monthly during the cooling season.

Clean the all-aluminum coil by spraying the coil steadily and uniformly from top to bottom. Do not exceed 900 psi or a 45° angle; nozzle must be at least 12 inches from the coil face. Take care not to fracture the braze between the fins and refrigerant tubes. Reduce pressure and work cautiously to prevent damage.

**Fin/Tube Coils -**

Clean condenser coil annually with detergent or commercial coil cleaner and inspect monthly during the cooling season. Access panels are provided on front and back of condenser section.

## Factory Unit Controller Settings

Use the Unit Controller to adjust parameters; menu paths are shown in each table. Refer to the Unit Controller manual provided with each unit.

Tables 29 through 39 show factory settings (in degrees, % of fan CFM, etc.). Record adjusted settings on the label located inside the compressor access panel.

When field installing optional kits and accessories, the Unit Controller must be configured to identify the option before it will function. Refer to figures 39 and 40 to determine whether the Unit Controller configuration I.D. must change. To configure the option, use MAIN MENU > SETUP > INSTALL menu path. Press SAVE until CONFIGURATION ID 1 or 2 appears depending on the option installed. Change the appropriate character in the configuration I.D. For example, when an economizer is installed using a single enthalpy sensor, change configuration I.D. 1, the second character, to "S".

**TABLE 29  
580730**

Units With BACnet Module Settings			
Use menu <b>SETUP &gt; NETWORK INTEGRATION</b> . Set "BACNET" and network address.			
BACNET MAC ADDRESS:			

**TABLE 30  
580732**

Units With Room Sensor, CPC/LSE Gateway Settings			
Use menu <b>SETUP &gt; NETWORK INTEGRATION</b> . Set "L CONNECTION" and network address.			
LCONN ADDRESS:			

**TABLE 31  
580735**

Units with BACnet Module (Target) Settings			
Use menu <b>SETUP &gt; NETWORK INTEGRATION</b> . Set "BACNET" and network address.			
BACNET MAC ADDRESS:			
Parameter	Factory Setting	Setting	Description
Use <b>SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETERS</b>			
91	120		Sets the compressor minimum run time to 2 minutes.
106	99		Set reheat SP from connected sensor to 99% to basically disable. Reheat will be controlled over by BAS. Only applies to units with the reheat option.
111	3		Thermostat with three cooling stages.
117	0		DCV max. open damper. 0=controlled by network.
153	60		Time delay between heating and cooling mode.

**TABLE 32  
580733**

Units With BACnet Module (Kohl's) Settings			
Use menu <b>SETUP &gt; NETWORK INTEGRATION</b> . Set "BACNET" and network address.			
BACNET MAC ADDRESS:			
Parameter	Factory Setting	Setting	Description
Use <b>SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETERS</b>			
137	65		Sets the backup occupied heating set-point to 65F.

**TABLE 33  
580685**

LGH/LCH 152U4E (2-Compressor) Staged Direct Drive			
Parameter	Factory Setting	Field Setting	Description
<b>Note: Any changes to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETERS</b>			
12	5000 CFM	CFM	Blower CFM during smoke detection.
<b>SETUP &gt; TEST &amp; BALANCE (can also use SETTINGS &gt; RTU OPTIONS &gt; BLOWER &gt; SPEEDS)</b>			
	5000 CFM	CFM	Blower CFM during heating.
	5000 CFM	CFM	Blower CFM during high speed cooling (2 compressor) operation.
	3250 CFM	CFM	Blower CFM during low speed cooling (1 compressor) operation.
	5000 CFM	CFM	Blower CFM during ventilation.
	1655 RPM	RPM*	Adjust RPM based on unit static and blower tables to reach target CFM.
<i>*Once all four blower settings are entered, the target (highest of the heating and cooling settings) CFM will be displayed. Once the RPM is saved for the target CFM, all other blower RPM values are set by the Unit Controller according to the field CFM setting..</i>			
<b>SETUP &gt; TEST &amp; BALANCE (can also use SETTINGS &gt; RTU OPTIONS &gt; DAMPER)</b>			
	0%	%	Damper min. position during LOW blower operation.
	0%	%	Damper min. position during HIGH blower operation.
	50%	%	Min. damper % for stage 1 power exhaust operation.
<b>SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETERS</b>			
29	101%	%Open	Damper minimum position during G blower operation. (Setting parameter 29 to "101" disables parameter 29 and passes control to parameter 9 or 132)
216	5%	%	Deadband % for stage 1 power exhaust operation.
<b>SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETER</b>			
85	40°F	°F	Compressor 1 low temp lockout. Settings lower than 40°F could void warranty.
86	40°F	°F	Compressor 2 low temp lockout. Settings lower than 40°F could void warranty.

