Product Data

WeatherMaker® Single Package Heat Pump Rooftop

15 to 25 Nominal Tons

ecoblue™ technology

50FCQ*17, 24, 28

Single-Packaged Heat Pump with Optional Electric Heat and Puron® Refrigerant (R-410A)

Features/Benefits

The New Carrier WeatherMaker® packaged heat pump rooftop units (RTU) with EcoBlue™ Technology were designed by customers to provide value added benefits never seen in this type of equipment before.

New features include:

- A patented, industry first, Vane Axial Indoor Fan System, powered by an electronically commutated motor for quiet, efficient, and reliable operation. Compared to traditional belt driven forwards curved fans, this system has:
  - 75% fewer moving parts
  - No fan belts, pulleys, shaft, and shaft bearings
  - Up to 40% better efficiency than traditional belt drive forward curve fans
  - Slow ramp up capability for better sound and comfort control
  - Internal protection from phase reversal and phase loss situations
  - High external static capability
  - Slide out blower assembly design
- Reliable 2 stage cooling with tandem scroll compressors technology, fully active evaporator coil, and mixed air temperature protection on all models
- New unit control board with intuitive indoor fan adjustment that uses simple dial and switch adjustments
- An industry first 25 ton packaged heat pump
- Reliable copper tube/aluminum fin condenser coil with 5/16 in. tubing to help reduce refrigerant charge and reduce weight versus prior designs

WeatherMaker® 50FCQ units up to 25 tons are specifically designed for dedicated factory-supplied vertical air flow or horizontal air flow. No special field kits are required. All footprints were maintained to easily fit on R-410A Carrier and select competitor curbs, making replacements easier than ever.

With “no-strip” screw collars, handled access panels, and more, the unit is easy to install, easy to maintain, and easy to use.

Our 2 speed staged air volume through our Vane Axial fan allows our 15 to 25 ton 50FCQ WeatherMaker units to deliver IEER values up to 14.0 and provide optimum comfort and control.

Value-added features include:

- SystemVu™ intuitive intelligent controls option that provides:
  - Large full text, multi-line display
  - USB Flash Port for data transfer
  - Built in i-Vu®, CCN and BACnet[1]
  - Read refrigerant pressures from display — no gauges
  - Quick LED Status — Run, Alert, Fault
  - Conventional thermostat or sensor capabilities
  - Historical component runtime and starts
  - Supply air tempering
  - Navigator™ and Network Service Tool compatible
- Single point electrical connections
- All 15 to 25 ton models use TXV refrigerant metering devices
- Scroll compressors with internal line-break overload protection
- Units come with an easy access tool-less filter door. Filter track tilts out for filter removal and replacement. All filters are the same size in each unit

1. Third-party trademarks and logos are the property of their respective owners.

Installation ease

Lighter units make for easy replacement and aid in the structural approval process. Units have simple, fast plug-in connections to the standard integrated unit control board (UCB). Clearly labeled connections points to reduce installation time. Also, a large control box provides room to work and room to mount Carrier accessory controls.

Easy to maintain

With the new EcoBlue Vane Axial fan system and direct drive ECM motor, there is no longer a need to adjust or replace belts or pulleys as in past designs. This frees up maintenance, installation and commissioning time.

Table of contents

Features/Benefits (cont)

Easy access handles by Carrier provide quick and easy access to all normally serviced components. Our "no-strip" screw system has superior holding power and guides screws into position while preventing the screw from stripping the unit's metal.

Sloped, corrosion resistant composite drain pan sheds water and won't rust.

Easy to use

The newly re-designed Unit Control Board by Carrier puts all connections and troubleshooting points in one convenient place. Most low voltage connections are made to the same board and make it easy to access it. Setting up the fan is simple by an intuitive switch and rotary dial arrangement.

Carrier rooftops have high and low pressure switches, a new mixed air temperature switch, a filter drier, and 2 in. filters standard.

EcoBlue™ Technology

Direct drive EcoBlue Technology indoor fan system uses Vane Axial fan design and electrically commutated motors.

This new Vane Axial design has 75% fewer moving parts, uses up to 40% less energy and has no fan belts, blower bearings and shaft when compared with past belt drive systems. The full fan and motor assembly also slides out for easier maintenance and service.

Streamlined control and integration

Carrier controllers make connecting WeatherMaker® rooftop heat pump units into existing building automation systems easy. The units are compatible with conventional thermostat controls or SystemVu™ controls for greater comfort, diagnostics and building network integration.

Operating efficiency and flexibility

These 50FCQ packaged rooftops meet the Department of Energy (DOE) 2023 efficiency standard, as well as the latest ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) 90.1 and IECC®[1] (International Energy Conservation Code) minimum IEER efficiency requirements.

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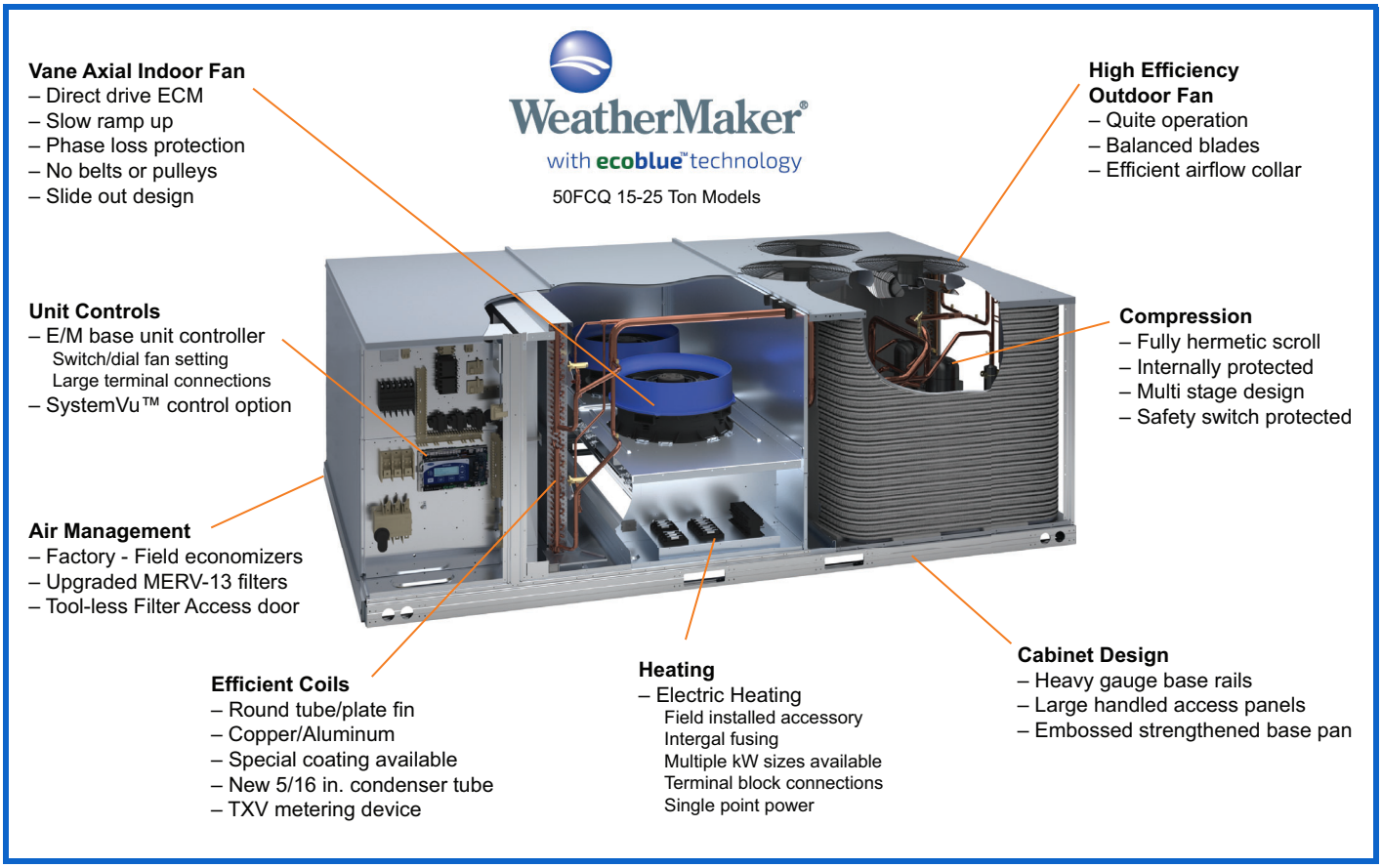


Model number nomenclature

50FCQ*17-28 Model Number Nomenclature

Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Example:	5	0	F	C	Q	M	2	4	A	2	A	6	-	0	A	0	A	0

Unit Heat Type
50 = Cooling Packaged Rooftop

Model Series - WeatherMaker®
FC = Standard Efficiency (EcoBlue™ Technology)

Heat Type
Q = Heat Pump
(Field-Installed Electic Heat)

Refrig. Systems Options
M = Two Stage Cooling/One Circuit Models

Cooling Tons
17 = 15.0 tons
24 = 20.0 tons
28 = 25.0 tons

Sensor Options
A = None
B = Return Air Smoke Detector (RA)
C = Supply Air Smoke Detector (SA)
D = RA + SA Smoke Detector
E = CO_2 Sensor
F = RA Smoke Detector and CO_2 Sensor
G = SA Smoke Detector and CO_2 Sensor
H = RA + SA Smoke Detector and CO_2 Sensor
J = Condensate Overflow Switch (COFS)
K = COFS + RA Smoke Detector
L = COFS + RA and SA Smoke Detectors
M = COFS + SA Smoke Detector
N = COFS + CO_2 Sensor
P = COFS + RA Smoke Detector and CO_2 Sensor
Q = COFS + SA Smoke Detector and CO_2 Sensor
R = COFS + RA and SA Smoke Detector and CO_2 Sensor

Indoor Fan Options - Vane Axial EcoBlue Fan System
2 = Standard/Medium Static Motor - Vertical Supply
3 = High Static Motor - Vertical Supply
5 = Standard/Medium Static Motor - Vertical Supply and Filter Status Switch
6 = High Static Motor - Vertical Supply and Filter Status Switch
J = High Static Motor - Horizontal Supply
L = High Static Motor - Horizontal Supply and Filter Status Switch

Coil Options – RTPF (Outdoor – Indoor) – Hail Guards
A = Al/Cu – Al/Cu
B = Precoat Al/Cu – Al/Cu
C = E-coat Al/Cu – Al/Cu
D = E-coat Al/Cu – E-coat Al/Cu
E = Cu/Cu – Al/Cu
F = Cu/Cu – Cu/Cu
M = Al/Cu – Al/Cu – Louvered Hail Guards
N = Precoat Al/Cu – Al/Cu – Louvered Hail Guards
P = E-coat Al/Cu – Al/Cu – Louvered Hail Guards
Q = E-coat Al/Cu – E-coat Al/Cu – Louvered Hail Guards
R = Cu/Cu – Al/Cu – Louvered Hail Guards
S = Cu/Cu – Cu/Cu – Louvered Hail Guards

Voltage
1 = 575-3-60
5 = 208/230-3-60
6 = 460-3-60

Base Unit Controls
0 = Electromechanical Controller (can be used with field installed W7212 EconoMi$er® IV — no FDD[a])
3 = SystemVu™ Controller
8 = Electromechanical Controls — with POL224 EconomizerONE (includes FDD[a])

Intake / Exhaust Options
A = None
B = Low Leak Temp Economizer w/ Baro Relief
D = Low Leak Temp Economizer w/ PE (cent) Vert Only
F = Low Leak Enthalpy Economizer w/ Baro Relief
H = Low Leak Enthalpy Economizer w/ PE (cent) Vert Only
U = ULTRA Low Leak Temp Economizer w/ Baro Relief
V = ULTRA Low Leak Temp Economizer w/ PE (cent) Vert Only
W = ULTRA Low Leak Enthalpy Economizer w/ Baro Relief
X = ULTRA Low Leak Enthalpy Economizer w/ PE (cent) Vert Only

Service Options
0 = None
1 = Unpowered Convenience Outlet
2 = Powered Convenience Outlet
3 = Hinged Access Panels
4 = Hinged Access Panels and Unpowered Convenience Outlet
5 = Hinged Access Panels and Powered Convenience Outlet
6 = 4" MERV 13 High Efficiency Filter Track
7 = Unpowered Convenience Outlet and 4" MERV 13 High Efficiency Filter Track
8 = Powered Convenience Outlet and 4" MERV 13 High Efficiency Filter Track
9 = Hinged Access Panels and 4" MERV 13 High Efficiency Filter Track
A = Hinged Access Panels, Unpowered Convenience Outlet and 4" MERV 13 High Efficiency Filter Track
B = Hinged Access Panels, Powered Convenience Outlet and 4" MERV 13 High Efficiency Filter Track

Electrical Options
A = None
C = Non-Fused Disconnect
N = Phase Monitor/Protection
Q = Phase Monitor/Protection and Non-Fused Disconnect
1 = HSCCR Protection

Packaging Compliance
0 = Standard

Design Revision
- = Factory Design Revision

[a] FDD (Fault Detection and Diagnostic) capability per California Title 24 section 120.2.

Capacity ratings

50FCQ AHRI Ratings, Cooling Mode[a,b,c]

UNIT	COOLING STAGES	NOMINAL CAPACITY (tons)	NET COOLING CAPACITY (Btuh)	TOTAL POWER (kW)	EER	IEER WITH 2-SPEED INDOOR FAN MOTOR	AHRI RATING CFM
50FCQM17	2	15	172,000	16.2	10.60	14.0	6,300
50FCQM24	2	20	240,000	24.5	9.80	14.0	8,000
50FCQM28	2	25	278,000	29.3	9.50	14.0	10,000

NOTE(S):

a. Rated in accordance with AHRI Standards 340/360.
b. Rating are based on:
Cooling Standard: 80°F (27°C) db, 67°F (19°C) wb indoor air temperature and 95°F (35°C) db outdoor air temperature.
IEER Standard: A measure that expresses cooling part-load EER efficiency for commercial unitary air-conditioning and heat pump equipment on the basis of weighted operation at various load capacities.
c. All 50FCQ units comply with ASHRAE 90.1-2019 (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) and DOE-2023 (Department of Energy) Energy Standard for minimum IEER requirements.

LEGEND

AHRI — Air-Conditioning, Heating and Refrigeration Institute
EER — Energy Efficiency Ratio
IEER — Integrated Energy Efficiency Ratio

50FCQ AHRI Ratings, Heating Mode[a,b,c]

UNIT	HEATING, LOW 17°F(–8°C) AMBIENT		HEATING, HIGH 47°F (8°C) AMBIENT		AHRI RATING CFM
	Net Capacity (Btuh)	COP	Net Capacity (Btuh)	COP	
50FCQM17	106,000	2.30	168,000	3.30	6300
50FCQM24	136,000	2.30	234,000	3.30	8000
50FCQM28	158,000	2.30	274,000	3.30	9500

NOTE(S):

a. Rated in accordance with AHRI Standards 340/360.
b. Rating are based on:
Cooling Standard: 80°F (27°C) db, 67°F (19°C) wb indoor air temperature and 95°F (35°C) db outdoor air temperature.
IEER Standard: A measure that expresses cooling part-load EER efficiency for commercial unitary air-conditioning and heat pump equipment on the basis of weighted operation at various load capacities.
c. All 50FCQ units comply with ASHRAE 90.1-2019 (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) and DOE-2023 (Department of Energy) Energy Standard for minimum IEER requirements.

LEGEND

AHRI — Air-Conditioning, Heating and Refrigeration Institute
COP — Coefficient of Performance

Capacity ratings (cont)

Sound Rating Table[a]

UNIT	COOLING STAGES	OUTDOOR SOUND (dB) AT 60 Hz[b]								
		A-WEIGHTED[c]	63	125	250	500	1000	2000	4000	8000
50FCQM17	2	84.1	92.2	83.9	80.4	81.8	78.7	76.5	72.2	65.4
50FCQM17	2	85.9	97.1	88.3	84.4	83.3	80.7	77.4	73.4	67.3
50FCQM28	2	85.9	97.1	88.3	84.4	83.3	80.7	77.4	73.4	67.3

NOTE(S):

a. Outdoor sound data is measured in accordance with AHRI.
b. Measurements are expressed in terms of sound power. Do not compare these values to sound pressure values because sound pressure depends on specific environmental factors which normally do not match individual applications. Sound power values are independent of the environment and therefore more accurate.
c. A-weighted sound ratings filter out very high and very low frequencies, to better approximate the response of “average” human ear. A-weighted measurements for Carrier units are taken in accordance with AHRI.

LEGEND

dB — Decibel

Minimum - Maximum Airflow Ratings (cfm) — Cooling Units and Accessory Electric Heat

UNIT	COOLING			ELECTRIC HEAT[a]	
	MINIMUM 2-SPEED AIRFLOW (LOW SPEED)	MINIMUM 2-SPEED AIRFLOW (HIGH SPEED)	MAXIMUM AIRFLOW CFM	MINIMUM AIRFLOW CFM	MAXIMUM AIRFLOW CFM
50FCQM17	2700	4500	7500	4500	7500
50FCQM24	3000	6000	10,000	6000	10,000
50FCQM28	3750	7500	12,500	7500	12,500

NOTE(S):

a. Electric heat modules and single point kits are available as field-installed accessories for 50FCQ units.

Physical data

50FCQ 17 to 28 Physical Data

50FCQ UNIT	50FCQM17	50FCQM24	50FCQM28
NOMINAL TONS	15	20	25
BASE UNIT OPERATING WT (lb)[a]	1627	2057	2125
REFRIGERATION SYSTEM			
No. Circuits/No. Compressors/Type	1/2/Scroll	1/2/Scroll	1/2/Scroll
Puron® (R-410A) Charge (lb-oz)	27-0	48-0	48-0
Cooling Metering Device	TXV	TXV	TXV
Heating Metering Device	TXV	TXV	TXV
High-Pressure Trip/Reset (psig)	630/505	630/505	630/505
Loss of Charge Trip/Reset	27/44	27/44	27/44
EVAPORATOR COIL			
Material (Tube/Fin)	Cu/Al	Cu/Al	Cu/Al
Coil Type	3/8 in. RTPF	3/8 in. RTPF	3/8 in. RTPF
Rows/FPI	4/15	4/15	4/15
Total Face Area (ft^2)	22	26	26
Condensate Drain Connection Size	3/4 in.	3/4 in.	3/4 in.
CONDENSER COIL			
Material (Tube/Fin)	Cu/Al	Cu/Al	Cu/Al
Coil Type	5/16 in. RTPF	5/16 in. RTPF	5/16 in. RTPF
Rows/FPI	2/18	2/18	2/18
Total Face Area (ft^2)	41.6	59.2	59.2
EVAPORATOR FAN AND MOTOR			
Standard/Medium Static 3 Phase			
Motor Qty / Drive Type	2 / Direct	2 / Direct	2 / Direct
Max Cont bhp	2.4	2.4	3
Range (rpm)	250-2000	250-2000	250-2200
Fan Qty / Type	2 / Vane Axial	2 / Vane Axial	2 / Vane Axial
Fan Diameter (in.)	22	22	22
Vertical High Static 3 Phase			
Motor Qty / Drive Type	2 / Direct	2 / Direct	2 / Direct
Max Cont bhp	3	5	5
Range (rpm)	250-2200	250-2200	250-2200
Fan Qty / Type	2 / Vane Axial	2 / Vane Axial	2 / Vane Axial
Fan Diameter (in.)	22	22	22
Horizontal High Static 3 Phase			
Motor Qty / Drive Type	2 / Direct	2 / Direct	2 / Direct
Max Cont bhp	5	5	5
Range (rpm)	250-2200	250-2200	250-2200
Fan Qty / Type	2 / Vane Axial	2 / Vane Axial	2 / Vane Axial
Fan Diameter (in.)	22	22	22
CONDENSER FAN AND MOTOR			
Qty / Motor Drive Type	3 / Direct	4 / Direct	4 / Direct
Motor hp / rpm	1/4 / 1100	1/4 /1100	1/4 /1100
Fan Diameter (in.)	22	22	22
FILTERS			
RA Filter Qty / Size (in.)	6 / 25x25x2	9 / 20x25x2	9 / 20x25x2
OA Inlet Screen Qty / Size (in.)	4 / 16x25x1	4 / 16x25/1	4 / 16x25/1

NOTE(S):

a. Base unit operating weight does not include weight of options.

LEGEND

bhp — Brake Horsepower
FPI — Fins Per Inch
OA — Outdoor Air
RA — Return Air

Options and accessories

ITEM	FACTORY-INSTALLED OPTION	FIELD-INSTALLED ACCESSORY
ELECTRIC HEAT		
Electric Resistance Heaters		X
Single Point Kits		X
CABINET		
Hinged Access Panels	X	
MERV-13, 4 in. Filters	X	
MERV-13, 2 in. Filters		X
MERV-8, 2 in. Filters		X
4 in. Filter Rack (filters not included)		X
Condenser Coil Hail Guard	X	X
COIL OPTIONS		
Cu/Cu Indoor and/or Outdoor Coils	X	
Pre-Coated Outdoor Coils	X	
Premium, E-Coated Indoor and/or Outdoor Coils	X	
CONTROLS		
Thermostats, Temperature Sensors, and Subbases		X
SystemVu™ DDC Communicating Controller	X	
Smoke Detector (supply and/or return air)	X	X
Horn Strobe Annunciator[a]		X
Time Guard II Compressor Delay Control Circuit		X
Phase Monitor	X	X
Condensate Overflow Switch	X	X
ECONOMIZERS AND OUTDOOR AIR DAMPERS		
EconomizerONE for Electromechanical Controls, complies with FDD (standard and ultra low leak damper models)[b]	X	X
Wi-Fi Stick for EconomizerONE (optional)		X
EconoMi$er® 2 for DDC Controls (standard and ultra low leak damper models)[c]	X	X
Motorized Two-Position Outdoor-Air Damper		X
Manual Outdoor-Air Damper (25% and 50%)		X
Barometric Relief[d]	X	X
Power Exhaust — Centrifugal Design	X	X
ECONOMIZER SENSORS AND IAQ DEVICES		
Single Dry Bulb Temperature Sensors[e]	X	X
Differential Dry Bulb Temperature Sensors[e]		X
Single Enthalpy Sensors[e]	X	X
Differential Enthalpy Sensors[e]		X
CO_2 Sensor (wall, duct, or unit mounted)[e]	X	X
INDOOR MOTOR AND DRIVE		
Multiple Motor and Drive Packages	X	
LOW AMBIENT CONTROLS		
Winter Start Kit[f]		X
Low Ambient Controller to 0°F (–18°C)[f]		X
POWER OPTIONS		
Convenience Outlet (powered)	X	
Convenience Outlet (unpowered)	X	
Convenience Outlet, 20 amp (unpowered)		X
Non-Fused Disconnect[g]	X	
High SCCR Protection[h]	X	
ROOF CURBS		
Roof Curb 14 in. (356 mm)		X
Roof Curb 24 in. (610 mm)		X

NOTE(S):

a. Requires a field-supplied 24V transformer for each application. See price pages for details.
b. FDD (Fault Detection and Diagnostic) capability per California Title 24 section 120.2.
c. Models with SystemVu controls comply with California Title 24 Fault Detection and Diagnostic (FDD).
d. Included with economizer.
e. Sensors used to optimize economizer performance.
f. See application data for assistance.
g. Non-fused disconnect switch cannot be used when unit FLA electrical rating exceeds 200 amps (all voltages).
h. High SCCR (Short Circuit Current Rating) is not available on the following: units with Low Ambient controls, Phase loss monitor, Non-fused disconnect, Powered convenience outlet, and 575-v models.

Options and accessories (cont)

Factory-installed options

Economizer (dry-bulb or enthalpy)

Economizers save money. They bring in fresh, outside air for ventilation; and provide cool, outside air to cool your building. This is the preferred method of low-ambient cooling. When coupled to CO_2 sensors, economizers can provide even more savings by coupling the ventilation air to only that amount required.

Economizers are available, installed and tested by the factory, with either enthalpy or dry-bulb temperature inputs. Additional sensors are available as accessories to optimize the economizers. Economizers include a powered exhaust system to help equalize building pressures.

Economizers can be factory-installed or easily field-installed.

Unit mounted CO_2 sensor

The CO_2 sensor works with the economizer to intake only the correct amount of outside air for ventilation. As occupants fill your building, the CO_2 sensor detects their presence through increasing CO_2 levels, and opens the economizer appropriately. When the occupants leave, the CO_2 levels decrease, and the sensor appropriately closes the economizer. This intelligent control of the ventilation air, called demand controlled ventilation (DCV), reduces the overall load on the rooftop, saving money. It is also available as a field-installed accessory.

Phase monitor protection

The Phase Monitor Control will monitor the sequence of 3-phase electrical system to provide a phase reversal protection; and monitor the 3-phase voltage inputs to provide a phase loss protection for the 3-phase device. It will work on either a Delta or Wye power connection.

Smoke detector (supply and/or return air)

Trust the experts. Smoke detectors make your application safer and your job easier. Carrier smoke detectors immediately shut down the rooftop unit when smoke is detected. They are available, installed by the factory, for supply air, return air, or both.

Thru-the-base connections

Thru-the-base connections, included as standard, are necessary to ensure proper connection and seal when routing wire and piping through the rooftop's basepan and curb. These couplings eliminate roof penetration and should be considered for gas lines, main power lines, as well as control power.

Hinged access panels

Allows access to unit's major components with specifically designed hinged access panels. Panels are filter, control box access, and indoor fan motor access.

Cu/Cu (indoor and outdoor) coils

Copper fins and copper tubes are mechanically bonded to copper tubes and copper tube sheets. A polymer strip prevents coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan.

E-coated (outdoor and indoor) coils

A flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation of tubes, fins and headers.

Pre-coated outdoor coils

A durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. The coating minimizes galvanic action between dissimilar metals. Coating is applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube.

Condenser coil hail guard

Sleek, louvered panels protect the condenser coil from hail damage, foreign objects, and incidental contact.

Convenience outlet (powered or un-powered)

Reduce service and/or installation costs by including a convenience outlet in your specification. Carrier will install this service feature at our factory. Provides a convenient, 15 amp, 115-v GFCI receptacle with "Wet in Use" cover. The "powered" option allows the installer to power the outlet from the line side of the disconnect or load side as required by code. The "unpowered" option is to be powered from a separate 115/120-v power source.

The unpowered convenience outlet is available as a 15 amp factory-installed option or a 20 amp field-installed accessory.

Non-fused disconnect

This OSHA-compliant, factory-installed, safety switch allows a service technician to locally secure power to the rooftop. When selecting a factory-installed non-fused disconnect, note they are sized for the unit as ordered from the factory. The sizing of these do not accommodate field-installed items such as power exhaust devices, etc. If field installing electric heat with factory-installed non-fused disconnect switch, a single point kit may or may not be required.

SystemVu™ controller

Carrier's SystemVu controller is an optional factory-installed and tested controller.

This controller takes on a whole new approach to provide an intuitive, intelligent controller that not only monitors and controls the unit, but also provides linkage to multiple building automation systems.

Each SystemVu controller makes it easy to set up, service, troubleshoot, gain historical data, generate reports and provide comfort only Carrier is noted for.

Key features include:

- Easy to read back lit 4 line text screen for superior visibility.
- Quick operational condition LEDs of: Run, Alert, and Fault.
- Simple navigation with large keypad buttons of: Navigation arrows, Test, Back, Enter and Menu.
- Capable of being controlled with a conventional thermostat, space sensor or build automation system.
- Service capabilities include:
  - Auto run test
  - Manual run test
  - Component run hours and starts
  - Commissioning reports
  - Data logging
- Full range of diagnosis:
  - Read refrigerant pressures without the need of gauges

Options and accessories (cont)

- Sensor faults
- Compressor reverse rotation
- Economizer diagnostics that meet California Title 24 requirements

- Quick data transfer via USB port:
  - Unit configuration uploading/downloading
  - Data logging
  - Software upgrades
- Built in capacity for:
  - i-Vu® open systems
  - BACnet systems
  - CCN systems
- Configuration and alarm point capability:
  - Contain over 100 alarm codes
  - Contain over 260 status, troubleshooting, diagnostic and maintenance points
  - Contain over 270 control configuration setpoints

Condensate overflow switch

This sensor and related controller monitors the condensate level in the drain pan and shuts down compression operation when overflow conditions occur. It includes:

- Indicator light — solid red (more than 10 seconds on water contact — compressors disabled), blinking red (sensor disconnected)
- 10-second delay to break — eliminates nuisance trips from splashing or waves in pan (sensor needs 10 seconds of constant water contact before tripping)
- Disables the compressors operation when condensate plug is detected, but still allows fans to run for economizer.

MERV-13 4 in. return air filters

This factory option upgrades the return air filters from standard unit filters to high efficiency MERV-13 filters. Non-woven MERV-13 filter media with high strength, moisture-resistant frame. Filter media is securely fasted inside the filter frame on all 4 sides.

High Short Circuit Current Rating (SCCR) protection

This factory-installed option provides high short circuit current protection to each compressor, plus all indoor and outdoor fan motors of 60 kA (for 208/230-3-60 units) and 65 kA (for 460-3-60 units) against high potential fault current situations.

Standard unit comes with 5 kA rating.

This option is not available with factory installed Non-Fused Disconnect, Low Ambient controls, Phase loss monitor/ protection and 575 Volt models.

Filter maintenance indicator

When the optional factory-installed filter maintenance indicator is used, a factory-installed differential pressure switch measures pressure drop across the outside air filter and activates a field-supplied dry contact indicator when the pressure differential exceeds the adjustable switch setpoint.

Options and accessories (cont)

Field-installed accessories

Condenser coil hail guard

Sleek, louvered panels protect the condenser coil from hail damage, foreign objects, and incidental contact. This can be purchased as a factory-installed option or as a field-installed accessory.

Differential enthalpy sensor

The differential enthalpy sensor is comprised of an outdoor and return air enthalpy sensors to provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.

Wall or duct mounted CO_2 sensor

The IAQ sensor shall be available in duct or wall mount. The sensor provides demand ventilation indoor air quality (IAQ) control.

4 in. filter rack kit

The 4 in. filter rack accessory kit is designed to hold 4 in. MERV-8 or MERV-13 filters. Filters not included in kit.

MERV-13 2 in. return air filters

This kit includes MERV-13 2 in. filters to accommodate unit filter rack size. Kit available through RDC (Replacement Components Division).

MERV-8 2 in. return air filters

This kit includes MERV-8 2 in. filters to accommodate unit filter rack size. Kit available through RDC.

Phase monitor protection

The Phase Monitor Control will monitor the sequence of 3-phase electrical system to provide a phase reversal protection; and monitor the 3-phase voltage inputs to provide a phase loss protection for the 3-phase device. It will work on either a Delta or Wye power connection.

Winter start kit

The winter start kit by Carrier extends the low ambient limit of your rooftop to 25°F (–4°C). The kit bypasses the low pressure switch, preventing nuisance tripping of the low pressure switch. Other low ambient precautions may still be prudent.

Low ambient controller

The low ambient controller is a head pressure controller kit that is designed to maintain the unit's condenser head pressure during periods of low ambient cooling operation. This device should be used as an alternative to economizer free cooling when economizer usage is either not appropriate or desired. The low ambient controller will either cycle the outdoor fan motors or operate them at reduced speed to maintain the unit operation, depending on the model. This controller allows cooling operation down to 0°F (–18°C) ambient conditions.

Roof curb (14 in./356 mm or 24 in./610 mm)

Full perimeter roof curb with exhaust capability provides separate air streams for energy recovery from the exhaust air without supply air contamination.

Filter status indicator accessory

Monitors static pressure across supply and exhaust filters and provides indication when filters become clogged.

Power exhaust

Superior internal building pressure control. This field-installed accessory may eliminate the need for costly, external pressure control fans.

Manual OA damper

Manual outdoor air dampers are an economical way to bring in ventilation air. The dampers are available in 25% and 50% versions.

NOTE: See application tip "ROOFTOP-18-01" prior to use of this damper on 17-28 size models.

Motorized two-position damper

The Carrier two-position, motorized outdoor air damper admits up to 100% outside air. Using reliable, gear-driven technology, the two-position damper opens to allow ventilation air and closes when the rooftop stops, stopping unwanted infiltration.

NOTE: See application tip "ROOFTOP-18-01" prior to use of this damper on 17-28 size models.

Electric heaters

Carrier offers a full-line of field-installed accessory heaters. The heaters are very easy to use, install and are all pre-engineered and certified.

Time Guard II control circuit

This accessory protects your compressor by preventing short-cycling in the event of some other failure, prevents the compressor from restarting for 30 seconds after stopping. Not required with SystemVu™ controller or authorized commercial thermostats.

Wi-Fi stick for EconomizerONE (optional)

The accessory Wi-Fi/WLAN stick can be connected to the EconomizerONE POL224 economizer controller via the USB host interface. The Wi-Fi stick enables a wireless connection to be made between a smartphone and the economizer controller via the Climatix™[1] mobile application for commissioning, troubleshooting, and maintenance operations. The Wi-Fi stick is required to utilize the mobile application.

Climatix™ mobile application

The Climatix™ mobile application offers a best-in-class user interface and a simple step-by-step commissioning workflow using a mobile device. The user interface walks users through the setup of the controller and allows users to view the operating mode and parameters. Users can adjust setpoints, initiate damper tests, and save the final configuration as a favorite to expedite setup in the future.

The application is available on Android™[1] and Apple iOS®[1] platforms. The Wi-Fi stick for the EconomizerONE is required to join the Siemens-WiFi-Stick network and setup the controller on a smartphone.

1. Third-party trademarks and logos are the property of their respective owners.

Options and accessories (cont)

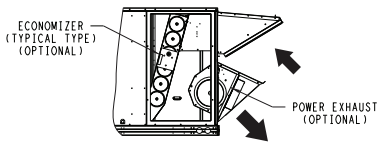
Option and Accessory Weights[a]

OPTION / ACCESSORY NAME	50FCQ UNIT WEIGHT					
	17		24		28	
	lb	kg	lb	kg	lb	kg
Power Exhaust	198	90	198	90	198	90
EconomizerONE and EconoMi$er® 2	293	133	304	138	304	138
Two-Position Damper	50	23	50	23	50	23
Manual Damper	35	16	35	16	35	16
Electric Heater	85	39	85	39	85	39
Hail Guard (louvered)	90	41	90	41	100	46
Cu/Cu Condenser and Evaporator Coils	305	139	448	204	448	204
Roof Curb (14 in. curb)	240	109	255	116	255	116
Roof Curb (24 in. curb)	340	154	355	161	355	161
CO_2 Sensor	5	3	5	3	5	3
Optional Indoor Motor[b]	30	14	30	14	0	0
Low Ambient Controller	9	4	9	4	9	4
Winter Start Kit	5	2	5	2	5	2
Return Air Smoke Detector	7	3	7	3	7	3
Supply Air Smoke Detector	7	3	7	3	7	3
Fan Filter Switch	2	1	2	1	2	1
Non-Fused Disconnect	15	7	15	7	15	7
Powered Convenience Outlet	36	16	36	16	36	16
Unpowered Convenience Outlet	4	2	4	2	4	2
Enthalpy Sensor	2	1	2	1	2	1
Differential Enthalpy Sensor	3	2	3	2	3	2
4 in. MERV 13 Filters	22	10	22	10	22	10

NOTE(S):

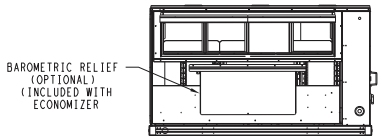
a. Where multiple variations are available, the heaviest combination is listed.
b. Add the Optional Indoor Motor weight to the weight of the base unit.

