⚠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.

INSTALLATION INSTRUCTIONS

LGT/LCT156H (13 Ton)
LGT/LCT180H (15 Ton)
LGT/LCT210H (17.5 Ton)
LGT/LCT240H (20 Ton)
LGT/LCT300S (25 Ton)

ROOFTOP PACKAGED UNITS
508288-01
9/2022

Table of Contents

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 control system and configure the unit. Refer to the “Download Mobile App” section in this manual and the Setup Guide provided with this unit. The QR code is also available in the unit control area.

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

0922
508288-01

⚠WARNING

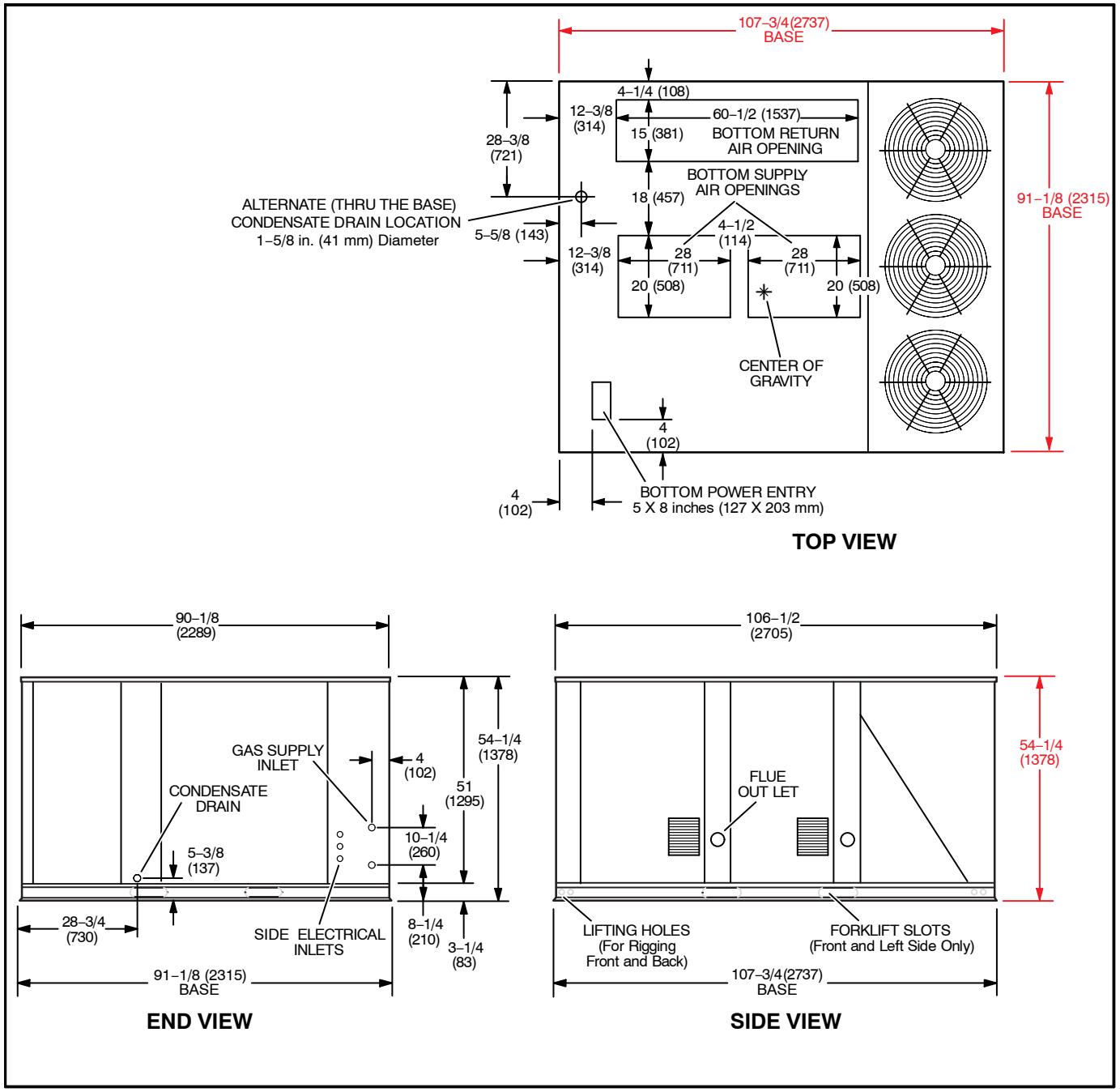
To prevent serious injury or death:

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

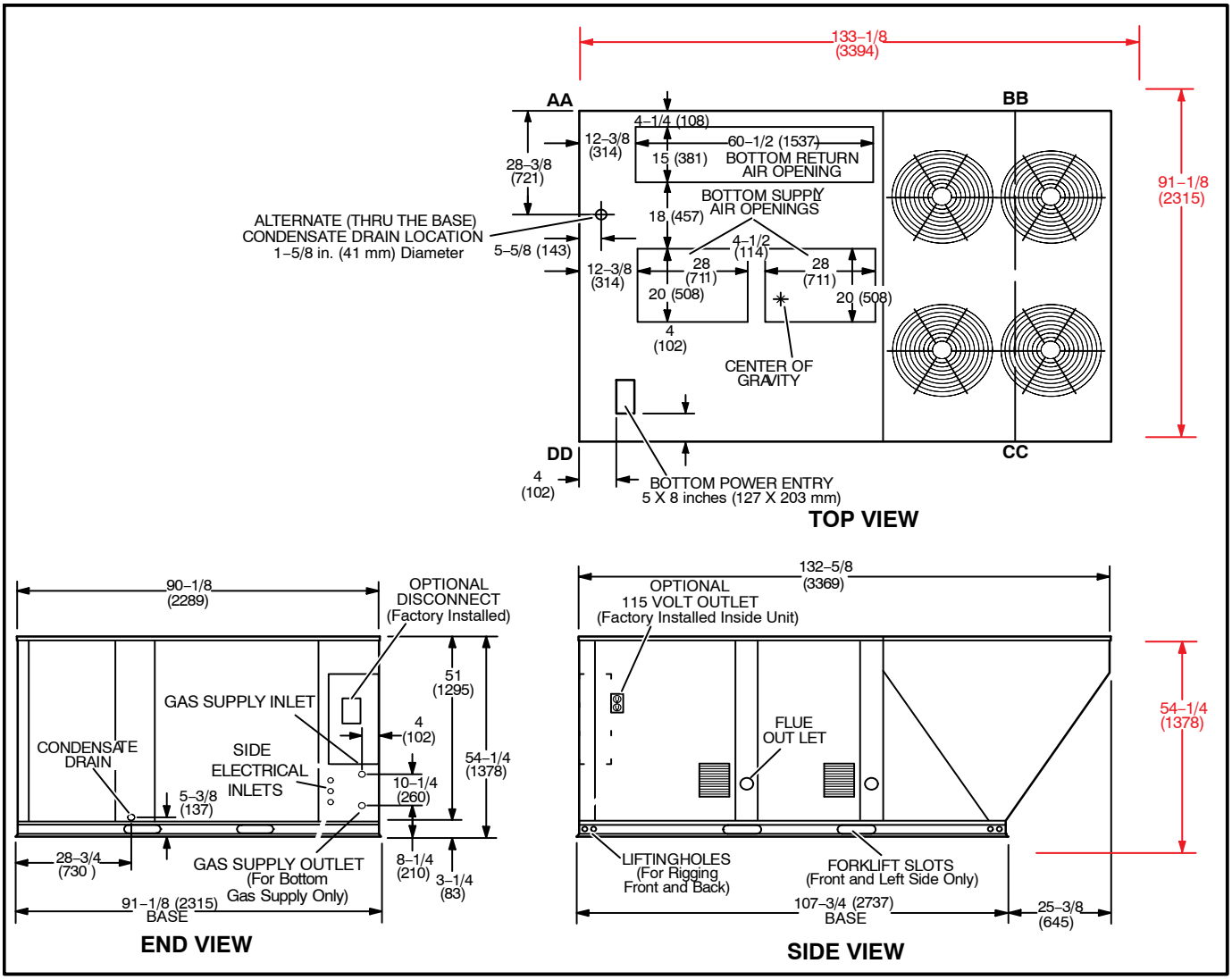
2- If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the "OFF" position before performing maintenance.

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

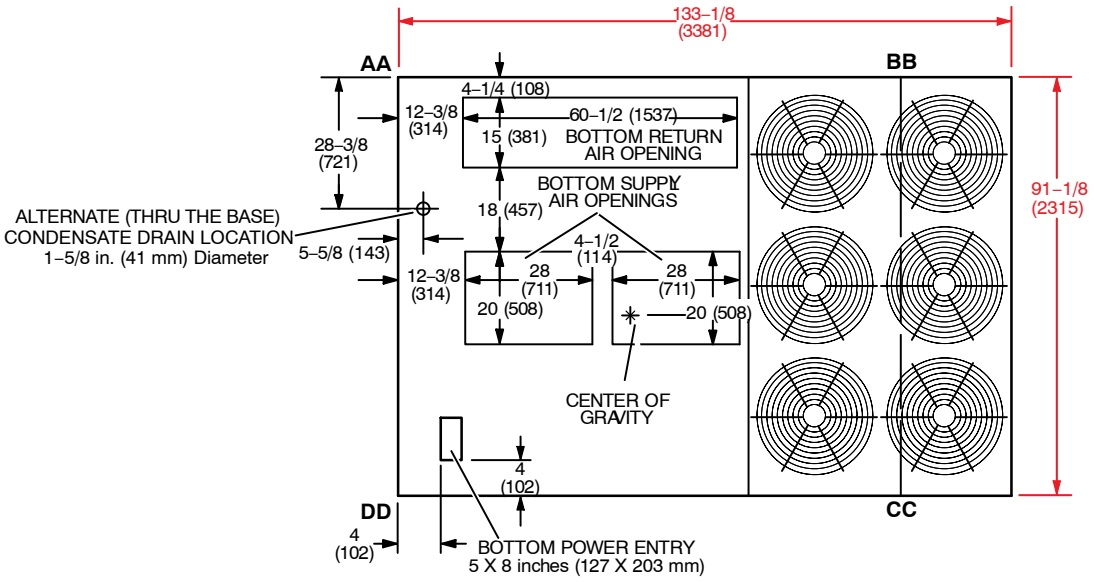
LGT/LCT156H Unit Dimensions - Inches (mm) - Gas Heat Section Shown



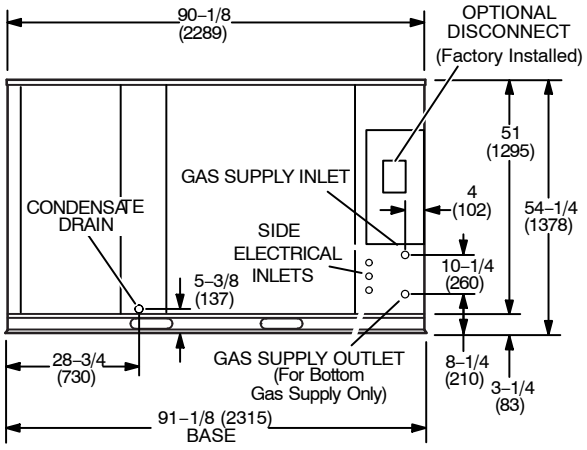
LGT/LCT180H, 210H Unit Dimensions - Inches (mm) - Gas Heat Section Shown



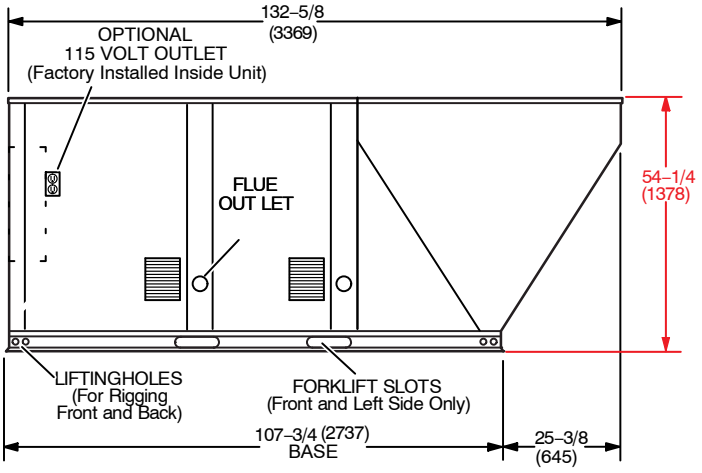
LGT/LCT 240H & 300S Unit Dimensions - Inches (mm)-Gas Heat Section Shown



TOP VIEW

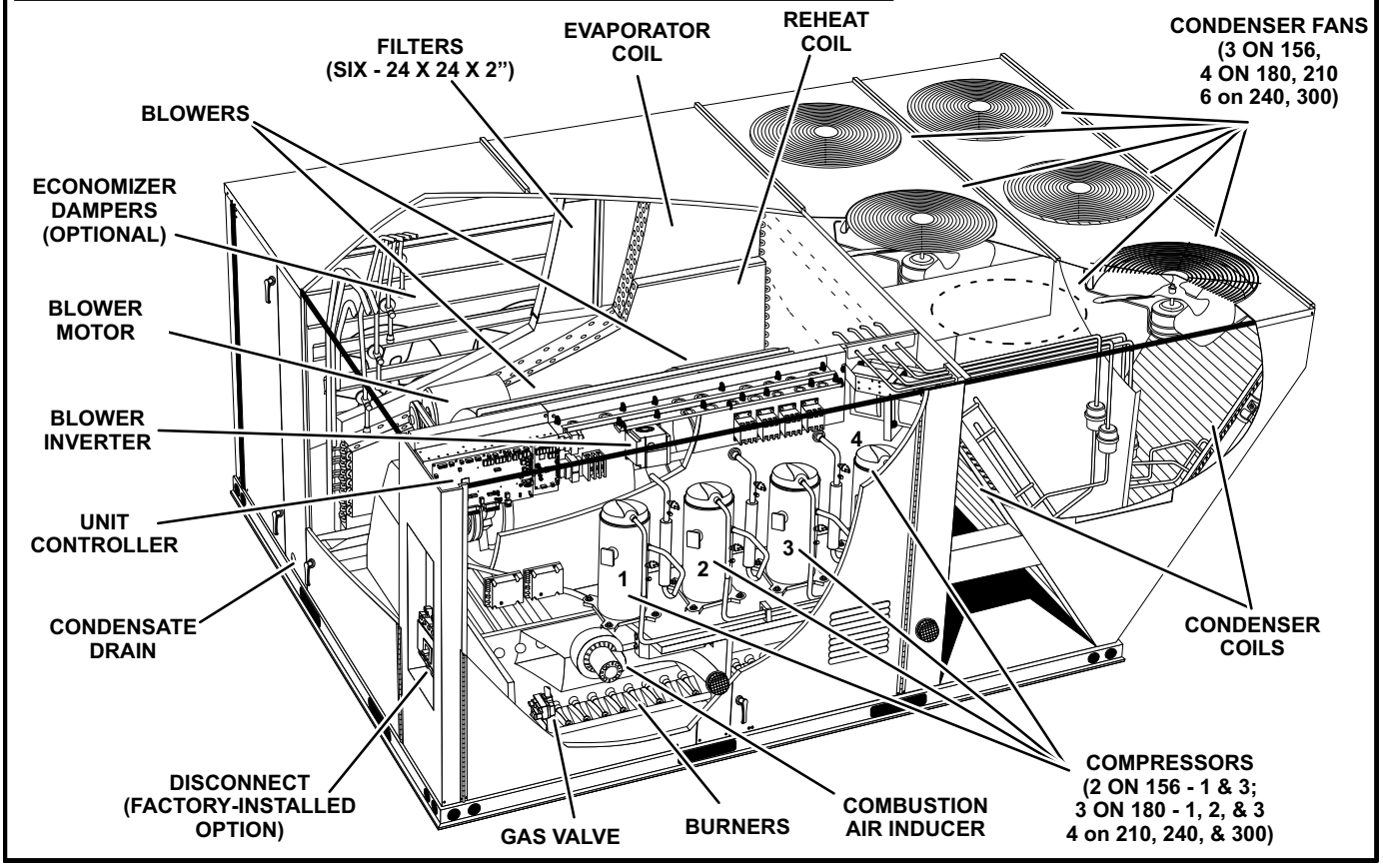


END VIEW

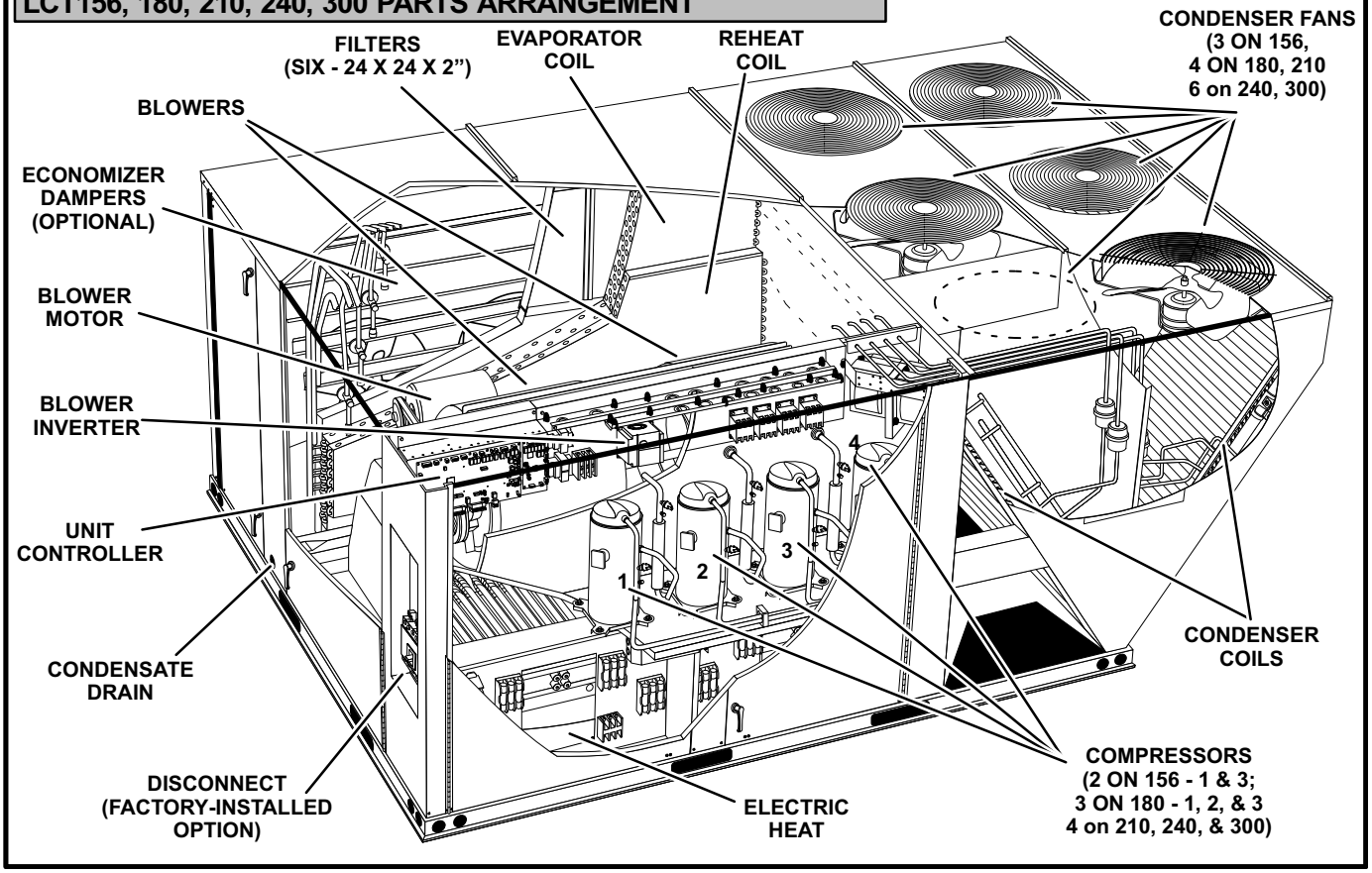


SIDE VIEW

LGT156, 180, 210, 240, 300 PARTS ARRANGEMENT



LCT156, 180, 210, 240, 300 PARTS ARRANGEMENT



Shipping and Packing List

Package 1 of 1 contains:

1- Assembled unit

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

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 LGT156H gas/electric packaged rooftop unit is available in 169, 000, 260,000, & 360,000 Btuh heating input. The LGT180, 210, 240, & 300 gas/electric packaged rooftop units are available in 260,000, 360,000, or 480,000 Btuh heating inputs.

The LCT cooling packaged rooftop unit is the same basic design as the LGT unit except for the heating section. Optional electric heat is factory- or field-installed in LCT units.

LGT and LCT units have identical refrigerant circuits with respective 13, 15, 17-1/2, 20 and 25 ton cooling capacities. 156H units contain two compressors; compressor 1 is two speed and compressor 2 is fixed speed. 180H units contain three compressors; all are fixed speed. 210, 240 and 300 units contain four compressors; all are fixed speed compressors.

Units come standard with a factory-installed, all-aluminum condenser coil.

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

Units are available with variable air volume or single-zone variable air volume. Refer to the 9th character of the model number to determine type of blower:

V - Variable Air Volume

M - Single-Zone Variable Air Volume

Units use R410A, an ozone-friendly HFC refrigerant. Refer to the Cooling Start-Up section for precautions when installing unit.

⚠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.

Requirements

See figure 1 for unit clearances.

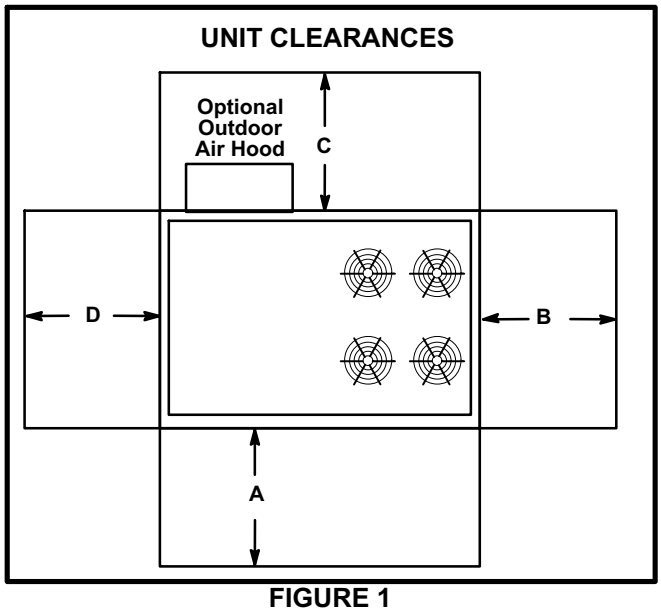


FIGURE 1

[1]Unit Clearance	A in.(mm)	B in.(mm)	C in.(mm)	D in.(mm)	Top Clearance
Service Clearance	60 (1524)	36 (914)	36 (914)	66 (1676)	Unob-structed
Clearance to Combus-tibles	36 (914)	1 (25)	1 (25)	1 (25)	Unob-structed
Minimum Operation Clearance	36 (914)	36 (914)	36 (914)	41 (1041)	Unob-structed

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 - Required clearance to combustible material (gas units). On LCT units, see clearance to combustible materials outlined on heater rating plate.
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.

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

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

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

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

This appliance should not be used by children. Children should be supervised to ensure they do not play with the appliance.

⚠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

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 LARMF18/36 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 LARMF18/36

1- The LARMF roof mounting frame must be installed, flashed and sealed in accordance with the instructions provided with the frame.

2- The LARMF 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 LARMF18/36 roof mounting frame is required.

B-Horizontal Discharge Applications

1- Units installed in horizontal airflow applications must use an LARMFH18/24 horizontal roof mounting frame. The supply air duct connects to the horizontal supply air opening on the LARMFH18/24. The return air duct connects to the unit horizontal return air opening. Refer to unit dimensions.

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.

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.)

RIGGING

LGT/LCT Unit	*Weight	
	Lbs.	Kg.
156	2499	1135
180	2613	1186
210	3054	1386
240, 300	3136	1424

*Maximum weight with all available factory-installed accessories.

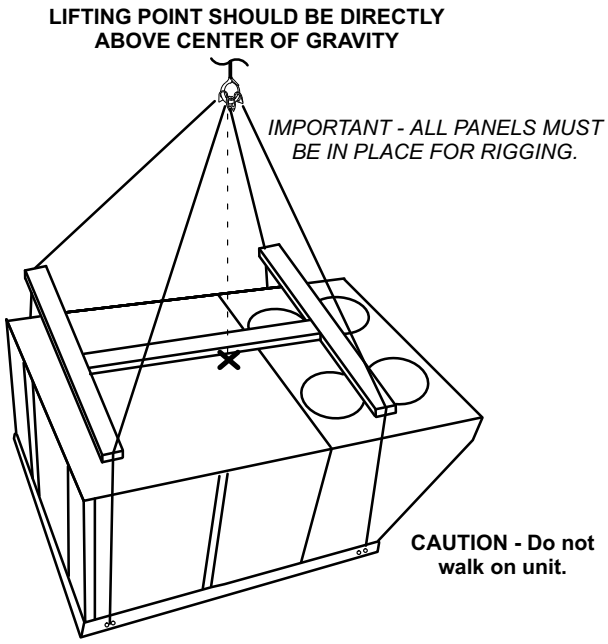


FIGURE 2

Condensate Drains

Remove cap and make drain connection to the 1" N.P.T. drain coupling provided on unit. A trap must be installed between drain connection and an open vent for proper condensate removal. See figure 3. 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 2, 3 and 4 for condensate drain location.

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.

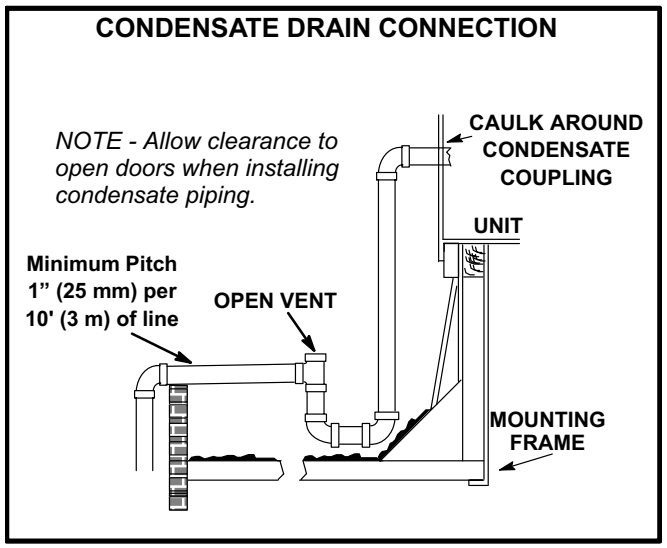


FIGURE 3

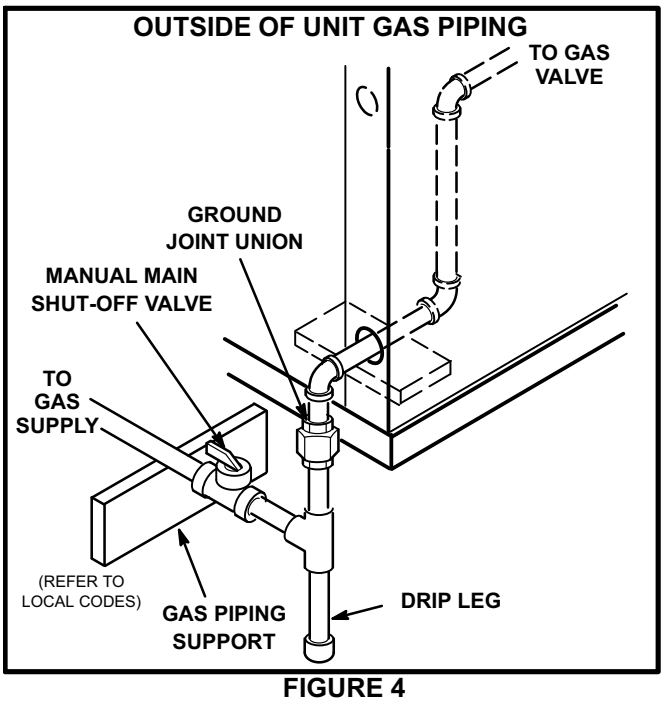


FIGURE 4

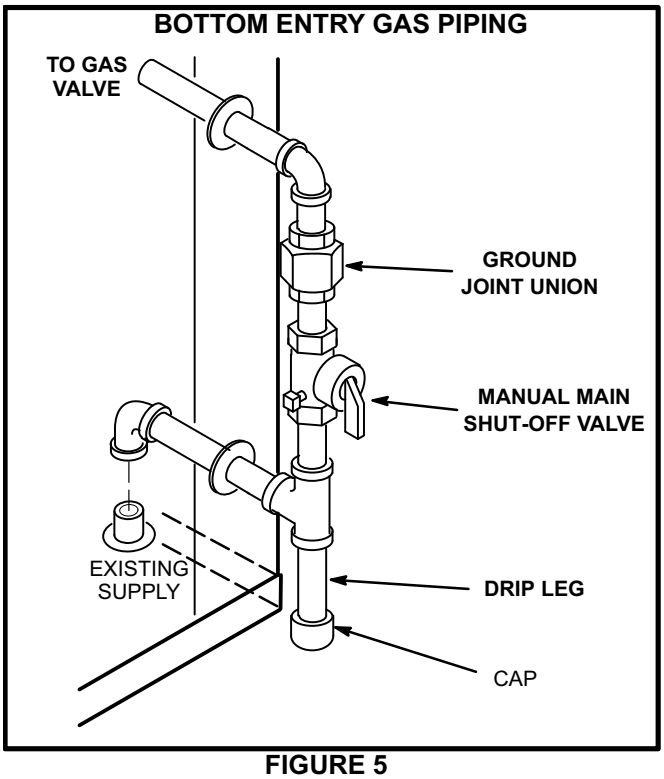


FIGURE 5

Connect Gas Piping

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 11" w.c. (2.74kPa) and a maximum of 13.5" w.c. (3.36kPa).

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 4 for gas supply piping entering outside the unit. See figure 5 for gas supply entering through bottom of unit.

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

Pressure Test Gas Piping

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 6.

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.

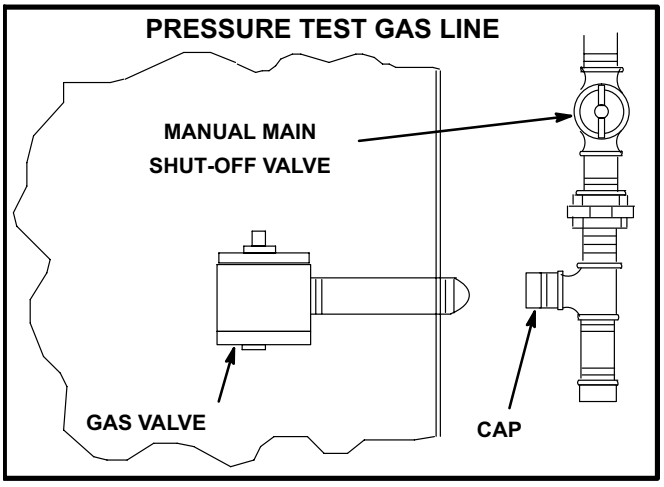


FIGURE 6

⚠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 othe 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. High altitude kits are available for field-installation.

Refer to table 1 for high altitude adjustments.

TABLE 1
HIGH ALTITUDE DERATE

Unit	Altitude Ft.*	Gas Manifold Pressure
2000-4500	2000-4500	See Unit Nameplate
169KBtuh	4500 & Above	Derate 2% / 1000 Ft. Above Sea Level
260-380 KBtuh	4500 & Above	Derate 4% / 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.

Download Mobile Service App

A-Mobile Device Requirements

- Android hardware requires 2GB RAM and a 2Ghz core processor. Tablets are supported.
- Minimum Android 6.0 (Marshmallow) or higher. Recommend Android 10 and Apple products require iOS version 11 or higher.

B-New Installations

Once the app is downloaded, refer to the Setup Guide provided with this unit to pair the app to the unit control system. Follow the setup wizard prompts to configure the unit. See figure 7 for the app menu overview. **If a mobile device is unavailable or not pairing, refer to the Unit Controller Setup Guide for start-up instructions.**

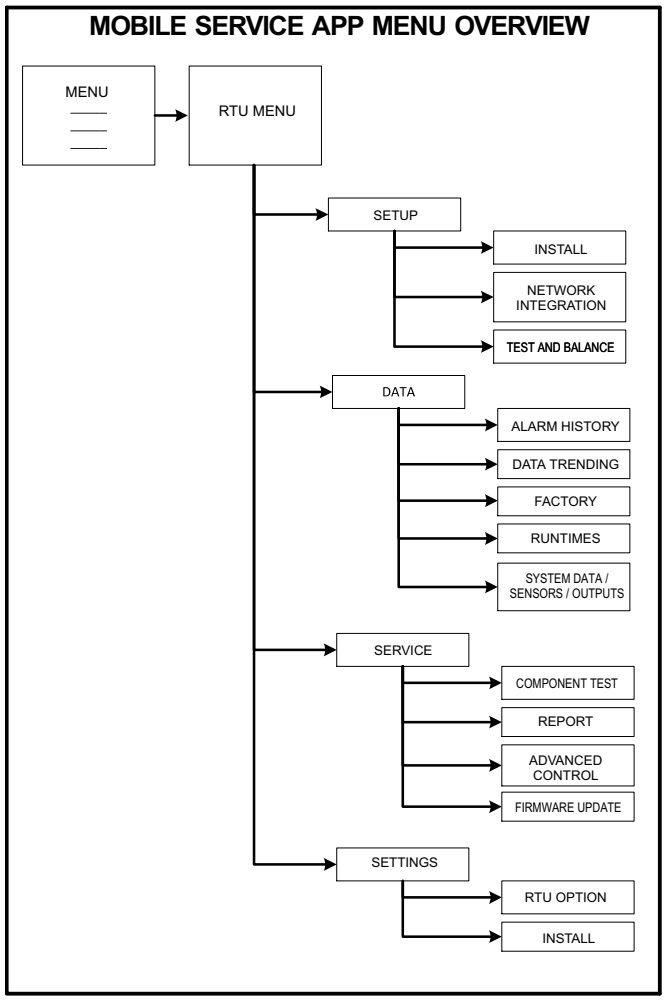


FIGURE 7

Electrical Connections - Power Supply

A-Wiring

Route field wiring in conduit between bottom power entry and disconnect. See figure 8. This does not supersede local codes or authorities having jurisdiction.

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

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

1- Units are factory-wired for 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 line side of unit disconnect, circuit breaker or terminal block. See unit wiring diagram.

3- *Units With Optional 120v GFCI Outlet* - Route and connect separate 120v wiring to GFCI outlets which do not have factory-installed wiring. Route field wiring in conduit between bottom power entry and GFCI. See figure 8.

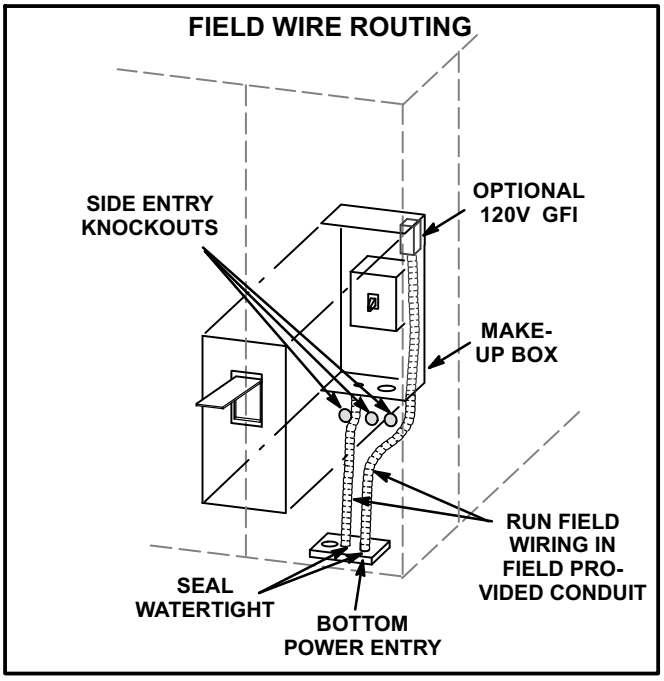


FIGURE 8

B-Unbalanced Three-Phase Voltage

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

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

TABLE 2
INVERTER UP-SIZING

Factory-Installed Inverter HP	Replacement Inverter HP
2	5
3	7-1/2
5	10
7.5	15
10	20

Electrical Connections - Control Wiring

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-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.

On hot gas reheat units, route wires from RH sensor or remote switch through knockout provided in unit. For sensor installations, use 22AWG stranded, two twisted pairs, individually shielded, 100% aluminum shield with drain wire and Teflon jacket.

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:

SETTINGS > INSTALL.

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 9 for field wiring and 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.

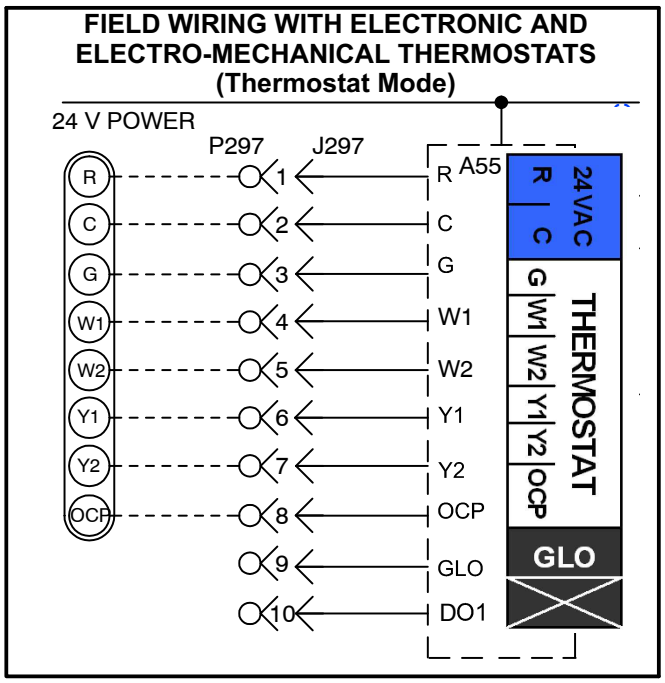


FIGURE 9

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 10.

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

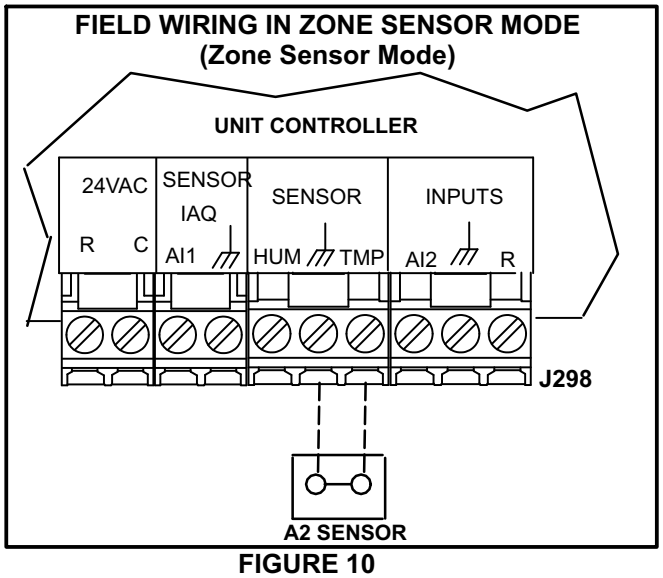


FIGURE 10

D-Hot Gas Reheat Units Only

1- Install humidity sensor in accordance with instructions provided with sensor. A DDC input may be used to initiate dehumidification instead of a sensor.

2- Make wiring connections as shown in figure 9 for Thermostat Mode and figure 10 for Zone Sensor Mode. In addition, connect either a humidity sensor or a dehumidification input. See figure 11 or 12 for humidity sensor wiring and figure 13 for dehumidification input wiring.

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 TB1-7 as shown in figure 11.

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 TB1-7 as shown in figure 11.

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 12. Use two shielded cables containing 20AWG minimum, twisted pair conductors with overall shield. Belden type 8762 or 88760 (plenum) or equivalent.

