



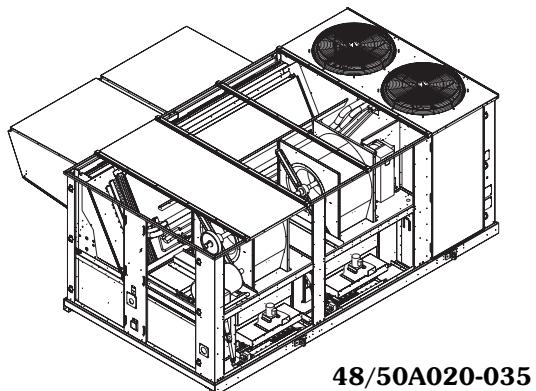
Product Data

**WEATHERMAKER®
48/50A2,A3,A4,A5020-060
Single-Package Gas Heating/Electric Cooling
Rooftop Units and Electric Cooling
Rooftop Units with Optional Electric Heat
with *ComfortLink* Controls
and PURON® Refrigerant (R-410A)**

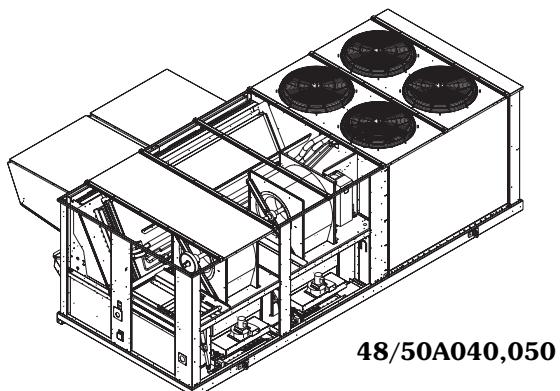
20 to 60 Nominal Tons



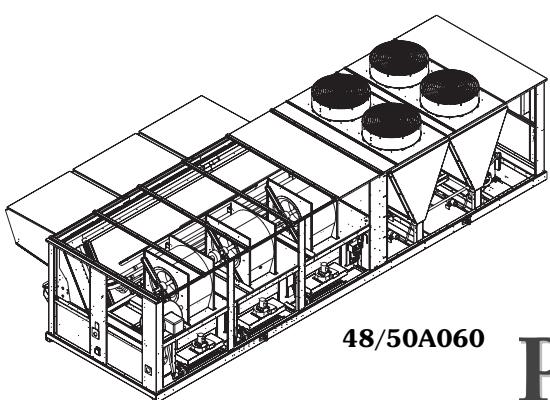
WeatherMaker®



48/50A020-035



48/50A040,050



48/50A060


Puron®
the environmentally sound refrigerant

Carrier's 48/50A Series commercial packaged rooftops offer:

- Puron (R-410A) environmentally sound refrigerant
- Novation® heat exchanger technology with microchannel coil
- An easy-to-use, plain language display on the *ComfortLink* controls
- EERs (energy efficiency ratios) meet ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) Standard 90.1-2010
- Meets ASHRAE Standard 62
- Constant, staged, or variable air volume
- Communicating controls
- Accurately match building loads with up to 5 steps of capacity
- VFD (variable frequency drive) on all VAV (variable air volume) units and SAV™ (staged air volume) units
- Mechanical cooling operation at outdoor ambient temperatures as low as 32 F (-20 F with optional Motormaster® V fan speed control)

Features/Benefits

Carrier's 48/50A commercial packaged unit offers design flexibility, quality, reliability, and *ComfortLink* controls.

Design flexibility

Dedicated vertical supply/return units (A2,A3) are ideal for new construction or retrofit to existing installations. The low unit profile is maintained when the unit is installed on the accessory roof curb. The ducts are attached directly to the roof curb to allow all ductwork to be completed before the unit is positioned.

Features/Benefits (cont)



Dedicated horizontal units (A4,A5) are ideal for replacement or applications such as through-the-wall where sound must be attenuated before the duct penetrates the roof. Ducts connect directly to the unit. Horizontal units may be curb or slab mounted.

The unit cabinet may be provided with optional double wall construction for indoor air quality sensitive applications.

ComfortLink controls

Factory-installed ComfortLink controls provide the capability for free standing operation or it may be linked with a more extensive system. Factory-installed and programmed BACnet^{*} communication capability provides simple integration with the building HVAC system (e.g., terminal devices), an i-Vu[®] Open Control System or a BACnet building automation system. The ComfortLink controls also have the capability to communicate with the Carrier Comfort Network[®] (CCN) system. This communication flexibility allows simple system integration as well as data collection, trending, monitoring and alarm displays.

The 48/50A Series may also be configured to communicate via MOD-BUS† or LonWorks^{**} protocols if required by the application.

The ComfortLink controls are your link to a world of simple and easy to use rooftop units that offer outstanding performance and value. When used with a space temperature sensor, the ComfortLink controls maintain control over the economizer and condenser fans and help optimize the performance of the multiple refrigeration circuits as conditions change, resulting in the following features:

- higher part load efficiency
- better control of temperature and humidity
- superior reliability
- redundant refrigeration systems
- high ambient cooling operation at 115 F

- Low ambient cooling operation at 32 F as standard (optional Motormaster[®] V inverter fan speed control for operation down to -20 F)

The ComfortLink scrolling marquee display is very easy to use. Messages are displayed in easy to understand English. No decoding is required. A scrolling readout provides detailed explanations of control information. Only four, large, easy-to-use buttons are required to maneuver through the entire menu. The readout is designed to be visible even in the brightest sunlight. A hand-held Navigator[™] accessory can be used for added service flexibility.

The ComfortLink controls provide unparalleled service diagnostic information. Temperature and pressure can be read from the display with no need for separate gages. Other data, such as compressor cycles, unit run time hours, current alarms, can also be accessed. A history of alarms is also available for viewing.

Service run test can be very helpful when troubleshooting. The user can run test major components to help determine the root cause of a problem. The unit can be run-tested before an installation is complete to support a satisfactory start-up.

To further support reliability, the ComfortLink controls prevent reverse compressor rotation.

No laptop computers are required for start-up. Time schedules are built in and the scrolling marquee display provides easy access to set points.

The ComfortLink controller accepts input from a CO₂ sensor and a smoke detector. Both are available as factory-installed options or as field-installed accessories.

The unit-mounted terminal strip allows control of the unit with a standard thermostat. Expensive interface devices are not required.

Environmentally sound

Carrier's unique Puron[®] refrigerant (R-410A) enables you to make an environmentally responsible decision. Puron refrigerant is an HFC refrigerant that does not contain chlorine that is damaging to the ozone layer. Puron refrigerant is unaffected by the Montreal Protocol. Puron refrigerant is a safe, non-toxic, efficient and environmentally sound refrigerant for the future.

Quality and reliability

Excellent full and part load efficiencies are achieved by using multiple scroll compressors and indoor coils with intertwined dual refrigerant circuits. The compressors are equipped with crank-case heaters and protected by electronic sensors and logic to control minimum on and off times and reverse rotation. The refrigerant circuits are both electrically and mechanically independent, to provide standby capability should one circuit require service.

Totally enclosed outdoor-fan motors are designed for many years of trouble-free operation.

Positive-locking bearings for the indoor fan reduce vibration of the supply fan assembly and remain locked during the life of the bearing.

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*Sponsored by ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers).

†Registered trademark of Schneider Electric.

**Registered trademark of Echelon corporation.

Variable frequency drive (VFD) and unit unloading

Variable air volume (VAV) units utilize state of the art variable frequency drive (VFD) to control duct static pressure for optimum supply fan energy savings.

The VAV units have up to 5 stages of capacity control to match the load requirements of the conditioned space.

Other VAV features include:

- control of cooling and heating (if equipped with heat) in both occupied and unoccupied mode
- support of optional space temperature sensor
- control of modulating economizer to provide free cooling when outdoor conditions are suitable
- support of IAQ (indoor air quality) sensor
- support linkage to ComfortID™ VAV systems

Staged air volume units utilize the VFD to allow for a configurable high and low fan speed. In this way, during times of part load or low demand, indoor fan motor power consumption can be reduced.

Constant volume units come equipped with 2 stages of capacity. Optional configuration is available to increase this up to 5 stages of operation. Unit operation will closely match the load and maintain comfort in the most energy-efficient manner.

Factory-installed economizer

An optional integrated economizer permits cooling utilizing an outdoor air sensor. The direct gear driven, low leakage blades eliminate conventional inter-blade linkages and the associated adjustments.

The economizer operates in conjunction with mechanical cooling when required and is factory-installed for either vertical or horizontal operation. The factory-supplied and field-installed rain hood/filter assembly is designed to prevent moisture or objects from entering the unit.

Exhaust air relief is available for all units:

- barometric relief (CV [constant volume] or VAV)
- power exhaust
- high capacity power exhaust

Field-adjustable set points on modulating power exhaust prevent space pressurization problems. Factory-installed relief options are unit mounted on downflow units. Accessories must be duct mounted for horizontal applications.

Novation® heat exchanger technology

The Novation heat exchanger design with microchannel condenser coil is a robust, cost effective alternative to traditional coil design for standard applications. Microchannel coils are also sturdier than other coil types, making them easier to clean without causing damage to the coil.

Due to the compact all aluminum design, microchannel coils reduce overall unit operating weight. The streamlined microchannel coil also reduces refrigerant charge by up to 40%.

Microchannel coils are not recommended by Carrier for marine, coastal, or industrial environments unless Carrier-approved coating is applied.

Gas heating units

Integrated gas unit controller (IGC) (gas heating units only) —

All ignition components are contained in the compact IGC which is easily accessible for servicing. The IGC control board, designed and manufactured exclusively for Carrier rooftop units, provides built-in diagnostic capability. An LED (light-emitting diode) simplifies troubleshooting by providing visual fault notification and system status confirmation.

The IGC also contains an anti-cycle protection for gas heat operation. After 4 continuous cycles on the unit high-temperature limit switch, the gas heat operation is disabled, and an error code is issued. This feature greatly improves reliability of the rooftop unit.

The IGC also contains burner control logic for accurate and dependable gas ignition. This LED fault-notification system reduces service person troubleshooting time and minimizes service costs. The IGC can also increase heating efficiency by controlling evaporator fan on and off delays.

Efficient, dependable operation — Tubular, dimpled gas heat exchangers optimize heat transfer for improved efficiency. The tubular design permits hot gases to make multiple passes

across the path of the supply air. The dimpled design creates a turbulent gas flow to increase heating efficiency. The extra thick Alumagard™ heat exchanger coating provides corrosion resistance to lengthen coil life. An optional stainless steel heat exchanger is also available.

The unsightly appearance of flue stacks is eliminated and the effects of wind on heating operations are diminished by the induced draft combustion system. The inducer fan draws hot combustion gas through the heat exchanger at the optimum rate for the most effective heat transfer. Induced draft heating systems are safer than positive pressure, forced draft heating systems. With the induced draft heating system, the heat exchanger operates under negative pressure, preventing flue gas leakage into the indoor supply air.

During the Heating mode, the evaporator-fan relay automatically starts the evaporator fan after the heat exchanger warms up to a suitable temperature. To increase efficiency and comfort, the 30-second fan delay prevents cold air from entering the supply duct system when the conditioned space is calling for heat.

The direct-spark ignition system saves operating expense when compared to pilot ignition systems. No crossover tube is required, therefore no sooting or pilot fouling problems can occur.

All 48A standard units are designed for natural gas. An accessory LP (liquid propane) conversion kit is available.

Safety is built in — All 48A units have a flame rectification sensor to quickly sense the burner flame and ignite burners almost immediately. The controls are designed to shut down the unit during any flame outage or circuit failure. The flame sensor reacts quickly to these events. In the event of a shutdown, an error code is issued at the IGC board.

The heating safety controls will shut down the unit if they detect a problem. If excessive temperatures develop, limit switches shut off the gas valve. After 4 continuous short cycles of the high-temperature limit switch, the IGC board locks out the gas heat cycle to prevent any further short cycles. This safety feature is provided exclusively on

Features/Benefits (cont)



Carrier rooftop units. The rollout switch also deenergizes the gas valve in the event of a flame rollout.

Support of fire and smoke control is included with an optional *ComfortLink* controls expansion module (CEM).

Staged gas unit heating

The staged gas control option adds the capability to control the rooftop unit's gas heating system to a specified supply air temperature set point for purposes of tempering a cool mixed-air condition, or for reheat when the mechanical cooling is being used for dehumidification. The gas heating system employs multiple heating sections. Each section is equipped with a two-stage gas valve. The gas valves are sequenced by a factory-installed staged gas controller (SGC) as required to maintain the user-specified supply air set point. Up to eleven stages of heating control are available, based on quantity and heating capacity sizes of the individual heat exchanger sections provided in the base unit. In addition to providing system control for tempering and reheat operation, the SGC also provides Demand Heating control for

the first stage (W1 or low-heat) heating mode. The heating capacity will always go to 100% for second stage (W2 or high-heat) operation.

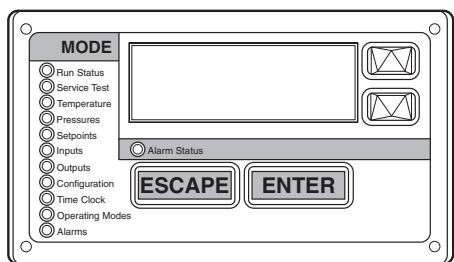
Tempering of supply air is desirable when rooftop units are operating in ventilation mode (economizer only operation) at low outdoor temperatures. At low outdoor temperatures, the mixed-air temperature (combination of return-from-space temperature and outdoor/ventilation air temperature) may become too low for the comfort of the occupants or for the terminal reheat systems. The tempering function adds incremental steps of heat capacity to raise the temperature of the mixed air up to levels suitable for direct admission into the occupied space or to levels consistent with reheat capabilities of the space terminals.

Installation/serviceability

Dedicated design (vertical or horizontal) requires no alteration time to convert in the field. Single point electrical connections are standard on all units. Electrical service access can be made through roof curb or side of unit.

All units are equipped with the *ComfortLink* control system as standard. The *ComfortLink* control system has a fully alpha-numeric display and keypad. The display has expandable text messages that eliminate the need to look up coded display information. Unit also supports the use of the enhanced multiple line display that can be connected through a phone jack connection at either end of the unit. The standard microprocessor controls replace the need for field-installed anti-short cycle timers. The controls are compatible with either a room sensor or conventional thermostat with no need to install an accessory interface. In addition, no special tools are required to run the unit through its operational steps. The unit can be run-tested before an installation is complete to ensure satisfactory start-up.

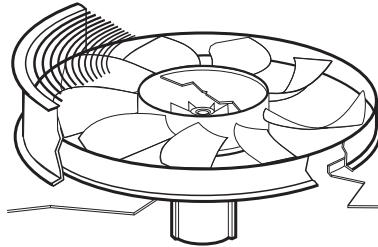
Hinged access panels are located for easy access to standard serviceable components for maintenance. No fasteners need to be removed, which reduces servicing time and helps prevent roof leaks caused by discarded screws. Color coded wiring permits easy tracing and diagnostics.



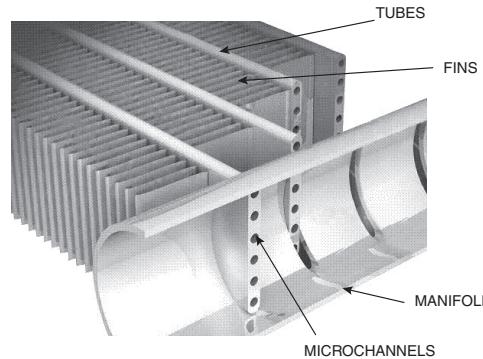
SCROLLING MARQUEE DISPLAY



NAVIGATOR™ DISPLAY



LOW-NOISE AEROACOUSTIC™ FAN

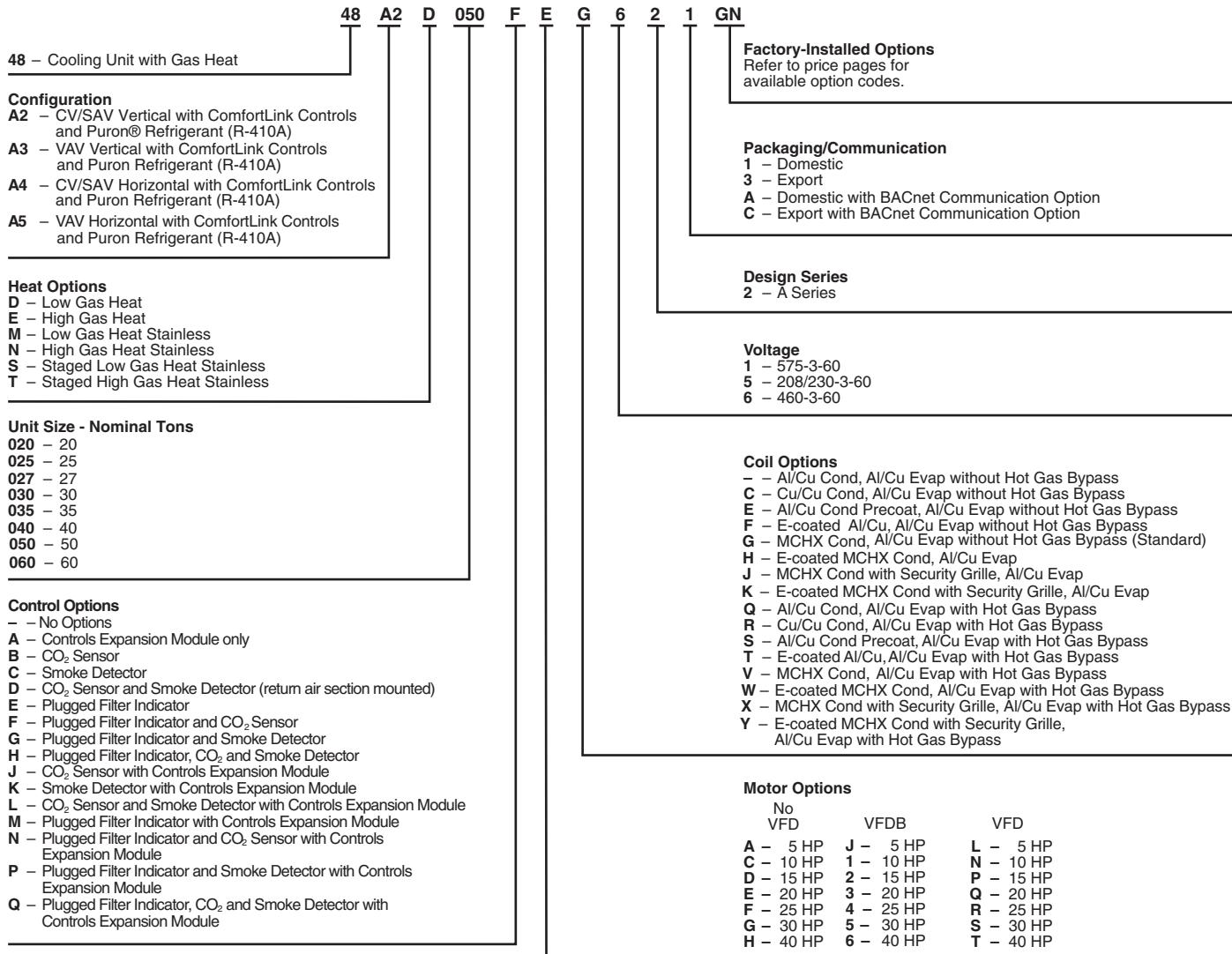


NOVATION® HEAT EXCHANGER TECHNOLOGY
WITH MICROCHANNEL COILS

Model number nomenclature



48A2,A3,A4,A5 UNITS



LEGEND

AI	— Aluminum
Cu	— Copper
CV	— Constant Volume
MCHX	— Microchannel Heat Exchanger
SAV™	— Staged Air Volume
VAV	— Variable Air Volume
VFDB	— Variable Frequency Drive Bypass

NOTES:

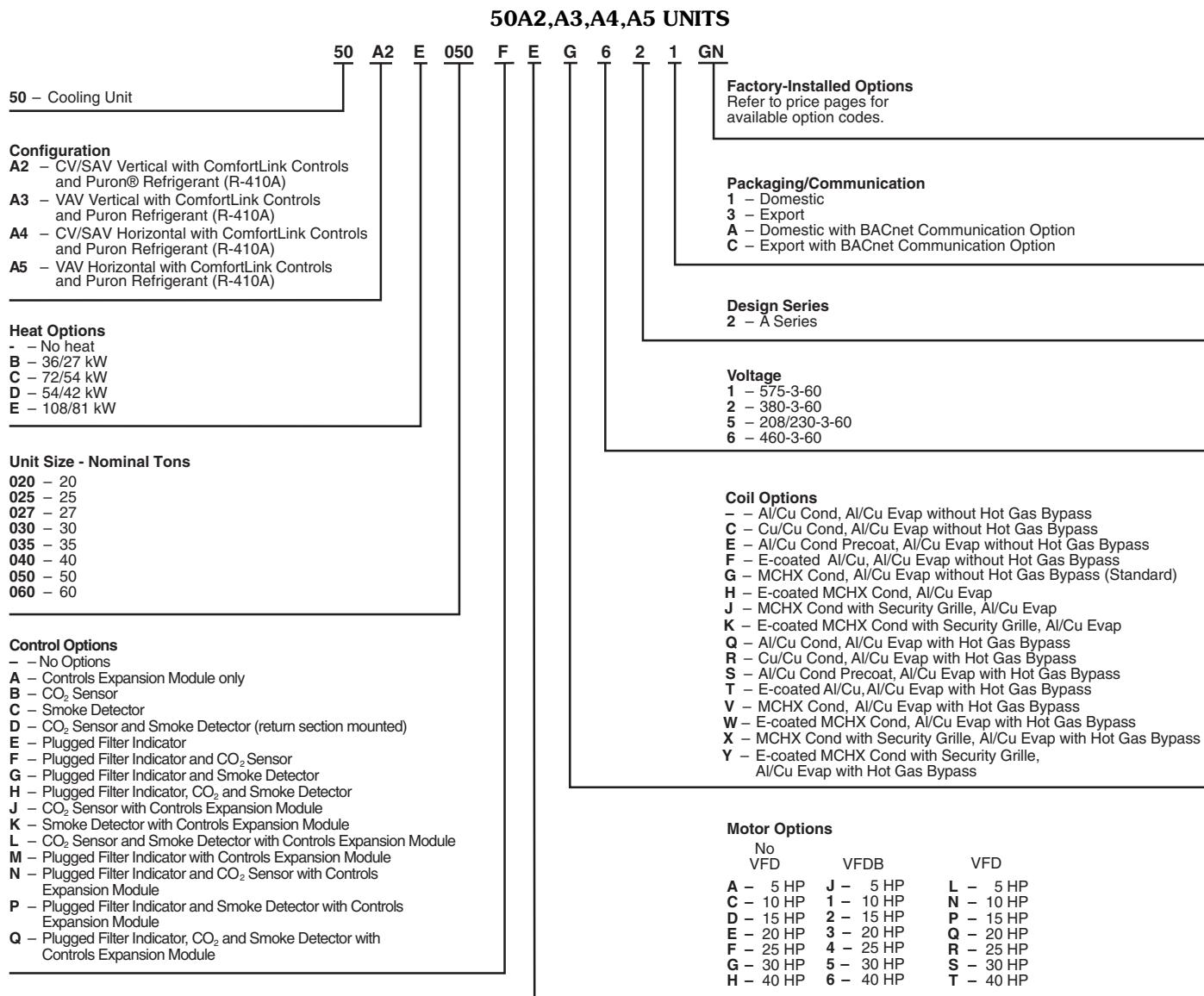
1. VAV and SAV models are equipped with a supply fan motor variable frequency drive (VFD).
2. All indoor fan motors meet the minimum efficiency requirements as established by the Energy Independence and Security Act (EISA) 2007.

Quality Assurance

Certified to ISO 9001



Model number nomenclature (cont)



LEGEND

Al	— Aluminum
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NOTES:

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Quality Assurance

Certified to ISO 9001



Ratings and capacities



ELECTRIC RESISTANCE HEATER DATA

UNIT 50A2,A3,A4,A5	HEATER KW				HEATER STAGES	% HEAT PER STAGE	DESIGN RANGE			
	Unit Voltages						Min CFM	Max CFM		
	208	230	460	575						
020-035 LO HEAT	27	36	36	36	1	100	6,000	15,000		
020-035 HIGH HEAT	54	72	72	72	2	50/100	6,000	15,000		
040,050 LO HEAT	27	36	36	36	1	100	10,500	20,000		
040,050 HIGH HEAT	54	72	72	72	2	50/100	10,500	20,000		
060 LO HEAT	41	54	54	54	1	100	15,000	27,000		
060 HIGH HEAT	81	108	108	108	2	50/100	15,000	27,000		

NOTE: Due to the open design of the electric heaters, the airside pressure drop is negligible.

COOLING CFM OPERATING RANGE

UNIT	MIN CFM	MAX CFM*
48/50A2,A4020	6,000	10,000
48/50A3,A5020	4,000†	10,000
48/50A2,A4025	7,000	12,500
48/50A3,A5025	5,000†	12,500
48/50A2,A4027	8,100	13,500
48/50A3,A5027	5,400†	13,500
48/50A2,A4030	9,000	15,000
48/50A3,A5030	6,000†	15,000
48/50A2,A4035	10,500	17,500
48/50A3,A5035	7,000†	17,500
48/50A2,A4040	12,000	20,000
48/50A3,A5040	8,000†	20,000
48/50A2,A4050	13,500	20,000
48/50A3,A5050	10,000†	20,000
48/50A2,A4060	18,000	27,000
48/50A3,A5060	12,000†	27,000

*Operation at these levels may be limited by entering evaporator air wet bulb temperatures. See Cooling Capacities tables on pages 39-47 for further details.

†Variable air volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.

GAS HEATING CAPACITIES AND EFFICIENCIES STANDARD UNITS

UNITS 48A2,A3,A4,A5	INPUT (Btuh)		MAXIMUM OUTPUT (Btuh)	TEMPERATURE RISE (F)	STEADY-STATE EFFICIENCY (%)	DESIGN RANGE	
	Stage 1	Stage 2				Min Cfm	Max Cfm*
020-030 LO HEAT	262,500	350,000	283,500	15 to 45	81	5,900	15,000
020-030 HIGH HEAT	394,000	525,000	425,250	35 to 65	81	6,100	11,400
035 LO HEAT	262,500	350,000	283,500	15 to 45	81	5,900	15,000
035 HIGH HEAT	600,000	800,000	648,500	30 to 60	81	10,100	20,200
040,050 LO HEAT	300,000	400,000	324,000	10 to 40	81	7,600	22,500
040,050 HIGH HEAT	600,000	800,000	648,000	30 to 60	81	10,100	20,200
060 LO HEAT	582,000	776,000	628,560	10 to 40	81	11,000	27,000
060 HIGH HEAT	873,000	1,164,000	942,840	30 to 60	81	14,550	27,000

UNITS WITH STAGED GAS OPTION

UNITS 48A2,A3,A4,A5	STAGES OF GAS CONTROL (% of Full Heat Output)		MIN. OUTPUT (Btuh)	MAX. OUTPUT (Btuh)	DESIGN RANGE	
	Min Cfm	Max Cfm*			Min Cfm	Max Cfm*
020-030 LO HEAT	38, 50, 75, 88, 100		107,730	283,500	5,900	15,000
020-030 HIGH HEAT	25, 33, 50, 67, 75, 83, 100		106,313	425,250	6,100	11,400
035 LO HEAT	38, 50, 75, 88, 100		107,730	283,500	5,900	15,000
035 HIGH HEAT	38, 50, 75, 88, 100		246,240	648,000	10,100	20,200
040,050 LO HEAT	38, 50, 75, 88, 100		123,120	324,000	7,600	22,500
040,050 HIGH HEAT	38, 50, 75, 88, 100		246,240	648,000	10,100	20,200
060 LO HEAT	19, 25, 38, 44, 50, 56, 63, 75, 88, 94, 100		119,426	628,560	11,000	27,000
060 HIGH HEAT	25, 33, 50, 58, 67, 75, 83, 92, 100		235,710	942,840	14,550	27,000

*In some cases, maximum cfm may be limited by maximum cooling airflow value.

NOTES:

1. Ratings are approved for altitudes to 2000 feet. At altitudes over 2000 ft, ratings are 4% less for each 1000 ft greater than 2000 ft above sea level.
2. At altitudes up to 2000 ft, the following formula may be used to calculate air temperature rise:

$$\Delta t = \frac{\text{Output capacity}}{1.10 \times \text{air quantity}}$$

3. At altitudes above 2000 ft, the following formula may be used:

$$\Delta t = \frac{\text{Output capacity}}{(24 \times \text{specific weight of air} \times 60)} \text{ (air quantity)}$$

4. On standard gas heat with aluminized heat exchangers, the minimum allowable mixed air entering the heat exchanger during half-rate (first stage) operation is 50 F. There is no minimum limitation for full-rate operation.
5. Total unit design is listed by ETL Testing Laboratories Inc.



Ratings and capacities (cont)



CAPACITY CONTROL STAGING OPTIONS

APPLICATION	UNIT	DEMAND SOURCE	COOLING CONTROL METHOD	COMPRESSOR SEQUENCE				
				SIZE 020-027 UNITS		SIZE 030-060 UNITS		
				WITHOUT HOT GAS BYPASS	WITH HOT GAS BYPASS	WITHOUT HOT GAS BYPASS	WITH HOT GAS BYPASS	
VAV	48/50A3,A5	RAT	Multiple Stage EDT	Table C	Table D	Table E	Table F	
		SPT	Multiple Stage EDT	Table C	Table D	Table E	Table F	
SAV™/CV Sensor	48/50A2,A4	SPT	2 Stage Demand	Table A	NA	Table B	NA	
			Multiple Adaptive Demand	Table C	Table D	Table E	Table F	
SAV/CV, Mech Thermostat		Y1,Y2	2 Stage Demand	Table A	NA	Table B	NA	
			Multiple Adaptive Demand	Table C	Table D	Table E	Table F	

LEGEND

CV — Constant Volume
EDT — Evaporator Discharge Temperature
RAT — Return Air Temperature
SAV — Staged Air Volume
SPT — Space Temperature
VAV — Variable Air Volume

CAPACITY CONTROL STAGING OPTIONS TABLE A 48/50A020-027 UNITS — CV/SAV 2-STAGE SEQUENCE

STAGE	SEQUENCE 1			SEQUENCE 2		
	0	1	2	0	1	2
Thermostat Inputs						
Y1	OPEN	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
Y2	OPEN	OPEN	CLOSED	OPEN	OPEN	CLOSED
COMP	Compressor Status			Compressor Status		
A1	OFF	ON	ON	OFF	OFF	ON
A2	OFF	OFF	ON	OFF	ON	ON
B1	OFF	OFF	ON	OFF	OFF	ON
UNIT	Capacity 48/50A			Capacity 48/50A		
020	0%	30%	100%	0%	30%	100%
025	0%	33%	100%	0%	33%	100%
027	0%	33%	100%	0%	33%	100%

CAPACITY CONTROL STAGING OPTIONS TABLE B 48/50A030-060 UNITS — CV/SAV 2-STAGE SEQUENCE

STAGE	SEQUENCE 1			SEQUENCE 2		
	0	1	2	0	1	2
Thermostat Inputs						
Y1	OPEN	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
Y2	OPEN	OPEN	CLOSED	OPEN	OPEN	CLOSED
COMP	Compressor Status			Compressor Status		
A1	OFF	ON	ON	OFF	OFF	ON
A2	OFF	OFF	ON	OFF	ON	ON
B1	OFF	ON	ON	OFF	OFF	ON
B2	OFF	OFF	ON	OFF	ON	ON
UNIT	Capacity 48/50A			Capacity 48/50A		
030	0%	50%	100%	0%	50%	100%
035	0%	50%	100%	0%	50%	100%
040	0%	50%	100%	0%	50%	100%
050	0%	50%	100%	0%	50%	100%
060	0%	50%	100%	0%	50%	100%

CAPACITY CONTROL STAGING OPTIONS TABLE C 48/50A020-027 UNITS VAV AND ADAPTIVE CV/SAV STAGING SEQUENCE WITHOUT HOT GAS BYPASS

STAGE	SEQUENCE 1				SEQUENCE 2			
	0	1	2	3	0	1	2	3
Compressor Status								
COMP								
A1	OFF	ON	OFF	ON	OFF	OFF	ON	ON
A2	OFF	OFF	ON	ON	OFF	ON	OFF	ON
B1	OFF	OFF	ON	ON	OFF	OFF	ON	ON
UNIT	Capacity 48/50A				Capacity 48/50A			
020	0%	30%	70%	100%	0%	30%	70%	100%
025	0%	33%	67%	100%	0%	33%	67%	100%
027	0%	33%	67%	100%	0%	33%	67%	100%



CAPACITY CONTROL STAGING OPTIONS TABLE D
48/50A020-027 UNIT VAV AND ADAPTIVE CV STAGING SEQUENCE WITH HOT GAS BYPASS

STAGE	SEQUENCE 1					SEQUENCE 2				
	0	1	2	3	4	0	1	2	3	4
COMP	Compressor Status					Compressor Status				
A1	OFF	ON*	ON	OFF	ON	OFF	OFF	OFF	ON	ON
A2	OFF	OFF	OFF	ON	ON	OFF	ON*	ON	OFF	ON
B1	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	ON	ON
UNIT	Capacity 48/50A					Capacity 48/50A				
020	0%	10%	30%	70%	100%	0%	10%	30%	70%	100%
025	0%	17%	33%	67%	100%	0%	17%	33%	67%	100%
027	0%	17%	33%	67%	100%	0%	17%	33%	67%	100%

*Hot gas bypass activated.

CAPACITY CONTROL STAGING OPTIONS TABLE E
48/50A030-060 UNITS VAV AND ADAPTIVE CV STAGING SEQUENCE WITHOUT HOT GAS BYPASS

STAGE	SEQUENCE 1					SEQUENCE 2				
	0	1	2	3	4	0	1	2	3	4
COMP	Compressor Status					Compressor Status				
A1	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	ON	ON
A2	OFF	OFF	ON	ON	ON	OFF	ON	OFF	ON	ON
B1	OFF	OFF	ON	ON	ON	OFF	OFF	ON	ON	ON
B2	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	ON
UNIT	Capacity 48/50A					Capacity 48/50A				
030	0%	25%	50%	75%	100%	0%	25%	50%	75%	100%
035	0%	20%	50%	80%	100%	0%	20%	50%	70%	100%
040	0%	25%	50%	75%	100%	0%	25%	50%	75%	100%
050	0%	25%	50%	75%	100%	0%	25%	50%	75%	100%
060	0%	25%	50%	75%	100%	0%	25%	50%	75%	100%

CAPACITY CONTROL STAGING OPTIONS TABLE F
48/50A030-060 UNITS VAV AND ADAPTIVE CV STAGING SEQUENCE WITH HOT GAS BYPASS STAGING SEQUENCE

STAGE	SEQUENCE 1						SEQUENCE 2				
	0	1	2	3	4	5	0	1	2	3	4
COMP	Compressor Status						Compressor Status				
A1	OFF	ON*	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
A2	OFF	OFF	OFF	ON	ON	ON	OFF	ON*	ON	OFF	ON
B1	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	ON	ON
B2	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	ON
UNIT	Capacity 48/50A						Capacity 48/50A				
030	0%	10%	25%	50%	75%	100%	0%	10%	25%	50%	75%
035	0%	7%	20%	50%	80%	100%	0%	7%	20%	50%	70%
040	0%	14%	25%	50%	75%	100%	0%	14%	25%	50%	75%
050	0%	16%	25%	50%	75%	100%	0%	16%	25%	50%	75%
060	0%	18%	25%	50%	75%	100%	0%	18%	25%	50%	75%

*Hot gas bypass activated.

ALTITUDE COMPENSATION — 48A2,A3,A4,A5 UNITS

ELEVATION (ft)	SIZES 020-035		SIZES 040-060	
	Natural Gas Orifice Drill Bit Size*	Liquid Propane Orifice Drill Bit Size*	Natural Gas Orifice Drill Bit Size*	Liquid Propane Orifice Drill Bit Size*
0-2,000	34	43	31	41
2,001- 3,000	7/64"	44	32	3/32"
3,001- 4,000	36	45	33	43
4,001- 5,000	37	45	33	43
5,001- 6,000	38	45	34	44
6,001- 7,000	39	47	36	44
7,001- 8,000	40	47	36	45
8,001- 9,000	41	48	37	45
9,001-10,000	3/32"	48	38	45
10,001-11,000	42	49	39	47
11,001-12,000	43	49	40	5/64"
12,001-13,000	43	50	41	48
13,001-14,000	44	50	3/32"	49

*Orifices available through your local Carrier distributor.

Physical data — 48A2,A3,A4,A5 units



UNIT 48A2,A3,A4,A5	020D/E	025D/E	027D/E	030D/E								
NOMINAL CAPACITY (tons)	20	25	27	30								
BASE UNIT OPERATING WEIGHT (lb)	See Unit Weights Table											
COMPRESSOR Quantity ... Type (Ckt 1/Ckt 2) Number of Refrigerant Circuits Oil	2 ... ZP67/1...ZP91 2 Precharged	2 ... ZP91/1...ZP91 2 Precharged	2 ... ZP91/1...ZP91 2 Precharged	2...ZP72, 2...ZP72 2 Precharged								
REFRIGERANT Operating Charge (lb), Ckt 1/Ckt 2 RTPF Coils MCHX Coils		R-410A										
RTPF CHARGE (lb)	26.2/18.8 14.9/11.8	30.2/15.2 20.4/12.8	32.8/16.5 20.4/12.8	30.5/34.3 15.1/15.3								
MCHX CONDENSER* Quantity Total Face Area (sq ft)	1 32.9	1 32.9	1 32.9	1 32.9								
RTPF CONDENSER Quantity Rows...Fins/in. Total Face Area (sq ft)	1 2...15 33.3	1 3...15 33.3	1 3...15 33.3	1 4...15 33.3								
CONDENSER FAN Nominal Cfm Quantity... Diameter (in.) Motor Hp	19,500 2 ... 30 1	19,500 2 ... 30 1	19,500 2 ... 30 1	19,500 2 ... 30 1								
EVAPORATOR COIL Tube Size (in.) Rows ... Fins/in. Total Face Area (sq ft)	3/8 3 ... 15 31.7	3/8 4 ... 14 31.7	3/8 4 ... 15 31.7	3/8 4 ... 15 31.7								
EVAPORATOR FAN Quantity ... Size (in.) Type Drive Nominal Cfm Motor Hp Motor Frame Size Motor Bearing Type Maximum Allowable Rpm Motor Pulley Pitch Diameter Nominal Motor Shaft Diameter (in.) Fan Pulley Pitch Diameter (in.) Nominal Fan Shaft Diameter (in.) Belt Quantity Belt Type Belt Length (in.) Pulley Center Line Distance (in.) Factory Speed Setting (rpm)	2 ... 20 X 15 Belt 8,000 5 10 215T 254T 184T 4.8 1 1/8 12.4 1 15/16 1 BX56 56 16.0- 18.7 717	2 ... 20 X 15 Belt 10,000 5 10 215T 254T 184T 5.2 1 1/8 12.4 1 15/16 2 BX50 63 18.4 1096	2 ... 20 X 15 Belt 11,000 10 15 254T 256T 215T 4.4 1 3/8 9.4 1 15/16 1 5VX530 56 15.6- 17.9 773	2 ... 20 X 15 Belt 12,000 10 15 254T 256T 215T 4.4 1 3/8 9.0 1 15/16 2 5VX500 50 15.0- 17.9 962	2 ... 20 X 15 Belt 12,000 10 15 254T 256T 215T 4.4 1 3/8 9.1 1 15/16 2 5VX530 53 15.6- 17.9 1106	2 ... 20 X 15 Belt 12,000 10 15 254T 256T 215T 4.4 1 3/8 9.1 1 15/16 2 5VX530 53 15.6- 17.9 848	2 ... 20 X 15 Belt 12,000 10 15 254T 256T 215T 4.4 1 3/8 9.0 1 15/16 2 5VX530 53 15.6- 17.9 1059	2 ... 20 X 15 Belt 12,000 10 15 254T 256T 215T 4.4 1 3/8 9.0 1 15/16 2 5VX530 53 15.6- 17.9 1187	2 ... 20 X 15 Belt 12,000 10 15 254T 256T 215T 4.4 1 3/8 9.1 1 15/16 2 5VX530 53 15.6- 17.9 856	2 ... 20 X 15 Belt 12,000 10 15 254T 256T 215T 4.4 1 3/8 9.1 1 15/16 2 5VX530 53 15.6- 17.9 1096	2 ... 20 X 15 Belt 12,000 10 15 254T 256T 215T 4.4 1 3/8 9.1 1 15/16 2 5VX530 53 15.6- 17.9 1187	
FURNACE SECTION Supply Line Pressure Range Rollout Switch Cutout Temp (F)† Burner Orifice Diameter (in. ...drill size) Natural Gas Liquid Propane Thermostat Heat Anticipator Setting Stage 1 (amps) Stage 2 (amps) Gas Input (Btuh) Stage 1 (Low Heat/High Heat) Stage 2 (Low Heat/High Heat) Efficiency (Steady State) (%) Temperature Rise Range Manifold Pressure (in. wg) Natural Gas Liquid Propane Gas Valve Quantity			5.0-in. wg min/13.5-in. wg max.									
CUTOUT Reset (Auto.)	650 500	650 500	225	225	225	225	225	225	225	225	225	225
MIXED-AIR FILTERS Quantity ... Size (in.) Standard Pleated	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	
OUTDOOR-AIR FILTERS Quantity...Size (in.)			8...16 x 25 x 2 4...20 x 25 x 2									
POWER EXHAUST Motor, Quantity...Hp Fan, Diameter...Width (in.)	Direct Drive, Single-Phase Motors (Factory-Wired for High Speed Operation), Forward-Curved Fan Wheels with Backdraft Dampers on Each Fan Housing											

LEGEND

Al — Aluminum
Cu — Copper
MCHX— Microchannel Heat Exchanger
RTPF — Round Tube Plate Fin

Sizes 030 and 035: Circuit 1 uses the upper portion of condenser coil, Circuit 2 uses the lower portion.

Sizes 040 and 050: Circuit 1 uses the left condenser coil, Circuit 2 the right.

Size 060: Circuit A uses the two MCHX coils near the bulkhead, Circuit B uses the two MCHX coils near the control box.

†Rollout switch is manual reset.

*Sizes 020 to 027: Circuit 1 uses the lower portion of condenser coil, Circuit 2 uses the upper portion.



UNIT 48A2,A3,A4,A5	035D/E	040D/E	050D/E	060D/E	
NOMINAL CAPACITY (tons)	35	40	50	60	
BASE UNIT OPERATING WEIGHT (lb)	See Unit Weights Table				
COMPRESSOR Quantity ... Type (Ckt 1/Ckt 2) Number of Refrigerant Circuits Oil	2 ... ZP67/2...ZP103 2 Precharged	2...ZP103/2...ZP103 2 Precharged	2...ZP120/2...ZP120 2 Precharged	2...ZP154/2...ZP154 2 Precharged	
REFRIGERANT Operating Charge (lb), Ckt 1/Ckt 2 RTPF Coils MCHX Coils	28.7/44.0 19.0/27.7	44.0/44.0 25.5/26.0	59.0/59.0 29.7/29.7	78.5/82.0 30.6/38.3	
MCHX CONDENSER* Quantity Total Face Area (sq ft)	1 32.9	2 65.8	2 65.8	4 105.2	
RTPF CONDENSER Quantity Rows...Fins/in. Total Face Area (sq ft)	1 4...15 33.3	2 3...15 66.7	2 4...15 66.7	2 6...30 100.0	
CONDENSER FAN Nominal Cfm	19,500	32,000	35,000	40,000	
Quantity... Diameter (in.)	2 ... 30	4 ... 30	4 ... 30	4...30(MCHX), 6...30(RTPF)	
Motor Hp	1	1	1	1	
EVAPORATOR COIL Tube Size (in.) Rows ... Fins/in. Total Face Area (sq ft)	1/2 6 ... 16 31.3	1/2 4 ... 17 31.3	1/2 6 ... 16 31.3	1/2 4...17 48.1	
EVAPORATOR FAN Quantity ... Size (in.) Type Drive Nominal Cfm Motor Hp Motor Frame Size Motor Bearing Type Maximum Allowable Rpm Motor Pulley Pitch Diameter Nominal Motor Shaft Diameter (in.) Fan Pulley Pitch Diameter (in.) Nominal Fan Shaft Diameter (in.) Belt Quantity Belt Type Belt Length (in.) Pulley Center Line Distance (in.) Factory Speed Setting (rpm)	2 ... 20 X 15 Belt 14,000 20 25 254T 256T 284T 15 Ball 1300 5.1 5.7 6.2 15/8 15/8 17/8 8.7 8.7 8.7 115/16 2 2 2 5VX500 5VX530 5VX550 50 53 55 15.0- 15.0- 15.0- 17.9 17.9 17.9 1025 1147 1247	2 ... 20 X 15 Belt 16,000 20 25 254T 256T 284T 15 Ball 1300 5.3 5.7 7.5 15/8 15/8 17/8 9.5 9.5 11.1 115/16 2 2 2 5VX500 5VX530 5VX550 53 55 59 15.0- 15.0- 14.6- 17.9 17.9 17.6 1050 1182 1050	2 ... 20 X 15 Belt 18,000 20 25 256T 284T 286T 20 Ball 1300 5.7 6.2 6.7 15/8 17/8 17/8 9.5 9.5 9.5 115/16 2 2 2 5VX500 5VX530 5VX550 55 57 57 15.0- 14.6- 14.6- 17.9 17.6 17.6 1050 1142 1234	3 ... 20 X 15 Belt 24,000 25 30 284T 286T 324T 25 Ball 1200 5.3 5.9 6.5 17/8 17/8 21/8 9.1 9.5 9.5 115/16 3 3 3 5VX500 5VX530 5VX550 53 55 55 15.2- 14.7- 14.2- 17.5 17.2 17.0 1019 1087 1197	
FURNACE SECTION Supply Line Pressure Range Rollout Switch Cutout Temp (F)† Burner Orifice Diameter (in ...drill size)	5.0-in. wg min/13.5-in. wg max.				
Natural Gas Liquid Propane	Std Alt	.111 ... 34 (low)/.120 ... 31 .089 ... 43	.120 ... 31 .096 ... 41	.120 ... 31 .096 ... 41	
Thermostat Heat Anticipator Setting Stage 1 (amps) Stage 2 (amps)		0.1 0.1	0.24 0.13	0.1 0.1	
Gas Input (Btuh) Stage 1 (Low Heat/High Heat) Stage 2 (Low Heat/High Heat)		262,500/600,000 350,000/800,000	300,000/600,000 400,000/800,000	300,000/600,000 400,000/800,000	
Efficiency (Steady State) (%) Temperature Rise Range Manifold Pressure (in. wg)		81 15-45/30-60	81 10-40/30-60	81 10-40/30-60	
Natural Gas Liquid Propane Gas Valve Quantity	Std Alt	3.5 3.5 2	3.5 3.5 2	3.5 3.5 2	
HIGH-PRESSURE SWITCH (psig) Cutout Reset (Auto.)		650 500	650 500	650 500	
MIXED-AIR FILTERS Quantity ... Size (in.) Standard Pleated		10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	
OUTDOOR-AIR FILTERS Quantity...Size (in.)		8...16 x 25 x 2 4...20 x 25 x 2	8...16 x 25 x 2 4...20 x 25 x 2	8...16 x 25 x 2 4...20 x 25 x 2	
POWER EXHAUST Motor, Quantity...Hp Fan, Diameter...Width (in.)		Direct Drive, Single-Phase Motors (Factory-Wired for High Speed Operation), Forward-Curved Fan Wheels with Backdraft Dampers on Each Fan Housing			
4...1 11 x 10	4...1 11 x 10	4...1 11 x 10	4...1 11 x 10	6...1 11 x 10	

LEGEND

Al — Aluminum
Cu — Copper
MCHX— Microchannel Heat Exchanger
RTPF — Round Tube Plate Fin

Sizes 030 and 035: Circuit 1 uses the upper portion of condenser coil, Circuit 2 uses the lower portion.

Sizes 040 and 050: Circuit 1 uses the left condenser coil, Circuit 2 the right.

Size 060: Circuit A uses the two MCHX coils near the bulkhead, Circuit B uses the two MCHX coils near the control box.

†Rollout switch is manual reset.

*Sizes 020 to 027: Circuit 1 uses the lower portion of condenser coil, Circuit 2 uses the upper portion.

Physical data — 50A2,A3,A4,A5 units



UNIT 50A2,A3,A4,A5	020	025	027	030
NOMINAL CAPACITY (tons)	20	25	27	30
BASE UNIT OPERATING WEIGHT (lb)	See Unit Weights Table			
COMPRESSOR Quantity ... Type (Ckt 1/Ckt 2) Number of Refrigerant Circuits Oil	2 ... ZP67/1...ZP91 2 Precharged	2 ... ZP91/1...ZP91 2 Precharged	2 ... ZP91/1...ZP91 2 Precharged	2...ZP72, 2...ZP72 2 Precharged
REFRIGERANT Operating Charge (lb), Ckt 1/Ckt 2 RTPF Coils MCHX Coils		R-410A		
	26.2/18.8 14.9/11.8	30.2/15.2 20.4/12.8	32.8/16.5 20.4/12.8	30.5/34.3 15.1/15.3
MCHX CONDENSER* Quantity Total Face Area (sq ft)	1 32.9	1 32.9	1 32.9	1 32.9
RTPF CONDENSER Quantity Rows...Fins/in. Total Face Area (sq ft)	1 2...15 33.3	1 3...15 33.3	1 3...15 33.3	1 4...15 33.3
CONDENSER FAN Nominal Cfm Quantity... Diameter (in.) Motor Hp	19,500 2 ... 30 1	19,500 2 ... 30 1	19,500 2 ... 30 1	19,500 2 ... 30 1
EVAPORATOR COIL Tube Size (in.) Rows ... Fins/in. Total Face Area (sq ft)	3/8 3 ... 15 31.7	3/8 4 ... 14 31.7	3/8 4 ... 15 31.7	3/8 4 ... 15 31.7
EVAPORATOR FAN Quantity ... Size (in.) Type Drive Nominal Cfm Motor Hp Motor Frame Size Motor Bearing Type Maximum Allowable Rpm Motor Pulley Pitch Diameter Nominal Motor Shaft Diameter (in.) Fan Pulley Pitch Diameter (in.) Nominal Fan Shaft Diameter (in.) Belt Quantity Belt Type Belt Length (in.) Pulley Center Line Distance (in.) Factory Speed Setting (rpm)	2 ... 20 X 15 Belt 8,000 5 184T 10 215T 15 254T 2 ... 20 X 15 Belt 10,000 5 184T 10 215T 15 254T 2 ... 20 X 15 Belt 11,000 10 215T 15 254T 20 256T 2 ... 20 X 15 Belt 12,000 10 215T 15 254T 20 256T	Centrifugal Type	2 ... 20 X 15 Belt 12,000 10 215T 15 254T 20 256T	2 ... 20 X 15 Belt 12,000 10 215T 15 254T 20 256T
HIGH-PRESSURE SWITCH (psig) Cutout Reset (Auto.)	650 500	650 500	650 500	650 500
MIXED-AIR FILTERS Quantity ... Size (in.) Standard Pleated	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4
OUTDOOR-AIR FILTERS Quantity...Size (in.)	8...16 x 25 x 2 4...20 x 25 x 2			
POWER EXHAUST Motor, Quantity...Hp Fan, Diameter...Width (in.)	Direct Drive, Single-Phase Motors (Factory-Wired for High Speed Operation), Forward-Curved Fan Wheels with Backdraft Dampers on Each Fan Housing 4...1 11 x 10			

LEGEND

Al — Aluminum
 Cu — Copper
 MCHX— Microchannel Heat Exchanger
 RTPF — Round Tube Plate Fin

*Sizes 020 to 027: Circuit 1 uses the lower portion of condenser coil, Circuit 2 uses the upper portion.

Sizes 030 and 035: Circuit 1 uses the upper portion of condenser coil, Circuit 2 uses the lower portion.

Sizes 040 and 050: Circuit 1 uses the left condenser coil, Circuit 2 the right.

Size 060: Circuit A uses the two MCHX coils near the bulkhead, Circuit B uses the two MCHX coils near the control box.



UNIT 50A2,A3,A4,A5	035	040	050	060
NOMINAL CAPACITY (tons)	35	40	50	60
BASE UNIT OPERATING WEIGHT (lb)	See Unit Weights Table			
COMPRESSOR Quantity ... Type (Ckt 1/Ckt 2) Number of Refrigerant Circuits Oil	2 ... ZP67/2...ZP103 2 Precharged	2...ZP103/2...ZP103 2 Precharged	2...ZP120/2...ZP120 2 Precharged	2...ZP154/2...ZP154 2 Precharged
REFRIGERANT Operating Charge (lb), Ckt 1/Ckt 2 RTPF Coils MCHX Coils	28.7/44.0 19.0/27.7	44.0/44.0 25.5/26.0	59.0/59.0 29.7/29.7	78.5/82.0 30.6/38.3
MCHX CONDENSER* Quantity Total Face Area (sq ft)	1 32.9	2 65.8	2 65.8	4 105.2
RTPF CONDENSER Quantity Rows...Fins/in. Total Face Area (sq ft)	1 4...15 33.3	2 3...15 66.7	2 4...15 66.7	2 6...30 100.0
CONDENSER FAN Nominal Cfm Quantity... Diameter (in.) Motor Hp	19,500 2 ... 30 1	32,000 4 ... 30 1	35,000 4 ... 30 1	40,000 4...30.5(MCHX), 6...30(RTPF) 1
EVAPORATOR COIL Tube Size (in.) Rows ... Fins/in. Total Face Area (sq ft)	1/2 6 ... 16 31.3	1/2 4 ... 17 31.3	1/2 6 ... 16 31.3	1/2 4...17 48.1
EVAPORATOR FAN Quantity ... Size (in.) Type Drive Nominal Cfm Motor Hp Motor Frame Size Motor Bearing Type Maximum Allowable Rpm Motor Pulley Pitch Diameter Nominal Motor Shaft Diameter (in.) Fan Pulley Pitch Diameter (in.) Nominal Fan Shaft Diameter (in.) Belt Quantity Belt Type Belt Length (in.) Pulley Center Line Distance (in.) Factory Speed Setting (rpm)	2 ... 20 X 15 Belt 14,000 15 254T 20 25 256T 254T 284T Ball 1300 5.1 5.7 6.2 15/8 15/8 17/8 8.7 8.7 8.7 115/16 2 5VX500 5VX530 5VX550 50 53 55 15.0- 17.9 1025 1147 1247	2 ... 20 X 15 Belt 16,000 15 254T 20 25 256T 284T 284T Ball 1300 5.3 5.7 7.5 15/8 15/8 17/8 9.5 9.5 11.1 115/16 2 5VX530 5VX550 5VX590 53 55 59 15.0- 17.9 976 1050 1182	2 ... 20 X 15 Belt 18,000 20 256T 25 30 284T 286T 286T Ball 1300 5.7 6.2 6.7 15/8 17/8 17/8 9.5 9.5 9.5 115/16 2 5VX550 5VX570 5VX570 55 57 57 15.0- 17.9 1050 1142 1234	3 ... 20 X 15 Belt 24,000 25 284T 30 40 286T 324T 324T Ball 1200 5.3 5.9 6.5 17/8 17/8 21/8 9.1 9.5 9.5 115/16 3 5VX530 5VX550 5VX570 53 55 57 15.2- 17.5 1019 1087 1197
HIGH-PRESSURE SWITCH (psig) Cutout Reset (Auto.)	650 500	650 500	650 500	650 500
MIXED-AIR FILTERS Quantity ... Size (in.) Standard Pleated	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	10 ... 20 x 24 x 2 5 ... 20 x 20 x 4 5 ... 20 x 24 x 4	16...20 x 24 x 2 8...20 x 20 x 4 8...20 x 24 x 4
OUTDOOR-AIR FILTERS Quantity...Size (in.)	8...16 x 25 x 2 4...20 x 25 x 2	8...16 x 25 x 2 4...20 x 25 x 2	8...16 x 25 x 2 4...20 x 25 x 2	12...16 x 25 x 2 6...20 x 25 x 2
POWER EXHAUST Motor, Quantity...Hp Fan, Diameter...Width (in.)	Direct Drive, Single-Phase Motors (Factory-Wired for High Speed Operation), Forward-Curved Fan Wheels with Backdraft Dampers on Each Fan Housing			
	4...1 11 x 10	4...1 11 x 10	4...1 11 x 10	6...1 11 x 10

LEGEND

Al — Aluminum
Cu — Copper
MCHX— Microchannel Heat Exchanger
RTPF — Round Tube Plate Fin

*Sizes 020 to 027: Circuit 1 uses the lower portion of condenser coil, Circuit 2 uses the upper portion.

Sizes 030 and 035: Circuit 1 uses the upper portion of condenser coil, Circuit 2 uses the lower portion.

Sizes 040 and 050: Circuit 1 uses the left condenser coil, Circuit 2 the right.

Size 060: Circuit A uses the two MCHX coils near the bulkhead, Circuit B uses the two MCHX coils near the control box.