50FCQ*17 Base Unit Dimensions



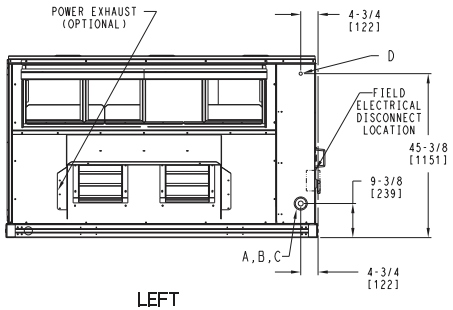
BACK

(PANELS REMOVED TO SHOW ECONOMIZER AND POWER EXHAUST OPTIONS)



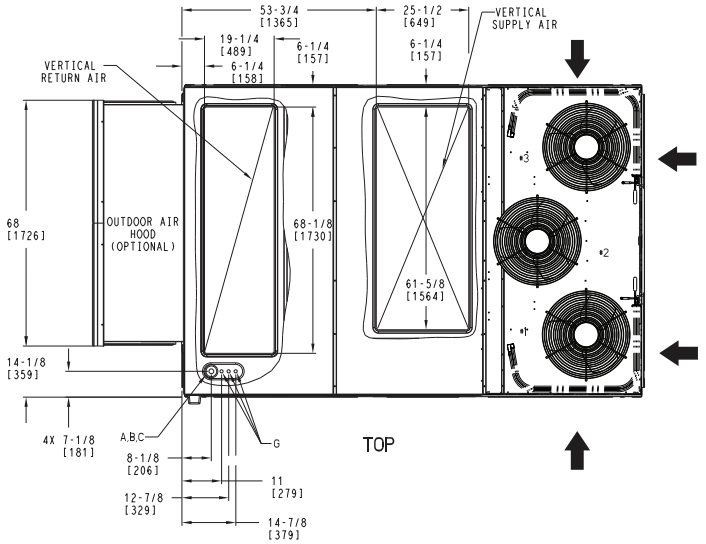
LEFT

SHOWN WITH THE BAROMETRIC RELIEF OPTION INSTALLED



LEFT

SHOWN WITH THE POWER EXHAUST OPTION INSTALLED

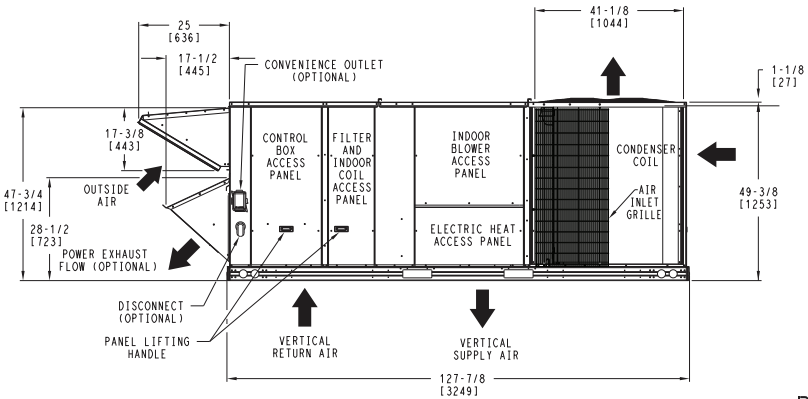


TOP

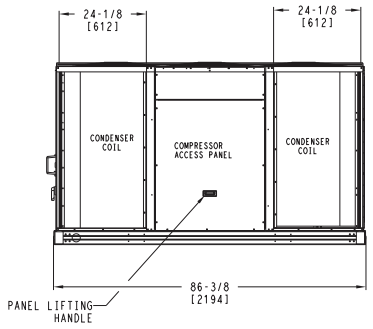
	CONNECTION SIZES
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
G	7/8" DIA [22] FIELD CONTROL WIRING KNOCKOUT

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE



FRONT

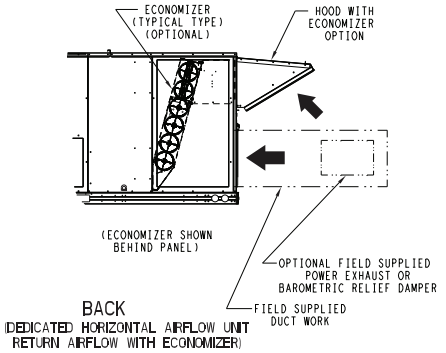


RIGHT

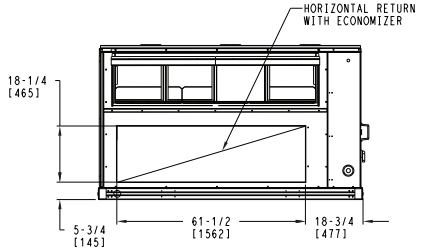
DEDICATED VERTICAL AIRFLOW UNIT
17 SIZE

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	1 OF 5	8/29/22	-	FCQ 17 SINGLE ZONE ELECTRICAL HEAT PUMP	50HE006191	-

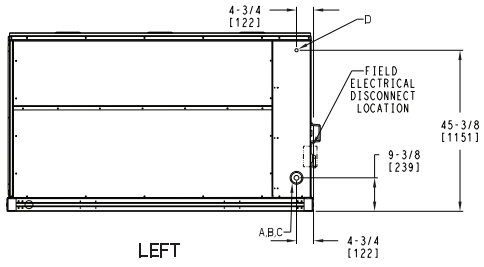
50FCQ*17 Base Unit Dimensions (cont)



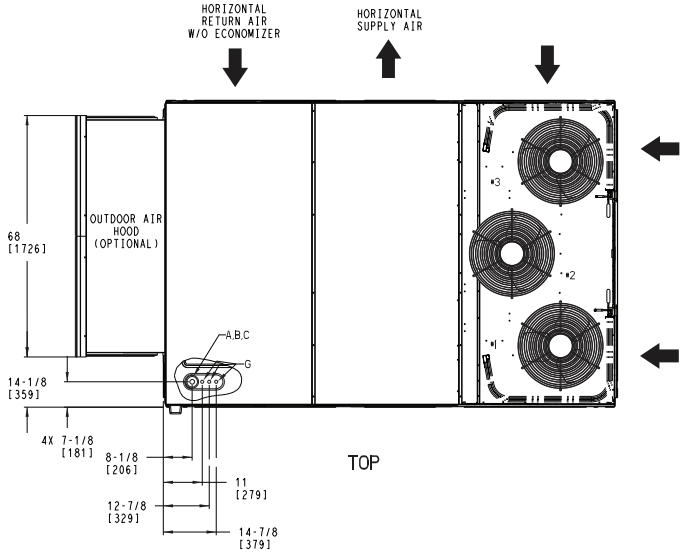
BACK
(DEDICATED HORIZONTAL AIRFLOW UNIT RETURN AIRFLOW WITH ECONOMIZER)



LEFT
(DEDICATED HORIZONTAL AIRFLOW UNIT RETURN AIRFLOW WITH ECONOMIZER)



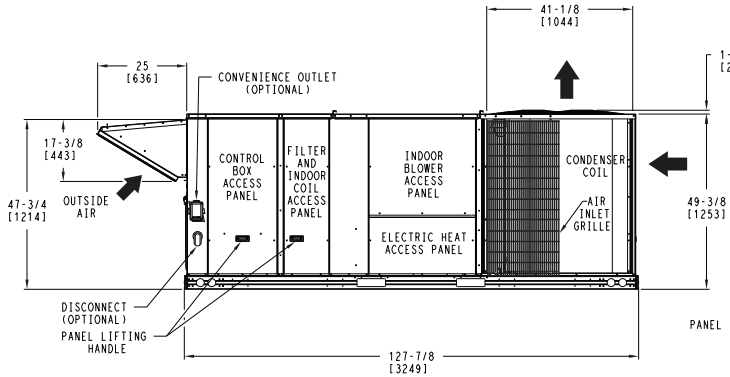
LEFT
(DEDICATED HORIZONTAL AIRFLOW UNIT RETURN AIRFLOW WITHOUT ECONOMIZER)



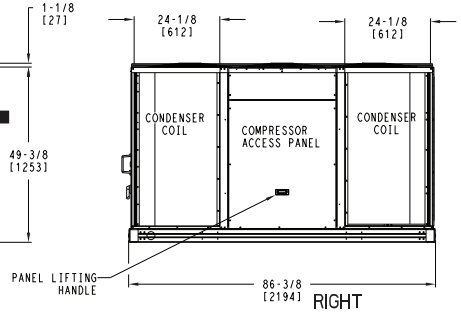
TOP

	CONNECTION SIZES
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
G	7/8" DIA [22] FIELD CONTROL WIRING KNOCKOUT

NOTES:
1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE



FRONT



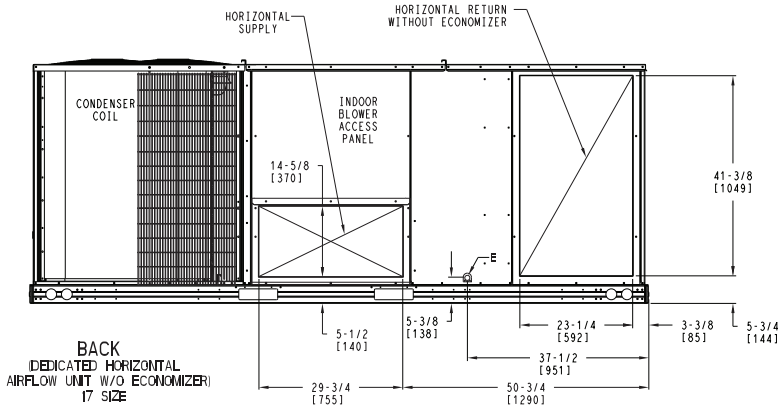
RIGHT

DEDICATED HORIZONTAL AIRFLOW UNIT
17 SIZE

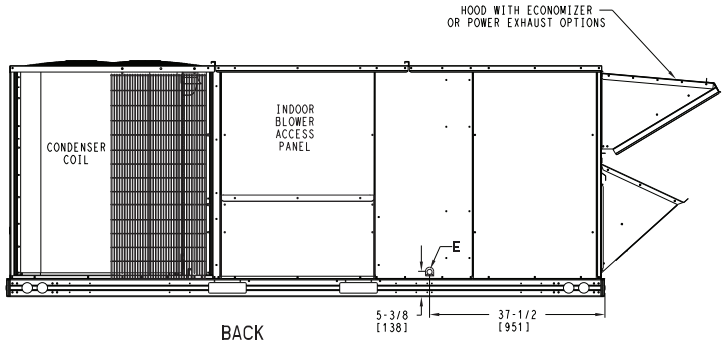
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 5	8/29/22	-	FCQ 17 SINGLE ZONE ELECTRICAL HEAT PUMP	50HE006191	-

50FCQ*17 Base Unit Dimensions (cont)

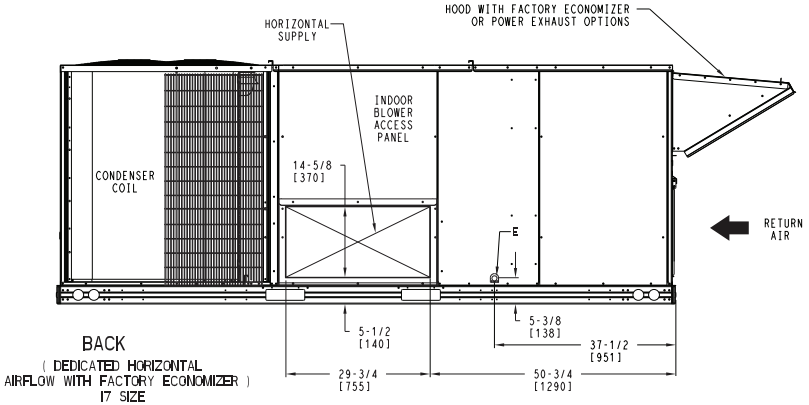
	CONNECTION SIZES
E	3/4"-14 NPT CONDENSATE DRAIN



BACK
(DEDICATED HORIZONTAL AIRFLOW UNIT W/O ECONOMIZER)
17 SIZE



BACK
(DEDICATED VERTICAL AIRFLOW UNIT W/ECONOMIZER)
17 SIZE



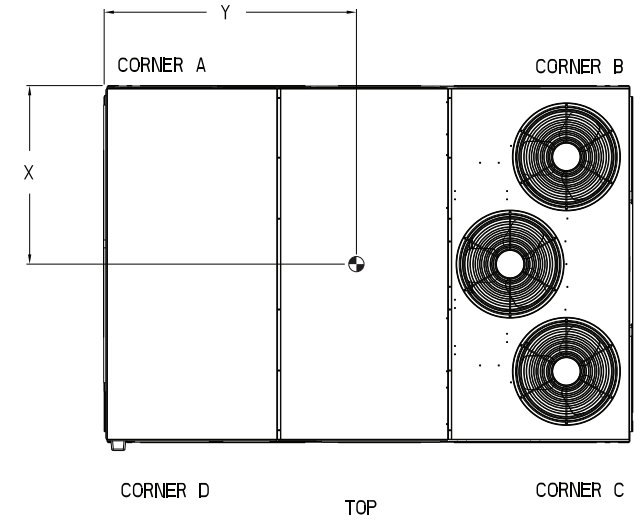
BACK
(DEDICATED HORIZONTAL AIRFLOW WITH FACTORY ECONOMIZER)
17 SIZE

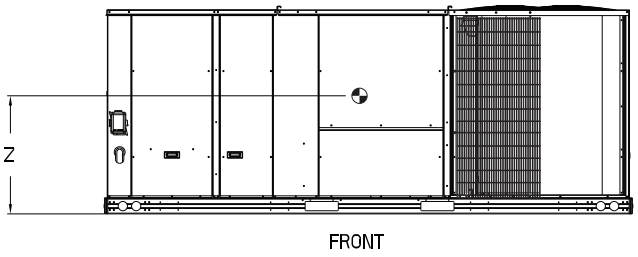
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 5	8/29/22	-	FCQ 17 SINGLE ZONE ELECTRICAL HEAT PUMP	50HE006191	-

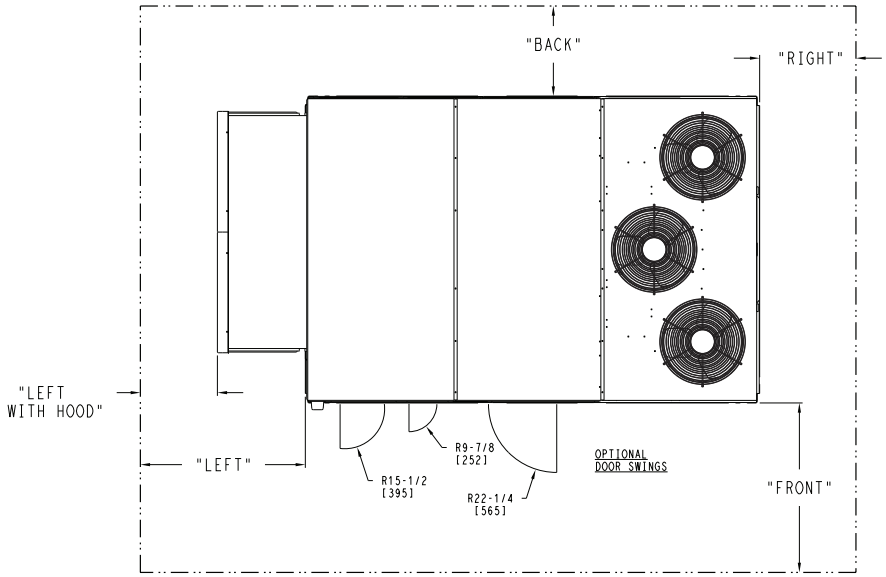
50FCQ*17 Base Unit Dimensions (cont)

UNIT	STD UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
FCQ-17	1627	738	357	162	460	209	456	207	354	161	72 [1829]	43 [1092]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.







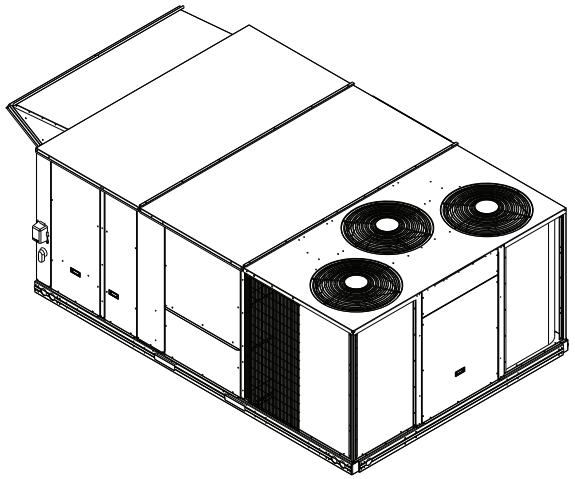
NOTES:

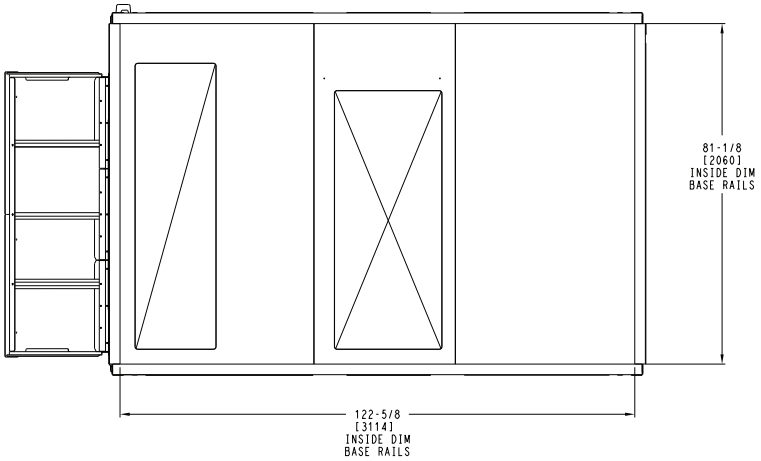
1. CLEARANCE ABOVE THE UNIT TO BE 72"
2. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	42 [1067mm]	36 [914mm]	18 [457mm]
LEFT WITH HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

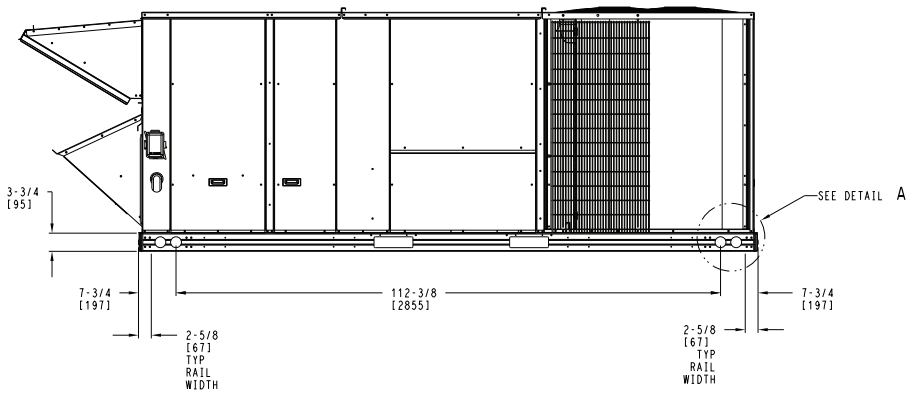
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	4 OF 5	8/29/22	-	FCQ 17 SINGLE ZONE ELECTRICAL HEAT PUMP	50HE006191	-

50FCQ*17 Base Unit Dimensions (cont)

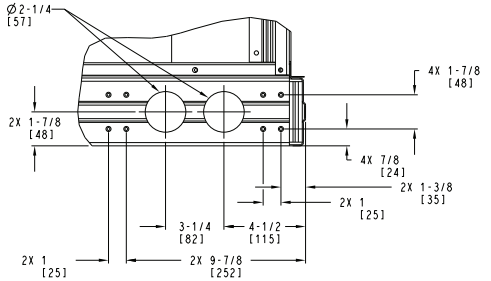




BOTTOM
INSIDE BASERAIL DIMENSIONS



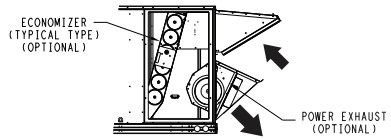
FRONT
RIGGING HOLE LOCATIONS



DETAIL A
TYP 4 PLCS

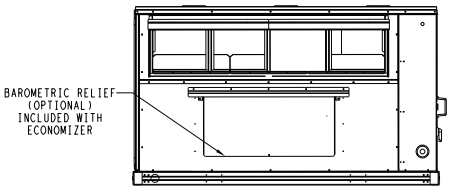
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES		
U.S. ECCN:NSR	5 OF 5	8/29/22	-	FCQ 17 SINGLE ZONE ELECTRICAL HEAT PUMP	50HE006191	REV -

50FCQ*24-28 Base Unit Dimensions



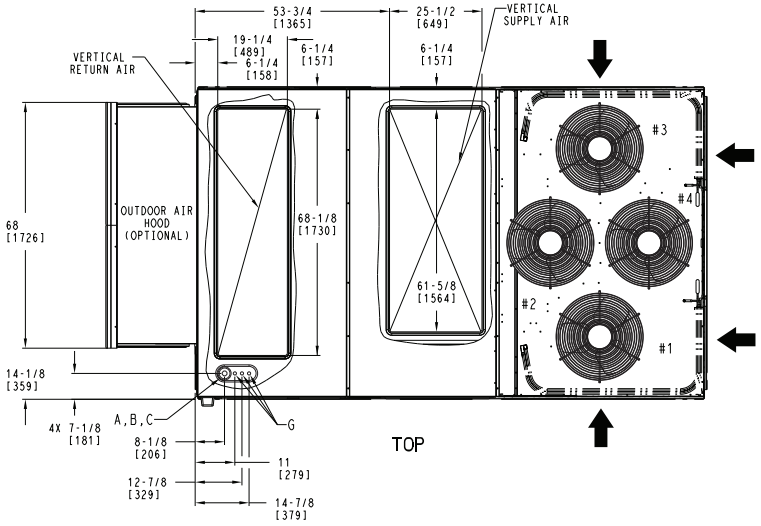
BACK

(PANELS REMOVED TO SHOW ECONOMIZER AND POWER EXHAUST OPTIONS)



LEFT

SHOWN WITH THE BAROMETRIC RELIEF OPTION INSTALLED



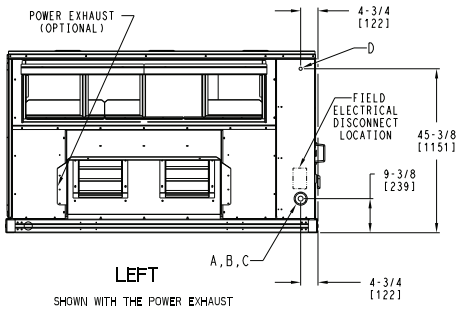
TOP

	CONNECTION SIZES
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
G	7/8" DIA [22] FIELD CONTROL WIRING KNOCKOUT

UNIT	H
24 SIZE	57-3/8 [1456]
28 SIZE	57-3/8 [1456]

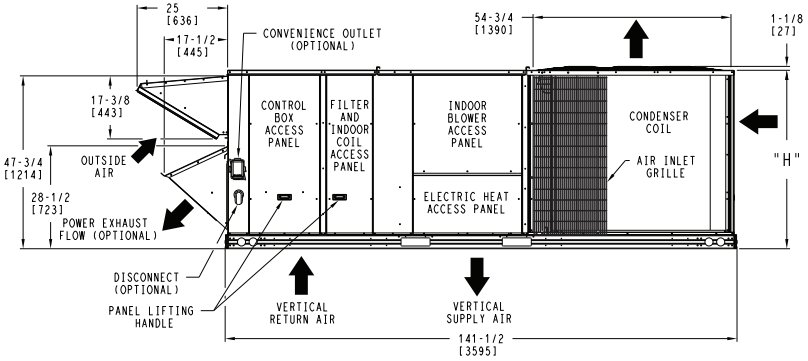
NOTES:

1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE

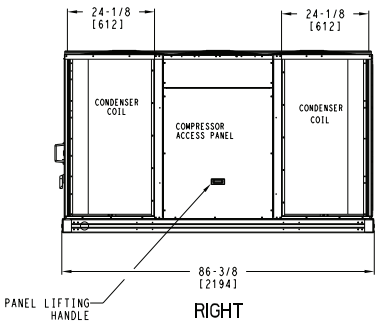


LEFT

SHOWN WITH THE POWER EXHAUST OPTION INSTALLED



FRONT

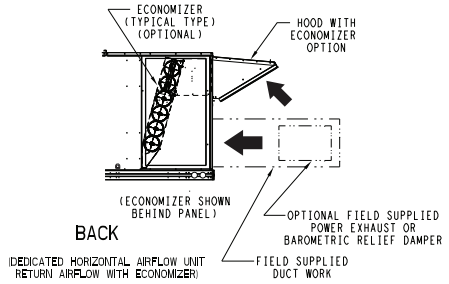


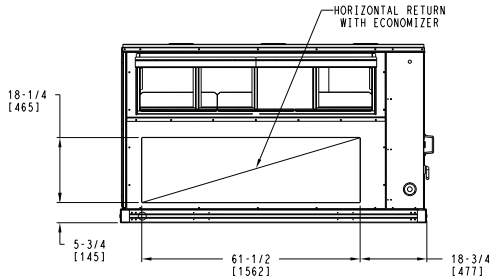
RIGHT

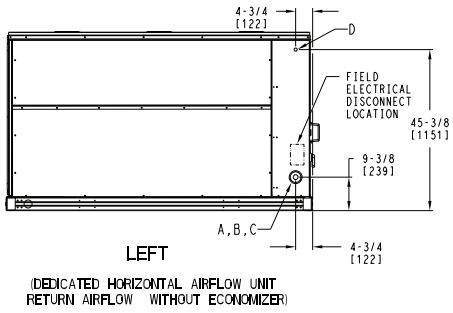
DEDICATED VERTICAL AIRFLOW UNIT
24,28 SIZE

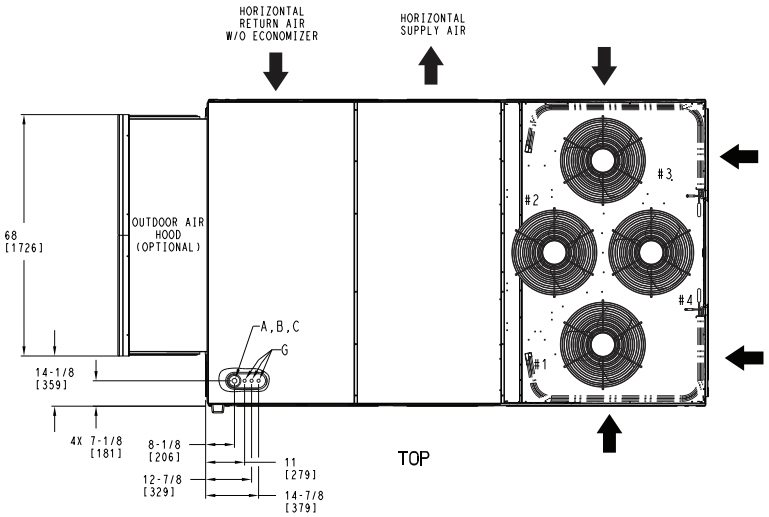
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	FCQ 24,28 SINGLE ZONE ELECTRICAL HEAT PUMP	50HE006192	REV
U.S. ECCN:NSR	1 OF 5	11/03/22	8/29/22			A

50FCQ*24-28 Base Unit Dimensions (cont)







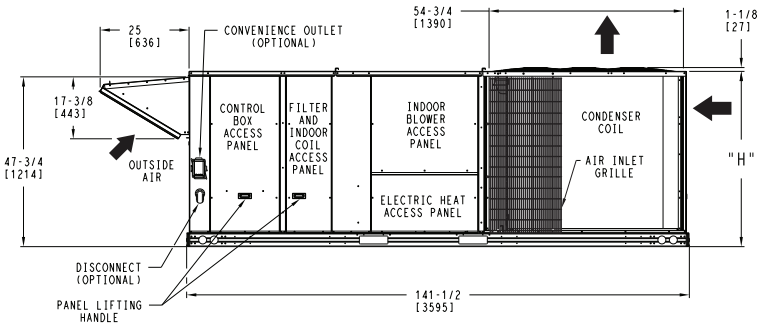


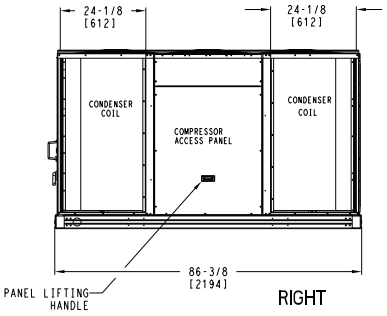
	CONNECTION SIZES
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
G	7/8" DIA [22] FIELD CONTROL WIRING KNOCKOUT

UNIT	H
24 SIZE	57-3/8 [1456]
28 SIZE	57-3/8 [1456]

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE





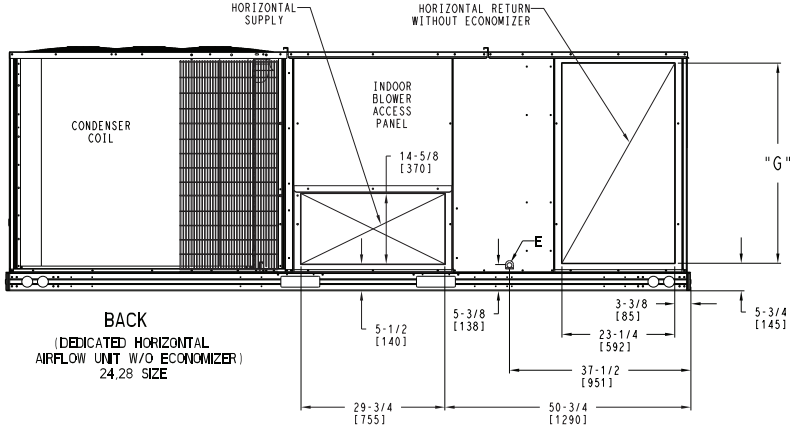
DEDICATED HORIZONTAL AIRFLOW UNIT
24,28 SIZE

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES		
U.S. ECCN:NSR	2 OF 5	11/03/22	8/30/22	FCQ 24,28 SINGLE ZONE ELECTRICAL HEAT PUMP	50HE006192	REV A

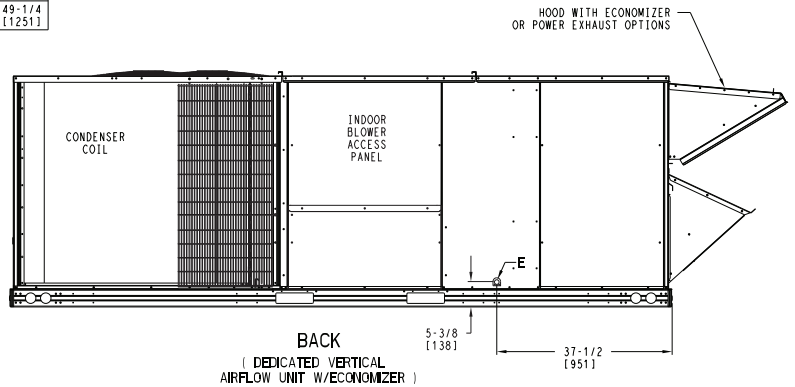
50FCQ*24-28 Base Unit Dimensions (cont)

	CONNECTION SIZES
E	3/4"-14 NPT CONDENSATE DRAIN

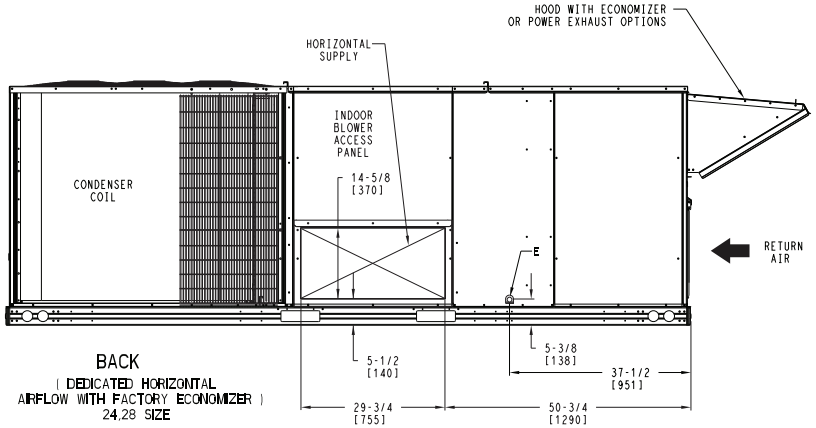
UNIT	G
24 SIZE	49-1/4 [1251]
28 SIZE	49-1/4 [1251]



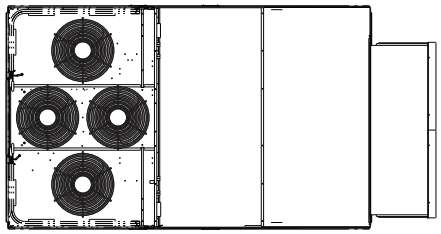
BACK
(DEDICATED HORIZONTAL AIRFLOW UNIT W/O ECONOMIZER)
24,28 SIZE



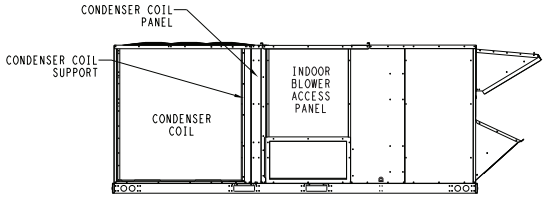
BACK
(DEDICATED VERTICAL AIRFLOW UNIT W/ECONOMIZER)
24,28 SIZE



BACK
(DEDICATED HORIZONTAL AIRFLOW WITH FACTORY ECONOMIZER)
24,28 SIZE



28 SIZE CONDENSER COIL TOP VIEW



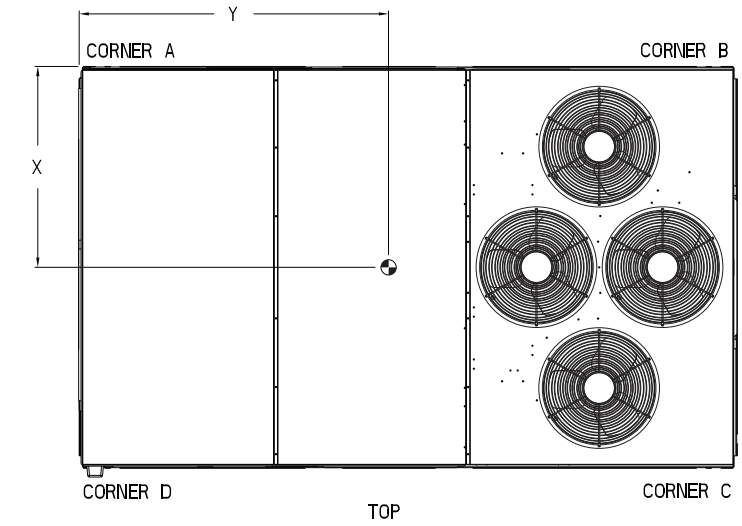
28 SIZE CONDENSER COIL END BRACKET SUPPORT

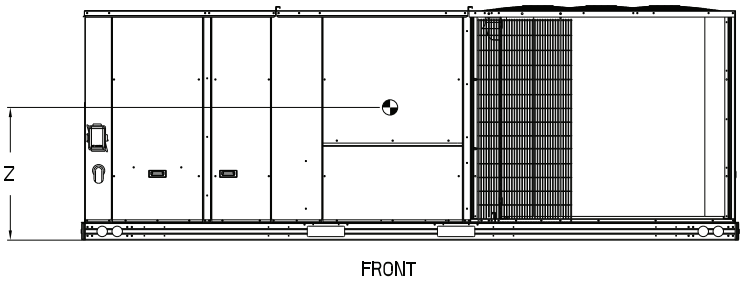
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 5	11/03/22	8/30/22	FCQ 24,28 SINGLE ZONE ELECTRICAL HEAT PUMP	50HE006192	A

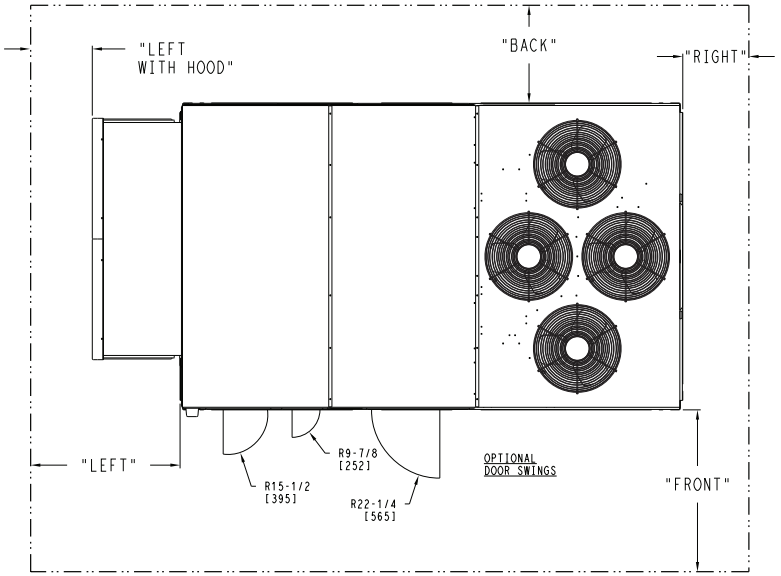
50FCQ*24-28 Base Unit Dimensions (cont)

UNIT	STD. UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
FCQ-24	2057	933	466	211	531	241	565	256	495	225	75 3/8 [1915]	44 1/2 [1130]	19 [483]
FCQ-28	2125	964	465	211	556	252	601	273	503	228	77 [1956]	44 7/8 [1140]	19 [483]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.







