



Installation, Start-Up and Service Instructions

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GENERAL

This installation instruction contains base unit installation information, including installation of thermostats and remote temperature sensors. In addition, this instruction contains start-up, control, and troubleshooting information for the constant volume (CV) units only (50ZA,ZB,ZC,ZD,ZT,ZX).

For complete information and service instructions for variable air volume (VAV) units (50ZE,ZF,ZR,ZS,ZV,ZY) and product integrated controls (PIC) units (50ZJ,ZK,ZL,ZM,ZW,ZZ), refer to the separate Controls and Troubleshooting literature also enclosed in this literature packet.

The 50ZC,ZD,ZL,ZM,ZR,ZS075-105 units are equipped with return/exhaust fan.

The 50ZT,ZV,ZW,ZX,ZY,ZZ075-105 units are equipped with standard integral economizer and high-capacity power exhaust.

NOTE: All PIC units are shipped in STANDBY mode. The accessory HSIO module must be used to change the unit to RUN mode. Refer to Remote Start section on page 104.

SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All

other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes, including ANSI (American National Standards Institute) Z223.1. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

FOR YOUR SAFETY

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

⚠ WARNING

Improper installation, adjustment, alteration, service, or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information, consult a qualified installer, service agency, or the gas supplier.

INSTALLATION

Jobsite Survey — Complete the following checks before installation.

1. Consult local building codes and the NEC (National Electrical Code) (ANSI/NFPA [National Fire Protection Association] 70) for special installation requirements.
2. Determine unit location (from project plans) or select unit location.
3. Check for possible overhead obstructions which may interfere with unit lifting or rigging.

⚠ CAUTION

Do not lift unit with forklift truck. Move unit with overhead rigging only.

Unit Placement — Inspect unit for transportation damage. File claim with transportation agency.

Provide clearance around and above unit for airflow, safety, and service access. Do not restrict top (area above condenser fans) in any way. Allow at least 6 ft (1.8 m) on all sides for rated performance, code compliance, and service.

Check unit dimensional drawings for unit arrangement and minimum performance and service clearances.

Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air.

On units equipped with power exhaust option, high velocity air is exhausted out the hood. Unit should be positioned with at least 10 ft (3 m) clearance between the exhaust hood and any obstruction. Although unit is weatherproof, guard against water from higher level runoff and overhangs.

Level by using unit frame as a reference. Physical data is shown in Tables 1A-6.

Table 1A — Physical Data (50ZA,ZB,ZE,ZF,ZJ,ZK Units)

BASE UNIT	50ZA,ZB,ZE,ZF,ZJ,ZK030		50ZA,ZB,ZE,ZF,ZJ,ZK035		
NOMINAL CAPACITY (tons)	30		35		
OPERATING WEIGHT (lb)	See Fig. 13				
COMPRESSORS	Semi-Hermetic				
Quantity...Type	2...06D		1...06D, 1...06E		
Capacity Steps (%)	17, 33, 50, 66, 83, 100		14, 28, 43, 71, 86, 100		
Number of Refrigerant Circuits	2		2		
REFRIGERANT					
Operating Charge (lb) Ckt A/Ckt B					
Standard Evaporator Coil	29.0/29.0		29.0/30.5		
Standard Evaporator With HGBP	31.0/29.0		31.0/30.5		
Alternate High-Capacity Evaporator Coil	N/A		N/A		
Alternate High-Capacity Evaporator With HGBP	N/A		N/A		
CONDENSER COILS	³ / ₈ -in. Tube Diameter				
Quantity	2		2		
Rows...Fins/in.					
Aluminum	3...15.0		3...15.0		
Copper (Optional)	3...13.7		3...13.7		
Total Face Area (sq ft)	37.5		37.5		
EVAPORATOR COILS					
Quantity			1		
Total Face Area (sq ft)			32.1		
Refrigerant Feed Device...No. per Circuit			TXV...1		
Standard Evaporator Coils	¹ / ₂ -in. Tube Diameter		¹ / ₂ -in. Tube Diameter		
Rows...Fins/in.	3...15.0		4...15.0		
Fin Type	Double Wavy		Double Wavy		
Tube Type	Cross Hatched		Cross Hatched		
Alternate, High-Capacity Evaporator Coils					
Rows...Fins/in.	N/A		N/A		
Fin Type	N/A		N/A		
Tube Type	N/A		N/A		
CONDENSER FANS	Propeller Type				
Quantity...Diameter (in.)	2...30		2...30		
Nominal Cfm	18,600		18,600		
Motor Hp...Rpm	1.0...1140		1.0...1140		
SUPPLY FAN	Centrifugal 25 x 25 in.				
Nominal Cfm	10,500		10,500		
Maximum Allowable Cfm	15,000		15,000		
Maximum Allowable Rpm	900		900		
Shaft Diameter at Pulley (in.)	1 ¹¹ / ₁₆		1 ¹¹ / ₁₆		
SUPPLY-FAN MOTOR AND DRIVE	(Any motor available on any unit)				
Motor Hp	7.5	10	15	20	25
Motor Frame Size	213T	215T	254T	256T	284T
Efficiency at Full Load (%)					
High Efficiency	88.5	89.5	91	91	91.7
Premium Efficiency*	91.7	91.7	93	93.6	93.6
Fan Pulley Pitch Diameter (in.)	13.7	13.7	13.7	13.7	13.7
Motor Pulley Pitch Diameter (in.)	3.4	4.3	4.9	5.5	6.5
Resulting Fan Rpm	438	549	626	703	830
Belts Quantity...Type					
Horizontal, Extended Plenum	2...BX60	2...5VX630	2...5VX630	2...5VX630	2...5VX650
Vertical Discharge	2...BX60	2...5VX630	2...5VX630	2...5VX630	2...5VX650
Center Distance Range (in.)					
Horizontal, Extended Plenum	17.74...14.30	17.74...14.30	17.63...14.01	17.63...14.01	16.63...12.87
Vertical Discharge	19.86...15.87	19.86...15.87	19.04...15.00	19.04...15.00	19.00...14.87
OPTIONAL POWER EXHAUST	Centrifugal, 15 x 15 in. (Any motor available on any unit)				
Quantity...Motor Hp	2...3.0		2...5.0		2...7.5
Motor Frame Size	56HZ		184T		213T
Efficiency at Full Load (%) High/Premium	81.0/88.5		87.5/89.5		88.5/91.7
Fan Pulley Pitch Diameter (in.)	6.9		6.9		6.9
Motor Pulley Pitch Diameter (in.)	3.35		4.12		5.0
Shaft Diameter at Pulley (in.)	1 ³ / ₁₆		1 ³ / ₁₆		1 ³ / ₁₆
Resulting Fan Rpm	843		1040		1264
Maximum Allowable Rpm	1300		1300		1300
Belts Quantity...No.	2...3VX670		2...3VX670		2...3VX710
FILTERS					
Standard Efficiency Throwaway (Standard)	12...20 x 25 x 2		12...20 x 25 x 2		
Quantity...Size (in.)	4...16 x 20 x 2		4...16 x 20 x 2		
Medium Efficiency (30%) Pleated (Optional)	12...20 x 25 x 2		12...20 x 25 x 2		
Quantity...Size (in.)	4...16 x 20 x 2		4...16 x 20 x 2		
High Efficiency (90%) Bag Filters with Prefilters (Optional)	6...20 x 24 x 22		6...20 x 24 x 22		
Quantity...Size (in.)	6...20 x 20 x 22		6...20 x 20 x 22		

LEGEND

HGBP — Hot Gas Bypass
TXV — Thermostatic Expansion Valve

*Not available on 575-v units.

Table 1A — Physical Data (50ZA,ZB,ZE,ZF,ZJ,ZK Units) (cont)

BASE UNIT	50ZA,ZB,ZE,ZF,ZJ,ZK040			50ZA,ZB,ZE,ZF,ZJ,ZK050		
NOMINAL CAPACITY (tons)	40			50		
OPERATING WEIGHT (lb)	See Fig. 13					
COMPRESSORS	Semi-Hermetic					
Quantity...Type	2...06E			2...06E		
Capacity Steps (%)	25, 50, 75, 100			18, 37, 56, 63, 81, 100		
Number of Refrigerant Circuits	2			2		
REFRIGERANT						
Operating Charge (lb) Ckt A/Ckt B						
Standard Evaporator Coil	40.0/40.0			41.5/39.0		
Standard Evaporator With HGBP	42.0/40.0			43.5/39.0		
Alternate High-Capacity Evaporator Coil	50.0/51.0			48.0/47.5		
Alternate High-Capacity Evaporator With HGBP	52.0/51.0			50.0/47.5		
CONDENSER COILS	³ / ₈ -in. Tube Diameter					
Quantity	2			2		
Rows...Fins/in.						
Aluminum	3...15.0			3...15.0		
Copper (Optional)	3...13.7			3...13.7		
Total Face Area (sq ft)	50.0			50.0		
EVAPORATOR COILS						
Quantity	2			2		
Total Face Area (sq ft)	45.5			45.5		
Refrigerant Feed Device...No. per Circuit	TXV...2			TXV...2		
Standard Evaporator Coils	¹ / ₂ -in. Tube Diameter			¹ / ₂ -in. Tube Diameter		
Rows...Fins/in.	3...15.0			4...15.0		
Fin Type	Double Wavy			Double Wavy		
Tube Type	Cross Hatched			Cross Hatched		
Alternate, High-Capacity Evaporator Coils	¹ / ₂ -in. Tube Diameter			¹ / ₂ -in. Tube Diameter		
Rows...Fins/in.	6...16			6...16		
Fin Type	Double Wavy			Double Wavy		
Tube Type	Cross Hatched			Cross Hatched		
CONDENSER FANS	Propeller Type					
Quantity...Diameter (in.)	3...30			3...30		
Nominal Cfm	26,000			26,000		
Motor Hp...Rpm	1.0...1140			1.0...1140		
SUPPLY FAN	Centrifugal 25 x 25 in.					
Nominal Cfm	14,000			14,000		
Maximum Allowable Cfm	20,000			20,000		
Maximum Allowable Rpm	900			900		
Shaft Diameter at Pulley (in.)	1 ¹¹ / ₁₆			1 ¹¹ / ₁₆		
SUPPLY-FAN MOTOR AND DRIVE	(Any motor available on any unit)					
Motor Hp	7.5	10	15	20	25	30
Motor Frame Size	213T	215T	254T	256T	284T	286T
Efficiency at Full Load (%)						
High Efficiency	88.5	89.5	91	91	91.7	92.4
Premium Efficiency*	91.7	91.7	93	93.6	93.6	93.6
Fan Pulley Pitch Diameter (in.)	13.7	13.7	13.7	13.7	13.7	12.5
Motor Pulley Pitch Diameter (in.)	3.4	4.3	4.9	5.5	6.5	6.5
Resulting Fan Rpm	438	549	626	703	830	910
Belts Quantity...Type						
Horizontal, Extended Plenum	2...BX60	2...5VX630	2...5VX630	2...5VX630	2...5VX650	3...5VX630
Vertical Discharge	2...BX60	2...5VX630	2...5VX630	2...5VX630	2...5VX650	3...5VX630
Center Distance Range (in.)						
Horizontal, Extended Plenum	17.74...14.30	17.74...14.30	17.63...14.01	17.63...14.01	16.63...12.87	16.63...12.87
Vertical Discharge	19.86...15.87	19.86...15.87	19.04...15.00	19.04...15.00	19.00...14.87	19.00...14.87
OPTIONAL POWER EXHAUST	Centrifugal, 15 x 15 in. (Any motor available on any unit)					
Quantity...Motor Hp	2...3.0		2...5.0		2...7.5	
Motor Frame Size	56HZ		184T		213T	
Efficiency at Full Load (%) High/Premium	81.0/88.5		87.5/89.5		88.5/91.7	
Fan Pulley Pitch Diameter (in.)	6.9		6.9		6.9	
Motor Pulley Pitch Diameter (in.)	3.35		4.12		5.0	
Shaft Diameter at Pulley (in.)	1 ³ / ₁₆		1 ³ / ₁₆		1 ³ / ₁₆	
Resulting Fan Rpm	843		1040		1264	
Maximum Allowable Rpm	1300		1300		1300	
Belts Quantity...No.	2...3VX670		2...3VX670		2...3VX710	
FILTERS						
Standard Efficiency Throwaway (Standard)	12...20 x 25 x 2			12...20 x 25 x 2		
Quantity...Size (in.)	4...16 x 20 x 2			4...16 x 20 x 2		
Medium Efficiency (30%) Pleated (Optional)	12...20 x 25 x 2			12...20 x 25 x 2		
Quantity...Size (in.)	4...16 x 20 x 2			4...16 x 20 x 2		
High Efficiency (90%) Bag Filters with Prefilters (Optional)	6...20 x 24 x 22			6...20 x 24 x 22		
Quantity...Size (in.)	6...20 x 20 x 22			6...20 x 20 x 22		

LEGEND

*Not available on 575-v units.

HGBP — Hot Gas Bypass
TXV — Thermostatic Expansion Valve

Table 1A — Physical Data (50ZA,ZB,ZE,ZF,ZJ,ZK Units) (cont)

BASE UNIT	50ZA,ZB,ZE,ZF,ZJ,ZK055		50ZA,ZB,ZE,ZF,ZJ,ZK060		50ZA,ZB,ZE,ZF,ZJ,ZK070
NOMINAL CAPACITY (tons)	55		60		70
OPERATING WEIGHT (lb)	See Fig. 13				
COMPRESSORS	Semi-Hermetic				
Quantity...Type	2...06E		2...06E		2...06E
Capacity Steps (%)	20, 40, 60, 80, 100		17,3 3, 50, 66, 83, 100		14, 28, 43, 71, 85, 100
Number of Refrigerant Circuits	2		2		2
REFRIGERANT					
Operating Charge (lb) Ckt A/Ckt B					
Standard Evaporator Coil	59.0/44.5		61.0/61.0		70.5/64.5
Standard Evaporator With HGBP	62.0/44.5		64.0/61.0		73.5/64.5
Alternate High-Capacity Evaporator Coil	72.0/58.0		68.5/68.5		76.5/74.0
Alternate High-Capacity Evaporator With HGBP	75.0/58.0		71.5/68.5		79.5/74.0
CONDENSER COILS	3/8-in. Tube Diameter				
Quantity	4		4		4
Rows...Fins/in.					
Aluminum	2...17.0, 3...17.0		3...17.0		3...17.0
Copper (Optional)	2...15.7, 3...15.7		3...15.7		3...15.7
Total Face Area (sq ft)	72.4		72.4		108.4
EVAPORATOR COILS					
Quantity			2		
Total Face Area (sq ft)			61.5		
Refrigerant Feed Device...No. per Circuit			TXV...2		
Standard Evaporator Coils	1/2-in. Tube Diameter		1/2-in. Tube Diameter		1/2-in. Tube Diameter
Rows...Fins/in.	3...17.0		4...17.0		4...17.0
Fin Type	Double Wavy		Double Wavy		Double Wavy
Tube Type	Smooth		Smooth		Smooth
Alternate, High-Capacity Evaporator Coils	1/2-in. Tube Diameter		1/2-in. Tube Diameter		1/2-in. Tube Diameter
Rows...Fins/in.	6...16		6...16		6...16
Fin Type	Double Wavy		Double Wavy		Double Wavy
Tube Type	Cross Hatched		Cross Hatched		Cross Hatched
CONDENSER FANS	Propeller Type				
Quantity...Diameter (in.)	4...30		4...30		5...30
Nominal Cfm	40,000		40,000		50,000
Motor Hp...Rpm	1.0...1140		1.0...1140		1.0...1140
SUPPLY FAN	Centrifugal 30 x 27 in.				
Nominal Cfm	17,500		21,000		24,500
Maximum Allowable Cfm	25,000		30,000		30,000
Maximum Allowable Rpm	750		750		750
Shaft Diameter at Pulley (in.)	1 11/16		1 11/16		1 11/16
SUPPLY-FAN MOTOR AND DRIVE	(Any motor available on any unit)				
Motor Hp	15.0	20.0	25.0	30.0	40.0
Motor Frame Size	254T	256T	284T	286T	S324T
Efficiency at Full Load (%)					
High Efficiency	91.0	91.0	91.7	92.4	93
Premium Efficiency*	93.0	93.6	93.6	93.6	94.5
Fan Pulley Pitch Diameter (in.)	13.7	13.7	13.7	15.5	16.1
Motor Pulley Pitch Diameter (in.)	4.5	5.1	5.5	5.9	6.7
Resulting Fan Rpm	575	651	703	711	740
Belts Quantity...Type					
Horizontal Discharge and Extended Plenum Units	2...5VX1230	2...5VX1230	2...5VX1230	2...5VX1230	2...5VX1250
Vertical Discharge Units	2...5VX1120	2...5VX1150	2...5VX1150	2...5VX1180	2...5VX1180
Center Distance Range (in.)					
Horizontal Discharge and Extended Plenum Units	48.25...44.00	48.25...44.00	48.50...44.25	48.50...44.25	48.25...44.00
Vertical Discharge Units	44.25...39.75	44.25...39.75	44.00...40.00	44.00...40.00	43.75...39.75
OPTIONAL POWER EXHAUST	Centrifugal, 15 x 15 in. (Any motor available on any unit)				
Quantity...Motor Hp	2...5.0		2...7.5		2...10.0
Motor Frame Size	184T		213T		215T
Efficiency at Full Load (%) High/Premium	87.5/89.5		88.5/91.7		89.5/91.7
Fan Pulley Pitch Diameter (in.)	10.6		10.6		10.6
Motor Pulley Pitch Diameter (in.)	4.5		5.0		5.6
Shaft Diameter at Pulley (in.)	1 7/16		1 7/16		1 7/16
Resulting Fan Rpm	740		820		920
Maximum Allowable Rpm	925		925		925
FILTERS					
Standard Efficiency Throwaway (Standard)	15...20 x 25 x 2		15...20 x 25 x 2		15...20 x 25 x 2
Quantity...Size (in.)	5...16 x 20 x 2		5...16 x 20 x 2		5...16 x 20 x 2
Medium Efficiency (30%) Pleated (Optional)	15...20 x 25 x 2		15...20 x 25 x 2		15...20 x 25 x 2
Quantity...Size (in.)	5...16 x 20 x 2		5...16 x 20 x 2		5...16 x 20 x 2
High Efficiency (90%) Bag Filters with Prefilters (Optional)	6...20 x 24 x 22		6...20 x 24 x 22		6...20 x 24 x 22
Quantity...Size (in.)	6...24 x 24 x 22		6...24 x 24 x 22		6...24 x 24x 22

LEGEND

HGBP — Hot Gas Bypass
TXV — Thermostatic Expansion Valve

*Not available on 575-v units.

Table 1A — Physical Data (50ZA,ZB,ZE,ZF,ZJ,ZK Units) (cont)

BASE UNIT	50ZA,ZB,ZE,ZF,ZJ,ZK075	50ZA,ZB,ZE,ZF,ZJ,ZK090	50ZA,ZB,ZE,ZF,ZJ,ZK105
NOMINAL CAPACITY (tons)	75	90	105
OPERATING WEIGHT (lb)			
Base Unit without Economizer	9,870	10,080	10,810
With Economizer	10,400	10,610	11,340
COMPRESSOR		Semi-Hermetic	
Number	2	2	4
Circuit (No. Cyl)	A (6) B (6)	A (6) B (6)	A1 (6), A2 (4) B1 (6), B2 (4)
Model 06E	-275 -299	-299 -299	-275, -250 -275, -250
Oil Charge (pints)	19 19	19 19	19, 14 19, 14
Capacity Steps (%)			
ZA,ZB	43,100	50,100	50,100
ZE,ZF	14,29,43,71,86,100	17,33,50,67,83,100	20,30,50,60,70,80,90,100
ZJ,ZK	19,38,57,71,86,100	17,33,50,67,83,100	20,30,40,50,60,60,70,80,80,90,100
Number of Refrigerant Circuits	2	2	2
REFRIGERANT			
Operating Charge (lb) Ckt A/Ckt B			
Standard Evaporator Coil	70.5/64.5	64.0/64.0	68.0/68.0
Standard Evaporator With HGBP	73.5/64.5	67.0/64.0	71.0/68.0
Alternate High-Capacity Evaporator Coil	76.5/74.0	76.0/76.0	79.5/79.5
Alternate High-Capacity Evaporator With HGBP	79.5/74.0	79.0/76.0	82.5/79.5
CONDENSER COILS		³ / ₈ in. Tube Diameter	
Quantity	4	4	4
Rows...Fins/in.			
Aluminum	3...17.0	3...17.0	3...17.0
Copper (Optional)	3...15.7	3...15.7	3...15.7
Fin Type	Double Wavy	Lanced, Sine-wave	Lanced, Sine-wave
Tube Type	Smooth	Cross-Hatched	Cross-Hatched
Total Face Area (sq ft)	108.4	108.4	108.4
EVAPORATOR COILS		2 61.5 TXV...2	
Quantity			
Total Face Area (sq ft)			
Refrigerant Feed Device...No. per Circuit			
Standard Evaporator Coils	¹ / ₂ -in. Tube Diameter	³ / ₈ -in. Tube Diameter	³ / ₈ -in. Tube Diameter
Rows...Fins/in.	4...17.0	4...17.0	4...17.0
Fin Type	Double Wavy	Lanced, Sine Wave	Lanced, Sine Wave
Tube Type	Smooth	Cross Hatched	Cross Hatched
Alternate High-Capacity Evaporator Coils	¹ / ₂ -in. Tube Diameter	¹ / ₂ -in. Tube Diameter	¹ / ₂ -in. Tube Diameter
Rows...Fins/in.	6...16	6...16	6...16
Fin Type	Double Wavy	Double Wavy	Double Wavy
Tube Type	Cross Hatched	Cross Hatched	Cross Hatched
CONDENSER FAN		Propeller Type	
Quantity...Diameter (in.)	5...30	6...30	6...30
Nominal Airflow (Cfm)	50,000	60,000	60,000
Motor Hp (ea)...rpm	1.0...1140	1.0...1140	1.0...1140
STANDARD SUPPLY FAN		Centrifugal 36 x 30 in., Forward Curved	
Nominal Airflow (Cfm)	24,500	29,750	35,000
Maximum Allowable Airflow (Cfm)	30,000	34,000	40,000
Maximum Allowable Wheel Speed (Rpm)	680	680	680
Shaft Diameter at Pulley (in.)	1 ¹¹ / ₁₆	1 ¹¹ / ₁₆	1 ¹¹ / ₁₆
STANDARD SUPPLY-FAN MOTOR AND DRIVE		(Any motor available on any unit)	
Motor Hp	30	40	50
Motor Frame Size	S286T	S324T	S36T
Efficiency at Full Load (%)			
High Efficiency	92.4	93.0	93.0
Premium Efficiency*	93.6	94.5	94.5
Fan Pulley Pitch Diameter (in.)	18.5	18.5	18.5
Motor Pulley Pitch Diameter (in.)	5.3	5.7	6.5
Resulting Fan Speed (Rpm)	501	539	615
Belts — Quantity...Model No.	3...5VX1320	4...5VX1320	4...5VX1320
Center Distance Range (in.)	47.88...45.01	47.64...44.76	47.42...44.52
ALTERNATE SUPPLY FAN		Airfoil	
Nominal Airflow (cfm)	24,500	29,750	35,000
Maximum Allowable Airflow (cfm)	30,000	34,000	40,000
Maximum Allowable Wheel Speed (rpm)	1846	1846	1846
Shaft Diameter at Pulley (in.)	2 ¹¹ / ₁₆	2 ¹¹ / ₁₆	2 ¹¹ / ₁₆
ALTERNATE SUPPLY FAN MOTOR AND DRIVE		(Any motor available on any unit)	
Motor Hp	30	40	50
Motor Frame Size	S286T	S324T	S364T
Efficiency at Full Load (%)			
High Efficiency	92.4	93.0	93.6
Premium Efficiency*	93.6	94.5	94.5
Fan Pulley Pitch Diameter (in.)	9.7	10.2	8.9
Motor Pulley Pitch Diameter (in.)	7.5	8.7	8.1
Resulting Fan Rpm	1353	1493	1593
Belts Quantity...Type	2...5VX1150	2...5VX1180	3...5VX1150
Center Distance Range (in.)	42.96...45.82	42.69...45.57	42.45...45.35
OPTIONAL POWER EXHAUST		Centrifugal, 18 x 15 in. (Any motor available on any unit)	
Quantity...Motor Hp	2...5.0	2...7.5	2...10.0
Motor Frame Size	184T	213T	215T
Efficiency at Full Load (%)			
High Efficiency	87.5	88.5	89.5
Premium Efficiency*	89.5	91.7	91.7
Fan Pulley Pitch Diameter (in.)	10.6	10.6	10.6
Motor Pulley Pitch Diameter (in.)	4.5	5.0	5.6
Shaft Diameter at Pulley (in.)	1 ⁷ / ₁₆	1 ⁷ / ₁₆	1 ⁷ / ₁₆
Resulting Fan Rpm	740	820	920
Maximum Allowable Rpm	925	925	925
FILTERS			
Medium Efficiency (30%) Pleated (Standard)	15...20 x 25 x 2	18...20 x 25 x 2	18...20 x 25 x 2
Qty...Size (in.)	5...16 x 20 x 2	6...16 x 20 x 2	6...16 x 20 x 2
High Efficiency (65%) Pleated (Optional)	15...20 x 25 x 2	18...20 x 25 x 2	18...20 x 25 x 2
Qty...Size (in.)	5...16 x 20 x 2	6...16 x 20 x 2	6...16 x 20 x 2
OUTSIDE AIR SCREENS			
Standard (25% Hoods) (Qty) Size (in.)	(4) 25 x 16 x 1	(4) 25 x 16 x 1	(4) 25 x 16 x 1
	(2) 20 x 16 x 1	(2) 20 x 16 x 1	(2) 20 x 16 x 1
Optional Economizer (Qty) Size (in.)	(12) 25 x 16 x 1	(12) 25 x 16 x 1	(12) 25 x 16 x 1
	(2) 20 x 16 x 1	(2) 20 x 16 x 1	(2) 20 x 16 x 1

LEGEND

HGBP — Hot Gas Bypass
TXV — Thermostatic Expansion Valve

*Not available on 575-v units.