Physical data (cont)



48/50A020-060 UNIT WEIGHTS BASE UNIT WEIGHTS* (lb)

UNIT	020	025	027	030	035	040	050	060
48A2D,A3D	3825	3961	3961	3992	4340	4770	4914	7066
48A2E,A3E	3905	4041	4041	4072	4500	4930	5074	7306
48A4D,A5D	3865	4001	4001	4032	4380	4810	4954	7106
48A4E,A5E	3945	4081	4081	4112	4540	4970	5114	7356
50A2,A3	3625	3761	3761	3792	4025	4455	4599	6826
50A4,A5	3703	3839	3839	3870	4218	4648	4792	7041
OPTIONS/ACCESSORIES (WEIGHT ADDERS) (lb)								
Barometric Relief	300	300	300	300	300	300	300	450
Non-Modulating Power Exhaust	450	450	450	450	450	450	450	675
Modulating Power Exhaust	500	500	500	500	500	500	500	725
Electric Heat	110	110	110	110	110	110	110	165
Cu Tube/Aluminum Fin Condenser Coil	100	100	100	150	150	187	317	26
Cu Tube/Cu Fin Condenser Coil	263	263	263	370	370	512	751	677
OA Hood Crate/Packaging (Less Hoods' Weight)	45	45	45	45	45	45	45	45
(Packaging Only)								
Outdoor Air Hoods/Filters (included with unit)	170	170	170	170	170	170	170	255
Hail Guards	73	73	73	73	73	146	146	219
Roof Curb (14-in.)	365	365	365	365	365	410	410	540
Double Wall	275	275	275	275	275	275	275	375

CV MOTOR WEIGHTS (lb)

MOTOR HP	UNIT VOLTAGE	HIGH EFFICIENCY IFM	PREMIUM EFFICIENCY IFM
5 HP	230/460	78	94
	575	78	92
10 HP	230/460	118	164
	575	118	156
15 HP	230/460	150	217
	575	150	220
20 HP	230/460	212	250
	575	212	258
25 HP	230/460	240	309
	575	240	319
30 HP	230/460	283	355
	575	283	359
40 HP	230/460	372	415
	575	372	410

SAV™/VAV MOTOR WEIGHTS (lb)

MOTOR HP	UNIT VOLTAGE	HIGH EFFICIENCY IFM	PREMIUM EFFICIENCY IFM
5 HP	230/460	136	152
	575	147	161
10 HP	230/460	187	233
	575	187	225
15 HP	230/460	249	316
	575	249	319
20 HP	230/460	347	385
	575	311	357
25 HP	230/460	375	444
	575	375	454
30 HP	230/460	418	490
	575	418	494
40 HP	230/460	507	550
	575	507	545

LEGEND

Cu	Copper
CV	Constant Volume
FIOP	Factory-Installed Option
HP	Horsepower
IFM	Indoor Fan Motor
OA	Outdoor Air
SAV	Staged Air Volume
VAV	Variable Air Volume
VFD	Variable Frequency Drive

*Outdoor-air hoods and filters included in base unit weights; indoor-fan motors are NOT included.

NOTES:

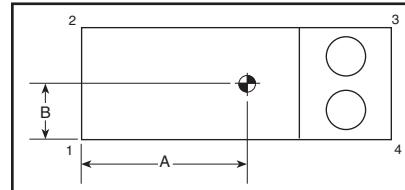
1. Base Unit Weight includes OA hoods (economizer or outdoor air damper); does not include an indoor-fan motor. ADD indoor motor, FIOPs and Accessories for TOTAL operating weight.
2. VAV Motor Weights include the indoor motor and the VFD, optional VFD bypass, VFD transducer and associated wiring.

CENTER OF GRAVITY AND CORNER WEIGHTS
48/50A2,A4 CONSTANT VOLUME UNITS

UNIT	WEIGHT (lb)	CENTER OF GRAVITY (in.)		CORNER WEIGHT (lb)			
		A	B	1	2	3	4
50A2020	4500	97.4	44.7	906	937	1348	1310
48A2D020	4590	96.3	44.2	950	962	1346	1333
48A2E020	4670	95.7	43.9	981	979	1352	1358
50A4020	4078	97.5	44.7	820	850	1223	1186
48A4D020	4130	96.3	44.3	853	866	1213	1198
48A4E020	4210	95.8	44.0	883	883	1221	1224
50A2025	4636	98.0	44.5	920	963	1379	1374
48A2D025	4726	96.9	44.0	964	988	1377	1397
48A2E025	4806	96.3	43.7	995	1005	1383	1423
50A4025	4214	98.1	44.5	834	876	1255	1250
48A4D025	4266	97.0	44.1	867	892	1244	1263
48A4E025	4346	96.4	43.8	897	909	1252	1288
50A2027	4674	97.2	44.1	958	963	1379	1374
48A2D027	4764	96.1	43.7	1002	988	1377	1397
48A2E027	4844	95.6	43.4	1033	1005	1383	1423
50A4027	4252	97.2	44.1	872	876	1255	1250
48A4D027	4304	96.1	43.7	905	892	1244	1263
48A4E027	4384	95.6	43.4	935	909	1252	1288
50A2030	4705	95.1	44.4	987	1006	1369	1343
48A2D030	4795	94.0	44.0	1032	1032	1366	1366
48A2E030	4875	93.5	43.7	1063	1049	1372	1392
50A4030	4283	94.9	44.4	901	918	1244	1220
48A4D030	4335	93.8	44.0	935	935	1232	1232
48A4E030	4415	93.3	43.7	966	952	1239	1258
50A2035	4999	95.9	41.5	1107	988	1367	1537
48A2D035	5204	94.8	41.0	1181	1034	1393	1596
48A2E035	5364	94.2	40.7	1235	1067	1417	1645
50A4035	4692	95.8	41.5	1040	928	1282	1442
48A4D035	4744	94.7	41.0	1078	944	1269	1454
48A4E035	4904	94.1	40.7	1131	976	1294	1503
50A2040	5429	121.7	41.4	1245	1110	1444	1629
48A2D040	5634	120.3	41.0	1324	1159	1466	1686
48A2E040	5794	118.8	40.7	1392	1202	1477	1723
50A4040	5122	121.6	41.4	1177	1049	1361	1536
48A4D040	5174	120.0	41.0	1219	1067	1343	1546
48A4E040	5334	118.6	40.7	1284	1108	1357	1584
50A2050	5613	119.3	41.7	1310	1188	1472	1644
48A2D050	5818	117.9	41.3	1390	1237	1491	1700
48A2E050	5978	116.5	41.0	1459	1281	1501	1738
50A4050	5306	119.0	41.7	1243	1127	1387	1550
48A4D050	5358	117.4	41.3	1287	1146	1366	1559
48A4E050	5518	115.9	40.9	1354	1189	1378	1598
50A2060	8176	184.9	43.4	1683	1637	2393	2463
48A2D060	8251	177.5	41.3	1879	1666	2206	2500
48A2E060	8491	170.4	39.2	2126	1718	2067	2580
50A4060	7666	184.7	43.4	1580	1537	2242	2307
48A4D060	7566	177.3	41.3	1727	1531	2019	2290
48A4E060	7816	170.1	39.2	1961	1585	1898	2373

NOTES:

1. Center of gravity .
2. The weight distribution and center of gravity information are representative of a standard unit and include the impact of factory-installed options such as electric heat (50A only), economizer, and modulating power exhaust.



Physical data (cont)



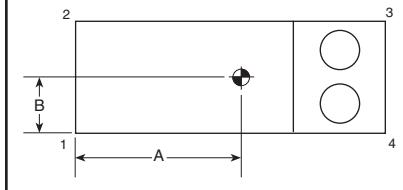
CENTER OF GRAVITY AND CORNER WEIGHTS (cont)

48/50A3,A5 VARIABLE AIR VOLUME UNITS

UNIT	WEIGHT (lb)	CENTER OF GRAVITY (in.)		CORNER WEIGHT (lb)			
		A	B	1	2	3	4
50A3020	4599	98.0	44.9	905	963	1385	1347
48A3D020	4689	96.8	44.5	949	989	1382	1370
48A3E020	4769	96.3	44.2	980	1006	1388	1396
50A5020	4177	98.1	45.0	818	876	1261	1223
48A5D020	4229	96.9	44.6	852	893	1249	1235
48A5E020	4309	96.4	44.2	882	910	1257	1261
50A3025	4735	98.5	44.7	918	989	1416	1411
48A3D025	4825	97.4	44.3	963	1015	1414	1434
48A3E025	4905	96.9	44.0	994	1032	1419	1460
50A5025	4313	98.7	44.8	832	902	1292	1287
48A5D025	4365	97.5	44.3	866	919	1281	1300
48A5E025	4445	97.0	44.0	896	936	1288	1325
50A3027	4801	97.2	44.1	984	989	1416	1411
48A3D027	4891	96.1	43.7	1029	1015	1414	1434
48A3E027	4971	95.6	43.4	1060	1032	1419	1460
50A5027	4379	97.2	44.1	898	902	1292	1287
48A5D027	4431	96.1	43.7	932	919	1281	1300
48A5E027	4511	95.6	43.4	962	936	1288	1325
50A3030	4832	95.2	44.4	1013	1032	1407	1380
48A3D030	4922	94.1	44.0	1058	1058	1403	1403
48A3E030	5002	93.6	43.7	1090	1075	1408	1428
50A5030	4410	95.0	44.4	927	944	1282	1257
48A5D030	4462	93.9	44.0	962	962	1269	1269
48A5E030	4542	93.4	43.7	993	979	1276	1295
50A3035	5134	95.9	41.5	1137	1014	1405	1579
48A3D035	5339	94.8	41.0	1211	1061	1430	1637
48A3E035	5499	94.2	40.7	1266	1093	1453	1687
50A5035	4827	95.8	41.5	1070	954	1320	1484
48A5D035	4879	94.7	41.0	1108	970	1305	1495
48A5E035	5039	94.1	40.7	1161	1003	1330	1545
50A3040	5564	121.8	41.4	1276	1137	1481	1671
48A3D040	5769	120.3	41.0	1355	1186	1502	1727
48A3E040	5929	118.8	40.7	1423	1229	1513	1764
50A5040	5257	121.6	41.4	1207	1076	1398	1577
48A5D040	5309	120.1	41.0	1250	1094	1379	1587
48A5E040	5469	118.6	40.7	1316	1136	1393	1625
50A3050	5744	119.5	41.7	1338	1214	1509	1684
48A3D050	5949	118.1	41.3	1419	1264	1527	1740
48A3E050	6109	116.6	41.0	1489	1308	1536	1777
50A5050	5437	119.1	41.7	1271	1153	1423	1590
48A5D050	5489	117.5	41.3	1316	1172	1402	1599
48A5E050	5649	116.1	40.9	1384	1215	1413	1638
50A3060	8311	184.9	43.4	1710	1663	2433	2504
48A3D060	8386	177.6	41.3	1909	1693	2243	2541
48A3E060	8626	170.4	39.2	2159	1745	2100	2622
50A5060	7801	184.8	43.4	1608	1564	2282	2349
48A5D060	7701	177.3	41.3	1757	1558	2056	2331
48A5E060	7951	170.1	39.2	1994	1611	1932	2414

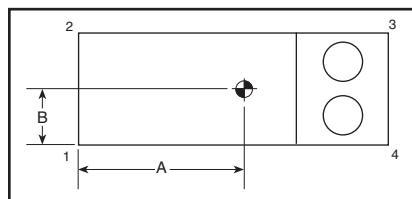
NOTES:

1. Center of gravity
2. The weight distribution and center of gravity information are representative of a standard unit and include the impact of factory-installed options such as electric heat (50A only), economizer, and modulating power exhaust.




FIOP AND ACCESSORY CORNER WEIGHT ADJUSTMENTS

UNIT	WEIGHT (lb)	CORNER WEIGHTS (lb)			
		1	2	3	4
48/50A 020-027					
Barometric Relief	300	2	185	111	1
Non Mod. Power Exhaust	450	3	278	167	2
Mod. Power Exhaust	500	4	309	186	2
Electric Heat	110	59	10	6	35
Al/Cu Cond Coil	100	1	1	49	49
Cu/Cu Cond Coil	263	2	2	129	129
Hail Guards	73	0	0	36	36
48/50A 030,035					
Barometric Relief	300	2	185	111	1
Non Mod. Power Exhaust	450	3	278	167	2
Mod. Power Exhaust	500	4	309	186	2
Electric Heat	110	59	10	6	35
Al/Cu Cond coil	150	1	1	74	74
Cu/Cu Cond Coil	370	3	3	182	182
Hail Guards	73	0	0	36	36
48/50A 040					
Barometric Relief	300	2	211	86	1
Non Mod. Power Exhaust	450	4	317	128	1
Mod. Power Exhaust	500	4	352	143	2
Electric Heat	110	67	12	5	27
Al/Cu Cond Coil	187	2	2	92	92
Cu/Cu Cond Coil	512	5	5	252	252
Hail Guards	146	0	0	73	73
48/50A 050					
Barometric Relief	300	2	211	86	1
Non Mod. Power Exhaust	450	4	317	128	1
Mod. Power Exhaust	500	4	352	143	2
Electric Heat	110	67	12	5	27
Al/Cu Cond Coil	317	34	34	124	124
Cu/Cu Cond Coil	751	80	80	295	295
Hail Guards	146	0	0	73	73
48/50A 060					
Barometric Relief	450	4	319	126	1
Non Mod. Power Exhaust	675	6	479	189	2
Mod. Power Exhaust	725	6	514	203	2
Electric Heat	165	101	17	7	40
Al/Cu Cond Coil	26	0	0	13	13
Cu/Cu Cond Coil	677	72	72	266	266
Hail Guards	219	0	0	109	109



Options and accessories



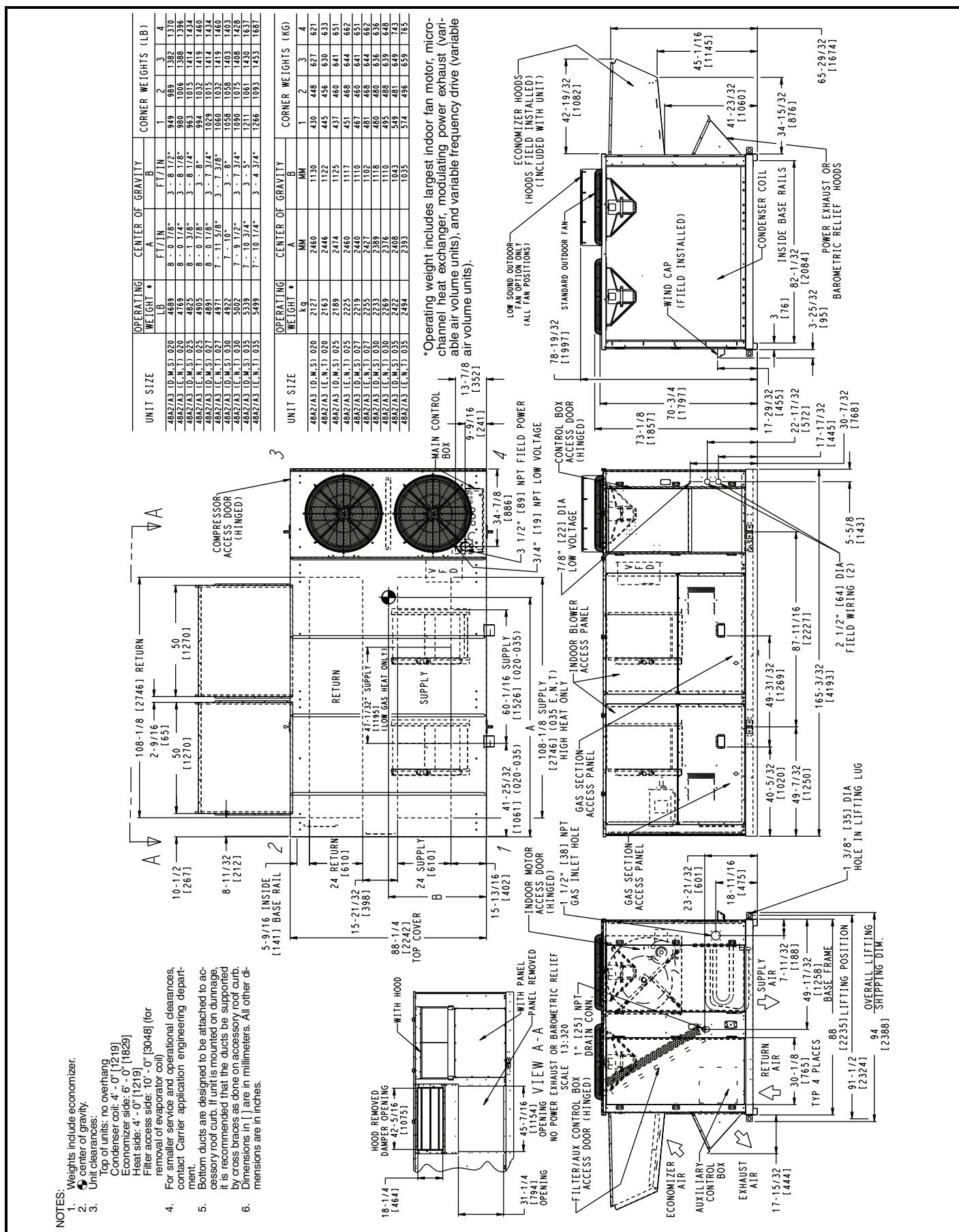
ITEM	FACTORY-INSTALLED OPTIONS				FIELD-INSTALLED ACCESSORIES			
	A2	A3	A4	A5	A2	A3	A4	A5
GAS HEAT OPTIONS (48A Only)								
Low Gas Heat - Aluminized	X	X	X	X				
High Gas Heat - Aluminized	X	X	X	X				
Low Gas Heat - Stainless Steel	X	X	X	X				
High Gas Heat - Stainless Steel	X	X	X	X				
Staged Gas Heat - Low - Stainless Steel	X	X	X	X				
Staged Gas Heat - High - Stainless Steel	X	X	X	X				
LP Conversion Kit					X	X	X	X
ELECTRIC HEAT (50A Only)								
Low Electric Heat	X	X	X	X				
High Electric Heat	X	X	X	X				
INDOOR AIR QUALITY								
2-inch Filters	X	X	X	X				
4-inch Filters	X	X	X	X				
Double Wall in the Airstream	X	X	X	X				
ECONOMIZER								
Manual Outside Air Self-Closing Damper	X	X	X	X				
Modulating Economizer	X	X	X	X				
Outdoor or Return Humidity Sensor (Enthalpy)					X	X	X	X
EXHAUST AIR CONTROL								
Barometric Relief	X	X			X	X	X	X
Non-Modulating Power Exhaust	X				X	X	X	X
Staged Power Exhaust	X	X			X	X	X	X
Building Pressure Control Board (ECB2)					X		X	
Building Pressure Control Sensor					X	X	X	X
CONDENSER AND EVAPORATOR COIL OPTIONS								
Al/Cu Condenser and Evaporator	X	X	X	X				
Al/Cu Pre-Coat Condenser and Al/Cu Evaporator	X	X	X	X				
Al/Cu E-Coat Condenser and Al/Cu Evaporator	X	X	X	X				
Cu/Cu Condenser and Al/Cu Evaporator	X	X	X	X				
MCHX Condenser and Al/Cu Evaporator	X	X	X	X				
E-Coat MCHX Condenser and Al/Cu Evaporator	X	X	X	X				
Hot Gas Bypass - Circuit A (Includes ECB2)	X	X	X	X				
Condenser Coil Hail Guard Assembly					X	X	X	X
Galvanized Drain Pan	X	X	X	X				
Stainless Drain Pan	X	X	X	X				
CONTROLS								
Controls Expansion Module (CEM)	X	X	X	X	X	X	X	X
BACnet Communications	X	X	X	X				
System Pilot™ Interface					X	X	X	X
Touch Pilot™ Interface					X	X	X	X
Navigator™ Display					X	X	X	X
Return Air CO ₂ Sensor	X	X	X	X	X	X	X	X
CO ₂ Space Sensor					X	X	X	X
CO ₂ Aspirator Box					X	X	X	X
Return Air Smoke Detector	X	X	X	X				
Filter Switch	X	X	X	X	X	X	X	X
Fan Status Switch (requires CEM)					X	X	X	X
T55 Thermostat					X	X	X	X
T56 Thermostat					X	X	X	X
T58 Sensor					X	X	X	X
Space Temperature Sensor with CO ₂ Override					X	X	X	X
Space Temperature Sensor Setpoint and CO ₂ Override					X	X	X	X
Thermostats (Temp System)					X		X	
Thermostats (Debonair®)					X		X	
Thermostats (Slimline)					X		X	
Thermostats (Corporate)					X		X	
MODBUS Carrier Translator					X	X	X	X
LonWorks Carrier Translator					X	X	X	X
POWER CIRCUIT								
GFI Convenience Outlet (powered)	X	X	X	X				
GFI Convenience Outlet (not powered)	X	X	X	X				
Power Terminal Block	X	X	X	X				
Non-Fused Disconnect	X	X	X	X				
INDOOR MOTOR OPTIONS								
Low HP	X	X	X	X				
Medium HP	X	X	X	X				
High HP	X	X	X	X				
Bypass on IFM VFD			X	X				
PACKAGING								
Domestic	X	X	X	X				
Export	X	X	X	X				
MISCELLANEOUS OPTIONS								
14-inch Roof Curb					X	X	X	X
Full-perimeter Roof Curb					X	X	X	X
Security Grille (60 Ton Unit Only)	X	X	X	X				
Low Outdoor Sound	X	X	X	X				
Low Compressor Sound					X	X	X	X
Motormaster® V Control					X	X	X	X

LEGEND

AI — Aluminum
 Cu — Copper
 GFI — Ground Fault Circuit Interrupter
 IFM — Indoor Fan Motor
 LP — Liquid Propane
 VFD — Variable Frequency Drive

Base unit dimensions — 48A2,A3 020-035

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- NOTES:**

 1. Weights include economizer.
 2. Center of gravity.
 3. Unit clearances.
 4. For smaller service and operating contact Carrier application engineering.
 5. Bottom ducts are designed to carry roof cuts. If run is more than 10' from roof, it is recommended that the duct be cross braced as done on air removal of evaporator coil.
 6. Dimensions in [] are in millimeters. Dimensions in " are in inches.

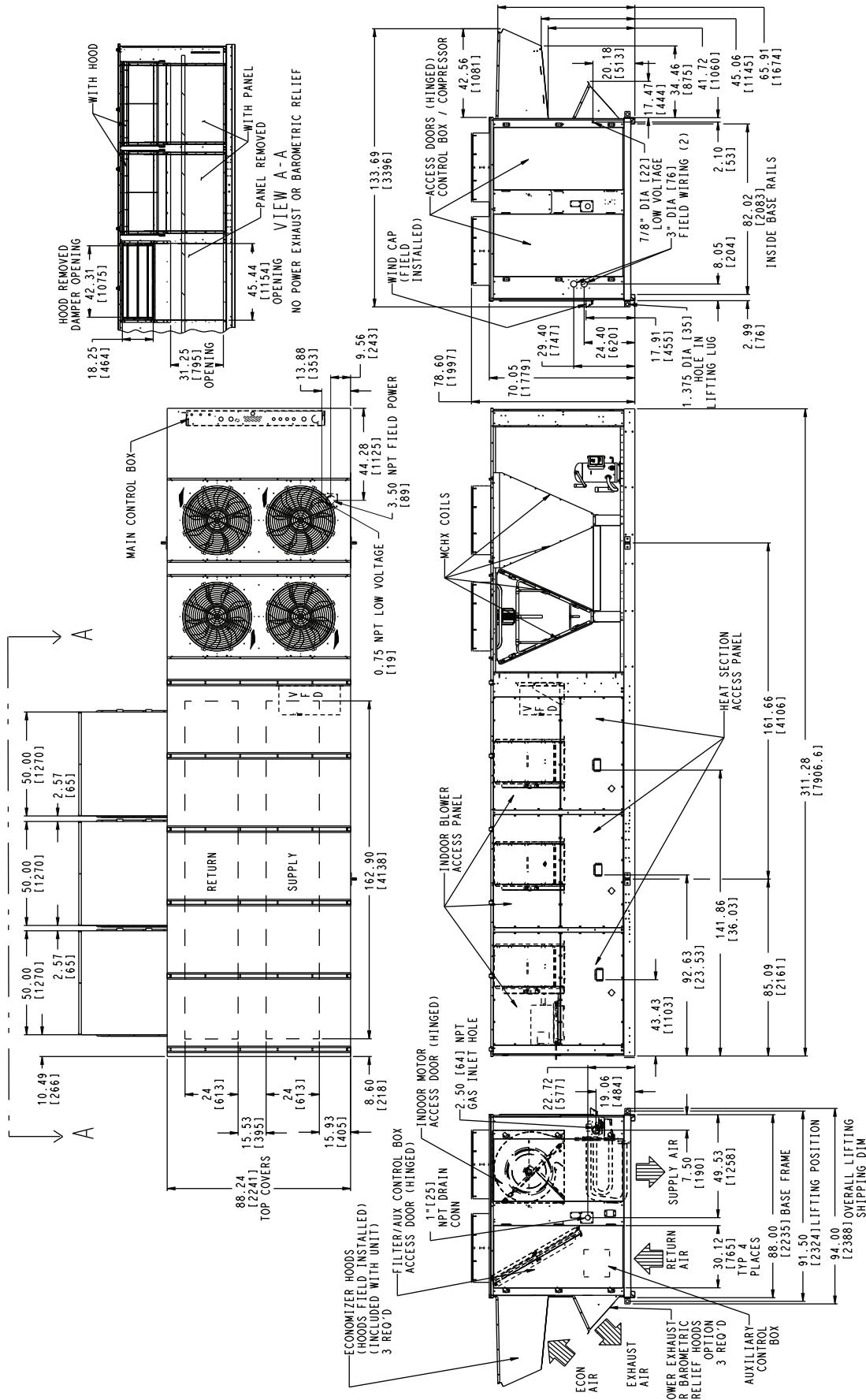
Base unit dimensions — 48A2,A3 040,050

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Base unit dimensions — 48A2,A3 060

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FOR CENTERS OF GRAVITY,
OPERATING AND CORNER
WEIGHTS, SEE PAGE 25

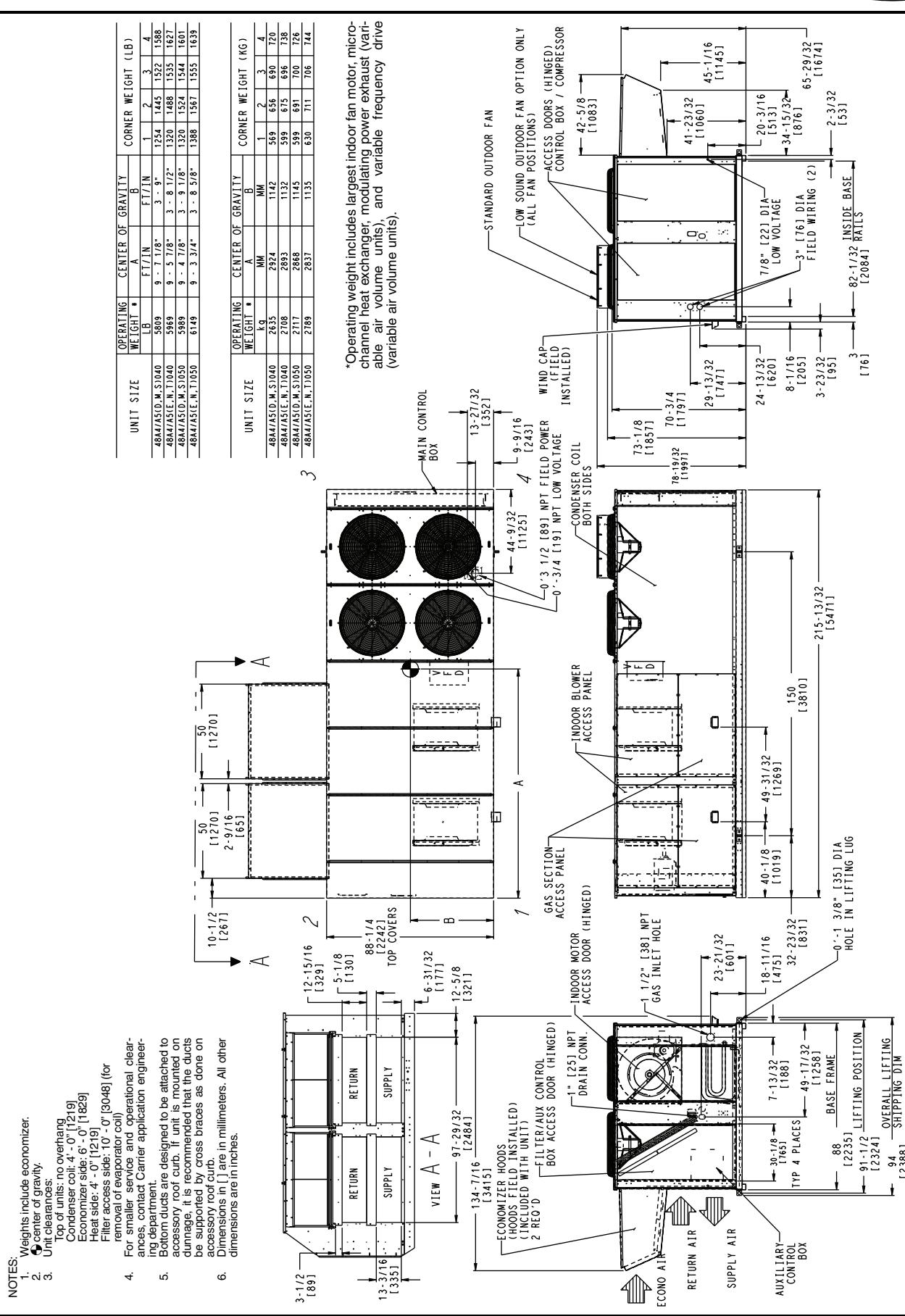


Base unit dimensions — 48A4,A5 020-035

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Base unit dimensions — 48A4,A5 040,050

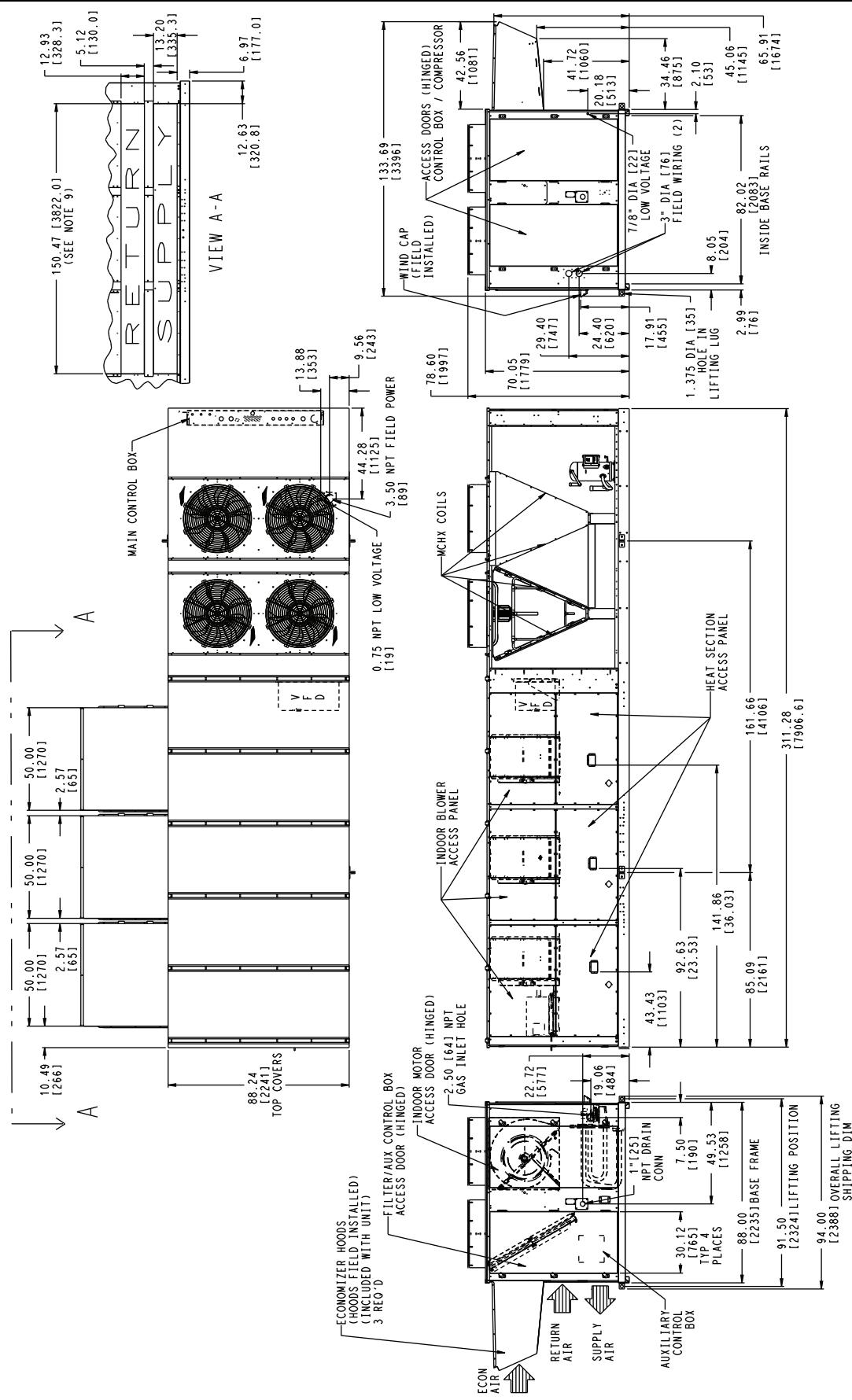
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Base unit dimensions — 48A4,A5060

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FOR CENTERS OF GRAVITY,
OPERATING AND CORNER
WEIGHTS, SEE PAGE 25



CENTER OF GRAVITY AND WEIGHTS — 48A2,A3,A4,A5 060

NOTES:

1. Weights include economizer or outdoor air damper.
2. Center of gravity.
3. Unit clearances:

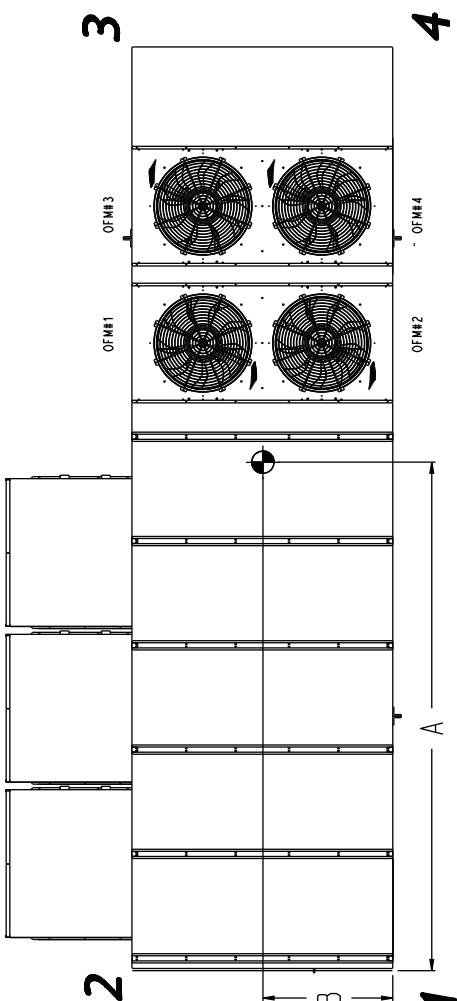
 - Top of units: no overhang [1219]
 - Condenser coil: 4' - 0" [1219]
 - Economizer side: 6' - 0" [1829]
 - Heat side: 4' - 0" [1219]
 - Filter access side: 10' - 0" [3048] (for removal of evaporator coil)

4. For smaller service and operational clearances, contact Carrier application engineering department.
5. Bottom ducts are designed to be attached to accessory roof curb. If unit is mounted on a flange, it is recommended that the ducts be supported by cross braces as done on accessory roof curb.
6. Base unit weights include outdoor air hoods and filters (indoor fan motor is not included). Add indoor fan motor, FIOPs, and accessories for total operating weight.
7. VAV motor weights include indoor motor, VFD, VFD transducer, and associated wiring.
8. Dimensions in [] are in millimeters. All other dimensions are in inches.
9. For side-supply/return applications, a single return and supply ductwork connection is recommended for covering all three return and all three supply openings. The entire area around the duct openings is available for a 1.5" duct flange attachment.

	BASE UNIT WEIGHTS (SEE NOTE 7) LB (kg)		UNIT SIZE MM		OPERATING WEIGHT KG		CENTRE OF GRAVITY A MM		CENTRE OF GRAVITY B MM		CORNER WEIGHT (LB) KG	
		060										
	48A2/A3 (D,M,S) 060				8386		14 - 9 1/8"	3 - 5 1/4"	1909	1633	2243	2541
	48A2/A3 (E,N,T) 060				8626		14 - 2 3/8"	3 - 3 1/4"	2159	1745	2100	2622
	48A4/A5 (D,M,S) 060				8426		14 - 1 5/8"	3 - 9 1/4"	1763	2072	2259	2333
	48A4/A5 (E,N,T) 060				8616		13 - 7 1/4"	3 - 7 1/4"	2000	2126	2134	2417

	OPTIONS / ACCESSORIES (SEE NOTE 7) UNIT SIZE MM		OPERATING WEIGHT KG		CENTRE OF GRAVITY A MM		CENTRE OF GRAVITY B MM		CORNER WEIGHT (KG)			
BAROMETRIC RELIEF	450 (204)				3804		4511	1049	866	768	1017	1153
NON MOD. POWER EXHAUST	675 (306)				3913		4329	996	919	792	933	1189
MOD. POWER EXHAUST	725 (329)				3822		4309	1149	800	940	1024	1058
ELECTRIC HEAT	165 (75)				3936		4147	1097	907	964	968	1096
CU TU/A FIN COND COIL	26 (12)											
CU TU/CU FIN COND COIL	677 (301)											

* Operating weight includes largest indoor fan motor, microchannel heat exchanger, modulating power exhaust (variable air volume units), and variable frequency drive (variable air volume units).



2

3

4

1

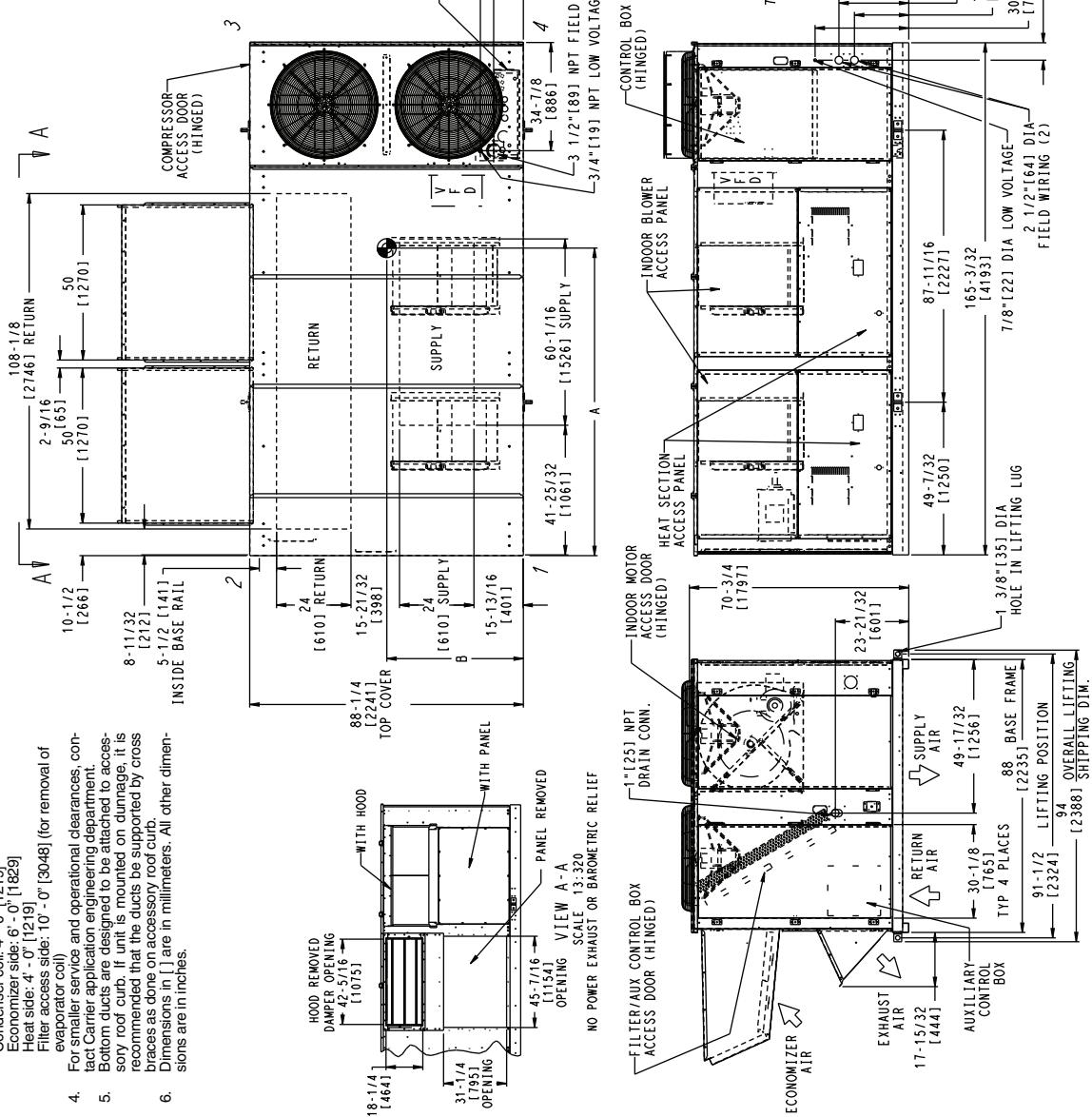
	CV MOTOR WEIGHTS LB (kg)		VAV MOTOR WEIGHTS LB (kg) (SEE NOTE 7)	
	HIGH EFFCY IFM	PREMIUM EFFCY IFM	HIGH EFFCY IFM	PREMIUM EFFCY IFM
25 HP (18.65 kW)	230/460 575	240 (109) 240 (109)	309 (140) 319 (145)	375 (170) 444 (201)
30 HP (22.38 kW)	230/460 575	283 (128) 372 (169)	355 (161) 415 (188)	454 (206) 494 (224)
40 HP (29.84 kW)	230/460 575	372 (169) 372 (169)	507 (230) 507 (230)	550 (249) 545 (247)

Base unit dimensions — 50A2,A3 020-035

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The figure is a technical line drawing of a variable air volume (VAV) unit. It features a central rectangular frame with various components mounted on it. At the top left, there are two outdoor fans labeled "STANDARD OUTDOOR FAN". To the right of the fans is a large rectangular coil labeled "CONDENSER COIL". Above the coil, a horizontal rail labeled "INSIDE BASE RAILS" runs across the unit. On the far right side, there is a vertical stack of components labeled "POWER EXHAUST OR BAROMETRIC RELIEF HOODS". The top edge of the unit has several vertical dimensions: "65-29/32 [1644]", "45-1/16 [1145]", "41-23/32 [1060]", and "34-15/32 [815]". The bottom edge has dimensions: "22-11/32 [512]", "8-1/32 [2083]", and "7-11/32 [4455]". On the left side, there are two vertical dimensions: "13-7/8 [352]" and "9-15/32 [243]". A bracket on the left indicates a height of "1-19-32 [11971]" from the base. A label "MAIN CONTROL BOX" points to a small rectangular cutout on the left side. A dimension "42-5/8 [1082]" is shown between two points on the top edge. A bracket on the right side indicates a height of "1-15/32 [437]" from the base. The top center of the unit is labeled "ECONOMIZER HOODS (HOODS FIELD INSTALLED) (HOODS INCLUDED WITH UNIT)". A dimension "3 [76]" is shown at the bottom right corner. The drawing also includes labels for "POWER", "ACCESS DOOR", and "LOW SOUND OUTDOOR FAN OPTION ONLY (ALL FAN POSITIONS)".

*Operating weight includes largest indoor fan motor, microchannel heat exchanger, modulating power exhaust (variable air volume units), and variable frequency drive (variable air volume units).



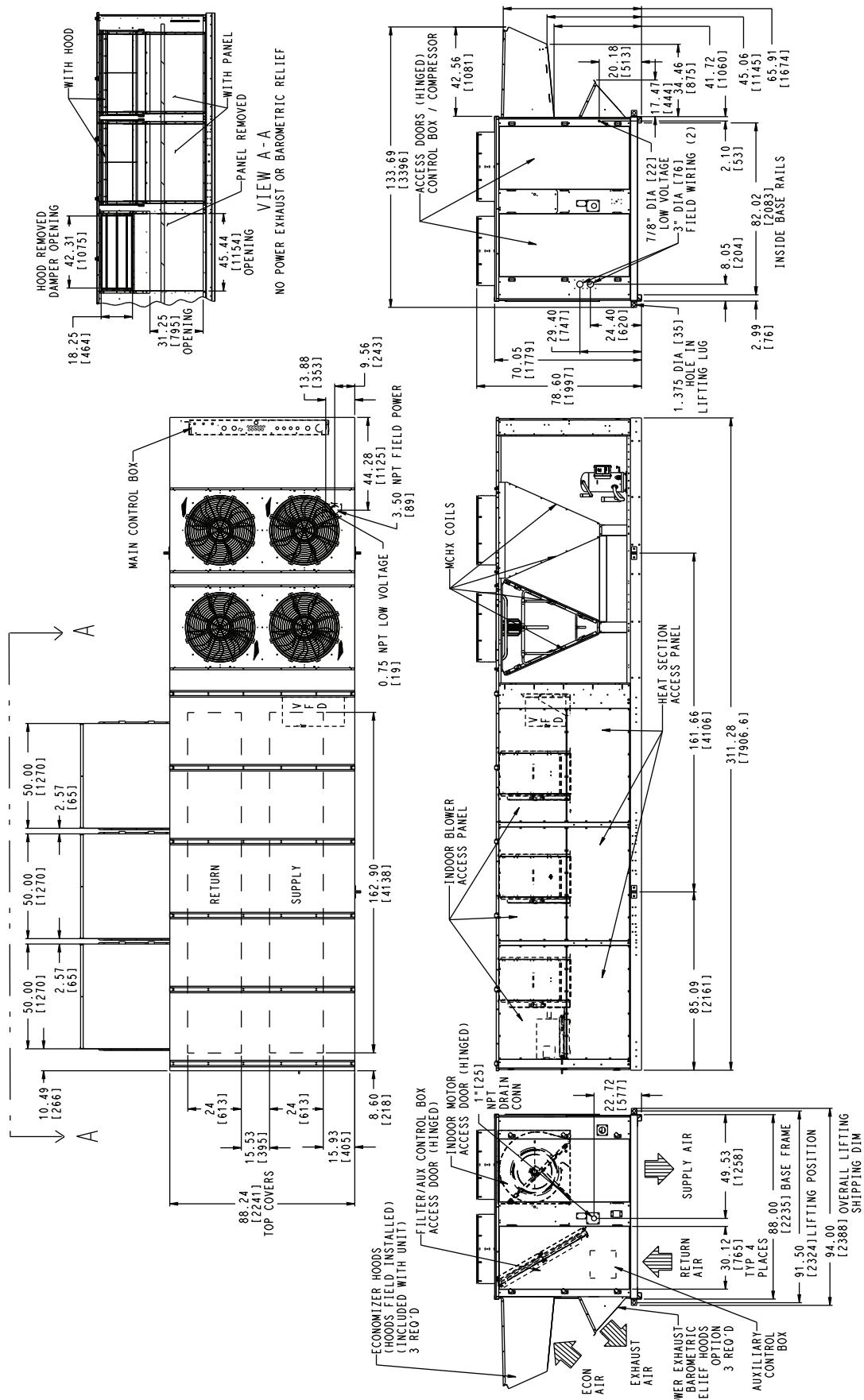
- NOTES:**

 1. Weights include economizer.
 2. Center of gravity.
 3. Unit clearances.

Base unit dimensions — 50A2,A3060

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FOR CENTERS OF GRAVITY,
OPERATING AND CORNER
WEIGHTS, SEE PAGE 32



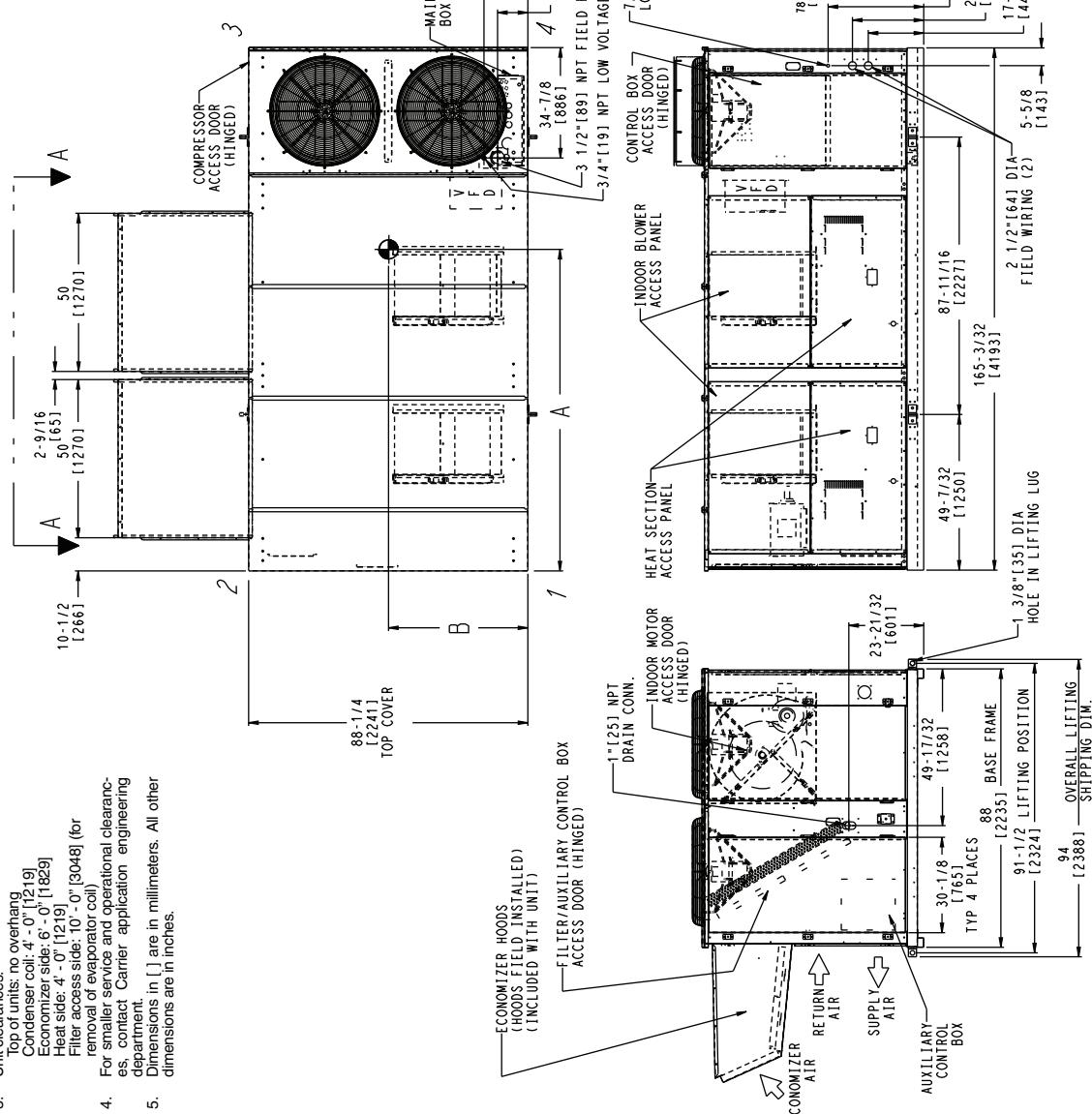
Base unit dimensions — 50A4,A5 020-035

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UNIT	SIZE	OPERATING WEIGHT *		CENTER OF GRAVITY		CORNER WEIGHT (LB)	
		LB	FT/IN	A	FT/IN	B	C
50A4/45.020	46.7	7 - 10 1/4"	4 - 1 1/2"	821	1184	1446	1225
50A4/45.025	48.1	7 - 10 1/4"	4 - 1 1/4"	835	1210	1478	1290
50A4/45.027	48.9	7 - 9 5/8"	4 - 0 1/2"	901	1210	1478	1290
50A4/45.030	49.0	7 - 8 3/4"	4 - 0 3/4"	913	1210	1478	1290
50A4/45.035	53.7	7 - 8 5/8"	3 - 9 3/4"	1013	1263	1506	1466

UNIT	SIZE	OPERATING WEIGHT *		CENTER OF GRAVITY		CORNER WEIGHT (KG)	
		KG	MM	MM	MM	MM	KG
50A4/45.020	21.2	2394	1257	373	571	656	556
50A4/45.025	21.5	2410	1248	370	559	670	585
50A4/45.027	22.3	2377	1232	409	549	670	585
50A4/45.030	22.7	2337	1218	427	568	666	614
50A4/45.035	24.6	2337	1218	487	513	683	674

*Operating weight includes largest indoor fan motor, microchannel heat exchanger, modulating power exhaust (variable air volume units), and variable frequency drive (variable air volume units).

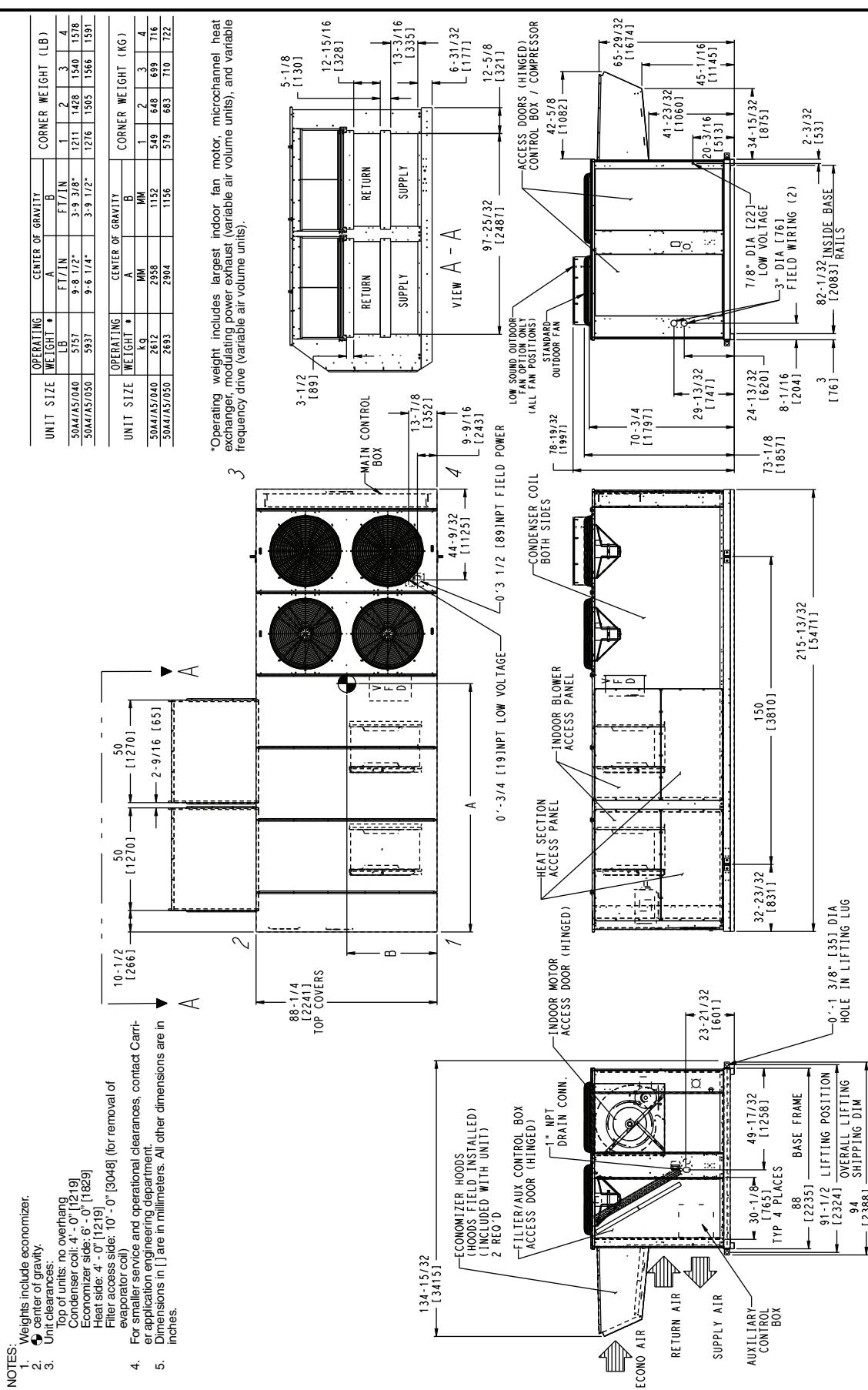


- NOTES:**

 1. Weights include economizer.
 2. Center of gravity.
 3. Unit clearances.
 4. Top of units; no overhang
Condenser coil: 4'-0" [1219]
Economizer side: 6'-0" [1829]
Heat side: 4'-0" [1219]
Filter access side: 10'-0" [3048] (for removal of evaporator coil)
 5. For smaller service and operational clearances, contact Carrier application engineering department. Dimensions in [] are in millimeters. All other dimensions are in inches.