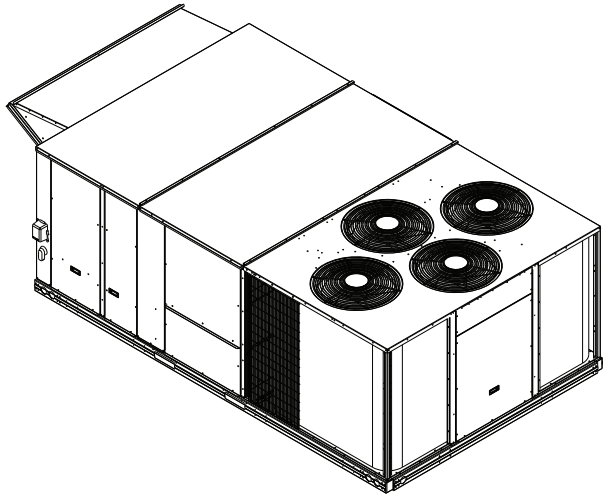
NOTES:

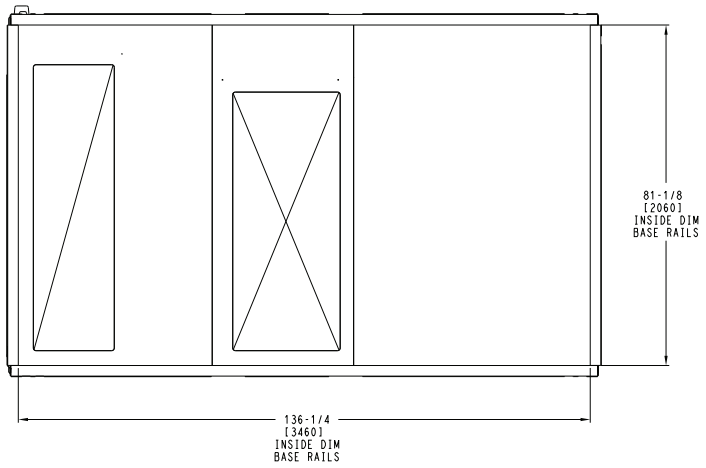
1. CLEARANCE ABOVE THE UNIT TO BE 72"
2. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	42 [1067mm]	36 [914mm]	18 [457mm]
LEFT WITH HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

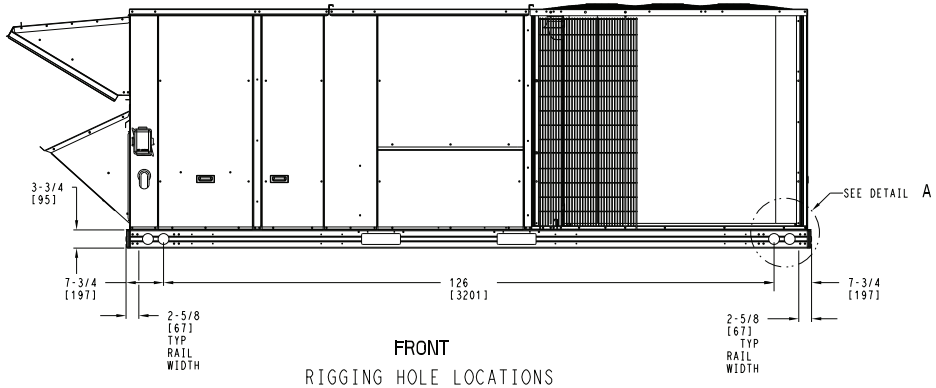
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	4 OF 5	11/03/22	8/30/22	FCQ 24,28 SINGLE ZONE ELECTRICAL HEAT PUMP	50HE006192	A

50FCQ*24-28 Base Unit Dimensions (cont)

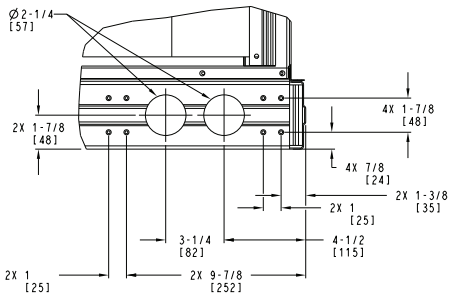




BOTTOM
INSIDE BASERAIL DIMENSIONS



FRONT
RIGGING HOLE LOCATIONS



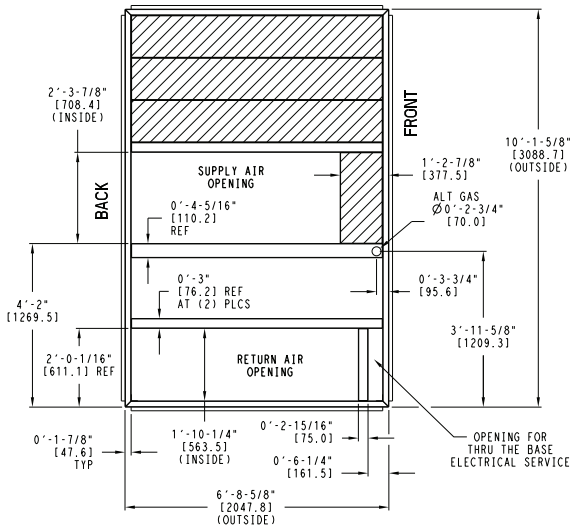
DETAIL A
TYP 4 PLCS

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	5 OF 5	11/03/22	-	FCQ 24,28 SINGLE ZONE ELECTRICAL HEAT PUMP	50HE006192	A

Accessory dimensions

Roof Curb Dimensions — 50FCQ*17

"A"	ROOF CURB ACCESSORY
1′-2" [356.0]	CRRFCURB045A00
2′-0" [610.0]	CRRFCURB046A00



NOTES:

1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.

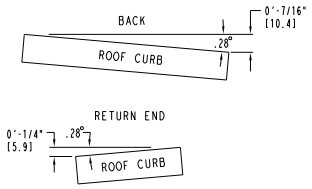
2 DIMENSIONS IN [ ] ARE IN MILLIMETERS.

3 ROOF CURB GALVANIZED STEEL.

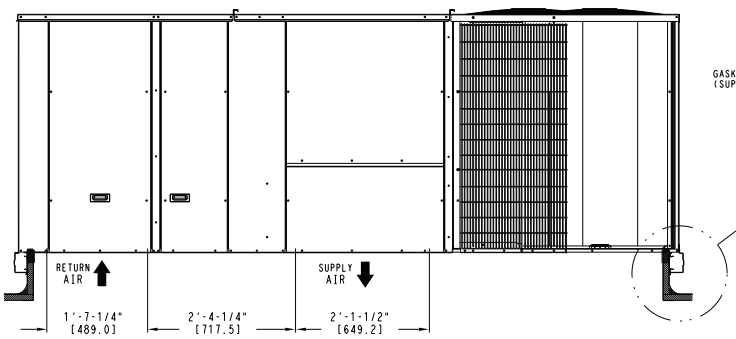
4 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)

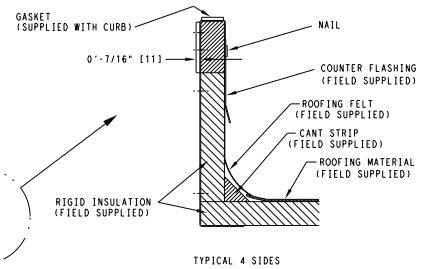
5 SERVICE CLEARANCE 4 ft ON EACH SIDE

DIRECTION OF AIR FLOW

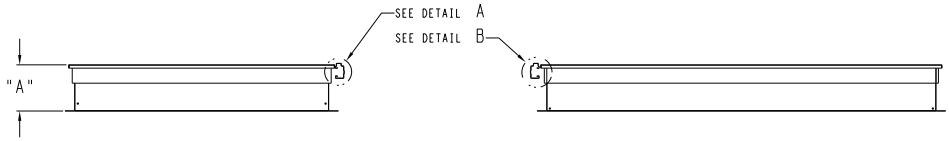


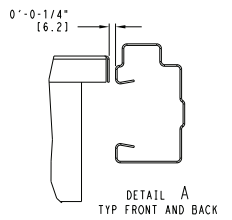
MAX CURB LEVELING TOLERANCES

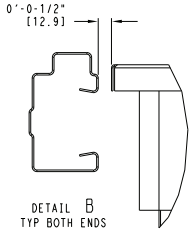


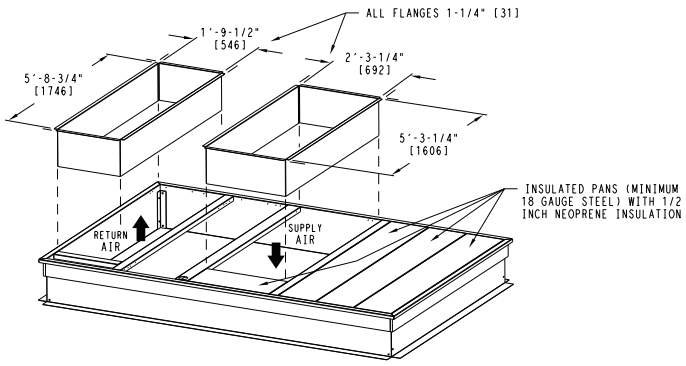


TYPICAL 4 SIDES





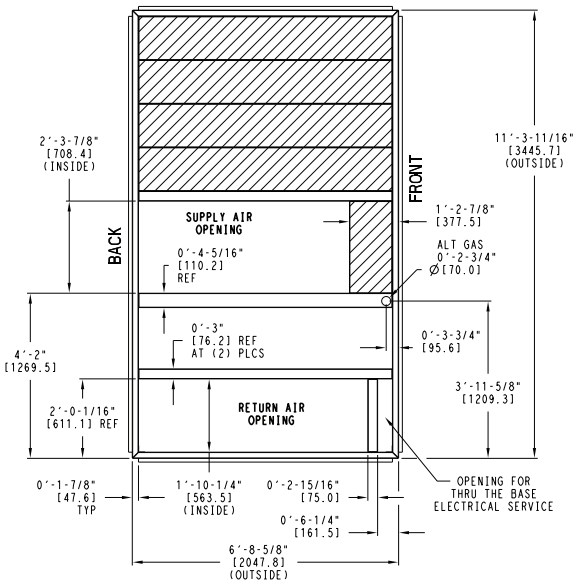




Accessory dimensions (cont)

Roof Curb Dimensions — 50FCQ*24-28

"A"	ROOF CURB ACCESSORY
1′-2" [356.0]	CRRFCURB047A00
2′-0" [610.0]	CRRFCURB048A00



NOTES:

1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.

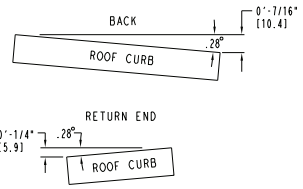
2 DIMENSIONS IN [ ] ARE IN MILLIMETERS.

3 ROOF CURB GALVANIZED STEEL.

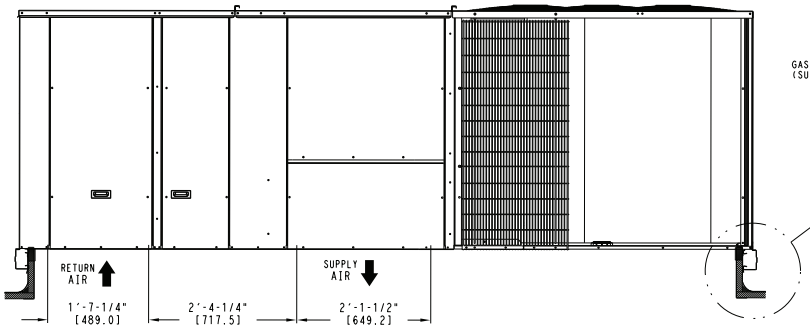
4 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)

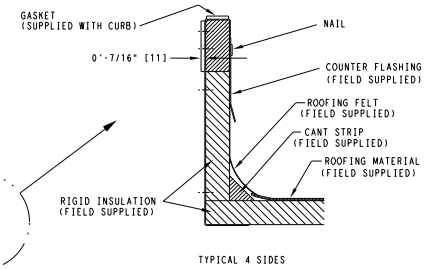
5 SERVICE CLEARANCE 4 ft ON EACH SIDE

DIRECTION OF AIR FLOW

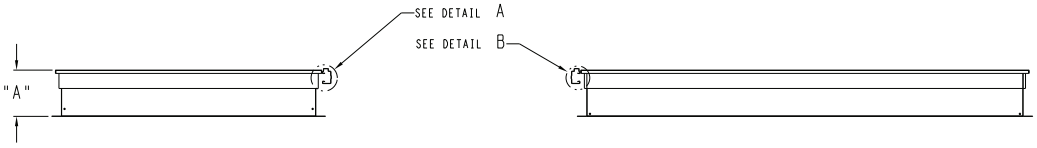


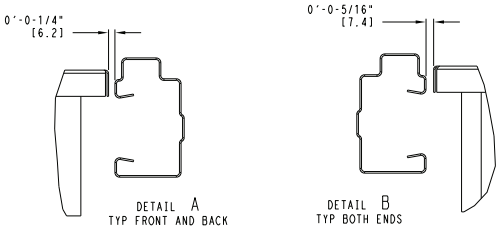
MAX CURB LEVELING TOLERANCES

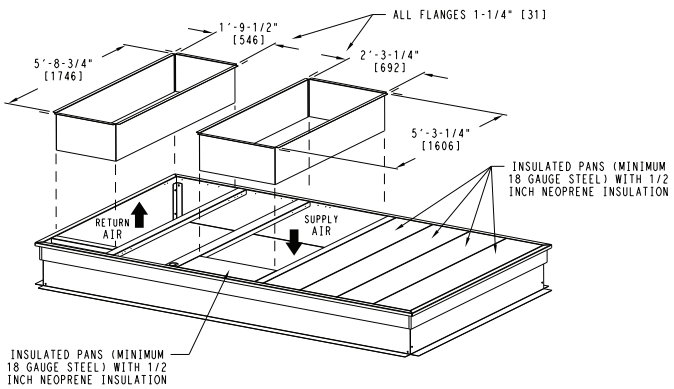




TYPICAL 4 SIDES







Performance data

50FCQM17 Two Stage Cooling Capacities

50FCQM17				AMBIENT TEMPERATURE (°F)															
				85			95			105			115			125		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85	75	80	85
4500 cfm	EAT (wb)	58	TC	144.9	144.9	157.4	136.8	136.8	146.8	126.6	126.6	141.0	116.6	116.6	133.8	107.6	107.6	123.9
			SHC	121.1	139.2	157.4	112.7	129.8	146.8	106.4	123.7	141.0	99.5	116.6	133.8	91.3	107.6	123.9
		62	TC	154.0	154.0	154.0	143.9	143.9	143.9	133.2	133.2	135.7	122.6	122.6	129.3	111.6	111.6	122.6
			SHC	108.8	128.5	148.3	102.5	122.3	142.1	96.1	115.9	135.7	89.6	109.5	129.3	83.0	102.8	122.6
		67	TC	170.8	170.8	170.8	159.9	159.9	159.9	148.7	148.7	148.7	137.3	137.3	137.3	125.6	125.6	125.6
			SHC	89.5	108.7	127.9	83.2	102.7	122.1	76.9	96.5	116.1	70.5	90.2	109.9	64.2	84.0	103.8
		72	TC	189.7	189.7	189.7	178.0	178.0	178.0	166.2	166.2	166.2	154.1	154.1	154.1	141.5	141.5	141.5
			SHC	71.7	88.4	105.1	64.8	82.5	100.2	58.2	76.6	94.9	51.7	70.5	89.3	45.1	64.4	83.6
		76	TC	—	205.0	205.0	—	193.7	193.7	—	181.4	181.4	—	168.4	168.4	—	155.0	155.0
			SHC	—	73.7	98.5	—	65.8	90.6	—	58.9	83.6	—	53.3	78.0	—	47.8	72.5
5250 cfm	EAT (wb)	58	TC	153.3	153.3	166.4	142.2	142.2	161.8	133.2	133.2	152.0	123.9	123.9	141.9	114.4	114.4	131.5
			SHC	128.3	147.4	166.4	122.6	142.2	161.8	114.4	133.2	152.0	105.9	123.9	141.9	97.3	114.4	131.5
		62	TC	155.9	155.9	166.7	148.9	148.9	156.3	138.1	138.1	149.6	126.9	126.9	142.3	115.7	115.7	134.1
			SHC	121.0	143.9	166.7	111.1	133.7	156.3	104.5	127.1	149.6	97.6	119.9	142.3	90.2	112.2	134.1
		67	TC	176.2	176.2	176.2	165.0	165.0	165.0	153.4	153.4	153.4	141.6	141.6	141.6	129.4	129.4	129.4
			SHC	95.4	117.6	139.9	89.1	111.5	133.9	82.7	105.2	127.7	76.2	98.9	121.5	69.7	92.5	115.2
		72	TC	195.3	195.3	195.3	183.4	183.4	183.4	171.0	171.0	171.0	158.3	158.3	158.3	145.4	145.4	145.4
			SHC	73.8	94.6	115.4	67.3	88.6	109.9	60.8	82.5	104.2	54.3	76.3	98.4	47.7	70.0	92.3
		76	TC	—	212.2	212.2	—	199.4	199.4	—	186.1	186.1	—	172.6	172.6	—	159.0	159.0
			SHC	—	74.3	103.2	—	68.5	97.4	—	63.3	92.1	—	57.4	86.2	—	51.3	70.8
6000 cfm	EAT (wb)	58	TC	158.1	158.1	179.3	149.1	149.1	169.5	139.7	139.7	159.2	129.9	129.9	148.6	120.0	120.0	137.7
			SHC	136.9	158.1	179.3	128.7	149.1	169.5	120.1	139.7	159.2	111.3	129.9	148.6	102.2	120.0	137.7
		62	TC	163.9	163.9	175.8	152.9	152.9	168.8	142.0	142.0	161.4	132.7	132.7	150.7	122.4	122.4	139.4
			SHC	125.5	150.6	175.8	118.7	143.8	168.8	111.7	136.6	161.4	103.4	127.1	150.7	94.5	117.0	139.4
		67	TC	180.5	180.5	180.5	169.0	169.0	169.0	157.0	157.0	157.0	144.8	144.8	144.8	132.3	132.3	132.3
			SHC	100.7	125.8	150.8	94.4	119.6	144.8	88.0	113.3	138.6	81.4	106.8	132.2	74.8	100.3	125.7
		72	TC	199.7	199.7	199.7	187.3	187.3	187.3	174.6	174.6	174.6	161.6	161.6	161.6	148.3	148.3	148.3
			SHC	76.2	100.2	124.2	69.7	94.1	118.5	63.2	87.9	112.6	56.6	81.5	106.5	50.0	75.2	100.3
		76	TC	—	216.3	216.3	—	203.3	203.3	—	189.8	189.8	—	176.0	176.0	—	162.2	162.2
			SHC	—	78.3	111.3	—	72.6	105.6	—	66.7	86.8	—	60.5	82.6	—	54.5	77.9
6750 cfm	EAT (wb)	58	TC	164.4	164.4	186.3	155.0	155.0	176.0	145.2	145.2	165.3	135.1	135.1	154.3	124.8	124.8	143.1
			SHC	142.5	164.4	186.3	133.9	155.0	176.0	125.0	145.2	165.3	115.8	135.1	154.3	106.5	124.8	143.1
		62	TC	167.5	167.5	187.2	159.2	159.2	169.1	147.9	147.9	165.5	137.7	137.7	155.9	126.9	126.9	143.2
			SHC	132.4	159.8	187.2	120.4	144.8	169.1	115.3	140.4	165.5	107.3	131.6	155.9	97.6	120.4	143.2
		67	TC	184.1	184.1	184.1	161.3	161.3	170.0	159.9	159.9	159.9	147.4	147.4	147.4	134.7	134.7	135.7
			SHC	105.8	133.6	161.4	109.9	140.0	170.0	92.9	120.9	148.8	86.3	114.3	142.3	79.6	107.7	135.7
		72	TC	203.2	203.2	203.2	190.6	190.6	190.6	177.5	177.5	177.5	164.2	164.2	164.2	150.7	150.7	150.7
			SHC	78.4	105.4	132.4	72.0	99.2	126.5	65.4	92.9	120.4	58.8	86.5	114.3	52.1	80.1	108.0
		76	TC	—	219.9	219.9	—	206.5	206.5	—	192.8	192.8	—	179.0	179.0	—	164.7	164.7
			SHC	—	81.8	118.9	—	75.8	98.6	—	69.7	94.3	—	63.6	89.4	—	57.3	83.9
7500 cfm	EAT (wb)	58	TC	169.7	169.7	192.2	160.0	160.0	181.6	149.8	149.8	170.6	139.5	139.5	159.2	128.8	128.8	147.6
			SHC	147.2	169.7	192.2	138.3	160.0	181.6	129.1	149.8	170.6	119.7	139.5	159.2	110.1	128.8	147.6
		62	TC	172.7	172.7	194.8	163.2	163.2	183.6	153.2	153.2	169.9	142.1	142.1	158.8	128.9	128.9	154.0
			SHC	137.6	166.2	194.8	129.0	156.3	183.6	118.9	144.4	169.9	110.0	134.4	158.8	103.9	128.9	154.0
		67	TC	187.0	187.0	187.0	174.8	174.8	174.8	155.0	155.0	173.8	150.0	150.0	152.3	136.6	136.6	145.1
			SHC	110.7	141.0	171.4	104.2	134.6	165.1	110.2	142.0	173.8	91.1	121.7	152.3	84.1	114.6	145.1
		72	TC	206.1	206.1	206.1	193.2	193.2	193.2	179.9	179.9	179.9	166.4	166.4	166.4	152.7	152.7	152.7
			SHC	80.5	110.3	140.0	74.1	104.1	134.1	67.5	97.7	127.9	60.8	91.2	121.6	54.2	84.8	115.4
		76	TC	—	222.9	222.9	—	209.3	209.3	—	195.2	195.2	—	181.2	181.2	—	166.6	166.6
			SHC	—	84.8	110.3	—	78.6	105.4	—	72.5	100.5	—	66.4	95.3	—	60.0	89.6

LEGEND

— — Do Not Operate
cfm — Cubic Feet Per Minute (Supply Air)
EAT (db) — Entering Air Temperature (dry bulb)
EAT (wb) — Entering Air Temperature (wet bulb)
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTE: See minimum-maximum airflow ratings on page 6.

Performance data (cont)

50FCQM17 Single Stage Cooling Capacities

50FCQM17				AMBIENT TEMPERATURE (°F)															
				85			95			105			115			125		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85	75	80	85
2700 cfm	EAT (wb)	58	TC	91.8	91.8	101.9	85.4	85.4	95.1	78.0	78.0	89.8	71.3	71.3	82.8	64.5	64.5	75.4
			SHC	77.0	89.4	101.9	71.1	83.1	95.1	65.9	77.9	89.8	59.9	71.3	82.8	53.6	64.5	75.4
		62	TC	99.8	99.8	99.8	92.2	92.2	92.2	84.6	84.6	84.6	76.3	76.3	78.2	68.1	68.1	73.0
			SHC	68.0	80.7	93.4	62.9	75.7	88.4	57.9	70.7	83.4	52.7	65.4	78.2	47.4	60.2	73.0
		67	TC	111.8	111.8	111.8	103.7	103.7	103.7	95.3	95.3	95.3	86.8	86.8	86.8	78.1	78.1	78.1
			SHC	56.0	68.3	80.7	50.9	63.4	75.8	45.7	58.3	70.9	40.6	53.2	65.8	35.4	48.1	60.8
		72	TC	125.2	125.2	125.2	116.6	116.6	116.6	107.8	107.8	107.8	98.7	98.7	98.7	89.5	89.5	89.5
			SHC	45.2	55.8	66.5	39.6	50.9	62.3	34.2	46.0	57.7	28.9	40.9	53.0	23.5	35.8	48.1
		76	TC	—	136.3	136.3	—	127.5	127.5	—	118.7	118.7	—	109.3	109.3	—	99.4	99.4
			SHC	—	46.6	61.4	—	41.5	56.4	—	35.5	50.4	—	30.2	45.0	—	25.5	40.4
3150 cfm	EAT (wb)	58	TC	97.7	97.7	109.5	90.5	90.5	103.6	83.7	83.7	96.3	76.6	76.6	88.7	69.4	69.4	80.9
			SHC	82.9	96.2	109.5	77.3	90.5	103.6	71.1	83.7	96.3	64.6	76.6	88.7	58.0	69.4	80.9
		62	TC	104.0	104.0	104.0	96.1	96.1	98.3	87.9	87.9	93.0	79.6	79.6	87.7	71.0	71.0	82.0
			SHC	74.3	88.9	103.5	69.1	83.7	98.3	63.8	78.4	93.0	58.5	73.1	87.7	53.0	67.5	82.0
		67	TC	116.0	116.0	116.0	107.5	107.5	107.5	98.9	98.9	98.9	90.0	90.0	90.0	81.0	81.0	81.0
			SHC	60.2	74.5	88.9	55.0	69.5	83.9	49.8	64.3	78.8	44.5	59.1	73.7	39.3	53.9	68.5
		72	TC	129.6	129.6	129.6	120.7	120.7	120.7	111.5	111.5	111.5	102.1	102.1	102.1	92.5	92.5	92.5
			SHC	46.8	60.1	73.5	41.5	55.2	68.9	36.1	50.1	64.0	30.8	44.9	59.1	25.4	39.7	54.0
		76	TC	—	141.7	141.7	—	132.5	132.5	—	122.6	122.6	—	112.6	112.6	—	102.4	102.4
			SHC	—	48.1	65.4	—	42.6	60.0	—	38.0	55.3	—	33.1	50.4	—	28.0	40.2
3600 cfm	EAT (wb)	58	TC	102.5	102.5	116.7	95.6	95.6	109.3	88.5	88.5	101.6	81.1	81.1	93.6	73.6	73.6	85.5
			SHC	88.3	102.5	116.7	81.9	95.6	109.3	75.3	88.5	101.6	68.6	81.1	93.6	61.7	73.6	85.5
		62	TC	107.3	107.3	112.8	99.2	99.2	107.4	90.8	90.8	101.7	82.4	82.4	95.9	74.3	74.3	87.8
			SHC	79.9	96.4	112.8	74.7	91.0	107.4	69.2	85.5	101.7	63.6	79.7	95.9	57.0	72.4	87.8
		67	TC	119.3	119.3	119.3	110.7	110.7	110.7	101.8	101.8	101.8	92.6	92.6	92.6	83.4	83.4	83.4
			SHC	64.1	80.4	96.6	58.9	75.2	91.5	53.6	70.0	86.4	48.3	64.7	81.1	42.9	59.4	75.9
		72	TC	133.1	133.1	133.1	123.9	123.9	123.9	114.4	114.4	114.4	104.7	104.7	104.7	94.8	94.8	94.8
			SHC	48.6	64.1	79.7	43.2	59.0	74.8	37.9	53.9	69.9	32.5	48.6	64.8	27.1	43.3	59.6
		76	TC	—	145.4	145.4	—	135.6	135.6	—	125.5	125.5	—	115.3	115.3	—	105.0	105.0
			SHC	—	50.2	70.0	—	45.5	65.3	—	40.5	60.3	—	35.4	49.5	—	30.3	45.3
4050 cfm	EAT (wb)	58	TC	107.1	107.1	121.9	100.0	100.0	114.1	92.6	92.6	106.2	84.9	84.9	97.9	77.1	77.1	89.4
			SHC	92.4	107.1	121.9	85.8	100.0	114.1	79.0	92.6	106.2	72.0	84.9	97.9	64.8	77.1	89.4
		62	TC	109.8	109.8	120.9	101.9	101.9	115.5	93.6	93.6	108.8	85.2	85.2	101.9	77.7	77.7	92.2
			SHC	84.9	102.9	120.9	79.6	97.6	115.5	73.6	91.2	108.8	67.5	84.7	101.9	60.1	76.2	92.2
		67	TC	122.1	122.1	122.1	113.2	113.2	113.2	104.1	104.1	104.1	94.7	94.7	94.7	85.3	85.3	85.3
			SHC	67.7	85.9	104.0	62.5	80.6	98.8	57.2	75.4	93.6	51.8	70.0	88.2	46.4	64.7	83.0
		72	TC	135.9	135.9	135.9	126.5	126.5	126.5	116.8	116.8	116.8	106.9	106.9	106.9	96.8	96.8	96.8
			SHC	50.2	67.8	85.4	44.9	62.6	80.4	39.6	57.4	75.3	34.2	52.2	70.2	28.7	46.8	65.0
		76	TC	—	148.1	148.1	—	138.2	138.2	—	127.9	127.9	—	117.6	117.6	—	106.9	106.9
			SHC	—	52.8	75.1	—	47.9	62.4	—	42.8	58.6	—	37.6	54.3	—	32.3	49.6
4500 cfm	EAT (wb)	58	TC	111.1	111.1	126.3	103.8	103.8	118.4	96.1	96.1	110.0	88.2	88.2	101.6	80.2	80.2	92.9
			SHC	96.0	111.1	126.3	89.2	103.8	118.4	82.1	96.1	110.0	74.9	88.2	101.6	67.6	80.2	92.9
		62	TC	112.7	112.7	128.6	105.0	105.0	120.8	97.3	97.3	112.3	89.2	89.2	104.2	80.3	80.3	97.2
			SHC	89.7	109.1	128.6	83.3	102.1	120.8	76.4	94.3	112.3	69.7	87.0	104.2	63.4	80.3	97.2
		67	TC	124.3	124.3	124.3	115.3	115.3	115.3	106.0	106.0	106.0	96.4	96.4	96.4	86.6	86.6	89.4
			SHC	71.2	91.1	111.0	65.9	85.8	105.8	60.5	80.5	100.4	55.1	75.1	95.0	49.5	69.5	89.4
		72	TC	138.2	138.2	138.2	128.6	128.6	128.6	118.7	118.7	118.7	108.6	108.6	108.6	98.3	98.3	98.3
			SHC	51.8	71.3	90.7	46.5	66.1	85.7	41.1	60.8	80.5	35.7	55.5	75.3	30.2	50.1	70.0
		76	TC	—	150.5	150.5	—	140.4	140.4	—	130.0	130.0	—	119.3	119.3	—	108.5	108.5
			SHC	—	55.0	71.5	—	49.9	67.5	—	44.8	63.1	—	39.5	58.4	—	34.2	53.4

LEGEND

— — Do Not Operate
cfm — Cubic Feet Per Minute (Supply Air)
EAT (db) — Entering Air Temperature (dry bulb)
EAT (wb) — Entering Air Temperature (wet bulb)
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTE: See minimum-maximum airflow ratings on page 6.