Table 1B — Physical Data (50ZC,ZD,ZL,ZM,ZR,ZS Units)

BASE UNIT	50ZC,ZD,ZL,ZM,ZR,ZS075		50ZC,ZD,ZL,ZM,ZR,ZS090		50ZC,ZD,ZL,ZM,ZR,ZS105	
NOMINAL CAPACITY (tons)	75		90		105	
OPERATING WEIGHT (lb)						
Base Unit without Economizer	11,340		11,550		12,280	
With Economizer	11,870		12,080		12,810	
COMPRESSOR			Semi-Hermetic			
Number	2		2		4	
Circuit (No. Cyl)	A (6)	B (6)	A (6)	B (6)	A1 (6), A2 (4)	B1 (6), B2 (4)
Model 06E	-275	-299	-299	-299	-275, -250	-275, -250
Oil Charge (pints)	19	19	19	19	19, 14	19, 14
Capacity Steps (%)						
ZC,ZD	43,100		50,100		50,100	
ZR,ZS	14,29,43,71,86,100		17,33,50,67,83,100		20,30,50,60,70,80,90,100	
ZL,ZM	19,38,57,71,86,100		17,33,50,67,83,100		20,30,40,50,60,60,70,80,80,90,100	
Number of Refrigerant Circuits	2		2		2	
REFRIGERANT						
Operating Charge (lb) Ckt A/Ckt B						
Standard Evaporator Coil	70.5/64.5		64.0/64.0		68.0/68.0	
Standard Evaporator With HGBP	73.5/64.5		67.0/64.0		71.0/68.0	
Alternate High-Capacity Evaporator Coil	76.5/74.0		76.0/76.0		79.5/79.5	
Alternate High-Capacity Evaporator With HGBP	79.5/74.0		79.0/76.0		82.5/79.5	
CONDENSER COILS			³ / ₈ in. Tube Diameter			
Quantity	4		4		4	
Rows...Fins/in.						
Aluminum	3...17.0		3...17.0		3...17.0	
Copper (Optional)	3...15.7		3...15.7		3...15.7	
Fin Type	Double Wavy		Lanced, Sine-wave		Lanced, Sine-wave	
Tube Type	Smooth		Cross-Hatched		Cross-Hatched	
Total Face Area (sq ft)	108.4		108.4		108.4	
EVAPORATOR COILS						
Quantity			2			
Total Face Area (sq ft)			61.5			
Refrigerant Feed Device...No. per Circuit			TXV...2			
Standard Evaporator Coils	¹ / ₂ -in. Tube Diameter		³ / ₈ -in. Tube Diameter		³ / ₈ -in. Tube Diameter	
Rows...Fins/in.	4...17.0		4...17.0		4...17.0	
Fin Type	Double Wavy		Lanced, Sine Wave		Lanced, Sine Wave	
Tube Type	Smooth		Cross Hatched		Cross Hatched	
Alternate High-Capacity Evaporator Coils	¹ / ₂ -in. Tube Diameter		¹ / ₂ -in. Tube Diameter		¹ / ₂ -in. Tube Diameter	
Rows...Fins/in.	6...16		6...16		6...16	
Fin Type	Double Wavy		Double Wavy		Double Wavy	
Tube Type	Cross Hatched		Cross Hatched		Cross Hatched	
CONDENSER FAN			Propeller Type			
Quantity...Diameter (in.)	5...30		6...30		6...30	
Nominal Airflow (Cfm)	50,000		60,000		60,000	
Motor Hp (ea)...rpm	1.0...1140		1.0...1140		1.0...1140	
STANDARD SUPPLY FAN			Centrifugal 36 x 30 in., Forward Curved			
Nominal Airflow (Cfm)	24,500		29,750		35,000	
Maximum Allowable Airflow (Cfm)	30,000		34,000		40,000	
Maximum Allowable Wheel Speed (Rpm)	680		680		680	
Shaft Diameter at Pulley (in.)	1 ¹¹ / ₁₆		1 ¹¹ / ₁₆		1 ¹¹ / ₁₆	
STANDARD SUPPLY-FAN MOTOR AND DRIVE			(Any motor available on any unit)			
Motor Hp	30	40	50	60	75	
Motor Frame Size	S286T	S324T	S36T	S364T	365T	
Efficiency at Full Load (%)						
High Efficiency	92.4	93.0	93.0	93.6	94.1	
Premium Efficiency*	93.6	94.5	94.5	95.4	95.4	
Fan Pulley Pitch Diameter (in.)	18.5	18.5	18.5	18.5	18.5	
Motor Pulley Pitch Diameter (in.)	5.3	5.7	6.5	7.1	7.1	
Resulting Fan Speed (Rpm)	501	539	615	672	672	
Belts — Quantity...Model No.	3...5VX1320	4...5VX1320	4...5VX1320	4...5VX1320	4...5VX1320	
Center Distance Range (in.)	47.88...45.01	47.64...44.76	47.42...44.52	47.42...44.52	47.42...44.52	
ALTERNATE SUPPLY FAN			Airfoil			
Nominal Airflow (cfm)	24,500		29,750		35,000	
Maximum Allowable Airflow (cfm)	30,000		34,000		40,000	
Maximum Allowable Wheel Speed (rpm)	1846		1846		1846	
Shaft Diameter at Pulley (in.)	2 ¹¹ / ₁₆		2 ¹¹ / ₁₆		2 ¹¹ / ₁₆	
ALTERNATE SUPPLY FAN MOTOR AND DRIVE			(Any motor available on any unit)			
Motor Hp	30	40	50	60	75	
Motor Frame Size	S286T	S324T	S364T	S364T	365T	
Efficiency at Full Load (%)						
High Efficiency	92.4	930	93	93.6	94.1	
Premium Efficiency*	93.6	94.5	94.5	95.4	95.4	
Fan Pulley Pitch Diameter (in.)	9.7	10.2	8.9	8.9	10.8	
Motor Pulley Pitch Diameter (in.)	7.5	8.7	8.1	8.7	11.1	
Resulting Fan Rpm	1353	1493	1593	1711	1799	
Belts Quantity...Type	2...5VX1150	2...5VX1180	3...5VX1150	3...5VX1150	3...5VX1230	
Center Distance Range (in.)	42.96...45.82	42.69...45.57	42.69...45.57	42.45...45.35	42.45...45.35	
RETURN/EXHAUST FAN			Plenum Fan, 47.13 in. (Any motor available on any unit)			
Quantity...Motor Hp	1...20	1...25	1...30	1...40		
Motor Frame Size	256T	284T	286T	324T		
Efficiency at Full Load (%)	91/93.6	91.7/93.6	92.4/93.6	93/93.8		
Fan Pulley Pitch Diameter (in.)	8.5	9.8	8.5	8.5		
Motor Pulley Pitch Diameter (in.)	5.3	6.7	6.1	6.7		
Blower Shaft Diameter at Pulley (in.)	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆		
Resulting Fan RPM	1104	1209	1271	1396		
Maximum Allowable RPM	1447	1447	1447	1447		
FILTERS						
Medium Efficiency (30%) Pleated (Standard)	15...20 x 25 x 2		18...20 x 25 x 2		18...20 x 25 x 2	
Qty...Size (in.)	5...16 x 20 x 2		6...16 x 20 x 2		6...16 x 20 x 2	
High Efficiency (65%) Pleated (Optional)	15...20 x 25 x 2		18...20 x 25 x 2		18...20 x 25 x 2	
Qty...Size (in.)	5...16 x 20 x 2		6...16 x 20 x 2		6...16 x 20 x 2	
OUTSIDE AIR SCREENS						
Standard (25% Hoods) (Qty) Size (in.)	(4) 25 x 16 x 1		(4) 25 x 16 x 1		(4) 25 x 16 x 1	
	(2) 20 x 16 x 1		(2) 20 x 16 x 1		(2) 20 x 16 x 1	
Optional Economizer (Qty) Size (in.)	(12) 25 x 16 x 1		(12) 25 x 16 x 1		(12) 25 x 16 x 1	
	(2) 20 x 16 x 1		(2) 20 x 16 x 1		(2) 20 x 16 x 1	

LEGEND

HGBP — Hot Gas Bypass
TXV — Thermostatic Expansion Valve

*Not available on 575-v units.

Table 1C — Physical Data (50ZT,ZV,ZW,ZX,ZY,ZZ Units)

BASE UNIT	50ZT,ZV,ZW,ZX,ZY,ZZ075	50ZT,ZV,ZW,ZX,ZY,ZZ090	50ZT,ZV,ZW,ZX,ZY,ZZ105
NOMINAL CAPACITY (tons)	75	90	105
OPERATING WEIGHT (lb) Base Unit without Economizer	12,805	13,015	13,745
COMPRESSOR	Semi-Hermetic		
Number	2	2	4
Circuit (No. Cyl)	A (6) B (6)	A (6) B (6)	A1 (6), A2 (4) B1 (6), B2 (4)
Model 06E	-275 -299	-299 -299	-275, -250 -275, -250
Oil Charge (pints)	19	19	19, 14
Capacity Steps (%)	43,100	50,100	50,100
ZT,ZX	14,29,43,71,86,100	17,33,50,67,83,100	20,30,50,60,70,80,90,100
ZV,ZY	19,38,57,71,86,100	17,33,50,67,83,100	20,30,40,50,60,60,70,80,80,90,100
ZW,ZZ	2	2	2
Number of Refrigerant Circuits			
REFRIGERANT			
Operating Charge (lb) Ckt A/Ckt B			
Standard Evaporator Coil	70.5/64.5	64.0/64.0	68.0/68.0
Standard Evaporator With HGBP	73.5/64.5	67.0/64.0	71.0/68.0
Alternate High-Capacity Evaporator Coil	76.5/74.0	76.0/76.0	79.5/79.5
Alternate High-Capacity Evaporator With HGBP	79.5/74.0	79.0/76.0	82.5/79.5
CONDENSER COILS		³ / ₈ in. Tube Diameter	
Quantity	4	4	4
Rows...Fins/in.			
Aluminum	3...17.0	3...17.0	3...17.0
Copper (Optional)	3...15.7	3...15.7	3...15.7
Fin Type	Double Wavy	Lanced, Sine-wave	Lanced, Sine-wave
Tube Type	Smooth	Cross-Hatched	Cross-Hatched
Total Face Area (sq ft)	108.4	108.4	108.4
EVAPORATOR COILS		2	
Quantity		61.5	
Total Face Area (sq ft)		TXV...2	
Refrigerant Feed Device...No. per Circuit			
Standard Evaporator Coils			
Rows...Fins/in.	¹ / ₂ -in. Tube Diameter	³ / ₈ -in. Tube Diameter	³ / ₈ -in. Tube Diameter
Fin Type	4...17.0	4...17.0	4...17.0
Tube Type	Double Wavy	Lanced, Sine Wave	Lanced, Sine Wave
Alternate High-Capacity Evaporator Coils		Cross Hatched	Cross Hatched
Rows...Fins/in.	¹ / ₂ -in. Tube Diameter	¹ / ₂ -in. Tube Diameter	¹ / ₂ -in. Tube Diameter
Fin Type	6...16	6...16	6...16
Tube Type	Double Wavy	Double Wavy	Double Wavy
	Cross Hatched	Cross Hatched	Cross Hatched
CONDENSER FAN		Propeller Type	
Quantity...Diameter (in.)	5...30	6...30	6...30
Nominal Airflow (Cfm)	50,000	60,000	60,000
Motor Hp (ea)...rpm	1.0...1140	1.0...1140	1.0...1140
STANDARD SUPPLY FAN		Centrifugal 36 x 30 in., Forward Curved	
Nominal Airflow (Cfm)	24,500	29,750	35,000
Maximum Allowable Airflow (Cfm)	30,000	34,000	40,000
Maximum Allowable Wheel Speed (Rpm)	680	680	680
Shaft Diameter at Pulley (in.)	1 ¹¹ / ₁₆	1 ¹¹ / ₁₆	1 ¹¹ / ₁₆
STANDARD SUPPLY-FAN MOTOR AND DRIVE		(Any motor available on any unit)	
Motor Hp	30	40	50
Motor Frame Size	S286T	S324T	S36T
Efficiency at Full Load (%)			
High Efficiency	92.4	93.0	93.0
Premium Efficiency*	93.6	94.5	94.5
Fan Pulley Pitch Diameter (in.)	18.5	18.5	18.5
Motor Pulley Pitch Diameter (in.)	5.3	5.7	6.5
Resulting Fan Speed (Rpm)	501	539	615
Belts — Quantity...Type	3...5VX	4...5VX	4...5VX
Center Distance Range (in.)	47.88...45.01	47.64...44.76	47.42...44.52
ALTERNATE SUPPLY FAN		Airfoil	
Nominal Airflow (cfm)	24,500	29,750	35,000
Maximum Allowable Airflow (cfm)	30,000	34,000	40,000
Maximum Allowable Wheel Speed (rpm)	1846	1846	1846
Shaft Diameter at Pulley (in.)	2 ¹¹ / ₁₆	2 ¹¹ / ₁₆	2 ¹¹ / ₁₆
ALTERNATE SUPPLY FAN MOTOR AND DRIVE		(Any motor available on any unit)	
Motor Hp	30	40	50
Motor Frame Size	S286T	S324T	S364T
Efficiency at Full Load (%)			
High Efficiency	92.4	930	93
Premium Efficiency*	93.6	94.5	94.5
Fan Pulley Pitch Diameter (in.)	9.7	10.2	8.9
Motor Pulley Pitch Diameter (in.)	7.5	8.7	8.1
Resulting Fan Rpm	1353	1493	1593
Belts — Quantity...Type	2...5VX1150	2...5VX1180	3...5VX1150
Center Distance Range (in.)	42.96...45.82	42.69...45.57	42.69...45.57
POWER EXHAUST		Centrifugal, 22 x 20 in., 1 ¹¹ / ₁₆ in. shaft diameter (Any motor available on any unit)	
Total Hp	20	30	40
Quantity...Motor Hp	2...10	2...15	2...20
Motor Frame Size	S215T	D254T	S256T
Efficiency at Full Load (%)			
High Efficiency	89.5	91	91
Premium Efficiency*	19.7	93	93.6
Fan Sheave Pitch Diameter (in.)	12.4	12.4	11.1
Motor Sheave Pitch Diameter (in.)	4.8	5.8	5.9
Resulting Fan Rpm	714	841	928
Maximum Allowable Rpm	1175	1175	1175
Belts — Quantity...Type	2...BX	2...BX	2...5VX
FILTERS			
Medium Efficiency (30%) Pleated (Standard)	15...20 x 25 x 2	18...20 x 25 x 2	18...20 x 25 x 2
Qty...Size (in.)	5...16 x 20 x 2	6...16 x 20 x 2	6...16 x 20 x 2
High Efficiency (65%) Pleated (Optional)	15...20 x 25 x 2	18...20 x 25 x 2	18...20 x 25 x 2
Qty...Size (in.)	5...16 x 20 x 2	6...16 x 20 x 2	6...16 x 20 x 2
OUTSIDE AIR SCREENS			
Quantity...Size (in.)		8...16 x 20 x 1	
		2...16 x 25 x 1	
		4...20 x 20 x 1	
		4...20 x 25 x 1	

LEGEND

*Not available on 575-v units.

HGBP — Hot Gas Bypass
TXV — Thermostatic Expansion Valve

Table 2 — Operating Weights of Options and Accessories

OPTION OR ACCESSORY	UNIT SIZE							
	030,035	040,050	055	060	070	075	090	105
Electric Heat*	150	150	150	150	150	200	200	200
Condenser Section Roof Curb	—	—	540	540	625	625	625	625
Economizer†	300	300	530	530	530	530	530	530
Power Exhaust†	600	600	710	710	710	710	710	710
Barometric Relief	200	200	200	200	200	200	200	200
Return/Exhaust Fan*	—	—	—	—	—	1470	1470	1470
Roof Curb								
Horizontal Units	450	480	560	560	560	605	605	605
Vertical Units	380	465	515	515	515	560	560	560
High-Efficiency Filters	20	20	20	20	20	—	—	—
Bag Filters	35	35	40	40	40	—	—	—
Hail Guard	120	150	145	145	210	210	210	210
Copper Condenser Coil Fins	180	235	235	235	420	420	420	420
Inlet Guide Vanes	95	95	115	115	115	115	115	115
Variable Frequency Drive								
7.5 hp	65	65	—	—	—	—	—	—
10 hp	65	65	—	—	—	—	—	—
15 hp	110	110	110	110	110	—	—	—
20 hp	111	111	111	111	111	111	111	111
25 hp	190	190	190	190	190	190	190	190
30 hp	190	190	190	190	190	152	152	152
40 hp	—	190	190	190	190	155	155	155
50 hp	—	—	—	—	—	263	263	263
60 hp	—	—	—	—	—	266	266	266
High-Capacity Evaporator Coil	300	300	300	300	300	300	300	300

*Vertical discharge units only.

†Includes hood.

Table 3 — Supply Fan Drive Data

HP	SHAFT DIA	SPEED (rpm)	MOTOR SHEAVE	MOTOR PITCH DIA.	WHEEL SHEAVE	WHEEL PITCH DIA.	QUANTITY ...BELT
Sizes 030-050							
7.5	1 ³ / ₈	438	2BK36	3.4	2B5V136	13.6	2...BX60
10	1 ³ / ₈	549	2B5V42	4.3	2B5V136	13.7	2...5VX630
15	1 ⁵ / ₈	626	2B5V48	4.9	2B5V136	13.7	2...5VX630
20	1 ⁵ / ₈	703	2B5V54	5.5	2B5V136	13.7	2...5VX630
25	1 ⁷ / ₈	830	2B5V64	6.5	2B5V136	13.7	2...5VX650
30*	1 ⁷ / ₈	910	3B5V64	6.5	3B5V124	12.5	3...5VX630
Sizes 055-070							
15	1 ⁵ / ₈	575	2B5V44	4.5	2B5V136	13.7	2...5VX1230† 2...5VX1120**
20	1 ⁵ / ₈	651	2B5V50	5.1	2B5V136	13.7	2...5VX1230† 2...5VX1150**
25	1 ⁷ / ₈	703	2B5V54	5.5	2B5V136	13.7	2...5VX1230† 2...5VX1150**
30	1 ⁷ / ₈	711	2B5V62	5.9	2B5V154	15.5	2...5VX1230† 2...5VX1180**
40	2 ¹ / ₈	740	3B5V66	6.7	3B5V160	16.1	3...5VX1250† 3...5VX1180**
Sizes 075-105 (Forward Curved Fan)							
30	1 ⁷ / ₈	501	3B5V52	5.33	B5V184	18.5	3...5VX1320
40	2 ¹ / ₈	539	4B5V56	5.74	B5V184	18.5	4...5VX1320
50	2 ¹ / ₈	615	4B5V64	6.54	B5V184	18.5	4...5VX1320
60	2 ³ / ₈	672	4B5V70	7.14	B5V184	18.5	4...5VX1320
Sizes 075-105 (Airfoil Fan)							
30	1 ⁷ / ₈	1353	2B5V74	7.5	2Q5V97	9.7	2...5VX1150
40	2 ¹ / ₈	1493	2B5V86	8.7	2Q5V103	10.2	2...5VX1180
50	2 ¹ / ₈	1593	3B5V80	8.1	3R5V90	8.9	3...5VX1150
60	2 ³ / ₈	1711	3B5V86	8.7	3R5V90	8.9	3...5VX1150
75	2 ³ / ₈	1799	3B5V110	11.1	3R5V109	10.8	3...5VX1230

*Sizes 040,050 only.

†Horizontal discharge units.

**Vertical discharge and extended plenum units.

NOTE: Part numbers are Browning Manufacturing Corp. reference.

Table 4 — Power Exhaust Fan Drive Data

TOTAL HP	MOTOR QTY...HP	MOTOR SHAFT DIA	FAN SPEED RPM	MOTOR SHEAVE P/N	PITCH DIA	FAN SHEAVE P/N	PITCH DIA	BELTS QTY...P/N	CENTER DIST
Sizes 030-050									
6*	2...3	7/8	843	2H3V33	3.30	2Q3V69	6.85	2...3VX670	23.7-26.3
6†	2...3	1 1/8	896	2P3V41	4.07	2Q3V80	7.95	2...3VX670	23.7-26.3
10**	2...5	1 3/8	1040	2P3V41	4.07	2Q3V69	6.85	2...3VX670	23.7-26.3
15**	2...7.5	1 3/8	1264	2P3V50	4.95	2Q3V69	6.85	2...3VX710	23.7-26.3
Sizes 055-105									
10	2...5	1 1/8	740	2P3V45	4.5	2Q3V106	10.6	2...3VX800	26.8-28.5
15	2...7.5	1 3/8	820	2P3V50	5.0	2Q3V106	10.6	2...3VX800	26.8-28.5
20	2...10	1 3/8	920	2P3V56	5.6	2Q3V106	10.6	2...3VX800	26.8-28.5

*High Efficiency Motor Option.

†Premium Efficiency Motor Option.

**Applies to both motor options.

NOTE: Part numbers are Browning Manufacturing Corp. reference.

**Table 5 — High-Capacity Power Exhaust Fan Drive Data
(50ZT,ZV,ZW,ZX,ZY,ZZ Units)**

TOTAL HP	MOTOR QTY...HP	MOTOR SHAFT DIA. (in.)	SPEED RPM	MOTOR SHEAVE		BLOWER SHEAVE		QTY...BELT	CENTER DISTANCE RANGE (in.)
				Part Number	Pitch Diameter	Part Number	Pitch Diameter		
20	2...10	1.375	714	2B5V48	4.8	2B5V124	12.4	2...BX93	32.8 to 36.7
30	2...15	1.625	841	2B5V58	5.8	2B5V124	12.4	2...BX93	32.6 to 36.5
40	2...20	1.625	928	2B5V58	5.9	2B5V110	11.1	2...5VX950	32.6 to 36.5
50	2...25	1.875	1020	2B5V64	6.5	2B5V110	11.1	2...5VX950	32.5 to 36.3
60	2...30	1.875	1094	2B5V68	6.9	2B5V110	11.1	2...5VX950	32.5 to 36.3

Table 6 — Return/Exhaust Fan Drive Data (50ZC,ZD,ZL,ZM,ZR,ZS Units)

TOTAL HP	MOTOR QTY...HP	MOTOR SHAFT DIA. (in.)	SPEED RPM	MOTOR SHEAVE		BLOWER SHEAVE		QTY...BELT	CENTER DISTANCE RANGE (in.)
				Part Number	Pitch Diameter	Part Number	Pitch Diameter		
20	1...20	1.625	1104	3B5V52	5.3	3R5V85	8.5	3...5VX1000	38.1 to 41.0
25	1...25	1.875	1209	3B5V66	6.7	3R5V97	9.8	3...5VX1060	38.9 to 41.8
30	1...30	1.875	1271	3B5V60	6.1	3R5V85	8.5	3...5VX1030	38.9 to 41.8
40	1...40	2.125	1396	3B5V66	6.7	3R5V85	8.5	3...5VX1060	39.9 to 42.8

Roof Mount — Check building codes for weight distribution requirements. Unit weight is shown in Tables 1A-2. Unit may be mounted on class A, B, or C roofing material.

ROOF CURB — Assemble and install as described in instructions shipped with the accessory. Accessory roof curb and information required to field fabricate a roof curb is shown in Fig. 1-5. Install insulation, cant strips, roofing and counter flashing as required. For unit condensate drain to function properly, curb must be level or within tolerances shown in Fig. 1-5.

STEEL BEAMS — If roof curb is not used, support unit with steel beams along its entire length and then support steel as required. As a minimum, unit must be supported across its width at each lifting lug location.

Slab Mount — Provide a level concrete slab that extends beyond unit cabinet at least 6 inches. Make a slab 8 in. thick with 4 in. above grade. Use gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow. Ensure that slab is of sufficient height to allow for condensate trap of 4-in. (030-070) or 7-in. (075-105).

Curb Gasketing

SIZE 030-050 UNITS — After ductwork has been connected to the roof curb, attach adhesive-backed gasketing on all end rails, cross rails, and duct rails. Be sure all joints and corners of

gasket are square and flush to prevent possible water leaks. Follow all applicable building codes.

SIZE 055-105 UNITS — After ductwork has been connected to the roof curb, apply gasket material (1/2-in. thick x 1 1/2 in. wide neoprene) where indicated.

