INSTALLATION INSTRUCTIONS

LHX092 **(7.5-Ton)**
LHX102 **(8.5-Ton)**
LHX120 **(10-Ton)**

HEAT PUMP UNITS
508514-01
8/2024

R-454B

⚠ 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

Table of Contents

⚠ WARNING

To prevent serious injury or death:

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

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

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

RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE

Attention!

Use this QR code to download the mobile service app. Follow the prompts to pair the app with the Unit Controller. Refer to the “Mobile Service App” section in this manual. The QR code is also available in the unit control area.

⚠ CAUTION

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

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

•Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

•The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).

•Do not pierce or burn.

•Be aware that refrigerants may not contain an odor.

⚠ CAUTION

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

⚠ CAUTION

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

⚠ CAUTION

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

⚠ CAUTION

Servicing shall be performed only as recommended by the manufacturer.

⚠ WARNING

•This appliance must be installed in accordance with local and national wiring regulations.

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

⚠ WARNING

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

⚠ IMPORTANT

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

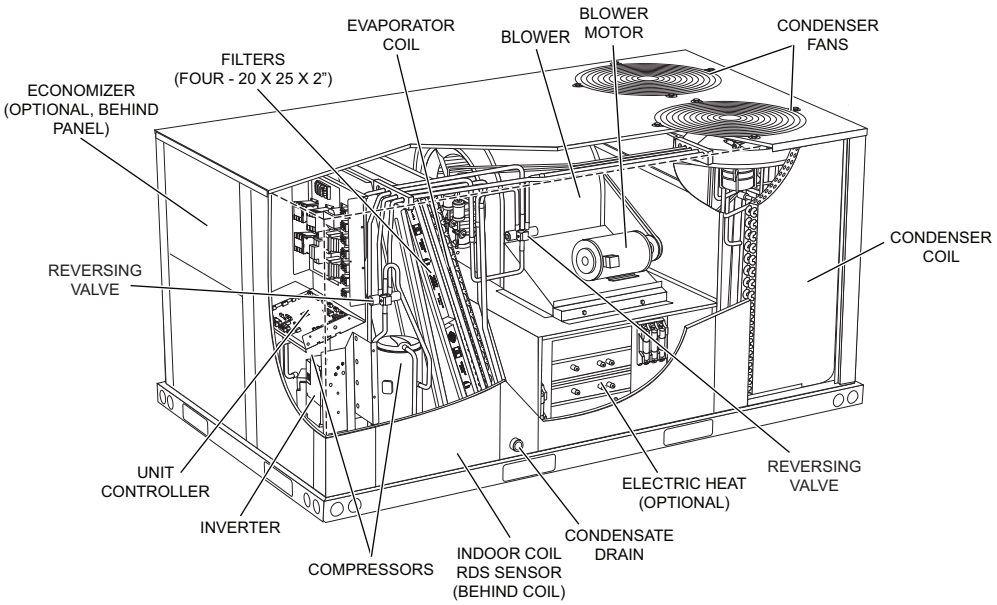
⚠ IMPORTANT

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

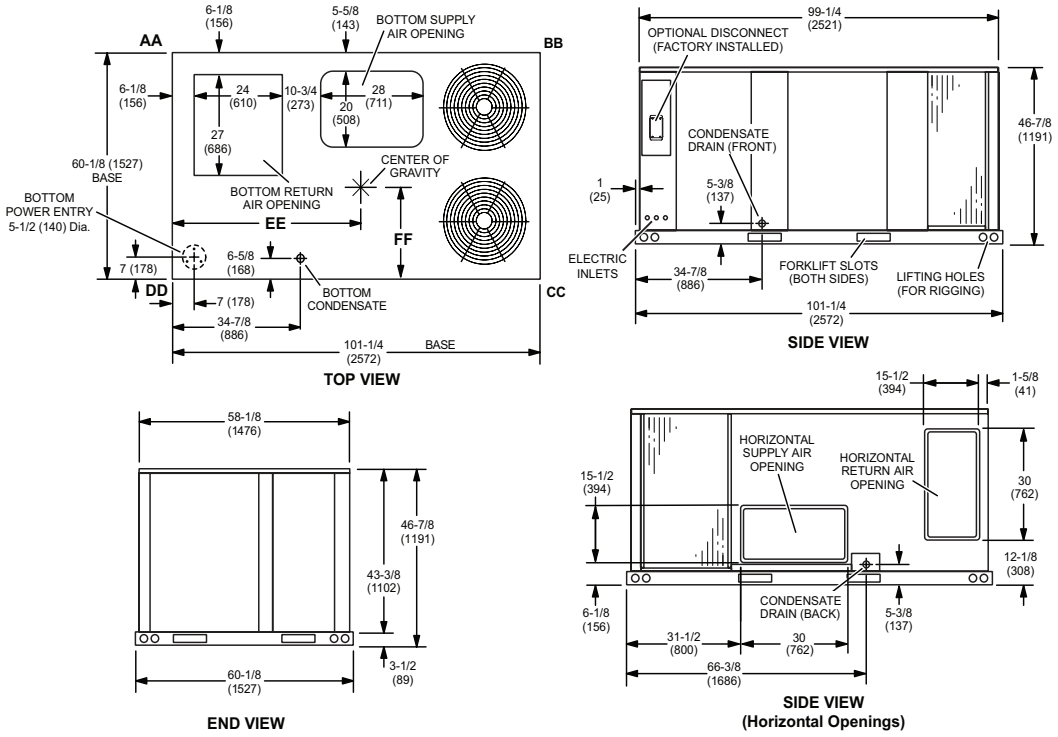
⚠ CAUTION

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

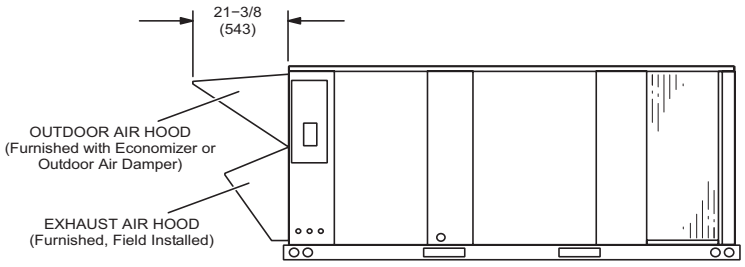
LHX092, 102, & 120 Parts Arrangement



LHX092, 102, & 120 Dimensions



OUTDOOR AIR HOOD DETAIL



A2L Refrigerant Considerations

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

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

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

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

-Safely remove refrigerant following local and national regulations.

-Evacuate the circuit.

-Purge the circuit with inert gas.

-Evacuate.

-Purge the circuit with inert gas.

-Open the circuit

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

Shipping and Packing List

Package 1 of 1 contains:

1 - Assembled unit

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

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.

LHX units have 7.5, 8.5, and 10-ton cooling capacities. Optional electric heat is available.

Units are equipped with fin/tube outdoor coils.

Units are equipped with a supply air inverter (variable frequency drive or VFD). The blower will operate at lower speeds when cooling demand is low and increase to higher speeds when cooling demand is high. Refer to Supply Air Inverter Start-Up section.

All units are available using R454B, an ozone-friendly HFC refrigerant. Refer to the Cooling Start-Up section for precautions when installing unit.

Availability of units and options varies by brand.

Requirements

See FIGURE 1 for unit clearances

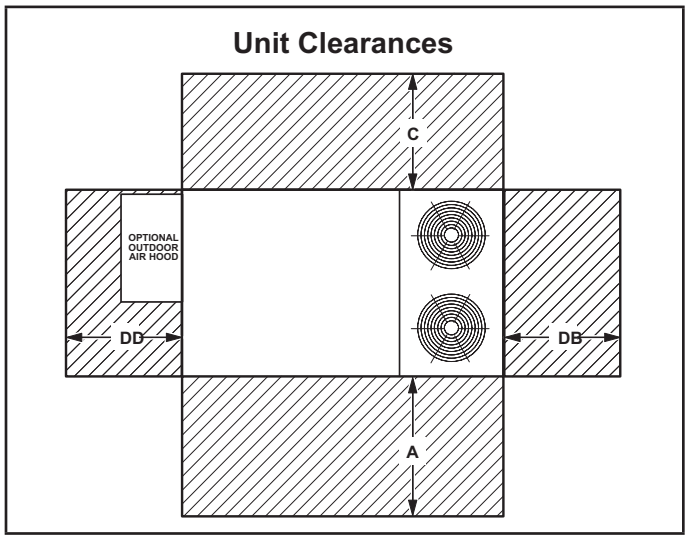


FIGURE 1

[1] Unit Clearance	A in-.(mm)	B in-.(mm)	C in-.(mm)	D in-.(mm)	Top Clearance
Service Clearance	45 (1143)	36 (914)	36 (914)	66 (1676)	Unobstructed
Minimum Operation Clearance	45 (1143)	36 (914)	36 (914)	41 (1041)	Unobstructed

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

[1] **Service Clearance -** Required for removal of serviceable parts. **Clearance to Combustibles -** On units with optional electric heat, see clearance to combustible materials as outlined on heater rating plate. **Minimum Operation Clearance** - Required clearance for proper unit operation.

⚠ 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.

⚠ 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.

Minimum R454B Space and CFM Requirements

Minimum Airflow[1]		
Unit	Q_{min}(CFM)	Q_{min}(m^3h)
LHX092	358	607
LHX102	371	629
LHX120	330	559

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

Minimum Room Area of Conditioned Space[2]		
Unit	TA_{min}(ft^2)	TA_{min}(m^2)
LHX092	198	18.4
LHX102	206	19.1
LHX120	183	16.9

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

Refrigerant Charge R-454B			
Unit	Stage	M_c(lbs)	M_c(kg)
LHX092	Stage 1	13.25	6.01
	Stage 2	13.50	6.12
LHX102	Stage 1	12.50	5.67
	Stage 2	14.00	6.35
LHX120	Stage 1	12.44	5.64
	Stage 2	12.25	5.56

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

*[3] **NOTE -** Use the Altitude Adjustment Factor to adjust the values in the tables above to different altitudes. Find the relevant altitude above sea level in the two "Halt" rows and then multiply the value needed from the tables above by the altitude factor number. Example: For the minimum airflow in CFM for an LHX092 at 1000 ft. above see level, multiply 358 by 1.05 to get 375.9 CFM as the new Q_{min}.*

The LHX unit is ETL/CSA certified as a heat pump with cooling and with or without auxiliary electric heat for non-residential use only at the clearances to combustible materials as listed on the unit nameplate and in FIGURE 1.

Installation of ETL/CSA certified units must conform with current standard C273.5 “Installation Requirements for Heat Pumps” and applicable local codes. Authorities having jurisdiction should be consulted before installation.

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-filter must be removed upon construction completion.
- The unit 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, and heating operation) must be verified according to these installation instructions.

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

⚠ 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.

Unit Support

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

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 LHX unit; supply and return plenums must be installed before setting the unit.

4 - Trim and discard any pieces of exposed insulation which extend past the edges of the roof mounting frame.

Installer’s Roof Mounting Frame

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

1 - The LHX 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 LHX 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 an LHX unit on a combustible surface for downflow discharge applications, the 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 weatherproofed 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

1 - Detach wooden base protection before rigging.

2 - Connect rigging to the unit base using both holes in each corner. See FIGURE 2.

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 top of unit.)

RIGGING

Unit	*Weight	
	Lbs.	Kg.
092-120	1514	687

*Maximum weight with all available factory-installed accessories.

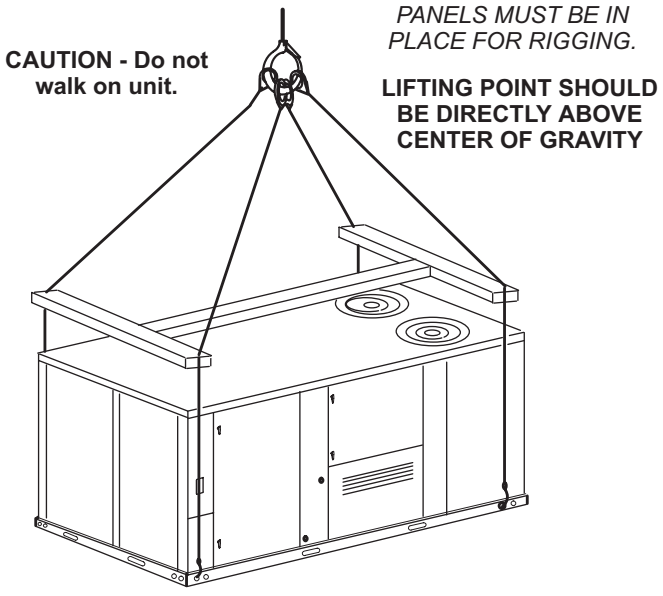


FIGURE 2

Condensate Drain

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 FIGURE 4. It is sometimes acceptable to drain condensate onto the roof or grade; however, a tee should be fitted to the trap to direct condensate downward. The condensate line must be vented. Check local codes concerning condensate disposal. Refer to page 1 and page 4 for condensate drain location.