Base unit dimensions — 50A4,A5040,050

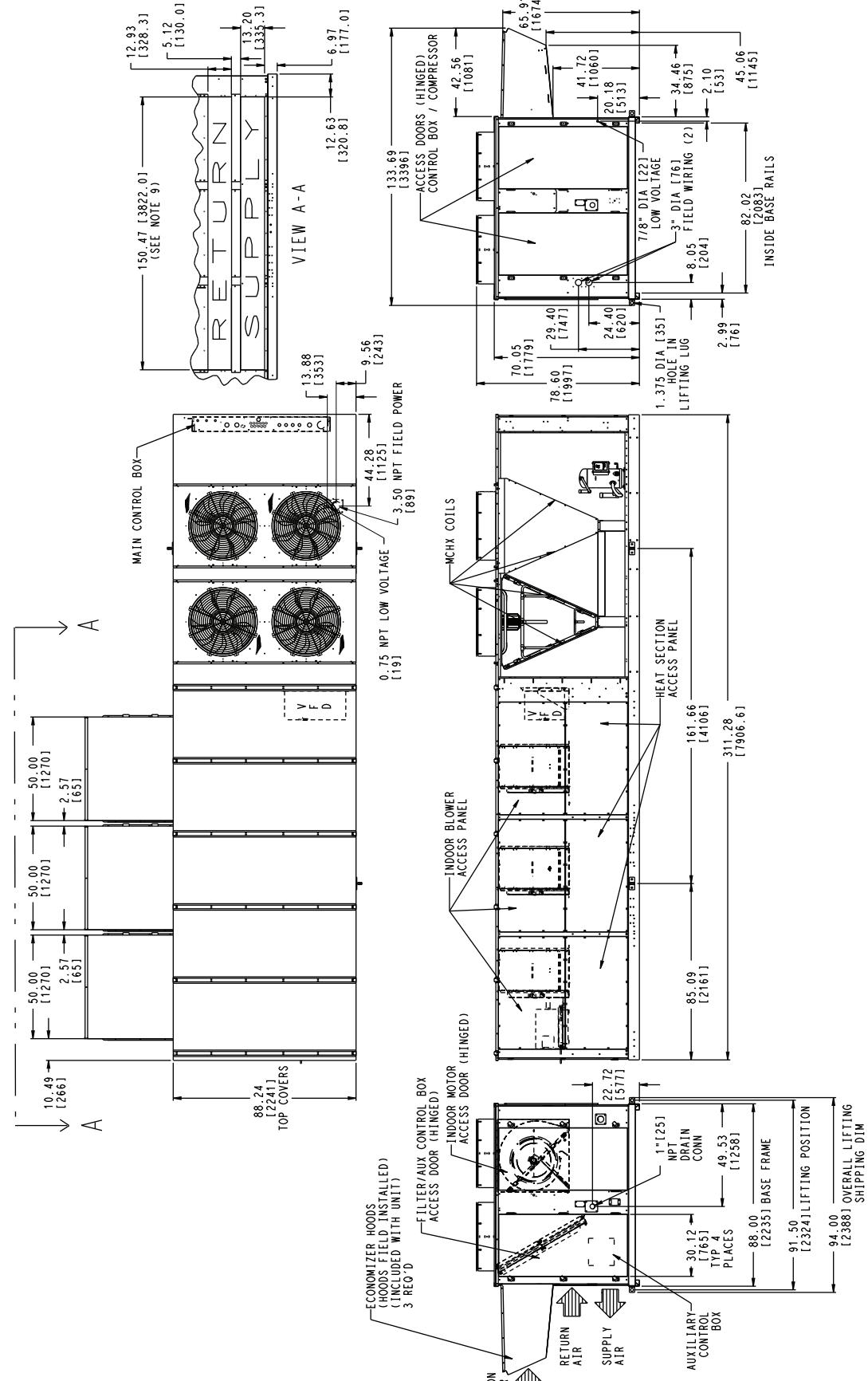
Carrier
®



Base unit dimensions — 50A4,A5 060

Carrier®

FOR CENTERS OF GRAVITY,
OPERATING AND CORNER
WEIGHTS, SEE PAGE 32



Base unit dimensions (cont)

Carrier
®

CENTER OF GRAVITY AND WEIGHTS — 50A2,A3,A4,A5060

NOTE S: Weights include economizer or outdoor air damper.

1. center of gravity.

2. Unit clearances.

3. Top of units: no overhang.

Condenser coil: 4'-0" [1219]

Economizer side: 6'-0" [1829]

Heat side: 4'-0" [1219]

Filter access side: 10'-0" [3048] (for removal of evaporator coil)

For smaller service and operational clearances, contact Carrier application engineering department.

5. Bottom ducts are designed to be attached to accessory roof curb. If unit is mounted on ducting, it is recommended that the ducts be supported by cross braces as done on accessory roof curb.

6. Base unit weights include outdoor air hoods and filters (indoor fan motor is not included). Add indoor fan motor, FIDPs, and accessories for total operating weight.

7. VAV motor weights include indoor motor, VFD, VFD transducer, and associated wiring.

8. Dimensions in [] are in millimeters. All other dimensions are in inches.

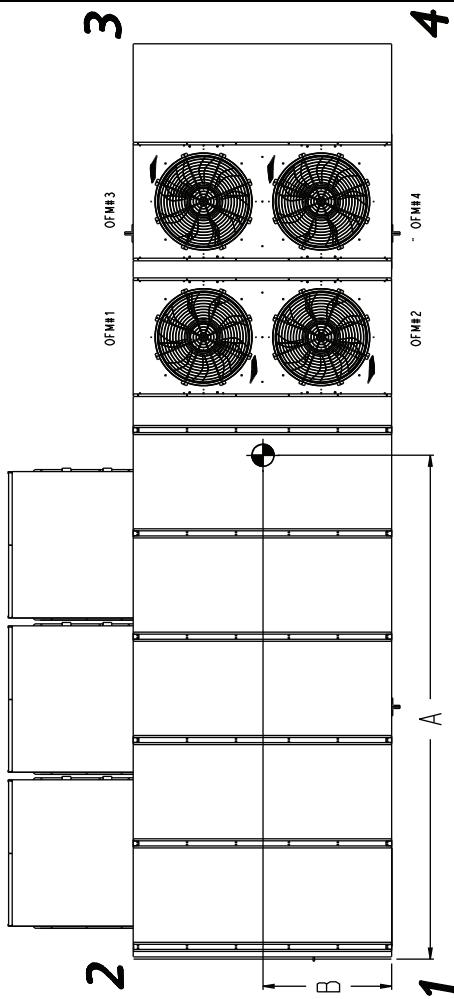
9. For side-supply/return applications, a single return and supply ductwork connection is recommended for covering all three return and all three supply openings. The entire area around the duct openings is available for a 1.5" duct flange attachment.

BASE UNIT WEIGHTS (SEE NOTE 7)		UNIT SIZE		OPERATING WEIGHT		CENTRE OF GRAVITY		CORNER WEIGHT (LB)			
	LB (kg)			LB	FT/IN	A	FT/IN	1	2	3	4
	060										
50A2/A3	6826 (3096)	50A2/A3 060	8311	15 - 5"	3 - 7 3/8"			1110	1463	2433	2504
50A4/A5	7041 (3194)	50A4/A5 060	8326	14 - 8 1/2"	3 - 11 1/8*			1613	2078	2484	2351

OPTIONS / ACCESSORIES (SEE NOTE 7)

	UNIT SIZE	OPERATING WEIGHT	CENTRE OF GRAVITY	CORNER WEIGHT (kg)
	KG	MM	MM	
BAROMETRIC RELIEF	450 (204)	3770	4638	1102
NON MOD. POWER EXHAUST	675 (306)	3668	4484	1196
MOD. POWER EXHAUST	725 (329)			
ELECTRIC HEAT	165 (75)			
CU TU/AL FIN COND COIL	26 (12)			
CU TU/CU FIN COND COIL	677 (307)			

*Operating weight includes largest indoor fan motor, microchannel heat exchanger, modulating power exhaust (variable air volume units), and variable frequency drive (variable air volume units).



CV MOTOR WEIGHTS		VAV MOTOR WEIGHTS	
HIGH EFFCY IFM	PREMIUM EFFCY IFM	HIGH EFFCY IFM	PREMIUM EFFCY IFM
230/460 (18.65 kW)	240 (109)	309 (140)	375 (170)
575	240 (109)	319 (145)	375 (170)
230/460 (22.38 kW)	283 (128)	355 (161)	454 (206)
575	283 (128)	359 (163)	418 (190)
230/460 (29.84 kW)	372 (169)	415 (188)	507 (230)
575	372 (169)	410 (186)	507 (230)

Accessory dimensions



ROOF CURB SIZES 020-035

NOTES:

1. Unless otherwise specified, all dimensions are to outside of part.
2. Rod curb accessory CRHCCURB05400 is shipped disassembled.
3. All rod curb parts are to be 14 ga. galvanized steel.
4. Units with electric heat must be installed with a 90° elbow on the supply duct prior to any supply take-offs or branchies.
5. Dimensions in [] are in millimeters. All other dimensions are in inches.

NOTE: TO PREVENT STANDING WATER IN THE DRAIN PAN OF THE
INDOOR SECTION, AND THE HEAT EXCHANGERS
UNIT CAN ONLY BE PITCHED AS SHOWN.

NOTE: TO PREVENT STANDING WATER INDOOR SECTION, AND THE UNIT CAN ONLY

CONDENSER COMPRESSOR END		DIMENSIONS (DEGREES AND INCHES)		
		A	B	
DEG.	IN.	DEG.	IN.	mm
1.0	2.9	.73	.50	17.5
			.75	19

UNIT LEVELING TOLERANCES
*FROM EDGE OF UNIT TO HORIZONTAL

NOTES:

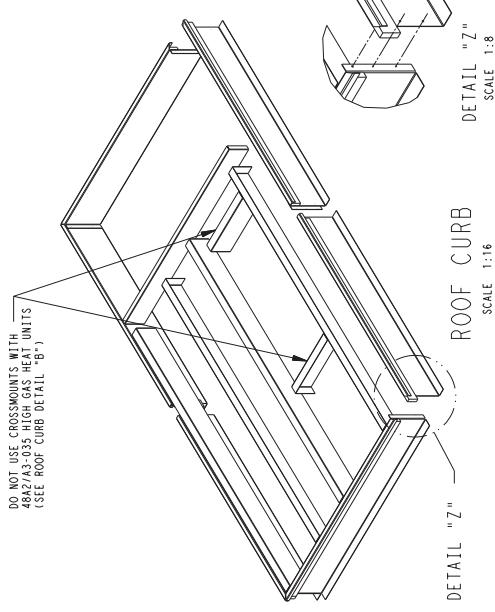
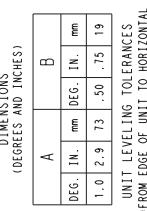
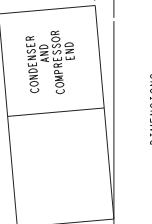
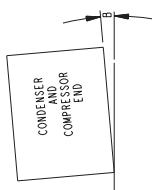
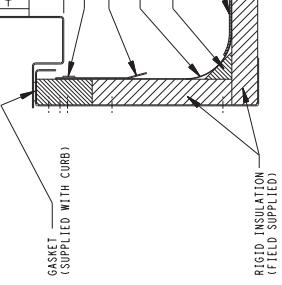
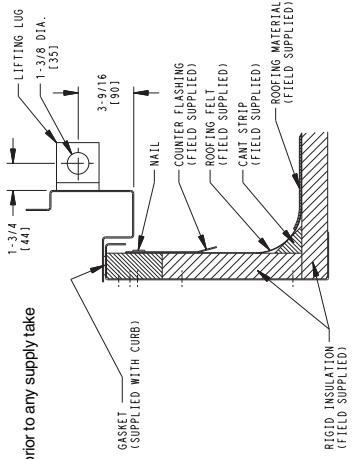
1. Unless otherwise specified, all dimensions are to outside of part.
2. Roof curb accessory CRHFCURB05A00 is shipped disassembled.
3. All roof curb parts are to be 14 ga. galvanized steel.
4. Units with electric heat must be installed with a 90° elbow on the supply or branches.
5. Dimensions in [] are in millimeters. All other dimensions are in inches.

NOTE: TO PREVENT STANDING WATER IN THE DRAIN PAN OF THE
INDOOR SECTION, AND THE HEAT EXCHANGERS
UNIT CAN ONLY BE PITCHED AS SHOWN.

NOTE: TO PREVENT STANDING WATER INDOOR SECTION, AND THE UNIT CAN ONLY

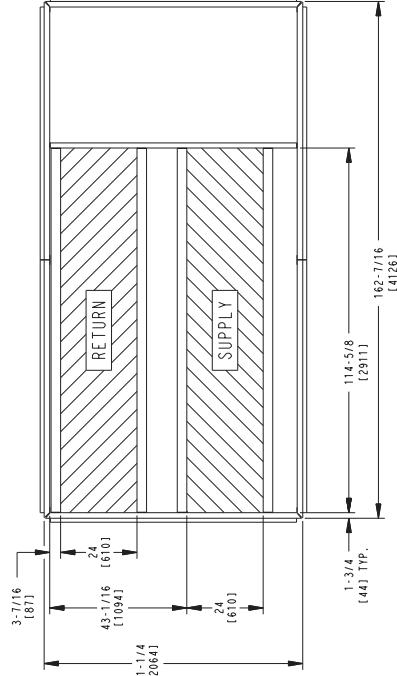
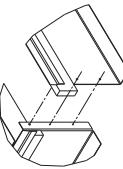
CONDENSER COMPRESSOR END		DIMENSIONS (DEGREES AND INCHES)			UNIT LEVELING TOLERANCES			
		A	B		DEG. IN.	mm	DEG. IN.	mm
1.0	2.9	.73	.50	.75	.19			

* FROM EDGE OF UNIT TO HORIZONTAL



SEE DETAIL "Z" ROOF CURB
SCALE 1:16

DETAIL "Z"
SCALE 1:8
TYP 4 CORNERS



48A2/A3-035 HIGH GAS HEAT ONLY

48A2/A3-035 HIGH GAS HEAT ONLY

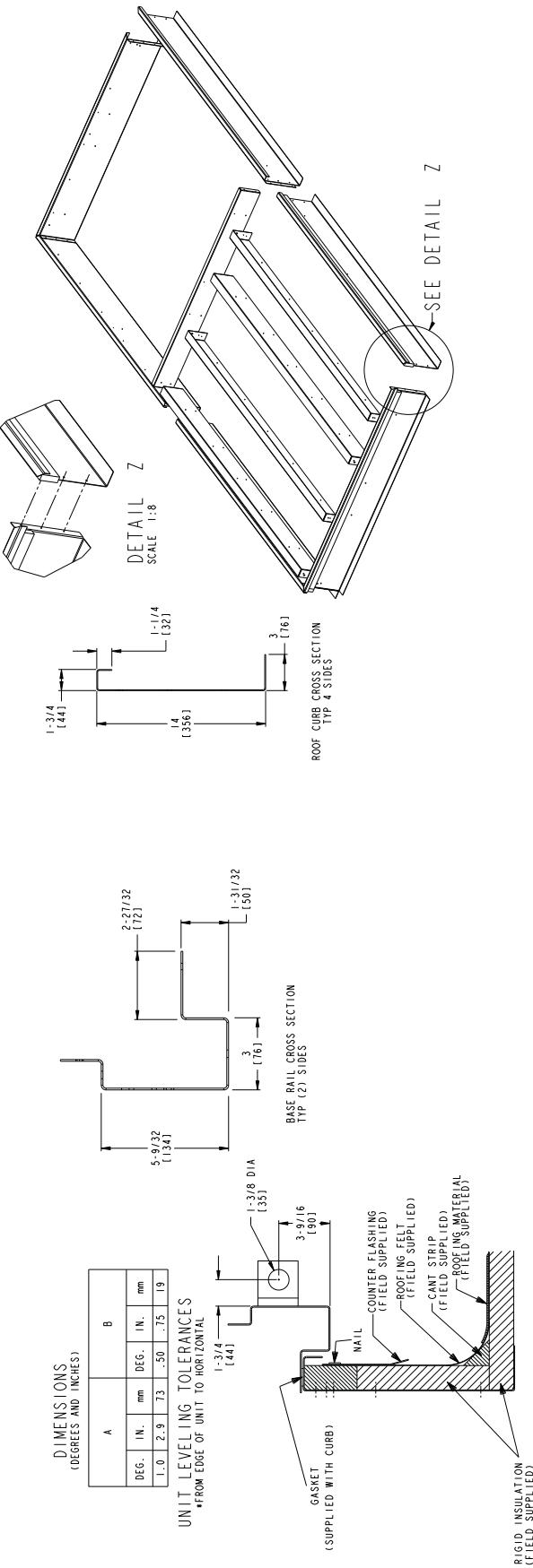
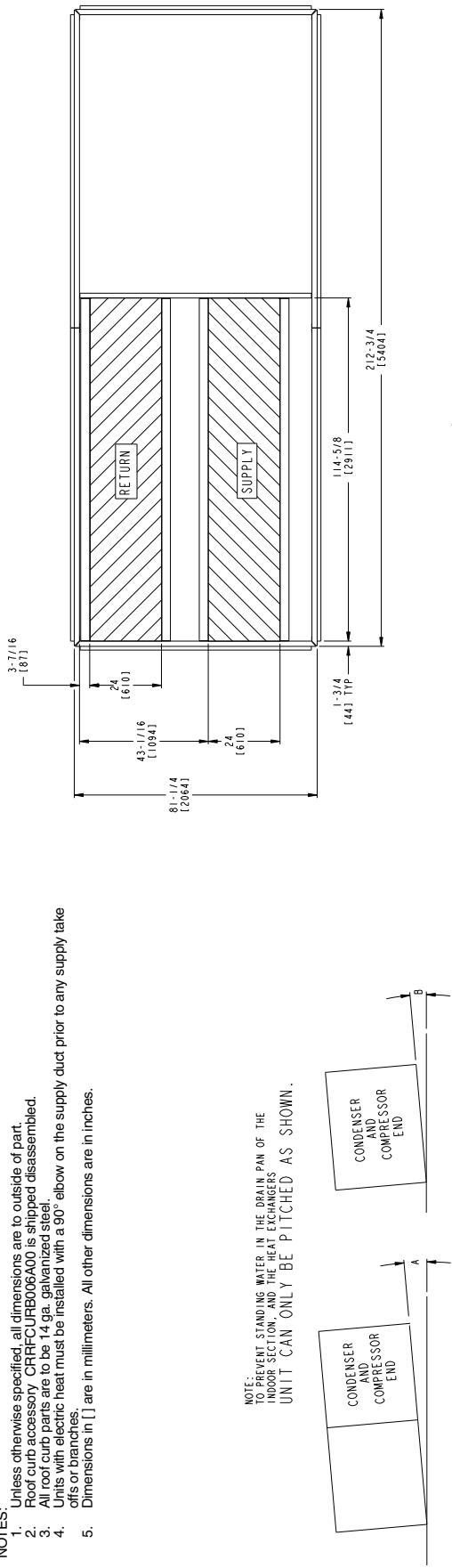
Accessory dimensions (cont)



ROOF CURB SIZES 040 AND 050

NOTES:

1. Unless otherwise specified, all dimensions are to outside of part.
2. Root curb accessory CRHF-CURBOA00 is shipped disassembled.
3. All root curb parts are to be 14-gauge galvanized steel.
4. Units with electric heat must be insulated with a 90° elbow on the supply duct prior to any supply take-offs or branches.
5. Dimensions in [] are in millimeters. All other dimensions are in inches.

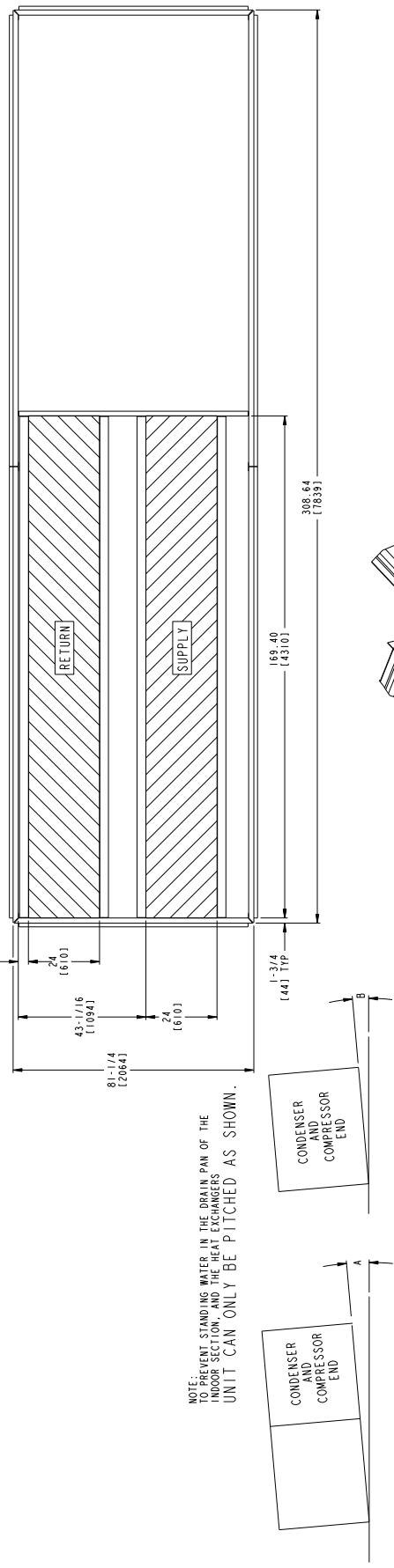


ROOF CURB 48A2,A3060, 50A2,A3060 WITHOUT ELECTRIC HEAT/UNIT SUPPORT 48/50A4,A5060

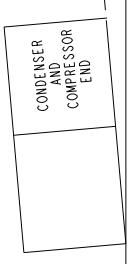
NOTES:

1. Unless otherwise specified, all dimensions are to outside of part.
2. Roof curb accessory CRRFCURB14A00 is shipped disassembled.
3. All roof curb parts are to be 14 ga. galvanized steel.
4. Dimensions in [] are in millimeters. All other dimensions are in inches.

{8}



NOTE: TO PREVENT STANDING WATER IN THE DRAIN PAN OF THE INDOOR SECTION, AND THE HEAT EXCHANGERS UNIT CAN ONLY BE PITCHED AS SHOWN.



DIMENSIONS (DEGREES AND INCHES)

	A	B			
DEG.	IN.	mm	DEG.	IN.	mm
1.0	.543	138	.50	.75	19

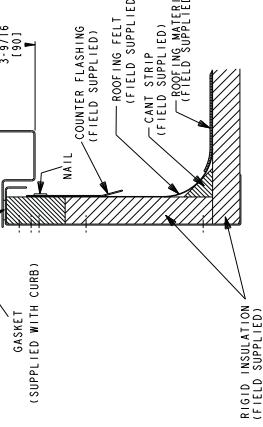
UNIT LEVELLING TOLERANCES
*FROM EDGE OF UNIT TO HORIZONTAL



ROOF CURB CROSS SECTION
TOP (2) SIDES



SEE DETAIL Z

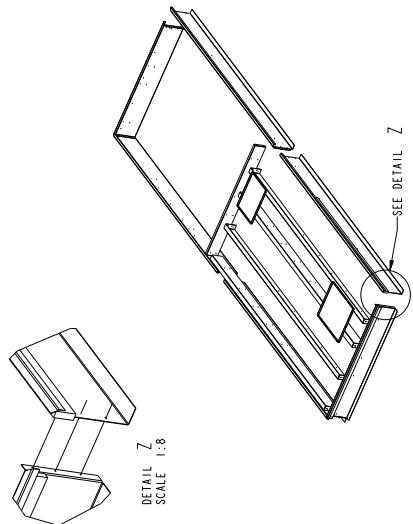
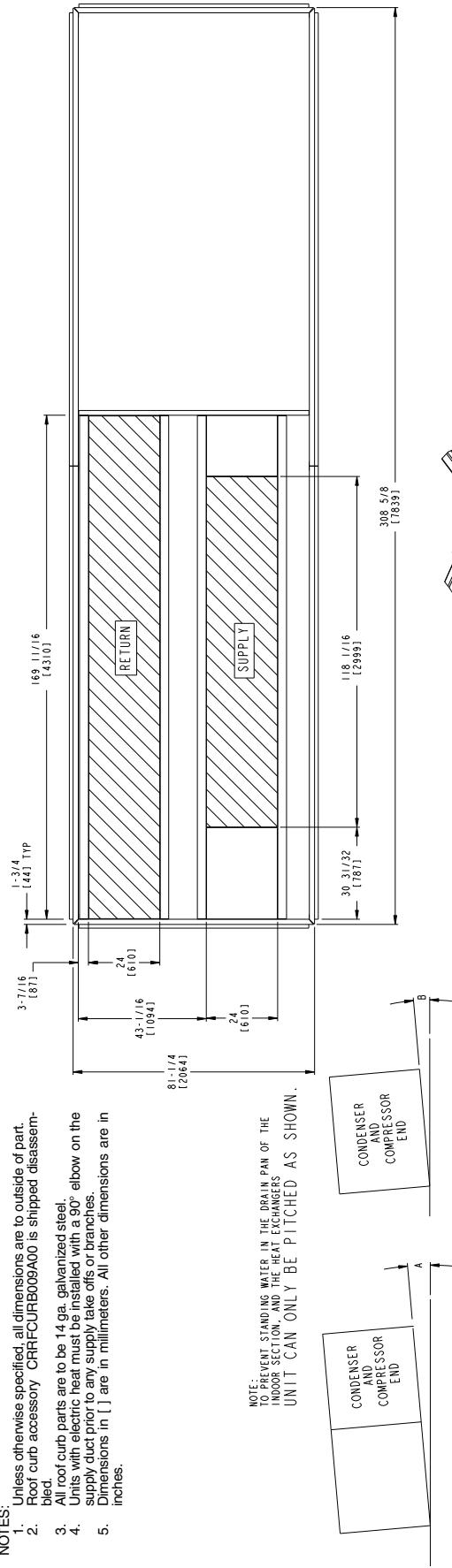


Accessory dimensions (cont)



ROOF CURB 50A2,A3060 WITH ELECTRIC HEAT

- NOTES:
1. Unless otherwise specified, all dimensions are to outside of part.
 2. Roof curb accessory CRRFCURB09400 is shipped disassembled.
 3. All roof curb parts are to be 14 ga. galvanized steel.
 4. Units with electric heat must be installed with a 90° elbow on the supply duct prior to any supply take offs or branch ducts. All other dimensions in [] are in millimeters. All other dimensions are in inches.
 5. Dimensions in [] are in millimeters. All other dimensions are in inches.

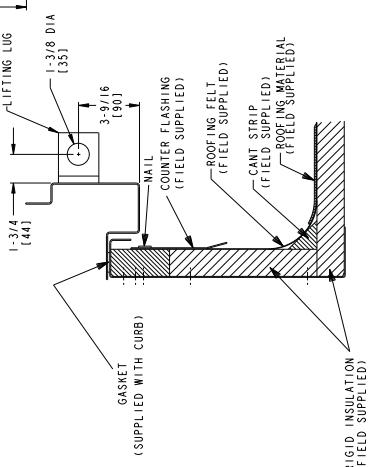


DIMENSIONS
(DEGREES AND INCHES)

	A	B
DEG.	IN.	mm
1.0	5.43	138

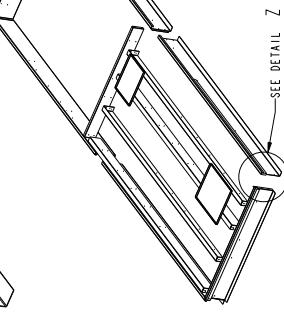
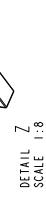
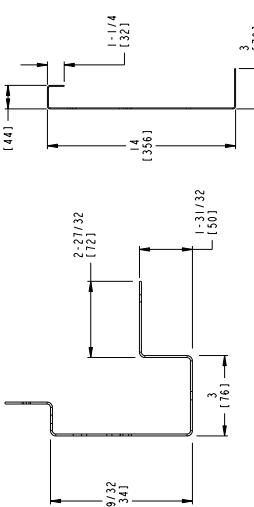
*UNIT LEVELLING TOLERANCES

*FROM EDGE OF UNIT TO HORIZONTAL

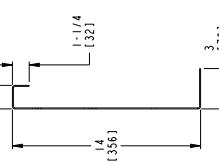


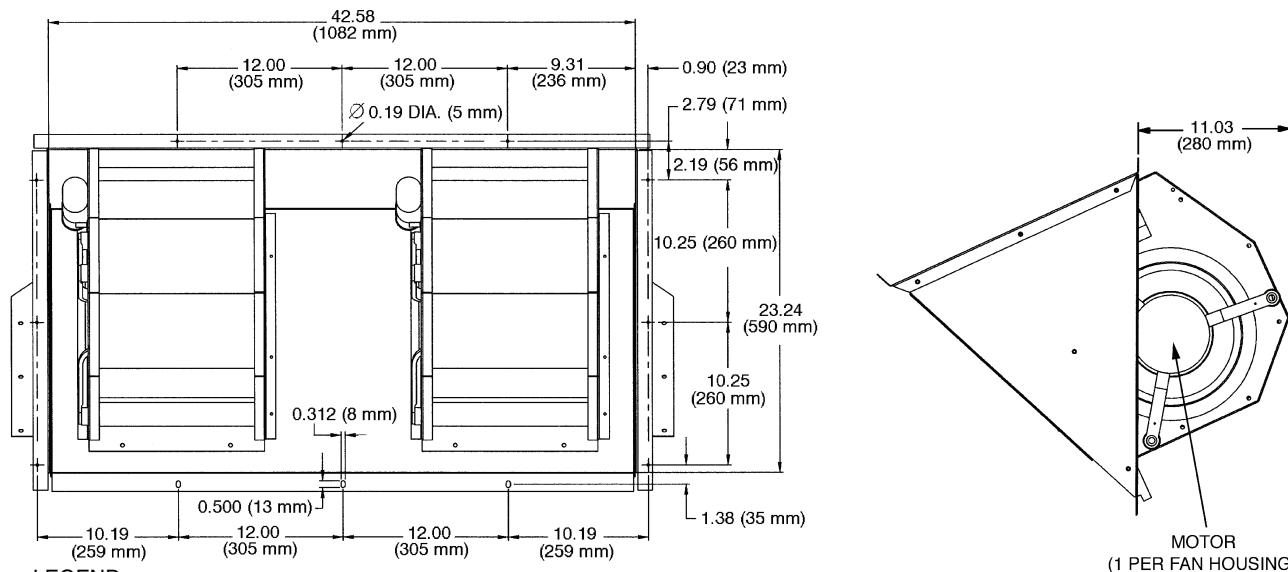
BASE RAIL CROSS SECTION
TYP (2) SIDES

ROOF CURB CROSS SECTION
TYP 4 SIDES



SEE DETAIL Z

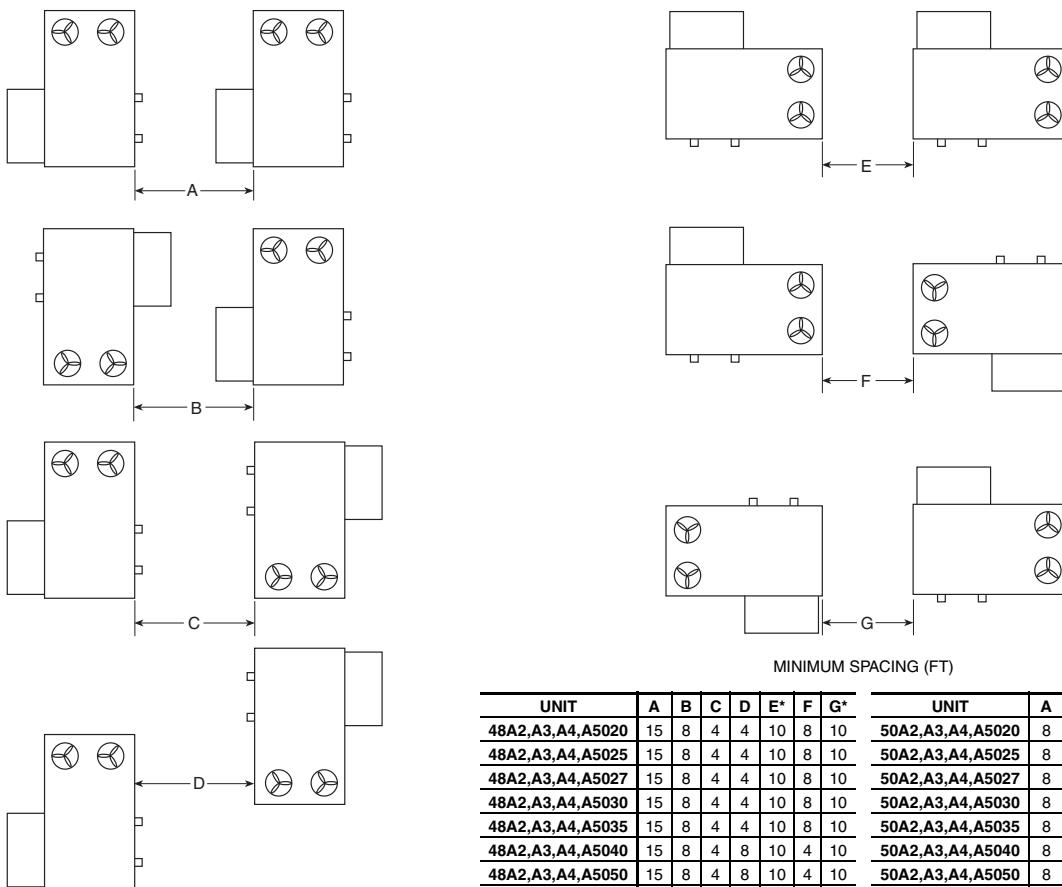


POWER EXHAUST AND BAROMETRIC RELIEF

LEGEND

\odot — Diameter

NOTES:

1. Unless otherwise specified, all dimensions are to outside of part.
2. Dimensions are in inches.
3. Unit sizes 020-050 have 2 fan assemblies. Unit size 060 has 3 fan assemblies.
4. For 48/50A4,A5 units, the accessory power exhaust or barometric relief must be mounted in the field-supplied return ductwork.

MULTIPLE UNIT APPLICATION SPACING

MINIMUM SPACING (FT)

UNIT	A	B	C	D	E*	F	G*	UNIT	A	B	C	D	E*	F	G*
48A2,A3,A4,A5020	15	8	4	4	10	8	10	50A2,A3,A4,A5020	8	8	4	4	10	8	10
48A2,A3,A4,A5025	15	8	4	4	10	8	10	50A2,A3,A4,A5025	8	8	4	4	10	8	10
48A2,A3,A4,A5027	15	8	4	4	10	8	10	50A2,A3,A4,A5027	8	8	4	4	10	8	10
48A2,A3,A4,A5030	15	8	4	4	10	8	10	50A2,A3,A4,A5030	8	8	4	4	10	8	10
48A2,A3,A4,A5035	15	8	4	4	10	8	10	50A2,A3,A4,A5035	8	8	4	4	10	8	10
48A2,A3,A4,A5040	15	8	4	8	10	4	10	50A2,A3,A4,A5040	8	8	4	8	10	4	10
48A2,A3,A4,A5050	15	8	4	8	10	4	10	50A2,A3,A4,A5050	8	8	4	8	10	4	10
48A2,A3,A4,A5060	15	8	4	8	15	4	15	50A2,A3,A4,A5060	8	8	4	8	15	4	15

* Required for coil removal. Can reduce to 6 ft if coil removed from top.

Selection procedure (with example)



I Determine cooling and heat requirements at design conditions.

Given:

Type Application VAV
Required Cooling Capacity (TC) . . . 480,000 Btuh
Sensible Heat Capacity (SHC) . . . 338,000 Btuh
Required Heating Capacity 300,000 Btuh
Design Outdoor Air db Temperature 95 F
Design Outdoor Air wb Temperature 67 F
Climate Type (as per ASHRAE 90.1 Table D) . . Dry Indoor-Air Temperature 80 F edb, 67 F ewb
Evaporator Air Quantity 16,000 cfm
External Static Pressure 1.4 in. wg
Electrical Characteristics (V-Ph-Hz) 460-3-60
Unit Type Gas Heating Vertical Discharge

II Select the unit based on required cooling capacity.

Entering Cooling Capacity table at air condenser entering temperature of 95 F. Unit 48A3D040 at 16,000 cfm and 67 F ewb will provide the total capacity of 485,000 Btuh and a SHC of 380,000 Btuh. Calculate SHC correction, if required, using notes under cooling capacity table.

III Select heat capacity of unit to provide design condition requirements.

In the Gas Heating Capacities and Efficiencies table note that unit 48A3D040 will provide 324,000 Btuh with an input of 400,000 Btuh.

IV Select supply fan to provide design condition requirements.

Tabulated fan performance includes 2-in. throw-away filters, wet evaporator coil, economizer, cabinet losses, and roof curb. Find fan rpm and bhp at 1.4 in. wg and 16,000 cfm on 48A3D040 Fan Performance table for vertical applications. Find that the fan speed is 1063 rpm and the power required is 19.06 bhp. Refer to the Motor Limitations table which shows the 20 hp motor is required.

V Select unit that corresponds to the power source available.

The electrical data table shows that a 460-3-60 unit is available.

VI Select the options and accessories.

As per the ASHRAE 90.1 requirements this unit is located in a dry climate and therefore is required to have an economizer. As this is a dry climate either differential dry bulb changeover, outdoor air changeover or differential enthalpy should be used. Outside air enthalpy can not be used.

Select the options and model number using the options summary and model number charts in the price pages.

Note as an alternative a computerized selection program, RTUBuilder, is available for use in selecting and optimizing the unit for your application.

Performance data



COOLING CAPACITIES

48/50A2,A3,A4,A5020 (20 TONS)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm																				
	4,000					5,000					6,000					7,000					
	Evaporator Air — Ewb (F)																				
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC KW BF	268 109 14.1 0.00	258 119 14.0 0.00	236 141 13.8 0.09	214 161 13.7 0.15	195 179 13.6 0.14	284 113 14.3 0.00	272 128 14.2 0.00	250 155 14.0 0.19	228 180 13.8 0.16	208 201 13.7 0.17	294 116 14.5 0.00	282 136 14.3 0.27	260 168 14.1 0.18	239 197 13.9 0.17	224 224 13.8 0.24	302 121 14.6 0.00	289 144 14.4 0.23	268 180 14.1 0.19	246 213 13.9 0.17	232 232 13.8 0.28
85	TC SHC KW BF	261 106 16.0 0.02	250 115 16.0 0.00	228 138 15.8 0.21	207 158 15.7 0.15	188 176 15.5 0.13	276 110 16.2 0.00	264 125 16.1 0.14	242 152 15.9 0.18	221 176 15.8 0.15	200 194 15.6 0.17	286 112 16.4 0.00	273 133 16.2 0.24	252 164 16.0 0.18	230 193 15.8 0.16	218 218 16.5 0.26	293 118 16.3 0.15	280 141 16.1 0.22	259 216 15.9 0.18	238 226 15.8 0.17	226 226 15.8 0.30
95	TC SHC KW BF	253 102 18.2 0.00	242 112 18.2 0.00	220 134 18.0 0.18	200 154 17.9 0.14	181 172 17.9 0.13	267 106 18.4 0.00	254 122 18.3 0.12	233 148 18.2 0.17	212 172 18.0 0.15	198 198 18.5 0.20	277 109 18.4 0.00	264 130 18.2 0.22	242 161 18.1 0.17	221 190 18.0 0.16	207 207 18.6 0.25	283 115 18.5 0.13	271 137 18.3 0.21	249 173 18.1 0.18	228 206 18.0 0.17	218 218 18.0 0.32
105	TC SHC KW BF	244 97 20.7 0.00	232 109 20.6 0.00	211 130 20.6 0.17	191 150 20.7 0.13	174 168 20.8 0.13	257 101 20.8 0.00	244 118 20.8 0.25	223 144 20.6 0.16	203 187 20.8 0.14	187 106 20.9 0.00	266 126 20.8 0.20	253 156 20.7 0.16	232 185 20.6 0.15	211 200 20.7 0.28	272 200 21.0 0.28	260 112 20.9 0.20	238 134 20.7 0.17	218 211 20.6 0.35	218 218 20.6 0.35	
115	TC SHC KW BF	234 93 23.4 0.00	222 105 23.4 0.00	201 126 23.6 0.15	182 146 23.9 0.13	166 162 23.9 0.15	246 97 24.3 0.00	233 114 23.5 0.21	212 139 23.4 0.15	193 164 23.5 0.14	180 180 24.0 0.22	254 103 23.6 0.13	241 125 23.5 0.19	220 180 23.5 0.16	201 192 23.7 0.31	192 192 23.7 0.24	260 108 23.6 0.19	247 129 23.5 0.17	227 164 23.5 0.17	207 202 23.7 0.38	207 202 23.7 0.38
120	TC SHC KW BF	228 91 24.9 0.00	216 103 25.1 0.12	196 124 25.4 0.14	178 143 25.7 0.12	161 159 26.3 0.15	240 95 24.9 0.00	227 112 25.0 0.20	207 137 25.2 0.15	188 161 25.8 0.14	175 175 25.8 0.24	247 101 25.0 0.29	235 120 25.0 0.18	215 150 25.1 0.16	195 178 25.4 0.15	188 188 25.6 0.32	253 106 25.1 0.23	241 127 25.0 0.18	220 162 25.3 0.17	201 192 25.4 0.39	198 198 25.4 0.39

48/50A2,A3,A4,A5020 (20 TONS) (cont)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm																
	8,000					9,000					10,000						
	Evaporator Air — Ewb (F)																
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57		
75	TC SHC KW BF	308 126 14.7 0.34	295 151 14.5 0.22	274 191 14.2 0.19	252 228 14.0 0.19	243 243 13.9 0.34	313 130 14.8 0.28	299 158 14.5 0.22	278 202 14.3 0.20	257 242 14.0 0.21	251 251 14.0 0.40	317 135 14.8 0.26	303 164 14.6 0.23	282 212 14.3 0.21	262 251 14.1 0.25	259 259 14.1 0.44	259 259 14.1 0.44
85	TC SHC KW BF	298 123 16.6 0.29	286 148 16.4 0.21	265 188 16.1 0.19	243 224 16.0 0.19	236 236 15.9 0.36	302 127 0.26	290 155 16.4 0.22	269 199 16.2 0.20	248 236 0.22	244 244 0.41	306 131 0.25	294 161 0.22	273 165 0.21	253 247 0.25	251 251 16.0 0.46	251 251 16.0 0.46
95	TC SHC KW BF	288 120 18.7 0.27	276 145 18.5 0.21	255 184 18.3 0.18	234 219 18.2 0.19	228 228 18.1 0.38	293 124 0.25	280 151 0.21	259 195 0.19	239 230 0.23	236 236 0.43	296 129 0.24	284 158 0.22	262 205 0.20	245 239 0.28	243 243 18.3 0.47	243 243 18.3 0.47
105	TC SHC KW BF	277 116 21.1 0.24	265 141 20.9 0.20	243 180 20.8 0.18	223 213 20.6 0.21	220 220 20.6 0.41	281 121 0.23	269 148 0.20	248 191 0.19	229 223 0.25	227 227 0.45	284 125 0.23	272 154 0.23	251 201 0.21	235 232 0.29	234 234 0.49	234 234 0.49
115	TC SHC KW BF	264 113 23.7 0.22	252 137 23.6 0.19	231 175 23.5 0.18	213 206 23.6 0.22	211 117 23.6 0.43	268 117 0.22	256 144 0.20	235 186 0.19	219 216 0.29	218 218 0.48	271 121 0.22	258 150 0.22	238 197 0.21	225 221 0.32	224 224 0.52	224 224 0.52
120	TC SHC KW BF	257 110 25.1 0.22	245 134 25.1 0.19	225 173 25.2 0.18	207 202 25.3 0.23	206 115 25.2 0.44	261 141 0.22	248 184 0.20	229 215 0.19	215 215 0.29	219 218 0.49	263 119 0.22	251 148 0.21	232 194 0.20	219 219 0.32	219 219 0.53	219 219 0.53

See legend on page 43.

Performance data (cont)



COOLING CAPACITIES (cont)

48/50A2,A3,A4,A5025 (25 TONS)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm																				
	5,000					6,250					7,500					8,750					
	Evaporator Air — Ewb (F)																				
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC kW BF	318 128 18.7 0.00	305 142 18.4 0.00	281 173 17.9 0.18	260 201 17.6 0.13	239 226 17.2 0.11	335 133 19.0 0.00	320 154 18.7 0.11	296 190 18.2 0.16	274 224 17.8 0.13	253 251 17.4 0.16	347 138 19.3 0.00	331 165 18.9 0.22	307 205 18.4 0.17	284 242 17.7 0.15	268 268 19.4 0.24	354 145 19.1 0.13	339 175 18.6 0.21	315 220 18.1 0.17	292 264 17.9 0.16	280 280 17.9 0.32
85	TC SHC kW BF	308 124 20.8 0.00	295 139 20.5 0.00	274 170 20.1 0.17	253 197 19.8 0.12	232 222 19.5 0.12	324 127 21.1 0.00	309 151 20.8 0.10	287 186 20.3 0.16	266 220 19.6 0.13	248 248 18.0 0.18	334 135 21.3 0.00	319 161 21.0 0.21	297 202 20.5 0.16	275 242 20.1 0.15	261 261 19.9 0.26	341 141 21.2 0.20	327 216 20.7 0.17	305 260 20.3 0.16	283 273 20.1 0.33	
95	TC SHC kW BF	298 119 23.1 0.00	286 136 22.8 0.00	265 166 22.5 0.15	244 193 22.3 0.12	224 217 22.0 0.12	312 124 23.4 0.00	300 147 23.1 0.24	278 182 22.8 0.15	257 216 22.5 0.13	241 241 22.2 0.20	321 131 23.6 0.13	309 157 23.4 0.20	288 198 22.6 0.16	266 236 22.4 0.28	254 254 23.8 0.26	328 137 23.5 0.19	316 166 23.1 0.17	295 212 22.7 0.17	273 255 22.6 0.35	
105	TC SHC kW BF	289 116 25.7 0.00	277 133 25.6 0.00	256 162 25.3 0.14	235 188 25.1 0.11	214 208 24.9 0.12	302 121 26.0 0.00	290 144 25.9 0.21	268 178 25.6 0.15	247 211 25.3 0.13	231 228 25.0 0.22	311 128 26.2 0.11	298 153 26.0 0.18	277 193 25.8 0.15	255 231 25.5 0.30	245 245 26.4 0.24	318 134 26.2 0.18	304 163 25.9 0.17	283 208 25.5 0.17	262 249 25.4 0.37	
115	TC SHC kW BF	278 111 28.7 0.00	266 128 28.6 0.09	245 157 28.5 0.13	224 183 28.3 0.11	207 203 28.3 0.16	289 117 29.0 0.00	278 139 28.9 0.19	256 173 28.7 0.14	236 205 28.7 0.13	223 223 28.5 0.24	298 124 29.2 0.26	285 149 29.1 0.17	264 188 29.1 0.15	243 225 28.7 0.33	236 236 29.4 0.22	305 130 29.1 0.17	290 158 28.7 0.16	270 203 28.6 0.18	250 242 247 0.40	

48/50A2,A3,A4,A5025 (25 TONS) (cont)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm															
	10,000					11,250					12,500					
	Evaporator Air — Ewb (F)															
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC kW BF	361 152 19.6 0.28	346 184 19.2 0.20	321 234 18.7 0.18	297 281 18.2 0.19	291 291 18.1 0.38	367 158 19.7 0.25	351 192 19.3 0.21	326 248 18.8 0.19	303 295 18.4 0.21	300 300 18.3 0.43	372 163 19.8 0.25	355 19.8 19.4 0.22	330 201 18.9 0.20	309 261 18.5 0.26	307 305 18.4 0.48
85	TC SHC kW BF	348 148 21.6 0.25	332 179 21.3 0.20	310 230 20.8 0.18	288 275 20.4 0.19	283 283 20.3 0.40	353 153 21.8 0.24	337 188 21.4 0.21	315 244 20.9 0.19	294 288 20.5 0.23	291 291 20.4 0.45	357 159 21.8 0.24	341 197 21.5 0.21	318 257 21.0 0.20	299 296 20.6 0.49	
95	TC SHC kW BF	335 144 23.9 0.24	321 175 23.6 0.19	300 226 23.2 0.18	278 270 22.8 0.19	275 275 22.7 0.41	340 150 24.0 0.23	325 184 23.7 0.19	304 240 23.3 0.24	284 281 22.9 0.46	283 155 22.9 0.23	343 195 24.1 0.23	330 192 23.8 0.21	308 253 23.4 0.20	290 290 23.0 0.50	
105	TC SHC kW BF	323 140 26.6 0.22	310 172 26.3 0.18	288 222 26.0 0.22	268 260 25.5 0.43	266 266 25.5 0.22	328 146 26.7 0.20	314 180 26.4 0.19	292 235 26.0 0.27	275 268 25.6 0.48	274 274 25.7 0.22	331 151 26.8 0.21	318 188 26.5 0.21	296 248 26.1 0.20	280 280 25.8 0.52	
115	TC SHC kW BF	309 136 29.6 0.21	297 167 29.4 0.19	275 217 29.0 0.18	256 254 28.7 0.23	255 255 28.7 0.46	313 142 29.7 0.21	300 175 29.4 0.20	278 230 29.1 0.19	263 261 28.8 0.30	263 147 28.8 0.50	317 184 29.8 0.21	303 184 29.5 0.21	281 243 29.1 0.20	269 269 28.9 0.54	

See legend on page 43.


COOLING CAPACITIES (cont)
48/50A2,A3,A4,A5027 (27 TONS)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm																				
	5,500					6,875					8,250					9,625					
	Evaporator Air — Ewb (F)																				
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC KW BF	339 138 19.0 0.00	324 154 18.7 0.00	297 186 18.3 0.15	273 215 17.9 0.11	251 242 17.6 0.11	356 145 19.4 0.00	340 168 19.0 0.07	312 204 18.5 0.14	288 240 18.1 0.12	268 265 17.8 0.19	368 153 19.6 0.11	351 180 19.3 0.19	323 222 18.7 0.15	298 263 18.3 0.13	283 283 18.1 0.26	377 161 19.8 0.27	359 190 19.4 0.18	331 238 18.9 0.16	305 284 18.5 0.15	296 296 18.3 0.34
85	TC SHC KW BF	329 134 21.1 0.00	313 151 20.8 0.09	289 182 20.4 0.13	265 211 20.1 0.11	243 237 19.8 0.11	344 141 21.5 0.00	329 164 21.2 0.21	303 201 20.7 0.14	279 236 20.4 0.12	262 262 20.1 0.20	355 149 21.7 0.09	339 175 21.4 0.18	313 218 20.9 0.14	289 262 20.5 0.28	276 276 21.9 0.24	364 156 21.5 0.17	346 186 21.1 0.15	321 234 21.1 0.16	295 279 20.6 0.36	288 288 20.5 0.36
95	TC SHC KW BF	319 130 23.5 0.00	305 148 23.3 0.08	280 178 23.0 0.13	256 207 22.7 0.10	235 230 22.4 0.13	333 137 23.8 0.13	319 160 23.6 0.19	293 196 23.3 0.13	270 234 22.6 0.12	254 254 24.1 0.22	344 145 23.8 0.08	328 172 23.4 0.17	303 214 23.1 0.14	278 254 22.9 0.13	268 268 24.3 0.30	352 153 24.0 0.23	335 182 24.0 0.17	309 230 23.6 0.15	285 273 23.1 0.16	280 280 23.1 0.37
105	TC SHC KW BF	309 125 26.3 0.00	294 144 26.1 0.07	269 173 25.9 0.12	246 202 25.7 0.10	228 133 25.4 0.16	322 156 26.6 0.10	307 192 26.4 0.17	282 192 26.2 0.13	258 226 25.7 0.12	244 244 25.7 0.24	332 142 26.9 0.25	316 168 26.7 0.16	290 209 26.3 0.14	266 248 26.0 0.33	258 258 25.8 0.20	339 149 27.0 0.20	323 178 26.8 0.16	297 225 26.4 0.15	274 270 26.0 0.40	270 270 26.0 0.40
115	TC SHC KW BF	296 120 29.3 0.00	281 139 29.3 0.20	257 168 29.4 0.12	235 196 29.5 0.10	220 218 29.3 0.19	309 129 29.7 0.08	293 151 29.6 0.15	269 186 29.5 0.12	246 221 29.4 0.27	235 235 29.4 0.21	317 137 29.5 0.15	302 162 29.6 0.13	277 203 29.5 0.14	254 242 29.4 0.35	249 249 29.4 0.19	324 144 30.2 0.16	308 172 30.2 0.15	282 219 29.7 0.16	262 254 29.4 0.20	259 259 29.4 0.42

48/50A2,A3,A4,A5027 (27 TONS) (cont)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm																				
	11,000					12,375					13,750										
	Evaporator Air — Ewb (F)																				
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC KW BF	384 168 19.9 0.23	365 201 19.6 0.18	337 254 19.0 0.17	311 301 18.6 0.18	307 307 18.5 0.40	389 174 20.0 0.22	371 210 19.7 0.19	342 269 19.1 0.18	319 309 18.7 0.24	316 316 18.7 0.45	394 181 20.1 0.22	375 219 19.8 0.20	346 284 19.2 0.19	324 324 18.8 0.27	324 324 18.8 0.49					
85	TC SHC KW BF	370 163 22.0 0.22	353 196 21.7 0.18	326 250 21.2 0.17	302 294 20.8 0.19	299 299 20.7 0.41	375 170 22.1 0.21	358 206 21.8 0.19	331 265 21.3 0.18	309 301 20.9 0.26	307 307 20.8 0.46	307 176 22.2 0.21	380 215 21.9 0.20	362 279 21.3 0.19	334 315 21.0 0.29	315 315 21.0 0.51					
95	TC SHC KW BF	358 160 24.4 0.21	342 192 24.1 0.18	315 245 23.7 0.16	292 284 23.3 0.22	290 290 23.2 0.43	363 166 24.5 0.20	346 202 24.2 0.19	319 260 23.8 0.18	299 295 23.4 0.27	298 173 24.7 0.48	368 173 24.7 0.21	350 211 24.3 0.19	322 275 23.8 0.19	306 306 23.5 0.31	305 305 23.5 0.52					
105	TC SHC KW BF	345 155 27.2 0.20	328 188 26.9 0.17	301 240 26.5 0.16	281 275 26.1 0.24	280 280 26.1 0.45	350 162 27.4 0.20	332 197 27.1 0.18	305 255 26.6 0.28	288 285 26.3 0.50	288 168 27.5 0.20	353 168 27.1 0.19	336 206 26.6 0.20	308 269 26.4 0.19	295 295 26.4 0.35	295 295 26.4 0.54					
115	TC SHC KW BF	329 151 30.4 0.19	312 183 30.0 0.16	287 235 29.7 0.16	268 268 29.5 0.47	268 157 29.5 0.19	333 192 30.2 0.18	316 250 29.7 0.17	290 250 29.5 0.31	276 276 29.5 0.52	276 163 29.5 0.19	336 201 30.7 0.19	320 263 30.3 0.19	293 283 29.8 0.19	283 283 29.6 0.37	282 282 29.6 0.56					

See legend on page 43.