Single-Thickness Gasketing (See Fig. 6 and 7 for Item Numbers) — Apply gasketing in the following places:

1. Along both side rails (1) — 2 places, full length
2. Along return air end rail (2) — 1 place
3. Around Return-Air internal duct flange (3) — 1 or 2 places
4. Around Supply-Air internal duct flanges (4) — 3 places

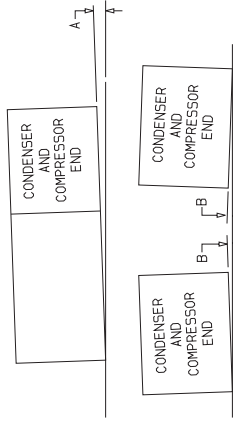
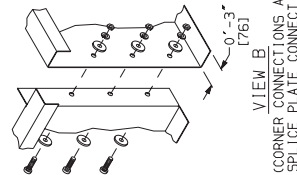
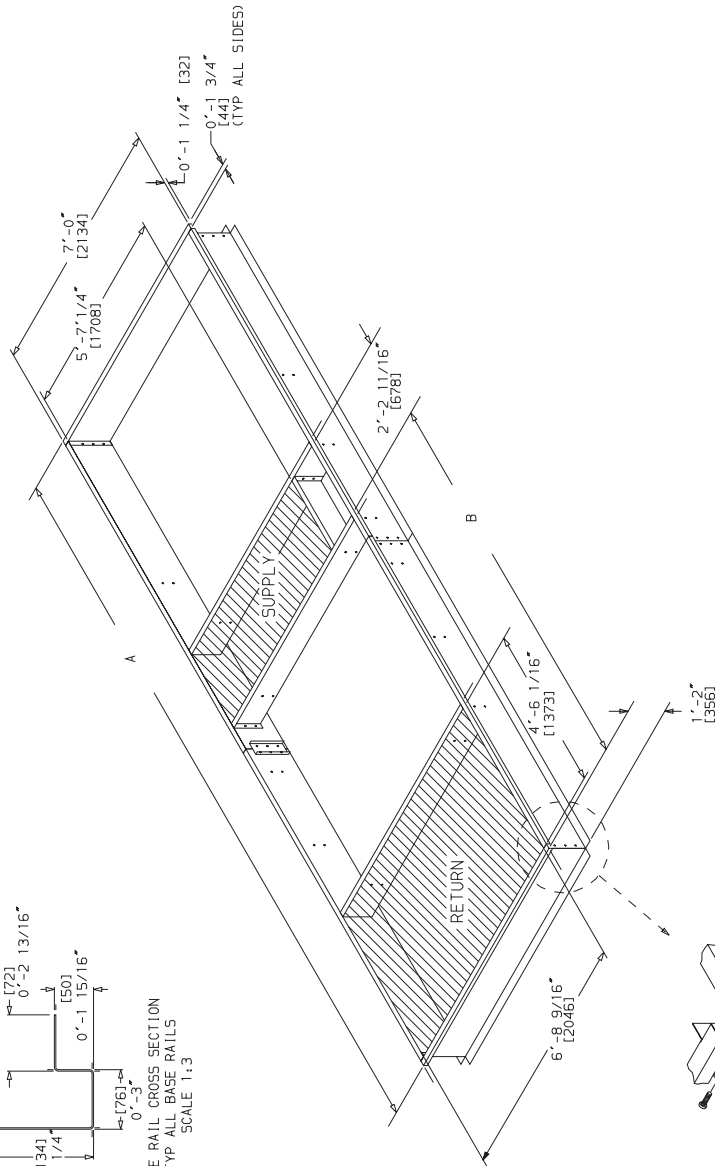
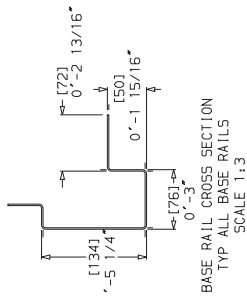
Double-Thickness Gasketing (See Fig. 6 and 7 and Detail A-A) — Locate a line 9 3/4-in. from the supply air end of the accessory curb. Apply a double-thickness of gasket material along with line per detail A-A.

NOTE: Do not apply gasket material along the outside edge of the curb (area "X"). This pan area of the curb extends out beneath the end of the unit's air handler section; applying gasket here develops a potential water trap area on top of the curb.

Condenser Section Roof Curb (See Fig. 8) — Apply single-thickness gasket along both side rails (5).

NOTES:

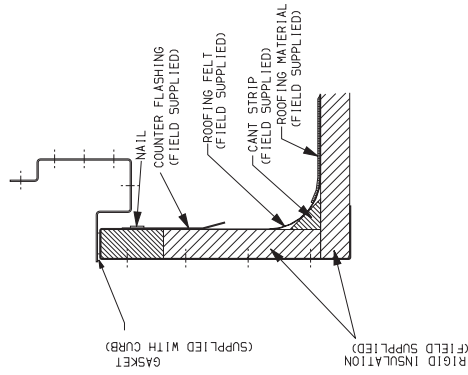
1. ROOF CURB IS SHIPPED DISASSEMBLED.
2. ROOFCURB: 14 GA. [VA03-56] STL.
3. DIMENSIONS IN [] ARE MILLIMETERS.



DIMENSIONS
(degrees and inches)

A	B
DEG.	IN.
1.0	2.0
.50	.75

UNIT LEVELING TOLERANCES
*From edge of unit to horizontal.



UNIT TYPE	DIMENSION	UNIT SIZE 030,035	UNIT SIZE 040,050
VERTICAL SUPPLY & RETURN	A B	20'-13 1/8" 10'-10 3/8"	24'-11 1/8" 13'-7 1/16"
HORIZONTAL SUPPLY & RETURN	A B	21'-8 1/16" 13'-3 1/16"	25'-8 1/16" 16'-0 5/8"
VERTICAL SUPPLY & RETURN W/EXTENDED CHASSIS	A B	22'-29 1/16" 12'-11 9/16"	26'-25 1/16" 15'-8 7/32"
HORIZONTAL SUPPLY & RETURN W/EXTENDED CHASSIS	A B	23'-9 1/16" 15'-4 7/8"	27'-9 5/16" 18'-1 7/8"

Fig. 1 — Roof Curb; Sizes 030-050

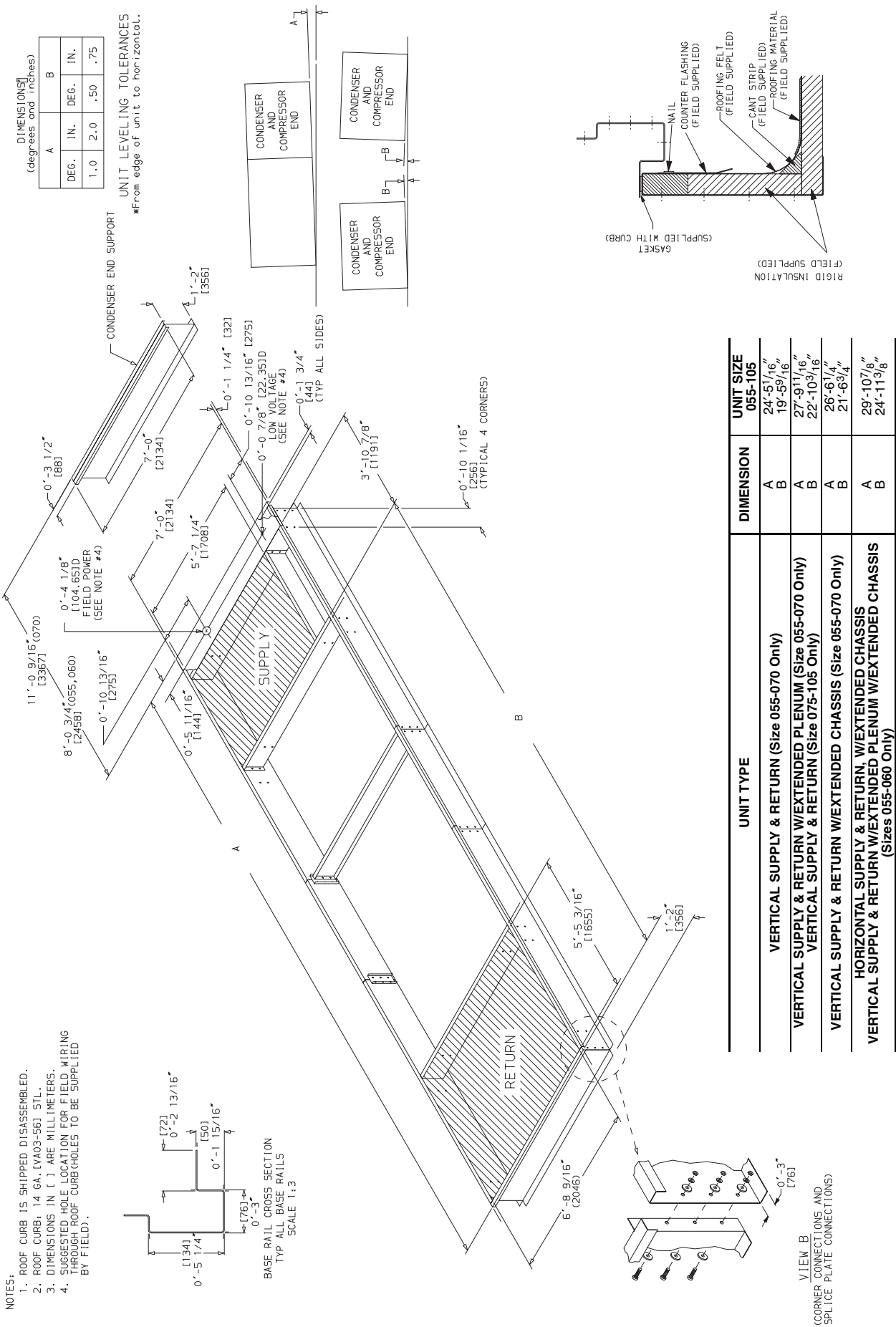


Fig. 2 — Roof Curb; Sizes 055-070 and Sizes 075-105 without High-Capacity Power Exhaust

- NOTES:
1. Roof curb is shipped disassembled.
 2. Roof curb: 14 gage (VA03-56) steel.
 3. Dimensions in [] are millimeters.

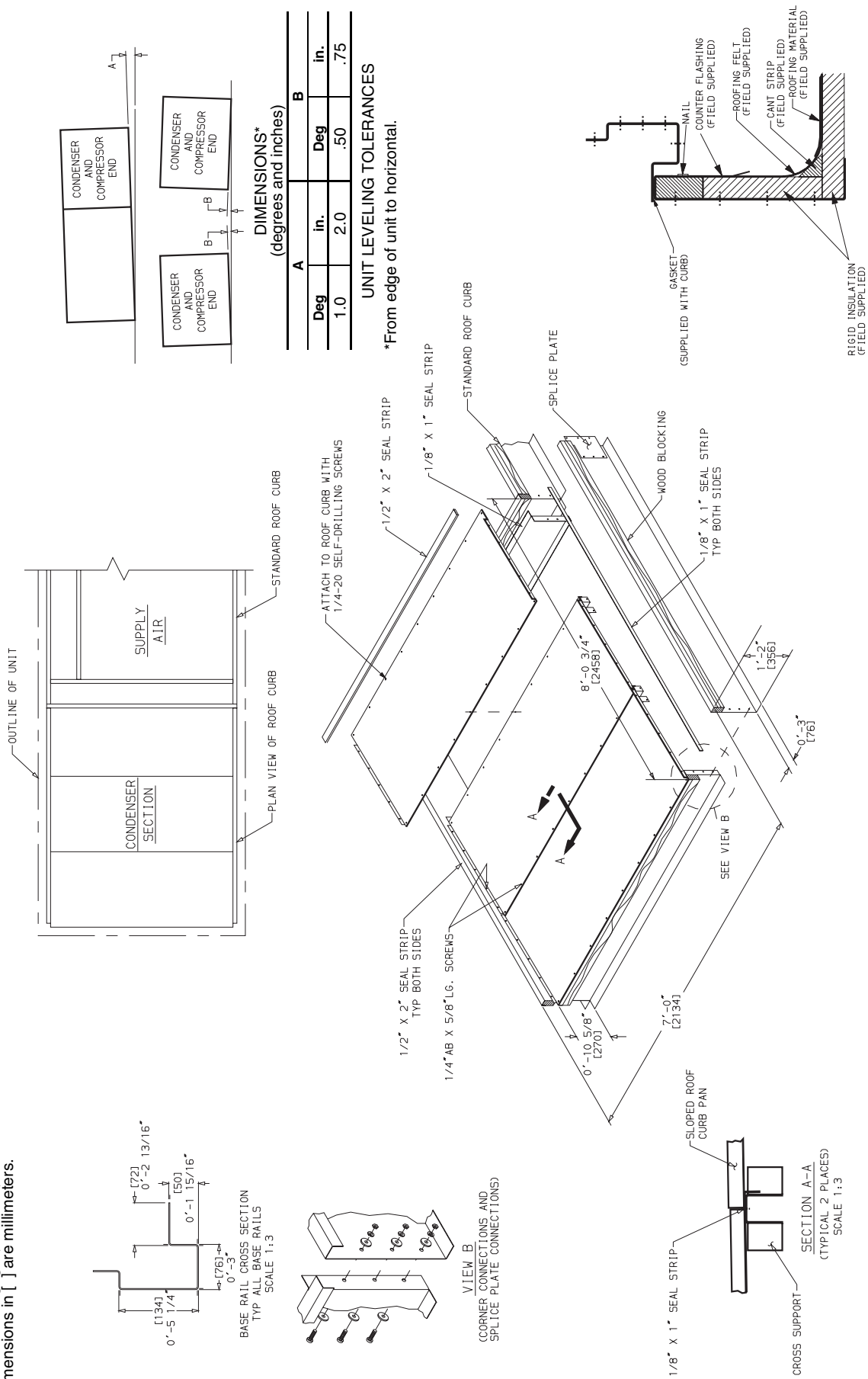


Fig. 4 — Condenser Section Roof Curb — All Units, Sizes 055 and 060

- NOTES:
1. Roof curb is shipped disassembled.
 2. Dimensions in [] are millimeters.
 3. Roof curb: 14 gage (VA03-56) steel.
Roof curb pans, 16 gage (VA03-56) steel.

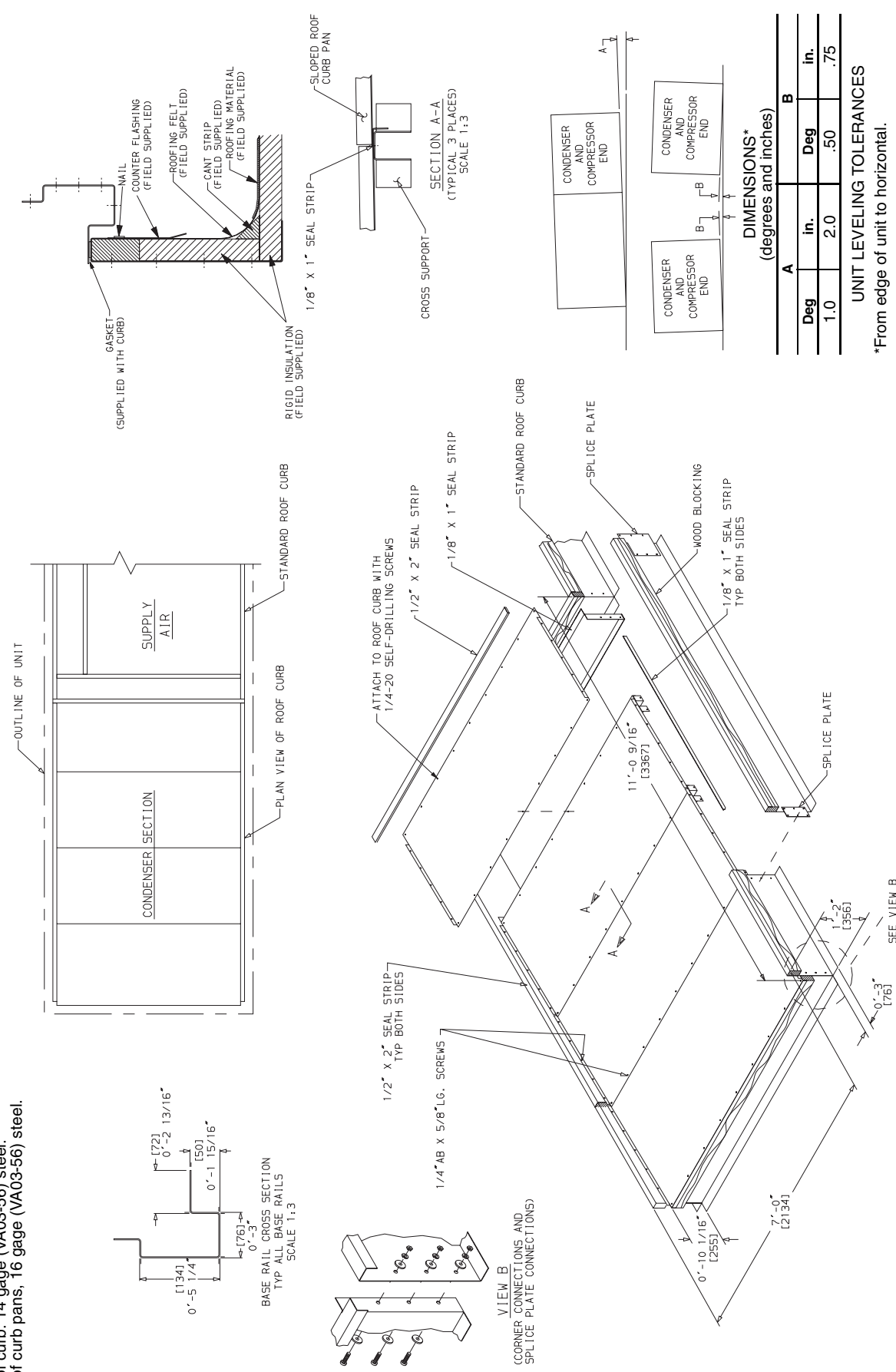


Fig. 5 — Condenser Section Roof Curb — All Units, Sizes 070-105

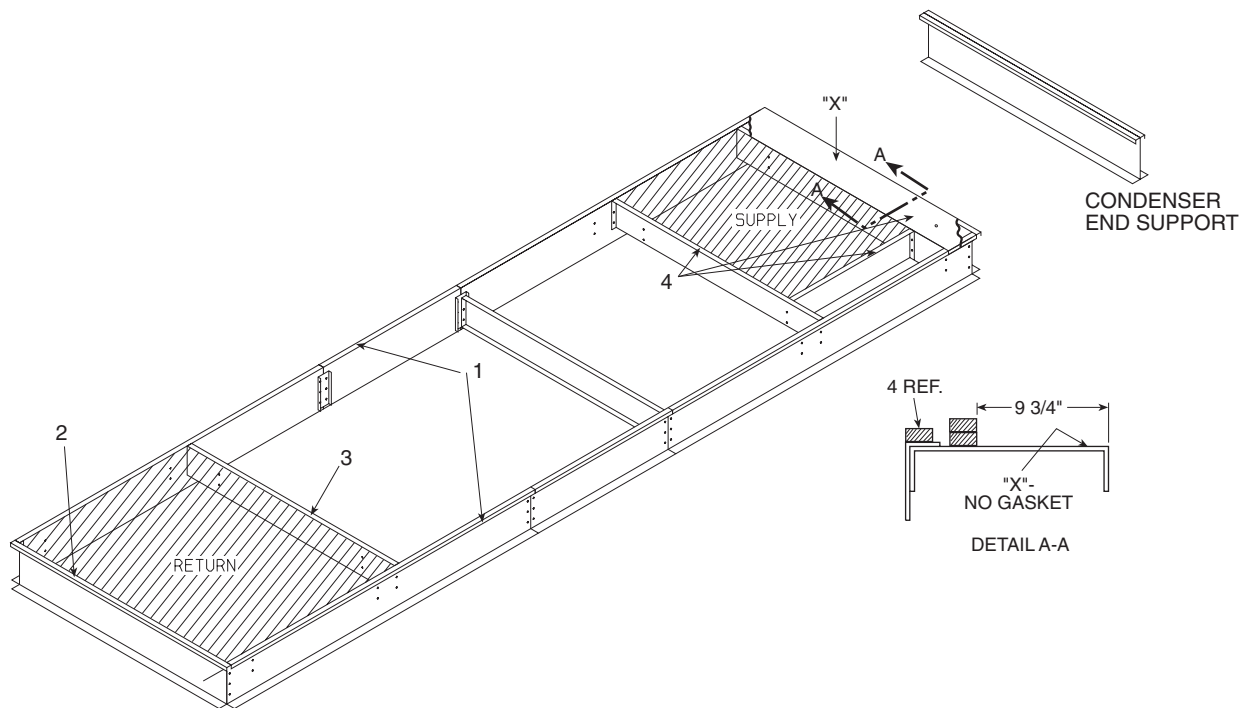


Fig. 6 — Gasket Location on Roof Curb (Size 055-105 Units without High-Capacity Power Exhaust)

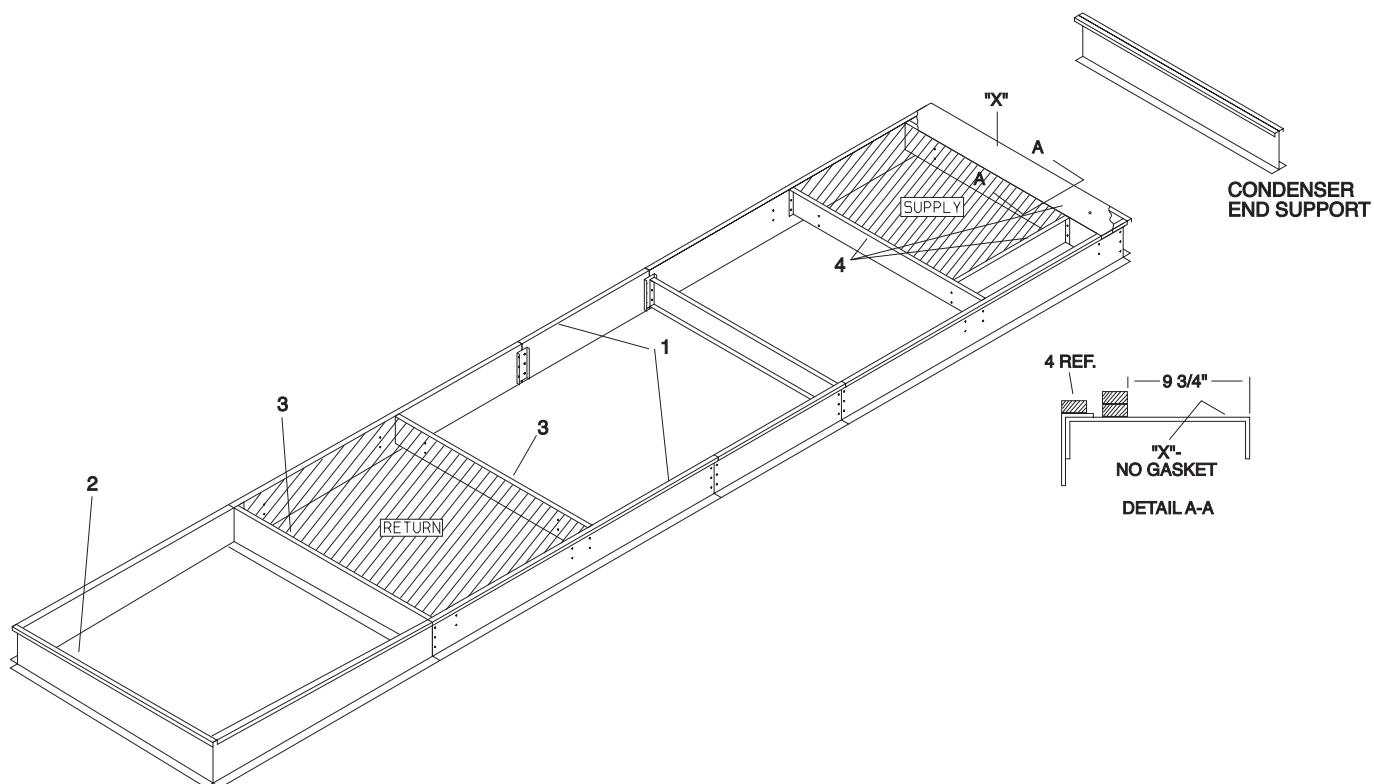


Fig. 7 — Gasket Location on Roof Curb (Size 075-105 Units with High-Capacity Power Exhaust)

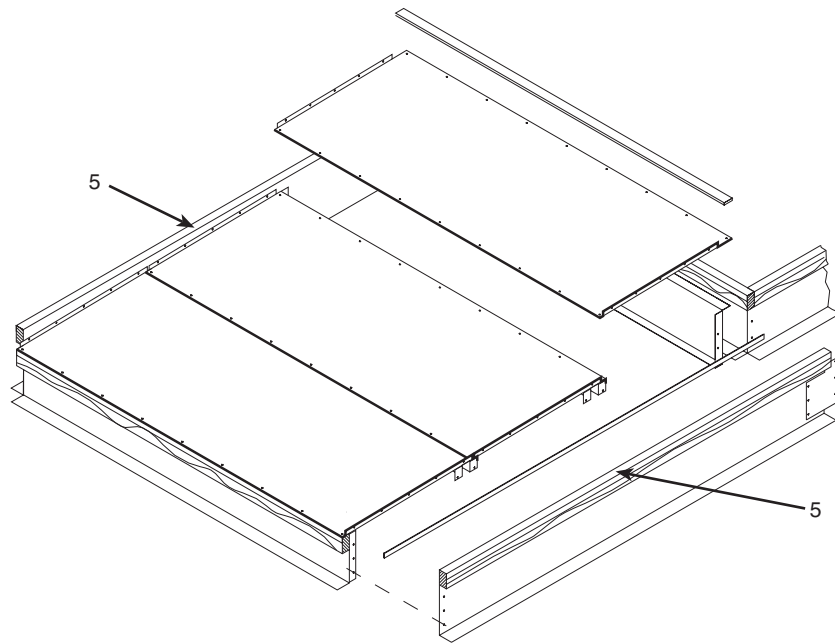


Fig. 8 — Gasket Location — Condenser Section Roof Curb (Size 055-105 Units)

Field-Fabricated Ductwork

⚠ WARNING

For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90-degree turn in the return ductwork between the unit and the conditioned space. If a 90-degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Due to electric heater, supply duct will require 90-degree elbow. Failure to follow these instructions could result in personal injury or property damage due to fire or falling objects.