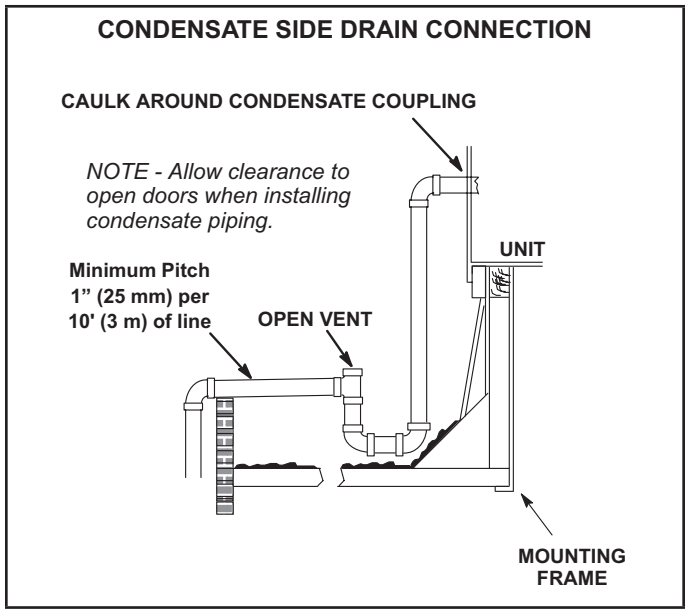


FIGURE 3

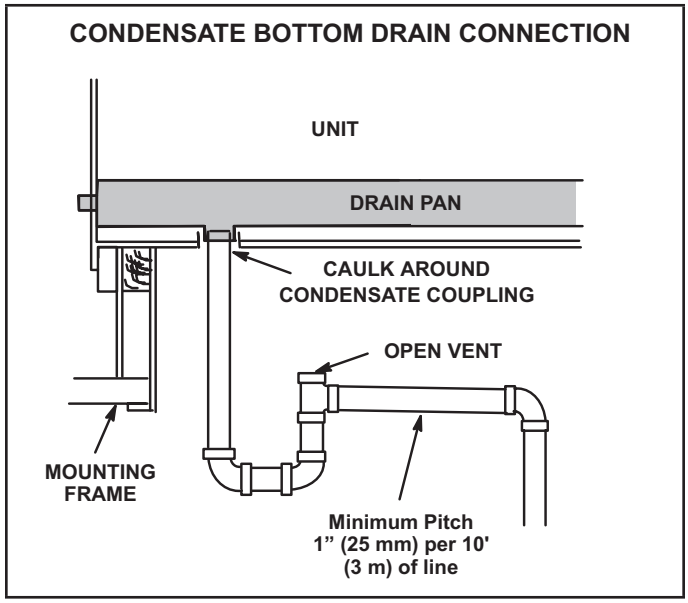


FIGURE 4

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 - Remove heat access door. See FIGURE 5.

2 - Remove filter access door.

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

4 - Lift front edge of the drain pan (to clear bottom drain plug) and slide drain pan out of unit. See FIGURE 6.

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

6 - 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.

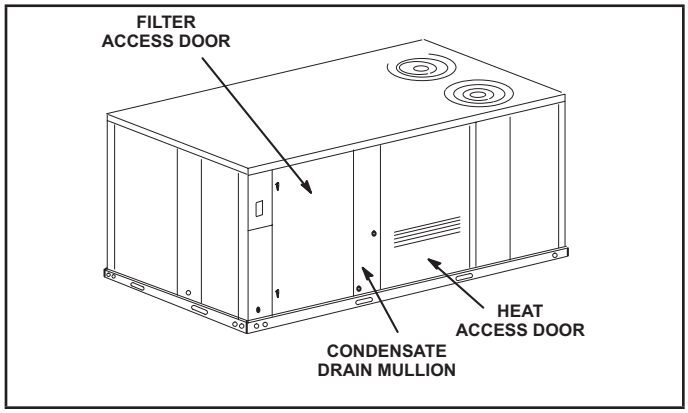


FIGURE 5

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

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

9 - Reinstall access doors.

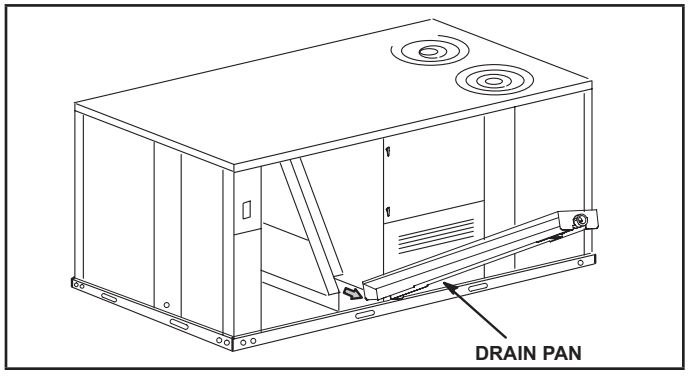


FIGURE 6

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.

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.

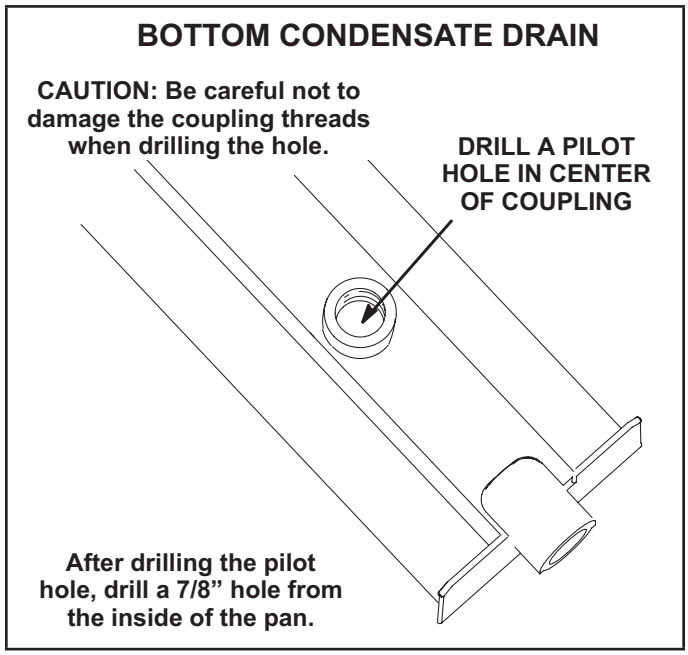


FIGURE 7

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.

Electrical Connections

⚠ 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.

POWER SUPPLY

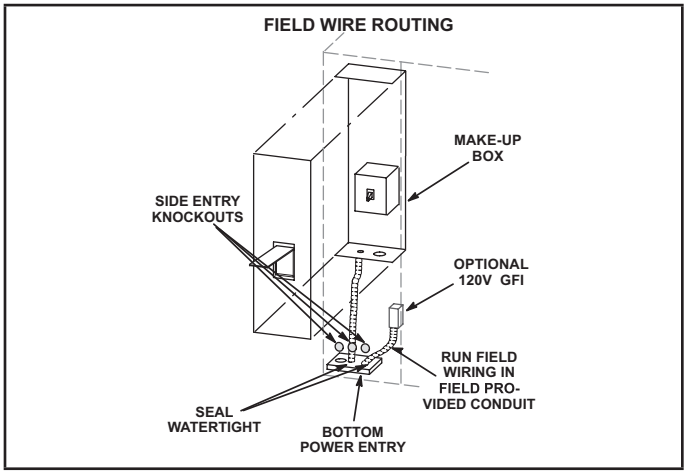


FIGURE 8

A-Wiring

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

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

1 - Units are factory-wired for 240/460/575 volt supply. For 208V supply, remove the insulated terminal cover from the 208V terminal on the control transformer. Move the wire from the transformer 240V terminal to the 208V terminal. Place the insulated terminal cover on the unused 240V terminal.

2 - Route power through the bottom power entry area and connect to L1, L2, and L3 on TB2 in incoming power enclosure. See unit wiring diagram.

3 - Route field wiring in conduit between bottom power entry disconnect. See FIGURE 9. This does not supersede local codes or authorities having jurisdiction.

B-Unbalanced Three-Phase Voltage - VFD Units Only

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

Factory-installed inverters are sized to drive blower motors with an equivalent current rating using balanced three-phase power. When unbalanced three-phase power is supplied; the installer must replace the existing factory-installed inverter with an inverter that has a higher current rating to allow for the imbalance. Use TABLE 1 to determine the appropriate replacement inverter.

TABLE 1
INVERTER UP-SIZING

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

CONTROL WIRING

A-Thermostat Location

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

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

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

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

- drafts or dead spots behind doors and in corners
- hot or cold air from ducts
- radiant heat from sun or appliances
- concealed pipes and chimneys

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- 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-Wire Routing

Route thermostat cable or wires from subbase through knockout provided in unit. Use 18 AWG wire for all applications using remotely installed electro-mechanical and electronic thermostats.

IMPORTANT - Unless field thermostat wires are rated for maximum unit voltage, they must be routed away from line voltage wiring.

C-Wire Connections

The Unit Controller will operate the unit from a thermostat or zone sensor based on the System Mode. The default System Mode is the thermostat mode. Refer to the Unit Controller Setup Guide to change the System Mode. Use the mobile service app menu and select:

RTU MENU > NETWORK INTEGRATION > NETWORK SETUP WIZARD > WIRED THERMOSTAT

NOTE - *Unit Controller is capable of up to four stages of cooling in network control mode.*

1 - Default Thermostat Mode

The Unit Controller will operate two stages of heating and cooling based on thermostat demands. Install thermostat assembly in accordance with instructions provided with thermostat. See FIGURE 10 for field wiring and refer to wiring diagrams on unit.

IMPORTANT - Terminal connections at the wall plate or subbase must be made securely. Loose control wire connections may result in intermittent operation.

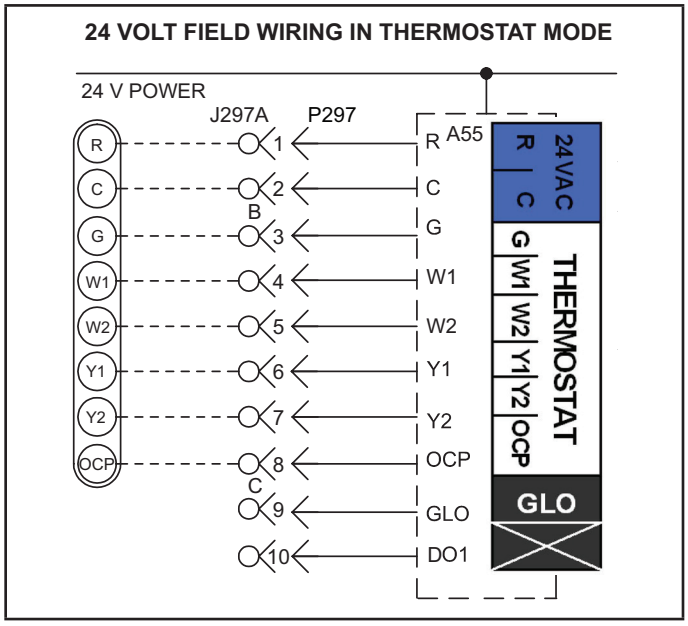


FIGURE 9

2 - Zone Sensor Mode

The Unit Controller will operate heating and cooling based on the Unit Controller internal setpoints and the temperature from the A2 zone sensor. An optional Network Control Panel (NCP) can also be used to provide setpoints. A thermostat or return air sensor can be used as a back-up mode. Make zone sensor wiring connections as shown in FIGURE 11.