Performance data (cont)

50FCQM24 Two Stage Cooling Capacities

50FCQM24				AMBIENT TEMPERATURE (°F)															
				85			95			105			115			125		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85	75	80	85
6000 cfm	EAT (wb)	58	TC	205.6	205.6	233.9	193.7	193.7	221.0	181.2	181.2	207.3	168.1	168.1	193.1	154.2	154.2	177.9
			SHC	177.3	205.6	233.9	166.5	193.7	221.0	155.0	181.2	207.3	143.1	168.1	193.1	130.5	154.2	177.9
		62	TC	217.8	217.8	222.3	203.5	203.5	213.4	188.3	188.3	204.1	172.4	172.4	194.4	155.9	155.9	184.2
			SHC	159.7	191.0	222.3	150.7	182.0	213.4	141.5	172.8	204.1	132.0	163.2	194.4	122.0	153.1	184.2
		67	TC	242.0	242.0	242.0	226.8	226.8	226.8	210.6	210.6	210.6	193.8	193.8	193.8	176.1	176.1	176.1
			SHC	130.2	161.6	193.0	121.3	152.7	184.1	112.1	143.5	174.9	102.7	134.1	165.5	93.1	124.4	155.8
		72	TC	268.3	268.3	268.3	252.0	252.0	252.0	234.9	234.9	234.9	216.9	216.9	216.9	198.0	198.0	198.0
			SHC	100.2	131.5	162.8	91.4	122.6	153.9	82.2	113.5	144.8	72.9	104.1	135.4	63.2	94.5	125.7
		76	TC	—	290.5	290.5	—	273.4	273.4	—	255.3	255.3	—	236.4	236.4	—	—	—
			SHC	—	106.9	137.1	—	98.1	128.5	—	89.0	119.5	—	79.6	110.2	—	—	—
7000 cfm	EAT (wb)	58	TC	218.8	218.8	248.6	206.2	206.2	234.9	192.9	192.9	220.4	178.9	178.9	205.1	164.5	164.5	189.4
			SHC	189.0	218.8	248.6	177.5	206.2	234.9	165.5	192.9	220.4	152.7	178.9	205.1	139.6	164.5	189.4
		62	TC	225.7	225.7	246.3	210.7	210.7	236.9	195.0	195.0	226.9	181.8	181.8	207.7	168.8	168.8	185.7
			SHC	174.1	210.2	246.3	164.9	200.9	236.9	155.2	191.1	226.9	141.3	174.5	207.7	125.9	155.8	185.7
		67	TC	250.0	250.0	250.0	234.1	234.1	234.1	217.3	217.3	217.3	199.8	199.8	199.8	181.4	181.4	181.4
			SHC	139.6	175.9	212.2	130.6	166.8	203.1	121.3	157.5	193.7	111.7	147.9	184.1	101.9	138.1	174.3
		72	TC	276.5	276.5	276.5	259.6	259.6	259.6	241.7	241.7	241.7	223.0	223.0	223.0	203.4	203.4	203.4
			SHC	104.4	140.5	176.7	95.4	131.5	167.6	86.1	122.2	158.4	76.6	112.7	148.8	66.9	103.0	139.1
		76	TC	—	299.0	299.0	—	281.1	281.1	—	262.3	262.3	—	242.7	242.7	—	—	—
			SHC	—	111.7	146.9	—	102.7	138.0	—	93.5	128.8	—	84.0	119.4	—	—	—
8000 cfm	EAT (wb)	58	TC	229.8	229.8	260.8	216.6	216.6	246.4	202.7	202.7	231.3	188.1	188.1	215.3	172.8	172.8	198.6
			SHC	198.8	229.8	260.8	186.7	216.6	246.4	174.1	202.7	231.3	160.9	188.1	215.3	147.0	172.8	198.6
		62	TC	232.0	232.0	268.1	220.6	220.6	245.6	202.9	202.9	241.1	188.3	188.3	224.7	172.6	172.6	207.0
			SHC	187.2	227.7	268.1	171.9	208.7	245.6	164.7	202.9	241.1	151.9	188.3	224.7	138.2	172.6	207.0
		67	TC	256.1	256.1	256.1	239.7	239.7	239.7	222.3	222.3	222.3	204.3	204.3	204.3	185.4	185.4	192.0
			SHC	148.4	189.4	230.4	139.3	180.2	221.2	129.8	170.8	211.7	120.2	161.1	202.0	110.3	151.2	192.0
		72	TC	282.8	282.8	282.8	265.3	265.3	265.3	246.9	246.9	246.9	227.7	227.7	227.7	207.5	207.5	207.5
			SHC	108.1	148.9	189.8	99.0	139.8	180.6	89.6	130.4	171.2	80.0	120.8	161.6	70.1	110.9	151.7
		76	TC	—	305.3	305.3	—	286.9	286.9	—	267.6	267.6	—	247.4	247.4	—	—	—
			SHC	—	115.9	155.8	—	106.8	146.7	—	97.5	137.5	—	87.9	128.0	—	—	—
9000 cfm	EAT (wb)	58	TC	239.2	239.2	271.2	225.4	225.4	256.2	211.4	211.4	241.0	195.8	195.8	223.9	179.8	179.8	206.4
			SHC	207.1	239.2	271.2	194.5	225.4	256.2	181.8	211.4	241.0	167.7	195.8	223.9	153.2	179.8	206.4
		62	TC	242.8	242.8	271.2	225.6	225.6	266.8	211.1	211.1	250.5	196.0	196.0	233.6	180.0	180.0	215.5
			SHC	191.4	231.3	271.2	184.4	225.6	266.8	171.7	211.1	250.5	158.5	196.0	233.6	144.5	180.0	215.5
		67	TC	261.0	261.0	261.0	244.1	244.1	244.1	226.3	226.3	229.1	207.9	207.9	219.3	188.5	188.5	209.2
			SHC	156.7	202.4	248.0	147.5	193.1	238.7	138.0	183.6	229.1	128.3	173.8	219.3	118.4	163.8	209.2
		72	TC	287.7	287.7	287.7	269.8	269.8	269.8	251.0	251.0	251.0	231.2	231.2	231.2	210.6	210.6	210.6
			SHC	111.3	156.8	202.2	102.2	147.6	193.1	92.7	138.2	183.6	83.0	128.5	173.9	73.1	118.5	163.9
		76	TC	—	310.4	310.4	—	291.5	291.5	—	271.7	271.7	—	251.1	251.1	—	—	—
			SHC	—	119.8	164.2	—	110.6	155.1	—	101.1	145.7	—	91.5	136.0	—	—	—
1000 0 cfm	EAT (wb)	58	TC	247.1	247.1	280.1	232.9	232.9	264.5	217.9	217.9	248.2	202.3	202.3	231.1	185.7	185.7	212.9
			SHC	214.1	247.1	280.1	201.2	232.9	264.5	187.6	217.9	248.2	173.4	202.3	231.1	158.5	185.7	212.9
		62	TC	247.4	247.4	291.4	233.1	233.1	275.5	218.2	218.2	258.7	202.5	202.5	241.0	185.9	185.9	222.3
			SHC	203.3	247.4	291.4	190.8	233.1	275.5	177.7	218.2	258.7	164.0	202.5	241.0	149.5	185.9	222.3
		67	TC	264.9	264.9	265.1	247.7	247.7	255.7	229.6	229.6	246.0	210.8	210.8	236.0	191.1	191.1	225.8
			SHC	164.8	214.9	265.1	155.5	205.6	255.7	145.9	196.0	246.0	136.2	186.1	236.0	126.2	176.0	225.8
		72	TC	291.7	291.7	291.7	273.3	273.3	273.3	254.1	254.1	254.1	234.1	234.1	234.1	—	—	—
			SHC	114.3	164.4	214.4	105.1	155.1	205.1	95.6	145.6	195.5	85.9	135.8	185.8	—	—	—
		76	TC	—	314.5	314.5	—	295.3	295.3	—	275.0	275.0	—	254.0	254.0	—	—	—
			SHC	—	123.2	172.1	—	114.0	163.0	—	104.5	153.5	—	94.8	143.8	—	—	—

LEGEND

— — Do Not Operate
cfm — Cubic Feet Per Minute (Supply Air)
EAT (db) — Entering Air Temperature (dry bulb)
EAT (wb) — Entering Air Temperature (wet bulb)
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTE: See minimum-maximum airflow ratings on page 6.

Performance data (cont)

50FCQM24 Single Stage Cooling Capacities

50FCQM24				AMBIENT TEMPERATURE (°F)															
				85			95			105			115			125		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85	75	80	85
3600 cfm	EAT (wb)	58	TC	118.1	118.1	146.7	109.6	109.6	137.2	100.6	100.6	127.2	91.3	91.3	116.6	81.4	81.4	105.4
			SHC	89.5	118.1	146.7	82.0	109.6	137.2	74.1	100.6	127.2	65.9	91.3	116.6	57.4	81.4	105.4
		62	TC	125.5	125.5	142.3	115.2	115.2	135.3	104.4	104.4	128.1	93.5	93.5	120.8	81.9	81.9	112.9
			SHC	78.2	110.3	142.3	71.2	103.3	135.3	64.1	96.1	128.1	56.9	88.9	120.8	49.4	81.1	112.9
		67	TC	141.1	141.1	141.1	130.5	130.5	130.5	119.3	119.3	119.3	107.6	107.6	107.6	95.1	95.1	96.8
			SHC	61.3	93.4	125.6	54.4	86.5	118.6	47.3	79.5	111.6	40.1	72.2	104.3	32.7	64.8	96.8
		72	TC	158.4	158.4	158.4	147.2	147.2	147.2	135.4	135.4	135.4	123.0	123.0	123.0	109.8	109.8	109.8
			SHC	44.1	76.2	108.3	37.3	69.3	101.4	30.3	62.3	94.4	23.1	55.1	87.1	15.7	47.7	79.7
		76	TC	—	173.4	173.4	—	161.6	161.6	—	149.2	149.2	—	136.1	136.1	—	122.3	122.3
			SHC	—	62.2	93.4	—	55.4	86.6	—	48.4	79.7	—	41.1	72.6	—	33.7	65.2
4200 cfm	EAT (wb)	58	TC	126.8	126.8	157.0	117.8	117.8	146.9	131.6	131.6	150.9	98.5	98.5	125.1	88.0	88.0	113.2
			SHC	96.7	126.8	157.0	88.7	117.8	146.9	112.4	131.6	150.9	71.9	98.5	125.1	62.8	88.0	113.2
		62	TC	130.5	130.5	159.6	120.1	120.1	152.4	109.1	109.1	144.7	98.6	98.6	134.2	88.2	88.2	121.9
			SHC	85.4	122.5	159.6	78.4	115.4	152.4	71.1	107.9	144.7	63.0	98.6	134.2	54.5	88.2	121.9
		67	TC	146.5	146.5	146.5	135.3	135.3	135.3	123.7	123.7	125.7	111.4	111.4	118.3	98.5	98.5	110.7
			SHC	65.5	102.7	139.9	58.4	95.6	132.9	51.3	88.5	125.7	43.9	81.1	118.3	36.3	73.5	110.7
		72	TC	164.1	164.1	164.1	152.3	152.3	152.3	140.0	140.0	140.0	127.0	127.0	127.0	113.4	113.4	113.4
			SHC	45.2	82.4	119.6	38.2	75.4	112.5	31.1	68.2	105.3	23.7	60.8	97.9	16.2	53.3	90.4
		76	TC	—	179.2	179.2	—	166.8	166.8	—	153.9	153.9	—	140.3	140.3	—	125.9	125.9
			SHC	—	65.8	102.1	—	58.8	95.2	—	51.7	88.1	—	44.3	80.7	—	36.8	73.2
4800 cfm	EAT (wb)	58	TC	134.1	134.1	165.6	124.8	124.8	155.2	137.0	137.0	156.8	104.5	104.5	132.2	112.2	112.2	129.9
			SHC	102.6	134.1	165.6	94.5	124.8	155.2	117.2	137.0	156.8	76.8	104.5	132.2	94.5	112.2	129.9
		62	TC	134.8	134.8	175.4	124.9	124.9	165.4	115.0	115.0	153.8	104.6	104.6	141.6	93.7	93.7	128.7
			SHC	92.1	133.7	175.4	84.4	124.9	165.4	76.2	115.0	153.8	67.7	104.6	141.6	58.7	93.7	128.7
		67	TC	150.5	150.5	153.8	139.0	139.0	146.6	127.0	127.0	139.3	114.4	114.4	131.8	101.2	101.2	124.0
			SHC	69.3	111.5	153.8	62.2	104.4	146.6	54.9	97.1	139.3	47.4	89.6	131.8	39.8	81.9	124.0
		72	TC	168.3	168.3	168.3	156.1	156.1	156.1	143.4	143.4	143.4	130.0	130.0	130.0	116.0	116.0	116.0
			SHC	45.9	88.2	130.4	38.8	81.0	123.2	31.6	73.7	115.9	24.1	66.2	108.4	16.5	58.6	100.7
		76	TC	—	183.6	183.6	—	170.8	170.8	—	157.5	157.5	—	143.4	143.4	—	128.6	128.6
			SHC	—	69.0	110.3	—	61.9	103.2	—	54.6	95.9	—	47.2	88.5	—	39.5	80.8
5400 cfm	EAT (wb)	58	TC	140.3	140.3	172.9	130.6	130.6	161.9	120.3	120.3	150.4	109.6	109.6	138.2	98.2	98.2	125.2
			SHC	107.7	140.3	172.9	99.2	130.6	161.9	90.3	120.3	150.4	81.0	109.6	138.2	71.2	98.2	125.2
		62	TC	140.5	140.5	184.0	130.7	130.7	172.6	120.5	120.5	160.6	109.7	109.7	147.9	98.4	98.4	134.4
			SHC	97.0	140.5	184.0	88.8	130.7	172.6	80.4	120.5	160.6	71.5	109.7	147.9	62.3	98.4	134.4
		67	TC	153.7	153.7	167.2	142.0	142.0	160.0	129.7	129.7	152.6	116.7	116.7	144.9	103.3	103.3	137.0
			SHC	72.8	120.0	167.2	65.6	112.8	160.0	58.3	105.4	152.6	50.7	97.8	144.9	43.0	90.0	137.0
		72	TC	171.6	171.6	171.6	159.1	159.1	159.1	146.2	146.2	146.2	132.5	132.5	132.5	118.1	118.1	118.1
			SHC	46.4	93.6	140.8	39.2	86.4	133.5	31.9	79.0	126.1	24.4	71.4	118.5	16.7	63.7	110.7
		76	TC	—	187.0	187.0	—	174.0	174.0	—	160.3	160.3	—	145.9	145.9	—	130.8	130.8
			SHC	—	71.9	118.1	—	64.7	110.9	—	57.4	103.5	—	49.8	95.9	—	42.0	88.0
6000 cfm	EAT (wb)	58	TC	145.7	145.7	179.3	135.7	135.7	168.0	125.1	125.1	155.9	113.9	113.9	143.3	102.2	102.2	130.0
			SHC	112.2	145.7	179.3	103.4	135.7	168.0	94.2	125.1	155.9	84.6	113.9	143.3	74.5	102.2	130.0
		62	TC	145.9	145.9	190.7	135.8	135.8	178.9	125.2	125.2	166.5	114.1	114.1	153.3	102.4	102.4	139.4
			SHC	101.1	145.9	190.7	92.7	135.8	178.9	83.9	125.2	166.5	74.8	114.1	153.3	65.3	102.4	139.4
		67	TC	156.4	156.4	180.3	144.4	144.4	173.0	131.9	131.9	165.5	118.6	118.6	157.7	105.0	105.0	149.5
			SHC	76.2	128.3	180.3	69.0	121.0	173.0	61.6	113.5	165.5	53.9	105.8	157.7	46.1	97.8	149.5
		72	TC	174.4	174.4	174.4	161.6	161.6	161.6	148.4	148.4	148.4	134.5	134.5	134.5	119.8	119.8	120.5
			SHC	46.7	98.8	150.8	39.5	91.5	143.5	32.1	84.1	136.1	24.5	76.4	128.4	16.8	68.6	120.5
		76	TC	—	189.8	189.8	—	176.5	176.5	—	162.5	162.5	—	147.9	147.9	—	132.4	132.4
			SHC	—	74.6	125.6	—	67.4	118.3	—	59.9	110.8	—	52.3	103.0	—	44.4	95.0

LEGEND

— — Do Not Operate
cfm — Cubic Feet Per Minute (Supply Air)
EAT (db) — Entering Air Temperature (dry bulb)
EAT (wb) — Entering Air Temperature (wet bulb)
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTE: See minimum-maximum airflow ratings on page 6.

Performance data (cont)

50FCQM28 Two Stage Cooling Capacities

50FCQM28				AMBIENT TEMPERATURE (°F)															
				85			95			105			115			125		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85	75	80	85
7500 cfm	EAT (wb)	58	TC	253.6	253.6	277.3	237.2	237.2	269.7	222.7	222.7	253.8	207.4	207.4	237.1	191.5	191.5	219.6
			SHC	213.5	245.4	277.3	204.7	237.2	269.7	191.6	222.7	253.8	177.8	207.4	237.1	163.4	191.5	219.6
		62	TC	266.7	266.7	266.7	249.6	249.6	256.9	231.9	231.9	246.8	213.3	213.3	236.0	194.0	194.0	224.0
			SHC	194.1	230.4	266.7	184.1	220.5	256.9	174.0	210.4	246.8	163.3	199.6	236.0	151.9	188.0	224.0
		67	TC	294.5	294.5	294.5	276.2	276.2	276.2	256.7	256.7	256.7	236.9	236.9	236.9	216.4	216.4	216.4
			SHC	158.7	194.6	230.6	148.7	184.8	220.9	138.3	174.6	210.9	128.0	164.3	200.7	117.4	153.8	190.3
		72	TC	325.2	325.2	325.2	305.0	305.0	305.0	284.2	284.2	284.2	262.7	262.7	262.7	—	—	—
			SHC	123.5	158.0	192.4	113.1	148.1	183.1	102.7	138.1	173.5	92.1	127.9	163.7	—	—	—
		76	TC	—	351.7	351.7	—	330.5	330.5	—	308.0	308.0	—	285.1	285.1	—	—	—
			SHC	—	127.6	168.9	—	117.5	158.8	—	108.4	136.2	—	98.5	131.8	—	—	—
8750 cfm	EAT (wb)	58	TC	265.6	265.6	301.1	251.0	251.0	285.1	235.5	235.5	268.1	219.3	219.3	250.4	202.5	202.5	231.8
			SHC	230.2	265.6	301.1	216.9	251.0	285.1	202.9	235.5	268.1	188.3	219.3	250.4	173.2	202.5	231.8
		62	TC	275.4	275.4	293.9	257.3	257.3	282.7	243.3	243.3	274.8	221.8	221.8	255.0	202.7	202.7	241.9
			SHC	210.3	252.1	293.9	199.5	241.1	282.7	192.5	233.6	274.8	175.4	215.2	255.0	163.5	202.7	241.9
		67	TC	303.2	303.2	303.2	284.0	284.0	284.0	264.1	264.1	264.1	243.4	243.4	243.4	222.1	222.1	222.1
			SHC	168.8	210.3	251.8	158.7	200.3	241.9	148.4	190.1	231.8	137.8	179.6	221.4	127.1	169.0	210.8
		72	TC	333.6	333.6	333.6	312.7	312.7	312.7	291.3	291.3	291.3	269.2	269.2	269.2	—	—	—
			SHC	127.4	167.8	208.2	117.0	157.8	198.6	106.6	147.7	188.7	96.0	137.3	178.6	—	—	—
		76	TC	—	360.2	360.2	—	337.9	337.9	—	314.9	314.9	—	291.0	291.0	—	—	—
			SHC	—	133.1	181.3	—	123.5	160.1	—	113.6	152.3	—	103.3	143.3	—	—	—
10000 cfm	EAT (wb)	58	TC	277.9	277.9	314.8	262.4	262.4	297.8	246.0	246.0	279.8	229.1	229.1	261.2	211.3	211.3	241.7
			SHC	241.0	277.9	314.8	227.0	262.4	297.8	212.2	246.0	279.8	197.0	229.1	261.2	181.0	211.3	241.7
		62	TC	282.9	282.9	317.3	264.4	264.4	304.7	253.8	253.8	273.2	234.1	234.1	258.2	212.5	212.5	250.5
			SHC	224.5	270.9	317.3	212.9	258.8	304.7	193.0	233.1	273.2	180.0	219.1	258.2	170.4	210.4	250.5
		67	TC	310.2	310.2	310.2	290.2	290.2	290.2	269.8	269.8	269.8	248.5	248.5	248.5	—	—	—
			SHC	178.4	225.2	272.0	168.1	215.0	261.9	157.7	204.7	251.7	147.1	194.1	241.1	—	—	—
		72	TC	340.4	340.4	340.4	319.0	319.0	319.0	296.9	296.9	296.9	274.2	274.2	274.2	—	—	—
			SHC	131.1	177.0	223.0	120.7	166.9	213.1	110.2	156.6	203.0	99.5	146.1	192.7	—	—	—
		76	TC	—	366.8	366.8	—	343.9	343.9	—	320.0	320.0	—	295.7	295.7	—	—	—
			SHC	—	138.1	180.3	—	128.2	172.1	—	117.9	162.9	—	107.5	153.3	—	—	—
11250 cfm	EAT (wb)	58	TC	288.0	288.0	326.0	271.8	271.8	308.2	254.8	254.8	289.6	237.1	237.1	270.1	219.0	219.0	250.2
			SHC	249.9	288.0	326.0	235.3	271.8	308.2	220.0	254.8	289.6	204.1	237.1	270.1	187.8	219.0	250.2
		62	TC	289.6	289.6	334.9	274.7	274.7	312.9	259.0	259.0	289.6	238.2	238.2	279.2	219.1	219.1	260.8
			SHC	235.5	285.2	334.9	219.7	266.3	312.9	203.0	246.3	289.6	192.2	235.7	279.2	177.4	219.1	260.8
		67	TC	315.7	315.7	315.7	295.2	295.2	295.2	274.1	274.1	274.1	252.4	252.4	260.1	—	—	—
			SHC	187.5	239.5	291.5	177.2	229.2	281.3	166.6	218.7	270.8	156.0	208.0	260.1	—	—	—
		72	TC	345.8	345.8	345.8	323.9	323.9	323.9	301.4	301.4	301.4	278.1	278.1	278.1	—	—	—
			SHC	134.4	185.6	236.8	123.9	175.4	226.8	113.4	165.0	216.6	102.7	154.4	206.2	—	—	—
		76	TC	—	372.3	372.3	—	348.6	348.6	—	324.0	324.0	—	299.3	299.3	—	—	—
			SHC	—	142.3	191.1	—	132.2	182.0	—	121.7	172.3	—	111.2	162.4	—	—	—
12500 cfm	EAT (wb)	58	TC	296.7	296.7	335.7	279.8	279.8	317.2	262.4	262.4	298.1	244.3	244.3	278.1	—	—	—
			SHC	257.6	296.7	335.7	242.4	279.8	317.2	226.8	262.4	298.1	210.4	244.3	278.1	—	—	—
		62	TC	301.5	301.5	334.8	282.2	282.2	323.6	263.8	263.8	307.4	244.4	244.4	289.6	—	—	—
			SHC	238.1	286.5	334.8	227.1	275.4	323.6	213.7	260.5	307.4	199.2	244.4	289.6	—	—	—
		67	TC	320.2	320.2	320.2	299.3	299.3	299.9	277.8	277.8	289.3	255.7	255.7	278.3	—	—	—
			SHC	196.3	253.2	310.2	185.9	242.9	299.9	175.3	232.3	289.3	164.5	221.4	278.3	—	—	—
		72	TC	350.3	350.3	350.3	328.2	328.2	328.2	305.0	305.0	305.0	281.3	281.3	281.3	—	—	—
			SHC	137.4	193.7	250.1	127.0	183.5	240.0	116.3	173.0	229.6	105.6	162.3	219.1	—	—	—
		76	TC	—	376.4	376.4	—	352.2	352.2	—	327.5	327.5	—	302.6	302.6	—	—	—
			SHC	—	146.1	200.6	—	135.7	191.0	—	125.2	181.1	—	114.7	170.9	—	—	—

LEGEND

— — Do Not Operate
cfm — Cubic Feet Per Minute (Supply Air)
EAT (db) — Entering Air Temperature (dry bulb)
EAT (wb) — Entering Air Temperature (wet bulb)
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTE: See minimum-maximum airflow ratings on page 6.

Performance data (cont)

50FCQM28 Single Stage Cooling Capacities

50FCQM28				AMBIENT TEMPERATURE (°F)															
				85			95			105			115			125		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85	75	80	85
4500 cfm	EAT (wb)	58	TC	147.5	147.5	168.2	137.8	137.8	157.8	128.0	128.0	147.1	117.5	117.5	135.8	106.3	106.3	123.7
			SHC	126.7	147.5	168.2	117.9	137.8	157.8	108.8	128.0	147.1	99.1	117.5	135.8	88.9	106.3	123.7
		62	TC	156.5	156.5	160.3	145.0	145.0	152.9	133.1	133.1	145.3	120.4	120.4	137.2	107.2	107.2	128.4
			SHC	114.2	137.2	160.3	106.7	129.8	152.9	99.2	122.2	145.3	91.2	114.2	137.2	82.8	105.6	128.4
		67	TC	175.1	175.1	175.1	162.7	162.7	162.7	149.9	149.9	149.9	136.4	136.4	136.4	122.3	122.3	122.3
			SHC	93.0	115.8	138.7	85.5	108.4	131.3	77.9	100.9	123.8	70.1	93.1	116.1	62.1	85.1	108.2
		72	TC	195.4	195.4	195.4	182.2	182.2	182.2	168.4	168.4	168.4	154.0	154.0	154.0	138.7	138.7	138.7
			SHC	71.9	94.1	116.2	64.4	86.7	109.1	56.6	79.1	101.6	48.7	71.4	94.0	40.6	63.4	86.2
		76	TC	—	213.2	213.2	—	199.0	199.0	—	184.2	184.2	—	169.0	169.0	—	153.4	153.4
			SHC	—	75.5	100.2	—	68.6	93.4	—	61.2	80.3	—	53.7	74.4	—	46.0	67.6
5250 cfm	EAT (wb)	58	TC	157.4	157.4	179.2	147.3	147.3	168.3	136.7	136.7	156.9	125.5	125.5	144.7	113.7	113.7	131.9
			SHC	135.6	157.4	179.2	126.2	147.3	168.3	116.6	136.7	156.9	106.3	125.5	144.7	95.5	113.7	131.9
		62	TC	162.4	162.4	178.0	150.4	150.4	170.2	138.0	138.0	161.6	125.7	125.7	151.4	113.9	113.9	138.2
			SHC	124.9	151.4	178.0	117.2	143.7	170.2	109.0	135.3	161.6	100.0	125.7	151.4	89.6	113.9	138.2
		67	TC	181.1	181.1	181.1	168.2	168.2	168.2	154.9	154.9	154.9	140.8	140.8	140.8	126.1	126.1	126.1
			SHC	100.1	126.6	153.1	92.5	119.1	145.6	84.8	111.4	138.0	76.8	103.4	130.0	68.7	95.4	122.0
		72	TC	201.9	201.9	201.9	188.1	188.1	188.1	173.8	173.8	173.8	158.7	158.7	158.7	142.9	142.9	142.9
			SHC	75.3	101.2	127.1	67.6	93.7	119.8	59.8	86.0	112.2	51.8	78.1	104.4	43.5	69.9	96.4
		76	TC	—	219.7	219.7	—	204.9	204.9	—	189.7	189.7	—	173.7	173.7	—	157.3	157.3
			SHC	—	80.3	102.0	—	72.8	96.4	—	65.2	89.7	—	57.4	82.5	—	49.4	75.0
6000 cfm	EAT (wb)	58	TC	165.8	165.8	188.5	155.1	155.1	176.9	144.0	144.0	164.9	132.3	132.3	152.2	119.8	119.8	138.6
			SHC	143.0	165.8	188.5	133.2	155.1	176.9	123.0	144.0	164.9	112.3	132.3	152.2	101.0	119.8	138.6
		62	TC	167.2	167.2	193.6	156.9	156.9	180.9	145.2	145.2	169.4	133.0	133.0	159.8	120.3	120.3	145.5
			SHC	134.4	164.0	193.6	124.5	152.7	180.9	115.0	142.2	169.4	106.3	133.0	159.8	95.1	120.3	145.5
		67	TC	185.9	185.9	185.9	172.6	172.6	172.6	158.7	158.7	158.7	144.2	144.2	144.2	128.9	128.9	135.2
			SHC	106.9	136.9	166.9	99.2	129.2	159.3	91.3	121.4	151.4	83.3	113.5	143.7	74.9	105.0	135.2
		72	TC	206.8	206.8	206.8	192.5	192.5	192.5	177.7	177.7	177.7	162.4	162.4	162.4	145.7	145.7	145.7
			SHC	78.2	107.8	137.3	70.5	100.2	129.8	62.6	92.3	122.1	54.5	84.3	114.2	46.1	76.0	106.0
		76	TC	—	224.6	224.6	—	209.6	209.6	—	193.8	193.8	—	177.4	177.4	—	160.4	160.4
			SHC	—	84.0	111.2	—	76.5	104.4	—	68.7	97.2	—	60.7	89.6	—	52.6	81.8
6750 cfm	EAT (wb)	58	TC	172.9	172.9	196.4	161.8	161.8	184.4	150.2	150.2	171.8	137.9	137.9	158.5	125.0	125.0	144.4
			SHC	149.3	172.9	196.4	139.2	161.8	184.4	128.6	150.2	171.8	117.4	137.9	158.5	105.6	125.0	144.4
		62	TC	173.2	173.2	203.8	162.0	162.0	191.7	150.4	150.4	179.2	138.2	138.2	165.7	125.2	125.2	151.1
			SHC	141.3	172.5	203.8	131.5	161.6	191.7	121.5	150.4	179.2	110.8	138.2	165.7	99.2	125.2	151.1
		67	TC	189.7	189.7	189.7	176.0	176.0	176.0	161.7	161.7	164.5	146.8	146.8	156.3	131.2	131.2	148.0
			SHC	113.3	146.7	180.2	105.4	139.0	172.5	97.5	131.0	164.5	89.3	122.8	156.3	81.0	114.5	148.0
		72	TC	210.8	210.8	210.8	195.9	195.9	195.9	180.9	180.9	180.9	164.9	164.9	164.9	148.2	148.2	148.2
			SHC	81.0	114.0	147.0	73.1	106.2	139.4	65.1	98.3	131.6	56.9	90.3	123.6	48.5	81.9	115.3
		76	TC	—	229.0	229.0	—	213.4	213.4	—	197.2	197.2	—	180.6	180.6	—	162.9	162.9
			SHC	—	87.5	118.9	—	79.8	111.6	—	71.9	104.1	—	63.9	96.4	—	55.5	88.3
7500 cfm	EAT (wb)	58	TC	178.9	178.9	203.1	167.5	167.5	190.7	155.5	155.5	177.7	142.8	142.8	163.9	129.5	129.5	149.4
			SHC	154.7	178.9	203.1	144.2	167.5	190.7	133.3	155.5	177.7	121.7	142.8	163.9	109.6	129.5	149.4
		62	TC	179.2	179.2	211.5	167.6	167.6	198.7	155.7	155.7	185.3	143.6	143.6	171.9	129.6	129.6	156.1
			SHC	146.8	179.2	211.5	136.6	167.6	198.7	126.0	155.7	185.3	115.3	143.6	171.9	103.0	129.6	156.1
		67	TC	192.8	192.8	193.0	178.7	178.7	185.1	164.3	164.3	177.1	150.0	150.0	169.1	133.0	133.0	159.8
			SHC	119.3	156.1	193.0	111.4	148.2	185.1	103.4	140.3	177.1	95.5	132.3	169.1	86.5	123.1	159.8
		72	TC	214.1	214.1	214.1	198.9	198.9	198.9	183.4	183.4	183.4	167.1	167.1	167.1	150.1	150.1	150.1
			SHC	83.5	120.0	156.4	75.5	112.1	148.6	67.5	104.2	140.8	59.2	95.9	132.6	50.8	87.5	124.3
		76	TC	—	232.2	232.2	—	216.3	216.3	—	199.9	199.9	—	182.7	182.7	—	165.0	165.0
			SHC	—	90.6	125.6	—	82.8	118.2	—	74.8	110.5	—	66.6	102.6	—	58.3	94.4

LEGEND

— — Do Not Operate
cfm — Cubic Feet Per Minute (Supply Air)
EAT (db) — Entering Air Temperature (dry bulb)
EAT (wb) — Entering Air Temperature (wet bulb)
SHC — Sensible Heat Capacity (1000 Btuh) Gross
TC — Total Capacity (1000 Btuh) Gross

NOTE: See minimum-maximum airflow ratings on page 6.

