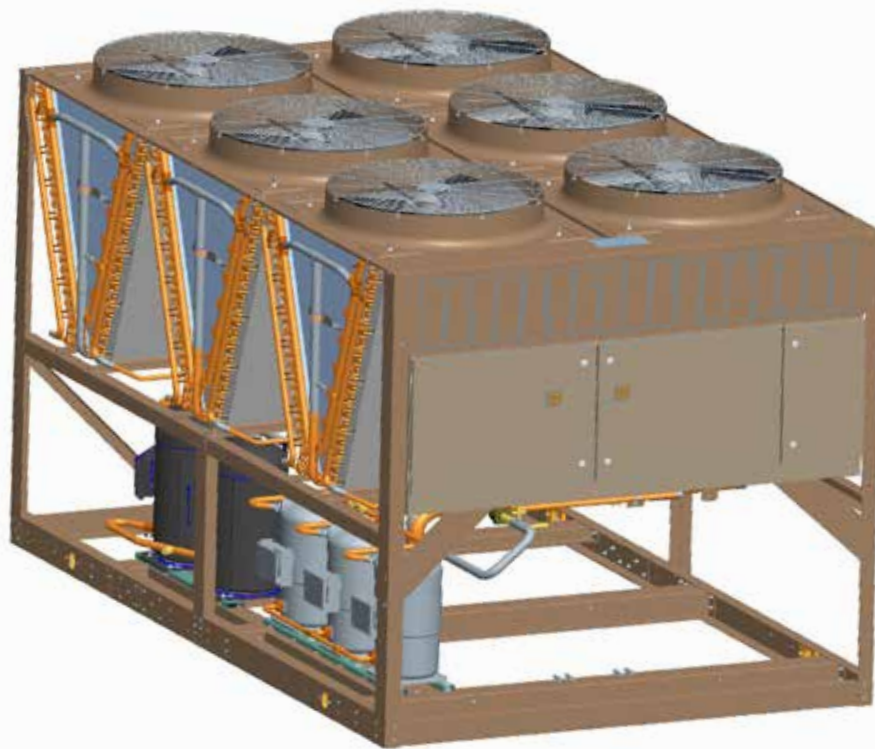
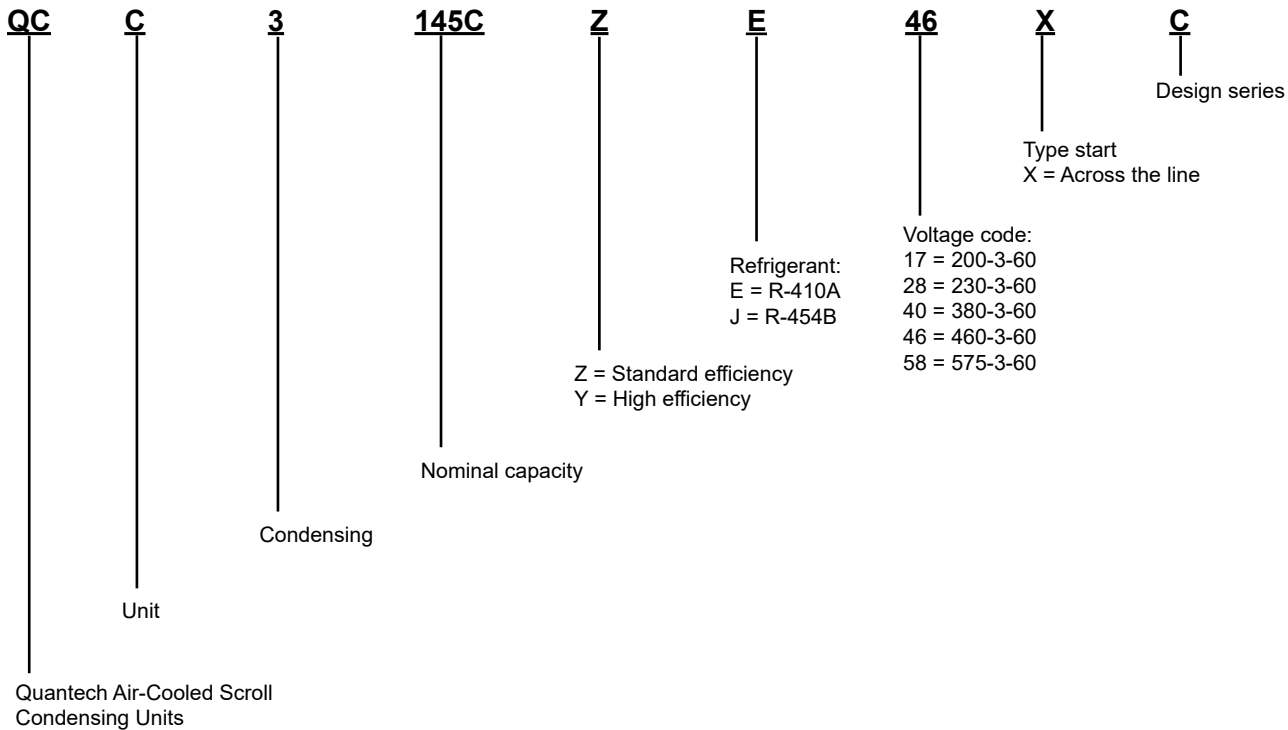


# Model QCC3 Air-Cooled Scroll Compressor Condensing Units Style A and B

80 ton to 160 ton  
281 kW to 562 kW  
60 Hz  
R-410A and R-454B



# Nomenclature



## Approvals

- ASME Boiler and Pressure Vessel Code – Section VIII Division 1
- UL 1995 – Heating and Cooling Equipment
- ASHRAE 15 – Safety Code for Mechanical Refrigeration
- ASHRAE Guideline 3 – Reducing Emission of Halogenated Refrigerants in Refrigeration and Air-Conditioning Equipment and Systems
- NEC – National Electrical Code
- OSHA – Occupational Safety and Health Act
- The condensing units conform to Underwriters Laboratories (U.L.) for construction of chillers and provide U.L./cU.L. Listing Label. Conforms to UL60335-2-40 requirements.

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# Introduction

## General

The 78 ton to 160 ton, 273 kW to 560 kW QCC3 condensing unit models are shipped complete from the factory ready for field installation.

The unit is pressure-tested, evacuated and given a nitrogen holding charge, and includes an initial oil charge. The R-410A or R-454B refrigerant is not supplied by Quantech. After assembly, a operational test is performed to ensure that each control device operates correctly.

The unit structure is heavy-gauge, galvanized steel. This galvanized steel is coated with baked-on powder paint, which, when subjected to ASTM B117 1,000 hour, salt spray testing, yields a minimum ASTM 1654 rating of 6. Units are designed in accordance with NFPA 70, National Electric Code (NEC), ASHRAE/ANSI 15 Safety code for mechanical refrigeration, and are cETL listed. All units are produced at an ISO 9000-registered facility.

## Compressors

The chiller has suction-gas cooled, hermetic, scroll compressors. The compressors incorporate a compliant scroll design in both the axial and radial direction. All rotating parts of the compressors are statically and dynamically balanced. A large internal volume and oil reservoir provides greater liquid tolerance. Compressor crankcase heaters are also included for extra protection against liquid migration.

## Condenser

**Coils:** Fin and tube condenser coils of seamless, internally-enhanced, corrosion resistant copper tubes are arranged in staggered rows, and mechanically expanded into aluminum fins. Integral subcooling is included. The design working pressure of the coil is 650 psig (45 barg).

**Fans:** The condenser fans are composed of corrosion-resistant aluminum hub and glass-fiber-reinforced polypropylene composite blades that are molded into a low noise airfoil section. They are designed for maximum efficiency and are statically and dynamically balanced for vibration free operation. They are directly driven by independent motors, and positioned for vertical air discharge. The fan guards are constructed of heavy-gauge, rust-resistant, coated steel. All blades are statically and dynamically balanced for vibration-free operation.

**Motors:** The fan motors are totally enclosed air-over, squirrel-cage type, and current protected. They feature ball bearings that are double-sealed and permanently lubricated.

# Control center

## Refrigerant circuit

Two independent refrigerant circuits are furnished on each unit. All unit piping is copper, with brazed joints. The liquid line includes a field connection shutoff valve with a charging port located on each condenser circuit. Suction line connections are provided on each refrigeration circuit.

The following components are supplied and installed by others:

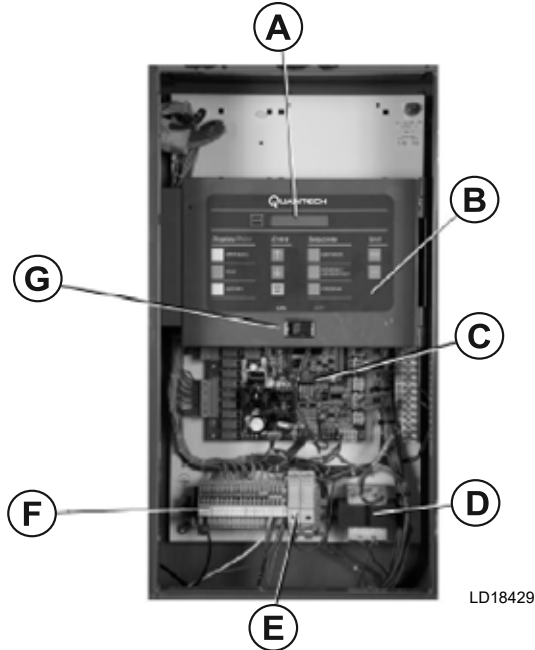
- Expansion valves
- Liquid line solenoid valves
- Filter driers
- Sight glasses
- Refrigerant
- Refrigerant field piping

All controls are contained in a NEMA 3R/12 cabinet with hinged outer door and include:

- Liquid Crystal Display with light emitting diode (LED) backlighting suitable for outdoor viewing:
- Two display lines
- Twenty characters per line
- Color coded 12-button keypad with sections for **display/print** of typical information:
  - Suction temperatures, optional
  - Ambient temperature
  - System pressures for each circuit
  - Operating hours and starts for each compressor
  - Print calls up to the liquid crystal display
  - Operating data for the systems
  - History of fault shutdown data for up to the last six fault shutdown conditions
  - An RS-232 port, in conjunction with this press-to-print button, is provided to permit the capability of hard copy print-outs using a separate printer, which must be supplied by others.

## Control center, continued

**Figure 1:** Control panel with keyboard



LD18429

Callout	Description	Callout	Description
A	Display	E	Fuses
B	Keypad	F	Terminal block
C	Microboard	G	On/off switch
D	Control transformer	—	—

**Entry** section allows entering setpoints or modifying system values.

Use **Setpoints** to update the following parameters:

- Suction pressure setting
- Suction pressure control zone
- Remote reset temperature range
- Set daily schedule/holiday for start/stop
- Manual override for servicing
- Low and high ambient cutouts
- Number of compressors
- Low suction pressure cutout
- High discharge pressure cutout
- Anti-recycle timer (compressor start cycle time)

## ***Control center, continued***

- Anti-coincident timer (delay compressor starts) **UNIT** section to:
  - Set clock
  - Set options
  - Set unit option

Set unit control for discharge air temperature control or for suction pressure control (requires suction pressure transducers – standard).

### **Unit on/off switch**

The microprocessor control center displays the following data:

- Suction temperatures, optional
- Low ambient temperature cutout setting
- Outdoor air temperature
- English or metric data
- Suction pressure cutout setting
- Each system suction pressure
- System discharge pressure
- Discharge air temperature reset using a Quantech ISN DDC or building automation system (BAS) using:
  - A pulse width modulated (PWM) input as standard
  - A 4 mA to 20 mA or 0 VDC to 10 VDC input, or contact closure with the optional BAS interface option
- Anti-recycle timer status for each system
- Anti-coincident system start timer condition
- Compressor run status
- No cooling load condition
- Day, date, and time
- Daily start/stop times
- Holiday status
- Automatic or manual system lead/lag control. For discharge air temperature control only
- Automatic lead/lag of compressors within a system
- Compressor starts and operating hours for each compressor
- Status of hot gas valves, and fan operation
- Run permissive status



## Control center, continued

- Number of compressors running
- Liquid solenoid valve status
- Load and unload timer status

Provisions are included for pumpdown at shutdown, optional remote discharge air temperature reset, and two steps of demand load limiting from an external building automation system. Unit alarm contacts are standard.

The operating program is stored in non-volatile memory (EPROM) to eliminate chiller failure due to AC powered failure/battery discharge. Programmed setpoints are retained in lithium battery-backed RTC memory for 5 years minimum.

**Ambient kit for high temperature:** Required if units are to operate when the ambient temperature is above 115°F (46°C). Includes sun shield panels and discharge pressure transducers. This option includes the Discharge Pressure Transducer /Readout Capability option. **Field mounted.**

### Communications

- Native communication capability for BACnet® (MS/TP) and Modbus®
- Optional communication available for N2 and LON using the eLink option

### Power panel

Each panel contains:

- Compressor power terminals
- Compressor motor starting contactors per International Electrotechnical Commission (IEC)
- Control power terminals to accept incoming for 115-1-60 control power
- Fan contactors and overload current protection

The power wiring is routed through a liquid-tight conduit to the compressors and fans.

## Accessories and options

All options are factory installed unless otherwise noted.

### Compressor and piping options

**Chicago code relief valves:** Units are provided with relief valves to meet Chicago code requirements.

**Hot gas by-pass:** Permits continuous, stable operation at capacities below the minimum step of compressor by unloading to as low as 5% capacity, depending on both the unit and operating conditions. This is accomplished by introducing an artificial load. A hot gas by-pass is available installed on refrigerant system #1 or on both systems of two circuited units.

**Service isolation valve:** Service suction and discharge (ball-type) isolation valves are added to unit per system. This option also includes a system high pressure relief valve in compliance with ASHRAE 15.

### Condenser and cabinet options

Choose any of the following options to protect the condenser coil against corrosive environments. For additional application information, refer to *Form 150.12-ES1*.

**Pre-coated fin condenser coils:** The condenser coils are constructed of black epoxy-coated aluminum fins. This can provide corrosion resistance comparable to copper-fin coils in typical seashore locations. Use either these or the post-coated coils for units being installed at the seashore or where salt spray may hit the unit.

**Post-coated dipped condenser coils:** The unit is built with dipped and cured condenser coils. This is another choice for seashore and other corrosive applications, with the exception of strong alkalis, oxidizers and wet bromine, chlorine and fluorine in concentrations greater than 100 ppm.

**Copper-fin condenser coils:** The unit is constructed with condenser coils which have copper fins. Do not use for units that may be exposed to acid rain.

**Enclosure panels for the unit:** Tamperproof enclosure panels prevent unauthorized access to units. Enclosure Panels can provide an aesthetically pleasing alternative to expensive fencing. Additionally, for correct head pressure control, Quantech suggests using condenser louvered panels for winter applications where wind gusts may exceed 5 mph (8 km/h).

The following types of enclosure panels are available:

**Wire panels, full unit:** Wire panels consist of welded wire-mesh guards mounted on the exterior of the unit. These prevent unauthorized access, yet provide free airflow.

**Wire/louvered panels:** Wire and louvered panels consist of welded wire-mesh panels on the bottom part of unit and louvered panels on the condenser section of the unit.

## Accessories and options, continued

**Louvered panels, condenser coil only:** Louvered panels are mounted on the sides and ends of the condenser coils for protection.