NOTE - *Install sensor and make communication wiring connections as shown in literature provided with sensor.*

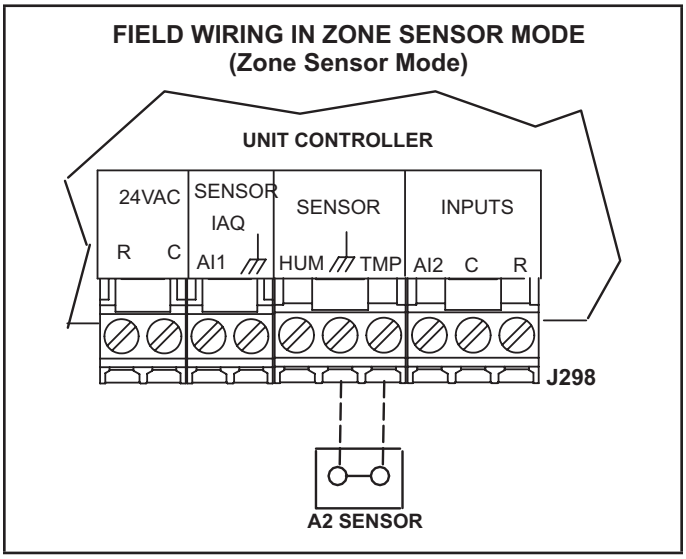


FIGURE 10

Mobile Service App

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

A-Mobile Device Requirements

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

B-Download the App

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

C-Pair the App to the Unit Controller

1 - Apply power to the unit and wait until the Unit Controller has booted-up (approximately two minutes).

2 - Press and hold the pair button for five seconds.

3 - The unit (or list of units) will appear; select the appropriate unit. When the app code matches the four-character code on the Unit Controller display, the unit is paired (within 10 seconds). Note the following:

- The app will list the units by signal strength; the RTU name will be displayed.
- Once paired, the RTU name, model number, serial number and firmware version will be displayed.

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

D-App Menus

See FIGURE 12 for the menu overview. Follow the app prompts in the Install, Network Integration, and Test and Balance menus. Verify the app is setup properly for the unit application (including the date and time). Refer to FIGURE 13, FIGURE 14, and FIGURE 15.

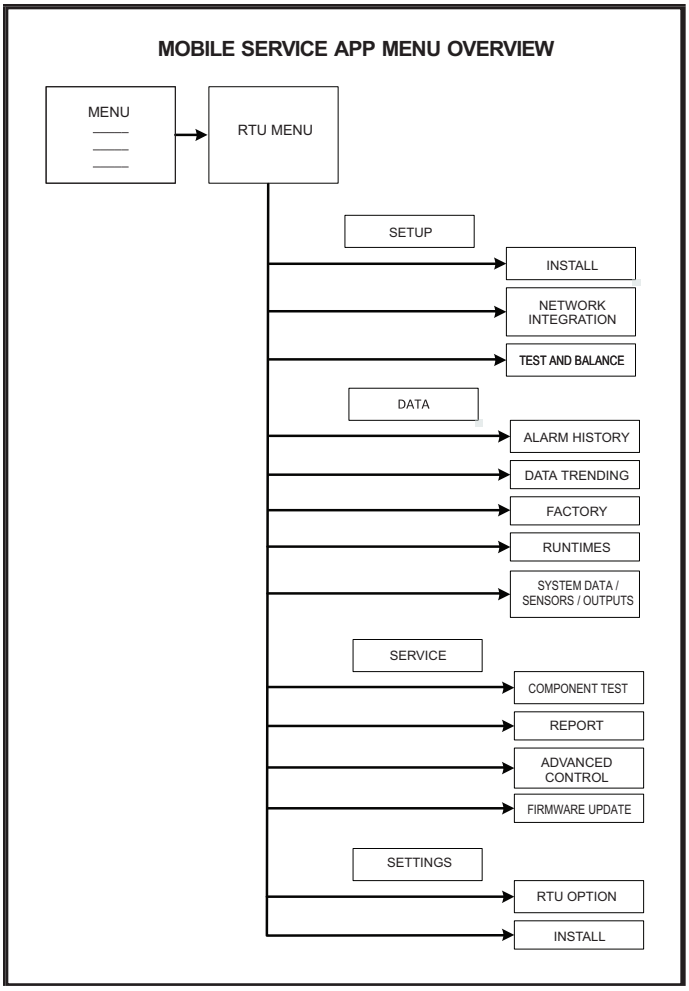


FIGURE 11

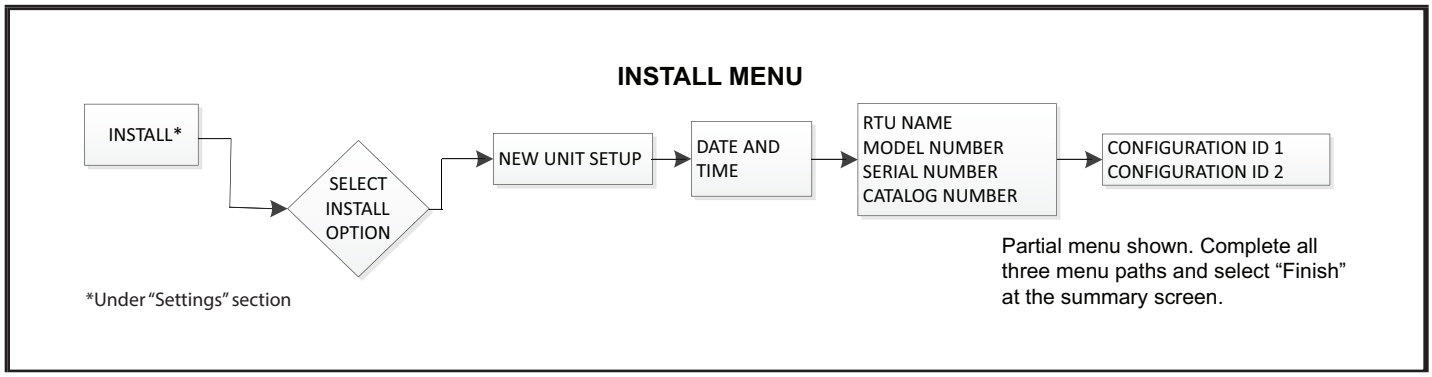


FIGURE 12

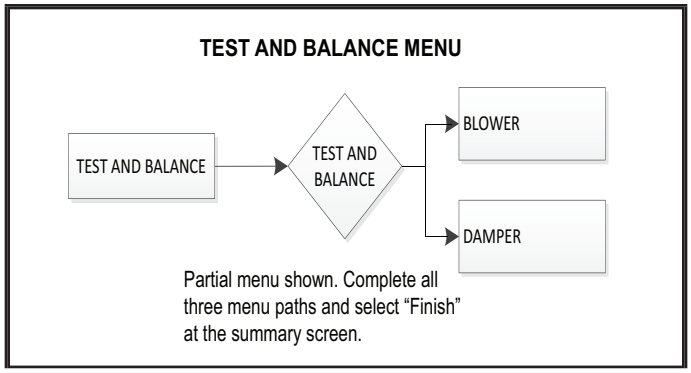


FIGURE 13

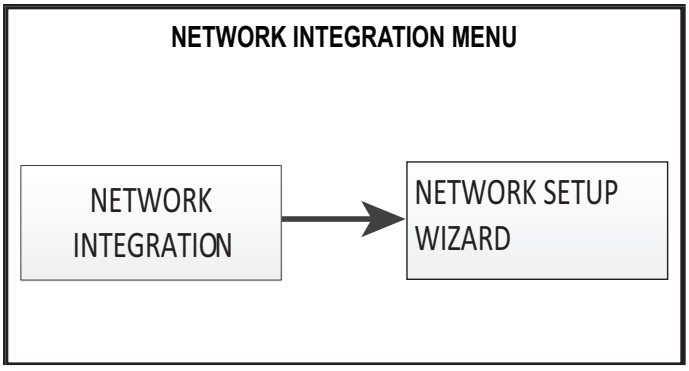


FIGURE 14

E-Unit Controller Components

See FIGURE 16 for Unit Controller components. See FIGURE 17 and TABLE 2 for pushbutton and LED functions.

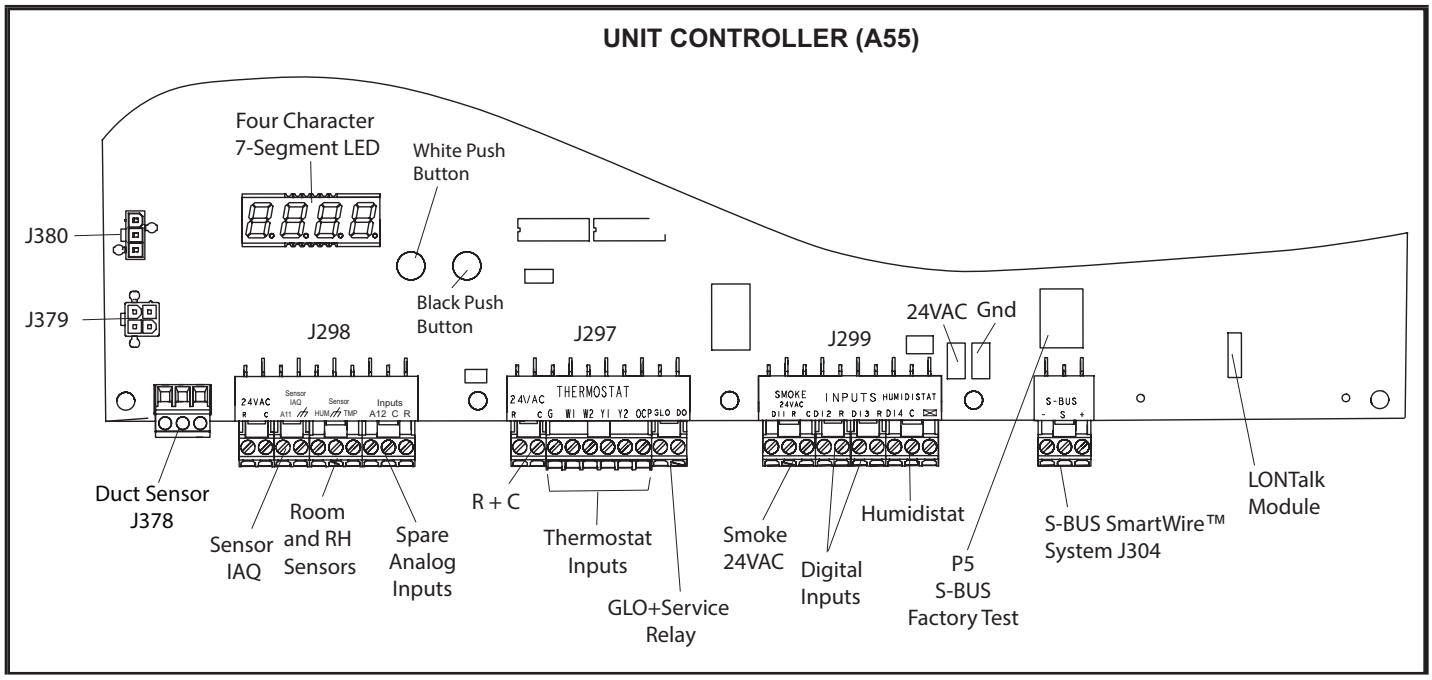
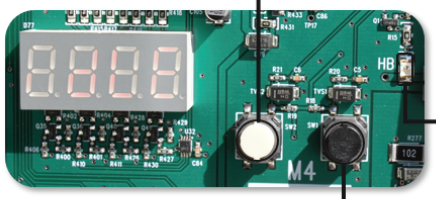


FIGURE 15



TEST BUTTON

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

HB LED – blinks while M4 is powered

RESET BUTTON

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

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

**Short Press (2 – 5 Seconds), Long Press (5 – 10 seconds)*

FIGURE 16

TABLE 2

UNIT CONTROLLER PUSHBUTTON CODES

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

Multi-Staged Air Volume Start-Up

A-Design Specifications

Use TABLE 3 to fill in field-provided, design specified blower CFM for appropriate unit.

B-Set Maximum CFM

Use TABLE 4 to determine highest blower CFM for appropriate unit. Adjust the blower pulley to deliver that amount of CFM with only the blower operating. See Determining Unit CFM in the Blower Operation and Adjustment section.

C-Set Blower Speeds

Use the following mobile service app menu to enter the blower design specified CFM into the Unit Controller. Make sure blower CFM is within limitations shown in TABLE 4 or TABLE 5. Refer to the Unit Controller manual provided with unit.

RTU MENU > RTU OPTIONS > BLOWER > SPEED

Enter the following design specifications as shown in TABLE 4.

Blower / Heat CFM
Cooling High CFM
Cooling Low CFM
Vent CFM

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

Measure the static pressure again and apply the static pressure and RPM to the 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 damper to “Min OCP Blwr High” when blower CFM is at or ABOVE the “midpoint” CFM.

The Unit Controller will open the dampers to “Min OCP Blwr Low” when blower CFM is BELOW a “midpoint” CFM.