**TABLE 34**  
**580682**

LGH/LCH092H4M, 120H4M, 150H4M (2-Compressor) Staged Belt Drive						
Parameter	Factory Setting				Field Setting	Description
	092	102	120	150		
Note: Any changes to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS > RTU OPTIONS > EDIT PARAMETERS						
12	3000 CFM	3400 CFM	4000 CFM	5000 CFM	CFM	Blower CFM during smoke detection.
SETUP > TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > BLOWER > SPEEDS)						
	3000 CFM	3400 CFM	4000 CFM	5000 CFM	CFM	Blower CFM during heating.
	2700 CFM	2200 CFM	3600 CFM	4500 CFM	CFM	Blower CFM during high speed (2 compressor) cooling.
	1950 CFM	3050 CFM	2600 CFM	3250 CFM	CFM	Blower CFM during low speed (1 compressor) cooling.
	3000 CFM	3400 CFM	4000 CFM	5000 CFM	CFM	Blower CFM during ventilation.
*Once all four blower settings are entered, the target (highest of the heating and cooling settings) CFM will be displayed. Once the target CFM is saved, all other blower CFM are set by the Unit Controller.						
SETUP > TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > DAMPER)						
	0%	0%	0%	0%	%	Damper min. position during LOW blower operation.
	0%	0%	0%	0%	%	Damper min. position during HIGH blower operation.
	50%	50%	50%	50%	%	Min. damper % for stage 1 power exhaust operation.
SETTINGS > RTU OPTIONS > EDIT PARAMETERS						
29	101%	101%	101%	101%	%Open	Damper minimum position during G blower operation. (Setting parameter 29 to “101” disables parameter 29 and passes control to parameter 9 or 132)
216	5%	5%	5%	5%	%	Deadband % for stage 1 power exhaust operation.

**TABLE 35**  
**580686**

LGH/LCH094U4M, 122U4M, 152U4M (2-Compressor) Staged Belt Drive					
Parameter	Factory Setting			Field Setting	Description
	094	122	152		
Note: Any changes to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS > RTU OPTIONS > EDIT PARAMETERS					
12	3000 CFM	4000 CFM	5000 CFM	CFM	Blower CFM during smoke detection.
SETUP > TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > BLOWER > SPEEDS)					
	3000 CFM	4000 CFM	5000 CFM	CFM	Blower CFM during heating.
	2700 CFM	3600 CFM	4500 CFM	CFM	Blower CFM during high speed (2 compressor) cooling.
	1950 CFM	2600 CFM	3250 CFM	CFM	Blower CFM during low speed (1 compressor) cooling.
	3000 CFM	4000 CFM	5000 CFM	CFM	Blower CFM during ventilation.
*Once all four blower settings are entered, the target (highest of the heating and cooling settings) CFM will be displayed. Once the target CFM is saved, all other blower CFM are set by the Unit Controller.					
SETUP > TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > DAMPER)					
	0%	0%	0%	%	Damper min. position during LOW blower operation.
	0%	0%	0%	%	Damper min. position during HIGH blower operation.
	50%	50%	50%	%	Min. damper % for stage 1 power exhaust operation.
SETTINGS > RTU OPTIONS > EDIT PARAMETERS					
29	101%	101%	101%	%Open	Damper minimum position during G blower operation. (Setting parameter 29 to "101" disables parameter 29 and passes control to parameter 9 or 132)
216	5%	5%	5%	%	Deadband % for stage 1 power exhaust operation.
SETTINGS > RTU OPTIONS > EDIT PARAMETER					
85	40°F	40°F	40°F	°F	Compressor 1 low temp lockout. Settings lower than 40°F could void warranty.
86	40°F	40°F	40°F	°F	Compressor 2 low temp lockout. Settings lower than 40°F could void warranty.