Performance data (cont)



COOLING CAPACITIES (cont)

48/50A2,A3,A4,A5030 (30 TONS)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm																				
	6,000					7,500					9,000					10,500					
	Evaporator Air — Ewb (F)																				
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC kW BF	370 151 20.2 0.00	354 169 19.9 0.00	325 203 19.5 0.12	298 234 19.2 0.10	272 263 18.8 0.10	389 157 20.6 0.00	371 184 20.3 0.19	342 224 19.8 0.12	314 262 19.4 0.11	293 287 18.9 0.20	401 167 20.9 0.13	384 196 20.6 0.16	354 243 20.1 0.13	325 288 19.6 0.12	309 309 19.3 0.13	411 176 21.1 0.22	392 208 20.7 0.16	362 261 20.2 0.14	334 311 19.8 0.14	323 323 19.5 0.34
85	TC SHC kW BF	362 147 22.8 0.00	345 166 22.5 0.00	316 199 22.1 0.12	288 230 21.8 0.09	263 257 21.4 0.10	379 154 23.2 0.00	361 180 22.9 0.17	332 219 22.5 0.12	303 257 22.1 0.11	276 276 21.6 0.13	391 164 23.5 0.26	373 193 23.2 0.16	343 238 22.7 0.13	314 282 22.3 0.12	300 300 22.0 0.28	400 172 23.4 0.21	381 204 22.9 0.16	351 256 22.4 0.14	322 305 22.2 0.35	
95	TC SHC kW BF	351 143 25.7 0.00	334 162 25.5 0.10	305 194 25.1 0.11	278 225 25.1 0.09	255 250 24.7 0.12	367 151 26.1 0.00	349 176 25.9 0.16	320 214 25.5 0.12	292 252 25.3 0.10	274 274 25.0 0.21	379 160 26.4 0.23	360 188 26.2 0.15	330 233 25.8 0.13	302 277 25.4 0.12	291 291 26.7 0.30	387 168 26.3 0.19	368 200 25.9 0.15	338 251 25.4 0.14	310 298 25.3 0.37	
105	TC SHC kW BF	339 138 29.0 0.00	322 157 28.9 0.20	293 189 29.0 0.11	267 219 29.3 0.09	247 242 28.7 0.15	353 147 0.13	336 171 0.15	307 209 0.15	280 246 0.11	265 265 0.24	364 183 29.8 0.20	346 183 29.5 0.14	317 228 29.4 0.12	290 271 29.3 0.33	372 281 30.1 0.18	353 163 29.6 0.14	324 246 29.5 0.16	297 291 29.2 0.40		
115	TC SHC kW BF	326 132 32.8 0.00	309 153 33.1 0.16	281 184 33.8 0.10	256 214 34.3 0.08	237 235 34.3 0.16	339 142 0.24	322 166 0.13	294 204 0.11	268 241 0.10	256 256 0.26	349 150 33.8 0.18	331 178 33.5 0.13	303 222 33.8 0.12	277 264 34.0 0.35	356 158 34.1 0.17	338 190 34.0 0.14	309 240 33.8 0.13	286 280 33.5 0.19	283 283 33.7 0.42	

48/50A2,A3,A4,A5030 (30 TONS) (cont)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm															
	12,000					13,500					15,000					
	Evaporator Air — Ewb (F)															
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC kW BF	419 183 21.3 0.20	399 219 20.9 0.16	369 278 20.4 0.15	340 330 19.9 0.17	336 336 19.7 0.40	426 191 21.4 0.20	406 229 21.0 0.18	374 294 20.5 0.16	347 343 19.9 0.22	346 346 19.9 0.45	430 198 21.5 0.20	411 240 21.1 0.18	379 310 20.6 0.17	356 351 20.1 0.28	354 354 20.1 0.49
85	TC SHC kW BF	408 180 23.9 0.19	388 215 23.5 0.16	357 273 23.0 0.15	329 322 22.5 0.19	326 326 22.4 0.41	414 187 24.0 0.19	394 226 23.7 0.17	362 290 23.1 0.16	338 331 22.6 0.26	336 336 22.6 0.46	418 194 24.1 0.19	398 236 23.8 0.18	366 305 23.2 0.17	344 337 22.7 0.28	345 345 22.8 0.50
95	TC SHC kW BF	394 175 26.9 0.18	375 211 26.6 0.16	344 268 26.0 0.15	318 312 25.4 0.21	316 316 25.5 0.43	399 182 27.0 0.18	380 221 26.7 0.17	348 284 26.1 0.16	328 320 25.6 0.28	326 326 25.6 0.48	403 189 27.2 0.19	384 231 26.8 0.18	352 300 26.2 0.17	334 334 25.8 0.31	334 334 25.8 0.52
105	TC SHC kW BF	378 170 30.3 0.17	359 205 30.0 0.16	329 262 29.6 0.15	307 301 29.0 0.24	305 305 29.2 0.45	383 177 30.5 0.18	364 215 30.1 0.17	334 278 29.6 0.17	314 314 29.3 0.28	314 314 29.3 0.50	387 184 30.7 0.18	367 225 30.2 0.18	337 294 29.7 0.17	322 322 29.4 0.34	322 322 29.3 0.54
115	TC SHC kW BF	361 165 34.4 0.17	343 200 34.2 0.16	314 257 33.9 0.15	295 290 33.4 0.26	293 293 33.6 0.47	366 172 34.7 0.17	347 210 34.3 0.17	318 272 33.9 0.16	302 302 33.6 0.31	302 302 33.6 0.52	369 179 34.9 0.18	351 220 34.4 0.18	321 288 34.4 0.36	310 310 33.7 0.56	309 309 33.7 0.56

See legend on page 43.



COOLING CAPACITIES (cont)

48/50A2,A3,A4,A5035 (35 TONS)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm																				
	7,000					8,750					10,500					12,250					
	Evaporator Air — Ewb (F)																				
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC KW BF	442 179 24.8 0.00	423 206 24.3 0.00	394 250 23.6 0.00	366 291 23.2 0.01	338 329 23.1 0.02	459 189 25.3 0.00	440 222 24.7 0.00	410 275 24.0 0.01	383 327 23.2 0.10	363 199 25.6 0.01	471 237 25.1 0.01	452 299 24.3 0.01	421 359 23.6 0.02	395 383 23.4 0.21	383 383 23.4 0.21	479 208 25.8 0.01	460 252 25.3 0.02	430 323 24.5 0.02	403 389 23.8 0.04	399 399 23.7 0.29
85	TC SHC KW BF	428 174 27.8 0.00	412 201 27.3 0.01	384 245 26.9 0.02	354 285 26.7 0.02	326 322 27.0 0.00	444 184 28.2 0.00	426 217 27.7 0.00	399 270 27.1 0.01	372 321 26.8 0.13	352 352 26.7 0.01	455 193 28.5 0.01	437 231 27.3 0.01	410 294 26.9 0.03	384 354 26.8 0.23	374 374 28.2 0.02	463 203 27.5 0.02	444 246 27.0 0.02	417 318 27.5 0.02	393 384 26.9 0.31	389 389 26.9 0.31
95	TC SHC KW BF	417 170 31.3 0.00	400 197 31.1 0.01	371 239 30.8 0.01	341 279 31.3 0.03	312 312 31.3 0.03	432 179 31.6 0.00	415 212 30.9 0.01	387 265 30.8 0.01	358 314 31.2 0.16	341 341 31.9 0.01	441 188 31.4 0.01	424 227 31.0 0.02	397 289 30.8 0.03	370 348 30.7 0.25	362 362 30.7 0.02	447 197 32.1 0.02	431 241 31.6 0.02	405 313 31.0 0.02	380 376 30.8 0.05	378 378 30.8 0.33
105	TC SHC KW BF	403 165 35.5 0.00	385 191 35.4 0.01	356 232 36.0 0.01	325 271 37.7 0.12	308 308 39.3 0.00	417 174 35.7 0.01	400 207 35.5 0.01	372 258 35.5 0.02	343 307 37.4 0.19	328 328 35.9 0.01	427 184 35.5 0.01	410 222 35.3 0.02	381 283 35.8 0.03	355 340 36.1 0.28	349 349 36.0 0.02	433 193 35.6 0.02	417 236 35.5 0.02	389 307 35.5 0.07	365 365 35.5 0.35	
115	TC SHC KW BF	380 156 39.4 0.00	364 182 39.7 0.01	337 224 40.9 —	— — —	— — —	391 165 39.5 0.00	376 198 39.5 0.01	351 250 40.1 —	— — —	— — —	398 174 39.5 0.01	384 213 39.4 0.01	360 274 39.8 0.02	335 330 40.9 0.04	332 332 41.1 0.31	403 183 39.6 0.01	389 227 39.4 0.02	366 298 39.6 0.12	347 347 40.2 0.39	347 347 40.2 0.39

48/50A2,A3,A4,A5035 (35 TONS) (cont)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm														
	14,000				15,750				17,500						
	Evaporator Air — Ewb (F)														
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57
75	TC SHC KW BF	485 217 26.0 0.02	466 347 25.5 0.02	436 411 24.7 0.03	412 411 24.0 0.09	490 226 24.0 0.36	471 281 26.1 0.03	442 369 25.6 0.04	422 422 24.8 0.17	422 422 24.3 0.42	— — —	475 295 25.7 0.04	446 391 24.9 0.05	432 432 24.5 0.23	432 432 24.5 0.46
85	TC SHC KW BF	469 212 29.0 0.02	451 261 28.4 0.02	422 341 27.6 0.03	402 402 27.1 0.11	— — —	455 275 28.6 0.03	426 363 27.7 0.04	411 411 27.3 0.19	411 411 27.3 0.43	— — —	459 290 28.7 0.04	431 384 27.8 0.05	419 419 27.5 0.26	419 419 27.5 0.48
95	TC SHC KW BF	— — — —	436 256 31.7 0.02	410 336 31.1 0.03	391 391 30.9 0.13	— — —	439 270 31.8 0.03	414 358 31.2 0.04	401 401 31.0 0.21	400 400 31.0 0.45	— — —	443 284 31.9 0.04	418 379 31.3 0.06	409 409 31.1 0.27	408 408 31.1 0.49
105	TC SHC KW BF	— — — —	421 251 35.7 0.03	394 330 35.3 0.03	377 377 35.3 0.16	— — —	425 265 35.7 0.03	399 352 35.3 0.04	387 387 35.2 0.24	386 386 35.2 0.47	— — —	428 279 35.8 0.04	403 373 35.3 0.06	395 395 35.3 0.30	395 395 35.3 0.51
115	TC SHC KW BF	— — — —	393 242 39.4 0.02	371 321 39.4 0.03	358 358 39.7 0.21	— — —	396 256 39.5 0.03	375 342 39.4 0.05	367 367 39.5 0.28	367 367 39.5 0.49	— — —	399 270 39.5 0.04	378 362 39.3 0.07	374 374 39.4 0.34	374 374 39.4 0.54

LEGEND

BF — Bypass Factor
 Edb — Entering Dry Bulb
 Ewb — Entering Wet Bulb
 kW — Compressor Motor Power Input
 SHC — Sensible Heat Capacity (1000 Btuh)
 TC — Total Capacity (1000 Btuh) Gross
 VAV — Variable Air Volume

Boldface — VAV Units Only

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{edb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{ewb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{ewb})

$$h_{ewb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.

Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.

Interpolation is permissible.
Correction Factor = 1.10 x (1 - BF) x (edb - 80).

4. Cooling capacities are gross and do not include deduction for indoor fan motor heat.
5. Variable air volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.

BF	ENTERING AIR DRY-BULB TEMP (F)					
	79	78	77	76	75	under 75
81	82	83	84	85	over 85	Correction Factor
.05	1.04	2.07	3.11	4.14	4.18	Use formula shown below.
.10	.98	1.96	2.94	3.92	4.91	
.20	.87	1.74	2.62	3.49	4.36	

Performance data (cont)



COOLING CAPACITIES (cont)

48/50A2,A3,A4,A5040 (40 TONS)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm																				
	8,000					10,000					12,000					14,000					
	Evaporator Air — Ewb (F)																				
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC kW BF	517 235 25.9 0.00	495 284 25.5 0.06	459 330 25.0 0.04	423 371 24.7 0.05	388 216 24.3 0.00	542 253 26.3 0.10	518 313 25.9 0.06	482 370 25.4 0.05	445 408 25.0 0.13	415 270 24.5 0.15	558 228 26.6 0.08	533 270 26.2 0.06	498 341 25.6 0.06	461 408 24.8 0.06	439 439 24.8 0.20	570 287 26.4 0.11	546 368 25.8 0.08	509 441 25.3 0.07	473 441 25.1 0.08	460 460 25.1 0.29
85	TC SHC kW BF	503 199 29.2 0.00	481 230 28.8 0.13	446 278 28.5 0.06	410 325 28.0 0.03	376 364 27.7 0.05	525 210 29.6 0.00	504 248 29.3 0.09	467 307 28.8 0.06	431 363 28.4 0.05	405 397 27.9 0.16	541 222 29.9 0.13	519 265 29.5 0.08	483 335 29.0 0.06	447 400 28.6 0.23	427 427 29.7 0.10	552 233 29.2 0.08	531 282 28.7 0.07	494 362 28.5 0.08	458 434 28.5 0.31	448 448 28.5 0.31
95	TC SHC kW BF	489 193 33.0 0.00	467 224 32.6 0.10	431 272 32.3 0.05	395 317 32.0 0.04	363 356 31.7 0.06	510 205 33.4 0.10	488 242 33.1 0.08	452 301 32.6 0.05	416 356 32.3 0.15	390 390 31.8 0.11	525 217 33.7 0.08	503 260 33.4 0.06	466 328 32.9 0.06	429 392 32.5 0.25	414 414 32.1 0.10	536 228 33.5 0.08	514 276 33.0 0.07	477 355 32.6 0.09	442 425 32.4 0.33	434 434 32.4 0.33
105	TC SHC kW BF	473 187 37.2 0.00	451 218 36.8 0.08	414 264 36.8 0.05	381 311 36.2 0.03	350 346 36.5 0.07	492 200 37.6 0.15	470 236 37.4 0.08	434 293 37.0 0.05	399 348 37.0 0.18	378 378 36.6 0.10	506 211 37.9 0.07	484 253 37.6 0.06	447 321 37.2 0.07	412 384 37.1 0.27	401 401 36.7 0.09	516 221 37.8 0.08	493 269 37.4 0.07	457 347 37.0 0.10	423 419 36.8 0.35	419 419 36.8 0.35
115	TC SHC kW BF	453 180 42.0 0.00	432 211 41.4 0.07	397 257 42.2 0.05	364 302 42.1 0.03	337 332 41.8 0.11	471 193 42.5 0.12	450 228 42.4 0.07	415 286 42.4 0.05	381 340 42.4 0.21	364 364 42.2 0.09	483 204 42.6 0.07	462 245 42.6 0.06	427 313 42.5 0.07	394 375 42.5 0.30	386 386 42.2 0.08	492 214 42.8 0.07	472 262 42.8 0.06	436 339 42.7 0.06	405 402 42.3 0.37	403 403 42.2 0.37
120	TC SHC kW BF	442 177 44.6 0.00	422 207 44.8 0.07	389 255 44.1 0.03	354 297 45.8 0.04	330 327 45.1 0.12	460 189 45.2 0.11	440 225 45.3 0.07	405 281 45.3 0.05	372 336 45.2 0.04	356 356 45.5 0.23	473 200 45.5 0.09	451 241 45.4 0.09	417 309 45.4 0.07	384 369 45.4 0.06	378 378 45.6 0.32	481 211 45.6 0.08	460 258 45.6 0.07	425 335 45.2 0.06	395 395 45.2 0.39	395 395 45.2 0.39

48/50A2,A3,A4,A5040 (40 TONS) (cont)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm																
	16,000					18,000					20,000						
	Evaporator Air — Ewb (F)																
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57		
75	TC SHC kW BF	579 249 26.9 0.10	555 304 26.5 0.09	519 394 25.9 0.07	483 470 25.4 0.11	477 477 25.3 0.11	587 259 27.1 0.09	563 320 26.6 0.08	526 419 26.1 0.15	491 491 25.5 0.41	491 269 25.5 0.11	593 335 27.2 0.10	569 335 26.7 0.09	532 443 26.1 0.23	504 499 25.7 0.45	503 503 25.7 0.45	
85	TC SHC kW BF	560 243 30.2 0.10	539 298 29.9 0.09	503 388 29.3 0.07	468 461 28.8 0.12	464 464 28.7 0.37	568 253 0.11	546 314 30.4 0.09	510 412 29.4 0.09	479 476 28.9 0.18	574 478 28.9 0.42	552 330 28.1 0.11	515 437 29.1 0.09	491 486 29.1 0.25	489 489 29.1 0.47	489 489 29.1 0.47	
95	TC SHC kW BF	543 238 34.0 0.09	522 292 33.7 0.08	485 380 33.2 0.08	451 449 32.6 0.08	450 450 32.6 0.13	551 248 0.10	528 308 0.09	492 458 0.08	465 463 0.22	463 258 0.44	556 324 0.11	534 324 0.09	497 427 0.09	477 465 0.29	475 475 0.48	475 475 0.48
105	TC SHC kW BF	523 232 38.2 0.09	501 285 38.0 0.08	464 373 37.5 0.07	435 432 36.9 0.16	434 434 37.0 0.41	529 241 0.10	507 397 0.09	471 440 0.08	450 447 0.25	447 251 0.46	534 38.5 0.10	512 38.2 0.09	475 420 0.10	459 454 0.30	458 458 0.50	458 458 0.50
115	TC SHC kW BF	500 224 43.1 0.09	479 278 42.9 0.08	443 365 42.7 0.07	420 412 42.0 0.21	417 417 42.0 0.43	505 234 0.10	484 294 0.09	449 389 0.09	434 434 0.31	429 429 0.48	510 244 0.10	489 309 0.09	453 411 0.10	440 440 0.32	439 439 0.52	439 439 0.52
120	TC SHC kW BF	488 220 45.9 0.09	467 274 45.7 0.08	432 361 45.5 0.07	412 404 44.4 0.23	408 408 45.2 0.45	493 230 0.10	473 290 0.09	437 384 0.09	425 425 0.33	420 420 0.49	497 420 0.10	477 306 0.09	442 406 0.10	430 430 0.33	430 430 0.53	430 430 0.53

See legend on page 43.



COOLING CAPACITIES (cont)

48/50A2,A3,A4,A5050 (50 TONS)

Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm														
		10,000					12,500					15,000				
		Evaporator Air — Ewb (F)														
75	TC SHC kW BF	632 254 30.8 0.00	601 292 30.4 0.07	556 353 29.8 0.03	512 411 29.2 0.01	471 463 29.0 0.03	663 271 31.3 0.10	630 316 30.8 0.05	584 391 30.1 0.03	541 463 29.7 0.02	508 508 29.2 0.13	682 286 31.5 0.08	651 339 31.1 0.05	604 428 30.4 0.03	560 511 30.0 0.04	539 539 29.6 0.23
85	TC SHC kW BF	612 246 34.8 0.00	586 286 34.4 0.07	540 347 33.8 0.02	497 403 33.8 0.02	457 453 33.2 0.04	640 263 35.3 0.13	614 310 34.9 0.05	568 384 34.4 0.03	523 454 34.1 0.15	495 495 33.6 0.07	659 278 35.5 0.04	633 333 35.2 0.03	587 421 34.7 0.03	542 502 34.3 0.04	526 526 33.9 0.25
95	TC SHC kW BF	597 239 39.5 0.00	566 279 38.9 0.05	523 338 38.9 0.03	480 396 38.4 0.01	441 441 38.7 0.05	623 257 39.9 0.10	595 303 39.7 0.04	549 376 39.3 0.03	504 445 39.5 0.02	480 480 38.6 0.18	641 272 40.3 0.07	613 326 40.0 0.04	567 412 39.6 0.03	522 493 39.5 0.04	510 510 38.8 0.27
105	TC SHC kW BF	576 233 44.9 0.00	549 271 44.9 0.05	503 329 45.4 0.03	461 387 45.0 0.01	426 426 45.7 0.09	600 249 45.4 0.08	573 295 45.5 0.04	527 367 45.7 0.03	483 435 46.5 0.03	463 463 45.5 0.20	617 264 45.9 0.06	590 317 45.9 0.04	544 403 46.2 0.03	500 482 46.1 0.04	492 492 45.4 0.30
115	TC SHC kW BF	553 226 51.9 0.00	526 262 52.2 0.04	480 319 53.4 0.02	436 374 55.1 0.01	408 408 54.4 0.12	576 241 52.5 0.07	549 286 53.0 0.04	503 357 53.8 0.03	458 423 55.1 0.03	444 444 53.9 0.24	592 256 53.1 0.05	564 308 53.4 0.04	518 393 54.5 0.03	476 469 54.0 0.05	472 472 53.6 0.32
120	TC SHC kW BF	541 221 56.0 0.13	513 257 56.9 0.04	467 314 58.0 0.02	— — — —	— — — —	563 237 57.0 0.06	535 281 57.3 0.04	489 351 58.9 0.03	— — — —	— — — —	577 251 57.2 0.05	550 303 57.7 0.04	504 387 59.2 0.03	463 461 58.5 0.06	462 462 58.3 0.34

48/50A2,A3,A4,A5050 (50 TONS) (cont)

Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm									
		17,500					20,000				
		Evaporator Air — Ewb (F)									
75	TC SHC kW BF	— — — —	— — — —	619 463 30.6 0.04	575 555 30.1 0.05	565 565 29.9 0.31	— — — —	— — — —	631 498 30.8 0.04	587 583 30.2 0.11	585 585 30.2 0.37
85	TC SHC kW BF	— — — —	— — — —	602 456 35.0 0.04	557 546 34.4 0.06	551 551 34.2 0.32	— — — —	— — — —	613 491 35.1 0.04	573 568 34.4 0.13	571 571 34.4 0.39
95	TC SHC kW BF	— — — —	— — — —	580 447 39.9 0.04	537 533 39.2 0.07	534 534 39.1 0.35	— — — —	— — — —	590 482 40.1 0.04	557 550 39.3 0.16	554 554 39.3 0.41
105	TC SHC kW BF	— — — —	— — — —	557 439 46.4 0.03	517 514 45.4 0.10	516 516 45.5 0.37	— — — —	— — — —	566 472 46.9 0.04	538 530 45.3 0.20	535 535 45.5 0.43
115	TC SHC kW BF	— — — —	— — — —	530 428 54.5 0.03	497 492 53.0 0.14	495 495 53.3 0.39	— — — —	— — — —	538 462 55.0 0.04	514 514 53.2 0.21	513 513 53.2 0.45
120	TC SHC kW BF	— — — —	— — — —	514 422 54.5 0.04	485 482 53.0 0.16	484 484 53.3 0.41	— — — —	— — — —	523 456 59.7 0.04	502 502 57.8 0.23	501 501 57.8 0.46

See legend on page 43.

Performance data (cont)



COOLING CAPACITIES (cont)

48/50A2,A3,A4,A5060 (60 TONS)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm															
	12,000					15,000					18,000					
	Evaporator Air — Ewb (F)															
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC KW BF	738 293 40.0 0.00	705 334 39.2 0.00	653 406 38.1 0.10	603 474 37.1 0.08	554 533 36.3 0.08	773 305 40.7 0.00	736 361 39.9 0.15	684 447 38.7 0.10	633 530 37.7 0.09	592 578 36.9 0.19	796 324 41.2 0.23	759 386 40.4 0.13	706 486 39.2 0.11	655 582 38.2 0.10	622 622 37.5 0.25
85	TC SHC KW BF	716 284 44.4 0.00	686 327 43.7 0.12	635 398 42.7 0.10	585 465 41.7 0.07	537 522 40.9 0.09	748 298 45.1 0.00	715 353 44.4 0.14	664 439 43.3 0.10	615 521 42.3 0.09	579 562 41.5 0.22	768 315 45.6 0.20	737 378 44.9 0.12	685 478 43.7 0.11	635 572 42.7 0.10	607 607 42.1 0.27
95	TC SHC KW BF	695 276 49.5 0.00	666 320 48.8 0.19	615 389 47.8 0.09	566 456 46.9 0.07	519 510 46.1 0.10	725 292 50.2 0.00	694 346 49.5 0.13	643 430 48.4 0.09	593 511 47.5 0.09	557 557 46.8 0.20	745 308 50.7 0.18	713 370 50.0 0.12	662 469 48.8 0.10	613 561 47.9 0.10	590 590 47.4 0.29
105	TC SHC KW BF	673 264 55.3 0.00	643 311 54.6 0.15	593 380 53.7 0.09	545 446 52.8 0.07	502 493 51.8 0.13	699 283 55.9 0.24	669 337 55.3 0.12	619 420 54.2 0.09	570 500 53.3 0.08	539 539 52.6 0.22	718 300 56.4 0.16	687 361 55.7 0.12	638 460 54.7 0.10	587 549 53.7 0.31	570 570 53.3 0.31
115	TC SHC KW BF	647 255 61.7 0.00	617 301 61.1 0.13	567 369 60.3 0.08	521 434 60.0 0.07	484 474 59.2 0.17	670 274 62.3 0.18	641 327 61.7 0.11	592 410 60.9 0.09	544 488 60.4 0.08	519 519 59.9 0.25	687 290 62.8 0.14	657 350 62.2 0.11	609 448 61.3 0.10	561 536 60.6 0.11	549 549 60.2 0.34
120	TC SHC KW BF	632 251 65.2 0.00	603 296 64.8 0.12	554 364 64.3 0.08	508 428 64.1 0.07	471 461 63.3 0.17	654 269 65.8 0.17	626 322 65.5 0.17	578 404 64.9 0.10	531 482 64.5 0.09	509 509 64.0 0.09	670 285 66.4 0.09	641 345 65.8 0.11	594 443 65.2 0.10	547 528 64.7 0.12	538 538 64.4 0.35

48/50A2,A3,A4,A5060 (60 TONS) (cont)

Temp (F) Air Entering Condenser (Edb)	Evaporator Air Quantity — Cfm															
	21,000					24,000					27,000					
	Evaporator Air — Ewb (F)															
	75	72	67	62	57	75	72	67	62	57	75	72	67	62	57	
75	TC SHC KW BF	813 340 41.6 0.18	776 409 40.7 0.13	722 523 39.5 0.11	671 627 38.5 0.12	651 651 38.1 0.33	826 432 41.9 0.16	789 560 39.8 0.12	735 665 38.7 0.16	683 674 38.5 0.39	674 674 42.2 0.16	837 369 41.3 0.14	800 369 40.1 0.13	745 594 39.0 0.21	695 689 38.9 0.44	693 693 38.9 0.44
85	TC SHC KW BF	784 331 46.0 0.16	752 401 45.2 0.13	700 515 44.1 0.11	650 617 43.0 0.13	634 634 42.7 0.35	796 423 46.3 0.15	764 552 45.5 0.14	713 648 44.3 0.12	662 656 43.2 0.18	656 656 43.1 0.41	806 361 46.5 0.15	774 446 45.8 0.14	723 587 44.6 0.13	678 665 43.6 0.25	675 675 43.5 0.46
95	TC SHC KW BF	759 323 51.1 0.15	728 393 50.4 0.13	678 507 49.2 0.11	627 604 48.2 0.14	616 616 47.9 0.36	770 338 51.4 0.15	739 415 50.6 0.13	689 543 49.5 0.12	640 630 48.4 0.20	638 638 48.3 0.42	780 353 51.6 0.15	748 437 50.9 0.14	698 577 49.7 0.13	659 644 48.8 0.27	656 656 48.7 0.47
105	TC SHC KW BF	731 315 56.8 0.14	701 384 56.1 0.12	651 497 55.0 0.11	602 589 54.0 0.15	596 596 53.8 0.39	742 430 57.1 0.14	711 406 56.4 0.13	662 533 55.3 0.12	620 608 54.2 0.23	616 616 54.2 0.44	750 344 57.3 0.14	720 428 56.6 0.14	670 566 55.5 0.13	637 622 54.6 0.30	634 634 54.6 0.49
115	TC SHC KW BF	699 305 63.2 0.13	670 373 62.5 0.12	622 485 61.5 0.11	576 568 60.6 0.17	573 573 60.6 0.41	709 320 63.5 0.13	679 396 62.7 0.13	631 521 61.8 0.12	596 583 60.8 0.26	592 592 60.8 0.47	716 334 61.8 0.14	687 418 61.1 0.13	639 555 62.0 0.13	612 596 61.1 0.33	609 609 61.1 0.51
120	TC SHC KW BF	682 300 66.7 0.13	653 368 66.1 0.12	607 480 65.4 0.11	564 555 64.4 0.19	561 561 64.6 0.42	691 315 67.0 0.13	662 390 66.3 0.13	616 515 65.7 0.12	584 570 64.7 0.28	580 580 64.8 0.48	698 329 67.1 0.13	670 412 66.5 0.13	623 549 65.8 0.13	600 584 65.0 0.35	595 595 65.4 0.52

See legend on page 43.



FAN PERFORMANCE — VERTICAL DISCHARGE UNITS

48A2,A3 020 (20 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	328	0.62	406	0.84	472	1.07	529	1.30	580	1.54	626	1.78	668	2.02	708	2.27	745	2.51	780	2.76
5,000	369	0.97	439	1.19	500	1.43	554	1.69	604	1.95	650	2.21	692	2.48	731	2.74	769	3.01	804	3.28
6,000	415	1.43	477	1.65	533	1.90	584	2.17	631	2.45	676	2.73	717	3.01	756	3.30	793	3.59	828	3.88
7,000	463	2.01	519	2.25	570	2.50	618	2.78	662	3.06	704	3.36	744	3.65	782	3.96	818	4.27	852	4.58
7,500	488	2.36	541	2.60	590	2.86	636	3.13	679	3.42	720	3.72	759	4.02	796	4.33	832	4.65	866	4.96
8,000	513	2.74	564	2.98	611	3.24	655	3.52	697	3.81	737	4.11	775	4.42	811	4.74	846	5.06	879	5.38
9,000	564	3.61	612	3.87	655	4.13	696	4.42	735	4.71	772	5.02	808	5.33	843	5.65	876	5.98	909	6.32
10,000	616	4.64	661	4.91	701	5.18	739	5.47	776	5.77	811	6.08	845	6.40	878	6.72	909	7.06	940	7.40

48A2,A3 020 (20 TONS) (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	814	3.01	845	3.26	876	3.51	905	3.76	934	4.02	961	4.28	987	4.54	1013	4.80	1038	5.06	1062	5.32
5,000	837	3.55	869	3.82	900	4.10	929	4.37	958	4.64	985	4.92	1012	5.20	1038	5.48	1063	5.76	1087	6.04
6,000	861	4.17	893	4.46	923	4.76	953	5.05	981	5.35	1009	5.65	1036	5.94	1062	6.24	1087	6.54	1111	6.84
7,000	885	4.89	917	5.20	947	5.51	977	5.83	1005	6.14	1033	6.46	1059	6.78	1085	7.09	1110	7.41	1135	7.73
7,500	898	5.28	930	5.61	960	5.93	989	6.25	1017	6.58	1045	6.90	1071	7.23	1097	7.56	1122	7.88	1147	8.21
8,000	912	5.71	943	6.04	973	6.37	1002	6.70	1030	7.04	1057	7.37	1083	7.71	1109	8.04	1134	8.38	1159	8.72
9,000	940	6.66	970	7.00	999	7.35	1028	7.69	1055	8.04	1082	8.39	1109	8.75	1134	9.10	1159	9.45	1183	9.81
10,000	971	7.75	1000	8.10	1028	8.46	1056	8.82	1083	9.18	1109	9.54	1135	9.91	1160	10.28	1185	10.65	—	—

48A2,A3 025-030 (25 THRU 30 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,000	374	0.98	443	1.20	503	1.45	558	1.70	607	1.96	653	2.23	695	2.49	734	2.76	771	3.03	806	3.30
6,000	421	1.45	482	1.68	538	1.93	589	2.20	636	2.47	680	2.75	721	3.04	759	3.33	796	3.62	831	3.91
7,000	471	2.04	526	2.28	576	2.54	623	2.81	668	3.10	710	3.39	749	3.69	787	4.00	823	4.31	857	4.62
8,000	522	2.78	572	3.03	619	3.29	662	3.57	704	3.86	743	4.16	781	4.47	817	4.79	851	5.11	885	5.44
9,000	574	3.66	621	3.92	664	4.19	704	4.47	743	4.77	780	5.08	815	5.40	850	5.72	883	6.05	915	6.39
10,000	628	4.71	671	4.97	711	5.25	748	5.54	784	5.84	819	6.15	853	6.47	885	6.81	917	7.14	948	7.49
11,000	682	5.91	722	6.19	759	6.48	795	6.77	828	7.08	861	7.40	893	7.72	924	8.06	954	8.40	983	8.75
12,000	736	7.30	774	7.59	809	7.88	842	8.18	874	8.49	905	8.82	935	9.15	965	9.48	993	9.83	1021	10.19
13,000	791	8.86	827	9.16	860	9.46	891	9.78	922	10.09	951	10.42	979	10.75	1007	11.10	1034	11.45	1061	11.80
14,000	846	10.61	880	10.93	912	11.24	941	11.56	970	11.88	998	12.21	1025	12.56	1052	12.90	1078	13.26	1103	13.62
15,000	902	12.56	934	12.89	964	13.21	992	13.54	1020	13.87	1046	14.21	1072	14.55	1098	14.91	1122	15.26	1147	15.63

48A2,A3 025-030 (25 THRU 30 TONS) (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,000	839	3.57	871	3.84	902	4.11	931	4.39	960	4.66	987	4.94	1014	5.22	1039	5.50	1064	5.78	1089	6.06
6,000	864	4.20	896	4.49	926	4.79	956	5.08	984	5.38	1012	5.68	1038	5.97	1064	6.27	1089	6.57	1114	6.87
7,000	890	4.93	921	5.24	951	5.55	980	5.87	1009	6.18	1036	6.50	1063	6.82	1088	7.14	1114	7.45	1138	7.77
8,000	917	5.76	948	6.09	977	6.42	1006	6.76	1034	7.09	1061	7.43	1088	7.76	1113	8.10	1138	8.43	1163	8.77
9,000	946	6.73	976	7.07	1005	7.42	1033	7.76	1061	8.11	1088	8.46	1114	8.82	1139	9.17	1164	9.52	1188	9.88
10,000	978	7.84	1007	8.19	1035	8.55	1063	8.91	1089	9.27	1116	9.63	1141	10.00	1166	10.37	1191	10.74	—	—
11,000	1012	9.10	1040	9.47	1067	9.83	1094	10.20	1120	10.57	1145	10.95	1170	11.33	1195	11.71	—	—	—	—
12,000	1048	10.54	1075	10.91	1102	11.28	1127	11.66	1152	12.04	1177	12.42	—	—	—	—	—	—	—	—
13,000	1087	12.17																		

Performance data (cont)



FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48A2,A3 035 (35 TONS)

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	534	2.46	584	2.80	630	3.13	674	3.48	716	3.82	756	4.16	793	4.50	829	4.83	863	5.17	896	5.49
8,000	590	3.27	635	3.63	677	3.99	718	4.35	757	4.72	794	5.08	830	5.45	864	5.81	897	6.18	929	6.54
9,000	646	4.23	687	4.62	726	5.00	764	5.38	800	5.76	835	6.15	869	6.54	902	6.93	934	7.31	964	7.70
10,000	704	5.35	742	5.77	778	6.17	812	6.57	846	6.97	879	7.38	911	7.78	942	8.19	972	8.60	1002	9.01
10,500	733	5.97	769	6.40	804	6.82	837	7.23	870	7.64	902	8.05	933	8.46	963	8.88	992	9.30	1021	9.72
11,000	762	6.63	797	7.08	830	7.51	863	7.93	894	8.35	925	8.77	955	9.19	984	9.62	1013	10.04	1041	10.47
12,000	820	8.09	853	8.56	884	9.01	915	9.46	944	9.90	973	10.34	1001	10.78	1029	11.22	1056	11.66	1083	12.10
13,000	879	9.72	909	10.22	939	10.70	968	11.17	996	11.63	1023	12.09	1050	12.55	1076	13.01	1102	13.46	1127	13.92
14,000	938	11.54	967	12.07	995	12.58	1022	13.07	1048	13.55	1074	14.03	1099	14.51	1124	14.98	1149	15.46	1173	15.93
15,000	997	13.56	1024	14.11	1051	14.64	1076	15.16	1102	15.67	1126	16.17	1150	16.66	1174	17.16	1197	17.65	1220	18.14
16,000	1056	15.78	1082	16.35	1107	16.91	1132	17.45	1156	17.98	1179	18.50	1202	19.02	1225	19.53	1247	20.04	1269	20.55
17,000	1116	18.20	1140	18.80	1164	19.38	1188	19.95	1210	20.50	1233	21.05	1255	21.58	1276	22.11	1298	22.64	—	—
17,500	1145	19.49	1170	20.10	1193	20.70	1216	21.28	1238	21.84	1260	22.40	1282	22.94	—	—	—	—	—	—

48A2,A3 035 (35 TONS) (cont)

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	927	5.81	956	6.13	985	6.45	1012	6.76	1039	7.06	1065	7.37	1090	7.67	1114	7.97	1138	8.26	1161	8.56
8,000	960	6.89	989	7.25	1018	7.60	1045	7.94	1072	8.29	1098	8.63	1122	8.96	1147	9.29	1170	9.62	1193	9.95
9,000	994	8.09	1023	8.47	1051	8.85	1078	9.23	1104	9.61	1130	9.98	1155	10.35	1179	10.71	1203	11.08	1226	11.44
10,000	1030	9.42	1058	9.82	1085	10.23	1112	10.64	1138	11.04	1163	11.44	1188	11.84	1212	12.24	1235	12.64	1258	13.03
10,500	1049	10.14	1077	10.56	1103	10.97	1129	11.39	1155	11.81	1180	12.23	1204	12.64	1228	13.05	1251	13.46	1274	13.87
11,000	1069	10.90	1095	11.33	1122	11.76	1147	12.18	1173	12.61	1197	13.04	1221	13.47	1245	13.89	1268	14.31	1291	14.73
12,000	1109	12.55	1135	13.00	1160	13.44	1185	13.89	1209	14.34	1233	14.79	1256	15.24	1279	15.69	—	—	—	—
13,000	1152	14.38	1176	14.84	1200	15.31	1224	15.77	1248	16.24	1271	16.70	1293	17.17	—	—	—	—	—	—
14,000	1196	16.41	1220	16.88	1243	17.36	1266	17.84	1288	18.32	—	—	—	—	—	—	—	—	—	—
15,000	1243	18.63	1265	19.12	1287	19.61	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16,000	1290	21.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48A2,A3040 (40 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	502	2.90	550	3.30	596	3.71	639	4.12	680	4.54	720	4.97	759	5.40	796	5.85	832	6.31	867	6.77
9,000	552	3.81	595	4.24	637	4.67	677	5.11	715	5.55	752	6.00	788	6.45	823	6.92	857	7.39	890	7.87
10,000	602	4.89	642	5.34	680	5.80	717	6.26	752	6.73	787	7.20	821	7.67	854	8.16	886	8.64	917	9.14
11,000	653	6.15	689	6.62	725	7.11	759	7.59	792	8.08	825	8.58	856	9.07	887	9.57	918	10.08	947	10.59
12,000	704	7.60	738	8.09	771	8.60	803	9.11	834	9.63	865	10.14	895	10.66	924	11.18	952	11.71	980	12.24
13,000	756	9.24	788	9.76	818	10.29	848	10.83	878	11.36	906	11.90	935	12.44	962	12.99	989	13.53	1016	14.08
14,000	808	11.10	838	11.64	867	12.19	895	12.74	922	13.30	950	13.87	976	14.43	1002	15.00	1028	15.57	1053	16.14
15,000	861	13.18	888	13.74	915	14.31	942	14.88	968	15.46	994	16.05	1019	16.63	1044	17.22	1068	17.81	1093	18.40
16,000	914	15.49	940	16.06	965	16.65	990	17.24	1015	17.85	1039	18.45	1063	19.06	1087	19.67	1110	20.28	1133	20.89
17,000	967	18.03	991	18.62	1015	19.23	1039	19.85	1062	20.47	1086	21.09	1109	21.72	1131	22.35	1153	22.98	1175	23.61
18,000	1020	20.82	1043	21.43	1066	22.06	1088	22.69	1111	23.33	1133	23.97	1155	24.62	1176	25.27	1197	25.92	1219	26.58
19,000	1073	23.87	1095	24.50	1117	25.14	1138	25.79	1159	26.44	1180	27.11	1201	27.77	1222	28.45	1242	29.12	—	—
20,000	1127	27.24	1147	27.82	1168	28.48	1188	29.15	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND
 Bhp — Brake Horsepower
 NOTES:
 1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.
 2. Conversion — Bhp to watts:
 Watts = $\frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$

3. Variable air volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.



FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

48A2,A3050 (50 TONS)		Available External Static Pressure (in. wg)																		
Airflow (Cfm)	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
10,000	611	5.00	651	5.45	689	5.91	725	6.37	761	6.84	795	7.31	829	7.79	861	8.27	893	8.76	925	9.26
11,000	662	6.27	699	6.75	734	7.23	768	7.72	801	8.21	833	8.71	865	9.20	895	9.71	925	10.21	955	10.73
12,000	714	7.74	748	8.24	780	8.75	812	9.26	843	9.77	873	10.29	903	10.81	932	11.33	960	11.86	988	12.39
13,000	766	9.41	798	9.93	828	10.46	858	11.00	887	11.54	916	12.08	944	12.62	971	13.16	998	13.71	1024	14.26
14,000	819	11.29	848	11.84	877	12.39	905	12.95	932	13.51	959	14.07	986	14.63	1012	15.20	1037	15.77	1062	16.34
15,000	872	13.40	899	13.96	926	14.54	953	15.11	979	15.70	1004	16.28	1029	16.87	1054	17.46	1078	18.05	1102	18.64
16,000	925	15.74	951	16.32	976	16.91	1001	17.51	1026	18.12	1050	18.72	1074	19.33	1097	19.94	1121	20.55	1143	21.17
17,000	979	18.32	1003	18.92	1027	19.53	1051	20.15	1074	20.77	1097	21.40	1120	22.03	1142	22.66	1164	23.29	1186	23.93
18,000	1032	21.15	1055	21.77	1078	22.40	1100	23.04	1123	23.68	1145	24.33	1166	24.98	1188	25.63	1209	26.28	1230	26.93
19,000	1086	24.24	1108	24.88	1129	25.52	1151	26.18	1172	26.84	1193	27.51	1214	28.18	1234	28.85	1255	29.52	1275	30.19
20,000	1140	27.60	1161	28.25	1181	28.92	1202	29.59	1222	30.27	1242	30.95	1262	31.64	1281	32.33	—	—	—	—

Available External Static Pressure (in. wg)																				
Airflow (Cfm)	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	476	4.33	534	5.04	585	5.78	632	6.56	674	7.39	714	8.24	751	9.12	786	10.02	819	10.93	851	11.85
14,000	536	6.19	588	6.96	636	7.74	680	8.56	720	9.41	758	10.30	793	11.21	827	12.15	859	13.11	890	14.08
15,000	566	7.28	617	8.09	662	8.90	704	9.73	744	10.59	781	11.50	816	12.42	849	13.38	881	14.36	911	15.35
16,000	597	8.48	645	9.34	689	10.17	730	11.02	768	11.90	804	12.82	839	13.76	871	14.73	902	15.72	932	16.73
17,000	628	9.80	674	10.71	717	11.58	756	12.45	793	13.34	829	14.27	862	15.23	894	16.21	925	17.21	954	18.24
18,000	659	11.25	704	12.21	745	13.11	783	14.00	819	14.91	853	15.85	886	16.82	918	17.82	948	18.84	977	19.88
19,000	691	12.82	734	13.84	773	14.77	810	15.69	845	16.62	879	17.58	911	18.56	942	19.57	971	20.60	1000	21.65
20,000	723	14.53	764	15.60	802	16.57	838	17.52	872	18.47	905	19.44	936	20.44	966	21.45	995	22.50	1023	23.57
21,000	755	16.37	794	17.49	831	18.51	866	19.49	899	20.47	931	21.46	961	22.47	991	23.50	1019	24.55	1047	25.63
22,000	787	18.35	825	19.53	861	20.59	894	21.60	927	22.61	958	23.62	987	24.64	1016	25.69	1044	26.76	1071	27.84
23,000	819	20.48	856	21.71	890	22.81	923	23.87	954	24.90	985	25.93	1014	26.97	1042	28.03	1069	29.11	1096	30.21
24,000	851	22.75	887	24.04	920	25.19	952	26.28	983	27.34	1012	28.40	1041	29.46	1068	30.54	1095	31.63	1121	32.74
25,000	883	25.17	918	26.52	951	27.72	982	28.84	1011	29.94	1040	31.02	1068	32.11	1095	33.21	1121	34.31	1147	35.44
26,000	916	27.76	950	29.15	981	30.40	1011	31.57	1040	32.70	1068	33.81	1095	34.92	1122	36.04	1147	37.16	1172	38.30
27,000	948	30.49	981	31.95	1012	33.24	1041	34.46	1070	35.62	1097	36.76	1123	37.90	1149	39.04	1174	40.18	1199	41.34

3. Variable air volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.
 2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

Performance data (cont)



FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

50A2,A3 020 (20 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	311	0.54	390	0.71	457	0.88	515	1.05	567	1.21	613	1.38	656	1.55	696	1.71	733	1.88	768	2.04
5,000	347	0.84	417	1.02	480	1.21	536	1.40	587	1.59	633	1.78	676	1.97	716	2.16	753	2.34	788	2.52
6,000	387	1.25	450	1.43	507	1.63	560	1.84	609	2.05	654	2.26	696	2.47	735	2.68	773	2.88	808	3.09
7,000	430	1.77	488	1.96	540	2.17	588	2.38	634	2.61	677	2.83	718	3.06	756	3.29	793	3.51	828	3.74
7,500	452	2.07	507	2.27	557	2.48	604	2.70	648	2.93	690	3.16	730	3.40	768	3.63	804	3.87	839	4.10
8,000	474	2.41	528	2.61	576	2.82	620	3.04	663	3.28	704	3.52	743	3.76	780	4.00	816	4.24	850	4.48
9,000	519	3.19	570	3.39	614	3.60	656	3.83	696	4.07	734	4.32	771	4.57	806	4.82	840	5.08	873	5.34
10,000	565	4.10	613	4.31	655	4.53	694	4.76	731	5.00	767	5.26	802	5.51	835	5.78	868	6.04	900	6.31

50A2,A3 020 (20 TONS) (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	802	2.21	833	2.38	864	2.55	893	2.71	921	2.88	949	3.06	975	3.23	1001	3.40	1026	3.58	1050	3.75
5,000	822	2.71	854	2.89	885	3.08	914	3.26	943	3.45	970	3.64	997	3.82	1023	4.01	1048	4.20	1072	4.39
6,000	842	3.29	874	3.50	905	3.70	934	3.90	963	4.10	991	4.31	1017	4.51	1043	4.71	1069	4.91	1093	5.12
7,000	862	3.96	894	4.19	924	4.41	954	4.63	983	4.85	1010	5.07	1037	5.29	1063	5.51	1089	5.72	1113	5.94
7,500	872	4.33	904	4.56	934	4.79	964	5.02	993	5.25	1020	5.48	1047	5.71	1073	5.94	1099	6.16	1123	6.39
8,000	883	4.73	914	4.97	945	5.21	974	5.45	1003	5.68	1030	5.92	1057	6.16	1083	6.39	1108	6.63	1133	6.87
9,000	905	5.60	936	5.85	966	6.11	995	6.37	1023	6.62	1051	6.88	1077	7.13	1103	7.38	1129	7.64	1153	7.89
10,000	931	6.58	961	6.85	990	7.13	1018	7.40	1046	7.67	1073	7.94	1099	8.21	1124	8.48	1149	8.75	1174	9.02

50A2,A3 025-030 (25 THRU 30 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,000	352	0.85	422	1.03	484	1.22	540	1.42	590	1.61	636	1.79	678	1.98	718	2.17	755	2.35	791	2.54
6,000	394	1.26	456	1.45	513	1.65	565	1.86	613	2.07	658	2.28	700	2.49	739	2.70	776	2.90	811	3.11
7,000	438	1.79	495	1.98	546	2.19	594	2.41	640	2.64	682	2.86	723	3.09	761	3.32	798	3.54	833	3.77
8,000	483	2.44	536	2.64	583	2.85	628	3.08	670	3.32	710	3.55	749	3.80	786	4.04	821	4.28	855	4.52
9,000	530	3.23	579	3.43	623	3.65	664	3.88	704	4.12	741	4.37	778	4.62	813	4.88	847	5.13	880	5.39
10,000	577	4.15	624	4.36	665	4.58	703	4.82	740	5.06	776	5.32	810	5.58	843	5.84	876	6.11	907	6.38
11,000	625	5.22	669	5.44	708	5.67	744	5.91	779	6.16	813	6.41	845	6.68	877	6.95	907	7.22	937	7.50
12,000	674	6.45	715	6.67	753	6.90	787	7.15	820	7.40	851	7.67	882	7.93	912	8.21	941	8.49	970	8.78
13,000	722	7.85	762	8.07	798	8.30	831	8.55	862	8.81	892	9.08	921	9.35	950	9.63	977	9.92	1005	10.21
14,000	771	9.41	810	9.64	844	9.88	875	10.13	905	10.39	934	10.66	962	10.94	989	11.22	1015	11.51	1041	11.81
15,000	821	11.15	857	11.38	890	11.62	921	11.88	949	12.14	977	12.42	1004	12.70	1030	12.99	1055	13.28	1080	13.58

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.

2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$



FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

50A2,A3035 (35 TONS)

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	503	1.96	553	2.22	601	2.47	646	2.72	689	2.97	730	3.22	768	3.46	804	3.70	839	3.94	872	4.17
8,000	553	2.62	599	2.89	643	3.16	684	3.43	724	3.70	763	3.97	799	4.23	834	4.50	868	4.76	901	5.02
9,000	605	3.39	647	3.68	687	3.97	726	4.26	763	4.55	798	4.83	833	5.12	867	5.40	899	5.68	930	5.96
10,000	657	4.29	696	4.61	733	4.91	769	5.22	803	5.52	837	5.82	870	6.12	901	6.42	932	6.72	962	7.02
10,500	684	4.80	721	5.12	757	5.43	791	5.75	825	6.06	857	6.37	889	6.68	920	6.98	950	7.29	979	7.60
11,000	710	5.33	747	5.66	781	5.99	814	6.31	847	6.63	878	6.95	909	7.26	939	7.58	968	7.89	997	8.21
12,000	764	6.52	798	6.86	830	7.21	861	7.54	891	7.88	921	8.21	950	8.54	978	8.87	1006	9.20	1033	9.53
13,000	818	7.85	849	8.21	880	8.57	909	8.92	938	9.27	966	9.62	993	9.97	1020	10.31	1046	10.66	1072	11.00
14,000	872	9.33	901	9.71	930	10.09	958	10.45	985	10.82	1012	11.19	1037	11.55	1063	11.91	1088	12.27	1113	12.63
15,000	926	10.98	954	11.37	981	11.76	1008	12.15	1033	12.53	1059	12.91	1083	13.28	1108	13.66	1131	14.03	1155	14.40
16,000	980	12.79	1007	13.20	1033	13.60	1058	14.00	1082	14.40	1106	14.79	1130	15.18	1153	15.57	1176	15.96	1199	16.35
17,000	1035	14.77	1060	15.19	1085	15.61	1109	16.03	1132	16.44	1155	16.84	1178	17.25	1200	17.65	1222	18.05	1243	18.46
17,500	1062	15.83	1087	16.25	1111	16.68	1134	17.10	1157	17.52	1180	17.94	1202	18.35	1224	18.76	1245	19.17	1266	19.58

50A2,A3035 (35 TONS) (cont)

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	903	4.40	933	4.62	962	4.84	990	5.06	1017	5.27	1043	5.48	1068	5.69	1092	5.89	1116	6.09	1139	6.28
8,000	932	5.27	962	5.52	991	5.77	1019	6.02	1045	6.26	1071	6.50	1097	6.73	1121	6.96	1145	7.19	1168	7.42
9,000	961	6.24	990	6.52	1019	6.79	1047	7.06	1073	7.33	1099	7.59	1125	7.85	1149	8.11	1173	8.37	1196	8.62
10,000	992	7.32	1020	7.62	1048	7.91	1075	8.20	1102	8.49	1127	8.78	1152	9.07	1177	9.35	1201	9.63	1224	9.91
10,500	1008	7.90	1036	8.21	1063	8.51	1090	8.82	1116	9.12	1142	9.41	1166	9.71	1191	10.01	1214	10.30	1238	10.59
11,000	1025	8.52	1052	8.84	1079	9.15	1105	9.46	1131	9.77	1156	10.08	1181	10.39	1205	10.69	1228	10.99	1252	11.29
12,000	1060	9.86	1086	10.19	1112	10.52	1137	10.85	1162	11.17	1187	11.50	1211	11.82	1234	12.15	1257	12.47	1280	12.79
13,000	1097	11.35	1122	11.69	1147	12.03	1171	12.37	1195	12.72	1219	13.06	1242	13.40	1265	13.74	1287	14.08	—	—
14,000	1137	12.98	1161	13.34	1184	13.69	1208	14.05	1231	14.41	1253	14.76	1276	15.12	1298	15.47	—	—	—	—
15,000	1178	14.77	1201	15.15	1223	15.51	1246	15.88	1268	16.25	1289	16.62	—	—	—	—	—	—	—	—
16,000	1221	16.73	1243	17.11	1264	17.50	1286	17.88	—	—	—	—	—	—	—	—	—	—	—	—
17,000	1265	18.85	1286	19.25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,500	1287	19.98	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

50A2,A3040 (40 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	475	2.69	523	3.08	569	3.47	612	3.86	653	4.26	692	4.66	730	5.07	767	5.49	802	5.92	836	6.36
9,000	521	3.53	565	3.94	606	4.36	646	4.78	684	5.20	721	5.63	757	6.06	791	6.49	825	6.94	857	7.39
10,000	568	4.52	608	4.96	646	5.40	683	5.84	719	6.29	753	6.74	787	7.20	819	7.65	851	8.11	882	8.58
11,000	615	5.68	652	6.14	687	6.60	722	7.07	755	7.55	788	8.02	819	8.50	850	8.97	880	9.46	909	9.94
12,000	663	7.01	697	7.49	730	7.98	762	8.47	794	8.97	824	9.47	854	9.96	883	10.47	912	10.97	939	11.48
13,000	712	8.53	743	9.03	774	9.54	804	10.05	834	10.57	862	11.09	891	11.61	918	12.13	945	12.66	972	13.19
14,000	760	10.24	790	10.76	819	11.29	847	11.82	875	12.36	902	12.90	929	13.45	955	13.99	981	14.54	1006	15.09
15,000	809	12.15	837	12.69	864	13.24	891	13.79	917	14.35	943	14.91	968	15.48	993	16.04	1018	16.62	1042	17.18
16,000	859	14.27	885	14.83	910	15.40	936	15.97	960	16.55	985	17.13	1009	17.71	1033	18.30	1056	18.89	1079	19.48
17,000	908	16.61	933	17.19	957	17.77	981	18.36	1004	18.96	1028	19.56	1051	20.16	1073	20.77	1096	21.38	1118	21.99
18,000	958	19.18	981	19.77	1004	20.37	1027	20.98	1049	21.60	1071	22.22	1093	22.84	1115	23.46	1136	24.09	1157	24.72
19,000	1007	21.98	1030	22.59	1052	23.21	1073	23.84	1095	24.47	1116	25.10	1137	25.74	1157	26.39	1178	27.04	1198	27.68
20,000	1057	25.02	1079	25.65	1099	26.29	1120	26.93	1140	27.58	1161	28.23	1181	28.89	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

- Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.

2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

- Variable air volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.

