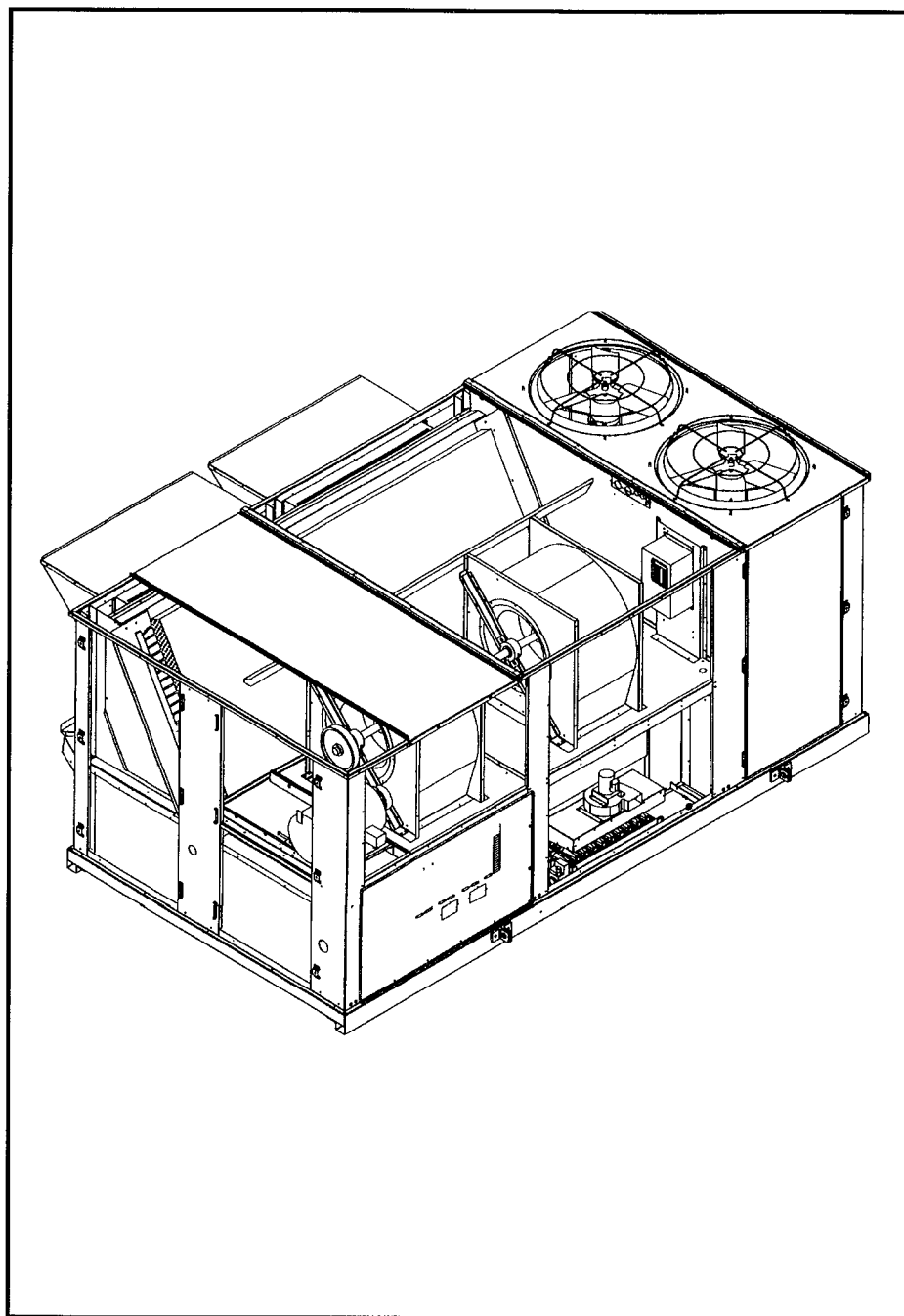




Product Data

48/50EJ,EK,EW,EY Single-Package Rooftop Gas Heating/Electric Cooling and Electric Cooling Units With Optional Electric Heat

20 to 45 Nominal Tons



Single-Package Rooftop Units with:

- dedicated vertical and horizontal discharge configurations.
- constant and variable volume controls
- efficiencies from 8.5 to 10.4
- meets ASHRAE Standard 62
- standard cooling operation at outdoor ambient temperatures as low as 35 F
- aluminized steel, sloped condensate pan
- all internal surfaces are sheet metal lined or anti-microbial insulation
- two-inch return air filters
- single power entry to unit
- Commercial duty, totally enclosed, 3-phase condenser motors with permanently lubricated bearings
- Alumagard™ heat exchanger coating
- induced-draft fan for gas combustion
- tubular heat exchangers
- pre-painted, galvanized steel cabinet
- commercial strength base rails (full perimeter, 14 gage)
- communicating DDC (Direct Digital Controls) unit controllers
- semi-hermetic compressors with service valves as standard
- dual independent refrigerant circuits with intertwined evaporator coils
- hinged access panels
- short cycle protection
- service diagnostics
- integrated economizer utilizing direct-drive actuators and opposed blade dampers
- IAQ options
- VFD (variable frequency drives) on all VAV units

Features/Benefits



Design flexibility

Dedicated vertical supply/return units (EJ,EK) 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, which is approved by the National Roofing Contractors Association (NRCA). The roof curb is made watertight by the roofer.

The ducts are attached directly to the roof curb to allow all ductwork to be completed before the unit is positioned.

Dedicated horizontal units (EW,EY) are ideal for replacement or applications such as through-the-wall jobs or jobs 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.

Direct Digital Controls (DDC) — standard

Every unit comes equipped with a microprocessor-based control system. Standard features include:

- heating/cooling operation
- remote start/stop
- space temperature offset (CV [constant volume])/space temperature reset (VAV [variable air volume])
- intelligent outdoor air mixing for Indoor Air Quality (IAQ)
- supply air pressure via Variable Frequency Drive (VAV only)
- LED diagnostic capability

Expandable features include (requires accessory electronic expansion board):

- programmable heating/cooling set points with scheduling (CCN only)
- temperature compensated start (CCN only)
- Indoor Air Quality sensor/outdoor air quality sensor
- IAQ Pre-Occupancy Purge
- fire modes (pressurization/purge/evacuation)
- fan status
- filter status
- field-configurable status
- demand limiting
- modulating power exhaust
- external alarm light

The Direct Digital Controls are “cable ready” to plug into the Carrier Comfort Network (CCN). The CCN is a fully communicating HVAC network which allows the user to fine tune equipment performance, manage energy use, and minimize operating costs. Among the network’s many monitoring and management capabilities are:

- maintenance management
- data collection
- Network Service Tool
- tenant billing
- Autodial Gateway
- load shed
- water system manager

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

The IGC also contains burner control logic for accurate and dependable gas ignition. The light-emitting diode (LED) fault notification system reduces service person troubleshooting time and minimizes service costs. The IGC also maximizes heating efficiency by controlling evaporator fan on and off delays.

The IGC control board provides built-in diagnostic capability. An LED simplifies troubleshooting by providing visual fault notification and system status confirmation.

The IGC also contains exclusive anticycle 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.

Quality and reliability

Dual serviceable, semi-hermetic compressors on intertwined evaporator coil ensures excellent full and part load efficiency. Dual refrigerant circuits, both electrically and mechanically independent, provide standby capability should one circuit require service. Reliable Carlyle 06D/E compressors are proven performers.

Solid core dessicant filter driers are sized at 30 cubic in. to assure longer compressor life. Solid core filters prevent erosion and dispersion of dessicant.

Totally enclosed outdoor-fan motors ensure many years of trouble-free operation.

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

Variable frequency drive (VFD) and unit unloading

Variable air volume (VAV) units utilize state of the art variable frequency drive (VFD) to control airflow.

VAV units have up to 6 steps of unloading for low load operation. Constant volume units come equipped with 2 stages of capacity. Field installed accessory unloaders are available to increase this to up to 6 stages of operation. The unit operation will closely match the load and maintain comfort in the most energy-efficient manner.

Factory-installed economizer (standard)

All units come equipped with an integrated economizer which 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 prevents moisture or objects from entering the unit.

Exhaust air relief is available for all units:

- barometric relief (CV or VAV)
- power exhaust (CV)
- 100% modulating power exhaust (VAV)

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.



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.

High static capability of standard units minimize the need to convert to higher static, oversized motors. The unit is less sensitive to distribution ductwork design.

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. It's as simple as throwing a DIP switch to activate the automatic test mode. After the test cycle, the unit automatically returns to normal operation.

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 prevents roof leaks caused by discarded screws.

Color coded wiring permits easy tracing and diagnostics.

The thermal insulation contains an EPA (Environmental Protection Agency) registered immobilized antimicrobial agent to inhibit the growth of bacteria and fungi.

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Model number nomenclature



48 EJ D 034 -- -- 6 0 1 E C

48 — Cooling Unit with Natural Gas Heat

EJ — CV Vertical
EK — VAV Vertical
EW — CV Horizontal
EY — VAV Horizontal

Heat Options

D — Low Gas Heat
E — High Gas Heat (EJ/EW Only)

Nominal Tons

024 — 20
028 — 25
030 — 27
034 — 30
038 — 35 (Not available for VAV or 575-v units)
044 — 40
048 — 45 (Not available for VAV or 575-v units)

Filter Option

-- — Std. 2-in. Throwaway

Coil Material

— — Al/Cu Condenser and Evaporator
C — Cu/Cu Condenser, Al/Cu Evaporator (without lances)
E — Al/Cu Condenser with Precoated Fins (without lances)

Economizer/Relief Options

A — Economizer Only (all)
B — Economizer with Non-Modulating Power Exhaust (EJ Only)
C — Economizer with Barometric Relief (EJ/EK Only)
D — Economizer with Modulating Power Exhaust (EK Only)

Motor Options

HP	UNIT						
	024	028	030	034	038	044	048
A — 5	X						
B — 7.5		X					
C — 10	X	X	X	X	X		
D — 15	X	X	X	X	X	X	
E — 20			X	X	X	X	X
F — 25						X	X
G — 30							X

NOTE: VAV models (EK and EY) equipped with variable frequency drive (VFD)

Packaging

1 — Domestic
3 — Export Crate

Design Series

0 — Original

Voltage

1 — 575-3-60
5 — 208/230-3-60
6 — 460-3-60

LEGEND

Al — Aluminum
Cu — Copper
CV — Constant Volume
VAV — Variable Air Volume

Quality Assurance



Certificate No FM 21837

Approvals:

ISO 9002
EN 29002
BS5750 PART 2
ANSI/ASQC Q92

50 EJ B 034 -- -- 6 0 1 E C

50 — Cooling Unit with
Optional Electric Heat

EJ — CV Vertical
EK — VAV Vertical
EW — CV Horizontal
EY — VAV Horizontal

Heat Options (kW)

	0 kW	B 36 kW	C 72 kW
024	O	O	X
028	O	O	X
030	O	O	X
034	O	O	X
038	O	X	X
044	O	O	X
048	O	X	X

X = Available CV only (EJ/EW)
O = Available CV and VAV Models

Nominal Tons

024 — 20
028 — 25
030 — 27
034 — 30
038 — 35 (Not available for VAV or 575-v units)
044 — 40
048 — 45 (Not available for VAV or 575-v units)

Filter Option

-- — Std. 2-in. Throwaway

Coil Material

— — Al/Cu Condenser and Evaporator
C — Cu/Cu Condenser, Al/Cu Evaporator
E — Al/Cu Condenser with Precoated Fins

LEGEND

Al — Aluminum
Cu — Copper
CV — Constant Volume
VAV — Variable Air Volume

Economizer/Relief Options

A — Economizer Only (all)
B — Economizer with Non-Modulating Power Exhaust (EJ Only)
C — Economizer with Barometric Relief (EJ/EK Only)
D — Economizer with Modulating Power Exhaust (EK Only)

Motor Options

HP	UNIT						
	024	028	030	034	038	044	048
A — 5	X						
B — 7.5		X					
C — 10	X	X	X	X	X		
D — 15	X	X	X	X	X	X	
E — 20			X	X	X	X	X
F — 25						X	X
G — 30							X

NOTE: VAV models (EK and EY) equipped with variable frequency drive (VFD)

Packaging

1 — Domestic
3 — Export Crate

Design Series

0 — Original

Voltage

1 — 575-3-60
5 — 208/230-3-60
6 — 460-3-60

Quality Assurance



Certificate No FM 21837

Approvals:

ISO 9002
EN 29002
BS5750 PART 2
ANSI/ASQC Q92

Physical data (gas heating units)



UNIT 48EJ,EK,EW,EY	024D/E	028D/E	030D/E	034D/E
NOMINAL CAPACITY (tons)	20	25	27	30
OPERATING WEIGHT (lb)* Unit				
Al/Al† (Lo Heat/Hi Heat)	4176/4256	4262/4342	4262/4342	4262/4342
Al/Cu† (Lo Heat/Hi Heat)	4396/4476	4482/4562	4482/4562	4482/4562
Roof Curb (14-in curb)	365	365	365	365
COMPRESSOR Type	06D328	06D328	06D537	06D537
Ckt 1	06D818	06D328	06D328	06D537
Ckt 2	2	2	2	2
Number of Refrigerant Circuits	2	2	2	2
Oil (oz) (Ckt 1, Ckt 2)	115, 88	115 ea	115 ea	115 ea
REFRIGERANT TYPE	R-22			
Operating Charge (lb-oz)				
Circuit 1**	25-0	25-0	25-0	25-0
Circuit 2	31-0	25-0	25-0	25-0
CONDENSER COIL	Cross-Hatched 3/8" Copper Tubes, Aluminum Lanced, Aluminum Pre-Coated, or Copper Plate Fins			
Quantity	1	1	1	1
Rows... Fins/in	4...15	4...15	4...15	4...15
Total Face Area (sq ft)	33.3	33.3	33.3	33.3
CONDENSER FAN	Propeller Type			
Nominal Cfm	13,420	13,420	13,420	13,420
Quantity . Diameter (in.)	2 .30	2 .30	2 .30	2 .30
Motor Hp (1075 Rpm)	1	1	1	1
EVAPORATOR COIL	Cross-Hatched 3/8" Copper Tubes, Aluminum Plate Fins			
Rows... Fins/in	4. 15	4. 15	4. 15	4. 15
Total Face Area (sq ft)	31.7	31.7	31.7	31.7
EVAPORATOR FAN	Centrifugal Type			
Quantity Size (in.)	2 .20x15	2 .20x15	2 .20x15	2 .20x15
Type Drive	Belt	Belt	Belt	Belt
Nominal Cfm	8,000	10,000	11,000	12,000
Motor Hp	5	7.5	10	10
Motor Frame Size	S184T	S213T	S215T	S215T
Motor Bearing Type	10††	10††	15††	15††
Maximum Allowable Rpm	1200	1200	1200	1200
Motor Pulley Pitch Diameter	4.6	6.6	6.7	6.9
Nominal Motor Shaft Diameter (in.)	1 1/8	1 1/8	1 1/8	1 1/8
Fan Pulley Pitch Diameter (in.)	11.1	11.1	11.1	11.1
Nominal Fan Shaft Diameter (in.)	1 1/16	1 1/16	1 1/16	1 1/16
Belt, Quantity, Type	1 BX59	1 BX56	1 BX62	1 BX60
Belt, Length (in.)	62	59	65	63
Pulley Center Line Distance (in.)	16 0-18 7	15 6-18 4	15 6-18 4	15 6-18 4
Factory Speed Setting (rpm)	725	924	1088	1088
FURNACE SECTION				
Rollout Switch Cutout Temp (F)‡	225	225	225	225
Burner Orifice Diameter (in. - drill size)				
Natural Gas Std	111 34	111 34	111 34	111 34
Liquid Propane Alt	089 43	089 43	089 43	089 43
Thermostat Heat Anticipator Setting (amps)				
Stage 1	0 1	0 1	0 1	0 1
Stage 2	0 1	0 1	0 1	0 1
Gas Input (Btuh) Stage 1 Low	262,500	262,500	262,500	262,500
High	394,000	394,000	394,000	394,000
Stage 2 Low	350,000	350,000	350,000	350,000
High	525,000	525,000	525,000	525,000
Efficiency (Steady State) (%)	82	82	82	82
Temperature Rise Range	15-45/35-65	15-45/35-65	15-45/35-65	15-45/35-65
Manifold Pressure (in. wg)				
Natural Gas Std	3.5	3.5	3.5	3.5
Liquid Propane Alt	3.5	3.5	3.5	3.5
Gas Valve Quantity	2	2	2	2
Field Gas Connection Size (in - FPT)	1.5	1.5	1.5	1.5
HIGH-PRESSURE SWITCH (psig)				
Cutout	426	426	426	426
Reset (Auto.)	320	320	320	320
LOW-PRESSURE SWITCH (psig)				
Cutout	7	7	7	7
Reset (Auto.)	22	22	22	22
RETURN-AIR FILTERS				
Quantity Size (in.)	10 20x24x2	10 20x24x2	10 20x24x2	10 20x24x2

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Weight of unit does not include variable frequency drive (VFD) If a VFD is installed, add the VFD weight in the table at right

†Evaporator coil fin material/condenser coil fin material

**Sizes 024-034: Circuit 1 uses the lower portion of condenser coil, Circuit 2 uses the upper portion Sizes 038-048: Circuit 1 uses the left condenser coil, Circuit 2 the right All units have intertwined evaporator coils

‡Motor and drive shown will deliver approximately 2.5 in. wg net external static

‡Rollout switch is manual reset

NOTES:

- Sizes 038 and 048 are 48EJ,EW only
- High heat is for 48EJ,EW only

VFD (Hp)	VFD WEIGHTS (lb)		
	208/230 v	460 v	575 v
5	20	22	60
7.5	51	37	64
10	51	61	64
15	61	63	109
20	63	111	109
25	105	112	174
30	172	118	180

UNIT 48EJ,EK,EW,EY	038D/E			044D/E			048D/E		
NOMINAL CAPACITY (tons)	35			40			45		
OPERATING WEIGHT (lb)* Unit									
Al/Alt (Lo Heat/Hi Heat)	4442/4602			4668/4828			4955/5115		
Al/Cut† (Lo Heat/Hi Heat)	4727/4887			4953/5113			5335/5495		
Roof Curb (14-in. curb)	410			410			410		
COMPRESSOR									
Type Ckt 1	06D537			06EA250			06EA265		
Ckt 2	06D537			06EA250			06EA250		
Number of Refrigerant Circuits	2			2			2		
Oil (oz) (Ckt 1, Ckt 2)	115 ea			224 ea			304, 224		
REFRIGERANT TYPE				R-22					
Operating Charge (lb-oz)									
Circuit 1**	34-0			35-0			41-0		
Circuit 2	34-0			35-0			41-0		
CONDENSER COIL	Cross-Hatched 3/8" Copper Tubes, Aluminum Lanced, Aluminum Pre-Coated, or Copper Plate Fins								
Quantity	2			2			1		
Rows.. Fins/in.	3...15			3...15			4 15		
Total Face Area (sq ft)	58 3			58 3			66 7		
CONDENSER FAN	Propeller Type								
Nominal Cfm	27,064			27,064			27,064		
Quantity Diameter (in.)	4 .30			4 .30			4 .30		
Motor Hp (1075 Rpm)	1			1			1		
EVAPORATOR COIL	Cross-Hatched 3/8" Copper Tubes, Aluminum Plate Fins								
Rows.. Fins/in	3 .15			3 .15			4 .15		
Total Face Area (sq ft)	34 7			34 7			34 7		
EVAPORATOR FAN	Centrifugal Type								
Quantity...Size (in.)	2 .20x15			2 .20x15			2 .20x15		
Type Drive	Belt			Belt			Belt		
Nominal Cfm	14,000			16,000			18,000		
Motor Hp	15††			20††			25††		
Motor Frame Size	S215T			S254T			S256T		
Motor Bearing Type	S254T			S256T			S284T		
Motor Pulley Pitch Diameter	Ball			Ball			Ball		
Maximum Allowable Rpm	1200			1200			1200		
Motor Pulley Pitch Diameter	4.1			6.9			5.3		
Nominal Motor Shaft Diameter (in.)	1 3/8			1 3/8			1 3/8		
Fan Pulley Pitch Diameter (in.)	9 1			12 5			9 1		
Nominal Fan Shaft Diameter (in.)	1 11/16			1 11/16			1 11/16		
Belt, Quantity...Type	1 BX51			1 5VX630			1 5VX550		
Belt, Length (in.)	54			63			55		
Pulley Center Line Distance (in.)	15 6-18 4			15 0-17 9			15.0-17 9		
Factory Speed Setting (rpm)	788			966			1019		
FURNACE SECTION									
Rollout Switch Cutout Temp (F)	225			225			225		
Burner Orifice Diameter (in. ... drill size)									
Natural Gas Std	120 31			120 31			120 31		
Liquid Propane Alt	096 41			096 41			096 41		
Thermostat Heat Anticipator Setting (amps)									
Stage 1	0 1			0 1			0 1		
Stage 2	0 1			0 1			0 1		
Gas Input (Btuh) Stage 1 Low	300,000			300,000			300,000		
Stage 2 High	600,000			600,000			600,000		
Stage 2 Low	400,000			400,000			400,000		
Stage 2 High	800,000			800,000			800,000		
Efficiency (Steady State) (%)	82			82			82		
Temperature Rise Range	10-40/30-60			10-40/30-60			10-40/30-60		
Manifold Pressure (in. wg)									
Natural Gas Std	3 5			3 5			3 5		
Liquid Propane Alt	3.5			3.5			3.5		
Gas Valve Quantity	2			2			2		
Field Gas Connection Size (in -FPT)	1 5			1 5			1 5		
HIGH-PRESSURE SWITCH (psig)									
Cutout	426			426			426		
Reset (Auto.)	320			320			320		
LOW-PRESSURE SWITCH (psig)									
Cutout	7			7			7		
Reset (Auto.)	22			22			22		
RETURN-AIR FILTERS									
Quantity . Size (in.)	10 20x24x2			10 20x24x2			10 20x24x2		

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Weight of unit does not include variable frequency drive (VFD) If a VFD is installed, add the VFD weight in the table at right

†Evaporator coil fin material/condenser coil fin material

**Sizes 024-034: Circuit 1 uses the lower portion of condenser coil, Circuit 2 uses the upper portion. Sizes 038-048: Circuit 1 uses the left condenser coil, Circuit 2 the right All units have interwound evaporator coils

††Motor and drive shown will deliver approximately 2.5 in. wg net external static

||Rollout switch is manual reset

NOTES:

1 Sizes 038 and 048 are 48EJ,EW only

2 High heat is for 48EJ,EW only

VFD (Hp)	VFD WEIGHTS (lb)		
	208/230 v	460 v	575 v
5	20	22	60
7.5	51	37	64
10	51	61	64
15	61	63	109
20	63	111	109
25	105	112	174
30	172	118	180

Physical data (electric heating units)



UNIT 50EJ,EK,EW,EY	024	028	030	034
NOMINAL CAPACITY (tons)	20	25	27	30
OPERATING WEIGHT (lb)* Unit				
AI/AH†	4016	4102	4102	4102
AI/Cu†	4236	4322	4322	4322
Roof Curb (14-in. curb)	365	365	365	365
COMPRESSOR Type Ckt 1	06D328	06D328	06D537	06D537
Ckt 2	06D818	06D328	06D328	06D537
Number of Refrigerant Circuits	2	2	2	2
Oil (oz) (Ckt 1, Ckt 2)	115, 88	115 ea	115 ea	115 ea
REFRIGERANT TYPE	R-22			
Operating Charge (lb-oz)	25-0	25-0	25-0	25-0
Circuit 1**	31-0	25-0	25-0	25-0
Circuit 2				
CONDENSER COIL	Enhanced 3/8" Copper Tubes, Aluminum Lanced, Aluminum Precoated or Copper Fins			
Quantity	1	1	1	1
Rows...Fins/in.	4...15	4...15	4...15	4...15
Total Face Area (sq ft)	33.3	33.3	33.3	33.3
CONDENSER FAN	Propeller Type			
Nominal Cfm	13,420	13,420	13,420	13,420
Quantity...Diameter (in.)	2...30	2...30	2...30	2...30
Motor Hp (1075 Rpm)	1	1	1	1
EVAPORATOR COIL	Enhanced 3/8" Copper Tubes, Aluminum or Copper Plate Fins			
Rows...Fins/in.	4...15	4...15	4...15	4...15
Total Face Area (sq ft)	31.7	31.7	31.7	31.7
EVAPORATOR FAN	Centrifugal Type			
Quantity...Size (in.)	2 .20x15	2 .20x15	2 .20x15	2 .20x15
Type Drive	Belt	Belt	Belt	Belt
Nominal Cfm	8,000	10,000	11,000	12,000
Motor Hp	5	7.5	10	10
Motor Frame Size	S184T	S213T	S215T	S215T
Motor Bearing Type	10††	10††	15††	15††
Maximum Allowable Rpm	1200	1200	1200	1200
Motor Pulley Pitch Diameter	4.6	6.6	6.7	6.9
Nominal Motor Shaft Diameter (in.)	1 1/8	1 1/8	1 1/8	1 1/8
Fan Pulley Pitch Diameter (in.)	11.1	11.1	11.1	11.1
Nominal Fan Shaft Diameter (in.)	1 1/8	1 1/8	1 1/8	1 1/8
Belt, Quantity...Type	1 BX59	1 BX56	1 BX62	1 BX60
Belt, Length (in.)	62	59	65	63
Pulley Center Line Distance (in.)	16 0-18 7	15 6-18 4	15 6-18 4	15 6-18 4
Factory Speed Setting (rpm)	725	924	1088	1088
HIGH-PRESSURE SWITCH (psig)	426	426	426	426
Cutout	320	320	320	320
Reset (Auto)				
LOW-PRESSURE SWITCH (psig)	7	7	7	7
Cutout	22	22	22	22
Reset (Auto)				
RETURN-AIR FILTERS	10 20x24x2	10 20x24x2	10 20x24x2	10 20x24x2
Quantity Size (in.)				