Performance data (cont)

50FCQM17 Heating Capacities

50FCQM17 (15 Tons)											
Return Air (°F db)	CFM (Standard Air)		Temperature Air Entering Outdoor Coil (°F db at 70% rh)								
			-10	0	10	17	30	40	47	50	60
55	4500	Capacity	—	63.2	85.4	97.9	122.4	149.4	165.1	170.5	193.4
		Int. Cap.	—	58.1	78.4	89.2	107.3	149.4	165.1	170.5	193.4
	6000	Capacity	—	65.0	87.7	100.6	126.4	153.9	170.8	176.4	201.3
		Int. Cap.	—	59.8	80.5	91.7	110.8	153.9	170.8	176.4	201.3
	7500	Capacity	—	67.0	89.7	102.9	129.5	157.3	174.9	180.7	206.8
		Int. Cap.	—	61.6	82.3	93.8	113.4	157.3	174.9	180.7	206.8
70	4500	Capacity	42.1	57.2	79.8	91.8	115.2	142.5	157.4	162.7	184.3
		Int. Cap.	38.9	52.7	73.3	83.7	100.9	142.5	157.4	162.7	184.3
	6000	Capacity	43.8	59.3	82.2	94.6	119.1	147.0	162.8	168.3	191.6
		Int. Cap.	40.5	54.6	75.5	86.3	104.4	147.0	162.8	168.3	191.6
	7500	Capacity	45.5	61.4	84.3	97.0	122.2	150.3	166.8	172.5	196.9
		Int. Cap.	42.1	56.5	77.4	88.4	107.1	150.3	166.8	172.5	196.9
80	4500	Capacity	38.1	52.8	75.9	87.5	110.3	138.1	152.4	157.6	178.2
		Int. Cap.	35.2	48.6	69.7	79.8	96.6	138.1	152.4	157.6	178.2
	6000	Capacity	39.9	55.1	78.4	90.3	114.2	142.4	157.6	163.0	185.3
		Int. Cap.	36.9	50.7	72.0	82.4	100.1	142.4	157.6	163.0	185.3
	7500	Capacity	42.5	57.1	80.5	92.7	117.2	145.7	161.5	167.1	190.5
		Int. Cap.	39.3	52.5	73.8	84.5	102.7	145.7	161.5	167.1	190.5

LEGEND

— — Do Not Operate
Capacity — Instantaneous Capacity (1000 Btuh) — includes indoor fan motor heat at AHRI static conditions
Int. Cap. — Integrated Capacity = instantaneous capacity minus the effects of frost on the OD coil and the heat required to defrost it
rh — Relative Humidity
db — Dry Bulb

50FCQM24 Heating Capacities

50FCQM24 (20 Tons)											
Return Air (°F db)	CFM (Standard Air)		Temperature Air Entering Outdoor Coil (°F db at 70% rh)								
			-10	0	10	17	30	40	47	50	60
55	6000	Capacity	—	89.5	121.0	140.6	181.0	220.7	245.6	254.0	292.4
		Int. Cap.	—	82.4	111.1	128.2	158.6	220.7	245.6	254.0	292.4
	8000	Capacity	—	92.4	123.9	144.0	185.9	227.2	253.9	262.9	305.0
		Int. Cap.	—	85.0	113.7	131.3	162.9	227.2	253.9	262.9	305.0
	10000	Capacity	—	95.0	126.6	146.8	189.4	231.2	259.2	268.3	312.7
		Int. Cap.	—	87.4	116.2	133.9	166.0	231.2	259.2	268.3	312.7
70	6000	Capacity	56.8	80.0	111.6	130.7	169.5	208.9	232.7	240.7	276.7
		Int. Cap.	52.6	73.6	102.4	119.2	148.5	208.9	232.7	240.7	276.7
	8000	Capacity	59.5	82.9	114.6	134.2	174.7	215.5	241.1	249.8	289.5
		Int. Cap.	55.0	76.3	105.2	122.4	153.0	215.5	241.1	249.8	289.5
	10000	Capacity	62.3	85.4	117.3	137.1	178.2	219.7	246.3	255.4	297.4
		Int. Cap.	57.6	78.6	107.7	125.0	156.2	219.7	246.3	255.4	297.4
80	6000	Capacity	50.0	72.9	105.0	123.8	161.5	200.9	223.8	231.6	265.9
		Int. Cap.	46.2	67.1	96.3	112.9	141.5	200.9	223.8	231.6	265.9
	8000	Capacity	52.7	76.0	108.0	127.4	167.0	207.7	232.3	240.9	278.8
		Int. Cap.	48.8	69.9	99.1	116.2	146.3	207.7	232.3	240.9	278.8
	10000	Capacity	55.3	78.7	110.9	130.4	170.5	211.9	237.7	246.5	286.9
		Int. Cap.	51.2	72.4	101.8	118.9	149.4	211.9	237.7	246.5	286.9

LEGEND

— — Do Not Operate
Capacity — Instantaneous Capacity (1000 Btuh) — includes indoor fan motor heat at AHRI static conditions
Int. Cap. — Integrated Capacity = instantaneous capacity minus the effects of frost on the OD coil and the heat required to defrost it
rh — Relative Humidity
db — Dry Bulb

Performance data (cont)

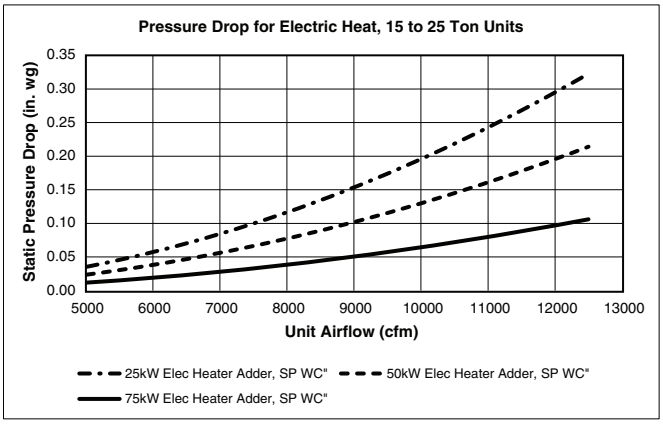
50FCQM28 Heating Capacities

50FCQM28 (25 Tons)											
Return Air (°F db)	CFM (Standard Air)		Temperature Air Entering Outdoor Coil (°F db at 70% rh)								
			-10	0	10	17	30	40	47	50	60
55	7500	Capacity	—	121.3	153.9	175.2	219.1	260.4	287.9	297.1	339.8
		Int. Cap.	—	111.6	141.3	159.8	191.9	260.4	287.9	297.1	339.8
	10000	Capacity	—	124.9	157.5	179.1	224.4	267.1	296.4	306.0	351.8
		Int. Cap.	—	114.9	144.6	163.3	196.6	267.1	296.4	306.0	351.8
	12500	Capacity	—	129.0	161.6	183.3	229.2	272.7	302.9	312.8	360.5
		Int. Cap.	—	118.7	148.4	167.1	200.8	272.7	302.9	312.8	360.5
70	7500	Capacity	—	112.9	145.8	166.6	208.9	249.7	275.8	284.4	324.7
		Int. Cap.	—	103.9	133.8	151.9	183.1	249.7	275.8	284.4	324.7
	10000	Capacity	—	116.4	149.5	170.9	214.6	256.5	284.3	293.6	336.8
		Int. Cap.	—	107.1	137.3	155.8	188.0	256.5	284.3	293.6	336.8
	12500	Capacity	—	120.8	153.8	175.4	219.6	262.2	290.8	300.5	345.8
		Int. Cap.	—	111.2	141.2	159.9	192.4	262.2	290.8	300.5	345.8
80	7500	Capacity	—	107.1	140.1	160.6	202.0	242.2	267.6	276.0	314.3
		Int. Cap.	—	98.6	128.5	146.4	177.0	242.2	267.6	276.0	314.3
	10000	Capacity	—	110.9	144.0	164.9	207.9	249.3	276.3	285.3	326.7
		Int. Cap.	—	102.0	132.2	150.3	182.1	249.3	276.3	285.3	326.7
	12500	Capacity	—	114.8	148.5	169.4	212.9	254.9	283.1	292.2	335.9
		Int. Cap.	—	105.7	136.3	154.5	186.5	254.9	283.1	292.2	335.9

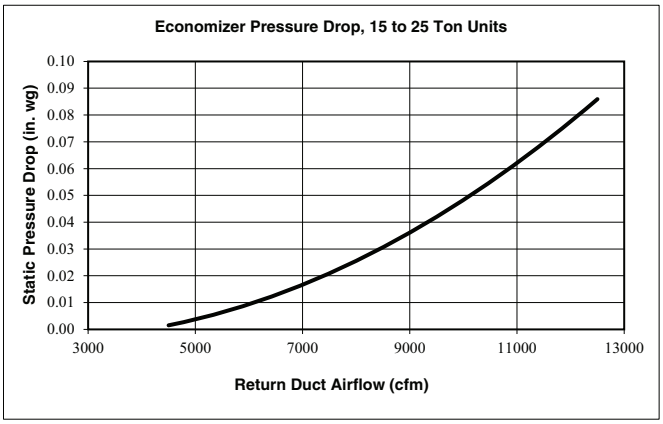
LEGEND

— — Do Not Operate
Capacity — Instantaneous Capacity (1000 Btuh) — includes indoor fan motor heat at AHRI static conditions
Int. Cap. — Integrated Capacity = instantaneous capacity minus the effects of frost on the OD coil and the heat required to defrost it
rh — Relative Humidity
db — Dry Bulb

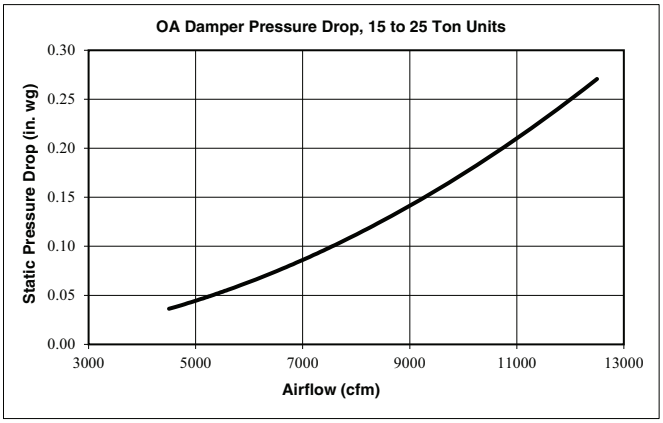
Pressure Drop for Electric Heating Units
15 to 25 Ton Units



Static Pressure Drop — Accessory Economizer
15 to 25 Ton Units



Outside Air Damper Leakage
15 to 25 Ton Units



General Fan Performance Notes

1. Interpolation is permissible. Do not extrapolate.
2. External static pressure is the static pressure difference between the return duct and the supply duct plus the static pressure caused by any FIOPs or accessories.
3. Tabular data accounts for pressure loss due to clean filters, unit casing, and wet coils.
4. Factory options and accessories may effect static pressure losses. Selection software is available, through your salesperson, to help you select the best motor/drive combination for your application.
5. The fan performance tables offer motor/drive recommendations. In cases when 2 motor/drive combinations would work, the lower horsepower option is recommended.
6. For information on the electrical properties of the fan motors, please see the Electrical information section of this book.
7. For more information on the performance limits of the fan motors, see the application data section of this book.
8. The EPACT (Energy Policy Act of 1992) regulates energy requirements for specific types of indoor fan motors. Motors regulated by EPACT include any general purpose, T-frame (3-digit, 143 and larger), single-speed, foot mounted, polyphase, squirrel cage induction motors of NEMA (National Electrical Manufacturers Association) design A and B, manufactured for use in the United States. Ranging from 1 to 200 Hp, these continuous-duty motors operate on 230 and 460 volt, 60 Hz power. If a motor does not fit into these specifications, the motor does not have to be replaced by an EPACT compliant energy-efficient motor. Variable-speed motors are exempt from EPACT compliance requirements.

Fan data (cont)

50FCQM17 — 15 Ton Vertical Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
4500	936	0.61	1065	0.90	1180	1.23	1285	1.59	1380	1.97
4875	991	0.73	1112	1.03	1224	1.37	1325	1.74	1418	2.14
5250	1048	0.86	1161	1.18	1268	1.53	1366	1.91	1457	2.32
5625	1106	1.02	1211	1.34	1314	1.71	1410	2.11	1498	2.53
6000	1166	1.19	1263	1.52	1362	1.90	1454	2.31	1540	2.75
6375	1226	1.38	1317	1.72	1410	2.11	1499	2.53	1584	2.99
6750	1287	1.59	1371	1.93	1460	2.33	1546	2.76	1628	3.23
7125	1349	1.82	1428	2.16	1511	2.56	1594	3.01	1674	3.48
7500	1412	2.07	1485	2.40	1563	2.80	1643	3.26	1721	3.74

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
4500	1470	2.38	1554	2.81	1634	3.27	1710	3.74	1782	4.24
4875	1505	2.55	1588	3.00	1666	3.46	1741	3.95	1812	4.46
5250	1542	2.75	1623	3.21	1700	3.69	1773	4.18	1844	4.71
5625	1581	2.97	1660	3.44	1735	3.93	1807	4.44	1876	4.97
6000	1622	3.21	1699	3.69	1772	4.19	1843	4.71	1911	5.25
6375	1663	3.46	1739	3.95	1811	4.46	1880	4.99	1946	5.54
6750	1706	3.71	1780	4.22	1850	4.74	1918	5.28	1983	5.83
7125	1750	3.98	1822	4.49	1891	5.02	1958	5.57	2022	6.14
7500	1794	4.24	1866	4.77	1933	5.30	1999	5.86	—	—

Std/Med Static 936-2000 rpm, 4.8 Max bhp (2.4 Max bhp per fan motor)

High Static 936-2200 rpm, 6.0 Max bhp (3.0 Max bhp per fan motor)

50FCQM17 — Standard/Medium Static — 15 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
4500	936	4.5	1065	5.2	1180	5.8	1285	6.3	1380	6.8
4875	991	4.8	1112	5.4	1224	6.0	1325	6.5	1418	7.0
5250	1048	5.1	1161	5.7	1268	6.2	1366	6.7	1457	7.2
5625	1106	5.4	1211	5.9	1314	6.5	1410	7.0	1498	7.4
6000	1166	5.7	1263	6.2	1362	6.7	1454	7.2	1540	7.6
6375	1226	6.0	1317	6.5	1410	7.0	1499	7.4	1584	7.9
6750	1287	6.3	1371	6.8	1460	7.2	1546	7.7	1628	8.1
7125	1349	6.7	1428	7.1	1511	7.5	1594	7.9	1674	8.3
7500	1412	7.0	1485	7.4	1563	7.8	1643	8.2	1721	8.6

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
4500	1470	7.3	1554	7.7	1634	8.1	1710	8.5	1782	8.9
4875	1505	7.5	1588	7.9	1666	8.3	1741	8.7	1812	9.0
5250	1542	7.6	1623	8.1	1700	8.5	1773	8.8	1844	9.2
5625	1581	7.8	1660	8.3	1735	8.6	1807	9.0	1876	9.4
6000	1622	8.1	1699	8.5	1772	8.8	1843	9.2	—	—
6375	1663	8.3	1739	8.7	1811	9.0	1880	9.4	—	—
6750	1706	8.5	1780	8.9	1850	9.2	—	—	—	—
7125	1750	8.7	1822	9.1	1891	9.4	—	—	—	—
7500	1794	8.9	1866	9.3	—	—	—	—	—	—

Std/Med Static 936-2000 rpm

Fan data (cont)

50FCQM17 — High Static — 15 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
4500	936	4.2	1065	4.8	1180	5.3	1285	5.8	1380	6.2
4875	991	4.4	1112	5.0	1224	5.5	1325	6.0	1418	6.4
5250	1048	4.7	1161	5.2	1268	5.7	1366	6.2	1457	6.6
5625	1106	5.0	1211	5.4	1314	5.9	1410	6.4	1498	6.8
6000	1166	5.2	1263	5.7	1362	6.1	1454	6.6	1540	7.0
6375	1226	5.5	1317	5.9	1410	6.4	1499	6.8	1584	7.2
6750	1287	5.8	1371	6.2	1460	6.6	1546	7.0	1628	7.4
7125	1349	6.1	1428	6.4	1511	6.8	1594	7.2	1674	7.6
7500	1412	6.4	1485	6.7	1563	7.1	1643	7.4	1721	7.8

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
4500	1470	6.6	1554	7.0	1634	7.4	1710	7.7	1782	8.1
4875	1505	6.8	1588	7.2	1666	7.5	1741	7.9	1812	8.2
5250	1542	7.0	1623	7.3	1700	7.7	1773	8.0	1844	8.4
5625	1581	7.1	1660	7.5	1735	7.9	1807	8.2	1876	8.5
6000	1622	7.3	1699	7.7	1772	8.0	1843	8.4	1911	8.7
6375	1663	7.5	1739	7.9	1811	8.2	1880	8.5	1946	8.8
6750	1706	7.7	1780	8.1	1850	8.4	1918	8.7	1983	9.0
7125	1750	7.9	1822	8.3	1891	8.6	1958	8.9	2022	9.2
7500	1794	8.1	1866	8.5	1933	8.8	1999	9.1	—	—

High Static 936-2200 rpm

Fan data (cont)

50FCQM24 — 20 Ton Vertical Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
6,000	1038	0.84	1148	1.14	1251	1.47	1351	1.86	1448	2.28
6,500	1103	1.01	1207	1.32	1304	1.66	1398	2.05	1490	2.48
7,000	1169	1.19	1269	1.52	1360	1.87	1448	2.26	1535	2.69
7,500	1234	1.38	1332	1.74	1418	2.09	1501	2.48	1583	2.91
8,000	1299	1.58	1395	1.95	1478	2.32	1557	2.72	1634	3.14
8,500	1364	1.78	1459	2.18	1540	2.56	1615	2.95	1689	3.37
9,000	1427	1.97	1524	2.40	1602	2.79	1674	3.18	1745	3.60
9,500	1491	2.17	1589	2.62	1665	3.02	1735	3.41	1802	3.83
10,000	1553	2.36	1653	2.84	1729	3.25	1797	3.65	1862	4.06

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
6,000	1539	2.74	1624	3.22	1703	3.72	1777	4.22	1847	4.74
6,500	1578	2.95	1662	3.44	1741	3.96	1816	4.49	1887	5.04
7,000	1619	3.16	1701	3.66	1779	4.19	1854	4.74	1924	5.30
7,500	1663	3.38	1742	3.88	1818	4.41	1892	4.97	1962	5.55
8,000	1711	3.60	1786	4.10	1859	4.62	1931	5.18	2000	5.76
8,500	1761	3.83	1832	4.31	1903	4.83	1972	5.37	2039	5.94
9,000	1813	4.04	1882	4.52	1949	5.02	2015	5.55	2081	6.11
9,500	1868	4.26	1933	4.72	1998	5.21	2061	5.72	2124	6.27
10,000	1925	4.49	1987	4.94	2049	5.41	2110	5.91	2170	6.43

Std/Med Static 1038-2000 rpm, 4.8 Max bhp (2.4 Max bhp per fan motor)

High Static 1038-2200 rpm, 10.0 Max bhp (5.0 Max bhp per fan motor)

50FCQM24 — Standard/Medium Static — 20 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
6,000	1038	5.1	1148	5.6	1251	6.1	1351	6.7	1448	7.2
6,500	1103	5.4	1207	5.9	1304	6.4	1398	6.9	1490	7.4
7,000	1169	5.7	1269	6.2	1360	6.7	1448	7.2	1535	7.6
7,500	1234	6.1	1332	6.6	1418	7.0	1501	7.4	1583	7.9
8,000	1299	6.4	1395	6.9	1478	7.3	1557	7.7	1634	8.1
8,500	1364	6.7	1459	7.2	1540	7.6	1615	8.0	1689	8.4
9,000	1427	7.1	1524	7.6	1602	8.0	1674	8.3	1745	8.7
9,500	1491	7.4	1589	7.9	1665	8.3	1735	8.6	1802	9.0
10,000	1553	7.7	1653	8.2	1729	8.6	1797	9.0	1862	9.3

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
6,000	1539	7.6	1624	8.1	1703	8.5	1777	8.9	1847	9.2
6,500	1578	7.8	1662	8.3	1741	8.7	1816	9.1	1887	9.4
7,000	1619	8.0	1701	8.5	1779	8.9	1854	9.2	—	—
7,500	1663	8.3	1742	8.7	1818	9.1	1892	9.4	—	—
8,000	1711	8.5	1786	8.9	1859	9.3	—	—	—	—
8,500	1761	8.8	1832	9.1	1903	9.5	—	—	—	—
9,000	1813	9.0	1882	9.4	1949	9.7	—	—	—	—
9,500	1868	9.3	1933	9.7	—	—	—	—	—	—
10,000	1925	9.6	1987	9.9	—	—	—	—	—	—

Std/Med Static 1038-2000 rpm

Fan data (cont)

50FCQM24 — High Static — 20 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
6,000	1038	4.6	1148	5.1	1251	5.6	1351	6.1	1448	6.5
6,500	1103	4.9	1207	5.4	1304	5.9	1398	6.3	1490	6.7
7,000	1169	5.2	1269	5.7	1360	6.1	1448	6.5	1535	6.9
7,500	1234	5.5	1332	6.0	1418	6.4	1501	6.8	1583	7.2
8,000	1299	5.8	1395	6.3	1478	6.7	1557	7.0	1634	7.4
8,500	1364	6.1	1459	6.6	1540	7.0	1615	7.3	1689	7.6
9,000	1427	6.4	1524	6.9	1602	7.2	1674	7.6	1745	7.9
9,500	1491	6.7	1589	7.2	1665	7.5	1735	7.9	1802	8.2
10,000	1553	7.0	1653	7.5	1729	7.8	1797	8.1	1862	8.4

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
6,000	1539	6.9	1624	7.3	1703	7.7	1777	8.0	1847	8.4
6,500	1578	7.1	1662	7.5	1741	7.9	1816	8.2	1887	8.6
7,000	1619	7.3	1701	7.7	1779	8.1	1854	8.4	1924	8.7
7,500	1663	7.5	1742	7.9	1818	8.2	1892	8.6	1962	8.9
8,000	1711	7.7	1786	8.1	1859	8.4	1931	8.8	2000	9.1
8,500	1761	8.0	1832	8.3	1903	8.6	1972	8.9	2039	9.3
9,000	1813	8.2	1882	8.5	1949	8.8	2015	9.1	2081	9.5
9,500	1868	8.5	1933	8.8	1998	9.1	2061	9.4	2124	9.6
10,000	1925	8.7	1987	9.0	2049	9.3	2110	9.6	2170	9.9

High Static 1038-2200 rpm

Fan data (cont)

50FCQM28 — 25 Ton Vertical Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
7,500	1099	1.27	1174	1.55	1256	1.90	1343	2.32	1433	2.82
8,125	1177	1.58	1246	1.87	1319	2.22	1397	2.64	1479	3.13
8,750	1256	1.92	1319	2.23	1385	2.58	1456	3.00	1530	3.48
9,375	1337	2.32	1394	2.63	1455	2.99	1519	3.40	1586	3.87
10,000	1417	2.74	1471	3.06	1526	3.42	1585	3.83	1646	4.29
10,625	1498	3.18	1548	3.51	1600	3.88	1654	4.28	1710	4.73
11,250	1579	3.65	1626	3.98	1675	4.36	1725	4.76	1777	5.20
11,875	1661	4.17	1705	4.51	1751	4.88	1798	5.29	1846	5.72
12,500	1743	4.78	1785	5.14	1828	5.52	1872	5.93	1917	6.37

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
7,500	1521	3.38	1604	3.96	1683	4.58	1757	5.21	1828	5.86
8,125	1561	3.68	1642	4.28	1720	4.92	1794	5.58	1864	6.26
8,750	1606	4.02	1683	4.63	1758	5.28	1830	5.95	1900	6.66
9,375	1655	4.40	1727	5.00	1798	5.64	1869	6.33	1937	7.05
10,000	1710	4.81	1776	5.39	1843	6.02	1910	6.70	1976	7.42
10,625	1769	5.24	1829	5.79	1891	6.40	1954	7.06	2018	7.78
11,250	1831	5.69	1887	6.23	1944	6.81	2003	7.45	2063	8.14
11,875	1896	6.20	1948	6.72	2001	7.29	2056	7.90	2111	8.56
12,500	1964	6.85	2012	7.36	2061	7.91	2112	8.51	2164	9.16

Std/Med Static 1099-2200 rpm, 6.0 Max bhp (3.0 Max bhp per fan motor)

High Static 1099-2200 rpm, 10.0 Max bhp (5.0 Max bhp per fan motor)

50FCQM28 — Standard/Medium Static — 25 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
7,500	1099	4.9	1174	5.3	1256	5.6	1343	6.0	1433	6.5
8,125	1177	5.3	1246	5.6	1319	5.9	1397	6.3	1479	6.7
8,750	1256	5.6	1319	5.9	1385	6.2	1456	6.6	1530	6.9
9,375	1337	6.0	1394	6.3	1455	6.6	1519	6.9	1586	7.2
10,000	1417	6.4	1471	6.6	1526	6.9	1585	7.2	1646	7.4
10,625	1498	6.8	1548	7.0	1600	7.2	1654	7.5	1710	7.7
11,250	1579	7.1	1626	7.4	1675	7.6	1725	7.8	1777	8.0
11,875	1661	7.5	1705	7.7	1751	7.9	1798	8.1	1846	8.4
12,500	1743	7.9	1785	8.1	1828	8.3	1872	8.5	1917	8.7

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
7,500	1521	6.9	1604	7.2	1683	7.6	1757	8.0	1828	8.3
8,125	1561	7.1	1642	7.4	1720	7.8	1794	8.1	1864	8.4
8,750	1606	7.3	1683	7.6	1758	8.0	1830	8.3	—	—
9,375	1655	7.5	1727	7.8	1798	8.1	1869	8.5	—	—
10,000	1710	7.7	1776	8.0	1843	8.4	—	—	—	—
10,625	1769	8.0	1829	8.3	1891	8.6	—	—	—	—
11,250	1831	8.3	1887	8.6	—	—	—	—	—	—
11,875	1896	8.6	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—

Std/Med Static 1099-2200 rpm

Fan data (cont)

50FCQM28 — High Static — 25 Ton Vertical Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
7,500	1099	4.9	1174	5.3	1256	5.6	1343	6.0	1433	6.5
8,125	1177	5.3	1246	5.6	1319	5.9	1397	6.3	1479	6.7
8,750	1256	5.6	1319	5.9	1385	6.2	1456	6.6	1530	6.9
9,375	1337	6.0	1394	6.3	1455	6.6	1519	6.9	1586	7.2
10,000	1417	6.4	1471	6.6	1526	6.9	1585	7.2	1646	7.4
10,625	1498	6.8	1548	7.0	1600	7.2	1654	7.5	1710	7.7
11,250	1579	7.1	1626	7.4	1675	7.6	1725	7.8	1777	8.0
11,875	1661	7.5	1705	7.7	1751	7.9	1798	8.1	1846	8.4
12,500	1743	7.9	1785	8.1	1828	8.3	1872	8.5	1917	8.7

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
7,500	1521	6.9	1604	7.2	1683	7.6	1757	8.0	1828	8.3
8,125	1561	7.1	1642	7.4	1720	7.8	1794	8.1	1864	8.4
8,750	1606	7.3	1683	7.6	1758	8.0	1830	8.3	1900	8.6
9,375	1655	7.5	1727	7.8	1798	8.1	1869	8.5	1937	8.8
10,000	1710	7.7	1776	8.0	1843	8.4	1910	8.7	1976	9.0
10,625	1769	8.0	1829	8.3	1891	8.6	1954	8.9	2018	9.2
11,250	1831	8.3	1887	8.6	1944	8.8	2003	9.1	2063	9.4
11,875	1896	8.6	1948	8.8	2001	9.1	2056	9.3	2111	9.6
12,500	1964	8.9	2012	9.1	2061	9.4	2112	9.6	2164	9.8

High Static 1099-2200 rpm

Fan data (cont)

50FCQM17 — 15 Ton Horizontal Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
4500	1055	0.71	1171	0.97	1279	1.26	1379	1.58	1472	1.92
4875	1122	0.85	1231	1.12	1334	1.43	1430	1.76	1520	2.11
5250	1190	1.01	1293	1.30	1390	1.61	1482	1.95	1569	2.32
5625	1259	1.19	1356	1.49	1448	1.81	1536	2.16	1621	2.54
6000	1329	1.39	1420	1.69	1508	2.03	1592	2.39	1674	2.78
6375	1399	1.60	1486	1.92	1570	2.26	1650	2.63	1728	3.02
6750	1470	1.83	1553	2.16	1632	2.51	1710	2.89	1785	3.28
7125	1541	2.08	1620	2.42	1696	2.77	1770	3.15	1842	3.56
7500	1612	2.34	1688	2.69	1761	3.06	1832	3.44	1902	3.85

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
4500	1560	2.29	1642	2.67	1721	3.29	1796	3.74	1870	4.22
4875	1605	2.49	1685	2.88	1762	3.29	1835	3.99	1906	4.47
5250	1652	2.70	1730	3.10	1805	3.53	1877	4.27	1946	4.75
5625	1701	2.94	1777	3.35	1850	3.78	1920	4.57	1988	5.07
6000	1751	3.18	1826	3.60	1897	4.04	1966	4.90	2032	5.41
6375	1803	3.43	1876	3.86	1945	4.31	2013	5.26	2078	5.79
6750	1857	3.70	1927	4.13	1995	4.59	2061	5.65	2125	6.19
7125	1913	3.98	1981	4.42	2047	4.88	2111	6.07	2173	6.62
7500	1969	4.27	2035	4.72	2099	5.18	2162	6.52	—	—

High Static 1055-2200 rpm,10.0 Max bhp (5.0 Max bhp per fan motor

50FCQM17 — High Static — 15 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
4500	1055	4.7	1171	5.3	1279	5.7	1379	6.2	1472	6.6
4875	1122	5.0	1231	5.5	1334	6.0	1430	6.4	1520	6.9
5250	1190	5.3	1293	5.8	1390	6.3	1482	6.7	1569	7.1
5625	1259	5.7	1356	6.1	1448	6.5	1536	6.9	1621	7.3
6000	1329	6.0	1420	6.4	1508	6.8	1592	7.2	1674	7.6
6375	1399	6.3	1486	6.7	1570	7.1	1650	7.5	1728	7.8
6750	1470	6.6	1553	7.0	1632	7.4	1710	7.7	1785	8.1
7125	1541	7.0	1620	7.3	1696	7.7	1770	8.0	1842	8.3
7500	1612	7.3	1688	7.6	1761	8.0	1832	8.3	1902	8.6

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
4500	1560	7.0	1642	7.4	1721	7.8	1796	8.1	1870	8.5
4875	1605	7.3	1685	7.6	1762	8.0	1835	8.3	1906	8.6
5250	1652	7.5	1730	7.8	1805	8.2	1877	8.5	1946	8.8
5625	1701	7.7	1777	8.0	1850	8.4	1920	8.7	1988	9.0
6000	1751	7.9	1826	8.3	1897	8.6	1966	8.9	2032	9.2
6375	1803	8.2	1876	8.5	1945	8.8	2013	9.1	2078	9.4
6750	1857	8.4	1927	8.7	1995	9.1	2061	9.4	2125	9.7
7125	1913	8.7	1981	9.0	2047	9.3	2111	9.6	2173	9.9
7500	1969	8.9	2035	9.2	2099	9.5	2162	9.8	—	—

High Static 1055-2200 rpm

Fan data (cont)

50FCQM24 — 20 Ton Horizontal Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
6,000	1267	1.20	1361	1.49	1451	1.81	1538	2.15	1621	2.52
6,500	1356	1.45	1443	1.75	1527	2.07	1609	2.43	1688	2.80
7,000	1446	1.73	1527	2.04	1606	2.37	1683	2.73	1758	3.11
7,500	1537	2.03	1612	2.35	1687	2.69	1760	3.05	1831	3.44
8,000	1628	2.36	1699	2.68	1769	3.03	1838	3.40	1906	3.79
8,500	1719	2.71	1786	3.04	1853	3.40	1918	3.77	1983	4.16
9,000	1811	3.09	1875	3.43	1938	3.79	2000	4.17	2061	4.56
9,500	1904	3.50	1964	3.85	2024	4.21	2083	4.59	2142	4.99
10,000	1997	3.94	2054	4.29	2111	4.66	2167	5.04	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
6,000	1700	2.90	1777	3.32	1850	3.74	1921	4.19	1989	4.65
6,500	1764	3.20	1838	3.62	1909	4.05	1977	4.50	2043	4.97
7,000	1831	3.51	1901	3.93	1970	4.37	2036	4.83	2100	5.30
7,500	1900	3.84	1968	4.27	2033	4.71	2098	5.17	2160	5.64
8,000	1972	4.20	2037	4.63	2100	5.07	2162	5.53	—	—
8,500	2046	4.57	2108	5.00	2169	5.45	—	—	—	—
9,000	2122	4.97	2181	5.40	—	—	—	—	—	—
9,500	2199	5.40	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—

High Static 1267-2000 rpm, 10.0 Max bhp (5.0 Max bhp per fan motor

50FCQM24 — High Static — 20 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
6,000	1267	5.7	1361	6.1	1451	6.5	1538	6.9	1621	7.3
6,500	1356	6.1	1443	6.5	1527	6.9	1609	7.3	1688	7.6
7,000	1446	6.5	1527	6.9	1606	7.3	1683	7.6	1758	8.0
7,500	1537	6.9	1612	7.3	1687	7.6	1760	8.0	1831	8.3
8,000	1628	7.4	1699	7.7	1769	8.0	1838	8.3	1906	8.6
8,500	1719	7.8	1786	8.1	1853	8.4	1918	8.7	1983	9.0
9,000	1811	8.2	1875	8.5	1938	8.8	2000	9.1	2061	9.4
9,500	1904	8.6	1964	8.9	2024	9.2	2083	9.5	2142	9.7
10,000	1997	9.1	2054	9.3	2111	9.6	2167	9.8	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
6,000	1700	7.7	1777	8.0	1850	8.4	1921	8.7	1989	9.0
6,500	1764	8.0	1838	8.3	1909	8.7	1977	9.0	2043	9.3
7,000	1831	8.3	1901	8.6	1970	8.9	2036	9.2	2100	9.5
7,500	1900	8.6	1968	8.9	2033	9.2	2098	9.5	2160	9.8
8,000	1972	8.9	2037	9.2	2100	9.5	2162	9.8	—	—
8,500	2046	9.3	2108	9.6	2169	9.9	—	—	—	—
9,000	2122	9.6	2181	9.9	—	—	—	—	—	—
9,500	2199	10.0	—	—	—	—	—	—	—	—
10,000	—	—	—	—	—	—	—	—	—	—

High Static 1267-2000 rpm

Fan data (cont)

50FCQM28 — 25 Ton Horizontal Supply (rpm - bhp)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
7,500	1406	2.11	1483	2.47	1559	2.87	1636	3.32	1711	3.80
8,125	1509	2.60	1580	2.98	1651	3.40	1722	3.86	1792	4.35
8,750	1614	3.16	1679	3.56	1744	3.98	1810	4.45	1876	4.96
9,375	1719	3.78	1779	4.19	1840	4.63	1902	5.11	1963	5.62
10,000	1824	4.44	1880	4.87	1938	5.33	1995	5.81	2053	6.34
10,625	1930	5.16	1983	5.60	2036	6.06	2091	6.56	2145	7.09
11,250	2036	5.91	2086	6.35	2137	6.83	2187	7.32	—	—
11,875	2143	6.67	2190	7.12	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp	rpm	bhp
7,500	1783	4.30	1853	4.82	1921	5.37	1986	5.94	2048	6.51
8,125	1861	4.87	1928	5.42	1993	5.98	2055	6.56	2116	7.16
8,750	1941	5.49	2005	6.05	2067	6.63	2128	7.24	2187	7.86
9,375	2024	6.16	2085	6.74	2144	7.33	—	—	—	—
10,000	2111	6.89	2168	7.46	—	—	—	—	—	—
10,625	2199	7.63	—	—	—	—	—	—	—	—
11,250	—	—	—	—	—	—	—	—	—	—
11,875	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—

High Static 1406-2200 rpm, 10.0 Max bhp (5.0 Max bhp per fan motor

50FCQM28 — High Static — 25 Ton Horizontal Supply (rpm - vdc)

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
7,500	1406	6.3	1483	6.7	1559	7.0	1636	7.4	1711	7.7
8,125	1509	6.8	1580	7.1	1651	7.5	1722	7.8	1792	8.1
8,750	1614	7.3	1679	7.6	1744	7.9	1810	8.2	1876	8.5
9,375	1719	7.8	1779	8.1	1840	8.3	1902	8.6	1963	8.9
10,000	1824	8.3	1880	8.5	1938	8.8	1995	9.1	2053	9.3
10,625	1930	8.8	1983	9.0	2036	9.2	2091	9.5	2145	9.7
11,250	2036	9.2	2086	9.5	2137	9.7	2187	9.9	—	—
11,875	2143	9.7	2190	10.0	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc	rpm	vdc
7,500	1783	8.1	1853	8.4	1921	8.7	1986	9.0	2048	9.3
8,125	1861	8.4	1928	8.7	1993	9.0	2055	9.3	2116	9.6
8,750	1941	8.8	2005	9.1	2067	9.4	2128	9.7	2187	9.9
9,375	2024	9.2	2085	9.5	2144	9.7	—	—	—	—
10,000	2111	9.6	2168	9.9	—	—	—	—	—	—
10,625	2199	10.0	—	—	—	—	—	—	—	—
11,250	—	—	—	—	—	—	—	—	—	—
11,875	—	—	—	—	—	—	—	—	—	—
12,500	—	—	—	—	—	—	—	—	—	—

High Static 1406-2200 rpm

Electrical data

Legend and Notes

Applicable for Electrical Data Tables on pages 45 to 57

LEGEND

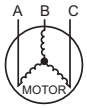
BRKR	—	Circuit Breaker
C.O.	—	Convenience Outlet
FLA	—	Full Load Amps
IFM	—	Indoor Fan Motor
LRA	—	Locked Rotor Amps
MCA	—	Minimum Circuit Amps
P.E.	—	Power Exhaust
PWRD C.O.	—	Powered Convenience Outlet
RLA	—	Rated Load Amps
SCCR	—	Short Circuit Current Rating
UNPWR C.O.	—	Unpowered Convenience Outlet

NOTES:

1. In compliance with NEC requirements for multi-motor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. For 208/230 v units, where one value is show it is the same for either 208 or 230 volts.
3. **Unbalanced 3-Phase Supply Voltage**: Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60



AB = 224-v
BC = 231-v
AC = 226-v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3} = 227$$

Determine maximum deviation from average voltage.
(AB) 227-224 = 3-v
(BC) 231-227 = 4-v
(AC) 227-226 = 1-v
Maximum deviation is 4-v.
Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100x \frac{4}{227} = 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Electrical data (cont)

50FCQM17-28 Cooling Electrical Data

50FCQ UNIT SIZE	V-Ph-Hz	UNIT VOLTAGE RANGE		STD SCCR kA	HIGH SCCR kA[a]	COMP 1		COMP 2		OFM (EA)		IFM		
		MIN	MAX			RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFFCY AT FULL LOAD	FLA
50FCQM17 Vertical	208-3-60	187	253	5	60	28.2	240	19.6	136	350	1.5	STD/MED	90.0%	6.4
												HIGH		7.5
	230-3-60	187	253	5	60	28.2	240	19.6	136	350	1.5	STD/MED	90.0%	6.4
												HIGH		7.5
	460-3-60	414	506	5	65	14.7	130	8.2	66	277	0.9	STD/MED	90.0%	3.0
												HIGH		3.5
	575-3-60	518	633	5	—	11.3	94	6.6	55	397	0.6	STD/MED	90.0%	2.5
												HIGH		3.0
50FCQM17 Horizontal	208-3-60	187	253	5	60	28.2	240	19.6	136	350	1.5	HIGH	90.0%	12.6
	230-3-60	187	253	5	60	28.2	240	19.6	136	350	1.5	HIGH	90.0%	12.6
	460-3-60	414	506	5	65	14.7	130	8.2	66	277	0.9	HIGH	90.0%	5.6
	575-3-60	518	633	5	—	11.3	94	6.6	55	397	0.6	HIGH	90.0%	4.6
50FCQM24 Vertical	208-3-60	187	253	5	60	34.0	240	34.0	240	397	1.9	STD/MED	90.0%	6.4
												HIGH		12.6
	230-3-60	187	253	5	60	34.0	240	34.0	240	397	1.9	STD/MED	90.0%	6.4
												HIGH		12.6
	460-3-60	414	506	5	65	16.0	140	16.0	140	397	0.9	STD/MED	90.0%	3.0
												HIGH		5.6
	575-3-60	518	633	5	—	12.9	108	12.9	108	397	0.7	STD/MED	90.0%	2.5
												HIGH		4.6
50FCQM24 Horizontal	208-3-60	187	253	5	60	34.0	240	34.0	240	397	1.9	HIGH	90.0%	12.6
	230-3-60	187	253	5	60	34.0	240	34.0	240	397	1.9	HIGH	90.0%	12.6
	460-3-60	414	506	5	65	16.0	140	16.0	140	397	0.9	HIGH	90.0%	5.6
	575-3-60	518	633	5	—	12.9	1085	12.9	1085	397	0.7	HIGH	90.0%	4.6
50FCQM28 Vertical	208-3-60	187	253	5	60	51.3	300	48.1	245	350	1.9	STD/MED	90.0%	7.5
												HIGH		12.6
	230-3-60	187	253	5	60	51.3	300	48.1	245	350	1.9	STD/MED	90.0%	7.5
												HIGH		12.6
	460-3-60	414	506	5	65	22.4	150	18.6	125	277	0.9	STD/MED	90.0%	3.5
												HIGH		5.6
	575-3-60	518	633	5	—	19.9	109	14.7	100	397	0.7	STD/MED	90.0%	3.0
												HIGH		4.6
50FCQM28 Horizontal	208-3-60	187	253	5	60	51.3	300	48.1	245	397	1.9	HIGH	90.0%	12.6
	230-3-60	187	253	5	60	51.3	300	48.1	245	397	1.9	HIGH	90.0%	12.6
	460-3-60	414	506	5	65	22.4	150	18.6	125	397	0.9	HIGH	90.0%	5.6
	575-3-60	518	633	5	—	19.9	109	14.7	100	397	0.7	HIGH	90.0%	4.6

NOTE(S):

a. High SCCR (Short Circuit Current Rating) is not available on the following: units with Low Ambient controls, Phase loss monitor, Non-fused disconnect, Powered convenience outlet, and 575-v models.