**Louvered panels, full unit:** Louvered panels surround the front, back, and sides of the unit. These prevent unauthorized access and visually screen unit components. Unrestricted air flow is permitted through generously sized louvered openings. This option is applicable for any outdoor design ambient temperature up to 115°F (46°C).

**Sound attenuation:** One or both of the following sound attenuation options are recommended for residential or other similar sound sensitive locations:

**Compressor acoustic sound blanket:** Each compressor is individually enclosed by an acoustic sound blanket. The sound blankets are made with one layer of acoustical absorbent textile fiber of 5/8 in. (15 mm) thickness and one layer of anti-vibrating heavy material thickness of 1/8 in. (3 mm). Both are closed by two sheets of welded PVC, reinforced for temperature and UV resistance.

**Ultra quiet fans:** Lower RPM, 8-pole fan motors are used with steeper-pitch fans.

**Vibration isolators:** Level adjusting, spring type 1 in. (25.4 mm) or seismic deflection or neoprene pad isolators for mounting under unit base rails.

### Control options

**Ambient kit, low:** Units operate to 32°F (-4°C) as standard. This accessory includes all necessary components to permit condensing unit operation to 0°F (-18°C). This option includes the Discharge Pressure Transducer / Readout Capability option. For correct head pressure control in applications below 25°F (-4°C) where wind gusts may exceed 5 mph (8 km/h), it is recommended that Optional Condenser Louvered Enclosure Panels also be included.

**Building automation system interface:** The factory addition of a printed circuit board to accept a 4 mA to 20 mA, 0 VDC to 10 VDC or contact closure input to reset the discharge air temperature from a building automation system. The standard control panel can be directly connected to a Quantech building automated system via the standard on board RS485 communication port.

**Language LCD and keypad display:** Spanish, French, German, and Italian unit LCD controls and keypad display are available. The standard language is English.

**Discharge pressure transducers and readout capability:** The addition of pressure transducers allows models to sense and display discharge pressure. This option is included with either the low or high ambient kits.

**Suction pressure transducers and readout capability:** The addition of suction transducers allows models to sense and display suction pressure.

**Suction temperature readout:** The addition of temperature sensors allow models to sense and display suction temperature.

## Accessories and options, continued

### Power options

**Compressor power connections:** Single-point terminal block connections are provided as standard. The following power connections are available as options. See *Electrical data on page 25* for specific voltage and options availability.

**Single-point non-fused disconnect switch:** Unit-mounted disconnect switch(es) with external, lockable handle, in compliance with Article 440-14 of NEC, can be supplied to isolate the unit power voltage for servicing. Separate external fusing must be supplied, by others in the power wiring, which must comply with the NEC and local codes.

**Single-point non-fused disconnect switch with individual system breakers:** Includes unit-mounted disconnect switch with external, lockable handles, in compliance with Article 440-14 of NEC, to isolate unit power voltage for servicing. Factory interconnecting wiring is provided from the disconnect switch to factory supplied system circuit breakers.

**Single-point circuit breaker:** A unit mounted circuit breaker with external, lockable handle, in compliance with NEC Article 440-14, can be supplied to isolate the power voltage for servicing. This option includes the single-point power connection.

**Control transformer:** Converts unit power voltage to 115-1-60 or 115-1-50 (0.5 kVA or 1.0 kVA capacity). Factory mounting includes primary- and secondary-wiring between the transformer and the control panel.

**Power factor correction capacitors:** Corrects unit compressor power factors to a 0.90-0.95.

## Refrigerant piping

**General:** When the unit has been located in its final position, the unit piping may be connected. Observe normal installation precautions in order to receive maximum operating efficiencies. System piping must conform to the DX piping guide *Form 050.40-ES2* or ASHRAE refrigeration handbook guidelines. All piping design and installation is the responsibility of the user.

**Quantech assumes no warranty responsibility for system operation or failures due to incorrect piping or piping design.**

Quantech does not supply or install expansion valves, liquid line solenoid valves, filter driers, sight glasses, refrigerant, and refrigerant piping. These must be sourced elsewhere.

*Table 1 on page 15* lists refrigerant line connections sizes per unit model number.

### Refrigerant line sizing

Refrigerant piping systems must be designed to provide practical line sizes without excessive pressure drops, prevent compressor oil from being trapped in the refrigerant piping, and ensure correct flow of liquid refrigerant to the thermal expansion valve. Considerations must be given to:

- Suction line pressure drop due to refrigerant flow.
- Suction line refrigerant velocity for oil return.
- Liquid line pressure drop due to refrigerant flow.
- Liquid line pressure drop (or gain) due to vertical rise of the liquid line.

See *Table 4 on page 16* for the pressure drops for given pipe sizes for both liquid and suction lines. The pressure drops given are per 100 equivalent ft (30.5 m) of refrigerant piping. These friction losses do not include any allowances for strainer, filter drier, solenoid valve, isolation valve or fittings.

See *Table 2 on page 15* for nominal pressure drop for solenoids, sight glass, and driers.

See *Table 3 on page 15* for approximate equivalent lengths for copper fittings.

To ensure a solid column of liquid refrigerant to the expansion valve, the total liquid line pressure drop must never exceed 50 psi (3.4 bar). Refrigerant vapor in the liquid line measurably reduces valve capacity and negatively impacts system performance.

To allow adequate oil return to the compressor, suction risers must be sized for a minimum

## Refrigerant piping, continued

of 1,000 fpm (5.08 m/s) while the system is operating at minimum capacity to ensure oil return up the suction riser. See *Table 4 on page 16* under column labeled nominal ton unloaded.

### Evaporator below condensing unit

On a system where the evaporator is located below the condensing unit, the suction line must be sized for both pressure drop and oil return. In some cases a double suction riser must be installed to ensure reliable oil return at reduced loads. See *Table 3 on page 15* for when to use a double suction riser for listed pipe sizes to provide adequate oil return at reduced loads. The calculated information is based on maintaining a minimum of 1,000 fpm (5.08 m/s) refrigerant vapor velocity.

### Condenser below evaporator

When the condensing unit is located below the evaporator, the liquid line must be designed for both friction loss and static head loss due the vertical rise. The value of static head loss of 5 psi/ft. (3.4 kPa/30 cm) must be added to the friction loss pressure drop in addition to all pressure drops due to driers, valves, and similar components.

### Oil traps

Pitch all horizontal suction lines at least 1/4 in. (6 mm) each foot in length in the direction of the refrigerant flow to aid in the return of oil to the compressor. Ensure all suction lines with a vertical rise exceeding 3 ft (0.91 m) have a P trap at the bottom and top of the riser. Trap suction lines with a vertical rise exceeding 25 ft (7.6 m) every 15 ft (4.6 m).

### Refrigerant charge

The condensing unit is charged with a dry nitrogen holding charge. The remaining operating charge for the condensing unit, evaporator coil, and refrigerant piping must be weighed in after all refrigerant piping is installed, leak checked, and evacuated. Verify the final adjustment of refrigerant charge using the subcooling values. Refer to the *Installation and Startup Checklist 150.73-CL2* for checking subcooling and see *Table 3 on page 15* for refrigerant line charges.

## Refrigerant piping, continued

### Refrigerant piping reference

For more details, refer to *ASHRAE Refrigeration Handbook, Chapter 2*.

**Table 1:** Copper fitting equivalent lengths

QCC3	Short radius elbow	Long radius elbow
3/4 in. (19 mm)	6.5 ft (2 m)	4.5 ft (1.4 m)
7/8 in. (22 mm)	7.8 ft (2.4 m)	5.3 ft (1.6 m)
1 1/8 in. (29 mm)	2.7 ft (0.8 m)	1.9 ft (0.6 m)
1 3/8 in. (35 mm)	3.2 ft (1 m)	2.2 ft (0.7 m)
1 5/8 in. (41 mm)	3.8 ft (1.2 m)	2.6 ft (0.8 m)
2 1/8 in. (54 mm)	5.2 ft (1.6 m)	3.4 ft (1 m)
2 5/8 in. (67 mm)	6.5 ft (2.0 m)	4.2 ft (1.3 m)

**Table 2:** Miscellaneous liquid line pressure drops

<b>Solenoid Valve</b>	2 psi to 3 psi (13.8 kPa - 20.7 kPa)
<b>Filter/Drier</b>	2 psi to 3 psi (13.8 kPa to 20.7 kPa)
<b>Sight Glass</b>	0.5 psi (3.4 kPa)

**Table 3:** Refrigeration piping charges

R-410A, suction at 36°F (2.2°C), liquid at 105°F (40.6°C)					
Suction lines					
Size	Inside diameter	ft <sup>2</sup>	Density, lb/ft <sup>3</sup>	Oz/ft	g/30 cm
1-3/8	1.3	0.0	2.1	0.3	8.1
1-5/8	1.5	0.0	2.1	0.4	11.5
2-1/8	2.0	0.0	2.1	0.7	20.0
2-5/8	2.5	0.0	2.1	1.1	30.9
Liquid lines					
3/4	0.7	0.0	60.9	2.4	66.8
7/8	0.8	0.0	60.9	3.3	92.8
1-1/8	1.0	0.0	60.9	5.6	158.3
1-3/8	1.3	0.0	60.9	8.5	241.1

## Refrigerant piping, continued

Table 4: Refrigerant line connections

Model number	Ton	System number	Refrigerant line connection		Suction line		Liquid line	
			Suction	Liquid	Copper Type I in. OD	Velocity at nominal capacity in fpm	Nominal ton, unloaded	Copper Type I in. OD
080CZE	81.3	1	2.7	1.1	2-5/8	1,656	13.5	1-1/8
		2	2.7	1.1	2-5/8	1,656	3.5	1-1/8
085CZE	84.3	1	2.7	1.1	2-5/8	1,818	14.9	1-1/8
		2	2.7	1.1	2-5/8	1,572	13.2	1-1/8
090CZE	91.1	1	2.7	1.1	2-5/8	1,812	14.9	1-1/8
		2	2.7	1.1	2-5/8	1,896	14.9	1-1/8
100CZE	98.5	1	2.7	1.1	2-5/8	1,896	14.9	1-1/8
		2	2.7	1.1	2-5/8	1,896	14.9	1-1/8
110CZE	111.5	1	2.7	1.1	2-5/8	1,812	14.9	1-1/8
		2	2.7	1.1	2-5/8	2,598	33.6	1-1/8
130CZE	131.5	1	2.7	1.1	2-5/8	2,658	32.8	1-1/8
		2	2.7	1.1	2-5/8	2,658	32.8	1-1/8
145CZE	145.3	1	3.1	1.4	3-1/8	2,790	31.3	1-3/8
		2	2.7	1.1	2-5/8	1,926	14.9	1-1/8
160CZE	158.3	1	3.1	1.4	3-1/8	2,658	30.7	1-3/8
		2	2.7	1.1	2-5/8	2,556	33.1	1-1/8

## Notes:

1. Based on R-410A at the nominal capacity of the unit or system, an ambient temperature of 95°F (35°C) and a suction temperature of 45°F (7.2°C).
2. Suction line sizes are calculated based on a nominal maximum pressure drop to 3 psi/100 ft (20.7 kPa/30.5 m). When calculating the suction line pressure drop for a specific application, note that the system capacity decreases as the suction line pressure drop increases.
3. Nominal ton (KW) unloaded is based on one compressor (per system) operating at design conditions.
4. Based on minimum compressor staging for the given pipe size, use a double suction riser to ensure correct oil return to the compressor on all vertical suction risers. Oil returning up the riser moves up the inner surface of the pipe and depends on the mass velocity of the refrigerant vapor at the wall surface to move the oil up the vertical rise.
5. Hot gas bypass lines are typically 7/8 in. (22 mm) for lines up to 40 ft (12 m) and 1 1/8 in. (28.5 mm) for lines over 40 ft (12 m) in length. The field connections sizes are 7/8 in. (22 mm) for the optional factory mounted hot gas bypass valve. Note: Hot gas bypass is only available for refrigerant system number 1.
6. For more information, refer to either the DX Piping Guide, *Form 050.40-ES2*, or the *ASHRAE Refrigeration Handbook*.



# Physical data

**Table 5:** Physical data

Refrigerant R-410A	Standard efficiency units							
	080CZE	085CZE	090CZE	100CZE	110CZE	130CZE	145CZE	160CZE
<b>General unit data</b>								
Length	116.1	116.1	116.1	142.7	142.7	142.7	187.7	187.7
Width	88.0	88.0	88.0	88.0	88.0	88.0	88.0	88.0
Height	94.2	94.2	94.2	94.2	94.2	94.2	94.2	94.2
<b>Refrigerant</b>								
Number of refrigerant circuits	2	2	2	2	2	2	2	2
Refrigerant charge circuit 1 (lb)	54	56	56	78	56	81	81	108
Refrigerant charge circuit 2 (lb)	49	49	51	73	98	76	76	96
Oil charge, circuit 1/circuit 2, gal	2.6 / 2.6	3.3 / 2.6	3.3 / 2.8	2.8 / 2.8	3.3/3.3	3.3/3.3	5.0 / 2.8	5.0 / 3.3
<b>Unit weights</b>								
Shipping weight (lb)	3,713	3,989	4,185	4,911	5,146	5,221	6,473	6,628
<b>Compressors, scroll type</b>								
Compressors per circuit	3/3	3/3	3/2	2/2	3/2	2/2	3/2	3/2
Compressors per unit	6	6	5	4	5	4	5	5
<b>Nominal tons per compressor</b>								
Circuit 1	13	15	15	15/32	15	32	32	32
Circuit 2	13	13	15/32	15/32	32	32	15/32	32
<b>Condenser</b>								
Total face area ft <sup>2</sup>	106.9	106.9	106.9	160.3	160.3	160.3	213.8	213.8
Number of rows	3	3	3	3	3	3	3	3
Fins per in.	17	17	17	17	17	17	17	17
<b>Condenser fans, low sound</b>								
Number of fans, circuit 1/circuit 2	2/2	2/2	2/2	3/3	2/4	3/3	4/4	4/4
Fan HP	2	2	2	2	2	2	2	2
Fan rpm	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160
Total chiller, cfm	62,400	62,400	62,400	93,600	93,600	93,600	124,800	124,800