NOTE: A 90-degree elbow must be provided in the supply ductwork to comply with UL (Underwriters' Laboratories) codes for use with electric heat.

VERTICAL SUPPLY/RETURN — The 50ZA,ZC,ZE,ZJ,ZL,ZR,ZT,ZV,ZW units are designed for vertical supply/return only. Field-fabricated ductwork must be attached to the roof curb, on to the support steel, prior to the final rigging and installation of the unit. Supply and return duct dimensions are shown in Fig. 1-3.

To attach ductwork to roof curb, insert duct approximately 10 to 11 in. up into roof curb. Connect ductwork to 14-gage roof curb material with sheet metal screws driven from inside the duct.

Secure all ducts to the building structure, using flexible duct connectors between roof curbs and ducts as required. Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier. Outlet grilles must not lie directly below unit discharge. The return duct must have a 90-degree elbow before opening into the building space if the unit is equipped with power exhaust.

Design supply duct strong enough to handle expected static pressures.

HORIZONTAL SUPPLY/RETURN — The 50ZB,ZF,ZK,ZX,ZY,ZZ units are designed for horizontal return (end of unit) and horizontal supply (left hand side of unit). Units are shipped

with sheet metal duct opening covers. Units are provided with duct flanges on each opening. Ductwork should be connected directly to the unit duct flanges after the unit has been rigged, positioned, and installed. Remove and discard duct covers prior to connecting ductwork. Supply and return duct dimensions are shown in Base Unit Dimensional Drawings on pages 22-45.

To attach ductwork to unit flanges, insert duct approximately 3-in. over the flanges. Connect ductwork to 14-gage flanges with sheet metal screws driven from outside of the duct. Add sealant or caps to sharp points on screws where appropriate for technician safety.

Secure all ducts to the building structure, using flexible duct connectors between roof curbs and ducts as required. Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier.

Design supply duct strong enough to handle expected static pressures.

HORIZONTAL SUPPLY/VERTICAL RETURN WITH RETURN/EXHAUST FAN — The 50ZD,ZM,ZS units with return/exhaust fan are designed for vertical return and horizontal supply (left hand side of unit). Units are shipped with sheet metal duct opening cover for the horizontal supply. Units are provided with duct flanges on the supply opening. Ductwork should be connected directly to the unit duct flanges after the unit has been rigged, positioned and installed. Remove and discard duct covers prior to connecting ductwork. Field-fabricated ductwork must be attached to the return roof curb, on to the support steel, prior to the final rigging and installation of the unit. Return duct dimensions are shown in Fig. 2. Supply duct dimensions are shown in Base Unit Dimensional Drawing on page 45.

To attach ductwork to roof curb, insert duct approximately 10 to 11-in. up into roof curb. Connect ductwork to 14-gage roof curb material with sheet metal screws driven from inside the duct. To attach ductwork to unit flanges, insert duct approximately 3-in. over the flanges. Connect ductwork to 14-gage flanges with sheet metal screws driven from outside of the duct. Add sealant or caps to sharp points on screws where appropriate for technician safety.

Secure all ducts to the building structure, using flexible duct connectors between roof curbs and ducts, as required. Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier. Outlet grilles must not lie directly below unit discharge. The return duct must have a 90-degree elbow before opening into the building space if the unit is equipped with power exhaust.

Design supply duct strong enough to handle expected static pressures.

Rigging — Do not drop unit; keep upright. Use spreader bars over unit to prevent sling or cable damage. Sheets of plywood placed along the condenser coils will provide additional protection. All lifting lugs **MUST** be used when lifting unit. Level by using unit frame as a reference. See Fig. 9-12 for information. Unit and accessory weights are shown in Tables 1A-1C and 2. Weight distribution and center of gravity can be found in Fig. 13.

CAUTION

NOTICE TO RIGGERS

- ALL PANELS MUST BE IN PLACE WHEN RIGGING.
- DO NOT ATTEMPT TO FORK THESE UNITS.

MODEL NO.	WEIGHT		A		B		ECONOMIZER	
	lbs	kgs	in.	mm	in.	mm	lbs	kgs
50ZA,ZE,ZJ030	5400	2455	74.06	1881	165.28	4198	300	136
50ZA,ZE,ZJ035	5525	2511	74.06	1881	167.01	4242	300	136
50ZA,ZE,ZJ040	6050	2750	84.76	2153	194.80	4948	300	136
50ZA,ZE,ZJ050	6090	2768	84.76	2153	195.98	4978	300	136
50ZB,ZF,ZK,ZAH,ZEH,ZJH,ZAJ,ZJJ,ZEJ030	5970	2714	83.23	2114	159.21	4044	300	136
50ZB,ZF,ZK,ZAH,ZEH,ZJH,ZAJ,ZJJ,ZEJ035	6095	2770	83.23	2114	161.02	4090	300	136
50ZB,ZF,ZK,ZAH,ZEH,ZJH,ZAJ,ZJJ,ZEJ040	6620	3009	92.64	2353	189.88	4823	300	136
50ZB,ZF,ZK,ZAH,ZEH,ZJH,ZAJ,ZJJ,ZEJ050	6660	3027	92.64	2353	190.98	4851	300	136

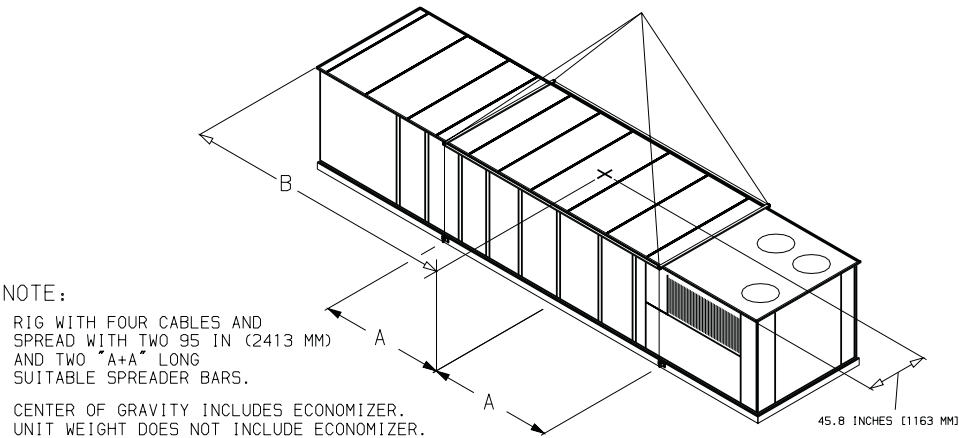


Fig. 9 — Rigging Label — Size 030-050 Units (Standard Chassis)

⚠ CAUTION

NOTICE TO RIGGERS

1. ALL PANELS MUST BE IN PLACE WHEN RIGGING.
2. DO NOT ATTEMPT TO FORK THESE UNITS.

MODEL NO.	WEIGHT		A		B		ECONOMIZER	
	lbs	kgs	in.	mm	in.	mm	lbs	kgs
50ZA,ZE,ZJ055	7,700	3500	105.25	2673	218	5537	530	240.9
50ZA,ZE,ZJ060	8,000	3636	105.25	2673	218	5537	530	240.9
50ZA,ZE,ZJ070	8,430	3832	88.25	2242	235	5969	530	240.9
50ZB,ZK,ZF,ZAH,ZJH,ZEH,ZAJ,ZJJ,ZEJ055	8,250	3750	126.50	3213	238	6045	530	240.9
50ZB,ZK,ZF,ZAH,ZJH,ZEH,ZAJ,ZJJ,ZEJ060	8,550	3886	126.50	3213	238	6045	530	240.9
50ZB,ZK,ZF,ZAH,ZJH,ZEH,ZAJ,ZJJ,ZEJ070	8,970	4077	109.50	2782	255	6477	530	240.9
50ZB,ZK,ZF,ZH075	9,870	4477	127.80	3247	257	6528	530	240.9
50ZB,ZK,ZF,ZH090	10,080	4572	127.80	3247	259	6579	530	240.9
50ZB,ZK,ZF,ZH105	10,810	4903	127.80	3247	267	6782	530	240.9
50ZC,ZD,ZL,ZM,ZR,ZS075	11,340	5144	127.80	3247	257	6528	530	240.9
50ZC,ZD,ZL,ZM,ZR,ZS090	11,550	5239	127.80	3247	259	6579	530	240.9
50ZC,ZD,ZL,ZM,ZR,ZS105	12,280	5570	127.80	3247	267	6782	530	240.9

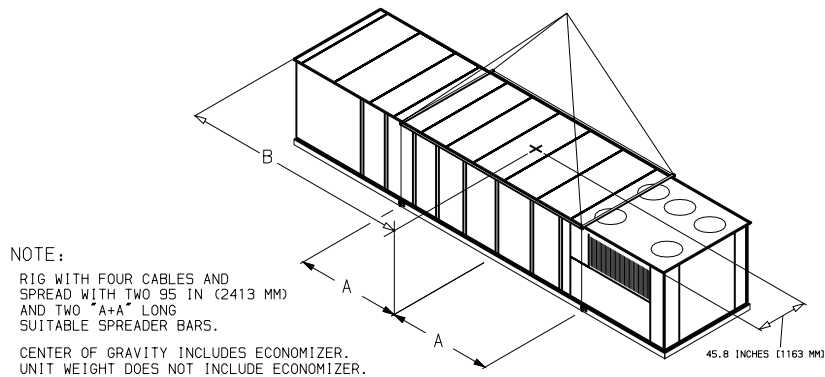


Fig. 10 — Rigging Label — Size 055-105 Units (Standard Chassis)

⚠ CAUTION

NOTICE TO RIGGERS

1. ALL PANELS MUST BE IN PLACE WHEN RIGGING.
2. DO NOT ATTEMPT TO FORK THESE UNITS.

MODEL NO.	WEIGHT		A		B		ECONOMIZER	
	lbs	kgs	in.	mm	in.	mm	lbs	kgs
50ZA,ZE,ZJ030	5900	2657	86.65	2201	181.69	4615	300	136
50ZA,ZE,ZJ035	6025	2732	86.65	2201	183.90	4671	300	136
50ZA,ZE,ZJ040	6350	2880	97.36	2473	211.54	5373	300	136
50ZA,ZE,ZJ050	6390	2898	97.36	2473	212.64	5401	300	136
50ZB,ZK,ZF,ZAP,ZJP,ZEP,ZAQ,ZJQ,ZEQ030	6470	2934	95.83	2434	173.94	4418	300	136
50ZB,ZK,ZF,ZAP,ZJP,ZEP,ZAQ,ZJQ,ZEQ035	6596	2991	95.83	2434	176.14	4474	300	136
50ZB,ZK,ZF,ZAP,ZJP,ZEP,ZAQ,ZJQ,ZEQ040	7120	3229	105.24	2673	205.16	5211	300	136
50ZB,ZK,ZF,ZAP,ZJP,ZEP,ZAQ,ZJQ,ZEQ050	7160	3247	105.24	2673	206.26	5239	300	136

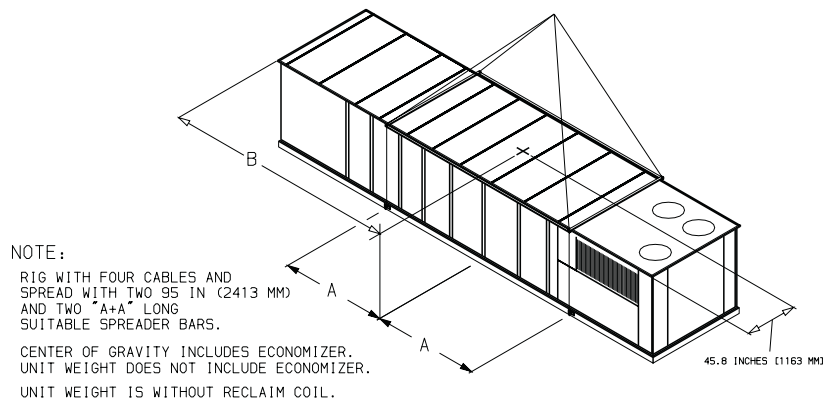


Fig. 11 — Rigging Label — Size 030-050 Units (Extended Chassis)

⚠ CAUTION

NOTICE TO RIGGERS

1. ALL PANELS MUST BE IN PLACE WHEN RIGGING.
2. DO NOT ATTEMPT TO FORK THESE UNITS.

MODEL NO.	WEIGHT		A		B		ECONOMIZER	
	lbs	kgs	in.	mm	in.	mm	lbs	kgs
50ZA,ZE,ZJ055	8248	3740	107.50	2734	231.81	5888	530	240.9
50ZA,ZE,ZJ060	8548	3877	107.50	2734	231.81	5888	530	240.9
50ZA,ZE,ZJ070	8978	4071	100.84	2561	269.81	6853	530	240.9
50ZB,ZK,ZF,ZAP,ZJP,ZEP,ZAQ,ZJQ,ZEQ055	8800	3990	136.61	3470	251.70	6393	530	240.9
50ZB,ZK,ZF,ZAP,ZJP,ZEP,ZAQ,ZJQ,ZEQ060	9100	4127	136.61	3470	251.70	6393	530	240.9

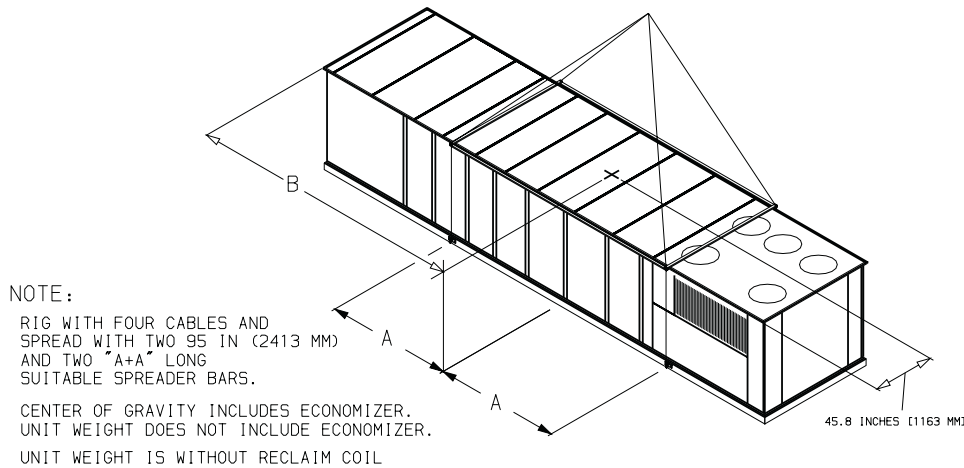


Fig. 12 — Rigging Label — Size 055,060 Units (Extended Chassis)

Condensate Drains — There is a total of three drain connections required on each unit.

PRIMARY DRAIN — The primary drain is a 2-in., NPT pipe connection located on the right hand side of the unit. See Fig. 14-37.

With field-supplied fittings and pipe sections, plumb the primary condensate drain to the 2-in. FPT connector on the base rail. Use a trap height of at least 4-in. (for size 030-070 units) or 7-in. (for size 075-105 units). See Fig. 38. Install with a height dimension, from the top of the exit pipe from the trap section to the bottom of the connector, of at least 4-in. (for size 030-070 units) or 7-in. (for size 075-105 units). See Fig. 39. Apply a bead of RTV or similar sealant around the pipe joint at the connector in the base rail.

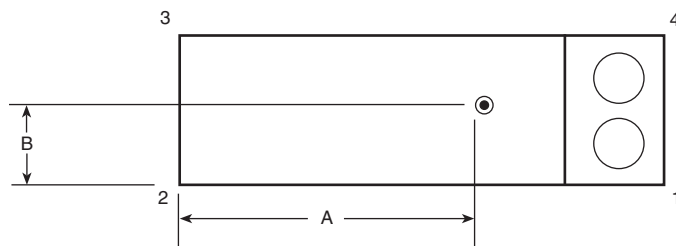
SECONDARY DRAINS — There are two, 1 $\frac{1}{4}$ -in., NPT pipe connections located on each side of the unit. See Fig. 40 and 41 for locations. These holes are pre-drilled into the bottom of the base rail on all units (use for curb-mounted units only). For units mounted on steel rails or on slab, field-drilled holes will be required.

Locate the 1 $\frac{1}{4}$ -in. drain coupling assemblies, seal plates, and mounting screws (shipped in a bag taped to the basepan behind the access door marked FAN SECTION). The drain couplings are 10-gage plate with a 1 $\frac{1}{4}$ -in. half coupling welded to the plate. Seal plates are 16-gage, used to cover the drain holes which are not being used.

CURB-MOUNTED UNITS — The secondary drain connections are 1 $\frac{1}{4}$ -in., NPT pipe connections, located one per side, in holes factory-drilled in the bottom of the base rails.

To install condensate drains, after the unit has been set in place on the curb, perform the following procedure:

1. Select the appropriate drain locations. The 030 and 035 units have 6 drain holes (3 per side) and the 040-105 units have 8 drain holes (4 per side). Two holes on each side must be selected for condensate drains as shown in Fig. 40 and 41, and the remaining holes must be sealed. Select the set of holes per Fig. 40 and 41.
2. Remove the drain assemblies and attach them to the bottom of the unit base rails at the preferred drain locations using the screws provided. See Fig. 42.
3. Using field-supplied fittings and pipe sections, assemble U-traps at each secondary drain fitting.
NOTE: Use a trap at least 4-in deep (for size 030-070 units) or 7-in. deep (for size 075-105 units).
4. Cover the remaining drain holes with the seal plates and screws provided. See Fig. 43.
5. Apply a bead of RTV or similar sealant around the drain assemblies and seal plates where they attach to the base rail. See Fig. 44.



UNITS	SIZE	CORNER WEIGHTS (lb)				TOTAL (lb)	A ft.-in.	B ft.-in.
		1	2	3	4			
HORIZONTAL SUPPLY & RETURN (50ZB,ZF,ZK) VERTICAL SUPPLY & RETURN W/EXTENDED PLENUM (50ZA,ZE,ZJ)	030	1939	1198	1200	1933	6,270	13- 9 ¹ / ₄	3-9 ¹³ / ₁₆
	035	1997	1203	1202	1993	6,395	13-11	3-9 ¹³ / ₁₆
	040	2139	1323	1324	2133	6,920	16- 2 ¹³ / ₁₆	3-9 ¹³ / ₁₆
	050	2162	1320	1317	2161	6,960	16- 4	3-9 ¹³ / ₁₆
	055	2322	2071	2068	2319	8,780	18- 2	3-9 ¹³ / ₁₆
	060	2401	2142	2139	2398	9,080	18- 2	3-9 ¹³ / ₁₆
	070	2555	2198	2195	2552	9,500	21- 3	3-9 ¹³ / ₁₆
VERTICAL SUPPLY & RETURN (50ZA,ZE,ZJ)	030	1826	1026	1027	1821	5,700	13- 3 ¹ / ₄	3-9 ¹³ / ₁₆
	035	1885	1029	1028	1883	5,825	13- 5	3-9 ¹³ / ₁₆
	040	2035	1142	1144	2029	6,350	15- 9 ⁷ / ₈	3-9 ¹³ / ₁₆
	050	2059	1139	1137	2056	6,390	15-11	3-9 ¹³ / ₁₆
	055	2469	1649	1651	2461	8,230	19-10	3-9 ¹³ / ₁₆
	060	2559	1709	1712	2550	8,530	19-10	3-9 ¹³ / ₁₆
	070	2643	1840	1845	2632	8,960	21- 3	3-9 ¹³ / ₁₆
HORIZONTAL SUPPLY & RETURN (50ZB,ZF,ZK) VERTICAL SUPPLY & RETURN (50ZA,ZE,ZJ)	075	2817	2385	2381	2817	10,400	21- 5	3-9 ¹³ / ₁₆
	090	2897	2410	2407	2896	10,610	21- 7	3-9 ¹³ / ₁₆
	105	3203	2469	2465	3204	11,340	22- 4	3-9 ¹³ / ₁₆
HORIZONTAL SUPPLY & RETURN W/EXTENDED CHASSIS (50ZB,ZF,ZK) VERTICAL SUPPLY & RETURN W/EXTENDED PLENUM/EXT. CHASSIS (50ZA,ZE,ZJ)	030	2103	1284	1286	2096	6,770	15- 15 ⁸ / ₈	3-9 ¹³ / ₁₆
	035	2167	1283	1282	2163	6,895	15- 3 ⁷ / ₈	3-9 ¹³ / ₁₆
	040	2306	1406	1407	2300	7,420	17- 7 ⁹ / ₁₆	3-9 ¹³ / ₁₆
	050	2327	1406	1399	2328	7,460	17- 8 ⁵ / ₈	3-9 ¹³ / ₁₆
	055	2232	2411	2231	2406	9,280	19- 3 ¹³ / ₁₆	3-9 ¹³ / ₁₆
	060	2303	2490	2303	2484	9,580	19- 3 ¹³ / ₁₆	3-9 ¹³ / ₁₆
	070	3116	1887	1884	3113	10,000	22- 5 ¹³ / ₁₆	3-9 ¹³ / ₁₆
VERTICAL SUPPLY & RETURN/EXT. CHASSIS (50ZA,ZF,ZJ)	030	1970	1132	1133	1965	6,200	14- 5 ¹⁵ / ₁₆	3-9 ¹³ / ₁₆
	035	2034	1131	1129	2031	6,325	14- 8 ¹ / ₈	3-9 ¹³ / ₁₆
	040	2186	1241	1243	2180	6,850	17- 1 ¹ / ₈	3-9 ¹³ / ₁₆
	050	2208	1239	1235	2208	6,890	17- 2 ¹ / ₄	3-9 ¹³ / ₁₆
	055	2605	1763	1766	2596	8,730	20-11 ¹¹ / ₁₆	3-9 ¹³ / ₁₆
	060	2694	1824	1827	2685	9,030	20-11 ¹¹ / ₁₆	3-9 ¹³ / ₁₆
HORIZONTAL SUPPLY & RETURN, HIGH-CAPACITY POWER EXHAUST (50ZX,ZY,ZZ) VERTICAL SUPPLY & RETURN, HIGH-CAPACITY POWER EXHAUST (50ZT,ZV,ZW)	075	3415	2990	2986	3415	12,806	24- 7 ⁵ / ₁₆	3-9 ¹³ / ₁₆
	090	3493	3016	3011	3494	13,014	24- 9 ¹ / ₄	3-9 ¹³ / ₁₆
	105	3811	3064	3059	3812	13,746	25- 7 ⁵ / ₆₄	3-9 ¹³ / ₁₆
HORIZONTAL SUPPLY AND VERTICAL RETURN WITH RETURN/EXHAUST FAN (50ZD,ZM,ZS) VERTICAL SUPPLY/RETURN WITH RETURN/EXHAUST FAN (50ZC,ZL,ZR)	075	2726	2938	2944	2732	11,340	19- 0	3-9 ¹³ / ₁₆
	090	2804	2964	2971	2811	11,550	19- 2	3-9 ¹³ / ₁₆
	105	3106	3028	3034	3112	12,280	20- 0	3-9 ¹³ / ₁₆

Fig. 13 — Weight Distribution and Center of Gravity

STEEL BEAM OR SLAB MOUNTED UNITS — Prior to final positioning, install a bead of sealant around each drain hole in the base rail. Then position the unit into final location.

After final positioning of unit, perform the following procedure:

1. Locate the appropriate drain locations (one per side). See Fig. 40 and 41. Select the location for the secondary drains at the locations of the base rail holes that are the LOWEST location of the available drain locations.
2. Position the drain assembly on the base rail. Mark the screw holes and the drain hole location on the base rail.
3. Drill holes for drain outlet (use 1³/₈-in. hole saw) and for screws (use 3¹/₁₆-in. drill bit).

4. Install the factory-provided drain assemblies at the two locations.

5. Using field-supplied fittings and pipe sections, assemble U-traps at each secondary drain fitting. See Fig. 39.

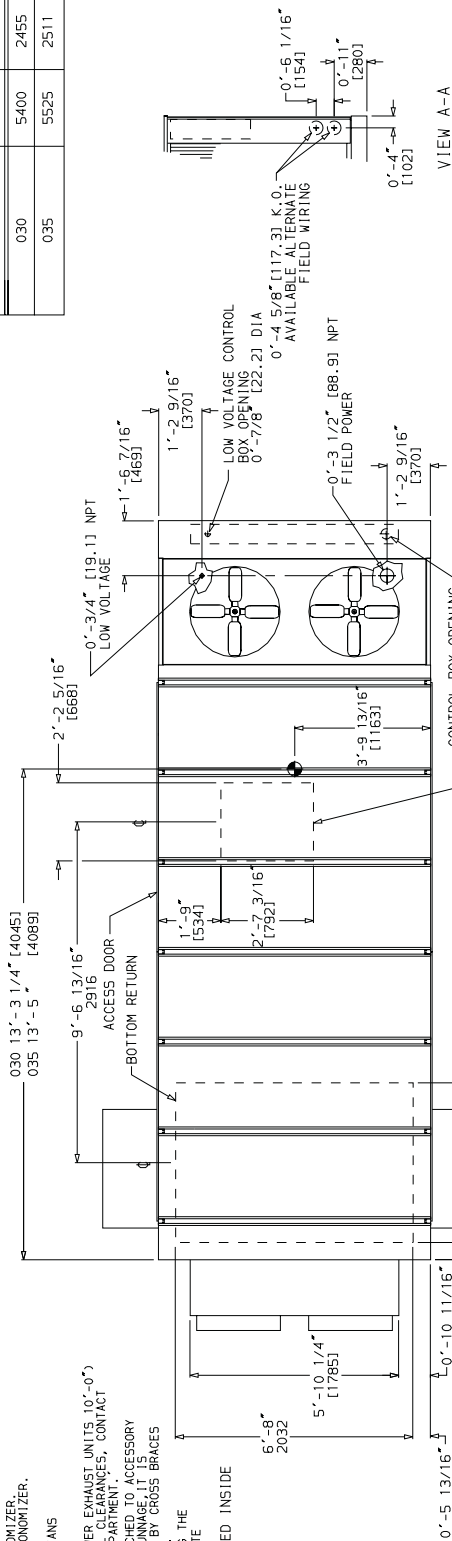
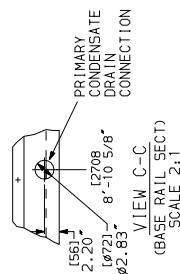
NOTE: Use a trap at least 4-in. deep (for 030-070 units) or 7-in. deep (for 075-105 units).