Performance data (cont)



FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

50A2,A3050 (50 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
10,000	577	4.62	617	5.06	655	5.50	692	5.95	727	6.40	761	6.85	794	7.30	827	7.76	858	8.22	889	8.69
11,000	625	5.80	661	6.26	697	6.73	731	7.20	764	7.67	796	8.14	827	8.62	858	9.10	888	9.58	917	10.07
12,000	673	7.15	707	7.63	740	8.12	772	8.62	803	9.11	833	9.61	863	10.11	891	10.61	920	11.12	947	11.62
13,000	722	8.69	753	9.19	784	9.70	814	10.22	843	10.74	872	11.26	900	11.78	927	12.31	954	12.83	980	13.36
14,000	771	10.43	800	10.95	829	11.48	857	12.01	885	12.55	912	13.10	938	13.64	964	14.19	990	14.74	1015	15.29
15,000	821	12.37	848	12.91	875	13.46	901	14.01	928	14.57	953	15.14	978	15.70	1003	16.27	1028	16.84	1052	17.41
16,000	870	14.52	896	15.08	922	15.65	947	16.22	971	16.80	996	17.39	1020	17.97	1043	18.56	1066	19.15	1089	19.75
17,000	920	16.89	945	17.48	969	18.06	993	18.65	1016	19.25	1039	19.86	1062	20.46	1084	21.07	1107	21.68	1129	22.30
18,000	971	19.50	994	20.10	1017	20.71	1039	21.32	1061	21.93	1083	22.55	1105	23.18	1126	23.80	1148	24.44	1169	25.07
19,000	1021	22.35	1043	22.96	1065	23.59	1086	24.21	1107	24.85	1128	25.49	1149	26.13	1170	26.78	1190	27.42	1210	28.08
20,000	1071	25.43	1092	26.07	1113	26.71	1133	27.36	1154	28.01	1174	28.66	1194	29.33	1213	29.99	1233	30.65	1252	31.33

50A2,A3050 (50 TONS) (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
10,000	919	9.17	948	9.64	977	10.13	1005	10.62	1032	11.12	1059	11.63	1086	12.14	1112	12.66	1137	13.18	1162	13.71
11,000	945	10.56	973	11.05	1001	11.55	1027	12.06	1054	12.57	1080	13.09	1105	13.61	1130	14.14	1155	14.67	1179	15.21
12,000	975	12.13	1001	12.64	1027	13.16	1053	13.68	1078	14.21	1103	14.74	1128	15.27	1152	15.81	1176	16.35	1199	16.90
13,000	1006	13.89	1032	14.42	1057	14.96	1081	15.49	1105	16.03	1129	16.58	1153	17.12	1176	17.68	1199	18.23	1221	18.80
14,000	1040	15.84	1064	16.39	1088	16.94	1112	17.50	1135	18.06	1158	18.62	1180	19.18	1203	19.75	1225	20.32	1246	20.90
15,000	1075	17.99	1098	18.56	1121	19.13	1144	19.71	1166	20.29	1188	20.86	1210	21.45	1231	22.03	1253	22.62	1274	23.21
16,000	1112	20.34	1134	20.93	1156	21.53	1178	22.12	1199	22.72	1221	23.32	1241	23.92	1262	24.52	1283	25.13	—	—
17,000	1150	22.91	1172	23.52	1193	24.14	1214	24.76	1234	25.37	1255	25.99	1275	26.61	1295	27.23	—	—	—	—
18,000	1190	25.70	1210	26.34	1230	26.97	1250	27.61	1270	28.25	1290	28.89	—	—	—	—	—	—	—	—
19,000	1230	28.73	1250	29.38	1269	30.04	1289	30.70	—	—	—	—	—	—	—	—	—	—	—	—
20,000	1271	31.99	1290	32.67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

50A2,A3060 (60 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	450	4.02	509	4.71	560	5.41	605	6.12	647	6.86	686	7.62	723	8.40	757	9.21	790	10.04	821	10.89
14,000	505	5.74	558	6.49	606	7.24	649	8.01	689	8.79	727	9.59	762	10.40	795	11.24	827	12.09	857	12.96
15,000	533	6.75	584	7.53	630	8.32	672	9.11	711	9.91	748	10.73	782	11.56	815	12.41	846	13.28	876	14.17
16,000	561	7.88	610	8.68	655	9.50	696	10.32	734	11.14	770	11.98	803	12.84	836	13.71	866	14.59	896	15.49
17,000	590	9.12	637	9.95	680	10.79	720	11.64	757	12.49	792	13.35	825	14.23	857	15.12	887	16.02	916	16.94
18,000	619	10.48	664	11.33	706	12.20	744	13.07	781	13.96	815	14.84	847	15.74	878	16.65	908	17.57	937	18.50
19,000	648	11.96	692	12.84	732	13.74	769	14.64	805	15.54	838	16.45	870	17.37	900	18.30	930	19.24	958	20.19
20,000	678	13.57	719	14.47	758	15.40	795	16.32	829	17.25	862	18.19	893	19.13	923	20.08	952	21.04	979	22.01
21,000	707	15.30	748	16.24	785	17.19	821	18.14	854	19.09	886	20.05	917	21.02	946	22.00	974	22.98	1001	23.97
22,000	737	17.18	776	18.14	812	19.11	847	20.09	879	21.07	911	22.06	940	23.05	969	24.04	997	25.05	1024	26.06
23,000	767	19.20	804	20.18	840	21.17	873	22.17	905	23.18	935	24.19	965	25.21	993	26.23	1020	27.25	1046	28.28
24,000	797	21.35	833	22.36	867	23.38	900	24.40	931	25.13	961	26.47	989	27.51	1017	28.55	1044	29.60	1070	30.65
25,000	827	23.66	862	24.68	895	25.72	927	26.78	957	27.83	986	28.89	1014	29.95	1041	31.02	1068	32.09	1093	33.17
26,000	857	26.11	891	27.16	923	28.23	954	29.30	984	30.38	1012	31.46	1040	32.55	1066	33.64	1092	34.73	1117	35.83
27,000	888	28.72	920	29.79	952	30.88	982	31.97	1011	33.08	1038	34.19	1065	35.29	1091	36.40	1117	37.52	1141	38.64

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.
2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

3. Variable air volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.



FAN PERFORMANCE – HORIZONTAL DISCHARGE UNITS

48A4,A5 020 (20 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	339	0.71	414	0.97	478	1.25	534	1.54	585	1.84	631	2.14	674	2.44	714	2.75	751	3.06	787	3.37
5,000	384	1.10	452	1.37	510	1.66	563	1.96	611	2.28	656	2.60	698	2.93	738	3.27	775	3.60	811	3.94
6,000	433	1.61	494	1.89	548	2.19	597	2.51	643	2.84	686	3.18	726	3.52	764	3.88	800	4.23	835	4.60
7,000	484	2.27	540	2.56	590	2.87	636	3.19	679	3.53	719	3.88	757	4.24	794	4.61	829	4.98	863	5.36
7,500	511	2.66	563	2.95	612	3.26	656	3.59	698	3.94	737	4.29	775	4.66	810	5.03	845	5.41	877	5.79
8,000	538	3.09	588	3.38	634	3.70	678	4.03	718	4.38	756	4.74	793	5.11	827	5.49	861	5.87	893	6.26
9,000	593	4.07	639	4.37	682	4.69	722	5.03	760	5.39	796	5.76	831	6.13	864	6.52	896	6.91	927	7.32
10,000	649	5.23	691	5.54	731	5.87	769	6.21	805	6.58	839	6.95	872	7.34	904	7.73	934	8.13	964	8.54

48A4,A5 020 (20 TONS) (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	820	3.68	852	3.99	883	4.30	912	4.62	940	4.93	967	5.25	993	5.57	1019	5.89	1043	6.21	1067	6.53
5,000	844	4.28	877	4.63	907	4.97	937	5.31	966	5.66	993	6.01	1020	6.35	1046	6.70	1071	7.05	1095	7.40
6,000	869	4.96	901	5.33	931	5.70	961	6.07	990	6.44	1017	6.81	1044	7.19	1070	7.57	1096	7.94	1121	8.32
7,000	895	5.74	926	6.13	956	6.52	986	6.91	1014	7.30	1042	7.70	1068	8.10	1094	8.50	1120	8.90	1145	9.30
7,500	909	6.18	940	6.57	970	6.97	999	7.37	1027	7.78	1054	8.18	1081	8.59	1107	9.00	1132	9.41	1157	9.82
8,000	925	6.66	955	7.06	984	7.46	1013	7.87	1040	8.28	1067	8.69	1094	9.11	1119	9.53	1144	9.95	1169	10.37
9,000	957	7.72	986	8.13	1015	8.55	1042	8.97	1069	9.39	1096	9.82	1121	10.25	1146	10.69	1171	11.12	1195	11.56
10,000	993	8.96	1021	9.38	1048	9.80	1075	10.23	1101	10.67	1126	11.11	1151	11.55	1176	12.00	1200	12.45	—	—

48A4,A5 025-030 (25 THRU 30 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,000	389	1.11	456	1.38	514	1.68	566	1.98	614	2.30	659	2.62	701	2.95	740	3.29	777	3.62	813	3.96
6,000	439	1.64	499	1.92	553	2.22	602	2.54	647	2.87	689	3.21	730	3.56	768	3.91	804	4.27	838	4.63
7,000	492	2.31	546	2.60	596	2.91	641	3.24	684	3.58	724	3.93	762	4.29	798	4.66	833	5.03	867	5.41
8,000	546	3.14	596	3.43	642	3.75	684	4.09	724	4.44	762	4.80	798	5.17	833	5.55	866	5.93	898	6.32
9,000	602	4.13	647	4.43	690	4.76	730	5.10	768	5.46	803	5.83	838	6.21	871	6.60	903	7.00	933	7.40
10,000	659	5.31	701	5.62	740	5.95	777	6.30	813	6.67	847	7.04	880	7.43	911	7.83	942	8.23	971	8.64
11,000	717	6.67	755	6.99	792	7.33	827	7.68	860	8.06	893	8.44	924	8.83	954	9.24	983	9.65	1011	10.07
12,000	775	8.23	811	8.56	845	8.90	878	9.27	909	9.64	940	10.03	970	10.43	999	10.84	1026	11.26	1054	11.69
13,000	834	9.99	867	10.33	899	10.68	930	11.05	960	11.44	989	11.83	1017	12.24	1045	12.65	1072	13.08	1098	13.51
14,000	893	11.97	924	12.32	954	12.68	983	13.06	1012	13.44	1039	13.85	1066	14.26	1093	14.68	1118	15.11	1143	15.54
15,000	953	14.17	982	14.53	1010	14.90	1037	15.28	1064	15.68	1091	16.08	1116	16.50	1142	16.93	1166	17.36	1190	17.80

48A4,A5 025-030 (25 THRU 30 TONS) (cont)

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.
 2. Conversion - Bhp to watts:

2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

3. Variable air volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.

Performance data (cont)



FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48A4,A5 035 (35 TONS)

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	553	2.59	602	2.92	648	3.26	691	3.61	732	3.95	770	4.29	807	4.63	842	4.96	875	5.29	907	5.62
8,000	612	3.45	656	3.81	698	4.17	738	4.53	776	4.90	812	5.27	847	5.63	881	6.00	913	6.36	944	6.72
9,000	672	4.47	712	4.86	750	5.24	787	5.62	823	6.01	857	6.39	890	6.78	922	7.17	953	7.56	983	7.95
10,000	733	5.67	769	6.08	805	6.48	839	6.88	872	7.28	904	7.69	935	8.10	966	8.51	995	8.92	1024	9.33
10,500	763	6.33	798	6.75	832	7.17	865	7.58	897	7.99	929	8.40	959	8.82	989	9.24	1017	9.66	1046	10.08
11,000	794	7.04	828	7.47	861	7.90	892	8.32	923	8.74	954	9.16	983	9.59	1012	10.01	1040	10.44	1067	10.87
12,000	855	8.60	887	9.06	918	9.51	948	9.95	977	10.39	1005	10.83	1033	11.27	1060	11.71	1087	12.16	1113	12.60
13,000	917	10.36	947	10.84	976	11.31	1004	11.77	1031	12.23	1058	12.69	1084	13.14	1110	13.60	1135	14.06	1160	14.52
14,000	980	12.32	1008	12.82	1035	13.31	1061	13.79	1087	14.27	1112	14.75	1137	15.22	1161	15.70	1185	16.17	1209	16.65
15,000	1042	14.49	1069	15.01	1094	15.52	1119	16.03	1143	16.53	1167	17.02	1191	17.51	1214	18.01	1237	18.50	1260	18.99
16,000	1105	16.88	1130	17.42	1154	17.96	1178	18.48	1201	19.00	1224	19.51	1246	20.02	1268	20.53	1290	21.04	—	—
17,000	1168	19.49	1191	20.06	1214	20.61	1237	21.16	1259	21.69	1281	22.23	—	—	—	—	—	—	—	—
17,500	1200	20.88	1222	21.46	1245	22.03	1267	22.58	1288	23.13	—	—	—	—	—	—	—	—	—	—

48A4,A5 035 (35 TONS) (cont)

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	937	5.94	967	6.26	995	6.57	1022	6.87	1048	7.18	1073	7.48	1098	7.78	1122	8.07	1145	8.36	1168	8.66
8,000	974	7.08	1003	7.43	1031	7.77	1058	8.12	1084	8.46	1109	8.79	1134	9.13	1158	9.46	1181	9.78	1204	10.11
9,000	1012	8.33	1041	8.72	1068	9.10	1094	9.47	1120	9.85	1145	10.22	1169	10.58	1193	10.95	1216	11.31	1239	11.66
10,000	1052	9.74	1080	10.15	1106	10.55	1132	10.96	1157	11.36	1182	11.76	1206	12.16	1229	12.55	1252	12.95	1275	13.34
10,500	1073	10.50	1100	10.92	1126	11.34	1151	11.75	1176	12.17	1201	12.59	1224	13.00	1248	13.41	1271	13.82	1293	14.22
11,000	1094	11.30	1120	11.73	1146	12.16	1171	12.59	1196	13.02	1220	13.45	1243	13.87	1266	14.30	1289	14.72	—	—
12,000	1138	13.05	1163	13.50	1188	13.95	1212	14.40	1236	14.84	1259	15.30	1282	15.74	—	—	—	—	—	—
13,000	1184	14.99	1208	15.45	1232	15.92	1255	16.39	1278	16.85	—	—	—	—	—	—	—	—	—	—
14,000	1232	17.13	1255	17.61	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15,000	1282	19.48	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48A4,A5040 (40 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	526	3.10	573	3.50	617	3.91	660	4.33	700	4.75	740	5.18	778	5.62	814	6.07	850	6.53	884	7.00
9,000	579	4.08	621	4.51	662	4.95	701	5.39	738	5.83	775	6.28	810	6.74	845	7.21	878	7.69	911	8.17
10,000	633	5.24	671	5.70	709	6.16	744	6.62	779	7.09	813	7.57	846	8.05	879	8.53	910	9.03	941	9.53
11,000	687	6.59	723	7.07	757	7.56	790	8.05	823	8.54	854	9.04	885	9.54	916	10.05	945	10.56	974	11.08
12,000	742	8.15	775	8.65	807	9.17	838	9.68	868	10.20	898	10.72	927	11.24	955	11.77	983	12.30	1011	12.84
13,000	797	9.92	827	10.45	857	10.98	887	11.52	915	12.07	943	12.61	970	13.15	997	13.70	1024	14.25	1050	14.81
14,000	852	11.92	881	12.47	909	13.03	936	13.59	963	14.15	990	14.72	1016	15.29	1041	15.86	1066	16.43	1091	17.01
15,000	908	14.15	935	14.72	961	15.31	987	15.89	1013	16.48	1038	17.06	1062	17.65	1086	18.25	1110	18.84	1134	19.44
16,000	964	16.63	989	17.23	1014	17.83	1039	18.43	1063	19.04	1086	19.65	1110	20.26	1133	20.88	1156	21.49	1178	22.11
17,000	1021	19.37	1044	19.98	1068	20.60	1091	21.23	1114	21.86	1136	22.49	1158	23.12	1180	23.76	1202	24.39	1223	25.03
18,000	1077	22.37	1099	23.01	1122	23.64	1144	24.29	1165	24.94	1187	25.59	1208	26.25	1229	26.90	1250	27.56	1270	28.22
19,000	1133	25.65	1155	26.30	1176	26.96	1197	27.62	1217	28.29	1238	28.96	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.

2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

3. Variable air volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.



FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

48A4,A5050 (50 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
10,000	642	5.35	680	5.80	717	6.27	753	6.73	787	7.20	821	7.68	854	8.16	886	8.65	917	9.14	948	9.65
11,000	696	6.72	732	7.20	766	7.69	799	8.18	831	8.67	863	9.17	893	9.68	923	10.18	953	10.70	982	11.21
12,000	751	8.29	784	8.80	816	9.32	847	9.83	877	10.35	906	10.87	935	11.40	964	11.92	991	12.46	1019	12.99
13,000	807	10.09	837	10.62	867	11.16	896	11.70	924	12.24	952	12.78	979	13.33	1006	13.88	1032	14.43	1058	14.99
14,000	863	12.12	891	12.67	919	13.23	946	13.79	973	14.36	999	14.92	1025	15.49	1050	16.06	1075	16.64	1100	17.21
15,000	919	14.38	946	14.96	972	15.54	997	16.12	1023	16.71	1047	17.30	1072	17.89	1096	18.48	1120	19.08	1143	19.68
16,000	975	16.90	1000	17.49	1025	18.09	1049	18.70	1073	19.31	1097	19.92	1120	20.53	1143	21.15	1165	21.76	1188	22.38
17,000	1032	19.67	1056	20.29	1079	20.91	1102	21.54	1125	22.17	1147	22.80	1169	23.44	1191	24.07	1213	24.71	1234	25.35
18,000	1089	22.71	1111	23.35	1134	23.99	1155	24.64	1177	25.29	1198	25.95	1219	26.60	1240	27.26	1261	27.92	1281	28.58
19,000	1146	26.04	1167	26.69	1188	27.35	1209	28.02	1230	28.69	1250	29.37	1270	30.04	1290	30.72	—	—	—	—
20,000	1203	29.65	1224	30.32	1244	31.00	1263	31.69	1283	32.38	—	—	—	—	—	—	—	—	—	—

48A4,A5050 (50 TONS) (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
10,000	978	10.15	1008	10.67	1036	11.19	1064	11.72	1092	12.25	1119	12.79	1145	13.33	1171	13.88	1196	14.43	1221	14.99
11,000	1010	11.74	1038	12.27	1066	12.81	1093	13.35	1119	13.90	1145	14.45	1171	15.01	1196	15.57	1220	16.14	1245	16.72
12,000	1046	13.53	1072	14.08	1098	14.63	1124	15.19	1149	15.76	1174	16.32	1199	16.90	1223	17.48	1247	18.06	1270	18.65
13,000	1084	15.55	1109	16.11	1134	16.68	1158	17.26	1182	17.84	1206	18.42	1230	19.01	1253	19.60	1276	20.20	1299	20.80
14,000	1124	17.79	1148	18.38	1171	18.97	1195	19.55	1218	20.15	1241	20.75	1263	21.35	1285	21.96	—	—	—	—
15,000	1166	20.27	1189	20.88	1211	21.49	1234	22.09	1256	22.71	1277	23.32	1299	23.94	—	—	—	—	—	—
16,000	1210	23.00	1231	23.62	1253	24.25	1274	24.88	1295	25.51	—	—	—	—	—	—	—	—	—	—
17,000	1255	25.99	1276	26.63	1296	27.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48A4,A5060 (60 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	516	4.81	569	5.54	617	6.30	660	7.10	701	7.93	739	8.79	774	9.68	808	10.59	841	11.52	872	12.46
14,000	584	6.90	632	7.69	676	8.50	716	9.33	754	10.20	790	11.10	824	12.02	857	12.97	888	13.94	917	14.92
15,000	619	8.13	664	8.96	706	9.79	745	10.65	782	11.53	817	12.44	850	13.38	882	14.35	912	15.33	941	16.34
16,000	654	9.49	697	10.36	737	11.22	775	12.10	811	13.00	845	13.93	877	14.88	908	15.86	938	16.86	966	17.88
17,000	689	10.99	730	11.90	769	12.79	806	13.69	840	14.61	873	15.56	904	16.53	935	17.52	964	18.54	992	19.58
18,000	725	12.64	764	13.58	801	14.51	837	15.43	870	16.38	902	17.34	933	18.32	962	19.33	990	20.36	1018	21.41
19,000	760	14.43	798	15.41	834	16.37	868	17.32	900	18.29	932	19.27	961	20.27	990	21.29	1018	22.34	1045	23.40
20,000	796	16.37	833	17.39	867	18.39	900	19.37	931	20.36	962	21.36	991	22.38	1019	23.42	1046	24.48	1072	25.56
21,000	832	18.47	867	19.54	901	20.56	932	21.57	963	22.59	992	23.61	1020	24.65	1048	25.71	1074	26.78	1100	27.87
22,000	869	20.74	902	21.84	934	22.90	965	23.94	995	24.98	1023	26.03	1051	27.09	1077	28.17	1103	29.26	1129	30.36
23,000	905	23.17	937	24.31	968	25.40	998	26.48	1027	27.55	1055	28.62	1081	29.70	1107	30.79	1133	31.90	1157	33.02
24,000	942	25.78	973	26.95	1003	28.08	1032	29.18	1059	30.28	1086	31.38	1113	32.48	1138	33.59	1163	34.72	1187	35.86
25,000	978	28.56	1008	29.77	1037	30.93	1065	32.07	1092	33.20	1119	34.32	1144	35.44	1169	36.58	1193	37.72	—	—
26,000	1015	31.52	1044	32.76	1072	33.96	1099	35.13	1125	36.29	1151	37.44	1176	38.59	—	—	—	—	—	—
27,000	1052	34.66	1080	35.94	1107	37.18	1133	38.38	1159	39.57	1184	40.75	—	—	—	—	—	—	—	—

48A4,A5060 (60 TONS) (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	2.2		2.4																	

Performance data (cont)



FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

50A4,A5 020 (20 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	322	0.62	399	0.82	464	1.04	521	1.26	572	1.48	619	1.71	662	1.93	702	2.16	739	2.38	774	2.61
5,000	361	0.95	431	1.17	491	1.41	545	1.65	594	1.89	640	2.14	682	2.39	722	2.64	759	2.89	795	3.14
6,000	405	1.41	467	1.64	524	1.88	574	2.14	621	2.40	664	2.67	705	2.93	744	3.20	780	3.47	816	3.75
7,000	451	2.00	508	2.22	559	2.48	607	2.75	651	3.02	693	3.30	732	3.58	769	3.87	804	4.16	839	4.45
7,500	475	2.34	529	2.57	579	2.82	625	3.10	668	3.38	708	3.66	746	3.96	783	4.25	818	4.55	851	4.84
8,000	500	2.72	551	2.95	598	3.21	643	3.48	685	3.77	724	4.06	762	4.36	797	4.66	832	4.96	864	5.27
9,000	550	3.60	596	3.83	640	4.09	682	4.36	721	4.66	759	4.96	795	5.27	829	5.58	862	5.90	893	6.22
10,000	601	4.63	644	4.86	684	5.12	723	5.40	760	5.70	796	6.01	830	6.33	863	6.65	894	6.98	925	7.31

50A4,A5 020 (20 TONS) (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	808	2.84	840	3.06	870	3.29	900	3.52	928	3.75	955	3.98	981	4.21	1007	4.44	1031	4.67	1055	4.91
5,000	829	3.39	861	3.64	892	3.89	922	4.14	950	4.40	978	4.65	1005	4.90	1031	5.16	1056	5.41	1080	5.67
6,000	849	4.02	881	4.29	912	4.57	942	4.84	971	5.12	999	5.39	1026	5.67	1052	5.94	1077	6.22	1102	6.49
7,000	871	4.74	903	5.03	933	5.33	963	5.62	991	5.92	1019	6.21	1046	6.51	1072	6.80	1098	7.10	1123	7.40
7,500	883	5.14	915	5.44	945	5.75	974	6.05	1002	6.35	1030	6.66	1057	6.96	1083	7.27	1108	7.58	1133	7.88
8,000	896	5.58	927	5.89	957	6.20	985	6.51	1014	6.82	1041	7.13	1067	7.45	1093	7.76	1118	8.08	1143	8.39
9,000	924	6.54	954	6.86	983	7.19	1011	7.51	1038	7.84	1064	8.17	1090	8.50	1116	8.83	1141	9.16	1165	9.49
10,000	954	7.64	983	7.98	1011	8.31	1038	8.65	1065	8.99	1091	9.34	1116	9.68	1141	10.02	1165	10.37	1189	10.72

50A4,A5 025-030 (25 THRU 30 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,000	366	0.97	435	1.19	495	1.42	548	1.67	597	1.91	642	2.16	685	2.41	724	2.65	762	2.90	797	3.16
6,000	411	1.43	473	1.66	529	1.91	579	2.16	625	2.43	668	2.69	709	2.96	747	3.23	784	3.50	819	3.77
7,000	459	2.02	515	2.25	566	2.51	613	2.78	657	3.06	698	3.34	737	3.62	774	3.91	809	4.20	843	4.49
8,000	508	2.76	559	2.99	606	3.25	650	3.53	691	3.82	731	4.11	768	4.41	803	4.71	837	5.01	870	5.32
9,000	560	3.64	605	3.88	649	4.14	690	4.42	729	4.72	766	5.02	802	5.33	835	5.64	868	5.96	900	6.28
10,000	612	4.68	654	4.92	694	5.19	732	5.47	769	5.77	804	6.09	838	6.40	870	6.73	902	7.06	932	7.39
11,000	665	5.89	703	6.14	740	6.41	776	6.69	811	7.00	844	7.31	876	7.64	907	7.97	937	8.31	967	8.65
12,000	718	7.28	754	7.53	788	7.80	822	8.09	854	8.39	886	8.71	916	9.04	946	9.38	975	9.72	1003	10.07
13,000	772	8.85	806	9.11	838	9.38	869	9.67	899	9.98	929	10.30	958	10.63	987	10.97	1014	11.32	1041	11.68
14,000	826	10.61	858	10.87	888	11.15	917	11.44	946	11.75	974	12.07	1002	12.41	1029	12.75	1055	13.10	1081	13.46
15,000	881	12.57	910	12.84	939	13.12	967	13.41	994	13.72	1021	14.05	1047	14.38	1073	14.73	1098	15.08	1123	15.45

50A4,A5 025-030 (25 THRU 30 TONS) (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
5,000	831	3.41	863	3.66	894	3.91	924	4.16	952	4.41	980	4.67	1007	4.92	1032	5.17	1057	5.43	1082	5.68
6,000	852	4.05	884	4.32	915	4.59	945	4.87	974	5.14	1001	5.42	1028	5.69	1054	5.97	1080	6.24	1105	6.52
7,000	875	4.78	907	5.07	937	5.37	967	5.66	995	5.95	1023	6.25	1049	6.55	1076	6.84	1101	7.14	1126	7.44
8,000	901	5.63	932	5.94	961	6.25	990	6.56	1018	6.87	1045	7.18	1072	7.50	1097	7.81	1123	8.13	1147	8.44
9,000	930	6.60	960	6.93	988	7.25	1016	7.58	1043	7.91	1071	8.23	1096	8.57	1121	8.90	1146	9.23	1170	9.56
10,000	961	7.72	990	8.06	1018	8.40	1045	8.74	1071	9.08	1097	9.42	1122	9.76	1147	10.11	1171	10.46	1194	10.80
11,000	995	8.99	1022	9.34	1049	9.69	1075	10.04	1101	10.39	1126	10.75	1151	11.11	1175	11.47	1198	11.82	—	—
12,000	1030	10.43	1057	10.78	1083	11.14	1108	11.51	1133	11.87	1157	12.24	1181	12.61	—	—	—	—</td		



FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

50A4,A5035 (35 TONS)

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	522	2.06	573	2.32	620	2.57	664	2.82	705	3.06	744	3.30	780	3.54	815	3.78	849	4.01	881	4.24
8,000	576	2.75	622	3.03	665	3.30	706	3.57	745	3.84	782	4.10	817	4.36	850	4.62	883	4.87	914	5.12
9,000	630	3.57	672	3.86	712	4.16	750	4.45	787	4.74	822	5.02	855	5.30	888	5.58	919	5.86	949	6.13
10,000	686	4.52	724	4.84	761	5.15	797	5.46	831	5.77	864	6.07	896	6.37	927	6.67	957	6.97	986	7.26
10,500	714	5.05	750	5.38	786	5.70	821	6.02	854	6.34	886	6.65	917	6.96	947	7.27	977	7.57	1005	7.87
11,000	742	5.62	777	5.95	811	6.28	845	6.61	877	6.94	909	7.26	939	7.58	968	7.90	997	8.21	1025	8.52
12,000	799	6.88	831	7.22	863	7.57	894	7.91	925	8.25	954	8.60	983	8.93	1011	9.27	1039	9.60	1065	9.93
13,000	856	8.29	886	8.65	916	9.01	945	9.37	974	9.72	1002	10.08	1029	10.44	1056	10.79	1082	11.14	1108	11.49
14,000	914	9.87	942	10.24	969	10.61	997	10.98	1024	11.36	1050	11.73	1076	12.10	1102	12.47	1127	12.84	1152	13.20
15,000	971	11.62	998	12.00	1024	12.39	1050	12.77	1075	13.16	1100	13.54	1125	13.93	1149	14.31	1173	14.70	1197	15.08
16,000	1029	13.55	1054	13.94	1079	14.34	1103	14.74	1127	15.13	1151	15.53	1174	15.93	1198	16.33	1220	16.73	1243	17.12
17,000	1088	15.66	1111	16.07	1134	16.47	1157	16.88	1180	17.29	1203	17.70	1225	18.11	1247	18.53	1269	18.93	1290	19.34
17,500	1117	16.79	1140	17.20	1162	17.61	1184	18.02	1207	18.44	1229	18.86	1250	19.27	1272	19.69	1293	20.11	—	—

50A4,A5035 (35 TONS) (cont)

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
7,000	912	4.46	942	4.68	970	4.90	998	5.12	1025	5.33	1051	5.54	1076	5.75	1101	5.96	1124	6.16	1148	6.36
8,000	944	5.37	973	5.62	1001	5.86	1029	6.11	1055	6.35	1081	6.58	1106	6.82	1130	7.05	1154	7.28	1177	7.51
9,000	978	6.40	1006	6.67	1034	6.93	1060	7.20	1086	7.46	1112	7.72	1136	7.98	1160	8.23	1184	8.49	1207	8.74
10,000	1014	7.55	1041	7.84	1068	8.12	1094	8.41	1119	8.69	1144	8.97	1168	9.25	1192	9.52	1215	9.80	1238	10.07
10,500	1033	8.17	1059	8.47	1086	8.77	1111	9.06	1136	9.35	1161	9.64	1184	9.93	1208	10.22	1231	10.50	1253	10.79
11,000	1052	8.83	1078	9.14	1104	9.44	1129	9.75	1154	10.05	1178	10.35	1201	10.64	1224	10.94	1247	11.23	1269	11.53
12,000	1091	10.26	1117	10.58	1142	10.90	1166	11.23	1190	11.54	1213	11.86	1236	12.18	1259	12.49	1281	12.80	—	—
13,000	1133	11.83	1157	12.17	1181	12.51	1205	12.85	1228	13.19	1251	13.52	1273	13.86	1295	14.19	—	—	—	—
14,000	1176	13.56	1199	13.92	1222	14.28	1245	14.63	1268	14.99	1290	15.34	—	—	—	—	—	—	—	—
15,000	1220	15.45	1243	15.83	1265	16.20	1287	16.58	—	—	—	—	—	—	—	—	—	—	—	—
16,000	1265	17.52	1287	17.91	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

50A4,A5040 (40 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	499	2.88	546	3.27	590	3.66	632	4.06	672	4.46	711	4.87	748	5.28	784	5.70	819	6.14	853	6.58
9,000	548	3.78	591	4.20	631	4.62	670	5.04	708	5.47	744	5.90	778	6.33	812	6.77	845	7.22	877	7.67
10,000	599	4.86	637	5.30	675	5.74	711	6.19	746	6.64	779	7.09	812	7.55	844	8.01	875	8.47	905	8.94
11,000	649	6.11	685	6.57	720	7.04	753	7.51	786	7.99	817	8.47	848	8.94	878	9.43	907	9.91	936	10.40
12,000	701	7.54	734	8.03	766	8.52	797	9.02	828	9.52	857	10.02	886	10.52	915	11.03	943	11.53	970	12.04
13,000	753	9.18	783	9.69	813	10.21	842	10.72	871	11.25	909	11.77	927	12.30	953	12.82	980	13.35	1006	13.88
14,000	805	11.03	833	11.56	861	12.09	889	12.63	916	13.18	942	13.73	968	14.27	994	14.82	1019	15.37	1044	15.92
15,000	857	13.09	884	13.64	910	14.20	936	14.76	962	15.32	987	15.89	1011	16.46	1036	17.03	1060	17.61	1083	18.18
16,000	910	15.38	935	15.95	960	16.53	984	17.11	1008	17.69	1032	18.28	1056	18.87	1079	19.47	1101	20.06	1124	20.66
17,000	963	17.91	986	18.50	1010	19.09	1033	19.69	1056	20.30	1078	20.91	1101	21.52	1123	22.13	1145	22.75	1166	23.36
18,000	1016	20.68	1038	21.29	1060	21.90	1082	22.52	1104	23.15	1126	23.77	1147	24.41	1168	25.04	1189	25.67	1209	26.31
19,000	1069	23.71	1090	24.33	1111	24.96	1132	25.60	1153	26.25	1173	26.89	1194	27.54	1214	28.19	1234	28.85	—	—
20,000	1122	26.99	1142	27.64	1162	28.29	1182	28.95	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:
1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.

2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

3. Variable air volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.

Performance data (cont)



FAN PERFORMANCE — HORIZONTAL DISCHARGE UNITS (cont)

50A4,A5050 (50 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
10,000	608	4.96	646	5.40	683	5.85	719	6.30	754	6.75	787	7.20	819	7.66	851	8.12	882	8.58	912	9.06
11,000	659	6.23	694	6.69	728	7.16	762	7.64	794	8.11	825	8.59	856	9.07	886	9.55	915	10.04	943	10.53
12,000	710	7.68	743	8.17	775	8.67	806	9.17	836	9.67	866	10.17	895	10.67	923	11.17	950	11.68	978	12.19
13,000	763	9.35	793	9.86	823	10.37	852	10.89	880	11.42	908	11.94	935	12.47	962	12.99	988	13.52	1014	14.05
14,000	815	11.22	843	11.75	871	12.29	899	12.83	925	13.38	952	13.92	978	14.47	1003	15.02	1028	15.57	1052	16.12
15,000	868	13.31	895	13.86	921	14.42	946	14.98	972	15.55	997	16.12	1021	16.69	1045	17.26	1069	17.83	1092	18.41
16,000	921	15.64	946	16.21	971	16.78	995	17.37	1019	17.96	1043	18.54	1066	19.14	1089	19.73	1111	20.32	1134	20.92
17,000	974	18.20	998	18.79	1021	19.39	1044	19.99	1067	20.60	1089	21.21	1112	21.82	1134	22.43	1155	23.05	1176	23.66
18,000	1028	21.01	1050	21.62	1072	22.24	1094	22.86	1116	23.49	1137	24.12	1158	24.75	1179	25.38	1200	26.02	1220	26.65
19,000	1081	24.08	1103	24.71	1124	25.35	1145	25.99	1165	26.63	1185	27.28	1206	27.93	1226	28.58	1245	29.24	1265	29.90
20,000	1135	27.42	1155	28.06	1175	28.72	1195	29.38	1215	30.04	1234	30.71	1254	31.38	1273	32.05	1292	32.72	—	—

50A4,A5050 (50 TONS) (cont)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
10,000	941	9.53	970	10.02	998	10.51	1026	11.00	1053	11.51	1080	12.01	1106	12.53	1131	13.05	1156	13.58	1181	14.11
11,000	971	11.02	999	11.52	1026	12.02	1052	12.53	1078	13.05	1103	13.57	1128	14.09	1153	14.63	1177	15.16	1201	15.71
12,000	1004	12.70	1030	13.22	1056	13.74	1081	14.26	1106	14.79	1130	15.33	1154	15.86	1178	16.41	1201	16.96	1224	17.51
13,000	1039	14.59	1064	15.12	1088	15.66	1113	16.20	1136	16.74	1160	17.29	1183	17.85	1206	18.40	1228	18.96	1250	19.53
14,000	1076	16.68	1100	17.23	1123	17.79	1147	18.35	1169	18.91	1192	19.48	1214	20.04	1236	20.62	1257	21.19	1279	21.77
15,000	1115	18.98	1138	19.56	1160	20.14	1182	20.72	1204	21.30	1226	21.88	1247	22.47	1268	23.05	1289	23.65	—	—
16,000	1156	21.52	1178	22.11	1199	22.71	1220	23.31	1241	23.91	1262	24.51	1282	25.12	—	—	—	—	—	—
17,000	1198	24.28	1218	24.90	1239	25.52	1259	26.14	1279	26.76	1299	27.38	—	—	—	—	—	—	—	—
18,000	1240	27.29	1260	27.93	1280	28.57	1300	29.21	—	—	—	—	—	—	—	—	—	—	—	—
19,000	1284	30.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

50A4,A5060 (60 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
12,000	490	4.48	543	5.17	591	5.88	634	6.61	674	7.37	711	8.14	746	8.94	779	9.76	811	10.60	841	11.45
14,000	554	6.41	602	7.17	645	7.94	686	8.72	723	9.51	759	10.33	792	11.16	824	12.01	855	12.88	884	13.76
15,000	586	7.56	632	8.34	674	9.14	713	9.94	749	10.77	784	11.60	816	12.45	848	13.32	878	14.21	906	15.11
16,000	619	8.83	663	9.64	703	10.46	741	11.30	776	12.14	810	13.00	841	13.87	872	14.76	901	15.66	929	16.58
17,000	652	10.23	694	11.07	733	11.92	769	12.78	803	13.65	836	14.53	867	15.42	897	16.33	926	17.25	953	18.19
18,000	685	11.76	725	12.63	763	13.51	798	14.39	831	15.29	863	16.20	893	17.11	922	18.04	950	18.98	978	19.93
19,000	719	13.44	757	14.33	793	15.23	827	16.14	860	17.07	890	18.00	920	18.94	949	19.88	976	20.84	1003	21.81
20,000	753	15.26	789	16.18	824	17.10	857	18.04	888	18.99	918	19.94	947	20.90	975	21.87	1002	22.85	1028	23.84
21,000	787	17.23	822	18.17	855	19.12	887	20.08	918	21.05	947	22.03	975	23.02	1002	24.01	1029	25.01	1054	26.02
22,000	821	19.35	855	20.32	887	21.29	918	22.28	947	23.28	976	24.28	1003	25.28	1030	26.30	1056	27.32	1081	28.35
23,000	855	21.63	888	22.62	919	23.62	949	24.63	977	25.65	1005	26.68	1032	27.71	1058	28.75	1083	29.79	1108	30.85
24,000	889	24.07	921	25.08	951	26.11	980	27.14	1008	28.19	1038	30.89	1065	31.96	1090	33.04	1115	34.12	1139	35.21
25,000	924	26.67	954	27.71	983	28.76	1011	29.82	1038	30.89	1065	31.96	1090	33.04	1115	34.12	1139	35.21	1163	36.31
26,000	958	29.45	987	30.51	1016	31.59	1043	32.67	1069	33.76	1095	34.85	1120	35.95	1144	37.06	1168	38.17	1191	39.29
27,000	993	32.40	1021	33.49	1048	34.58	1075	35.69	1101	36.80	1126	37.92	1150	39.04	1174	40.17	1197	41.30	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.

2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

3. Variable air volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by edb and ewb conditions.



FAN PERFORMANCE — POWER EXHAUST

48/50A2,A3,A4,A5020-050 (20 to 50 Tons)

Airflow (Cfm)	208 V			230, 460, 575 V		
	ESP	Bhp	Watts	ESP	Bhp	Watts
7,700	0.60	3.69	4140	0.73	3.98	4460
7,900	0.56	3.74	4190	0.69	4.02	4510
8,100	0.51	3.78	4240	0.65	4.07	4560
8,500	0.41	3.83	4290	0.56	4.12	4620
8,900	0.31	3.93	4410	0.47	4.23	4740
9,300	0.20	4.07	4560	0.37	4.37	4900
9,700	0.11	4.17	4670	0.30	4.47	5010
10,100	0.04	4.25	4770	0.23	4.56	5110
10,500	—	—	—	0.17	4.66	5220
10,900	—	—	—	0.12	4.75	5330
11,300	—	—	—	0.07	4.80	5380
11,700	—	—	—	0.04	4.83	5420

LEGEND

Bhp — Brake Horsepower
 ESP — External Static Pressure (in. wg)
 Watts — Input Watts to Motor

48/50A2,A3,A4,A5060 (60 Tons)

Airflow (Cfm)	208 V			230, 460, 575 V		
	ESP	Bhp	Watts	ESP	Bhp	Watts
11,550	0.60	5.54	6210	0.73	5.97	6690
11,850	0.56	5.61	6285	0.69	6.03	6765
12,150	0.51	5.67	6360	0.65	6.10	6840
12,750	0.41	5.74	6435	0.56	6.18	6930
13,350	0.31	5.90	6615	0.47	6.34	7110
13,950	0.20	6.10	6840	0.37	6.56	7350
14,550	0.11	6.25	7005	0.30	6.70	7515
15,150	0.04	6.38	7155	0.23	6.84	7665
15,750	—	—	—	0.17	6.98	7830
16,350	—	—	—	0.12	7.13	7995
16,950	—	—	—	0.07	7.20	8070
17,550	—	—	—	0.04	7.25	8130

LEGEND

Bhp — Brake Horsepower
 ESP — External Static Pressure (in. wg)
 Watts — Input Watts to Motor

MOTOR LIMITATIONS

PREMIUM-EFFICIENCY MOTORS

Nominal		Maximum		Maximum Amps		Maximum Efficiency
Bhp	BkW	Bhp	BkW	230 v	460 v	
5	3.73	5.9	4.40	15.8	7.9	89.5
10	7.46	10.2	7.61	30.0	—	91.7
		11.8	8.80	—	15.0	91.7
15	11.19	15.3	11.41	46.0	—	93.0
		18.0	13.43	—	22.0	93.0
20	14.92	22.4	16.71	59.0	—	93.6
		23.4	17.46	—	28.7	93.6
25	18.65	28.9	21.56	73.0	—	93.6
		29.4	21.93	—	36.3	93.6
30	22.38	35.6	26.56	82.6	—	93.6
		34.7	25.89	—	41.7	93.6
40	29.84	42.0	31.33	110.0	55.0	94.5

LEGEND

Bhp — Brake Horsepower
 BkW — Brake Kilowatts

NOTES:

- Extensive motor and electrical testing on the Carrier units has ensured that the full horsepower range of the motor can be utilized with confidence. Using the fan motors up to the horsepower ratings shown in the Motor Limitations table will not result in nuisance tripping or premature motor failures. Unit warranty will not be affected.
- All motors comply with Energy Policy Act (EPACT) Standards effective October 24, 1997.

Performance data (cont)



AIR QUANTITY LIMITS (48A2,A3,A4,A5)

UNIT 48A2,A3,A4,A5	MINIMUM HEATING AIRFLOW CFM (Low Heat)	MINIMUM HEATING AIRFLOW CFM (High Heat)	MINIMUM COOLING AIRFLOW (VAV) CFM AT FULL LOAD	MINIMUM COOLING AIRFLOW CFM (CV)	MAXIMUM AIRFLOW CFM
020	5,900	6,100	4,000	6,000	10,000
025	5,900	6,100	5,000	7,500	12,500
027	5,900	6,100	5,400	8,100	13,500
030	5,900	6,100	6,000	9,000	15,000
035	5,900	10,100	7,000	10,500	17,500
040	7,600	10,100	8,000	12,000	20,000
050	7,600	10,100	10,000	13,500	20,000
060	11,000	14,700	12,000	18,000	27,000

LEGEND

CV — Constant Volume
VAV — Variable Air Volume

NOTE: Variable air volume units will operate down to 70 cfm/ton in Cooling mode. Performance at 70 cfm/ton is limited to unloaded operation and may be also limited by edb (entering dry bulb) and ewb (entering wet bulb) conditions.

AIR QUANTITY LIMITS (50A2,A3,A4,A5)

UNIT	COOLING		ELECTRIC HEAT	
	Min CFM	Max CFM*	Min CFM	Max CFM
50A2,A4020	6,000	10,000		
50A3,A5020	4,000	10,000		
50A2,A4025	7,500	12,500		
50A3,A5025	5,000	12,500		
50A2,A4027	8,100	13,500		
50A3,A5027	5,400	13,500		
50A2,A4030	9,000	15,000		
50A3,A5030	6,000	15,000		
50A2,A4035	10,500	17,500		
50A3,A5035	7,000	17,500		
50A2,A4040	12,000	20,000		
50A3,A5040	8,000	20,000		
50A2,A4050	13,500	20,000		
50A3,A5050	10,000	20,000		
50A2,A4060	18,000	27,000		
50A3,A5060	12,000	27,000		

*Operation at these levels may be limited by entering evaporator air wet bulb temperatures.

NOTES:

- Extensive motor and electrical testing on the Carrier units has ensured that the full horsepower range of the motor can be utilized with confidence. Using the fan motors up to the horsepower ratings shown in the Motor Limitations table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
- All motors comply with Energy Policy Act (EPACT) Standards effective October 24, 1997.

Electrical data



48A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET

UNIT SIZE 48A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		POWER SUPPLY	
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2									
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	FLA (total)	MCA	MOPC*	
020	208	187	229	22.4	149	22.4	149	27.6	191	—	—	2	6.5 (ea)	5	16.7	—	23.6	109.0	125
														10	30.8	—	23.6	132.6	150
														15	46.2	—	23.6	147.5	175
														5	15.2	—	23.6	143.2	175
	230	207	253	22.4	149	22.4	149	27.6	191	—	—	2	6.6 (ea)	10	28.0	—	23.6	166.8	200
														15	42.0	—	23.6	120.6	150
														5	15.2	—	23.6	144.2	175
														10	28.0	—	23.6	138.1	175
	460	414	508	10.6	75	10.6	75	12.8	100	—	—	2	3.3 (ea)	15	21.0	—	12.6	79.5	100
														5	7.6	—	12.6	66.9	80
														10	14.0	—	12.6	70.7	80
														15	21.0	—	12.6	42.0	50
025	575	518	632	7.7	54	7.7	54	12.2	80	—	—	2	2.6 (ea)	5	6.1	—	9.6	51.6	60
														10	11.0	—	9.6	46.9	50
														15	17.0	—	9.6	56.5	60
														5	6.1	—	9.6	54.1	70
	208	187	229	27.6	191	27.6	191	27.6	191	—	—	2	6.5 (ea)	10	30.8	—	23.6	143.0	150
														15	46.2	—	23.6	119.4	125
														5	16.7	—	23.6	143.0	150
														10	30.8	—	23.6	134.3	150
	230	207	253	27.6	191	27.6	191	27.6	191	—	—	2	6.6 (ea)	15	42.0	—	23.6	157.9	175
														5	15.2	—	23.6	153.6	175
														10	28.0	—	23.6	177.2	200
														15	42.0	—	23.6	148.5	175
027	460	414	508	12.8	100	12.8	100	12.8	100	—	—	2	3.3 (ea)	5	7.6	—	12.6	68.4	80
														10	14.0	—	12.6	62.5	70
														15	21.0	—	12.6	71.3	90
														5	6.1	—	9.6	51.0	60
	575	518	632	12.2	80	12.2	80	12.2	80	—	—	2	2.6 (ea)	10	11.0	—	9.6	59.5	60
														15	17.0	—	9.6	65.5	70
														5	6.1	—	9.6	63.1	80
														10	30.8	—	23.6	72.7	80
027	208	187	229	27.6	191	27.6	191	27.6	191	—	—	2	6.5 (ea)	10	30.8	—	23.6	134.3	150
														15	46.2	—	23.6	157.9	175
														20	59.4	—	23.6	153.6	175
														10	28.0	—	23.6	177.2	200
	230	207	253	27.6	191	27.6	191	27.6	191	—	—	2	6.6 (ea)	15	42.0	—	23.6	148.5	175
														20	54.0	—	23.6	172.1	200
														10	14.0	—	12.6	170.1	193.7
														15	21.0	—	12.6	193.7	225
027	460	414	508	12.8	100	12.8	100	12.8	100	—	—	2	3.3 (ea)	10	14.0	—	12.6	75.1	80
														15	21.0	—	12.6	83.9	90
														20	27.0	—	12.6	78.8	110
														10	11.0	—	9.6	65.5	70
	575	518	632	12.2	80	12.2	80	12.2	80	—	—	2	2.6 (ea)	15	17.0	—	9.6	63.1	80
														20	22.0	—	9.6	69.3	90
														10	11.0	—	9.6	78.9	100
														15	17.0	—	9.6	55.9	60

See Legend and Notes on page 85.

Electrical data (cont)



48A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET (cont)

UNIT SIZE 48A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		POWER SUPPLY	
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2									
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	FLA (total)	MCA	MOCP*	
030	208	187	229	23.2	184	23.2	164	23.2	164	23.2	164	2	6.5 (ea)	10	30.8	— 23.6	144.3 167.9	175 175	
														15	46.2	— 23.6	163.6 187.2	200 225	
														20	59.4	— 23.6	180.1 203.7	225 250	
														10	28.0	— 23.6	141.0 164.6	150 175	
	230	207	253	23.2	164	23.2	164	23.2	164	23.2	164	2	6.6 (ea)	15	42.0	— 23.6	158.5 182.1	200 200	
														20	54.0	— 23.6	173.5 197.1	225 250	
														10	14.0	— 12.6	68.9 81.5	80 90	
														15	21.0	— 12.6	77.7 90.3	90 110	
	460	414	508	11.2	75	11.2	75	11.2	75	11.2	75	2	3.3 (ea)	10	27.0	— 12.6	85.2 97.8	110 110	
														10	11.0	— 9.6	50.6 60.2	60 70	
														15	17.0	— 9.6	58.1 67.7	70 80	
														20	22.0	— 9.6	64.3 73.9	80 90	
035	208	187	229	22.4	149	22.4	149	30.1	225	30.1	225	2	6.5 (ea)	15	46.2	— 23.6	175.8 199.4	200 225	
														20	59.4	— 23.6	192.3 215.9	250 250	
														25	74.8	— 23.6	211.5 235.1	250 300	
														15	42.0	— 23.6	170.7 194.3	200 225	
	230	207	253	22.4	149	22.4	149	30.1	225	30.1	225	2	6.6 (ea)	20	54.0	— 23.6	185.7 209.3	225 250	
														25	68.0	— 23.6	203.2 226.8	250 250	
														15	21.0	— 12.6	87.5 100.1	100 110	
														20	27.0	— 12.6	95.0 107.6	110 125	
	460	414	508	10.6	75	10.6	75	16.7	114	16.7	114	2	3.3 (ea)	25	34.0	— 12.6	103.7 116.3	125 150	
														15	17.0	— 9.6	66.3 75.9	80 90	
														20	22.0	— 9.6	72.5 82.1	90 100	
														25	27.0	— 9.6	78.8 88.4	100 110	
040	208	187	229	30.1	225	30.1	225	30.1	225	30.1	225	4	6.5 (ea)	15	46.2	— 23.6	204.2 227.8	250 250	
														20	59.4	— 23.6	220.7 244.3	250 300	
														25	74.8	— 23.6	239.9 263.5	300 300	
														15	42.0	— 23.6	199.3 222.9	225 250	
	230	207	253	30.1	225	30.1	225	30.1	225	30.1	225	4	6.6 (ea)	20	54.0	— 23.6	214.3 237.9	250 250	
														25	68.0	— 23.6	231.8 255.4	250 300	
														15	21.0	— 12.6	106.3 118.9	125 125	
														20	27.0	— 12.6	113.8 126.4	125 150	
	460	414	508	16.7	114	16.7	114	16.7	114	16.7	114	4	3.3 (ea)	25	34.0	— 12.6	122.5 135.1	150 150	
														15	17.0	— 9.6	80.5 90.1	90 100	
														20	22.0	— 9.6	86.7 96.3	100 110	
														25	27.0	— 9.6	93.0 102.6	110 125	

See Legend and Notes on page 85.



48A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET (cont)

UNIT SIZE 48A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		POWER SUPPLY	
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2									
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	FLA (total)	MCA	MOPC*	
050	208	187	229	33.3	239	33.3	239	33.3	239	33.3	239	4	6.5 (ea)	20	59.4	—	23.6	233.5	250
														25	74.8	—	23.6	252.7	300
														30	88.0	—	23.6	269.2	350
	230	207	253	33.3	239	33.3	239	33.3	239	33.3	239	4	6.6 (ea)	20	54.0	—	23.6	227.1	300
														25	68.0	—	23.6	244.6	300
														30	80.0	—	23.6	259.6	350
	460	414	508	17.9	125	17.9	125	17.9	125	17.9	125	4	3.3 (ea)	20	27.0	—	12.6	118.6	125
														25	34.0	—	12.6	127.3	150
														30	40.0	—	12.6	134.8	175
060 (MCHX)	575	518	632	12.8	80	12.8	80	12.8	80	12.8	80	4	2.6 (ea)	20	22.0	—	9.6	89.1	110
														25	27.0	—	9.6	95.4	125
														30	32.0	—	9.6	101.6	125
	208	187	229	51.3	300	51.3	300	51.3	300	51.3	300	4	5.5 (ea)	25	74.8	—	35.4	320.7	400
														30	88.0	—	35.4	337.2	450
														40	114.0	—	35.4	369.7	500
	230	207	253	51.3	300	51.3	300	51.3	300	51.3	300	4	5.8 (ea)	25	68.0	—	35.4	313.4	400
														30	80.0	—	35.4	328.4	400
														40	104.0	—	35.4	358.4	450
	460	414	508	22.4	150	22.4	150	22.4	150	22.4	150	4	2.9 (ea)	25	34.0	—	18.9	143.7	175
														30	40.0	—	18.9	151.2	200
														40	52.0	—	18.9	166.2	225
060 (RTPF)	575	518	632	19.9	109	19.9	109	19.9	109	19.9	109	4	2.3 (ea)	25	27.0	—	14.4	122.6	150
														30	32.0	—	14.4	128.8	175
														40	41.0	—	14.4	140.1	175
	208	187	229	51.3	300	51.3	300	51.3	300	51.3	300	6	6.5 (ea)	25	74.8	—	35.4	337.7	400
														30	88.0	—	35.4	354.2	450
														40	114.0	—	35.4	386.7	500
	230	207	253	51.3	300	51.3	300	51.3	300	51.3	300	6	6.6 (ea)	25	68.0	—	35.4	329.8	400
														30	80.0	—	35.4	344.8	450
														40	104.0	—	35.4	374.8	500
	460	414	508	22.4	150	22.4	150	22.4	150	22.4	150	6	3.3 (ea)	25	34.0	—	18.9	151.9	200
														30	40.0	—	18.9	159.4	225
														40	52.0	—	18.9	174.4	225
	575	518	632	19.9	109	19.9	109	19.9	109	19.9	109	6	2.6 (ea)	25	27.0	—	14.4	129.0	150
														30	32.0	—	14.4	135.2	175
														40	41.0	—	14.4	146.5	200

See Legend and Notes on page 85.

Electrical data (cont)



48A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET

UNIT SIZE 48A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET		POWER SUPPLY								
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2																	
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA																
020	208	187	229	22.4	149	22.4	149	27.6	191	—	—	2	6.5 (ea)	5	16.7	— 23.6	7.0 7.0	116.0 139.6	125 150								
	230	207	253	22.4	149	22.4	149	27.6	191	—	—	2	6.6 (ea)	5	15.2	— 23.6	7.0 7.0	130.9 154.5	150 175								
	460	414	508	10.6	75	10.6	75	12.8	100	—	—	2	3.3 (ea)	5	7.6	— 12.6	3.5 3.5	54.9 67.5	60 80								
	575	518	632	7.7	54	7.7	54	12.2	80	—	—	2	2.6 (ea)	5	6.1	— 9.6	2.5 2.5	44.5 54.1	50 60								
025	208	187	229	27.6	191	27.6	191	27.6	191	—	—	2	6.5 (ea)	5	16.7	— 23.6	7.0 7.0	126.4 150.0	150 175								
	230	207	253	27.6	191	27.6	191	27.6	191	—	—	2	6.6 (ea)	5	15.2	— 23.6	7.0 7.0	141.3 164.9	150 175								
	460	414	508	12.8	100	12.8	100	12.8	100	—	—	2	3.3 (ea)	5	7.6	— 12.6	3.5 3.5	59.3 71.9	70 80								
	575	518	632	12.2	80	12.2	80	12.2	80	—	—	2	2.6 (ea)	5	6.1	— 9.6	2.5 2.5	53.5 63.1	60 70								
027	208	187	229	27.6	191	27.6	191	27.6	191	—	—	2	6.5 (ea)	10	30.8	— 23.6	7.0 7.0	141.3 164.9	150 175								
	230	207	253	27.6	191	27.6	191	27.6	191	—	—	2	6.6 (ea)	10	28.0	— 23.6	7.0 7.0	160.6 184.2	200 225								
	460	414	508	12.8	100	12.8	100	12.8	100	—	—	2	3.3 (ea)	10	14.0	— 12.6	3.5 3.5	66.0 78.6	80 90								
	575	518	632	12.2	80	12.2	80	12.2	80	—	—	2	2.6 (ea)	10	11.0	— 9.6	2.5 2.5	58.4 68.0	80 90								

See Legend and Notes on page 85.



48A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET (cont)

UNIT SIZE 48A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	POWER SUPPLY			
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2											
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	FLA (total)	FLA	MCA	MOP*		
030	208	187	229	23.2	184	23.2	164	23.2	164	23.2	164	23.2	164	2	6.5 (ea)	10	30.8	—	7.0	151.3 174.9	175 200
																15	46.2	—	7.0	170.6 194.2	200 225
																20	59.4	—	7.0	187.1 210.7	225 250
	230	207	253	23.2	164	23.2	164	23.2	164	23.2	164	23.2	164	2	6.6 (ea)	10	28.0	—	7.0	148.0 171.6	175 175
																15	42.0	—	7.0	165.5 189.1	200 225
																20	54.0	—	7.0	180.5 204.1	225 250
	460	414	508	11.2	75	11.2	75	11.2	75	11.2	75	11.2	75	2	3.3 (ea)	10	14.0	—	3.5	72.4 85.0	80 90
																15	21.0	—	3.5	81.2 93.8	100 110
																20	27.0	—	3.5	88.7 101.3	110 125
	575	518	632	7.9	54	7.9	54	7.9	54	7.9	54	7.9	54	2	2.6 (ea)	10	11.0	—	2.5	53.1 62.7	60 70
																15	17.0	—	2.5	60.6 70.2	70 80
																20	22.0	—	2.5	66.8 76.4	80 90
035	208	187	229	22.4	149	22.4	149	30.1	225	30.1	225	225	2	6.5 (ea)	15	46.2	—	7.0	182.8 206.4	225 250	
															20	59.4	—	7.0	199.3 222.9	250 250	
															25	74.8	—	7.0	218.5 242.1	250 300	
	230	207	253	22.4	149	22.4	149	30.1	225	30.1	225	225	2	6.6 (ea)	15	42.0	—	7.0	177.7 201.3	200 225	
															20	54.0	—	7.0	192.7 216.3	225 250	
															25	68.0	—	7.0	210.2 233.8	250 300	
	460	414	508	10.6	75	10.6	75	16.7	114	16.7	114	16.7	2	3.3 (ea)	15	21.0	—	3.5	91.0 103.6	110 110	
															20	27.0	—	3.5	98.5 111.1	125 125	
															25	34.0	—	3.5	107.2 119.8	125 150	
	575	518	632	7.7	54	7.7	54	12.2	80	12.2	80	12.2	80	2	2.6 (ea)	15	17.0	—	2.5	68.8 78.4	80 90
																20	22.0	—	2.5	75.0 84.6	90 100
																25	27.0	—	2.5	81.3 90.9	100 110
040	208	187	229	30.1	225	30.1	225	30.1	225	30.1	225	225	2	6.5 (ea)	15	46.2	—	7.0	211.2 234.8	250 250	
															20	59.4	—	7.0	227.7 251.3	250 300	
															25	74.8	—	7.0	246.9 270.5	300 300	
	230	207	253	30.1	225	30.1	225	30.1	225	30.1	225	225	2	6.6 (ea)	15	42.0	—	7.0	206.3 229.9	225 250	
															20	54.0	—	7.0	221.3 244.9	250 250	
															25	68.0	—	7.0	238.8 262.4	300 300	
	460	414	508	16.7	114	16.7	114	16.7	114	16.7	114	16.7	2	3.3 (ea)	15	21.0	—	3.5	109.8 122.4	125 125	
															20	27.0	—	3.5	117.3 129.9	125 150	
															25	34.0	—	3.5	126.0 138.6	150 150	
	575	518	632	12.2	80	12.2	80	12.2	80	12.2	80	12.2	80	2	2.6 (ea)	15	17.0	—	2.5	83.0 92.6	90 100
																20	22.0	—	2.5	89.2 98.8	110 110
																25	27.0	—	2.5	95.5 105.1	110 125

See Legend and Notes on page 85.