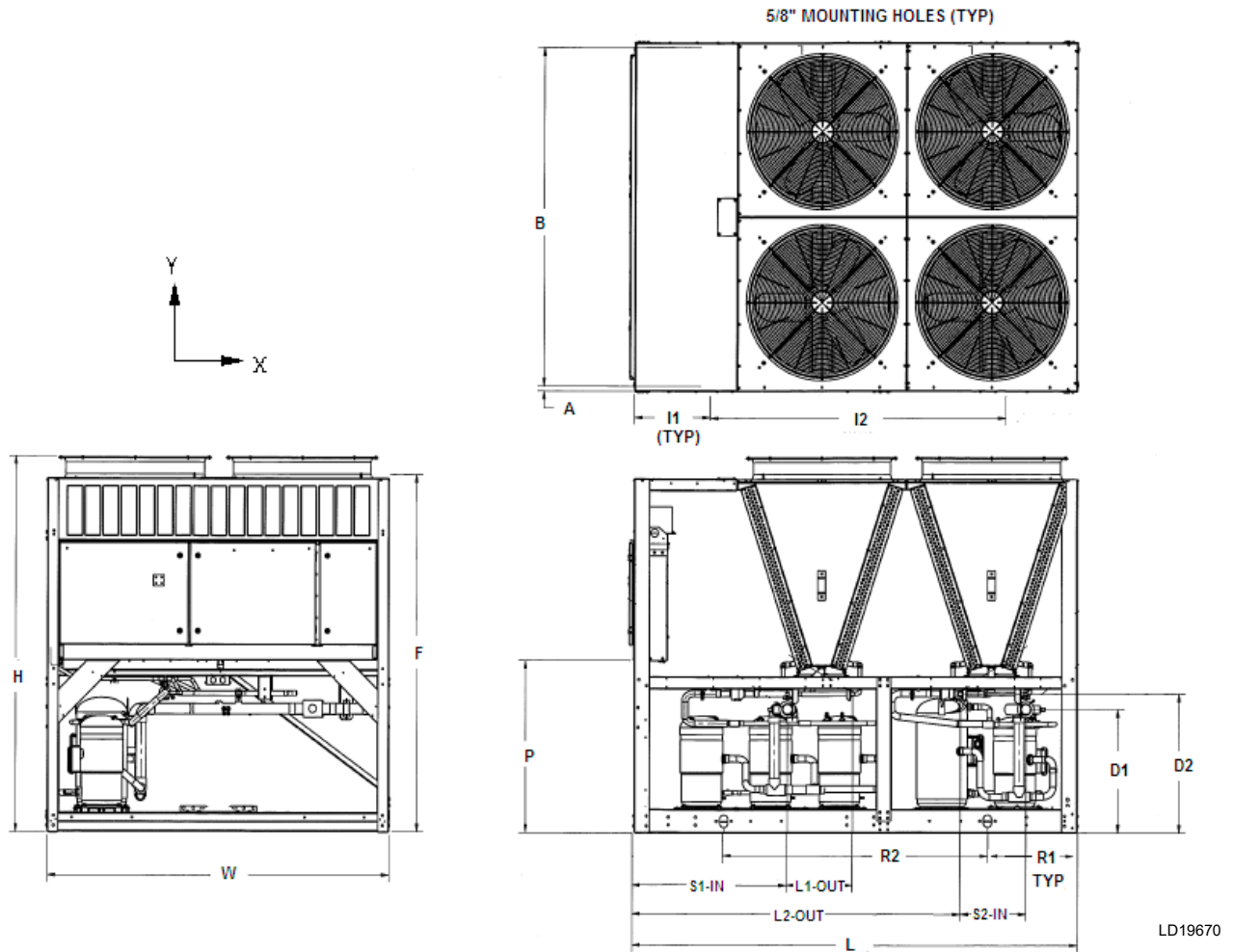
## Physical data, continued

Table 5: Physical data, continued

Refrigerant R-454B	Standard efficiency units							
	080CZJ	085CZJ	090CZJ	100CYJ	110CYJ	130CZJ	145CZJ	160CZJ
<b>General unit data</b>								
Length	116.1	116.1	116.1	142.7	142.7	142.7	187.7	187.7
Width	88.0	88.0	88.0	88.0	88.0	88.0	88.0	88.0
Height	94.2	94.2	94.2	94.2	94.2	94.2	94.2	94.2
<b>Refrigerant</b>								
Number of refrigerant circuits	2	2	2	2	2	2	2	2
Refrigerant charge circuit 1 (lb)	54	56	56	78	56	81	81	108
Refrigerant charge circuit 2 (lb)	49	49	51	73	98	76	76	96
Oil charge, circuit 1/circuit 2, gal	2.6 / 2.6	3.3 / 2.6	3.3 / 2.8	2.8 / 2.8	3.3/3.3	3.3/3.3	5.0 / 2.8	5.0 / 3.3
<b>Unit weights</b>								
Shipping weight (lb)	3,941	3,941	3,941	4,747	4,838	4,929	6,172	6,263
<b>Compressors, scroll type</b>								
Compressors per circuit	3/3	3/3	3/2	2/2	3/2	2/2	3/2	3/2
Compressors per unit	6	6	5	4	5	4	5	5
<b>Nominal tons per compressor</b>								
Circuit 1	13	15	15	15/32	15	32	32	32
Circuit 2	13	13	15/32	15/32	32	32	15/32	32
<b>Condenser</b>								
Total face area ft <sup>2</sup>	106.9	106.9	106.9	160.3	160.3	160.3	213.8	213.8
Number of rows	3	3	3	3	3	3	3	3
Fins per in.	17	17	17	17	17	17	17	17
<b>Condenser fans, low sound</b>								
Number of fans, circuit 1/circuit 2	2/2	2/2	2/2	3/3	2/4	3/3	4/4	4/4
Fan HP	2	2	2	2	2	2	2	2
Fan rpm	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160
Total chiller, cfm	62,400	62,400	62,400	93,600	93,600	93,600	124,800	124,800

## Dimension drawings

**Figure 2:** Dimensions 080CZx, 085CZx, and 090CZx



**Table 6:** Dimension data, 080CZx, 085CZx, and 090CZx

Model	Length	Width	Height	F	P	Connection sizes (OD)		System 1 dimensions		System 2 dimensions	
	L	W	H			Suction in 1/2	Liquid out 1/2	Suction in	Liquid out	Suction in	Liquid out
<b>080CZx</b>	116.1	88.3	95.3	89.7	43.9	2-5/8	1-1/8	39.6	17.0	17.0	84.4
<b>085CZx</b>	116.1	88.3	95.3	89.7	43.9	2-5/8	1-1/8	39.6	17.0	17.0	84.4
<b>090CZx</b>	116.1	88.3	95.3	89.7	43.9	2-5/8	1-1/8	39.6	17.0	17.0	84.4

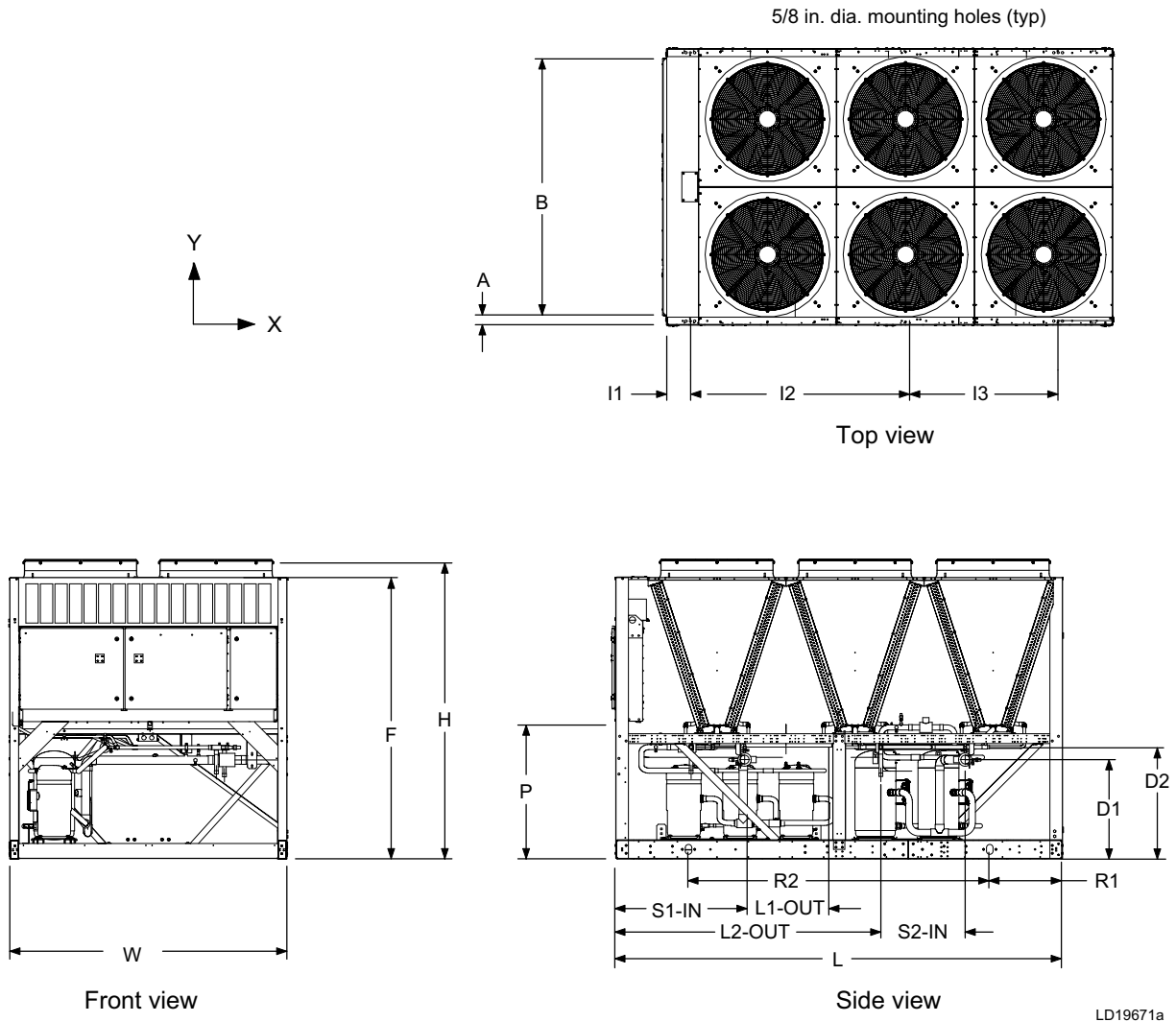
**Table 7:** Isolator data, 080CZx, 085CZx, and 090CZx

Model	D1	D2	Isolator location dimensions		A	B	Rigging hole locations			
			I1	I2			R1	R2	R3	R4
<b>080CZx</b>	31.6	35.5	19.5	76.6	1.3	85.5	23.2	68.3	—	—
<b>085CZx</b>	31.6	35.5	19.5	76.6	1.3	85.5	23.2	68.3	—	—
<b>090CZx</b>	31.6	35.5	18.5	76.6	1.3	85.5	23.2	68.3	—	—

**Note:** All dimensions are inches unless otherwise specified.

## Dimension drawings, continued

**Figure 3:** Dimensions 0098Zx, 0108Zx, and 130CZx



**Table 8:** Dimension data, 100CYx, 110CYx, and 130CZx

Model	Length	Width	Height	F	P	Connection sizes (OD)		System 1 dimensions		System 2 dimensions	
	L	W	H								
<b>100CYx</b>	142.0	88.3	95.3	89.7	43.9	2-5/8	1-1/8	41.0	26.9	26.9	84.4
<b>110CYx</b>	143.5	88.3	95.3	89.7	43.9	2-5/8	1-1/8	41.0	-17.1	26.9	84.4
<b>130CZx</b>	143.5	88.3	95.3	89.7	43.9	2-5/8	1-1/8	41.0	26.9	26.9	84.4

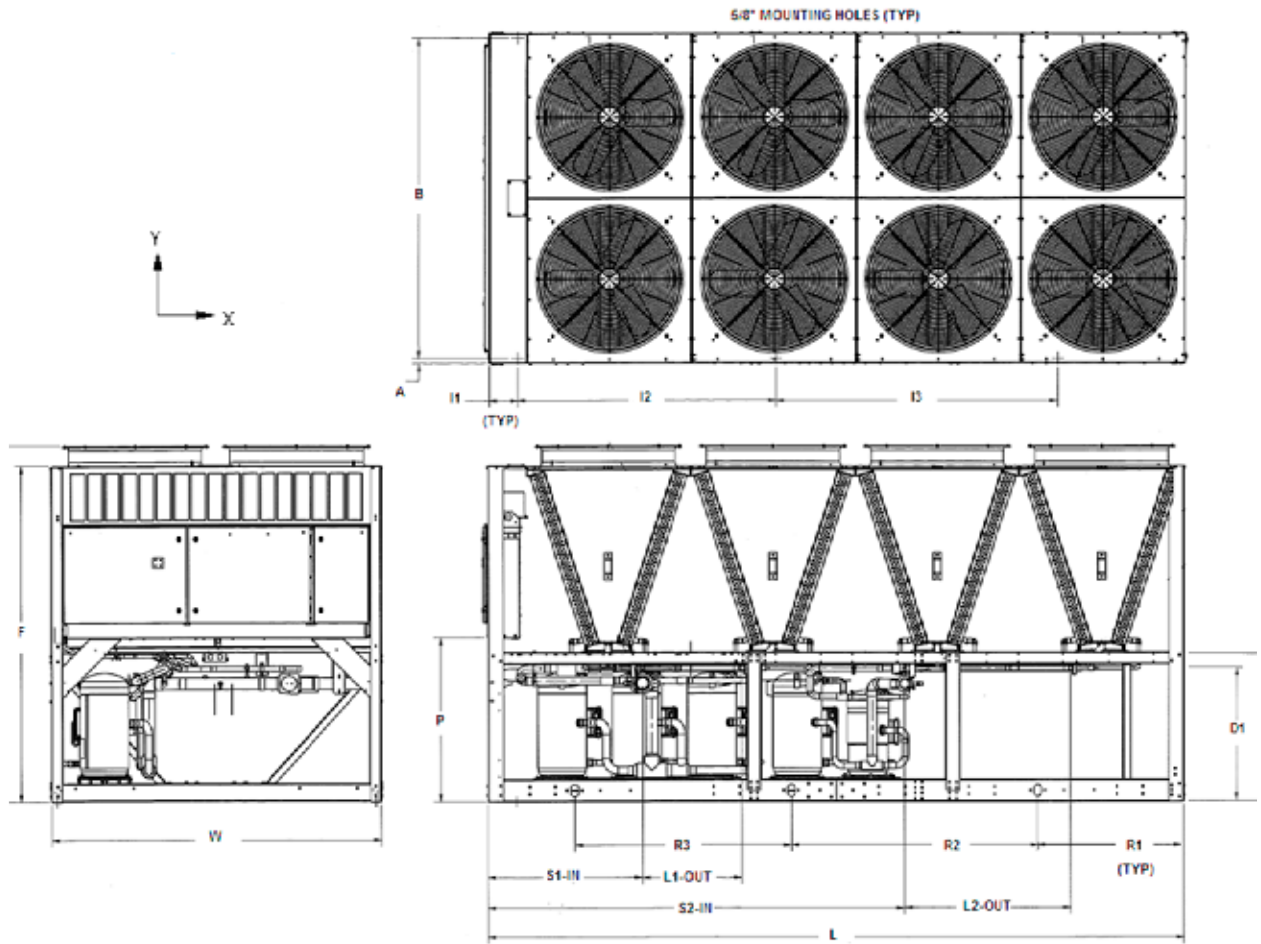
**Table 9:** Isolator data, 100CYx, 110CYx, and 130CZx

Model	D1	D2	Isolator location dimensions			A	B	Rigging hole locations			
			I1	I2	I3			R1	R2	R3	R4
<b>100CYx</b>	31.6	35.5	7.6	69.8	47.4	1.4	85.5	23.2	95.9	—	—
<b>110CYx</b>	31.6	35.5	7.6	69.8	47.4	1.4	85.5	23.2	95.9	—	—
<b>130CZx</b>	31.6	35.5	7.6	69.8	47.4	1.4	85.5	23.2	95.9	—	—

**Note:** All dimensions are inches unless otherwise specified.

## Dimension drawings, continued

**Figure 4:** Dimensions 145CZx and 160CZx



LD19672

**Table 10:** Dimension data, 145CZx and 160CZx

Model	Length	Width	Height	F	P	Connection sizes (OD)		System 1 dimensions		System 2 dimensions	
	L	W	H								
<b>145CZx</b>	187.5	88.3	95.3	89.7	43.9	3-1/8, 2-5/8	1-3/8, 1-1/8	41.4	26.5	111.3	44.7
<b>160CZx</b>	187.5	88.3	95.3	89.7	43.9	3-1/8, 2-5/8	1-3/8, 1-1/8	41.4	26.5	111.3	44.7