6. Apply a bead of RTV or similar sealant around the drain assemblies and seal plates where they attach to the base rail.

Consult local plumbing codes for direction on joining multiple drain lines. Total size of any combined line does not need to exceed nominal 2-in. size of primary drain connection.

UNIT SIZE	WEIGHT LBS.	KGS.
030	5400	2455
035	5525	2511

- NOTES:
1. DIMENSIONS IN [] ARE IN MILLIMETERS.
 2. Ⓢ CENTER OF GRAVITY INCLUDES ECONOMIZER.
 3. UNIT WEIGHT DOES NOT INCLUDE ECONOMIZER.
 4. TOP CLEARANCE: 6'-0" (1829) MIN. (SEE NOTE 1).
 5. CONTROL BOX END - 6'-0" (1829) MIN. (SEE NOTE 1).
 6. ECONOMIZER SIDE HOODS ARE FOLDED INSIDE UNIT FOR SHIPPING.



ECONOMIZER OPTION
HOODS
TYP (3.5 SIDES)

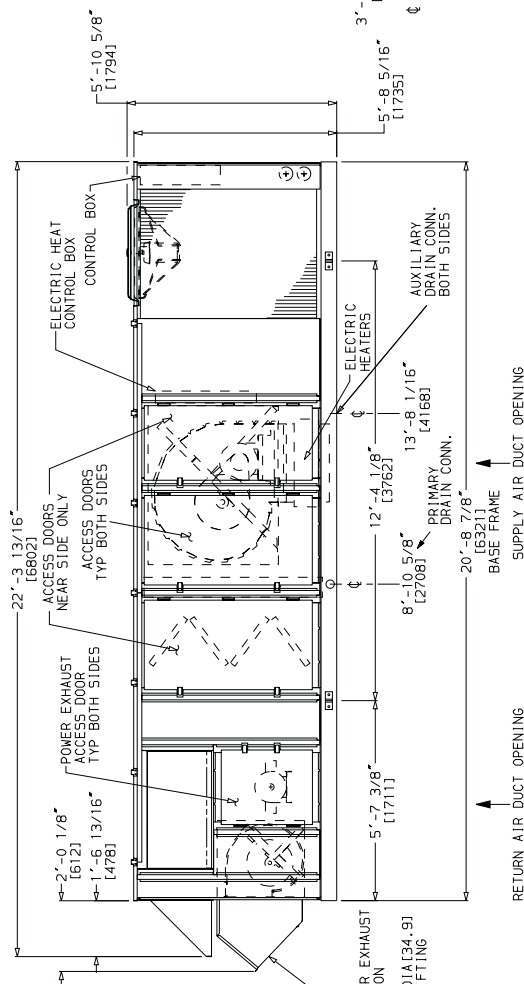
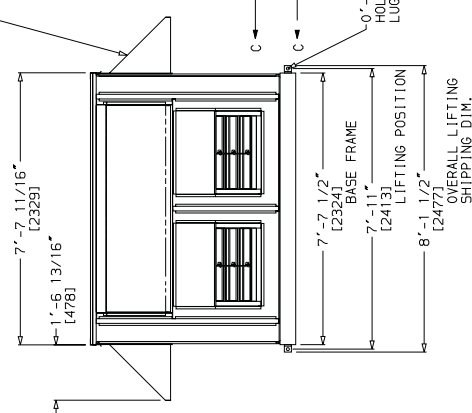
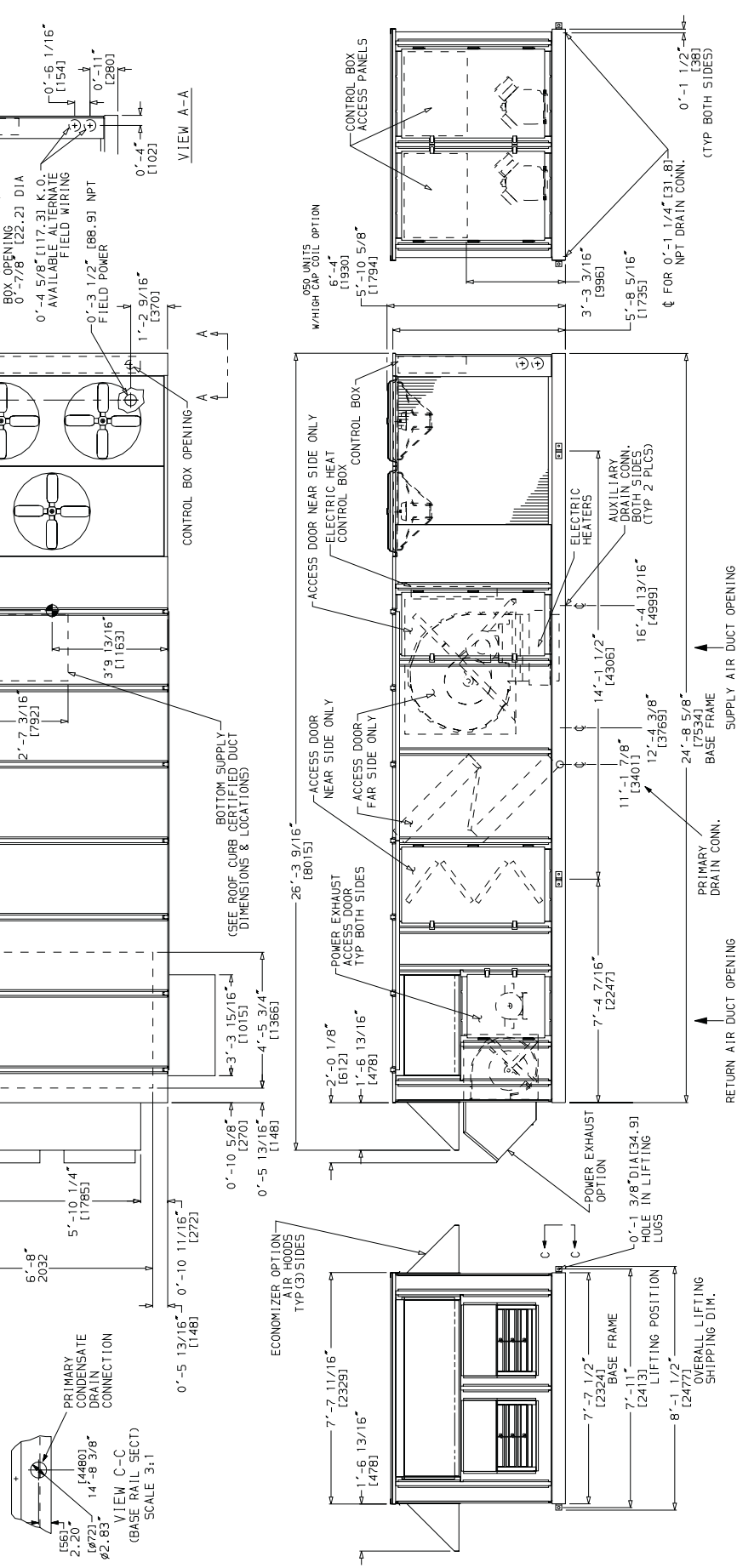


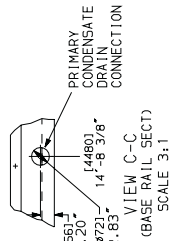
Fig. 14 — Base Unit Dimensional Drawing — 50ZA, ZE, ZJ030, 035 (Standard Chassis)

UNIT SIZE	WEIGHT LBS.	KGS.
040	6050	2750
050	6090	2768

- NOTES:
1. DIMENSIONS IN [] ARE IN MILLIMETERS.
 2. ⚡ REFER TO GRAVITY AND/OR ELECTRICITY CODES FOR ELECTRICAL REQUIREMENTS. UNIT WEIGHT DOES NOT INCLUDE ECONOMIZER.
 3. UNIT CLEARANCES
 4. TOP - DO NOT RESTRICT CONDENSER FANS
 5. CONTROL BOX END - 6'-0" (EXCEPT POWER EXHAUST UNITS 10'-0")
 6. ECONOMIZER END - 6'-0" (EXCEPT POWER EXHAUST UNITS 10'-0")
 7. FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES, CONTACT CARRIER APPLICATION ENGINEERING DEPARTMENT.
 8. DOWNSHOT DUCTS DESIGNED TO BE ATTACHED TO ACCESSORY ROOF CURB. IF UNIT IS MOUNTED ON DUNNAGE, IT IS AS DONE ON THE ACCESSORY ROOF CURB.
 9. WHEN THE UNIT IS SLAB MOUNTED, PLUG THE FACTORY DRILLED AUXILIARY CONDENSATE DRAIN HOLES.
 10. ECONOMIZER SIDE HOODS ARE FOLDED INSIDE UNIT FOR SHIPPING



UNIT SIZE	WEIGHT LBS. / KGS.	A		B		C		D		E		F		
		FT. IN.	MM	FT. IN.	MM	FT. IN.	MM	FT. IN.	MM	FT. IN.	MM	FT. IN.	MM	
055	7700	3500	2864	9'-4 3/4"	5347	17'-6 1/2"	19'-10"	6045	1163	3'-9 13/16"	10092	33'-1 5/16"	10476	34'-4 7/16"
060	8000	3636	2864	9'-4 3/4"	5347	17'-6 1/2"	19'-10"	6045	1163	3'-9 13/16"	10092	33'-1 5/16"	10476	34'-4 7/16"
070	8430	3832	3727	12'-2 3/4"	4483	14'-8 1/2"	21'-3"	6479	1163	3'-9 13/16"	11001	36'-1 1/8"	11385	37'-4 1/4"



NOTES:

1. DIMENSIONS IN [] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY INCLUDES ECONOMIZER.
3. UNIT WEIGHT DOES NOT INCLUDE ECONOMIZER.
4. TOP CLEARANCES DO NOT RESTRICT CONDENSER FANS. ECONOMIZER END - 6'-0" (EXCEPT POWER EXHAUST UNITS 10'-0") FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES, CONTACT CARRIER APPLICATION ENGINEERING DEPARTMENT.
5. DOWNSHOT DUCTS DESIGNED TO BE ATTACHED TO ACCESSORY ROOF CURB IF UNIT IS MOUNTED ON DOWNGAST. IS RECOMMENDED THE DUCT BE SUPPORTED BY CROSS BRACES AS DONE ON THE ACCESSORY ROOF CURB.
6. WHEN THE UNIT IS SLAB MOUNTED, PLUG THE FACTORY DRILLED AUXILIARY CONDENSATE DRAIN HOLES.
7. ECONOMIZER SIDE HOODS ARE FOLDED
8. ECONOMIZER UNIT FOR SHIPPING

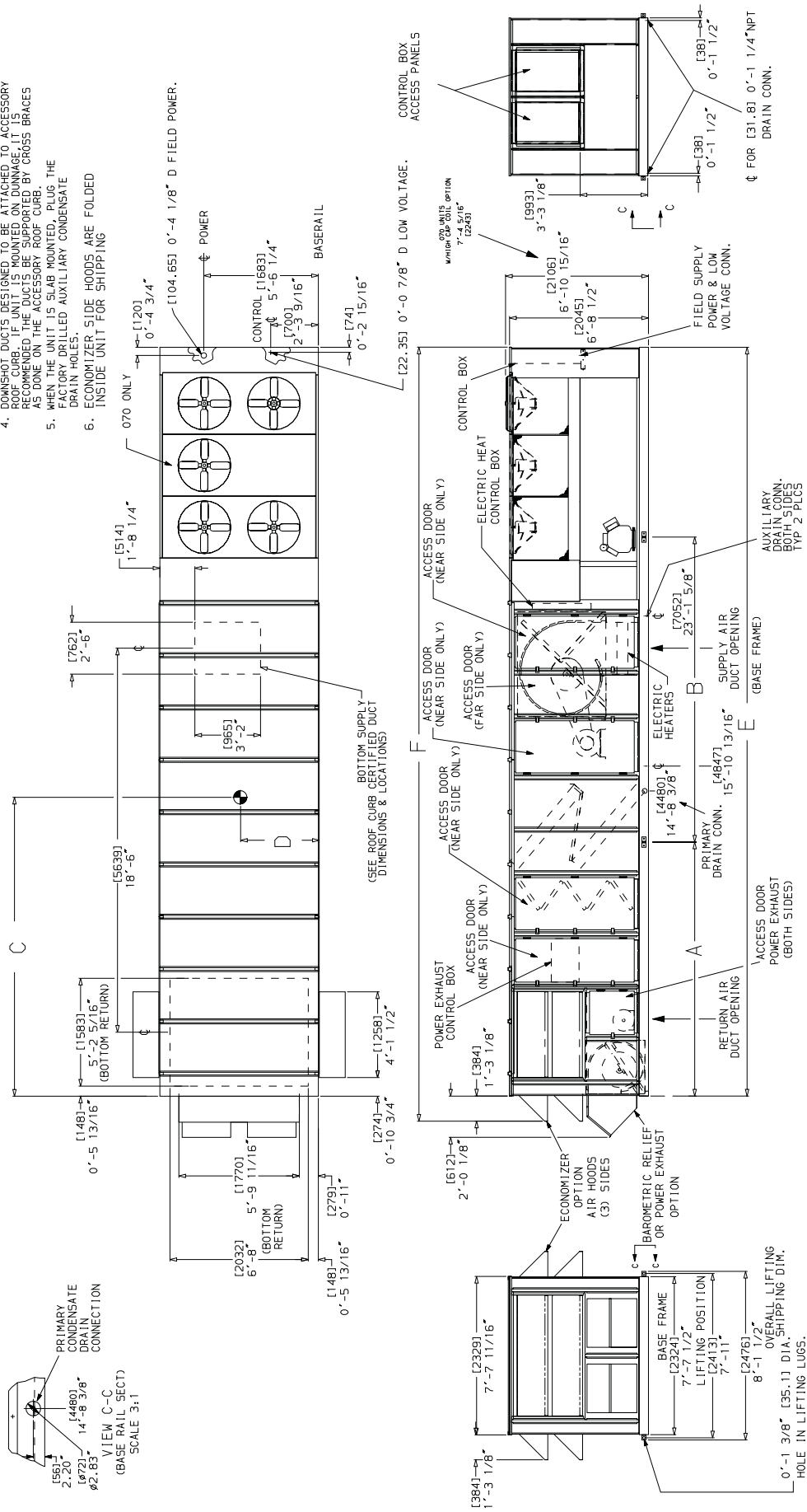


Fig. 16 — Base Unit Dimensional Drawing — 50ZA,ZE,ZJ055-070 (Standard Chassis)

UNIT SIZE	WEIGHT		A FT. IN.
	LBS.	KGS.	
030	5970	2714	13'-9 1/4"
035	6095	2770	13'-11"

- NOTES:
1. DIMENSIONS IN [] ARE IN MILLIMETERS.
 2. CENTER OF GRAVITY INCLUDES ECONOMIZER.
 3. UNIT WEIGHT DOES NOT INCLUDE ECONOMIZER.
 4. UNITS ARE DESIGNED TO BE MOUNTED ON A ROOF CURB. IF THE UNIT IS MOUNTED ON A ROOF CURB, IT IS RECOMMENDED THAT THE CURB BE SUPPORTED BY CROSS BRACES AS SHOWN ON THE ACCESSORY ROOF CURB. IF THE CURB IS NOT SUPPORTED BY CROSS BRACES, THE CURB WILL BE DAMAGED BY THE FACTORY DRILLED AUXILIARY CONDENSATE DRAIN HOLES.
 5. ECONOMIZER SIDE HOODS ARE FOLDED INSIDE.
 6. UNIT FOR SHIPPING.

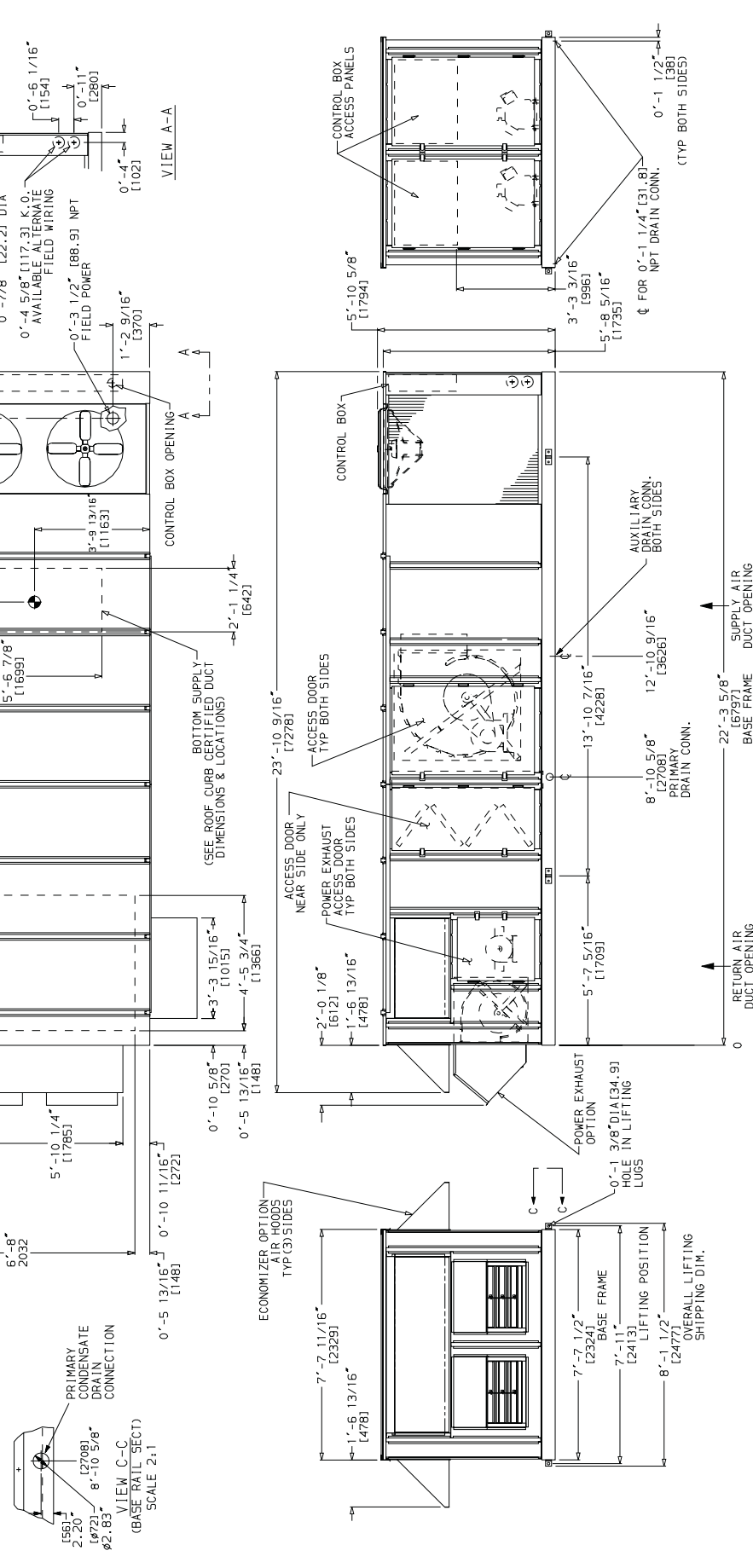
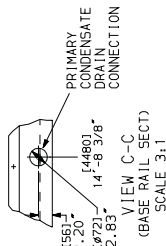


Fig. 18 — Base Unit Dimensional Drawing — 50ZA,ZE,ZJ030,035 (Standard Chassis with Extended Plenum)

UNIT SIZE	WEIGHT LBS.	KGS.	A		B		C		D		E		F	
			FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.
055	8250	3750	9'-3	3/4"	21'	1"	19'-	10"	1163	3'-9	13/16"	11140	36'-	6 9/16"
065	8550	3886	9'-3	3/4"	21'	1"	19'-	10"	1163	3'-9	13/16"	11140	36'-	6 9/16"
070	8970	4077	12'-1	3/4"	18'-	3"	21'-	3"	1163	3'-9	13/16"	12049	39'-	6 3/8"



- NOTES:
1. DIMENSIONS IN [] ARE IN MILLIMETERS.
 2. CENTER OF GRAVITY INCLUDES ECONOMIZER. UNIT WEIGHT DOES NOT INCLUDE ECONOMIZER.
 3. UNIT CLEARANCES
TOP - DO NOT RESTRICT CONDENSER FANS
CONTROL BOX END - 6'-0"
SIDE - 6'-0" (EXCEPT POWER EXHAUST UNITS 10'-0")
FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES, CONTACT CARRIER APPLICATION ENGINEERING DEPARTMENT.
 4. DOWNSHOT 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 THE ACCESSORY ROOF CURB.
 5. WHEN THE UNIT IS SLAB MOUNTED, PLUG THE ACCESSORY UNBLOCKED AUXILIARY CONDENSATE DRAIN HOLES.
 6. ECONOMIZER SIDE HOODS ARE FOLDED INSIDE UNIT FOR SHIPPING.