Electrical data (cont)

50FCQM17 MCA MOCP Electrical Data

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	STD SCCR kA	HIGH SCCR kA[a]	ELECTRIC HEATER				NO CONVENIENCE OUTLET OR UNPOWERED CONVENIENCE OUTLET							
									NO POWER EXHAUST				w/POWER EXHAUST (powered from unit)			
					STD SCCR CRHEATER ****00	HIGH SCCR CRHEATER ****00	NOM (kW)	FLA	MCA	FUSE OR HACR BRKR	DISCONNECT SIZE		MCA	FUSE OR HACR BRKR	DISCONNECT SIZE	
											FLA	LRA			FLA	LRA
50FCQM17 Vertical	208/230-3-60	STD/MED	5	60	—	—	—	—	72	100	75	403	84	100	88	423
					454A	454A	18.8/25.0	52.1/60.1	137/147	150/150	135/144	455/463	149/159	150/175	148/158	475/483
					455A	455A	37.6/50.0	104.2/120.3	202/192	225/200	195/213	507/523	214/204	225/225	208/227	527/543
					456A	456A	56.3/75.0	156.4/180.4	229/253	250/300	255/282	559/583	240/264	250/300	268/296	579/603
		HIGH	5	60	—	—	—	—	74	100	77	407	86	100	91	427
					454A	454A	18.8/25.0	52.1/60.1	140/150	150/150	137/147	459/467	151/161	175/175	151/160	479/487
					455A	455A	37.6/50.0	104.2/120.3	205/195	225/225	197/216	511/527	216/206	225/225	211/229	531/547
					456A	456A	56.3/75.0	156.4/180.4	231/255	250/300	257/285	563/587	243/267	250/300	271/298	583/607
	460-3-60	STD/MED	5	65	—	—	—	—	35	45	36	210	42	50	43	222
					457A	457A	25.0	30.1	73	80	71	240	79	80	78	252
					458A	458A	50.0	60.1	95	100	105	270	102	110	113	282
					459A	459A	75.0	90.2	126	150	140	300	132	150	147	312
		HIGH	5	65	—	—	—	—	36	50	37	212	42	50	45	224
					457A	457A	25.0	30.1	74	80	72	242	80	90	79	254
					458A	458A	50.0	60.1	96	110	107	272	103	110	114	284
					459A	459A	75.0	90.2	126	150	141	302	133	150	148	314
	575-3-60	STD/MED	5	—	—	—	—	—	28	35	28	163	32	40	34	171
					460A	—	24.8	23.9	57	60	56	187	62	70	61	195
					461A	—	49.6	47.7	87	90	83	211	92	100	89	219
					462A	—	74.4	71.6	99	110	111	235	104	110	116	243
		HIGH	5	—	—	—	—	—	28	35	30	163	33	40	35	171
					460A	—	24.8	23.9	58	60	57	187	63	70	63	195
					461A	—	49.6	47.7	88	90	84	211	93	100	90	219
					462A	—	74.4	71.6	100	110	112	235	105	110	117	243
50FCQM17 Horizontal	208/230-3-60	HIGH	5	60	—	—	—	—	85	100	89	421	96	110	103	441
					463A	463A	18.8/25.0	52.1/60.1	150/160	150/175	149/158	473/481	162/172	175/175	163/172	493/501
					464A	464A	37.6/50.0	104.2/120.3	215/205	225/225	209/227	525/541	227/217	250/225	223/241	545/561
					465A	465A	56.3/75.0	156.4/180.4	241/265	250/300	269/297	577/601	253/277	300/300	283/310	597/621
	460-3-60	HIGH	5	65	—	—	—	—	40	50	42	218	47	60	49	230
					466A	466A	25.0	30.1	78	80	77	248	84	90	84	260
					467A	467A	50.0	60.1	101	110	111	278	107	125	119	290
					468A	468A	75.0	90.2	131	150	146	308	137	150	153	320
	575-3-60	HIGH	5	—	—	—	—	—	32	40	33	167	36	45	39	175
					469A	—	24.8	23.9	62	70	61	191	66	70	66	199
					470A	—	49.6	47.7	91	100	88	215	96	100	94	223
					471A	—	74.4	71.6	103	110	116	239	108	125	121	247

NOTE(S):

a. High SCCR (Short Circuit Current Rating) is not available on the following: units with Low Ambient controls, Phase loss monitor, Non-fused disconnect, and 575-v models.

Electrical data (cont)

50FCQM17 MCA MOCP Electrical Data (cont)

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	STD SCCR kA	ELECTRIC HEATER			W/POWERED CONVENIENCE OUTLET							
							NO POWER EXHAUST				w/POWER EXHAUST (powered from unit)			
									DISCONNECT SIZE				DISCONNECT SIZE	
				STD SCCR CRHEATER ****00	NOM (kW)	FLA	MCA	FUSE OR HACR BRKR	FLA	LRA	MCA	FUSE OR HACR BRKR	FLA	LRA
50FCQM17 Vertical	208/230-3-60	STD/ MED	5	—	—	—	77	100	80	408	89	100	94	428
				454A	18.8/25.0	52.1/60.1	142/152	150/175	140/150	460/468	154/164	175/175	154/163	480/488
				455A	37.6/50.0	104.2/120.3	207/197	225/225	200/219	512/528	219/209	225/225	214/232	532/548
				456A	56.3/75.0	156.4/180.4	233/257	250/300	260/288	564/588	245/269	300/300	274/301	584/608
		HIGH	5	—	—	—	79	100	83	412	91	100	96	432
				454A	18.8/25.0	52.1/60.1	144/154	150/175	143/152	464/472	156/166	175/175	156/166	484/492
				455A	37.6/50.0	104.2/120.3	209/200	225/225	203/221	516/532	221/211	225/225	216/235	536/552
				456A	56.3/75.0	156.4/180.4	236/260	250/300	263/290	568/592	247/271	300/300	276/304	588/612
	460-3-60	STD/ MED	5	—	—	—	38	50	39	212	44	50	46	224
				457A	25.0	30.1	75	80	73	242	81	90	81	254
				458A	50.0	60.1	98	110	108	272	104	110	115	284
				459A	75.0	90.2	128	150	143	302	134	150	150	314
		HIGH	5	—	—	—	38	50	40	214	45	50	47	226
				457A	25.0	30.1	76	80	75	244	82	90	82	256
				458A	50.0	60.1	99	110	109	274	105	110	116	286
				459A	75.0	90.2	129	150	144	304	135	150	151	316
	575-3-60	STD/ MED	5	—	—	—	29	40	30	165	34	45	36	173
				460A	24.8	23.9	59	60	58	189	64	70	63	197
				461A	49.6	47.7	89	90	85	213	94	100	91	221
				462A	74.4	71.6	101	110	113	237	106	110	118	245
		HIGH	5	—	—	—	30	40	32	165	35	45	37	173
				460A	24.8	23.9	60	70	59	189	65	70	65	197
				461A	49.6	47.7	90	90	86	213	95	100	92	221
				462A	74.4	71.6	102	110	114	237	107	110	119	245
50FCQM17 Horizontal	208/230-3-60	HIGH	5	—	—	—	89	100	95	426	101	125	108	446
				463A	18.8/25.0	52.1/60.1	154/164	175/175	155/164	478/486	166/176	175/200	168/177	498/506
				464A	37.6/50.0	104.2/120.3	220/210	225/225	214/233	530/546	231/222	250/250	228/247	550/566
				465A	56.3/75.0	156.4/180.4	246/270	300/300	275/302	582/606	258/282	300/300	288/316	602/626
	460-3-60	HIGH	5	—	—	—	43	50	45	220	49	60	52	232
				466A	25.0	30.1	80	90	79	250	86	90	87	262
				467A	50.0	60.1	103	110	114	280	109	125	121	292
				468A	75.0	90.2	133	150	149	310	139	150	156	322
	575-3-60	HIGH	5	—	—	—	33	40	35	169	38	45	41	177
				469A	24.8	23.9	63	70	63	193	68	70	68	201
				470A	49.6	47.7	93	100	90	217	98	100	96	225
				471A	74.4	71.6	105	110	118	241	110	125	123	249

Electrical data (cont)

50FCQM24 MCA MOCP Electrical Data

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	STD SCCR kA	HIGH SCCR kA[a]	ELECTRIC HEATER				NO CONVENIENCE OUTLET OR UNPOWERED CONVENIENCE OUTLET							
									NO POWER EXHAUST				w/POWER EXHAUST (powered from unit)			
					STD SCCR CRHEATER ****00	HIGH SCCR CRHEATER ****00	NOM (kW)	FLA	MCA	FUSE OR HACR BRKR	DISCONNECT SIZE		MCA	FUSE OR HACR BRKR	DISCONNECT SIZE	
											FLA	LRA			FLA	LRA
50FCQM24 Vertical	208/230-3-60	STD/MED	5	60	—	—	—	—	97	125	102	510	109	125	115	530
					454A	454A	18.8/25.0	52.1/60.1	162/172	175/175	162/171	562/570	174/184	175/200	175/184	582/590
					455A	455A	37.6/50.0	104.2/120.3	227/217	250/250	221/240	614/630	239/229	250/250	235/254	634/650
					456A	456A	56.3/75.0	156.4/180.4	253/277	300/300	282/309	666/690	265/289	300/300	295/323	686/710
		HIGH	5	60	—	—	—	—	109	125	116	528	121	150	129	548
					454A	454A	18.8/25.0	52.1/60.1	174/184	175/200	176/185	580/588	186/196	200/200	189/199	600/608
					455A	455A	37.6/50.0	104.2/120.3	240/230	250/250	236/254	632/648	251/241	300/250	249/268	652/668
					456A	456A	56.3/75.0	156.4/180.4	266/290	300/300	296/323	684/708	278/302	300/350	309/337	704/728
	460-3-60	STD/MED	5	65	—	—	—	—	46	60	48	296	52	60	55	308
					457A	457A	25.0	30.1	83	90	82	326	89	90	90	338
					458A	458A	50.0	60.1	106	110	117	356	112	125	124	368
					459A	459A	75.0	90.2	136	150	152	386	142	150	159	398
		HIGH	5	65	—	—	—	—	51	60	54	304	57	70	61	316
					457A	457A	25.0	30.1	88	90	88	334	95	100	96	346
					458A	458A	50.0	60.1	111	125	123	364	117	125	130	376
					459A	459A	75.0	90.2	141	150	158	394	147	175	165	406
	575-3-60	STD/MED	5	—	—	—	—	—	37	45	39	232	42	50	44	240
					460A	—	24.8	23.9	67	70	66	256	72	80	72	264
					461A	—	49.6	47.7	96	100	93	280	101	110	99	288
					462A	—	74.4	71.6	108	125	121	304	113	125	127	312
		HIGH	5	—	—	—	—	—	41	50	43	236	46	50	49	244
					460A	—	24.8	23.9	71	80	71	260	76	80	76	268
					461A	—	49.6	47.7	101	110	98	284	106	110	104	292
					462A	—	74.4	71.6	113	125	126	308	117	125	131	316
50FCQM24 Horizontal	208/230-3-60	HIGH	5	60	—	—	—	—	109	125	116	528	121	150	129	548
					463A	463A	18.8/25.0	52.1/60.1	174/184	175/200	176/185	580/588	186/196	200/200	189/199	600/608
					464A	464A	37.6/50.0	104.2/120.3	240/230	250/250	236/254	632/648	251/241	300/250	249/268	652/668
					465A	465A	56.3/75.0	156.4/180.4	266/290	300/300	296/323	684/708	278/302	300/350	309/337	704/728
	460-3-60	HIGH	5	65	—	—	—	—	51	60	54	304	57	70	61	316
					466A	466A	25.0	30.1	88	90	88	334	95	100	96	346
					467A	467A	50.0	60.1	111	125	123	364	117	125	130	376
					468A	468A	75.0	90.2	141	150	158	394	147	175	165	406
	575-3-60	HIGH	5	—	—	—	—	—	41	50	43	236	46	50	49	244
					469A	—	24.8	23.9	71	80	71	260	76	80	76	268
					470A	—	49.6	47.7	101	110	98	284	106	110	104	292
					471A	—	74.4	71.6	113	125	126	308	117	125	131	316

NOTE(S):

a. High SCCR (Short Circuit Current Rating) is not available on the following: units with Low Ambient controls, Phase loss monitor, Non-fused disconnect, and 575-v models.

Electrical data (cont)

50FCQM24 MCA MOCP Electrical Data (cont)

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	STD SCCR kA	ELECTRIC HEATER			W/POWERED CONVENIENCE OUTLET							
							NO POWER EXHAUST				w/POWER EXHAUST (powered from unit)			
									DISCONNECT SIZE				DISCONNECT SIZE	
				STD SCCR CRHEATER ****00	NOM (kW)	FLA	MCA	FUSE OR HACR BRKR	FLA	LRA	MCA	FUSE OR HACR BRKR	FLA	LRA
50FCQM24 Vertical	208/230-3-60	STD/ MED	5	—	—	—	102	125	107	515	114	125	121	535
				454A	18.8/25.0	52.1/60.1	167/177	175/200	167/176	567/575	179/189	200/200	181/190	587/595
				455A	37.6/50.0	104.2/120.3	232/222	250/250	227/246	619/635	244/234	250/250	241/259	639/655
				456A	56.3/75.0	156.4/180.4	258/282	300/300	287/315	671/695	270/294	300/350	301/328	691/715
		HIGH	5	—	—	—	114	125	121	533	126	150	135	553
				454A	18.8/25.0	52.1/60.1	179/189	200/200	181/191	585/593	191/201	200/225	195/204	605/613
				455A	37.6/50.0	104.2/120.3	244/234	250/250	241/260	637/653	256/246	300/300	255/273	657/673
				456A	56.3/75.0	156.4/180.4	270/294	300/350	301/329	689/713	282/306	300/350	315/342	709/733
	460-3-60	STD/ MED	5	—	—	—	48	60	50	298	54	60	58	310
				457A	25.0	30.1	85	90	85	328	92	100	92	340
				458A	50.0	60.1	108	125	119	358	114	125	127	370
				459A	75.0	90.2	138	150	154	388	144	150	161	400
		HIGH	5	—	—	—	53	60	56	306	59	70	63	318
				457A	25.0	30.1	91	100	91	336	97	100	98	348
				458A	50.0	60.1	113	125	125	366	119	125	133	378
				459A	75.0	90.2	143	150	160	396	149	175	167	408
	575-3-60	STD/ MED	5	—	—	—	38	50	41	234	43	50	46	242
				460A	24.8	23.9	68	70	68	258	73	80	74	266
				461A	49.6	47.7	98	100	95	282	103	110	101	290
				462A	74.4	71.6	110	125	123	306	115	125	128	314
		HIGH	5	—	—	—	43	50	45	238	48	60	51	246
				460A	24.8	23.9	73	80	73	262	77	80	78	270
				461A	49.6	47.7	102	110	100	286	107	110	106	294
				462A	74.4	71.6	114	125	128	310	119	125	133	318
50FCQM24 Horizontal	208/230-3-60	HIGH	5	—	—	—	114	125	121	533	126	150	135	553
				463A	18.8/25.0	52.1/60.1	179/189	200/200	181/191	585/593	191/201	200/225	195/204	605/613
				464A	37.6/50.0	104.2/120.3	244/234	250/250	241/260	637/653	256/246	300/300	255/273	657/673
				465A	56.3/75.0	156.4/180.4	270/294	300/350	301/329	689/713	282/306	300/350	315/342	709/733
	460-3-60	HIGH	5	—	—	—	53	60	56	306	59	70	63	318
				466A	25.0	30.1	91	100	91	336	97	100	98	348
				467A	50.0	60.1	113	125	125	366	119	125	133	378
				468A	75.0	90.2	143	150	160	396	149	175	167	408
	575-3-60	HIGH	5	—	—	—	43	50	45	238	48	60	51	246
				469A	24.8	23.9	73	80	73	262	77	80	78	270
				470A	49.6	47.7	102	110	100	286	107	110	106	294
				471A	74.4	71.6	114	125	128	310	119	125	133	318

Electrical data (cont)

50FCQM28 MCA MOCP Electrical Data

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	STD SCCR kA	HIGH SCCR kA[a]	ELECTRIC HEATER				NO CONVENIENCE OUTLET OR UNPOWERED CONVENIENCE OUTLET							
									NO POWER EXHAUST				w/POWER EXHAUST (powered from unit)			
					STD SCCR CRHEATER ****00	HIGH SCCR CRHEATER ****00	NOM (kW)	FLA	MCA	FUSE OR HACR BRKR	DISCONNECT SIZE		MCA	FUSE OR HACR BRKR	DISCONNECT SIZE	
											FLA	LRA			FLA	LRA
50FCQM28 Vertical	208/230-3-60	STD/MED	5	60	—	—	—	—	135	175	140	579	147	175	154	599
					454A	454A	18.8/25.0	52.1/60.1	200/210	225/225	200/209	631/639	212/222	250/250	214/223	651/659
					455A	455A	37.6/50.0	104.2/120.3	265/255	300/300	260/279	683/699	277/267	300/300	274/292	703/719
					456A	456A	56.3/75.0	156.4/180.4	291/315	350/350	320/348	735/759	303/327	350/350	334/361	755/779
		HIGH	5	60	—	—	—	—	145	175	152	593	157	200	166	613
					454A	454A	18.8/25.0	52.1/60.1	210/220	225/250	212/221	645/653	222/232	250/250	226/235	665/673
					455A	455A	37.6/50.0	104.2/120.3	275/265	300/300	272/290	697/713	287/277	300/300	285/304	717/733
					456A	456A	56.3/75.0	156.4/180.4	301/325	350/350	332/359	749/773	313/337	350/400	345/373	769/793
	460-3-60	STD/MED	5	65	—	—	—	—	57	70	59	293	63	80	66	305
					457A	457A	25.0	30.1	95	100	94	323	101	110	101	335
					458A	458A	50.0	60.1	117	125	128	353	124	150	136	365
					459A	459A	75.0	90.2	147	175	163	383	154	175	170	395
		HIGH	5	65	—	—	—	—	61	80	64	299	68	90	71	311
					457A	457A	25.0	30.1	99	100	99	329	105	110	106	341
					458A	458A	50.0	60.1	122	150	133	359	128	150	140	371
					459A	459A	75.0	90.2	152	175	168	389	158	175	175	401
	575-3-60	STD/MED	5	—	—	—	—	—	48	60	50	225	53	60	55	233
					460A	—	24.8	23.9	78	90	77	249	83	90	83	257
					461A	—	49.6	47.7	108	110	105	273	113	125	110	281
					462A	—	74.4	71.6	120	125	132	297	125	150	138	305
		HIGH	5	—	—	—	—	—	52	60	54	229	56	70	59	237
					460A	—	24.8	23.9	82	90	81	253	86	100	87	261
					461A	—	49.6	47.7	111	125	108	277	116	125	114	285
					462A	—	74.4	71.6	123	150	136	301	128	150	141	309
50FCQM28 Horizontal	208/230-3-60	HIGH	5	65	—	—	—	—	145	175	152	593	157	200	166	613
					463A	463A	18.8/25.0	52.1/60.1	210/220	225/250	212/221	645/653	222/232	250/250	226/235	665/673
					464A	464A	37.6/50.0	104.2/120.3	275/265	300/300	272/290	697/713	287/277	300/300	285/304	717/733
					465A	465A	56.3/75.0	156.4/180.4	301/325	350/350	332/359	749/773	313/337	350/400	345/373	769/793
	460-3-60	HIGH	5	65	—	—	—	—	61	80	64	299	68	90	71	311
					466A	466A	25.0	30.1	99	100	99	329	105	110	106	341
					467A	467A	50.0	60.1	122	150	133	359	128	150	140	371
					468A	468A	75.0	90.2	152	175	168	389	158	175	175	401
	575-3-60	HIGH	5	—	—	—	—	—	52	60	54	229	56	70	59	237
					469A	—	24.8	23.9	82	90	81	253	86	100	87	261
					470A	—	49.6	47.7	111	125	108	277	116	125	114	285
					471A	—	74.4	71.6	123	150	136	301	128	150	141	309

NOTE(S):

a. High SCCR (Short Circuit Current Rating) is not available on the following: units with Low Ambient controls, Phase loss monitor, Non-fused disconnect, and 575-v models.

Electrical data (cont)

50FCQM28 MCA MOCP Electrical Data (cont)

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	STD SCCR kA	ELECTRIC HEATER			W/POWERED CONVENIENCE OUTLET							
							NO POWER EXHAUST				w/POWER EXHAUST (powered from unit)			
									DISCONNECT SIZE				DISCONNECT SIZE	
				STD SCCR CRHEATER ****00	NOM (kW)	FLA	MCA	FUSE OR HACR BRKR	FLA	LRA	MCA	FUSE OR HACR BRKR	FLA	LRA
50FCQM28 Vertical	208/230-3-60	STD/ MED	5	—	—	—	140	175	146	584	151	200	159	604
				454A	18.8/25.0	52.1/60.1	205/215	225/250	206/215	636/644	217/227	250/250	219/229	656/664
				455A	37.6/50.0	104.2/120.3	270/260	300/300	266/284	688/704	282/272	300/300	279/298	708/724
				456A	56.3/75.0	156.4/180.4	296/320	350/350	326/353	740/764	308/332	350/350	339/367	760/784
		HIGH	5	—	—	—	150	200	158	598	162	200	171	618
				454A	18.8/25.0	52.1/60.1	215/225	250/250	217/227	650/658	227/237	250/250	231/240	670/678
				455A	37.6/50.0	104.2/120.3	280/270	300/300	277/296	702/718	292/282	300/300	291/309	722/738
				456A	56.3/75.0	156.4/180.4	306/330	350/350	337/365	754/778	318/342	350/400	351/379	774/798
	460-3-60	STD/ MED	5	—	—	—	59	80	62	295	66	80	69	307
				457A	25.0	30.1	97	100	96	325	103	110	104	337
				458A	50.0	60.1	120	150	131	355	126	150	138	367
				459A	75.0	90.2	150	175	166	385	156	175	173	397
		HIGH	5	—	—	—	64	80	67	301	70	90	74	313
				457A	25.0	30.1	101	110	101	331	107	110	108	343
				458A	50.0	60.1	124	150	136	361	130	150	143	373
				459A	75.0	90.2	154	175	170	391	160	175	178	403
	575-3-60	STD/ MED	5	—	—	—	50	60	52	227	55	60	57	235
				460A	24.8	23.9	80	90	79	251	85	90	85	259
				461A	49.6	47.7	110	110	107	275	114	125	112	283
				462A	74.4	71.6	122	150	134	299	126	150	140	307
		HIGH	5	—	—	—	53	60	56	231	58	70	61	239
				460A	24.8	23.9	83	90	83	255	88	100	89	263
				461A	49.6	47.7	113	125	110	279	118	125	116	287
				462A	74.4	71.6	125	150	138	303	130	150	143	311
50FCQM28 Horizontal	208/230-3-60	HIGH	5	—	—	—	150	200	158	598	162	200	171	618
				463A	18.8/25.0	52.1/60.1	215/225	250/250	217/227	650/658	227/237	250/250	231/240	670/678
				464A	37.6/50.0	104.2/120.3	280/270	300/300	277/296	702/718	292/282	300/300	291/309	722/738
				465A	56.3/75.0	156.4/180.4	306/330	350/350	337/365	754/778	318/342	350/400	351/379	774/798
	460-3-60	HIGH	5	—	—	—	64	80	67	301	70	90	74	313
				466A	25.0	30.1	101	110	101	331	107	110	108	343
				467A	50.0	60.1	124	150	136	361	130	150	143	373
				468A	75.0	90.2	154	175	170	391	160	175	178	403
	575-3-60	HIGH	5	—	—	—	53	60	56	231	58	70	61	239
				469A	24.8	23.9	83	90	83	255	88	100	89	263
				470A	49.6	47.7	113	125	110	279	118	125	116	287
				471A	74.4	71.6	125	150	138	303	130	150	143	311

Electrical data (cont)

50FCQM17 Electric Heat Data — Standard SCCR Unit

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	STD SCCR kA	STD ELECTRIC HEATER PART NUMBER	NOMINAL (kW)	APPLICATION (kW)	APPLICATION OUTPUT (MBH)	STD SCCR SINGLE POINT OR JUNCTION KIT PART NUMBER CRSINGLEXXXA00			
								NO C.O. OR UNPOWERED C.O.		w/PWRD C.O.	
								NO P.E.	w/P.E. (pwrd fr/unit)	NO P.E.	w/P.E. (pwrd fr/unit)
50FCQM17 Vertical	208/230-3-60	STD/ MED	5	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH	5	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD/ MED	5	CRHEATER457A00	25.0	23.0	78.3	057	057	057	057
				CRHEATER458A00	50.0	45.9	156.7	057	057	057	057
				CRHEATER459A00	75.0	68.9	235.0	057	057	057	057
		HIGH	5	CRHEATER457A00	25.0	23.0	78.3	057	057	057	057
				CRHEATER458A00	50.0	45.9	156.7	057	057	057	057
				CRHEATER459A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD/ MED	5	CRHEATER460A00	24.8	22.8	77.7	—	—	—	—
				CRHEATER461A00	49.6	45.6	155.4	057	057	057	057
				CRHEATER462A00	74.4	68.3	233.1	057	057	057	057
		HIGH	5	CRHEATER460A00	24.8	22.8	77.7	—	—	—	—
				CRHEATER461A00	49.6	45.6	155.4	057	057	057	057
				CRHEATER462A00	74.4	68.3	233.1	057	057	057	057
50FCQM17 Horizontal	208/230-3-60	HIGH	5	CRHEATER463A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
				CRHEATER464A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
				CRHEATER465A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	HIGH	5	CRHEATER466A00	25.0	23.0	78.3	057	057	057	057
				CRHEATER467A00	50.0	45.9	156.7	057	057	057	057
				CRHEATER468A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	HIGH	5	CRHEATER469A00	24.8	22.8	77.7	—	—	—	—
				CRHEATER470A00	49.6	45.6	155.4	057	057	057	057
				CRHEATER471A00	74.4	68.3	233.1	057	057	057	057

Electrical data (cont)

50FCQM17 Electric Heat Data — High SCCR Unit

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	HIGH SCCR kA	HIGH SCCR ELECTRIC HEATER PART NUMBER	NOMINAL (kW)	APPLICATION (kW)	APPLICATION OUTPUT (MBH)	HIGH SCCR SINGLE POINT OR JUNCTION KIT PART NUMBER CRSINGLEXXXA00	
								NO C.O. OR UNPOWERED C.O.	
								NO P.E.	w/P.E. (pwrd fr/unit)
50FCQM17 Vertical	208/230-3-60	STD/MED	60	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	058	058
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	058	058
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	058	058
		HIGH	60	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	058	058
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	058	058
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	058	058
	460-3-60	STD/MED	65	CRHEATER457A00	25.0	23.0	78.3	059	059
				CRHEATER458A00	50.0	45.9	156.7	059	059
				CRHEATER459A00	75.0	68.9	235.0	059	059
		HIGH	65	CRHEATER457A00	25.0	23.0	78.3	059	059
				CRHEATER458A00	50.0	45.9	156.7	059	059
				CRHEATER459A00	75.0	68.9	235.0	059	059
	575-3-60	STD/MED	—	—	24.8	22.8	77.7	—	—
				—	49.6	45.6	155.4	—	—
				—	74.4	68.3	233.1	—	—
		HIGH	—	—	24.8	22.8	77.7	—	—
				—	49.6	45.6	155.4	—	—
				—	74.4	68.3	233.1	—	—
50FCQM17 Horizontal	208/230-3-60	HIGH	60	CRHEATER463A00	25.0	18.8/23.0	64.1/78.3	058	058
				CRHEATER464A00	50.0	37.6/45.9	128.1/156.7	058	058
				CRHEATER465A00	75.0	56.3/68.9	192.2/235.0	058	058
	460-3-60	HIGH	65	CRHEATER466A00	25.0	23.0	78.3	059	059
				CRHEATER467A00	50.0	45.9	156.7	059	059
				CRHEATER468A00	75.0	68.9	235.0	059	059
	575-3-60	HIGH	—	—	24.8	22.8	77.7	—	—
				—	49.6	45.6	155.4	—	—
				—	74.4	68.3	233.1	—	—

Electrical data (cont)

50FCQM24 Electric Heat Data — Standard SCCR Unit

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	STD SCCR kA	STD ELECTRIC HEATER PART NUMBER	NOMINAL (kW)	APPLICATION (kW)	APPLICATION OUTPUT (MBH)	STD SCCR SINGLE POINT OR JUNCTION KIT PART NUMBER CRSINGLEXXXA00			
								NO C.O. OR UNPOWERED C.O.		w/PWRD C.O.	
								NO P.E.	w/P.E. (pwrd fr/unit)	NO P.E.	w/P.E. (pwrd fr/unit)
50FCQM24 Vertical	208/230-3-60	STD/ MED	5	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH	5	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD/ MED	5	CRHEATER457A00	25.0	23.0	78.3	057	057	057	057
				CRHEATER458A00	50.0	45.9	156.7	057	057	057	057
				CRHEATER459A00	75.0	68.9	235.0	057	057	057	057
		HIGH	5	CRHEATER457A00	25.0	23.0	78.3	057	057	057	057
				CRHEATER458A00	50.0	45.9	156.7	057	057	057	057
				CRHEATER459A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD/ MED	5	CRHEATER460A00	24.8	22.8	77.7	—	057	—	057
				CRHEATER461A00	49.6	45.6	155.4	057	057	057	057
				CRHEATER462A00	74.4	68.3	233.1	057	057	057	057
		HIGH	5	CRHEATER460A00	24.8	22.8	77.7	057	057	057	057
				CRHEATER461A00	49.6	45.6	155.4	057	057	057	057
				CRHEATER462A00	74.4	68.3	233.1	057	057	057	057
50FCQM24 Horizontal	208/230-3-60	HIGH	5	CRHEATER463A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
				CRHEATER464A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
				CRHEATER465A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	HIGH	5	CRHEATER466A00	25.0	23.0	78.3	057	057	057	057
				CRHEATER467A00	50.0	45.9	156.7	057	057	057	057
				CRHEATER468A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	HIGH	5	CRHEATER469A00	24.8	22.8	77.7	—	—	—	—
				CRHEATER470A00	49.6	45.6	155.4	057	057	057	057
				CRHEATER471A00	74.4	68.3	233.1	057	057	057	057

Electrical data (cont)

50FCQM24 Electric Heat Data — High SCCR Unit

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	HIGH SCCR kA	HIGH SCCR ELECTRIC HEATER PART NUMBER	NOMINAL (kW)	APPLICATION (kW)	APPLICATION OUTPUT (MBH)	HIGH SCCR SINGLE POINT OR JUNCTION KIT PART NUMBER CRSINGLEXXXA00	
								NO C.O. OR UNPOWERED C.O.	
								NO P.E.	w/P.E. (pwrd fr/unit)
50FCQM24 Vertical	208/230-3-60	STD/MED	60	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	058	058
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	058	058
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	058	058
		HIGH	60	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	058	058
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	058	058
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	058	058
	460-3-60	STD/MED	65	CRHEATER457A00	25.0	23.0	78.3	059	059
				CRHEATER458A00	50.0	45.9	156.7	059	059
				CRHEATER459A00	75.0	68.9	235.0	059	059
		HIGH	55	CRHEATER457A00	25.0	23.0	78.3	059	059
				CRHEATER458A00	50.0	45.9	156.7	059	059
				CRHEATER459A00	75.0	68.9	235.0	059	059
	575-3-60	STD/MED	—	—	24.8	22.8	77.7	—	—
				—	49.6	45.6	155.4	—	—
				—	74.4	68.3	233.1	—	—
		HIGH	—	—	24.8	22.8	77.7	—	—
				—	49.6	45.6	155.4	—	—
				—	74.4	68.3	233.1	—	—
50FCQM24 Horizontal	208/230-3-60	HIGH	60	CRHEATER463A00	25.0	18.8/23.0	64.1/78.3	058	058
				CRHEATER464A00	50.0	37.6/45.9	128.1/156.7	058	058
				CRHEATER465A00	75.0	56.3/68.9	192.2/235.0	058	058
	460-3-60	HIGH	65	CRHEATER466A00	25.0	23.0	78.3	059	059
				CRHEATER467A00	50.0	45.9	156.7	059	059
				CRHEATER468A00	75.0	68.9	235.0	059	059
	575-3-60	HIGH	—	—	24.8	22.8	77.7	—	—
				—	49.6	45.6	155.4	—	—
				—	74.4	68.3	233.1	—	—

Electrical data (cont)