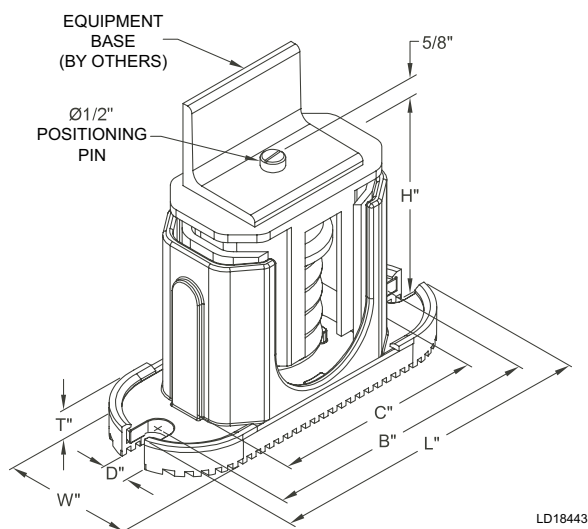
**Table 11:** Isolator data, 145CZx and 160CZx

Model	D1	D2	Isolator location dimensions			A	B	Rigging hole locations			
			I1	I2	I3			R1	R2	R3	R4
<b>145CZx</b>	31.6	35.5	7.6	69.0	80	1.4	85.5	39.0	66.0	58.0	—
<b>160CZx</b>	31.6	35.5	7.6	69.0	80	1.4	85.5	39.0	66.0	58.0	—

**Note:** All dimensions are inches unless otherwise specified.

# Isolators

**Figure 5:** 1 in. deflection spring isolator



LD18443

**Table 12:** 1 in. isolator dimensions, in.

Mount type	W	D	L	B	C	T	H
Type A	3	5/8	7 3/4	6 1/2	4 3/4	1/2	5 5/8
Type B	3	5/8	10 1/2	9 1/4	7 3/4	9/16	6

**Table 13:** 1 in. isolator weights and color

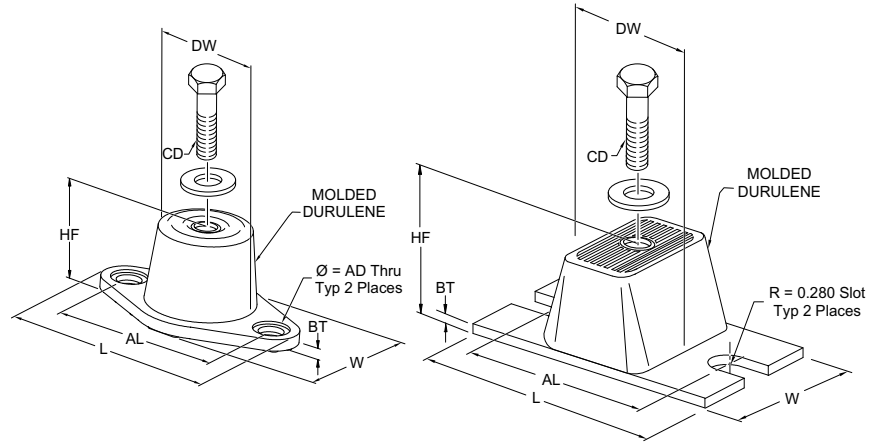
Type A part number	Color code	Rated capacity for units with all load points less than 1,785 lb (810 kg)	
		lb	kg
029-25334-002 (433668)	Black	Up to 434	Up to 197
029-25334-003 (433669)	Dark green	435 to 765	198 to 347
029-25334-004 (433670)	Gray	766 to 1,020	348 to 463
029-25334-005 (433871)	White	1,021 to 1,156	464 to 524
029-25334-006 (433872)	Gray/red	1,157 to 1,785	525 to 810

Type B part number	Color code	Rated capacity for units with any load point above 1,518 lb (689 kg)	
		lb	kg
029-25334-008 (433997)	Dark purple	Up to 1,148	Up to 521
029-25334-009 (433998)	Dark green	1,149 to 1,530	522 to 694
029-25334-010 (433999)	Gray	1,531 to 2,040	695 to 925
029-25334-012 (434000)	White	2,041 to 2,312	926 to 1,049
029-25334-013 (434001)	Gray/red	2,313 to 3,570	1,050 to 1,619

## Isolators, continued

**Figure 6:** Elastomeric isolator



LD17304

**Table 14:** Elastomeric isolator dimensions, in.

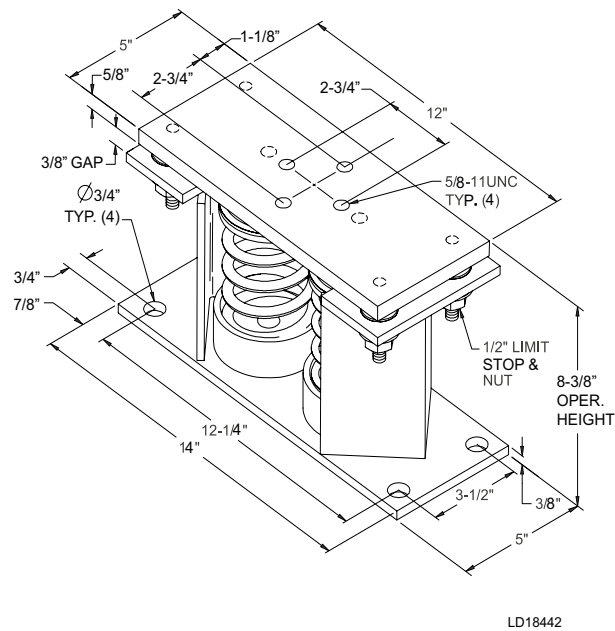
Model part number	Dimension data, in. (mm)							
	L	W	HF	AL	AD	BT	CD	DW
<b>Type A 029-25335-001</b> <b>(434002)</b>	5.50 (139.7)	3.38 (85.85)	2.88 (73.15)	4.13 (104.90)	0.56 (14.22)	0.25 (6.35)	1/2-13 UNC X 1 (M27 X 3)	2.50 (63.50)
<b>Type B 029-25335-002</b> <b>(434004)</b>	6.25 (158.75)	4.63 (117.6)	2.75 (69.85)	5.00 (127.00)	0.56 (14.22)	0.38 (9.65)	1/2-13 UNC X 1 (M27 X 3)	3.00 (76.20)
<b>Type B 029-25335-004</b> <b>(434005)</b>								

**Table 15:** Elastomeric isolator weights

Part number	Isolator color	Weight range	
		lb	kg
<b>029-25335-001</b> <b>(434002)</b>	Charcoal	Up to 825	Up to 374
<b>029-25335-002</b> <b>(434004)</b>	Brick red	826 to 1,688	375 to 766
<b>029-25335-004</b> <b>(434005)</b>	Charcoal	1,689 to 4,000	767 to 1,814

### ***Isolators, continued***

**Figure 7: 2 in. deflection spring isolator**



**Table 16: 2 in. deflection spring isolator weight and color**

* Weight range		Model part number	Color
lb	kg		
Up to 391	Up to 177	029-25336-006 (688690)	Green
392 to 604	178 to 274	029-25336-008 (688691)	Dark brown
605 to 740	275 to 336	029-25336-009 (688692)	Red
741 to 1,020	337 to 463	029-25336-010 (688693)	Red/black
1,021 to 1,437	464 to 652	029-25336-011 (688694)	Pink
1,438 to 2,244	653 to 1,018	029-25336-012 (688695)	Pink/gray
2,245 to 2,618	1,019 to 1,188	029-25336-013 (688697)	Pink/gray/orange
2,619 to 3,740	1,189 to 1,696	029-25336-014 (688698)	Pink/gray/dark brown

\* Value is de-rated by 15%

**Notes:**

1. All dimensions are in inches. Interpret in accordance with ANSI Y14.
2. Equipment must be bolted or welded to the top plate to meet allowable seismic ratings.
3. All springs are designed for 50% overload capacity with the exception of the 029-25336-013 and 029-25336-014.
4. Consult Quantech for concrete installation.



## Electrical data

Table 17: Electrical data, R-410A

Model	Volt	Hz	Minimum circuit amps	Minimum N/F DISC SW	Minimum dual element fuse and minimum CB	Maximum dual element fuse and maximum CB
<b>080CZE</b>	200	60	351	400	400	400
	230	60	350	400	400	400
	380	60	186	250	200	200
	460	60	160	200	175	175
	575	60	136	200	150	150
<b>085CZE</b>	200	60	366	600	400	400
	230	60	365	600	400	400
	380	60	216	250	225	250
	460	60	173	200	200	200
	575	60	148	200	175	175
<b>090CZE</b>	200	60	391	600	450	500
	230	60	390	600	450	450
	380	60	249	400	300	300
	460	60	192	250	225	225
	575	60	168	200	200	200
<b>100CZE</b>	200	60	404	600	450	500
	230	60	403	600	450	500
	380	60	255	400	300	300
	460	60	200	250	225	250
	575	60	176	200	200	225
<b>110CZE</b>	200	60	460	600	500	500
	230	60	458	600	500	500
	380	60	291	400	350	350
	460	60	227	250	250	250
	575	60	200	250	225	225
<b>130CZE</b>	200	60	511	600	600	600
	230	60	510	600	600	600
	380	60	321	400	350	350
	460	60	256	400	300	300
	575	60	227	250	250	250
<b>145CZE</b>	200	60	582	800	700	700
	230	60	581	800	700	700
	380	60	366	600	400	400
	460	60	291	400	350	350
	575	60	257	400	300	300
<b>160CZE</b>	200	60	636	800	700	700
	230	60	635	800	700	700
	380	60	399	600	450	450
	460	60	318	400	350	350
	575	60	283	400	300	300

## Electrical data, continued

Table 17: Electrical data, R-410A, continued

Model	System 1									System 2								
	Compr. 1		Compr. 2		Compr. 3		Cond. fans			Compr. 1		Compr. 2		Compr. 3		Cond. fans		
	RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA	LRA
080CZE	51.3	300	51.3	300	51.3	300	2	7.6	30.9	51.3	300	51.3	300	51.3	300	2	7.6	30.9
	51.3	300	51.3	300	51.3	300	2	7.4	37.0	51.3	300	51.3	300	51.3	300	2	7.4	37.0
	26.9	139	26.9	139	26.9	139	2	4.5	22.3	26.9	139	26.9	139	26.9	139	2	4.5	22.3
	23.1	150	23.1	150	23.1	150	2	4.0	19.0	23.1	150	23.1	150	23.1	150	2	4.0	19.0
	19.9	109	19.9	109	19.9	109	2	2.9	14.6	19.9	109	19.9	109	19.9	109	2	2.9	14.6
085CZE	55.8	425	55.8	425	55.8	425	2	7.6	30.9	51.3	300	51.3	300	51.3	300	2	7.6	30.9
	55.8	425	55.8	425	55.8	425	2	7.4	37.0	51.3	300	51.3	300	51.3	300	2	7.4	37.0
	36.0	239	36.0	239	36.0	239	2	4.5	22.3	26.9	139	26.9	139	26.9	139	2	4.5	22.3
	26.9	187	26.9	187	26.9	187	2	4.0	19.0	23.1	150	23.1	150	23.1	150	2	4.0	19.0
	23.7	148	23.7	148	23.7	148	2	2.9	14.6	19.9	109	19.9	109	19.9	109	2	2.9	14.6
090CZE	55.8	425	55.8	425	55.8	425	2	7.6	30.9	109.6	599	55.8	425	—	—	2	7.6	30.9
	55.8	425	55.8	425	55.8	425	2	7.4	37.0	109.6	599	55.8	425	—	—	2	7.4	37.0
	36.0	239	36.0	239	36.0	239	2	4.5	22.3	69.2	358	36.0	239	—	—	2	4.5	22.3
	26.9	187	26.9	187	26.9	187	2	4.0	19.0	54.5	310	26.9	187	—	—	2	4.0	19.0
	23.7	148	23.7	148	23.7	148	2	2.9	14.6	49.4	239	23.7	148	—	—	2	2.9	14.6
100CZE	109.6	599	55.8	425	—	—	3	7.6	30.9	109.6	599	55.8	425	—	—	3	7.6	30.9
	109.6	599	55.8	425	—	—	3	7.4	37.0	109.6	599	55.8	425	—	—	3	7.4	37.0
	69.2	358	36.0	239	—	—	3	4.5	22.3	69.2	358	36.0	239	—	—	3	4.5	22.3
	54.5	310	26.9	187	—	—	3	4.0	19.0	54.5	310	26.9	187	—	—	3	4.0	19.0
	49.4	239	23.7	148	—	—	3	2.9	14.6	49.4	239	23.7	148	—	—	3	2.9	14.6
110CZE	55.8	425	55.8	425	55.8	425	2	7.6	30.9	109.6	599	109.6	599	—	—	4	7.6	30.9
	55.8	425	55.8	425	55.8	425	2	7.4	37.0	109.6	599	109.6	599	—	—	4	7.4	37.0
	36.0	239	36.0	239	36.0	239	2	4.5	22.3	69.2	358	69.2	358	—	—	4	4.5	22.3
	26.9	187	26.9	187	26.9	187	2	4.0	19.0	54.5	310	54.5	310	—	—	4	4.0	19.0
	23.7	148	23.7	148	23.7	148	2	2.9	14.6	49.4	239	49.4	239	—	—	4	2.9	14.6
130CZE	109.6	599	109.6	599	—	—	3	7.6	30.9	109.6	599	109.6	599	—	—	3	7.6	30.9
	109.6	599	109.6	599	—	—	3	7.4	37.0	109.6	599	109.6	599	—	—	3	7.4	37.0
	69.2	358	69.2	358	—	—	3	4.5	22.3	69.2	358	69.2	358	—	—	3	4.5	22.3
	54.5	310	54.5	310	—	—	3	4.0	19.0	54.5	310	54.5	310	—	—	3	4.0	19.0
	49.4	239	49.4	239	—	—	3	2.9	14.6	49.4	239	49.4	239	—	—	3	2.9	14.6
145CZE	109.6	599	109.6	599	109.6	599	4	7.6	30.9	109.6	599	55.8	425	—	—	4	7.6	30.9
	109.6	599	109.6	599	109.6	599	4	7.4	37.0	109.6	599	55.8	425	—	—	4	7.4	37.0
	69.2	358	69.2	358	69.2	358	4	4.5	22.3	69.2	358	36.0	239	—	—	4	4.5	22.3
	54.5	310	54.5	310	54.5	310	4	4.0	19.0	54.5	310	26.9	187	—	—	4	4.0	19.0
	49.4	239	49.4	239	49.4	239	4	2.9	14.6	49.4	239	23.7	148	—	—	4	2.9	14.6
160CZE	109.6	599	109.6	599	109.6	599	4	7.6	30.9	109.6	599	109.6	599	—	—	4	7.6	30.9
	109.6	599	109.6	599	109.6	599	4	7.4	37.0	109.6	599	109.6	599	—	—	4	7.4	37.0
	69.2	358	69.2	358	69.2	358	4	4.5	22.3	69.2	358	69.2	358	—	—	4	4.5	22.3
	54.5	310	54.5	310	54.5	310	4	4.0	19.0	54.5	310	54.5	310	—	—	4	4.0	19.0
	49.4	239	49.4	239	49.4	239	4	2.9	14.6	49.4	239	49.4	239	—	—	4	2.9	14.6