UNIT 50EJ,EK,EW,EY	038	044	048
NOMINAL CAPACITY (tons)	35	40	45
OPERATING WEIGHT (lb)*			
Unit			
Al/Al†	4282	4508	4795
Al/Cu†	4567	4793	5175
Roof Curb (14-in. curb)	410	410	410
COMPRESSOR			
Type Ckt 1	06D537	06EA250	06EA265
Ckt 2	06D537	06EA250	06EA250
Number of Refrigerant Circuits	2	2	2
Oil (oz) (Ckt 1, Ckt 2)	115 ea	224 ea	304, 224
REFRIGERANT TYPE		R-22	
Operating Charge (lb-oz)			
Circuit 1**	34-0	35-0	41-0
Circuit 2	34-0	35-0	41-0
CONDENSER COIL		Enhanced 3/8" Copper Tubes, Aluminum Lanced, Aluminum Precoated or Copper Fins	
Quantity	2	2	1
Rows.. Fins/in	3...15	3...15	4 15
Total Face Area (sq ft)	58 3	58 3	66 7
CONDENSER FAN		Propeller Type	
Nominal Cfm	27,064	27,064	27,064
Quantity .Diameter (in)	4 .30	4 .30	4 .30
Motor Hp (1075 Rpm)	1	1	1
EVAPORATOR COIL		Enhanced 3/8" Copper Tubes, Aluminum or Copper Plate Fins	
Rows.. Fins/in.	3 .15	3 .15	4 .15
Total Face Area (sq ft)	34 7	34 7	34 7
EVAPORATOR FAN		Centrifugal Type	
Quantity . Size (in.)	2 20x15	2 20x15	2 20x15
Type Drive	Belt	Belt	Belt
Nominal Cfm	14,000	16,000	18,000
Motor Hp	15††	20††	25††
Motor Frame Size	S254T	S256T	S284T
Motor Bearing Type	Ball	Ball	Ball
Maximum Allowable Rpm	1200	1200	1200
Motor Pulley Pitch Diameter	4.1	6.9	7.5
Nominal Motor Shaft Diameter (in)	1 3/8	1 1/2	1 5/8
Fan Pulley Pitch Diameter (in.)	9 1	12 5	13 7
Nominal Fan Shaft Diameter (in)	1 1/4	1 1/2	1 5/8
Belt, Quantity.. Type	1 BX51	1 5VX630	1 5VX650
Belt, Length (in.)	54	63	65
Pulley Center Line Distance (in.)	15 6-18 4	15 0-17 9	15 0-17 9
Factory Speed Setting (rpm)	788	966	1050
HIGH-PRESSURE SWITCH (psig)			
Cutout	426	426	426
Reset (Auto.)	320	320	320
LOW-PRESSURE SWITCH (psig)			
Cutout	7	7	7
Reset (Auto)	22	22	22
RETURN-AIR FILTERS			
Quantity Size (in)	10 20x24x2	10 20x24x2	10 20x24x2

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Weight of unit does not include variable frequency drive (VFD) If a VFD is installed, add the VFD weight in the table at right

†Evaporator coil fin material/condenser coil fin material

**Sizes 024-034: Circuit 1 uses the lower portion of condenser coil, Circuit 2 uses the upper portion. Sizes 038-048: Circuit 1 uses the left condenser coil, Circuit 2 the right All units have intertwined evaporator coils

††Motor and drive shown will deliver approximately 2 5 in wg net external static

NOTE: Sizes 038 and 048 are 50EJ,EW units only

VFD (Hp)	VFD WEIGHTS (lb)		
	208/230 v	460 v	575 v
5	20	22	60
7.5	51	37	64
10	51	61	64
15	61	63	109
20	63	111	109
25	105	112	174
30	172	118	180

EER ratings and capacities



EER RATINGS (48 Series)

UNIT 48EJ, EK,EW,EY	NOMINAL TONS	EER
024	20	10.3
028	25	9.6
030	27.5	8.7
034	30	8.5
038	35	8.9
044	40	8.5
048	45	8.5

EER RATINGS (50 Series)

UNIT 50EJ, EK,EW,EY	NOMINAL TONS	EER
024	20	10.4
028	25	9.7
030	27.5	8.8
034	30	8.6
038	35	9.1
044	40	8.6
048	45	8.6

EER — Energy Efficiency Ratio

HEATING CAPACITIES AND EFFICIENCIES

UNIT 48EJ,EK, EW,EY	HEATING INPUT (Btuh) Stage 2/Stage 1	OUTPUT CAPACITY (Btuh)	TEMPERATURE RISE	STEADY-STATE EFFICIENCY (%)	MINIMUM HEATING CFM
D024	350,000/262,500	283,500	15-45	82.0	5730
E024	525,000/394,000	425,250	35-65	82.0	5950
D028	350,000/262,500	283,500	15-45	82.0	5730
E028	525,000/394,000	425,250	35-65	82.0	5950
D030	350,000/262,500	283,500	15-45	82.0	5730
E030	525,000/394,000	425,250	35-65	82.0	5950
D034	350,000/262,500	283,500	15-45	82.0	5730
E034	525,000/394,000	425,250	35-65	82.0	5950
D038	400,000/300,000	324,000	10-40	82.0	7360
E038	800,000/600,000	648,000	30-60	82.0	9820
D044	400,000/300,000	324,000	10-40	82.0	7360
E044	800,000/600,000	648,000	30-60	82.0	9820
D048	400,000/300,000	324,000	10-40	82.0	7360
E048	800,000/600,000	648,000	30-60	82.0	9820

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 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 limitation during full-rate operation.
- 5 Total unit design is listed by ETL Testing Laboratories Inc.
6. The minimum heating cfm is typically lower than the minimum cooling cfm on constant volume units (see Cooling Performance tables). To operate at the lower cfm requires the addition of unloaders to the lead compressor. Without this modification, the unit may not be operated below the minimum cooling cfm.



VAV STAGING SEQUENCE

STAGES	0	1	2	3	4	5	6
COMP NO. 1	OFF	ON	ON	ON	ON	ON	ON
UNLOADER NO. 1	OFF	ON	ON	OFF	ON	ON	OFF
UNLOADER NO. 2	OFF	ON	OFF	OFF	ON	OFF	OFF
COMP NO. 2	OFF	OFF	OFF	OFF	ON	ON	ON
UNIT SIZE	UNIT CAPACITY						
024	0%	20%	40%	60%	60%	80%	100%
028	0%	17%	34%	50%	67%	84%	100%
030	0%	18%	37%	55%	63%	82%	100%
034	0%	17%	34%	50%	67%	84%	100%
044	0%	25%	25%	50%	75%	75%	100%

 Indicates a 4-cylinder compressor; there is no unloading at this step

CV STAGING SEQUENCE

STAGES	0	1	2
COMP NO. 1	OFF	ON	ON
COMP NO. 2	OFF	OFF	ON
UNIT SIZE	UNIT CAPACITY		
024	0%	60%	100%
028	0%	50%	100%
030	0%	55%	100%
034	0%	50%	100%
038	0%	50%	100%
044	0%	50%	100%
048	0%	56%	100%

CV ONE UNLOADER STAGING SEQUENCE

STAGES	0	1	2	3	4
COMP NO. 1	OFF	ON	ON	ON	ON
UNLOADER NO. 1	OFF	ON	OFF	ON	OFF
COMP NO. 2	OFF	OFF	OFF	ON	ON
UNIT SIZE	UNIT CAPACITY				
024	0%	40%	60%	80%	100%
028	0%	34%	50%	84%	100%
030	0%	37%	55%	82%	100%
034	0%	34%	50%	84%	100%
038	0%	34%	50%	84%	100%
044	0%	34%	50%	84%	100%
048	0%	37%	56%	82%	100%

CV TWO UNLOADER STAGING SEQUENCE

STAGES	0	1	2	3	4	5	6
COMP NO. 1	OFF	ON	ON	ON	ON	ON	ON
UNLOADER NO. 1	OFF	ON	ON	OFF	ON	ON	OFF
UNLOADER NO. 2	OFF	ON	OFF	OFF	ON	OFF	OFF
COMP NO. 2	OFF	OFF	OFF	OFF	ON	ON	ON
UNIT SIZE	UNIT CAPACITY						
024	0%	20%	40%	60%	60%	80%	100%
028	0%	17%	34%	50%	67%	84%	100%
030	0%	18%	37%	55%	63%	82%	100%
034	0%	17%	34%	50%	67%	84%	100%
038	0%	17%	34%	50%	67%	84%	100%
044	0%	25%	25%	50%	75%	75%	100%
048	0%	18%	37%	56%	63%	82%	100%

 Indicates a 4-cylinder compressor; there is no unloading at this step

EER ratings and capacities (cont)



ALTITUDE COMPENSATION

ELEVATION (ft)	SMALL CHASSIS (024-034)		MEDIUM CHASSIS (038-048)	
	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

ELECTRIC RESISTANCE HEATER DATA — 50EJ, EK, EW, EY024-048

UNIT 50EJ,EK, EW,EY	HEATER kW				HEATER STAGES	% HEAT PER STAGE	MINIMUM CFM
	Unit Voltages						
	208	230	460	575			
024	29 59	36 72	36 72	36 72	1 2	100 50/50	6,000
028	29 59	36 72	36 72	36 72	1 2	100 50/50	7,500
030	29 59	36 72	36 72	36 72	1 2	100 50/50	8,250
034	29 59	36 72	36 72	36 72	1 2	100 50/50	9,000
038	29 59	36 72	36 72	36 72	1 2	100 50/50	10,500
044	29 59	36 72	36 72	36 72	1 2	100 50/50	12,000
048	29 59	36 72	36 72	36 72	1 2	100 50/50	13,500

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

NOMINAL CFM RANGE (Gas Heat Units)

UNIT	DESIGN RANGE (Cfm)		
48EJ,EW024	6,000	TO	10,000
48EK,EY024	4,000	TO	10,000
48EJ,EW028	7,500	TO	12,500
48EK,EY028	5,000	TO	12,500
48EJ,EW030	8,250	TO	13,750
48EK,EY030	5,500	TO	13,750
48EJ,EW034	9,000	TO	15,000
48EK,EY034	6,000	TO	15,000
48EJ,EW038	10,500	TO	17,500
48EK,EY038	7,000	TO	17,500
48EJ,EW044	12,000	TO	20,000
48EK,EY044	8,000	TO	20,000
48EJ,EW048	13,500	TO	22,500
48EK,EY048	9,000	TO	22,500

NOMINAL CFM RANGE (Electric Heat Units)

UNIT	DESIGN RANGE (Cfm)		
50EJ,EW024	6,000	TO	10,000
50EK,EY024	4,000	TO	10,000
50EJ,EW028	7,500	TO	12,500
50EK,EY028	5,000	TO	12,500
50EJ,EW030	8,250	TO	13,750
50EK,EY030	5,500	TO	13,750
50EJ,EW034	9,000	TO	15,000
50EK,EY034	6,000	TO	15,000
50EJ,EW038	10,500	TO	17,500
50EK,EY038	7,000	TO	17,500
50EJ,EW044	12,000	TO	20,000
50EK,EY044	8,000	TO	20,000
50EJ,EW048	13,500	TO	22,500
50EK,EY048	9,000	TO	22,500

Options and accessories



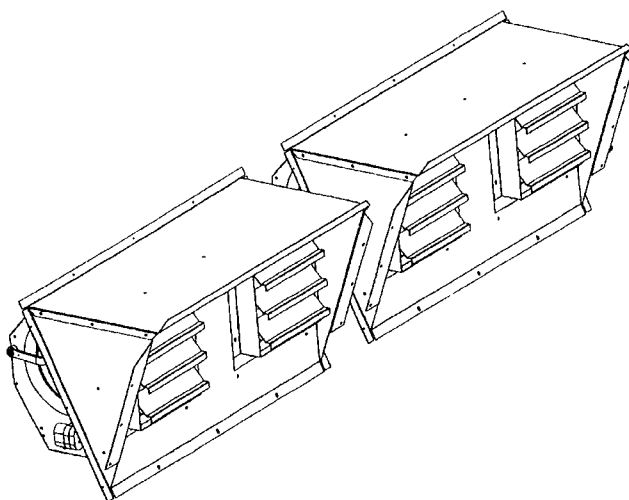
ITEM	OPTION*	ACCESSORY†
Barometric Relief	X	X
Copper/Copper Condenser Coil	X	
Pre-Coated Aluminum Fin Condenser Coil	X	
Modulating Power Exhaust (VAV Only)	X	
Non-Modulating Power Exhaust (CV Only)	X	X
Power Exhaust Conversion, Non-Modulating to Modulating (CV Only)		X
Electric Heat (50EJ,EK,EW,EY Units Only)	X	X
Roof Curb		X
Motormaster® III Head Pressure Control		X
LP (Liquid Propane) Conversion Kit (48EJ,EK,EW,EY Units Only)		X
Condenser Coil Hail Guard Assembly		X
Thermostat and Subbase		X
Space Temperature Sensor		X
Space Temperature Sensor with Offset (T-56)		X
IAQ (CO ₂) Sensor		X
Enthalpy Control for Integrated Economizer		X
Compressor Unloaders (CV Only)		X
Expansion Electronic Board		X
Roof Curb Retrofit Kit		X
Demand Limit Control		X

LEGEND

CV — Constant Volume
 IAQ — Indoor Air Quality
 VAV — Variable Air Volume

*Factory installed
 †Field Installed

POWER EXHAUST FANS

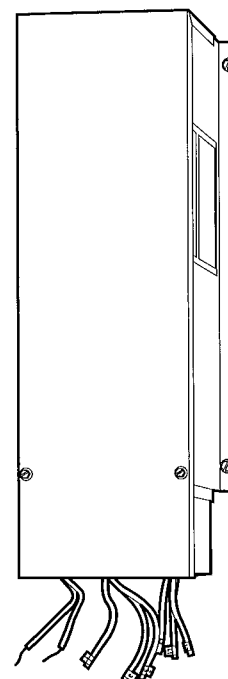


When combined with the economizer, the power exhaust can be used to exhaust the return air and eliminate over-pressurization of the building. The power exhaust utilizes multiple forward-curved fans, each driven by its own motor.

The constant volume power exhaust stages the motors according to economizer position to control the building pressure.

The modulating power exhaust stages the motors according to interior space pressure.

HEAD PRESSURE CONTROL

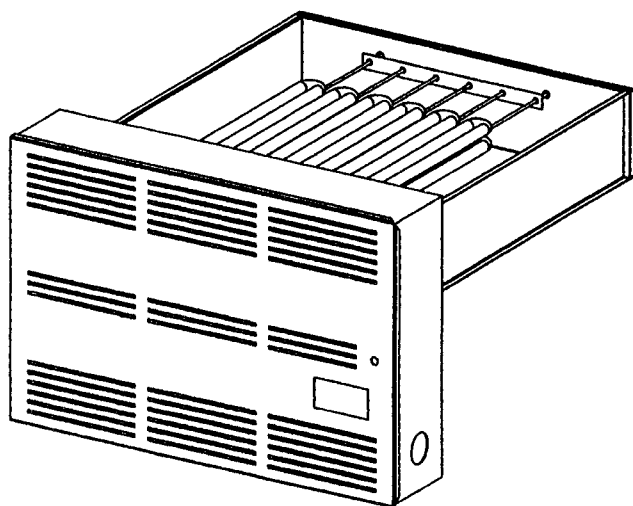


The standard units are designed to operate in cooling at outdoor temperatures down to 35 F. With accessory Motormaster III control (condenser fan speed modulation) units can operate at outdoor temperatures down to -20 F. The head pressure controls, which mount in the condenser section, control the condenser-fan motor to maintain correct condensing temperature. Refer to price pages or contact your local Carrier representative for appropriate accessory combinations for desired outdoor ambient temperature operation.

Options and accessories (cont)

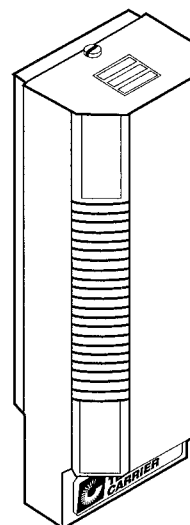


ELECTRIC HEATER



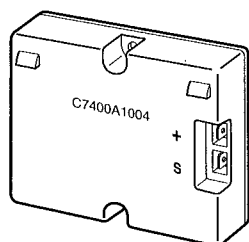
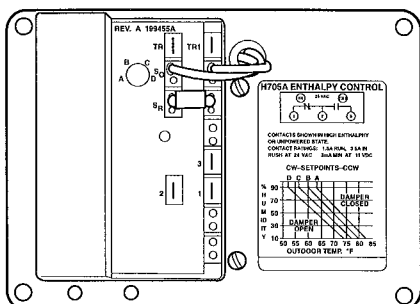
Electric heaters are available in a wide range of capacities for factory or field installation.

CO₂ SENSOR



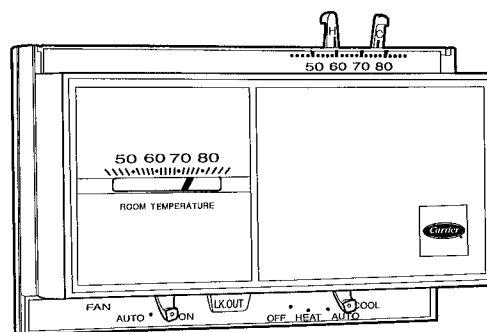
This sensor monitors building interior or return air carbon dioxide levels and automatically activates the outdoor fan and opens the economizer for rapid dilution of CO₂ levels above an adjustable set point.

ENTHALPY CONTROL FOR INTEGRATED ECONOMIZER



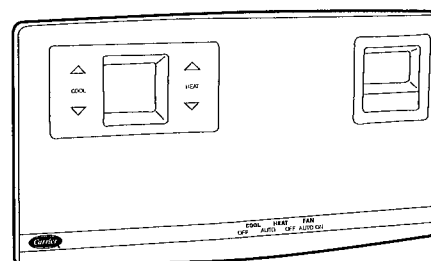
Enthalpy economizer controls help provide efficient, economical economizer operation. Solid-state enthalpy control includes the logic and one sensor to calculate both dry and wet bulb of the outdoor air to provide an accurate enthalpy reading. It then decides when to energize the economizer based on this reading. A second sensor provides information for comparison of outdoor temperature and humidity to return-air temperature and humidity and determines the most economical mixture of air (purchased in addition to first solid-state enthalpy sensor for differential enthalpy sensing).

THERMOSTATS AND SUBBASES



Zone thermostat (24 v) provides one- or 2-stage cooling for control of unit. Matching subbases are available with or without tamperproof switches and automatic changeover.

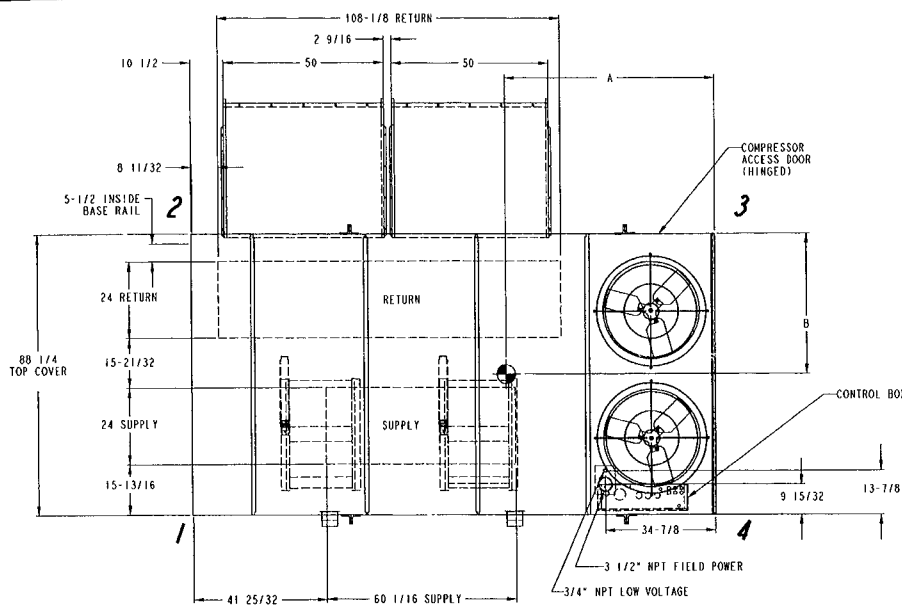
ELECTRONIC PROGRAMMABLE THERMOSTAT



Carrier's electronic programmable thermostat provides efficient temperature control by allowing you to program heating and cooling set-backs and set ups with provisions for weekends and holidays.

Base unit dimensions, 48EJ,EK024-034

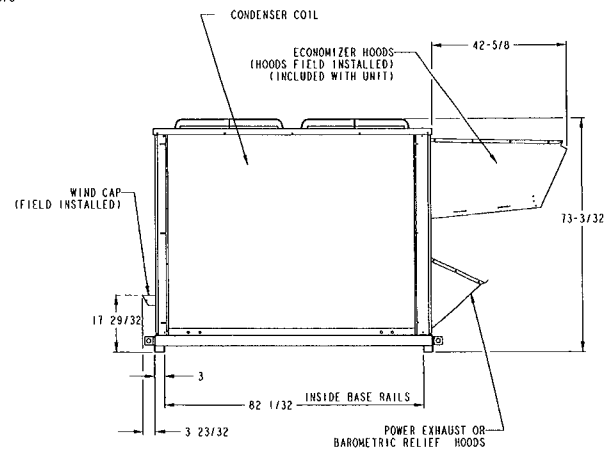
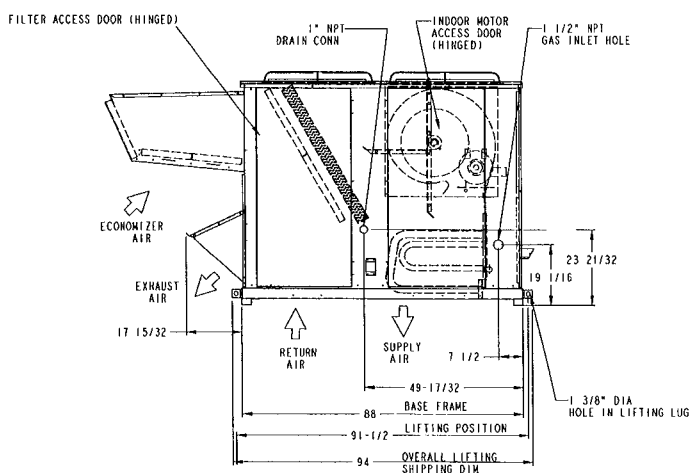
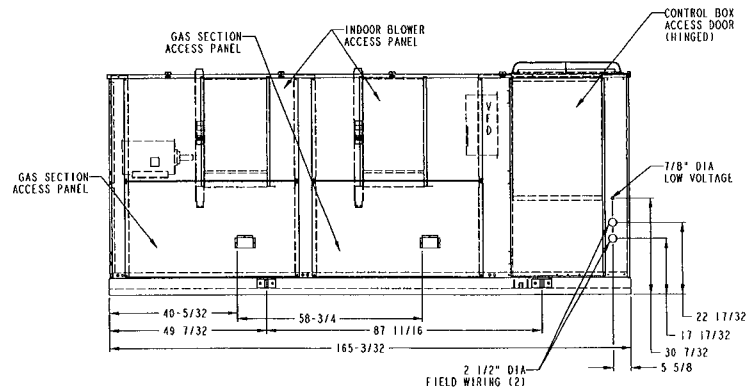
Carrier®



VFD — Variable Frequency Drive

NOTES:

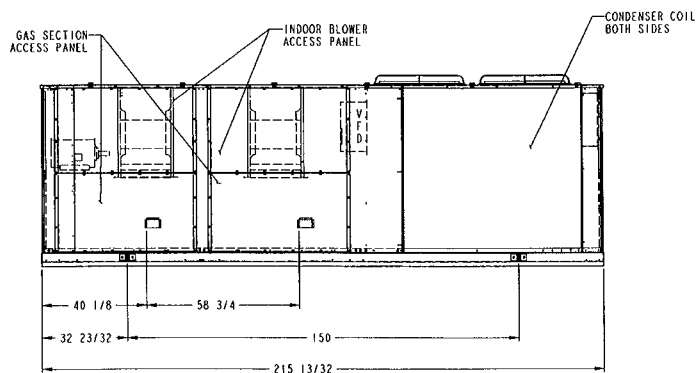
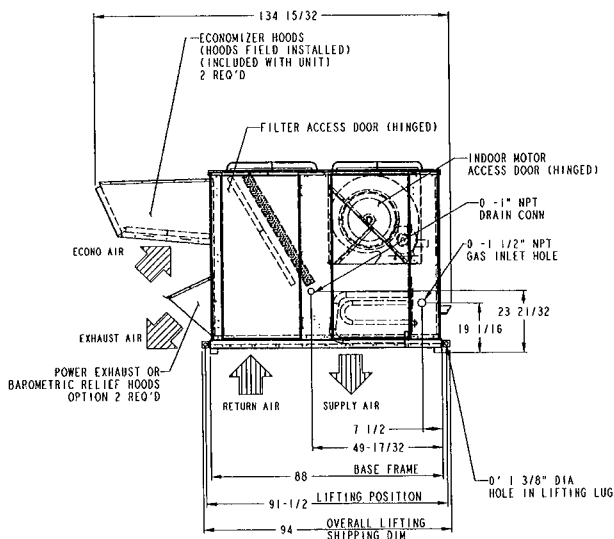
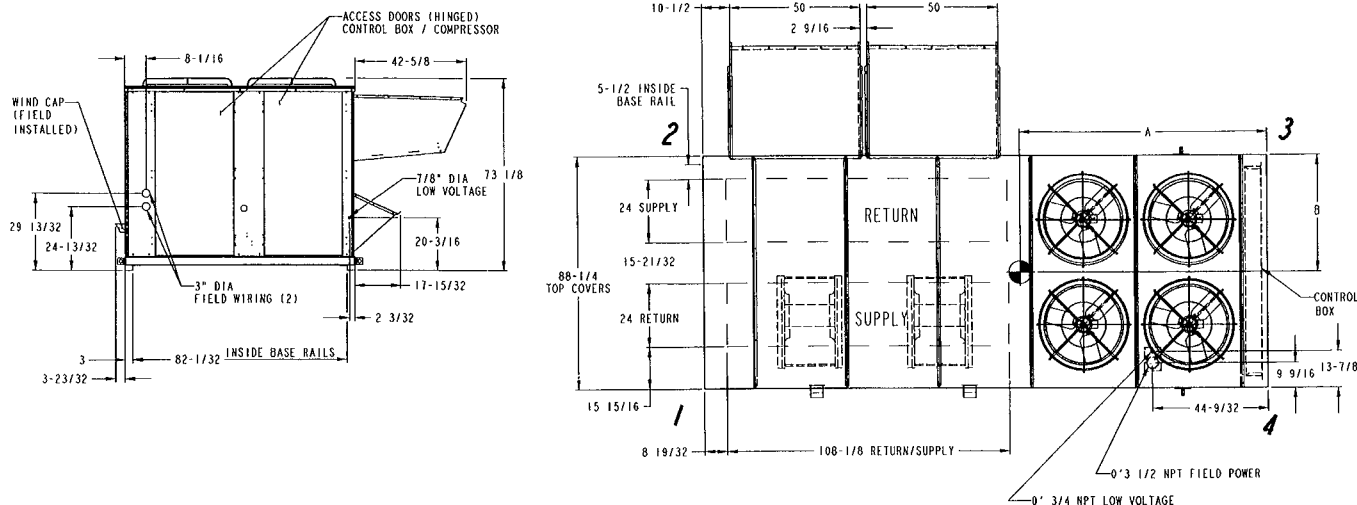
- Weights include economizer (STD)
- Center of gravity
- Do not locate adjacent units with flue discharge facing economizer inlet. Min. clearances to be:
Adjacent Units 15'-0"
Top of Units 12'-0"
Condenser Coil 4'-0"
Economizer Side 6'-0"
Gas Heat Side 4'-0"
Filter Access Side 10'-0" (For Removal of Evaporator Coil)
- For smaller service and operational clearances, contact Carrier Application Engineering department.
- Bottom ducts designed to be attached to accessory roof curb. If unit is mounted on dunnage, it is recommended the ducts be supported by cross braces as done on accessory roof curb.
- Dimensions are in inches