50FCQM28 Electric Heat Data — Standard SCCR Unit

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	STD SCCR kA	STD ELECTRIC HEATER PART NUMBER	NOMINAL (kW)	APPLICATION (kW)	APPLICATION OUTPUT (MBH)	STD SCCR SINGLE POINT OR JUNCTION KIT PART NUMBER CRSINGLEXXXA00			
								NO C.O. OR UNPOWERED C.O.		w/PWRD C.O.	
								NO P.E.	w/P.E. (pwrd fr/unit)	NO P.E.	w/P.E. (pwrd fr/unit)
50FCQM28 Vertical	208/230-3-60	STD/ MED	5	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
		HIGH	5	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	STD/ MED	5	CRHEATER457A00	25.0	23.0	78.3	057	057	057	057
				CRHEATER458A00	50.0	45.9	156.7	057	057	057	057
				CRHEATER459A00	75.0	68.9	235.0	057	057	057	057
		HIGH	5	CRHEATER457A00	25.0	23.0	78.3	057	057	057	057
				CRHEATER458A00	50.0	45.9	156.7	057	057	057	057
				CRHEATER459A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	STD/ MED	5	CRHEATER460A00	24.8	22.8	77.7	057	057	057	057
				CRHEATER461A00	49.6	45.6	155.4	057	057	057	057
				CRHEATER462A00	74.4	68.3	233.1	057	057	057	057
		HIGH	5	CRHEATER460A00	24.8	22.8	77.7	057	057	057	057
				CRHEATER461A00	49.6	45.6	155.4	057	057	057	057
				CRHEATER462A00	74.4	68.3	233.1	057	057	057	057
50FCQM28 Horizontal	208/230-3-60	HIGH	5	CRHEATER463A00	25.0	18.8/23.0	64.1/78.3	056	056	056	056
				CRHEATER464A00	50.0	37.6/45.9	128.1/156.7	056	056	056	056
				CRHEATER465A00	75.0	56.3/68.9	192.2/235.0	056	056	056	056
	460-3-60	HIGH	5	CRHEATER466A00	25.0	23.0	78.3	057	057	057	057
				CRHEATER467A00	50.0	45.9	156.7	057	057	057	057
				CRHEATER468A00	75.0	68.9	235.0	057	057	057	057
	575-3-60	HIGH	5	CRHEATER469A00	24.8	22.8	77.7	057	057	057	057
				CRHEATER470A00	49.6	45.6	155.4	057	057	057	057
				CRHEATER471A00	74.4	68.3	233.1	057	057	057	057

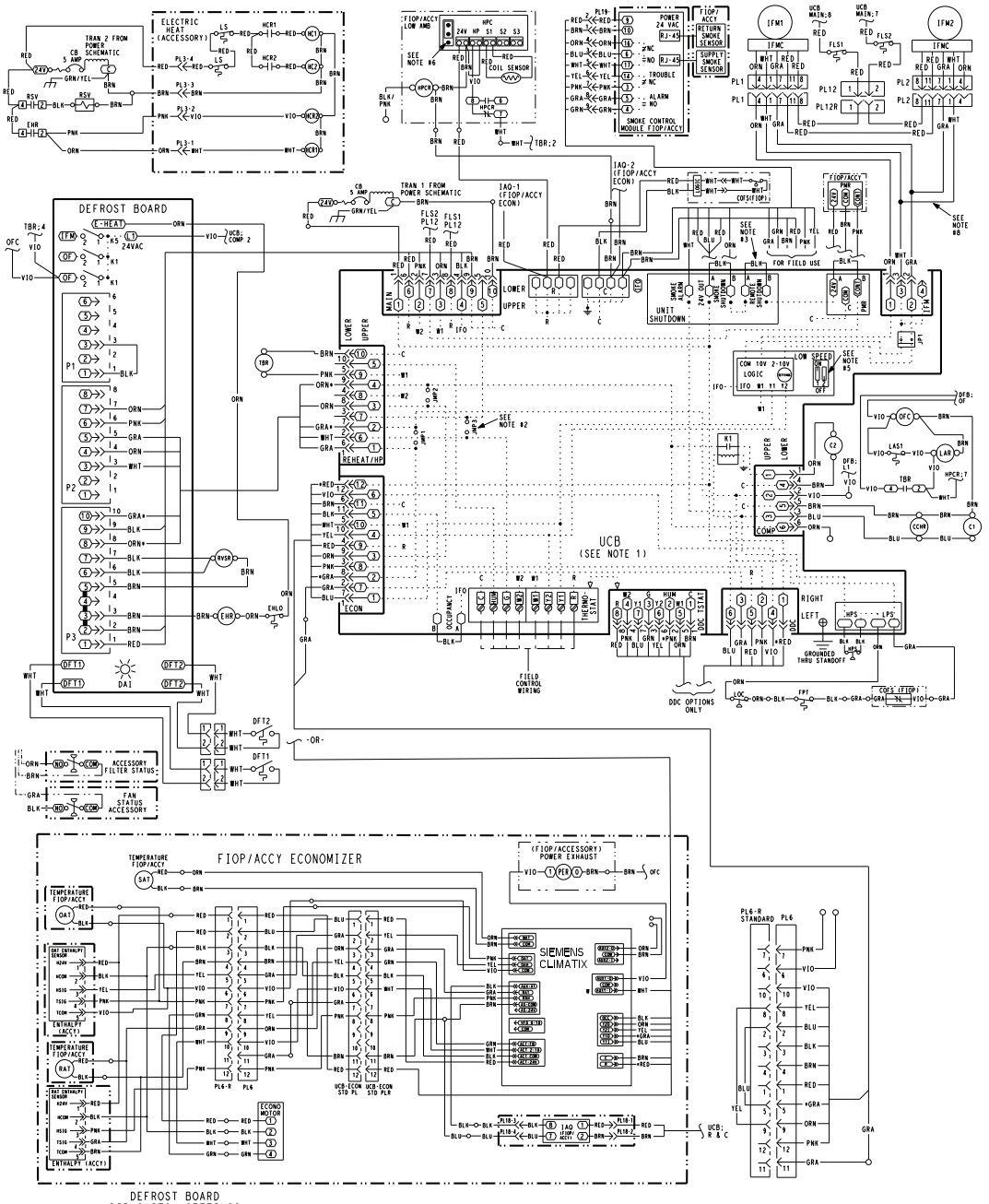
Electrical data (cont)

50FCQM28 Electric Heat Data — High SCCR Unit

50FCQ UNIT SIZE	NOM. V-Ph-Hz	IFM TYPE	HIGH SCCR kA	HIGH SCCR ELECTRIC HEATER PART NUMBER	NOMINAL (kW)	APPLICATION (kW)	APPLICATION OUTPUT (MBH)	HIGH SCCR SINGLE POINT OR JUNCTION KIT PART NUMBER CRSINGLEXXXA00	
								NO C.O. OR UNPOWERED C.O.	
								NO P.E.	w/P.E. (pwrd fr/unit)
50FCQM28 Vertical	208/230-3-60	STD/MED	60	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	058	058
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	058	058
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	058	058
		HIGH	60	CRHEATER454A00	25.0	18.8/23.0	64.1/78.3	058	058
				CRHEATER455A00	50.0	37.6/45.9	128.1/156.7	058	058
				CRHEATER456A00	75.0	56.3/68.9	192.2/235.0	058	058
	460-3-60	STD/MED	65	CRHEATER457A00	25.0	23.0	78.3	059	059
				CRHEATER458A00	50.0	45.9	156.7	059	059
				CRHEATER459A00	75.0	68.9	235.0	059	059
		HIGH	65	CRHEATER457A00	25.0	23.0	78.3	059	059
				CRHEATER458A00	50.0	45.9	156.7	059	059
				CRHEATER459A00	75.0	68.9	235.0	059	059
	575-3-60	STD/MED	—	—	24.8	22.8	77.7	—	—
				—	49.6	45.6	155.4	—	—
				—	74.4	68.3	233.1	—	—
		HIGH	—	—	24.8	22.8	77.7	—	—
				—	49.6	45.6	155.4	—	—
				—	74.4	68.3	233.1	—	—
50FCQM28 Horizontal	208/230-3-60	HIGH	60	CRHEATER463A00	25.0	18.8/23.0	64.1/78.3	058	058
				CRHEATER464A00	50.0	37.6/45.9	128.1/156.7	058	058
				CRHEATER465A00	75.0	56.3/68.9	192.2/235.0	058	058
	460-3-60	HIGH	65	CRHEATER466A00	25.0	23.0	78.3	059	059
				CRHEATER467A00	50.0	45.9	156.7	059	059
				CRHEATER468A00	75.0	68.9	235.0	059	059
	575-3-60	HIGH	—	—	24.8	22.8	77.7	—	—
				—	49.6	45.6	155.4	—	—
				—	74.4	68.3	233.1	—	—

Typical wiring diagrams

Typical 50FCQ*17-28 Control Wiring Diagram, Electromechanical with POL224 Controller, 460/575-3-60 Unit Shown

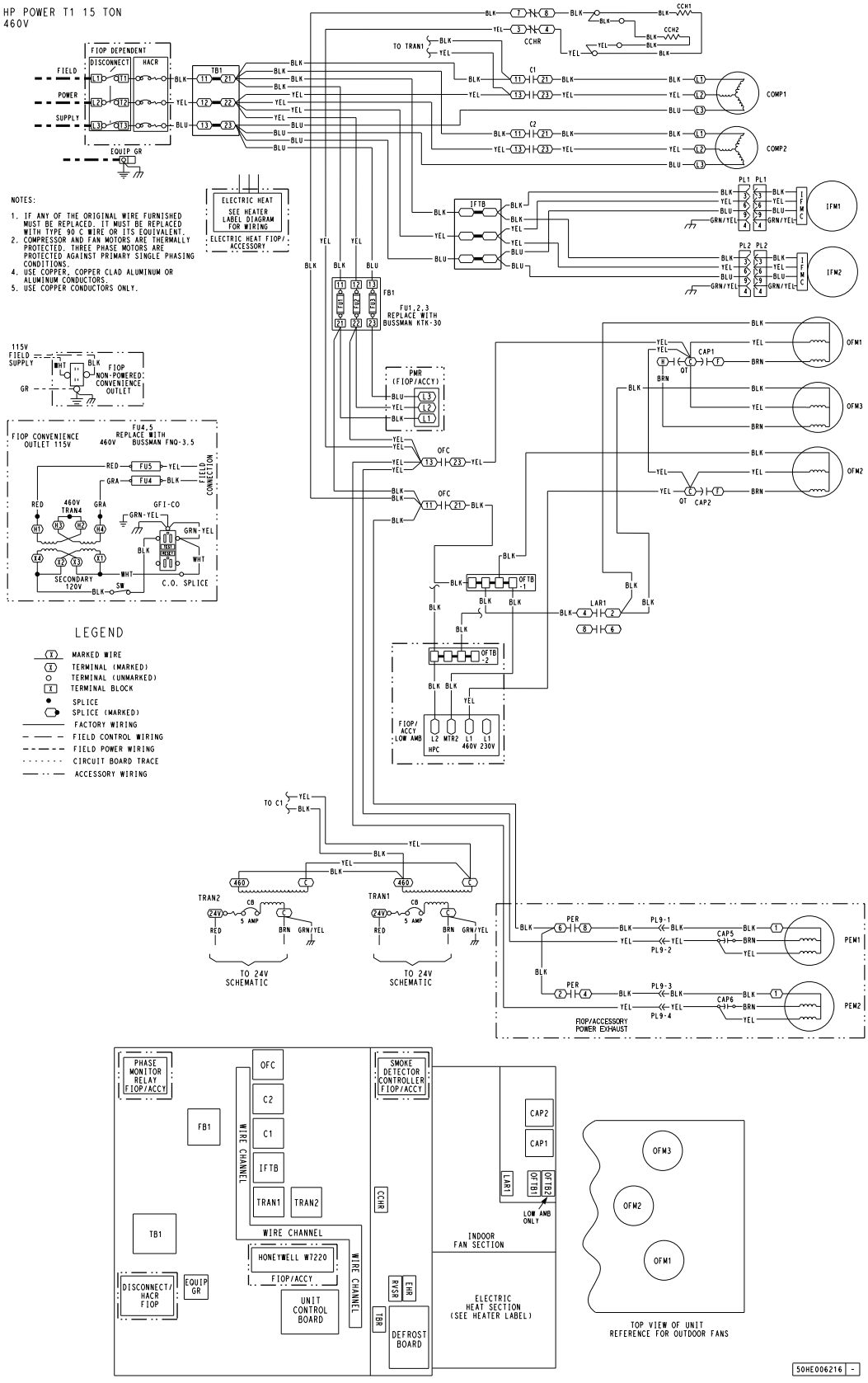


ACCY	ACCESSORY
AMB	AMBIENT
C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HEATER RELAY
CMB	COMBUSTION
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
DDC	DIRECT DIGITAL CONTROL
EHLO	ELECTRIC HEAT LOCKOUT
EHR	ELECTRIC HEAT RELEAY
ERV	ENERGY RECOVERY VENTILATOR
FIOP	FACTORY INSTALLED OPTION
FLS	FAN LIMIT SWITCH
FPT	FREEZE PROTECTION THERMOSTAT
FSD	FIRE SHUT DOWN
FS	FLAME SENSOR
FU	FUSE
GND	GROUND
GVR	GAS VALVE RELAY
HPC	HEAD PRESSURE CONTROL
HPS	HIGH PRESSURE SWITCH
HS	HALL EFFECT SENSOR
I	IGNITOR
IAQ	INDOOR AIR QUALITY SENSORS
IDM	INDUCED DRAFT MOTOR
IFCB	INDOOR FAN CIRCUIT BREAKER
IFM	INDOOR FAN MOTOR
IFMC	INDOOR FAN CONTROLLER
IGC	INTEGRATED GAS CONTROL
JMP	JUMPER
LA	LOW AMBIENT
LDV	LIQUID DIVERTER VALVE
LOC	LOSS OF CHARGE
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
LS	LIMIT SWITCH
LTLO	LOW TEMPERATURE LOCKOUT
MGV	MAIN GAS VALVE
MOV	VOLTAGE RESTRICTOR
MTR	MOTOR
MTS	MIXED AIR TEMPERATURE SWITCH
OAQ	OUTDOOR AIR QUALITY
OARH	OUTSIDE AIR RELATIVE HUMIDITY
OAT	OUTDOOR AIR TEMP. SENSOR
OFC	OUTDOOR FAN CONTACTOR
OFM	OUTDOOR FAN MOTOR
OFR	OUTDOOR FAN RELAY
OL	OVERLOAD
PER	POWER EXHAUST RELAY
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
RARH	RETURN AIR RELATIVE HUMIDITY
RAT	RETURN AIR TEMP. SENSOR
RDV	REHEAT DISCHARGE VALVE
RS	ROLLOUT SWITCH
RVSR	REVERSING VALVE RELAY
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SPRH	SPACE RELATIVE HUMIDITY
SPT	SPACE TEMPERATURE SENSOR
SPTO	SPACE TEMPERATURE OFFSET
STD	STANDARD
TB	TERMINAL BLOCK
TBR	TEMPERATURE BYPASS RELAY
TDR	TIME DELAY RELAY(WINTER START)
TRAN	TRANSFORMER
UCB	UNIT CONTROL BOARD

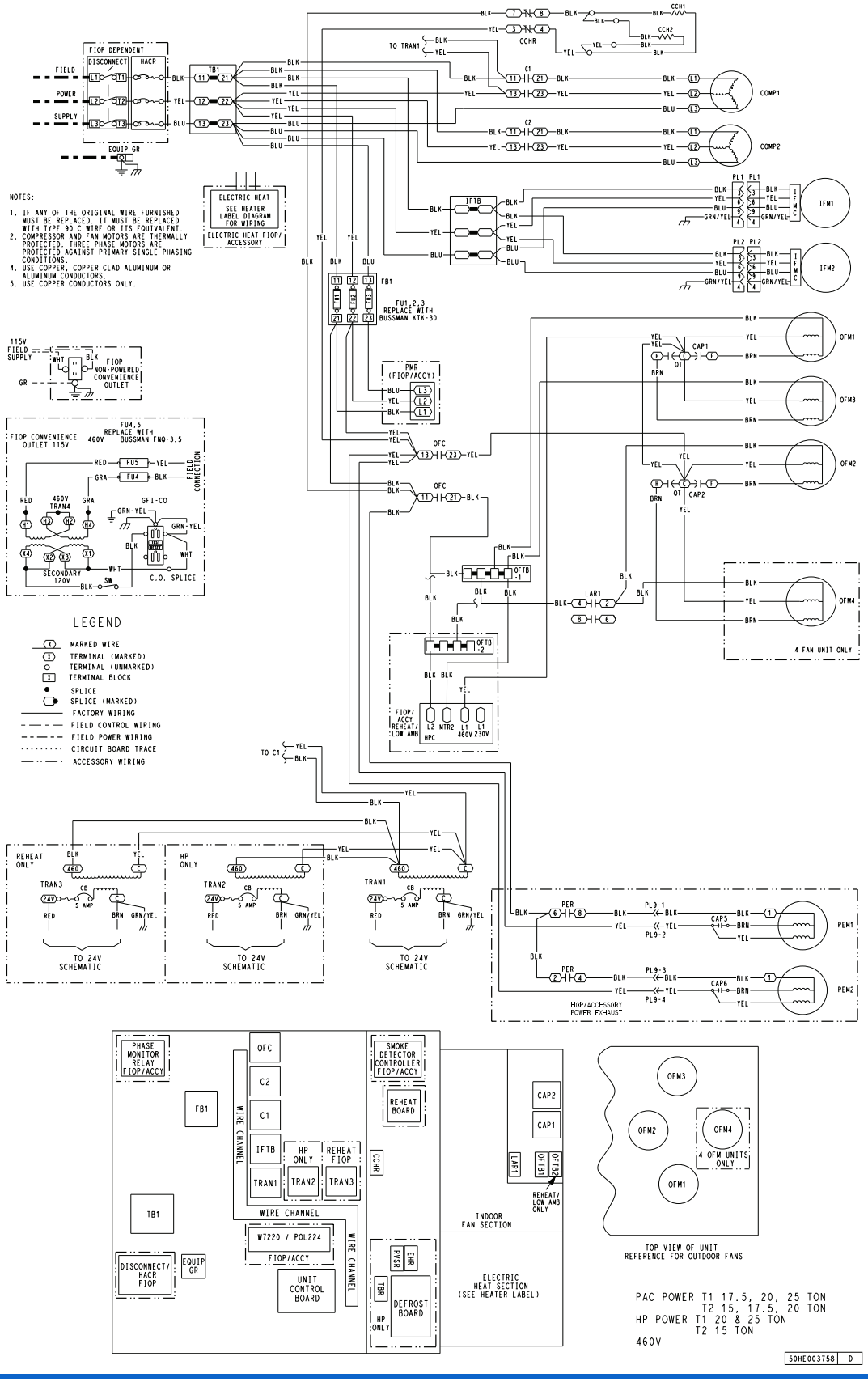
NOTES:
1. TERMINAL BOARD SCHEMATIC LAYOUT DOES NOT MATCH ACTUAL TERMINAL BOARD LAYOUT.
2. TERMINAL BOARD JUMPERS 1,2 AND 3 ARE CUT FROM THE FACTORY.
3. REMOVE DESIGNATED JUMPERS ON TERMINAL BOARD WHEN ADDING SMOKE DETECTORS, OCCUPANCY AND REMOTE SHUTDOWN.
4. USE ABC AS COARSE AND AS POT FINE ADJUSTMENTS FOR SETTING HIGH FAN SPEED. LOW SPEED IS AN OFFSET BASED ON DIP SWITCHES.
5. 2-PIN LOW SPEED DIP SWITCH POSITIONS ARE FACTORY SET AS SHOWN.
6. HARDSTART AND CUTOUT SET TO "MIN". JUMPER PIN ON TOP 2-PINS AS SHOWN.
7. THE + WIRE COLOR IS FOR DIFFERENTIATION WITHIN THIS SCHEMATIC.
8. ON HORIZONTAL SUPPLY UNITS, IFM2 GRA AND WHT WIRES WILL INCLUDE IN-LINE RESISTORS TO REDUCE IT'S SPEED.

Typical wiring diagrams (cont)

Typical 50FCQ*17 Power Wiring Diagram, Electromechanical Controller, 15 Ton 460-3-60 Unit Shown

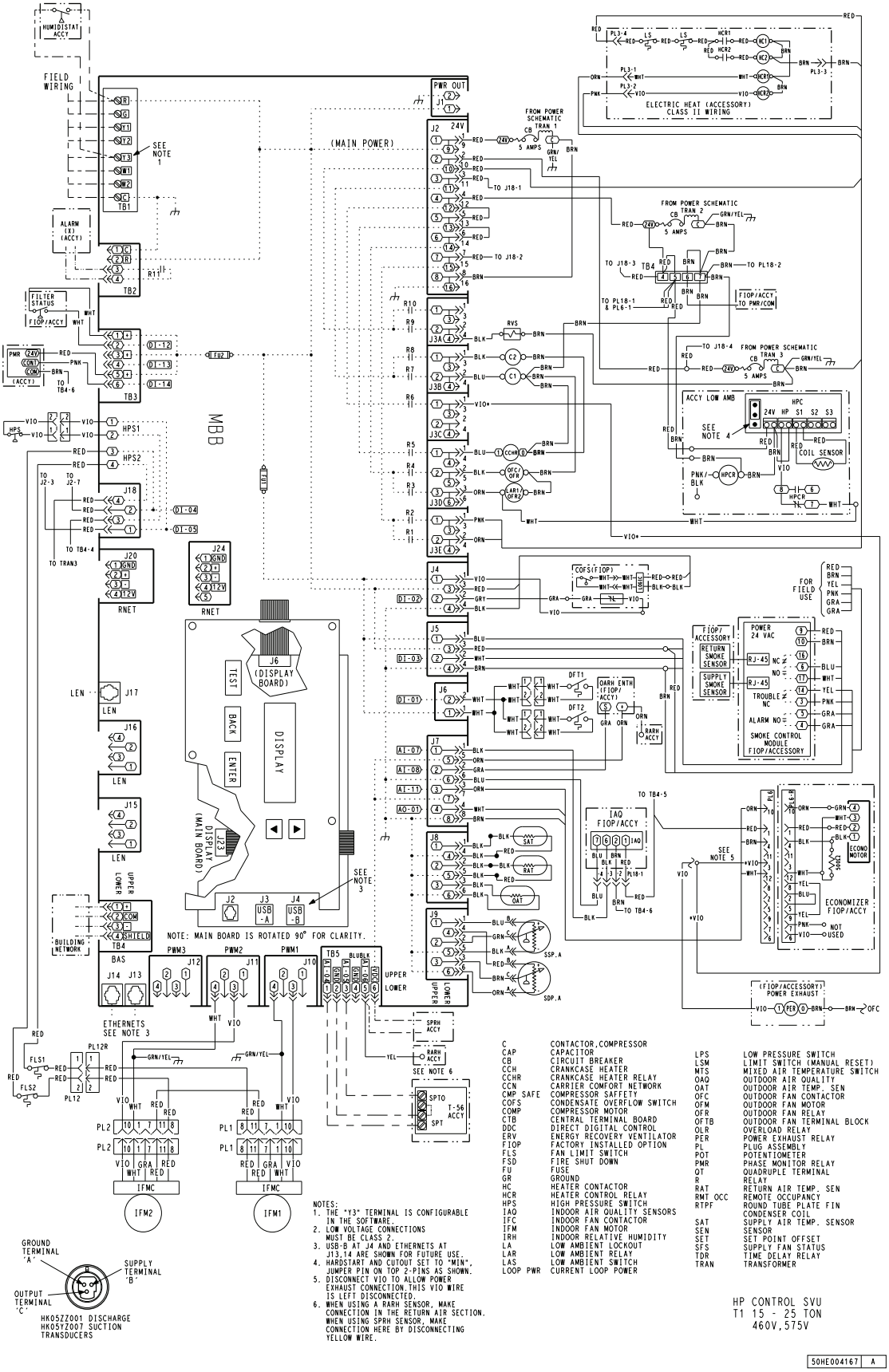


Typical 50FCQ*24-28 Power Wiring Diagram, Electromechanical Controller, 460-3-60 Unit Shown



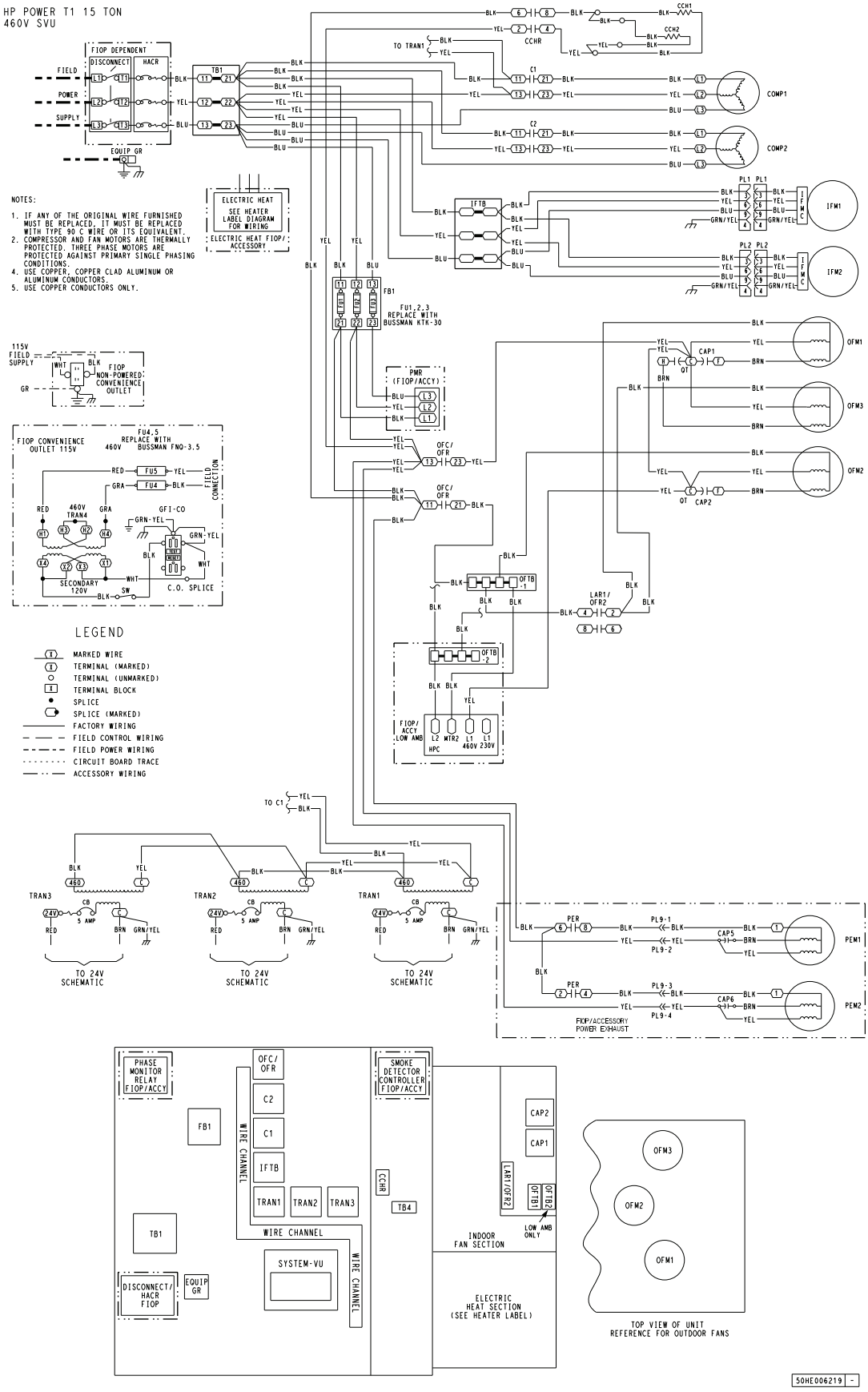
Typical wiring diagrams (cont)

Typical 50FCQ*17-28 Control Wiring Diagram, SystemVu™ Controller, 460-3-60 Unit Shown



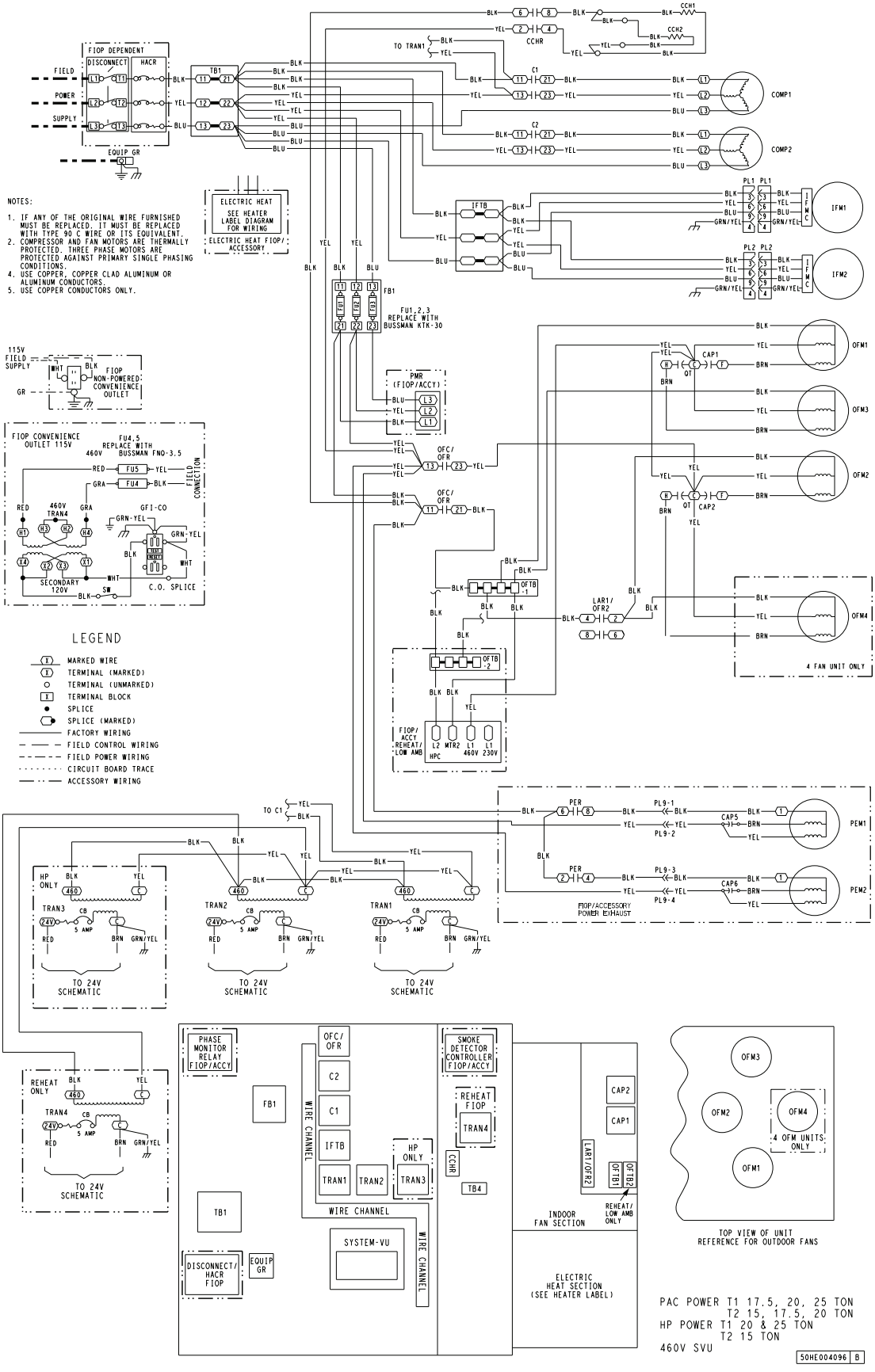
Typical wiring diagrams (cont)

Typical 50FCQ*17 Power Wiring Diagram, SystemVu™ Controller, 15 Ton 460-3-60 Unit Shown



Typical wiring diagrams (cont)

Typical 50FCQ*24-28 Power Wiring Diagram, SystemVu™ Controller, 460-3-60 Unit Shown



Sequence of operation

General

The sequence below describes the sequence of operation for an electromechanical unit with and without a factory-installed EconomizerONE (POL224 controller). For information regarding a direct digital controller, see the start-up, operations, and troubleshooting manual for the applicable controller.

Electromechanical units without economizer

Cooling

When the thermostat calls for cooling, terminals G and Y1 are energized. The indoor fan will run at the low fan speed and the C1 compressor contactor (CC) is energized causing the compressor and outdoor fan to run. The low indoor fan speed is 60% or 66% of the user set fan speed depending on unit size.

If additional cooling is needed, the thermostat will add the call for Y2. This will increase the indoor fan speed to the user set fan speed and energize the C2 contactor and second compressor for full compressor capacity. The outdoor fan is the same speed for Y1 and Y2.

When the thermostat removes the call for Y2 but leaves the Y1, the indoor fan will slow to the reduced percentage of the user set fan speed, the C2 contactor will de-energize, the second compressor will turn off, and the outdoor fan will remain on. When the thermostat removes the call for Y1 the compressor contactor will de-energize shutting down the compressor and the outdoor fan. When the thermostat removes the call for G, the indoor fan will turn off after the specific unit fan off delay.

NOTE: Per ASHRAE 90.1-2019 and IECC-2018 standards, during the first stage cooling operation the Unit Control Board (UCB) will adjust the fan motor speed to provide 60% or 66% of the total cfm established for the unit.

Defrost

When the temperature of the outdoor coil drops below 28°F (–2°C) as sensed by the defrost thermostat (DFT2) and the defrost timer is at the end of a timed period (adjustable at 30, 60, 90 or 120 minutes), the reversing valve solenoid (RVS) is energized and the OFC is de-energized. This switches the position of the reversing valve and shuts off the outdoor fan. The electric heaters (if installed) will be energized.

Heating, unit with economizer

Upon a request for heating from the space thermostat terminal, W1 will be energized with 24V. The indoor fan will run at high speed, and outdoor fan contactor (OFC), C1 and C2 will be energized in heating. The indoor fan, outdoor fans, and both stages of the compressor are energized. The reversing valve is de-energized and switch positions. The economizer is set to minimum position (ventilation position). If the space temperature continues to fall with W1 energized, W2 will bring on all electric heat (HC).

As the space temperature rises the W2 will de-energize and the compressors will continue to operate, until the thermostat set point is achieved de-energizing W1. If the thermostat is set to Auto, the indoor fan will de-energize and the economizer will close. If the indoor fan is set to On, the indoor fan will continue to operate and the economizer will remain at minimum position (vent position).

On units equipped for 2 stages of heat, when additional heat is needed, heater contactor no. 2 is energized through W2. The economizer damper moves to the minimum position. When the thermostat is satisfied, the damper moves to the fully closed position.

Heating, unit without economizer

Upon a request for heating from the space thermostat, terminal W1 will be energized with 24V. The IFC, outdoor fan contactor (OFC), C1, and C2 will be energized. The indoor fan, outdoor fans, and compressor no. 1, and compressor no. 2 are energized and reversing valves are de-energized and switch position.

If the space temperature continues to fall while W1 is energized, W2 will be energized with 24V, and the heater contactor(s) (HC) will be energized, which will energize the electric heater(s).

When the space thermostat is satisfied, W2 will be de-energized first, and the electric heater(s) will be de-energized. Upon a further rise in space temperature, W1 will be de-energized.

IMPORTANT: The thermostat must be configured for Electric Heat so it will energize G with the W1 call.