## Electrical data, continued

Table 18: Wiring lugs, R-410A

Model	Volt	Hz	MCA	Minimum required wire gauge, 75°C, CU	MCA	Minimum required wire gauge 75°C, CU	Terminal block lugs	Non-fused disconnect switch lugs	Circuit breaker lugs
<b>080CZE</b>	200	60	351	500 MCM	428	(2) 4/0 AWG	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	230	60	350	500 MCM	427	(2) 4/0 AWG	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	380	60	186	3/0 AWG	227	4/0 AWG	(1) #4 - 500 kcmil	(1) #6 - 350 kcmil	(1) #6 - 350 kcmil
	460	60	160	2/0 AWG	196	3/0 AWG	(1) #4 - 500 kcmil	(1) #6 - 350 kcmil	(1) #6 - 350 kcmil
	575	60	136	1/0 AWG	166	2/0 AWG	(1) #4 - 500 kcmil	(1) #6 - 350 kcmil	(1) #6 - 350 kcmil
<b>085CZE</b>	200	60	366	500 MCM	446	(2) 4/0 AWG	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	230	60	365	500 MCM	445	(2) 4/0 AWG	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	380	60	216	4/0 AWG	263	300 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0-250 kcmil	250 - 500 kcmil, (2)3/0- 250 kcmil
	460	60	173	2/0 AWG	211	4/0 AWG	(1) #4 - 500 kcmil	(1) #6 - 350 kcmil	(1) #6 - 350 kcmil
	575	60	148	1/0 AWG	181	3/0 AWG	(1) #4 - 500 kcmil	(1) #6 - 350 kcmil	(1) #6 - 350 kcmil
<b>090CZE</b>	200	60	391	600 MCM	476	(2) 250 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	230	60	390	600 MCM	475	(2) 250 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	380	60	249	250 MCM	303	350 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 -250 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil
	460	60	192	3/0 AWG	234	250 MCM	(1) #4 - 500 kcmil	(1) #6 - 350 kcmil	(1) #6 - 350 kcmil
	575	60	168	2/0 AWG	205	4/0 AWG	(1) #4 - 500 kcmil	(1) #6 - 350 kcmil	(1) #6 - 350 kcmil
<b>100CZE</b>	200	60	404	(2) 4/0 AWG	492	(2) 250 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	230	60	403	(2) 4/0 AWG	491	(2) 250 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	380	60	255	250 MCM	311	400 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 -250 kcmil	250 - 500 kcmil, (2)3/0- 250 kcmil
	460	60	200	4/0 AWG	244	250 MCM	(1) #4 - 500 kcmil	(1) #6 - 350 kcmil	(1) #6 - 350 kcmil
	575	60	176	3/0 AWG	215	4/0 AWG	(1) #4 - 500 kcmil	(1) #6 - 350 kcmil	(1) #6 - 350 kcmil

## Electrical data, continued

Table 18: Wiring lug, R-410A, continued

Model	Volt	Hz	MCA	Minimum required wire gauge, 75°C, CU	MCA	Minimum required wire gauge 75°C, CU	Terminal block lugs	Non-fused disconnect switch lugs	Circuit breaker lugs
<b>110CZE</b>	200	60	460	(2) 4/0 AWG	560	(2) 300 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	230	60	458	(2) 4/0 AWG	559	(2) 300 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	380	60	291	350 MCM	355	500 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil
	460	60	227	4/0 AWG	277	300 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil
	575	60	200	3/0 AWG	243	250 MCM	(1) #4 - 500 kcmil	(1) #6 - 350 kcmil	(1) #6 - 350 kcmil
<b>130CZE</b>	200	60	511	(2) 300 MCM	624	(2) 350 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	230	60	510	(2) 300 MCM	622	(2) 350 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	380	60	321	400 MCM	392	600 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil
	460	60	256	300 MCM	312	400 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil
	575	60	227	4/0 AWG	277	300 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil
<b>145CZE</b>	200	60	582	(2) 300 MCM	710	(3) 300 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	230	60	581	(2) 300 MCM	708	(3) 300 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	380	60	366	500 MCM	446	(2) 4/0 AWG	(1) #4 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0-400 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil
	460	60	291	350 MCM	354	500 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil
	575	60	257	300 MCM	313	400 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil
<b>160CZE</b>	200	60	636	(2) 400 MCM	776	(3) 300 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	230	60	635	(2) 400 MCM	774	(3) 300 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil	(2)250 - 500 kcmil, (3)2/0 - 400 kcmil
	380	60	399	600 MCM	487	(2) 250 MCM	(2) #6 - 500 kcmil	(2)250 - 500 kcmil, (3)2/0-400 kcmil	(2)250 - 500 kcmil, (3)2/0-400 kcmil
	460	60	318	400 MCM	388	600 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 -250 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil
	575	60	283	300 MCM	345	500 MCM	(1) #4 - 500 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil	250 - 500 kcmil, (2)3/0 - 250 kcmil

## Electrical data, continued

**Table 19:** Electrical data, R-454B

Model	Volt	Hz	Minimum circuit amps	Minimum N/F DISC SW	Minimum dual element fuse and minimum CB	Maximum dual element fuse and maximum CB
<b>080CZJ</b>	200	60	334	-	-	350
	230	60	333	-	-	350
	380	60	191	-	-	200
	460	60	169	-	-	175
	575	60	120	-	-	125
<b>085CZJ</b>	200	60	363	-	-	400
	230	60	363	-	-	400
	380	60	201	-	-	225
	460	60	177	-	-	200
	575	60	134	-	-	150
<b>090CZJ</b>	200	60	391	-	-	400
	230	60	390	-	-	400
	380	60	211	-	-	225
	460	60	184	-	-	200
	575	60	146	-	-	150
<b>100CYJ</b>	200	60	406	-	-	450
	230	60	405	-	-	450
	380	60	220	-	-	250
	460	60	192	-	-	200
	575	60	152	-	-	150
<b>110CYJ</b>	200	60	446	-	-	500
	230	60	444	-	-	500
	380	60	256	-	-	250
	460	60	218	-	-	225
	575	60	172	-	-	175
<b>130CZJ</b>	200	60	497	-	-	600
	230	60	496	-	-	600
	380	60	300	-	-	350
	460	60	250	-	-	300
	575	60	198	-	-	225
<b>145CZJ</b>	200	60	579	-	-	600
	230	60	577	-	-	600
	380	60	338	-	-	400
	460	60	285	-	-	300
	575	60	226	-	-	250
<b>160CZJ</b>	200	60	618	-	-	700
	230	60	617	-	-	700
	380	60	374	-	-	400
	460	60	311	-	-	350
	575	60	246	-	-	250

# Electrical data, continued

Table 19: Electrical data, R-454B, continued

Model	System 1									System 2								
	Compr. 1		Compr. 2		Compr. 3		Cond. fans			Compr. 1		Compr. 2		Compr. 3		Cond. fans		
	RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	QTY	FLA	LRA
080CZJ	48.5	257	48.5	257	48.5	257	2	7.6	44	48.5	257	48.5	257	48.5	257	2	7.6	44
	48.5	288	48.5	288	48.5	288	2	7.4	37	48.5	288	48.5	288	48.5	288	2	7.4	37
	27.6	172	27.6	172	27.6	172	2	4.5	23.1	27.6	172	27.6	172	27.6	172	2	4.5	23.1
	24.4	145	24.4	145	24.4	145	2	4	19	24.4	145	24.4	145	24.4	145	2	4	19
	17.4	114	17.4	114	17.4	114	2	2.9	15.3	17.4	114	17.4	114	17.4	114	2	2.9	15.3
085CZJ	57.7	284	57.7	284	57.7	284	2	7.6	44	48.5	257	48.5	257	48.5	257	2	7.6	44
	57.7	330	57.7	330	57.7	330	2	7.4	37	48.5	288	48.5	288	48.5	288	2	7.4	37
	30.9	192	30.9	192	30.9	192	2	4.5	23.1	27.6	172	27.6	172	27.6	172	2	4.5	23.1
	26.9	180	26.9	180	26.9	180	2	4	19	24.4	145	24.4	145	24.4	145	2	4	19
	21.5	132	21.5	132	21.5	132	2	2.9	15.3	17.4	114	17.4	114	17.4	114	2	2.9	15.3
090CZJ	57.7	284	57.7	284	57.7	284	2	7.6	44	57.7	284	57.7	284	57.7	284	2	7.6	44
	57.7	330	57.7	330	57.7	330	2	7.4	37	57.7	330	57.7	330	57.7	330	2	7.4	37
	30.9	192	30.9	192	30.9	192	2	4.5	23.1	30.9	192	30.9	192	30.9	192	2	4.5	23.1
	26.9	180	26.9	180	26.9	180	2	4	19	26.9	180	26.9	180	26.9	180	2	4	19
	21.5	132	21.5	132	21.5	132	2	2.9	15.3	21.5	132	21.5	132	21.5	132	2	2.9	15.3
100CYJ	57.7	284	57.7	284	57.7	284	3	7.6	44	57.7	284	57.7	284	57.7	284	3	7.6	44
	57.7	330	57.7	330	57.7	330	3	7.4	37	57.7	330	57.7	330	57.7	330	3	7.4	37
	30.9	192	30.9	192	30.9	192	3	4.5	23.1	30.9	192	30.9	192	30.9	192	3	4.5	23.1
	26.9	180	26.9	180	26.9	180	3	4	19	26.9	180	26.9	180	26.9	180	3	4	19
	21.5	132	21.5	132	21.5	132	3	2.9	15.3	21.5	132	21.5	132	21.5	132	3	2.9	15.3
110CYJ	57.7	284	57.7	284	57.7	284	2	7.6	44	106.2	652	106.2	652	—	—	4	7.6	44
	57.7	330	57.7	330	57.7	330	2	7.4	37	106.2	652	106.2	652	—	—	4	7.4	37
	30.9	192	30.9	192	30.9	192	2	4.5	23.1	64.3	355	64.3	355	—	—	4	4.5	23.1
	26.9	180	26.9	180	26.9	180	2	4	19	53.1	316	53.1	316	—	—	4	4	19
	21.5	132	21.5	132	21.5	132	2	2.9	15.3	42.5	255	42.5	255	—	—	4	2.9	15.3
130CZJ	106.2	652	106.2	652	—	—	3	7.6	44	106.2	652	106.2	652	—	—	3	7.6	44
	106.2	652	106.2	652	—	—	3	7.4	37	106.2	652	106.2	652	—	—	3	7.4	37
	64.3	355	64.3	355	—	—	3	4.5	23.1	64.3	355	64.3	355	—	—	3	4.5	23.1
	53.1	316	53.1	316	—	—	3	4	19	53.1	316	53.1	316	—	—	3	4	19
	42.5	255	42.5	255	—	—	3	2.9	15.3	42.5	255	42.5	255	—	—	3	2.9	15.3
145CZJ	106.2	652	106.2	652	106.2	652	4	7.6	44	57.7	284	57.7	284	57.7	284	4	7.6	44
	106.2	652	106.2	652	106.2	652	4	7.4	37	57.7	330	57.7	330	57.7	330	4	7.4	37
	64.3	355	64.3	355	64.3	355	4	4.5	23.1	30.9	192	30.9	192	30.9	192	4	4.5	23.1
	53.1	316	53.1	316	53.1	316	4	4	19	26.9	180	26.9	180	26.9	180	4	4	19
	42.5	255	42.5	255	42.5	255	4	2.9	15.3	21.5	132	21.5	132	21.5	132	4	2.9	15.3
160CZJ	106.2	652	106.2	652	106.2	652	4	7.6	44	106.2	652	106.2	652	—	—	4	7.6	44
	106.2	652	106.2	652	106.2	652	4	7.4	37	106.2	652	106.2	652	—	—	4	7.4	37
	64.3	355	64.3	355	64.3	355	4	4.5	23.1	64.3	355	64.3	355	—	—	4	4.5	23.1
	53.1	316	53.1	316	53.1	316	4	4	19	53.1	316	53.1	316	—	—	4	4	19
	42.5	255	42.5	255	42.5	255	4	2.9	15.3	42.5	255	42.5	255	—	—	4	2.9	15.3

## Electrical data, continued

Table 20: Wiring lugs, R-454B

Model	Global market		Single point supply terminal block	Molded case switch single point supply		Molded case circuit breaker single point supply	
	Volt	Hz	Installed lug	Installed lug	Alternate lug	Installed lug	Alternate lug
080CZJ	208	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 3/0 - 250	(1) 250 - 500
	230	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 3/0 - 250	(1) 250 - 500
	380	60	(1) # 6 - 500	(1) 6 - 350	—	(1) 6 - 350	—
	460	60	(1) # 6 - 500	(1) 6 - 350	—	(1) 6 - 350	—
	575	60	(1) # 6 - 500	(1) 6 - 350	—	(1) 6 - 350	—
085CZJ	208	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 3/0 - 250	(1) 250 - 500
	230	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 3/0 - 250	(1) 250 - 500
	380	60	(1) # 6 - 500	(2) 3/0 - 250	(1) 250 - 500	(1) 6 - 350	—
	460	60	(1) # 6 - 500	(1) 6 - 350	—	(1) 6 - 350	—
	575	60	(1) # 6 - 500	(1) 6 - 350	—	(1) 6 - 350	—
090CZJ	208	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400
	230	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400
	380	60	(1) # 6 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500
	460	60	(1) # 6 - 500	(1) 250 - 500	(2) 3/0 - 250	(1) 6 - 350	—
	575	60	(1) # 6 - 500	(1) 6 - 350	—	(1) 6 - 350	—
100CYJ	208	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400
	230	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400
	380	60	(1) # 6 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500
	460	60	(1) # 6 - 500	(1) 250 - 500	(2) 3/0 - 250	(1) 6 - 350	—
	575	60	(1) # 6 - 500	(1) 6 - 350	—	(1) 6 - 350	—
110CYJ	208	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400
	230	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400
	380	60	(1) # 6 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500
	460	60	(1) # 6 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500
	575	60	(1) # 6 - 500	(1) 6 - 350	—	(1) 6 - 350	—
130CZJ	208	60	(2) # 6 - 500	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500
	230	60	(2) # 6 - 500	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500
	380	60	(1) # 6 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500
	400/460	60	(1) # 6 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500
	575	60	(1) # 6 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500
145CZJ	208	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400
	230	60	—	—	—	—	—
	380	60	(2) # 6 - 500	(3) 2/0 - 400	(2) 250 - 500	(2) 3/0 - 250	(1) 250 - 500
	400/460	60	(1) # 6 - 500	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250
	575	60	(1) # 6 - 500	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250
160CZJ	208	60	(3) 2/0 - 400	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500
	230	60	(3) 2/0 - 400	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500
	380	60	(2) # 6 - 500	(2) 250 - 500	(3) 2/0 - 400	(2) 250 - 500	(3) 2/0 - 400
	400/460	60	(2) # 6 - 500	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250
	575	60	(1) # 6 - 500	(2) 3/0 - 250	(1) 250 - 500	(2) 3/0 - 250	(1) 250 - 500