Electrical data (cont)



48A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET (cont)

UNIT SIZE 48A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR						CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	POWER SUPPLY			
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2						FLA	MCA	MOPC*	
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	FLA (total)	FLA	MCA	MOPC*
050	208	187	229	33.3	239	33.3	239	33.3	239	33.3	239	4	6.5 (ea)	20	59.0	— 23.6	7.0 7.0	240.5 264.1	250 300
												25		75.0	— 23.6	7.0 7.0	259.7 283.3	300 350	
												30		88.0	— 23.6	7.0 7.0	276.2 299.8	350 350	
	230	207	253	33.3	239	33.3	239	33.3	239	33.3	239	4	6.6 (ea)	20	54.0	— 23.6	7.0 7.0	234.1 257.7	250 300
												25		68.0	— 23.6	7.0 7.0	251.6 275.2	300 300	
												30		80.0	— 23.6	7.0 7.0	266.6 290.2	300 350	
	460	414	508	17.9	125	17.9	125	17.9	125	17.9	125	4	3.3 (ea)	20	27.0	— 12.6	3.5 3.5	122.1 134.7	125 150
												25		34.0	— 12.6	3.5 3.5	130.8 143.4	150 175	
												30		40.0	— 12.6	3.5 3.5	138.3 150.9	175 175	
	575	518	632	12.8	80	12.8	80	12.8	80	12.8	80	4	2.6 (ea)	20	22.0	— 9.6	2.5 2.5	91.6 101.2	110 110
												25		27.0	— 9.6	2.5 2.5	97.9 107.5	110 125	
												30		32.0	— 9.6	2.5 2.5	104.1 113.7	125 125	
060 (MCHX)	208	187	229	51.3	300	51.3	300	51.3	300	51.3	300	4	5.5 (ea)	25	75.0	— 35.4	7.0 7.0	327.7 363.1	400 400
												30		88.0	— 35.4	7.0 7.0	344.2 379.6	400 450	
												40		114.0	— 35.4	7.0 7.0	376.7 412.1	450 500	
	230	207	253	51.3	300	51.3	300	51.3	300	51.3	300	4	5.8 (ea)	25	68.0	— 35.4	7.0 7.0	320.4 355.8	350 400
												30		80.0	— 35.4	7.0 7.0	335.4 370.8	400 450	
												40		104.0	— 35.4	7.0 7.0	365.4 400.8	450 500	
	460	414	508	22.4	150	22.4	150	22.4	150	22.4	150	4	2.9 (ea)	25	34.0	— 18.9	3.5 3.5	147.2 166.1	175 200
												30		40.0	— 18.9	3.5 3.5	154.7 173.6	175 200	
												40		52.0	— 18.9	3.5 3.5	169.7 188.6	200 225	
	575	518	632	19.9	109	19.9	109	19.9	109	19.9	109	4	2.3 (ea)	25	27.0	— 14.4	2.5 2.5	125.1 139.5	150 150
												30		32.0	— 14.4	2.5 2.5	131.3 145.7	150 175	
												40		41.0	— 14.4	2.5 2.5	142.6 157.0	175 175	
060 (RTPF)	208	187	229	51.3	300	51.3	300	51.3	300	51.3	300	6	6.5 (ea)	25	74.8	— 35.4	7.0 7.0	344.7 380.1	400 450
												30		88.0	— 35.4	7.0 7.0	361.2 396.6	400 450	
												40		114.0	— 35.4	7.0 7.0	393.7 429.1	500 500	
	230	207	253	51.3	300	51.3	300	51.3	300	51.3	300	6	6.6 (ea)	25	68.0	— 35.4	7.0 7.0	336.8 372.2	400 400
												30		80.0	— 35.4	7.0 7.0	351.8 387.2	400 450	
												40		104.0	— 35.4	7.0 7.0	381.8 417.2	450 500	
	460	414	508	22.4	150	22.4	150	22.4	150	22.4	150	6	3.3 (ea)	25	34.0	— 18.9	3.5 3.5	155.4 174.3	175 200
												30		40.0	— 18.9	3.5 3.5	162.9 181.8	200 200	
												40		52.0	— 18.9	3.5 3.5	177.9 196.8	225 225	
	575	518	632	19.9	109	19.9	109	19.9	109	19.9	109	6	2.6 (ea)	25	27.0	— 14.4	2.5 2.5	131.5 145.9	150 150
												30		32.0	— 14.4	2.5 2.5	137.7 152.1	150 175	
												40		41.0	— 14.4	2.5 2.5	149.0 163.4	175 200	

See Legend and Notes on page 85.



50A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT		POWER SUPPLY		
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2												
		Min	Max	FLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	FLA (total)	FLA	kW	MCA	MOCP*		
208	187	229	22.4	149	22.4	149	27.6	191	—	—	2	6.5 (ea)	5	16.7	—	—	75.1 150.1	—	109.0 125 114.8 125 171.0	125	109.0 125 114.8 125 200	
															23.6	— 75.1 150.1	— 27 54	132.6 150 144.3 200.5	150	132.6 150 144.3 200.5		
															10	30.8	— 75.1 150.1	— 27 54	123.9 150 132.4 188.6	150	123.9 150 132.4 188.6	
															23.6	— 75.1 150.1	— 27 54	147.5 175 161.9 218.1	175	147.5 175 161.9 218.1		
															15	46.2	— 75.1 150.1	— 27 54	143.2 175 151.6 207.9	175	143.2 175 151.6 207.9	
															23.6	— 75.1 150.1	— 27 54	166.8 200 181.1 237.4	200	166.8 200 181.1 237.4		
															5	15.2	— 86.6 173.2	— 36 72	107.7 125 127.3 192.2	125	107.7 125 127.3 192.2	
															23.6	— 86.6 173.2	— 36 72	131.3 150 156.8 221.7	150	131.3 150 156.8 221.7		
															10	28.0	— 86.6 173.2	— 36 72	120.6 125 143.3 208.2	125	120.6 125 143.3 208.2	
															23.6	— 86.6 173.2	— 36 72	144.2 175 172.8 237.7	150	144.2 175 172.8 237.7		
230	207	253	22.4	149	22.4	149	27.6	191	—	—	2	6.6 (ea)	5	15.2	—	—	86.6 173.2	— 36 72	107.7 125 127.3 192.2	125	107.7 125 127.3 192.2	
															23.6	— 86.6 173.2	— 36 72	131.3 150 156.8 221.7	150	131.3 150 156.8 221.7		
															10	28.0	— 86.6 173.2	— 36 72	120.6 125 143.3 208.2	125	120.6 125 143.3 208.2	
															15	42.0	— 86.6 173.2	— 36 72	138.1 175 160.8 225.7	175	138.1 175 160.8 225.7	
															23.6	— 86.6 173.2	— 36 72	161.7 200 190.3 255.2	200	161.7 200 190.3 255.2		
															5	7.6	— 43.3 86.6	— 36 72	51.4 60 63.6 96.1	60	51.4 60 63.6 96.1	
															12.6	— 43.3 86.6	— 36 72	64.0 70 79.4 111.9	70	64.0 70 79.4 111.9		
															10	14.0	— 43.3 86.6	— 36 72	58.1 70 71.6 104.1	70	58.1 70 71.6 104.1	
															12.6	— 43.3 86.6	— 36 72	70.7 80 87.4 119.9	80	70.7 80 87.4 119.9		
															15	21.0	— 43.3 86.6	— 36 72	66.9 80 80.4 112.9	80	66.9 80 80.4 112.9	
															12.6	— 43.3 86.6	— 36 72	79.5 100 96.1 128.6	100	79.5 100 96.1 128.6		
575	518	632	7.7	54	7.7	54	12.2	80	—	—	2	2.6 (ea)	5	6.1	—	—	— 36 72	— 36 72	42.0 50 50.9 76.9	50	42.0 50 50.9 76.9	
															9.6	— 34.6 69.3	— 36 72	51.6 60 62.9 88.9	60	51.6 60 62.9 88.9		
															10	11.0	— 34.6 69.3	— 36 72	46.9 50 57.0 83.1	50	46.9 50 57.0 83.1	
															9.6	— 34.6 69.3	— 36 72	56.5 60 69.0 95.1	100	56.5 60 69.0 95.1		
															15	17.0	— 34.6 69.3	— 36 72	54.1 70 64.5 90.6	70	54.1 70 64.5 90.6	
															9.6	— 34.6 69.3	— 36 72	63.7 80 76.5 102.6	80	63.7 80 76.5 102.6		
															5	9.1	— 34.2 68.4	— 23 45	59.2 70 59.2 70	70	59.2 70 59.2 70	
															14.8	— 34.2 68.4	— 23 45	74.0 90 74.0 90	90	74.0 90 74.0 90		
															10	16.7	— 34.2 68.4	— 23 45	66.8 80 66.8 80	80	66.8 80 66.8 80	
															14.8	— 34.2 68.4	— 23 45	81.6 110 82.1 124.9	110	81.6 90 82.1 124.9		
															15	24.5	— 34.2 68.4	— 23 45	76.5 100 76.5 100	100	76.5 100 76.5 100	
															14.8	— 34.2 68.4	— 23 45	91.3 110 91.9 134.6	110	91.3 110 91.9 134.6		

See Legend and Notes on page 85.

Electrical data (cont)



50A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT		POWER SUPPLY										
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2																				
		Min	Max	FLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA																			
025	208	187	229	27.6	191	27.6	191	27.6	191	—	—	2	6.5 (ea)	5	16.7	—	— 75.1 150.1	— 27 54	119.4 119.4 125 125 200	125	125									
																23.6	— 75.1 150.1	— 27 54	143.0 144.3 150 200.5 225	150	150									
																10	30.8	— 75.1 150.1	— 27 54	134.3 134.3 150 188.6 200	150	150								
																23.6	— 75.1 150.1	— 27 54	157.9 161.9 175 218.1 225	175	175									
																15	46.2	— 75.1 150.1	— 27 54	153.6 153.6 175 207.9 250	175	175								
	230	207	253	27.6	191	27.6	191	27.6	191	—	—	2	6.6 (ea)	5	15.2	—	— 86.6 173.2	— 36 72	118.1 127.3 150 192.2 225	125	125									
																23.6	— 86.6 173.2	— 36 72	141.7 156.8 175 221.7 225	150	150									
																10	28.0	— 86.6 173.2	— 36 72	131.0 143.3 150 208.2 225	150	150								
																23.6	— 86.6 173.2	— 36 72	154.6 172.8 175 237.7 250	175	175									
																15	42.0	— 86.6 173.2	— 36 72	148.5 160.8 175 225.7 250	175	175								
025	460	414	508	12.8	100	12.8	100	12.8	100	—	—	2	3.3 (ea)	5	7.6	—	— 43.3 86.6	— 36 72	55.8 63.6 60 96.1 110	60	60									
																12.6	— 43.3 86.6	— 36 72	68.4 79.4 80 111.9 125	80	80									
																10	14.0	— 43.3 86.6	— 36 72	62.5 71.6 70 104.1 110	70	70								
																12.6	— 43.3 86.6	— 36 72	75.1 87.4 90 119.9 125	80	80									
																15	21.0	— 43.3 86.6	— 36 72	71.3 80.4 90 112.9 125	90	90								
	575	518	632	12.2	80	12.2	80	12.2	80	—	—	2	2.6 (ea)	5	6.1	—	— 34.6 69.3	— 36 72	51.0 51.0 60 76.9 90	60	60									
																9.6	— 34.6 69.3	— 36 72	60.6 62.9 70 88.9 100	70	70									
																10	11.0	— 34.6 69.3	— 36 72	55.9 57.0 60 83.1 90	60	60								
																9.6	— 34.6 69.3	— 36 72	65.5 69.0 70 95.1 100	70	70									
																15	17.0	— 34.6 69.3	— 36 72	63.1 64.5 80 90.6 100	80	80								
380	380	342	418	16.7	123	16.7	123	16.7	123	—	—	2	3.6 (ea)	5	9.1	—	— 34.2 68.4	— 23 45	70.6 70.6 80 96.9 100	80	80									
																14.8	— 34.2 68.4	— 23 45	85.4 85.4 100 115.4 125	100	100									
																10	16.7	— 34.2 68.4	— 23 45	78.2 78.2 90 106.4 110	90	90								
																14.8	— 34.2 68.4	— 23 45	93.0 93.0 100 124.9 125	100	100									
																15	24.5	— 34.2 68.4	— 23 45	87.9 87.9 110 116.1 125	110	110								
																14.8	34.2 68.4	23 45	102.7 102.7 125 134.6 150	125	125									

See Legend and Notes on page 85.



50A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT		POWER SUPPLY	
		Min	Max	Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2		Qty	FLA	Hp	FLA	FLA (total)	FLA	kW	MCA	MOCP*	
208	187	229	27.6	191	27.6	191	27.6	191	—	—	2	6.5 (ea)	10	30.8	—	—	75.1 150.1	27 54	134.3 150	150	
															23.6	— 150.1	— 54	157.9 161.9 218.1	175 175 225		
															15	46.2	— 150.1	— 54	153.6 153.6 207.9	175 175 250	
															23.6	— 150.1	— 54	177.2 181.1 237.4	200 200 250		
															20	59.4	— 150.1	— 54	170.1 170.1 224.4	225 225 250	
															23.6	— 150.1	— 54	193.7 197.6 253.9	250 250 300		
															10	28.0	— 173.2	— 72	131.0 143.3 208.2	150 150 225	
															23.6	— 173.2	— 72	154.6 172.8 237.7	175 175 250		
															15	42.0	— 173.2	— 72	148.5 160.8 225.7	175 175 250	
															23.6	— 173.2	— 72	172.1 190.3 255.2	200 200 300		
027	207	253	27.6	191	27.6	191	27.6	191	—	—	2	6.6 (ea)	10	28.0	—	—	86.6 173.2	36 72	130.0 143.3 208.2	150 150 225	
															23.6	— 173.2	— 72	154.6 172.8 237.7	175 175 250		
															15	42.0	— 173.2	— 72	148.5 160.8 225.7	175 175 250	
															23.6	— 173.2	— 72	172.1 190.3 255.2	200 200 300		
															20	54.0	— 173.2	— 72	163.5 175.8 240.7	200 200 250	
															23.6	— 173.2	— 72	187.1 205.3 270.2	225 225 300		
															10	14.0	— 86.6	— 72	62.5 71.6 104.1	70 80 110	
															12.6	— 86.6	— 72	75.1 87.4 119.9	80 90 125		
															15	21.0	— 86.6	— 72	71.3 80.4 112.9	90 90 125	
															12.6	— 86.6	— 72	83.9 96.1 128.6	100 100 150		
575	460	414	508	12.8	100	12.8	100	12.8	100	—	—	2	3.3 (ea)	10	11.0	—	—	43.3 69.3	36 72	62.5 70.8 83.1	70 80 90
																9.6	— 69.3	— 72	65.5 69.0 95.1	70 70 100	
																15	17.0	— 69.3	— 72	63.1 64.5 90.6	80 80 100
																9.6	— 69.3	— 72	72.7 76.5 102.6	80 80 110	
																20	22.0	— 69.3	— 72	69.3 70.8 96.8	90 90 110
																9.6	— 69.3	— 72	78.9 82.8 108.8	100 100 125	
																10	16.7	— 68.4	— 45	78.2 87.9 106.4	90 90 110
																14.8	— 68.4	— 45	93.0 124.9	100 100 125	
																15	24.5	— 68.4	— 45	87.9 116.1	110 110 125
																14.8	— 68.4	— 45	102.7 134.6	125 125 150	
380	342	418	16.7	123	16.7	123	16.7	123	—	—	2	3.6 (ea)	10	30.0	—	—	34.2 68.4	23 45	94.8 94.8 123.0	110 110 125	
															14.8	— 68.4	— 45	109.6 141.5	125 125 150		

See Legend and Notes on page 85.

Electrical data (cont)



50A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	OPTIONAL ELECTRIC HEAT		POWER SUPPLY								
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2																	
		Min	Max	FLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA																
208	187	229	23.2	164	23.2	164	23.2	164	23.2	164	23.2	164	2	6.5 (ea)	10	30.8	—	— 75.1 150.1	— 27 54	144.3 144.3 188.6	175 175 200						
																	23.6	— 75.1 150.1	— 27 54	167.9 167.9 218.1	175 175 225						
																	15	46.2	— 75.1 150.1	— 27 54	163.6 163.6 207.9	200 200 250					
																	23.6	— 75.1 150.1	— 27 54	187.2 187.2 237.4	225 225 250						
																	20	59.4	— 75.1 150.1	— 27 54	180.1 180.1 224.4	225 225 250					
	207	253	23.2	164	23.2	164	23.2	164	23.2	164	23.2	164	2	6.6 (ea)	10	28.0	—	— 86.6 173.2	— 36 72	141.0 143.3 208.2	150 150 225						
																	23.6	— 86.6 173.2	— 36 72	164.6 175 237.7	175 175 250						
																	15	42.0	— 86.6 173.2	— 36 72	158.5 160.8 225.7	200 200 250					
																	23.6	— 86.6 173.2	— 36 72	182.1 190.3 255.2	200 200 300						
																	20	54.0	— 86.6 173.2	— 36 72	173.5 175.8 240.7	225 225 250					
030	460	414	508	11.2	75	11.2	75	11.2	75	11.2	75	11.2	75	2	3.3 (ea)	10	14.0	—	— 43.3 86.6	— 36 72	68.9 71.6 104.1	80 80 110					
																		12.6	— 43.3 86.6	— 36 72	81.5 87.4 119.9	90 90 125					
																		15	21.0	— 43.3 86.6	— 36 72	77.7 80.4 112.9	90 90 125				
																		12.6	— 43.3 86.6	— 36 72	90.3 96.1 128.6	110 110 150					
																		20	27.0	— 43.3 86.6	— 36 72	85.2 87.9 120.4	110 110 125				
	575	518	632	7.9	54	7.9	54	7.9	54	7.9	54	7.9	54	2	2.6 (ea)	10	11.0	—	— 34.6 69.3	— 36 72	50.6 57.0 83.1	60 60 90					
																		9.6	— 34.6 69.3	— 36 72	60.2 69.0 95.1	70 70 100					
																		15	17.0	— 34.6 69.3	— 36 72	58.1 64.5 90.6	70 70 100				
																		9.6	— 34.6 69.3	— 36 72	67.7 76.5 102.6	80 80 110					
																		20	22.0	— 34.6 69.3	— 36 72	64.3 70.8 96.8	80 80 110				
380	342	418	12.2	73	12.2	73	12.2	73	12.2	73	12.2	73	2	3.6 (ea)	10	16.7	—	— 34.2 68.4	— 23 45	76.9 76.9 106.4	90 90 110						
																	14.8	— 34.2 68.4	— 23 45	91.7 91.7 124.9	100 100 125						
																	15	24.5	— 34.2 68.4	— 23 45	86.6 86.6 116.1	110 110 125					
	342	418	12.2	73	12.2	73	12.2	73	12.2	73	12.2	73	2	3.6 (ea)	20	30.0	—	— 34.2 68.4	— 23 45	93.5 93.5 123.0	110 110 125						
																	14.8	— 34.2 68.4	— 23 45	108.3 108.3 141.5	125 125 150						

See Legend and Notes on page 85.



50A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	OPTIONAL ELECTRIC HEAT		POWER SUPPLY		
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2											
Min	Max	FLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	HP	FLA	FLA (total)	FLA	kW	MCA	MOCP*			
208	187	229	22.4	149	22.4	149	30.1	225	30.1	225	2	6.5 (ea)	15	46.2	—	— 75.1 150.1	— 27 54	175.8 199.4 225	200 225 250		
															23.6	— 75.1 150.1	— 27 54	175.8 199.4 225	200 225 250		
															20	59.4	— 75.1 150.1	— 27 54	192.3 215.9 224.4	250 250 250	
															23.6	— 75.1 150.1	— 27 54	215.9 253.9	250 300		
															25	74.8	— 75.1 150.1	— 27 54	211.5 235.1	250 300	
	207	253	22.4	149	22.4	149	30.1	225	30.1	225	2	6.6 (ea)	15	42.0	—	— 86.6 173.2	— 36 72	170.7 194.3 225	200 225 250		
															23.6	— 86.6 173.2	— 36 72	170.7 194.3 225	200 225 300		
															20	54.0	— 86.6 173.2	— 36 72	185.7 209.3	225 250	
															23.6	— 86.6 173.2	— 36 72	209.3 230.3	250 300		
															25	68.0	— 86.6 173.2	— 36 72	203.2 226.8	250 250	
035	460	414	508	10.6	75	10.6	75	16.7	114	16.7	114	2	3.3 (ea)	15	21.0	—	— 43.3 86.6	— 36 72	87.5 100 112.9	100 100 125	
																12.6	— 43.3 86.6	— 36 72	100.1 100.1 128.6	110 110 150	
																20	27.0	— 43.3 86.6	— 36 72	95.0 120.4	110 125
																12.6	— 43.3 86.6	— 36 72	107.6 136.1	125 150	
																25	34.0	— 43.3 86.6	— 36 72	103.7 129.1	125 150
	575	518	632	7.7	54	7.7	54	12.2	80	12.2	80	2	2.6 (ea)	15	17.0	—	— 34.6 69.3	— 36 72	66.3 75.9 90.6	80 90 100	
																9.6	— 34.6 69.3	— 36 72	76.5 102.6	90 110	
																20	22.0	— 34.6 69.3	— 36 72	72.5 82.1	90 100
																9.6	— 34.6 69.3	— 36 72	108.8	125	
																25	27.0	— 34.6 69.3	— 36 72	78.8 103.1	100 125
380	342	418	11	75.3	11	75.3	19.2	140	19.2	140	2	3.6 (ea)	15	24.5	—	— 34.2 68.4	— 23 45	98.2 113.0 116.1	110 125		
															14.8	— 34.2 68.4	— 23 45	105.1 134.6	125		
															20	30.0	— 34.2 68.4	— 23 45	119.9 141.5	125	
															14.8	— 34.2 68.4	— 23 45	115.1 133.0	150		
	342	418	11	75.3	11	75.3	19.2	140	19.2	140	2	3.6 (ea)	25	38.0	—	— 34.2 68.4	— 23 45	115.1 129.9 151.5	150 150 175		
															14.8	— 34.2 68.4	— 23 45	129.9 151.5	150		
															14.8	— 34.2 68.4	— 23 45	129.9 151.5	150		

See Legend and Notes on page 85.

Electrical data (cont)



50A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR						CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	OPTIONAL ELECTRIC HEAT		POWER SUPPLY																				
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2		Qty	FLA	Hp	FLA	FLA (total)	FLA	kW	MCA	MOPC*																	
		Min	Max	FLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	4	6.5 (ea)	15	46.2	—	— 75.1 150.1	— 27 54	204.2 204.2 204.2 207.9	250 250 250 250																	
208	187	229	30.1	225	30.1	225	30.1	225	30.1	225	30.1	225	4	6.5 (ea)	15	46.2	—	— 75.1 150.1	— 27 54	204.2 204.2 204.2 207.9	250 250 250 250																
																	23.6	— 75.1 150.1	— 27 54	227.8 227.8 227.8 237.4	250 250 250 250																
																	20	59.4	— 75.1 150.1	— 27 54	220.7 220.7 220.7 224.4	250 250 250 250															
																	23.6	— 75.1 150.1	— 27 54	244.3 244.3 244.3 253.9	300 300 300 300																
																	25	74.8	— 75.1 150.1	— 27 54	239.9 239.9 239.9 243.6	300 300 300 300															
	230	207	253	30.1	225	30.1	225	30.1	225	30.1	225	30.1	225	4	6.6 (ea)	15	42.0	—	— 86.6 173.2	— 36 72	199.3 199.3 199.3 225.7	225 225 225 250															
																		23.6	— 86.6 173.2	— 36 72	222.9 222.9 222.9 255.2	250 250 250 300															
																	20	54.0	— 86.6 173.2	— 36 72	214.3 214.3 214.3 240.7	250 250 250 250															
																	23.6	— 86.6 173.2	— 36 72	237.9 237.9 237.9 270.2	250 250 250 300																
																	25	68.0	— 86.6 173.2	— 36 72	231.8 231.8 231.8 258.2	250 250 250 300															
040	460	414	508	16.7	114	16.7	114	16.7	114	16.7	114	16.7	114	4	3.3 (ea)	15	21.0	—	— 43.3 86.6	— 36 72	106.3 106.3 106.3 112.9 125	125 125 125 125 125															
																		12.6	— 43.3 86.6	— 36 72	118.9 118.9 118.9 128.6	125 125 125 150															
																	20	27.0	—	— 43.3 86.6	— 36 72	113.8 113.8 113.8 120.4	125 125 125 125														
																	12.6	— 43.3 86.6	— 36 72	126.4 126.4 126.4 136.1	150 150 150 150																
																	25	34.0	—	— 43.3 86.6	— 36 72	122.5 122.5 122.5 129.1	150 150 150 150														
	575	518	632	12.2	80	12.2	80	12.2	80	12.2	80	12.2	80	4	2.6 (ea)	15	17.0	—	— 34.6 69.3	— 36 72	80.5 80.5 80.5 90.6 100	90 90 90 90 100															
																	9.6	— 34.6 69.3	— 36 72	90.1 90.1 90.1 102.6	100 100 100 110																
																	20	22.0	—	— 34.6 69.3	— 36 72	86.7 86.7 86.7 96.8	100 100 100 110														
																	9.6	— 34.6 69.3	— 36 72	96.3 96.3 96.3 108.8	110 110 110 125																
																	25	27.0	—	— 34.6 69.3	— 36 72	93.0 93.0 93.0 103.1	110 110 110 125														
380	342	418	19.2	140	19.2	140	19.2	140	19.2	140	19.2	140	19.2	4	3.6 (ea)	15	24.5	—	— 34.2 68.4	— 23 45	121.8 121.8 121.8 125	125 125 125 125															
																	14.8	— 34.2 68.4	— 23 45	136.6 136.6 136.6 136.6	150 150 150 150																
																	20	30.0	—	— 34.2 68.4	— 23 45	128.7 128.7 128.7 128.7	150 150 150 150														
	342	418															14.8	— 34.2 68.4	— 23 45	143.5 143.5 143.5	150 150 150																
																	25	38.0	—	— 34.2 68.4	— 23 45	138.7 138.7 138.7	175 175 175														
																	14.8	— 34.2 68.4	— 23 45	153.5 153.5 153.5	175 175 175																

See Legend and Notes on page 85.



50A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	OPTIONAL ELECTRIC HEAT		POWER SUPPLY			
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2												
Min	Max	FLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	FLA (total)	FLA	kW	MCA	MOPC*				
208	187	229	33.3	239	33.3	239	33.3	239	33.3	239	33.3	239	4	6.5 (ea)	20	59.0	—	—	233.5	250		
																75.1 150.1	27 54	233.5	250			
																23.6	75.1 150.1	27 54	257.1 257.1	300 300		
																25	75.0	—	252.7 252.7	300 300		
																23.6	75.1 150.1	27 54	276.3 276.3	350 350		
	207	253	33.3	239	33.3	239	33.3	239	33.3	239	33.3	239	4	6.6 (ea)	30	88.0	—	—	269.2 269.2	350 350		
																23.6	75.1 150.1	27 54	292.8 292.8	350 350		
																20	54.0	—	—	227.1 227.1	250 250	
																23.6	86.6 173.2	36 72	250.7 270.2	300 300		
																25	68.0	—	—	244.6 258.2	300 300	
230	207	253	33.3	239	33.3	239	33.3	239	33.3	239	33.3	239	4	6.6 (ea)	30	80.0	—	—	268.2 287.7	300 300		
																23.6	86.6 173.2	36 72	259.6 273.2	300 350		
																20	54.0	—	—	227.1 240.7	250 250	
																23.6	86.6 173.2	36 72	250.7 270.2	300 300		
																25	68.0	—	—	244.6 258.2	300 300	
	460	414	508	17.9	125	17.9	125	17.9	125	17.9	125	17.9	125	4	3.3 (ea)	20	27.0	—	—	118.6 120.4	125 125	
																12.6	43.3 86.6	36 72	131.2 136.1	150 150		
																25	34.0	—	—	127.3 129.1	150 150	
																12.6	43.3 86.6	36 72	139.9 144.9	150 175		
																30	40.0	—	—	134.8 136.6	150 175	
575	518	632	12.8	80	12.8	80	12.8	80	12.8	80	12.8	80	4	2.6 (ea)	20	22.0	—	—	89.1 96.8	110 110		
																9.6	34.6 69.3	36 72	98.7 108.8	110 125		
																25	27.0	—	—	95.4 103.1	110 125	
																9.6	34.6 69.3	36 72	105.0 115.1	125 125		
																30	32.0	—	—	101.6 109.3	125 125	
	380	342	418	23.7	145	23.7	145	23.7	145	23.7	145	23.7	145	4	3.6 (ea)	20	30.0	—	—	146.7 146.7	175 175	
																14.8	34.2 68.4	23 45	161.5 161.5	175 175		
																25	38.0	—	—	156.7 156.7	175 175	
																14.8	34.2 68.4	23 45	171.5 171.5	200 200		
																30	43.5	—	—	163.6 163.6	200 200	
															14.8	34.2 68.4	23 45	178.4 178.4	200 200			

See Legend and Notes on page 85.

Electrical data (cont)



50A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT		POWER SUPPLY	
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2		Qty	FLA	Hp	FLA	FLA (total)	FLA	kW	MCA	MOPC*	
		Min	Max	FLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA										
060 (MCHX)	208	187	229	51.3	300	51.3	300	51.3	300	51.3	300	4	5.5 (ea)	25	74.8	—	—	320.7	350		
															112.6 225.2	41 81	320.7	350			
															35.4	112.6 225.2	41 81	356.1 363.0	400		
															—	112.6 225.2	41 81	337.2 379.5	400		
															35.4	112.6 225.2	41 81	372.6 397.5	450		
	230	207	253	51.3	300	51.3	300	51.3	300	51.3	300	4	5.8 (ea)	30	88.0	—	—	320.7	350		
															112.6 225.2	41 81	356.1 363.0	400			
															35.4	112.6 225.2	41 81	337.2 379.5	400		
															—	112.6 225.2	41 81	372.6 397.5	450		
															35.4	112.6 225.2	41 81	395.7 405.1	500		
575	460	414	508	22.4	150	22.4	150	22.4	150	22.4	150	4	2.9 (ea)	25	34.0	—	—	313.4	350		
															129.9 259.8	54 108	313.4 344.8	400			
															35.4	129.9 259.8	54 108	348.8 389.1	400		
															—	129.9 259.8	54 108	328.4 359.8	400		
															35.4	129.9 259.8	54 108	363.8 404.1	450		
	380	342	418	26.9	139	26.9	139	26.9	139	26.9	139	4	3.7 (ea)	40	104.0	—	—	358.4	450		
															129.9 259.8	54 108	358.4 389.8	450			
															35.4	129.9 259.8	54 108	393.8 434.1	500		
															—	129.9 259.8	54 108	358.4 389.8	450		
															18.9	65.0 129.9	54 108	143.7 172.4	175		
060 (MCHX)	575	518	632	19.9	109	19.9	190	19.9	109	19.9	109	4	2.3 (ea)	30	40.0	—	—	162.6	175		
															65.0 129.9	54 108	162.6 196.0	225			
															18.9	65.0 129.9	54 108	151.2 179.9	200		
															—	65.0 129.9	54 108	170.1 203.5	225		
															18.9	65.0 129.9	54 108	166.2 194.9	200		
	380	342	418	26.9	139	26.9	139	26.9	139	26.9	139	4	3.7 (ea)	40	52.0	—	—	185.1	225		
															65.0 129.9	54 108	185.1 218.5	225			
															14.4	65.0 129.9	54 108	122.6 137.7	125		
															—	65.0 129.9	54 108	137.0 155.7	150		
															14.4	65.0 129.9	54 108	128.8 143.9	150		
See Legend and Notes on page 85.	25	38.0	43.5	22.2	102.8	102.8	102.8	102.8	102.8	102.8	102.8	4	3.7 (ea)	40	56.2	—	—	140.1	175		
															51.4 102.8	54 108	140.1 152	175			
															14.4	51.4 102.8	54 108	154.5 173.2	200		
															—	51.4 102.8	33.8 67.7	169.9 169.9	200		
	30	43.5	22.2	102.8	102.8	102.8	102.8	102.8	102.8	102.8	102.8	4	3.7 (ea)	40	56.2	—	—	192.1	225		
															51.4 102.8	33.8 67.7	192.1 192.1	225			
															22.2	51.4 102.8	33.8 67.7	192.7 192.7	225		
															22.2	51.4 102.8	33.8 67.7	214.9 214.9	250		



50A2,A3,A4,A5 UNITS WITHOUT CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT		POWER SUPPLY									
				Cir A, No. 1		Cir A, No. 2		Cir B, No. 1		Cir B, No. 2																			
		Min	Max	FLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA																		
060 (RTPF)	208	187	229	51.3	300	51.3	300	51.3	300	51.3	300	6	6.5 (ea)	25	74.8	—	—	112.6 225.2	41 81	333.7 333.7 400	400 400 400								
																35.4	—	112.6 225.2	41 81	373.1 373.1 400	400 400 400								
																30	88.0	—	112.6 225.2	41 81	354.2 354.2 400	400 400 400							
																35.4	—	112.6 225.2	41 81	389.6 389.6 450	450 450 450								
																40	114.0	—	112.6 225.2	41 81	386.7 386.7 500	500 500 500							
	230	207	253	51.3	300	51.3	300	51.3	300	51.3	300	6	6.6 (ea)	25	68.0	—	—	129.9 259.8	54 108	329.8 329.8 350 344.8	350 350 400								
																35.4	—	129.9 259.8	54 108	365.2 365.2 400	400 400 400								
																30	80.0	—	129.9 259.8	54 108	344.8 344.8 400	400 400 400							
																35.4	—	129.9 259.8	54 108	380.2 380.2 404.1	450 450 450								
																40	104.0	—	129.9 259.8	54 108	374.8 374.8 389.8	450 450 450							
575	460	414	508	22.4	150	22.4	150	22.4	150	22.4	150	6	3.3 (ea)	25	34.0	—	—	65.0 129.9	54 108	151.9 151.9 175 172.4	175 175 200								
																18.9	—	65.0 129.9	54 108	170.8 170.8 200	200 200 225								
																30	40.0	—	65.0 129.9	54 108	159.4 159.4 175	175 175 200							
																18.9	—	65.0 129.9	54 108	178.3 178.3 203.5	200 200 225								
																40	52.0	—	65.0 129.9	54 108	174.4 174.4 225	225 225 225							
	380	518	632	19.9	109	19.9	190	19.9	109	19.9	109	6	2.6 (ea)	25	27.0	—	—	52.0 103.9	54 108	129.0 129.0 150 137.7	150 150 150								
																14.4	—	52.0 103.9	54 108	143.4 143.4 150	150 150 175								
																30	32.0	—	52.0 103.9	54 108	135.2 135.2 150	150 150 175							
																14.4	—	52.0 103.9	54 108	149.6 149.6 161.9	175 175 175								
																40	41.0	—	52.0 103.9	54 108	146.5 146.5 175	175 175 175							
380	575	518	632	19.9	109	19.9	190	19.9	109	19.9	109	6	3.6 (ea)	25	38.0	—	—	51.4 102.8	33.8 67.7	151.9 151.9 175	175 175 200								
																22.2	—	51.4 102.8	33.8 67.7	170.8 170.8 200	200 200 225								
																30	43.5	—	51.4 102.8	33.8 67.7	149.4 149.4 175	175 175 200							
	380	342	418	26.9	139	26.9	139	26.9	139	26.9	139	6	3.6 (ea)	25	56.2	—	—	51.4 102.8	33.8 67.7	174.4 174.4 225	225 225 225								
																22.2	—	51.4 102.8	33.8 67.7	193.3 193.3 218.5	225 225 250								

See Legend and Notes on page 85.

Electrical data (cont)



50A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR						CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	OPTIONAL ELECTRIC HEAT		POWER SUPPLY	
				Cir A, No. 1	Cir A, No. 2	Cir B, No. 1	Cir B, No. 2	Qty	FLA	Hp	FLA	FLA (total)	FLA	FLA	kW	MCA	MOCP*		
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	5	16.7	—	7.0	—	116.0	125			
208	187 229 22.4 149 22.4 149 27.6 191 — — 2	6.5 (ea)	5	16.7	7.0	—	7.0	—	7.0	—	—	116.0	125						
					7.0	—	7.0	—	7.0	—	75.1	75.1	75.1	27	123.5	125			
					7.0	—	7.0	—	7.0	—	150.1	150.1	150.1	54	179.7	200			
			10	30.8	7.0	—	7.0	—	7.0	—	—	—	—	—	139.6	150			
					7.0	—	7.0	—	7.0	—	75.1	75.1	75.1	27	153.0	175			
					7.0	—	7.0	—	7.0	—	150.1	150.1	150.1	54	209.2	225			
			15	46.2	7.0	—	7.0	—	7.0	—	—	—	—	—	130.9	150			
					7.0	—	7.0	—	7.0	—	75.1	75.1	75.1	27	141.1	150			
					7.0	—	7.0	—	7.0	—	150.1	150.1	150.1	54	197.4	225			
230	207 253 22.4 149 22.4 149 27.6 191 — — 2	6.6 (ea)	5	15.2	7.0	—	7.0	—	7.0	—	—	—	—	—	114.7	125			
					7.0	—	7.0	—	7.0	—	86.6	86.6	86.6	36	136.0	150			
					7.0	—	7.0	—	7.0	—	173.2	173.2	173.2	72	201.0	225			
			10	28.0	7.0	—	7.0	—	7.0	—	—	—	—	—	138.3	150			
					7.0	—	7.0	—	7.0	—	86.6	86.6	86.6	36	165.5	175			
					7.0	—	7.0	—	7.0	—	173.2	173.2	173.2	72	230.5	250			
			15	42.0	7.0	—	7.0	—	7.0	—	—	—	—	—	127.6	150			
					7.0	—	7.0	—	7.0	—	86.6	86.6	86.6	36	152.0	175			
					7.0	—	7.0	—	7.0	—	173.2	173.2	173.2	72	217.0	225			
020	414 508 10.6 75 10.6 75 12.8 100 — — 2	3.3 (ea)	5	7.6	3.5	—	3.5	—	3.5	—	—	—	—	—	54.9	60			
					3.5	—	3.5	—	3.5	—	43.3	43.3	43.3	36	68.0	70			
					3.5	—	3.5	—	3.5	—	86.6	86.6	86.6	72	100.5	110			
			10	14.0	3.5	—	3.5	—	3.5	—	—	—	—	—	67.5	80			
					3.5	—	3.5	—	3.5	—	43.3	43.3	43.3	36	83.8	90			
					3.5	—	3.5	—	3.5	—	86.6	86.6	86.6	72	116.2	125			
			15	21.0	3.5	—	3.5	—	3.5	—	—	—	—	—	61.6	70			
					3.5	—	3.5	—	3.5	—	43.3	43.3	43.3	36	76.0	80			
					3.5	—	3.5	—	3.5	—	86.6	86.6	86.6	72	108.5	110			
460	518 632 7.7 54 7.7 54 12.2 80 — — 2	2.6 (ea)	5	6.1	2.5	—	2.5	—	2.5	—	—	—	—	—	70.4	90			
					2.5	—	2.5	—	2.5	—	34.6	34.6	34.6	36	84.8	90			
					2.5	—	2.5	—	2.5	—	69.3	69.3	69.3	72	117.2	125			
			10	11.0	2.5	—	2.5	—	2.5	—	—	—	—	—	83.0	100			
					2.5	—	2.5	—	2.5	—	43.3	43.3	43.3	36	100.5	110			
					2.5	—	2.5	—	2.5	—	86.6	86.6	86.6	72	133.0	150			
			15	17.0	2.5	—	2.5	—	2.5	—	—	—	—	—	44.5	50			
					2.5	—	2.5	—	2.5	—	34.6	34.6	34.6	36	50.4	60			
					2.5	—	2.5	—	2.5	—	69.3	69.3	69.3	72	80.1	90			
575	518 632 7.7 54 7.7 54 12.2 80 — — 2	2.6 (ea)	10	11.0	2.5	—	2.5	—	2.5	—	—	—	—	—	49.4	60			
					2.5	—	2.5	—	2.5	—	34.6	34.6	34.6	36	60.1	70			
					2.5	—	2.5	—	2.5	—	69.3	69.3	69.3	72	86.2	90			
			15	17.0	2.5	—	2.5	—	2.5	—	—	—	—	—	56.6	70			
					2.5	—	2.5	—	2.5	—	34.6	34.6	34.6	36	66.2	80			
					2.5	—	2.5	—	2.5	—	69.3	69.3	69.3	72	93.7	110			
					9.6	—	9.6	—	9.6	—	—	—	—	—	59.0	70			
					9.6	—	9.6	—	9.6	—	34.6	34.6	34.6	36	72.1	80			
					9.6	—	9.6	—	9.6	—	69.3	69.3	69.3	72	98.2	100			
					9.6	—	9.6	—	9.6	—	—	—	—	—	56.6	70			
					9.6	—	9.6	—	9.6	—	34.6	34.6	34.6	36	66.2	80			
					9.6	—	9.6	—	9.6	—	69.3	69.3	69.3	72	105.7	110			

See Legend and Notes on page 85.



50A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	OPTIONAL ELECTRIC HEAT		POWER SUPPLY			
		Min	Max	RRA	LRA	RRA	LRA	RRA	LRA	Qty	FLA	Hp	FLA	FLA (total)	FLA	kW	MCA	MOCP*	
208	187	229	27.6	191	27.6	191	27.6	191	—	2	6.5 (ea)	5	16.7	—	7.0	—	126.4	150	
														7.0	75.1	27	126.4	150	
														7.0	150.1	54	179.7	200	
													10	30.8	—	7.0	—	150.0	175
														7.0	75.1	27	153.0	175	
													15	46.2	—	7.0	—	141.3	150
														7.0	75.1	27	141.3	150	
													23.6	46.2	—	7.0	—	197.4	225
														7.0	75.1	54	226.9	250	
230	207	253	27.6	191	27.6	191	27.6	191	—	2	6.6 (ea)	5	15.2	—	7.0	—	125.1	150	
														7.0	86.6	36	136.0	150	
													23.6	15.2	—	7.0	—	201.0	225
														7.0	86.6	36	148.7	175	
													10	28.0	—	7.0	—	138.0	150
														7.0	86.6	36	152.0	175	
													23.6	28.0	—	7.0	—	217.0	225
														7.0	86.6	36	161.6	175	
025	460	414	508	12.8	100	12.8	100	12.8	100	—	2	3.3 (ea)	5	7.6	—	3.5	—	59.3	70
														3.5	43.3	36	68.0	70	
													12.6	7.6	—	3.5	—	100.5	110
														3.5	43.3	36	83.8	90	
													10	14.0	—	3.5	—	116.2	125
														3.5	43.3	36	66.0	80	
													12.6	14.0	—	3.5	—	76.0	80
														3.5	86.6	72	108.5	110	
575	518	632	12.2	80	12.2	80	12.2	80	—	2	2.6 (ea)	5	6.1	—	2.5	—	53.5	60	
														2.5	34.6	36	54.0	60	
													9.6	6.1	—	2.5	—	80.1	90
														2.5	69.3	72	63.1	70	
													10	11.0	—	2.5	—	92.1	100
														2.5	34.6	36	74.8	90	
													9.6	11.0	—	2.5	—	84.8	90
														2.5	86.6	72	117.2	125	
													15	17.0	—	2.5	—	87.4	100
														2.5	43.3	36	100.5	110	
													9.6	17.0	—	2.5	—	133.0	150
														2.5	69.3	72	75.2	90	

See Legend and Notes on page 85.

Electrical data (cont)



50A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR						CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	OPTIONAL ELECTRIC HEAT		POWER SUPPLY		
				Cir A, No. 1	Cir A, No. 2	Cir B, No. 1	Cir B, No. 2	Qty	FLA							FLA	FLA	kW	MCA	MOCP*
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA											
027	208	187	229	27.6	191	27.6	191	27.6	191	—	—	2	6.5 (ea)	10	30.8	—	7.0	—	141.3	150
																7.0	75.1	27	141.3	150
																7.0	150.1	54	197.4	225
																23.6	7.0	—	164.9	175
																7.0	75.1	27	170.6	175
	230	207	253	27.6	191	27.6	191	27.6	191	—	—	2	6.6 (ea)	15	46.2	—	7.0	—	160.6	200
																7.0	75.1	27	160.6	200
																7.0	150.1	54	216.6	250
																23.6	7.0	—	184.2	225
																7.0	75.1	27	189.9	225
027	460	414	508	12.8	100	12.8	100	12.8	100	—	—	2	3.3 (ea)	10	14.0	—	7.0	—	138.0	150
																7.0	86.6	36	152.0	175
																7.0	173.2	72	217.0	225
																23.6	7.0	—	161.6	175
																7.0	86.6	36	181.5	200
	575	518	632	12.2	80	12.2	80	12.2	80	—	—	2	2.6 (ea)	15	21.0	—	7.0	—	155.5	175
																7.0	86.6	36	169.5	175
																7.0	173.2	72	234.5	250
																23.6	7.0	—	179.1	200
																7.0	86.6	36	199.0	200
027	208	187	229	27.6	191	27.6	191	27.6	191	—	—	2	6.5 (ea)	10	30.8	—	7.0	—	170.5	200
																7.0	86.6	36	184.5	200
																7.0	173.2	72	249.5	300
																23.6	7.0	—	194.1	225
																7.0	86.6	36	214.0	225
	230	207	253	27.6	191	27.6	191	27.6	191	—	—	2	6.6 (ea)	15	42.0	—	7.0	—	170.5	200
																7.0	86.6	36	184.5	200
																7.0	173.2	72	249.5	300
																23.6	7.0	—	194.1	225
																7.0	86.6	36	214.0	300

See Legend and Notes on page 85.



50A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	OPTIONAL ELECTRIC HEAT		POWER SUPPLY		
		Min	Max	RRA	LRA	RRA	LRA	RRA	LRA	Qty	FLA	Hp	FLA	FLA (total)	FLA	kW	MCA	MOCP*
030	208	187	229	23.2	164	23.2	164	23.2	164	2	6.5 (ea)	10	30.8	—	7.0	—	151.3	175
														7.0	75.1	27	151.3	175
														7.0	150.1	54	197.4	225
												15	46.2	—	7.0	—	174.9	200
														7.0	75.1	27	174.9	200
												20	59.4	—	7.0	—	170.6	200
														7.0	75.1	27	170.6	200
												23.6	28.0	—	7.0	—	194.2	225
														7.0	75.1	27	194.2	225
	230	207	253	23.2	164	23.2	164	23.2	164	2	6.6 (ea)	10	42.0	—	7.0	—	148.0	175
														7.0	86.6	36	152.0	175
														7.0	173.2	72	217.0	225
												15	54.0	—	7.0	—	165.5	200
														7.0	86.6	36	169.5	200
												20	21.0	—	7.0	—	189.1	225
														7.0	86.6	36	199.0	225
												23.6	14.0	—	7.0	—	180.5	225
														7.0	86.6	36	184.5	225
												10	27.0	—	7.0	—	204.1	250
														7.0	86.6	36	214.0	250
												15	22.0	—	7.0	—	204.1	250
														7.0	86.6	36	214.0	250
575	460	414	508	11.2	75	11.2	75	11.2	75	2	3.3 (ea)	10	14.0	—	3.5	—	72.4	80
														3.5	43.3	36	76.0	80
														3.5	86.6	72	108.5	110
												15	21.0	—	3.5	—	85.0	90
														3.5	43.3	36	91.8	100
												20	27.0	—	3.5	—	93.8	110
														3.5	43.3	36	100.5	110
												23.6	11.0	—	3.5	—	93.0	100
														3.5	43.3	36	117.2	125
												10	22.0	—	3.5	—	88.7	110
														3.5	43.3	36	92.3	110
												15	17.0	—	3.5	—	101.3	125
														3.5	43.3	36	108.0	125
												20	22.0	—	3.5	—	140.5	150
														3.5	43.3	36	124.7	150
												23.6	11.0	—	2.5	—	88.7	110
														2.5	34.6	36	92.3	110
												15	17.0	—	2.5	—	60.6	70
														2.5	34.6	36	67.6	70
												20	22.0	—	2.5	—	62.7	70
														2.5	34.6	36	72.1	80
												23.6	11.0	—	2.5	—	98.2	100
														2.5	34.6	36	105.7	110
												20	22.0	—	2.5	—	70.2	80
														2.5	34.6	36	79.6	80
												23.6	11.0	—	2.5	—	105.7	110
														2.5	34.6	36	99.9	110
												20	22.0	—	2.5	—	66.8	80
														2.5	34.6	36	73.9	80
												23.6	11.0	—	2.5	—	111.9	125
														2.5	34.6	36	85.9	90

See Legend and Notes on page 85.

Electrical data (cont)



50A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR						CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	OPTIONAL ELECTRIC HEAT		POWER SUPPLY	
				Cir A, No. 1	Cir A, No. 2	Cir B, No. 1	Cir B, No. 2	Qty	FLA	Hp	FLA	FLA (total)	FLA	FLA	kW	MCA	MOCP*		
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA								
035	208	187	229	22.4	149	22.4	149	30.1	225	30.1	225	2	6.5 (ea)	46.2	—	7.0	—	182.8	225
															7.0	75.1	27	182.8	225
															7.0	150.1	54	216.6	250
															23.6	7.0	—	206.4	250
															7.0	75.1	27	206.4	250
	230	207	253	22.4	149	22.4	149	30.1	225	30.1	225	2	6.6 (ea)	42.0	—	7.0	—	199.3	250
															7.0	86.6	36	192.7	225
															7.0	173.2	72	201.3	225
															23.6	7.0	—	201.3	225
															7.0	86.6	36	264.0	300
460	575	518	632	7.7	54	7.7	54	12.2	80	12.2	80	2	3.3 (ea)	21.0	—	7.0	—	177.7	200
															7.0	86.6	36	177.7	200
															7.0	173.2	72	234.5	250
															23.6	7.0	—	201.3	225
															7.0	86.6	36	201.3	225
	575	518	632	7.7	54	7.7	54	12.2	80	12.2	80	2	2.6 (ea)	27.0	—	7.0	—	192.7	225
															7.0	86.6	36	192.7	225
															7.0	173.2	72	249.5	300
															23.6	7.0	—	216.3	250
															7.0	86.6	36	216.3	250
035	460	414	508	10.6	75	10.6	75	16.7	114	16.7	114	2	3.3 (ea)	21.0	—	3.5	—	91.0	110
															3.5	43.3	36	91.0	110
															3.5	86.6	72	117.2	125
															12.6	3.5	—	103.6	110
															3.5	43.3	36	103.6	110
	575	518	632	7.7	54	7.7	54	12.2	80	12.2	80	2	2.6 (ea)	27.0	—	3.5	—	98.5	125
															3.5	43.3	36	98.5	125
															3.5	86.6	72	124.7	150
															12.6	3.5	—	111.1	125
															3.5	43.3	36	111.1	125
575	575	518	632	7.7	54	7.7	54	12.2	80	12.2	80	2	2.6 (ea)	27.0	—	3.5	—	107.2	125
															3.5	43.3	36	107.2	125
															3.5	86.6	72	133.5	150
															12.6	3.5	—	119.8	150
															3.5	43.3	36	119.8	150
	575	518	632	7.7	54	7.7	54	12.2	80	12.2	80	2	2.6 (ea)	27.0	—	2.5	—	81.3	100
															2.5	34.6	36	81.3	100
															2.5	69.3	72	106.2	125
															9.6	2.5	—	90.9	110
															2.5	34.6	36	92.1	110

See Legend and Notes on page 85.



50A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	OPTIONAL ELECTRIC HEAT		POWER SUPPLY					
		Min	Max	RRA	LRA	RRA	LRA	RRA	LRA	Qty	FLA	Hp	FLA	FLA (total)	FLA	kW	MCA	MOCP*			
040	208	187	229	30.1	225	30.1	225	30.1	225	30.1	225	30.1	225	6.5 (ea)	15	46.2	—	7.0	—	211.2	250
																7.0	75.1	27	211.2	250	
																7.0	150.1	54	216.6	250	
																23.6	7.0	—	234.8	250	
																7.0	75.1	27	234.8	250	
																7.0	150.1	54	246.1	250	
																20	59.4	—	227.7	250	
																23.6	7.0	—	251.3	300	
																7.0	75.1	27	251.3	300	
																7.0	150.1	54	262.6	300	
																25	74.8	—	246.9	300	
																23.6	7.0	—	270.5	300	
																7.0	75.1	27	281.9	300	
																15	42.0	—	206.3	225	
																7.0	86.6	36	206.3	225	
																7.0	173.2	72	234.5	250	
																23.6	7.0	—	229.9	250	
																7.0	86.6	36	229.9	250	
																7.0	173.2	72	264.0	300	
																20	54.0	—	221.3	250	
																23.6	7.0	—	244.9	250	
																7.0	86.6	36	244.9	250	
																7.0	173.2	72	279.0	300	
																25	68.0	—	238.8	300	
																23.6	7.0	—	262.4	300	
																7.0	86.6	36	262.4	300	
																7.0	173.2	72	296.5	350	
																15	21.0	—	109.8	125	
																3.5	43.3	36	109.8	125	
																3.5	86.6	72	117.2	125	
																12.6	3.5	—	122.4	125	
																3.5	43.3	36	122.4	125	
																3.5	86.6	72	133.0	150	
																20	27.0	—	117.3	125	
																3.5	43.3	36	117.3	125	
																12.6	3.5	—	124.7	150	
																3.5	43.3	36	124.7	150	
																25	34.0	—	126.0	150	
																3.5	43.3	36	126.0	150	
																3.5	86.6	72	133.5	150	
																12.6	3.5	—	129.9	150	
																3.5	43.3	36	129.9	150	
																3.5	86.6	72	140.5	150	
																25	34.0	—	126.0	150	
																12.6	3.5	—	138.6	150	
																3.5	43.3	36	138.6	150	
																9.6	3.5	—	149.2	175	
																2.5	34.6	36	83.0	90	
																2.5	69.3	72	93.7	110	
																9.6	2.5	—	92.6	100	
																2.5	34.6	36	92.6	100	
																2.5	69.3	72	105.7	110	
																20	22.0	—	89.2	110	
																9.6	2.5	—	89.2	110	
																2.5	34.6	36	99.2	110	
																2.5	69.3	72	111.9	125	
																25	27.0	—	105.1	125	
																9.6	2.5	—	105.1	125	
																2.5	34.6	36	118.2	125	

Electrical data (cont)



50A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR						CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	OPTIONAL ELECTRIC HEAT		POWER SUPPLY	
				Cir A, No. 1	Cir A, No. 2	Cir B, No. 1	Cir B, No. 2	Qty	FLA	Hp	FLA	FLA (total)	FLA	FLA	kW	MCA	MOCP*		
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	20	59.0	7.0	—	240.5	250	240.5	250		
050	208	187	229	33.3	239	33.3	239	33.3	239	4	6.5 (ea)	20	59.0	7.0	—	240.5	250	240.5	250
												7.0	—	240.5	250	240.5	250		
												7.0	—	240.5	250	240.5	250		
												23.6	7.0	—	264.1	300	264.1	300	
												7.0	7.0	—	264.1	300	264.1	300	
	230	207	253	33.3	239	33.3	239	33.3	239	4	6.6 (ea)	20	54.0	7.0	—	259.7	300	259.7	300
												7.0	—	259.7	300	259.7	300		
												7.0	7.0	—	283.3	350	283.3	350	
												23.6	7.0	7.0	—	283.3	350	283.3	350
												23.6	7.0	7.0	—	299.8	350	299.8	350
460	460	414	508	17.9	125	17.9	125	17.9	125	4	3.3 (ea)	20	27.0	7.0	—	234.1	250	234.1	250
												7.0	—	234.1	250	234.1	250		
												7.0	173.2	—	249.5	300	249.5	300	
												23.6	7.0	—	257.7	300	257.7	300	
												7.0	173.2	—	279.0	300	279.0	300	
												25	68.0	7.0	—	251.6	300	251.6	300
												7.0	173.2	—	267.0	300	267.0	300	
												23.6	7.0	7.0	—	275.2	300	275.2	300
												23.6	7.0	173.2	—	296.5	350	296.5	350
												30	80.0	7.0	—	266.6	300	266.6	300
												7.0	173.2	—	282.0	350	282.0	350	
												23.6	7.0	173.2	—	290.2	350	290.2	350
575	575	518	632	12.8	80	12.8	80	12.8	80	4	2.6 (ea)	20	22.0	3.5	—	122.1	125	122.1	125
												3.5	43.3	36	—	122.1	125	122.1	125
												3.5	86.6	72	—	124.7	150	124.7	150
												12.6	3.5	—	134.7	150	134.7	150	
												3.5	43.3	36	—	134.7	150	134.7	150
												3.5	86.6	72	—	140.5	150	140.5	150
												25	34.0	3.5	—	130.8	150	130.8	150
												3.5	43.3	36	—	133.5	150	133.5	150
												12.6	3.5	86.6	—	143.4	175	143.4	175
												3.5	43.3	72	—	143.4	175	143.4	175
												30	40.0	3.5	—	149.2	175	149.2	175
												3.5	43.3	36	—	149.2	175	149.2	175
												12.6	3.5	86.6	—	156.7	175	156.7	175
See Legend and Notes on page 85.	20	22.0	9.6	2.5	2.5	2.5	2.5	2.5	2.5	4	2.6 (ea)	20	22.0	2.5	—	91.6	110	91.6	110
												2.5	34.6	36	—	99.9	110	99.9	110
												2.5	69.3	72	—	111.9	125	111.9	125
												9.6	2.5	34.6	36	101.2	110	101.2	110
												2.5	69.3	72	—	111.9	125	111.9	125
												25	27.0	2.5	—	97.9	110	97.9	110
												2.5	34.6	36	—	106.2	125	106.2	125
												9.6	2.5	34.6	36	107.5	125	107.5	125
82	30	32.0	9.6	2.5	2.5	2.5	2.5	2.5	2.5	4	2.6 (ea)	20	22.0	2.5	—	104.1	125	104.1	125
												2.5	34.6	36	—	112.4	125	112.4	125
												2.5	69.3	72	—	113.7	125	113.7	125
												9.6	2.5	34.6	36	124.4	150	124.4	150



50A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	OPTIONAL ELECTRIC HEAT		POWER SUPPLY		
		Min	Max	R LA	L RA	R LA	L RA	R LA	L RA	Qty	FLA	Hp	FLA	FLA (total)	FLA	FLA	kW	MCA
060 (MCHX)	208	187	229	51.3	300	51.3	300	51.3	300	4	5.5 (ea)	25	75.0	—	7.0	—	327.7	400
														7.0	41	327.7	400	
														7.0	81	327.7	400	
												30	88.0	35.4	7.0	—	363.1	400
														7.0	41	363.1	400	
												40	114.0	35.4	7.0	—	371.7	400
														7.0	81	344.2	400	
	230	207	253	51.3	300	51.3	300	51.3	300	4	5.8 (ea)	25	68.0	—	7.0	—	320.4	350
														7.0	54	320.4	350	
												30	80.0	35.4	7.0	—	355.8	400
														7.0	54	355.8	400	
												40	104.0	35.4	7.0	—	397.8	450
														7.0	108	335.4	400	
575	460	414	508	22.4	150	22.4	150	22.4	150	4	2.9 (ea)	25	34.0	—	3.5	—	320.4	350
														3.5	54	320.4	350	
												30	40.0	18.9	3.5	—	355.8	400
														3.5	54	355.8	400	
												40	52.0	18.9	3.5	—	400.8	500
														3.5	108	400.8	500	
	575	518	632	19.9	109	19.9	190	19.9	109	4	2.3 (ea)	25	27.0	—	2.5	—	147.2	175
														2.5	54	147.2	175	
												30	32.0	14.4	2.5	—	166.1	200
														2.5	54	166.1	200	
												40	41.0	14.4	2.5	—	173.6	200
														2.5	108	173.6	200	

See Legend and Notes on page 85.