UNIT SIZE	OPERATING WEIGHT	A ft-in.	B ft-in.	CORNER WEIGHT (lb)			
	lb			1	2	3	4
48EJ,EKD024	4176	6'- 0 3/8"	3'-6 3/8"	879	954	1220	1124
48EJE024	4256	6'- 1 5/16"	3'-6 1 1/16"	917	973	1218	1148
48EJ,EKD028	4262	5'- 9 5/8"	3'-8"	899	899	1232	1232
48EJE028	4342	5'-10 1/8"	3'-8 5/16"	929	916	1240	1257
48EJ,EKD030	4262	5'- 9 5/8"	3'-8"	899	899	1232	1232
48EJE030	4342	5'-10 1/8"	3'-8 9/16"	929	916	1240	1257
48EJ,EKD034	4262	5'- 9 5/8"	3'-8"	899	899	1232	1232
48EJE034	4342	5'-10 1/8"	3'-8 5/16"	929	916	1240	1257

Base unit dimensions, 48EJ,EK038-048

Carrier



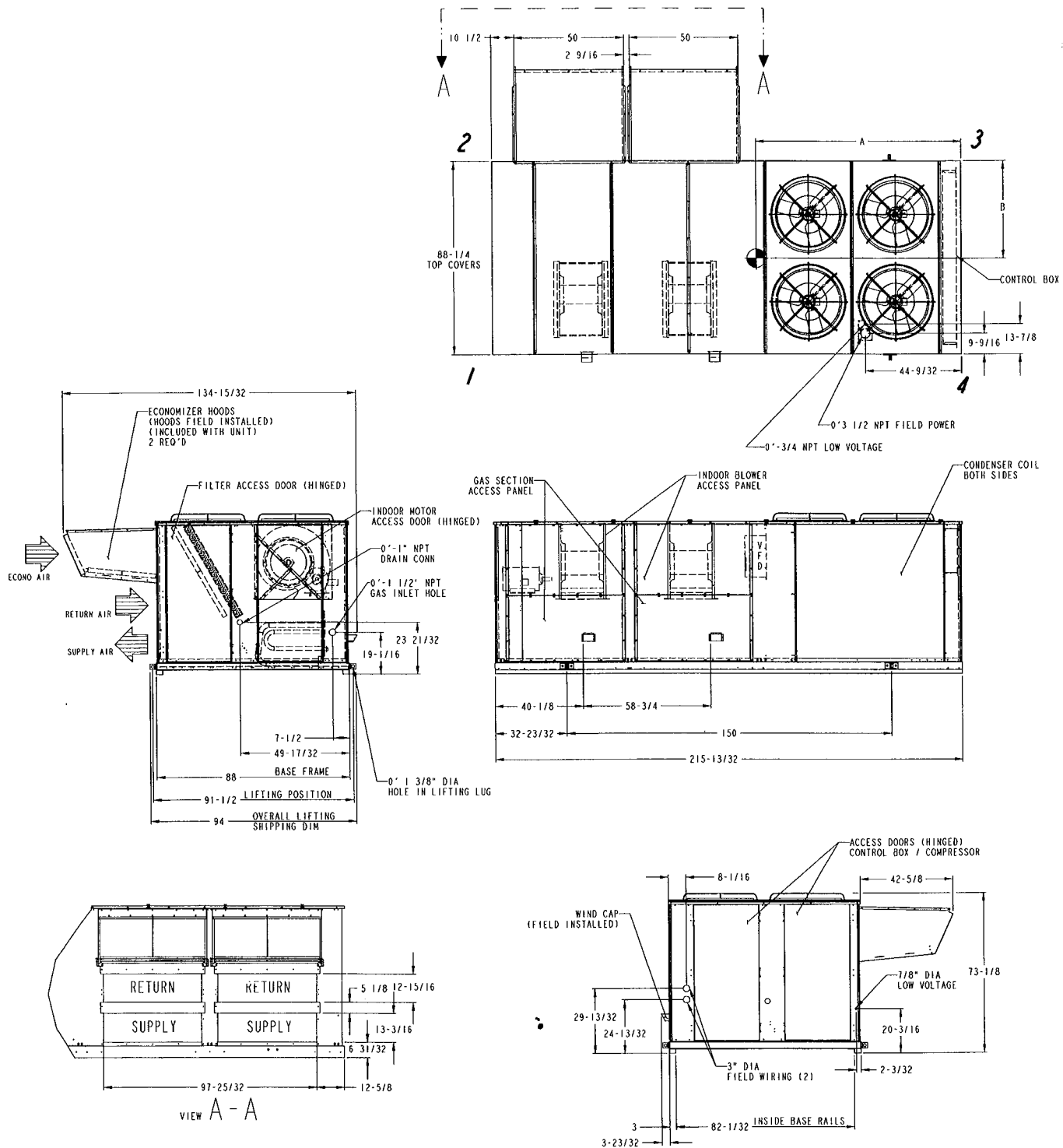
VFD — Variable Frequency Drive

NOTES

- Weights include economizer (std)
- Center of gravity.
- Do not locate adjacent units with flue discharge facing economizer inlet. Min clearances to be.
Adjacent Units: 15'-0"
Top of Units: 12'-0"
Condenser Coil: 4'-0"
Economizer Side: 6'-0"
Gas Heat Side: 4'-0"
Filter Access Side: 10'-0" (For Removal of Evaporator Coil)
- For smaller service and operational clearances, contact Carrier Application Engineering department.
- Bottom ducts designed to be attached to accessory roof curb. If unit is mounted on dunnage, it is recommended the ducts be supported by cross braces as done on accessory roof curb.
- Dimensions are in inches

UNIT SIZE	OPERATING WEIGHT	A	B	CORNER WEIGHT (lb)			
	lb	ft-in.	ft-in.	1	2	3	4
48EJD038	4442	7'- 8 ¹¹ / ₁₆ "	3'-10 ⁷ / ₈ "	1021	894	1180	1347
48EJEQ38	4602	7'-10 ¹ / ₈ "	3'-11 ³ / ₁₆ "	1080	934	1200	1388
48EJ,EKD044	4668	7'- 5 ⁵ / ₁₆ "	3'-10 ⁷ / ₈ "	1033	906	1275	1455
48EJE044	4828	7'- 6 ¹³ / ₁₆ "	3'-11 ³ / ₁₆ "	1094	945	1293	1496
48EJD048	4955	7'- 3 ¹¹ / ₁₆ "	3'-10 ¹ / ₂ "	1068	953	1384	1550
48EJE048	5115	7'- 5 ³ / ₁₆ "	3'-10 ¹³ / ₁₆ "	1129	994	1401	1592

Base unit dimensions, 48EW,EY038-048



VFD — Variable Frequency Drive

NOTES.

- 1 Weights include economizer (std).
- 2 Center of gravity
- 3 Do not locate adjacent units with flue discharge facing economizer inlet. Min. clearances to be:
 Adjacent Units: 15'-0"
 Top of Units: 12'-0"
 Condenser Coil: 4'-0"
 Economizer Side: 6'-0"
 Gas Heat Side: 4'-0"
 Filter Access Side: 10'-0" (For Removal of Evaporator Coil)
- 4 For smaller service and operational clearances, contact Carrier Application Engineering department
- 5 Dimensions are in inches

6 For side-supply/return applications, a single return and supply ductwork connection is recommended for covering both return and both supply openings

UNIT SIZE	OPERATING WEIGHT	A ft-in.	B ft-in.	CORNER WEIGHT (lb)			
	lb			1	2	3	4
48EWD038	4442	7'- 8 1/16"	3'-10 7/8"	1021	894	1180	1347
48EWE038	4602	7'-10 1/8"	3'-11 3/16"	1080	934	1200	1388
48EW,EYD044	4668	7'- 5 5/16"	3'-10 7/8"	1033	906	1275	1455
48EWE044	4828	7'- 6 3/16"	3'-11 3/16"	1094	945	1293	1496
48EWD048	4955	7'- 3 1/16"	3'-10 1/2"	1068	953	1384	1550
48EWE048	5115	7'- 5 3/16"	3'-10 13/16"	1129	994	1401	1592

Base unit dimensions, 50EJ,EK024-034

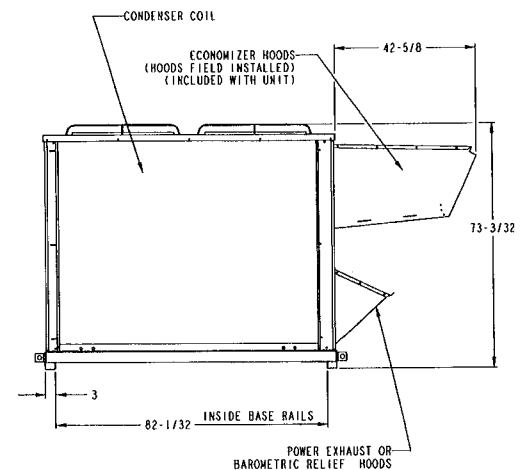
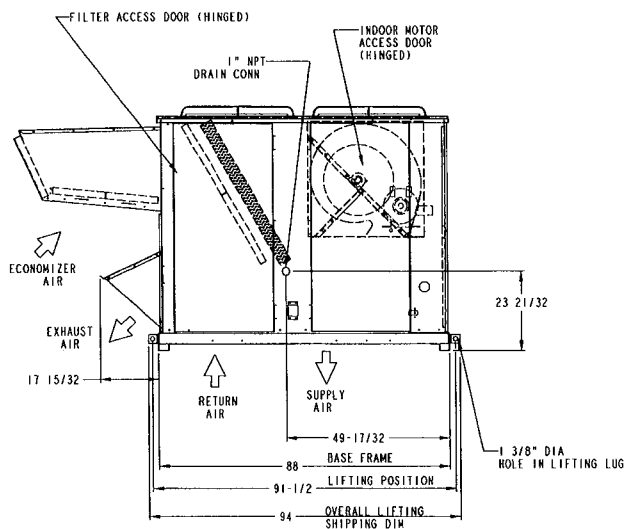
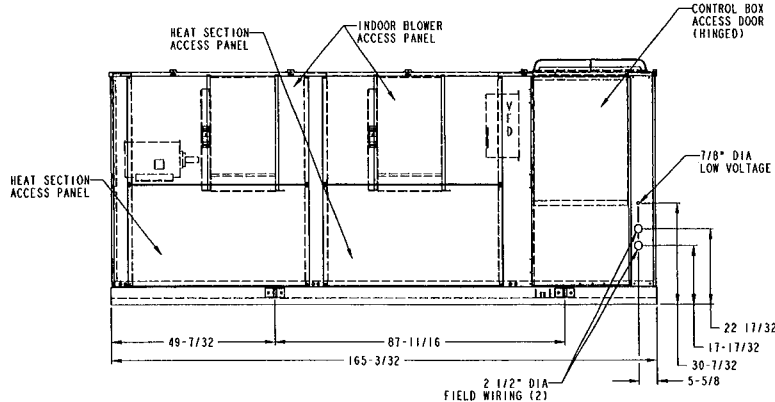
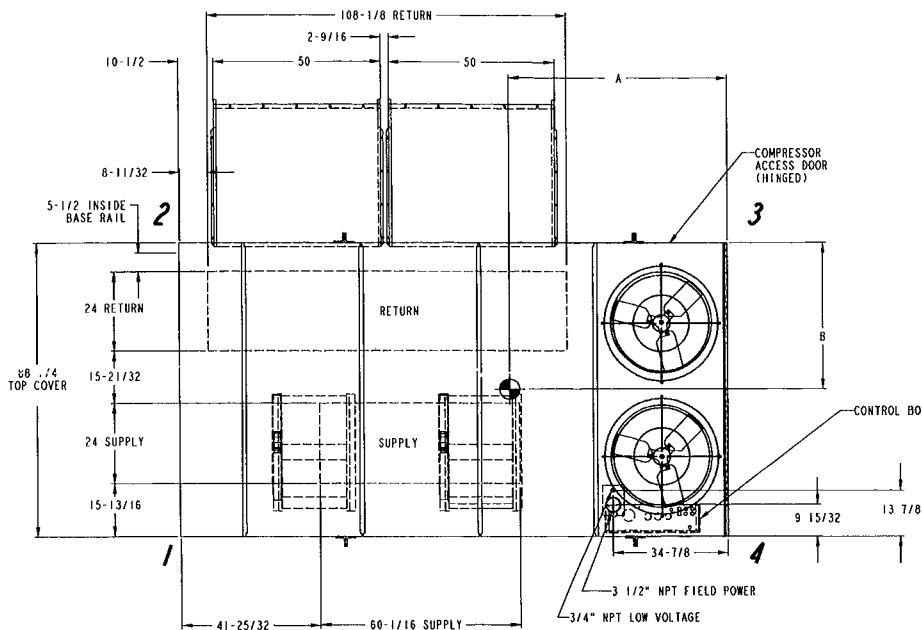


LEGEND

VFD — Variable Frequency Drive

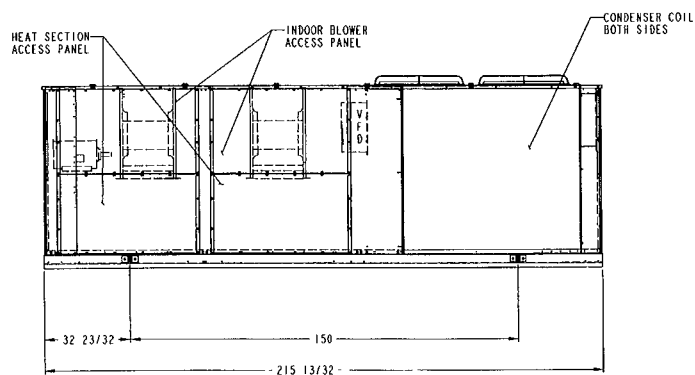
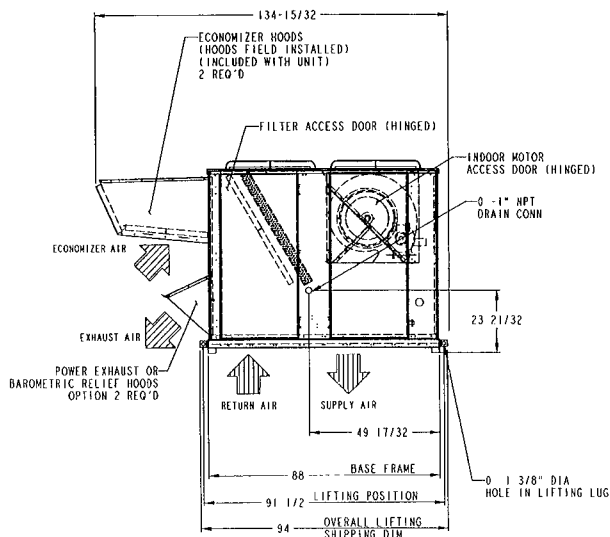
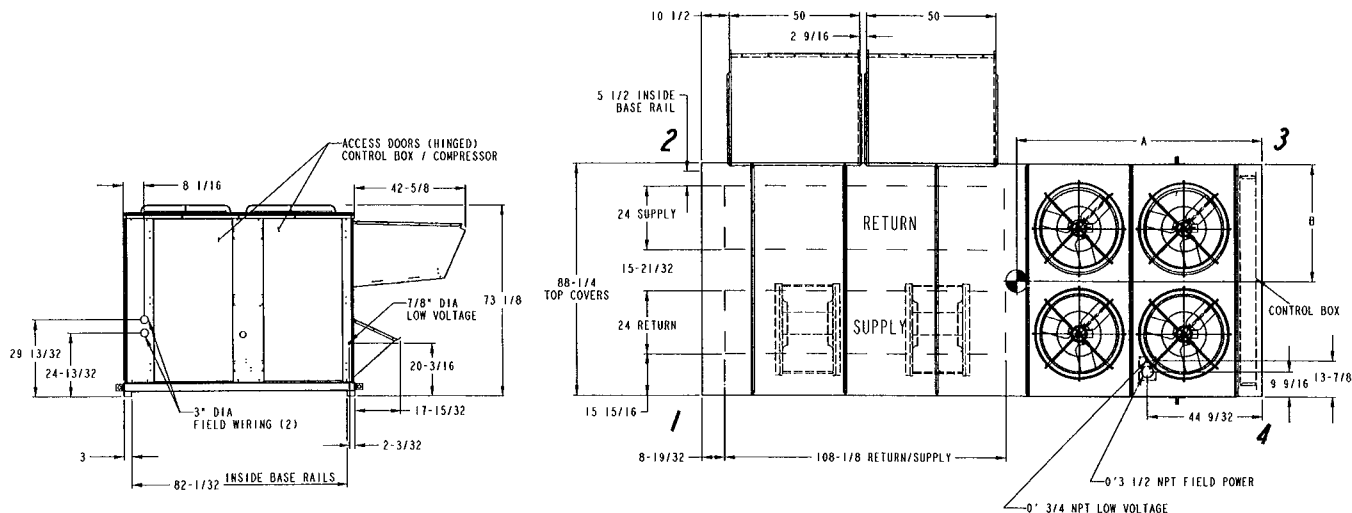
NOTES

- Weights include economizer (Std)
- Center of gravity
- Do not locate adjacent units with discharge facing economizer inlet. Minimum clearances to be:
Adjacent Units: 15'-0"
Top of Units: 12'-0"
Condenser Coil: 4'-0"
Economizer Side: 6'-0"
Filter Access Side: 10'-0" (for removal of evaporator coil)
- For smaller service and operational clearances, contact Carrier Application Engineering department
- Bottom ducts designed to be attached to accessory roof curb. If unit is mounted on dunnage, it is recommended the ducts be supported by cross braces as done on accessory roof curb
- Dimensions are in inches
- For units with electric heat, a field-supplied 90° elbow must be installed in the supply ductwork below the unit discharge.



UNIT SIZE 50EJ,EK	OPERATING WEIGHT lb	CORNER WEIGHT (lb)		CORNER WEIGHT (lb)			
		A	B	1	2	3	4
024	4016	5-11 ³ / ₈	3-5 ¹¹ / ₁₆	823	914	1199	1080
028	4102	5- 8 ¹ / ₂	3-7 ⁵ / ₈	844	859	1210	1189
030	4102	5- 8 ¹ / ₂	3-7 ⁵ / ₈	844	859	1210	1189
034	4102	5- 8 ¹ / ₂	3-7 ⁵ / ₈	844	859	1210	1189

Base unit dimensions, 50EJ,EK038-048



LEGEND

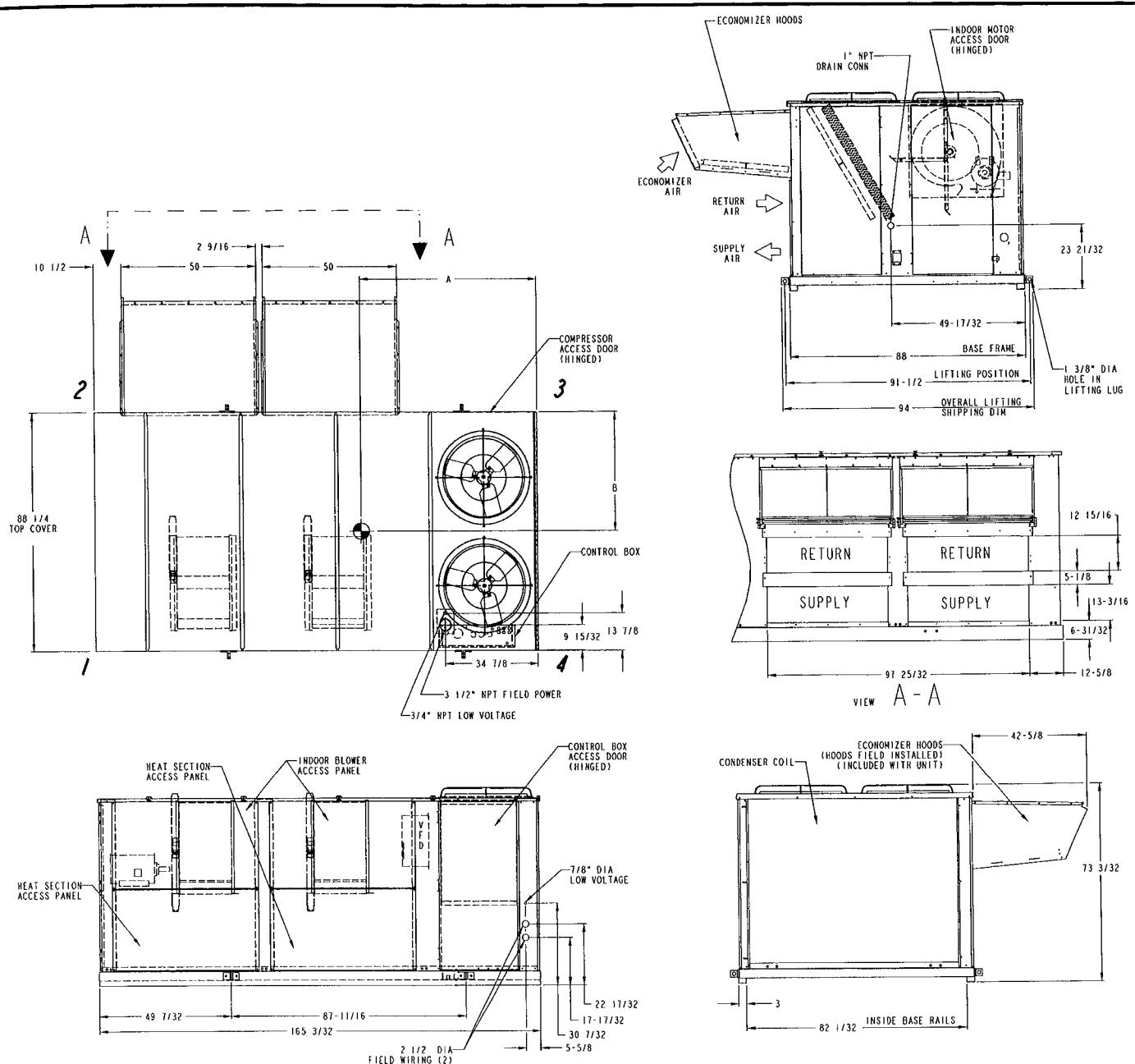
VFD — Variable Frequency Drive

NOTES

- Weights include economizer (Std)
- Center of gravity
- Do not locate adjacent units with discharge facing economizer inlet. Minimum clearances to be:
Adjacent Units: 15'-0"
Top of Units: 12'-0"
Condenser Coil: 4'-0"
Economizer Side: 6'-0"
Filter Access Side: 10'-0" (for removal of evaporator coil)
- For smaller service and operational clearances, contact Carrier Application Engineering department
- Bottom ducts designed to be attached to accessory roof curb. If unit is mounted on dunnage, it is recommended the ducts be supported by cross braces as done on accessory roof curb
- Dimensions are in inches
- For units with electric heat, a field-supplied 90° elbow must be installed in the supply ductwork below the unit discharge

UNIT SIZE 50E	OPERATING WEIGHT lb	A ft-in.	B ft-in.	CORNER WEIGHT (lb)			
				1	2	3	4
J038	4282	7-7 ⁵ / ₁₆	3-10 ¹ / ₂	961	858	1162	1302
J/K044	4508	7-3 ³ / ₁₆	3-11 ¹ / ₂	973	868	1258	1409
J048	4795	7-2 ³ / ₁₆	3-10 ³ / ₃₂	1007	915	1368	1505