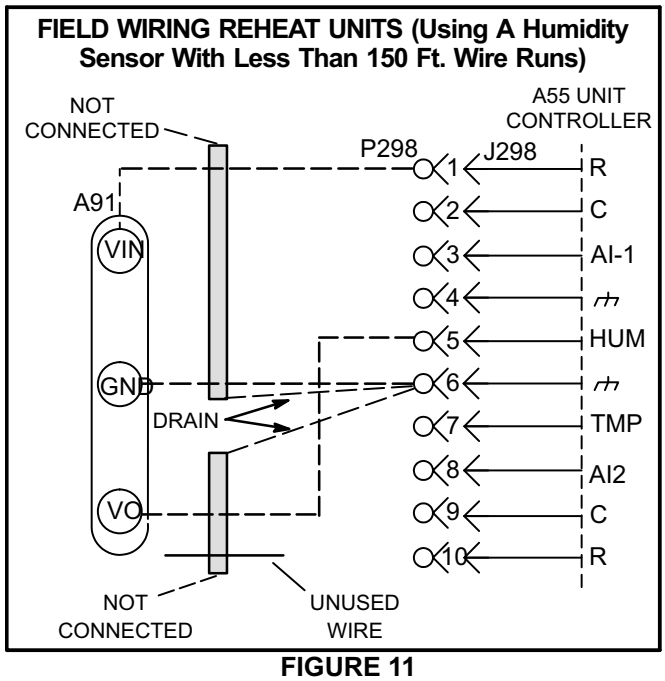


FIGURE 11

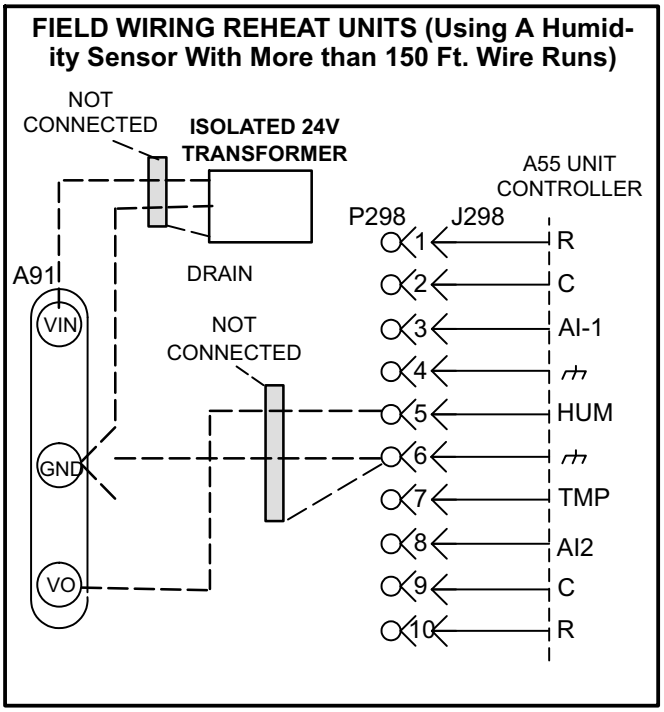


FIGURE 12

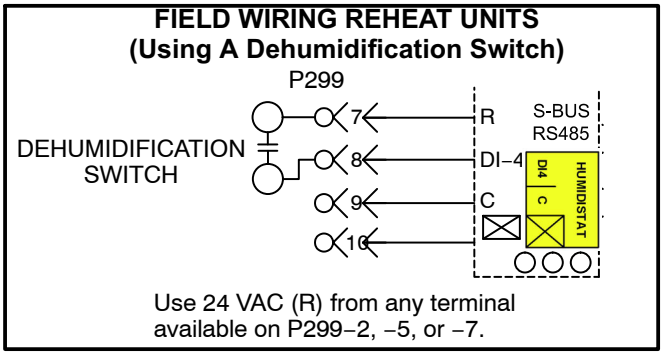


FIGURE 13

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 inverter blower motors should rotate in the correct direction; verify scroll compressor rotation separately. Contact technical support if the 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

1- Disconnect jack/plug connector to blower motor. Also disconnect jack/plug connector heating limit switches on gas units.

2- Remove screws on either side of blower assembly sliding base. See figure 15.

3- Pull base toward outside of unit.

C-Determining Unit CFM

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

Variable Air Volume Units - Refer to the Variable Air Volume 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 14.

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

3- Referring to page 17, use static pressure and RPM readings to determine unit CFM. Use page 18 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 15. Do not exceed minimum and maximum number of pulley turns as shown in table 3.

TABLE 3
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.

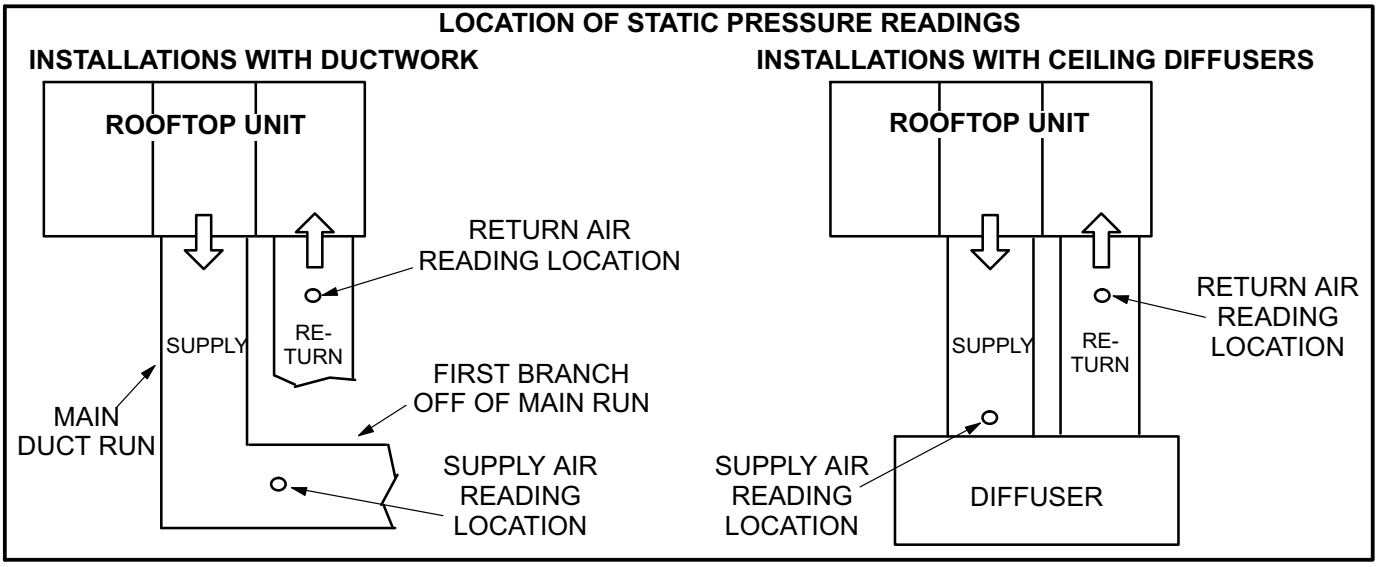


FIGURE 14

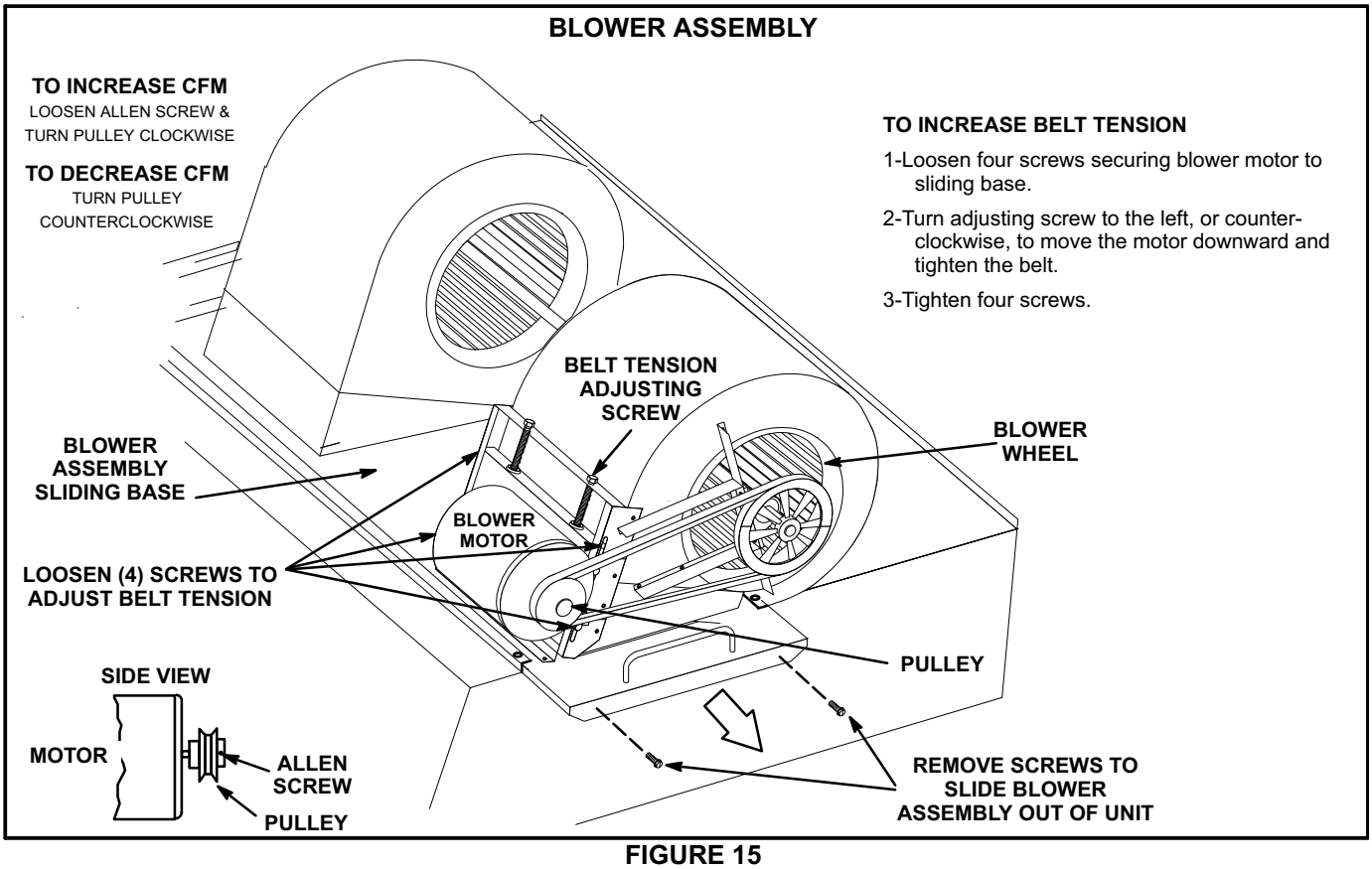


FIGURE 15

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 into pulley grooves. Make sure blower and motor pulley are aligned. See figure 16.

1- Loosen four screws securing blower motor to sliding base. See figure 15.

2- *To increase belt tension -*
Turn belt tension adjusting screw to the left, or counterclockwise, to tighten the belt. This increases the distance between the blower motor and the blower housing.

To loosen belt tension -
Turn the adjusting screw to the right, or clockwise to loosen belt tension.

3- Tighten four screws securing blower motor to sliding base once adjustments have been made.

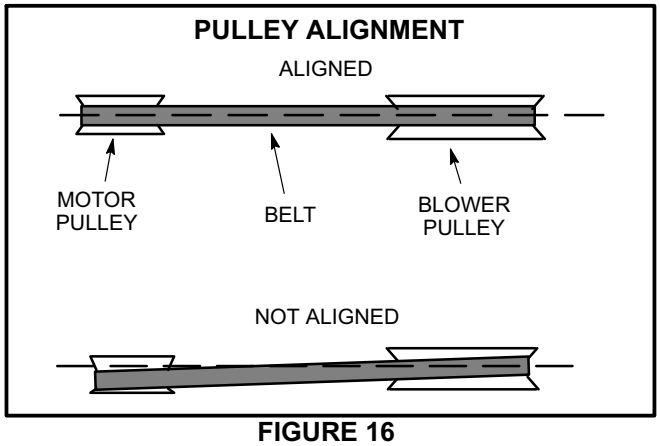


FIGURE 16

E-Check Belt Tension

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

1- Measure span length X. See figure 17.

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

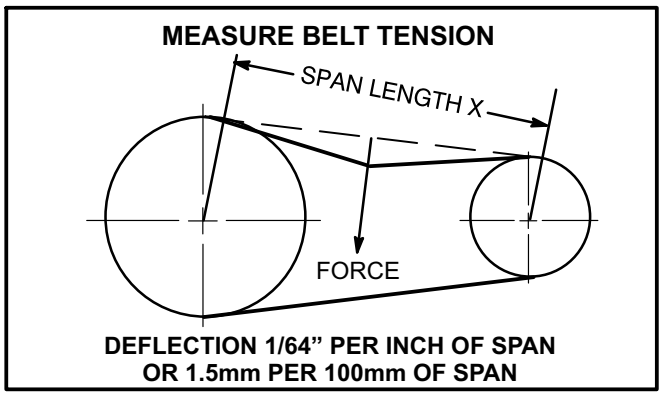


FIGURE 17

F-Field-Furnished Blower Drives

For field-furnished blower drives, use page 16 to determine BHP and RPM required. Reference page 17 to determine the manufacturer's model number.

G-Minimum Airflow For Optional Electric Heat

Electric Heat kW	Minimum CFM
15	5200
30	5200
45	5200
60	5200
90	6000

Accessory Air Resistance

MANUFACTURER'S NUMBERS

Same as 508336. Not as of 12/5 markup.

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.

NOTE - These units must not be used as a "construction heater" at any time during any phase of construction. Very low return air temperatures, harmful vapors and misplacement of the filters will damage the unit and its efficiency. Additionally, a unit which will be subject to cold temperatures when not in operation must have a vapor barrier installed to seal the duct connections. Failure to protect the unit from moisture laden air or harmful vapors (generated from the construction process and temporary combustion heating equipment) will cause corrosive condensation within the unit. Failure to properly protect the unit in this situation will cause electrical and electronic component failure and could affect the unit warranty status.

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 Staged Blower - Refer to the Multi-Staged Air Volume Start-Up section.

1- Initiate first and second stage cooling demands using this mobile service app menu path:

SERVICE > TEST > COOLING > COOL4

Instructions provided with the thermostat may also be used to initiate cooling.

2- First-stage thermostat demand will energize indoor blower in Low Cooling CFM and associated first-stage compressors. Second-stage thermostat demand will energize indoor blower in High Cooling CFM and all remaining compressors.

3- *156 -*
Units contain two refrigerant circuits or systems. See figure 18.

180 -
Units contain three refrigerant circuits or systems. See figure 19.

210, 240, 300 -
Units contain four refrigerant circuits or systems. See figure 20.

4- Each refrigerant circuit is separately charged with R410A refrigerant. See unit rating plate for correct amount of charge.

5- Refer to the *Refrigerant Check and Charge* section 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.

⚠IMPORTANT

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

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.

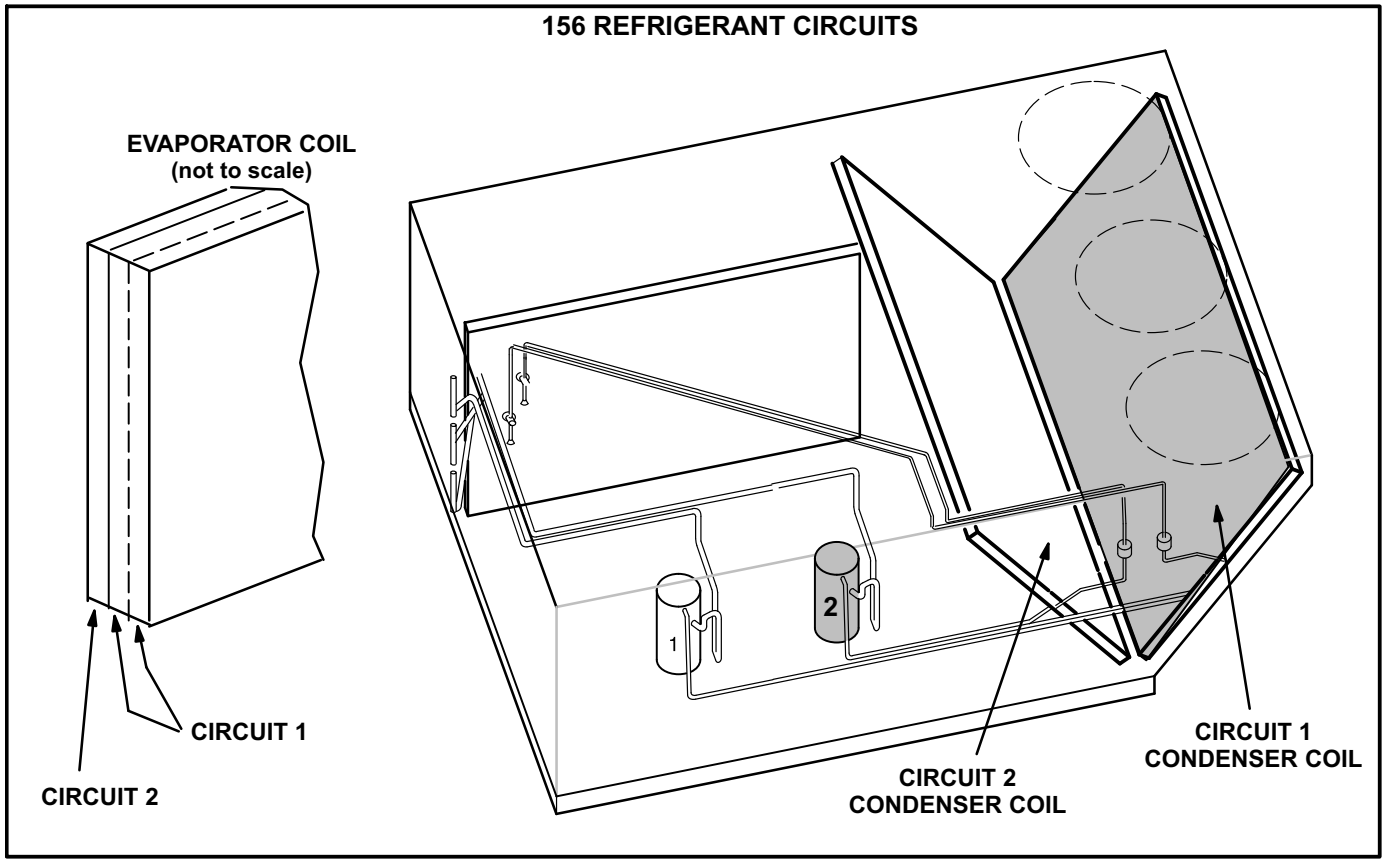


FIGURE 18

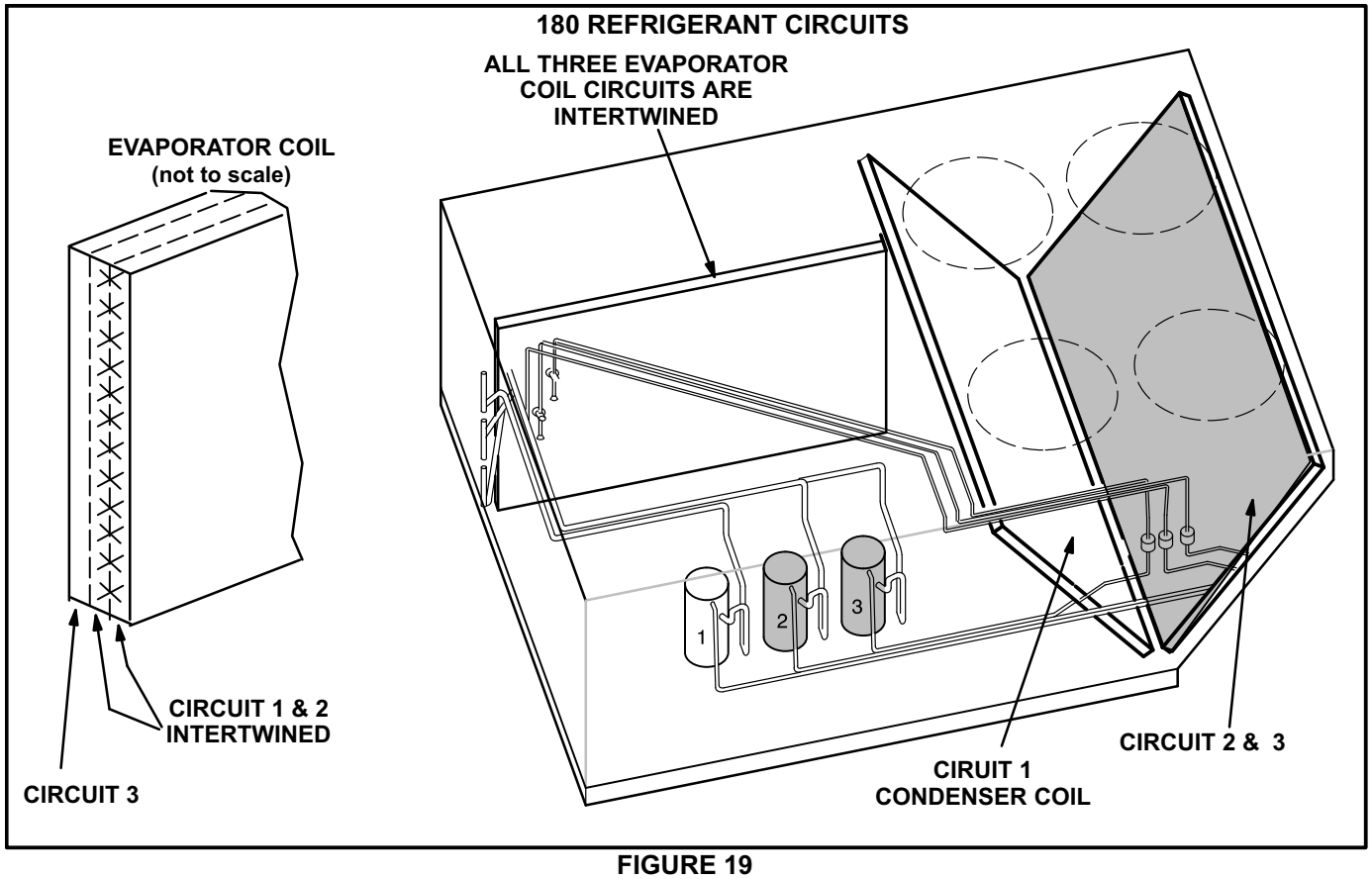


FIGURE 19

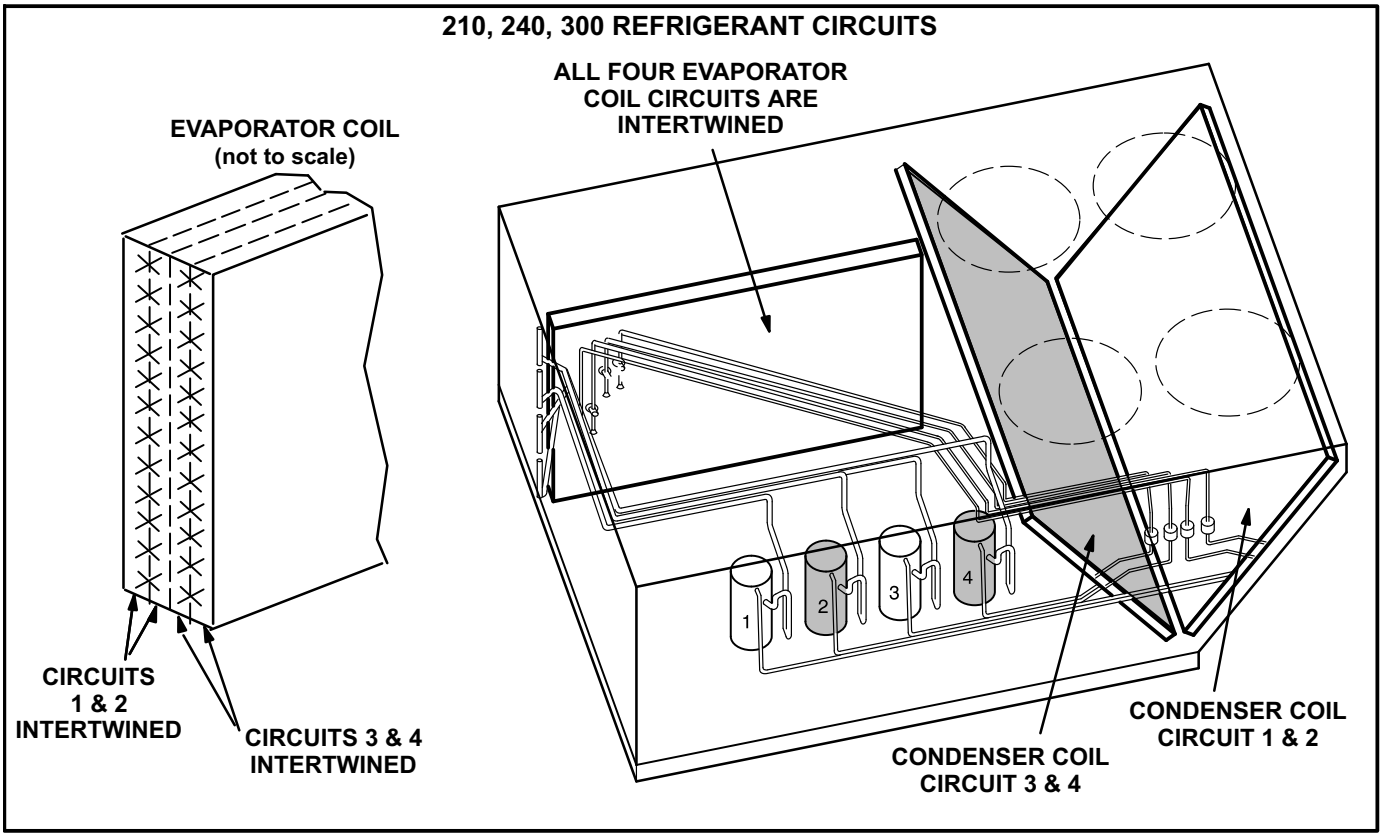


FIGURE 20

D-Refrigerant Charge and Check - All-Aluminum Coil

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 normal cooling mode.

1- Attach gauge manifolds to discharge and suction lines. With the economizer disabled, operate the unit in **cooling mode at high speed** using the following mobile service app menu path:

SERVICE>TEST>COOL>COOL 4

2- Use a thermometer to accurately measure the outdoor ambient temperature.

3- Apply the outdoor temperature to tables 4 through 13 to determine normal operating pressures. Pressures are listed for sea level applications at 80°F dry bulb and 67°F wet bulb return air.

4- 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.**

5- 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.

6- Confirm charge amount using liquid temperature plots. Fine tune charge amount(s) to match liquid temperature plots as needed per the next section.

E-Charge Confirmation and Fine Tuning - Liquid Temperature Check

Note - Pressures are listed for sea level applications.

1- 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.

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

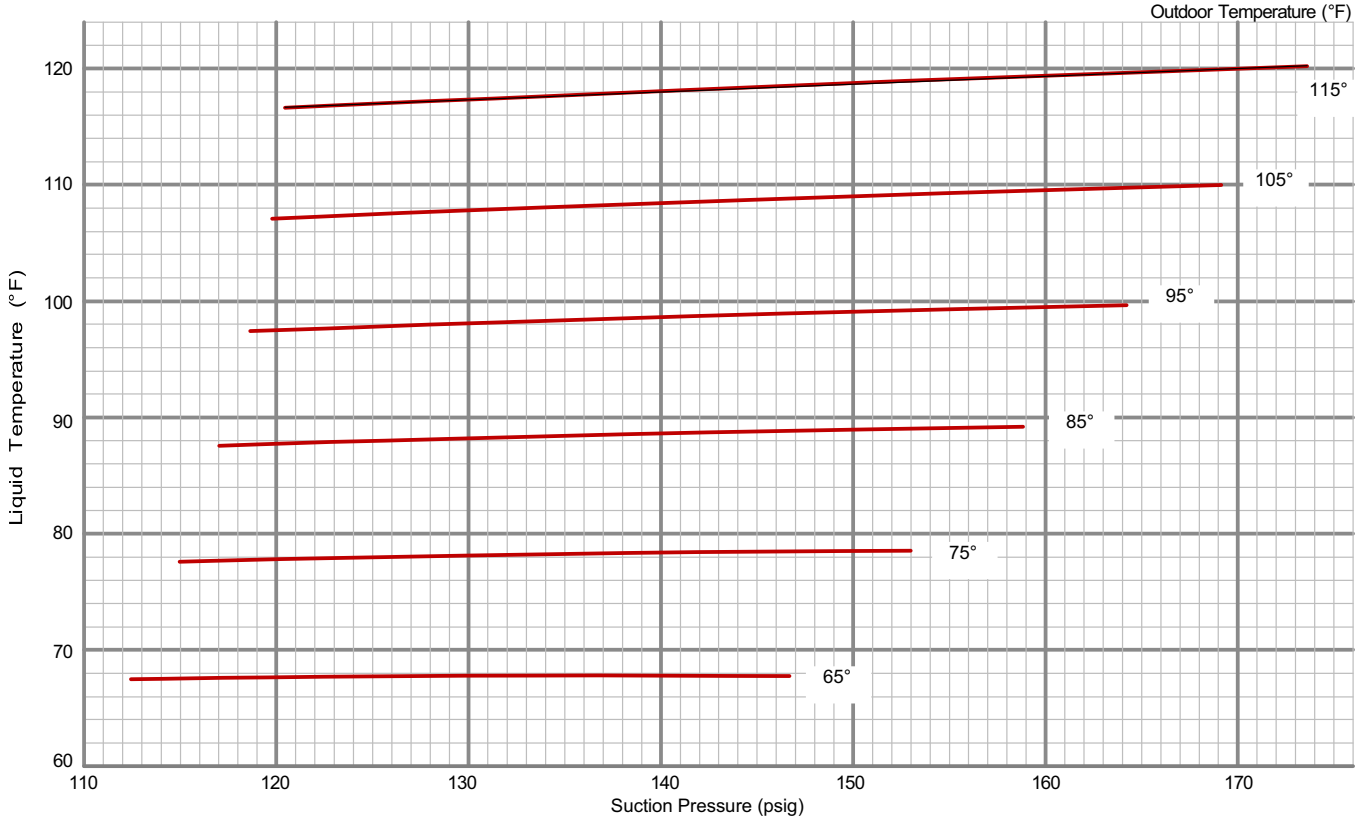
3- Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.

4- Example: At 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 98°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 4
156 NORMAL OPERATING PRESSURES - NO REHEAT - ALL-ALUMINUM COIL - 581081-01

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	112	231	115	269	117	313	119	362	120	416	120	475
	120	233	123	271	126	314	128	362	130	416	131	475
	133	240	138	277	142	319	146	366	150	419	153	477
	147	250	153	285	159	326	164	372	169	424	174	481
Circuit 1	110	246	113	285	115	329	117	379	118	432	119	491
	116	249	119	288	122	333	125	382	127	435	129	494
	127	256	133	295	137	340	142	389	146	442	149	501
	138	264	145	304	152	348	158	396	163	450	169	509

156 CHARGING CURVE CIRCUIT 1 - NO REHEAT - ALL-ALUMINUM COIL - 581082-01



156 CHARGING CURVE CIRCUIT 2 - NO REHEAT - ALL-ALUMINUM COIL - 581082-01

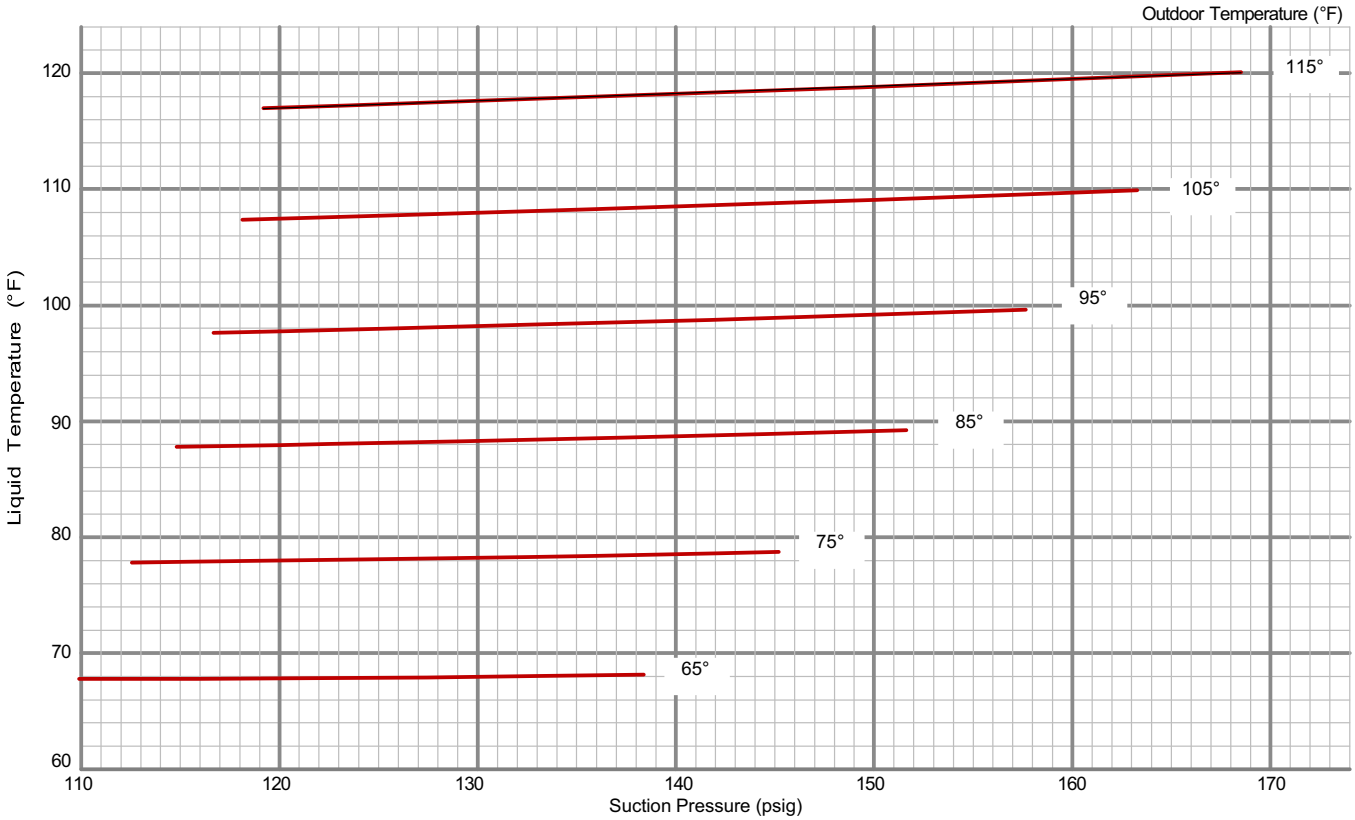
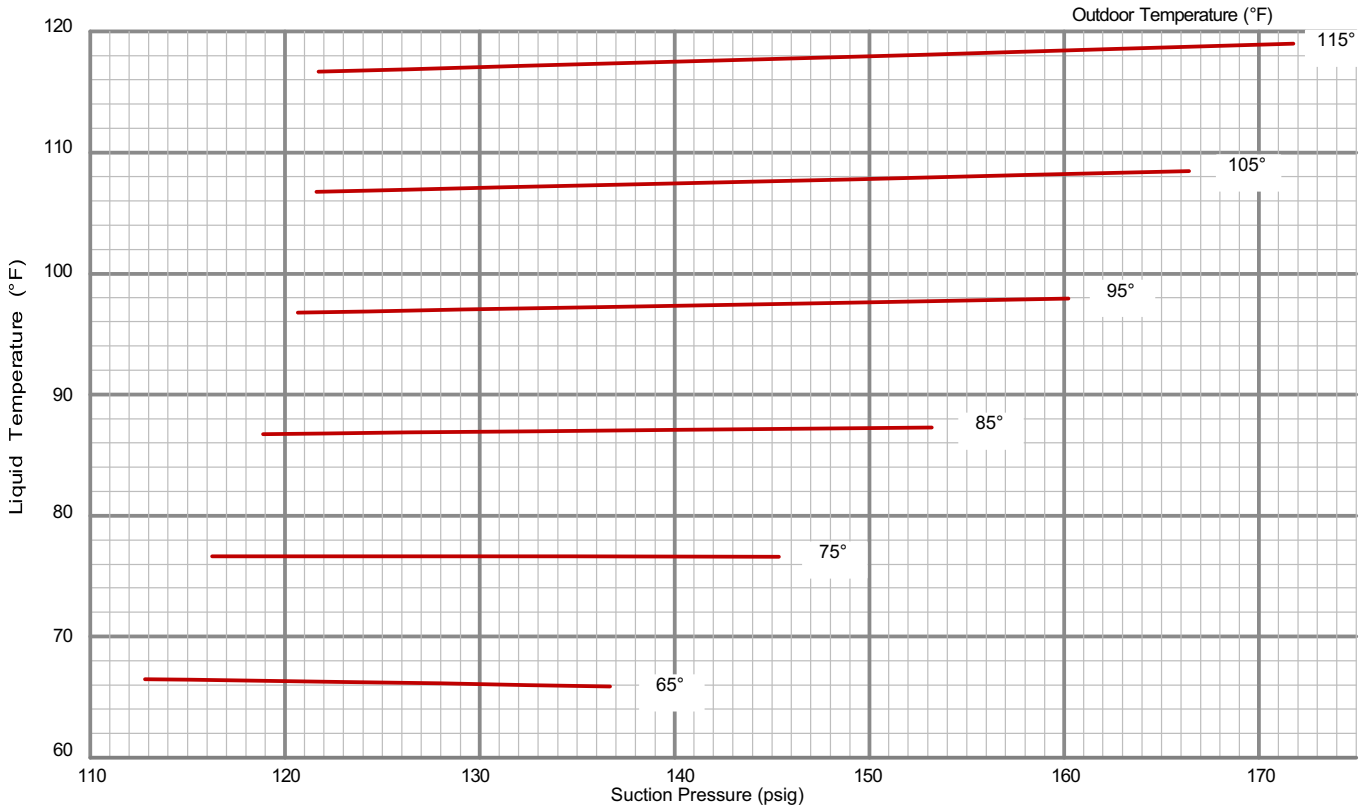


TABLE 5
156 NORMAL OPERATING PRESSURES - REHEAT - ALL-ALUMINUM COIL - 581083-01

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	113	245	116	282	119	324	121	372	122	425	122	484
	118	247	123	284	126	326	129	374	131	427	132	486
	128	255	135	291	140	333	145	380	149	433	153	492
	137	264	145	300	153	342	160	389	166	442	172	500
Circuit 2	112	260	115	298	118	342	120	392	122	447	123	508
	116	262	121	300	125	344	128	393	131	449	133	510
	125	269	132	307	138	350	143	399	148	454	152	515
	133	280	141	318	149	361	157	409	164	464	170	524