Electrical data (cont)



50A2,A3,A4,A5 UNITS WITH CONVENIENCE OUTLET (cont)

UNIT SIZE 50A	VOLTAGE 3 PH, 60 Hz	VOLTAGE RANGE		COMPRESSOR						CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST	CONVENIENCE OUTLET	OPTIONAL ELECTRIC HEAT		POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	FLA (total)	FLA	FLA	kW	MCA	MOPC*
060 (RTPF)	208	187	229	51.3	300	51.3	300	51.3	300	6	6.5 (ea)	25	74.8	—	7.0	—	344.7	400	
														7.0	112.6	41	344.7	400	
														7.0	225.2	81	344.7	400	
												30	88.0	35.4	7.0	—	380.1	450	
														7.0	112.6	41	380.1	450	
												40	114.0	35.4	7.0	—	380.6	450	
														7.0	112.6	41	380.6	450	
														7.0	225.2	81	380.7	450	
	230	207	253	51.3	300	51.3	300	51.3	300	6	6.6 (ea)	25	68.0	35.4	7.0	—	396.6	500	
														7.0	129.9	41	396.6	500	
														7.0	259.8	81	396.6	500	
												30	80.0	35.4	7.0	—	397.2	400	
														7.0	129.9	54	397.2	400	
												40	104.0	35.4	7.0	—	397.8	450	
														7.0	129.9	54	397.8	450	
														7.0	259.8	108	397.8	450	
460	460	414	508	22.4	150	22.4	150	22.4	150	6	3.3 (ea)	25	34.0	35.4	3.5	—	336.8	400	
														3.5	65.0	54	336.8	400	
														3.5	129.9	108	336.8	400	
												30	40.0	35.4	3.5	—	351.8	400	
														3.5	129.9	54	351.8	400	
												40	52.0	35.4	3.5	—	368.6	400	
														3.5	129.9	108	368.6	400	
														3.5	259.8	108	368.6	400	
575	575	518	632	19.9	109	19.9	190	19.9	109	6	2.6 (ea)	25	27.0	35.4	2.5	—	155.4	175	
														2.5	65.0	54	155.4	175	
														2.5	129.9	108	155.4	175	
												30	32.0	35.4	2.5	—	174.3	200	
														2.5	65.0	54	174.3	200	
												40	41.0	35.4	2.5	—	200.4	225	
														2.5	129.9	108	200.4	225	
														2.5	259.8	108	200.4	225	

See Legend and Notes on page 85.

LEGEND AND NOTES FOR ELECTRICAL DATA TABLES

LEGEND

FLA	— Full Load Amps
HACR	— Heating, Air Conditioning and Refrigeration
LRA	— Locked Rotor Amps
MCA	— Minimum Circuit Amps
MCHX	— Microchannel
MOCP	— Maximum Overcurrent Protection
NEC	— National Electrical Code
RLA	— Rated Load Amps
RTPF	— Round Tube Plate Fin

*Fuse or HACR circuit breaker.



NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker.
2. **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 percent voltage imbalance.

Controls

Control components

The 48/50A Series rooftops use the *ComfortLink* control system that has been developed for use in Carrier Commercial equipment. The control system monitors all operating conditions in the rooftop unit as well as controlling the compressors, economizers, fans, heat and other devices. It also has the capability of communicating with the Carrier *Comfort Network®* devices using the CCN protocol and other popular protocols including BACnet, MODBUS, LonWorks, etc.

The system uses a microprocessor and a series of boards, each with inputs and outputs. A local network communications bus (LEN) ties all the boards together into a system and enables the boards to communicate.

For the 48/50A Series, the control consists of the following key components:

Main base board (MBB) — The MBB is the center of the *ComfortLink* control system. It contains the major portion of the operating software and controls the operation of the unit. The MBB continuously monitors inputs and outputs as well as data from the LEN and CCN communications channels. The MBB also controls 11 output relays. A complete list of the MBB and system I/O are contained in the table on page 86. The board is located in the main control box.

Economizer control board (ECB1) — The ECB controls the economizer actuator. The ECB controls the economizer motor using a digital communications signal that also provides operation and diagnostic data on the economizer motor. The ECB also controls the operation of the power exhaust motors and provides up to 6 stages of digitally sequenced power exhaust. Exhaust sequencing can be based on either the economizer motor position or the building pressure. On the A Series unit, the ECB board is located in an auxiliary box located at the end of the unit near the economizer motor. The board also contains a second LEN port than can be used with the handheld Navigator™ display.

Supply and building pressure control board (ECB2) — The board, which is the same hardware as the ECB1, is used to control the supply fan inverter on the VAV units. It sends a 4 to 20 mA signal to the inverter based on a supply

% Voltage Imbalance

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

EXAMPLE: Supply voltage is 460-3-60.

A	B	C
AB = 452 v	BC = 464 v	AC = 455 v
Average Voltage = $\frac{452 + 464 + 455}{3}$		
$= \frac{1371}{3}$		
$= 457$		

Determine maximum deviation from average voltage.

$$\begin{aligned} (AB) 457 - 452 &= 5 \text{ v} \\ (BC) 464 - 457 &= 7 \text{ v} \\ (AC) 457 - 455 &= 2 \text{ v} \end{aligned}$$

Maximum deviation is 7 v.

Determine percent voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

duct pressure sensor connected to the board. The board also accepts a signal from another pressure sensor that monitors building pressure and controls the operation of the optional modulating power exhaust system. This board is located in the auxiliary control box.

CV staged gas heat board (SCB) — When the optional staged gas heat is used, the SCB board will be installed and control the operation of the gas valves. It also provides additional sensors for monitoring of the supply air temperature. This board is located in the gas heat section of the unit.

Integrated gas controller (IGC) — One IGC is provided with each bank of gas heat exchangers. It controls the direct spark ignition system and monitors the rollout switch, limit switches, and induced-draft motor Hall Effect sensor. It is equipped with an LED for diagnostics.

Controls expansion module (CEM) — The optional expansion module is used to provide inputs for demand limiting, remote set point and other optional inputs. It is located in the main control box.

Compressor protection Cycle-LOC™ board (CS) — This board monitors the status of the compressor by sensing the current flow to the compressors and then provides digital status signal to the MBB.

Scrolling marquee display — This device is the keypad interface used to access the control information, read sensor values, test the unit, and monitor alarm status. The marquee display is a 4-key, 4-character, 16-segment LED (light-emitting diode) display. The display is very easy to operate using 4 buttons and a group of 11 LED's that indicate the following menu structures:

- Run Status
- Service Test
- Temperatures
- Pressures
- Set Points
- Inputs
- Outputs
- Configuration
- Timeclock
- Operating Modes
- Alarms

Controls (cont)



MAIN BASE BOARD (MBB) INPUTS AND OUTPUTS

POINT NAME	POINT DESCRIPTION	I/O POINT NAME	PLUG AND PIN REFERENCE	SIGNAL PIN(S)	PORT STATE
INPUTS					
GASFAN	YAC Indoor Fan relay (fan request from YAC)	DI1	J6, 3-4	4	0 = 24vac, 1 = 0vac
FSD	Fire Shutdown switch input	DI2	J6, 5-6	6	0 = 24vac, 1 = 0vac
G	Thermostat 'G' input/Remote Occupied	DI3	J7, 1-2	2	0 = 24vac, 1 = 0vac
W2	Thermostat 'W2' input	DI4	J7, 3-4	4	0 = 24vac, 1 = 0vac
W1	Thermostat 'W1' input	DI5	J7, 5-6	6	0 = 24vac, 1 = 0vac
Y2	Thermostat 'Y2' input	DI6	J7, 7-8	8	0 = 24vac, 1 = 0vac
Y1	Thermostat 'Y1' input	DI7	J7, 9-10	10	0 = 24vac, 1 = 0vac
CSB_A1	Compressor A1 current sensor	DIG1	J9, 10-12	10=5v, 11=Vin, 12=GND	0 = 5vdc, 1 = 0vdc
CSB_A2	Compressor A2 current sensor	DIG2	J9, 7-9	7=5v, 8=Vin, 9=GND	0 = 5vdc, 1 = 0vdc
CSB_B1	Compressor B1 current sensor	DIG3	J9, 4-6	4=5v, 5=Vin, 6=GND	0 = 5vdc, 1 = 0vdc
CSB_B2	Compressor B2 current sensor	DIG4	J9, 1-3	1=5v, 2=Vin, 3=GND	0 = 5vdc, 1 = 0vdc
DP_A/SCTA	Circuit A saturated condensing pressure/temp	AN1	J8, 21-23	21=5v, 22=Vin, 23=GND (thermistor 21-22)	(0-5vdc, thermistor, ohms)
DP_B/SCTB	Circuit B saturated condensing pressure/temp	AN2	J8, 24-26	24=5v, 25=Vin, 26=GND (thermistor 24-25)	(0-5vdc, thermistor, ohms)
SP_A/SSTA	Circuit A saturated suction pressure/temp	AN3	J8, 15-17	15=5v, 16=Vin, 17=GND (thermistor 15-16)	(0-5vdc, thermistor, ohms)
SP_B/SSTB	Circuit B saturated suction pressure/temp	AN4	J8, 18-20	18=5v, 19=Vin, 20=GND (thermistor 18-20)	(0-5vdc, thermistor, ohms)
RAT	Return air temperature	AN5	J8, 9-10	9	(thermistor, ohms)
SA_TEMP	Supply air temperature	AN6	J8, 11-12	11	(thermistor, ohms)
OAT	Outdoor air temperature	AN7	J8, 13-14	13	(thermistor, ohms)
SPT	Space temperature (T55/56)	AN8	J8, 1-2	1	(thermistor, ohms)
SPTO	Space temperature offset (T56)	AN9	J8, 3-4	3	(thermistor, ohms)
IAQ/IAQMINOV	IAQ analog input	AN10	J8, 5-6	5	(thermistor, ohms)
FLTS	Filter Status	AN11	J8, 7-8	7	(thermistor, ohms)
OUTPUTS					
CMPB2	Compressor B2	RLY 1	J10, 20-21	20 = RLY1A (=RLY2A), 21 = RLY1B	1 = Closes RLY1A/RLY1B
CMPB1	Compressor B1	RLY 2	J10, 22-23	22 = RLY2A (=RLY1A), 23 = RLY2B	1 = Closes RLY2A/RLY2B
CMPA2	Compressor A2	RLY 3	J10, 24-25	24 = RLY3A (=RLY4A), 25 = RLY3B	1 = Closes RLY3A/RLY3B
CMPA1	Compressor A1	RLY 4	J10, 26-27	26 = RLY4A (=RLY3A), 27 = RLY4B	1 = Closes RLY4A/RLY4B
CONDFANB	Condenser fan B	RLY 5	J10, 10-11	10 = RLY5A (=RLY6A), 11 = RLY5B	1 = Closes RLY5A/RLY5B
CONDFANA	Condenser fan A	RLY 6	J10, 12-13	12 = RLY6A (=RLY5A), 13 = RLY6B	1 = Closes RLY6A/RLY6B
HS2	Heat stage 2	RLY7	J10, 14-16	14 = 15 = RLY7A, 16 = RLY7B	1 = Closes RLY7A/RLY7B
HS1	Heat stage 1	RLY 8	J10, 17-19	17 = 18 = RLY8A, 19 = RLY8B	1 = Closes RLY8A/RLY8B
HIR	Heat interlock relay	RLY 9	J10, 4-6	4 = 5 = RLY9A, 6 = RLY9B	1 = Closes RLY9A/RLY9B
SF	Supply fan	RLY 10	J10, 7-9	7 = 8 = RLY10A, 9 = RLY10B	1 = Closes RLY10A/RLY10B
ALRM	Alarm output relay	RLY 11	J10, 1-3	1 = 2 = RLY11A, 3 = RLY11B	1 = Closes RLY11A/RLY11B

LEGEND

IAQ — Indoor-Air Quality
YAC — Gas Heat Unit

CONTROLS EXPANSION MODULE (CEM) INPUTS AND OUTPUTS

POINT NAME	POINT DESCRIPTION	I/O POINT NAME	PLUG AND PIN REFERENCE	SIGNAL PIN(S)	PORT STATE
INPUTS					
SFS	Supply Fan Status switch	DI 1	J7, 1-2	2	0 = 24vac, 1 = 0vac
DMD_SW1	Demand Limit - SW1	DI 2	J7, 3-4	4	0 = 24vac, 1 = 0vac
DMD_SW2/DHDDISCIN	Demand Limit - SW2 / Dehumidification Switch Input	DI 3	J7, 5-6	6	0 = 24vac, 1 = 0vac
PRES	Pressurization	DI 4	J7, 7-8	8	0 = 24vac, 1 = 0vac
EVAC	Evacuation	DI 5	J7, 9-10	10	0 = 24vac, 1 = 0vac
PURG	Purge	DI 6	J7, 11-12	12	0 = 24vac, 1 = 0vac
IAQIN	Indoor Air Quality Switch	DI 7	J7, 13-14	14	0 = 24vac, 1 = 0vac
		AN7	J6, 1-3	2 (1 = loop power)	(0-20mA input)
DMDLMTMA	4-20mA Demand Limit	AN8	J6, 4-6	5 (4 = loop power)	(0-20mA input)
EDTRESMA	4-20mA Evaporator Discharge SP Reset	AN9	J6, 7-9	8 (7 = loop power)	(0-20mA input)
OAQ	Outside Air CO ₂ Sensor	AN10	J6, 10-12	11 (10 = loop power)	(0-20mA input)
SPRESET	SP Reset millamps	AN10	J6, 10-12	11 (10 = loop power)	(0-20mA input)
CEM_10K1/CEM_4201	CEM AN1 10k temp J5,1-2/CEM AN1 4-20 ma J5,1-2	AN1	J5, 1-2	1	(thermistor, ohms)
CEM_10K2/CEM_4202	CEM AN2 10k temp J5,3-4/CEM AN2 4-20 ma J5,3-4	AN2	J5, 3-4	3	(thermistor, ohms)
CEM_10K3/CEM_4203	CEM AN3 10k temp J5,5-6/CEM AN3 4-20 ma J5,5-6	AN3	J5, 5-6	5	(thermistor, ohms)
CEM_10K4/CEM_4204	CEM AN4 10k temp J5,7-8/CEM AN4 4-20 ma J5,7-8	AN4	J5, 7-8	7	(thermistor, ohms)
		AN5	J5, 9-10	9	(thermistor, ohms)
		AN6	J5, 11-12	11	(thermistor, ohms)



ECONOMIZER CONTROL BOARD (ECB1) INPUTS AND OUTPUTS

POINT NAME	POINT DESCRIPTION	I/O POINT NAME	PLUG AND PIN REFERENCE	SIGNAL PIN(S)	PORT STATE
INPUTS					
RMTIN	Remote occupancy	DI1	J4, 1-2	2	24VAC = 1, 0VAC = 0
ECONENBL, ECOORIDE	Economizer enable	DI2	J4, 3-4	4	24VAC = 1, 0VAC = 0
RARH	Return air relative humidity	AN1	J5, 1-3	1=24VDC, 2=0-20mA in, 3=GND	0-20mA
OARH	Outdoor air relative humidity	AN2	J5, 4-6	4=24VDC, 5=0-20mA in, 6=GND	0-20mA
OUTPUTS					
ECB1_AO1	ECB1, analog output 1	AO1	J9, 1-2	1=0-20mA, 2=GND	0-20mA OUT
ECONOCMD	Economizer actuator (digital control)	PP/MP	J7, 1-3	1=PP/MP Data, 2=24VAC, 3=GND	Belimo PP/MP Protocol
PE_A	Power Exhaust stage A	RLY1	J8, 1-3	1 = 2 = RLY1A, 3 = RLY1B	1 = Closes RLY1A/RLY1B
PE_B	Power Exhaust stage B	RLY 2	J8, 4-6	4 = 5 = RLY2A, 6 = RLY2B	1 = Closes RLY2A/RLY2B
PE_C	Power Exhaust stage C	RLY 3	J8, 7-9	7 = 8 = RLY3A, 9 = RLY3B	1 = Closes RLY3A/RLY3B
ECON_PWR	Economizer Power	RLY 6	J8, 16-18	16 = 17 = RLY6A, 18 = RLY6B	1 = Closes RLY6A/RLY6B

VAV CONTROL BOARD (ECB2) INPUTS AND OUTPUTS

POINT NAME	POINT DESCRIPTION	I/O POINT NAME	PLUG AND PIN REFERENCE	SIGNAL PIN(S)	PORT STATE
INPUTS					
		DI1	J4, 1-2	2	24VAC = 1, 0VAC = 0
		DI2	J4, 3-4	4	24VAC = 1, 0VAC = 0
BP	Building static pressure	AN1	J5, 1-3	1=24VDC, 2=0-20mA in, 3=GND	0-20mA
SP	Supply Duct static pressure	AN2	J5, 4-6	4=24VDC, 5=0-20mA in, 6=GND	0-20mA
OUTPUTS					
SFAN_VFD	Supply Fan Inverter speed	AO1	J9, 1-2	1=0-20mA, 2=GND	0-20mA OUT
		PP/MP	J7, 1-3	1=PP/MP Data, 2=24VAC, 3=GND	Belimo PP/MP Protocol
		RLY1	J8, 1-3	1 = 2 = RLY1A, 3 = RLY1B	1 = Closes RLY1A/RLY1B
		RLY 2	J8, 4-6	4 = 5 = RLY2A, 6 = RLY2B	1 = Closes RLY2A/RLY2B
		RLY 3	J8, 7-9	7 = 8 = RLY3A, 9 = RLY3B	1 = Closes RLY3A/RLY3B
MLV	Minimum load valve	RLY 6	J8, 16-18	16 = 17 = RLY6A, 18 = RLY6B	1 = Closes RLY6A/RLY6B

STAGED GAS HEAT BOARD (SCB) INPUTS AND OUTPUTS

POINT NAME	POINT DESCRIPTION	I/O POINT NAME	PLUG AND PIN REFERENCE	SIGNAL PIN(S)	PORT STATE
INPUTS					
		AN1	J5, 1-3	1=5v, 2=Vin, 3=GND (thermistor 1-2)	(0-5VDC, thermistor, ohms)
		AN2	J5, 4-6	4=5v, 5=Vin, 6=GND (thermistor 4-5)	(0-5VDC, thermistor, ohms)
LAT1SGAS	Leaving air temperature 1	AN3	J5, 7-9	7=5v, 8=Vin, 9=GND (thermistor 7-8)	(0-5VDC, thermistor, ohms)
LAT2SGAS	Leaving air temperature 2	AN4	J5, 10-12	10=5v, 11=Vin, 12=GND (thermistor 10-11)	(0-5VDC, thermistor, ohms)
LAT3SGAS	Leaving air temperature 3	AN5	J5, 13-15	13=5v, 14=Vin, 15=GND (thermistor 13-14)	(0-5VDC, thermistor, ohms)
		AN6	J6, 1-3	1=5v, 2=Vin, 3=GND (thermistor 1-2)	(0-5VDC, thermistor, ohms)
		AN7	J6, 4-6	4=5v, 5=Vin, 6=GND (thermistor 4-5)	(0-5VDC, thermistor, ohms)
		AN8	J6, 7-9	7=5v, 8=Vin, 9=GND (thermistor 7-8)	(0-5VDC, thermistor, ohms)
		AN9	J7, 1-2	1	(thermistor, ohms)
		AN10	J7, 3-4	3	(thermistor, ohms)
OUTPUTS					
		AO1	J8, 1-2	1=0-20mA, 2=GND	0-20mA OUT
		AO2	J8, 3-4	3=0-20mA, 4=GND	0-20mA OUT
HS3	Heat Stage 3	RLY1	J9, 1-3	1 = 2 = RLY1A, 3 = RLY1B	1 = Closes RLY1A/RLY1B
HS4	Heat Stage 4	RLY 2	J9, 4-6	4 = 5 = RLY2A, 6 = RLY2B	1 = Closes RLY2A/RLY2B
HS5	Heat Stage 5	RLY 3	J9, 7-9	7 = 8 = RLY3A, 9 = RLY3B	1 = Closes RLY3A/RLY3B
HS6	Heat Stage 6	RLY 4	J9, 10-12	10 = 11 = RLY4A, 12 = RLY4B	1 = Closes RLY4A/RLY4B
		RLY 5	J9, 13-15	13 = 14 = RLY5A, 15 = RLY5B	1 = Closes RLY5A/RLY5B

Controls (cont)



INPUT/OUTPUT CHANNEL DESIGNATIONS — FIELD CONNECTION TERMINAL STRIPS

TERMINAL BOARD	TERMINAL NO.	DESCRIPTION	TYPE
TB-1 - POWER CONNECTION OR DISCONNECT (in Main Control Box)			
TB1	11	L1 power supply	208-230/460/575/380/-3-60
	12	L2 power supply	208-230/460/575/380/-3-60
	13	L3 power supply	208-230/460/575/380/-3-60
TB-2 - GROUND (in Main Control Box)			
TB2	1	Neutral Power	
TB-3 - CCN COMMUNICATIONS (HY84HA096) (in Main Control Box)			
TB3	1	LEN +	5 VDC, logic
	2	LEN C	5 VDC, logic
	3	LEN -	5 VDC, logic
	4	24 VAC	24 VAC
	5	CCN +	5 VDC, logic
	6	CCN C	5 VDC, logic
	7	CCN -	5 VDC, logic
	8	Grd	ground
TB-4 - THERMOMSTAT CONNECTIONS (HY84HA090) (in Main Control Box)			
TB4	1	Thermostat R	24 VAC Power
	2	Thermostat Y1	24 VAC Input
	3	Thermostat Y2	24 VAC Input
	4	Thermostat W1	24 VAC Input
	5	Thermostat W2	24 VAC Input
	6	Thermostat G	24 VAC Input
	7	Thermostat C	24 VAC Common
	8	Thermostat X (Alarm Contact)	24 VAC Output
TB-5 - FIELD CONNECTIONS (HY84HA101) (in Main Control Box)			
TB5	1	VAV Heater Interlock Relay, Ground	Dry Contact, Max 1 Amp
	2	VAV Heater Interlock Relay, 24 VAC	Dry Contact, Max 1 Amp
	3	T55/T56 10 K Thermistor	Thermistor Input
	4	T55/T56 10 K Thermistor	Thermistor Input
	5	T56 Set Point Adjustment (100,000 ohm)	Thermistor Input
	6	Indoor Air IAQ Remote Sensor/Remote Pot/Remote 4-20 mA	4-20 mA, ext. powered w/res or 0-5 VDC, +
	7	Indoor Air IAQ Remote Sensor/Remote Pot/Remote 4-20 mA	4-20 mA, ext. powered w/res or 0-5 VDC, -
	8	Smoke Detector Remote Alarm	external contacts
	9	Smoke Detector Remote Alarm	external contacts
	10	Fire Shutdown	24 VAC Power
	11	Fire Shutdown	24 VAC Input
	12	Fire Control*	24 VAC Power
	13	Fire Pressurization*	24 VAC Input
	14	Fire Evacuation*	24 VAC Input
	15	Fire Smoke Purge*	24 VAC Input
	16	Not Used	—
TB-6 - FIELD CONNECTIONS (HY84HA101) (in Main Control Box)			
TB6	1	Remote Occupied/Economizer Enable 24 VAC	24 VAC Power
	2	Remote Economizer Contact	24 VAC Input
	3	Remote Occupied Contact	24 VAC Input
	4	Demand Limit Contacts Common*	24 VAC Power
	5	Demand Limit SW1*	24 VAC Input
	6	Demand Limit SW2 / Dehumidification Switch*	24 VAC Input
	7	Demand Limit 4-20 mA*	externally powered 4-20 mA
	8	Demand Limit 4-20 mA*	externally powered 4-20 mA
	9	Remote Supply Air Setpoint 4-20 mA*	externally powered 4-20 mA
	10	Remote Supply Air Setpoint 4-20 mA*	externally powered 4-20 mA
	11	Outdoor Air IAQ 4-20 mA*	externally powered 4-20 mA
	12	Outdoor Air IAQ 4-20 mA*	externally powered 4-20 mA
	13	IAQ Remote Switch*	24 VAC Power
	14	IAQ Remote Switch*	24 VAC Input
	15	Supply Fan Status Switch*	24 VAC Power
	16	Supply Fan Status Switch*	24 VAC Input
TB-7 - ELECTRIC HEAT POWER BLOCK (in Electric Heat section)			
TB7	1	L1 Power Supply	208-230/460/575/380/-3-60, 400-3-50
	2	L2 Power Supply	208-230/460/575/380/-3-60, 400-3-50
	3	L3 Power Supply	208-230/460/575/380/-3-60, 400-3-50

* Requires optional Controls Expansion Module (CEM).

Through the display, inputs and outputs can be checked for their value or status. Because the unit is equipped with suction pressure transducers and discharge saturation temperature sensors it can also display pressures typically obtained from gages. The control includes a full alarm history which can be accessed from the display. Through the display, a built-in test routine can be used at start-up commission and during maintenance inspections to help diagnose operational problems with the unit.

Cooling control options

When mechanical cooling is required, the A Series *ComfortLink* controls have the capability to control the staging of the compressors in several different ways. Three scroll compressors are used on size 020 to 027 units and four scroll compressors are used on sizes 030 to 060. In addition, the *ComfortLink* controls support the use of an optional minimum load hot gas bypass valve (MLV) with the Multiple Adaptive Demand and VAV control sequences. The MLV is directly controlled by the *ComfortLink* controls and provides an additional stage of capacity as well as low load coil freeze protection. The control also integrates the use of an economizer with the use of mechanical cooling to allow for the greatest use of free cooling. When both mechanical cooling and the economizer are being used, the control will use the economizer to provide better temperature control and limit the cycling of the compressors. The control also checks on various other operation parameters in the units to make sure that safety limits are not exceeded and the compressors are reliably operated.

The A Series *ComfortLink* controls offer two basic control approaches to mechanical cooling: constant volume with 2 stages of cooling and VAV with multiple stages of cooling. In addition to these traditional methods of control, the A Series *ComfortLink* controls offer the ability to run multiple stages of cooling in constant volume operation by controlling the unit to either a low or high cool supply air set point based on either a space temperature sensor or 2-stage thermostat input.

CONTROL TYPE			COOLING CONTROL METHOD
Unit	Application	Demand Source	
A3,A5	VAV	RAT or SPT	Multiple Stage EDT
A2,A4	CV/SAV	SPT or T-STAT	Multiple Adaptive Demand or 2-Stage Demand

Control type — The control type determines the selection of the type of cooling control as well as the technique for selecting a cooling mode. The control types are:

VAV-RAT and VAV-SPT — Both of these configurations refer to standard VAV operation. If the control is occupied, the supply fan is run continuously and return-air temperature will be used in the determination of the selection of the cooling mode. VAV-SPT differs from VAV-RAT only in that during the unoccupied period, space temperature will be used instead of return-air temperature to start the fan for ten minutes before the return-air temperature is allowed to call out any mode.

CV/SAV TSTAT-Multiple Stage — This configuration will force the control to monitor the thermostat inputs (Y1,Y2) to make a determination of mode. Unlike traditional 2-stage thermostat control, the unit is allowed to use multiple stages of cooling control and perform VAV-style capacity control.

CV/SAV TSTAT-2 Stage — This configuration will force the control to monitor the thermostat inputs (Y1,Y2) to make a determination of mode.

CV/SAV SPT-Multiple Stage — This configuration will force the control to monitor a space temperature sensor to make a determination of mode. The unit is allowed to use multiple stages of cooling control and perform VAV-style capacity control.

CV/SAV SPT-2 Stage — This configuration will force the control to monitor the space temperature sensor to make a determination of mode and allow two stages of cooling.

Cooling control method — Three different cooling control methods are used to step through the available stages of capacity. Depending on the unit size, cooling control method and presence of an MLV, this may range from 2 up to 5 stages of capacity control. These methods are:

Multiple Stage Evaporator Discharge Temperature (EDT) — The capacity of the economizer and compressors are controlled based on the evaporator air discharge temperature and supply air temperature set point. This control method uses an adaptive PID (proportional, integral, derivative) algorithm to calculate the estimated change in supply air temperature before engaging or disengaging the next stage of cooling. The algorithm compensates for varying conditions, including changing flow rates across the evaporator coil, to provide better overall control of compressor staging.

Multiple Adaptive Demand — This control method will base the capacity of the economizer and compressors on the evaporator air discharge temperature and one of two supply air temperature set points. The control will be able to call out a LOW COOL or a HIGH COOL mode and maintain a low or high cool supply air set point. The unit will use either the input from a conventional thermostat to turn the Y1, Y2 signals into a high and low demand signal, or with a space temperature sensor use a differential from set point to determine the mode. Once the mode has been established the control uses the same algorithm as with VAV control.

Two-Stage Demand — The unit will operate with integrated economizer and 2 stages of compressor capacity control.

Integrated economizer — For each of the above modes of operation all mechanical cooling will first be delayed while the unit attempts to use the economizer for free cooling. Once the economizer is at full capacity, the control will then supplement the free cooling with as much mechanical cooling as required. To prevent any rapid changes in cooling, the control will also use the economizer to trim the cooling supplied.

Controls (cont)



Heating control options

When heating is required the A Series units can be provided with 2-stage electric heat, 2-stage gas heat or multiple-stage gas heat. Depending on unit size and heating capacity the multiple-stage option may have between 5 and 11 stages of heating capacity control. The A Series *ComfortLink* controls have the capability to control the heating capacity based on input from a 2-stage mechanical thermostat, a space temperature sensor, or on VAV units by the return air temperature sensor. With CV units the heating mode (off, low or high) will be enabled based on W1 and W2 thermostat inputs, or when using a space temperature sensor the differential from heating set point will be used. Heating with VAV units will be enabled based on the return-air temperature or the space temperature, but once enabled control will be based on the return-air temperature. Variable air volume terminals will be commanded open to the heating cfm through linkage or the heat interlock relay. The A Series *ComfortLink* controls will use one of the following control methods:

Two-stage control — The unit will operate in LOW HEAT or HIGH HEAT mode as determined by the demand inputs. In the LOW HEAT mode if the temperature sensed by the evaporator discharge temperature sensor is below 50 F, the unit will automatically go into a HIGH HEAT mode.

Multiple-stage control — When the unit is in a LOW HEAT mode the algorithm calculates the desired heat capacity based on set point and supply-air temperature. The staged gas control logic will stage the heating capacity to match the calculated demand. When the unit is in a HIGH HEAT mode all stages of heat will be activated. Staged gas heat can also be used in a TEMPERING mode. This mode is enabled during a VENTILATION, LOW COOL or HIGH COOL mode when the economizer dampers are at their minimum ventilation position and the mixed-air temperature is below the supply air set point. Tempering can also be used during a preoccupancy purge to prevent low temperature air from being delivered to the space.

Economizer and IAQ options

The controls have been designed to support the requirements of indoor air quality control through the use of outside air. Units can either be equipped with an outside air adjustable, self-closing economizer or a fully modulating, gear driven economizer with no linkages. The economizer can be configured for a full modulation mode or 3-position mode of operation. The control includes logic for a minimum ventilation position and different set points for occupied and unoccupied minimum position set points. This control also has logic built in to calibrate the economizer position to the actual percentage of outside air introduced. During periods when the compressors are not being used the control will use the RAT, SAT and OAT to calibrate the economizer. This will allow for setting the outside air actual percentage and not just the percent damper position.

The use of the economizer will depend on the mode of change selected. This control integrates the changeover directly into the control. Five types of changeover are available:

- Outdoor air dry bulb
- Differential dry bulb
- Outdoor air enthalpy
- Differential enthalpy
- Outdoor air dew point

The units are provided with an outdoor air and return air temperature sensor so the first two changeover methods are available as standard. To use the enthalpy changeover options the control supports the addition of highly reliable, electronic humidity sensors. The humidity sensor input is then used with the dry bulb sensors to calculate the enthalpy. For outdoor enthalpy changeover the control also has the ASHRAE 90.1 A, B, C, D economizer changeover curves built into the software.

When operating with outside air economizers, large amounts of air can be introduced into the building and a means must be provided for building pressure relief. The 48/50A Series control supports the following three types of building pressure control:

- Relief Dampers — Can be used on low return duct static applications
- Non-Modulating Two-Stage Power Exhaust — The unit can be equipped with multiple power exhaust fans, 4 on sizes 020-050 and 6 on size 060. The software controls the power exhaust stages based on the economizer position (percent open).
- Modulating Power Exhaust — Both the VAV and CV units can be equipped with power exhaust fans that are controlled by a building pressure sensor that is connected to the *ComfortLink* controller. The fans are in groups which allow for 4 stages on sizes 020-050 and 6 stages on size 060.

The units are capable of using either 2-in. or optional 4-in. pleated filters and can have an optional filter pressure drop switch to warn of dirty filter conditions.

The indoor air quality (IAQ) function provides a demand-based control for ventilation air quantity, by providing a modulating outside air damper position that is proportional to the space CO₂ level. The ventilation damper position is varied between a minimum ventilation level (based on internal sources of contaminants and CO₂ levels other than the effect of people) and the maximum design ventilation level (determined at maximum populated status in the building). During a less-than-fully populated space period, the CO₂ level will be lower than that at full-load design condition and will require less ventilation air. Reduced quantities of ventilation air will result in reduced operating costs. Space CO₂ levels are monitored and compared to user-configured set points. Accessory CO₂ sensor for space (or return duct mounting) is required. The IAQ routine can be enhanced by also installing a sensor for outdoor air quality.

During the occupied period, in the absence of a demand for cooling using outside air, if CO₂ levels are below the set point for the minimum ventilation level, the outside-air damper will open to the minimum ventilation level damper position set point. The minimum damper position will be maintained as long as the CO₂ level remains below the set point.

When the space CO₂ level exceeds set point for the minimum ventilation level condition, the *ComfortLink* controls will begin to open the outside air damper position to admit more ventilation air and remove the additional contaminants. As the space CO₂ level approaches the set point for maximum design ventilation level condition, the outside air damper position will reach the maximum ventilation level damper position set point limit. Damper position will be modulated in a directly proportional relationship between these two CO₂ set point limits and their corresponding damper position limits.

In most applications a fixed reference value can be set for the outdoor air quality level, but the control also supports the addition of an outdoor air quality sensor that will be compared to the indoor or return IAQ sensor. If an OAQ (outdoor air quality) sensor is connected, the demand set point levels will be adjusted automatically as the outdoor CO₂ levels vary. Also, if the outdoor CO₂ level exceeds a user-configured maximum limit value, then outside air damper position will be limited to the minimum ventilation damper set point value. The control can also receive these signals through the CCN system.

The IAQ and OAQ measurement levels are displayed by the *ComfortLink* scrolling marquee in parts per million (ppm).

Fire and smoke controls interface — The unit can be equipped with an optional return air smoke detector. The smoke detector is wired to stop the unit and send a message to a remote alarm system if a fault condition is detected. If the controls expansion module is added, the control will support smoke control modes including evacuation, smoke purge, and pressurization.

Demand limiting — The control supports demand limiting using one or two fixed capacity limits initiated by discrete input switches or a variable capacity limit function based on an analog input signal. On CCN systems this can be done through the network, or for non-CCN network jobs this can be done by adding the controls expansion module.

Diagnostics

The *ComfortLink* controls have fully integrated all controls and sensors into a common control system. The control monitors these inputs as well as many of the routines to provide advanced diagnostics and prognostics. These include adaptive logic to allow the unit to continue to operate in a reduced output mode and automatic resets where applicable. The last 10 alarms and alerts are stored in memory and can be accessed through the display. The alarms can also be monitored through the Carrier Comfort Network® connection or building automation system. The unit also supports the use of the hand held Navigator™ display which can be plugged in at the main control box and auxiliary control box at the opposite end of the unit.

Some of the diagnostics that are included are:

- Monitoring of all sensors
- Suction pressure transducers to provide compressor protection and coil freeze protection
- Monitoring of the economizer motor using a digitally controlled motor
- Monitoring of compressor status using compressor protection boards
- Adaptive logic for low supply-air temperatures
- Compressor lockout at low ambient conditions
- Storage of compressor run hours and starts
- Low refrigerant charge protection
- Compressor reverse rotation protection

Control interface

The *ComfortLink* controller can interface with the i-Vu® Open Control System, a BACnet building automation system, or Carrier Comfort Network® devices. This will allow for the use of all system control programs. These include:

- Network Service Tool
- System Pilot™ device
- Touch Pilot™ device
- i-Vu Open Control System software
- ComfortView™ software
- CCN Web software
- ComfortID™ system

Contact Carrier Controls Marketing for more information.

The control can also provide interface with other energy management systems with the addition of either the BACnet communication option, MODBUS Carrier translator or the LonWorks Carrier translator.

Several contact connection points have been provided in the main control box for interface to external controls and systems. These are summarized in the Interface Connection table. External controls use the following interface points:

- Start/Stop (On/Off) — Start/Stop is accomplished with a contact closure between terminals 1 and 3 on TB6.
- Remote Economizer Enable — Enabling and disabling of the economizer can be done by connecting a contact closure to terminals 1 and 2 on TB6. The economizer can be configured for a switch closure changeover for 3-position operation.
- VAV Heating Interlock — Interface with non-linkage terminals can be done through TB5 terminal 1 and 2.
- Remote IAQ Inputs — External IAQ demand inputs can be connected through terminals 6 and 7 on TB5.
- Smoke Detectors Alarm Output — Remote detector alarm outputs can be connected through terminals 8 and 9 on TB5.
- Fire Shutdown — A remote fire shutdown signal can be connected to 10 and 11 on TB5. The software can be configured to shut the unit down on an open or closed signal.
- Fire Pressurization — For a remote control of pressurization a contact closer can be connected to terminals 12 and 13 on TB5. In this mode the economizer damper will be fully opened and the supply fan turned on to pressurize the space.

Controls (cont)

- Fire Evacuation — For this mode a remote contact closure can be connected to terminal 12 and 14 on TB5. For remote evacuation of a space the outside-air dampers will be opened and the power exhaust fans turned on to evacuate the space of smoke.
- Fire Purge — For this mode external contacts can be connected to terminals 12 and 15 on TB5. In this mode the supply fan and return fans will be turned on with the economizer at a full open position.
- Demand Limiting — For demand limiting the controls expansion module must be used. Connections are provided on TB6 for switch input demand limiting and for 4 to 20 mA demand limit signals.
- Dehumidification — A discrete input is available on TB6 to initiate the Dehumidification mode. This input is shared with one of the demand limiting inputs and requires the controls expansion module.
- Remote Supply Air Set Point — A remote supply air temperature set point can be supported when the controls expansion module is used. It can be connected to terminals 11 and 12 on TB6.
- Outdoor Air IAQ Signal — If an external outdoor air signal is being used then it can be connected to terminals 9 and 10 on TB6.
- IAQ Switch Input — If an external control will be controlling IAQ then it can be connected as a contact closure through terminals 13 and 14 on TB6.

Carrier can also support electronic interface to other systems using the following:

- MODBUS Carrier translator (read/write, provides CCN to MODBUS remote terminal unit [RTU] protocol conversion)
- LonWorks Carrier translator (read/write, provides CCN to LON FT-10A ANSI/EIA-709.1 protocol conversion)

Constant volume/staged volume applications

The 48/50A2,A4 units are designed to operate in CV/SAV™ applications. The units are shipped as operable, stand-alone units using either a standard (mechanical or electronic) 2-stage heat, 2-stage cool thermostat, or with an electronic room temperature sensor and a timeclock to establish unit start and stop times. With a standard thermostat (programmable is optional), heating and cooling operation is set by space temperature. With a space sensor and field-supplied timeclock, the machine will operate at default values unless they are changed using appropriate input devices. The space sensor monitors space temperature and may be equipped with a timed override feature, which allows unit operation during unoccupied periods. The space sensors may be used in multiples of 4 or 9 to achieve space temperature averaging. The use of a space sensor also allows the unit to be turned on and off from a remote signal or it can be programmed to use the time of day scheduling that is built into the control. Supply air can be supplied at a constant volume, or at staged air volumes corresponding to two configurable speeds.



INTERFACE CONNECTIONS

TB-3 — CCN COMMUNICATIONS (HY84HA096)

TB3	1 LEN +
	2 LEN C
	3 LEN -
	4 24 VAC
	5 CCN +
	6 CCN c
	7 CCN -
	8 Grd

TB-4 — THERMOSTAT CONNECTIONS (HY84HA090)

TB4	1 Thermostat R
	2 Thermostat Y1
	3 Thermostat Y2
	4 Thermostat W1
	5 Thermostat W2
	6 Thermostat G
	7 Thermostat C
	8 Thermostat X

TB-5 — FIELD CONNECTIONS (HY84HA101)

TB5	1 VAV Heater Interlock Relay, Ground
	2 VAV Heater Interlock Relay, 24 VAC
	3 T55/T56 10K Thermistor
	4 T55/T56 10K Thermistor
	5 T56 Set Point Adjustment (100,000 ohm)
	6 Indoor Air IAQ Remote Sensor/Remote Pot/Remote 4-20 mA
	7 Indoor Air IAQ Remote Sensor/Remote Pot/Remote 4-20 mA
	8 Smoke Detector Remote Alarm
	9 Smoke Detector Remote Alarm
	10 Fire Shutdown
	11 Fire Shutdown
	12 Fire Control Common*
	13 Fire Pressurization*
	14 Fire Evacuation*
	15 Fire Smoke Purge*
	16 Not Used

TB-6 — FIELD CONNECTIONS (HY84HA101)

TB6	1 Remote Occupied/Economizer Enable 24 VAC
	2 Remote Occupied Contact
	3 Remote Economizer Contact
	4 Demand Limit Contacts Common*
	5 Demand Limit Switch 1*
	6 Demand Limit Switch 2/Dehumidify Switch*
	7 Demand Limit 4-20 mA*
	8 Demand Limit 4-20 mA*
	9 Remote Supply Air Set Point 4-20 mA*
	10 Remote Supply Air Set Point 4-20 mA*
	11 Outdoor Air IAQ 4-20 mA*
	12 Outdoor Air IAQ 4-20 mA*
	13 IAQ Remote Switch Common*
	14 IAQ Remote Switch*
	15 Supply Fan Status Switch*
	16 Supply Fan Status Switch*

* Optional controls expansion module (CEM) is required.

Features with thermostat control of unit

- Two-stage heating (if installed)
- Multiple stage gas heating if unit is equipped with the staged gas heat option
- Two-stage demand with fully proportional economizers and integrated compressor capacity
- Two-stage cooling or adaptive multiple stage cooling which can provide up to 5 stages of capacity

- Control of unit using Y1, Y2, W1, W2, and G thermostat or T55, T56, or T58 space sensors
- Control of the indoor fan
- Outdoor-air temperature/supply-air temperature monitoring with logic to lock the compressors out at low ambient temperatures down to 0° F
- Control of a condenser fan based on outdoor-air and condensing pressures
- Control of modulating economizer to provide free cooling when outdoor conditions are suitable
- Control allows for use of the economizer and the compressors to maximize the use of outside air cooling to reduce part load operating costs
- Control of the power exhaust fans based on configurable damper positions or outside air intake valves or directly from the optional building pressure sensor
- Compressor time guard override (power up and minimum on and off timers) to assure air return in low load conditions
- Support of IAQ sensor

Features with sensor control of unit

There are 3 sensor options available:

- T55 sensor will monitor room temperature and provide unoccupied override capability (1 to 4 hours).
- T56 sensor will monitor room temperature, provide unoccupied override capability (1 to 4 hours), and provide a temperature offset of 5 F maximum.
- T58 is a CCN communicating sensor that will provide the set point and space temperature values.

Standard features are:

- Support of remote occupied/unoccupied input to start and stop the unit
- Two-stage economizer demand with fully proportional economizers and integrated compressor capacity
- Cooling capacity control of 2 levels cooling with either 2-stage control or adaptive control with up to 5 stages of mechanical refrigeration capacity
- Occupied or unoccupied set point
- Enable heating (if installed) or cooling during unoccupied periods as required to maintain space temperature within the unoccupied set points
- Adjustment of space temperature set points of ± 5° F when using a T56 sensor
- Support of IAQ sensor
- 365-day timeclock with backup (supports minute, hour, and day of week, date, month, and year access). The timeclock includes the following features:
 - Daylight savings time function
 - Occupancy control with 8 periods for unit operation
 - Holiday table containing up to 18 holiday schedules
 - Ability to initiate timed override from T55 or T56 sensors (for a timed period of 1 to 4 hours)
 - Temperature compensated start to calculate early start times before occupancy
 - For units connected into a CCN network the timeclock can be integrated into the overall building energy management system and be updated remotely

- For units connected to the CCN network the user can also display all the unit information including I/O values Maintenance, Configuration, Service, and Set Point data tables
- Indoor air quality (IAQ)

Variable air volume (VAV) applications

The 48/50A3,A5 units are designed to operate in VAV applications. As standard they include a supply fan inverter (VFD) to control the supply fan speed and duct pressure. They are designed to control the leaving-air temperature in cooling to a configurable set point. The changes in mode of operation from Heating to Vent to Cooling mode can be controlled either from the return air temperature sensor or from an accessory space temperature sensor. Some of the features for VAV units in a stand-alone application are:

- The units are shipped as operable, stand-alone units with the addition of a field-supplied timeclock to establish unit start and stop times or they can use *ComfortLink* time of day scheduling routine
- Provide cooling and heating control (if equipped with heat) in both occupied and unoccupied modes
- Supports an optional space temperature sensor for mode control and supply air temperature reset
- If space sensor is equipped with an override feature, the sensor will allow operation during the unoccupied period for a fixed length of time
- Base unit control supports a heat interlock relay (field supplied) to signal the VAV terminal devices to fully open during heating operation
- Control board diagnostics
- Control of an outdoor-condenser fan based upon outdoor-air temperature and saturated condensing temperature
- Control of modulating economizer to provide free cooling when outdoor conditions are suitable.
- Control also allows for use of the economizer and the compressors to maximize the use of outside air cooling to reduce part load operating costs
- Support of remote occupied/unoccupied input to start
- Controls the operation of the supply fan inverter to maintain a configurable supply duct static pressure set point. Inverter is configured and controlled directly by *ComfortLink* controls
- Support of IAQ sensor
- Support a field test for field check out
- Support linkage to *ComfortID™* systems
- Cooling capacity control of up to 5 stages plus economizer
- Control of two stages of heat to maintain return-air temperature
- Multiple stage gas heating if unit is equipped with the staged gas heat option
- Control of heat interlock relay
- Compressor time delays to prevent rapid cycling of compressors
- Automatic lead-lag control of compressors to reduce the number of compressor cycles

Controls (cont)

- With the addition of a remote start/stop switch heating or cooling is enabled during unoccupied periods as required to maintain space temperature to within unoccupied set points
- With the addition of the controls expansion board, the *ComfortLink* controls will also support demand limiting and remote set point control

When the unit is connected to a CCN (Carrier Comfort Network®) system, additional features can be used:

- Interface of the unit clock with the CCN network clock and allow for remote configuration of the schedules
- CCN demand limit participation
- Interface with *ComfortID™* control systems through linkage

Sequence of operation

Cooling, constant volume (CV)/Staged air volume (SAV™) units — On power up, the control module will activate the initialization software. The initialization software will determine the unit configuration and also initialize any controls loops and input/output devices. All alarms and configurations are saved in memory and maintained during power outages. All alarms will be maintained in memory and must be cleared through the display.

On SAV units equipped with a supply fan VFD, the fan is controlled at discrete speeds based on the operation mode of the unit. When in low cool mode and the compressor staging is less than half capacity, the fan will be set at the low speed. When the unit is operating at half or more capacity, the fan will operate at high speed. In vent mode the fan will operate in low speed. In heating mode, the fan will operate at low speed when heating capacity is less than 75%, and will operate at high speed when the unit is at 75% or greater capacity.

Constant volume/staged air volume conventional thermostat control — If the unit is equipped with a conventional thermostat with Y1, Y2, W1, W2 and G connections then the control will perform the following sequence.

When G is closed the indoor fan will turn on. G must be closed for heating or cooling to occur. If Y1 is closed then the control will first check the ability to use the economizer. If the economizer can be used, the control will modulate the damper open to maintain the low load economizer leaving air temperature set point. If Y2 closes then the control will lower the leaving air temperature set point to the configured set point. If the economizer can not satisfy the load then compressors will be sequenced on to maintain either the low or high load temperature set points. If the economizer can not be used or the enable control disables the economizer, then the control will sequence the compressors based on the Y1 and Y2 signals. If two-stage control has been selected then the control will map the compressors to the Y1 and Y2 inputs as defined in the loading sequence. If Adaptive mode has been selected then the control will add and remove compressor stages to maintain the low and high demand leaving air set points. If Y1 is closed at least one compressor stage will be turned on.

If W1 closes then it will indicate that the units should be in the Heating mode. The economizer will be closed to the

minimum position, and if the unit is equipped with gas or electric heat then the first stage of heat will be energized. If W2 closes then the control will turn on the second stage of heat. If the unit is equipped with a staged gas heat control option then the W1 signal will be used to control the gas heat to the configurable low heat load leaving air temperature set point. When W2 is energized, the unit will fire all stages of heat capacity. If the unit is equipped with gas heat then the IGC board will control the operation of the gas heat. See the 48 Series Gas Heat units section for the IGC board sequence of operation.

Constant volume/staged air volume space temperature sensor control — If the space temperature operation has been selected using a T55, T56, or T58 sensor then the following logic will be used to control the operation of the unit. If a space temperature is used then a wire jumper must be added between R, W1, and W2. If a remote occupancy control method has been selected then the input must first be closed for the unit to go into Heat, Vent or Cooling mode. If the internal timeclock is used, the control module determines the occupancy state based on the system time schedules. If Temperature Compensated Start is active, the unit will be controlled as in the occupied mode and will start a time as determined by prior operation to have the space at set point by the occupied time. If the unit has been configured for a preoccupancy purge then the control will start the unit in Vent mode prior to the occupancy time to vent the space. If an IAQ sensor is being used and the low IAQ set point is satisfied then the occupancy purge mode will be terminated. The set points for heat and cooling are configurable through the display. If a T56 sensor is being used then the set point can be shifted by as much as 5 degrees. If the space temperature goes above the cooling set point then the unit will go into Cooling mode. If the economizer can be used, the control will first try to control to the leaving air temperature set point. The set point will depend on the space temperature. If the temperature is above the low demand set point then the low economizer load discharge air temperature set point will be used. If the temperature is above the high load space temperature set point then the high load leaving air temperature set point will be used. If the economizer can not satisfy the load then compressors will be sequenced on to maintain either the low or high load temperature set points. If the economizer can not be used or the enable control disables the economizer then the control will sequence the compressors based on the low and high load space temperature variables. If two-stage control has been selected then the control will map the compressors to the low and high loads as defined in the loading sequence. If Adaptive mode has been selected then the control will add and remove compressor stages to maintain the high and low demand leaving air set points.

If the space temperature goes below the heating space temperature set points then it will indicate that the units should be in the Heating mode. The economizer will be closed to the minimum position and if the unit is equipped with gas or electric heat then the first stage of heat will be energized. If the space temperature goes below the high load space temperature set point then the control will turn on the second stage of heat. If the unit is equipped with a



staged gas heat control option then the low load demand signal will turn on heating stages to maintain the leaving air temperature set point. A high demand signal will energize all stages of heat.

If the unit is configured for unoccupied free cooling, mechanical cooling or heating and the temperature goes beyond the unoccupied configuration set points then the control will turn on free cooling, mechanical cooling or heat as needed to get within the unoccupied set points. When in this mode, the economizer dampers will be maintained fully closed or to the minimum unoccupied ventilation set point.

Variable air volume control — On power up, the control module will activate the initialization software. The initialization software will determine the unit configuration and also initialize any controls loops and input/output devices. All alarms and configurations are saved in memory and maintained during power outages. All alarms will be maintained in memory and must be cleared through the display.

The unit will first determine the mode of operation. If the unit has been configured for space temperature demand then the control will determine, based on the configurable set points, if the unit should be in the heat mode, vent mode or cooling mode. If the unit is configured for return air temperature control then it will start the fan and monitor the return air temperature vs. the configurable set point to determine if the unit should be in cooling, vent or heating mode.

If the control is connected to a ComfortID™ system, the room terminals are equipped with microprocessor controls that give commands to the base module. If linkage is active, the control module will replace local *ComfortLink* set points and occupancy data with linkage supplied data.

If temperature compensated start is active then advance pre-cool or heat of the space is enabled. If the unit is configured to use a pre-purge cycle then the *ComfortLink* controls will start the unit in Vent mode based on a pre-start time interval. If an IAQ sensor is being used and the low IAQ control point is satisfied, then the mode will be terminated.

If Cooling mode is required, then the controlling set point will be the leaving air temperature set point. If an economizer is present and the changeover control allows the economizer to be used, then it will first attempt to control the leaving-air temperature using free cooling. If this can not satisfy the load, then additional compressor stages will be turned on to maintain the leaving-air temperature. When both compressors and economizers are being used, the control will use the economizer dampers to maintain better control of the leaving-air and to help prevent high compressor cycling. If the economizer can not be used then it will be set to the minimum vent position. When using compressors, the leaving-air temperature will sequence to compressors on and off using a PID control loop. If the unit is equipped with an optional hot gas bypass valve the control will use the hot gas as an additional stage of capacity. When the first stage of cooling is required the control will turn on a circuit "A" compressor and the hot gas bypass valve. When additional cooling is

called for it will turn off the hot gas bypass valve. The valve will also be used for additional freeze protection of the coils when low evaporator refrigerant temperatures are detected using the suction pressure transducers.

When operating in cooling the control will also monitor the supply duct pressure and send a 4 to 20 mA signal to the factory-supplied inverter to control the speed of the fan and the delivered cfm. If on a linkage system the control will also support static pressure reset based on the needs of the zones.

If the unit has been enabled for occupied heat and the space temperature sensor (SPT), return air temperature sensor (RAT) or linkage demand calls for heat, the control will energize the electric heat or gas heat (if present) to warm the space. In this mode the control will energize the heat interlock relay which will signal the terminals to open to the heating position. Note that for the linkage systems the interlock relay connection is not required. Once the Heat mode is enabled, the heat capacity will be controlled by the return air temperature set point. Heating will continue until the return temperature set point is satisfied. If the unit is configured for morning warm-up and the heating demand is below the set point during the first 10 minutes of operation, the control will energize full heating capacity until the return air temperature set point is satisfied.