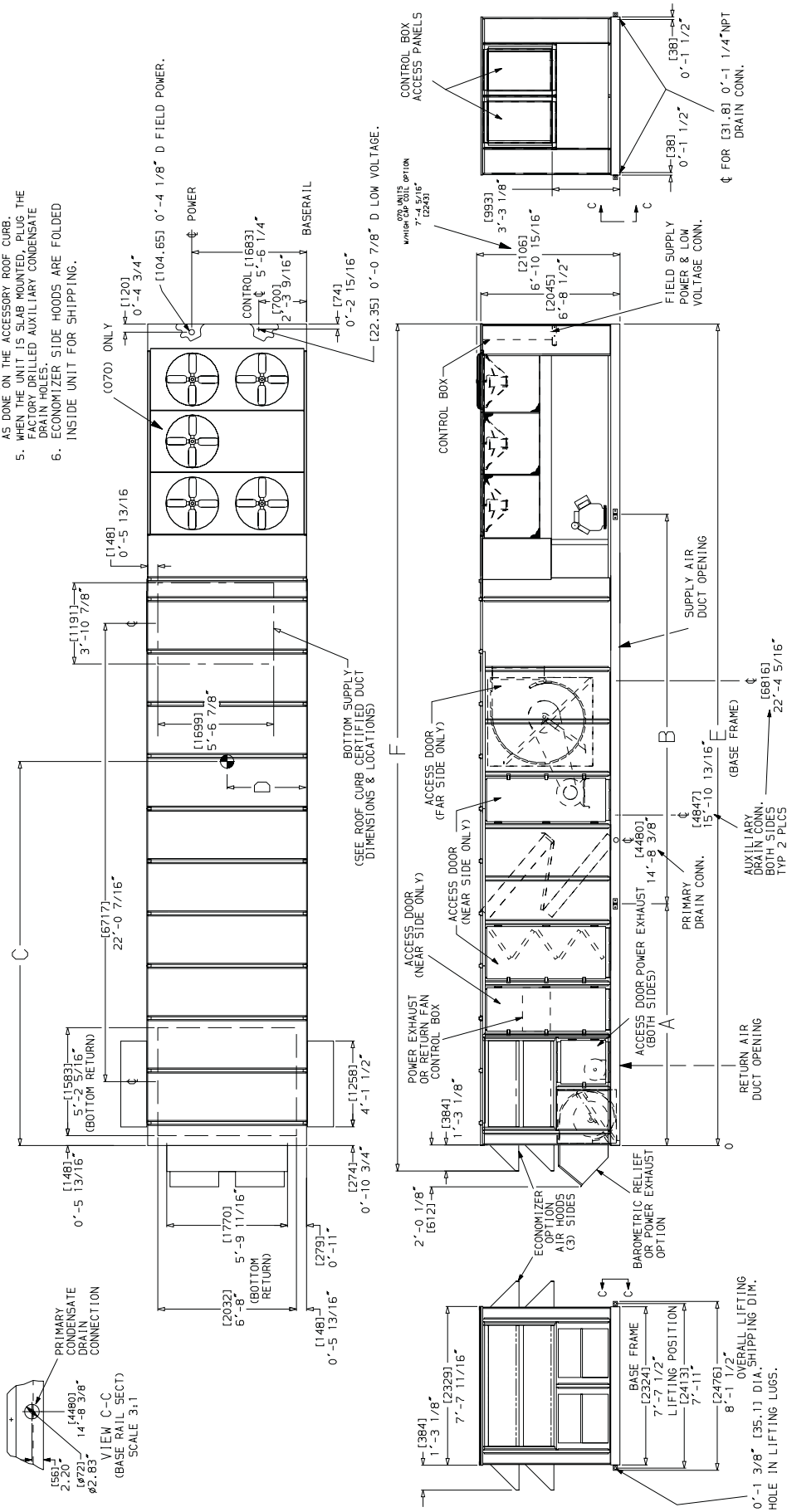


Fig. 20 — Base Unit Dimensional Drawing — 50ZA,ZE,ZJ055-070 (Standard Chassis with Extended Plenum)

UNIT SIZE	WEIGHT		A
	LBS.	KGS.	FT. IN.
030	5500	2675	15' - 1 5/8"
035	6025	2732	15' - 3 7/8"

- NOTES:
1. DIMENSIONS IN [] ARE IN MILLIMETERS.
 2. CENTER OF GRAVITY INCLUDES ECONOMIZER. UNIT WEIGHT DOES NOT INCLUDE ECONOMIZER.
 3. UNIT CLEARANCES
TOP - DO NOT RESTRICT CONDENSER FANS
CONTROL BOX END - 6'-0"
 4. DOWNSHOT DUCTS DESIGNED TO BE ATTACHED TO ACCESSORY RECOMMENDED THE DUCTS BE SUPPORTED BY CROSS BRACES AS DONE ON THE ACCESSORY ROOF CURB.
 5. WHEN THE UNIT IS SLAB MOUNTED, PLUG THE FACTORY DRILLED AUXILIARY CONDENSATE DRAIN HOLES.
 6. ECONOMIZER SIDE HOODS ARE FOLDED INSIDE UNIT FOR SHIPPING.
 7. COIL DIMENSIONS (MAXIMUM)
- LENGTH (ECONOMIZER INCLUDED): 7'-0 1/4"
- HEIGHT: 4'-5 15/16"
 8. HEAT RECLAIM COIL FIELD SUPPLIED AND INSTALLED.
 9. PIPE CHASE LOCATIONS ARE RECOMMENDATIONS ONLY. OPENINGS ARE NOT FACTORY PROVIDED

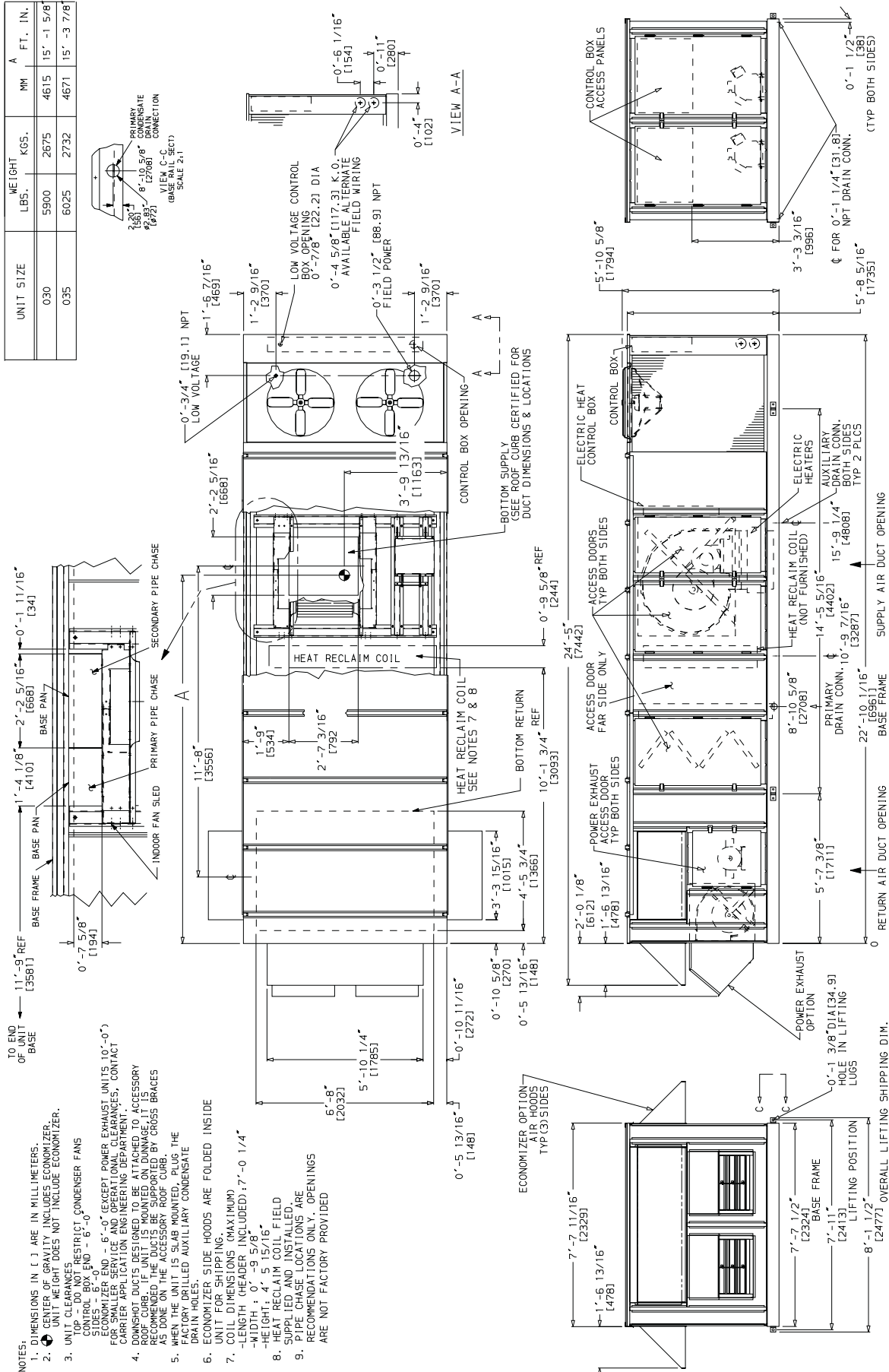
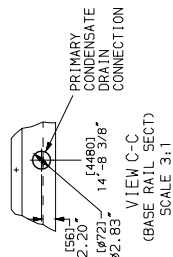


Fig. 21 — Base Unit Dimensional Drawing — 50ZA,ZE,ZJ030,035 (Extended Chassis)

UNIT SIZE	WEIGHT LBS.	A MM	A FT. IN.	B MM	B FT. IN.	C MM	C FT. IN.	D MM	D FT. IN.	E MM	E FT. IN.	F MM	F FT. IN.
055	8250	3383	11'-1 3/16"	5468	17'-11 1/4"	5888	19'-3 13/16"	1163	3'-9 25/32"	10732	35'-2 1/2"	11116	36'-5 5/8"
065	8550	3383	11'-1 3/16"	5468	17'-11 1/4"	5888	19'-3 13/16"	1163	3'-9 25/32"	10732	35'-2 1/2"	11116	36'-5 5/8"
070	8970	4071	12'-2 3/4"	5123	16'-9 11/16"	6853	22'-5 13/16"	1163	3'-9 25/32"	11641	38'-2 5/16"	12025	39'-5 7/16"

NOTES CONT.

9. PIPE CHASE LOCATIONS ARE INDICATED BY DIMENSIONS AND ARE NOT FACTORY PROVIDED



1. DIMENSIONS IN [] ARE IN MILLIMETERS.
2. ⚡ CENTER OF GRAVITY INCLUDES ECONOMIZER.
3. UNIT WEIGHT DOES NOT INCLUDE ECONOMIZER.
4. UNIT CLEARANCES ARE TO THE FOLLOWING:
 - CONTROL BOX END - 6'-0"
 - SIDES - 6'-0"
 - ECONOMIZER END - 6'-0" (EXCEPT POWER EXHAUST UNITS 10'-0")
 - FIELD COILS - 10'-0" (EXCEPT FIELD COILS WITH ACCESSORIES, CONTACT CARRIER APPLICATION ENGINEERING DEPARTMENT)
5. DOWNSHOT 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 THE ACCESSORY ROOF CURB.
6. WHEN THE UNIT IS SLAB MOUNTED, PLUG THE ECONOMIZER AND FIELD COIL DRAIN HOLES.
7. ECONOMIZER SIDE HOODS ARE FOLDED INSIDE UNIT FOR SHIPPING (MAXIMUM)
 - LENGTH HEADER INCLUDED: 7'-0 1/4"
 - WIDTH: 0'-9 5/8"
 - HEIGHT: 5'-6"
8. HEAT RECLAIM COIL FIELD SUPPLIED AND INSTALLED.

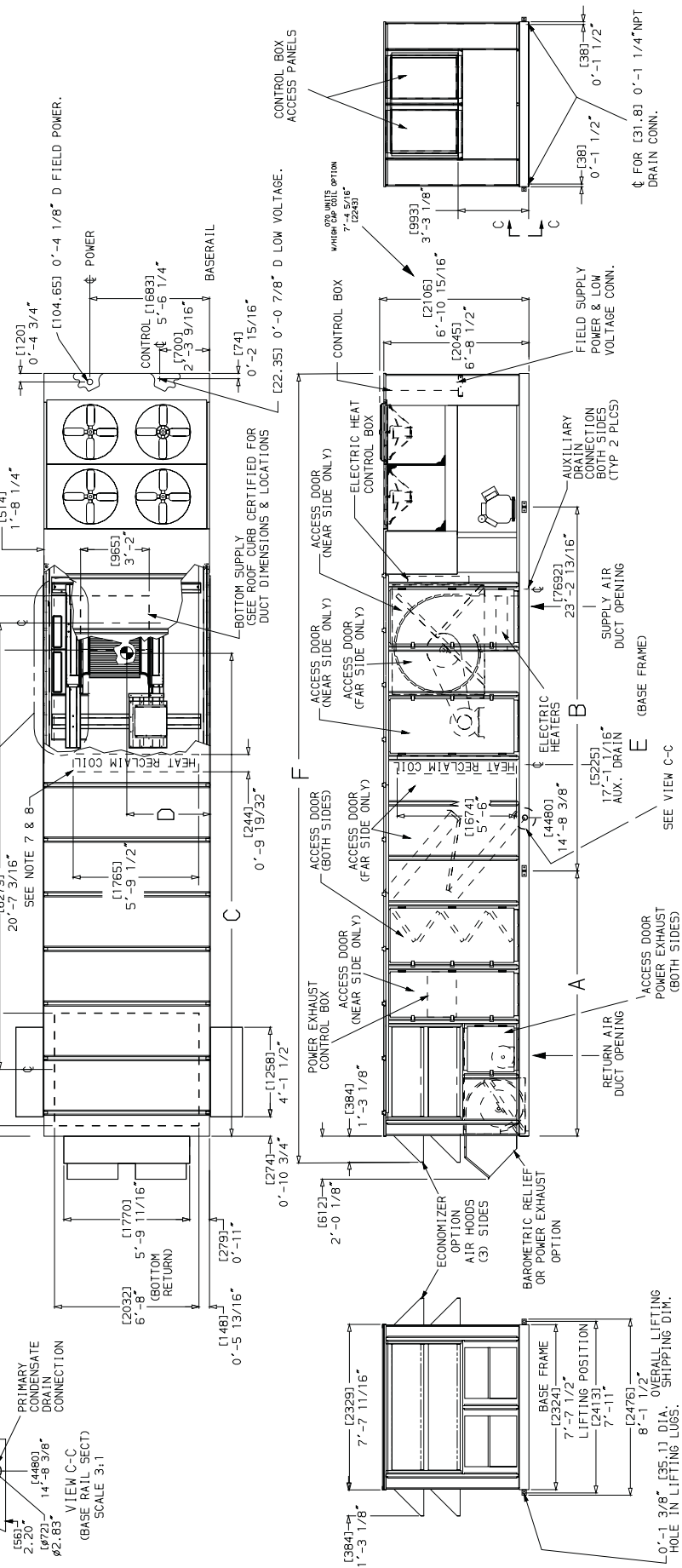


Fig. 23 — Base Unit Dimensional Drawing — 50ZA,ZE,ZJ055-070 (Extended Chassis)

UNIT SIZE	WEIGHT		A FT. IN.
	LBS.	KGS.	
040	7120	3229	17'-1 1/8"
050	7160	3247	17'-2 1/4"

- NOTES:
1. DIMENSIONS IN [] ARE IN MILLIMETERS.
 2. CENTER OF GRAVITY INCLUDES ECONOMIZER.
 3. UNIT WEIGHT DOES NOT INCLUDE ECONOMIZER.
 4. DOWNSHOT 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 WHEN THE UNIT IS SLAB MOUNTED. PLUG THE FACTORY DRILLED AUXILIARY CONDENSATE DRAIN HOLES.
 5. ECONOMIZER SIDE HOODS ARE FOLDED INSIDE UNIT FOR SHIPPING.
 6. COIL DIMENSIONS (MAXIMUM):
-LENGTH (HEADER INCLUDED): 7'-0 1/4"
-WIDTH: 0'-9 5/8"
-HEIGHT: 4'-5 15/16"
HEAT RECLAIM COIL FIELD SUPPLIED AND INSTALLED.

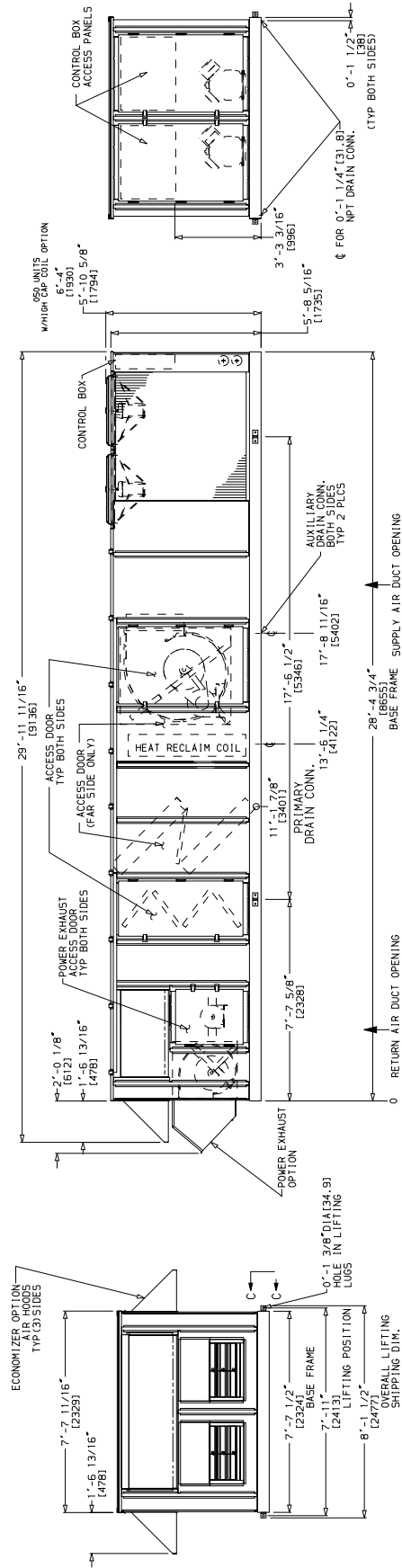
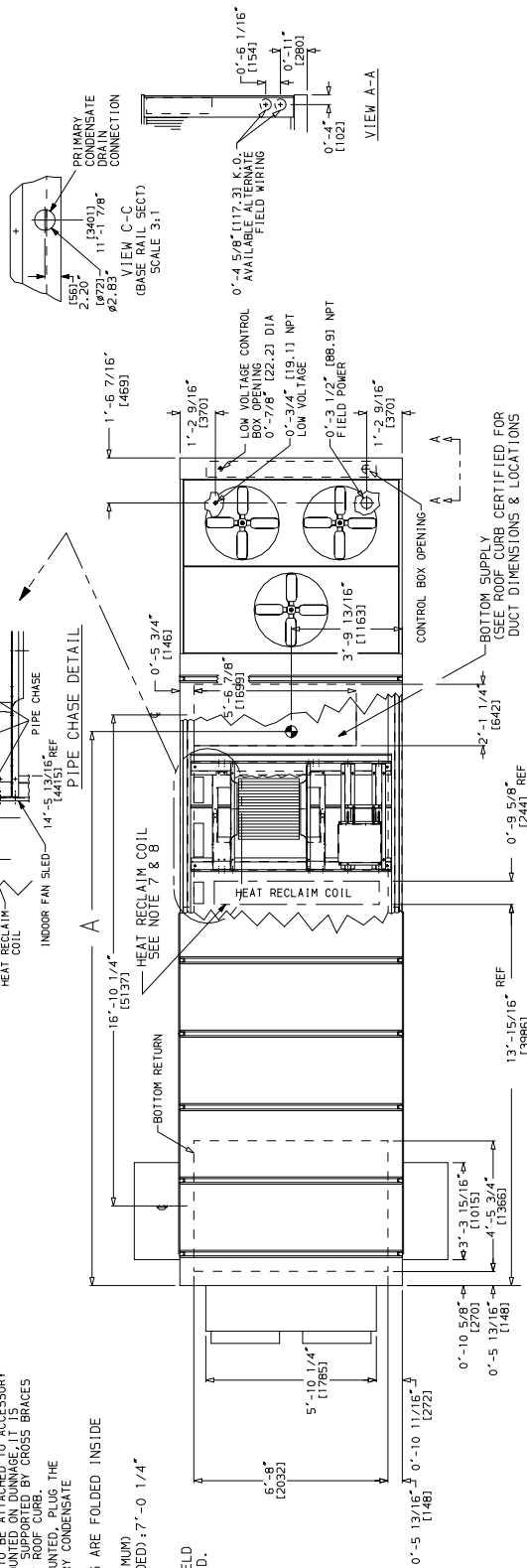


Fig. 25 — Base Unit Dimensional Drawing — 50ZA,ZE,ZJ040,050 (Extended Chassis with Extended Plenum)

UNIT SIZE	WEIGHT LBS.	A		B		C		D		E		F	
		MM	FT. IN.	MM	FT. IN.	MM	FT. IN.	MM	FT. IN.	MM	FT. IN.	MM	FT. IN.
055	8800	2959	9'-8 1/2"	6940	22'-9 3/4"	6393	20'-11 11/16"	1163	3'-9 25/32"	11780	38'-7 13/16"	12164	39'-10 7/8"
060	9100	2959	9'-8 1/2"	6940	22'-9 3/4"	6393	20'-11 11/16"	1163	3'-9 25/32"	11780	38'-7 13/16"	12164	39'-10 7/8"

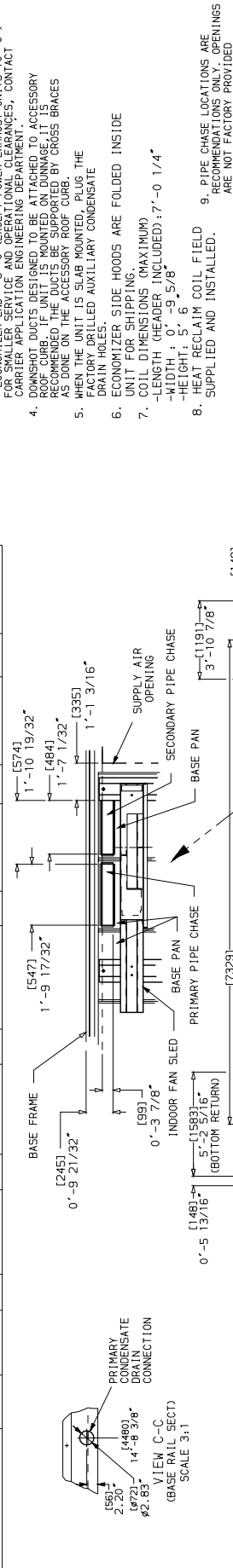


Fig. 26 — Base Unit Dimensional Drawing — 50ZA,ZE,ZJ055,060 (Extended Chassis with Extended Plenum)

UNIT SIZE	WEIGHT LBS.	WEIGHT KGS.	MM	FT. IN.
030	5970	2714	4044	13'-3 1/4"
035	6095	2770	4090	13'-5"

- NOTES:
1. DIMENSIONS IN [] ARE IN MILLIMETERS.
 2. CENTER OF GRAVITY INCLUDES ECONOMIZER. UNIT WEIGHT DOES NOT INCLUDE ECONOMIZER.
 3. UNIT CLEARANCES
TOP - DO NOT RESTRICT CONDENSER FANS
CONTROL BOX END - 6'-0"
ECONOMIZER END - 6'-0" (EXCEPT POWER EXHAUST UNITS 10'-0")
FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES, CONTACT CARRIER APPLICATION ENGINEERING DEPARTMENT.
 4. SUGGESTED FIELD CONNECTIONS TO BE MADE
INSIDE OR OUTSIDE OF 32.5 mm FLANGE.
 5. WHEN THE UNIT IS SLAB MOUNTED, PLUG THE FIELD HOLES. FIELD HOLES: UNITS WITH CONDENSATE DRAIN HOLES.
 6. ECONOMIZER SIDE HOODS ARE FOLDED
INSIDE UNIT FOR SHIPPING.

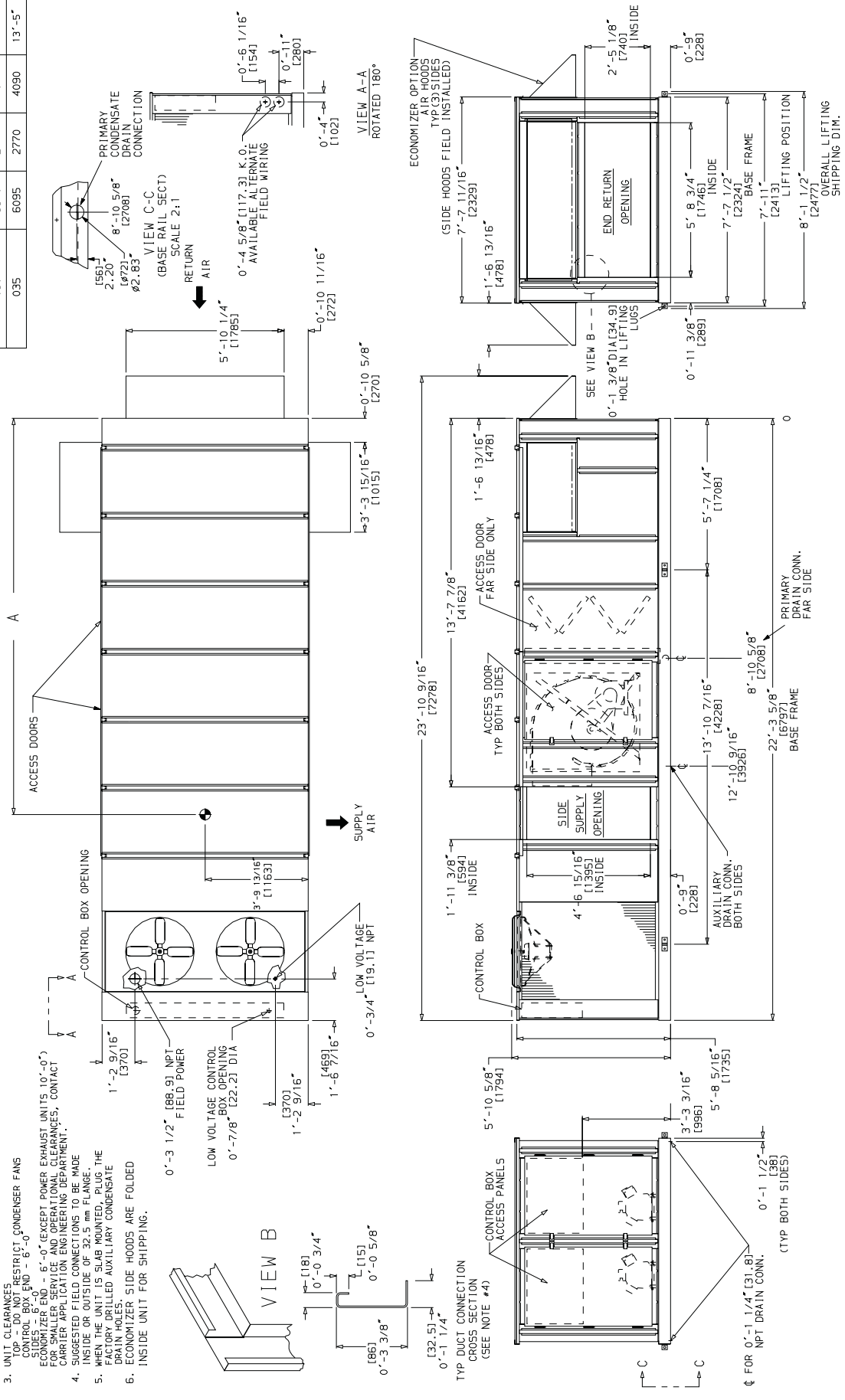
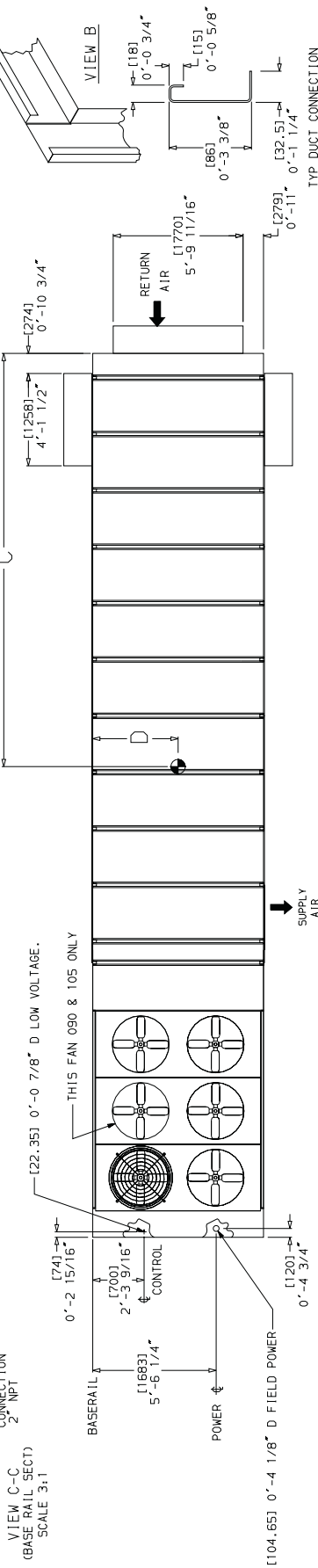
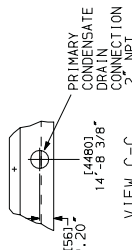