156 CHARGING CURVE CIRCUIT 1 - REHEAT - ALL-ALUMINUM COIL - 581084-01



156 CHARGING CURVE CIRCUIT 2 - REHEAT - ALL-ALUMINUM COIL - 581084-01

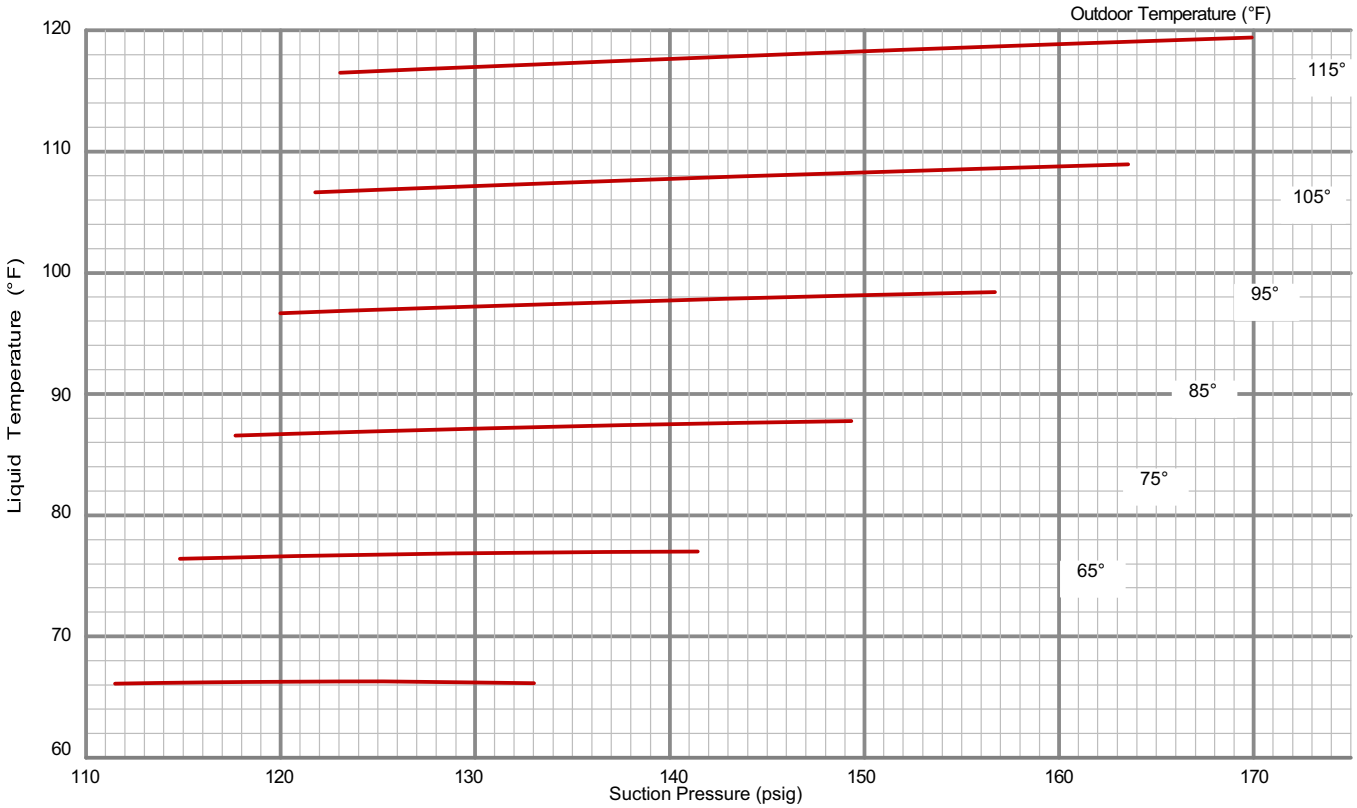
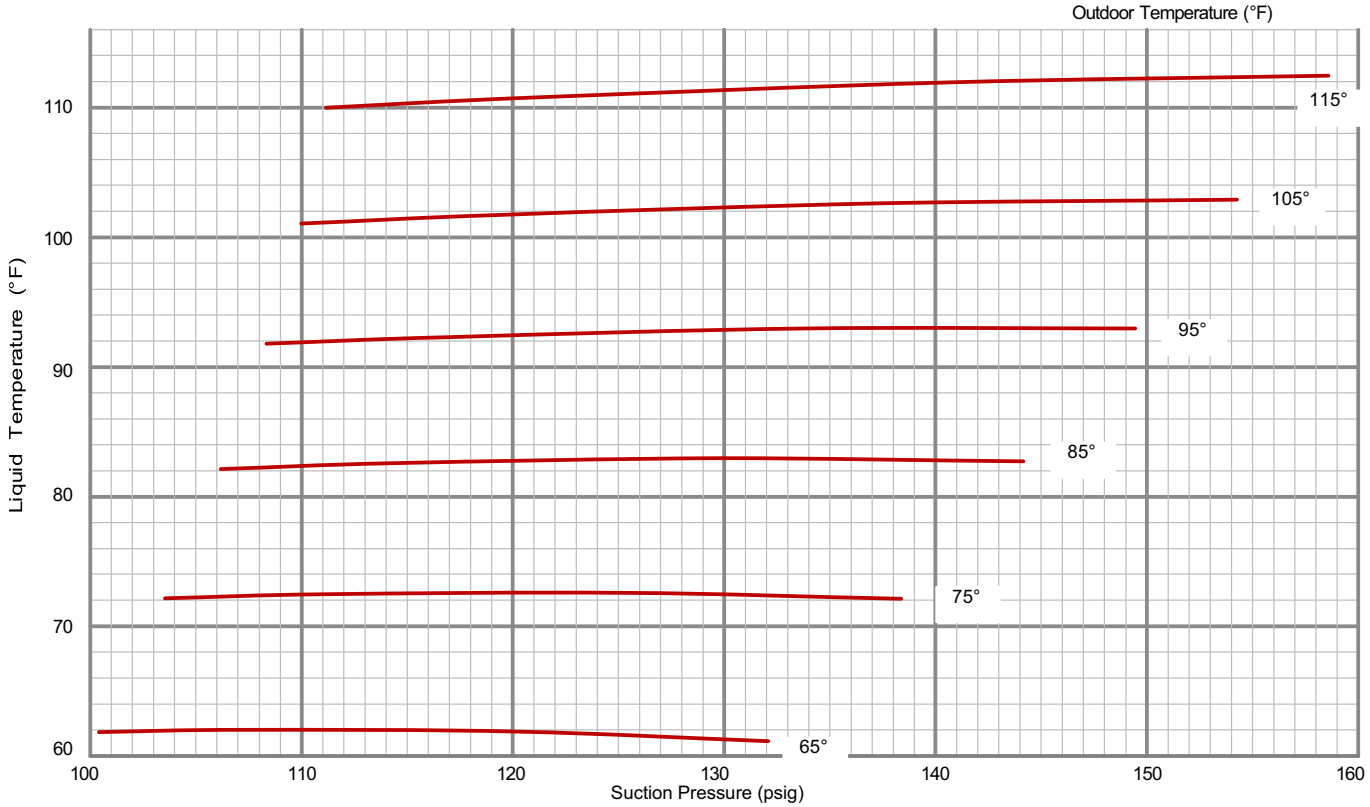


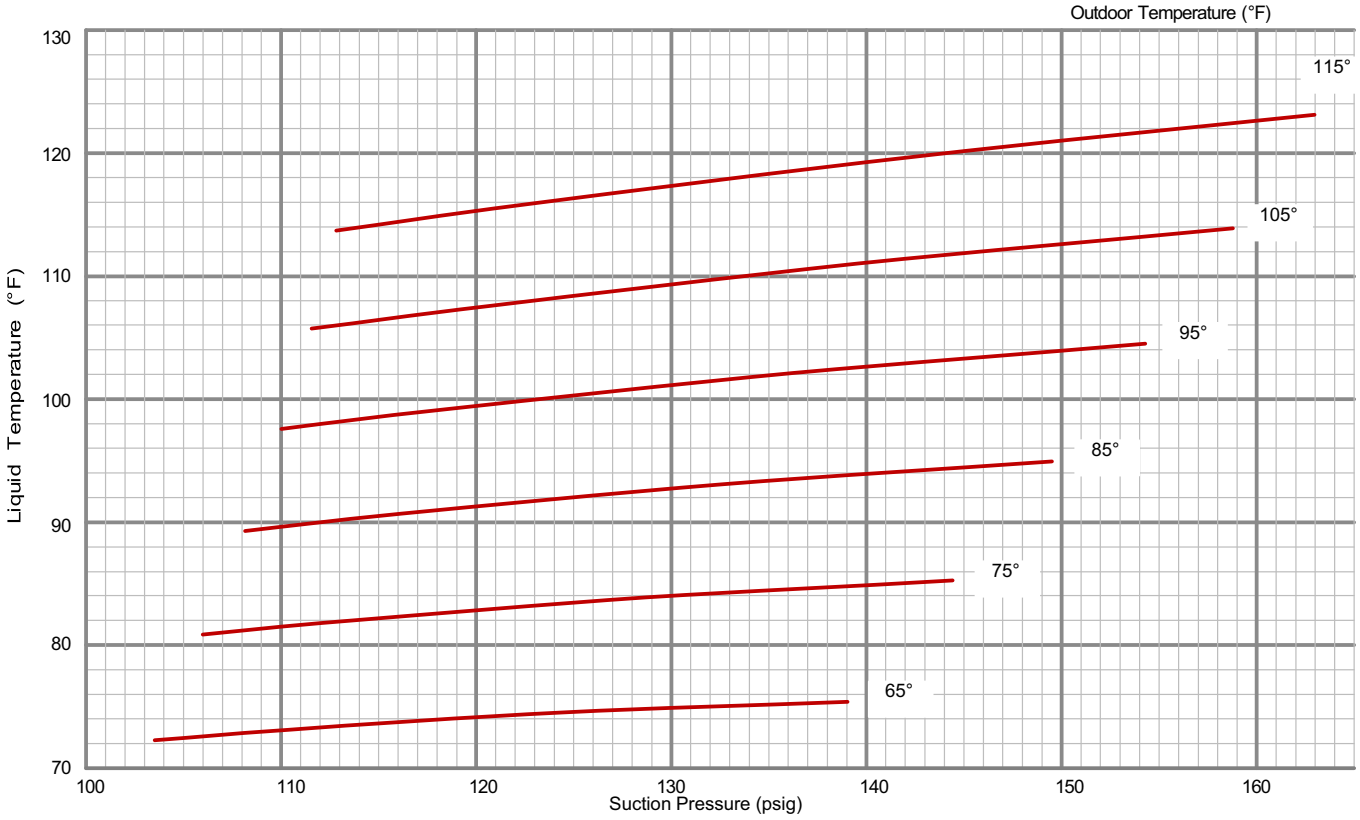
TABLE 6
180 NORMAL OPERATING PRESSURES - NO REHEAT - ALL-ALUMINUM COIL - 581085-01

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	100	217	104	249	106	287	108	331	110	379	111	433
	107	219	111	251	114	289	117	333	119	382	121	436
	120	222	125	255	130	293	134	337	137	386	140	440
	132	225	138	258	144	296	149	340	154	389	159	444
Circuit 2	104	243	106	283	108	327	110	375	112	428	113	485
	110	246	113	286	116	330	119	378	121	431	123	489
	124	251	129	292	133	336	136	385	140	439	143	496
	139	258	144	299	150	344	154	393	159	447	163	505
Circuit 3	119	242	119	282	120	325	123	373	127	424	131	479
	123	246	124	285	126	329	129	376	133	428	138	483
	135	252	138	292	141	336	145	384	150	435	157	491
	154	258	157	298	162	342	167	390	174	442	181	498

180 CHARGING CURVE CIRCUIT 1 - NO REHEAT - ALL-ALUMINUM COIL - 581086-01



180 CHARGING CURVE CIRCUIT 2 - NO REHEAT - ALL-ALUMINUM COIL - 581086-01



180 CHARGING CURVE CIRCUIT 3 - NO REHEAT - ALL-ALUMINUM COIL - 581086-01

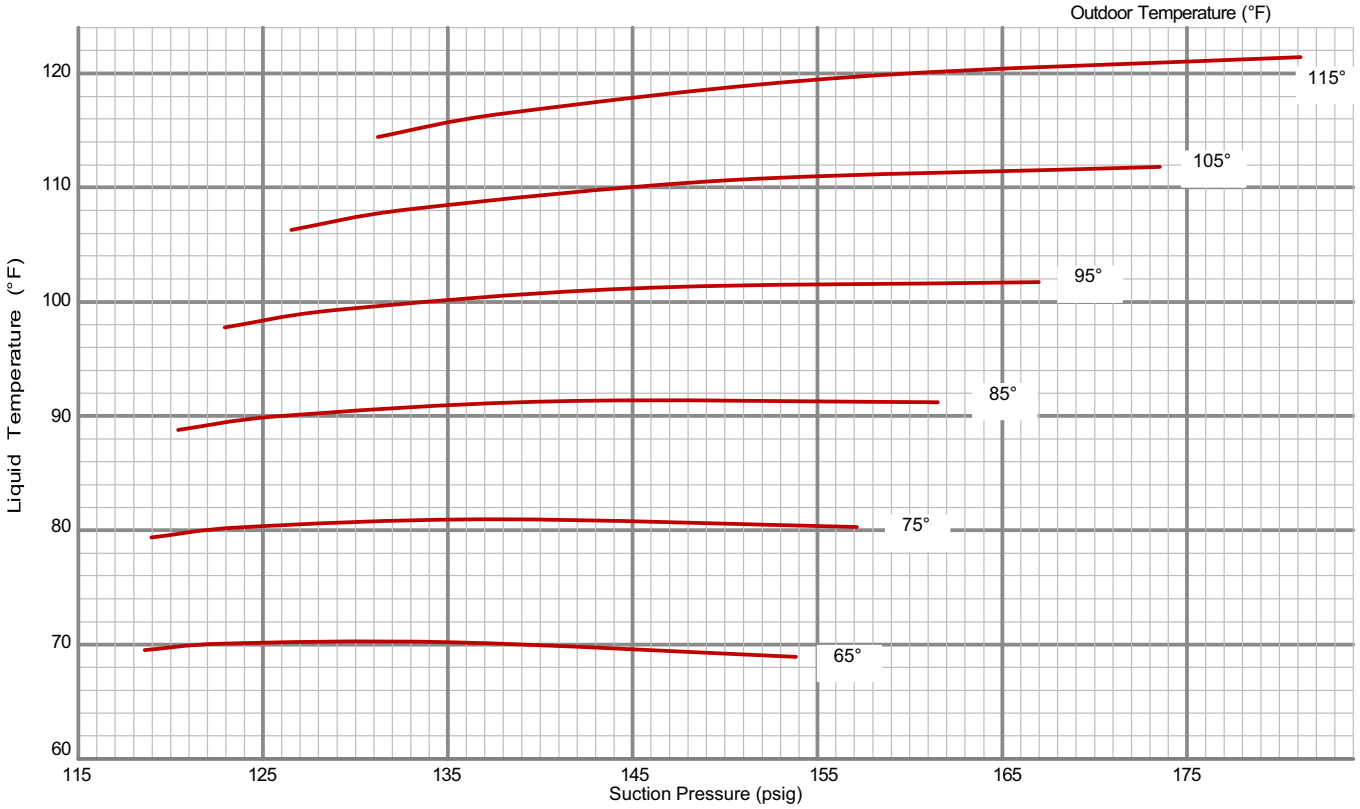
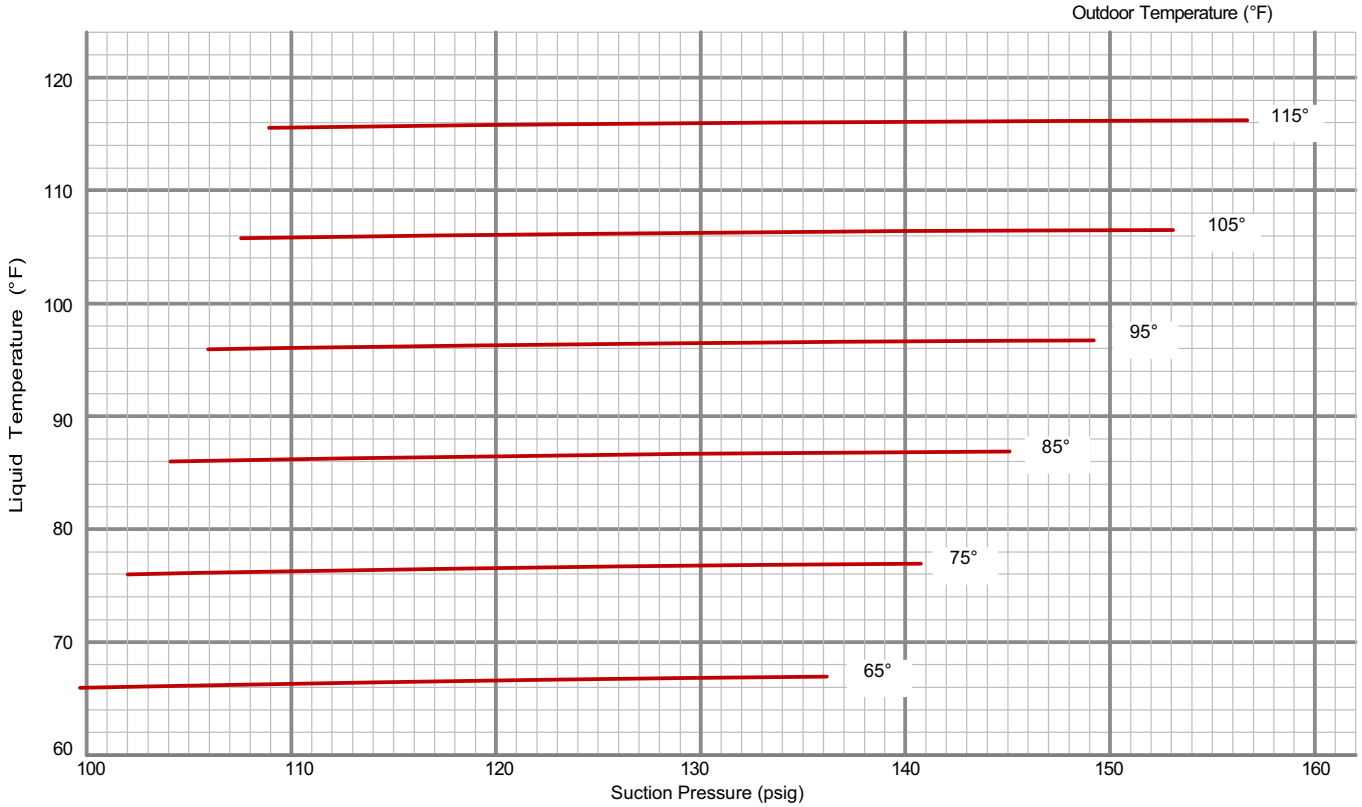


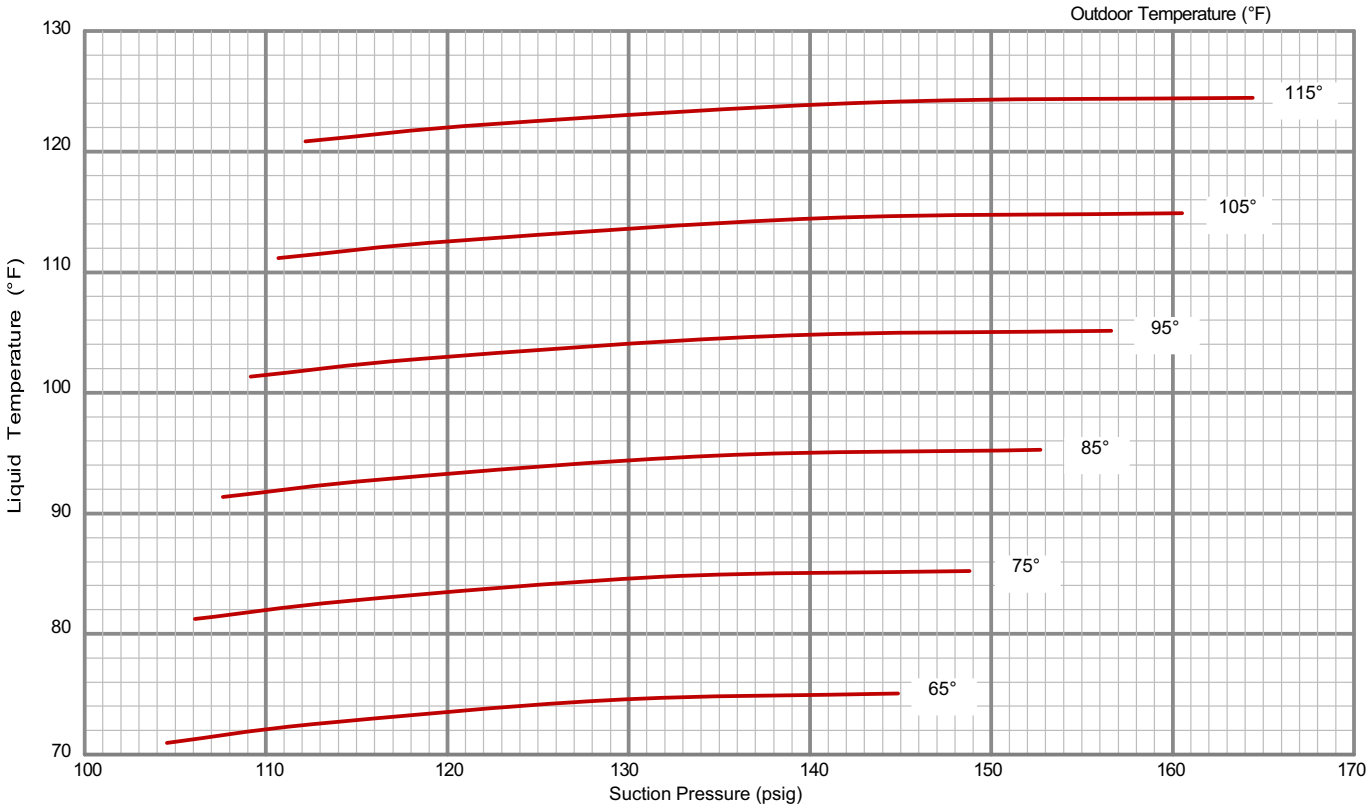
TABLE 7
180 NORMAL OPERATING PRESSURES - REHEAT - ALL-ALUMINUM COIL - 581087-01

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	100	237	102	271	104	312	106	357	108	409	109	465
	107	239	110	273	113	313	115	359	117	410	119	466
	122	245	126	279	129	318	133	363	136	414	138	470
	136	254	141	287	145	326	149	371	153	421	157	476
Circuit 2	105	249	106	288	108	333	109	385	111	444	112	510
	113	251	115	288	117	332	119	384	121	442	123	507
	129	258	132	293	135	336	138	385	141	441	144	504
	145	271	149	305	153	345	157	393	161	447	164	508
Circuit 3	113	251	115	290	116	333	118	382	120	435	122	494
	121	255	124	293	126	336	128	385	130	438	132	496
	139	264	141	303	144	346	147	394	150	447	153	504
	155	278	159	316	162	359	166	407	169	459	173	517

180 CHARGING CURVE CIRCUIT 1 - REHEAT - ALL-ALUMINUM COIL - 581088-01



180 CHARGING CURVE CIRCUIT 2 - REHEAT - ALL-ALUMINUM COIL - 581088-01



180 CHARGING CURVE CIRCUIT 3 - REHEAT - ALL-ALUMINUM COIL - 581088-01

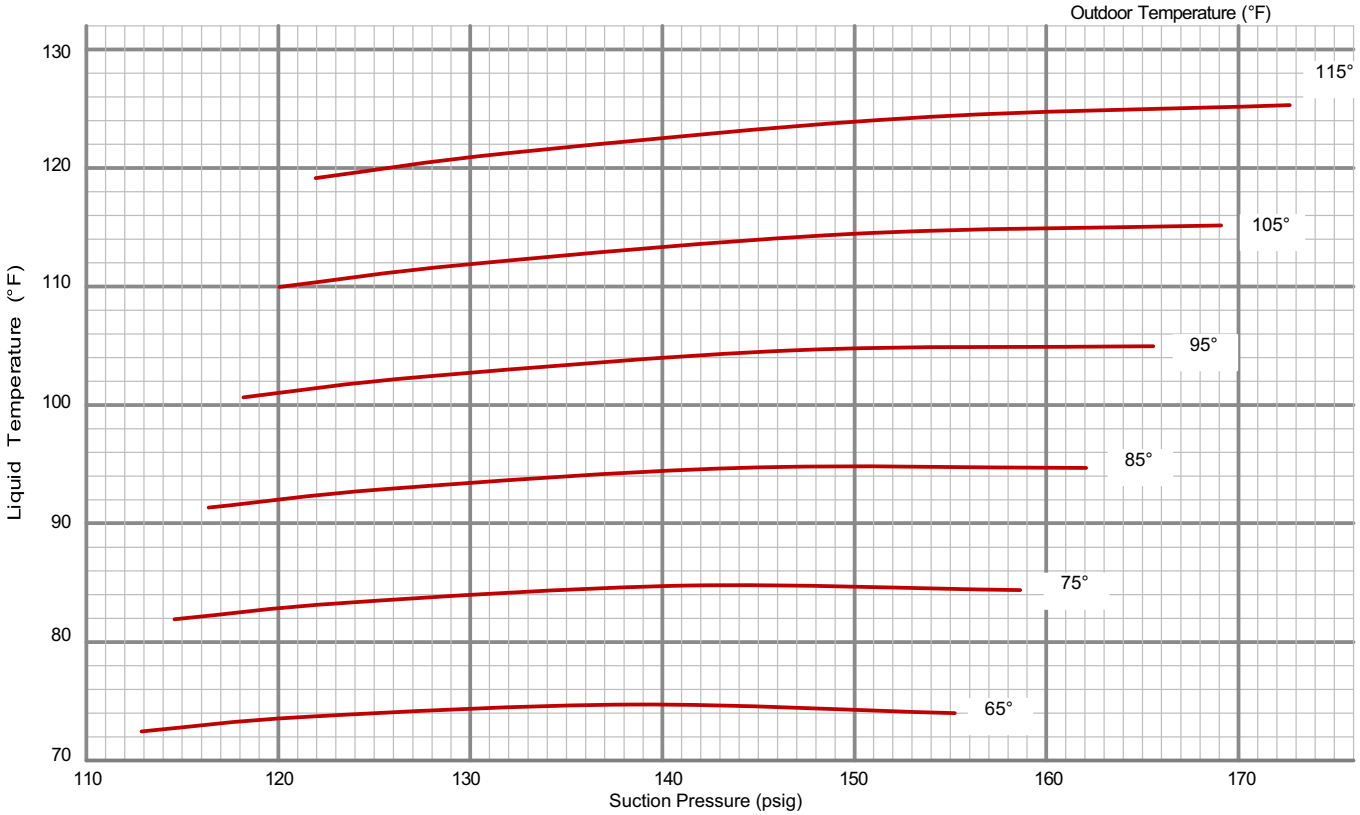
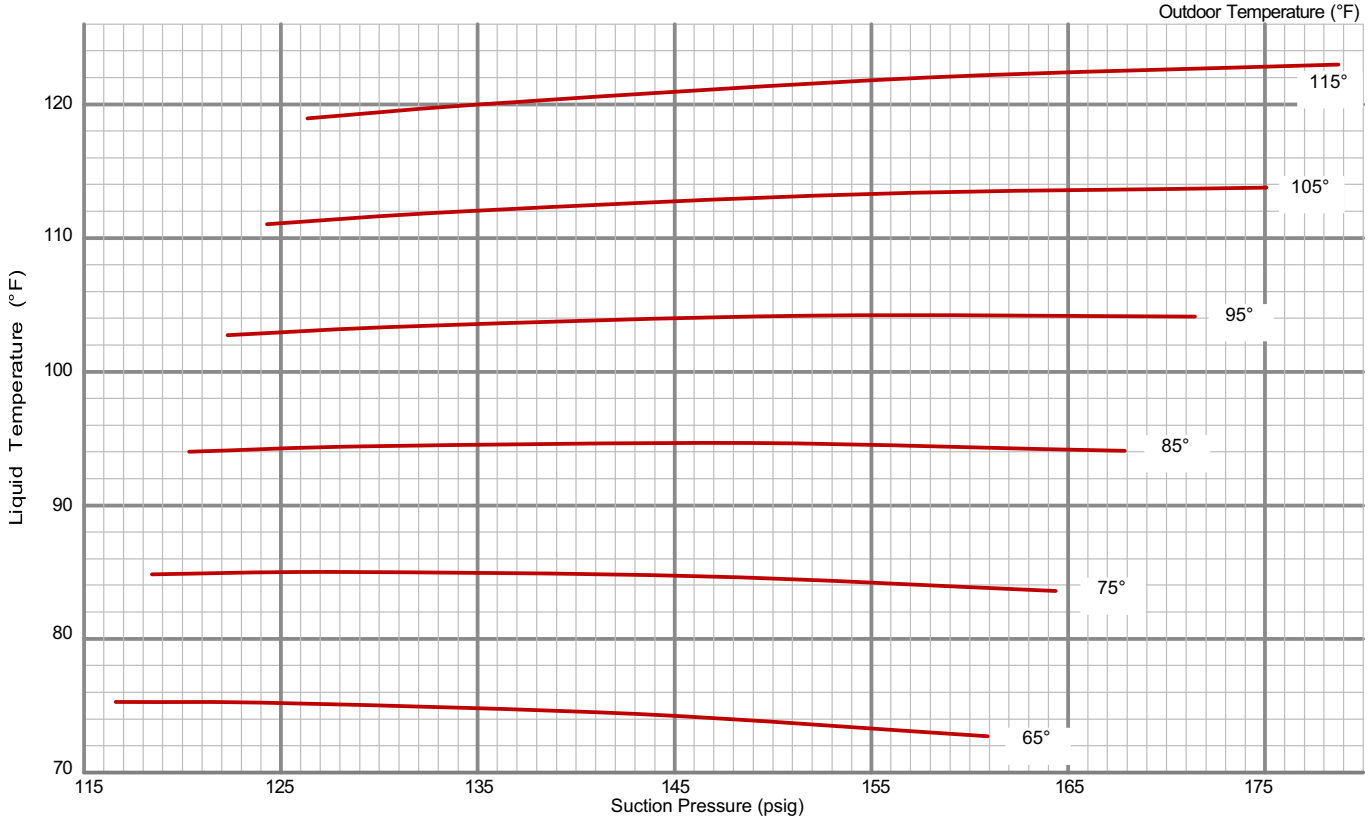


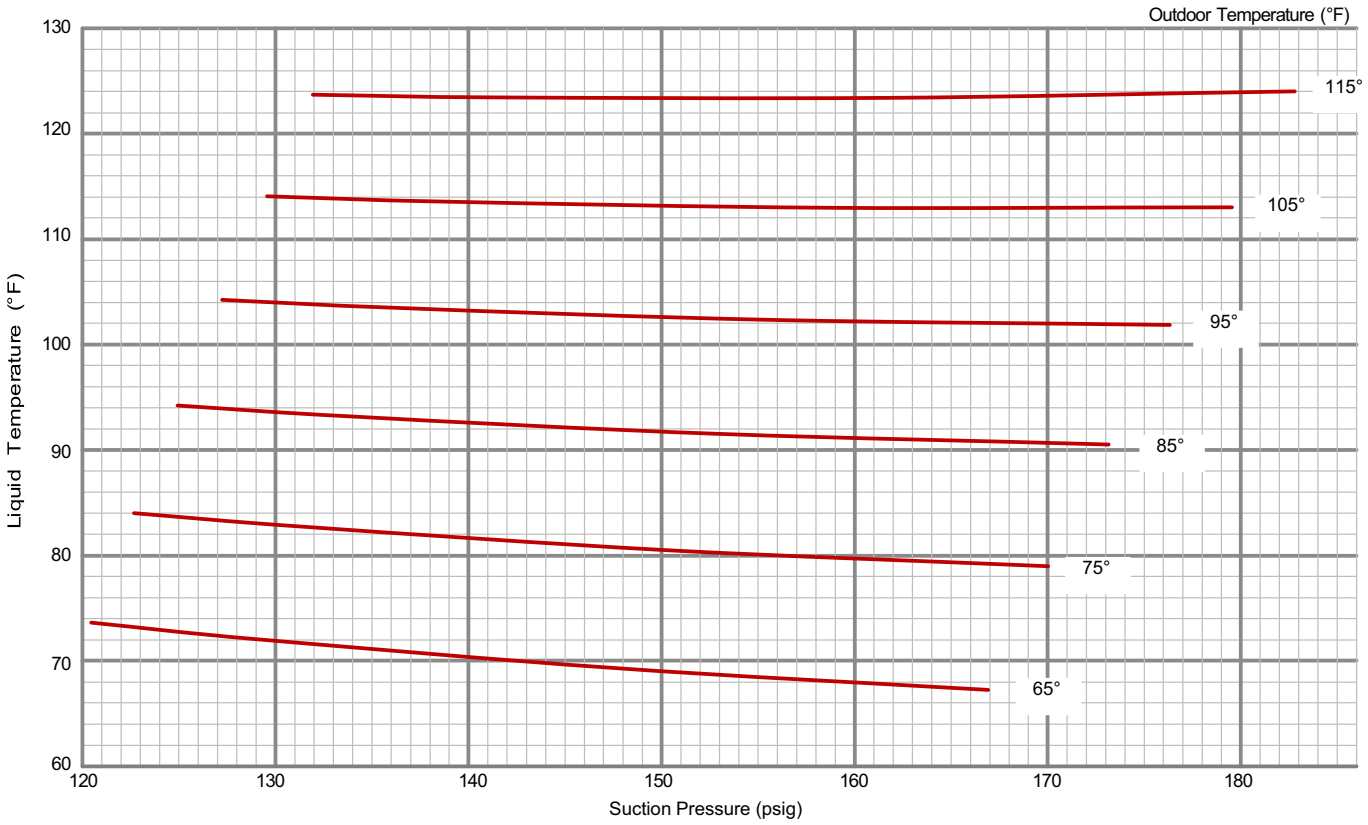
TABLE 8
210 NORMAL OPERATING PRESSURES - NO REHEAT - ALL-ALUMINUM COIL - 581089-01

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	117	250	118	288	120	330	122	376	124	426	126	480
	125	256	128	294	130	336	132	383	134	433	137	487
	143	268	146	306	149	349	152	396	155	446	158	501
	161	280	164	319	168	362	171	409	175	460	179	515
Circuit 2	120	243	123	281	125	321	127	365	130	412	132	463
	129	249	132	287	134	328	137	372	139	419	142	470
	148	262	150	300	153	341	156	385	159	433	162	484
	167	276	170	314	173	355	176	400	180	448	183	499
Circuit 3	104	249	106	290	108	335	110	385	112	438	114	496
	112	252	114	293	116	338	119	388	121	441	123	499
	129	258	132	299	134	345	137	394	139	447	142	505
	147	266	150	307	153	352	156	401	159	455	162	512
Circuit 4	106	242	108	283	110	329	112	382	114	440	116	505
	113	244	116	284	118	330	120	382	123	440	125	504
	130	250	133	289	136	334	138	385	141	442	144	504
	147	260	150	298	154	341	157	391	161	447	164	508

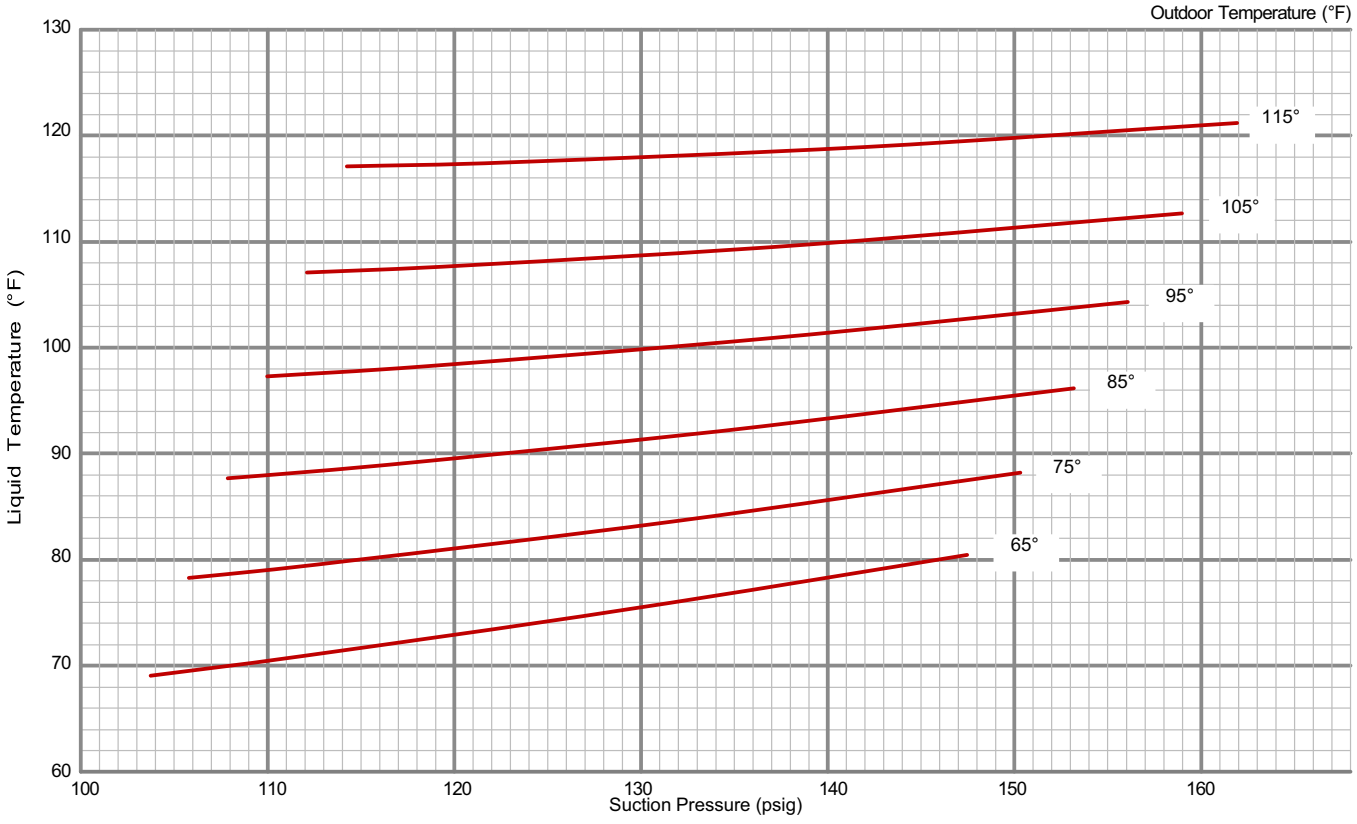
210 CHARGING CURVE CIRCUIT 1 - NO REHEAT - ALL-ALUMINUM COIL - 581090-01