The Unit Controller will calculate the “midpoint” CFM.

TABLE 3
Blower CFM Design Specifications

Unit	T’Stat or Zone Control Stages	Blower Speed	Design Specified CFM
92	3	Htg.	
		Clg. High	
		Clg. Med	
		Clg. Low	
		Ventilation	
102	3	Htg.	
		Clg. High	
		Clg. Med	
		Clg. Low	
		Ventilation	
120	3	Htg.	
		Clg. High	
		Clg. Med	
		Clg. Low	
		Ventilation	

*Available blower speeds vary by unit and thermostat stages.

Set Minimum Position 1

Use the following mobile service app menu to set “Min OCP Blwr High” for the blower CFM above the “midpoint” CFM. When navigating into this menu, the Unit Controller will run damper calibration and allow damper position adjustment.

RTU MENU > SETTINGS > RTU OPTIONS > DAMPER

Tap “Next” to skip tabs and complete damper position calibration until “Damper Calibration Blower Speed High” tab appears.

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 4
HEATING, VENTILATION & SMOKE MINIMUM AND MAXIMUM CFM

Unit				Heating CFM			Vent CFM			Smoke CFM		
Model	Tonnage	Heat Option	Heat Code	Default	Min	Max	Default	Min	Max	Default	Min	Max
LHX092S5	7.5	All	N,C,E,G,J,K	3000	2800	3600	3000	1125	3600	3000	1125	3600
LHX102S5	8.5	All	N,C,E,G,J,K	3400	2800	4075	3400	1275	4075	3400	1275	4075
LHX120S5	10	15, 30, 45 KW	E,G,J,K	4000	2800	4800	4000	1500	4800	4000	1500	4800
		0, 60 KW	N, L		4000							

*Use highest value between Heating and Cooling High CFM max

TABLE 5
COOLING MINIMUM AND MAXIMUM CFM

LHX Unit	Cooling Low CFM			Cooling Med-Low CFM			Cooling High CFM		
	Default	Min	Max	Default	Min	Max	Default	Min	Max
092	1800	1650	3600	2400	2100	3600	3000	1650	3600
102	2050	1875	4075	3050	2375	4075	3400	1875	4075
120	2400	2200	4800	3200	2800	4800	4000	2200	4800

*Use Cooling High CFM Max

Set Minimum Position 2

Use the following mobile service app 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 run damper calibration and allow damper position adjustment.

RTU MENU > SETTINGS > RTU OPTIONS > DAMPER

Tap "Next" to skip tabs and complete damper position calibration until "Damper Calibration Blower Speed High" tab appears.

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

The supply air inverter is factory-set to bypass the inverter manually. To bypass the inverter and operate the blower in the constant air volume mode, use the following Unit Controller menu and set to "engaged":

SETTINGS > RTU OPTIONS > BLOWER > VFD BYPASS

To configure the unit to bypass the inverter automatically, use the following Unit Controller menu.

SETUP > INSTALL

Press SAVE until the menu reads:

CONFIGURATION ID 1

Change the 6th character position to A for automatic bypass option.

Press SAVE

CAUTION - Units not equipped with an inverter will have the 6th character set to N, indicating the inverter is not by-passed. The blower motor could be damaged and/or result in product or property damage if the setting is changed to automatic or manual.

Blower Operation and Adjustments

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

Supply Air Staged Units and Units 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

Refer to the Unit Controller Setup Guide to energize blower. Use this mobile service app menu:

SERVICE > TEST > BLOWER

Instructions provided with the thermostat may also be used to initiate blower only (G) demand. 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.

⚠ IMPORTANT

Three Phase Scroll Compressor Voltage Phasing

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

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

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

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

3- Disconnect all remote electrical power supplies.

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

5- Make sure the connections are tight.

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

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

⚠ WARNING

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 new and in place before start-up.

B-Blower Access

The blower assembly is secured to a sliding base which allows the entire assembly to be pulled out of the unit. See FIGURE 13.

Remove the clamp which secures the blower wiring to the blower motor base.

Remove and retain screws on either side of sliding base. Pull base toward outside of unit. When pulling the base out further than 12” (305mm), disconnect wiring to K3 blower contactor T1, T2, and T3. Pull wiring toward blower to allow enough slack to slide the base out further.

Slide base back into original position when finished servicing. Replace the clamp and blower wiring in the previous location on the blower motor base. Reconnect wiring to K3 if it was disconnected.

Replace retained screws on either side of the sliding base.

Tighten two bolts on motor pulley side. IMPORTANT - Align top edges of blower motor base and mounting frame base parallel before tightening two bolts on the other side of base. Motor shaft and blower shaft must be parallel.

Tighten two bolts on other side of base.

C-Determining Unit CFM

IMPORTANT - Units are factory-set to run the blower at full speed when there is a blower (G) demand without a heating or cooling demand. Use the following procedure to adjust motor pulley to deliver the full load cooling or heating CFM. See Supply Air Inverter Start-Up section to set blower CFM for all modes once the motor pulley is set.

1 - The following measurements must be made with a dry indoor coil and with air filters in place. Run blower without a cooling demand. Measure the indoor blower shaft RPM.

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 20.

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

3 - Referring to page 20, use static pressure and RPM readings to determine unit CFM. Use page 21 when installing units with any of the optional accessories listed.

4 - The blower RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. See FIGURE 19. Tighten Allen screw after adjustment. Do not exceed minimum and maximum number of pulley turns as shown in TABLE 6.

TABLE 6
MINIMUM AND MAXIMUM PULLEY ADJUSTMENT

Belt	Minimum Turns Open	Maximum Turns Open
A Section	No minimum	5
B Section	1*	6

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

D-Blower Belt Adjustment

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 grooves. Make sure blower and motor pulley are aligned as shown in FIGURE 18.

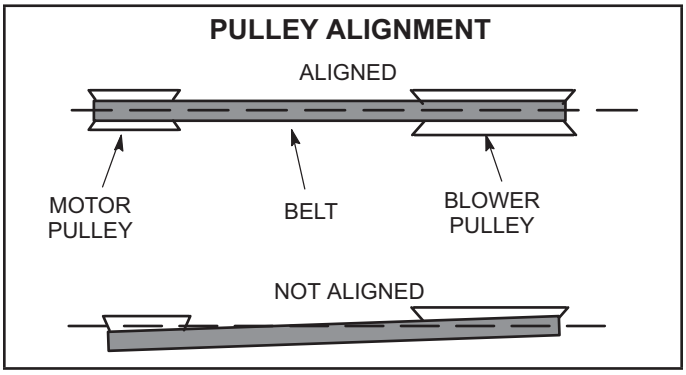


FIGURE 17

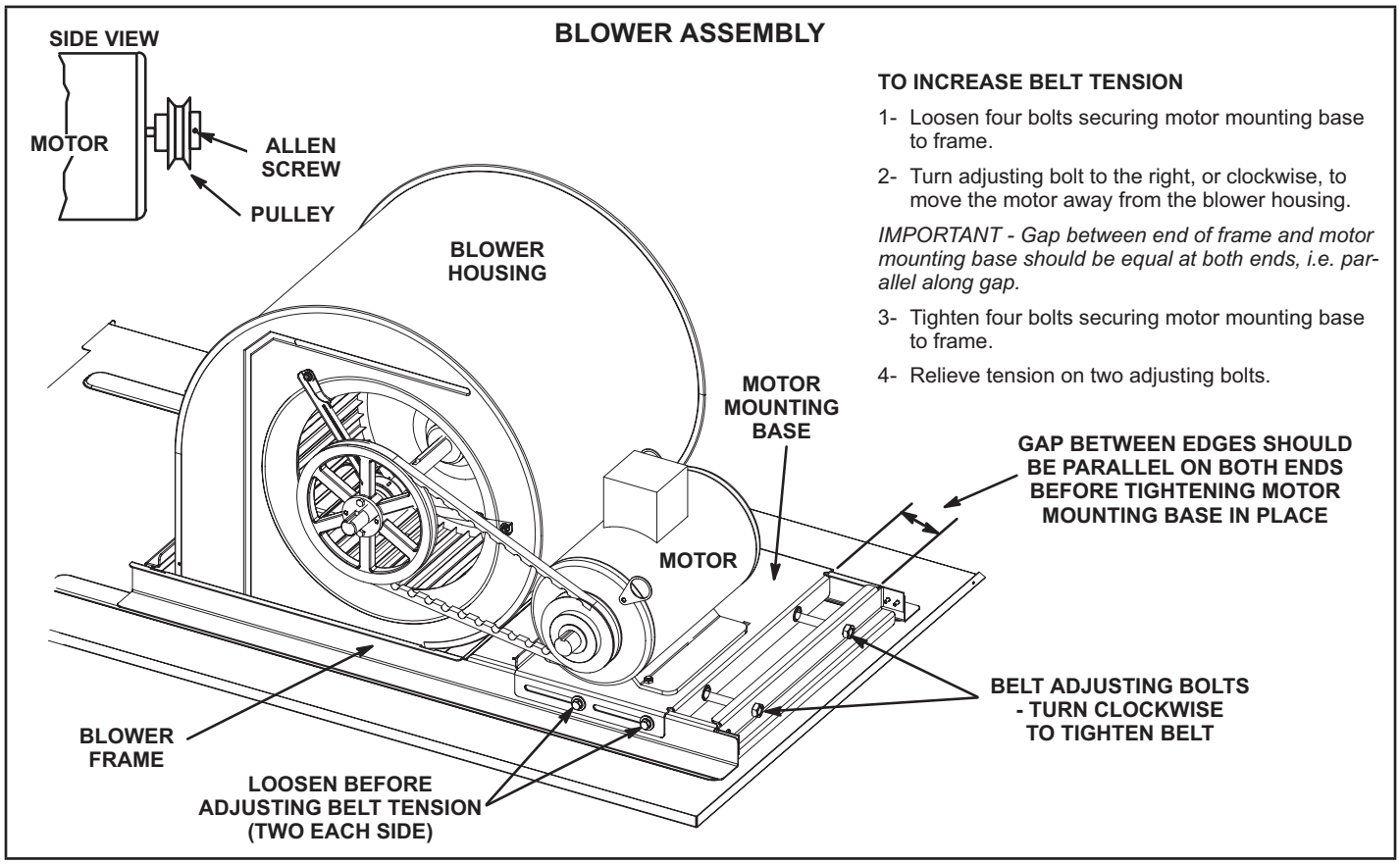


FIGURE 18

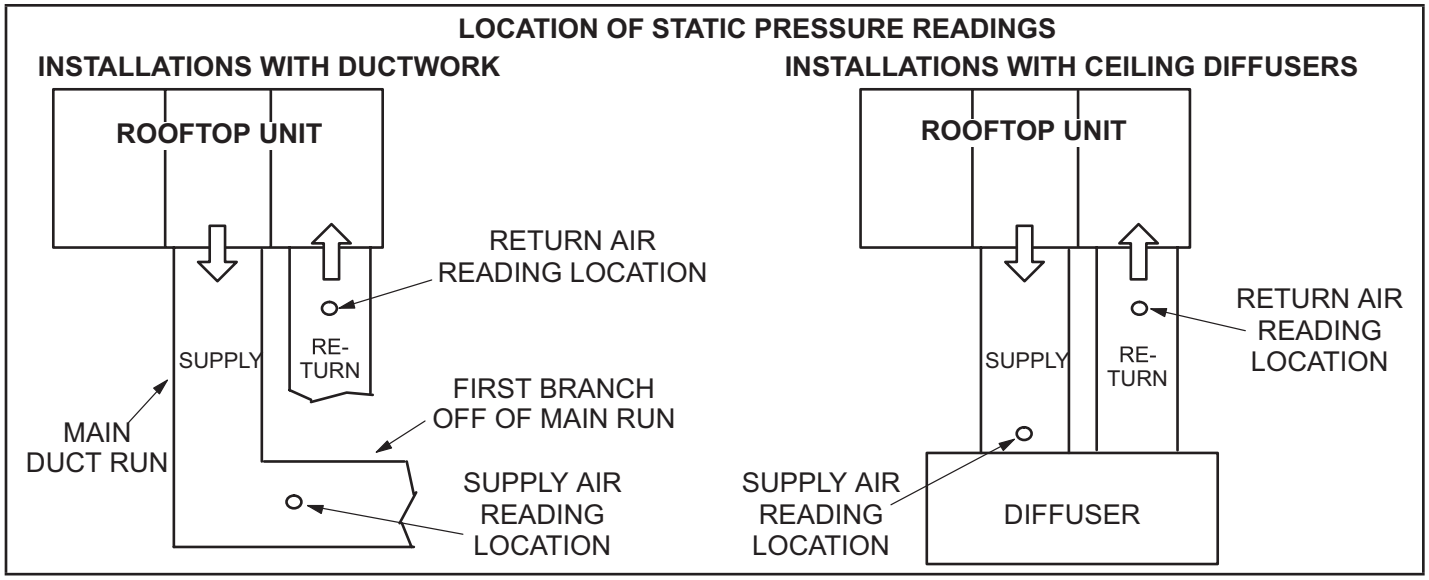


FIGURE 19

E-Check Belt Tension

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

1 - Measure span length X. See FIGURE 21.