Base unit dimensions, 50EW,EY024-034



LEGEND

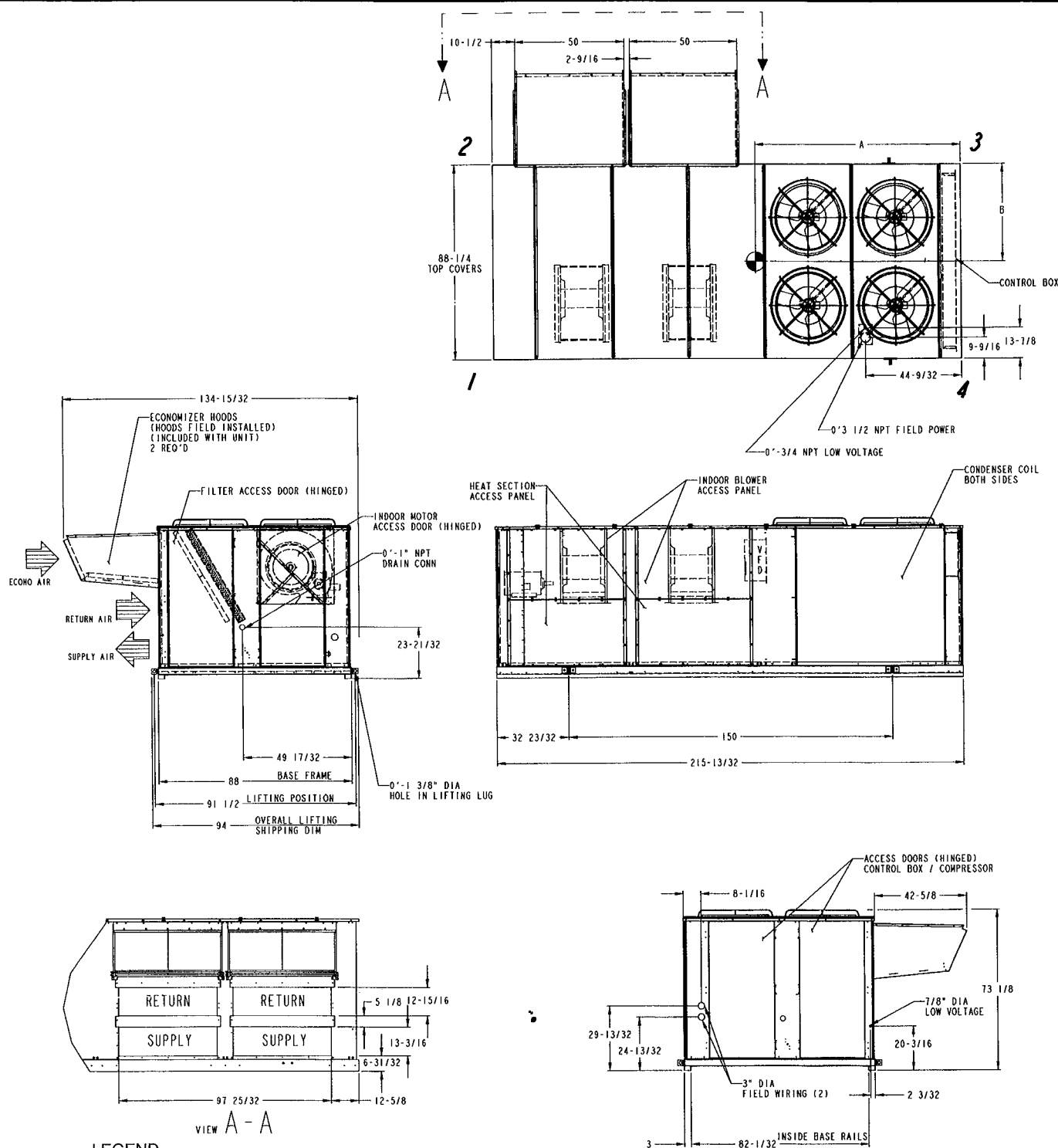
VFD — Variable Frequency Drive

NOTES:

- Weights include economizer (Std)
- Center of gravity
- Do not locate adjacent units with discharge facing economizer inlet. Minimum clearances to be:
Adjacent Units 15'-0"
Top of Units 12'-0"
Condenser Coil 4'-0"
Economizer Side 6'-0"
Filter Access Side: 10'-0" (for removal of evaporator coil)
- For smaller service and operational clearances, contact Carrier Application Engineering department.
- Dimensions are in inches
- For units equipped with electric heat, a field-supplied 90° elbow must be installed in the supply ductwork below the unit discharge
- For side-supply/return applications, a single return and supply ductwork connection is recommended for covering both return and both supply openings

UNIT SIZE 50EW,EY	OPERATING WEIGHT lb	A	B	CORNER WEIGHT (lb)			
		ft-in.	ft-in.	1	2	3	4
024	4016	5-11 ³ / ₈	3-5 ¹¹ / ₁₆	823	914	1199	1080
028	4102	5- 8 ¹ / ₂	3-7 ⁵ / ₈	844	859	1210	1189
030	4102	5- 8 ¹ / ₂	3-7 ⁵ / ₈	844	859	1210	1189
034	4102	5- 8 ¹ / ₂	3-7 ⁵ / ₈	844	859	1210	1189

Base unit dimensions, 50EW,EY038-048



LEGEND

VFD — Variable Frequency Drive

NOTES

1 Weights include economizer (Std)

2 Center of gravity

3 Do not locate adjacent units with discharge facing economizer inlet. Minimum clearances to be:
 Adjacent Units 15'-0"
 Top of Units 12'-0"
 Condenser Coil 4'-0"
 Economizer Side 6'-0"
 Filter Access Side: 10'-0" (for removal of evaporator coil)

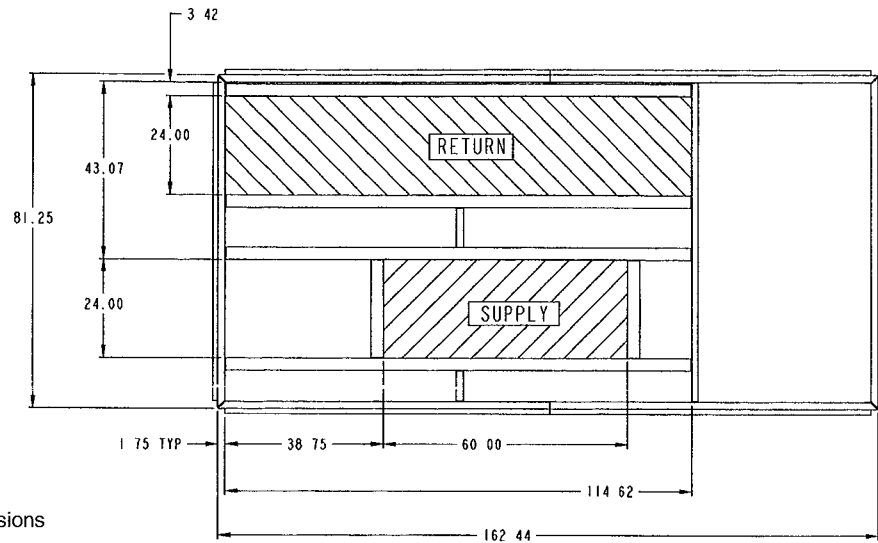
4 For smaller service and operational clearances, contact Carrier Application Engineering department.

5 Dimensions are in inches

- 6 For units equipped with electric heat, a field-supplied 90° elbow must be installed in the supply ductwork below the unit discharge
- 7 For side-supply/return applications, a single return and supply ductwork connection is recommended for covering both return and both supply air openings

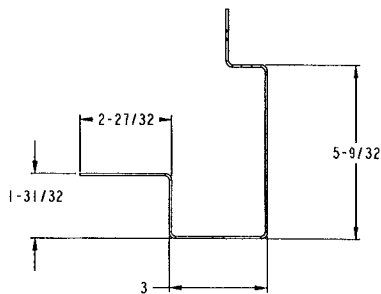
UNIT SIZE 50E	OPERATING WEIGHT	A	B	CORNER WEIGHT (lb)			
	lb	ft-in.	ft-in.	1	2	3	4
W038	4282	7-7 ⁹ / ₁₆	3-10 ¹ / ₂	961	858	1162	1302
W/Y044	4508	7-3 ¹³ / ₁₆	3-11 ¹ / ₂	973	868	1258	1409
W048	4795	7-2 ³ / ₁₆	3-10 ³ / ₃₂	1007	915	1368	1505

Accessory dimensions — roof curb (sizes 024-034)

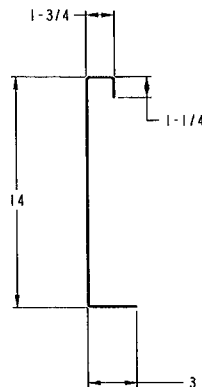


NOTES:

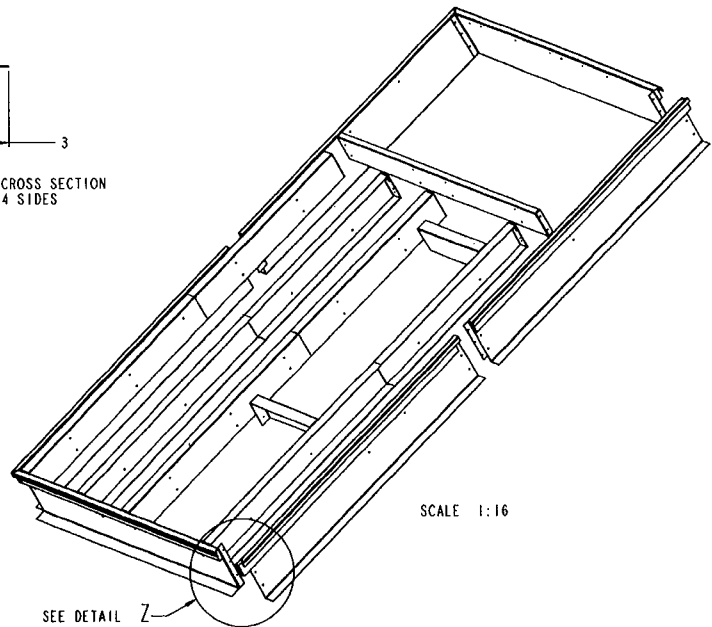
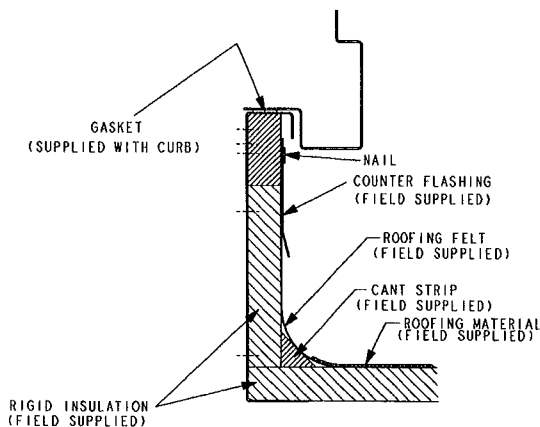
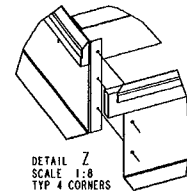
- 1 Unless otherwise specified, all dimensions are to outside of part.
2. Roof curb accessory CRRFCURB005A00 is shipped disassembled
- 3 All roof curb parts are to be 14 gage galvanized steel



BASE RAIL CROSS SECTION
TYP 2 SIDES



ROOF CURB CROSS SECTION
TYP 4 SIDES

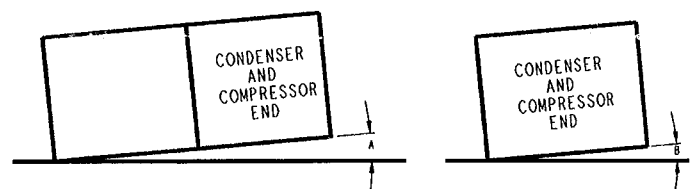


DIMENSIONS* (degrees and inches)

A		B	
Deg.	in.	Deg.	in.
10	29	50	75

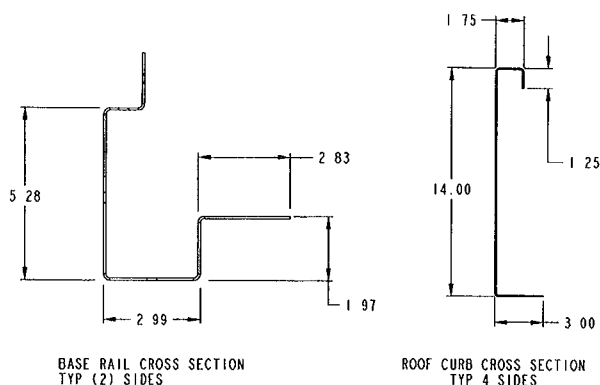
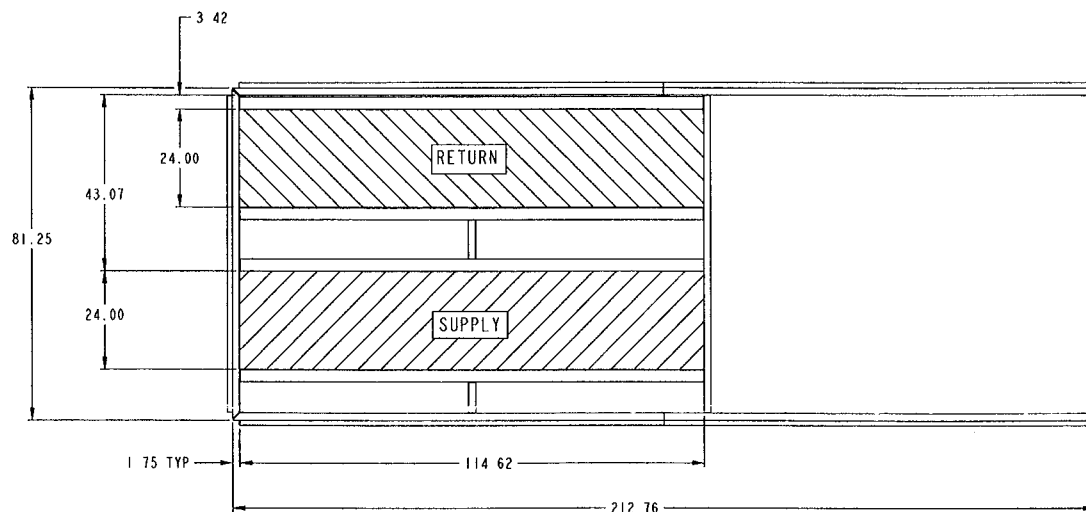
UNIT LEVELING TOLERANCES

*From edge of unit to horizontal



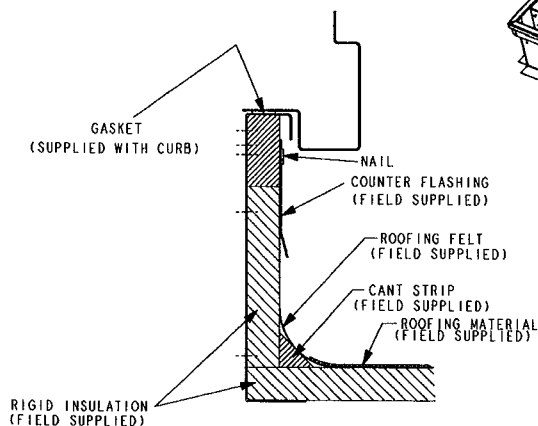
NOTE. To prevent standing water in the drain pan of the indoor section and the heat exchangers, **UNIT CAN ONLY BE PITCHED AS SHOWN.**

Accessory dimensions — roof curb (sizes 038-048)



NOTES

- 1 Unless otherwise specified, all dimensions are to outside of part
- 2 Roof curb accessory CRRFCURB006A00 is shipped disassembled.
- 3 All roof curb parts are to be 14 gage galvanized steel

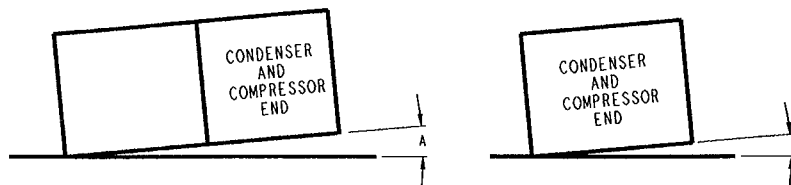
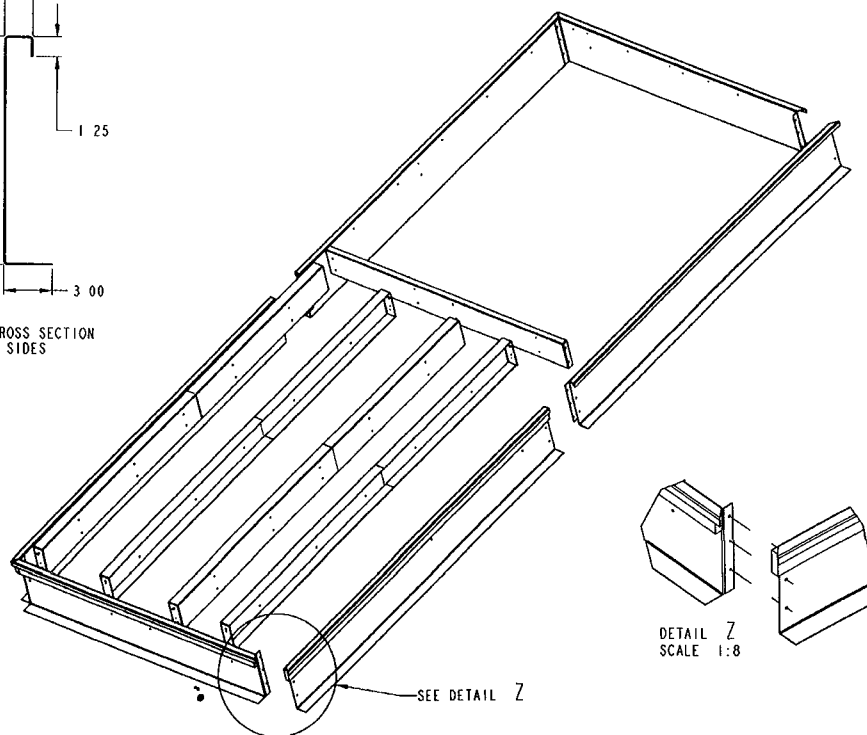


DIMENSIONS*
(degrees and inches)

A		B	
Deg.	in.	Deg.	in.
1 0	2 9	.50	7 5

UNIT LEVELING TOLERANCES

*From edge of unit to horizontal.



NOTE: To prevent standing water in the drain pan of the indoor section and the heat exchangers, **UNIT CAN ONLY BE PITCHED AS SHOWN.**

Selection procedure (with example)



I Determine cooling and heating requirements at design conditions.

Given:

Required Cooling Capacity (TC) . . . 458,000 Btuh
Sensible Heat Capacity (SHC) 338,000 Btuh
Required Heating Capacity 640,000 Btuh
Condenser Entering Air Temperature 95 F
Indoor Air Temperature 80 F ewb, 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 unit based on required cooling capacity.

Enter Cooling Capacities table at condenser entering temperature of 95 F. Unit 48EJ044 at 16,000 cfm and 67 F ewb will provide a total capacity of 462,000 Btuh and a SHC of 342,000 Btuh. Calculate SHC correction, if required, using notes under cooling capacities tables.

III Select heating capacity of unit to provide design condition requirement.

In the Heating Capacities and Efficiencies table, page 10, note that unit 48EJE044 will provide 648,000 Btuh with an input of 800,000 Btuh.

IV Determine fan speed and power requirements at design conditions.

Tabulated fan performance includes 2-in. throwaway 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 48EJE044 Fan Performance table for vertical applications. Find that the fan speed is 1025 rpm and the power required is 18.11 bhp. The 20 hp motor is required.

V Select unit that corresponds to power source available.

The Electrical Data table shows that a 460-3-60 unit is available.

Performance data



COOLING CAPACITIES

48/50EJ,EK,EW,EY024 (20 TONS)													
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF											
		4,000 / 0.06			5,000 / 0.075			6,000 / 0.085			7,000 / 0.105		
		Evaporator Air — Ewb (F)											
		62	67	72	62	67	72	62	67	72	62	67	72
75	TC	216	238	261	228	250	275	241	264	289	248	272	296
	SHC	166	146	125	185	160	133	204	173	142	220	186	150
	KW	14.4	14.8	15.3	14.7	15.1	15.5	15.0	15.4	15.8	15.1	15.5	16.0
85	TC	207	228	251	219	240	264	230	253	277	237	260	283
	SHC	161	141	120	180	155	129	199	169	138	214	181	145
	KW	15.8	16.4	16.9	16.2	16.7	17.3	16.5	17.0	17.6	16.7	17.2	17.8
95	TC	199	219	240	209	230	252	220	242	263	226	248	271
	SHC	157	136	116	175	150	124	194	164	133	207	176	140
	KW	17.2	17.9	18.6	17.6	18.3	19.0	18.0	18.7	19.4	18.3	18.9	19.5
105	TC	190	209	230	199	219	240	209	230	251	15	236	256
	SHC	152	132	111	170	145	119	188	159	128	201	171	135
	KW	18.6	19.4	20.2	19.0	19.9	20.6	19.5	20.3	21.0	19.7	20.5	21.2
115	TC	181	198	219	189	209	229	198	218	238	204	222	242
	SHC	148	127	106	165	141	114	182	154	123	195	166	130
	KW	20.0	20.9	21.8	20.5	21.4	22.3	20.9	21.8	22.7	21.2	22.1	22.9
125	TC	170	189	208	179	197	217	187	205	224	193	210	228
	SHC	143	122	102	159	136	110	176	149	118	187	160	124
	KW	21.3	22.3	23.3	21.8	22.8	23.8	22.2	23.3	24.2	22.6	23.6	24.5

48/50EJ,EK,EW,EY024 (20 TONS)										
Temp (F) Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF								
		8,000 / 0.125			9,000 / 0.16			10,000 / 0.19		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
75	TC SHC kW	256	279	305	261	284	309	267	289	314
		236	198	158	248	210	164	260	221	170
		15.3	15.6	16.1	15.4	15.8	16.2	15.5	15.9	16.2
85	TC SHC kW	244	267	290	250	271	294	255	274	299
		229	193	152	240	205	159	252	215	165
		16.9	17.4	17.9	17.0	17.5	18.0	17.1	17.6	18.1
95	TC SHC kW	232	254	277	238	258	280	244	261	284
		222	188	147	233	198	154	243	210	160
		18.4	19.1	19.8	18.7	19.2	19.9	18.9	19.4	20.0
105	TC SHC kW	221	240	262	227	244	266	233	248	269
		214	183	142	224	193	148	233	204	155
		20.0	20.7	21.5	20.3	20.8	21.6	20.4	21.0	21.7
115	TC SHC kW	210	228	248	215	231	251	222	234	254
		207	177	137	214	188	143	222	198	150
		21.5	22.3	23.1	21.8	22.5	23.3	22.1	22.6	23.5
125	TC SHC kW	199	215	233	205	217	235	210	219	238
		199	172	131	204	182	137	210	192	143
		22.9	23.7	24.7	23.3	24.0	24.8	23.6	24.1	25.0

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

NOTES:

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

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil } (h_{lwb})$$

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

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

3. 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

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	

Interpolation is permissible.
 Correction factor = $1.10 \times (1 - BF) \times (edb - 80)$

4. Cooling capacities are gross and do not include deduction for indoor fan motor heat.
5. VAV units will operate down to 70 cfm/ton.

COOLING CAPACITIES (cont)

48/50EJ,EK,EW,EY028 (25 TONS)													
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF											
		5,000 / 0.05			6,250 / 0.065			7,500 / 0.08			8,750 / 0.1		
		Evaporator Air — Ewb (F)											
		62	67	72	62	67	72	62	67	72	62	67	72
75	TC SHC kW	270	296	323	280	306	334	290	317	346	298	326	355
		208	179	152	229	195	162	250	212	172	270	226	181
		18.9	19.52	20.13	19.15	19.78	20.4	19.41	20.05	20.7	19.62	20.3	20.9
85	TC SHC kW	258	284	310	267	293	320	277	303	331	285	311	339
		203	174	146	223	190	156	244	206	166	262	220	175
		20.7	21.5	22.2	21	21.8	22.5	21.3	22	22.8	21.5	22.3	23
95	TC SHC kW	247	272	296	255	281	306	264	290	315	271	297	324
		197	168	140	217	184	150	237	199	160	255	214	169
		22.5	23.4	24.4	22.8	23.7	24.7	23.1	24	25	23.4	24.3	25.2
105	TC SHC kW	234	259	283	242	267	291	250	275	300	258	281	307
		194	163	134	213	178	144	231	194	154	247	208	163
		24.1	25.2	26.2	24.5	25.5	26.7	24.9	26	27	25.3	26.2	27.2
115	TC SHC kW	222	246	269	229	253	277	238	260	285	245	266	291
		192	157	129	208	172	138	225	187	148	239	202	158
		25.7	27	28.2	26.2	27.5	28.7	26.7	27.8	29	27.1	28.2	29.3
125	TC SHC kW	208	233	256	216	240	262	224	246	269	232	251	274
		188	152	124	203	167	133	218	182	143	230	196	152
		27.3	28.8	30.1	27.8	29.3	30.5	28.3	29.6	31	28.8	30	31.2

48/50EJ,EK,EW,EY028 (25 TONS)										
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF								
		10,000 / 0.12			11,250 / 0.15			12,500 / 0.195		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
75	TC	305	333	363	311	339	369	319	343	374
	SHC	289	241	190	305	256	199	316	269	207
	kW	19.8	20.4	21.0	19.9	20.5	21.2	20.1	20.7	21.3
85	TC	291	318	346	298	323	352	305	327	356
	SHC	281	234	184	294	249	193	304	262	201
	kW	21.7	22.5	23.2	21.9	22.7	23.4	22.2	22.7	23.5
95	TC	278	302	330	284	307	335	292	311	338
	SHC	272	228	178	284	242	187	292	256	195
	kW	23.7	24.6	25.4	24	24.7	25.6	24.2	24.9	25.8
105	TC	265	286	312	272	291	317	278	294	320
	SHC	261	222	173	272	236	181	278	249	189
	kW	25.6	26.5	27.5	25.9	26.7	27.7	26.2	26.8	27.8
115	TC	252	272	296	260	275	300	266	278	302
	SHC	251	217	167	260	230	175	266	243	183
	kW	27.5	28.4	29.6	27.9	28.6	29.8	28.2	28.8	29.9
125	TC	240	256	278	246	259	282	253	262	284
	SHC	239	210	161	246	223	169	253	235	177
	kW	29.4	30.2	31.6	29.8	30.5	31.8	30.2	30.6	31.8

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

NOTES

- Direct interpolation is permissible. Do not extrapolate.
- The following formulas may be used

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h}_{lwb}\text{)}$$

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

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

- 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

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	

Interpolation is permissible.
 Correction factor = $1.10 \times (1 - BF) \times (edb - 80)$

- Cooling capacities are gross and do not include deduction for indoor fan motor heat
- VAV units will operate down to 70 cfm/ton

Performance data (cont)



COOLING CAPAITIES (cont)

48/50EJ,EK,EW,EY030 (27.5 TONS)													
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF											
		5,500 / 0.06			6,875 / 0.07			8,250 / 0.09			9,625 / 0.11		
		Evaporator Air — Ewb (F)											
		62	67	72	62	67	72	62	67	72	62	67	72
75	TC	299	326	357	311	340	371	323	353	384	333	363	395
	SHC	229	198	168	252	215	179	276	233	190	298	249	201
	kW	23.4	24.3	25.3	23.7	24.8	25.8	24.2	25.1	26.1	24.5	25.5	26.5
85	TC	287	313	342	298	326	356	309	338	367	318	347	377
	SHC	223	192	162	246	209	173	269	227	184	289	243	194
	kW	25.4	26.5	27.7	25.9	27	28.1	26.4	27.4	28.6	26.8	27.8	29
95	TC	275	301	329	285	313	340	296	322	352	303	330	360
	SHC	217	186	156	240	204	167	262	220	177	281	237	187
	kW	27.4	28.7	30	28	29.2	30.6	28.5	29.8	31.1	28.9	30.2	31.5
105	TC	262	288	314	272	298	325	281	307	335	290	315	343
	SHC	210	180	150	232	198	161	254	214	171	273	230	181
	kW	29.4	30.9	32.3	29.9	31.5	32.9	30.5	32	33.4	31	32.4	33.8
115	TC	251	274	299	258	284	310	267	292	319	275	298	325
	SHC	204	174	145	226	192	155	247	208	165	264	224	175
	kW	31.3	33	34.5	32	33.6	35.2	32.6	34.1	35.7	33.1	34.6	36.2
125	TC	238	261	283	246	269	292	254	277	299	261	282	306
	SHC	198	168	138	219	185	148	240	201	158	255	216	168
	kW	33.3	35	36.7	33.9	35.6	37.3	34.5	36.3	37.9	35.1	36.7	38.3

48/50EJ,EK,EW,EY030 (27.5 TONS)										
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF								
		11,000 / 0.13			12,375 / 0.17			13,750 / 0.205		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
75	TC SHC kW	341	371	404	348	377	409	355	382	415
		319	266	211	334	281	219	349	296	228
		24.8	25.8	26.8	25.1	26.1	27.0	25.3	26.2	27.1
85	TC SHC kW	326	354	385	333	360	391	340	365	396
		310	259	204	323	274	213	337	288	221
		27.1	28.1	29.3	27.4	28.4	29.5	27.6	28.6	29.7
95	TC SHC kW	311	337	367	318	342	372	325	347	377
		300	253	197.8	314	267	206	325	282	215
		29.3	30.5	31.8	29.6	30.8	32.1	30	31	32.2
105	TC SHC kW	296	320	348	304	325	353	311	329	358
		289	246	191	301	261	200	311	275	208
		31.4	32.8	34.2	31.8	33	34.4	32.3	33.2	34.7
115	TC SHC kW	282	303	331	290	308	334	297	311	339
		279	238	184	290	253	194	297	267	202
		33.6	34.9	36.6	34.1	35.2	36.9	34.6	35.5	37
125	TC SHC kW	269	288	310	276	291	314	282	294	317
		267	232	177	276	246	186	282	259	194
		35.7	37.1	38.8	36.3	37.3	38.9	36.7	37.6	39.2

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

NOTES

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

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil } (h_{lwb})$$

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

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

3. 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.