210 CHARGING CURVE CIRCUIT 2 - NO REHEAT - ALL-ALUMINUM COIL - 581090-01



210 CHARGING CURVE CIRCUIT 3 - NO REHEAT - ALL-ALUMINUM COIL - 581090-01



210 CHARGING CURVE CIRCUIT 4 - NO REHEAT - ALL-ALUMINUM COIL - 581090-01

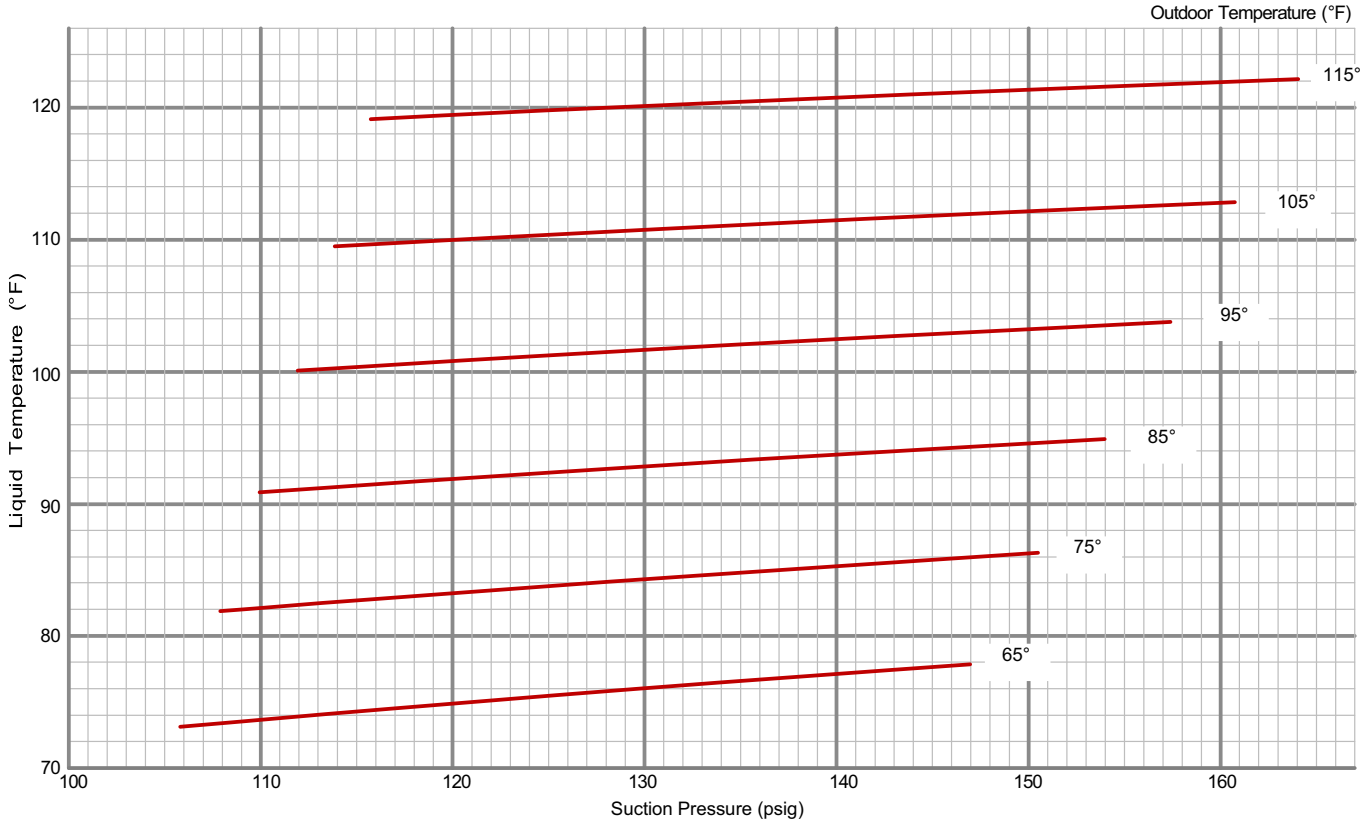
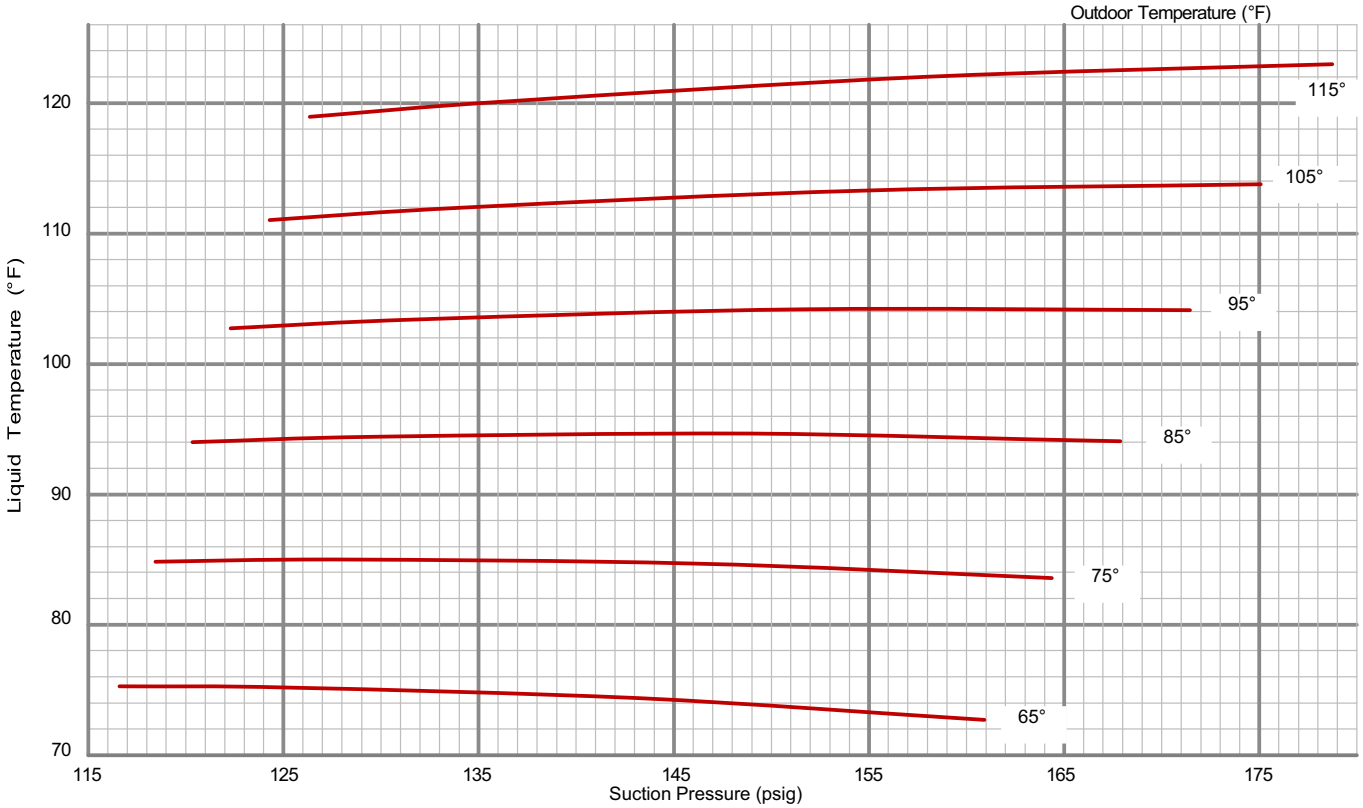


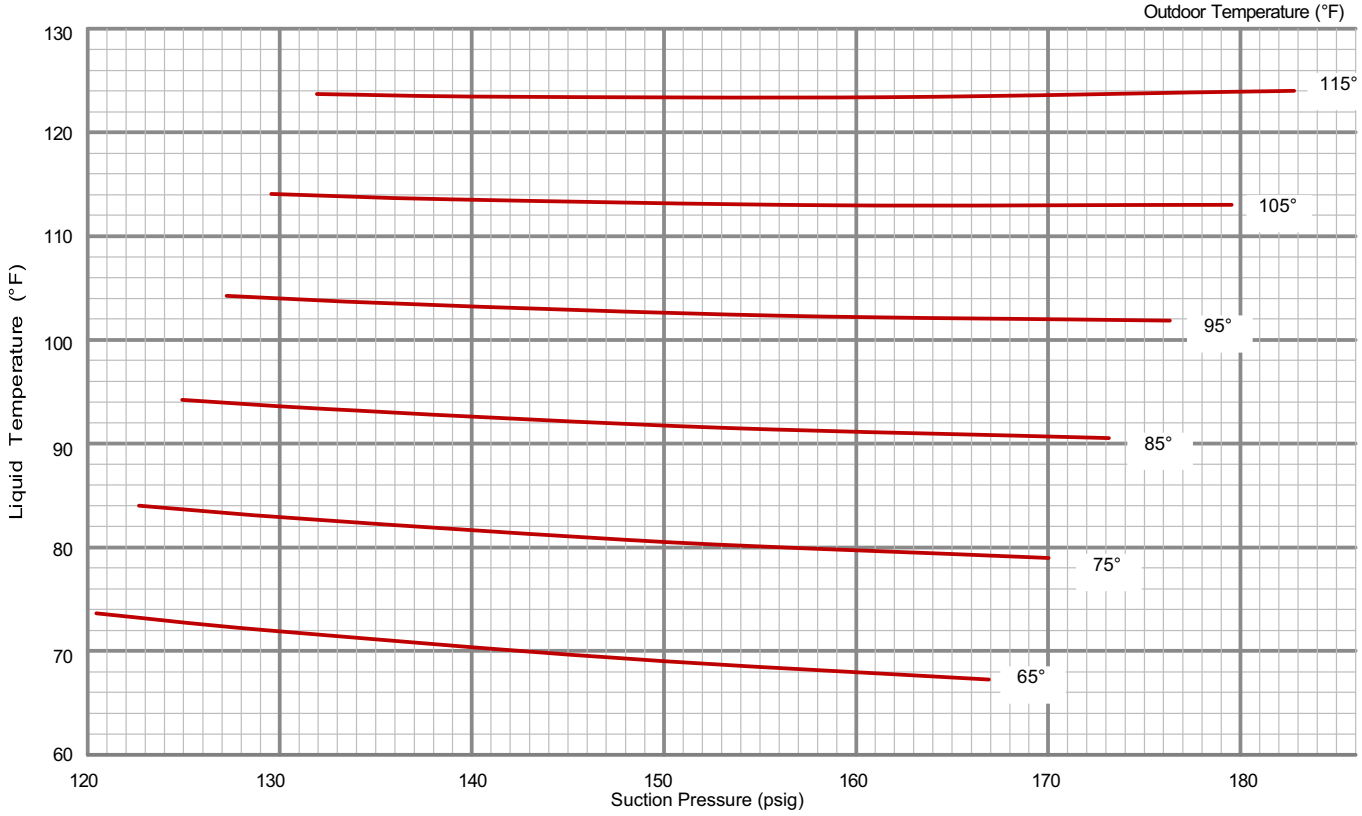
TABLE 9
210 NORMAL OPERATING PRESSURES - REHEAT - ALL-ALUMINUM COIL - 581091-01

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	117	250	118	288	120	330	122	376	124	426	126	480
	125	256	128	294	130	336	132	383	134	433	137	487
	143	268	146	306	149	349	152	396	155	446	158	501
	161	280	164	319	168	362	171	409	175	460	179	515
Circuit 2	120	243	123	281	125	321	127	365	130	412	132	463
	129	249	132	287	134	328	137	372	139	419	142	470
	148	262	150	300	153	341	156	385	159	433	162	484
	167	276	170	314	173	355	176	400	180	448	183	499
Circuit 3	104	249	106	290	108	335	110	385	112	438	114	496
	112	252	114	293	116	338	119	388	121	441	123	499
	129	258	132	299	134	345	137	394	139	447	142	505
	147	266	150	307	153	352	156	401	159	455	162	512
Circuit 4	106	242	108	283	110	329	112	382	114	440	116	505
	113	244	116	284	118	330	120	382	123	440	125	504
	130	250	133	289	136	334	138	385	141	442	144	504
	147	260	150	298	154	341	157	391	161	447	164	508

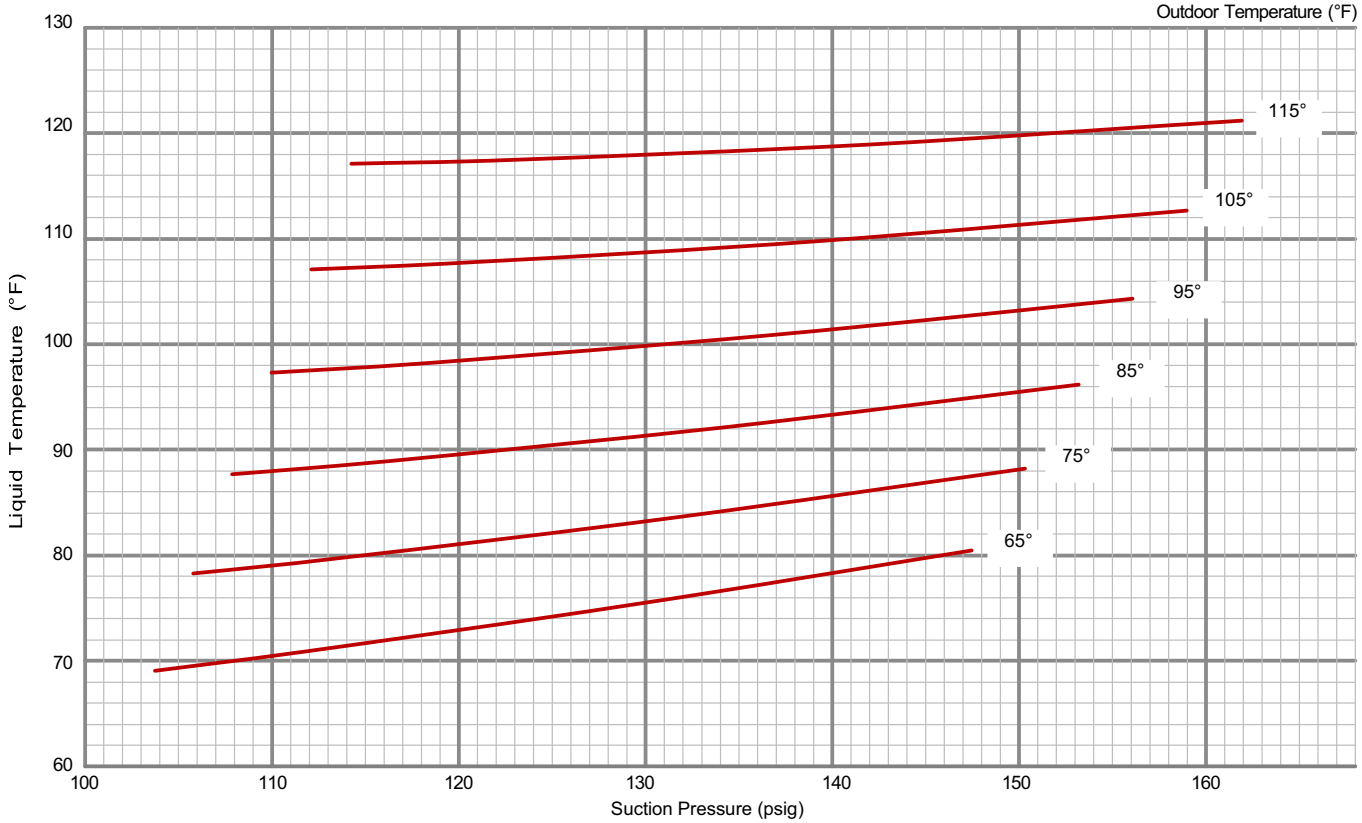
210 CHARGING CURVE CIRCUIT 1 - REHEAT - ALL-ALUMINUM COIL - 581092-01



210 CHARGING CURVE CIRCUIT 2 - REHEAT - ALL-ALUMINUM COIL - 581092-01



210 CHARGING CURVE CIRCUIT 3 - REHEAT - ALL-ALUMINUM COIL - 581092-01



210 CHARGING CURVE CIRCUIT 4 - REHEAT - ALL-ALUMINUM COIL - 581092-01

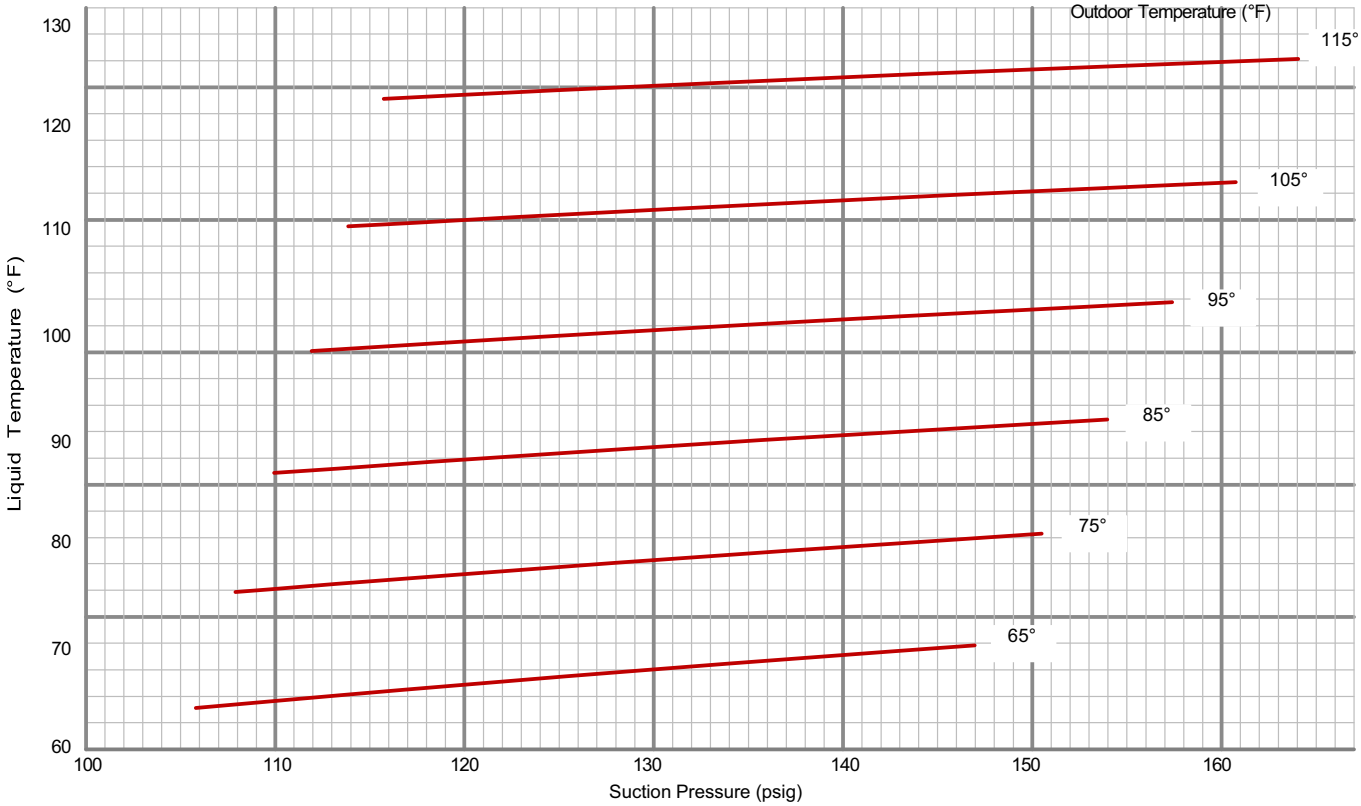
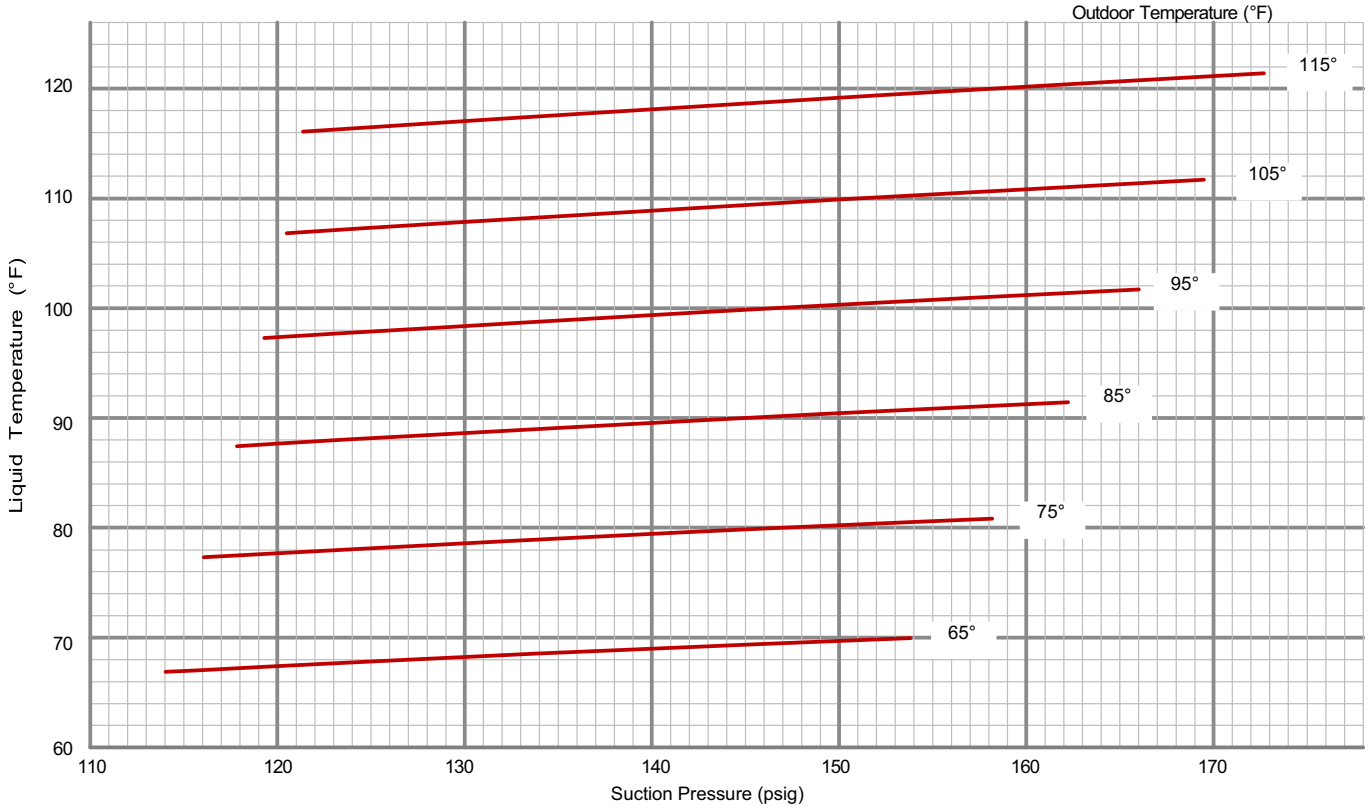


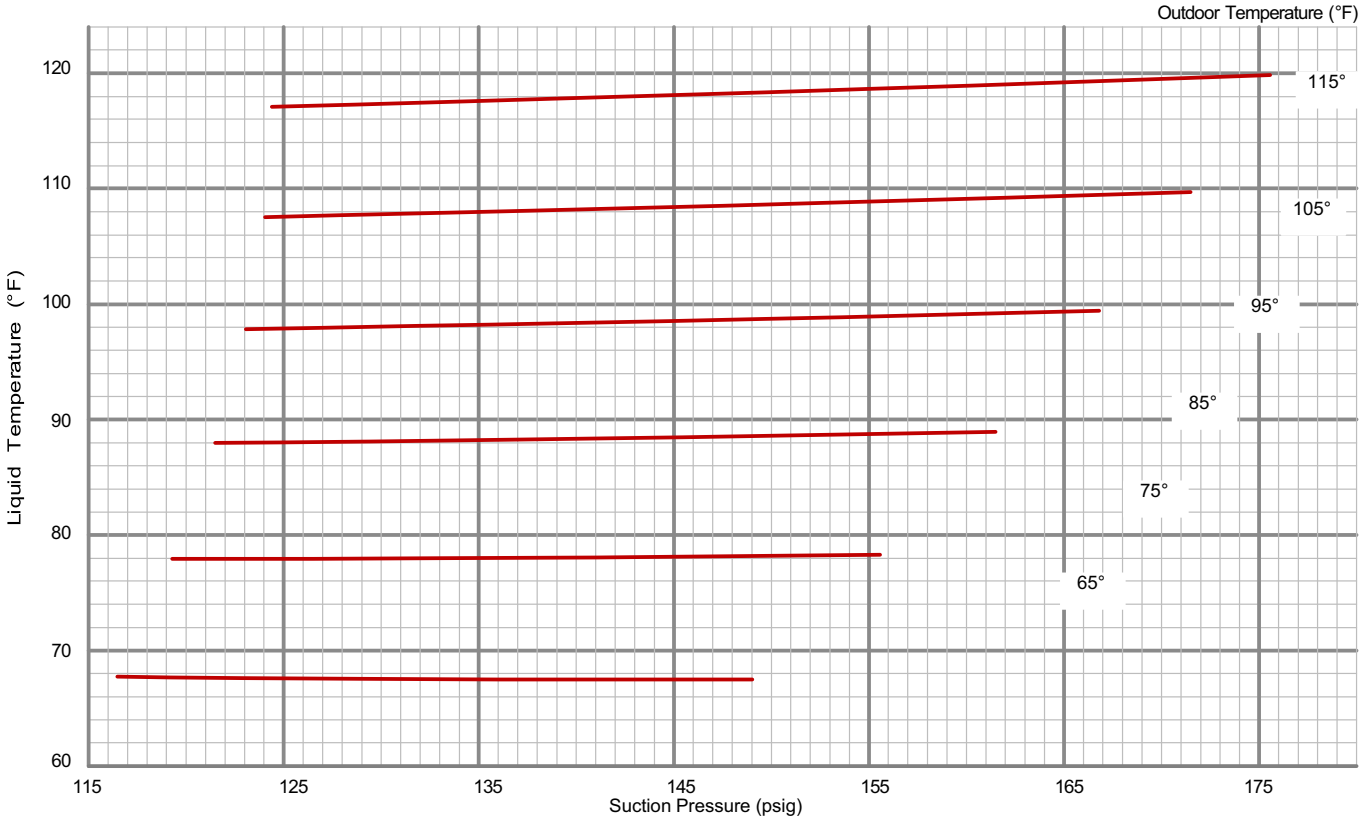
TABLE 10
240 NORMAL OPERATING PRESSURES - NO REHEAT - ALL-ALUMINUM COIL - 581093-01

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	114	253	116	292	118	337	119	387	120	441	121	501
	122	255	125	294	127	339	129	388	130	443	132	503
	138	262	141	301	145	345	147	394	150	448	152	507
	154	271	158	310	162	353	166	402	169	456	173	515
Circuit 2	116	240	119	279	121	324	123	374	124	429	124	490
	123	243	127	281	129	326	132	375	134	430	135	490
	136	250	141	288	145	331	149	379	152	433	155	493
	149	259	156	296	161	339	167	386	171	439	176	498
Circuit 3	101	250	103	290	105	335	107	385	109	439	111	498
	108	252	111	292	113	337	116	387	118	441	120	499
	124	257	127	298	130	343	133	392	135	446	138	504
	141	266	144	306	148	350	151	399	154	453	157	512
Circuit 4	101	247	104	289	105	336	107	390	109	449	111	514
	109	249	111	290	114	336	116	389	118	447	120	511
	125	255	128	294	131	339	134	390	137	447	139	509
	141	264	145	301	149	345	153	394	156	449	160	510

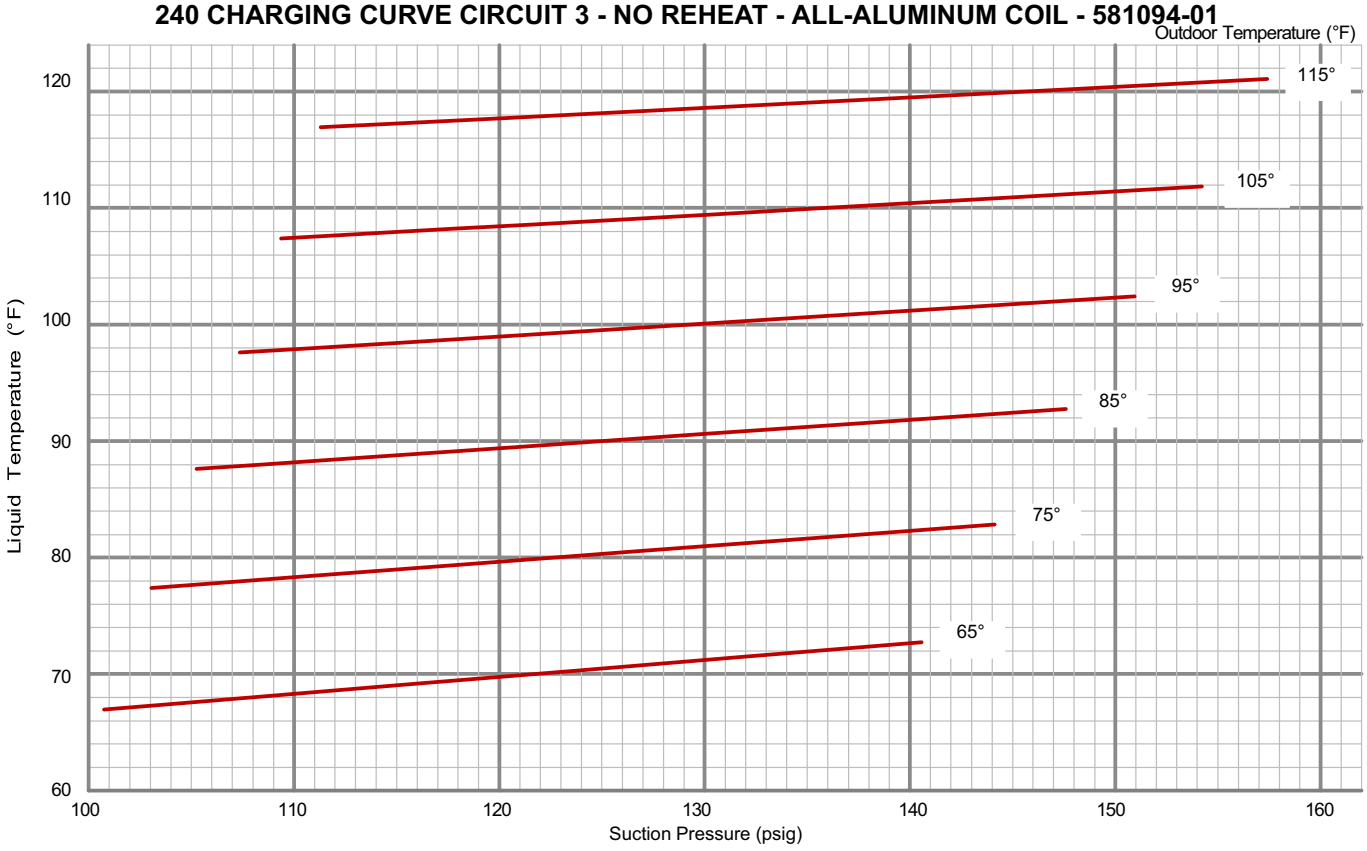
240 CHARGING CURVE CIRCUIT 1 - NO REHEAT - ALL-ALUMINUM COIL - 581094-01



240 CHARGING CURVE CIRCUIT 2 - NO REHEAT - ALL-ALUMINUM COIL - 581094-01



240 CHARGING CURVE CIRCUIT 3 - NO REHEAT - ALL-ALUMINUM COIL - 581094-01



240 CHARGING CURVE CIRCUIT 4 - NO REHEAT - ALL-ALUMINUM COIL - 581094-01

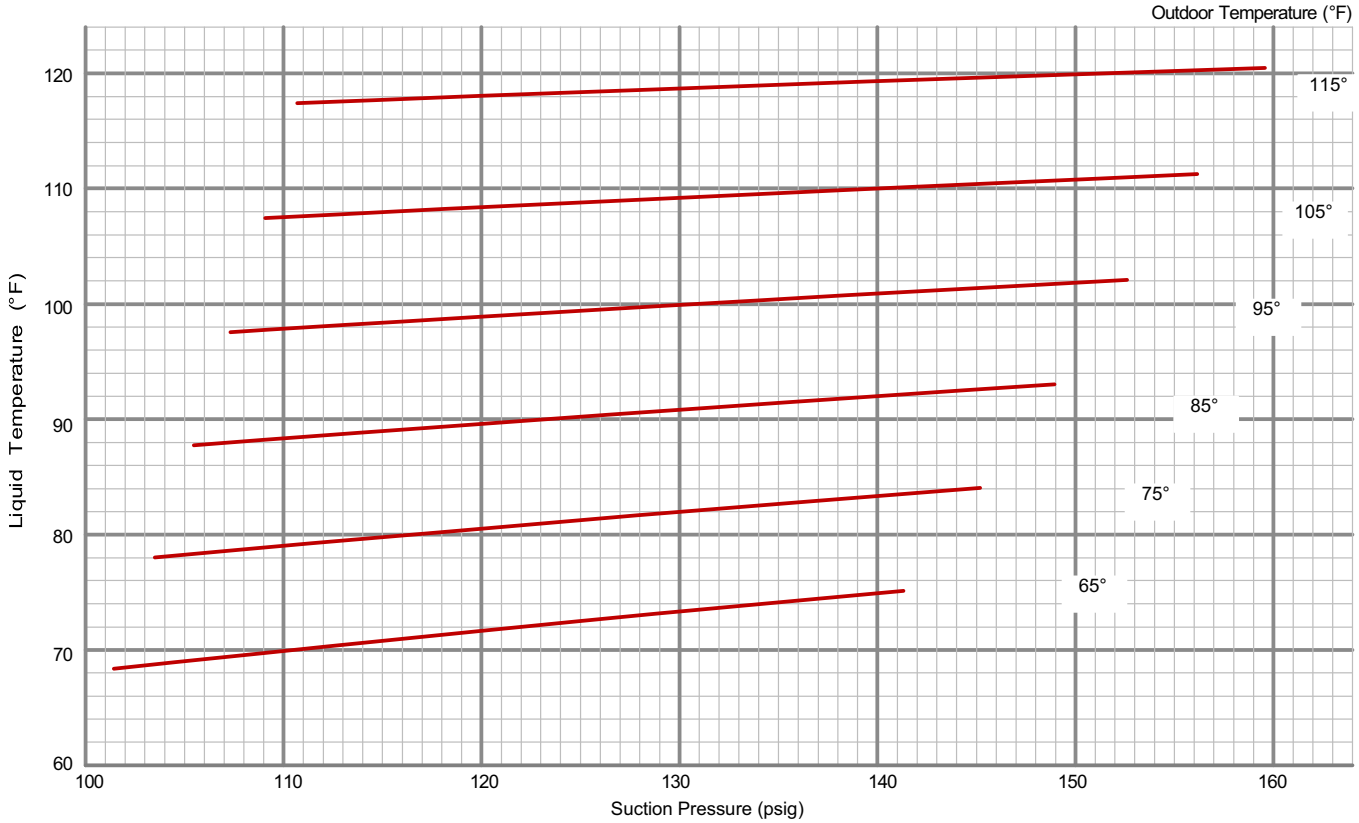
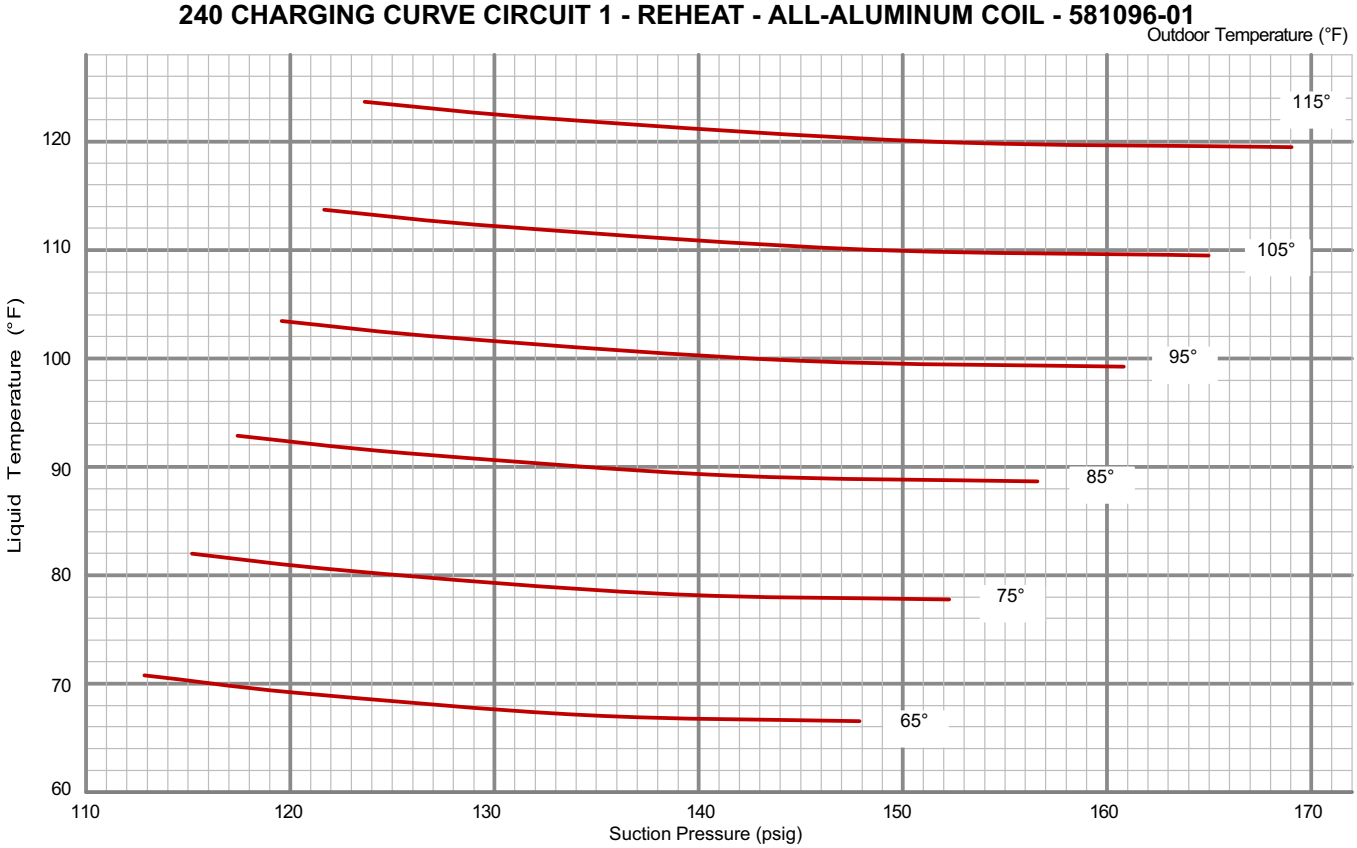


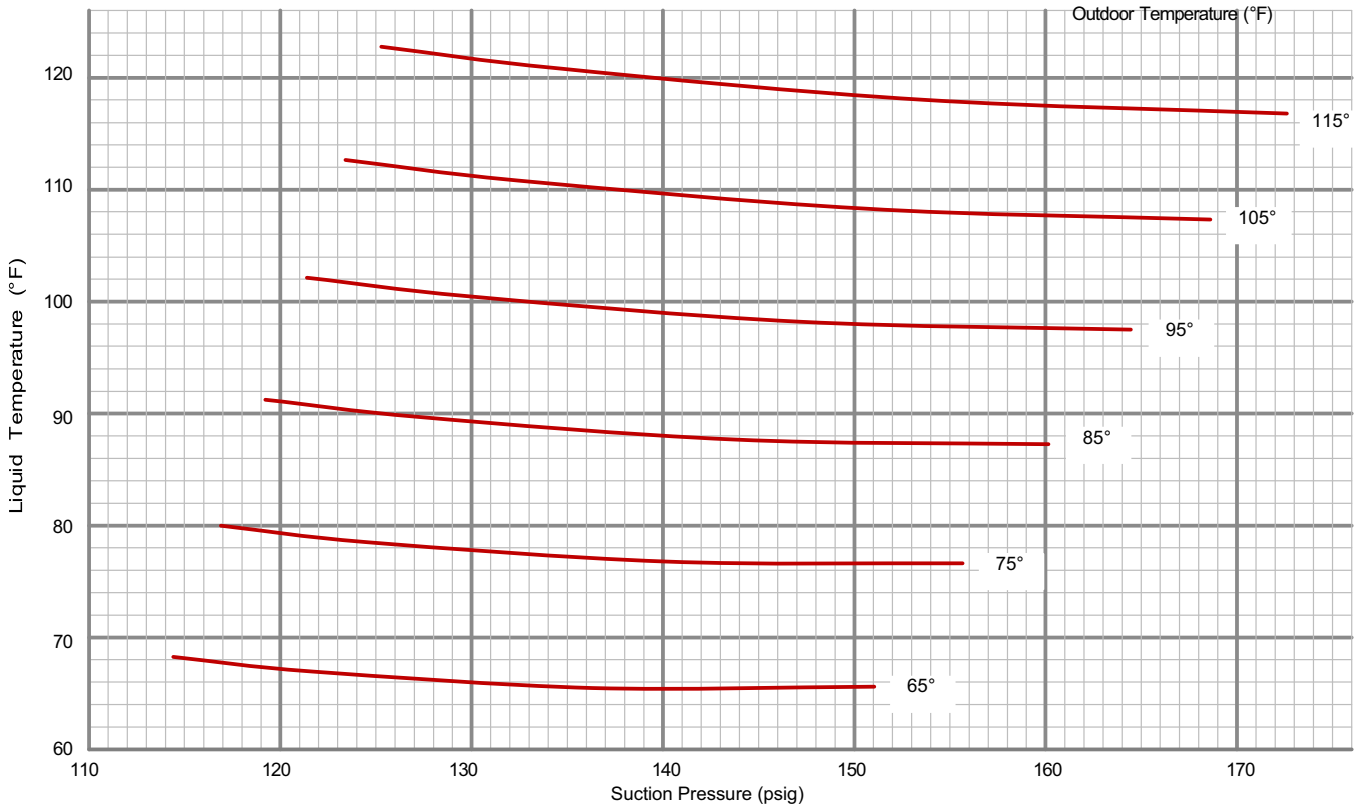
TABLE 11
240 NORMAL OPERATING PRESSURES - REHEAT - ALL-ALUMINUM COIL - 581095-01