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 used belt, the deflection force should be 5 lbs. (35kPa) . A new belt deflection force should be 7 lbs. (48kPa).

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

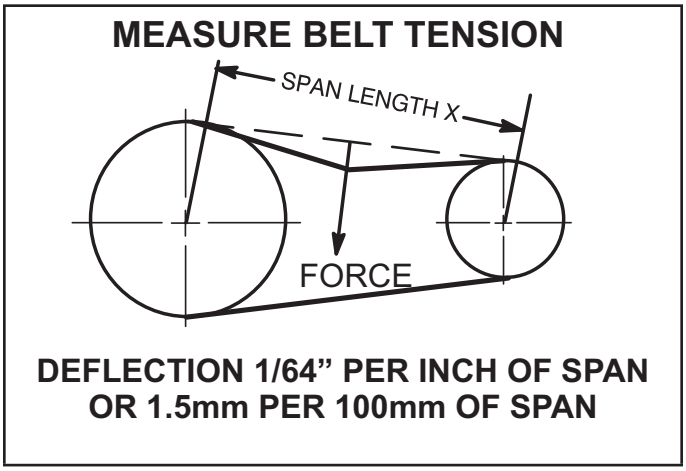


FIGURE 20

F-Field-Furnished Blower Drives

For field-furnished blower drives, use page 20 and page 21 to determine BHP and RPM required. Reference page 20 to determine the drive kit and TABLE 7 to determine the manufacturer's model number.

BLOWER DATA

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY WITH DRY INDOOR COIL & AIR FILTERS IN PLACE
FOR ALL UNITS ADD:
1- Wet indoor coil air resistance of selected unit.
2- Any factory installed options air resistance (electric heat, economizer, etc.)
3- Any field installed accessories air resistance (electric heat, duct resistance, diffuser, etc.)
Then determine from blower table blower motor output and drive required.
See page 20 for wet coil and option/accessory air resistance data.
See page 20 for factory installed drive kit specifications.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT

All units require 6000 cfm minimum air with electric heat.

Air Volume	TOTAL STATIC PRESSURE - Inches Water Guage (Pa)																									
	0.20		0.40		0.60		0.80		1.00		1.20		1.40		1.60		1.80		2.00		2.20		2.40		2.60	
cfm	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	542	0.43	602	0.60	664	0.75	732	0.89	802	1.02	869	1.15	927	1.27	979	1.41	1029	1.57	1079	1.75	1129	1.95	1179	2.15	1230	2.37
2250	560	0.55	619	0.71	681	0.86	748	1.00	817	1.14	882	1.27	939	1.41	991	1.57	1041	1.74	1090	1.93	1140	2.13	1190	2.35	1241	2.57
2500	579	0.68	637	0.83	699	0.98	766	1.12	834	1.26	897	1.41	953	1.57	1005	1.74	1054	1.92	1103	2.12	1152	2.33	1202	2.55	1254	2.79
2750	599	0.81	657	0.97	719	1.11	785	1.25	851	1.41	913	1.57	968	1.74	1020	1.93	1068	2.13	1116	2.34	1165	2.56	1215	2.78	1268	3.01
3000	620	0.95	678	1.11	741	1.25	806	1.40	870	1.58	930	1.75	985	1.94	1036	2.14	1084	2.36	1131	2.58	1180	2.80	1230	3.02	1283	3.26
3250	643	1.10	701	1.26	764	1.41	828	1.57	891	1.76	950	1.95	1003	2.16	1053	2.38	1100	2.61	1148	2.83	1196	3.06	1246	3.29	1299	3.52
3500	667	1.26	726	1.43	788	1.58	851	1.77	913	1.97	970	2.17	1023	2.41	1071	2.65	1118	2.88	1165	3.11	1213	3.33	1264	3.57	1317	3.81
3750	693	1.44	752	1.61	813	1.78	876	1.98	936	2.20	992	2.43	1043	2.68	1091	2.93	1137	3.17	1183	3.40	1232	3.64	1284	3.88	1338	4.13
4000	720	1.65	779	1.82	840	2.00	902	2.22	961	2.46	1015	2.71	1064	2.98	1111	3.24	1156	3.48	1203	3.72	1253	3.96	1305	4.22	1359	4.48
4250	748	1.86	807	2.04	868	2.24	929	2.48	986	2.75	1038	3.02	1086	3.30	1132	3.57	1177	3.81	1224	4.05	1274	4.31	1327	4.57	1382	4.85
4500	778	2.09	837	2.28	898	2.51	957	2.78	1012	3.07	1062	3.37	1108	3.65	1154	3.92	1199	4.17	1247	4.41	1297	4.67	1350	4.94	1405	5.22
4750	809	2.34	868	2.56	929	2.82	986	3.12	1038	3.43	1087	3.74	1132	4.03	1177	4.29	1223	4.54	1270	4.79	1321	5.04	1374	5.31	1428	5.58
5000	841	2.62	901	2.87	960	3.17	1015	3.50	1065	3.83	1112	4.14	1157	4.43	1201	4.69	1247	4.94	1295	5.18	1345	5.42	1398	5.68	---	---
5250	875	2.93	935	3.23	992	3.56	1044	3.91	1092	4.26	1138	4.57	1182	4.85	1226	5.10	1272	5.34	1320	5.57	---	---	---	---	---	---
5500	911	3.30	969	3.63	1024	4.00	1074	4.37	1120	4.71	1165	5.02	1208	5.29	1253	5.53	---	---	---	---	---	---	---	---	---	---
5750	948	3.71	1004	4.08	1056	4.48	1104	4.85	1148	5.19	1192	5.49	1235	5.74	---	---	---	---	---	---	---	---	---	---	---	---
6000	985	4.18	1039	4.59	1088	5.00	1134	5.37	1177	5.69	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6250	1022	4.70	1073	5.14	1120	5.54	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

BLOWER DATA

FACTORY INSTALLED BELT DRIVE KIT SPECIFICATIONS

Nominal hp	Maximum hp	Drive Kit Number	RPM Range
2	2.3	1	590 - 890
2	2.3	2	800 - 1105
2	2.3	3	795 - 1195
3	3.45	4	730 - 970
3	3.45	5	940 - 1200
3	3.45	6	1015 - 1300
5	5.75	10	900 - 1135
5	5.75	11	1050 - 1335

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.*

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

Air Volume cfm	Wet Indoor Coil		Electric Heat	Economizer	Filters		Return Air Adapter Plate
	092	102, 120			MERV 8	MERV 13	
1750	0.04	0.04	0.03	0.05	0.01	0.03	0.00
2000	0.05	0.05	0.03	0.06	0.01	0.03	0.00
2250	0.06	0.06	0.04	0.08	0.01	0.04	0.00
2500	0.07	0.07	0.04	0.11	0.01	0.05	0.00
2750	0.08	0.08	0.05	0.12	0.02	0.05	0.00
3000	0.10	0.09	0.06	0.13	0.02	0.06	0.02
3250	0.11	0.10	0.06	0.15	0.02	0.06	0.02
3500	0.12	0.11	0.09	0.15	0.03	0.07	0.04
3750	0.14	0.13	0.09	0.15	0.03	0.08	0.07
4000	0.15	0.14	0.09	0.19	0.04	0.08	0.09
4250	0.17	0.15	0.13	0.19	0.04	0.09	0.11
4500	0.19	0.17	0.14	0.22	0.04	0.09	0.12
4750	0.20	0.18	0.17	0.25	0.05	0.10	0.16
5000	0.22	0.20	0.20	0.29	0.06	0.10	0.18
5250	0.24	0.22	0.22	0.32	0.06	0.11	0.19
5500	0.25	0.23	0.25	0.34	0.07	0.12	0.22
5750	0.27	0.25	0.31	0.45	0.07	0.12	0.25
6000	0.29	0.27	0.33	0.52	0.08	0.13	0.27

TABLE 7
MANUFACTURER'S NUMBERS

Drive No.	DRIVE COMPONENTS					
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELTS	
	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	P-8-1488	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
10	1VP50x1-1/8	P-8-1977	BK77x1	49K4001	BX59	59A5001
11	1VP60x1-1/8	41C1301	BK77x1	49K4001	BX61	93J9801

Refrigerant Leak Detection System

A-System Test

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

RTU MENU > COMPONENT TEST > LEAK DETECTION > START TEST

2 - Ensure that indoor blower and outdoor fan are energized.

Diagnostic Sensors

Units are equipped with four factory-installed thermistors (RT46, 47, 48, & 49) located on different points on the refrigerant circuit.

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

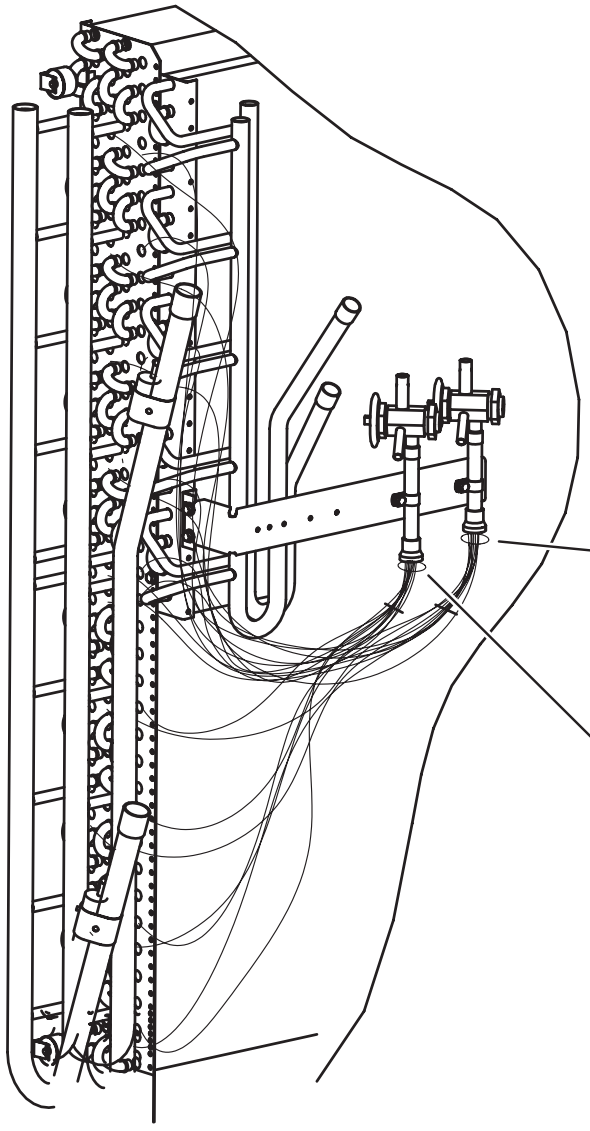
Each thermistor must be specifically placed for proper unit operation and to initiate valid alarms. See TABLE 8 for proper locations.