If the space temperature sensor (SPT), return air temperature sensor (RAT) or linkage demand requires that the unit be in heating then the control will energize the electric heat or gas heat (if present) to warm the space. In this mode the control will energize the heat interlock relay which should be connected to the terminals to indicate that they should open to the heating position. The interlock relay connection is not required for the linkage systems. Heating will continue until the mode selection sensor is satisfied.

Dehumidification mode — A Dehumidification mode can be initiated by either a discrete input on TB6 or by a direct measurement of humidity levels with an optional space or return air humidity sensor. When the Dehumidification mode is active, the evaporator coil leaving air temperature will be controlled to the Dehumidify Cool set point, which is typically colder than the normal cool mode leaving air set points.

In this mode, comfort condition set points, which are based on dry bulb temperature, will be overridden. If a source of reheat is available, then the leaving-air temperature can be raised to a more desirable temperature. Available methods of reheat are internal gas heat if the unit is equipped with the staged gas heating option or an external heat source that can be controlled by an auxiliary alarm relay switch.

48 series gas heat units

The gas heat units incorporate 2 (3 on size 060) separate systems to provide gas heat. Each system incorporates its own induced-draft motor, integrated gas control (IGC) board, 2-stage gas valve, manifold, and safeties. For 2-stage heat control the systems are operated in parallel. For example, when there is a call for first stage heat, both induced-draft motors operate, both gas valves are energized, and both IGC boards initiate spark. With the

Controls (cont)

staged gas control, the systems are operated independently to allow for a greater range of capacity control. All of the gas heating control is performed through the IGC boards (located in the heating section). The MBB module board serves only to initiate and terminate heating operation and monitor the status of the requirements for indoor fan operation. The fan will be controlled directly by the MBB board. The base module board is powered by 24 vac. When the thermostat or room sensor calls for heating the MBB board will close heating relays and send power to W on each of the IGC boards. An LED on the IGC board will be on during normal operation. A check is made to ensure that the rollout switches and limit switches are closed and the induced-draft motors are not running. After the induced-draft motors are energized and speed is proven with the Hall Effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds. When ignition occurs the IGC board will continue to monitor the condition of the rollout and limit switches, the Hall Effect sensor and the flame sensor. If the unit is controlled through a room thermostat set for fan auto., 45 seconds after ignition occurs the indoor-fan motor will be energized and the outdoor-air dampers will open to their minimum position. If the over temperature limit opens prior to the start of the indoor fan blower, on the next attempt the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will



continue. Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control. If the unit is controlled through a room sensor, the indoor fan will be operating in the occupied mode and the outdoor-air dampers will be in the minimum position. If the unit is controlled with a room sensor in the unoccupied mode, the indoor fan will be energized through the IGC board with a 45-second delay and the outside-air dampers will move to the minimum unoccupied set point. When additional heat is required, the second stage MBB output relay closes and initiates power to the second stage of all main gas valves in all sections. When the demand is satisfied, MBB heat output relays will open and the gas valves close, interrupting the flow of gas to the main burners. If the call for stage 1 heat lasts less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is configured for intermittent fan then the indoor-fan motor will continue to operate for an additional 45 seconds then stop and the outdoor-air dampers will close. If the over temperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

Application data



Ductwork — Secure vertical discharge ductwork to roof curb. Interior installation may proceed before unit is set in place on roof. For horizontal discharge applications, attach ductwork to unit, or field-supplied flanges can be attached to horizontal discharge openings and all ductwork attached to flanges. Units equipped with electric heat require a 90-degree elbow below the unit supply duct connection.

Thru-the-curb service connections — Roof curb connections allow field power wires and control wires to enter through the roof curb opening.

Thermostat (CV only) — Use of a thermistor-type room sensor is recommended on all CCN installations. A thermistor-type room sensor or a 2-stage heating/cooling thermostat may be used for all other units.

Heating-to-cooling changeover — All units are automatic changeover from heating to cooling when automatic changeover thermostat and subbase or a thermistor-type room sensor are used.

Airflow — Units are draw-thru on cooling and blow-thru on heating.

Maximum airflow — To minimize the possibility of condensate blow-off from evaporator, airflow through units should not exceed values shown in Cooling Cfm Operating Range table and Cooling Capacities tables.

Minimum airflow — The minimum airflow for cooling is 300 cfm/ton for constant volume units and 70 cfm/ton for VAV (variable air volume) units. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited by entering-air temperatures. Refer to Gas Heating Capacities and Efficiencies table on page 7 for minimum airflow cfm for heating.

Minimum ambient cooling operation temperature — All units are equipped with factory economizers to allow free cooling at any outdoor ambient. If mechanical cooling is required, the units are designed to operate at outdoor

temperatures down to 32 F. With accessory Motormaster® V control units can operate at outdoor temperatures down to -20 F. Outdoor-fan motor no. 1 change out is required for Motormaster V applications.

Carrier recommends the installation of field-fabricated wind baffles on all vertically oriented condenser coil surfaces when operating in environments with prevailing winds of more than 5 mph and where temperatures drop below 32 F.

Maximum operating outdoor-air temperature — The maximum operating outdoor-air temperature is 115 F. Some models will operate up to 125 F depending on model and operating conditions.

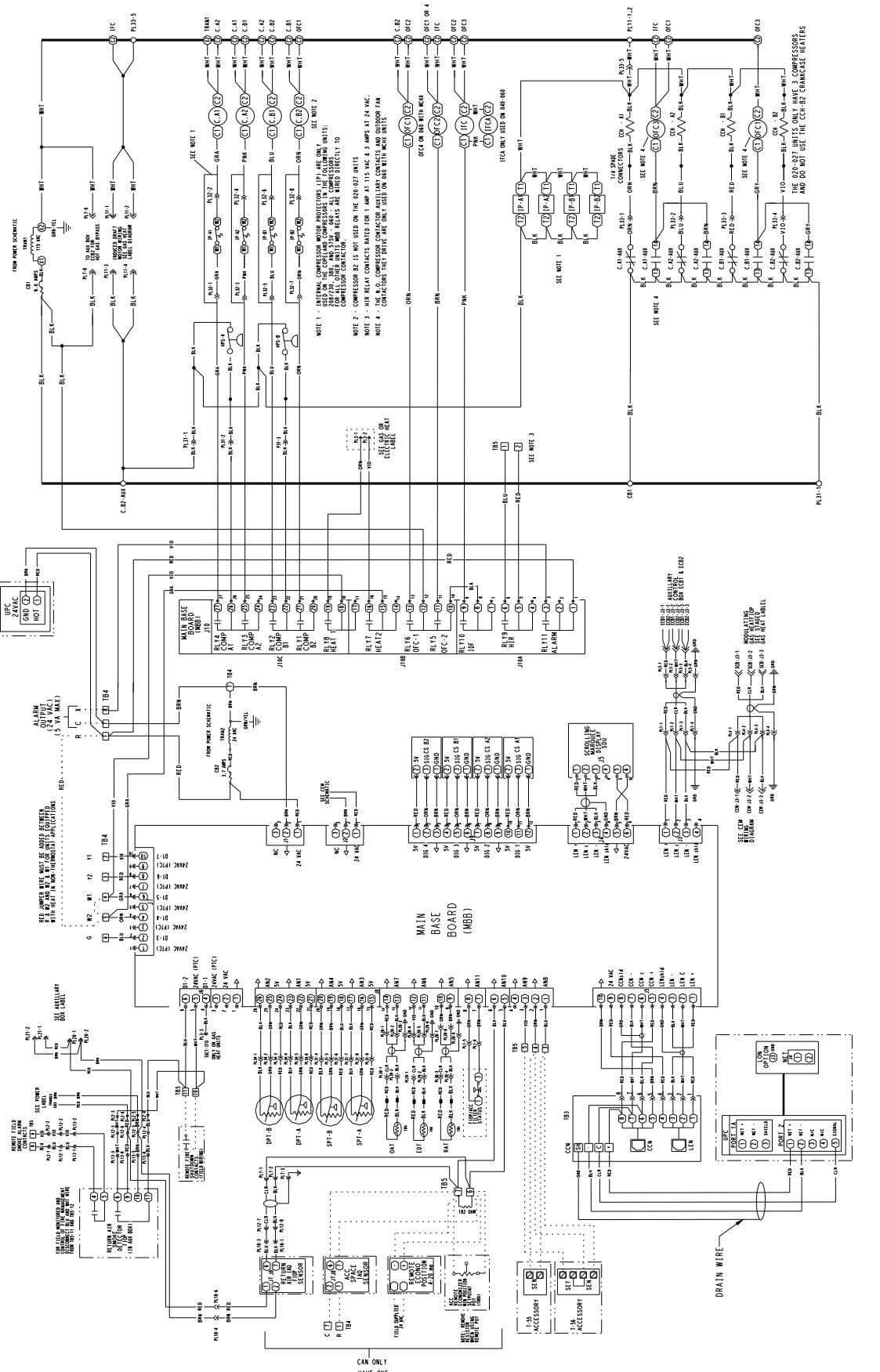
High altitude (gas heat units only) — A change to the gas orifice may be required at high altitudes. Refer to Altitude Compensation table on page 9.

Minimum temperature — Minimum allowable temperature of mixed air entering the heat exchanger during half rate (first stage) operation is 50 F. There is no minimum mixture temperature during full-rate operation. Comfort conditioning may be compromised at temperatures below 50 F. Below 50 F entering-air temperature (EAT) both stages of heat are engaged.

Internal unit design — Due to Carrier's internal unit design (draw-thru over the motor), air path, and specially designed motors, the full horsepower listed in the Physical Data table and Motor Limitations table can be utilized with extreme confidence. Using Carrier motors with the values listed in the Physical Data and Motor Limitations tables will not result in nuisance tripping or premature motor failure. The unit warranty will not be affected.

Electric heat — A field-supplied 90-degree elbow must be installed in the supply ductwork below the unit discharge.

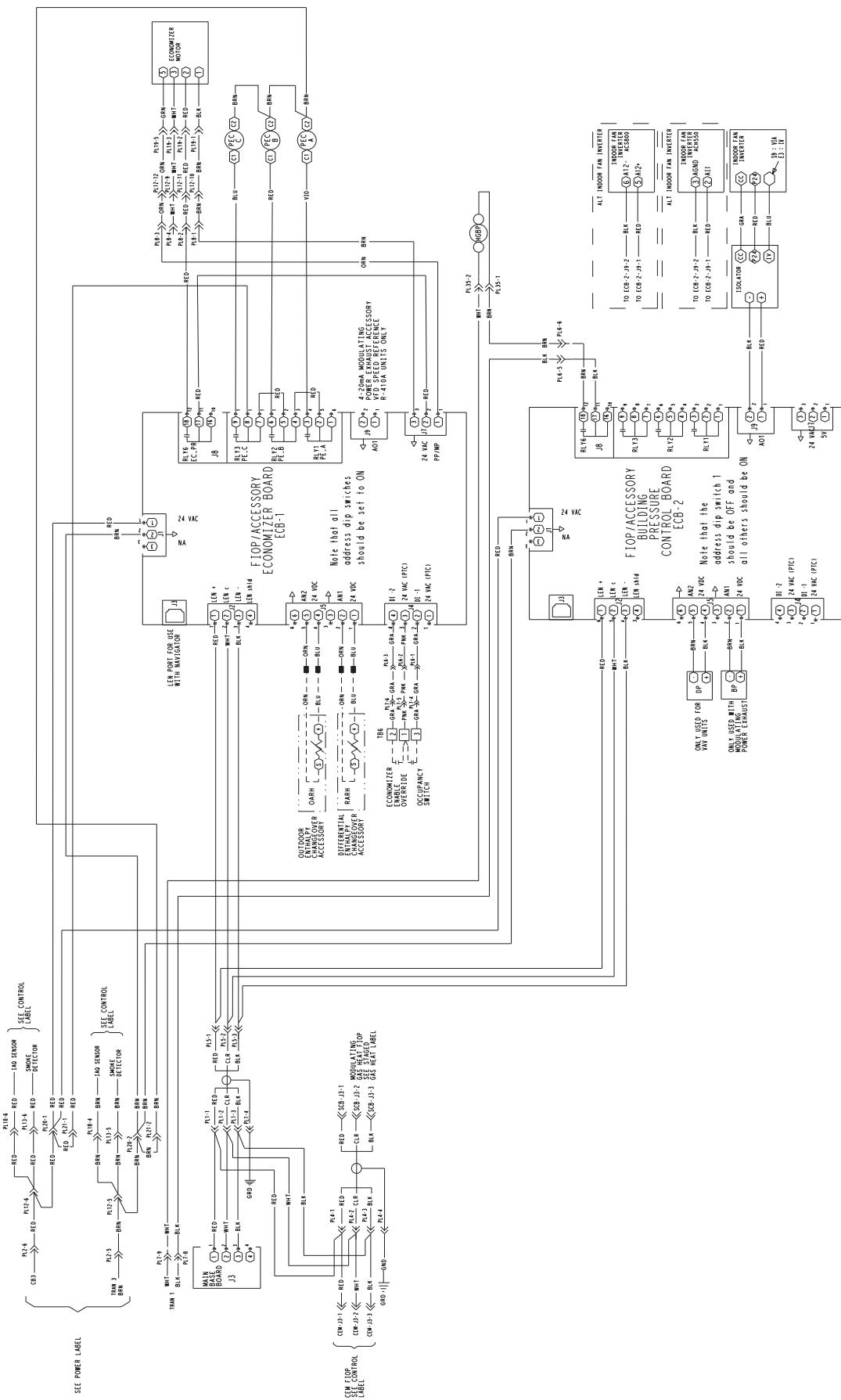
MAIN BOX CONTROL SCHEMATIC 48/50A2,A3,A4,A5020-060

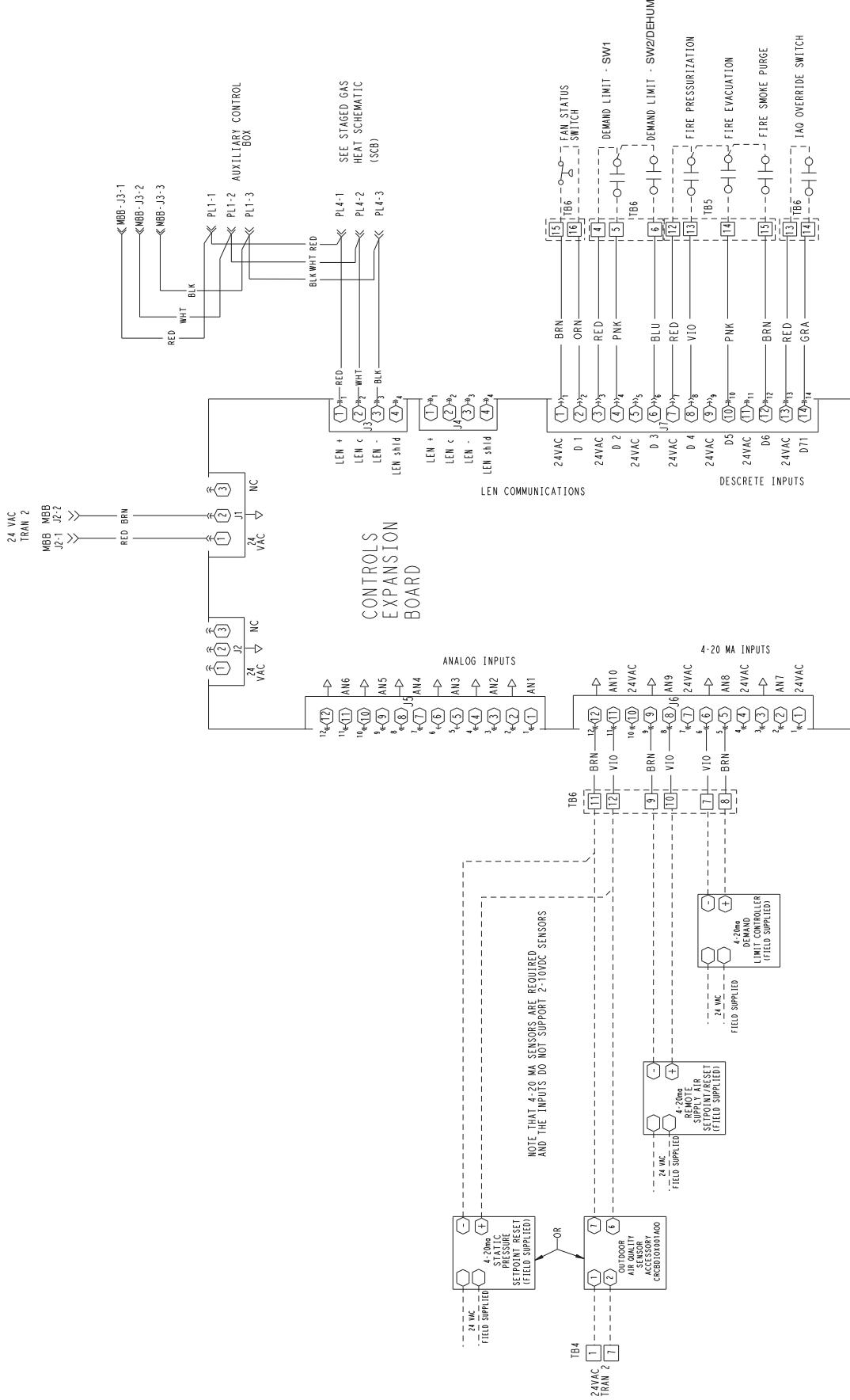


Typical wiring schematics (cont)



AUXILIARY CONTROL BOX SCHEMATIC 48/50A2,A3,A4,A5020-060

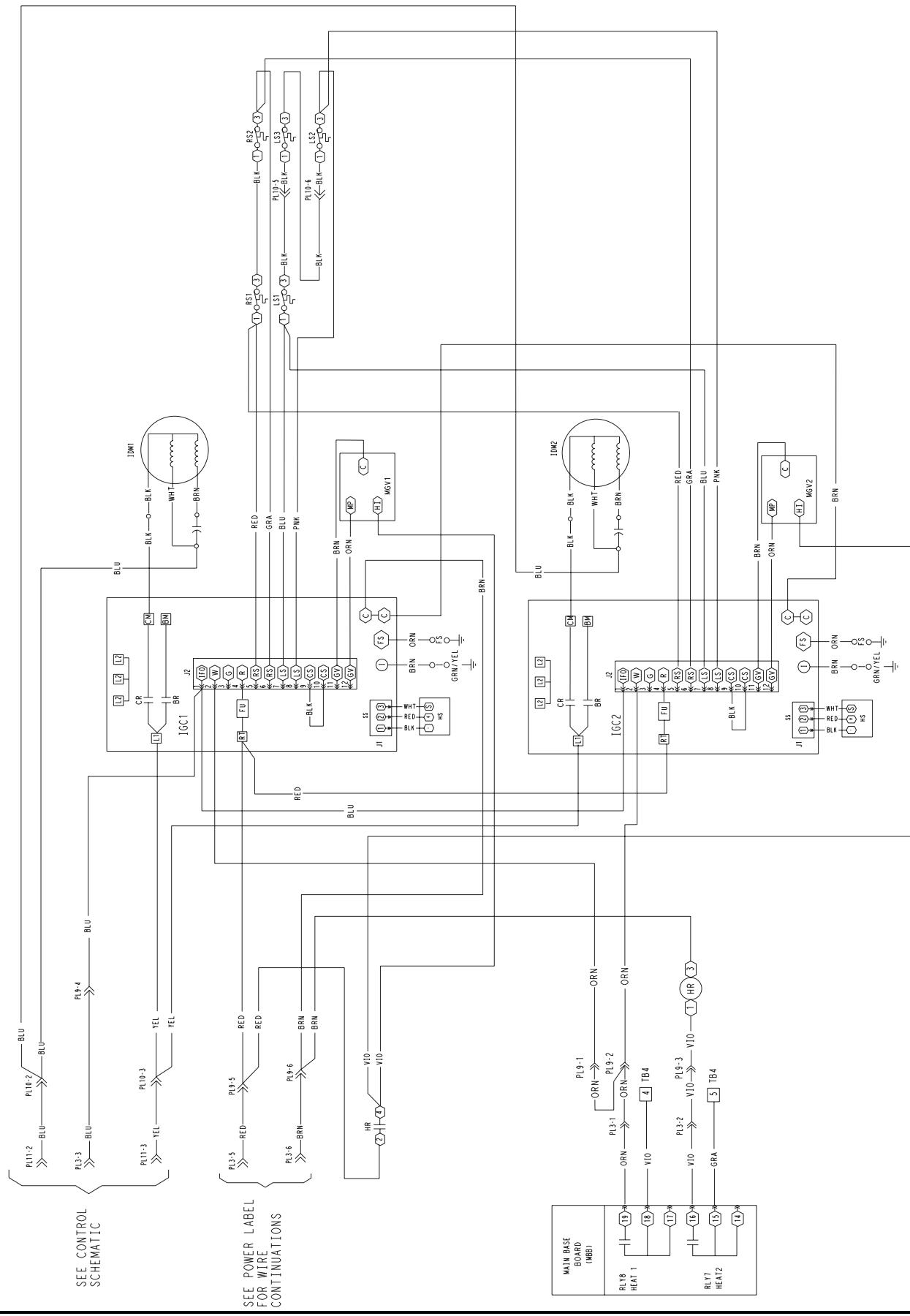


CONTROLS EXPANSION MODULE WIRING SCHEMATIC 48/50A2,A3,A4,A5020-060


Typical wiring schematics (cont)

The Carrier logo is located in the bottom right corner. It consists of the word "Carrier" in a white, cursive, serif font, enclosed within a black oval border. A small registered trademark symbol (®) is positioned at the bottom right of the oval.

GAS HEAT CONTROL SCHEMATIC (TWO-STAGE HEAT) 48A2,A3020-060



LEGEND FOR TYPICAL WIRING SCHEMATICS

LEGEND

A	—	Circuit A
AUX	—	Auxiliary Contact
BP	—	Building Pressure Transducer
C	—	Compressor Contactor
CAP	—	Capacitor
CB	—	Circuit Breaker
CCB	—	Control Circuit Breaker
CCN	—	Carrier Comfort Network®
CEM	—	Controls Expansion Module
COMP	—	Compressor
CS	—	Compressor Current Sensor Board
DP	—	Discharge Pressure Transducer
DPT	—	Discharge Pressure Transducer
ECB-1	—	Economizer Control Board
ECB-2	—	VAV Control Board
EDT	—	Evaporator Discharge Temperature
FIOP	—	Factory-Installed Option
FS	—	Flame Sensor
FU	—	Fuse
GND	—	Ground
HGBP	—	Hot Gas Bypass
HPS	—	High-Pressure Switch
HR	—	Heat Relay
HS	—	Hall Effect Induced Draft Motor Switch
IAQ	—	Indoor Air Quality
IDM	—	Induced-Draft Motor
IFC	—	Indoor-Fan Contactor
IFCB	—	Indoor-Fan Circuit Breaker
IFM	—	Indoor-Fan Motor

IGC	—	Integrated Gas Control Board
IP	—	Internal Compressor Protector
LEN	—	Local Equipment Network
LS	—	Limit Switch
MBB	—	Main Base Board
MGV	—	Main Gas Valve
OARH	—	Outdoor Air Relative Humidity
OAT	—	Outdoor Air Temperature Sensor
OFC	—	Outdoor-Fan Contactor
OFM	—	Outdoor-Fan Motor
OL	—	Overload
PEC	—	Power Exhaust Contactor
PEM	—	Power Exhaust Motor
PL	—	Plug
PTC	—	Positive Temperature Coefficient
RARH	—	Return Air Relative Humidity
RAT	—	Return Air Temperature Sensor
RS	—	Rollout Switch
SCB	—	Staged Gas Heat Control Board
SDU	—	Scrolling Marquee Display
SPT	—	Suction Pressure Transducer
T-55	—	Room Temperature Sensor
T-56	—	Room Temperature Sensor with Set Point
TB	—	Terminal Block
TRANS	—	Transformer
UPC	—	Universal Protocol Converter
VAV	—	Variable Air Volume
VFD	—	Variable Frequency Drive

THERMOSTAT MARKINGS

BM	—	Blower Motor
C	—	Common
CM	—	Inducer Motor
CS	—	Centrifugal Switch
G	—	Fan
IFO	—	Indoor Fan On
L1	—	Line 1
R	—	Thermostat Power
RT	—	Power Supply
SS	—	Speed Sensor
W1	—	Thermostat Heat Stage 1
W2	—	Thermostat Heat Stage 2
X	—	Alarm Output
Y1	—	Thermostat Cooling Stage 1
Y2	—	Thermostat Cooling Stage 2
 X		Terminal (Marked)
 O		Terminal (Unmarked)
 X		Terminal Block
 ●		Splice
 —		Factory Wiring
 - - -		Field Wiring
 —		To indicate common potential only, not to represent wiring.

Guide specifications — 48/50A2,A4



Packaged Rooftop Cooling Unit and Packaged Rooftop Cooling Unit with Gas Heat — Constant Volume or Staged Air Volume Application

HVAC Guide Specifications — Section 48/50A2,A4

Size Range: **20 to 60 Tons, Nominal (Cooling)**

Carrier Model Number:
48A2, 48A4, 50A2, 50A4

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor roof curb or slab mounted, electronically controlled heating and cooling unit utilizing hermetic scroll compressors with crankcase heaters for cooling duty and with optional gas heat or electric heat. Units shall discharge supply and return air vertically or horizontally as shown on contract drawings. EER shall meet requirements of ASHRAE Standard 90.1-2010.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with AHRI Standard 340/360, latest edition.
- B. Unit shall be designed to conform to ANSI/ASHRAE 15 (latest edition), ASHRAE 62, and UL Standard 1995.
- C. Unit shall be listed by ETL and ETL, Canada as a total package.
- D. 48A2,A4 units shall be designed to conform with ANSI Standard Z21.47 (U.S.A.) / CSA Standard 2.3 (Canada), Gas-Fired Central Furnaces.
- E. Roof curb shall be designed to NRCA criteria per Bulletin B-1986.
- F. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- G. Unit shall be manufactured in a facility registered to the ISO 9001 manufacturing quality standard.

1.03 DELIVERY, STORAGE AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations. All exposed coils shall have protective shipping covers.

Part 2 — Products

2.01 EQUIPMENT

A. General:

Factory-assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, refrigerant charge (R-410A), operating oil charge, dual refrigerant circuits, microprocessor based control system and associated hardware, and all special features required prior to field start-up.

B. Unit Cabinet:

- 1. Constructed of galvanized steel, bonderized and precoated with a baked enamel finish.

a. Top cover shall be 18-gage sheet metal with 0.75-in. thick, 1.5-lb density, fiberglass insulation.

b. Access panels and doors shall be 20-gage sheet metal with 0.5-in. thick, 1.5-lb density, fiberglass insulation.

c. Corner and center posts shall be 16-gage galvanized steel.

d. Basepans in the heating and return air sections shall be 16-gage galvanized steel.

e. Basepans in the condenser section shall be 16-gage galvanized steel.

f. Compressor rail shall be 12-gage galvanized steel.

g. Condensate pan shall be 16-gage aluminized steel.

h. Air baffles shall be 18-gage galvanized steel with 0.5-in. thick, 1.5-lb density, fiberglass insulation.

i. Base rail shall be 14-gage galvanized steel.

j. Fan deck (indoor and outdoor section) shall be 16-gage galvanized steel.

2. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).

3. Sides shall have person-sized insulated hinged access doors for easy access to the control box and other areas requiring servicing. Each door shall seal against a rubber gasket to help prevent air and water leakage and be equipped to permit ease and safety during servicing.

4. Interior cabinet surfaces shall be sheet metal lined or insulated with flexible fire-retardant material, coated on the air side.

5. Unit shall have a factory-installed sloped condensate drain connection made from an aluminized steel or optional stainless steel.

6. Equipped with lifting lugs to facilitate overhead rigging.

7. Filters shall be accessible through a hinged access panel without requiring any special tools.

C. Fans:

1. Indoor Evaporator Fans:

a. Double-width/double-inlet, centrifugal, belt driven, forward-curved type with single outlet discharge.

b. Fan shaft bearings shall be of the pillow-block type with positive locking collar and lubrication provisions.

c. Statically and dynamically balanced.

d. Evaporator fan shaft bearings shall have a life of 200,000 hours at design operating conditions in accordance with ANSI B3.15.

- e. Solid fan shaft construction for size 020-050 units and two-piece solid fan shaft construction on the size 060 unit.
- 2. Condenser Fans:
 - a. Fans shall be direct-driven propeller type only, with corrosion-resistant blades riveted to corrosion resistant steel supports for all size 020-050 units and the size 060 unit with optional condenser coil. Size 060 units with the microchannel condenser coil shall have a direct driven, 9-blade airfoil cross section, reinforced polymer construction, and shrouded-axial type fans with inherent corrosion resistance.
 - b. Discharge air vertically upward and protected by PVC coated steel wire safety guards.
 - c. Statically and dynamically balanced.
- 3. Fan Drive for SAV™ Units:

Staged air volume units shall be equipped with variable frequency drive (VFD) inverter. The VFD shall control motor speed to user configurable speeds. High speed shall be a percentage of 60 Hz, and shall be user configurable. The range of adjustment for high speed shall be between 50 and 100% of 60 Hz. Low speed shall be a percentage of 60 Hz, and shall be user configurable. The range of adjustment for low speed shall be between 33 and 67% of 60 Hz. The control shall allow user configurable fan speeds for cooling and heating modes. The VFD shall be provided with a metal enclosure and shall be factory-mounted, wired, and tested. The variable speed drive shall include the following features.

 - a. Full digital control with direct control from the unit *ComfortLink* controls.
 - b. Insulated gate bi-polar transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform, allowing for quiet motor operation.
 - c. Inverters capable of operation at a frequency of 8 kHz so no acoustic noise shall be produced by the motor.
 - d. Critical frequency avoidance.
 - e. Self diagnostics.
 - f. On-board storage of unit manufacturer's customer user settings, retrievable from the keypad.
 - g. RS485 communications capability.
 - h. Electronic thermal overload protection.
 - i. 5% swinging chokes for harmonic reduction and improved power factor.
 - j. All printed circuit boards shall be conformal coated.

D. Compressors:

- 1. Fully hermetic, scroll type compressors with overload protection and short cycle protection with minimum on and off timers.
- 2. Factory rubber-in-shear mounted for vibration isolation.
- 3. Reverse rotation protection capability.
- 4. Crankcase heaters shall only be activated during compressor off mode.

E. Coils:

- 1. Standard evaporator coil shall have aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
- 2. Standard condenser coil shall be microchannel design. The coil shall have a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds. Microchannel coils shall consist of a two-pass arrangement. Coil construction shall consist of aluminum alloys for the fins, tubes and manifolds.
- 3. Coils shall be leak tested at 150 psig and pressure tested at 650 psig.
- 4. Optional condenser coil shall have aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
- 5. Optional pre-coated aluminum-fin coils shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. 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. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
- 6. Copper-fin coils shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan. All copper construction shall provide protection in moderate coastal environments.
- 7. E-coated aluminum-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to

Guide specifications — 48/50A2,A4 (cont)



160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes.

F. Gas Heating Section (48 Series Only):

1. Induced-draft combustion type with energy saving direct spark ignition systems and redundant main gas valves.
2. The heat exchanger shall be of the tubular section type constructed of a minimum of 20-gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance. Optional stainless steel heat exchangers shall be available.
3. Burners shall be of the in-shot type constructed of aluminum coated steel.
4. All gas piping shall enter the unit cabinet at a single location.
5. Induced Draft Fans:
 - a. Direct-driven, single inlet, forward-curved centrifugal type.
 - b. Statically and dynamically balanced.
 - c. Made from steel with a corrosion-resistant finish.
6. High-corrosion areas such as flue gas collection and exhaust areas shall be lined with corrosion resistant material.

G. Refrigerant Components:

Unit shall be equipped with dual refrigerant circuits each containing:

1. Solid core filter drier.
2. Thermostatic expansion valve.
3. Fusible plug.

H. Filter Section:

Standard filter section shall be supplied with 2-in. thick disposable fiberglass filters.

I. Controls and Safeties:

1. Unit *ComfortLink* Controls:
 - a. Scrolling marquee display.
 - b. CCN (Carrier Comfort Network®) capable.
 - c. Unit control with standard suction pressure and condensing pressure transducers.
 - d. Shall provide a minimum 5° F temperature difference between cooling and heating set points to meet ASHRAE 90.1, energy standard.
 - e. Shall provide and display a current alarm list and an alarm history list.
 - f. Automatic compressor lead/lag control.

- g. Service run test capability.
 - h. Shall accept input from a CO₂ sensor (both indoor and outdoor).
 - i. Configurable alarm light shall be provided which activates when certain types of alarms occur.
 - j. Compressor minimum run time (3 minutes) and minimum off time (3 minutes) are provided.
 - k. Service diagnostic mode.
 - l. Optional integrated economizer control or two-position self-closing adjustable outside air damper.
 - m. Minimum of 3 capacity stages of mechanical capacity control (excluding hot gas bypass) controlled by one of the following user selectable methods:
 - 1) A control algorithm to maintain either high-cool or low-cool supply air temperature set point. Cooling mode (off, low or high) to be determined from space temperature sensor or standard 2-stage mechanical thermostat input.
 - 2) Two-stage control.
 - n. Optional minimum load valve for additional capacity stage.
 - o. Unit shall be complete with self-contained low voltage control circuit.
 - p. Control of evaporator leaving air temperature through compressor and economizer control.
2. Safeties:
 - a. Unit shall incorporate a solid-state compressor lockout which provides optional reset capability at the space thermostat should any of the following safety devices trip and shut off compressor:
 - 1) Compressor lockout protection provided for either internal or external overload.
 - 2) Low-pressure protection.
 - 3) Freeze protection (evaporator coil).
 - 4) High-pressure protection (high pressure switch or internal).
 - 5) Compressor reverse rotation protection.
 - 6) Loss-of-charge protection.
 - 7) Welded contactor protection.
 - b. Supply-air sensor shall be located in the unit and should be used for economizer control and compressor stage control.
 - c. Induced draft heating section (48 Series) shall be provided with the following minimum protections:
 - 1) High-temperature limit switch.
 - 2) Induced-draft motor speed sensor.
 - 3) Flame rollout switch.
 - 4) Flame proving controls.
 - 5) Redundant gas valve.

J. Operating Characteristics:

1. Unit shall be capable of starting and running at 115 F ambient outdoor temperature per maximum load criteria of AHRI Standard 340/360.
2. Unit with standard controls will operate in cooling down to an outdoor ambient temperature of 32 F.
3. Unit shall be provided with fan time delay to help prevent cold air delivery.

K. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single location.

L. Motors:

1. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have either internal line break thermal and current overload protection or external current overload modules with compressor temperature sensors.
2. All condenser-fan motors shall be totally enclosed 3-phase type with permanently lubricated ball bearings, class F insulation and internal, automatic-reset thermal overload protection or manual reset calibrated circuit breakers.
3. All indoor fan and power exhaust motors 5 hp and larger shall meet the minimum efficiency requirements as established by the Energy Independence and Security Act (EISA) of 2007.

M. Special Features:

Certain features are not applicable when the features designated * are specified. For assistance in amending the specifications, contact your local Carrier Sales Office.

* 1. Integrated Economizer:

- a. Economizer shall meet the requirements of ASHRAE 90.1.
- b. Economizer shall be furnished and installed complete with recirculated air dampers, outside air dampers, and controls.
- c. All dampers shall be low leakage type and gear driven.
- d. Capable of introducing up to 100% outdoor air for minimum ventilation as well as free cooling.
- e. Damper actuator shall be gear driven, 24-v fully modulating design.
- f. Economizer outdoor hood shall be pre-painted.
- g. Economizer shall meet the requirements of the California Energy Commission airside economizer acceptance test.

* 2. Barometric Relief Damper Package:

- a. Package shall include damper, seals, hardware, and hoods to relieve excess internal pressure.

- b. Damper shall close due to gravity upon unit shutdown.

* 3. Power Exhaust:

Package shall include a multiple exhaust fan (centrifugal style) fan, 1 Hp 208-230, 460 v direct-drive motor, and damper for vertical flow units with economizer to control overpressurization of building. Control shall be through *ComfortLink* controls based on damper position or through an optional building pressure sensor. On size 020-050 units, 4 stages of control shall be available. On size 060 units, 6 stages of control shall be available.

* 4. Thermostats and Subbases:

To provide staged heating and cooling in addition to automatic (or manual) changeover and fan control.

* 5. Electronic Programmable Thermostat:

Capable of using deluxe full-featured electronic thermostat.

* 6. Liquefied Propane Conversion Kit (48 Series):

Kit shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane gas.

* 7. Convenience Outlet:

Shall be factory-installed and internally mounted with an externally accessible 115-v, 15 amp. GFI, female receptacle with hinged cover. A step-down transformer and overload protection shall be included so no additional wiring is necessary unless the field-wired outlet has been requested. When applied with a unit-mounted disconnect, the outlet shall be wired to the load side of the disconnect so the outlet will shut off with the disconnect.

* 8. Non-Fused Disconnect Switch:

Shall be factory-installed, internally mounted, and UL approved. Non-fused switch shall provide unit power shutoff. Shall be accessible from outside the unit and shall provide power off lockout capability.

* 9. Electric Heater (50 Series Units Only):

Electric resistance heaters shall be factory-installed, nichrome element type, open wire coils with 0.29 in. inside diameter, insulated with ceramic bushings, and include operating and safety controls. Coil ends are staked and welded to terminal screw slots.

*10. Hail Guard, Condenser Coil Grille:

Shall protect the condenser coil from hail, flying debris, and damage by large objects without increasing unit clearances.

*11. CO₂ Sensor:

The CO₂ sensor shall have the ability to monitor CO₂ levels and relay information to the controller. The controller will use CO₂ level information to modulate the economizer and

Guide specifications — 48/50A2,A4 (cont)



provide demand controlled ventilation. The sensor shall be available as field installed or factory installed return air sensor or a remote space sensor.

*12. Return Air Smoke Detector:

The smoke detector shall send input to the controller to shut down the unit in case smoke is detected. The smoke detector shall be factory installed in the return air section or shall be available as a field-installed accessory.

*13. Filter Status:

The filter status switch shall be a pressure differential switch and will indicate a dirty filter. The switch shall be available as field or factory installed.

*14. Humidity Sensor:

A humidity sensor will allow for outside air enthalpy changeover control using the standard outside air dry bulb sensor and the accessory humidity sensor. When both an outside and return air humidity sensor are used then differential enthalpy changeover can be supported.

*15. Two-Position Damper:

A two-position damper shall admit up to 25% outdoor air during fan operation and shall close when the fan is off. The damper position shall be mechanically adjustable.

*16. 4-Inch Filters:

Optional filter section shall be supplied with 4-in. thick MERV-7 pleated fiberglass filters.

*17. Control Expansion Module (CEM):

Shall provide the following additional optional features:

- a. Remote set point
- b. Demand limit control
- c. Remote economizer position
- d. Fire and smoke control override control
- e. Remote sensor monitoring
- f. Fan status switch monitoring

*18. Staged Gas Heat (48A2,A4 only):

The control shall have the option for control of the gas heat to a discharge air temperature by sequencing on the gas cells to provide up to 11 stages of capacity. The control shall be integrated directly into the main unit controls and shall include leaving air temperature sensors to ensure that high temperatures do not occur during the operation of the staged gas heat.

19. Navigator™ Display Module:

The Navigator display module shall be a portable hand-held display module with a minimum of 4 lines and 20 characters per line, of clear

English, Spanish, Portuguese or French language. Display menus shall provide clear language descriptions of all menu items, operating modes, configuration points and alarm diagnostics. Reference to factory codes shall not be accepted. An industrial grade coiled extension cord shall allow the display module to be moved around the chiller. Magnets shall hold the display module to any sheet metal panel to allow hands-free operation. Display module shall have NEMA 4x housing suitable for use in outdoor environments. Display shall have back light and contrast adjustment for easy viewing in bright sunlight or night conditions. The display module shall have raised surface buttons with positive tactile response.

20. BACnet Communication Option:

Shall provide factory installed communication capability with a BACnet MS/TP network. Allows integration with i-Vu® Open Control System or a BACnet Building Automation System.

21. MODBUS Protocol Translator:

A controller-based accessory module shall provide CCN to MODBUS Remote Terminal Unit (RTU) protocol conversion.

22. LonWorks Protocol Translator:

A controller-based accessory module shall provide CCN to LON FT-10A ANSI/EIA-709.1 protocol conversion.

23. Full Perimeter Roof Curbs (Horizontal and Vertical):

Shall be formed of 14-gage galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.

24. Security Grille (48/50A060 Unit with MCHX Only):

Factory-installed grille shall limit access to compressor and condenser coil area to authorized personnel only.

25. Double Wall Option:

Unit cabinet shall have double wall construction featuring flexible fire retardant fiberglass insulation sandwiched between pre-painted exterior panels and galvanized steel inner panels.

26. Low Outdoor Sound Accessory:

Field-installed accessory, consisting of compressor sound blankets which are used to mitigate the level of outdoor sound. Available in both single and tandem arrangements.

27. Low Outdoor Sound Condenser Fans:

Low sound condenser fan system shall be provided to reduce outdoor sound levels.

Guide specifications — 48/50A3,A5



Packaged Rooftop Cooling Unit and Packaged Rooftop Cooling Unit with Gas Heat — Variable Air Volume Application

HVAC Guide Specifications — Section 48/50A3,A5

Size Range: **20 to 60 Tons, Nominal (Cooling)**

Carrier Model Number:

48A3, 48A5, 50A3, 50A5

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor roof curb or slab mounted, electronically controlled heating and cooling unit utilizing hermetic scroll compressors with crankcase heaters for cooling duty and gas heat or electric heat. Units shall discharge supply and return air vertically or horizontally as shown on contract drawings. EER shall meet requirements of ASHRAE Standard 90.1-2010.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with AHRI Standard 340/360, latest edition.
- B. Unit shall be designed to conform to ANSI/ASHRAE 15 (latest edition), ASHRAE 62, and UL Standard 1995.
- C. Unit shall be listed by ETL and ETL, Canada as a total package.
- D. 48A3,A5 units shall be designed to conform with ANSI Standard Z21.47 (U.S.A.) / CSA Standard 2.3 (Canada), Gas-Fired Central Furnaces.
- E. Roof curb shall be designed to NRCA criteria per Bulletin B-1986.
- F. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- G. Unit shall be manufactured in a facility registered to the ISO 9001 manufacturing quality standard.

1.03 DELIVERY, STORAGE AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT

A. General:

Factory-assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, refrigerant charge (R-410A), operating oil charge, dual refrigerant circuits, microprocessor based control system and associated hardware, and all special features required prior to field start-up.

B. Unit Cabinet:

- 1. Constructed of galvanized steel, bonderized and precoated with a baked enamel finish.
 - a. Top cover shall be 18-gage sheet metal with 0.75-in. thick, 1.5-lb density, fiberglass insulation.

- b. Access panels and doors shall be 20-gage sheet metal with 0.5-in. thick, 1.5-lb density, fiberglass insulation.
 - c. Corner and center posts shall be 16-gage galvanized steel.
 - d. Basepans in the heating and return air sections shall be 16-gage galvanized steel.
 - e. Basepans in the condenser section shall be 16-gage galvanized steel.
 - f. Compressor rail shall be 12-gage galvanized steel.
 - g. Condensate pan shall be 16-gage aluminized steel.
 - h. Air baffles shall be 18-gage galvanized steel with 0.5-in. thick, 1.5-lb density, fiberglass insulation.
 - i. Base rail shall be 14-gage galvanized steel.
 - j. Fan deck (indoor and outdoor section) shall be 16-gage galvanized steel.
- 2. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
 - 3. Sides shall have person-sized insulated hinged access doors for easy access to the control box and other areas requiring servicing. Each door shall seal against a rubber gasket to help prevent air and water leakage and be equipped to permit ease and safety during servicing.
 - 4. Interior cabinet surfaces shall be sheet metal lined or insulated with flexible fire-retardant material, coated on the air side.
 - 5. Unit shall have a factory-installed sloped condensate drain connection made from an aluminized steel or optional stainless steel.
 - 6. Equipped with lifting lugs to facilitate overhead rigging.
 - 7. Filters shall be accessible through a hinged access panel without requiring any special tools.

C. Fans:

1. Indoor Evaporator Fans:

- a. Double-width/double-inlet, centrifugal, belt driven, forward-curved type with single outlet discharge.
- b. Fan shaft bearings shall be of the pillow-block type with positive locking collar and lubrication provisions.
- c. Statically and dynamically balanced.
- d. Evaporator fan shaft bearings shall have a life of 200,000 hours at design operating conditions in accordance with ANSI B3.15.
- e. Solid fan shaft construction for size 020-050 units and two-piece solid fan shaft construction on the size 060 unit.

Guide specifications — 48/50A3,A5 (cont)



2. Condenser Fans:

- a. Fans shall be direct-driven propeller type only, with corrosion-resistant blades riveted to corrosion resistant steel supports for all size 020-050 units and the size 060 unit with optional condenser coil. Size 060 units with the microchannel condenser coil shall have a direct driven, 9-blade airfoil cross section, reinforced polymer construction, and shrouded-axial type fans with inherent corrosion resistance.
- b. Discharge air vertically upward and protected by PVC coated steel wire safety guards.
- c. Statically and dynamically balanced.

3. Supply Fan Drive:

Unit shall be equipped with variable frequency drive (VFD) inverter. The VFD shall be installed inside the unit cabinet and shall be factory-mounted, wired and tested. The VFD shall control motor speed to maintain set point static pressure at the sensor tube location of the supply duct pressure transducer (transducer is factory-provided and installed; sensor tube must be field-routed). The control system may be field-adjusted to maintain supply duct static pressure set points from 0 in. wg to 3.5 in. wg. The variable frequency drive shall include the following features:

- a. Full digital control with direct control from the unit *ComfortLink* controls.
- b. Insulated Gate Bi-Polar Transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform, allowing for quiet motor operation.
- c. Inverters capable of operation at a frequency of 8 kHz, so no acoustic noise shall be produced by the motor.
- d. Self diagnostics.
- e. Personal lockout code for additional security.
- f. Critical frequency avoidance.
- g. RS485 capability standard.
- h. Electronic thermal overload protection.
- i. 5% swinging chokes for harmonic reduction and improved power factor.
- j. All printed circuit boards shall be conformal coated.

D. Compressors:

1. Fully hermetic, scroll type compressors with overload protection and short cycle protection with minimum on and off timers.
2. Factory rubber-in-shear mounted for vibration isolation.
3. Reverse rotation protection capability.
4. Crankcase heaters shall only be activated during compressor off mode.

E. Coils:

1. Standard evaporator coil shall have aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
2. Standard condenser coil shall be microchannel design. The coil shall have a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds. Microchannel coils shall consist of a two-pass arrangement. Coil construction shall consist of aluminum alloys for the fins, tubes and manifolds.
3. Coils shall be leak tested at 150 psig and pressure tested at 650 psig.
4. Optional condenser coil shall have aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
5. Optional pre-coated aluminum-fin coils shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments. 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. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
6. Copper-fin coils shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan. All copper construction shall provide protection in moderate coastal environments.
7. E-coated aluminum-fin coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss — 60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes.

F. Gas Heating Section (48 Series Only):

1. Induced-draft combustion type with energy saving direct spark ignition systems and redundant main gas valves.
2. The heat exchanger shall be of the tubular section type constructed of a minimum of 20-gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance. Optional stainless steel heat exchangers shall be available.
3. Burners shall be of the in-shot type constructed of aluminum coated steel.
4. All gas piping shall enter the unit cabinet at a single location.
5. Induced Draft Fans:
 - a. Direct-driven, single inlet, forward-curved centrifugal type.
 - b. Statically and dynamically balanced.
 - c. Made from steel with a corrosion-resistant finish.
6. High-corrosion areas such as flue gas collection and exhaust areas shall be lined with corrosion resistant material.

G. Refrigerant Components:

Unit shall be equipped with dual refrigerant circuits each containing:

1. Solid core filter drier.
2. Thermostatic expansion valve.
3. Fusible plug.

H. Filter Section:

Standard filter section shall be supplied with 2-in. thick disposable fiberglass filters.

I. Controls and Safeties:

1. Unit *ComfortLink* Controls:
 - a. Scrolling marquee display.
 - b. CCN (Carrier Comfort Network®) capable.
 - c. Unit control with standard suction pressure and condensing pressure transducers.
 - d. Shall provide a 5° F temperature difference between cooling and heating set points to meet ASHRAE 90.1, energy standard.
 - e. Shall provide and display a current alarm list and an alarm history list.
 - f. Automatic compressor redundancy.
 - g. Service run test capability.
 - h. Shall accept input from a CO₂ sensor (both indoor and outdoor).
 - i. Configurable alarm light shall be provided which activates when certain types of alarms occur.
 - j. Compressor minimum run time (3 minutes) and minimum off time (3 minutes) are provided.
 - k. Service diagnostic mode.

- l. Optional integrated economizer control or two-position self-closing adjustable outside-air damper.

- m. Minimum of 3 capacity stages of mechanical capacity control (excluding hot gas bypass) controlled with logic to maintain supply air temperature set point.

- n. Optional minimum load valve for additional capacity stage.

- o. Unit shall be complete with self-contained low voltage control circuit.

2. Safeties:

- a. Unit shall incorporate a solid-state compressor lockout which provides optional reset capability at the space thermostat should any of the following safety devices trip and shut off compressor:

- 1) Compressor lockout protection provided for either internal or external overload.
- 2) Low-pressure protection.
- 3) Freeze protection (evaporator coil).
- 4) High-pressure protection (high pressure switch or internal).
- 5) Compressor reverse rotation protection.
- 6) Loss of charge protection.
- 7) Welded contactor protection.

- b. Supply-air sensor shall be located in the unit and should be used for economizer control and compressor stage control.

- c. Induced draft heating section (48 Series) shall be provided with the following minimum protections:

- 1) High-temperature limit switch.
- 2) Induced-draft motor speed sensor.
- 3) Flame rollout switch.
- 4) Flame proving controls.
- 5) Redundant gas valve.

J. Operating Characteristics:

1. Unit shall be capable of starting and running at 115 F ambient outdoor temperature per maximum load criteria of AHRI Standard 340/360.
2. Unit with standard controls will operate in cooling down to an outdoor ambient temperature of 32 F.
3. Unit shall be provided with fan time delay to prevent cold air delivery.

K. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single location.

L. Motors:

1. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have either internal line break thermal and current overload protection or external current overload modules with compressor temperature sensors.

Guide specifications — 48/50A3,A5 (cont)



2. All condenser-fan motors shall be totally enclosed 3-phase type with permanently lubricated ball bearings, class F insulation and internal, automatic-reset thermal overload protection or manual reset calibrated circuit breakers.
3. All indoor fan and power exhaust motors 5 hp and larger shall meet the minimum efficiency requirements as established by the Energy Independence and Security Act (EISA) of 2007.

M. Special Features:

Certain features are not applicable when the features designated * are specified. For assistance in amending the specifications, contact your local Carrier Sales Office.

- * 1. Integrated Economizer:
 - a. Economizer shall meet the requirements of ASHRAE 90.1.
 - b. Economizer shall be furnished and installed complete with recirculated air dampers, outside air dampers, and controls.
 - c. All dampers shall be low leakage type and gear driven.
 - d. Capable of introducing up to 100% outdoor air for minimum ventilation as well as free cooling.
 - e. Damper actuator shall be gear driven, 24-v fully modulating design.
 - f. Economizer outdoor hood shall be pre-painted.
 - g. Economizer shall meet the requirements of the California Energy Commission airside economizer acceptance test.
 - * 2. Barometric Relief Damper Package:
 - a. Package shall include damper, seals, hardware, and hoods to relieve excess internal pressure.
 - b. Damper shall close due to gravity upon unit shutdown.
 - * 3. Power Exhaust:

Package shall include a multiple exhaust fan (centrifugal style) fan, 1 Hp 208-230, 460 v direct-drive motor, and damper for vertical flow units with economizer to control overpressurization of building. Control shall be through *ComfortLink* controls based on optional building pressure sensor. On size 020-050 units, 4 stages of control shall be available. On size 060 units, 6 stages of control shall be available.
 - * 4. Liquefied Propane Conversion Kit (48 Series):

Kit shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane gas.
- * 5. Convenience Outlet:

Shall be factory-installed and internally mounted with an externally accessible 115-v, 15 amp GFI, female receptacle with hinged cover. A step-down transformer and overload protection shall be included so no additional wiring is necessary unless the field wired outlet has been requested. When applied with a unit-mounted disconnect, the outlet shall be wired to the load side of the disconnect so the outlet will shut off with the disconnect.
 - * 6. Non-Fused Disconnect Switch:

Shall be factory-installed, internally mounted, and UL approved. Non-fused switch shall provide unit power shutoff. Shall be accessible from outside the unit and shall provide power off lockout capability.
 - * 7. Electric Heater (50 Series Units Only):

Electric resistance heaters shall be factory-installed, nichrome element type, open wire coils with 0.29 in. inside diameter, insulated with ceramic bushings, and include operating and safety controls. Coil ends are staked and welded to terminal screw slots.
 - * 8. Hail Guard, Condenser Coil Grille:

Shall protect the condenser coil from hail, flying debris, and damage by large objects without increasing unit clearances.
 - * 9. CO₂ Sensor:

The CO₂ sensor shall have the ability to monitor CO₂ levels and relay information to the controller. The controller will use CO₂ level information to modulate the economizer and provide demand control ventilation. The sensor shall be available as field installed or factory-installed return air sensor or a remote space sensor.
 - * 10. Return Air Smoke Detector:

The smoke detector shall send input to the controller to shut down the unit in case smoke is detected. The smoke detector shall be factory installed in the return air section or shall be available as a field-installed accessory.
 - * 11. Filter Status:

The filter status switch shall be a pressure differential switch and will indicate a dirty filter. The switch shall be available as field or factory installed.
 - * 12. Humidity Sensor:

A humidity sensor will allow for outside air enthalpy changeover control using the standard outside air dry bulb sensor and the accessory humidity sensor. When both an outside and return air humidity sensor are used then differential enthalpy changeover can be supported.

- *13. Two-Position Damper:
A two-position damper shall admit up to 25% outdoor air during fan operation and shall close when the fan is off. The damper position shall be mechanically adjustable.
- *14. 4-Inch Filters:
Optional filter section shall be supplied with 4-in. thick MERV-7 pleated fiberglass filters.
- *15. Control Expansion Module (CEM):
Shall provide the following additional optional features:
- a. Remote set point.
 - b. Demand limit control.
 - c. Remote economizer position.
 - d. Fire and smoke control override control.
 - e. Remote sensor monitoring.
 - f. Fan status switch monitoring.
16. Bypass for Supply Fan VFD:
Units may be equipped with an optional manual bypass switch which allows the supply fan VFD to be electrically bypassed.
17. BACnet Communication Option:
Shall provide factory-installed communication capability with a BACnet MS/TP network. Allows integration with i-Vu® Open Control System or a BACnet Building Automation System.
18. MODBUS Protocol Translator:
A controller-based module shall provide CCN to MODBUS Remote Terminal Unit (RTU) protocol conversion.
19. LonWorks Protocol Translator:
A controller-based module shall provide CCN to LON FT-10A ANSI/EIA-709.1 protocol conversion.
20. Navigator™ Display Module:
The Navigator display module shall be a portable hand-held display module with a minimum of 4 lines and 20 characters per line, of clear English, Spanish, Portuguese or French language. Display menus shall provide clear language descriptions of all menu items, operating modes, configuration points and alarm diagnostics. Reference to factory codes shall not be accepted. An industrial grade coiled extension cord shall allow the display module to be moved around the chiller. Magnets shall hold the display module to any sheet metal panel to allow hands-free operation. Display module shall have NEMA 4x housing suitable for use in outdoor environments. Display shall have back light and contrast adjustment for easy viewing in bright sunlight or night conditions. The display module shall have raised surface buttons with positive tactile response.
- *21. Staged Gas Heat (48A3,A5 only):
The control shall have the option for control of the gas heat to a discharge air temperature by sequencing on the gas cells to provide up to 11 stages of capacity. The control shall be integrated directly into the main unit controls and shall include leaving air temperature sensors to ensure that high temperatures do not occur during the operation of the staged gas heat.
22. Full Perimeter Roof Curbs (Horizontal and Vertical):
Shall be formed of 14-gage galvanized steel with wood nailing strip and shall be capable of supporting entire unit weight.
23. Security Grille (48/50A060 Unit with MCHX Only):
Factory-installed grille shall limit access to compressor and condenser coil area to authorized personnel only.
24. Double Wall Option:
Unit cabinet shall have double wall construction featuring flexible fire retardant fiberglass insulation sandwiched between pre-painted exterior panels and galvanized steel inner panels.
25. Low Outdoor Sound Accessory:
Field-installed accessory, consisting of compressor sound blankets which are used to mitigate the level of outdoor sound. Available in both single and tandem arrangements.
26. Low Outdoor Sound Condenser Fans:
Low sound condenser fan system shall be provided to reduce outdoor sound levels.

Carrier Corporation • Syracuse, New York 13221

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Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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