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	113	247	115	281	117	320	120	363	122	411	124	463
	120	253	123	288	126	327	128	371	131	419	133	472
	134	265	138	301	142	341	145	386	148	435	151	488
	148	276	152	312	157	353	161	399	165	448	169	503
Circuit 2	114	239	117	272	119	309	121	352	123	401	125	454
	122	249	125	281	127	319	130	362	132	410	135	464
	136	266	140	299	144	337	147	380	150	429	154	482
	151	284	156	316	160	355	164	398	169	447	173	501
Circuit 3	99	241	102	281	104	325	106	373	108	426	109	483
	106	244	109	284	112	328	114	376	116	429	118	487
	121	252	125	291	128	335	131	383	133	436	136	493
	137	259	141	299	145	343	149	391	152	444	155	501
Circuit 4	102	239	105	279	107	325	108	377	110	435	110	499
	109	241	112	281	115	326	117	378	118	435	120	498
	123	248	127	286	131	331	134	381	137	437	139	500
	138	257	143	294	148	338	152	387	156	442	159	503

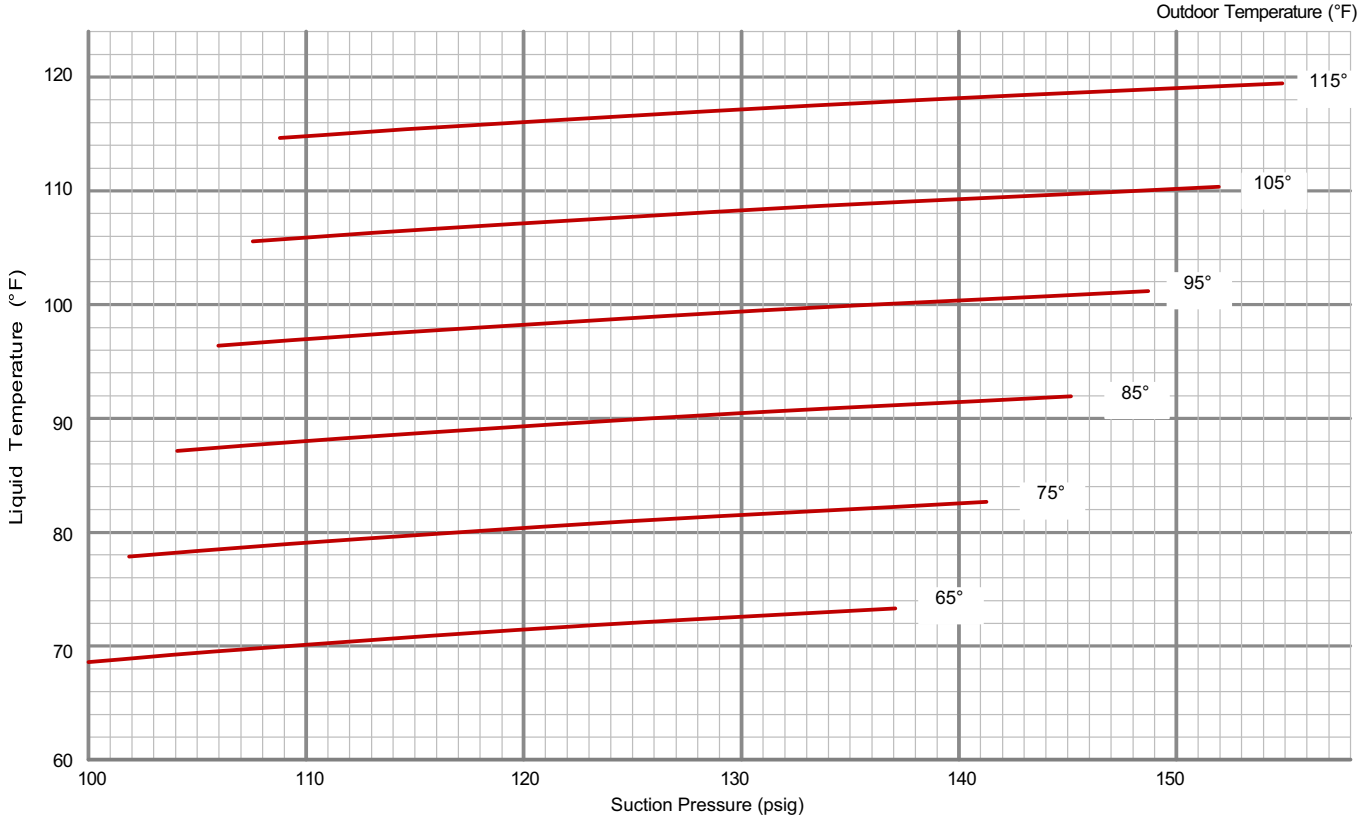
240 CHARGING CURVE CIRCUIT 1 - REHEAT - ALL-ALUMINUM COIL - 581096-01



240 CHARGING CURVE CIRCUIT 2 - REHEAT - ALL-ALUMINUM COIL - 581096-01



240 CHARGING CURVE CIRCUIT 3 - REHEAT - ALL-ALUMINUM COIL - 581096-01



240 CHARGING CURVE CIRCUIT 4 - REHEAT - ALL-ALUMINUM COIL - 581096-01

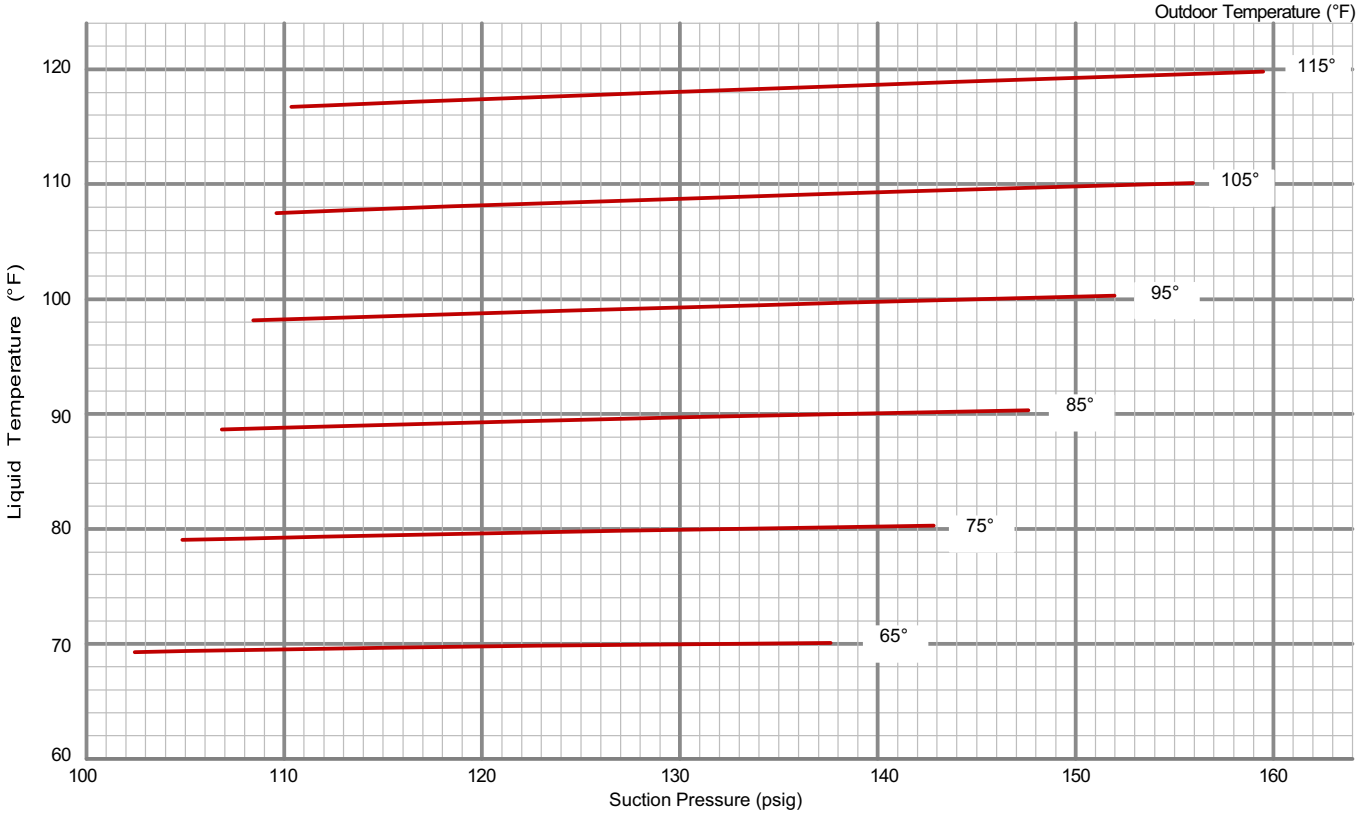
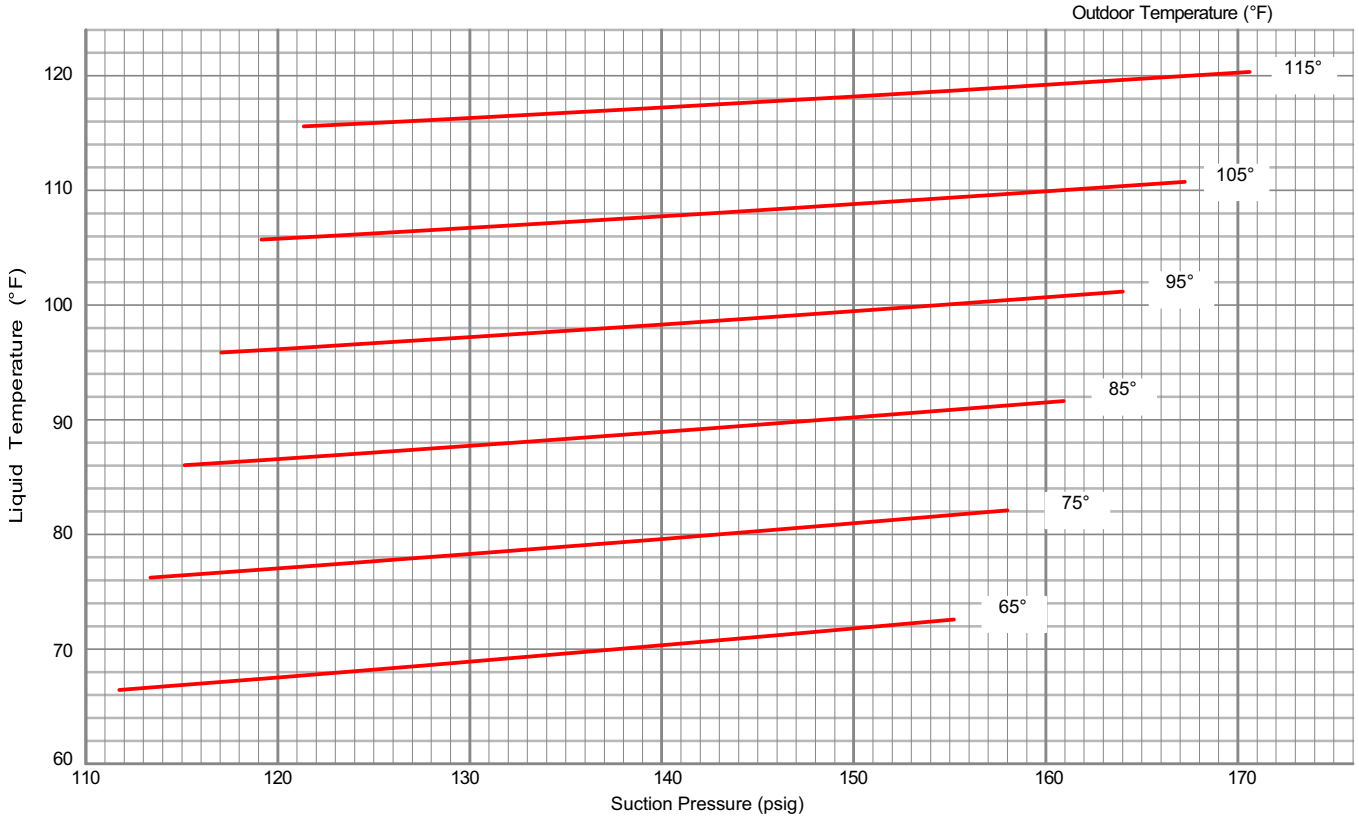


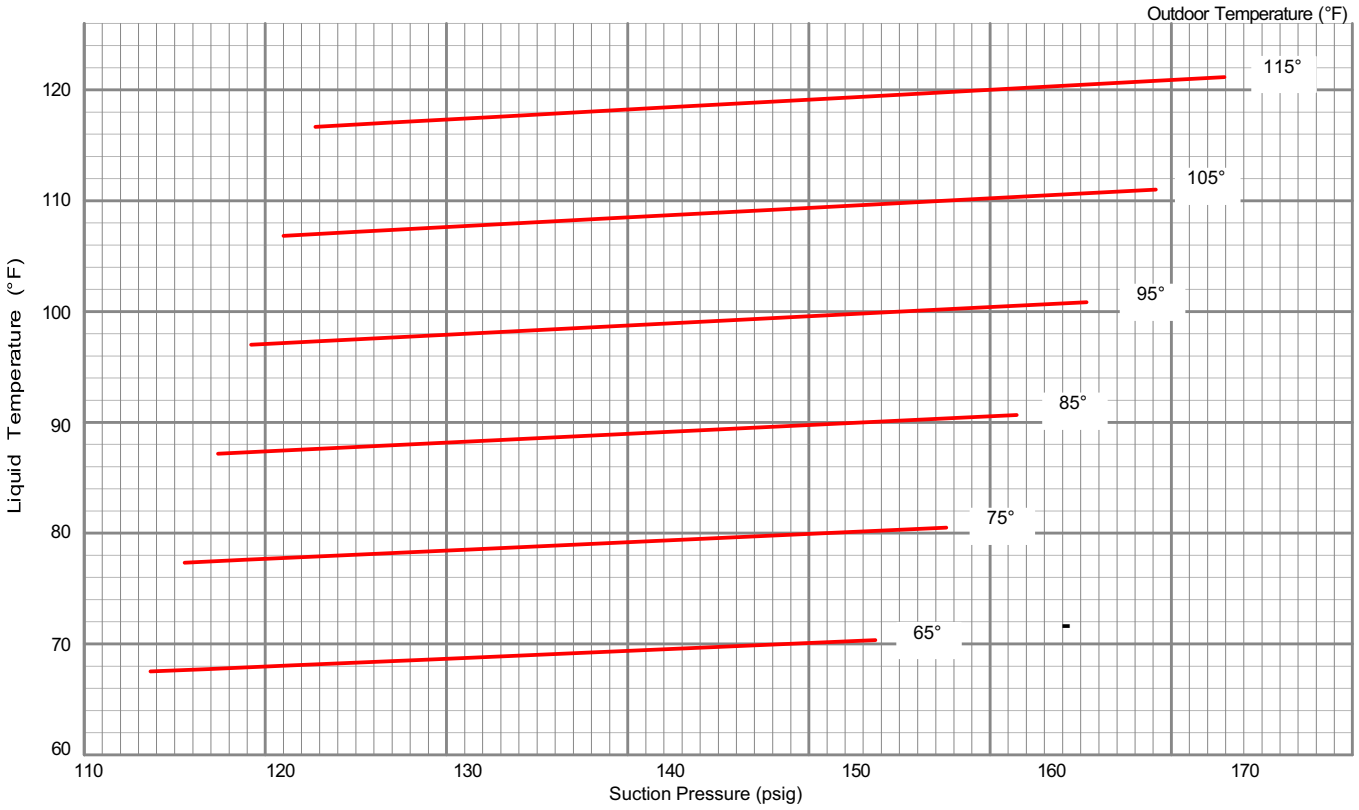
TABLE 12
300 NORMAL OPERATING PRESSURES - NO REHEAT - ALL-ALUMINUM COIL - 581097-01

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	112	260	113	302	115	349	117	401	119	459	121	523
	120	264	122	305	124	352	126	404	128	462	131	525
	137	273	140	313	142	359	145	410	147	467	150	529
	155	283	158	322	161	367	164	417	167	473	171	535
Circuit 2	114	245	116	285	117	329	119	379	121	434	123	494
	121	249	124	289	126	333	128	383	130	438	133	497
	137	257	140	297	144	341	147	390	150	445	153	505
	154	265	158	304	161	348	165	397	169	451	173	511
Circuit 3	95	259	97	300	99	346	102	398	104	454	107	515
	102	264	105	306	107	352	110	403	113	459	115	520
	118	274	121	315	124	362	127	413	130	469	134	530
	135	282	138	323	142	370	146	421	149	478	153	539
Circuit 4	98	251	100	294	102	341	104	393	106	450	108	511
	105	259	107	301	110	347	112	399	115	456	117	517
	121	269	124	310	127	357	130	408	133	464	136	524
	137	274	141	315	145	360	148	411	152	466	156	526

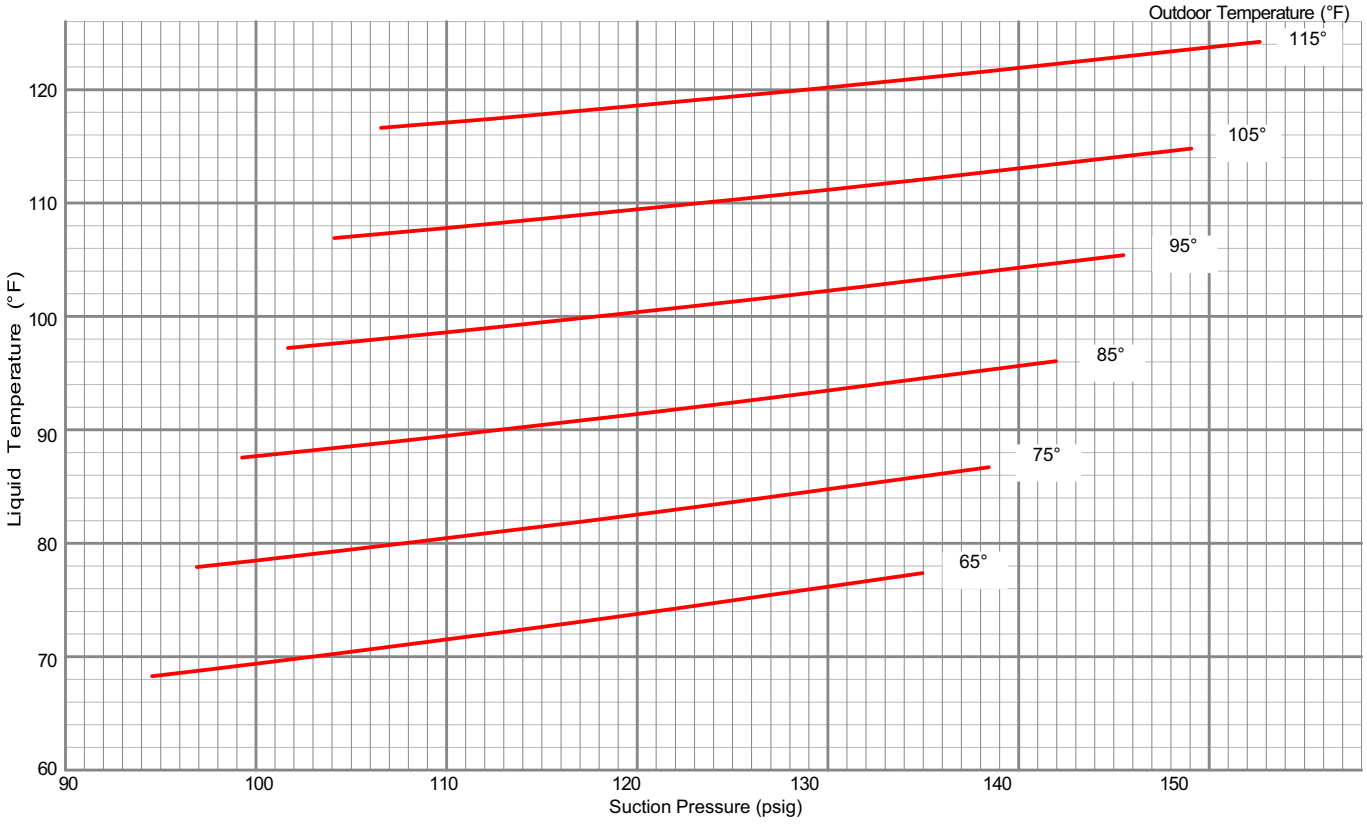
300 CHARGING CURVE CIRCUIT 1 - NO REHEAT - ALL-ALUMINUM COIL - 581098-01



300 CHARGING CURVE CIRCUIT 2 - NO REHEAT - ALL-ALUMINUM COIL - 581098-01



300 CHARGING CURVE CIRCUIT 3 - NO REHEAT - ALL-ALUMINUM COIL - 581098-01



300 CHARGING CURVE CIRCUIT 4 - NO REHEAT - ALL-ALUMINUM COIL - 581098-01

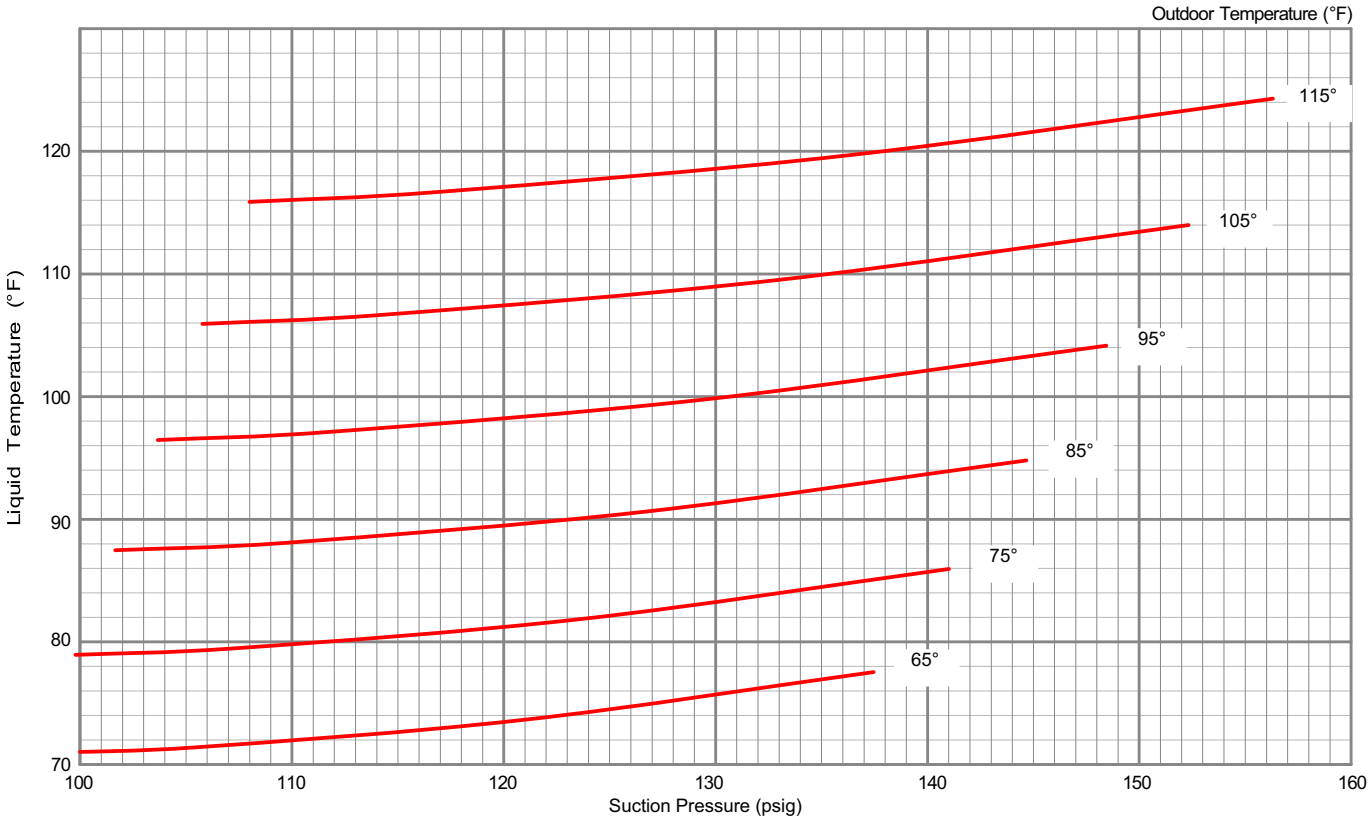
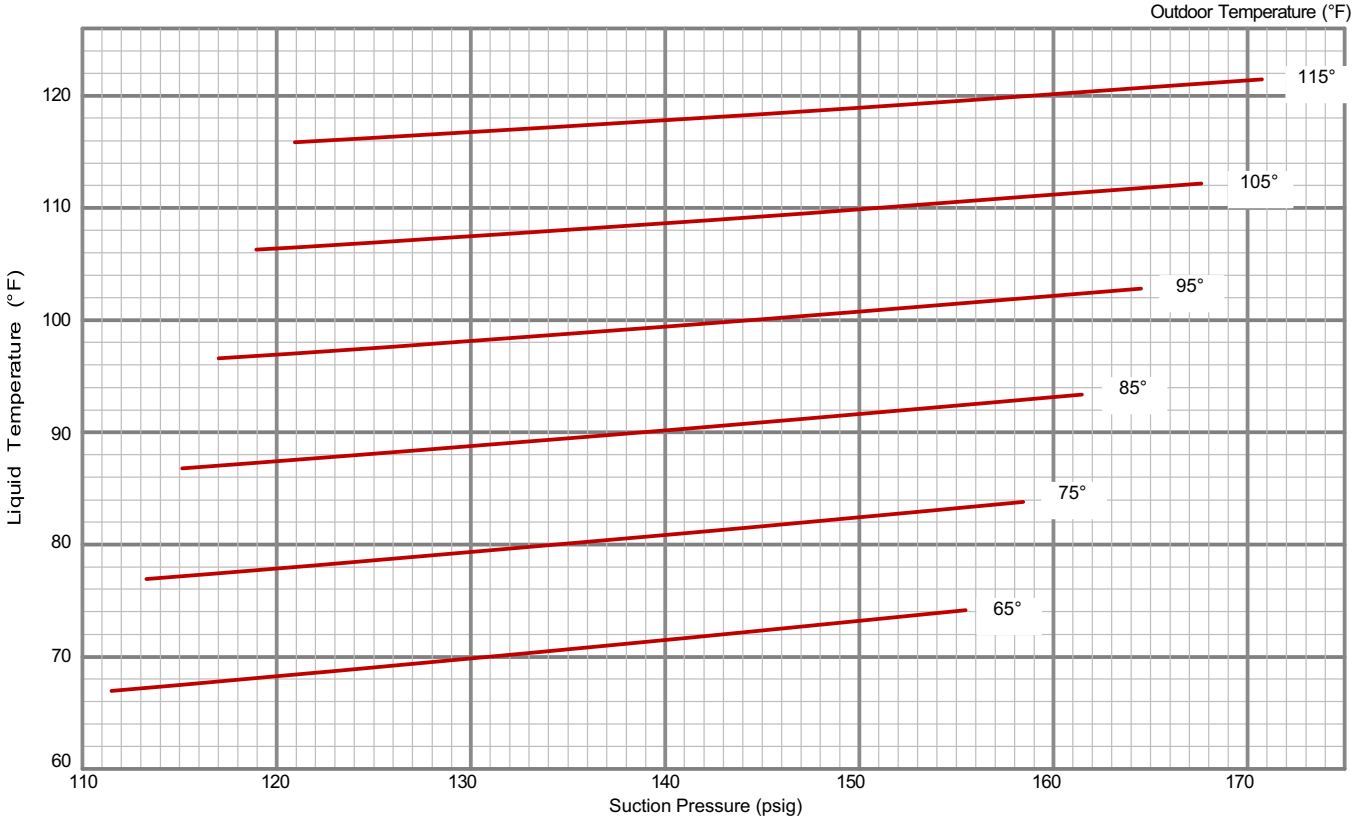


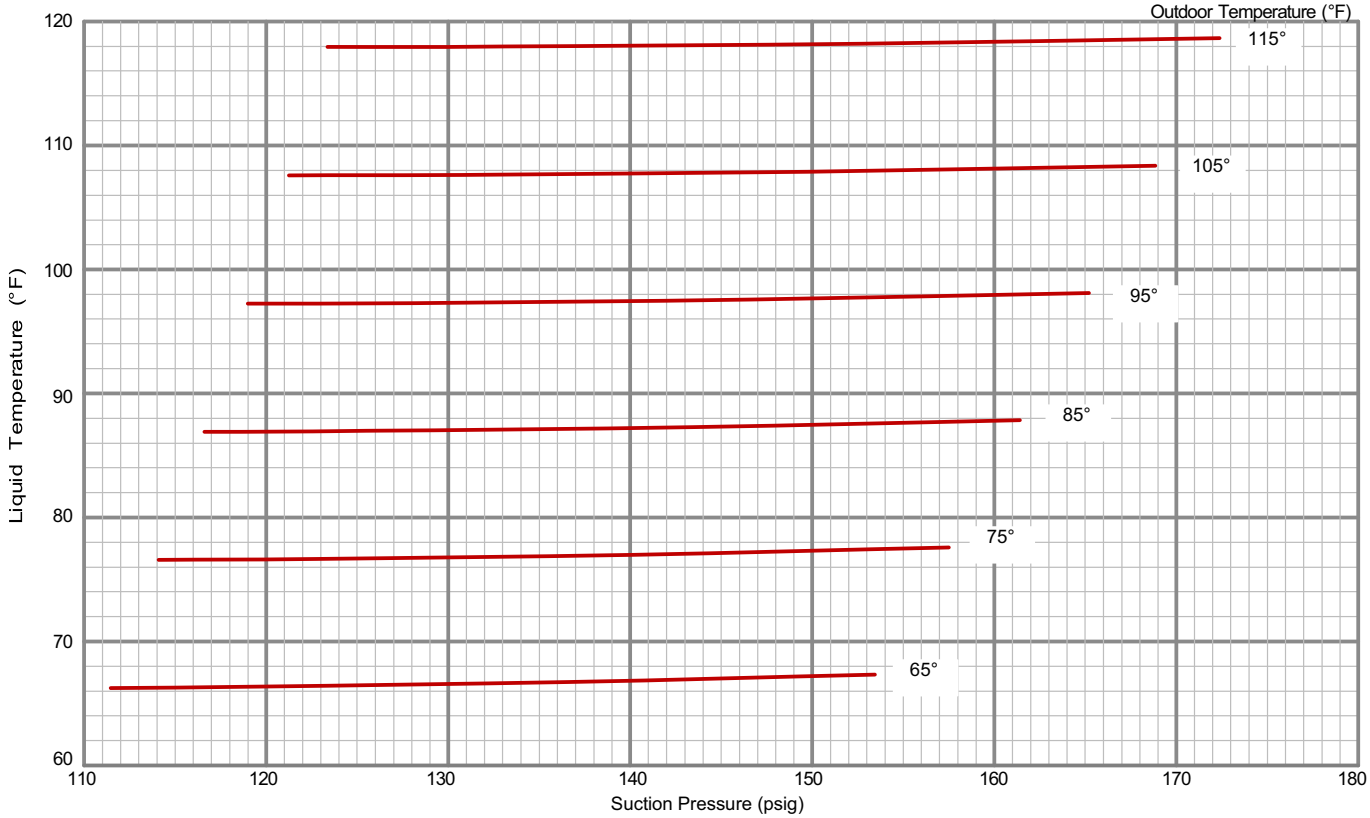
TABLE 13
300 NORMAL OPERATING PRESSURES - REHEAT - ALL-ALUMINUM COIL - 581099-01

	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	111	270	113	310	115	355	117	405	119	461	121	522
	120	274	122	314	124	358	126	408	128	463	130	524
	137	285	140	323	142	367	145	416	147	470	150	529
	155	298	158	335	161	378	165	425	168	478	171	537
Circuit 2	111	260	114	297	117	340	119	389	121	443	123	502
	120	268	123	306	126	349	128	398	131	452	133	512
	137	280	140	319	143	363	147	413	150	468	153	529
	153	287	158	326	161	372	165	422	169	479	172	540
Circuit 3	95	263	97	304	100	350	102	401	104	458	106	519
	102	266	105	307	108	353	110	405	112	461	115	522
	118	274	122	315	125	361	128	412	130	468	133	529
	136	284	140	324	143	370	147	421	150	477	153	537
Circuit 4	97	258	99	300	101	346	103	398	105	456	108	518
	105	263	107	304	109	351	112	402	114	459	117	521
	120	272	123	312	126	358	129	409	132	466	136	527
	137	280	141	320	145	365	148	416	152	472	156	532

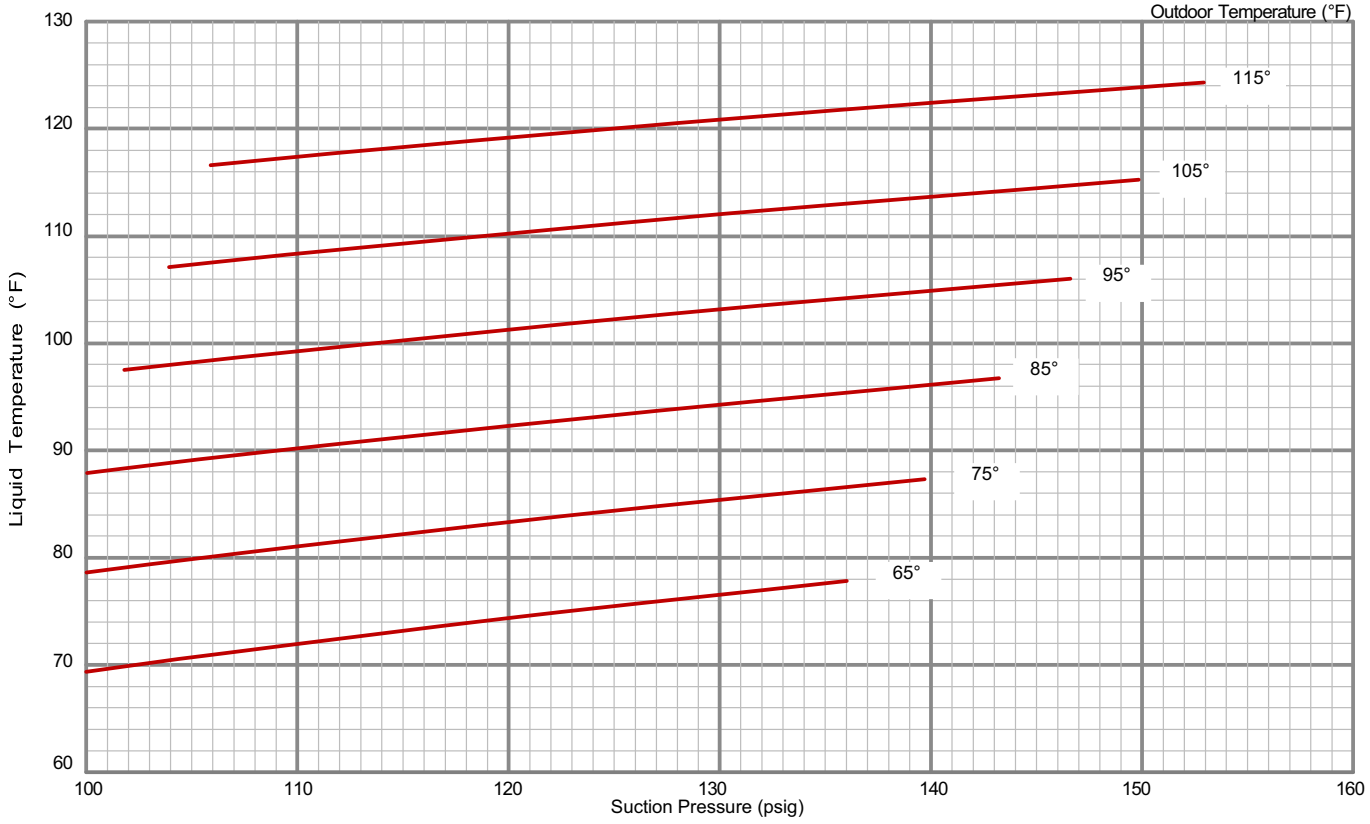
300 CHARGING CURVE CIRCUIT 1 - REHEAT - ALL-ALUMINUM COIL - 581100-01



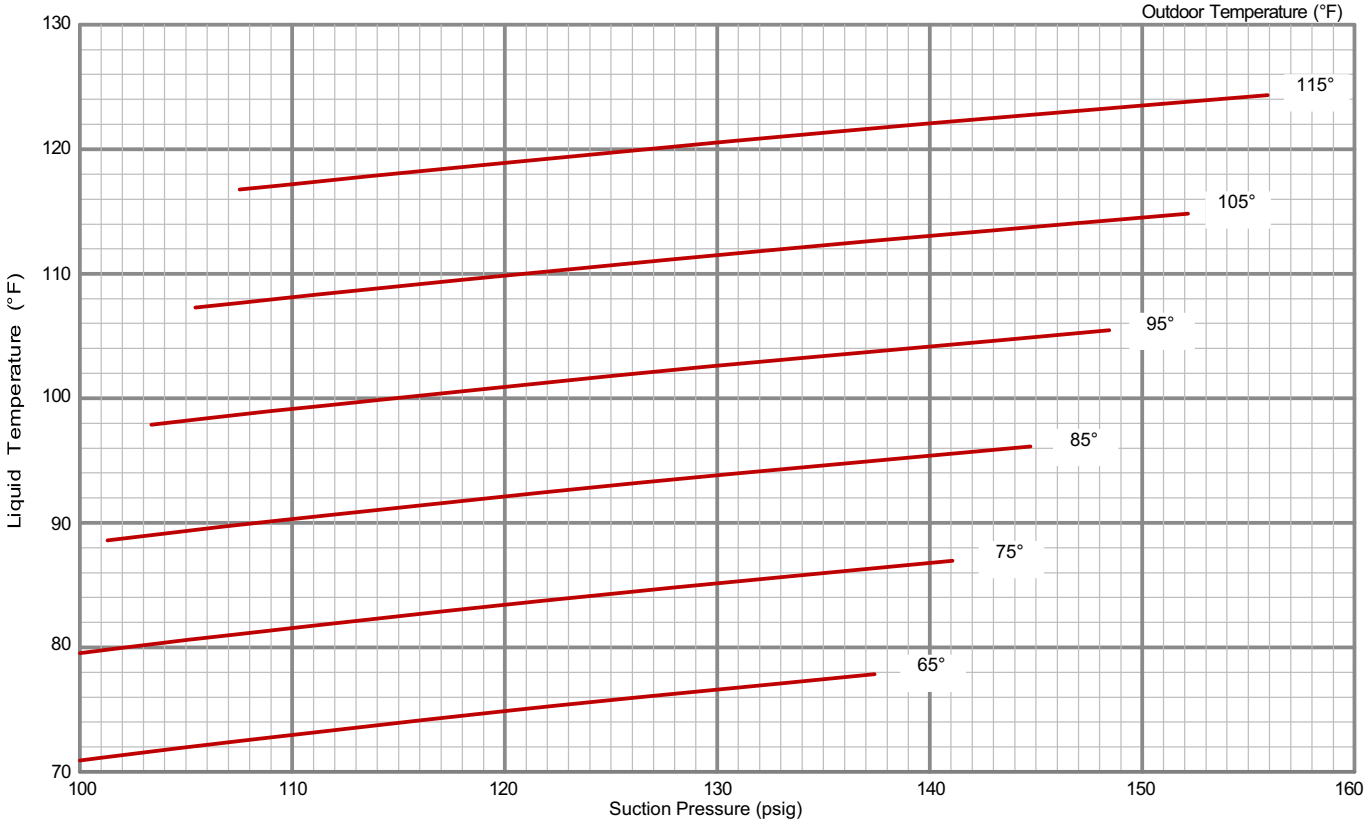
300 CHARGING CURVE CIRCUIT 2 - REHEAT - ALL-ALUMINUM COIL - 581100-01



300 CHARGING CURVE CIRCUIT 3 - REHEAT - ALL-ALUMINUM COIL - 581100-01



300 CHARGING CURVE CIRCUIT 4 - REHEAT - ALL-ALUMINUM COIL - 581100-01



F-Compressor Controls

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

1- High Pressure Switch (S4, S7, S28, S96)
The compressor circuit is protected by a high pressure switch which opens at 640 psig ± 10 psig (4413 kPa ± 70 kPa) and automatically resets at 475 psig ± 20 psig (3275kPa ± 138 kPa).