ENTERING AIR DRY-BULB TEMP (F)						
BF	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	

Interpolation is permissible.
Correction factor = $1.10 \times (1 - BF) \times (edb - 80)$

4. Cooling capacities are gross and do not include deduction for indoor fan motor heat.
5. VAV units will operate down to 70 cfm/ton.

COOLING CAPACITIES (cont)

48/50EJ,EK,EW,EY034 (30 TONS)													
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF											
		6000 / 0.07			7,500 / 0.085			9,000 / 0.1			10,500 / 0.11		
		Evaporator Air — Ewb (F)											
		62	67	72	62	67	72	62	67	72	62	67	72
75	TC SHC kW	334	363	397	345	376	410	357	389	423	369	401	435
		251	218	185	277	236	197	302	256	208	327	274	220
		28	29.2	30.6	28.6	29.8	31.2	29	30.4	31.6	29.6	30.8	32.2
85	TC SHC kW	320	349	381	331	361	393	343	373	405	353	383	417
		246	212	179	270	230	190	294	248	202	318	266	212
		30.4	31.8	33.3	31	32.4	33.8	31.5	33	34.4	32	33.4	35
95	TC SHC kW	307	335	366	317	346	377	327	357	389	337	367	398
		240	205	173	264	224	184	287	242	195	310	260	206
		32.7	34.2	36	33.3	35	36.6	34	35.6	37.2	34.4	36.2	37.8
105	TC SHC kW	294	321	350	303	331	361	312	341	371	321	349	379
		233	199	166	257	216	177	280	234	188	302	252	199
		35	36.8	38.6	35.6	37.4	39.2	36.2	38	39.8	36.8	38.6	40.4
115	TC SHC kW	280	307	335	289	316	343	297	324	353	305	331	361
		227	193	160	249	210	171	272	228	181	294	245	192
		37.2	39.2	41.1	37.8	39.8	41.8	38.4	40.5	42.5	39.2	41.1	43.1
125	TC SHC kW	266	293	316	274	300	323	282	307	330	290	314	338
		219	187	152	242	204	163	264	221	173	283	238	184
		39.2	41.5	43.6	40	42.2	44.3	40.7	42.8	44.9	41.4	43.4	45.5

48/50EJ,EK,EW,EY034 (30 TONS)										
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF								
		12,000 / 0.135			13,500 / 0.155			15,000 / 0.18		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
75	TC SHC kW	377	410	445	383	417	451	390	423	459
		350	291	230	369	307	240	389	323	251
		30	31.2	32.6	30.2	31.5	32.8	30.5	31.8	33.1
85	TC SHC kW	361	391	425	367	397	431	374	403	437
		340	284	224	358	300	233	374	316	243
		32.4	33.9	35.4	32.8	34.2	35.7	33.1	34.5	36
95	TC SHC kW	344	373	406	351	379	411	357	385	417
		332	276	216	347	292	226	357	309	234
		35	36.6	38.2	35.4	36.9	38.6	35.8	37.2	38.9
105	TC SHC kW	328	355	386	336	361	391	343	365	396
		322	269	210	334	285	219	343	301	228
		37.3	39	40.9	37.8	39.4	41.2	38.4	39.8	41.5
115	TC SHC kW	312	337	366	320	342	371	330	347	375
		312	261	203	320	277	212	330	293	222
		39.7	41.6	43.5	40.4	41.9	43.9	41.1	42.3	44.2
125	TC SHC kW	296	319	342	304	322	346	312	324	350
		296	255	193.5	304	269	203	312	284	212
		42.1	43.9	45.9	42.9	44.3	46.3	43.6	44.6	46.5

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

NOTES

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

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil } (h_{lwb})$$

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

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

- 3 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.

ENTERING AIR DRY-BULB TEMP (F)						
BF	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	

Interpolation is permissible.
Correction factor = $1.10 \times (1 - BF) \times (edb - 80)$

- 4 Cooling capacities are gross and do not include deduction for indoor fan motor heat.
- 5 VAV units will operate down to 70 cfm/ton.

Performance data (cont)



COOLING CAPACITIES (cont)

48/50EJ,EW038 (35 TONS)										
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF								
		10,500 / 0.155			12,250 / 0.17			14,000 / 0.19		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
75	TC	378	416	458	388	428	471	396	437	480
	SHC	329	278	226	354	299	239	378	318	251
	kW	24.8	25.6	26.4	25.1	25.9	26.9	25.3	26.1	27.1
85	TC	362	400	441	374	412	453	381	420	462
	SHC	321	272	220	346	291	233	369	311	244
	kW	27	28	29	27.3	28.3	29.3	27.5	28.5	29.5
95	TC	348	384	424	358	394	435	365	402	443
	SHC	314	266	213	338	285	225	358	304	237
	kW	29.2	30.3	31.5	29.5	30.6	31.9	29.8	30.9	32.1
105	TC	333	367	406	343	377	415	350	384	423
	SHC	306	258	207	328	278	219	346	297	231
	kW	31.3	32.6	34	31.7	33	34.3	32	33.3	34.7
115	TC	318	350	387	327	359	396	335	365	403
	SHC	297	252	200.1	319	272	212	334	289	224
	kW	33.4	35	36.4	33.9	35.4	36.8	34.3	35.6	37.1

48/50EJ,EW038 (35 TONS)							
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF					
		15,750 / 0.20			17,500 / 0.21		
		Evaporator Air — Ewb (F)					
		62	67	72	62	67	72
75	TC	403	442	487	412	448	493
	SHC	398	338	266	411	356	277
	kW	25.5	26.3	27.2	25.7	26.3	27.3
85	TC	389	425	469	398	431	475
	SHC	386	330	256	397	347	267
	kW	27.8	28.7	29.7	28	28.9	29.9
95	TC	374	408	449	385	412	455
	SHC	373	322	249	384	339	260
	kW	30.1	31.1	32.3	30.5	31.3	32.5
105	TC	360	389	429	370	393	434
	SHC	360	314	242	370	331	252
	kW	32.5	33.6	34.8	32.7	33.7	35.1
115	TC	346	370	409	356	374	413
	SHC	346	307	235	355	323	246
	kW	34.8	35.8	37.4	35.3	36	37.6

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

NOTES:

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

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

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

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

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

- 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.

ENTERING AIR DRY-BULB TEMP (F)						
BF	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	

Interpolation is permissible.
Correction factor = $1.10 \times (1 - BF) \times (edb - 80)$

- Cooling capacities are gross and do not include deduction for indoor fan motor heat.
- VAV units will operate down to 70 cfm/ton

COOLING CAPACITIES (cont)

48/50EJ,EK,EW,EY044 (40 TONS)													
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF											
		8000 / 0.14			10,000 / 0.16			12,000 / 0.18			14,000 / 0.20		
		Evaporator Air — Ewb (F)											
		62	67	72	62	67	72	62	67	72	62	67	72
75	TC SHC kW	396	437	484	418	461	508	436	478	528	449	492	545
		306	267	226	341	293	243	373	315	257	400	336	271
		30.8	32.3	33.9	31.7	33.1	34.6	32.3	33.7	35.2	32.7	34.2	35.8
85	TC SHC kW	378	419	464	400	443	491	417	461	508	429	473	522
		298	259	218	333	285	235	364	307	250	390	333	263
		32.9	34.6	36.3	33.9	35.5	37.3	34.6	36.3	38	35.1	36.7	38.5
95	TC SHC kW	363	400	445	383	424	470	398	439	487	409	452	499
		290	251	211	324	277	227	354	298	241	379	320	255
		35.2	37	38.9	36.2	38	39.9	36.9	38.7	40.6	37.4	39.3	41.2
105	TC SHC kW	345	381	425	363	403	447	377	419	464	388	429	474
		281	242	202.8	314	266	218	343	290	233	368	312	246
		37.3	39.2	41.4	38.3	40.2	42.4	39	41.1	43.3	39.6	41.6	43.8
115	TC SHC kW	328	364	403	344	382	424	357	395	439	368	406	448
		272	234	194.7	304	256	211	332	280	222	355	302	240
		39.3	41.4	43.7	40.4	42.5	44.9	41.2	43.3	45.7	41.8	44	46.2

48/50EJ,EK,EW,EY044 (40 TONS)										
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF								
		16,000 / 0.22			18,000 / 0.23			20,000 / 0.24		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
75	TC	457	503	555	467	514	563	475	520	571
	SHC	426	358	284	449	379	300	468	400	308
	kW	33.1	34.5	36.1	33.5	34.9	36.3	33.7	35.2	36.6
85	TC	438	485	533	446	496	539	458	498	545
	SHC	416	353	276	437	371	284	452	389	301
	kW	35.5	37.2	38.8	35.8	37.6	39.1	36.3	37.8	39.3
95	TC	419	462	509	426	469	516	438	475	517
	SHC	403	342	268	422	361	277	435	380	294
	kW	37.9	39.7	41.6	38.3	40	41.9	38.8	40.4	41.9
105	TC	395	439	484	407	445	489	417	450	493
	SHC	389	333	259	406	352	276	417	370	282
	kW	40.1	42.2	44.2	40.7	42.4	44.5	41.2	42.8	44.6
115	TC	376	416	458	388	423	464	396	424	466
	SHC	374	322	249	388	342	262	396	359	276
	kW	42.3	44.6	46.7	43	45	47.1	43.6	45.1	47.2

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

NOTES:

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

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

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil } (h_{lwb})$$

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

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

- 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.

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	

Interpolation is permissible.
Correction factor = $1.10 \times (1 - BF) \times (edb - 80)$

- Cooling capacities are gross and do not include deduction for indoor fan motor heat.
- VAV units will operate down to 70 cfm/ton

Performance data (cont)



COOLING CAPACITIES (cont)

48EJ,EW048 (45 TONS)										
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF								
		13,500 / 0.115			15,750 / 0.13			18,000 / 0.14		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
75	TC	512	563	619	527	579	635	537	589	648
	SHC	444	376	305	479	403	322	512	430	339
	kW	38.5	40.3	42.1	39.1	40.9	42.7	39.4	41.2	43.2
85	TC	492	540	593	505	555	609	515	565	622
	SHC	433	367	296	468	394	313	498	420	329
	kW	41.2	43.1	45.2	41.7	43.7	45.8	42.2	44.2	46.3
95	TC	469	516	569	482	529	583	494	541	594
	SHC	423	357	287	455	383	304	483	409	320
	kW	43.8	45.9	48.2	44.5	46.6	48.9	45	47.1	49.3
105	TC	447	491	542	459	504	556	471	514	566
	SHC	411	347	278	443	372	294	465	400	311
	kW	46.4	48.8	51.2	47.1	49.4	51.8	47.8	49.9	52.4
115	TC	424	467	515	436	479	527	450	487	536
	SHC	399	337	268	427	363	285	449	388	300
	kW	48.9	51.4	54.1	49.7	52.1	54.8	50.5	52.7	55.3

48EJ,EW048 (45 TONS)							
Temp (F) Air Entering Condenser (Edb)		Evaporator Air Quantity — Cfm / BF					
		20,250 / 0.16			22,500 / 0.16		
		Evaporator Air — Ewb (F)					
		62	67	72	62	67	72
75	TC	549	599	658	561	606	666
	SHC	537	457	355	558	480	374
	kW	39.8	41.5	43.5	40.3	41.8	43.8
85	TC	528	575	631	540	581	639
	SHC	522	446	345	540	468	361
	kW	42.8	44.5	46.7	43.3	44.8	47
95	TC	506	548	604	520	555	611
	SHC	504	436	336	519	458	345
	kW	45.6	47.5	49.8	46.3	47.8	50.2
105	TC	485	521	575	499	527	581
	SHC	485	423	326	497	447	341
	kW	48.6	50.3	52.9	49.3	50.7	53.2
115	TC	464	494	545	477	499	551
	SHC	464	413	317	476	436	331
	kW	51.5	53	55.8	52.2	53.4	56.2

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

NOTES:

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

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

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

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

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

3. 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

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	

Interpolation is permissible.

Correction factor = $1.10 \times (1 - \text{BF}) \times (\text{edb} - 80)$

- 4 Cooling capacities are gross and do not include deduction for indoor fan motor heat
- 5 VAV units will operate down to 70 cfm/ton

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS

For EW,EY units, reduce net available external static pressure by 0.3 in. wg.

48EJ024-034 AND 48EK024-034 (20 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	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	340	0.83	416	1.17	480	1.52	537	1.90	588	2.29	635	2.69	679	3.11	720	3.53
5,000	384	1.25	453	1.61	513	1.99	566	2.39	615	2.79	660	3.21	703	3.64	742	4.08
6,000	432	1.79	495	2.19	550	2.59	600	3.01	647	3.43	690	3.87	730	4.31	769	4.77
7,000	483	2.48	540	2.91	591	3.33	638	3.77	682	4.22	723	4.67	762	5.14	799	5.61
8,000	536	3.33	588	3.78	635	4.23	679	4.69	720	5.16	759	5.64	797	6.12	832	6.61
8,250	549	3.57	600	4.02	646	4.48	690	4.95	730	5.42	769	5.90	806	6.39	841	6.88
9,000	590	4.34	637	4.82	681	5.30	722	5.78	762	6.27	799	6.77	834	7.27	868	7.77
10,000	645	5.54	689	6.04	729	6.54	768	7.04	805	7.56	840	8.07	874	8.59	906	9.12
11,000	701	6.92	741	7.44	779	7.96	816	8.49	850	9.03	884	9.56	916	10.10	947	10.65
12,000	757	8.49	795	9.04	830	9.59	865	10.14	898	10.69	929	11.25	960	11.81	990	12.37
12,500	786	9.36	822	9.92	856	10.47	890	11.03	922	11.60	953	12.16	983	12.73	1012	13.31
13,000	814	10.28	849	10.84	883	11.41	915	11.98	946	12.56	976	13.13	1006	13.71	1034	14.30
13,750	857	11.75	890	12.34	922	12.92	953	13.51	983	14.10	1012	14.69	1041	15.28	1068	15.88
14,000	871	12.27	904	12.86	936	13.45	966	14.05	996	14.64	1025	15.23	1053	15.83	1080	16.43
15,000	929	14.50	960	15.10	990	15.71	1019	16.33	1047	16.94	1074	17.55	1101	18.17	1127	18.79

48EJ024-034 AND 48EK024-034 (20 THRU 30 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	759	3.97	796	4.42	831	4.87	865	5.34	897	5.81	929	6.30	959	6.79	988	7.28
5,000	780	4.53	816	4.99	851	5.45	884	5.93	916	6.41	946	6.90	976	7.40	1005	7.91
6,000	805	5.23	840	5.70	874	6.18	906	6.67	937	7.16	968	7.66	997	8.17	1025	8.69
7,000	834	6.09	868	6.57	901	7.07	932	7.56	962	8.07	992	8.58	1020	9.10	1048	9.63
8,000	866	7.10	899	7.60	930	8.11	961	8.62	990	9.14	1019	9.67	1047	10.20	1074	10.74
8,250	874	7.38	907	7.89	938	8.40	968	8.92	998	9.44	1026	9.97	1054	10.50	1081	11.04
9,000	901	8.29	932	8.80	963	9.33	992	9.86	1021	10.39	1049	10.93	1076	11.48	1102	12.03
10,000	938	9.65	968	10.18	997	10.72	1026	11.27	1054	11.82	1081	12.37	1107	12.93	1133	13.49
11,000	977	11.19	1006	11.75	1035	12.30	1062	12.87	1089	13.43	1115	14.00	1141	14.57	1166	15.15
12,000	1019	12.94	1047	13.51	1074	14.08	1100	14.66	1126	15.24	1152	15.83	1177	16.42	1201	17.01
12,500	1040	13.88	1067	14.46	1094	15.05	1120	15.63	1146	16.22	1171	16.82	1195	17.41	—	—
13,000	1062	14.88	1089	15.47	1115	16.06	1140	16.66	1166	17.25	1190	17.86	—	—	—	—
13,750	1095	16.48	1121	17.08	1147	17.68	1172	18.29	1196	18.90	—	—	—	—	—	—
14,000	1106	17.04	1132	17.64	1157	18.25	1182	18.86	—	—	—	—	—	—	—	—
15,000	1152	19.41	1177	20.04	1200	20.66	—	—	—	—	—	—	—	—	—	—

48EJ024-034 AND 48EK024-034 (20 THRU 30 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)					
	3.4		3.6		3.8	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	1017	7.79	1045	8.30	1072	8.82
5,000	1033	8.42	1061	8.94	1087	9.46
6,000	1053	9.21	1080	9.73	1106	10.27
7,000	1075	10.16	1102	10.69	1127	11.24
8,000	1100	11.28	1126	11.83	1151	12.38
8,250	1107	11.59	1133	12.14	1158	12.69
9,000	1128	12.58	1153	13.14	1178	13.70
10,000	1158	14.06	1183	14.63	—	—
11,000	1190	15.74	—	—	—	—
12,000	—	—	—	—	—	—
12,500	—	—	—	—	—	—
13,000	—	—	—	—	—	—
13,750	—	—	—	—	—	—
14,000	—	—	—	—	—	—
15,000	—	—	—	—	—	—

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 VAV units will operate down to 70 cfm/ton

Performance data (cont)



FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

For EW,EY units, reduce net available external static pressure by 0.5 in. wg.

48EJ038,044 (35 AND 40 TONS) AND 48EK044 (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	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	475	2.36	525	3.09	571	3.49	616	3.90	658	4.31	699	4.74	738	5.17	776	5.61
9,000	523	3.11	567	3.97	610	4.39	651	4.82	690	5.26	728	5.71	765	6.16	801	6.62
10,000	571	4.00	612	5.01	651	5.46	689	5.91	725	6.37	761	6.84	795	7.31	829	7.79
11,000	620	5.04	658	6.22	694	6.69	729	7.17	763	7.65	796	8.14	829	8.64	860	9.14
12,000	670	6.24	705	7.61	738	8.10	771	8.60	803	9.11	834	9.62	865	10.13	894	10.65
13,000	720	7.61	752	9.19	784	9.70	814	10.23	844	10.75	874	11.29	902	11.82	931	12.36
14,000	771	9.15	801	10.97	830	11.51	859	12.05	887	12.60	915	13.15	942	13.71	969	14.27
15,000	822	10.88	850	12.95	877	13.52	904	14.08	931	14.65	957	15.22	983	15.80	1008	16.38
16,000	873	12.80	899	15.16	925	15.74	951	16.33	976	16.92	1001	17.51	1025	18.11	1049	18.71
17,000	924	14.91	949	17.59	974	18.20	998	18.80	1022	19.41	1045	20.03	1069	20.64	1092	21.26
18,000	976	17.24	999	20.26	1023	20.88	1046	21.51	1068	22.14	1091	22.77	1113	23.41	1135	24.05
19,000	1027	19.77	1050	23.17	1072	23.82	1094	24.46	1115	25.11	1137	25.76	1158	26.42	1179	27.07
20,000	1079	22.53	1100	26.33	1122	27.00	1142	27.66	1163	28.33	1183	29.00	—	—	—	—

48EJ038,044 (35 AND 40 TONS) AND 48EK044 (40 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	813	6.06	848	6.52	883	6.98	916	7.45	949	7.92	981	8.40	1012	8.89	1042	9.38
9,000	835	7.09	869	7.56	902	8.04	934	8.53	965	9.02	995	9.52	1025	10.02	1054	10.53
10,000	862	8.28	893	8.77	925	9.27	955	9.77	985	10.28	1014	10.79	1043	11.31	1071	11.84
11,000	891	9.64	921	10.15	951	10.67	980	11.19	1008	11.71	1036	12.24	1064	12.78	1090	13.32
12,000	924	11.18	952	11.71	980	12.24	1008	12.78	1035	13.32	1062	13.87	1088	14.42	1114	14.98
13,000	958	12.91	986	13.45	1012	14.01	1039	14.56	1064	15.13	1090	15.69	1115	16.26	1140	16.83
14,000	995	14.83	1021	15.40	1046	15.97	1071	16.55	1096	17.13	1120	17.71	1144	18.29	1168	18.89
15,000	1033	16.96	1058	17.55	1082	18.14	1106	18.73	1130	19.33	1153	19.93	1176	20.54	1199	21.14
16,000	1073	19.31	1097	19.92	1120	20.52	1143	21.14	1165	21.75	1188	22.37	—	—	—	—
17,000	1114	21.88	1137	22.51	1159	23.13	1181	23.76	—	—	—	—	—	—	—	—
18,000	1156	24.69	1178	25.33	1199	25.98	—	—	—	—	—	—	—	—	—	—
19,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48EJ038,044 (35 AND 40 TONS) AND 48EK044 (40 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)					
	3.4		3.6		3.8	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	1072	9.88	1101	10.39	1130	10.90
9,000	1083	11.04	1111	11.56	1139	12.08
10,000	1098	12.37	1125	12.90	1152	13.44
11,000	1117	13.86	1143	14.41	1169	14.96
12,000	1139	15.54	1164	16.11	1189	16.68
13,000	1164	17.41	1188	17.99	—	—
14,000	1191	19.48	—	—	—	—
15,000	—	—	—	—	—	—
16,000	—	—	—	—	—	—
17,000	—	—	—	—	—	—
18,000	—	—	—	—	—	—
19,000	—	—	—	—	—	—
20,000	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES

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

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

- VAV units will operate down to 70 cfm/ton

FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

For EW units, reduce net available external static pressure by 0.5 in. wg.

48EJ048 (45 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	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
13,000	728	7.71	760	9.31	791	9.83	822	10.35	851	10.88	881	11.42	909	11.95	938	12.50	965	13.04
14,000	779	9.28	809	11.11	838	11.65	867	12.20	895	12.75	923	13.31	950	13.87	976	14.43	1002	14.99
15,000	830	11.03	858	13.13	886	13.69	913	14.26	939	14.83	966	15.41	991	15.99	1017	16.57	1041	17.15
16,000	882	12.97	908	15.36	934	15.95	960	16.54	985	17.13	1010	17.73	1034	18.33	1058	18.93	1082	19.52
17,000	934	15.12	959	17.83	983	18.44	1008	19.05	1031	19.66	1055	20.28	1078	20.89	1101	21.52	1124	22.14
18,000	986	17.47	1010	20.53	1033	21.16	1056	21.79	1078	22.42	1101	23.06	1123	23.70	1145	24.34	1166	24.98
19,000	1038	20.05	1061	23.49	1083	24.13	1105	24.78	1126	25.44	1147	26.09	1169	26.75	1190	27.41	—	—
20,000	1091	22.84	1112	26.69	1133	27.36	1154	28.03	1174	28.70	1195	29.37	—	—	—	—	—	—

48EJ048 (45 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)																	
	2.0		2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
13,000	992	13.59	1019	14.15	1045	14.71	1071	15.27	1096	15.84	1121	16.41	1146	16.98	1170	17.56	1194	18.14
14,000	1028	15.56	1054	16.14	1079	16.71	1103	17.30	1127	17.88	1151	18.47	1175	19.06	1198	19.66	—	—
15,000	1066	17.74	1090	18.34	1114	18.93	1138	19.53	1161	20.13	1184	20.74	—	—	—	—	—	—
16,000	1105	20.14	1128	20.75	1151	21.37	1174	21.99	1196	22.61	—	—	—	—	—	—	—	—
17,000	1146	22.77	1168	23.40	1190	24.03	—	—	—	—	—	—	—	—	—	—	—	—
18,000	1188	25.63	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

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

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$
- VAV units will operate down to 70 cfm/ton

Performance data (cont)



FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

For EW,EY units, reduce net available external static pressure by 0.3 in. wg.