TABLE 8

THERMISTOR LOCATION

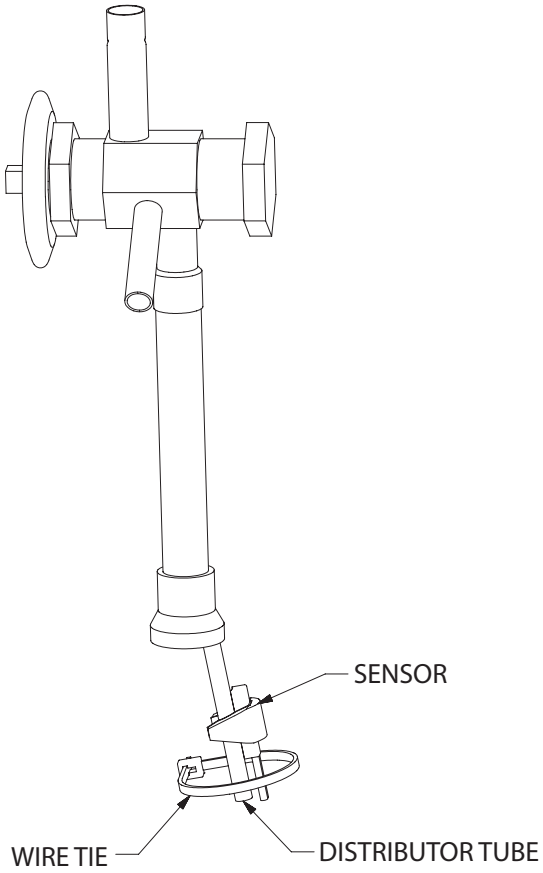
Unit	Sensor	Figure
LHX092-120 Indoor Coil	RT46, 47	FIGURE 22
LHX092-120 Outdoor Coil	RT48, 49	FIGURE 23

LHX092, 102, 120
EVAPORATOR COIL
RT46, RT47



22J06
BLUE
RT47
(STAGE 2)

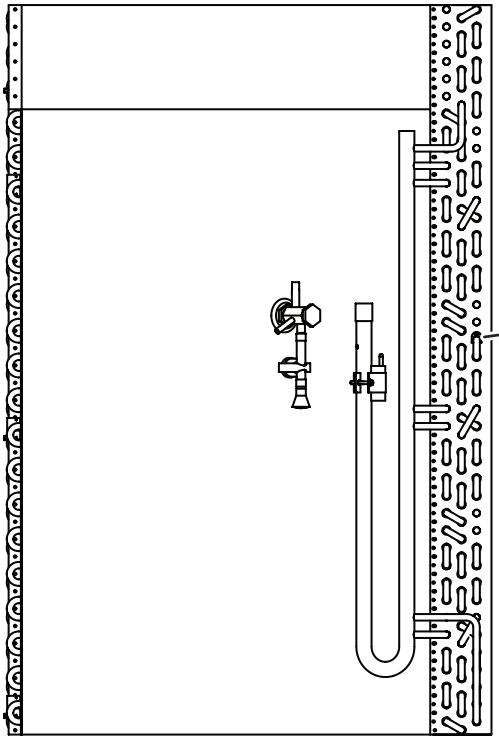
22J06
YELLOW
RT46
(STAGE 1)



DETAILS NOT TO SCALE

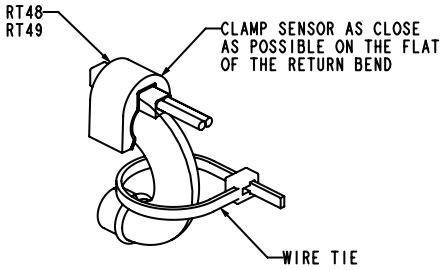
FIGURE 21

LHX092, 102, 120
CONDENSER COIL
RT48, RT49

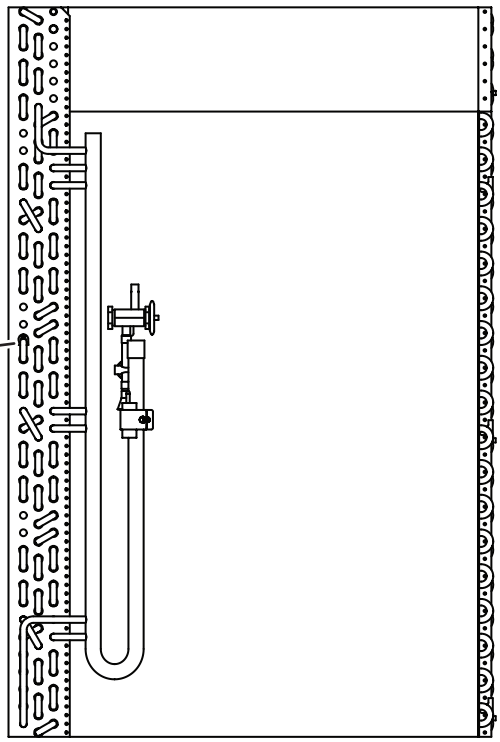


22J08
BLUE
RT49

STAGE 2



SENSOR DETAIL



22J08
YELLOW
RT48

STAGE 1

DETAILS NOT TO SCALE

FIGURE 22

RDS Sensors

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

Each sensor must be specifically placed for proper unit operation and to initiate valid alarms. To identify sensor locations see TABLE 9.

TABLE 9

RDS Sensor Figures

Model	Qty.	Type	Figure
LHX092-120	1 sensor	INDOOR SENSOR	FIGURE 24

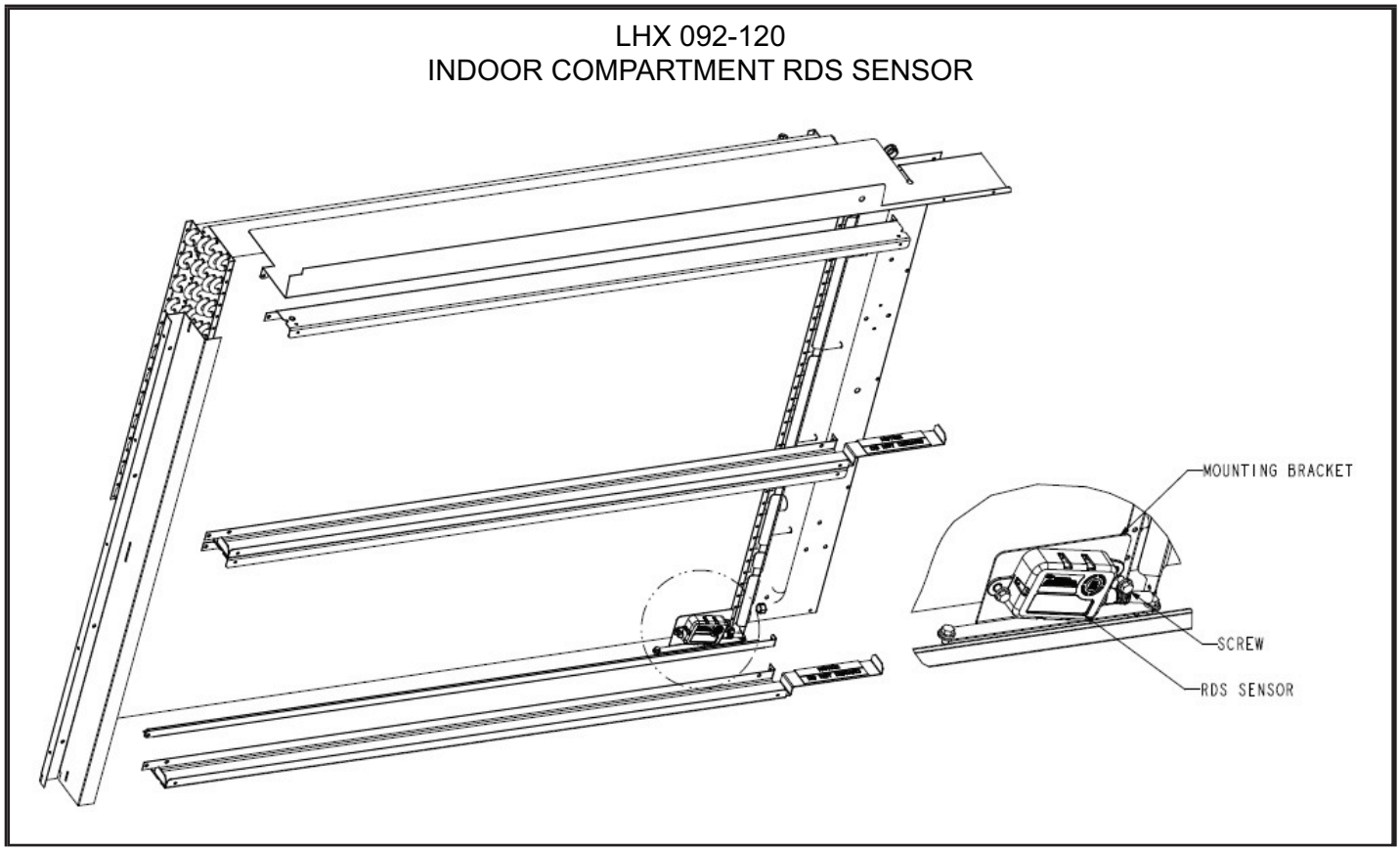


FIGURE 23

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-Start-Up

1 - Initiate full load cooling operation using the following mobile service app menu path:

RTU MENU > SERVICE > COMPONENT TEST > COOLING > COOLING STAGE 3

2 - Refer to Cooling Operation section for cooling start-up.

3 - Units have two refrigerant circuits. See FIGURE 25.

4 - Each refrigerant circuit is charged with R454B refrigerant. See unit rating plate for correct amount of charge.

5 - Refer to Refrigerant Check and Charge section for proper method to check refrigerant charge.

REFRIGERANT STAGES - TWO FANS
LHX092, 102, 120:

Two-Stage Thermostat/Control:

Y1 Demand = Outdoor Fan 1 HIGH Speed, Fan 2 OFF
Y2 Demand = Outdoor Fans 1 & 2 HIGH Speed
W1 Demand (Heat Pump Heating) =
Outdoor Fans 1 & 2 HIGH Speed

Three-Stage Thermostat/Control:

Y1 Demand = Outdoor Fan 1 LOW Speed, Fan 2 OFF
Y2 Demand = Outdoor Fans 1, 2 MEDIUM Speed
Y3 Demand = Outdoor fans 1, 2, HIGH Speed
W1 Demand (HP Heating)=
Outdoor Fans 1, 2 High Speed

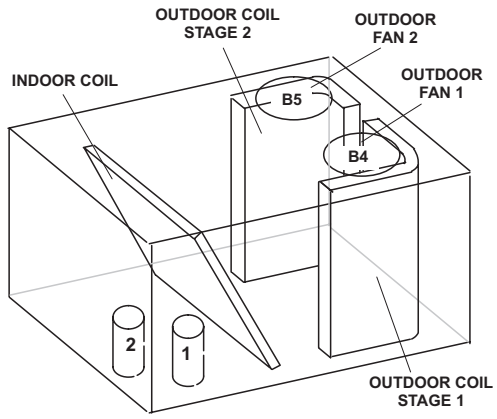


FIGURE 24

B-R454B Refrigerant

Units charged with R454B refrigerant operate at lower pressures than R410A. The expansion valve and liquid line dryer provided with the unit are approved for use with R454B.

R454B refrigerant is stored in a gray cylinder.

⚠ CAUTION

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

Manifold gauge sets used with systems charged with R454B refrigerant must be capable of handling various 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.

Refrigerant Charge R-454B			
Unit	Stage	M_c(lbs)	M_c(kg)
LHX092	Stage 1	13.25	6.01
	Stage 2	13.50	6.12
LHX102	Stage 1	12.50	5.67
	Stage 2	14.00	6.35
LHX120	Stage 1	12.44	5.64
	Stage 2	12.25	5.56

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

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

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

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-of f valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery
- The recovery equipment shall be in good work-

ing order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

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

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

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

2 - Compare the normal operating pressures to the pressures obtained from the gauges. Check unit components if there are significant differences.

3 - Measure the outdoor ambient temperature and the suction pressure. Refer to the charging curve to determine a target liquid temperature.

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

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

- If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
- If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system..

5 - Add or remove charge in increments. Allow the system to stabilize each time refrigerant is added or removed.

6 - Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.

7 - Example: At 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 97°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 10
581313-01
LHX092 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1			CIRCUIT 2		
	Dis. ± 10 psig	Suc. ± 5 psig	Appr. Temp +/-1F	Dis. ± 10 psig	Suc. ± 5 psig	Appr. Temp +/-1F
65°F	233	125	4	229	120	4
75°F	271	128	5	269	126	5
85°F	312	130	5	310	130	4
95°F	357	133	5	354	134	4
105°F	409	135	6	404	137	5
115°F	463	137	6	456	140	5

TABLE 11
581314-01
LHX102 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1			CIRCUIT 2		
	Dis. ± 10 psig	Suc. ± 5 psig	Appr. Temp +/-1F	Dis. ± 10 psig	Suc. ± 5 psig	Appr. Temp +/-1F
65°F	248	126	7	232	123	7
75°F	287	129	7	270	129	7
85°F	329	131	7	311	133	7
95°F	371	132	7	349	135	5
105°F	420	133	7	398	139	5
115°F	473	132	7	451	142	5

TABLE 12
581315-01
LHX120 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1			CIRCUIT 2		
	Dis. ± 10 psig	Suc. ± 5 psig	Appr. Temp +/-1F	Dis. ± 10 psig	Suc. ± 5 psig	Appr. Temp +/-1F
65°F	245	122	6	255	118	7
75°F	283	124	6	291	121	6
85°F	324	126	6	332	122	7
95°F	370	127	7	377	124	7
105°F	420	129	7	427	127	7
115°F	474	132	7	481	130	7

C-Charge Verification - Approach Method - AHRI Testing

Using the same thermometer, compare liquid temperature to outdoor ambient temperature.