2- Low Pressure Switch (S87, S88, S97, S98)
The compressor circuit is protected by a low pressure switch. Switch opens at 40 psig ± 5 psig (276 ± 34 kPa) and automatically resets at 90 psig ± 5 psig (621 kPa ± 34 kPa).

3- Crankcase Heater (HR1, HR2, HR5, HR11)
Units have compressors which contain a belly band compressor oil heater which must be on 24 hours before running compressors. Energize by setting thermostat so that there is no cooling demand, to prevent compressor from cycling, and apply power to unit.

4- Thermal Protector (S5)

Each fixed-speed compressor is protected by an internal thermal protector switch.

5- Condenser Fan Operation

156

Condenser fan 1, 2, and 3 are energized when compressor 1 or 2 are energized. See figure 21.

Condenser fans 1 and 2 are de-energized when outdoor temperature drops below 62°F (17°C).

Condenser fan 3 modulates to maintain target liquid temperatures when outdoor temperature drops below 62°F (17°C).

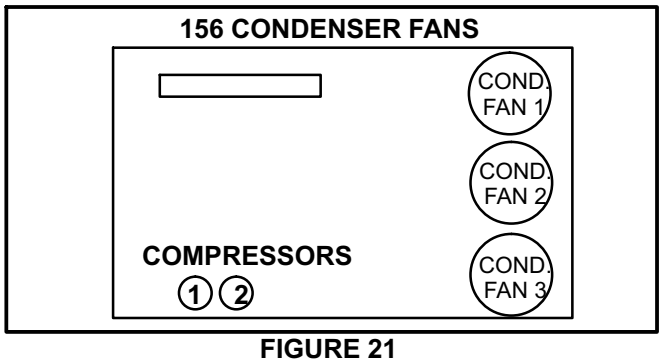


FIGURE 21

180

Condenser fan 3 and 4 are energized when compressor 1 is the ONLY compressor energized. As cooling demand increases, all four condenser fans are energized. See figure 22.

Condenser fans 1 and 3 are de-energized when outdoor temperature drops below 62°F (17°C).

Condenser fans 2 & 4 modulate to maintain target liquid temperatures when outdoor temperature drops below 62°F (17°C).

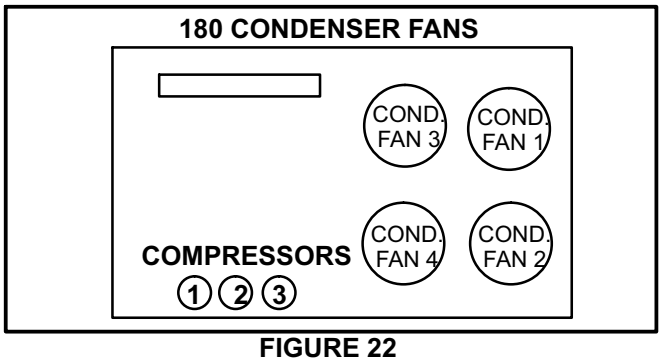


FIGURE 22

210

Condenser fans 1 and 2 are energized when compressor 1 or 2 are energized. As cooling demand increases, all four condenser fans are energized. See figure 23.

Condenser fans 1 and 3 are de-energized when outdoor temperature drops below 62°F (17°C).

Condenser fans 2 & 4 modulate to maintain target liquid temperatures when outdoor temperature drops below 62°F (17°C).

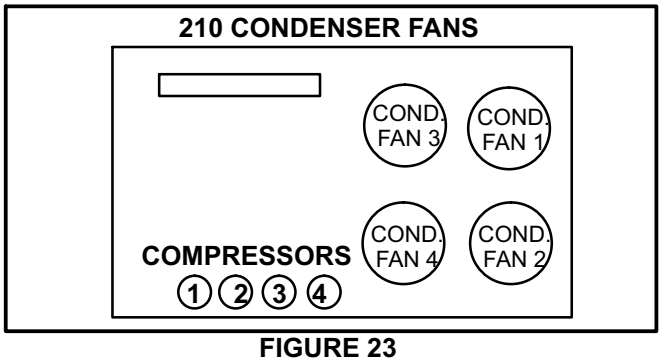


FIGURE 23

240 & 300

Condenser fans 1, 2, and 3 are energized when compressor 1 or 2 are energized. As cooling demand increases, all six condenser fans are energized. See figure 24.

Condenser fans 1, 2, 4, and 5 are de-energized when outdoor temperature drops below 62°F (17°C).

Condenser fans 3 & 6 modulate to maintain target liquid temperatures when outdoor temperature drops below 62°F (17°C).

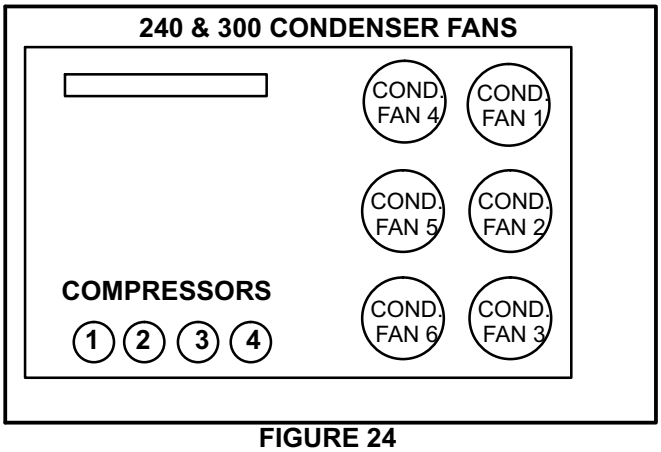


FIGURE 24

Prognostic Sensors

Temperature thermistor sensors (RT46-53) are located on specific points for each refrigeration circuit. Temperature thermistors provide continuous temperature input to the unit controller for proper cooling operation as well as system protection. Controller logic will de-energize compressors for each refrigeration circuit when evaporator coil temperature falls below 32°F (0°C) to prevent evaporator freeze-up.

Each thermistor must be specifically placed for proper unit operation and to initiate valid alarms. See table 14-16 for proper locations.

TABLE 14
LGT/LCT156

Cat. No.	Ass'y. No.	Sensor Yellow, Blue	Figure
22J06	623049-01	RT46, 47	25
23V50	623049-05	RT48, 49	26

TABLE 15
LGT/LCT180

Cat. No.	Ass'y. No.	Sensor Yellow, Blue, Red	Figure
22J06	623049-01	RT46, 47, 50	27
23V50	623049-05	RT48, 49, 52	28

TABLE 16
LGT/LCT210, 240, 300

Cat. No.	Ass'y. No.	Sensor Yel, Blu, Red, Grn	Figure
22J06	623049-01	RT46, 47, 50, 51	29
23V50	623049-05	RT48, 49, 52, 53	30

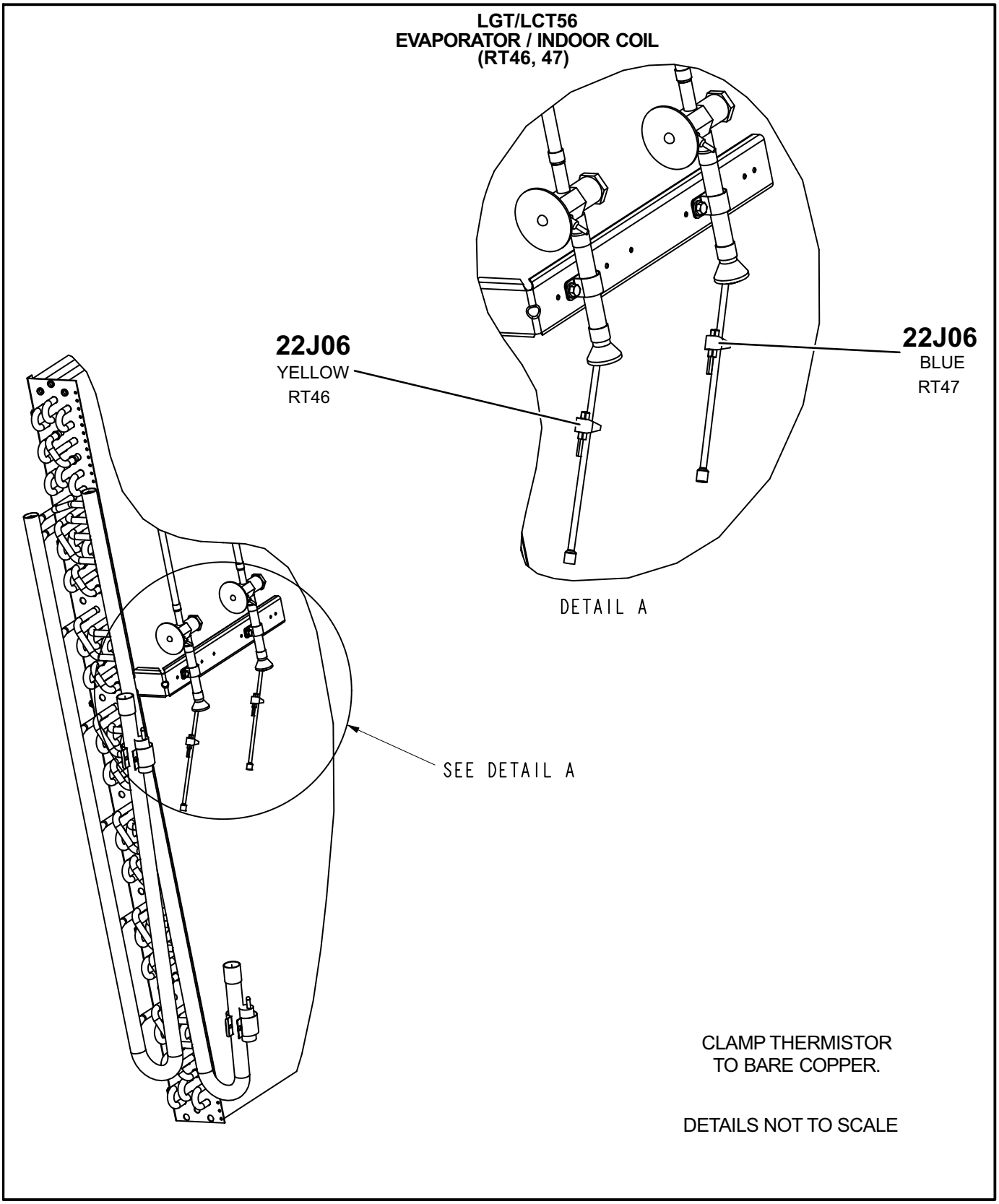
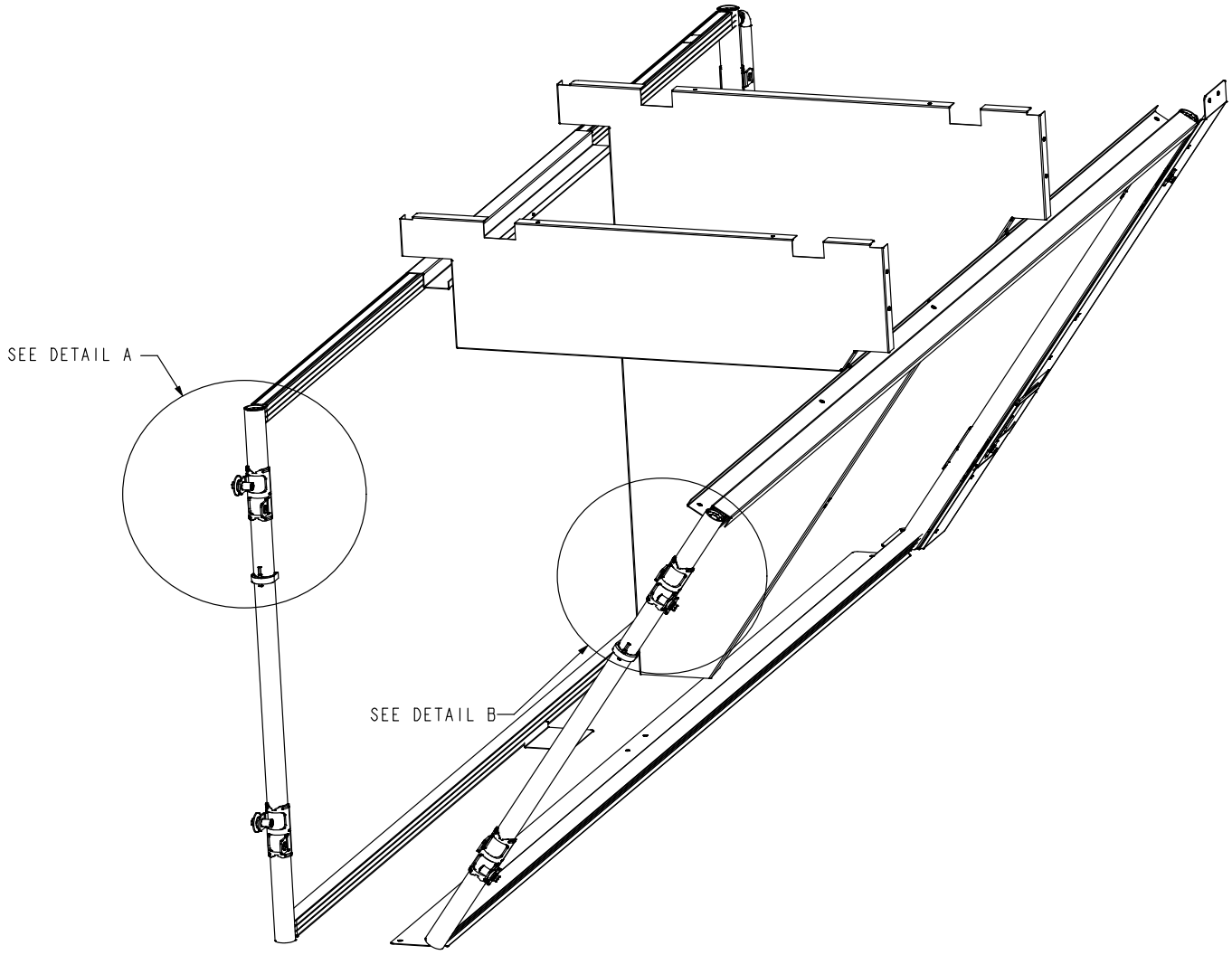
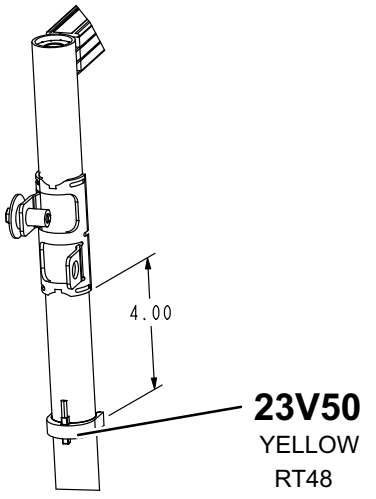

LGT/LCT56
EVAPORATOR / INDOOR COIL
(RT46, 47)
22J06
YELLOW
RT46
22J06
BLUE
RT47
DETAIL A
SEE DETAIL A
CLAMP THERMISTOR
TO BARE COPPER.
DETAILS NOT TO SCALE

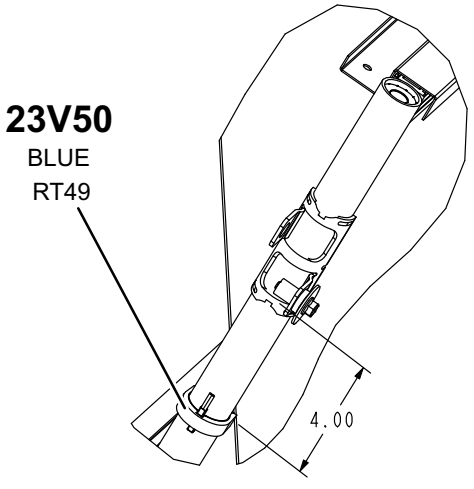
FIGURE 25

LGT/LCT156
CONDENSER / OUTDOOR COIL
(RT48, 49)





DETAIL A



DETAIL B

CLAMP THERMISTOR
TO BARE COPPER.

DETAILS NOT TO SCALE

FIGURE 26

LGT/LCT180
EVAPORATOR / INDOOR COIL
RT46, 47, 50

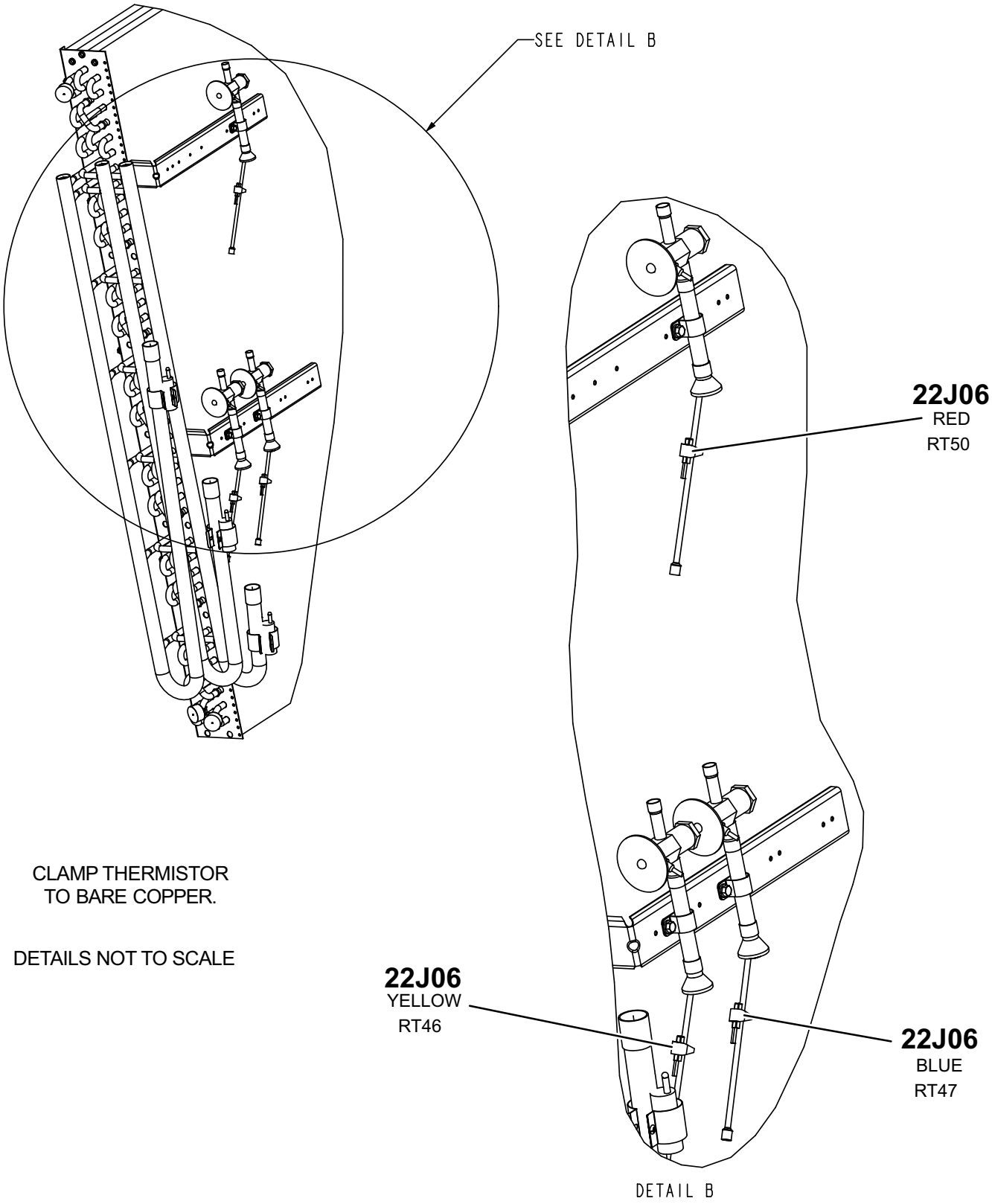
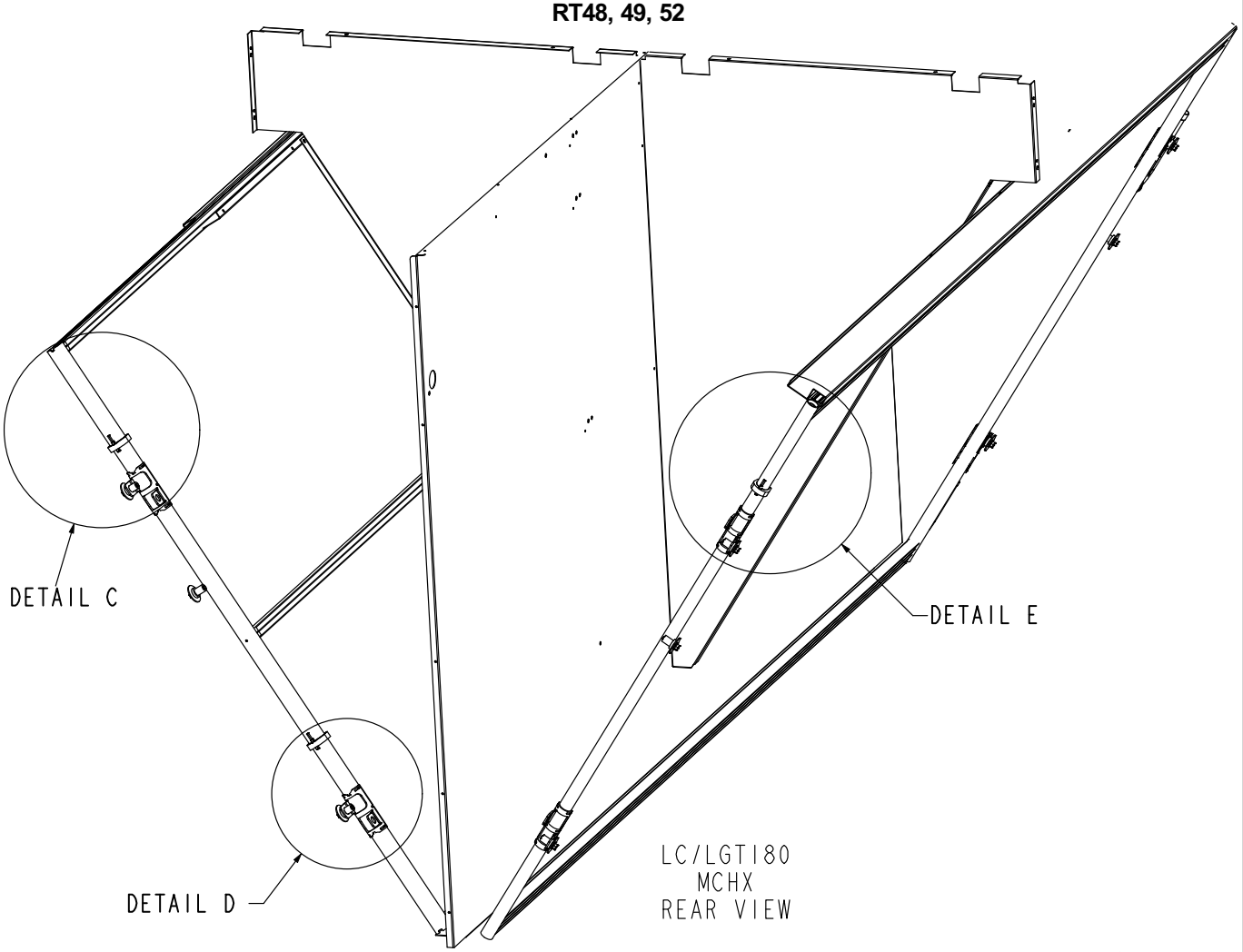
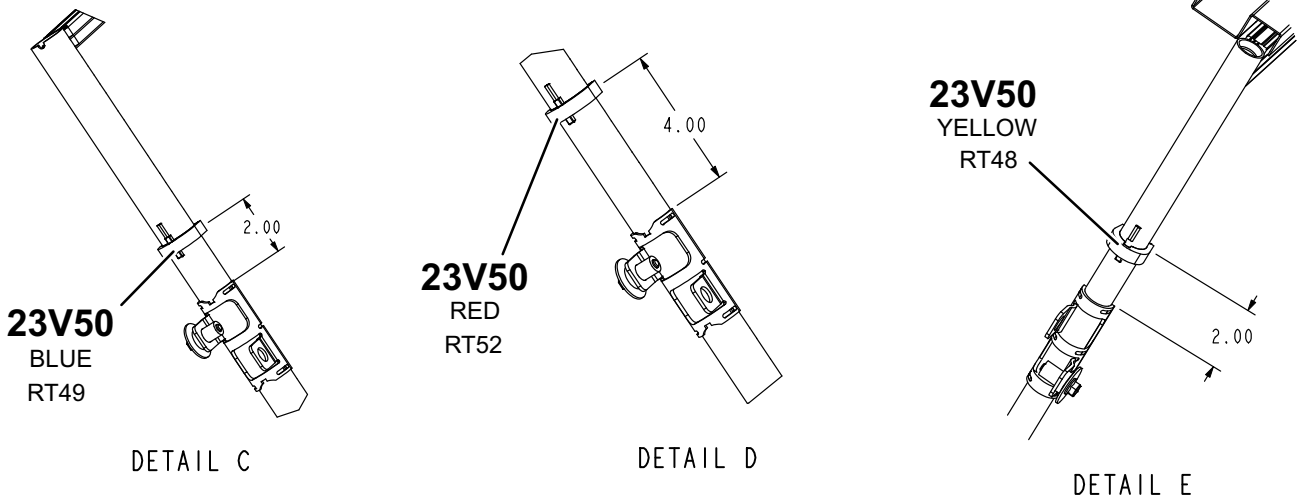


FIGURE 27

LGT/LCT180
CONDENSER / OUTDOOR COIL
RT48, 49, 52

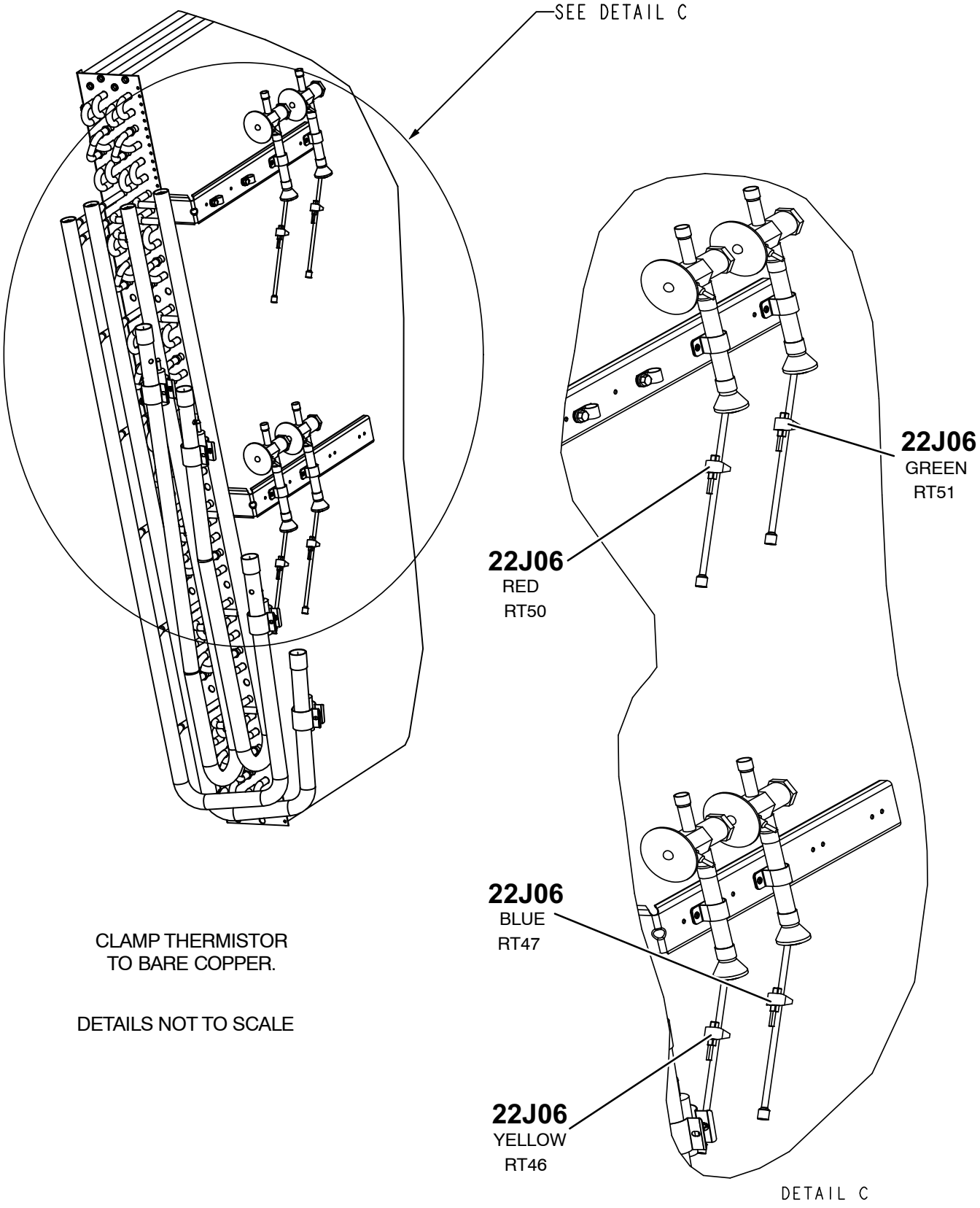




DETAILS NOT TO SCALE

FIGURE 28

LGT/LCT210, 240, 300
EVAPORATOR / INDOOR COIL
RT46, 47, 50, 51



CLAMP THERMISTOR
TO BARE COPPER.

DETAILS NOT TO SCALE

FIGURE 29

LGT/LCT/LHT/LDT210, 240, 300
CONDENSER / OUTDOOR COIL
RT48, 49, 52, 53

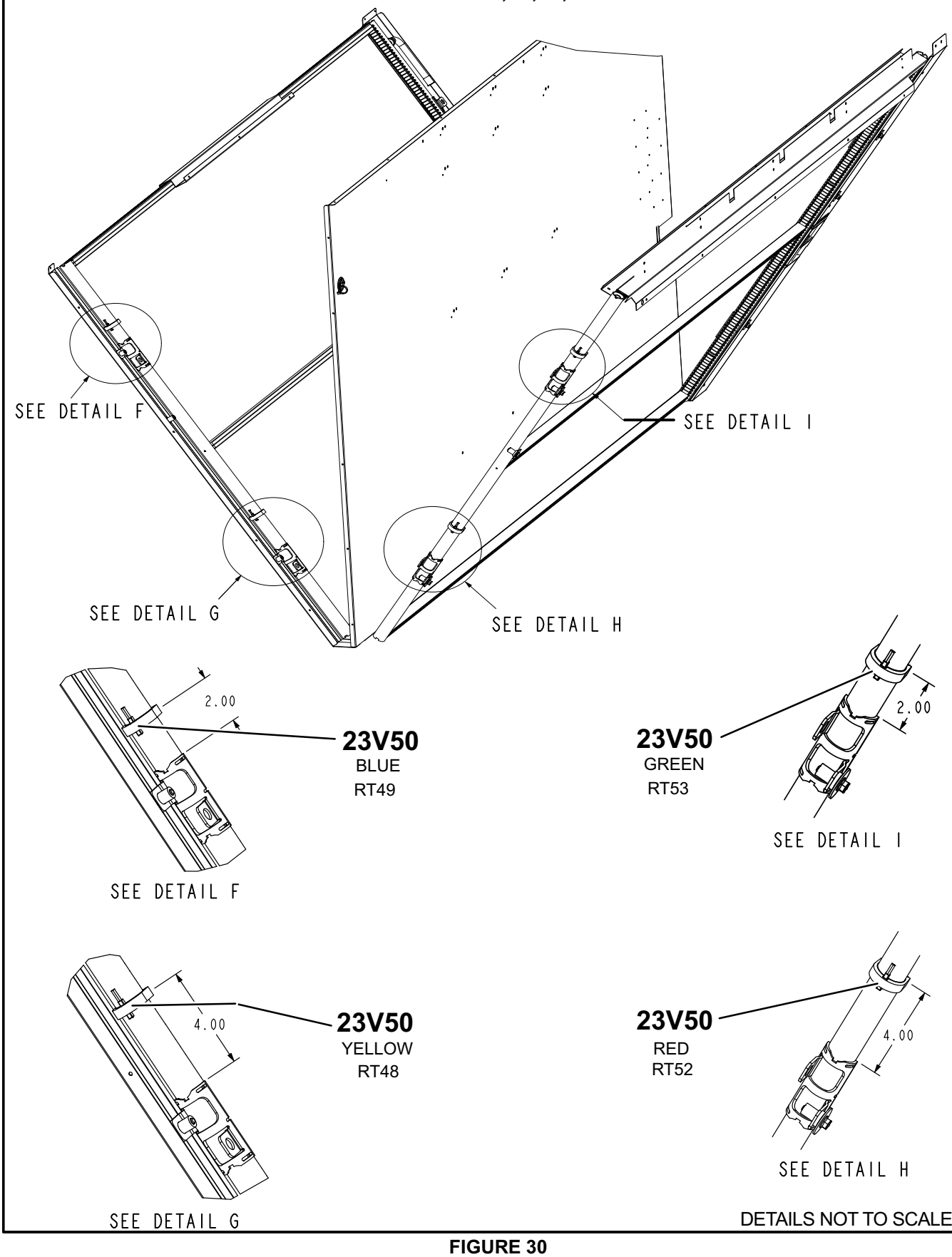


FIGURE 30

Gas Heat Start-Up (Gas Units)

FOR YOUR SAFETY READ BEFORE LIGHTING

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.

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

⚠WARNING

Electric shock hazard. Can cause injury or death. 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.

⚠WARNING

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

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 31)

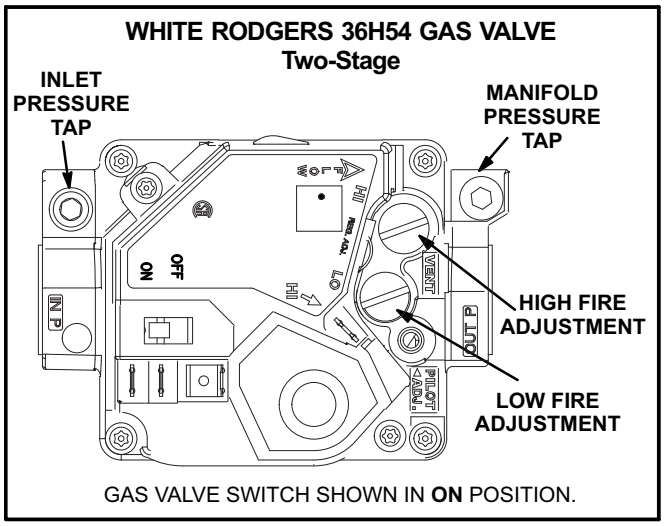


FIGURE 31

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 31.

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 31.

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**.

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. Two limits are located on the drip shield in the blower compartment. See figure 32.

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.

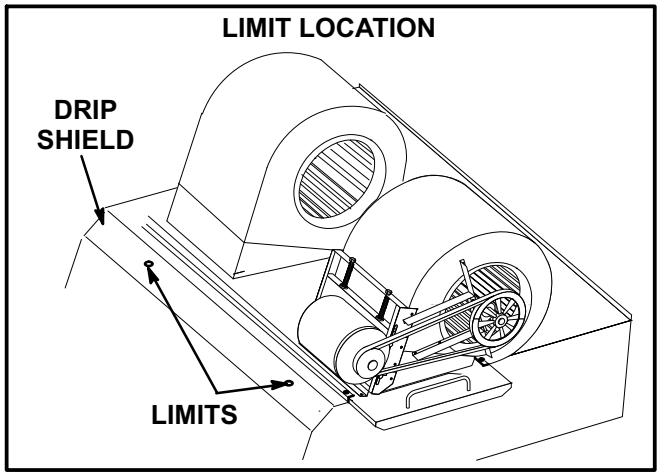


FIGURE 32

Electric Heat Start-Up (LCT 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.

Multi-Staged Air Volume Start-Up

A-Design Specifications

Use table 17 to fill in field-provided, design specified blower CFM for appropriate unit.

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

B-Set Maximum CFM

Use table 17 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

1- 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 18 or 19. Refer to the Unit Controller manual provided with unit.

RTU MENU > RTU OPTIONS > BLOWER > SPEED

2- Enter the following design specifications as shown in table 17.

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

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

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

5- Repeat adjustments until design CFM is reached.

D-Set Damper Minimum Position

To maintain required minimum ventilation air volumes when the unit is in the occupied mode, two minimum damper positions must be set.

The Unit Controller will open the 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 17
Blower CFM Design Specifications

Unit	T'Stat or Zone Control Stages	Blower Speed	Design Specified CFM
156	2	Htg.	
		Clg. High	
		Clg. Low	
		Ventilation	
180	2	Htg.	
		Clg. High	
		Clg. Low	
		Ventilation	
210	2	Htg.	
		Clg. High	
		Clg. Low	
		Ventilation	
240	2	Htg.	
		Clg. High	
		Clg. Low	
		Ventilation	
300	2	Htg.	
		Clg. High	
		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 18
HEATING, VENTILATION & SMOKE MINIMUM AND MAXIMUM CFM

Unit				Heating CFM			Vent CFM			Smoke CFM		
Tons	Model	Speed	Heat Code	De-fault	Min	Max	De-fault	Min	Max	De-fault	Min	Max
13	LGT156H	Low	L	5200	2725	6250	5200	1950		5200	1950	6250
		Std	S		4325							
		Med	M		4500							
	LGT156H	All	N, E, J, K, L		5200							
15	LGT180H	Low	L	6000	2725	7200	6000	2250		6000	2250	7200
		Std	S		4325							
		Med	M		4500							
		High	H		5125							
	LCT180H	15,30,45,60kW	N, E, J, K, L		5200							
17.5	LGT210H	Low, Std, Med	L, S, M	7000	4500	8400	7000	2625		7000	2625	8400
		High	H		5125							
	LCT210H	15,30,45,60kW	N, E, J, K, L		5200							
		90kW	P		6000							
20	LGT240H	Low, Std, Med	L, S, M	8000	4500	9600	8000	3000		8000	3000	9600
		High	H		5125							
	LCT240H	15,30,45,60kW	N, E, J, K, L		5200							
		90kW	P		6000							
25	LGT300S	Low, Std, Med	L, S, M	10000	4500		10000	3750		10000	3750	12000
		High	H		5125							
	LCT300S	15,30,45,60kW	N, E, J, K, L		5200							
		90kW	P		6000							

*Use highest value between Heating and Cooling High CFM Max.

TABLE 19
COOLING MINIMUM AND MAXIMUM CFM

LGT/ LCT Unit	Cool 1 CFM Cooling Low CFM			Cool 4 CFM Cooling High CFM		
	De-fault	Min	Max	Default	Min	Max
156H	3380	1500	6250	5200	4000	6250
180H	3900	2000	7200	5400	5000	7200
210H	4550	2500	8400	6300	6000	8400
240H	5200	3000	9600	7200	6250	9600
300S	6500	3500	12000	9000	7000	12000

*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 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 “engaged”:

SETTINGS > RTU OPTIONS > BLOWER > VFD BYPASS

To configure the unit to by-pass 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 bypassed. The blower motor could be damaged and/or result in product or property damage if the setting is changed to automatic or manual.

Objective: Outline the unit functions as a result of room thermostat or zone sensor demands.

Given: When economizer is present, it will function as an integral part of the unit cooling system. When not present, unit will function as if economizer is present but outdoor ambient is high and sensed as not suitable.

156 MODELS (2 COMPRESSORS)
UNIT OPERATION WITH 2-STAGE THERMOSTAT (2 COOL AND 2 HEAT STAGES, Y1, Y2, W1, W2)

SUPPLY AIR BLOWER SPEED

Unit has following supply air blower speed setting:

- Ventilation speed
- Cooling Speed – Low
- Cooling Speed – High
- Heating speed
- Smoke speed (Used only in smoke removal option - not discussed)

[1] Unit Features An Economizer And Outdoor Air Is Suitable

Y1 Demand:

All compressors are off, supply air blower is on low cooling speed to minimize blower power consumption, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

Y2 Demand:

All compressors are off, supply air blower is on high cooling speed providing higher cooling capacity, and economizer modulates to maintain 55°F supply air temperature. If economizer stays at maximum open for 3 minutes, compressor 1 is energized at full cooling capacity while supply air blower stays on high cooling speed providing maximum cooling capacity.