50EJ024-034 AND 50EK024-034 (20 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	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	322	0.77	401	1.09	466	1.43	523	1.78	575	2.13	622	2.50	666	2.87	707	3.25
5,000	361	1.14	433	1.50	494	1.86	548	2.23	598	2.62	643	3.00	686	3.40	726	3.80
6,000	403	1.62	468	2.01	526	2.41	577	2.81	624	3.21	668	3.62	709	4.04	748	4.46
7,000	448	2.22	508	2.65	561	3.08	609	3.50	654	3.93	696	4.37	736	4.81	773	5.25
8,000	495	2.97	549	3.42	599	3.88	645	4.33	687	4.79	727	5.25	765	5.71	801	6.18
8,250	507	3.18	560	3.64	609	4.10	654	4.56	696	5.02	735	5.49	773	5.96	809	6.43
9,000	543	3.85	593	4.34	639	4.82	682	5.30	723	5.78	761	6.27	797	6.76	832	7.24
10,000	592	4.90	638	5.41	682	5.91	722	6.42	760	6.93	797	7.44	832	7.95	865	8.46
11,000	642	6.10	685	6.64	725	7.17	764	7.70	800	8.24	835	8.77	868	9.30	900	9.84
12,000	693	7.48	733	8.04	771	8.60	807	9.15	841	9.71	874	10.26	906	10.82	937	11.38
12,500	718	8.23	757	8.80	794	9.37	829	9.94	862	10.51	895	11.08	926	11.64	956	12.21
13,000	744	9.03	781	9.62	817	10.20	851	10.78	884	11.36	915	11.93	946	12.51	975	13.09
13,750	783	10.32	818	10.92	852	11.52	885	12.12	917	12.71	947	13.31	977	13.90	1005	14.50
14,000	795	10.77	831	11.38	864	11.98	896	12.59	928	13.19	958	13.79	987	14.39	1015	14.99
15,000	847	12.71	880	13.34	912	13.96	943	14.59	972	15.21	1001	15.83	1029	16.45	1056	17.08

50EJ024-034 AND 50EK024-034 (20 THRU 30 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	746	3.64	783	4.03	818	4.44	852	4.85	884	5.26	916	5.68	946	6.11	975	6.54
5,000	764	4.21	800	4.62	834	5.04	868	5.46	900	5.89	930	6.33	960	6.77	989	7.22
6,000	785	4.89	820	5.32	854	5.76	886	6.21	918	6.65	948	7.11	977	7.56	1006	8.02
7,000	809	5.70	843	6.16	876	6.61	908	7.08	939	7.54	968	8.01	997	8.49	1025	8.96
8,000	836	6.65	869	7.12	901	7.60	932	8.08	962	8.57	991	9.05	1019	9.55	1046	10.04
8,250	843	6.91	876	7.39	908	7.87	938	8.36	968	8.84	997	9.34	1025	9.83	1052	10.33
9,000	865	7.74	898	8.23	929	8.73	959	9.23	988	9.74	1016	10.24	1043	10.75	1070	11.27
10,000	897	8.98	928	9.49	958	10.01	987	10.53	1016	11.06	1043	11.58	1070	12.11	1096	12.64
11,000	931	10.37	961	10.91	990	11.45	1018	11.99	1046	12.54	1073	13.08	1099	13.63	1124	14.18
12,000	967	11.94	996	12.49	1024	13.06	1051	13.62	1078	14.18	1104	14.75	1129	15.31	1154	15.88
12,500	985	12.78	1014	13.35	1041	13.92	1068	14.49	1094	15.07	1120	15.64	1145	16.22	1169	16.80
13,000	1004	13.67	1032	14.25	1059	14.83	1086	15.42	1111	16.00	1137	16.59	1161	17.17	1185	17.76
13,750	1033	15.09	1060	15.69	1087	16.29	1112	16.88	1138	17.48	1162	18.08	1186	18.68	—	—
14,000	1043	15.59	1070	16.19	1096	16.79	1122	17.40	1147	18.00	1171	18.60	1195	19.21	—	—
15,000	1083	17.70	1109	18.32	1134	18.94	1159	19.56	1183	20.19	—	—	—	—	—	—

50EJ024-034 AND 50EK024-034 (20 THRU 30 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)					
	3.4		3.6		3.8	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	1004	6.97	1032	7.41	1059	7.86
5,000	1017	7.67	1045	8.12	1072	8.58
6,000	1034	8.49	1061	8.96	1087	9.43
7,000	1052	9.44	1079	9.93	1105	10.42
8,000	1073	10.54	1099	11.04	1125	11.55
8,250	1079	10.84	1105	11.34	1130	11.85
9,000	1096	11.78	1122	12.30	1147	12.82
10,000	1122	13.18	1147	13.71	1171	14.25
11,000	1149	14.73	1173	15.29	1197	15.84
12,000	1178	16.45	1202	17.03	—	—
12,500	1193	17.38	—	—	—	—
13,000	—	—	—	—	—	—
13,750	—	—	—	—	—	—
14,000	—	—	—	—	—	—
15,000	—	—	—	—	—	—

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. VAV units will operate down to 70 cfm/ton



FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

For EW,EY units, reduce net available external static pressure by 0.5 in. wg.

50EJ038,044 (35 AND 40 TONS) AND 50EK044 (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	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	448	2.18	498	2.87	544	3.25	589	3.64	631	4.04	671	4.44	710	4.86	747	5.27
9,000	492	2.87	537	3.68	580	4.09	621	4.50	660	4.92	698	5.35	734	5.78	769	6.22
10,000	537	3.69	578	4.63	617	5.07	655	5.50	692	5.95	727	6.39	761	6.85	795	7.30
11,000	582	4.65	620	5.75	657	6.20	692	6.66	726	7.13	759	7.60	792	8.07	823	8.55
12,000	629	5.75	664	7.02	698	7.50	730	7.98	763	8.47	794	8.96	824	9.45	854	9.95
13,000	675	7.00	708	8.48	739	8.98	770	9.48	800	9.99	830	10.50	859	11.01	887	11.53
14,000	722	8.42	753	10.11	782	10.63	811	11.16	840	11.69	868	12.22	895	12.75	922	13.29
15,000	770	10.00	798	11.94	826	12.48	853	13.03	880	13.57	907	14.13	932	14.68	958	15.24
16,000	817	11.76	844	13.96	870	14.53	896	15.09	922	15.66	947	16.23	971	16.81	995	17.38
17,000	865	13.70	890	16.19	915	16.78	940	17.37	964	17.95	988	18.54	1011	19.14	1034	19.73
18,000	913	15.83	937	18.64	961	19.25	984	19.85	1007	20.46	1030	21.07	1052	21.68	1074	22.30
19,000	961	18.16	984	21.32	1006	21.94	1029	22.56	1050	23.19	1072	23.82	1093	24.45	1115	25.08
20,000	1009	20.69	1031	24.22	1052	24.86	1074	25.50	1095	26.15	1115	26.80	1136	27.45	1156	28.10

50EJ038,044 (35 AND 40 TONS) AND 50EK044 (40 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	783	5.70	818	6.13	852	6.56	884	7.00	916	7.45	947	7.90	978	8.36	1007	8.82
9,000	803	6.66	836	7.11	869	7.56	900	8.02	930	8.48	960	8.95	989	9.42	1018	9.90
10,000	827	7.77	858	8.23	889	8.70	919	9.18	948	9.66	977	10.15	1005	10.64	1032	11.13
11,000	854	9.03	884	9.51	913	10.00	941	10.50	969	11.00	997	11.50	1024	12.01	1050	12.52
12,000	883	10.45	911	10.96	939	11.47	967	11.98	993	12.50	1020	13.02	1046	13.54	1071	14.07
13,000	914	12.05	942	12.57	968	13.10	994	13.63	1020	14.17	1045	14.71	1070	15.25	1094	15.79
14,000	948	13.83	974	14.37	999	14.92	1024	15.47	1049	16.02	1073	16.58	1096	17.14	1120	17.70
15,000	983	15.80	1007	16.36	1032	16.92	1056	17.49	1079	18.06	1102	18.64	1125	19.21	1148	19.79
16,000	1019	17.96	1043	18.54	1066	19.13	1089	19.71	1111	20.30	1134	20.89	1156	21.49	1177	22.08
17,000	1057	20.33	1079	20.93	1102	21.53	1124	22.14	1145	22.75	1167	23.35	1188	23.97	—	—
18,000	1096	22.91	1117	23.53	1138	24.15	1160	24.78	1180	25.40	—	—	—	—	—	—
19,000	1135	25.72	1156	26.36	1176	26.99	1197	27.63	—	—	—	—	—	—	—	—
20,000	1176	28.75	1196	29.41	—	—	—	—	—	—	—	—	—	—	—	—

50EJ038,044 (35 AND 40 TONS) AND 50EK044 (40 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)					
	3.4		3.6		3.8	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,000	1036	9.29	1065	9.76	1092	10.24
9,000	1046	10.38	1073	10.87	1100	11.36
10,000	1059	11.63	1086	12.13	1112	12.64
11,000	1076	13.03	1102	13.55	1127	14.07
12,000	1096	14.60	1121	15.13	1145	15.67
13,000	1118	16.34	1142	16.89	1165	17.45
14,000	1143	18.26	1166	18.83	1188	19.40
15,000	1170	20.37	1192	20.96	—	—
16,000	1199	22.68	—	—	—	—
17,000	—	—	—	—	—	—
18,000	—	—	—	—	—	—
19,000	—	—	—	—	—	—
20,000	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

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

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$
- VAV units will operate down to 70 cfm/ton

Performance data (cont)



FAN PERFORMANCE — VERTICAL DISCHARGE UNITS (cont)

For EW units, reduce net available external static pressure by 0.5 in. wg.

50EJ048 (45 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	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
13,000	683	7.10	715	8.59	747	9.09	777	9.60	808	10.11	837	10.62	866	11.14	894	11.66
14,000	730	8.53	761	10.25	790	10.77	819	11.30	847	11.83	875	12.36	902	12.90	929	13.44
15,000	778	10.14	807	12.10	834	12.65	862	13.19	888	13.75	915	14.30	941	14.86	966	15.42
16,000	826	11.93	853	14.15	879	14.72	905	15.29	931	15.86	955	16.44	980	17.01	1004	17.59
17,000	875	13.90	900	16.42	925	17.01	949	17.60	973	18.19	997	18.78	1020	19.38	1043	19.98
18,000	923	16.06	947	18.90	971	19.51	994	20.12	1017	20.73	1039	21.34	1062	21.96	1084	22.58
19,000	972	18.42	995	21.61	1017	22.24	1039	22.87	1061	23.50	1083	24.13	1104	24.76	1125	25.40
20,000	1021	20.98	1042	24.55	1064	25.20	1085	25.85	1106	26.50	1126	27.15	1147	27.80	1167	28.46

50EJ048 (45 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
13,000	921	12.18	948	12.71	975	13.24	1001	13.77	1026	14.30	1051	14.84	1076	15.39	1100	15.93
14,000	955	13.98	981	14.53	1006	15.08	1031	15.63	1056	16.18	1080	16.74	1103	17.30	1127	17.86
15,000	991	15.98	1015	16.54	1040	17.11	1063	17.68	1087	18.25	1110	18.83	1133	19.41	1155	19.99
16,000	1028	18.17	1051	18.76	1074	19.34	1097	19.93	1120	20.52	1142	21.12	1164	21.71	1185	22.31
17,000	1066	20.58	1089	21.18	1111	21.78	1133	22.39	1154	23.00	1175	23.61	1197	24.23	—	—
18,000	1106	23.19	1127	23.82	1148	24.44	1169	25.07	1190	25.69	—	—	—	—	—	—
19,000	1146	26.04	1166	26.68	1187	27.32	—	—	—	—	—	—	—	—	—	—
20,000	1187	29.11	—	—	—	—	—	—	—	—	—	—	—	—	—	—

50EJ048 (45 TONS)

Airflow (Cfm)	Available External Static Pressure (in. wg)					
	3.4		3.6		3.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
13,000	1124	16.48	1148	17.03	1171	17.59
14,000	1150	18.43	1173	19.00	1195	19.57
15,000	1177	20.57	1199	21.16	—	—
16,000	—	—	—	—	—	—
17,000	—	—	—	—	—	—
18,000	—	—	—	—	—	—
19,000	—	—	—	—	—	—
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. VAV units will operate down to 70 cfm/ton

MOTOR LIMITATIONS

NAMEPLACE HP	VOLTAGE	MAXIMUM ACCEPTABLE OPERATING BHP
5.0	208/230	5.9
	460 and 575	5.9
7.5	208/230	8.7
	460 and 575	9.5
10.0	208/230	10.2
	460 and 575	11.8
15.0	208/230	15.3
	460 and 575	18.0
20.0	208/230	22.4
	460 and 575	23.4
25.0	208/230	28.9
	460 and 575	29.4
30.0	208/230	35.6
	460 and 575	34.7

LEGEND

BHP — Brake Horsepower

NOTE: 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 your fan motors up to the horsepower ratings shown on the Motor Limitations table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Electrical data — 48EJ,EK,EW,EY024-048



UNIT SIZE	NOMNAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		COMBUSTION FAN MOTOR	POWER SUPPLY	
				No. 1		No. 2							FLA	LRA		FLA	MCA
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA			FLA		
024	208/230	187	254	39 1	228	25 6	160	2	1	5.3	5	16 7/ 15.2	—	—	0 96	101.8/100.3	125/125
												23 6	41.6	0 96	125 4/123 9	150/150	
											10	30 8/ 28 0	—	—	0.96	115 9/113 1	150/150
												23.6	41 6	0 96	139.5/136 7	175/175	
											15	46 2/ 42 0	—	—	0 96	131.3/127 1	150/150
												23 6	41 6	0 96	154.9/150 7	175/175	
	460	414	508	19.9	114	11.5	80	2	1	2.7	5	7 6	—	—	0 5	49 4	60
												12.6	23.6	0 5	62 0	80	
											10	14.0	—	—	0 5	55 8	70
												12.6	23.6	0.5	68.4	80	
											15	21 0	—	—	0 5	62.8	80
												12 6	23.6	0.5	75 4	90	
	575	518	632	16 0	91	9 6	64	2	1	2 4	5	6 1	—	—	0 5	40 5	50
												12 6	23 6	0.5	53 1	60	
											10	11.0	—	—	0.5	45.4	60
												12 6	23 6	0 5	58 0	70	
											15	17 0	—	—	0 5	51.4	60
												12 6	23 6	0 5	64 0	80	
028	208/230	187	254	39.1	228	39.1	228	2	1	5 3	7 5	24.2/ 22 0	—	—	0.96	122 8/120 6	150/150
												23.6	41.6	0 96	146.4/144 2	175/175	
											10	30 8/ 28 0	—	—	0 96	129.4/126 6	150/150
												23 6	41 6	0 96	153 0/150.2	175/175	
											15	46.2/ 42.0	—	—	0 96	144 8/140 6	175/175
												23 6	41 6	0 96	168 4/164 2	200/200	
	460	414	508	19 9	114	19 9	114	2	1	2.7	7 5	11.0	—	—	0 5	61.2	80
												12 6	23 6	0 5	73 8	90	
											10	14 0	—	—	0.5	64 2	80
												12 6	23 6	0.5	76 8	90	
											15	21.0	—	—	0 5	71 2	90
												12 6	23.6	0 5	83.8	100	
	575	518	632	16 0	91	16 0	91	2	1	2 4	7.5	9 0	—	—	0 5	49 8	60
												12.6	23.6	0 5	62.4	70	
											10	11 0	—	—	0.5	51 8	60
												12 6	23 6	0 5	64.4	80	
											15	17.0	—	—	0 5	57 8	70
												12 6	23 6	0.5	70 4	80	
030	208/230	187	254	57.1	266	39 1	228	2	1	5 3	10	30.8/ 28.0	—	—	0 96	151 9/149 1	200/200
												23 6	41 6	0 96	175 5/172.7	225/225	
											15	46 2/ 42.0	—	—	0 96	167 3/163 1	225/225
												23 6	41 6	0.96	190.9/186 7	225/225	
											20	59 4/ 54.0	—	—	0.96	180 5/175.1	225/225
												23 6	41 6	0 96	204 1/198 7	250/250	
	460	414	508	25 6	120	19 9	114	2	1	2 7	10	14 0	—	—	0 5	71 3	90
												12.6	23 6	0.5	83 9	100	
											15	21.0	—	—	0.5	78.3	100
												12 6	23 6	0 5	90.9	110	
											20	27 0	—	—	0 5	84 3	100
												12.6	23.6	0.5	96 9	110	
	575	518	632	20 5	96	16.0	91	2	1	2.4	10	11.0	—	—	0 5	57 4	70
												12 6	23 6	0 5	70 0	90	
											15	17 0	—	—	0.5	63.4	80
												12.6	23 6	0.5	76.0	90	
											20	22.0	—	—	0.5	68 4	80
												12 6	23.6	0 5	81 0	100	

Electrical data — 48EJ,EK,EW,EY024-048 (cont)



UNIT SIZE	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		COMBUSTION FAN MOTOR	POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	FLA	MCA	MOCP*
034	208/230	187	254	57.1	266	57.1	266	2	1	5.3	10	30.8/28.0	—	—	0.96	169.9/167.1	225/200
												23.6	41.6	—	0.96	193.5/190.7	250/225
											15	46.2/42.0	—	—	0.96	185.3/181.1	225/225
												23.6	41.6	—	0.96	208.9/204.7	250/250
											20	59.4/54.0	—	—	0.96	198.5/193.1	250/250
												23.6	41.6	—	0.96	222.1/216.7	275/250
	460	414	508	25.6	120	25.6	120	2	1	2.7	10	14.0	—	—	0.5	77.0	100
												12.6	23.6	—	0.5	89.6	110
											15	21.0	—	—	0.5	84.0	100
												12.6	23.6	—	0.5	96.6	110
											20	27.0	—	—	0.5	90.0	110
												12.6	23.6	—	0.5	102.6	125
038	208/230	187	254	57.1	266	57.1	266	4	1	5.3	10	30.8/28.0	—	—	0.96	180.5/177.7	225/225
												23.6	41.6	—	0.96	204.1/201.3	250/250
											15	46.2/42.0	—	—	0.96	195.9/191.7	250/225
												23.6	41.6	—	0.96	219.5/215.3	275/250
											20	59.4/54.0	—	—	0.96	209.1/203.7	250/250
												23.6	41.6	—	0.96	232.7/227.3	275/275
	460	414	508	25.6	120	25.6	120	4	1	2.7	10	14.0	—	—	0.5	82.4	100
												12.6	23.6	—	0.5	95.0	110
											15	21.0	—	—	0.5	89.4	110
												12.6	23.6	—	0.5	102.0	125
											20	27.0	—	—	0.5	95.4	110
												12.6	23.6	—	0.5	108.0	125
	575	518	632	20.5	96	20.5	96	4	1	2.4	10	11.0	—	—	0.5	66.7	80
												12.6	23.6	—	0.5	79.3	90
											15	17.0	—	—	0.5	72.7	90
												12.6	23.6	—	0.5	85.3	100
											20	22.0	—	—	0.5	77.7	90
												12.6	23.6	—	0.5	90.3	110

LEGEND

- FLA** — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Fuse or HACR circuit breaker

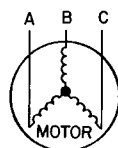


or



EXAMPLE Supply voltage is 460-3-60

AB = 452 v
 BC = 464 v
 AC = 455 v



$$\begin{aligned}
 \text{Average Voltage} &= \frac{452 + 464 + 455}{3} \\
 &= \frac{1371}{3} \\
 &= 457
 \end{aligned}$$

Determine maximum deviation from average voltage.

(AB) 457 - 452 = 5 v
 (BC) 464 - 457 = 7 v
 (AC) 457 - 455 = 2 v

Maximum deviation is 7 v

Determine percent voltage imbalance.

$$\begin{aligned}
 \% \text{ Voltage Imbalance} &= 100 \times \frac{7}{457} \\
 &= 1.53\%
 \end{aligned}$$

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

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

NOTES

- 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. Canadian units may be fuse or circuit 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.

% Voltage Imbalance

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

UNIT SIZE	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		COMBUSTION FAN MOTOR		POWER SUPPLY	
				No. 1		No. 2							FLA		FLA		MCA	
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	FLA	MCA	MOCP*	
044	208/230	187	254	69.2	345	69.2	345	4	1	5.3	15	46.2/ 42.0	—	—	0.96	223.1/218.9	275/275	
												23.6	41.6	0.96	246.7/242.5	300/300		
											20	59.4/ 54.0	—	—	0.96	236.3/230.9	300/300	
												23.6	41.6	0.96	259.9/254.5	300/300		
											25	74.8/ 68.0	—	—	0.96	251.7/244.9	300/300	
												23.6	41.6	0.96	275.3/268.5	300/300		
	460	414	508	28.8	173	28.8	173	4	1	2.7	15	21.0	—	—	0.5	96.6	125	
												12.6	23.6	0.5	109.2	125		
											20	27.0	—	—	0.5	102.6	125	
												12.6	23.6	0.5	115.2	125		
											25	34.0	—	—	0.5	109.6	125	
												12.6	23.6	0.5	122.2	150		
	575	518	632	26.7	120	26.7	120	4	1	2.4	15	17.0	—	—	0.5	86.7	110	
												12.6	23.6	0.5	99.3	125		
											20	22.0	—	—	0.5	91.7	110	
												12.6	23.6	0.5	104.3	125		
											25	27.0	—	—	0.5	96.7	110	
												12.6	23.6	0.5	109.3	125		
048	208/230	187	254	82.1	446	69.2	345	4	1	5.3	20	59.4/ 54.0	—	—	0.96	252.4/247.0	300/300	
												23.6	41.6	0.96	276.0/270.6	300/300		
											25	74.8/ 68.0	—	—	0.96	267.8/261.0	300/300	
												23.6	41.6	0.96	291.4/284.6	300/300		
											30	88.0/ 80.0	—	—	0.96	281.0/273.0	300/300	
												23.6	41.6	0.96	304.6/296.6	350/300		
	460	414	508	42.3	223	28.8	173	4	1	2.7	20	27.0	—	—	0.5	119.5	150	
												12.6	23.6	0.5	132.1	150		
											25	34.0	—	—	0.5	126.5	150	
												12.6	23.6	0.5	139.1	175		
											30	40.0	—	—	0.5	132.5	150	
												12.6	23.6	0.5	145.1	175		
	575	518	632	34.6	164	26.7	120	4	1	2.4	20	22.0	—	—	0.5	101.6	125	
												12.6	23.6	0.5	114.2	125		
											25	27.0	—	—	0.5	106.6	125	
												12.6	23.6	0.5	119.2	150		
											30	32.0	—	—	0.5	111.6	125	
												12.6	23.6	0.5	124.2	150		

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

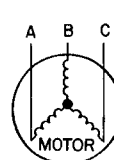
*Fuse or HACR circuit breaker



or



EXAMPLE Supply voltage is 460-3-60



AB = 452 v
 BC = 464 v
 AC = 455 v

$$\begin{aligned}
 \text{Average Voltage} &= \frac{452 + 464 + 455}{3} \\
 &= \frac{1371}{3} \\
 &= 457
 \end{aligned}$$

Determine maximum deviation from average voltage

(AB) 457 - 452 = 5 v
 (BC) 464 - 457 = 7 v
 (AC) 457 - 455 = 2 v

Maximum deviation is 7 v

Determine percent voltage imbalance

$$\begin{aligned}
 \% \text{ Voltage Imbalance} &= 100 \times \frac{7}{457} \\
 &= 1.53\%
 \end{aligned}$$

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

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

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. Canadian units may be fuse or circuit 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

% Voltage Imbalance

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

Electrical data — 50EJ,EK,EW,EY024-048



UNIT SIZE	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		ELECTRIC HEAT*		POWER SUPPLY	
				No. 1		No. 2							FLA	LRA	kW	FLA	MCA	MOCP†
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA						
024	208/230	187	254	39 1	228	25 6	160	2	1	5 3	5	16.7/ 15.2	—	—	—	—	101 8/100 8	125/125
													23.6	41.6	—	—	125.4/128.9	150/150
													—	—	29/36	75 1/ 86 6	114 7/127 3	125/150
													23.6	41.6	29/36	75.1/ 86.6	144.2/156.8	150/175
													—	—	59/72	150 1/173 2	171 0/192 2	200/225
													23.6	41.6	59/72	150.1/173.2	200.5/221.7	225/225
											10	30 8/ 28 0	—	—	—	—	115.9/113 1	150/150
													23.6	41.6	—	—	139.5/136.7	175/175
													—	—	29/36	75 1/ 86 6	132.3/143 3	150/150
													23.6	41.6	29/36	75.1/ 86.6	161.8/172.8	175/175
													—	—	59/72	150 1/173 2	188 6/208 2	220/225
													23.6	41.6	59/72	150.1/173.2	218.1/237.7	250/250
											15	46 2/ 42 0	—	—	—	—	131 3/127 1	150/150
													23.6	41.6	—	—	154.9/150.7	175/175
													—	—	29/36	75 1/ 86 6	151 6/160 8	175/175
													23.6	41.6	29/36	75.1/ 86.6	181.1/190.3	200/200
													—	—	59/72	150 1/173 2	207.9/225 7	250/250
													23.6	41.6	59/72	150.1/173.2	237.4/255.2	275/275
	460	414	508	19 9	114	11 5	80	2	1	2 7	5	7 6	—	—	—	—	49 4	60
													12.6	23.6	—	—	62.0	80
													—	—	36	43.3	63 6	70
													12.6	23.6	36	43.3	79.4	80
													—	—	72	86 6	96 1	110
													12.6	23.6	72	86.6	111.9	125
											10	14	—	—	—	—	55 8	70
													12.6	23.6	—	—	68.4	80
													—	—	36	43 3	71 6	80
													12.6	23.6	36	43.3	87.4	90
													—	—	72	86 6	104 1	110
													12.6	23.6	72	86.6	119.9	125
											15	21	—	—	—	—	62 8	80
													12.6	23.6	—	—	75.4	90
													—	—	36	43 3	80 4	90
													12.6	23.6	36	43.3	96.1	100
													—	—	72	86 6	112 9	125
													12.6	23.6	72	86.6	128.6	150
575	518	632	16.0	91	9 6	64	2	1	2 4	5	6 1	—	—	—	—	40 5	50	
												12.6	23.6	—	—	53.1	60	
												—	—	36	34 6	50.9	60	
												12.6	23.6	36	34.6	66.7	70	
												—	—	72	69 3	76 9	80	
												12.6	23.6	72	69.3	92.7	100	
										10	11	—	—	—	—	45.4	60	
												12.6	23.6	—	—	58.0	70	
												—	—	36	34 6	57 1	60	
												12.6	23.6	36	34.6	72.8	80	
												—	—	72	69 3	83 0	90	
												12.6	23.6	72	69.3	98.8	100	
										15	17	—	—	—	—	51 4	60	
												12.6	23.6	—	—	64.0	80	
												—	—	36	34 6	64 6	70	
												12.6	23.6	36	34.6	80.3	90	
												—	—	72	69.3	90.5	100	
												12.6	23.6	72	69.3	106 3	110	

LEGEND

- FLA — Full Load Amps
- HACR — Heating, Air Conditioning and Refrigeration
- IFM — Indoor (Evaporator) Fan Motor
- LRA — Locked Rotor Amps
- MCA — Minimum Circuit Amps
- MOCP — Maximum Overcurrent Protection
- NEC — National Electrical Code
- OFM — Outdoor (Condenser) Fan Motor
- RLA — Rated Load Amps

*Heater capacity (kW) is based on heater voltage of 208 v, 240 v, 480 v, and 575 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.