Electromechanical units with factory-installed EconomizerONE

When free cooling is not available, the compressors will be controlled by the zone thermostat. When free cooling is available, the outdoor-air damper is modulated by the EconomizerONE control to provide a 50°F (10°C) to 55°F (13°C) mixed-air temperature into the zone. As the mixed air temperature fluctuates above 55°F (13°C) or below 50°F (10°C) dampers will be modulated (open or close) to bring the mixed-air temperature back within control. If mechanical cooling is utilized with free cooling, the outdoor-air damper will maintain its current position at the time the compressor is started. If the increase in cooling capacity causes the mixed-air temperature to drop below 45°F (7°C), then the outdoor-air damper position will be decreased to the minimum position. If the mixed-air temperature continues to fall, the outdoor-air damper will close. Control returns to normal once the mixed-air temperature rises above 48°F (9°C). The power exhaust fans will be energized and de-energized, if installed, as the outdoor-air damper opens and closes.

If field-installed accessory CO_2 sensors are connected to the EconomizerONE control, a demand controlled ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set-point (on the EconomizerONE controller), the minimum position of the damper will be increased proportionally until the Maximum Ventilation setting is reached. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will follow the higher demand condition from either the DCV mode or from the free cooling mode. For EconomizerONE operation, there must be a thermostat call for the fan (G). If the unit is occupied and the fan is on, the damper will operate at minimum position. Otherwise, the damper will be closed.

When the EconomizerONE control is in the occupied mode and a call for cooling exists (Y1 on the thermostat), the control will first check for indoor fan operation. If the fan is not on, then cooling will not be activated. If the fan is

on, then the control will open the EconomizerONE damper to the minimum position.

On the initial power to the EconomizerONE control, it will take the damper up to 2-1/2 minutes before it begins to position itself. After the initial power-up, further changes in damper position can take up to 90 seconds to initiate. Damper movement from full closed to full open (or vice versa) will take between 1-1/2 and 2-1/2 minutes. If free cooling can be used as determined from the appropriate changeover command (dry bulb, outdoor enthalpy, differential dry bulb, or differential enthalpy), then the control will modulate the dampers open and closed to maintain the mixed-air temperature set-point at 50°F (10°C) to 55°F (13°C). If there is a further demand for cooling (cooling second stage — Y2 is energized), then the control will bring on compressor stage 1 to maintain the mixed-air temperature setpoint. The EconomizerONE damper will be open at maximum position.

NOTE: On 2-speed units, the EconomizerONE controller will adjust the damper position as the Indoor Fan Speed changes, per its configured values.

Heating

The sequence of operation for the heating is the same as an electromechanical unit without economizer. The only difference is how the economizer acts. The economizer will stay at the Economizer Minimum Position while the evaporator fan is operating. The outdoor-air damper is closed when the indoor fan is not operating. Refer to Service and Maintenance manual for further details.

SystemVu™ controller (factory option)

For details on operating 50FCQ units equipped with the factory-installed SystemVu controller option, refer to FCQ/GCQ Series Single Package Rooftop Units with SystemVu Controller Controls, Start-Up, Operation and Troubleshooting manual.

Application data

Minimum operating ambient temperature (cooling)

In mechanical cooling mode, your Carrier rooftop unit can safely operate down to an outdoor ambient temperature of 40°F (4°C). It is possible to provide cooling at lower outdoor ambient temperatures by using less outside air, economizers, and/or accessory low ambient kits.

Maximum operating ambient temperature (cooling)

The maximum operating ambient temperature for cooling mode is 125°F (52°C). While cooling operation above 125°F (52°C) may be possible, it could cause either a reduction in performance, reliability, or a protective action by the unit's internal safety devices.

Multiple motor and drive packages

Some applications need larger horsepower motors, some need more airflow, and some need both. Regardless of the case, your Carrier expert has a factory installed combination to meet your application. A wide selection of motors are available, factory installed, to handle nearly any application.

Minimum and maximum airflow (heating and cooling)

To maintain safe and reliable operation of your rooftop, operate within the heating airflow limits during heating mode and cooling airflow limits during cooling mode. Operating above the maximum may cause blow-off, undesired airflow noise, or airflow related problems with the rooftop unit. Operating below the minimum may cause problems with coil freeze-up and unsafe heating operation. Heating and cooling limitations differ when evaluating operating CFM, minimum value is the HIGHER of the cooling and heating minimum CFM values published on page 6 and the maximum value is the LOWER of the cooling and heating minimum values published on page 6.

Heating-to-cooling changeover

Your unit will automatically change from heating to cooling mode when using a thermostat with an auto-changeover feature.

Airflow

All units are draw-though in cooling mode and blow-through in heating mode.

Outdoor air application strategies

Economizers reduce operating expenses and compressor run time by providing a free source of cooling and a means of ventilation to match application changing needs. In fact, they should be considered for most applications. Also, consider the various economizer control methods and their benefits, as well as sensors required to accomplish your application goals. Please contact your local Carrier representative for assistance.

Motor limits, brake horsepower (bhp)

Due to internal design of Carrier units, the air path, and specially designed motors, the full horsepower (maximum continuous bhp) band, as listed in the Fan Performance tables, can be used with the utmost confidence. There is no need for extra safety factors, as Carrier motors are designed and rigorously tested to use the entire, listed bhp range without either nuisance tripping or premature motor failure.

Sizing a rooftop

Bigger is not necessarily better. While an air conditioner needs to have enough capacity to meet the design loads, it does not need excess capacity. In fact, excess capacity typically results in very poor part load performance and humidity control.

Using higher design temperatures than ASHRAE recommends for your location, adding "safety factors" to the calculated load, are all signs of oversizing air conditioners. Oversizing the air conditioner leads to poor humidity control, reduced efficiency, higher utility bills, larger indoor temperature swings, excessive noise, and increased wear and tear on the air conditioner.

Rather than oversizing an air conditioner, engineers should "right-size" or even slightly "under-size" air conditioners. Correctly sizing an air conditioner controls humidity better; promotes efficiency; reduces utility bills; extends equipment life, and maintains even, comfortable temperatures. Please contact your local Carrier representative for assistance.

Low ambient applications

The optional Carrier economizer can adequately cool your space by bringing in fresh, cool outside air. In fact, when so equipped, accessory low-ambient kit may not be necessary. In low ambient conditions, unless the outdoor air is excessively humid or contaminated, economizer-based "free cooling" is the preferred less costly and energy conscious method. In low ambient applications where outside air might not be desired (such as contaminated or excessively humid outdoor environments), your Carrier rooftop can operate to ambient temperatures down to –0°F (–18°C) using the recommended accessory low ambient controller.

Guide specifications

Note about this specification:

This specification is in the "Masterformat" as published by the Construction Specification Institute. Please feel free to copy this specification directly into your building spec.

Cooling Only/Electric Heat Packaged Rooftop Heat Pump

HVAC Guide Specifications

Size Range: **15 to 25 Nominal Tons**

Carrier Model Number: **50FCQ*17-28**

Part 1 — (23 06 80) Schedules for Decentralized HVAC Equipment

1.01 (23 06 80.13) Decentralized Unitary HVAC Equipment Schedule:

A. (23 06 80.13.A.) Rooftop Unit (RTU) Schedule:

1. Schedule is per the project specification requirements.

Part 2 — (23 07 16) HVAC Equipment Insulation

2.01 (23 07 16.13) Decentralized, Rooftop Units:

A. (23 07 16.13.A.) Evaporator Fan Compartment:

1. Interior cabinet surfaces shall be insulated with a minimum 1/2 in. thick, minimum 1-1/2 lb density, flexible fiberglass insulation bonded with a phenolic binder, neoprene coated on the air side.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

B. (23 07 16.13.B.) Electric Heat Compartment:

1. Aluminum foil-faced fiberglass insulation shall be used.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

Part 3 — (23 09 13) Instrumentation and Control Devices for HVAC

3.01 (23 09 13.23) Sensors and Transmitters:

A. (23 09 13.23.A.) Thermostats:

Thermostat must:

a. energize both "W" and "G" when calling for heat.

b. have capability to energize 1 or 2 different stages of cooling, and 2 different stages of heating.

c. include capability for occupancy scheduling.

Part 4 — (23 09 23) Direct Digital Control system for HVAC

4.01 (23 09 23.13) Decentralized, Rooftop Units:

A. (23 09 23.13.A.) SystemVu™ intelligent integrated Direct Digital Control (DDC) shall provide:

1. Integrated unit operation for comfort cooling, heating ventilation as well as all monitoring, recording and reporting capabilities. Controller shall also provide diagnostics and alarms of abnormal unit operation through the controller. Controller shall have an intuitive user display and be able to be used in a standalone operation or via building automation system (BAS).
2. Quick Unit Status LEDs of: RUN — meaning all systems are go, ALERT — that indicates there is currently a non-critical issue with the unit, like filters need to be replaced and FAULT — that indicates the unit has a critical issue and will possibly shut down.
3. Six large navigation keys for easy access. Navigation keys shall consist of: TEST, BACK, ENTER, and MENU along with UP and DOWN arrows.
4. Full back lit user display with 4 line by 30 character text capabilities. Display menu shall be designed to provide guided major menus and sub menus main menus provided below:
   a. Shutdown Unit
   b. Run Status
   c. Settings
   d. Alerts/Faults
   e. Service
   f. Inputs
   g. Outputs
   h. USB
5. The capability for standalone operation with conventional thermostat/sensor or use with building automation systems (BAS) of Carrier i-Vu®, BACnet[1] MS/TP and Carrier Comfort Network® (CCN) systems. No special modules or boards are required for these capabilities. Has the capability to work with Equipment Touch™ and System Touch™ devices and ZS Sensors.
6. The ability to read refrigerant pressures at display or via BAS network of; Discharge Pressure and Suction Pressure. The need for traditional refrigerant gauges is not required.
7. USB Data Port for flash drive interaction. This will allow the transfer of data for uploads, downloads, perform software upgrades, back-up and restore data and file transfer data such as component number of starts and run hours.
8. Reverse Rotation Protection of compressors if field 3-phase wiring is misapplied.

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9. Provide Service Capabilities of:
   a. Auto run test
   b. Manual run test
   c. Component run hours and starts
   d. Commissioning reports
   e. Data logging
   f. Alarm history
10. Economizer control and diagnostics. Set up economizer operation, receive feedback from actuator. Also meets the most recent California Title 24, ASHRAE 90.1 and IECC®[1] Fault Detection and Diagnostic (FDD) requirements.
11. Unit cooling operation down to 40°F (4°C).
12. Controller shall have easy access connections around the controller perimeter area and consist of Mate-N-Lok®[1], terminal block and RJ style modular jack connections.
13. 365 day real time clock, 20 holiday schedules along with occupied and unoccupied scheduling.
14. Auto-Recognition for easy installation and commissioning of devices like economizers, space sensors, etc.
15. A 5°F (2.8°C) temperature difference between cooling and heating set points to meet the latest ASHRAE 90.1 Energy Standard.
16. Contains return air sensor, supply air sensor and outdoor air sensor to help monitor and provide data for the unit comfort operation, diagnostic and alarms.
17. Use of Carrier's field accessory hand-held Navigator™ display, Equipment Touch and System Touch devices.
18. Supply Air Tempering control operates the electric heat to maintain a minimum supply air temperature during conditions where very cold outdoor air causes the supply air temperature to fall below the configured Supply Air Tempering Setpoint. This occurs during periods where DCV is active and increasing the amount of outdoor air or in cases where the system is operating at very low airflow and the calculated economizer position has increased to maintain a constant ventilation rate.
19. Demand limiting in units with SystemVu™ controller is achieved through set point expansion. The systems heating and cooling set points are expanded in steps or levels. The degree to which the set points may be expanded is defined by the 6 demand level offsets and the 2 commanded demand limit levels.
20. 3-year limited part warranty.

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Part 5 — (23 09 33) Electric and Electronic Control System for HVAC

5.01 (23 09 33.13) Decentralized, Rooftop Units:

A. (23 09 33.13.A.) General:
   1. Shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-v transformer side. Transformer shall have 75 VA capability.
   2. Shall utilize color-coded wiring.
   3. Shall include a Unit Control Board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, economizer, thermostat, DDC control options, and low and high pressure switches. Controller shall also provide an intuitive means to adjust the indoor fan speed through a simple switch and pot adjustment design.
   4. Unit shall include a minimum of one 8-pin screw terminal connection board for connection of control wiring.
   5. Shall include integrated defrost system to prevent excessive frost accumulation during heating duty, and shall be controlled as follows:
      a. Defrost shall be initiated on the basis of time and coil temperature.
      b. A 30, 60, 90, 120 minute timer shall activate the defrost cycle only if the coil temperature is low enough to indicate a heavy frost condition.
      c. Defrost cycle shall terminate when defrost thermostat is satisfied and shall have a positive termination time of 10 minutes.
   6. Defrost system shall also include:
      a. Defrost Cycle Indicator LED.
      b. DIP switch selectable defrost time between 30, 60, 90 and 120 minutes. Factory set at 30 minutes.
      c. Molded plug connection to ensure proper connection.

B. (23 09 33.13.B.) Safeties:
   1. Compressor over-temperature, over-current. High internal pressure differential.
   2. Low Pressure Switch.
      a. Low pressure switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
   3. High Pressure Switch.
      a. High pressure switch shall use different color wire than the low pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
   4. Automatic reset, motor thermal overload protector.

Part 6 — (23 09 93) Sequence of Operation for HVAC Controls

6.01 (23 09 93.13) Decentralized, Rooftop Units:

A. (23 09 93.13.A.) INSERT SEQUENCE OF OPERATION

Part 7 — (23 40 13) Panel Air Filters

7.01 (23 40 13.13) Decentralized, Rooftop Units:

A. (23 40 13.13.A.) Standard Filter Section:

1. Shall consist of factory installed, low velocity, disposable 2 in. thick fiberglass filters of commercially available sizes.
2. Filters shall be accessible through a dedicated, weather tight access pane.
3. Four-inch filter capabilities shall be capable with pre-engineered and approved Carrier filter track field installed accessory. This kit requires field furnished filters.

Part 8 — (23 81 19) Self-Contained Air Conditioners

8.01 (23 81 19.13) Small-Capacity Self-Contained Air Conditioners:

A. (23 81 19.13.A.) General:

1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing fully hermetic scroll compressors for cooling duty and optional electric heat for heating duty.
2. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.
3. Unit shall use Puron® (R-410A) refrigerant.
4. Unit shall be installed in accordance with the manufacturer's instructions.
5. Unit must be selected and installed in compliance with local, state, and federal codes.

B. (23 81 19.13.B.) Quality Assurance:

1. Unit meets ASHRAE 90.1 minimum efficiency requirements.
2. Unit shall be rated in accordance with AHRI Standards 340/360.
3. Unit shall be designed to conform to ASHRAE 15.
4. Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.
5. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
6. Unit casing shall be capable of withstanding 500 hour salt spray exposure per ASTM B117 (scribed specimen).
7. Unit shall be designed in accordance with ISO 9001, and shall be manufactured in a facility registered by ISO 9001:2015.
8. Roof curb shall be designed to conform to NRCA Standards.
9. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory, and must be available upon request.
10. Unit shall be designed in accordance with UL Standard 60335-2-40, including tested to withstand rain.
11. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.
12. Unit shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.

C. (23 81 19.13.C.) Delivery, Storage, and Handling:

1. Unit shall be stored and handled per manufacturer's recommendations.
2. Lifted by crane requires either shipping top panel or spreader bars.
3. Unit shall only be stored or positioned in the upright position.

D. (23 81 19.13.D.) Project Conditions:

1. As specified in the contract.

E. (23 81 19.13.E.) Operating Characteristics:

1. Unit shall be capable of starting and running at 125°F (52°C) ambient outdoor temperature meeting maximum load criteria of AHRI Standard 340/360 at ±10% voltage.
2. Compressor with standard controls shall be capable of operation down to 40°F (4°C) ambient outdoor temperatures. Accessory winter start kit is necessary if mechanically cooling at ambient temperatures down to 25°F (–4°C) or 0°F (–18°C).
3. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
4. Unit shall be factory configured for vertical supply and return configurations or horizontal supply and return configurations. Dedicated models provided with no special air conversion kits required.

F. (23 81 19.13.F.) Electrical Requirements:

1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.

G. (23 81 19.13.G.) Unit Cabinet:

1. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces.
2. Unit cabinet exterior paint shall be: film thickness, (dry) 0.003 in. minimum, gloss (per ASTM D523, 60°F/16°C): 60, Hardness: H-2H Pencil hardness.
3. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 340/360 minimum exterior sweat criteria.

Interior surfaces shall be insulated with a minimum 1/2 in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the heat compartment.

4. Base of unit shall have a minimum of 4 locations for thru-the-base gas and electrical connections (factory-installed or field-installed), standard.
5. Base Rail:
   a. Unit shall have base rails on a minimum of 2 sides.
   b. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
   c. Holes shall be provided in the base rail for moving the rooftop by fork truck.
   d. Base rail shall be a minimum of 16 gauge thickness.
6. Condensate Pan and Connections:
   a. Shall be a sloped condensate drain pan made of a corrosion resistant material.
   b. Shall comply with ASHRAE Standard 62.
   c. Shall use a 3/4 in. 14 NPT drain connection, possible either through the bottom or side of the drain pan. Connection shall be made per manufacturer's recommendations.
7. Top Panel:
   a. Shall be a multi-top panel with watertight flanges and locking systems.
8. Electrical Connections:
   a. All unit power wiring shall enter unit cabinet at a single, factory prepared, knockout location.
   b. Thru-the-Base Capability.
      1) Thru-the-base provisions/connections are available as standard with every unit. When bottom connections are required, field furnished couplings are required.
      2) No basepan penetration, other than those authorized by the manufacturer, is permitted.
9. Component Access Panels (standard):
   a. Cabinet panels shall be easily removable for servicing.
   b. Unit shall have large removable, filter access panel.
   c. Panels covering control box, indoor fan, indoor fan motor, gas components (where applicable), and compressors shall have molded composite handles.
   d. Handles shall be UV modified, composite. They shall be permanently attached, and recessed into the panel.
   e. Screws on the vertical portion of all removable access panel shall engage into heat resistant, molded composite collars.
   f. Collars shall be removable and easily replaceable using manufacturer recommended parts.

H. (23 81 19.13.H.) Coils:
   1. Standard Aluminum Fin-Copper Tube Coils:
      a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
      b. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
      c. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
   2. Optional Pre-Coated Aluminum-Fin Condenser Coils:
      a. Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments.
      b. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube.
      c. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
      d. Corrosion durability of fin stock shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90.
      e. Corrosion durability of fin stock shall be confirmed through testing to have no visible corrosion after 48 hour immersion in a room temperature solution of 5% salt, 1% acetic acid.
      f. Fin stock coating shall pass 2000 hours of the following: one week exposure in the prohesion chamber followed by one week of accelerated ultraviolet light testing. Prohesion chamber: the solution shall contain 3.5% sodium chloride and 0.35% ammonium sulfate. The exposure cycle is one hour of salt fog application at ambient followed by one hour drying at 95°F (35°C).
   3. Optional Copper-Fin Evaporator and Condenser Coils:
      a. Shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets.
      b. Galvanized steel tube sheets shall not be acceptable.
      c. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan.

4. Optional E-Coated Aluminum-Fin Evaporator and Condenser Coils:
   a. Shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins.
   b. Coating process shall ensure complete coil encapsulation of tubes, fins and headers.
   c. Color shall be high gloss black with gloss per ASTM D523-89.
   d. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges.
   e. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93.
   f. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93).
   g. Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92).
   h. Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90.

I. (23 81 19.13.I.) Refrigerant Components:
   1. Refrigerant circuit shall include the following control, safety, and maintenance features:
      a. Thermostatic Expansion Valve (TXV) shall help provide optimum performance across the entire operating range. Shall contain removable power element to allow change out of power element and bulb without removing the valve body.
      b. Refrigerant filter drier — Solid core design.
      c. Service gauge connections on suction and discharge lines.
      d. Suction line accumulator to provide protection in all operating modes from cooling, heating and reverse cycle switching.
   2. Compressors:
      a. Unit shall use 2 tandem scroll compressors on single independent refrigeration circuit.
      b. Units shall have single circuit and 2 stage cooling with 2 compressors.
      c. Evaporator coils shall be a full active design to help better control comfort latent removal.
      d. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
      e. Compressors shall be internally protected from high discharge temperature conditions.
      f. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
      g. Compressor shall be factory mounted on rubber grommets.
      h. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.
      i. Crankcase heaters shall not be required for normal operating range, unless required by compressor manufacturer due to refrigerant charge limits.
      j. Compressors shall be a 2 stage cooling capacity design.

J. (23 81 19.13.J.) Return Air Filter Section:
   1. Filters access is specified in the unit cabinet section of this specification.
   2. Filters shall be held in place by a pivoting filter tray, facilitating easy removal and installation.
   3. Shall consist of factory installed, low velocity, throw-away 2 in. thick fiberglass filters.
   4. Filters shall be standard, commercially available sizes.
   5. Only one size filter per unit is allowed.

K. (23 81 19.13.K.) Evaporator Fan and Motor with EcoBlue™ Technology:
   1. Direct Drive Evaporator Fan Motor:
      a. Shall be a ECM motor design.
      b. Shall have permanently lubricated bearings.
      c. Shall have inherent automatic-reset thermal overload protection.
      d. Shall have slow ramp up to speed capabilities.
      e. Shall require no fan/motor belts for operation, adjustments and or initial fan speed set up.
      f. Fan DC voltage set up on Unit Control Board can eliminate the need of removal of blower access door, required on conventional belt drive systems.
      g. Shall be internally protected from electrical phase reversal and loss.
   2. Evaporator Fan:
      a. Shall be easily set with dedicated selection switch and adjustment pot on unit control board or through SystemVu™ controller.
      b. Shall provide 2 stage cooling capacity control, the indoor fan speed is automatically controlled to meet the code-compliant <66% low fan speed and 100% at full fan speed operation.
      c. Blower fan shall be a Vane Axial fan design with 75% less moving parts than a conventional belt drive system.
      d. Shall be constructed of a cast aluminum stator and high impact composite material on stator, rotor and air inlet casing.
      e. Shall be a patented design with a corrosion resistant material and dynamically balanced.
      f. Shall have slow ramp up to speed capabilities to help reduce sound and comfort issues

typically associated with single speed belt drive systems.

g. Units shall contain 2 separate vane axial fan assemblies.

h. Shall be a slide out design with removal of a few support brackets.

3. Shall include an easily accessible Unit Control Board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, economizer, thermostat, DDC control options, and low, high and mixed air temperature switches. Controller shall also provide an intuitive means to adjust the indoor fan speed through a simple switch and pot adjustment design.

L. (23 81 19.13.L.) Condenser Fans and Motors:

1. Condenser Fan Motors:
   a. Shall be a totally enclosed motor.
   b. Shall use permanently lubricated bearings.
   c. Shall have inherent thermal overload protection with an automatic reset feature.
   d. Shall use a shaft-down design on all sizes.
2. Condenser Fans:
   a. Shall be a direct-driven propeller type fan.
   b. Shall have galvalum blades riveted to steel spider that have corrosion-resistant properties and shall be dynamically balanced.

M. (23 81 19.13.M.) Special Features Options and Accessories:

1. Integrated EconomizerONE and EconoMi$er® 2 Low Leak Rate Models.
   a. Integrated, gear driven opposing modulating blade design type capable of simultaneous economizer and compressor operation.
   b. Independent modules for vertical or horizontal return configuration shall be available. Vertical return modules shall be available as a factory installed option.
   c. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or return shall not be acceptable.
   d. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below setpoints.
   e. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
   f. Standard leak rate shall be equipped with dampers not to exceed 2% leakage at 1 in. wg pressure differential.
   g. Economizer controller on EconomizerONE models shall be Siemens POL224 that provides:
      1) Combined minimum and DCV maximum damper position potentiometers with compressor staging relay.
      2) Functions with solid-state analog enthalpy or dry bulb changeover control sensing.
      3) LED indicators for free cooling, sensor, and damper operation.
      4) One-line LCD interface screen for setup, configuration and troubleshooting.
      5) Optional configuration via WLAN stick and Siemens Climatix™[1] smartphone app for easy setup.
      6) On-board Fault Detection and Diagnostics (FDD) that senses and alerts when the economizer is not operating properly, per California Title 24, ASHRAE 90.1 and IECC.
      7) Sensor failure loss of communication identification.
      8) Capabilities for use with multiple-speed or single speed indoor fan systems.
      9) Utilize digital sensors: Dry bulb and Enthalpy.
   h. Economizer controller on EconoMi$er 2 models with SystemVu™ controls shall be a 4 to 20 mA design controlled directly by the controller. SystemVu controller meets California Title 24, ASHRAE 90.1 and IECC Fault Detection and Diagnostic (FDD) requirements.
   i. Shall be capable of introducing up to 100% outdoor air.
   j. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air and contain seals that meet ASHRAE 90.1 requirements.
   k. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
   l. Dry bulb outdoor air temperature sensor shall be provided as standard. Enthalpy sensor is also available on factory installed only. Outdoor air sensor setpoint shall be adjustable and shall range from 40°F to 100°F (4°C to 38°C). Additional sensor options shall be available as accessories.
   m. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 100%, with a range of 0% to 100%.

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n. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy.

o. Dampers shall be completely closed when the unit is in the unoccupied mode.

p. Economizer controller shall accept a 0 to 10 vdc CO_2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.

q. Compressor lockout temperature on POL224 control is adjustable from –45°F to 80°F (–43°C to 27°C), set at a factory default of 32°F (0°C).

r. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.

s. Shall contain LED indication for free cooling, sensor, and damper operation.

2. Integrated EconomizerONE and EconoMi$er® 2 Ultra Low Leak Rate Models.

a. Integrated, gear driven opposing modulating blade design type capable of simultaneous economizer and compressor operation.

b. Independent modules for vertical or horizontal return configuration shall be available. Vertical return modules shall be available as a factory-installed option.

c. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or return shall not be acceptable.

d. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below setpoints.

e. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.

f. Ultra Low Leak design meets California Title 24 section 140.4 and ASHRAE 90.1 requirements for 4 cfm per sq ft on the outside air dampers and 10 cfm per sq ft on the return dampers.

g. Economizer controller on EconomizerONE models shall be the Siemens POL224 that provides:

1) One-line LCD interface screen for setup, configuration and troubleshooting.

2) Optional configuration via WLAN stick and Siemens Climatix™ smartphone app for easy setup.

3) On-board Fault Detection and Diagnostics (FDD) that senses and alerts when the economizer is not operating properly, per California Title 24, ASHRAE 90.1 and IECC.

4) Sensor failure loss of communication identification.

5) Capabilities for use with multiple-speed indoor fan systems.

6) Utilize digital sensors: Dry bulb and Enthalpy.

h. Economizer controller on EconoMi$er 2 models with SystemVu™ controls shall be a 4-20mA design controlled directly by the controller. SystemVu controller meets California Title 24, ASHRAE 90.1 and IECC Fault Detection and Diagnostic (FDD) requirements.

i. Shall be capable of introducing up to 100% outdoor air.

j. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air and contain seals that meet ASHRAE 90.1 requirements.

k. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.

l. Dry bulb outdoor air temperature sensor shall be provided as standard. Enthalpy sensor is also available on factory installed only. Outdoor air sensor setpoint shall be adjustable and shall range from 40°F to 100°F (4°C to 38°C). Additional sensor options shall be available as accessories.

m. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 100%, with a range of 0% to 100%.

n. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy.

o. Dampers shall be completely closed when the unit is in the unoccupied mode.

p. Economizer controller shall accept a 0 to 10 vdc CO_2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.

q. Compressor lockout temperature on POL224 control is adjustable from –45°F to 80°F (–43°C to 27°C), set at a factory default of 32°F (0°C).

r. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.

s. Shall contain LED indication for free cooling, sensor, and damper operation.

3. Wi-Fi/WLAN stick for EconomizerONE POL224 (field-installed):

This item allows use of the Siemens Climatix™ mobile application.

4. Two-Position Damper (field-installed only):
   a. Damper shall be a Two-Position Damper. Damper travel shall be from the full closed position to the field adjustable %-open setpoint.
   b. Damper shall include adjustable damper travel from 25% to 100% (full open).
   c. Damper shall include single or dual blade, gear driven dampers and actuator motor.
   d. Actuator shall be direct coupled to damper gear. No linkage arms or control rods shall be acceptable.
   e. Damper will admit up to 100% outdoor air for applicable rooftop units.
   f. Damper shall close upon indoor (evaporator) fan shutoff and/or loss of power.
   g. The damper actuator shall plug into the rooftop unit's wiring harness plug. No hard wiring shall be required.
   h. Outside air hood shall include aluminum water entrainment filter.
5. Manual Damper (field-installed only):
   a. Manual damper package shall consist of damper, air inlet screen, and rain hood which can be preset to admit up to 25% or 50% outdoor air for year round ventilation.
6. Low Ambient Control Package:
   a. Controller shall control coil head pressure by condenser fan speed modulation or condenser fan cycling and wind baffles.
   b. Shall consist of solid-state control and condenser coil temperature sensor to maintain condensing temperature between 90°F (32°C) and 110°F (43°C) at outdoor ambient temperatures down to 0°F (–18°C).
7. Condenser Coil Hail Guard Assembly:
   a. Shall protect against damage from hail.
   b. Shall be either hood style or louvered.
8. Unit-Mounted, Non-Fused Disconnect Switch:
   a. Switch shall be factory installed, internally mounted.
   b. National Electric Code (NEC) and UL approved non-fused switch shall provide unit power shutoff.
   c. Shall be accessible from outside the unit.
   d. Shall provide local shutdown and lockout capability.
   e. Sized only for the unit as ordered from the factory. Does not accommodate field-installed devices.
9. Convenience Outlet:
   a. Powered Convenience Outlet.
      1) Outlet shall be powered from main line power to the rooftop unit.
      2) Outlet shall be powered from line side or load side of disconnect by installing contractor, as required by code. If outlet is powered from load side of disconnect, unit electrical ratings shall be UL certified and rated for additional outlet amperage.
      3) Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle.
      4) Outlet shall include 15 amp GFI receptacles with independent fuse protection.
      5) Voltage required to operate convenience outlet shall be provided by a factory installed step-down transformer.
      6) Outlet shall be accessible from outside the unit.
      7) Outlet shall include a field installed "Wet in Use" cover.
   b. Factory-Installed Non-Powered Convenience Outlet.
      1) Outlet shall be powered from a separate 115/120-v power source.
      2) A transformer shall not be included.
      3) Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle.
      4) Outlet shall include 15 amp GFI receptacles with independent fuse protection.
      5) Outlet shall be accessible from outside the unit.
      6) Outlet shall include a field installed "Wet in Use" cover.
   c. Field-Installed Non-Powered Convenience Outlet.
      1) Outlet shall be powered from a separate 115/120-v power source.
      2) A transformer shall not be included.
      3) Outlet shall be field-installed and internally mounted with easily accessible 115-v female receptacle.
      4) Outlet shall include 20 amp GFI receptacles. This kit provides a flexible installation method which allows code compliance for height requirements of the GFCI outlet from the finished roof surface as well as the capability to relocate the outlet to a more convenient location.
      5) Outlet shall be accessible from outside the unit.
      6) Outlet shall include a field installed "Wet in Use" cover.
10. Centrifugal Fan Power Exhaust:
    a. Power exhaust shall be used in conjunction with an integrated economizer.

b. Independent modules for vertical or horizontal return configurations shall be available.
c. Horizontal power exhaust shall be mounted in return ductwork.
d. Power exhaust shall be controlled by economizer controller operation. Exhaust fans shall be energized when dampers open past the 0 to 100% adjustable setpoint on the economizer control.

11. Roof Curbs (Vertical):
    a. Full perimeter roof curb with exhaust capability providing separate air streams for energy recovery from the exhaust air without supply air contamination.
    b. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
    c. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
12. Outdoor Air Enthalpy Sensor:
    a. The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.
13. Return Air Enthalpy Sensor:
    a. The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy control.
14. Indoor Air Quality (CO_2) Sensor:
    a. Shall be able to provide demand ventilation indoor air quality (IAQ) control.
    b. The IAQ sensor shall be available in duct mount, wall mount, or wall mount with LED display. The setpoint shall have adjustment capability.
15. Smoke Detectors:
    a. Shall be a 4-wire controller and detector.
    b. Shall be environmental compensated with differential sensing for reliable, stable, and drift-free sensitivity.
    c. Shall use magnet-activated test/reset sensor switches.
    d. Shall have tool-less connection terminal access.
    e. Shall have a recessed momentary switch for testing and resetting the detector.
    f. Controller shall include:
        1) One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel.
        2) Two Form-C auxiliary alarm relays for interface with rooftop unit or other equipment.
        3) One Form-C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station.
        4) Capable of direct connection to 2 individual detector modules.
        5) Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications.
16. Winter Start Kit:
    a. Shall contain a bypass device around the low pressure switch.
    b. Shall be required when mechanical cooling is required down to 25°F (–4°C).
    c. Shall not be required to operate on an economizer when below an outdoor ambient of 40°F (4°C).
17. Time Guard:
    a. Shall prevent compressor short-cycling by providing a 5 minute delay (±2 minutes) before restarting a compressor after shutdown for any reason.
    b. One device shall be required per compressor.
18. Hinged Access Panels:
    a. Shall provide easy access through integrated quarter turn latches.
    b. Shall be on major panels of: filter, control box, fan motor, and compressor.
19. 4 in. MERV-13 Return Air Filters:
    a. Factory option to upgrade standard unit filters to 4 in. MERV-13 filters. Filter media is securely fasted inside the filter frame on all 4 sides.
20. 4 in. Filter Rack Kit:
    a. The 4 in. filter rack accessory kit is designed to hold 4 in. MERV-8 or MERV-13 filters. Filters not included in kit.
21. 2 in. MERV-13 Return Air Filters:
    a. Accessory kit to field upgrade standard unit filters to 2 in. MERV-13 filters.
22. 2 in. MERV-8 Return Air Filters:
    a. Accessory kit to field upgrade standard unit filters to 2 in. MERV-8 filters.
23. Phase Monitor Control:
    a. Shall monitor the sequence of 3-phase electrical system to provide a phase reversal protection.
    b. Shall monitor the 3-phase voltage inputs to provide a phase loss protection for the 3-phase device.
    c. Will work on either a Delta or Wye power connection.

Guide specifications (cont)

24. Horn/Strobe Annunciator:
    a. Provides an audible/visual signaling device for use with factory-installed option or field installed accessory smoke detectors.
        1) Requires installation of a field-supplied 24-v transformer suitable for 4.2 VA (AC) or 3.0 VA (DC) per horn/strobe accessory.
        2) Requires field-supplied electrical box, North American 1-gang box, 2 in. (51 mm) x 4 in. (102 mm).
        3) Shall have a clear colored lens.
25. Electric Heat:
    a. Heating Section:
        1) Heater element open coil resistance wire, nickel-chrome alloy, 0.29 inches inside diameter, strung through ceramic insulators mounted on metal frame. Coil ends are staked and welded to terminal screw slots.
        2) Heater assemblies are provided with integral fusing for protection of internal heater circuits not exceeding 48 amps each. Auto reset thermo limit controls, magnetic heater contactors (24 v coil) and terminal block all mounted in electric heater control box (minimum 18 ga galvanized steel) attached to end of heater assembly.
26. High Short Circuit Current Rating (SCCR) Protection:
    a. Factory-installed option provides high short circuit current protection to each compressor, plus all indoor and outdoor fan motors of 60 kA for 208/230-3-60 units and 65 kA for 460-3-60 units against high potential fault current situations. (Standard unit comes with 5 kA rating.)
    b. This option is not available with factory installed Non-Fused Disconnect, Low Ambient controls, Phase loss monitor/protection, or 575 Volt models.

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