Fig. 28 — Base Unit Dimensional Drawing — 50ZB,ZF,ZK030,035 (Standard Chassis)

UNIT SIZE	WEIGHT LBS.	A FT. IN. MM	B FT. IN. MM	C FT. IN. MM	D FT. IN. MM	E FT. IN. MM	F FT. IN. MM
075	9870	3544	21' 3 5/8"	6528	21' -5"	1163	3'-9 13/16" 12049
090	10080	4572	21' 3 5/8"	6579	21' -7"	1163	3'-9 13/16" 12049
105	10810	4903	21' 3 5/8"	6807	22' -4"	1163	3'-9 13/16" 12049



TYP DUCT CONNECTION
CROSS SECTION
(SEE NOTE #4)

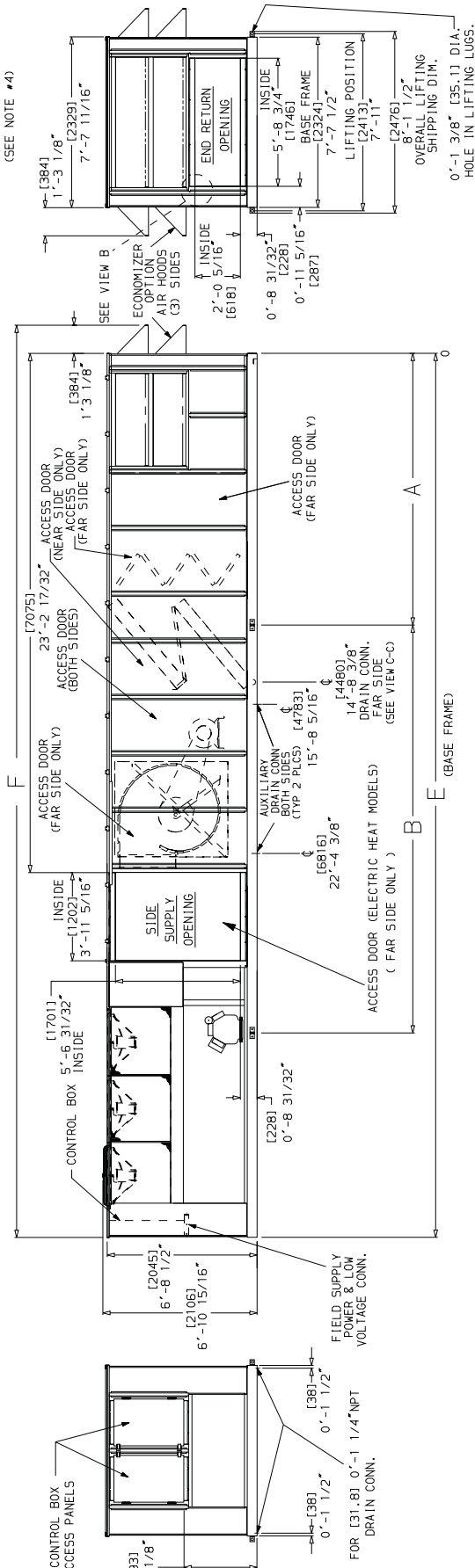
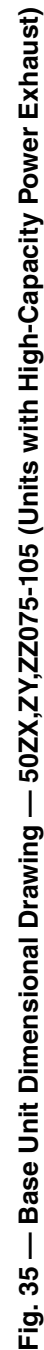


Fig. 31 — Base Unit Dimensional Drawing — 50ZB,ZF,ZK075-105 (Standard Chassis)

DIMENSIONS IN [] ARE IN MILLIMETERS.
 CENTER OF GRAVITY AND UNIT WEIGHT
 INCLUDES ECONOMIZER.
 UNIT CLEARANCES:
 TOP DO NOT RESTRICT CONDENSER FANS
 CONTROL BOX END - 6'-0"
 SIZES - 6'-0"
 ECONOMIZER END - 10'-0"
 FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES
 CARRIER APPLICATION ENGINEERING DEPARTMENT



UNIT SIZE	WEIGHT LBS.	KGS.	A		B		C		D		E		F	
			MM	FT. IN.	MM	FT. IN.	MM	FT. IN.	MM	FT. IN.	MM	FT. IN.	MM	FT. IN.
075	11340	5143	3544	11'-7 1/2"	6494	21' 3 5/8"	5791	19' 0"	1163	3'-9 13/16"	12049	39'-6 3/8"	12433	40'-9 1/2"
090	11550	5239	3544	11'-7 1/2"	6494	21' 3 5/8"	5842	19' 2"	1163	3'-9 13/16"	12049	39'-6 3/8"	12433	40'-9 1/2"
105	12280	5570	3544	11'-7 1/2"	6494	21' 3 5/8"	6096	20' 0"	1163	3'-9 13/16"	12049	39'-6 3/8"	12433	40'-9 1/2"

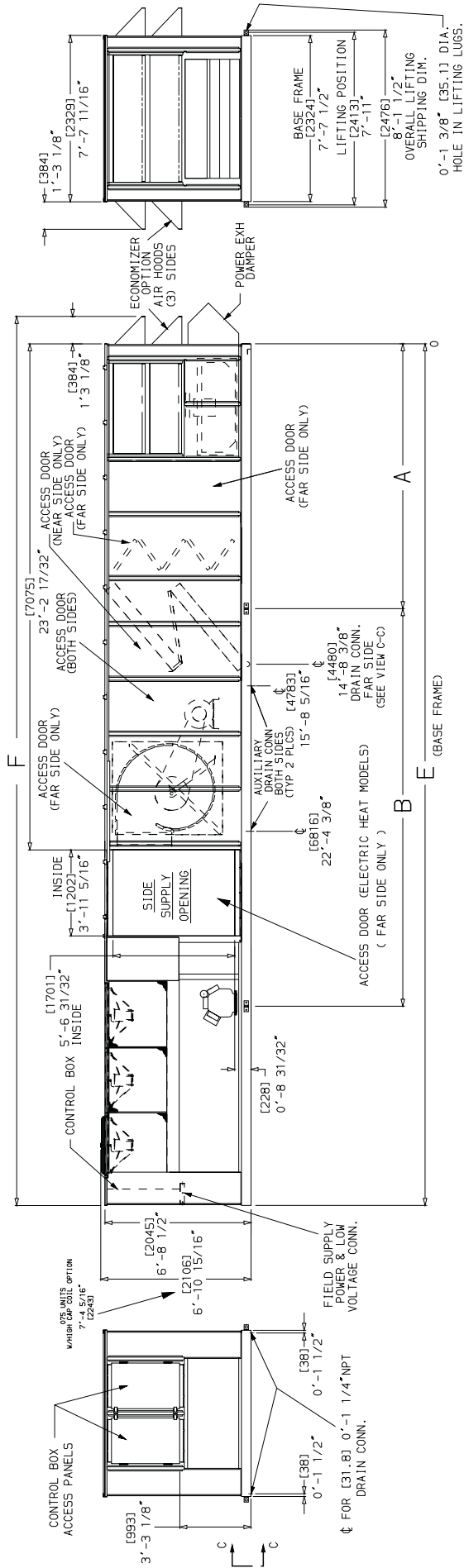
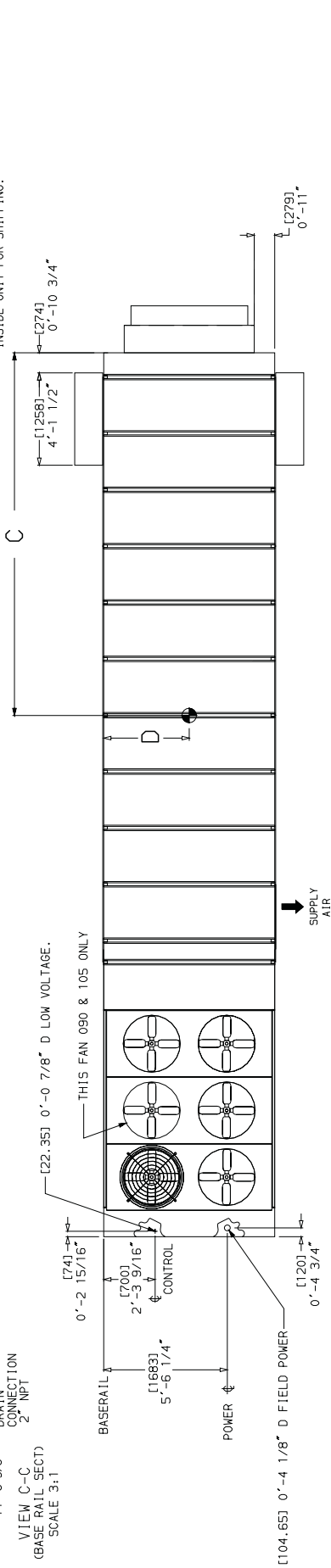
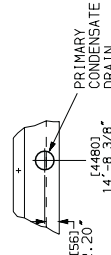


Fig. 37 — Base Unit Dimensional Drawing — 50ZD,ZM,ZS075-105 (Return/Exhaust Fan Units)

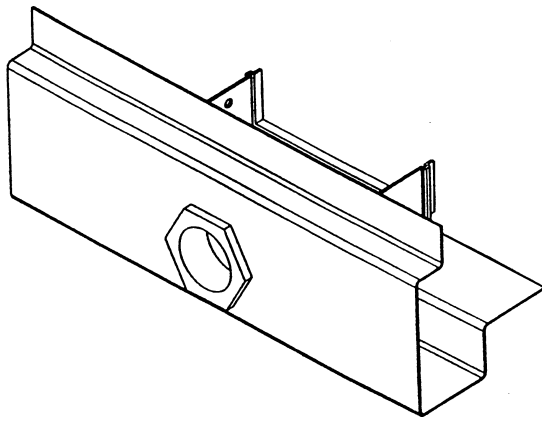


Fig. 38 — Primary Drain Connection

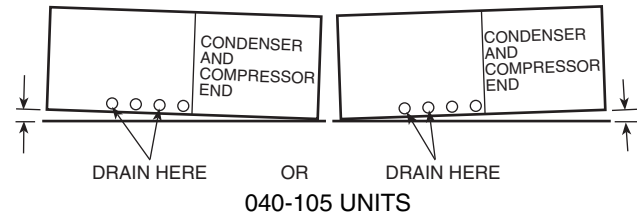
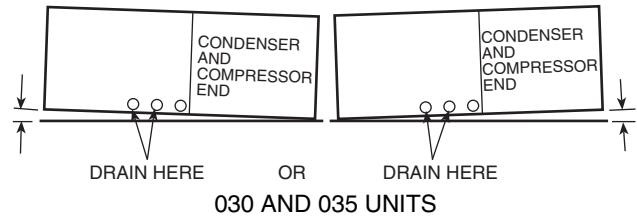


Fig. 40 — Typical Drain Location Selection

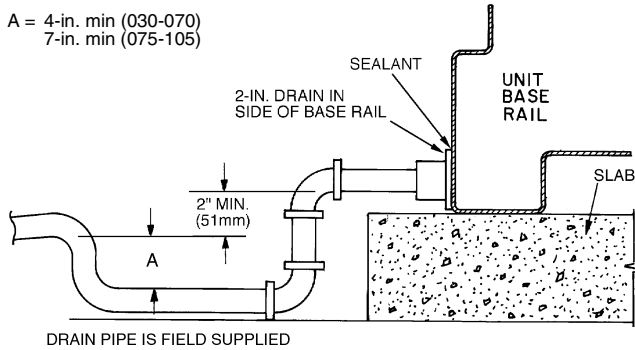
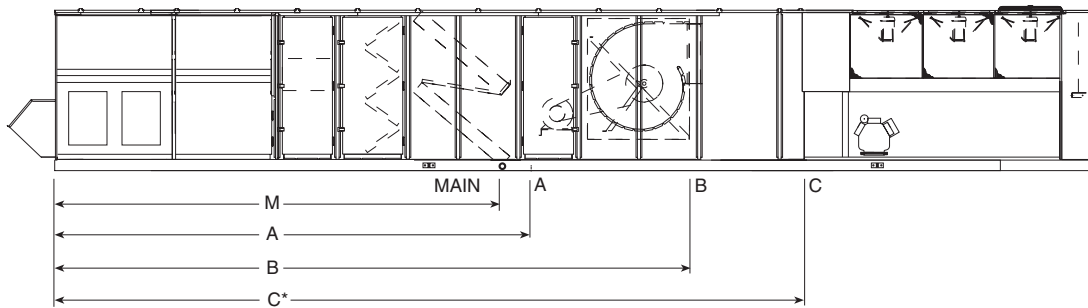


Fig. 39 — Slab-Mounted Condensate Drain Piping Details

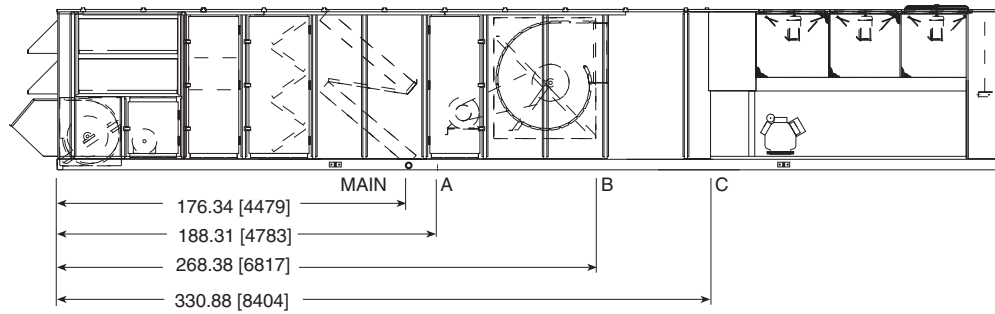


50ZA,ZB,ZE,ZF,ZJ,ZK030-070

UNIT SIZE STANDARD CHASSIS	PITCH		INCHES				MM			
			(M)	(A)	(B)	(C)	(M)	(A)	(B)	(C)
030,035		Dimension	105.67	154.57	N/A	190.47	2684	3926	N/A	4838
	Return Air End High	Action	Pipe	Pipe	N/A	Open	Pipe	Pipe	N/A	Open
	Control Box End High	Action	Pipe	Pipe	N/A	Open	Pipe	Pipe	N/A	Open
040,050		Dimension	133.90	148.39	187.48	226.89	3401	3769	4762	5763
	Return Air End High	Action	Pipe	Seal	Pipe	Open	Pipe	Seal	Pipe	Open
	Control Box End High	Action	Pipe	Pipe	Seal	Open	Pipe	Pipe	Seal	Open
055-070		Dimension	176.34	190.83	268.35	330.83	4479	4847	6816	8403
	Return Air End High	Action	Pipe	Seal	Pipe	Open	Pipe	Seal	Pipe	Open
	Control Box End High	Action	Pipe	Pipe	Seal	Open	Pipe	Pipe	Seal	Open
UNIT SIZE EXTENDED CHASSIS	PITCH		INCHES				MM			
			(M)	(A)	(B)	(C)	(M)	(A)	(B)	(C)
030,035		Dimension	105.67	129.41	201.93	219.21	2684	3287	5129	5568
	Return Air End High	Action	Pipe	Seal	Pipe	Open	Pipe	Seal	Pipe	Open
	Control Box End High	Action	Pipe	Pipe	Seal	Open	Pipe	Pipe	Seal	Open
040,050		Dimension	133.90	162.28	212.68	252.09	3401	4122	5402	6403
	Return Air End High	Action	Pipe	Seal	Pipe	Open	Pipe	Seal	Pipe	Open
	Control Box End High	Action	Pipe	Pipe	Seal	Open	Pipe	Pipe	Seal	Open
055,060		Dimension	176.34	206.06	293.54	356.02	4479	5234	7456	9043
	Return Air End High	Action	Pipe	Seal	Pipe	Open	Pipe	Seal	Pipe	Open
	Control Box End High	Action	Pipe	Pipe	Seal	Open	Pipe	Pipe	Seal	Open

*Drain location C: These drain locations (on both sides of the unit) permit drainage from the base rail sections of water that has entered the rail from under the condenser section. Do not seal or install traps at these locations.

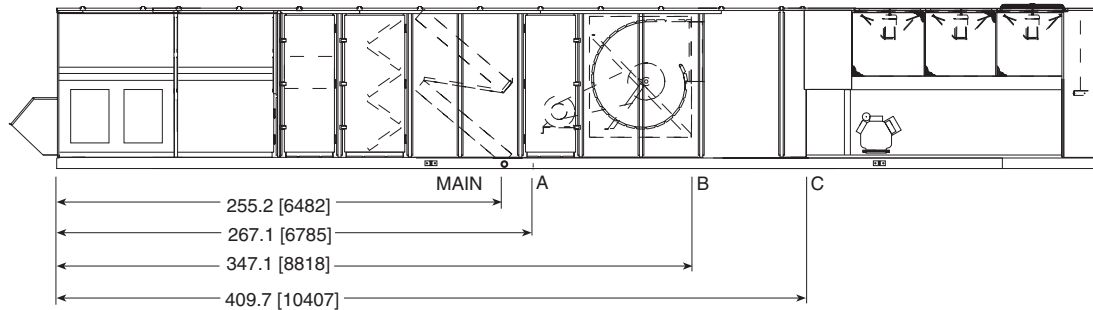
Fig. 41 — Condensate Drain Locations



50ZA,ZB,ZC,ZD,ZE,ZF,ZJ,ZK,ZL,ZM,ZR,ZS075-105

PITCH	DRAIN LOCATION		
	A	B	C*
Return Air End High	Seal	Pipe	Open
Control Box End High	Pipe	Seal	Open

*Drain location C: These drain locations (on both sides of the unit) permit drainage from the base rail sections of water that has entered the rail from under the condenser section. Do not seal or install traps at these locations.



50ZT,ZV,ZW,ZX,ZY,ZZ075-105

PITCH	DRAIN LOCATION		
	A	B	C*
Return Air End High	Seal	Pipe	Open
Control Box End High	Pipe	Seal	Open

*Drain location C: These drain locations (on both sides of the unit) permit drainage from the base rail sections of water that has entered the rail from under the condenser section. Do not seal or install traps at these locations.

Fig. 41 — Condensate Drain Locations (cont)

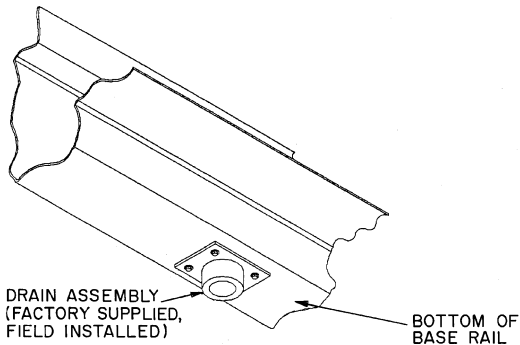


Fig. 42 — Secondary Condensate Drain Location

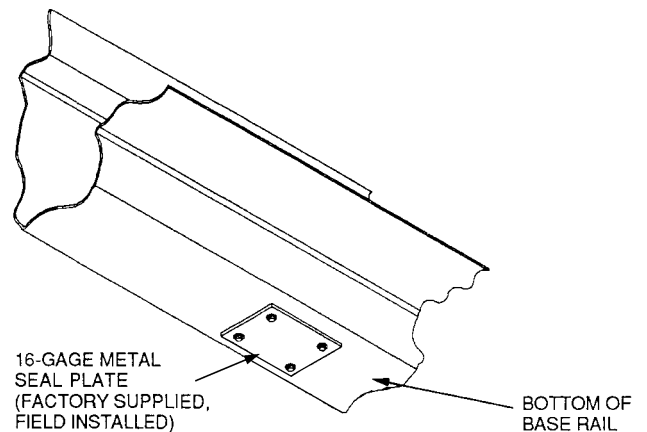


Fig. 43 — Secondary Drain Seal Plate Location

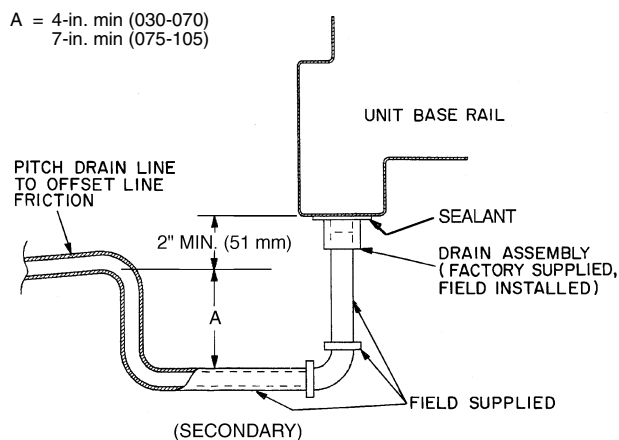


Fig. 44 — Curb Mounted Condensate Drain Piping Details

Install Outdoor Hoods (50ZA,ZB,ZC,ZD,ZE,ZF,ZJ,ZK,ZL,ZM,ZR,ZS)

UNIT SIZES 030-050

25% Outdoor-Air Hoods (Units Without Economizer Option) (Fig. 45)

1. Outdoor-air hoods are shipped bolted to the unit in a shipping position. Remove the 6 screws holding each 25% outdoor-air hood shipping cover in place.
2. Remove the holddown screw from each upper corner of each hood.
3. Pivot hoods outward (2 hoods).
4. Install 17 screws around outside of each hood. (Screws are in the fastener package taped to the basepan inside the fan section.)
5. Apply a bead of RTV or similar sealant to corner of each hood at pivot point to prevent water leaks. See Fig. 46.

Economizer Hoods (Units With Economizer Option) (Fig. 47 and 48) — Follow the same procedure described in 25% Outdoor-Air Hoods section above.

UNIT SIZES 055-105

25% Outdoor-Air Hoods (Fig. 49) — The outdoor-air hoods are factory installed on the 055-105 units.

Economizer Hoods (Units With Economizer Option) (Fig. 50-52)

1. Remove the 6 screws holding each of the 4 economizer shipping covers in place.
2. Remove the holddown screw from each upper corner of each economizer hood.
3. Pivot hoods outward (4 hoods).
4. Install 18 screws (5 each side, 6 top, and 2 bottom) around the outside of each hood. (Screws are in the fastener package taped to the basepan inside the fan section.)
5. Apply a bead of RTV or similar sealant to corner of economizer hood at pivot point to prevent water leaks. (See Fig. 46.)