**TABLE 36**  
**580683**

LGH/LCH 094U4E (2-Compressor) Staged Direct Drive			
Parameter	Factory Setting	Field Setting	Description
<b>Note: Any changes to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETERS</b>			
12	3000 CFM	CFM	Blower CFM during smoke detection.
<b>SETUP &gt; TEST &amp; BALANCE (can also use SETTINGS &gt; RTU OPTIONS &gt; BLOWER &gt; SPEEDS)</b>			
	3000 CFM	CFM	Blower CFM during heating.
	3000 CFM	CFM	Blower CFM during high speed cooling (2 compressor) operation.
	1950 CFM	CFM	Blower CFM during low speed cooling (1 compressor) operation.
	3000 CFM	CFM	Blower CFM during ventilation.
	1195 RPM	RPM*	Adjust RPM based on unit static and blower tables to reach target CFM.
<i>*Once all four blower settings are entered, the target (highest of the heating and cooling settings) CFM will be displayed. Once the RPM is saved for the target CFM, all other blower RPM values are set by the Unit Controller according to the field CFM setting..</i>			
<b>SETUP &gt; TEST &amp; BALANCE (can also use SETTINGS &gt; RTU OPTIONS &gt; DAMPER)</b>			
	0%	%	Damper min. position during LOW blower operation.
	0%	%	Damper min. position during HIGH blower operation.
	0%	%	Power exhaust position during HIGH blower operation.
<b>SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETERS</b>			
29	101%	%Open	Damper minimum position during G blower operation. (Setting parameter 29 to "101" disables parameter 29 and passes control to parameter 9 or 132)
216	5%	%	Deadband % for stage 1 power exhaust operation.
<b>SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETER</b>			
85	40°F	°F	Compressor 1 low temp lockout. Settings lower than 40°F could void warranty.
86	40°F	°F	Compressor 2 low temp lockout. Settings lower than 40°F could void warranty.

**TABLE 37**  
**580731**

Units With Automated Logic DDC (Target) Settings			
Parameter	Factory Setting	Field Setting	Description
<b>Use SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETERS</b>			
91	120		Compressor minimum run time.
111	3		Thermostat with three cooling stages.
118	400		Damper "start open" CO <sub>2</sub> setpoint for DCV.
119	2000		Damper "full open" CO <sub>2</sub> setpoint for DCV.
139	74		Backup occupied cooling setpoint.
153	60		Time delay between heating and cooling mode.