1 - Approach Temperature = Liquid temperature (at condenser outlet) minus ambient temperature.

2 - Approach temperature should match values in TABLE 10 through TABLE 12. 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 TABLE 10 through TABLE 12 as a guide for typical operating pressures.

D-Compressor Controls

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

1 - High Pressure Switch (S4, S7)

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

2 - Low Pressure Switch (S87, S88)

The compressor circuit is protected by a loss of charge switch. Switch opens at 25 psig + 5 psig (172 + 34 kPa) and automatically resets at 40 psig + 5 psig (276 kPa + 34 kPa).

3 - 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.

4 - Diagnostics Sensors (RT46-RT49)

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

Heating Start-Up

1 - Set thermostat or temperature control device to initiate a first-stage heating demand.

A first-stage heating demand (W1) will energize compressors 1 and 2. All four outdoor fans are energized with a W1 demand.

LHX Units With Optional Electric Heat -

An increased heating demand (W2) will energize electric heat.

Defrost Control

The defrost control ensures that the heat pump outdoor coil does not ice excessively during the heating mode. Defrost is enabled below 35°F. The Unit Controller will cycle in and out of defrost depending on the temperature difference between the outdoor coil and outdoor air temperature.

If the system fails to calibrate or obtain readings for demand defrost, defrost will run-time at the field setting. Defrost is also initiated when the accumulated run time with the outdoor coil temperature below 35°F reaches six hours.

Electric heat (optional on LHX) is energized during defrost.

NOTE - *Only one refrigerant circuit will go into defrost at a time.*

Defrost Test or Forced Defrost Option A TEST option is provided for troubleshooting. The TEST mode may be started at any time using the mobile service app.

Defrost mode may be started by entering the Defrost Mode in the Component Test Menu. When defrost is started, unit will run in Defrost Mode for a maximum of five minutes or when the outdoor coil reaches 100°F, whichever occurs first.

Cooling Operation

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

A-Two-Stage 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 five minutes, compressors are energized and blower stays on cooling high.*

Y2 Demand -

Compressor Full Load

Blower Cooling High Dampers

Maximum Open

2 - No Economizer or Outdoor Air Not Suitable

Y1 Demand -

Compressor 1 Full Load

Blower Cooling Low

Dampers Minimum Position

Y2 Demand -

Compressors Both Full Load

Blower Cooling High

Dampers Minimum Position

B-Room Sensor

1 - Economizer With Outdoor Air Suitable

Compressors Off

Blower Modulates

Dampers Modulate

NOTE - *If dampers are at maximum open for five minutes, compressors are energized and the blower modulates.*

2 - No Economizer or Outdoor Air Not Suitable

Compressors 1 Full Load

Blower High

Dampers Minimum Position

C-Three-Stage Thermostat

1 - Economizer With Outdoor Air Suitable

Y1 Demand -

Compressors Off

Blower Cooling Medium

Dampers Modulate

Y2 Demand -

Compressors Off

Blower Cooling High

Dampers Modulate

NOTE - *If dampers are at maximum open for five minutes, compressors are energized and blower stays on cooling high.*

Y2 Demand -

Compressor 1 Part Load

Blower Cooling High Dampers

Maximum Open

Y3 Demand -

Compressor 1 Full Load

Blower Cooling High

Dampers Maximum Open

2 - No Economizer or Outdoor Air Not Suitable

Y1 Demand -

Compressor 1 Part Load

Blower Cooling Low

Dampers Minimum Position

Y2 Demand -

Compressor 1 Part Load, Compressor 2 On

Blower Cooling Medium

Dampers Minimum Position

Y3 Demand -

Compressors Both Full Load

Blower Cooling High

Dampers Maximum Open

D-Defrost

Defrost is enabled when outdoor coil temperature is below 35°F. The Unit Controller will cycle in and out of defrost depending on the temperature difference between the outdoor coil and outdoor air temperature.

Defrost is also initiated when the accumulated run time with the outdoor coil temperature below 35°F reaches six hours.

NOTE - *Only one refrigerant circuit will go into defrost at a time*

Preventative Maintenance / Repair

IMPORTANT MAINTENANCE / REPAIR SAFETY INSTRUCTIONS

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

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

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

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

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

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

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

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

Initial safety checks shall include:

– that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking

– that no live electrical components and wiring are exposed while charging, recovering or purging the system

– that there is continuity of earth bonding

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

cthe actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant

containing parts are installed;

– the ventilation machinery and outlets are operating adequately and are not obstructed;

– if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

– marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

– refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

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

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

⚠ CAUTION

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

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

A-Lubrication

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

Blower shaft bearings are prelubricated. For extended bearing life, relubricate at least once every two years with a lithium base grease, such as Alvania 3 (Shell Oil), Chevron BRB2 (Standard Oil) or Regal AFB2 (Texas Oil). Use a hand grease gun for relubrication. Add only enough grease to purge through the bearings so that a bead of grease appears at the seal lip contacts.

B-Filters

Units are equipped with six 24 X 24 X 2” filters. Filters should be checked 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 26.

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

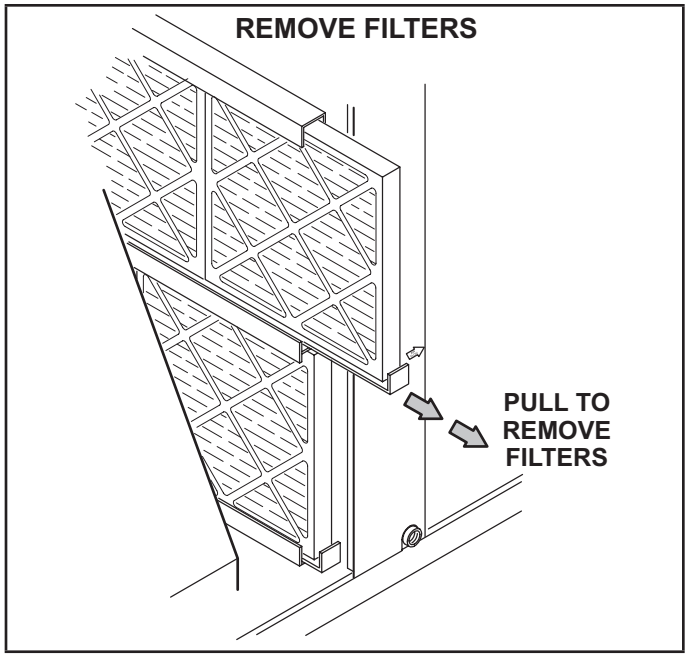


FIGURE 25

C-Indoor Coil

Inspect and clean coil at beginning of each cooling and heating 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.

D-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.

E-Outdoor Coil

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

Clean the 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.

M-Replacement Fuses

See the following tables for the proper replacement fuse sizes.

ELECTRIC HEAT REPLACEMENT FUSES				
	Electric Heat	Qty.	Rating	
			Amp	Volt
1	EH0075-1Y	3	25	250
2	EHO150-1Y	3	50	250
3	EHO225-1Y	3 EA.	25 & 50	250
4	EHO300-1Y	6	50	250
5	EHO450-1Y	3/6	50 & 60	250
6	EH0600-1Y	12	60	250
7	EH0075-1G	3	15	600
8	EH0150-1G	3	25	600
9	EHO225-1G	3 EA.	15 & 25	600
10	EHO300-1G	6	25	600
11	EHO450-1G	3 EA.	25 & 50	600
12	EH0600-1G	6	50	600
13	EH0075-1J	3	10	600
14	EH0150-1J	3	20	600
15	EHO225-1J	3 EA.	10 & 20	600
16	EHO300-1J	6	20	600
17	EHO450-1J	3 EA.	20 & 40	600
18	EH0600-1J	6	40	600

TABLE 13

LHX 092													
Electric Heat Size			7.5 KW						15 KW					
Unit Voltage			208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph		208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph	
Power Exhaust Option			W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.
Diagram Key	Class	Blower HP	Amps						Amps					
F4	RK or K	2HP	50	50	25	25	20	20	50	50	25	25	20	20
F4	RK or K	3HP	50	50	30	25	25	20	50	50	30	25	25	20
F4	RK or K	5HP	70	60	30	30	25	25	70	60	30	30	25	25
F10	CC	All	12	12	12	12	12	12	12	12	12	12	12	12

TABLE 14

LHX 092 continued														
Electric Heat Size			22.5 KW						30 KW					
Unit Voltage			208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph		208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph	
Power Exhaust Option			W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.
Diagram Key	Class	Blower HP	Amps						Amps					
F4	RK or K	2HP	50	50	25	25	20	20	50	50	25	25	20	20
F4	RK or K	3HP	50	50	30	25	25	20	50	50	30	25	25	20
F4	RK or K	5HP	70	60	30	30	25	25	70	60	30	30	25	25
F10	CC	All	12	12	12	12	12	12	12	12	12	12	12	12

TABLE 15

LHX 092 continued								
Electric Heat Size			45 KW					
Unit Voltage			208/230V - 3 Ph		460V - 3Ph		575V - 3Ph	
Power Exhaust Option			W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.
Diagram Key	Class	Blower HP	Amps					
F4	RK or K	2HP	50	50	25	25	20	20
F4	RK or K	3HP	50	50	30	25	25	20
F4	RK or K	5HP	70	60	30	30	25	25
F10	CC	All	12	12	12	12	12	12

TABLE 16

LHX 102													
Electric Heat Size			7.5 KW						15 KW					
Unit Voltage			208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph		208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph	
Power Exhaust Option			W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.
Diagram Key	Class	Blower HP	Amps						Amps					
F4	RK or K	2HP	50	50	25	25	20	20	50	50	25	25	20	20
F4	RK or K	3HP	60	50	30	25	25	20	60	50	30	25	25	20
F4	RK or K	5HP	70	60	30	30	25	25	70	60	30	30	25	25
F10	CC	All	12	12	12	12	12	12	12	12	12	12	12	12

TABLE 17

LHX 102 continued														
Electric Heat Size			22.5 KW						30 KW					
Unit Voltage			208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph		208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph	
Power Exhaust Option			W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.
Diagram Key	Class	Blower HP	Amps						Amps					
F4	RK or K	2HP	50	50	25	25	20	20	50	50	25	25	20	20
F4	RK or K	3HP	60	50	30	25	25	20	60	50	30	25	25	20
F4	RK or K	5HP	70	60	30	30	25	25	70	60	30	30	25	25
F10	CC	All	12	12	12	12	12	12	12	12	12	12	12	12

TABLE 18

LHX 102 continued								
Electric Heat Size			45 KW					
Unit Voltage			208/230V - 3 Ph		460V - 3Ph		575V - 3Ph	
Power Exhaust Option			W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.
Diagram Key	Class	Blower HP	Amps					
F4	RK or K	2HP	50	50	25	25	20	20
F4	RK or K	3HP	60	50	30	25	25	20
F4	RK or K	5HP	70	60	30	30	25	25
F10	CC	All	12	12	12	12	12	12

TABLE 19

LHX 120													
Electric Heat Size			15 KW						22.5 KW					
Unit Voltage			208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph		208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph	
Power Exhaust Option			W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.
Diagram Key	Class	Blower HP	Amps						Amps					
F4	RK or K	2HP	70	70	35	30	25	25	70	70	35	30	25	25
F4	RK or K	3HP	80	70	35	35	30	25	80	70	35	35	30	25
F4	RK or K	5HP	80	80	35	35	30	30	80	80	35	35	30	30
F10	CC	All	12	12	12	12	12	12	12	12	12	12	12	12

TABLE 20

LHX 120 continued														
Electric Heat Size			30 KW						45 KW					
Unit Voltage			208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph		208/230V - 3 Ph		460V - 3 Ph		575V - 3 Ph	
Power Exhaust Option			W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.
Diagram Key	Class	Blower HP	Amps						Amps					
F4	RK or K	2HP	70	70	35	30	25	25	70	70	35	30	25	25
F4	RK or K	3HP	80	70	35	35	30	25	80	70	35	35	30	25
F4	RK or K	5HP	80	80	35	35	30	30	80	80	35	35	30	30
F10	CC	All	12	12	12	12	12	12	12	12	12	12	12	12

TABLE 21

LHX 120 continued								
Electric Heat Size			60 KW					
Unit Voltage			208/230V - 3 Ph		460V - 3Ph		575V - 3Ph	
Power Exhaust Option			W / P.E.	W / O P.E.	W / P.E.	W / O P.E.	W / P.E.	W / O P.E.
Diagram Key	Class	Blower HP	Amps					
F4	RK or K	2HP	70	70	35	30	25	25
F4	RK or K	3HP	80	70	35	35	30	25
F4	RK or K	5HP	80	80	35	35	30	30
F10	CC	All	12	12	12	12	12	12

Adusting Factory Unit Controller Settings

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

When field installing optional kits and accessories, the Unit Controller must be configured to identify the option before it will function. Refer to FIGURE 27 and FIGURE 28 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”.