†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. The Canadian units may be fuse or circuit 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 of voltage imbalance.

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

EXAMPLE: Supply voltage is 460-3-60

AB = 452 v

BC = 464 v

AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage

$$(AB) 457 - 452 = 5 \text{ v}$$

$$(BC) 464 - 457 = 7 \text{ v}$$

$$(AC) 457 - 455 = 2 \text{ v}$$

Maximum deviation is 7 v

Determine percent of voltage imbalance

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

$$= 1.53\%$$

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

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

3 MCA calculation for units with electric heaters over 50 kW = (1.25 x IFM amps) + (1.00 x heater FLA).

4 72 kW heaters are for constant volume applications only.



UNIT SIZE	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		ELECTRIC HEAT*		POWER SUPPLY							
				No. 1		No. 2																		
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	kW	FLA	MCA	MOCP†						
028	208/230	187	254	39 1	228	39 1	228	2	1	5 3	7 5	24.2/ 22 0	—	—	—	—	122.8/120 6	150/150						
													—	—	29/36	75 1/ 86 6	124 1/135 8	150/150						
													23.6	41.6	29/36	75.1/ 86.6	153.6/165.3	175/175						
													—	—	59/72	150 1/173 2	180 4/200 7	200/225						
											23.6	41.6	59/72	150.1/173.2	209.9/230.2	225/250	10	30 8/ 28 0	—	—	—	—	129 4/126 6	150/150
											23.6	41.6	—	—	153.0/150.2	175/175								
											—	—	29/36	75 1/ 86 6	132.3/143 3	150/150								
											23.6	41.6	29/36	75.1/ 86.6	161.8/172.8	175/175								
											—	—	59/72	150.1/173 2	188 6/208 2	200/225								
											23.6	41.6	59/72	150.1/173.2	218.1/237.7	225/250	15	46 2/ 42 0	—	—	—	—	144 8/140 6	175/175
											23.6	41.6	—	—	168.4/164.2	200/200								
											—	—	29/36	75 1/ 86 6	151 6/160 8	175/175								
	23.6	41.6	29/36	75.1/ 86.6	181.1/190.3	200/200																		
	—	—	59/72	150 1/173 2	207 9/225 7	250/250																		
	23.6	41.6	59/72	150.1/173.2	237.4/255.2	275/275	460	414	508	19 9	114	19 9	114	2	1	2 7	7 5	11	—	—	—	—	61 2	80
	12.6	23.6	—	—	73.8	90																		
	—	—	36	43.3	67 9	70																		
	12.6	23.6	36	43.3	83.6	90																		
	—	—	72	86 6	100.4	110																		
	12.6	23.6	72	86.6	116.1	125											10	14	—	—	—	—	64 2	80
	12.6	23.6	—	—	76.8	90																		
	—	—	36	43 3	71 6	80																		
	12.6	23.6	36	43.3	87.4	90																		
	—	—	72	86 6	104 1	110																		
	12.6	23.6	72	86.6	119.9	125											15	21	—	—	—	—	71 2	90
	12.6	23.6	—	—	83.8	100																		
	—	—	36	43 3	80 4	90																		
	12.6	23.6	36	43.3	96.1	100																		
	—	—	72	86 6	112 9	125																		
	12.6	23.6	72	86.6	128.6	150	575	518	632	16 0	91	16 0	91	2	1	2 4	7 5	9	—	—	—	—	49 8	60
	12.6	23.6	—	—	62.4	70																		
	—	—	36	34 6	54 6	60																		
	12.6	23.6	36	34.6	70.3	80																		
	—	—	72	69 3	80 5	90																		
	12.6	23.6	72	69.3	96.3	100											10	11	—	—	—	—	51 8	60
	12.6	23.6	—	—	64.4	80																		
	—	—	36	34 6	57 1	60																		
	12.6	23.6	36	34.6	72.8	80																		
	—	—	72	69 3	83 0	90																		
	12.6	23.6	72	69.3	98.8	100											15	17	—	—	—	—	57 8	70
	12.6	23.6	—	—	70.4	80																		
	—	—	36	34.6	64 6	70																		
	12.6	23.6	36	34.6	80.3	90																		
	—	—	72	69 3	90 5	100																		
	12 6	23 6	72	69 3	106 3	110																		

Electrical data — 50EJ,EK,EW,EY024-048 (cont)



UNIT SIZE	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		ELECTRIC HEAT*		POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	kW	FLA	MCA	MOCPT
030	208/230	187	254	57 1	266	39 1	228	2	1	5 3	10	30 8/28 0	—	—	—	—	151.9/149 1	200/200
													23.6	41.6	—	—	175.5/172.7	225/225
													—	—	29/36	75 1/ 86 6	151 9/149 1	200/200
													23.6	41.6	29/36	75.1/ 86.6	175.5/172.8	225/225
													—	—	59/72	150 1/173 2	188 6/208 2	200/225
													23.6	41.6	59/72	150.1/173.2	218.1/237.7	225/250
											15	46 2/42 0	—	—	—	—	167.5/163 1	200/200
													23.6	41.6	—	—	190.9/186.7	225/225
													—	—	29/36	75 1/ 86 6	167 3/163 1	200/200
													23.6	41.6	29/36	75.1/ 86.6	175.5/172.8	225/225
													—	—	59/72	150 1/173 2	207 9/225 7	250/250
													23.6	41.6	59/72	150.1/173.2	237.4/255.2	275/275
											20	59 4/54 0	—	—	—	—	180 5/175 1	225/225
													23.6	41.6	—	—	204.1/198.7	250/250
													—	—	29/36	75 1/ 86 6	180 5/175 1	225/225
													23.6	41.6	29/36	75.1/ 86.6	190.9/186.7	250/250
													—	—	59/72	150 1/173 2	224 4/240 7	275/275
													23.6	41.6	59/72	150.2/173.2	253.9/270.2	300/300
	460	414	508	25 6	120	19 9	114	2	1	2 7	10	14	—	—	—	—	71 3	90
													12.6	23.6	—	—	83.9	100
													—	—	36	43 3	71 6	90
													12.6	23.6	36	43.3	87.4	100
													—	—	72	86 6	104 1	110
													12.6	23.6	72	86.6	119.9	125
											15	21	—	—	—	—	78 3	100
													12.6	23.6	—	—	90.9	110
													—	—	36	43 3	80 4	100
													12.6	23.6	36	43.3	96.1	110
													—	—	72	86 6	112 9	125
													12.6	23.6	72	86.6	128.6	150
											20	27	—	—	—	—	84 3	100
													12.6	23.6	—	—	96.9	110
													—	—	36	43 3	87.9	100
													12.6	23.6	36	43.3	103.6	110
													—	—	72	86 6	120 4	125
													12.6	23.6	72	86.6	136.1	150
	575	518	632	20 5	96	16 0	91	2	1	2 4	10	11	—	—	—	—	57.4	70
													12.6	23.6	—	—	70.0	90
													—	—	36	34 6	57 4	70
													12.6	23.6	36	34.6	72.8	90
													—	—	72	69 3	83 0	90
													12.6	23.6	72	69.3	98.8	100
											15	17	—	—	—	—	63 4	80
													12.6	23.6	—	—	76.0	90
													—	—	36	34 6	64 6	80
													12.6	23.6	36	34.6	80.3	90
													—	—	72	69 3	90 5	100
													12.6	23.6	72	69.3	106.3	110
											20	22	—	—	—	—	68 4	80
													12.6	23.6	—	—	81.0	100
													—	—	36	34 6	70 8	80
													12.6	23.6	36	34.6	86.6	100
													—	—	72	69 3	96 8	110
													12.6	23.6	72	69.3	112 5	125

LEGEND

- FLA — Full Load Amps
- HACR — Heating, Air Conditioning and Refrigeration
- IFM — Indoor (Evaporator) Fan Motor
- LRA — Locked Rotor Amps
- MCA — Minimum Circuit Amps
- MOCPT — Maximum Overcurrent Protection
- NEC — National Electrical Code
- OFM — Outdoor (Condenser) Fan Motor
- RLA — Rated Load Amps

*Heater capacity (kW) is based on heater voltage of 208 v, 240 v, 480 v, and 575 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.

†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. The Canadian units may be fuse or circuit 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 of voltage imbalance.

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

EXAMPLE: Supply voltage is 460-3-60

$$AB = 452 \text{ v}$$

$$BC = 464 \text{ v}$$

$$AC = 455 \text{ v}$$

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage

$$(AB) 457 - 452 = 5 \text{ v}$$

$$(BC) 464 - 457 = 7 \text{ v}$$

$$(AC) 457 - 455 = 2 \text{ v}$$

Maximum deviation is 7 v

Determine percent of voltage imbalance

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

$$= 1.53\%$$

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

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

3 MCA calculation for units with electric heaters over 50 kW = (1 25 x IFM amps) + (1.00 x heater FLA).

4 72 kW heaters are for constant volume applications only.



UNIT SIZE	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		ELECTRIC HEAT*		POWER SUPPLY	
				No. 1		No. 2												
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	kW	FLA	MCA	MOCP†
034	208/230	187	254	57.1	266	57.1	266	2	1	5.3	10	30.8 / 28.0	—	—	—	—	169.9/167.1	225/200
													23.6	41.6	—	—	193.5/190.7	250/225
													—	—	29/36	75.1/ 86.6	169.9/167.1	225/200
													23.6	41.6	29/36	75.1/ 86.6	193.5/190.7	250/225
													—	—	59/72	150.1/173.2	188.6/208.2	225/225
													23.6	41.6	59/72	150.1/173.2	218.1/237.7	250/250
											15	46.2 / 42.0	—	—	—	—	185.3/181.1	225/225
													23.6	41.6	—	—	208.9/204.7	250/250
													—	—	29/36	75.1/ 86.6	185.3/181.1	225/225
													23.6	41.6	29/36	75.1/ 86.6	208.9/204.7	250/250
													—	—	59/72	150.1/173.2	207.9/225.7	250/250
													23.6	41.6	59/72	150.1/173.2	237.4/255.2	275/275
											20	59.4 / 54.0	—	—	—	—	198.5/193.1	250/250
													23.6	41.6	—	—	222.1/216.7	275/250
													—	—	29/36	75.1/ 86.6	198.5/193.1	250/250
													23.6	41.6	29/36	75.1/ 86.6	222.1/216.7	275/250
													—	—	59/72	150.1/173.2	224.4/240.7	275/275
													23.6	41.6	59/72	150.1/173.2	253.9/270.2	300/300
	460	414	508	25.6	120	25.6	120	2	1	2.7	10	14	—	—	—	—	77.0	100
													12.6	23.6	—	—	89.6	110
													—	—	36	43.3	77.0	100
													12.6	23.6	36	43.3	89.6	110
													—	—	72	86.6	104.1	110
													12.6	23.6	72	86.6	119.9	125
											15	21	—	—	—	—	84.0	100
													12.6	23.6	—	—	96.6	110
													—	—	36	43.3	84.0	100
													12.6	23.6	36	43.3	96.6	110
													—	—	72	86.6	112.9	125
													12.6	23.6	72	86.6	128.6	150
											20	27	—	—	—	—	90.0	110
													12.6	23.6	—	—	102.6	125
													—	—	36	43.3	90.0	110
													12.6	23.6	36	43.3	103.6	125
													—	—	72	86.6	120.4	125
													12.6	23.6	72	86.6	136.1	150
	575	518	632	20.5	96	20.5	96	2	1	2.4	10	11	—	—	—	—	61.9	80
													12.6	23.6	—	—	74.5	90
													—	—	36	34.6	61.9	70
													12.6	23.6	36	34.6	74.5	90
													—	—	72	69.3	83.0	90
													12.6	23.6	72	69.3	98.8	100
											15	17	—	—	—	—	67.9	80
													12.6	23.6	—	—	80.5	100
													—	—	36	34.6	67.9	80
													12.6	23.6	36	34.6	80.5	100
													—	—	72	69.3	90.5	100
													12.6	23.6	72	69.3	106.3	110
											20	22	—	—	—	—	72.9	90
													12.6	23.6	—	—	85.5	100
													—	—	36	34.6	72.9	90
													12.6	23.6	36	34.6	86.6	100
													—	—	72	69.3	96.8	110
													12.6	23.6	72	69.3	112.5	125

Electrical data — 50EJ,EK,EW,EY024-048 (cont)



UNIT SIZE	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		ELECTRIC HEAT*		POWER SUPPLY	
				No. 1		No. 2												
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	kW	FLA	MCA	MOCP†
038	208/230	187	254	57 1	266	57 1	266	4	1	5 3	10	30 8/ 28 0	—	—	—	—	180 5/177.7	225/225
													23.6	41.6	29/36	75.1/ 86.6	180 5/177.7	225/225
													—	—	59/72	150 1/173.2	188 6/208.2	225/225
													23.6	41.6	59/72	150.1/173.2	218.1/237.7	250/250
													—	—	—	—	195 9/191.7	250/225
													23.6	41.6	—	—	219.5/215.3	275/250
											15	46 2/ 42 0	23.6	41.6	29/36	75.1/ 86.6	195 9/191.7	250/225
													—	—	29/36	75.1/ 86.6	219.5/215.3	275/250
													—	—	59/72	150 1/173.2	207 9/225.7	250/250
													23.6	41.6	59/72	150.1/173.2	237.4/255.2	275/275
													—	—	—	—	209 1/203.7	250/250
													23.6	41.6	—	—	232.7/227.3	275/275
											20	59 4/ 54 0	23.6	41.6	29/36	75.1/ 86.6	209 1/203.7	250/250
													—	—	29/36	75.1/ 86.6	232.7/227.3	275/275
													—	—	59/72	150 1/173.2	224 4/240.7	275/275
													23.6	41.6	59/72	150.1/173.2	253.9/270.2	300/300
													—	—	—	—	82 4	100
													12.6	23.6	—	—	95.0	110
	460	414	508	25 6	120	25 6	120	4	1	2 7	10	14	—	—	—	—	82 4	100
													12.6	23.6	36	43 3	82 4	100
													—	—	36	43.3	95.0	110
													—	—	72	86 6	104 1	110
													12.6	23.6	72	86.6	119.9	125
													—	—	—	—	89.4	110
											15	21	12.6	23.6	—	—	102.0	125
													—	—	36	43 3	89 4	110
													12.6	23.6	36	43.3	102.0	125
													—	—	72	86 6	112 9	125
													12.6	23.6	72	86.6	128.6	150
													—	—	—	—	95 4	110
											20	27	12.6	23.6	—	—	108.0	125
													—	—	36	43 3	95 4	110
													12.6	23.6	36	43.3	108.0	125
													—	—	72	86.6	120.4	125
													12.6	23.6	72	86.6	136.1	150
													—	—	—	—	66 7	80
	575	518	632	20 5	96	20.5	96	4	1	2 4	10	11	12.6	23.6	—	—	79.3	90
													—	—	36	34.6	66.7	80
													12.6	23.6	36	34.6	79.3	90
													—	—	72	69 3	83 0	90
													12.6	23.6	72	69.3	98.8	100
													—	—	—	—	72 7	90
											15	17	12.6	23.6	—	—	85.3	100
													—	—	36	34 6	72 7	80
													12.6	23.6	36	34.6	85.3	100
													—	—	72	69 3	90 5	100
													12.6	23.6	72	69.3	106.3	110
													—	—	—	—	77 7	90
20											22	12.6	23.6	—	—	90.3	110	
												—	—	36	34 6	77 7	90	
												12.6	23.6	36	34.6	90.3	110	
												—	—	72	69.3	96 8	110	
												12 6	23 6	72	69.3	112 5	125	

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Heater capacity (kW) is based on heater voltage of 208 v, 240 v, 480 v, and 575 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.

†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. The Canadian units may be fuse or circuit 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 of voltage imbalance.

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

EXAMPLE: Supply voltage is 460-3-60

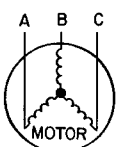
AB = 452 v

BC = 464 v

AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$



$$= 457$$

Determine maximum deviation from average voltage

$$(AB) 457 - 452 = 5 \text{ v}$$

$$(BC) 464 - 457 = 7 \text{ v}$$

$$(AC) 457 - 455 = 2 \text{ v}$$

Maximum deviation is 7 v

Determine percent of voltage imbalance

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457} = 1.53\%$$

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

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

3 MCA calculation for units with electric heaters over 50 kW = (1.25 x IFM amps) + (1.00 x heater FLA).

4 72 kW heaters are for constant volume applications only.



UNIT SIZE	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		ELECTRIC HEAT*		POWER SUPPLY	
				No. 1		No. 2												
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	kW	FLA	MCA	MOCP†
044	208/230	187	254	69.2	345	69.2	345	4	1	5.3	15	46.2/ 42.0	—	—	—	—	223.1/218.9	275/275
													—	—	29/36	75.1/ 86.6	223.1/218.9	275/275
													23.6	41.6	29/36	75.1/ 86.6	246.7/242.5	300/300
													—	—	59/72	150.1/173.2	223.1/225.7	275/275
													23.6	41.6	59/72	150.1/173.2	246.7/255.2	300/300
													—	—	—	—	236.3/230.9	300/300
											20	59.4/ 54.0	23.6	41.6	—	—	259.9/254.5	300/300
													—	—	29/36	75.1/ 86.6	236.3/230.9	300/300
													23.6	41.6	29/36	75.1/ 86.6	259.9/254.5	300/300
													—	—	59/72	150.1/173.2	236.3/240.7	300/300
													23.6	41.6	59/72	150.1/173.2	259.9/270.2	300/300
													—	—	—	—	251.7/244.9	300/300
											25	74.8/ 68.0	23.6	41.6	—	—	275.3/268.5	300/300
													—	—	29/36	75.1/ 86.6	251.7/244.9	300/300
													23.6	41.6	29/36	75.1/ 86.6	275.3/268.5	300/300
													—	—	59/72	150.1/173.2	251.7/258.2	300/300
													23.6	41.6	59/72	150.2/173.2	275.3/287.7	300/300
													—	—	—	—	96.6	125
	460	414	508	28.8	173	28.8	173	4	1	2.7	15	21	12.6	23.6	—	—	109.2	125
													—	—	36	43.3	96.6	125
													12.6	23.6	36	43.3	109.2	125
													—	—	72	86.6	112.9	125
													12.6	23.6	72	86.6	128.6	150
													—	—	—	—	102.6	125
											20	27	12.6	23.6	—	—	115.2	125
													—	—	36	43.3	102.6	125
													12.6	23.6	36	43.3	115.2	125
													—	—	72	86.6	120.4	150
													12.6	23.6	72	86.6	136.1	150
													—	—	—	—	109.6	125
											25	34	12.6	23.6	—	—	122.2	150
													—	—	36	43.3	109.6	125
													12.6	23.6	36	43.3	122.2	150
													—	—	72	86.6	129.1	150
													12.6	23.6	72	86.6	144.9	175
													—	—	—	—	86.7	110
575	518	632	26.7	120	26.7	120	4	1	2.4	15	17	12.6	23.6	—	—	99.3	125	
												—	—	36	34.6	86.7	110	
												12.6	23.6	36	34.6	99.3	125	
												—	—	72	69.3	91.4	110	
												12.6	23.6	72	69.3	106.3	125	
												—	—	—	—	91.7	110	
										20	22	12.6	23.6	—	—	104.3	125	
												—	—	36	34.6	91.7	110	
												12.6	23.6	36	34.6	104.3	125	
												—	—	72	69.3	96.8	125	
												12.6	23.6	72	69.3	112.5	125	
												—	—	—	—	96.7	110	
										25	27	12.6	23.6	—	—	109.3	125	
												—	—	36	34.6	96.7	110	
												12.6	23.6	36	34.6	109.3	125	
												—	—	72	69.3	103.0	125	
												12.6	23.6	72	69.3	118.8	125	
												—	—	—	—	—	—	

Electrical data — 50EJ,EK,EW,EY024-048 (cont)



UNIT SIZE	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		ELECTRIC HEAT*		POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	kW	FLA	MCA	MOCP†
048	208/230	187	254	82 1	446	69 2	345	4	1	5 3	20	59 4/54.0	—	—	—	—	252 4/247 0	300/300
													23.6	41.6	—	—	276.0/270.6	300/300
													—	—	29/36	75 1/ 86 6	252 4/247 0	300/300
													23.6	41.6	29/36	75.1/ 86.6	276.0/270.6	300/300
											25	74 8/68 0	—	—	59/72	150 1/173 2	252 4/247 0	300/300
													23.6	41.6	59/72	150.1/173.2	276.0/270.6	300/300
													—	—	—	—	267 8/261 0	300/300
													23.6	41.6	29/36	75 1/ 86 6	267 8/261 0	300/300
													—	—	29/36	75.1/ 86.6	291.4/284.6	300/300
													23.6	41.6	59/72	150 1/173 2	267 8/261 0	300/300
													—	—	59/72	150.1/173.2	291.4/284.6	300/300
	460	414	508	42 3	223	28 8	173	4	1	2 7	20	27	—	—	—	—	119 5	150
													12.6	23.6	—	—	132.1	150
													—	—	36	43 3	119 5	150
													12.6	23.6	36	43.3	132.1	150
											25	34	—	—	72	86 6	120 4	150
													12.6	23.6	72	86.6	136.1	150
													—	—	—	—	126 5	150
													12.6	23.6	—	—	139.1	175
											30	40	—	—	36	43 3	126 5	150
													12.6	23.6	36	43.3	139.1	175
													—	—	72	86 6	129 1	150
													12.6	23.6	72	86.6	144.9	175
048	575	518	632	34 6	164	26 7	120	4	1	2 4	20	22	—	—	—	—	101 6	125
													12.6	23.6	—	—	114.2	125
													—	—	36	34 6	101 6	125
													12.6	23.6	36	34.6	114.2	125
											25	27	—	—	72	69 3	101 6	125
													12.6	23.6	72	69.3	114.2	125
													—	—	—	—	106 6	125
													12.6	23.6	—	—	119.2	150
											30	32	—	—	36	34 6	106 6	125
													12.6	23.6	36	34.6	119.2	150
													—	—	72	69 3	106 6	125
													12.6	23.6	72	69.3	119.2	150
	575	518	632	34 6	164	26 7	120	4	1	2 4	20	22	—	—	—	—	111 6	125
													12.6	23.6	—	—	124.2	150
													—	—	36	34 6	111 6	125
													12.6	23.6	36	34.6	124.2	150
											25	27	—	—	72	69 3	111 6	125
													12.6	23.6	72	69.3	124.2	150
													—	—	—	—	106 6	125
													12.6	23.6	—	—	119.2	150
											30	32	—	—	36	34 6	106 6	125
													12.6	23.6	36	34.6	119.2	150
													—	—	72	69 3	106 6	125
													12.6	23.6	72	69.3	124.2	150

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Heater capacity (kW) is based on heater voltage of 208 v, 240 v, 480 v, and 575 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.

†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. The Canadian units may be fuse or circuit 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 of voltage imbalance.

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

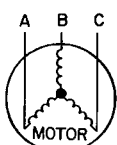
EXAMPLE: Supply voltage is 460-3-60

AB = 452 v

BC = 464 v

AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3} = \frac{1371}{3}$$



= 457

Determine maximum deviation from average voltage

(AB) 457 - 452 = 5 v

(BC) 464 - 457 = 7 v

(AC) 457 - 455 = 2 v

Maximum deviation is 7 v

Determine percent of voltage imbalance

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

= 1.53%

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

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

3 MCA calculation for units with electric heaters over 50 kW = (1.25 x IFM amps) + (1.00 x heater FLA).

4 72 kW heaters are for constant volume applications only.



Operating sequence

Cooling, constant volume units with wall thermostat

— When the room thermostat calls for cooling, the supply-air temperature (SAT) is above 65 F, and the SAT and the outside-air temperature (OAT) are not in alarm, compressor contactor no. 1 is energized. Then compressor no. 1 and outdoor (condenser) fan motor (OFM) no. 1 and 2 (1, 2, 3, and 4 on sizes 038-048) are started. The indoor (evaporator) fan motor (IFM) is then energized, and the economizer damper moves to the minimum position. Note that on 024-034 units, OFM2 cycles on outdoor-air temperature. The fan motor is energized at 65 F and deenergized at 55 F. On 038-048 units, OFM3 and 4 are cycled on outdoor temperature in a similar manner.

Upon a further call for cooling, compressor contactor no. 2 will be energized, starting compressor no. 2.

After the thermostat is satisfied, the compressors and OFMs are turned off, and the damper moves to the fully closed position when using an auto fan. If using continuous fan, the damper will stay at the minimum position.

When the outdoor-air temperature is below 65 F, and the room thermostat calls for cooling, the economizer dampers move to the minimum position. If the supply-air temperature is above 55 F, the damper continues to open until it reaches the fully open position, or until the supply-air temperature drops below 55 F.

When the supply-air temperature is 55 F, the damper will remain at an intermediate open position. If the supply-air temperature falls below 55 F, the damper will modulate closed until it reaches the minimum position or until the supply-air temperature is above 55 F. When the room thermostat is satisfied, the damper will move to the fully closed position when using an auto fan or to the minimum position when using a continuous fan.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing second-stage cooling. When the thermostat calls for second-stage cooling, compressor no. 1 and condenser fan(s) will be energized and the position of the economizer damper will be determined by the supply-air temperature. If the supply-air temperature is above 55 F for more than 15 minutes, compressor no. 2 is energized.