[1] Outdoor air suitability is determined by the energy state of outdoor ambient (enthalpy or sensible) and its ability to achieve the desired free cooling effects. Outdoor air suitability can also be determined by a third party controller and provided to the rooftop unit via a network connection.

Unit Does Not Feature An Economizer Or Outdoor Air Is Not Suitable

Y1 Demand:

Compressor 1 operates at full cooling capacity and supply air blower operates at low cooling speed.

Y2 Demand:

All compressors operate at max cooling capacity and supply air blower operates at high cooling speed.

Dehumidification Mode

If a reheat unit receives a call for dehumidification, economizer free cooling is locked out.

Call For Dehumidification, No Y1, Y2 demand:

1st and 2nd stage compressor operate at max cooling capacity, supply air blower operates at low cooling speed, and the reheat valves 1,2 are energized.

Y1 Demand With A Call For Dehumidification:

All compressors operate at max cooling capacity, supply air blower operates at high cooling speed, reheat valve 1 is energized, reheat valve 2 is deenergized.

Y2 Demand With A Call For Dehumidification:

All compressors operate at max cooling capacity, supply air blower operates at high cooling speed, and the reheat valves 1,2 are deenergized.

156 MODELS (2 COMPRESSORS)
UNIT OPERATION WITH 3-STAGE THERMOSTAT OR ZONE SENSOR (3 COOL AND 2 HEAT STAGES, Y1, Y2, Y3 AND W1, W2)

Unit has following supply air blower speed setting:

- Ventilation speed
- Cooling Speed – Low
- Cooling Speed – Medium
- Cooling Speed – High
- Heating speed
- Smoke speed (Used only in smoke removal option - not discussed)

[1] Unit Features An Economizer And Outdoor Air Is Suitable

Cooling - Thermostat or Zone Sensor Mode (Y1, Y2, Y3)

Y1 Demand:

All compressors are off, supply air blower is on medium cooling speed to minimize blower power consumption, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

Y2 Demand:

All compressors are off, supply air blower is on high cooling speed providing higher cooling capacity, and economizer modulates to maintain 55°F supply air temperature. If economizer stays at maximum open for 3 minutes, compressor 1 is energized at part load capacity while supply air blower stays on high cooling speed providing maximum cooling capacity. After compressors are energized the economizer stays at maximum open.

Y3 Demand:

Compressors 1 is energized at full capacity while supply air blower stays on high cooling speed, economizer stays at maximum open.

[1] Outdoor air suitability is determined by the energy state of outdoor ambient (enthalpy or sensible) and its ability to achieve the desired free cooling effects. Outdoor air suitability can also be determined by a third party controller and provided to the rooftop unit via a network connection.

Unit Does Not Feature An Economizer or Outdoor Air Is Not Suitable

Y1 Demand:

Compressor 1 operates at part load and supply air blower operates at low cooling speed.

Y2 Demand:

Compressor 1 operates at part load with compressor 2 ON, and supply air blower operates at medium cooling speed.

Y3 Demand:

All compressors operate at full capacity and supply air blower operates at high cooling speed.

Dehumidification Mode

If a reheat unit receives a call for dehumidification, economizer free cooling is locked out.

Call For Dehumidification, No Y1, Y2 Demand:

Compressor 1,2 operates at full cooling capacity, supply air blower operates at low cooling speed, and the reheat valves 1,2 are energized.

Y1 Demand With A Call For Dehumidification:

Compressor 1,2 operates at full cooling capacity, supply air blower operates at low cooling speed and the reheat valve 1 is energized, reheat valve 2 is deenergized.

Y2 Demand With A Call For Dehumidification:

Compressor 1,2 operates at full cooling capacity, supply air blower operates at high cooling speed and the reheat valve 1 is energized, reheat valve 2 is deenergized.

Y3 Demand With A Call For Dehumidification:

Compressor 1,2 operates at full cooling capacity, supply air blower operates at high cooling speed, and the reheat valves 1,2 are deenergized.

180/210/240/300 MODELS (3 AND 4 COMPRESSORS)
UNIT OPERATION WITH 2-STAGE THERMOSTAT (2 COOLING STAGES, Y1, Y2)

SUPPLY AIR BLOWER SPEED

Unit has the following supply air blower speed settings:

- Ventilation speed
- Cooling speed - Low
- Cooling speed - High
- Heating speed
- Smoke speed (Used only in smoke removal option - not discussed)

[1] Unit Features An Economizer And Outdoor Air Is Suitable

Y1 Demand:

All compressors are off, supply air blower is on low cooling speed to minimize blower power consumption, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

Y2 Demand:

All compressors are off, supply air blower is on high cooling speed providing higher cooling capacity, and economizer modulates to maintain 55°F supply air temperature.

If economizer stays at maximum open for 3 minutes, 1st stage compressors (compressor 1 and 2) are energized while supply air blower stays on high cooling speed providing maximum cooling capacity.

[1] Outdoor air suitability is determined by the energy state of outdoor ambient (enthalpy or sensible) and its ability to achieve the desired free cooling effects. Outdoor air suitability can also be determined by a third party controller and provided to the RTU via a network connection.

Unit Does Not Feature An Economizer Or Outdoor Air Is Not Suitable

Y1 Demand:

1st stage compressors operate and supply air blower operates at low cooling speed.

Y2 Demand:

All compressors operate and supply air blower operates at high cooling speed.

Dehumidification Mode

If a reheat unit receives a call for dehumidification, economizer free cooling is locked out.

Call For Dehumidification, No Y1, Y2 Demand:

1st stage compressors (1 & 2) operate, supply air blower operates at high cooling speed, and the reheat valves are energized.

Y1 Demand With A Call For Dehumidification:

All compressors operate, supply air blower operates at high cooling speed and the reheat valves are energized.

Y2 Demand With A Call For Dehumidification:

All compressors operate, supply air blower operates at high cooling speed, and the reheat valves are de-energized.

180/210/240/300 MODELS (3 AND 4 COMPRESSORS)
UNIT WITH 3-STAGE THERMOSTAT (3 COOLING STAGES, Y1, Y2, Y3) OR 3 COMPRESSORS MODELS - ZONE SENSOR (4 COOLING STAGES, Y1, Y2, Y3, Y4)

SUPPLY AIR BLOWER SPEED

Unit has following supply air blower speed setting:

- Ventilation speed
- Cooling speed - Low
- Cooling speed - Medium
- Cooling speed - High
- Heating speed
- Smoke speed (Used only in smoke removal option - not discussed)

[1] Unit Features An Economizer And Outdoor Air Is Suitable

3 Compressor Units

Y1 Demand:

All compressors are off, supply air blower is on low cooling speed to minimize blower power consumption, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

Y2 Demand:

All compressors are off, supply air blower is on high cooling speed providing higher cooling capacity, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

If economizer stays at maximum open for 3 minutes then compressor 1 is energized while supply air blower stays on high cooling speed. After compressor is energized the economizer stays at maximum open.

Y3 Demand:

Compressors 1 and 2 are energized while supply air blower stays on high cooling speed. After compressors are energized the economizer stays at maximum.

Y4 (Zone Sensor Only) Demand:

All compressors are energized and supply air blower stays on high cooling speed.

4 Compressor Units

Y1 Demand:

All compressors are off, supply air blower is on low cooling speed to minimize blower power consumption, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

Y2 Demand:

All compressors are off, supply air blower is on high cooling speed providing higher cooling capacity, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

If economizer stays at maximum open for 3 minutes then compressors 1 and 2 are energized while supply air blower stays on high cooling speed. After compressors are energized the economizer stays at maximum open.

Y3 Demand:

Compressors 1, 2 and 3 are energized and supply air blower stays on high cooling speed.

[1] Outdoor air suitability is determined by the energy state of outdoor ambient (enthalpy or sensible) and its ability to achieve the desired free cooling effects. Outdoor air suitability can also be determined by a third party controller and provided to the RTU via a network connection.

180/210/240/300 MODELS (3 AND 4 COMPRESSORS) (CONTINUED)
UNIT WITH 3-STAGE THERMOSTAT (3 COOLING STAGES, Y1, Y2, Y3) OR 3 COMPRESSORS MODELS - ZONE SENSOR (4 COOLING STAGES, Y1, Y2, Y3, Y4)

Unit Does Not Feature An Economizer Or Outdoor Air Is Not Suitable

3 Compressor Units

Y1 Demand:

Compressor 1 operates and supply air blower operates at low cooling speed.

Y2 Demand:

Compressors 1 and 2 operate and supply air blower operates at medium cooling speed.

Y3 or Y4 (Zone Sensor Only) Demand:

All compressors operate and supply air blower operates at high cooling speed .

4 Compressor Units

Y1 Demand:

Compressors 1 and 2 operate and supply air blower operates at low cooling speed.

Y2 Demand:

Compressors 1, 2, and 3 operate and supply air blower operates at medium cooling speed.

Y3 Demand:

All compressors operate and supply air blower operates at high cooling speed.

Dehumidification Mode

If a reheat unit receives a call for dehumidification, economizer free cooling is locked out.

Call For Dehumidification, No Y1, Y2, Y3 Demand:

Compressor 1 and 2 operate, supply air blower operates at high cooling speed, and both reheat valves are energized.

Y1 Demand With A Call For Dehumidification:

All compressors operate, supply air blower operates at high cooling speed and both reheat valves are energized.

Y2 Demand With A Call For Dehumidification:

All compressors operate, supply air blower operates at high cooling speed, and the reheat valve of refrigeration circuit 1 is energized while the reheat valve of refrigeration circuit 2 is de-energized.

Y3 or Y4 (Zone Sensor Only) Demand:

All compressors operate, supply air blower operates at high cooling speed, and both reheat valves are de-energized.

210/240/300 MODELS (4 COMPRESSORS)
UNIT WITH ZONE SENSOR (4 COOLING STAGES, Y1, Y2, Y3, Y4)

SUPPLY AIR BLOWER SPEED

Unit has following supply air blower speed setting:

- Ventilation speed
- Cooling speed - Low
- Cooling speed - Medium-Low
- Cooling speed - Medium-High
- Cooling speed - High
- Heating speed
- Smoke speed (Used only in smoke removal option - not discussed)

[1] Unit Features An Economizer And Outdoor Air Is Suitable

Y1 Demand:

All compressors are off, supply air blower is on low cooling speed to minimize blower power consumption, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

Y2 Demand:

All compressors are off, supply air blower is on high cooling speed providing higher cooling capacity, and economizer modulates to maintain 55°F supply air temperature.

If economizer stays at maximum open for 3 minutes, compressor 1 is energized while supply air blower stays on high cooling speed. After compressor 1 is energized the economizer stays at maximum open.

Y3 Demand:

Compressor 1 and 2 are energized while supply air blower is on high cooling speed providing even higher cooling capacity.

Y4 Demand:

All compressors are energized while supply air blower is on high cooling speed providing maximum cooling capacity.

[1] Outdoor air suitability is determined by the energy state of outdoor ambient (enthalpy or sensible) and its ability to achieve the desired free cooling effects. Outdoor air suitability can also be determined by a third party controller and provided to the RTU via a network connection.

Unit Does Not Feature An Economizer Or Outdoor Air Is Not Suitable

Y1 Demand:

Compressor 1 operates and supply air blower operates at low cooling speed.

Y2 Demand:

Compressors 1 and 2 operate and supply air blower operates at medium-low cooling speed.

Y3 Demand:

Compressors 1, 2, and 3 operate and supply air blower operates at medium-high cooling speed.

Y4 Demand:

All compressors operate and supply air blower operates at high cooling speed.

210/240/300 MODELS (4 COMPRESSORS) (CONTINUED)
UNIT WITH ZONE SENSOR (4 COOLING STAGES, Y1, Y2, Y3, Y4)

Dehumidification Mode

If a reheat unit receives a call for dehumidification, economizer free cooling is locked out.

Call For Dehumidification, No Y1, Y2, Y3, Y4 Demand:

Compressors 1 and 2 operate, supply air blower operates at high cooling speed, and both reheat valves are energized.

Y1 Demand With A Call For Dehumidification:

Compressors 1, 2, and 3 operate, supply air blower operates at high cooling speed and both reheat valves are energized.

Y2 Demand With A Call For Dehumidification:

All compressors operate, supply air blower operates at high cooling speed, and both reheat valves are energized.

Y3 Demand With A Call For Dehumidification:

All compressors operate, supply air blower operates at high cooling speed, and the reheat valve of compressor 1 is energized while the reheat valve of compressor 2 is de-energized.

Y4 Demand With A Call For Dehumidification:

All compressors operate, supply air blower operates at high cooling speed, and the reheat valves are de-energized.

Heating Mode (4 Heat)

- Room sensors (when connected to S-Bus) or Discharge air temperature (DAT) can be used to control up to four stages of electric heat.
- DAT default setpoint = 110ºF. Unit will stage heating as required to maintain the setpoint when provided with W1 demand.
- Room sensor occupied setpoint default = 70ºF. Unit will stage heating as required to maintain the setpoint.
- Increasing heat stages provides more heating capacity while decreasing heat stages provides less heating capacity.
- Blower set to Heating Speed for all stages.

Modulating Outdoor Air Damper

The minimum damper position for “occupied low blower” and “occupied high blower” is adjusted during unit setup to provide minimum fresh air requirements per ASHRAE 62.1 at the corresponding supply air blower speeds.

- When supply air blower is off or the unit is in unoccupied mode, the outdoor air damper is closed.
- When unit is in occupied mode and supply air blower is operating at a speed below the “midpoint” blower speed, the outdoor air damper is at minimum “low blower” position.
- When unit is in occupied mode and supply air blower is operating at a speed equal to or above the “midpoint” blower speed, the outdoor air damper is at minimum “high blower” position.

NOTE - The “midpoint” blower speed is an average of the minimum and maximum blower speed (minimum speed + maximum speed divided by 2).

Power Exhaust Operation

NOTE - POWER EXHAUST OPERATION IS THE SAME FOR ALL CONTROL OPTIONS

Multi-stage air volume models are equipped with 2-stage power exhaust fans. Power exhaust fans operate when economizer outdoor air dampers are 50% open (adjustable). Power exhaust operates in 1st stage (one fan) up to 70% of supply air blower speed. 2nd stage power exhaust fans (both fans) operate when supply air blower speed is above 70% (adjustable) of full speed.

156 MODELS (2 COMPRESSORS)
UNITS IN ZONING APPLICATIONS OPERATING WITH DISCHARGE AIR CONTROL (2 HEAT / 3 COOL)

SUPPLY AIR BLOWER SPEED

Unit has the following supply air blower speed settings:

- Ventilation Speed
- Cooling Speed - Fully modular based on supply duct static pressure
- Heating Speed
- Smoke Speed (Used only in smoke removal option - not discussed)

Cooling Mode (3 Cool)

- Discharge air temperature (DAT) can be used to control unit staging.
- DAT default setpoint = 55ºF. Unit will stage compressors as required to maintain the setpoint when provided with Y1 thermostat demand.
- Increasing compressor stages provides more cooling capacity while decreasing compressor stages provides less cooling capacity.

[1] Unit Features An Economizer And Outdoor Air Is Suitable

Y1 Demand:

All compressors are off, supply air blower operates to maintain duct static pressure, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

Y2 Demand:

All compressors are off, supply air blower operates to maintain duct static pressure, and economizer modulates to maintain 55°F supply air temperature. If economizer stays at maximum open for 3 minutes, compressor 1 is energized at part load capacity supply air blower operates to maintain duct static pressure. Economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

Y3 Demand:

Compressor 1 is energized at full capacity, supply air blower operates to maintain duct static pressure. Economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

[1] Outdoor air suitability is determined by the energy state of outdoor ambient (enthalpy or sensible) and its ability to achieve the desired free cooling effects. Outdoor air suitability can also be determined by a third party controller and provided to the rooftop unit via a network connection.

Unit Does Not Feature An Economizer Or Outdoor Air Is Not Suitable

Y1 Demand:

- Compressor 1 operates at part load and supply air blower operates to maintain duct static pressure.

Y2 Demand:

Compressors 1 operates at part load with compressor 2 ON and supply air blower operates to maintain duct static pressure.

Y3 Demand:

All compressors operate at full capacity and supply air blower operates to maintain duct static pressure.

180 MODELS (3 COMPRESSORS)

VAV UNITS IN ZONING APPLICATIONS OPERATING WITH DISCHARGE AIR CONTROL (4 HEAT / 3 COOL)

SUPPLY AIR BLOWER SPEED

Unit has the following supply air blower speed settings:

- Ventilation Speed
- Cooling Speed - Fully modular based on supply duct static pressure
- Heating Speed
- Smoke Speed (Used only in smoke removal option - not discussed)

Cooling Mode (3 Cool)

- Discharge air temperature (DAT) can be used to control unit staging.
- DAT default setpoint = 55ºF. Unit will stage compressors as required to maintain the setpoint when provided with Y1 thermostat demand.
- Increasing compressor stages provides more cooling capacity while decreasing compressor stages provides less cooling capacity.

[1] Unit Features An Economizer And Outdoor Air Is Suitable

Y1 Demand:

All compressors are off, supply air blower operates to maintain duct static pressure, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

Y2 Demand:

All compressors are off, supply air blower operates to maintain duct static pressure, and economizer modulates to maintain 55°F supply air temperature. If economizer stays at maximum open for 3 minutes, compressor 1 is energized while supply air blower operates to maintain duct static pressure. After compressor 1 is energized, the economizer stays at maximum open.

Y3 Demand:

Compressor 1 and 2 are energized while supply air blower operates to maintain duct static pressure.

[1] Outdoor air suitability is determined by the energy state of outdoor ambient (enthalpy or sensible) and its ability to achieve the desired free cooling effects. Outdoor air suitability can also be determined by a third party controller and provided to the RTU via a network connection.

Unit Does Not Feature An Economizer Or Outdoor Air Is Not Suitable

Y1 Demand:

Compressor 1 operates and supply air blower operates to maintain duct static pressure.

Y2 Demand:

Compressors 1 and 2 operate and supply air blower operates to maintain duct static pressure.

Y3 Demand:

Compressors 1, 2, and 3 operate and supply air blower operates to maintain duct static pressure.

Heating Mode (4 Heat)

- Room sensors (when connected to S-Bus) or Discharge air temperature (DAT) can be used to control up to four stages of electric heat.
- DAT default setpoint = 110ºF. Unit will stage heating as required to maintain the setpoint when provided with W1 demand.
- Room sensor occupied setpoint default = 70ºF. Unit will stage heating as required to maintain the setpoint.
- Increasing heat stages provides more heating capacity while decreasing heat stages provides less heating capacity.
- Blower set to Heating Speed for all stages.

210/240/300 MODELS (4 COMPRESSORS)
VAV UNITS IN ZONING APPLICATIONS OPERATING WITH DISCHARGE AIR CONTROL (4 HEAT / 4 COOL)

SUPPLY AIR BLOWER SPEED

Unit has the following supply air blower speed settings:

- Ventilation Speed
- Cooling Speed - Fully modular based on supply duct static pressure
- Heating Speed
- Smoke Speed (Used only in smoke removal option - not discussed)

Cooling Mode (4 Cool)

- Discharge air temperature (DAT) can be used to control unit staging.
- DAT default setpoint = 55ºF. Unit will stage compressors as required to maintain the setpoint when provided with Y1 thermostat demand.
- Increasing compressor stages provides more cooling capacity while decreasing compressor stages provides less cooling capacity.

[1] Unit Features An Economizer And Outdoor Air Is Suitable

Y1 Demand:

All compressors are off, supply air blower operates to maintain duct static pressure, economizer modulates (minimum to maximum open position) to maintain 55°F supply air temperature (default unit controller setting).

Y2 Demand:

All compressors are off, supply air blower operates to maintain duct static pressure, and economizer modulates to maintain 55°F supply air temperature. If economizer stays at maximum open for 3 minutes, compressor 1 is energized while supply air blower operates to maintain duct static pressure. After compressor 1 is energized, the economizer stays at maximum open.

Y3 Demand:

Compressor 1 and 2 are energized while supply air blower operates to maintain duct static pressure.

Y4 Demand:

All compressors are energized while supply air blower operates to maintain duct static pressure.

[1] Outdoor air suitability is determined by the energy state of outdoor ambient (enthalpy or sensible) and its ability to achieve the desired free cooling effects. Outdoor air suitability can also be determined by a third party controller and provided to the RTU via a network connection.

Unit Does Not Feature An Economizer Or Outdoor Air Is Not Suitable

Y1 Demand:

Compressor 1 operates and supply air blower operates to maintain duct static pressure.

Y2 Demand:

Compressors 1 and 2 operate and supply air blower operates to maintain duct static pressure.

Y3 Demand:

Compressors 1, 2, and 3 operate and supply air blower operates to maintain duct static pressure.

Y4 Demand:

All compressors operate and supply air blower operates to maintain duct static pressure.

UNITS IN ZONING APPLICATIONS OPERATING WITH DISCHARGE AIR CONTROL (4 HEAT / 4 COOL) (CONTINUED)

Heating Mode (4 Heat)

Discharge air temperature (DAT) can be used to control unit staging.

- DAT default setpoint = 110ºF. Unit will stage heating as required to maintain the setpoint when provided with W1 demand.
- Increasing heat stages provides more heating capacity while decreasing heat stages provides less heating capacity.
- Blower set to Heating Speed for all stages.
- Heating Stage 1 -The first stage of mechanical heat is activated; gas valve one is in low fire mode. This is ~33% of heating capacity.
- Heating Stage 2 - The first and second stages of mechanical heat are activated; gas valves one and two are in low fire mode. This is ~66% of heating capacity.

Heating Stage 3

- Gas valve one is in high fire mode; gas valve two is in low fire mode. This is ~83% of heating capacity.

Heating Stage 4

- Gas valves one and two are in high fire mode. This is 100% of heating capacity.

Modulating Outdoor Air Damper

The minimum damper position for “occupied low blower” and “occupied high blower” is adjusted during unit setup to provide minimum fresh air requirements per ASHRAE 62.1 at the corresponding supply air blower speeds. When supply air blower is off or the unit is in unoccupied mode, the outdoor air damper is closed.

- When unit is in occupied mode and supply air blower is operating at a speed below the “midpoint” blower speed, the outdoor air damper is at minimum “low blower” position.
- When unit is in occupied mode and supply air blower is operating at a speed equal to or above the “midpoint” blower speed, the outdoor air damper is at minimum “high blower” position.

NOTE - The “midpoint” blower speed is an average of the minimum and maximum blower speed ((minimum speed + maximum speed) divided by 2).

Hot Gas Reheat Start-Up

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 valves, L14 and L30, route 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 33 through 38 for refrigerant routing.

L14 and L30 Reheat Coil Solenoid Valves

When Unit Controller (P298-5 or J299-8) indicates room conditions require dehumidification, See figure 11 through 13. L14 and L30 reheat valves are energized (Unit Controller J394-1 or J394-3) and refrigerant is routed to the reheat coil.

Reheat Setpoint

Reheat is factory-set to energize when indoor relative humidity rises above 60% (default). The reheat setpoint can be adjusted by changing mobile service app *Settings - Control* menu. A setting of 100% will operate reheat from an energy management system digital output. The reheat setpoint can also be adjusted using an optional Network Control Panel (NCP).

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

A91 Humidity Sensor

Relative humidity should correspond to the sensor (A91) output voltage listed in table 20. For example: if indoor air relative humidity is 80% ± 3%, the humidity sensor output should read 8.00VDC.

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

TABLE 20

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

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- Use mobile service app menu path to select:

SERVICE > TEST > DEHUMIDIFIER

The blower, compressor 1 and compressor 2 (reheat) should be operating. Reheat mode will appear on the mobile service app display.

4- Deselect:

SERVICE > TEST > DEHUMIDIFIER

Compressor 1 and 2 (reheat should de-energize, blower should still be energized.