**TABLE 38**  
**580734**

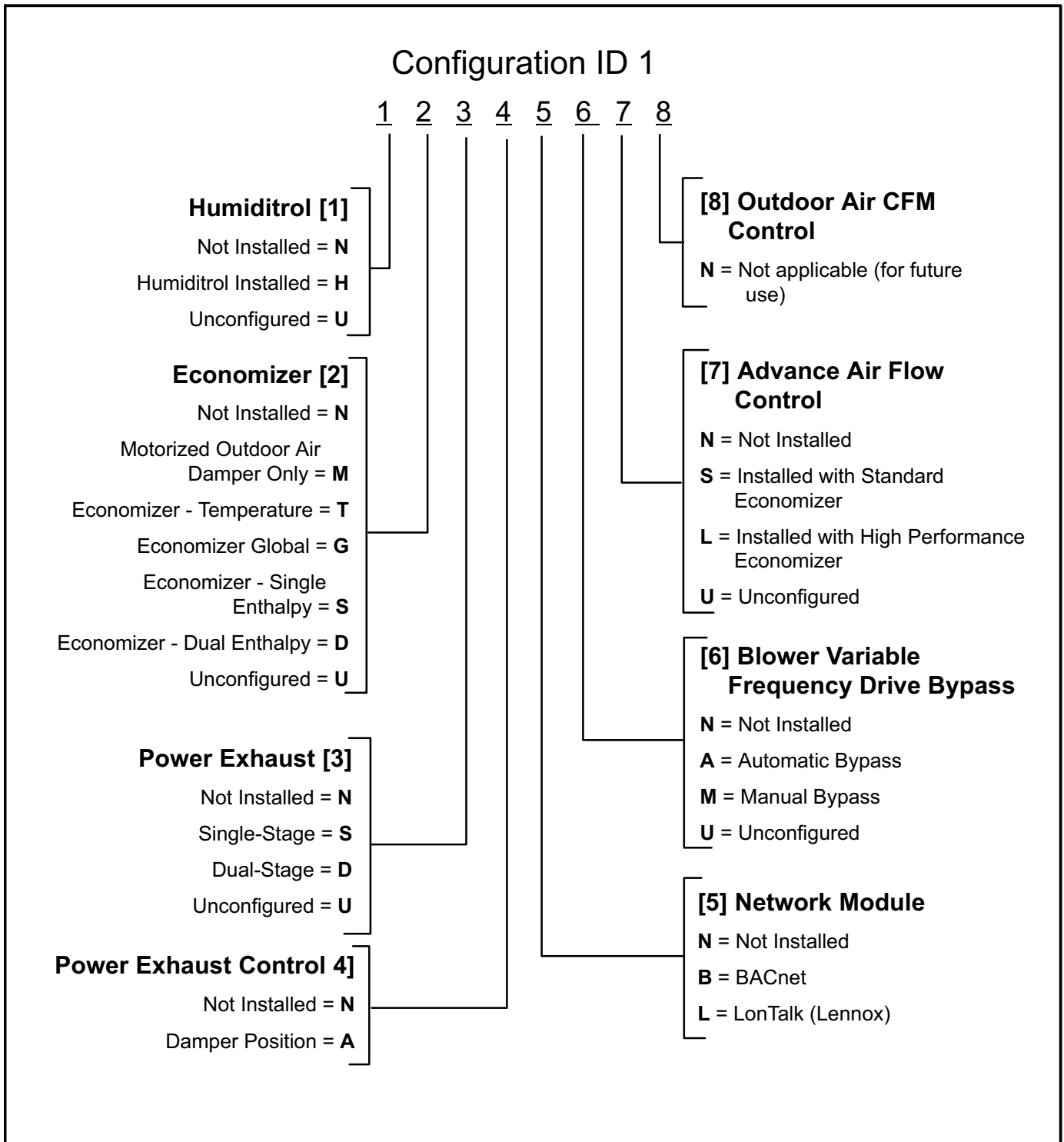
Units With Hot Gas Reheat			
<b>Use SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETERS</b>			
Parameter	Factory Setting	Field Setting	Description
105	6		Hot Gas Reheat Option 6: Reheat is only possible if blower is energized during occupied periods. Controlled by RH sensor (A91) connected to input A55_P298_5 and set point set at parameter 106 (default 60%).