When the second stage of cooling is satisfied, the last compressor energized and OFM(s), if appropriate, will be deenergized. The damper position will be determined by the supply-air temperature. When the first stage of cooling is satisfied, the remaining compressor (if any) and the IFM shuts off. If the thermostat fan selector switch is in the ON position, the IFM will run continuously and the dampers will remain in the minimum position.

Heating, constant volume units with wall thermostat

48 Series Units — When the thermostat calls for heating, the induced-draft motor (IFM) is energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. When additional heat is needed, the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied, the flame is extinguished, then after a 45-second delay, the IFM is deenergized. Note that in

order to prevent short-cycling, the unit is locked into the Heating mode for at least 1 minute after heating is called for. In addition, the outdoor damper stays open at the minimum position while the IFM is operating.

50 Series Units — When the thermostat calls for heating, the first stage of electric heat is energized. The indoor (evaporator) fan motor (IFM) is energized immediately after the heating element is energized. When additional heating is required, the remaining electric heating elements are energized. When the thermostat is satisfied, all stages of heating and the indoor fan are deenergized.

Cooling, constant volume units with space sensor and CCN

— When the IFM is energized and the outside-air temperature sensor is not in alarm, the software controls space temperature by maintaining the supply-air temperature at the value specified by the supply-air temperature set point through cycling the compressors. Both the supply-air temperature and set point temperature are used to adjust the cycling deadband to match the actual load. The control system provides cooling capacity control of up to 2 stages of cooling to maintain occupied space temperature to the occupied or unoccupied set point.

If nighttime free cooling is enabled via CCN, the indoor fan will be energized and dampers opened to pre-cool the space prior to the system entering the Occupied mode in the morning.

Heating, constant volume units with space sensor and CCN (both 48 and 50 series units)

— When the IFM is energized and Nighttime Free Cool mode is inactive, the software controls space temperature by maintaining the supply-air temperature at the value specified by the supply-air temperature set point through adding or removing stages of heating. The space temperature, occupied set point, and the supply-air temperature are used to calculate the number of stages required. The control system provides heating capacity control of up to 2 stages of heating to maintain occupied space temperature to the occupied set point.

Cooling, variable volume units — When the internal clock places the unit in the Occupied mode, the control goes through an initialization routine. Upon completion of initialization, the control operates to try to maintain the supply-air temperature at the cold temperature set point in the controls memory. The control will always try to use the economizer as the first stage of cooling. Temperature permitting, the control will open the economizer dampers and try to maintain the leaving-air temperature at the cooling set point minus 2° F. If the economizer dampers become fully open and still cannot maintain the desired leaving-air temperature, the control will begin to cycle on compressors and condenser fans. Once mechanical cooling begins, the control strives to maintain the leaving-air temperature at the cooling set point rather than at the set point minus 2° F.

The control determines how rapidly capacity steps are added or subtracted based on deviation from leaving air set point and rate of change of leaving-air temperature.

If the temperature is such that the economizer cannot be used for cooling, the dampers will go to the minimum position. The control will then use mechanical cooling to meet the cooling load.

Controls (cont)



Heating, morning warm-up, variable volume units (both 48 and 50 series units) — When in the Heating mode, room terminals must be wide open.

If the return-air temperature is 5° F below the warm-up temperature set point, heating will be energized and will run until the return-air temperature is above 2° F below set point.

During heating, the economizer dampers will be fully closed. The unit can go in and out of heating until the return-air temperature rises above the warm-up temperature set point. After the return-air temperature rises above the set point, the unit cannot go back into Heating mode until the unit enters the Occupied mode.

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.

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 500 cfm/ton.

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. Refer to Heating Capacities and Efficiencies table on page 10 for minimum airflow cfm for heating.

Minimum ambient cooling operation temperature — All units 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 35 F. With accessory Motormaster® III control units can operate at outdoor temperatures down to -20 F. Outdoor-fan motor no. 1 changeout is required for Motormaster III applications.

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 — A change to the gas orifice may be required at high altitudes. Refer to Altitude Compensation table on page 12.

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.

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° elbow must be installed in the supply ductwork below the unit discharge connection.

Guide specifications — 48/50EJ,EW constant volume units



Packaged Rooftop Cooling Unit and Packaged Rooftop Cooling Unit With Gas Heat — Constant Volume Application

HVAC Guide Specifications — Section 48/50EJ,EW

Size Range: **20 to 45 Tons, Nominal**

Carrier Model Number: **48EJ, 48EW, 50EJ, 50EW**

Part 1 — General

1 01 SYSTEM DESCRIPTION

- A. Outdoor roof curb or slab mounted, electronically controlled heating and cooling unit utilizing semi-hermetic reciprocating type compressors for cooling duty and gas or electric heat for heating duty. Units shall discharge supply air vertically or horizontally as shown on contract drawings.

1.02 QUALITY ASSURANCE

- A Unit shall be rated in accordance with ARI Standard 360 and designed in accordance with UL Standard 1995
- B. Unit shall be designed to conform to ANSI/ASHRAE 15 (latest edition) and NEC.
- C Unit shall be tested and certified by ETL in accordance with ANSI Z21.47 Standards as a total package.
- D. Roof curb shall be NRCA approved.
- E. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation
- F. Unit shall be manufactured in a facility registered to the ISO 9002 manufacturing quality standard.

1.03 DELIVERY, STORAGE AND HANDLING

- A Unit shall be stored and handled per manufacturer's recommendations

Part 2 — Products

2.01 EQUIPMENT

- A Factory-assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, refrigerant charge (R-22), 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.
 - 2. Unit casing shall be capable of withstanding Federal test method Standard No. 141 (Method 6061) 500-hour salt spray test
 - 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 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 and containing an EPA-registered immobilized antimicrobial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM standards G21 and 22.
- 5. Unit shall have a factory-installed condensate drain connection and an aluminized steel, sloped condensate drain pan to prevent standing water from accumulating.
- 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

2. Condenser Fans:

- a. Direct-driven propeller type only, with corrosion-resistant blades riveted to corrosion-resistant steel supports.
- b. Discharge air vertically upward and protected by PVC coated steel wire safety guards.
- c. Statically and dynamically balanced.

D. Compressors:

- 1 Reciprocating, semi-hermetic type only and located for easy servicing.
- 2 Mounted on spring vibration isolators with an isolation efficiency of no less than 95%.
- 3 Each equipped with an automatically reversible oil pump, operating oil charge, insert-type crankcase heater to prevent refrigerant migration to the compressor, and suction and discharge service valves.
- 4 Maximum operating speed of 1800 rpm (30 rps).
- 5 Each on independent refrigerant and electrical circuits

E. Coils:

1. Evaporator Coil:

- a. Intertwined circuited, constructed of aluminum fins mechanically bonded to seamless copper tubes.
- b. Full face active type during full load and part load conditions.

- c. Coils shall be leak tested at 150 psig and pressure tested at 450 psig.

2. Condenser Coil:

- a. Constructed of aluminum fins mechanically bonded to seamless copper tubes
- b. Air-cooled condenser coils shall be leak tested at 150 psig and pressure tested at 450 psig.

3. All coils shall be same manufacturer as unit.

F. Heating Section:

Electric Heat:

Electric resistance heaters shall be factory-installed, open wire, nichrome element type, insulated with ceramic bushings, and include operating and safety controls.

Gas Heat:

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.
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 and dynamically balanced.
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. Liquid line service valve.
2. Solid core filter drier.
3. Thermostatic expansion valve.
4. Fusible plug.

H. Filter Section:

Filter section shall consist of 2-in. thick, disposable fiberglass filters or commercially available sizes.

I. Controls and Safeties:

1. Controls:

- a. Unit shall be complete with self-contained, demand-oriented microprocessor based, solid-state control system.
- b. Unit shall be compatible with either a room sensor or room thermostat with no accessory interface required.
- c. Unit staging shall be minimum 2-cool, 2-heat.

- d. Unit shall perform in response to a variable space temperature signal. Control system shall determine control sequences through monitoring the following operational variables:

- 1) Evaporator leaving-air temperature
- 2) Economizer position.
- 3) Minimum economizer set point.
- 4) Morning warm-up set point.
- 5) Outdoor-air temperature.

- e. In the event of a power failure, unit control system shall sequence the unit to re-start beginning with the first stage of cooling or heating.

- f. Thermostats shall be of the dual set point type for heating and cooling

- g. Set points must have adjustable deadband between heat and cool.

- h. Unit shall be capable of performing night-time free cooling.

- i. Control boards shall be equipped with flashing LED(s) for diagnostics.

- j. With gas heat, upon flame failure a new ignition sequence must start (rather than locking out heat)

- k. Minimum heat on-time of 1 minute.

2. Safeties:

Unit components shall be equipped with the following protections:

a. Compressors:

- 1) Overtemperature (shuts down individual compressor).
- 2) Overcurrent (shuts down individual compressor)
- 3) Crankcase heaters.
- 4) High-pressure switch (shuts down individual compressor, automatic reset type).
- 5) Loss-of-charge switch (shuts down individual compressor, automatic reset type).
- 6) Compressor shall be prevented from re-starting for a minimum of 5 minutes after shutdown. Compressor shall run a minimum of 10 seconds after starting.

b. Heating Section:

Gas Heat:

- 1) High-temperature limit switch.
- 2) Redundant dual-stage gas valve.
- 3) Flame rollout switches.
- 4) Flame proving controls.
- 5) Speed sensor on each induced draft fan motor.

Electric Heat:

- 1) Automatic reset high-temperature limit switches.
- 2) Heat limiters (fusible links).
- 3) Overcurrent protection short-circuit fuses.
- 4) Branch circuit protection.

Guide specifications — 48/50EJ,EW constant volume units (cont)



J. Operating Characteristics:

1. Unit shall be capable of starting and running at 115 F ambient outdoor temperature per maximum load criteria of ARI Standard 360.
2. Unit shall be capable of mechanical cooling operation down to 35 F ambient outdoor temperature.
3. Provides multi-stage mechanical cooling capability.
4. Unit provided with fan time delay to prevent cold starts.

K. Motors:

1. Compressor motors shall be cooled by suction gas passing over motor windings and shall have line break thermal and current overload protection.
2. Condenser-fan motors shall be totally enclosed, 3-phase type with permanently lubricated ball bearings and internal, automatic-reset thermal overload protection.
3. Indoor blower motor shall be of the 3-phase ball bearing type
4. Induced-draft motor shall be of the permanently lubricated sealed bearing type with inherent automatic reset thermal overload protection.

L. Electrical Requirements:

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

M. Integrated Economizer:

Consists of gear driven dampers, direct-drive motor in conjunction with microprocessor control system to provide primary cooling using outdoor air, temperature permitting, supplemented with mechanical cooling when necessary.

1. Dampers shall be low leakage type, not to exceed 20 cfm per sq ft leakage at 1 in wg pressure differential when fully closed.
2. Motor shall have a spring return feature which shuts dampers upon a power interruption or unit shutdown.
3. Equipped with solid-state control that sets the economizer cut-in point at an economical level.
4. Capable of introducing up to 100% outdoor air.

N. Space Temperature Control:

1. Two-Stage Thermostat with Integral Sensor:
 - a. Thermostat shall be capable of automatic heating and cooling changeover without system switches.
 - b. Each thermostat or transmitter shall provide the following features:
 - 1) Separate locking heating and cooling set point adjustments concealed under a locking cover.
 - 2) An adjustable (3 to 30 F) deadband between heating and cooling set points.
 - 3) Two LEDs concealed under locking cover to provide remote checkout of control system.
 - 4) Load reactive time delays to ensure stable system performance.

2 Thermistor Type Room Sensor

- a. Sensor shall be capable of setback override.
- b. Set point adjustment may be made at sensor
- c. Allows access to CCN.

O. Special Features:

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

*1. Optional Condenser Coil Materials:

- a. Unit shall be factory equipped with a condenser coil made from copper tubes and copper fins.
- b. Unit shall be factory equipped with a condenser coil made from corrosion resistant pre-coated aluminum fins

*2. Roof Curb:

Formed 14-gage galvanized steel with wood nailer strip. Supports full perimeter of unit.

*3. Constant Volume Power Exhaust:

Package shall include 4 double-width, double inlet direct drives, forward-curved power exhaust fans with non-modulating dampers at the discharge.

- a. Fans shall be statically and dynamically balanced.
- b. Exhaust hood and eliminators shall prevent objects from entering unit through the relief dampers

*4. Non-Modulating to Modulating Power Exhaust Conversion Package:

Package shall include modulating devices to maintain a field adjustable interior space pressure set point.

5 Barometric Relief Damper Package:

- a. Package shall relieve excess internal pressure and consist of damper assembly, hoods, damper screen, seal strip, and required hardware.
- b. Damper assembly shall close due to gravity upon unit shutoff.
- c. Unit mounted on vertical supply/return units only; can be duct mounted on horizontal applications.

6. Modulating Head Pressure Control:

Package shall consist of an accessory outdoor-air package and a solid-state control with condenser coil temperature sensor capable of modulating outdoor fan speed to maintain condensing temperature between 90 F and 100 F at outdoor ambient temperature down to -20 F.

7. Condenser Coil Hail Guard:

Hood with welded wire grille complete with support retainers and fasteners shall be provided for protection of condensing coil(s).

- 8 LP Gas Conversion Package:
ETL and ETL, Canada approved package allows unit to be field converted for use with LP (liquid propane) gas.
9. Electric Heat Package:
Shall be fully-assembled for installation. The 208/230-v, 460-v, and 575-v units are designed in accordance with UL standards and all units feature a single point connection.
- *10 Space Temperature Sensor:
This space temperature sensor (for CV applications) shall determine the actual temperature in the conditioned space.
- *11. Space Temperature Sensor with Offset (T-56):
This space temperature sensor (for CV applications) shall determine the actual temperature in the conditioned space. In addition, this accessory device shall provide a space temperature offset $\pm 5^{\circ}\text{F}$.
- *12. Enthalpy Sensor:
 - a. For use with economizer only.
 - b. Capable of measuring temperature of outdoor air and controlling economizer cut-in point at a more economical level.
- *13. Thermostat and Subbase Assembly:
To provide staged heating and cooling in addition to automatic (or manual) changeover and fan control.
14. Indoor Air Quality (CO₂) Sensor (Electronic Expansion Board Required):
Shall have the ability to provide demand ventilation IAQ control through the economizer with an indoor air quality sensor.
The IAQ sensor shall be available in duct mount, wall mount, and wall mount with LED display of CO₂ in parts per million. The set point shall have adjustment capability.
15. Electronic Expansion Board:
Shall provide the following:
 - a. Control of modulating economizer damper to maintain indoor air quality when outdoor conditions are suitable.
 - b. Discrete inputs for fan status, filter status, field-applied status, and demand limit.
 - c. Shall perform demand limit functions based on the state of the discrete input.
 - d. An output for the external alarm light indicator.
 - e. Smoke control modes including evacuation, smoke purge, pressurization, and shutdown.
 - f. Pre-occupancy purge shall be available.
- 16 Pressure Operated Unloader:
Additional steps for unloading can be obtained by the addition of accessory pressure-actuated suction cutoff unloaders to the lead compressor.
- 17 Roof Curb Retrofit Kit:
Shall provide adaptors to retrofit unit to an existing 48/50DJ roof curb.

Guide specifications — 48/50EK,EY variable air volume units



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

HVAC Guide Specifications — Section 48/50EK,EY

Size Range: **20 to 40 Tons, Nominal**

Carrier Model Number: **48EK, 48EY, 50EK, 50EY**

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Outdoor roof curb or slab mounted, electronically controlled heating and cooling unit utilizing semi-hermetic reciprocating type compressors for cooling duty and gas combustion or electric heaters for heating duty. Units shall discharge supply air horizontally or vertically as shown on contract drawings.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standard 360 and designed in accordance with UL Standard 1995.
- B. Unit shall be designed to conform to ANSI/ASHRAE 15 (latest edition) and NEC.
- C. Unit shall be tested and certified by ETL in accordance with ANSI Z21.47 Standards as a total package.
- D. Roof curb shall be NRCA approved.
- E. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation. Insulation shall contain an EPA-registered immobilized antimicrobial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM standards G21 and 22.
- F. Unit shall be manufactured in a facility registered to the ISO 9002 manufacturing quality standard

1.03 DELIVERY, STORAGE AND HANDLING

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

Part 2 — Products

2.01 EQUIPMENT

- A. Factory-assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, refrigerant charge (R-22), operating oil charge, dual refrigerant circuits, micro-processor 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.
 - 2. Unit casing shall be capable of withstanding Federal test method Standard No. 141 (Method 6061) 500-hour salt spray test.

- 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 prevent air and water leakage.
 - 4. Interior cabinet surfaces shall be sheet metal lined or insulated with flexible fire-retardant material, coated on the air side and containing an EPA-registered immobilized antimicrobial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM standards G21 and 22.
 - 5. Unit shall have a factory-installed condensate drain connection and an aluminized steel, sloped condensate drain pan to prevent standing water from accumulating.
 - 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.
 - f. Statically and dynamically balanced.
 - g. Evaporator fan shaft bearings shall have a life of 200,000 hours at design operating conditions in accordance with ANSI B3.15.
 - 2. Condenser Fans:
 - a. Direct-driven propeller type only, with corrosion-resistant blades riveted to corrosion-resistant steel supports
 - b. Discharge air vertically upward and protected by PVC coated steel wire safety guards.
 - c. Statically and dynamically balanced.
- D. Compressors:
- 1. Reciprocating, semi-hermetic type only and shall be located for easy servicing.
 - 2. Equipped with suction-cutoff type unloader(s).
 - 3. Mounted on spring vibration isolators with an isolation efficiency of no less than 95%.
 - 4. Each equipped with an automatically reversible oil pump, operating oil charge, insert-type crankcase heater to prevent refrigerant migration to the compressor, and suction and discharge service valves.

- 5 Maximum operating speed of 1800 rpm (30 rps).
6. Each on independent refrigerant and electrical circuits.

E. Coils:

1. Evaporator Coil:

- a. Intertwined circuited, constructed of aluminum fins mechanically bonded to seamless copper tubes.
- b. Full-face active type during full load and part load conditions.
- c. Coils shall be leak tested at 150 psig and pressure tested at 450 psig.

2. Condenser Coil:

- a. Constructed of aluminum fins mechanically bonded to seamless copper tubes.
- b. Air-cooled condenser coils shall be leak tested at 150 psig and pressure tested at 450 psig.

3. All coils shall be same manufacturer as unit

F. Heating Section:

Electric Heat:

Electric resistance heaters shall be factory-installed, open wire, nichrome element type, insulated with ceramic bushings, and include operating and safety controls.

Gas Heat:

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.
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 and dynamically balanced
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. Liquid line service valve
2. Solid core filter drier.
3. Thermostatic expansion valve.
4. Fusible plug.

H. Filter Section:

Filter section shall consist of 2-in. thick, disposable fiberglass filters of commercially available sizes

I. Controls, Safeties and Diagnostics:

1. Controls:

- a. Control shall be accomplished through the use of a factory-installed, microprocessor based control system and associated electronic and electrical hardware. Control system shall determine control sequences through monitoring the following operational variables:
 - 1) Evaporator leaving-air temperature.
 - 2) Evaporator entering-air temperature.
 - 3) Economizer position
 - 4) Minimum economizer set point.
 - 5) Morning warm-up set point.
 - 6) Outdoor-air temperature
- b. Controls shall be capable of performing the following functions:
 - 1) Capacity control based on discharge air temperature and compensated by rate of change of return air temperature. Capacity control shall be accomplished through the use of an unloading device and compressor staging.
 - 2) Perform a quick test to check the status of all input and output signals to the control system.
 - 3) Control of integrated economizer operation.
 - 4) Capable of single-step demand limit control.
 - 5) Condenser fan cycling to maintain correct head pressure.
 - 6) Morning warm-up.
 - 7) Remote monitoring and set point adjustments.
 - 8) In the event of a power failure, unit control system shall sequence the unit to restart beginning with the first stage of cooling or heating.
 - 9) Nighttime free cooling.
 - 10) Control boards shall be equipped with flashing LED(s) for diagnostics.
 - 11) With gas heat, upon flame failure a new ignition sequence must start (rather than locking out heat)
 - 12) Minimum heat on-time of 1 minute.

2. Safeties:

Unit components shall be equipped with the following protections:

- a. Compressors:
 - 1) Overtemperature (shuts down individual compressor).
 - 2) Overcurrent (shuts down individual compressor).
 - 3) Crankcase heaters
 - 4) High-pressure switch (shuts down individual compressor, automatic reset type).

Guide specifications — 48/50EK,EY variable air volume units (cont)



- 5) Loss-of-charge switch (shuts down individual compressor, automatic reset type).
- 6) Compressor shall be prevented from re-starting for a minimum of 5 minutes after shutdown. Compressor must run for at least 10 seconds after start-up.
- b. Heating Section:
 - Gas Heat:
 - 1) High-temperature limit switch.
 - 2) Redundant dual-stage gas valve
 - 3) Flame rollout switches.
 - 4) Flame proving controls.
 - 5) Speed sensor on each induced draft fan motor
 - Electric Heat:
 - 1) Automatic reset high-temperature limit switches.
 - 2) Heat limiters (fusible links).
 - 3) Overcurrent protection short-circuit fuses.
 - 4) Branch circuit protection.
- 3. Diagnostics:
 - a. Diagnostic display via the Carrier Comfort Network (CCN) shall be capable of indicating a safety lockout condition.
 - b. Diagnostics must also be capable of displaying outputs of microprocessor controlled run test to verify operation of every thermistor, potentiometer, fan and compressor before unit is started.
- J. Operating Characteristics:
 - 1. Unit shall be capable of starting and running at 115 F ambient outdoor temperature per maximum load criteria of ARI Standard 360.
 - 2. Unit shall be capable of mechanical cooling operation down to 35 F ambient outdoor temperature.
 - 3. Provides multi-stage mechanical cooling capability and single-stage morning warm-up heating.
 - 4. Unit provided with fan time delay to prevent cold starts.
- K. Motors:
 - 1. Compressor motors shall be cooled by suction gas passing over motor windings and shall have line break thermal and current overload protection.
 - 2. Condenser-fan motors shall be totally enclosed, 3-phase type with permanently lubricated ball bearings and internal, automatic-reset thermal overload protection.
 - 3. Indoor blower motor shall be of the 3-phase ball bearing type.
 - 4. Induced-draft motor shall be of the permanently lubricated sealed bearing type with inherent automatic reset thermal overload protection.
- L. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single location.
- M. Integrated Economizer:

Consists of gear driven dampers, direct-drive motor in conjunction with microprocessor control system to provide primary cooling using outdoor air, temperature permitting, supplemented with mechanical cooling when necessary.

 - 1. Dampers shall be low leakage type, not to exceed 20 cfm per sq ft leakage at 1 in. wg pressure differential when fully closed.
 - 2. Motor shall have a spring return feature which shuts dampers upon a power interruption or unit shutdown.
 - 3. Equipped with solid-state control that sets the economizer cut-in point at an economical level.
 - 4. Capable of introducing up to 100% outdoor air.
- N Special Features:

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

 - *1. Optional Condenser coil Materials:
 - a. Unit shall be factory equipped with a condenser coil made from copper tubes and copper fins.
 - b. Unit shall be factory equipped with a condenser coil made from corrosion resistant pre-coated aluminum fins
 - *2. Roof Curb:

Formed 14-gage galvanized steel with wood nailer strip. Supports full perimeter of unit.
 - *3. Demand Limit Control:

Package shall allow external demand limit control device to limit the capacity of the unit to a preselected point which is consistent with the stages of unloading on the unit.
 - *4. 100% Modulating Power Exhaust:

Package shall include 4 double-width, double inlet direct drives, forward-curved power exhaust fans staged independently to maintain a field adjustable interior space pressure set point.

 - a. Fans shall be statically and dynamically balanced.
 - b. Exhaust hood and eliminators shall prevent objects from entering unit through the relief dampers.
 - 5. Barometric Relief Damper Package:
 - a. Package shall relieve excess internal pressure and consist of damper assembly, hoods, damper screen, seal strip, and required hardware.
 - b. Damper assembly shall close due to gravity upon unit shutoff.
 - c. Unit mounted on vertical supply/return units only; can be duct mounted on horizontal applications.

6. Modulating Heat Pressure Control:
Package shall consist of an accessory outdoor-air package and a solid-state control with condenser coil temperature sensor capable of modulating outdoor fan speed to maintain condensing temperature between 90 F and 100 F at outdoor ambient temperature down to -20 F.
7. Condenser Coil Hail Guard:
Hood with welded wire grille complete with support retainers and fasteners shall be provided for protection of condensing coil
8. LP Gas Conversion Package:
ETL and ETL, Canada approved package allows unit to be field converted for use with LP gas.
9. Electric Heat Package:
Shall be fully-assembled for installation. The 208/230-v, 460-v, and 575-v units are designed in accordance with UL standards and all units feature a single point connection.
- *10. Space Temperature Sensor:
This space temperature sensor shall determine the actual temperature in the conditioned space.
- *11. Space Temperature Sensor with Offset (T-56):
This space temperature sensor shall determine the actual temperature in the conditioned space. In addition, this accessory device shall provide a space temperature offset $\pm 5^{\circ}$ F.
- *12. Enthalpy Sensor:
 - a. For use with economizer only.
 - b. Capable of measuring temperature of outdoor air and controlling economizer cut-in point at a more economical level.
- *13. Thermostat and Subbase Assembly:
To provide staged heating and cooling in addition to automatic (or manual) changeover and fan control.
14. Indoor Air Quality (CO₂) Sensor (Electronic Expansion Board Required):
Shall have the ability to provide demand ventilation IAQ control through the economizer with an indoor air quality sensor.
The IAQ sensor shall be available in duct mount, wall mount, and wall mount with LED display of CO₂ in parts per million. The set point shall have adjustment capability.
15. Electronic Expansion Board:
Shall provide the following:
 - a. Control of modulating economizer damper to maintain indoor air quality when outdoor conditions are suitable.
 - b. Discrete inputs for fan status, filter status, field-applied status, and demand limit.
 - c. Shall perform demand limit functions based on the state of the discrete input.
 - d. An output for the external alarm light indicator.
 - e. Smoke control modes including evacuation, smoke purge, pressurization, and shutdown.
 - f. Pre-occupancy purge shall be available.
16. Roof Curb Retrofit Kit:
Shall provide adaptors to retrofit unit to an existing 48/50DJ roof curb