Additional Cooling Stages

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

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

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

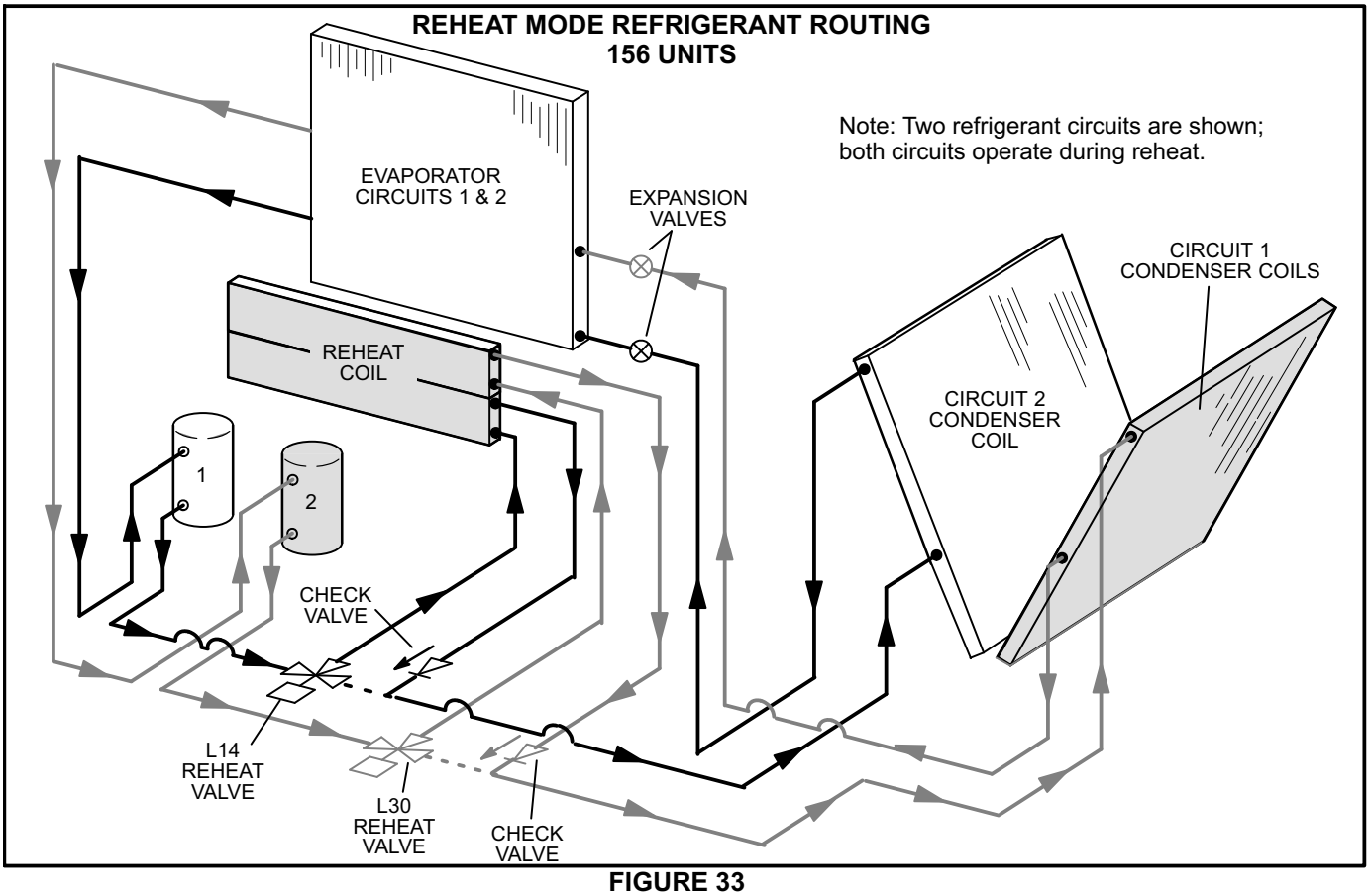


FIGURE 33

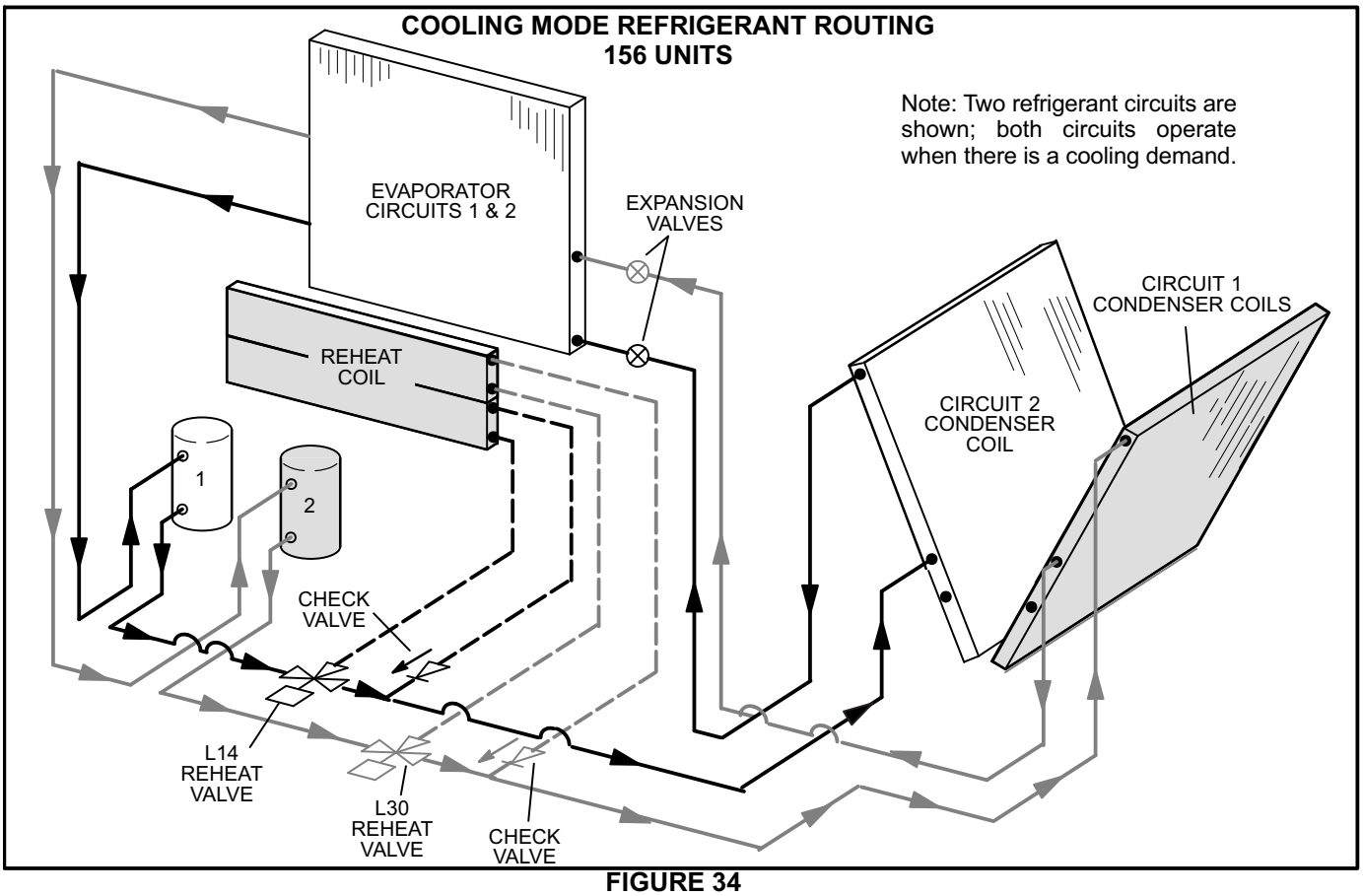


FIGURE 34

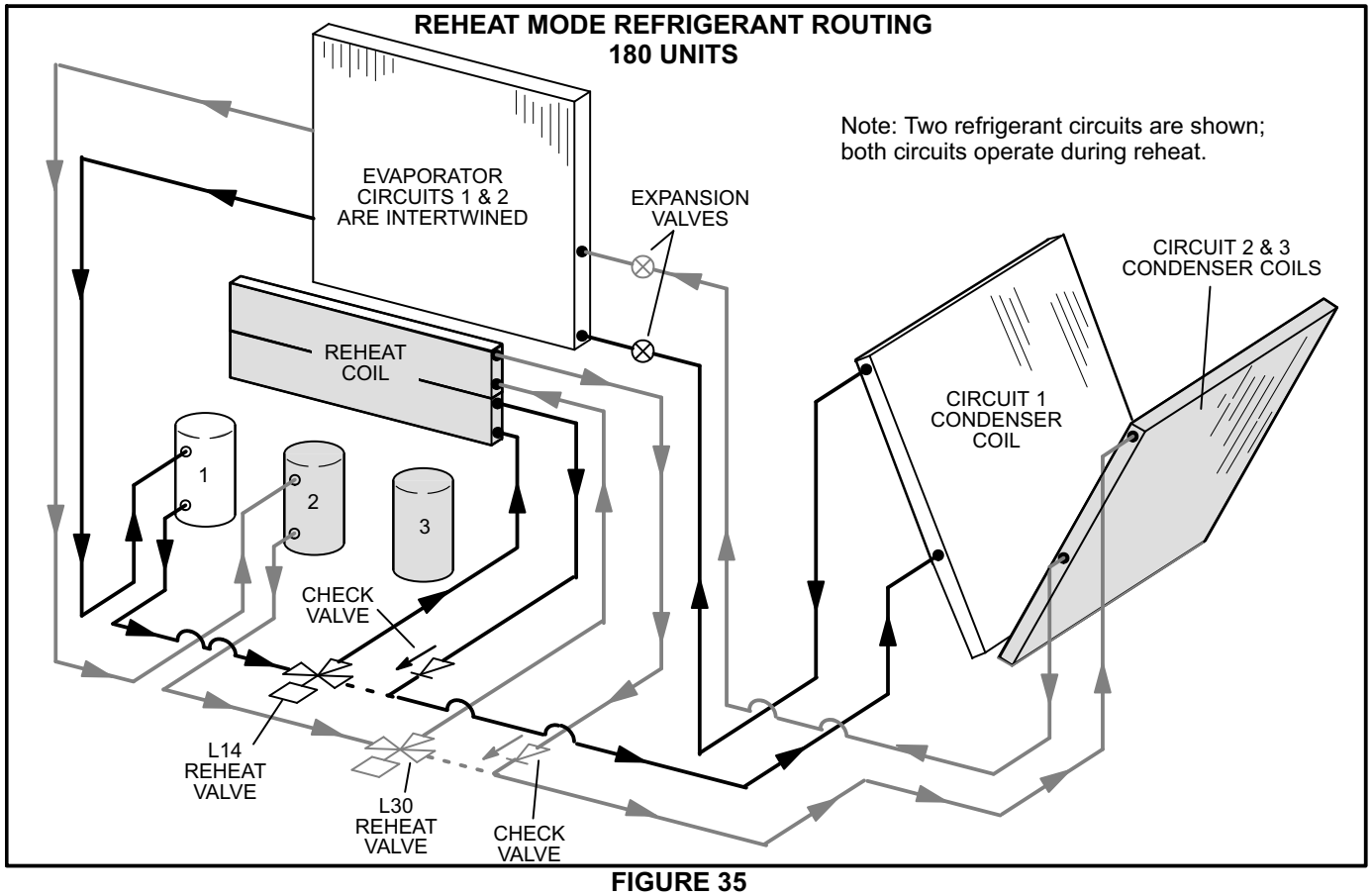


FIGURE 35

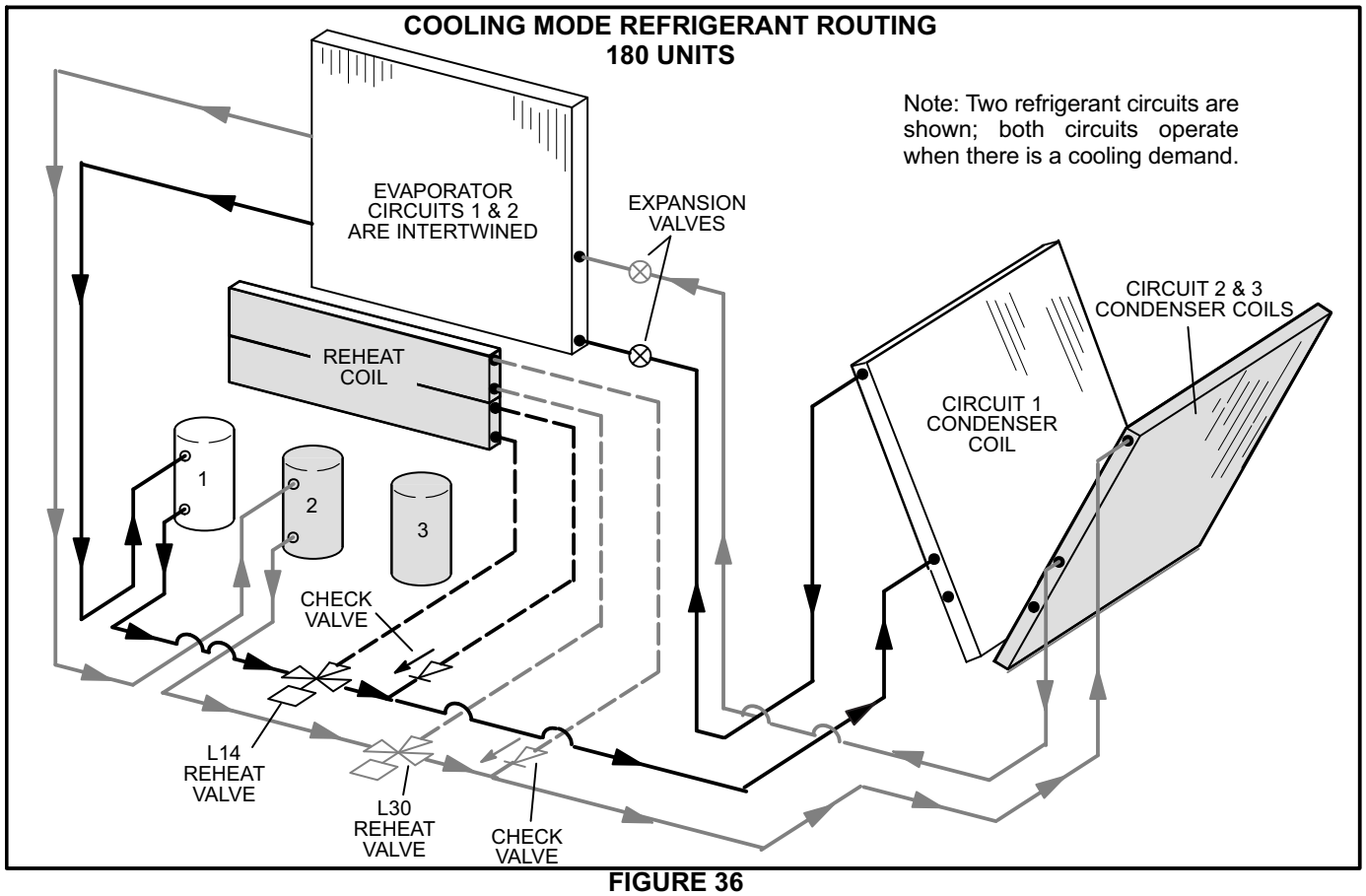


FIGURE 36

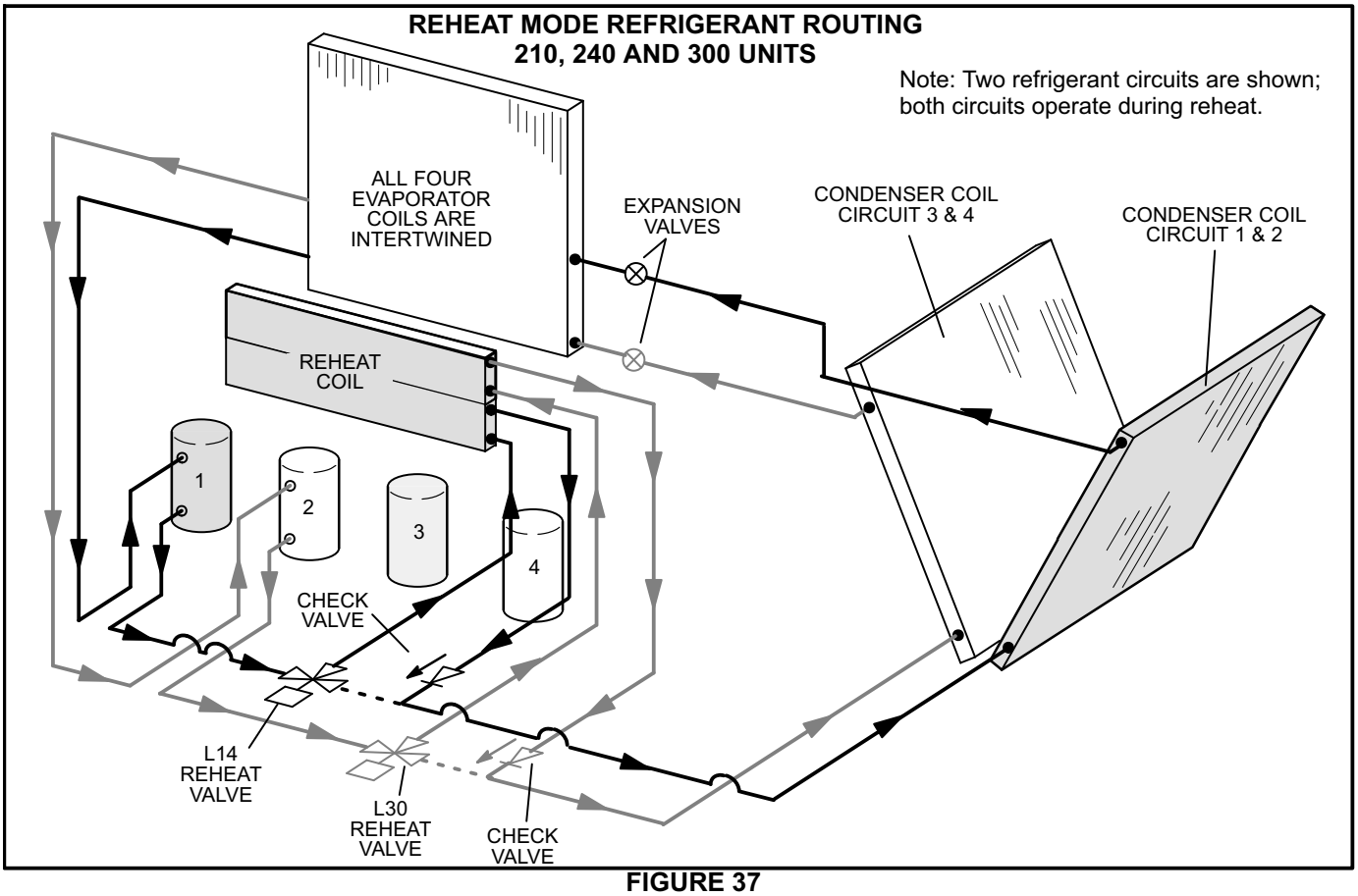


FIGURE 37

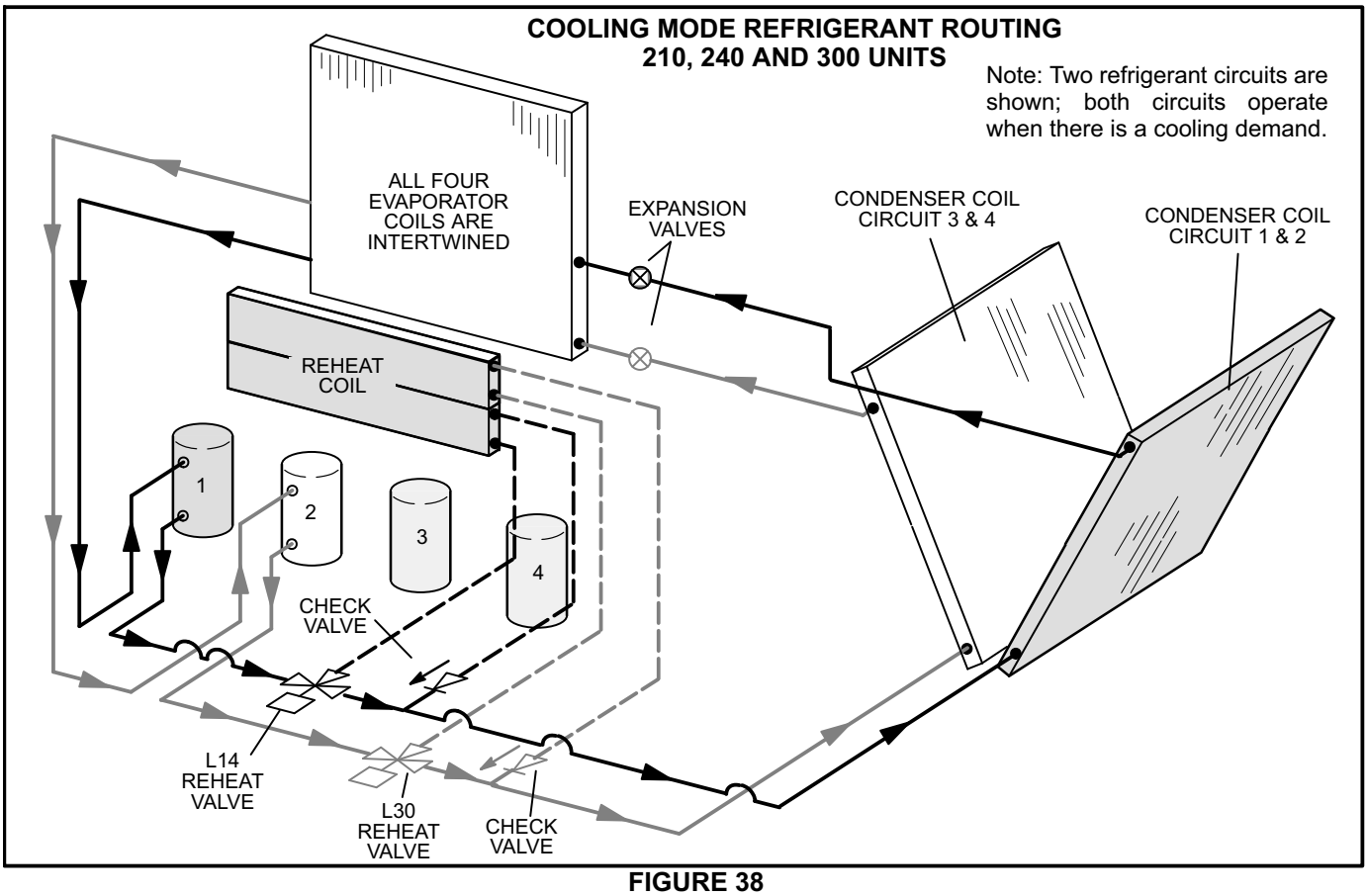


FIGURE 38

Service

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

A-Filters

Units are equipped with six 24 X 24 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 39.

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

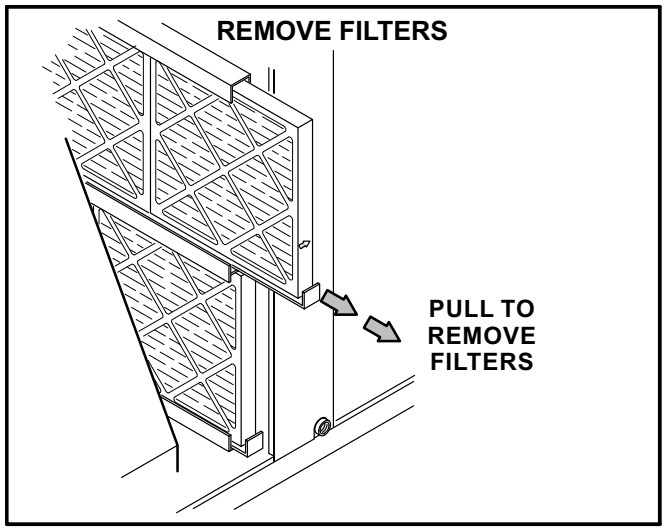


FIGURE 39

⚠CAUTION

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

B-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.

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- Open burner compartment access panel.

3- Remove screws securing burner assembly to burner support and remove assembly. See figure 40. 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 41.

5- Check the alignment of the ignitor and the sensor as shown in figure 42 and table 21.

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.

⚠WARNING

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

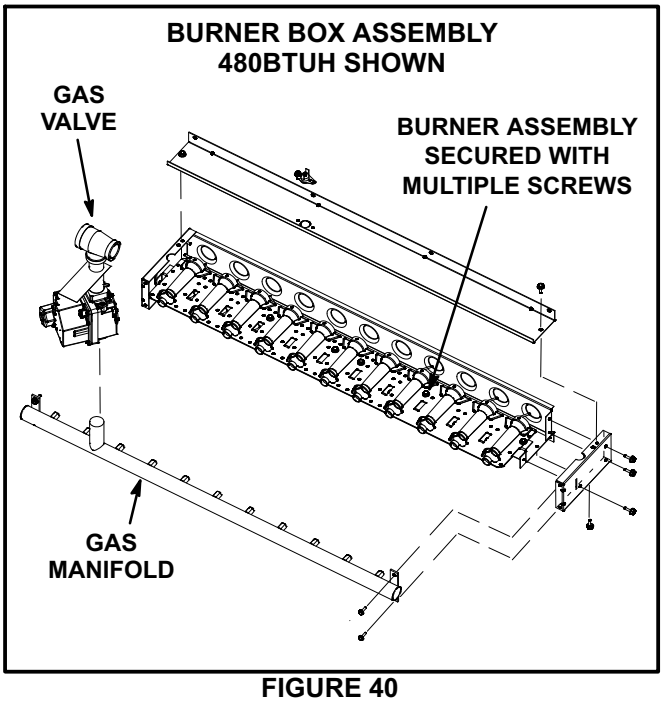


FIGURE 40

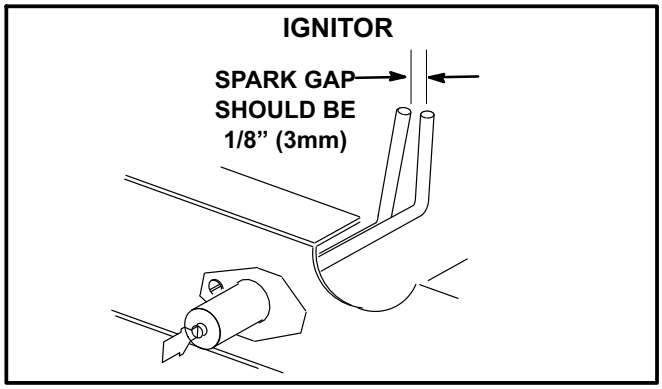


FIGURE 41

TABLE 21

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

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 and retain two screws from bracket supporting vent connector. See figure 43.

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.

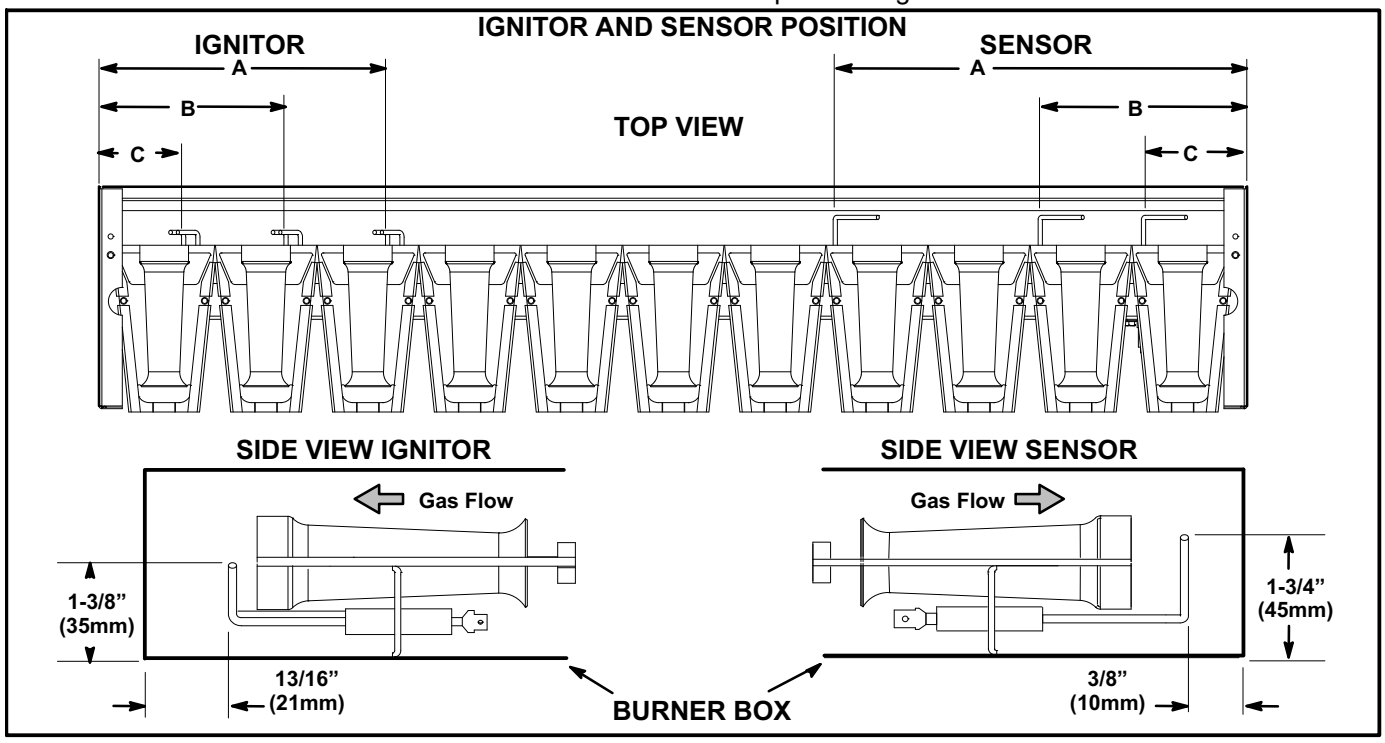


FIGURE 42

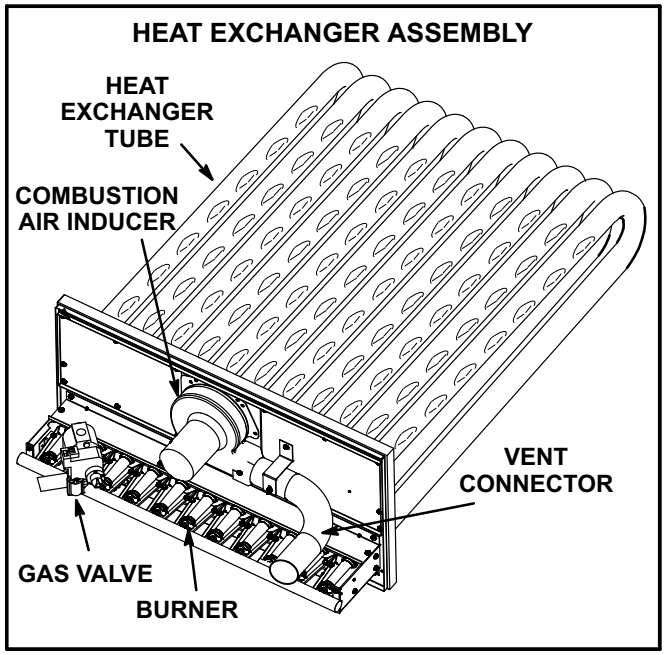


FIGURE 43

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- Clean tubes with a wire brush.

4- Reassemble the unit. The flue box cover gasket and combustion air inducer gasket should also be replaced during reassembly.

F-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.

G-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.

H-Condenser Coil

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.

J-Needlepoint Bipolar Ionizer

The optional, brush-type ionizer produces positive and negative ions to clean air and reduce airborne contaminants. The ionizer was designed to be low maintenance. The device should be checked semi-annually to confirm the brushes are clean for maximum output. The ionizer is located behind the filters. See figure 44.

1- Remove filters, screws securing the top and bottom of the upper filter bracket, and the wire ties the screws hold in place. See figure 44.

2- Disconnect the ionizer plug near the top of the filter rack.

3- Pull ionizer out of unit and clean brushes.

4- Replace ionizer, reconnect ionizer plug, and replace filters, screws, and wire ties.

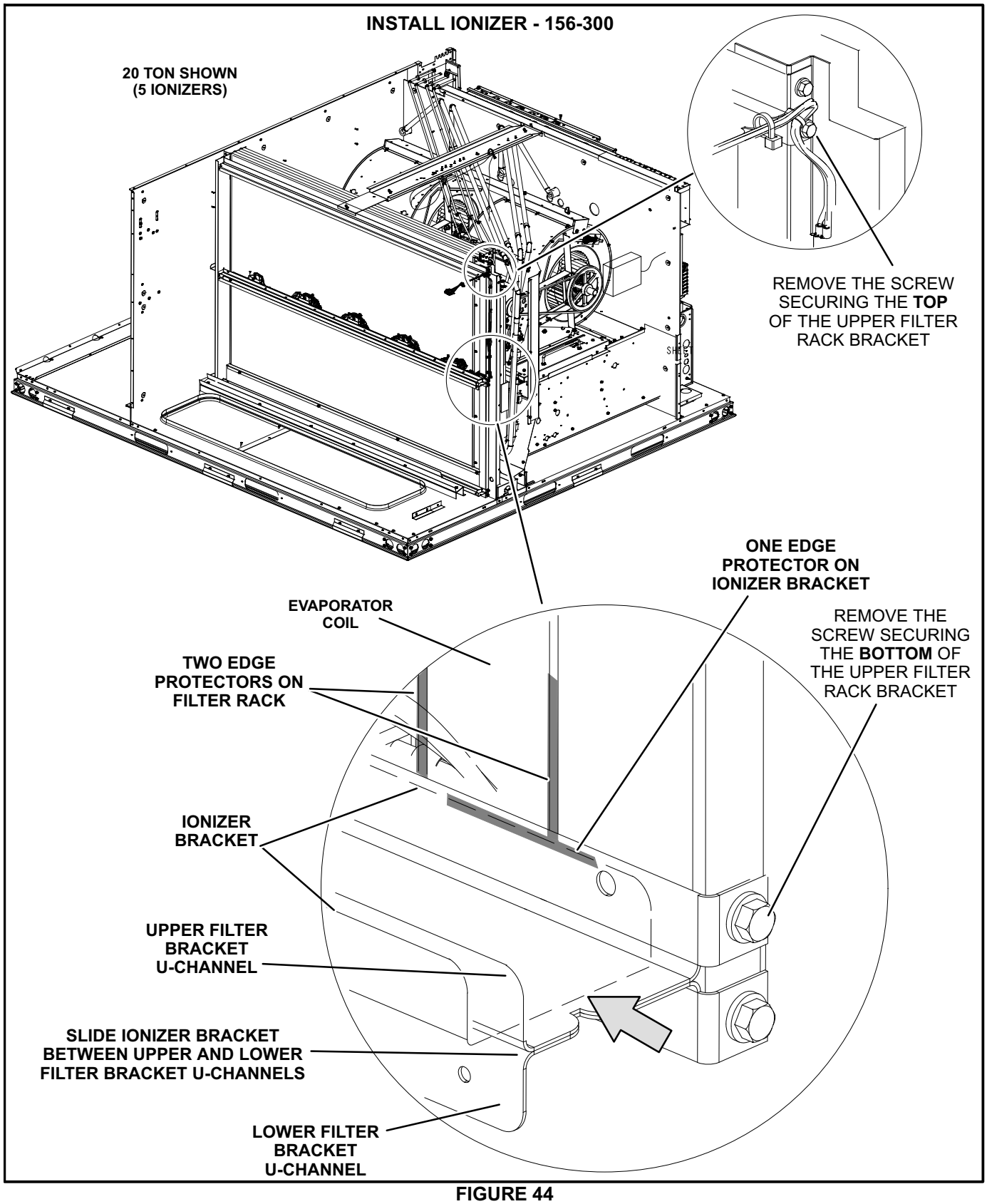

INSTALL IONIZER - 156-300
20 TON SHOWN
(5 IONIZERS)
REMOVE THE SCREW SECURING THE **TOP** OF THE UPPER FILTER RACK BRACKET
ONE EDGE PROTECTOR ON IONIZER BRACKET
EVAPORATOR COIL
REMOVE THE SCREW SECURING THE **BOTTOM** OF THE UPPER FILTER RACK BRACKET
TWO EDGE PROTECTORS ON FILTER RACK
IONIZER BRACKET
UPPER FILTER BRACKET U-CHANNEL
SLIDE IONIZER BRACKET BETWEEN UPPER AND LOWER FILTER BRACKET U-CHANNELS
LOWER FILTER BRACKET U-CHANNEL

FIGURE 44

K-UVC Light (Optional)

When field-installed, use only UVC Light Kit assembly 106883-01 (21A94) with this appliance.

Factory-Installed UVC Light

When the UVC light is factory installed, the lamp is shipped in a foam sleeve. The lamp is attached to the UVC light assembly on the blower deck. Remove the lamp and install into the UVC light assembly as shown in steps 2 through 11 as follows.

Annual Lamp Replacement

⚠WARNING

Personal Burn Hazard.

Personal injury may result from hot lamps. During replacement, allow lamp to cool for 10 minutes before removing lamp from fixture.

The lamp should be replaced every 12 months, as UVC energy production diminishes over time.

1- Obtain the correct model germicidal light replacement lamp 101087-02.
2- Disconnect power to the rooftop unit before servicing the UVC kit.
3- Open the blower access door.
4- Disconnect the UVC cable quick connects (black/white).
5- Remove and retain the (3) mounting screws securing the UVC assembly. Carefully remove the complete UVC assembly out through the blower access door. See figure 46.
6- Allow 10 minutes before touching the lamps. Then, carefully remove the lamp splash guards (and lamp for annual replacement) from each of the lamp holders. See figure 45.
7- Wear cotton gloves or use a cotton cloth when handling the new lamp. Gently but firmly push in the splash guards on each end of the lamp. Align and insert the lamp with splash guard into the lamp holders of the UVC assembly until each end clicks into place.

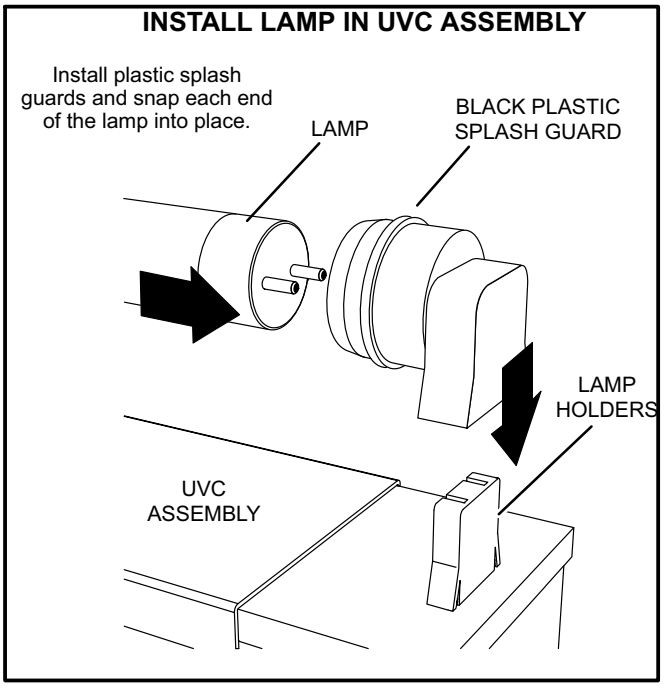


FIGURE 45

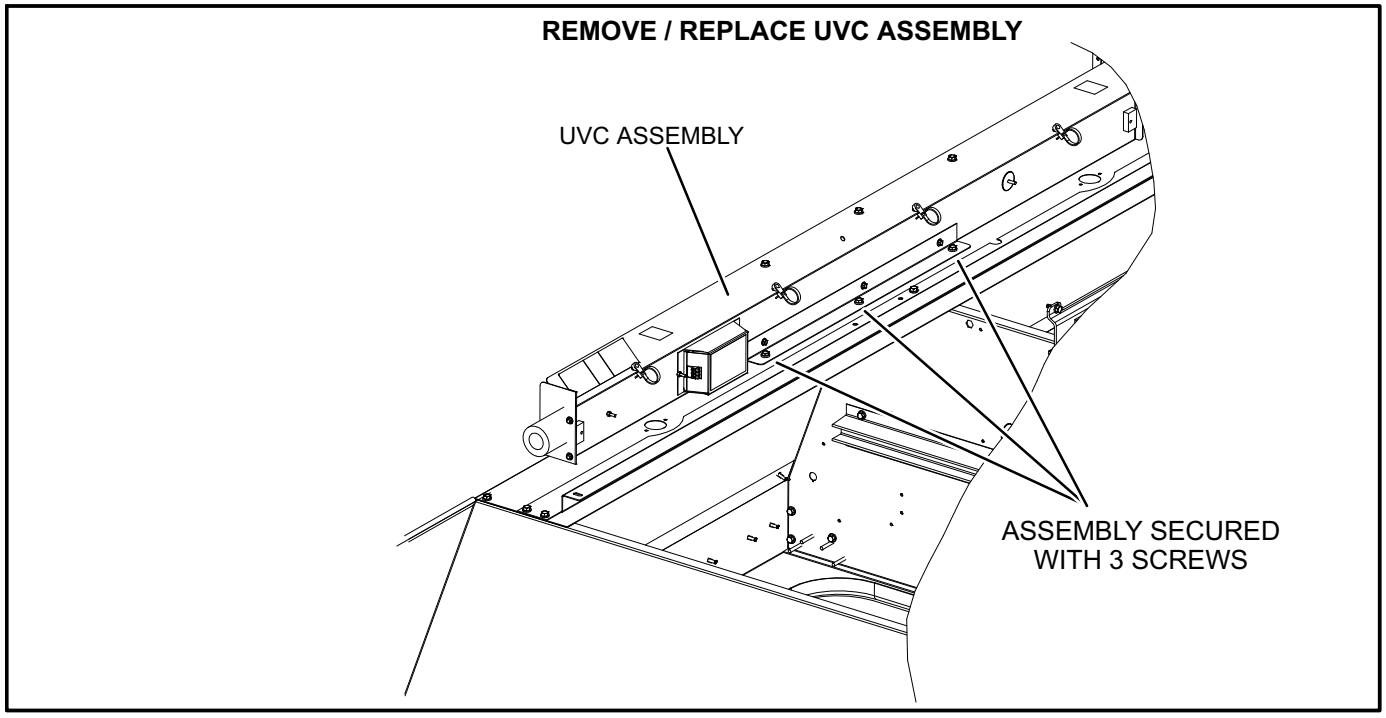


FIGURE 46

8- Carefully place the UVC assembly on the blower deck. Line up the mounting holes on the UVC assembly with the mounting holes on the blower deck. Use the retained #10 screws to attach the UVC assembly in place.

9- Close the blower access door.

10- Reconnect power to the rooftop unit.

11- Open the filter access door and look through the view port in the triangular sheet-metal panel to verify that the UVC light is on.

For all maintenance, contact a licensed HVAC technician.

If UVC lamp does not come on:

1- Check Power Wiring: Disconnect 1/4" QC (quick connects) of the UVC cable near the UVC assembly. With Power ON, use multimeter to test 110-230V at the 1/4"QC quick connects from the control panel.

2- Check Lamp: Carefully remove the UVC assembly out of the rooftop unit. Use multimeter to test for continuity across each pair of pins at each end of the lamp.

3- Check Lamp Installation: Make sure that lamp's pins snap properly into the lamp holder.

Lamp Disposal

Hg-Lamp Contains Mercury - Manage in accordance with local, state and federal disposal laws. Refer to www.lamprecycle.org.

Proper Clean-up Technique in Case of Lamp Breakage
Wear protective gloves, eye wear and mask.

Sweep the broken glass and debris into a plastic bag, seal the bag, and dispose of properly. Contact your local waste management office for proper disposal.

Do not use a vacuum cleaner. Do not incinerate.

Maintenance

- For all maintenance, contact a qualified HVAC technician.
- Read the maintenance instructions before opening unit panels.
- Unintended use of the unit or damage to the unit housing may result in the escape of dangerous UVC radiation. UVC radiation may, even in small doses, cause harm to the eyes and skin.
- Do not operate units that are obviously damaged.
- Do not discard the triangular UVC light shield or any barriers with an ultraviolet radiation symbol.
- Do not override the door interlock switch that interrupts power to the UVC light.
- Do not operate the UVC light outside of the unit.

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.

Tables 22 through 26 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 47 and 48 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 22 - 581038-01

Units With BACnet Module Settings
RTU Menu > Network Integration > Network Setup Wizard > BACnet MS/TP > See BACnet MAC Address
BACNET MAC ADDRESS:
Units With Room Sensor, CPC/LSE Gateway Settings
RTU Menu > Network Integration > Network Setup Wizard > SBUS > Set SBUS Address
LCONN ADDRESS:

TABLE 23 - 581024-01

Units With Hot Gas Reheat			
RTU Menu > Settings "RTU Options" > Dehumidifier			
Parameter	**Factory Setting**	**Field Setting**	**Description**
105	7		Factory Setting 7: Reheat mode enabled without prerequisite conditions. Controlled by RH sensor (A91) connected to input A55_P298_5 and set point set at parameter 106 (default 60%).

TABLE 24 581037-01

Units With LonTalk Settings
Use menu RTU Menu > Network Integration > Network Setup Wizard > Set "LONTALK"

TABLE 25 - 581025-01

LGT/LCT 156, 180, 210, 240, 300 Staged							
Para meter	Factory Setting					Field Setting	Description
	156	180	210	240	300		
Note: Any changes to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS > RTU OPTIONS > EDIT PARAMETERS							
12	5200 CFM	6000 CFM	7000 CFM	8000 CFM	10000 CFM	CFM	Blower CFM during smoke detection.
SETUP > TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > BLOWER > SPEEDS)							
17	1150 CFM	1325 CFM	1550 CFM	1750 CFM	2200 CFM	CFM	Blower CFM during COOLING LOW operation.
14	4550 CFM	5250 CFM	6125 CFM	7000 CFM	8750 CFM	CFM	Blower CFM during COOLING HIGH operation.
13	5200 CFM	6000 CFM	7000 CFM	8000 CFM	10000 CFM	CFM	Blower CFM during Heating operation.
18	1150 CFM	1325 CFM	1550 CFM	1750 CFM	2200 CFM	CFM	Blower CFM during ventilation.
SETUP > TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > DAMPER)							
9	0%	0%	0%	0%	0%	%	Damper min. position during LOW blower operation.
132	0%	0%	0%	0%	0%	%	Damper min. position during HIGH blower operation.
215	50%	50%	50%	50%	50%	%	Min. damper % for stg 1 power exhaust operation.
SETTINGS > RTU OPTIONS > EDIT PARAMETERS							
29	101%	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)
219	75%	75%	75%	75%	75%	%	Min. damper % for stg 2 power exhaust operation.
216	10%	10%	10%	10%	10%	%	Deadband % for stage 1 power exhaust operation.
220	10%	10%	10%	10%	10%	%	Deadband % for stage 2 power exhaust operation.
224	100	100	100	100	100	Sec	Stage 1 power exhaust off-delay in seconds.
30	70%	70%	70%	70%	70%	%Speed	Minimum blower speed % for stage 2 power exhaust operation.

TABLE 26 - 581026-01

LGT/LCT 156-300 - VAV - Test and Balance Settings			
Para-meter	Factory Setting	Field Setting	**Description**
Use SETTINGS > RTU OPTIONS > EDIT PARAMETERS			
386	1	W.C.	Supply static pressure setpoint during smoke operation.
SETUP > TEST & BALANCE > (can also use SETTINGS > RTU OPTIONS > BLOWER > SPEEDS)			
	1	W.C.	Supply static pressure setpoint
SETUP > TEST & BALANCE (can also use SETTINGS > RTU OPTIONS > DAMPER) (Optional)			
132	0%	%	Damper min. position during blower operation.
215	50%	%	Min. damper % for stage 1 power exhaust operation.
219	75%	%	Min. damper % for stage 2 power exhaust operation.
217	0.05	W.C.	Pressure setpoint for stage 1 power exhaust operation.
221	0.10	W.C.	Pressure setpoint for stage 2 power exhaust operation.
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)

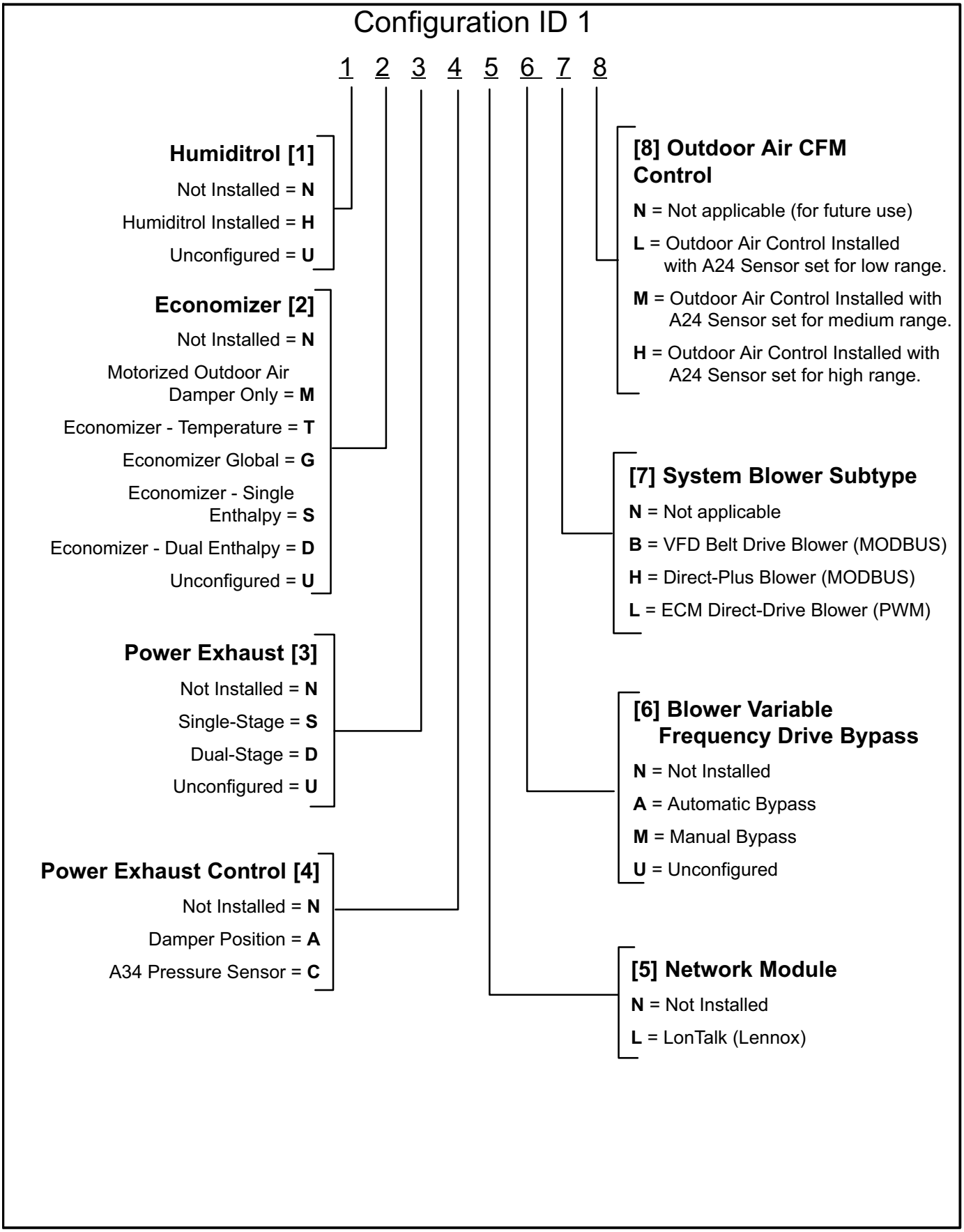

Configuration ID 1
1 2 3 4 5 6 7 8
Humiditrol [1]
Not Installed = N
Humiditrol Installed = H
Unconfigured = U
Economizer [2]
Not Installed = N
Motorized Outdoor Air Damper Only = M
Economizer - Temperature = T
Economizer Global = G
Economizer - Single Enthalpy = S
Economizer - Dual Enthalpy = D
Unconfigured = 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 47

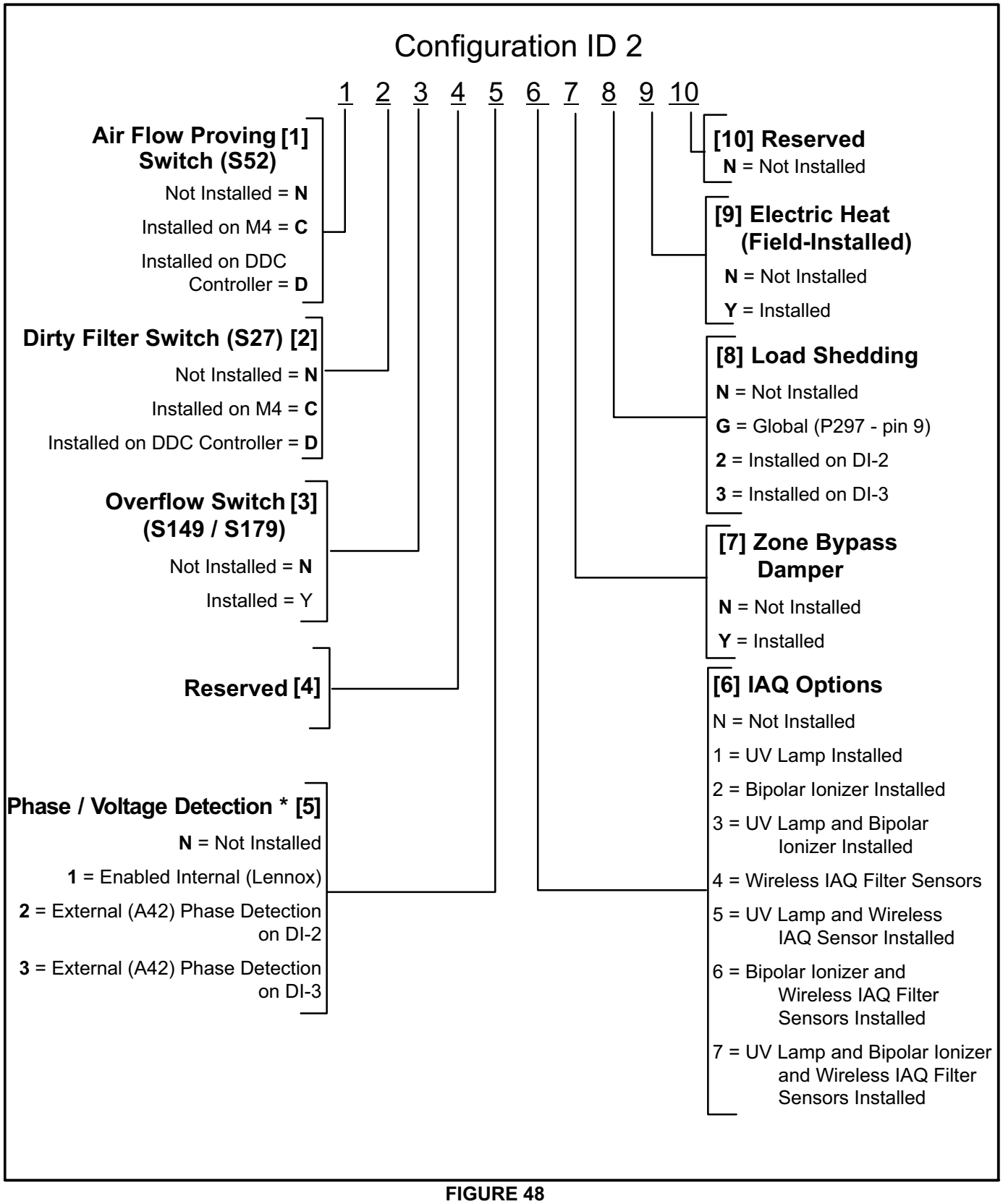

Configuration ID 2
1 2 3 4 5 6 7 8 9 10
Air Flow Proving Switch (S52) [1]
Not Installed = N
Installed on M4 = C
Installed on DDC Controller = D
Dirty Filter Switch (S27) [2]
Not Installed = N
Installed on M4 = C
Installed on DDC Controller = D
Overflow Switch (S149 / S179) [3]
Not Installed = N
Installed = Y
Reserved [4]
Phase / Voltage Detection * [5]
N = Not Installed
1 = Enabled Internal (Lennox)
2 = External (A42) Phase Detection on DI-2
3 = 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 48

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 R22 ☐ R410A ☐

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: ☐

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 ☐