**TABLE 39**  
**580743**

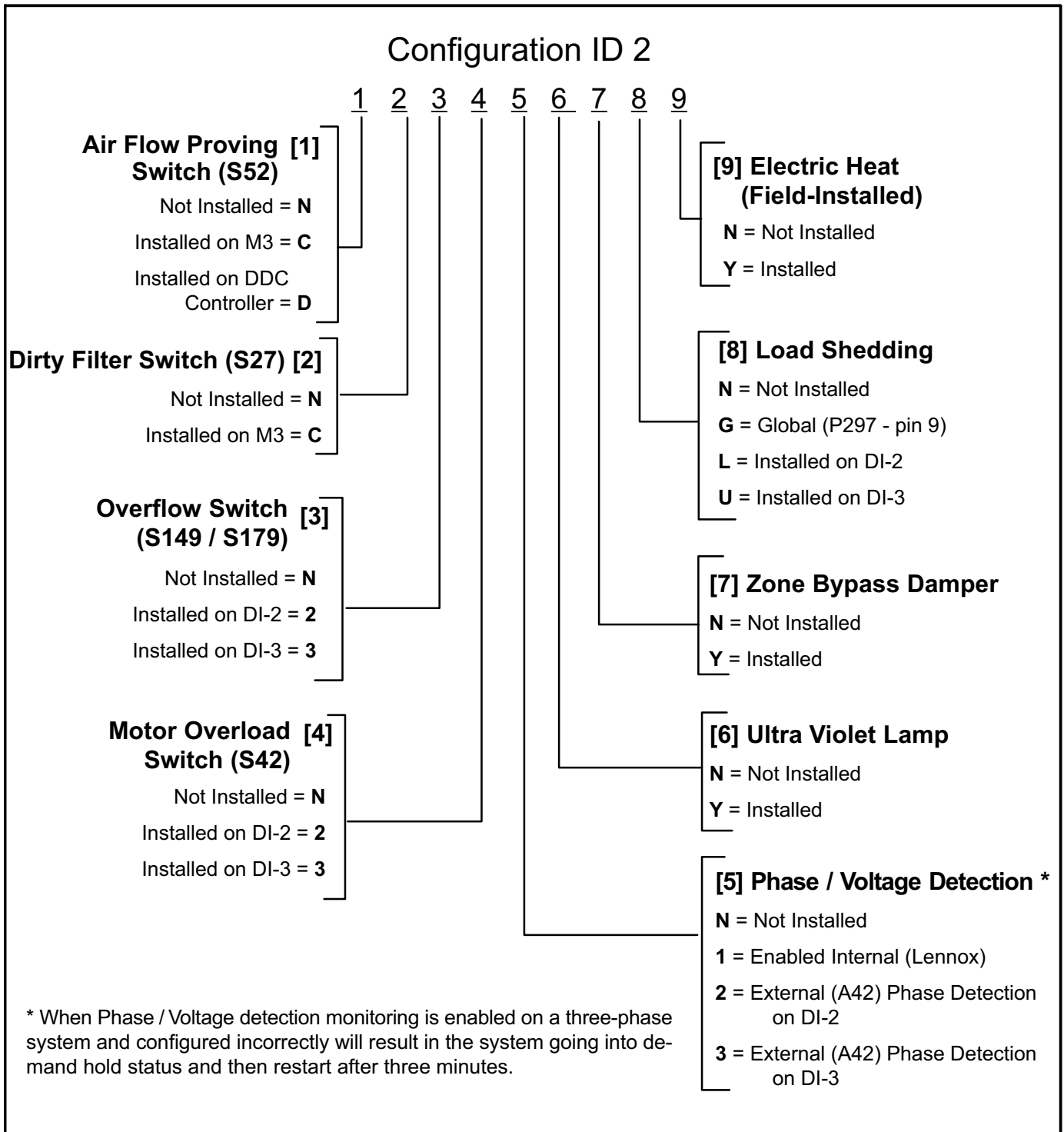
Units With LonTalk Settings	
<b>Use menu SETUP &gt; NETWORK INTEGRATION. Set "LONTALK".</b>	

**TABLE 40**  
**580684**

<b>LGH/LCH 122U4E (2-Compressor) Staged Direct Drive</b>			
<b>Parameter</b>	<b>Factory Setting</b>	<b>Field Setting</b>	<b>Description</b>
<b>Note: Any changes to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETERS</b>			
12	4000 CFM	CFM	Blower CFM during smoke detection.
<b>SETUP &gt; TEST &amp; BALANCE (can also use SETTINGS &gt; RTU OPTIONS &gt; BLOWER &gt; SPEEDS)</b>			
	4000 CFM	CFM	Blower CFM during heating.
	4000 CFM	CFM	Blower CFM during high speed cooling (2 compressor) operation.
	2600 CFM	CFM	Blower CFM during low speed cooling (1 compressor) operation.
	4000 CFM	CFM	Blower CFM during ventilation.
	1425 RPM	RPM*	Adjust RPM based on unit static and blower tables to reach target CFM.
<i>*Once all four blower settings are entered, the target (highest of the heating and cooling settings) CFM will be displayed. Once the RPM is saved for the target CFM, all other blower RPM values are set by the Unit Controller according to the field CFM setting..</i>			
<b>SETUP &gt; TEST &amp; BALANCE (can also use SETTINGS &gt; RTU OPTIONS &gt; DAMPER)</b>			
	0%	%	Damper min. position during LOW blower operation.
	0%	%	Damper min. position during HIGH blower operation.
	50%	%	Min. damper % for stage 1 power exhaust operation.
<b>SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETERS</b>			
29	101%	%Open	Damper minimum position during G blower operation. (Setting parameter 29 to "101" disables parameter 29 and passes control to parameter 9 or 132)
216	5%	%	Deadband % for stage 1 power exhaust operation.
<b>SETTINGS &gt; RTU OPTIONS &gt; EDIT PARAMETER</b>			
85	40°F	°F	Compressor 1 low temp lockout. Settings lower than 40°F could void warranty.
86	40°F	°F	Compressor 2 low temp lockout. Settings lower than 40°F could void warranty.



**FIGURE 39**



**FIGURE 40**