## Electrical notes

### Notes:

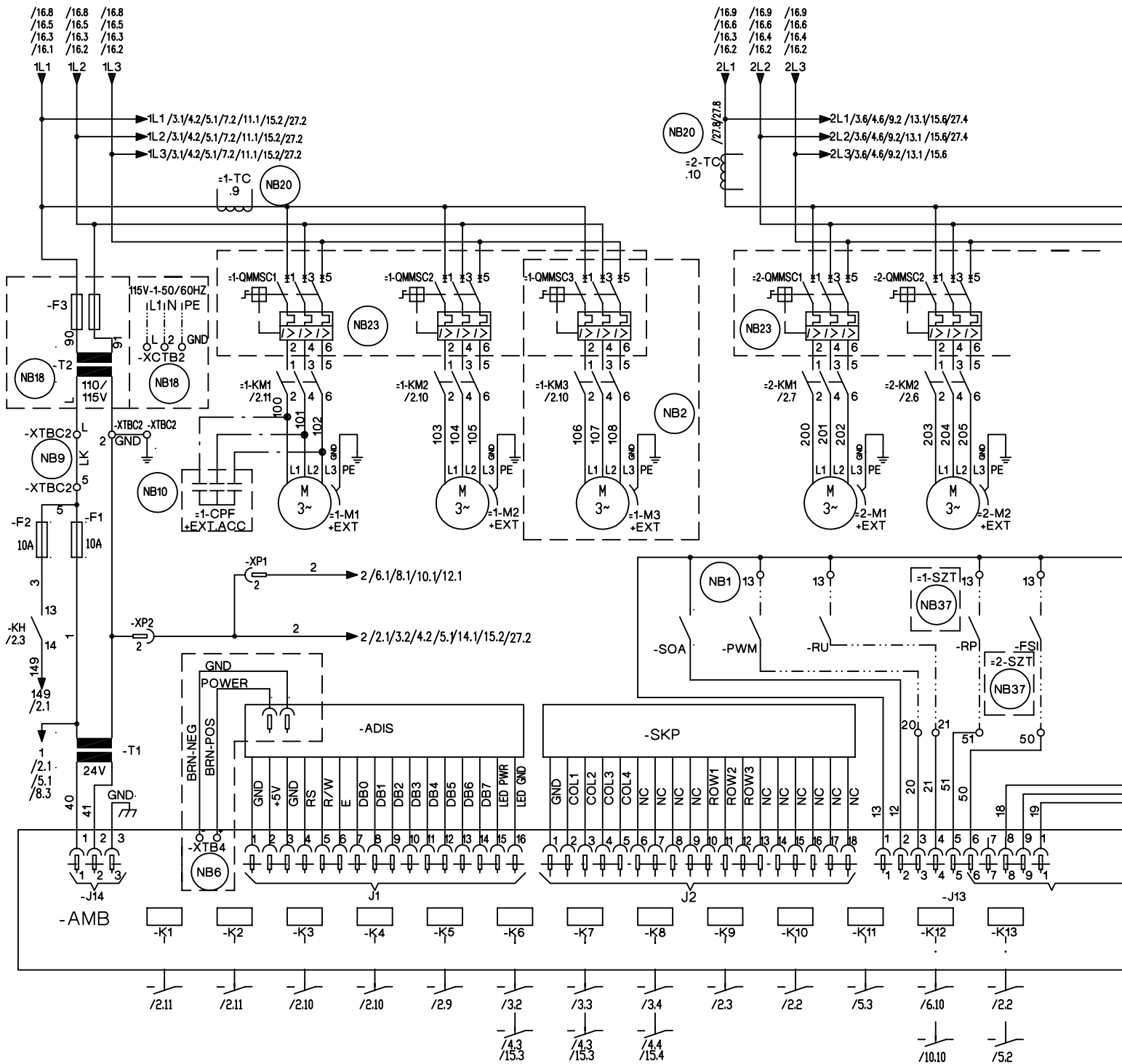
1. Minimum circuit ampacity (MCA) is based on 125% of the rated load amps for the largest motor plus 100% of the rated load amps for all other loads included in the circuit, per NEC Article 430-24. If the optional factory mounted control transformer is provided, add the following MCA values to the electrical tables for the system providing power to the transformer: -17, add 2.5 amps; -28, add 2.3 amps; -40, add 1.5 amps; -46, add 1.3 amps; -58, add 1 amps.
2. The minimum recommended disconnect switch is based on 115% of the rated load amps for all loads included in the circuit, per NEC Article 440.
3. The Minimum fuse size is based on 150% of the rated load amps for the largest motor plus 100% of the rated mload amps for all other loads included in the circuit to avoid nuisance trips at start-up due to lock rotor amps. It is not recommended in applications where brown outs, frequent starting and stopping of the unit, and/or operation at ambient temperatures in excess of 95°F (35°C) is anticipated.
4. The maximum fuse size is based on 225% of the rated load amps for the largest motor plus 100% of the rated load amps for all other loads included in the circuit, per NEC Article 440-22.
5. Circuit breakers must be UL listed and CSA certified. The maximum size is based on 225% of the rated load amps for the largest motor plus 100% of the rated load amps for all other loads included in the circuit. Otherwise, HACR-type circuit breakers must be used. The maximum HACR circuit breaker rating is based on 225% of the rated load amps for the largest motor plus 100% of the rated load amps for all other loads included in the circuit.
6. The incoming wire range is the minimum and maximum wire size that can be accommodated by the unit wiring lugs. The (2) preceding the wire range indicates the number of termination points available per phase of the wire range specified. Actual wire size and number of wires per phase must be determined based on the NEC, **using copper connectors only**. Field wiring must also comply with local codes.
7. A ground lug is provided for each compressor system to accommodate a field grounding conductor per NEC Table 250-95. A control circuit grounding lug is also supplied.
8. The supplied disconnect is a "disconnecting means" as defined in the NEC 100, and is intended for isolating the unit for the available power supply to perform maintenance and troubleshooting. This disconnect is not intended to be a Load Break Device.
9. Field wiring by others which complies to the NEC and local codes.

Legend	Description	Voltage code
ACR-LINE	ACROSS THE LINE START	-17 = 200-3-60
C.B.	CIRCUIT BREAKER	-28 = 230-3-60
D.E.	DUAL ELEMENT FUSE	-40 = 380-3-60
DISC SW	DISCONNECT SWITCH	-46 = 460-3-60
FACT MOUNT CB	FACTORY MOUNTED CIRCUIT BREAKER	-58 = 575-3-60
FLA	FULL LOAD AMPS	
HZ	HERTZ	
MAX	MAXIMUM	
MCA	MINIMUM CIRCUIT AMPACITY	
MIN	MINIMUM	
MIN NF	MINIMUM NON FUSED	
RLA	RATED LOAD AMPS	
S.P. WIRE	SINGLE POINT WIRING	
UNIT MTD SERV SW	UNIT MOUNTED SERVICE (NON-FUSED DISCONNECT SWITCH)	
LRA	LOCKED ROTOR AMPS	
NEC	NATIONAL ELECTRICAL CODE	



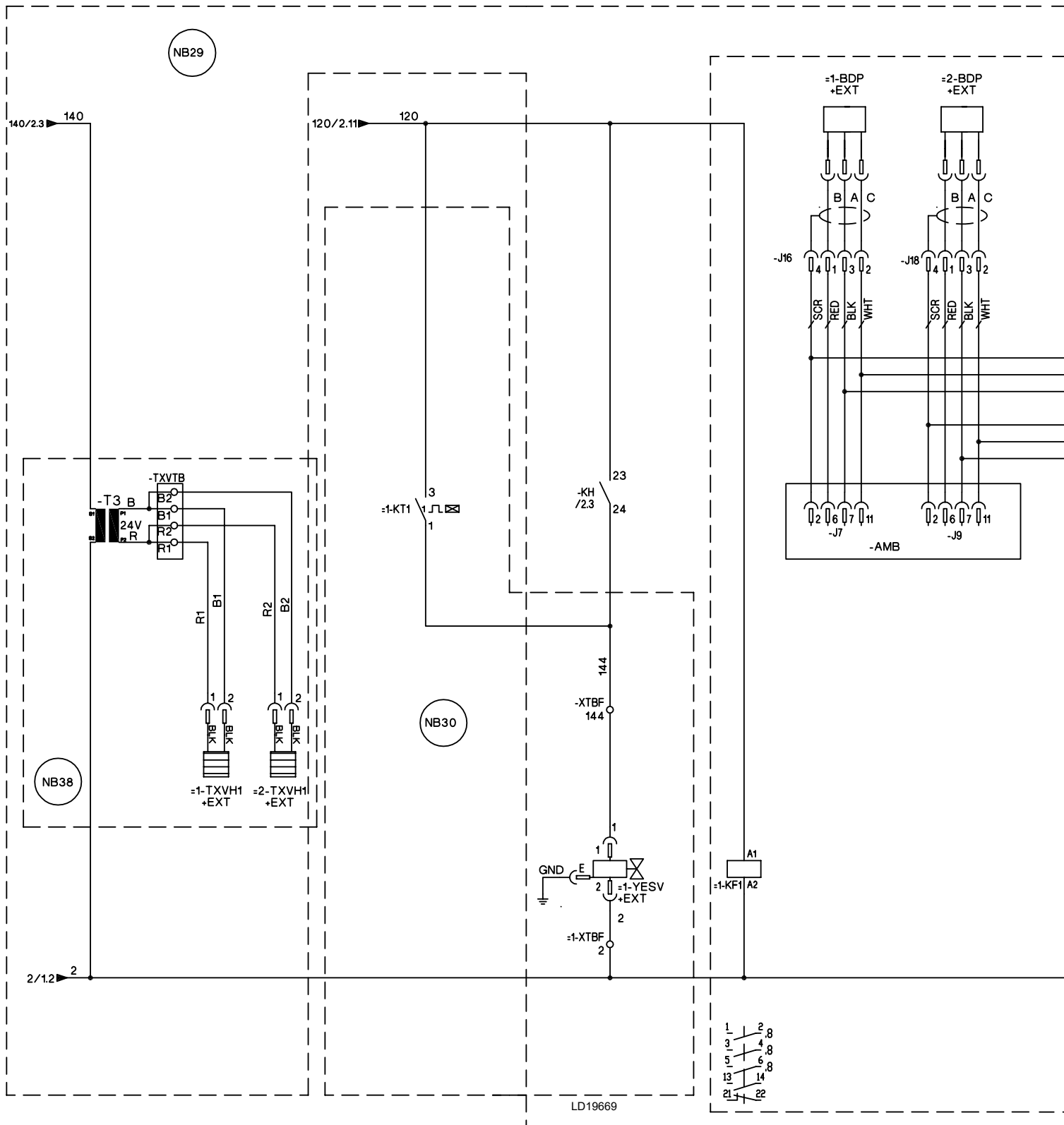
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# Electrical drawings





# Electrical drawings, continued



LD19669



# Electrical drawings, continued

-XP2				
1 1	2 2	3 118	4 119	5
6 121	7 122	8 127	9 128	10 129
11 131	12 25	13 26	14 29	15 30

-XP2				
11 131	12 25	13 26	14 29	15 30
6 121	7 122	8 127	9 128	10 129
1 1	2 2	3 118	4 119	5

-XP3				
1 218	2 219	3	4 221	5 222
6 227	7 228	8 229	9 231	10 27
11 28	12 31	13 32	14	15

-XP3				
11 28	12 31	13 32	14	15
6 227	7 228	8 229	9 231	10 27
1 218	2 219	3	4 221	5 222

-XP4	
3 19	4
1 13	2 18

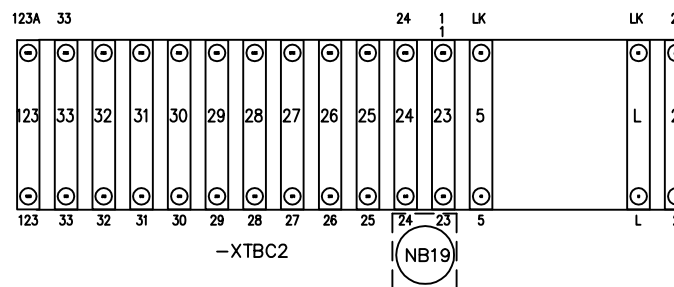
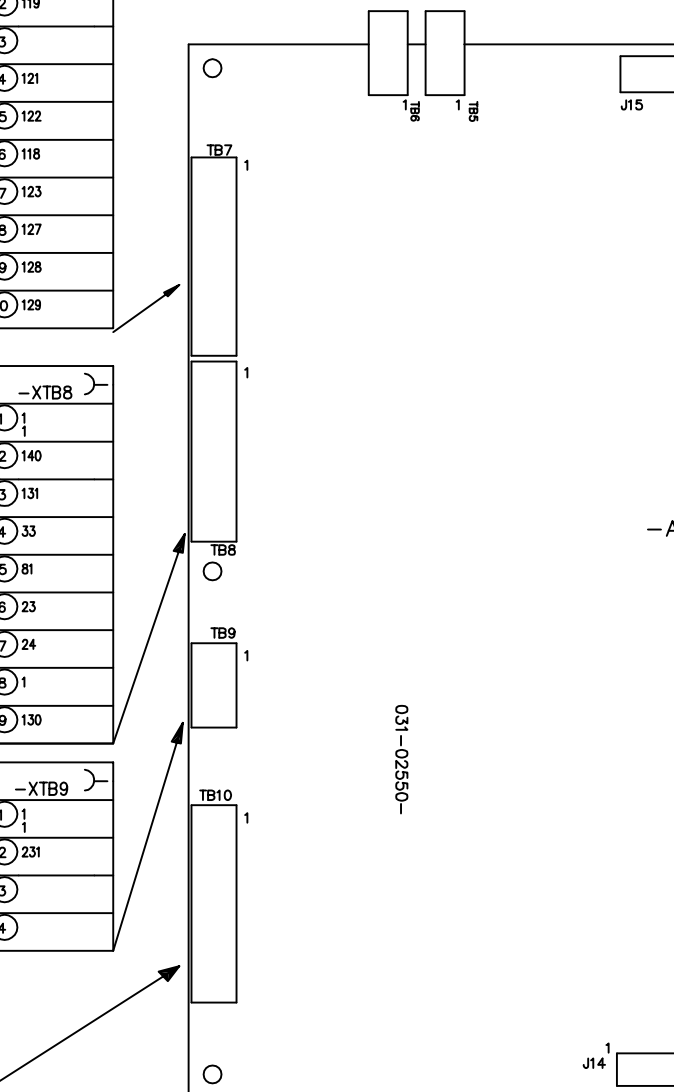
-XP4	
1 13	2 18
3 19	4