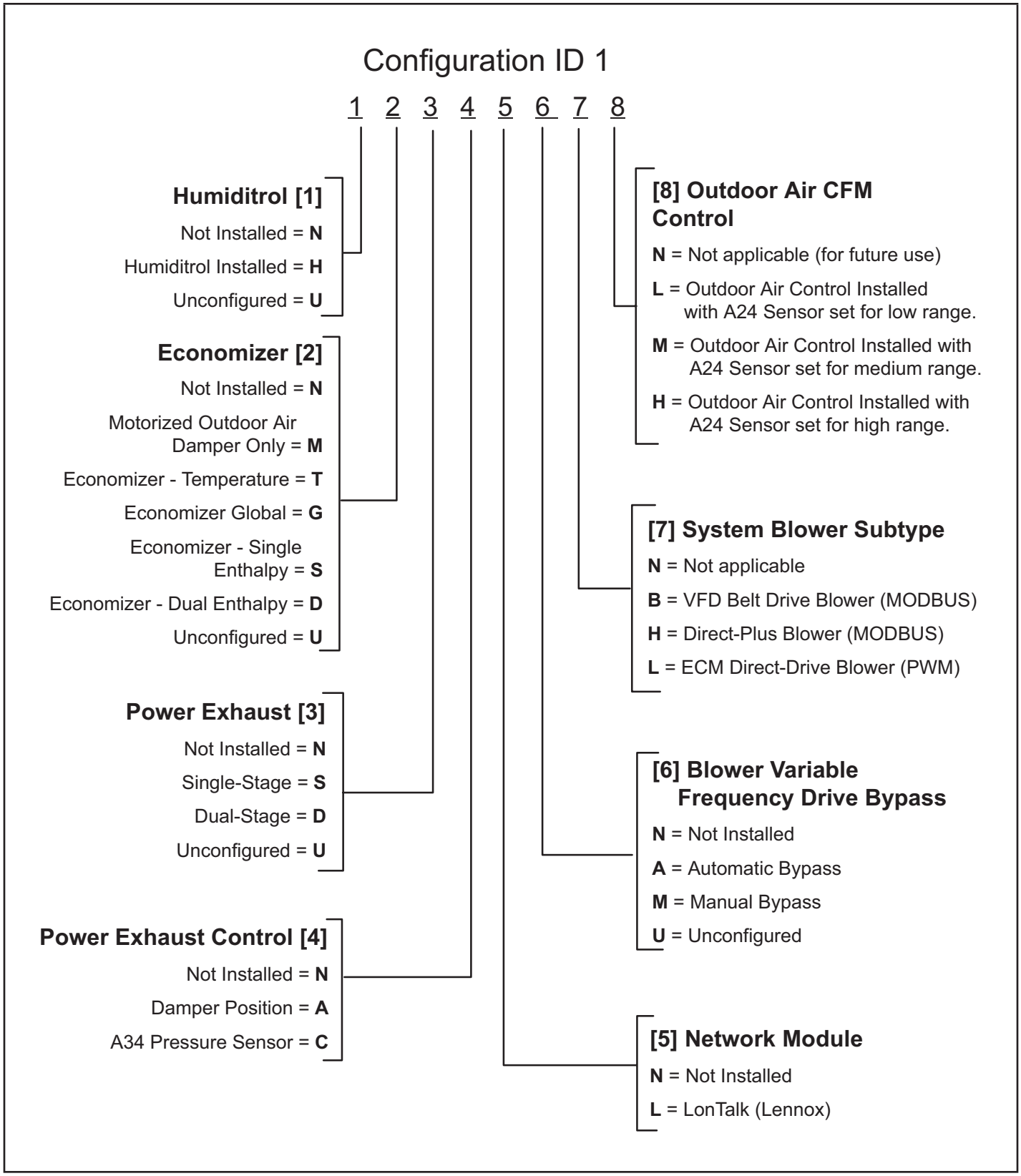

Configuration ID 1
1 2 3 4 5 6 7 8
Humiditrol [1]
Not Installed = N
Humiditrol Installed = H
Unconfigured = U
Economizer [2]
Not Installed = N
Motorized Outdoor Air Damper Only = M
Economizer - Temperature = T
Economizer Global = G
Economizer - Single Enthalpy = S
Economizer - Dual Enthalpy = D
Unconfigured = U
Power Exhaust [3]
Not Installed = N
Single-Stage = S
Dual-Stage = D
Unconfigured = U
Power Exhaust Control [4]
Not Installed = N
Damper Position = A
A34 Pressure Sensor = C
[8] Outdoor Air CFM Control
N = Not applicable (for future use)
L = Outdoor Air Control Installed with A24 Sensor set for low range.
M = Outdoor Air Control Installed with A24 Sensor set for medium range.
H = Outdoor Air Control Installed with A24 Sensor set for high range.
[7] System Blower Subtype
N = Not applicable
B = VFD Belt Drive Blower (MODBUS)
H = Direct-Plus Blower (MODBUS)
L = ECM Direct-Drive Blower (PWM)
[6] Blower Variable Frequency Drive Bypass
N = Not Installed
A = Automatic Bypass
M = Manual Bypass
U = Unconfigured
[5] Network Module
N = Not Installed
L = LonTalk (Lennox)

FIGURE 26

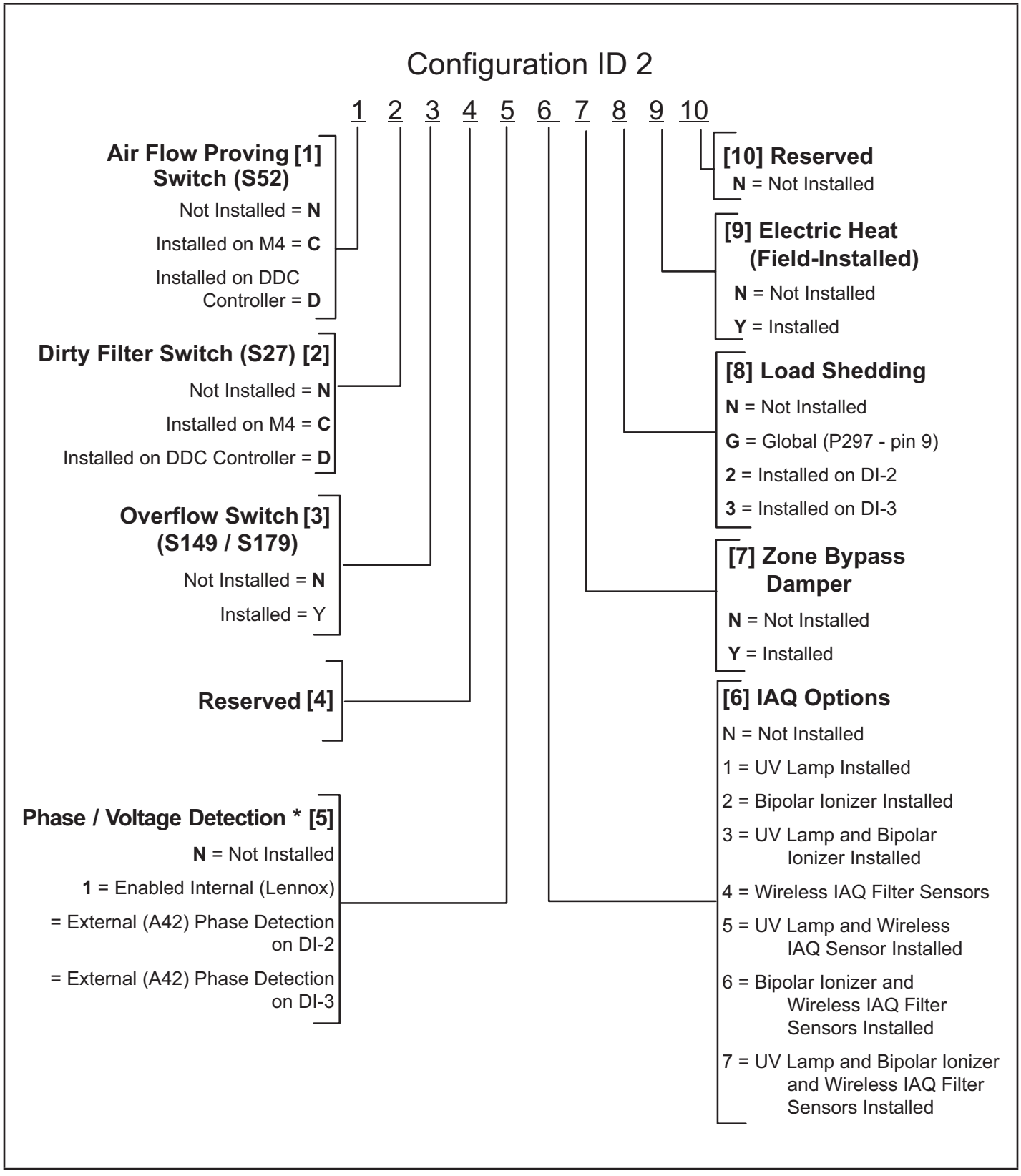

Configuration ID 2
1 2 3 4 5 6 7 8 9 10
Air Flow Proving Switch (S52) [1]
Not Installed = N
Installed on M4 = C
Installed on DDC Controller = D
Dirty Filter Switch (S27) [2]
Not Installed = N
Installed on M4 = C
Installed on DDC Controller = D
Overflow Switch (S149 / S179) [3]
Not Installed = N
Installed = Y
Reserved [4]
Phase / Voltage Detection * [5]
N = Not Installed
1 = Enabled Internal (Lennox)
= External (A42) Phase Detection on DI-2
= External (A42) Phase Detection on DI-3
[6] IAQ Options
N = Not Installed
1 = UV Lamp Installed
2 = Bipolar Ionizer Installed
3 = UV Lamp and Bipolar Ionizer Installed
4 = Wireless IAQ Filter Sensors
5 = UV Lamp and Wireless IAQ Sensor Installed
6 = Bipolar Ionizer and Wireless IAQ Filter Sensors Installed
7 = UV Lamp and Bipolar Ionizer and Wireless IAQ Filter Sensors Installed
[7] Zone Bypass Damper
N = Not Installed
Y = Installed
[8] Load Shedding
N = Not Installed
G = Global (P297 - pin 9)
2 = Installed on DI-2
3 = Installed on DI-3
[9] Electric Heat (Field-Installed)
N = Not Installed
Y = Installed
[10] Reserved
N = Not Installed

FIGURE 27

Decommissioning

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

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

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

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

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

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

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

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

⚠ IMPORTANT

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

START-UP REPORT

Job Name:_____

Store No._____Start-Up Date:_____

Address:_____

City:_____State:_____

Start-Up Contractor:_____

Technician:_____

Model No.:_____

Serial No.:_____

RTU No.:_____ Catalog No.:_____

Inspections and Checks

Damage? Yes No R454B ☐

If yes, reported to:_____

_____

Verify factory and field-installed accessories.

Check electrical connections. Tighten if necessary.

Supply voltage: L1-L2_____L1-L3_____L2-L3_____

If unit contains a 208-230/240 volt transformer:
Check primary transformer tap ☐
Transformer secondary voltage: _____

Cooling Checks

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

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

Blower Checks

Pulley/Belt Alignment ☐ Blower Rotation ☐
Set Screws Tight ☐ Belt Tension ☐

Nameplate Amps:_____ Volts:_____

Motor	Amps	Volts
	L1_____	L1-L2_____
	L2_____	L1-L3_____
	L3_____	L2-L3_____

Heating Checks - Gas

Fuel type: Nat. ☐ LP ☐ Inlet Pressure:_____in. w.c.

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

Altitude:_____ Primary Limits Operate: ☐

CO_2%:

Gas Valve	Manifold Pressure	
	Low Fire	High Fire
GV1		
GV2		

Control Type

Heating Checks - Electric

Return Air Temp.:_____ Supply Air Temp.:_____
Limits Operate: ☐

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

Accessory Checks

Power Exhaust Amps

1 _____ 2 _____ None ☐

Economizer Operation

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