-XTB7	
1 118	118
2 119	
3	
4 121	
5 122	
6 118	
7 123	
8 127	
9 128	
10 129	

-XTB8	
1 1	1
2 140	
3 131	
4 33	
5 81	
6 23	
7 24	
8 1	
9 130	

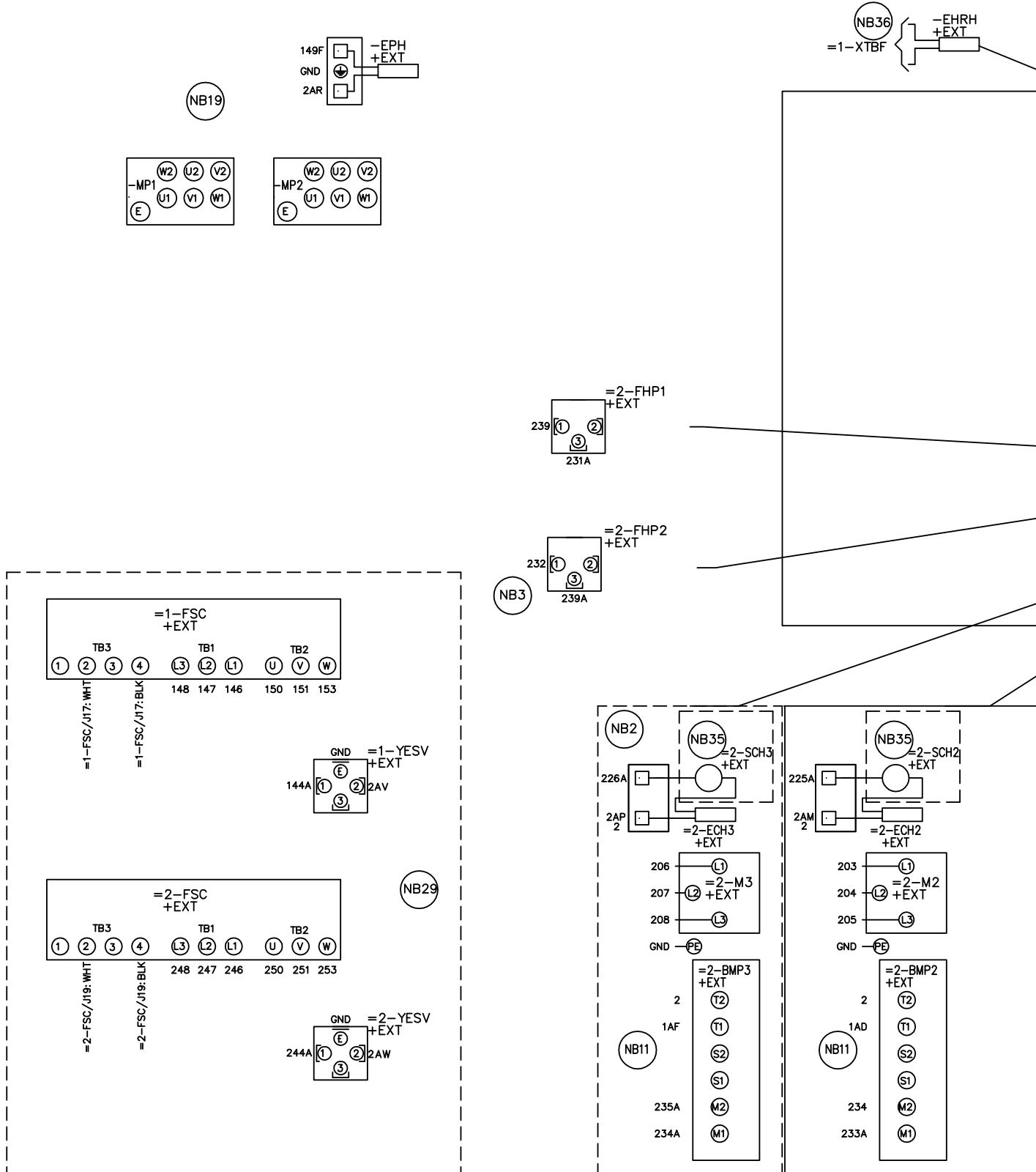
-XTB9	
1 1	1
2 231	
3	
4	

-XTB10	
1 218	218
2 219	
3	
4 221	
5 222	
6 218	
7	
8 227	
9 228	
10 229	





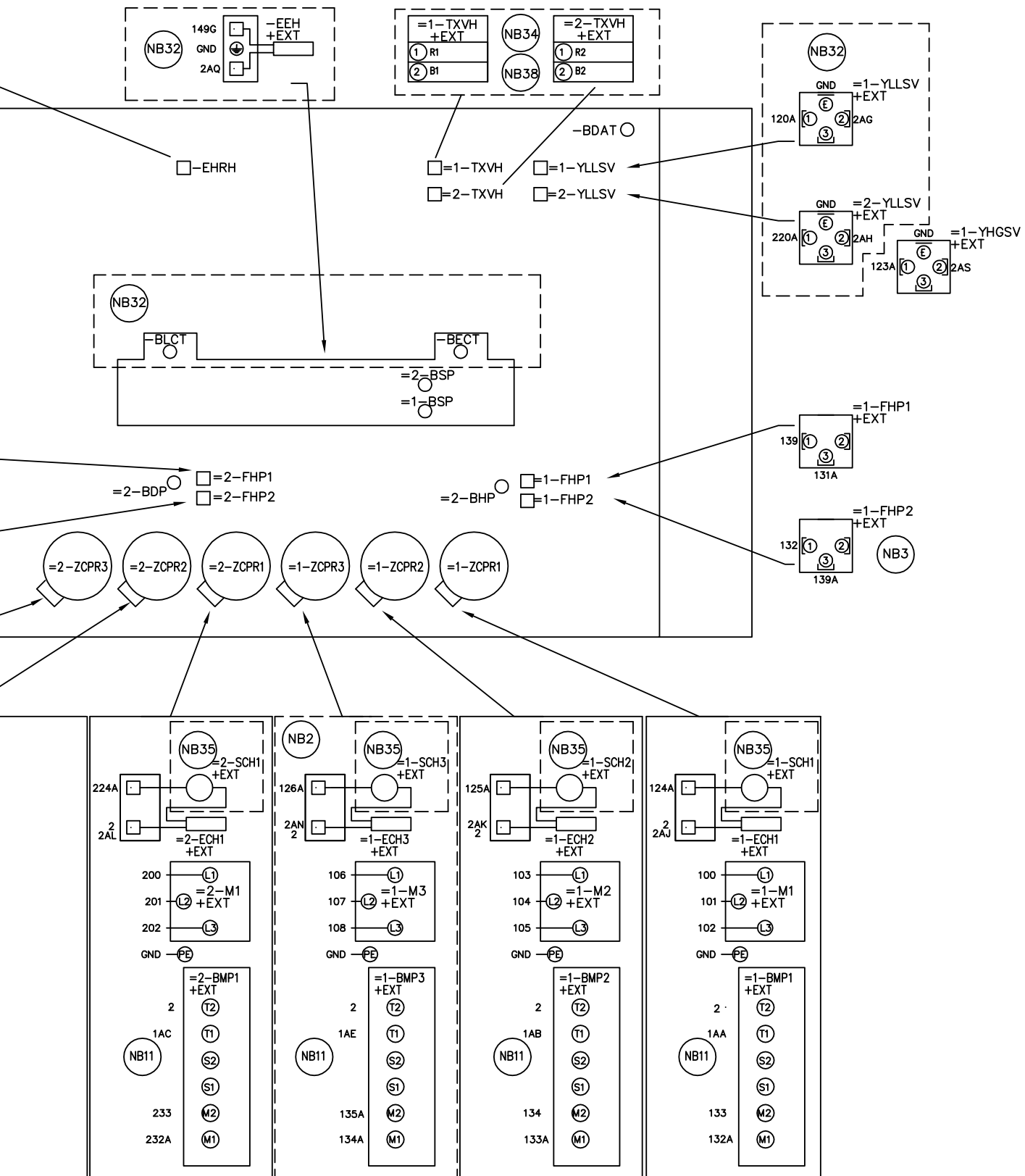
# Electrical drawings, continued



LD19677



### ***Electrical drawings, continued***



## Electrical drawings, continued

Designation	DESCRIPTION
ACC	ACCESSORY
- ADIS	DISPLAY BOARD
- AMB	MICRO BOARD

- BAMB	AMBIENT
- BDP	DISCHARGE PRESSURE
- BECT	ENTERING CHILLED TEMPERATURE
- BLCT	LEAVING CHILLED TEMPERATURE
	NOT FITTED ON REMOTE EVAP UNITS

- BMP	MOTOR PROTECTOR COMPRESSOR
- BSP	SUCTION PRESSURE

- CPF	CAPACITOR POWER FACTOR
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- ECH	CRANKCASE HEATER
- EEH	EVAPORATOR HEATER
- EPH	PUMP HEATER
- EXT	EXTERNAL TO CONTROL PANEL

- F	FUSE
- FHP	HIGH PRESSURE CUTOUT
- FSI	FAN SPEED INHIBIT TWO SPEED FAN OPTION ONLY

GND	GROUND
G/Y	GREEN / YELLOW

J	PLUG BOARD CONNECTOR
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-K	CIRCUIT BOARD RELAY
-KF	FAN CONTACTOR LINE
-KFH	FAN CONTACTOR HIGH SPEED (INCLUDING COIL SUPPRESSOR)
-KFL	FAN CONTACTOR LOW SPEED (INCLUDING COIL SUPPRESSOR)
-KFOL	FAN OVERLOAD
-KFS	RELAY FAN SPEED
-KM	COMPRESSOR CONTACTOR (INCLUDING COIL SUPPRESSOR)
-KCR	CONTROL RELAY
-KP	PUMP CONTACTOR PART (INCLUDING COIL SUPPRESSOR)

- M	COMPRESSOR MOTOR
-MF	MOTOR FAN
-MP	MOTOR PUMP

NU	NOT USED
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PE	PROTECTIVE EARTH
PWM	PULSE WIDTH MODULATION TEMP RESET or REMOTE UNLOAD 2nd STEP

Designation	DESCRIPTION
-QCB	CIRCUIT BREAKER
-QMSC	MANUAL MOTOR STARTER COMPRESSOR
-QMSP	MANUAL MOTOR STARTER PUMP
-QSD	SWITCH DISCONNECT

R	RESISTOR
RED	RED
RP	RUN PERMISSIVE
RU	REMOTE UNLOAD 1st STEP

SCR	SCREEN
- SF	FLOW SWITCH
- SKP	KEYPAD
- SOA	SWITCH OFF AUTO

- T	TRANSFORMER
-TC	TRANSFORMER CURRENT


-UBR	BRIDGE RECTIFIER
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WHT	WHITE
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- XTBC	TERMINAL BLOCK CUSTOMER
- XTBF	TERMINAL BLOCK FACTORY

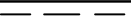
-YHGSV	HOT GAS SOLENOID VALVE (INCLUDING COIL SUPPRESSOR)
- YLLSV	LIQUID LINE SOLENOID VALVE (INCLUDING COIL SUPPRESSOR)
	FIELD MOUNTED AND WIRED ON REMOTE EVAP UNITS

- ZCPR	COMPRESSOR
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	NOTE WELL {SEE NOTE}
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	WIRING AND ITEMS SHOWN THUS ARE STANDARD YORK ACCESSORIES
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	WIRING AND ITEMS SHOWN THUS ARE NOT SUPPLIED BY YORK
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	ITEMS THUS ENCLOSED FORM A COMPONENTS OR SETS OF COMPONENTS
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## Electrical drawings, continued

- A. This drawing is based on IEC symbols.
  - B. Field wiring must be in accordance with the relevant electrical code as well as all other applicable codes and specifications.
  - C. All sources of supply shown on this diagram must be taken from one main isolator, not shown or supplied by the chiller manufacturer.
  - D. Green and yellow wire is used for earth, multicolored cable used for low voltage. Red wire used for AC control, blue wire for neutral, black wire for AC and DC power. Use an orange wire for the interlock control wiring, which is supplied by an external source.
  - E. Legend designation depicts component abbreviations. Number prefix located, if applicable, on schematic circuit, refers to system thereon, e.g.= 1-FHP2 refers to high pressure cutout no 2 on system no 1.
  - F. All wiring to control section voltage free contacts requires a supply provided by the customer maximum voltage 240 volts. The customer must take particular care when deriving the supplies for the voltage free terminals with regard to a common point of isolation. Thus, these circuits when used must be fed via the common point of isolation the voltage to these circuits is removed when the common point of isolation to the unit is opened. This common point of isolation is not supplied. The voltage free contacts are rated at 100VA. All inductive devices {relays} switch by the voltage free contacts must have their coil suppressed using standard r/c suppressors.
  - G. Customer voltage free contacts connected to terminal 13 must be rated at 30 V 5 mA.
  - H. Do not mount controls, relays, or similar components any section of the control panel. Additionally, do not run control wiring not connected to the control panel through the panel. If these precautions are not followed, electrical noise could cause malfunctions or damage to the unit and its controls.
- 
1. Refer to the installation, commissioning, operation, and maintenance manual for customer connections and customer connection notes. Non-compliance with these instructions invalidates unit warranty.
  2. Wiring and components for compressor 3 only fitted when unit has 3 compressors on the system. 1-BMP3 is replaced by a link across terminals 134 and 135. 2-BMP3 is replaced by a link across terminals 234 and 235.
  3. FHP2 is only fitted on 0089 and above. When not fitted 1-FHP2 is replaced by a link across terminals 132 and 139. 2-FHP2 is replaced by a link across terminals 232 and 239
  4. Fitted on units with hot gas bypass option.
  5. EMS option is wired as shown
  6. This wiring must be used for old display 031-0110-000
  7. Network connection point
  8. Printer port
  9. Remote emergency stop can be wired between terminal 1 and 5 after removing link
  10. Power factor correction accessory. Power factor correction fitted to each compressor contactor
  11. Not fitted on compressors with internal motor protection. For system 1 terminals 132 and 133, 133 and 134 And 134 and 135 are linked. For system 2 terminals 232 and 233, 233 and 234 and 234 and 235 are linked.
  12. Only fitted on systems with 3 or 4 fans
  13. Only fitted on systems with 4 fans
  14. Only fitted on systems with 5 fans
  15. Only fitted on systems with 6 fans
  16. Input switch disconnect or circuit breaker option replaces input terminal block
  17. Input switch disconnect and system circuit breaker option replaces input terminal block
  18. 115V control circuit requires a 115V supply unless control circuit transformer-T2 and -F3 are fitted
  19. For optional hydro kit. Heater -EPH is fitted and wired as shown. On single pump -KP1, -QMMSP1 and -MP1 are fitted and wired as shown. On two pump hydro kits -KP2, -QMMSP2 and -MP2 are also fitted and wired as shown.
  20. Current measurement option wired as shown
  21. Only fitted on systems with single speed fans
  22. Only fitted on systems with two speed fans
  23. Optional compressor manual motors starters.
  24. See sheet 3 of connection diagram for power input options

# Application data

## Unit location

QCC3 condensing units are designed for outdoor installation. When selecting a site for installation, consider the following conditions:

1. For outdoor installation, ensure that the condenser has an adequate supply of fresh air.
2. Avoid locations beneath windows or between structures where normal operating sounds may be objectionable.
3. Installation sites may be either on a roof, or at ground level. See *Foundation*.
4. The condenser fans are the propeller-type. Do not use with duct work in the condenser air stream.
5. If you need to surround the units, ensure that the screening can pass the required chiller CFM without exceeding 0.1 in. of water external static pressure.
6. Protection against corrosive environments is available by supplying the units with either copper fin, cured phenolic, or epoxy coating on the condenser coils. The phenolic or epoxy coils are offered with any units being installed at the seashore or where salt spray may hit the unit.

In installations where winter operation is intended and snow accumulations are expected, additional height must be provided to ensure normal condenser air flow.

Recommended clearances for units are given in *Dimension drawings on page 19*. When the available space is less, the unit(s) must be equipped with the discharge pressure transducer option to permit high pressure unloading in the event that air recirculation were to occur.

## Foundation

Mount the unit on a flat and level foundation, ground or roof, capable of supporting the entire operating weight of the equipment. See *Physical data on page 17* for operating weights.

**Roof locations:** Choose a spot with adequate structural strength to safely support the entire weight of the unit and service personnel. Take care not to damage the roof during installation. If the roof is bonded, consult the building contractor or architect for special installation requirements. Use spring-type isolators in roof installations to minimize the transmission of vibration into the building structure.

**Ground level installations:** Install the unit on a substantial base that does not settle. Settling causes strain on the refrigerant lines and may result in leaks. A one-piece concrete slab with footers extending below the frost line is highly recommended, particularly in areas where winters are long and very cold. Additionally, do not tie the slab to the main building foundation as noises can telegraph.

## Application Data, continued

Mounting holes (11/16 in. diameter) are provided in the steel channel for bolting the unit to its foundation. See *Dimension drawings on page 19*.

For ground level installations, take the following precautions to protect the unit from tampering by or injury to unauthorized persons. Screws on access panels prevent casual tampering; however, further safety precautions, such as unit enclosure options, a fenced-in enclosure, or locking devices on the panels may be advisable. Check local authorities for safety regulations.

### Refrigerant piping

When sizing the refrigerant pipe for split system air conditioning, consideration must be given to the following:

- Suction line pressure drop due to friction
- Liquid line pressure drop due to friction
- Suction line velocity for oil return
- Liquid line pressure drop due to vertical rise

On a system where the evaporator blower is located below the condensing unit, the suction line must be sized for both pressure drop and oil return.

When the condensing unit is located below the evaporator blower, the liquid line must be designed for pressure drop due to friction loss and vertical rise. If the pressure drop due to vertical rise and friction loss exceeds 30 psig (2.1 barg), some refrigerant flashes before it reaches the thermal expansion valve.

Pitch all horizontal suction lines at least 1/4 in. (6 mm) each foot in the direction of the refrigerant flow to aid the return of oil to the compressor. Ensure all suction lines with a vertical rise exceeding 3 ft (1 m) have a P trap at the bottom and the top to facilitate oil return. Trap suction lines with a vertical rise exceeding 25 ft (7.6 m) every 15 ft (4.6 m) to provide drain points for the oil when the circuit is deactivated. When the circuit is reactivated, oil returns to the compressor more quickly and in smaller slugs.

For more details, refer to *ASHRAE Refrigeration Handbook, System Practices for Halocarbon Refrigerants*.

# Guide specifications

## Part 1: General

### 1.01 scope

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, and Drawings apply to all Work herein.
- B. Provide microprocessor controlled, multiple-scroll compressor, air-cooled, condensing units of the scheduled capacities as shown and indicated on the drawings, including but not limited to:
  - 1. Condensing unit package
  - 2. Electrical power and control connections
  - 3. DX central station air handling connections

### 1.02 Quality assurance

- A. Products shall be designed, tested, and installed in compliance with applicable sections of the following Standards and Codes:
  - 1. ANSI/ASHRAE Standard 15 – *Safety Code for Mechanical Refrigeration*
  - 2. ASHRAE 90.1 - *Energy efficiency compliance*.
  - 3. ANSI/NFPA Standard 70 – *National Electrical Code (NEC)*.
  - 4. Conform to Intertek Testing Services, formerly ETL, for construction of condensing units and provide E.T.L./c E.T.L. Listing label.
  - 5. Manufactured in facility registered to ISO 9002.
- B. Factory Test: Condensing Unit shall be pressure tested, evacuated and given a nitrogen holding charge and an initial oil charge, and shall be factory operational run tested to ensure each control device operates correctly.
- C. Warranty: Manufacturer shall warrant all equipment and material of its manufacture against defects in workmanship and material for a period of one year from date of initial start-up or eighteen (18) months from date of shipment, whichever occurs first.

### 1.03 Delivery and handling

- A. Unit shall be delivered to job site fully assembled, and given nitrogen holding charge and a full oil charge by the Manufacturer. R-410A and R-454B refrigerant supplied by others.
- B. Unit shall be stored and handled per Manufacturer's instructions.

## ***Guide specifications, continued***

### **Part 2: Products**

#### **2.01 Condensing units materials and components**

- A. General: Install and commission, as shown on the schedules and plans, factory assembled, charged, and tested air cooled scroll compressor condensing unit as specified herein. Condensing Unit shall be designed, selected, and constructed using a refrigerant with Flammability rating of "1", as defined by ANSI/ASHRAE STANDARD - 34 Number Designation and Safety Classification of Refrigerants. Condensing Unit shall include, but is not limited to: not less than two refrigerant circuits, scroll compressors, air-cooled condenser, refrigerant, lubrication system, interconnecting wiring, safety and operating controls including capacity controller, control center, motor starting components, and special features as specified herein or required for safe, automatic operation.
- B. Cabinet: External structural members shall be constructed of heavy gauge, galvanized steel coated with baked on powder paint which, when subject to ASTM B117, 1000 hour, 5% salt spray test, yields minimum ASTM 1654 rating of 6.

#### **2.02 Compressors**

Compressors: shall be hermetic, scroll-type, including:

1. Compliant design for axial and radial sealing.
2. Refrigerant flow through the compressor with 100% suction cooled motor.
3. Large suction side free volume and oil sump to provide liquid handling capability.
4. Compressor crankcase heaters to provide extra liquid migration protection.
5. Annular discharge check valve and reverse vent assembly to provide low pressure drop, silent shutdown and reverse rotation protection.
6. Initial oil charge.
7. Oil level sightglass.
8. Vibration isolator mounts for compressors.
9. Brazed-type connections for fully hermetic refrigerant circuits.

#### **2.03 Refrigerant circuit**

Two independent refrigerant circuits are furnished on each unit. All unit piping is copper, with brazed joints. The liquid line includes a field connection shutoff valve with charging port located on each condenser circuit. Suction line connections are provided on each refrigeration circuit. All expansion valves, liquid line solenoid valves, filter driers, sight glasses, refrigerant, and refrigerant field piping are supplied and installed by others.

## ***Guide specifications, continued***

### **2.04 Heat exchangers**

#### **A. Air cooled condenser:**

1. Coils: Internally enhanced, seamless copper tubes, mechanically expanded into aluminum alloy fins with full height collars. Subcooling coil an integral part of condenser. Design working pressure shall be 650 psig (45 barg).
2. Fans: Shall be dynamically and statically balanced, direct drive, corrosion resistant glass fiber reinforced composite blades molded into low noise, full airfoil cross section, providing vertical air discharge from extended orifices for efficiency and low sound. Each fan in its own compartment to prevent cross flow during fan cycling. Guards of heavy gauge PVC (polyvinyl chloride) coated steel.
3. Fan Motors: High efficiency, direct drive, 6 pole, 3 phase, insulation class "F", current-protected, Totally Enclosed Air-Over (TEAO), rigid mounted, with double sealed, permanently lubricated, ball bearings.

### **2.05 Controls**

#### **A. General: Automatic start, stop, operating, and protection sequences across the range of scheduled conditions and transients.**

#### **B. Microprocessor enclosure: Rain and dust tight NEMA 3R/12 (IP55) powder painted steel cabinet with hinged, latched, and gasket sealed door.**

#### **C. Microprocessor control center:**

1. Condensing Unit control is set for Discharge Air Temperature Control
2. Automatic control of compressor start/stop, anti-coincidence and anti-recycle timers, automatic pump-down shut-down, condenser fans, unit alarm contacts, and condensing unit operation from 0°F to 125°F (-18°C to 52°C) ambient. Automatic reset to normal chiller operation after power failure.
3. Software stored in non-volatile memory, with programmed set-points retained in lithium battery-backed real time clock (RTC) memory for minimum 5 years.
4. Forty character liquid crystal display, descriptions in English (or Spanish, French, Italian, or German), numeric data in English (or Metric) units. Sealed keypad with sections for Setpoints, Display/Print, Entry, Unit Options and clock, and On/Off Switch.
5. Programmable setpoints (within Manufacturer limits): display language; suction pressure setting and control range, remote reset temperature range, set daily schedule/holiday for start/stop, manual override for servicing, low and high ambient cutouts, number of compressors, low suction pressure cutout, high discharge pressure cutout, anti-recycle timer (compressor start cycle time), and anticoincident timer (delay compressor starts).
6. Display data: Suction temperatures (optional), low ambient temperature cutout setting, outdoor air temperature, English or metric data, suction pressure cutout setting, each system suction pressure, discharge pressure (optional), discharge air reset via Building Automation System (by others) via a 4 mA to 20 mA or 0 VDC to



## Guide specifications, continued

10 VDC input with optional BAS interface, anti-recycle timer status for each system, anti-coincident system start timer condition, compressor run status, no cooling load condition, day, date and time, daily start/stop times, holiday status, automatic or manual system lead/lag control (when controlling based on Discharge Air Temperature only), automatic lead/lag of compressors within a system, compressor starts/operating hours (each), status of hot gas valves, and fan operation, run permissive status, number of compressors running, liquid solenoid valve status, load and unload timer status.

7. System safeties: Shall cause individual compressor systems to perform auto shut down; manual reset required after the third trip in 90 minutes. Includes: high discharge pressure, low suction pressure, high pressure switch, and motor protector. Compressor motor protector shall protect against damage due to high input current or thermal overload of windings.
  8. Unit safeties: Shall be automatic reset and cause compressors to shut down if low ambient, or under voltage.
  9. Alarm contacts: Low ambient, low voltage, low battery, and (per compressor circuit): high discharge pressure, and low suction pressure.
  10. High ambient control: Permits unit operation above 115°F (46°C) ambient.
- D. Manufacturer shall provide any controls not listed above, necessary for automatic condensing unit operation. Mechanical Contractor shall provide field control wiring necessary to interface sensors to the condensing unit control system.

### 2.06 Power connection and distribution

#### A. Power panels:

1. NEMA 3R/12 (IP55) rain/dust tight, powder painted steel cabinets with hinged, latched, and gasket sealed outer doors. Provide main power connection(s), control power connections, compressor and fan motor start contactors, current overloads, and factory wiring.
2. Power supply shall enter unit at a single location, be 3 phase of scheduled voltage, and connect to individual terminal blocks per compressor. Separate disconnecting means and/or external branch circuit protection (by Contractor) required per applicable local or national codes.

- B. Exposed compressor, control and fan motor power wiring shall be routed through liquid tight conduit.

### 2.07 Accessories and options

Some accessories and options supercede standard product features. Contact your Quantech representative for more information.

- A. Microprocessor controlled, Factory installed Across-the-Line type compressor motor starters as standard.

#### B. Outdoor ambient temperature control:

1. Low ambient control: Permits unit operation to 0°F (-18°C) ambient. Standard unit controls to 32°F (0°C) ambient.

## ***Guide specifications, continued***

### **C. Power supply connections:**

1. Single point power supply: Single point Terminal Block for field connection and interconnecting wiring to the compressors. Separate external protection must be supplied, by others, in the incoming power wiring, which must comply with the National Electric Code and/or local codes.
2. Single point: Single point Non-Fused Disconnect(s) and lockable external handle (in compliance with Article 440-14 of NEC) can be supplied to isolate the unit power voltage for servicing. Separate external fusing must be supplied, by others, in the incoming power wiring, which must comply with the National Electric Code and/or local codes.
3. Single point disconnect with individual system breakers: Single point Terminal Block with Non-Fused Disconnect and lockable external handle (in compliance with Article 440-14 of NEC) can be supplied to isolate power voltage for servicing. Factory interconnecting wiring from disconnect to factory supplied circuit breakers.
4. Single point circuit breaker: Single point Terminal Block with Circuit Breaker and lockable external handle (in compliance with Article 440-14 of NEC) can be supplied to isolate power voltage for servicing. Incoming power wiring must comply with the National Electric Code and/or local codes.

### **D. Pressure and temperature transducers and sensors:**

1. Discharge pressure transducers: Permits unit to sense and display discharge pressure.
2. Suction pressure transducers: Permits unit to sense and display suction pressure.
3. Suction temperature sensors: Permits units to sense and display suction temperature.

E. Control power transformer: Converts unit power voltage to 120-1-60 or 120-1-50 for 50 Hz units (500 VA capacity). Factory mounting includes primary- and secondary-wiring between the transformer and the control panel.

F. Power factor correction capacitors: Provided to correct unit compressor factors to a 0.90/0.95.

### **G. Condenser coil environmental protection:**

1. Pre-coated: Epoxy coated aluminum fin stock to guard from corrosive agents and insulate against galvanic potential. For mild seashore or industrial locations
2. Copper fin: Provide copper fins in lieu of aluminum.
3. Post-coated dipped: Dipped-cured coating on condenser coils for seashore and other corrosive applications (with the exception of strong alkalis, oxidizers, and wet bromine, chlorine and fluorine in concentrations greater than 100ppm).

## Guide specifications, continued

### H. Protective condensing unit panels (Factory or Field Mounted):

1. Louvered panels (condenser coils only): Painted steel as per remainder of unit cabinet, over external condenser coil faces.
2. Wire panels (full unit): Heavy gauge, welded wire-mesh, coated to resist corrosion, to protect condenser coils from incidental damage and restrict unauthorized access to internal components.
3. Louvered panels (full unit): Painted steel as per remainder of unit cabinet, to protect condenser coils from incidental damage, visually screen internal components, and prevent unauthorized access to internal components.
4. Louvered/wire panels: Louvered steel panels on external condenser coil faces, painted as per remainder of unit cabinet. Heavy gauge, welded wire-mesh, coated to resist corrosion, around base of machine to restrict unauthorized access.

### I. Service isolation valves: Service suction and discharge (ball type) isolation valves are added to unit per system. This option also includes a system high pressure relief valve in compliance with ASHRAE15. (Factory-mounted.)

### J. Hot gas by-pass: Permits continuous, stable operation at capacities below the minimum step of unloading to as low as 5% capacity (depending on both the unit and operating conditions) by introducing an artificial load. Hot gas by-pass is available installed on one or both refrigerant circuit(s).

### K. Microprocessor membrane keypad graphics on in lieu of standard English:

1. French language.
2. German language.
3. Spanish language.
4. Italian language.

### L. Chicago code relief valves to meet Chicago Code requirements.

### M. Building automation system (EMS) reset interface: Condensing Unit to accept 4 mA to 20 mA, 0 VDC to 10 VDC, input to reset the discharge air temperature.

### N. Sound reduction (Factory Mounted):

1. Low speed, reduced noise fans
2. Compressor acoustic sound blankets

### O. Vibration isolation (Field Mounted):

1. Neoprene pad isolators.
2. 1 in. deflection spring isolators: Level adjustable, spring and cage type isolators for mounting under the unit base rails.
3. 2 in. deflection seismic isolators: Level adjustable, restrained mounts in rugged welded steel housing with vertical and horizontal limit stops. Housings shall be designed to withstand a minimum 1.0g accelerated force in all directions to 2 in.

## ***Guide specifications, continued***

### **Part 3: Execution**

#### **3.01 Installation**

- A. General: Rig and install in full accordance with manufacturers requirements, project drawings, and contract documents.
- B. Location: Locate condensing unit as indicated on drawings, including cleaning and service maintenance clearance per manufacturer instructions. Adjust and level condensing unit on support structure.
- C. Components: Installing contractor shall provide and install all auxiliary devices and accessories for fully operational condensing unit.
- D. Electrical: Coordinate electrical requirements and connections for all power feeds with Electrical Contractor (Division 16).
- E. Controls: Coordinate all control requirements and connections with controls contractor.
- F. Finish: Installing contractor shall paint damaged and abraded factory finish with touch-up paint matching factory finish.

## ***Notes***