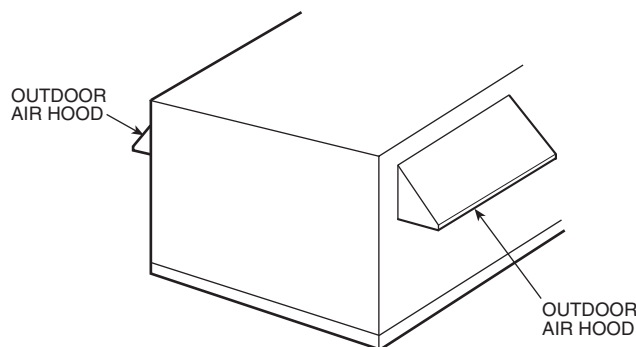


Fig. 45 — Outdoor Air Hood Installation (50ZA,ZB,ZE,ZF,ZJ,ZK030-050)

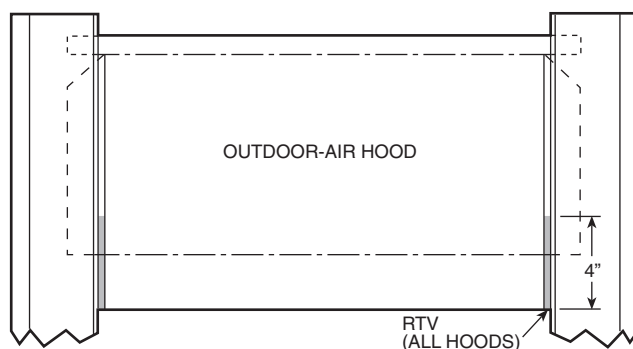


Fig. 46 — Outdoor-Air and Economizer Hood

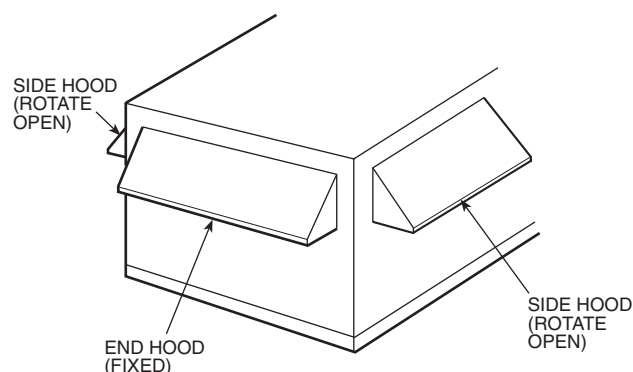


Fig. 47 — Economizer Outdoor-Air Hood Installation (50ZA,ZB,ZE,ZF,ZJ,ZK030-050)

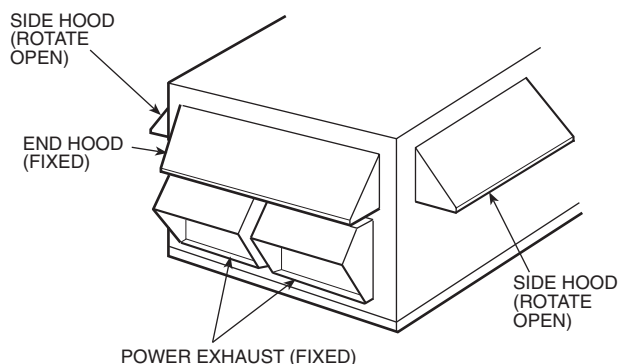


Fig. 48 — Economizer with Power Exhaust Outdoor-Air Hood Installation (50ZA,ZB,ZE,ZF,ZJ,ZK030-050)

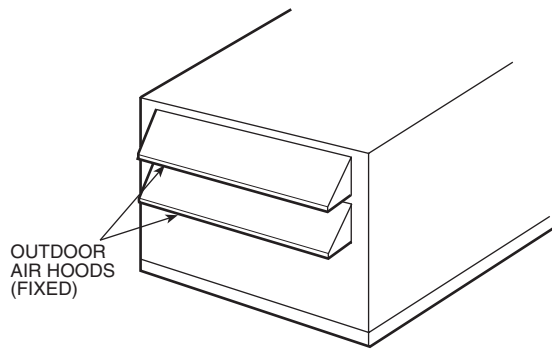


Fig. 49 — 25% Outdoor-Air Hood Location (50ZA,ZB,ZE,ZF,ZJ,ZK055-105)

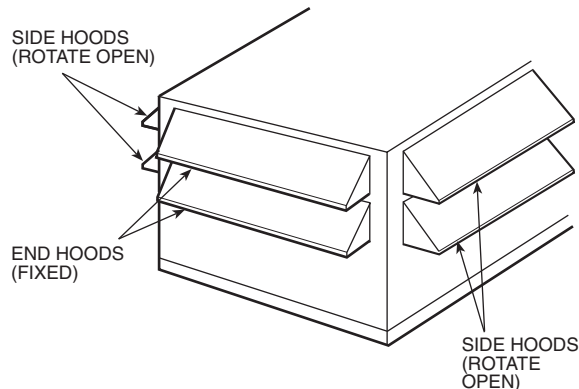


Fig. 50 — Economizer Outdoor-Air Hood Installation (50ZA,ZB,ZE,ZF,ZJ,ZK055-105)

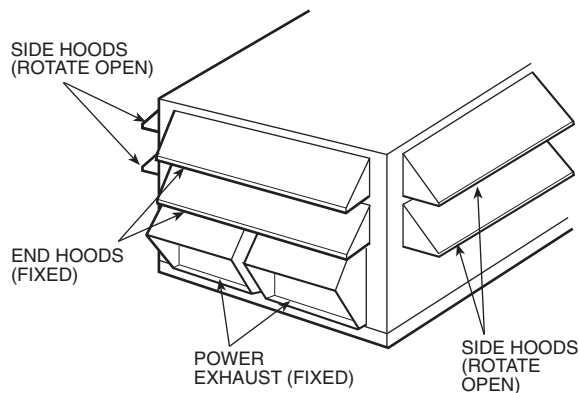


Fig. 51 — Economizer with Power Exhaust Outdoor-Air Hood Installation (50ZA,ZB,ZE,ZF,ZJ,ZK055-105)

Install Economizer Hoods (50ZT,ZV,ZW,ZX,ZY,ZZ) — The economizer uses a total of 4 outdoor intake hoods, 2 on each side of the unit. See Fig. 53. Two small hoods (one per side) are factory-installed and are pivoted inside the unit chassis for shipment. Two large hoods are shipped in packages located inside the unit. The large hoods (1 on each side) require field assembly and mounting.

INSTALL SMALL HOODS — To install the small economizer hoods, perform the following procedure:

1. Remove the 10 screws holding each of the small economizer hood shipping covers in place.

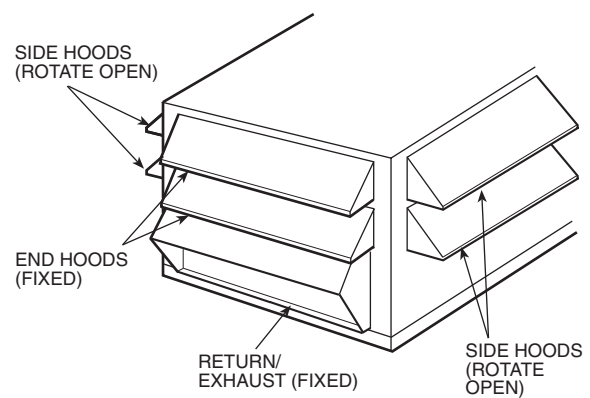


Fig. 52 — Economizer with Return/Exhaust Fan Outdoor-Air Hood Installation (50ZC,ZD,ZL,ZM,ZR,ZS)

2. Pivot hoods outward (2 hoods).
3. Install 15 screws (4 each side, 7 across top) around the outside of each hood. Screws are in the fastener package taped to the basepan inside the fan section.
4. Apply a bead of RTV or similar sealant to corner of economizer hood at pivot point to prevent water leaks. (See Fig. 46.)

INSTALL LARGE HOODS — Large hoods are shipped disassembled in the economizer section of the unit behind the large economizer hood shipping cover. See Fig. 54 for assembly details for large economizer hoods. To install the large economizer hoods, perform the following procedure:

1. Remove the 17 screws holding each of the large economizer hood shipping covers in place.
2. Remove the two packages containing the disassembled large economizer hoods. Each package contains the following: left side hood, right side hood, top hood, front hood, top filter flange, side filter flanges (4), bottom support, front support, filters (6), filter clips (9), seal strip, fasteners.
3. Place seal strip on backside of bottom support along entire length of support, covering 6 clearance holes.
4. Attach bottom support piece to unit. Be sure seal strip is between bottom support and panel on unit.
5. Place seal strip on $\frac{3}{4}$ -in. flange on both the left and right side hood.
6. Attach the side filter flanges to the left and right side hoods, 2 on each side hood.
7. Attach left and right side hoods to unit. Be sure seal strip is between side hood and unit.
8. Place seal strip on $\frac{3}{4}$ -in. flange on top hood.
9. Attach top filter flange to top hood.
10. Attach top hood to unit and to side hoods. Be sure seal strip is between top hood and unit.
11. Attach front support between left and right side hoods.
12. Place seal strip on all filter flanges.
13. Attach filter clips to front and bottom supports.
14. Install filters and filter clips. Filters are held in place with filter clips.
15. Attach front hood to top and side hoods.
16. Apply RTV to 6 places shown in Fig. 54.

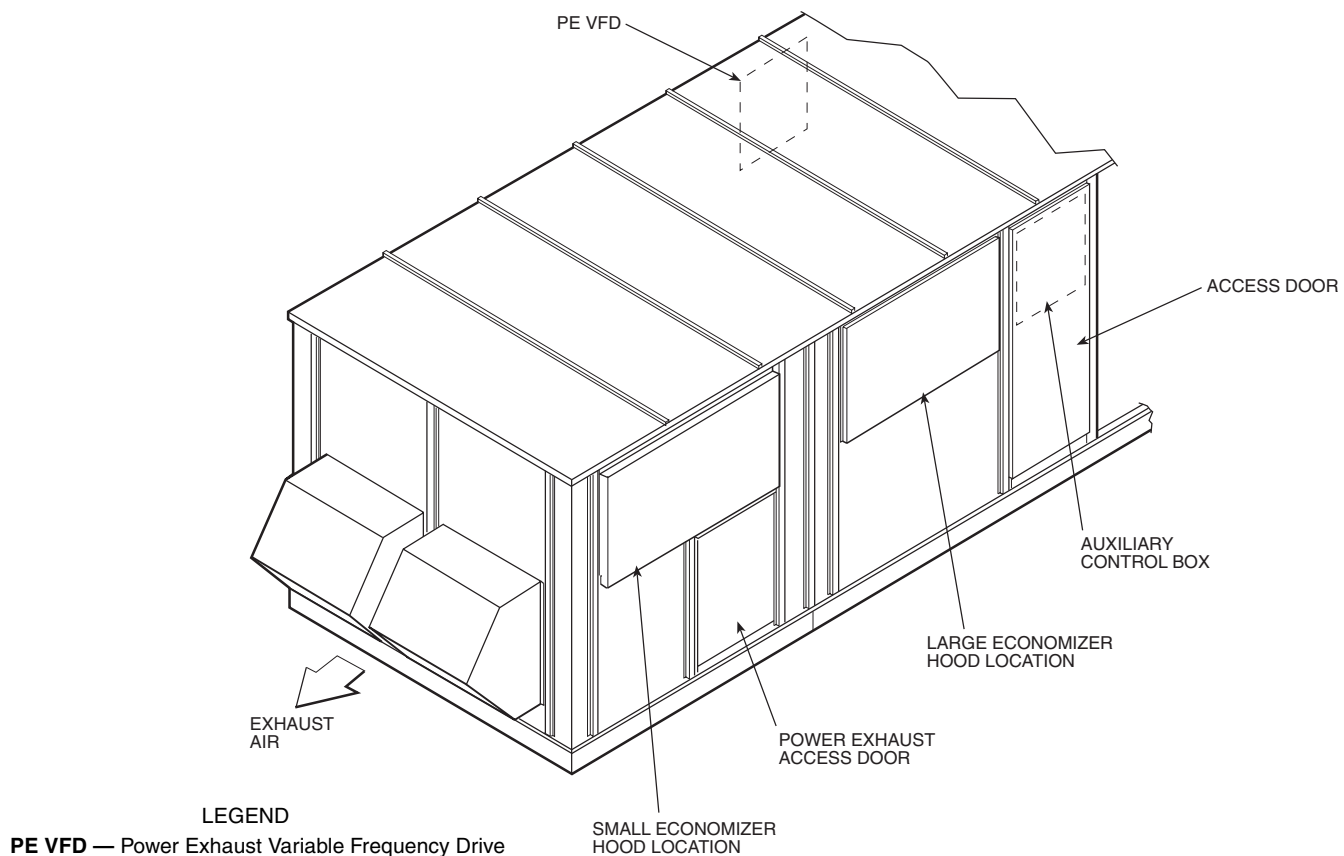


Fig. 53 — Economizer Hood Location — 50ZT,ZV,ZW,ZX,ZY,ZZ

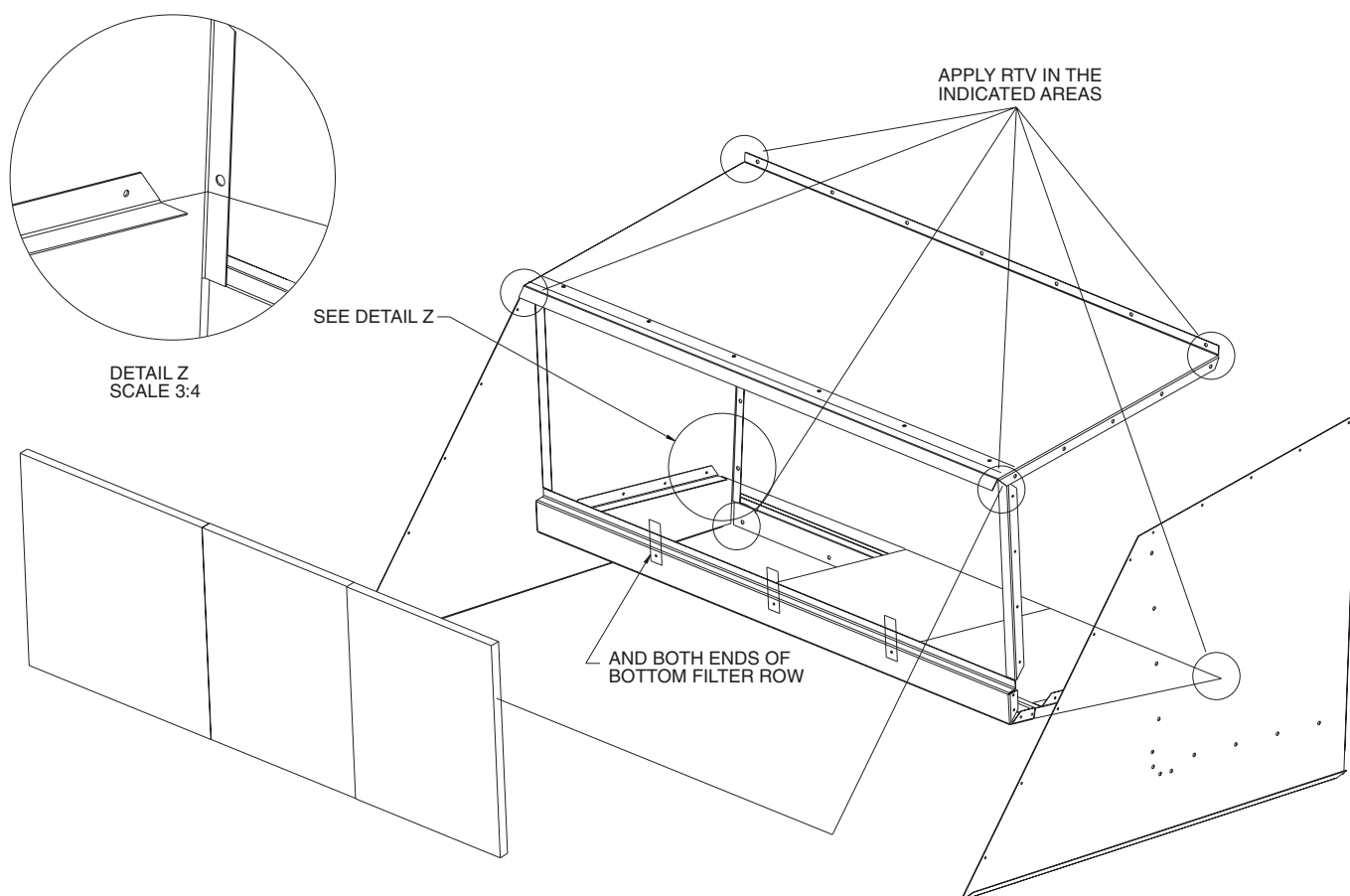


Fig. 54 — Large Economizer Hood Assembly

Field Wire Routing

UNIT SIZES 030-050 — Field wiring can be brought into the unit through the basepan and roof curb or through the corner post in the side of the unit next to the control box.

A $3\frac{1}{2}$ -in. NPT coupling for field power and a $\frac{3}{4}$ -in. NPT coupling for 24-v control wiring are provided in the basepan. There are two $4\frac{5}{8}$ -in. knockouts in the corner post for field power wiring.

If field power wiring is brought through the roof curb, route wiring out through one of the $4\frac{5}{8}$ -in. knockouts to the field-supplied disconnect and then back into the unit through the other knockout. See Fig. 55 for recommended disconnect location.

If power wiring is brought through the side of the unit, route wiring from field-supplied disconnect through top $4\frac{5}{8}$ -in. knockouts into unit.

If control wiring is to be brought in through the side of the unit, a $\frac{7}{8}$ -in. diameter hole must be drilled in the corner post next to the control box.

UNIT SIZES 055-105 — Field wiring is brought into the unit through the bottom of the control box. Wiring can be brought through the roof curb through field-supplied watertight connections. See Fig. 56.

A $4\frac{5}{32}$ -in. hole for field power wiring and a $\frac{7}{8}$ -in. hole for 24-v control wiring are provided in the bottom of the control box. Field-supplied couplings must be used when routing wiring into the control box.

See Fig. 56 for recommended disconnect location.

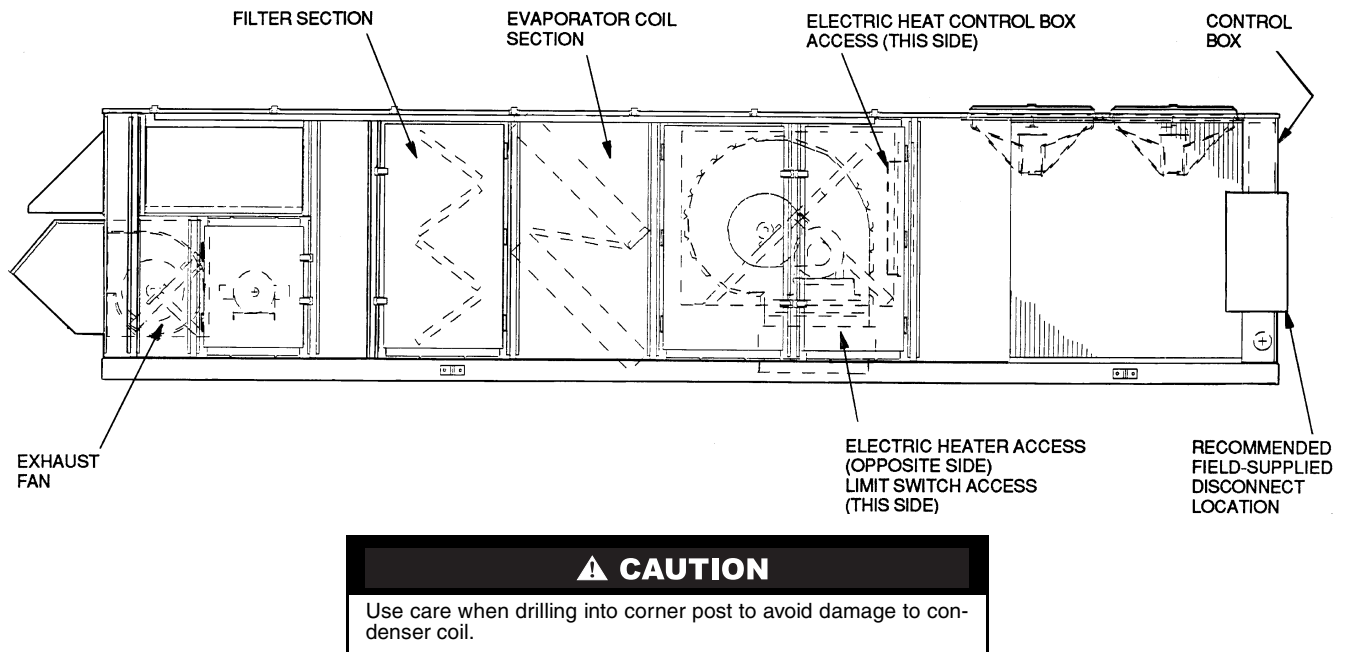


Fig. 55 — Disconnect Location, 030-050 Units (Vertical Discharge Unit Shown)

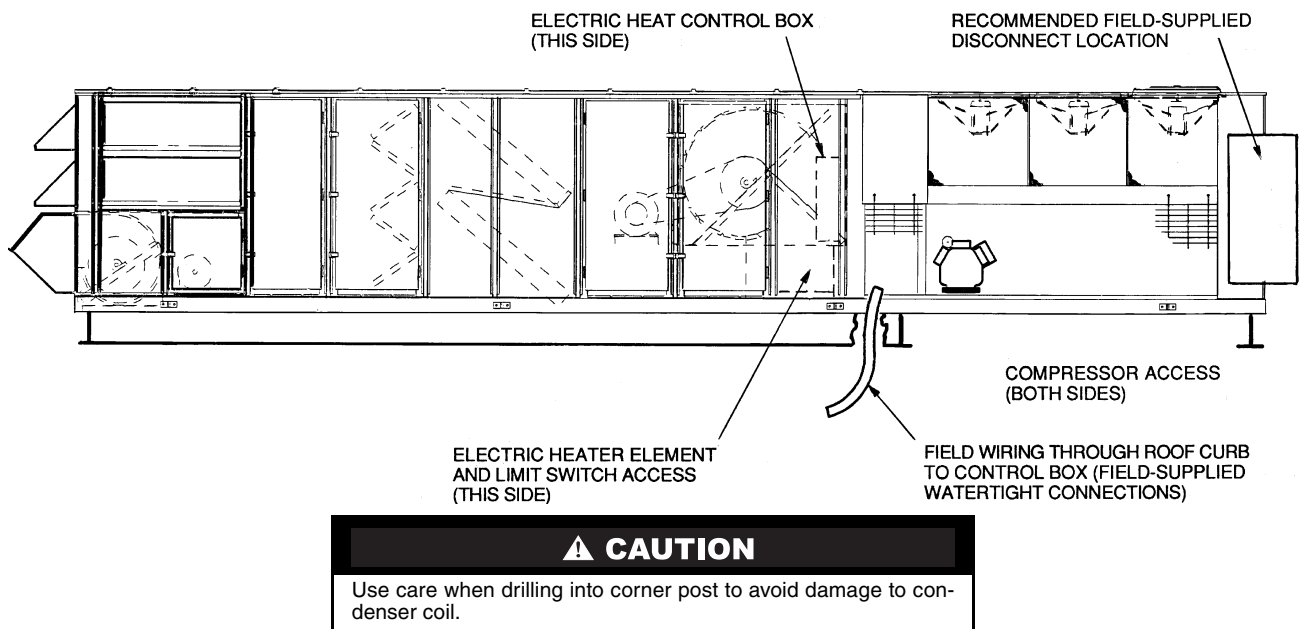


Fig. 56 — Disconnect Location, 055-105 Units (Vertical Discharge Units without High-Capacity Power Exhaust Shown)

Field Electrical Connections

IMPORTANT: The 50ZE,ZF,ZJ,ZK,ZL,ZM,ZR,ZS,ZW,ZV,ZY,ZZ units generate, use, and can radiate radio frequency energy. If units are not installed and used in accordance with these instructions, they may cause radio interference. They have been tested and found to comply with limits of a Class A computing device as defined by FCC (Federal Communications Commission) regulations, Subpart J of Part 15, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

POWER WIRING — Units are factory wired for the voltage shown on the unit nameplate. The main terminal block is suitable for use with aluminum or copper wires. Maximum wire size is 3/0 AWG (American Wire Gage).

Units Without Factory-Installed Disconnect — When installing units, provide a disconnect per NEC (National Electrical Code) of adequate size (MOCP [Maximum Overcurrent Protection] of unit is on the informative plate). All field wiring must comply with NEC and all local codes. Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 57 for power wiring connections to the unit power terminal block and equipment ground. Maximum wire size is two 500 MCM conductors per pole.

Units With Factory-Installed Disconnect — The factory-installed disconnect is an interlocking, door-type. The disconnect handle locks the door when it is in the ON position. The disconnect handle must be in the OFF position to open the control box door. The disconnect is located in a separate control box behind the control box door for 030-050 units. See Fig. 58. The disconnect is located inside the main control box for 055-105 units. See Fig. 59.

All field wiring must comply with NEC and all local codes. Wire must be sized based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 60 for power wiring connections to the unit disconnect and equipment ground.

DISCONNECT SIZE	MAXIMUM WIRE SIZE (MCM)
200 Amps	300
400 Amps	600
600 Amps	600*

*Two conductors per pole.

Operating Voltage — Operating voltage to the compressor must be within the voltage range indicated on the unit nameplate. Voltages between phases must be balanced within 2%, and the current must be balanced within 10%. See Tables 7-22 for unit electrical data.

(Text continued on page 90.)

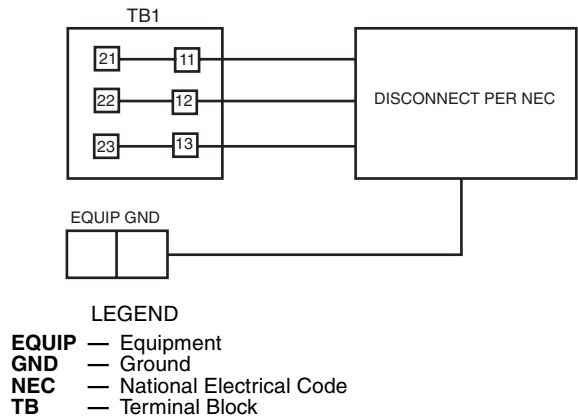


Fig. 57 — Field Power Wiring Connections

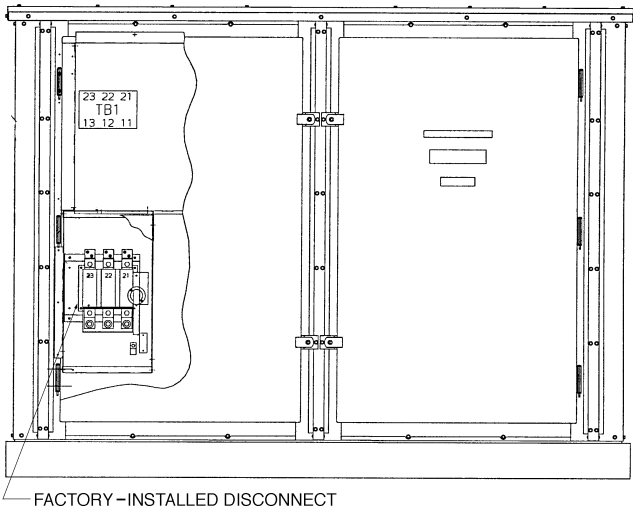


Fig. 58 — Factory-Installed Disconnect Location (Sizes 030-050)

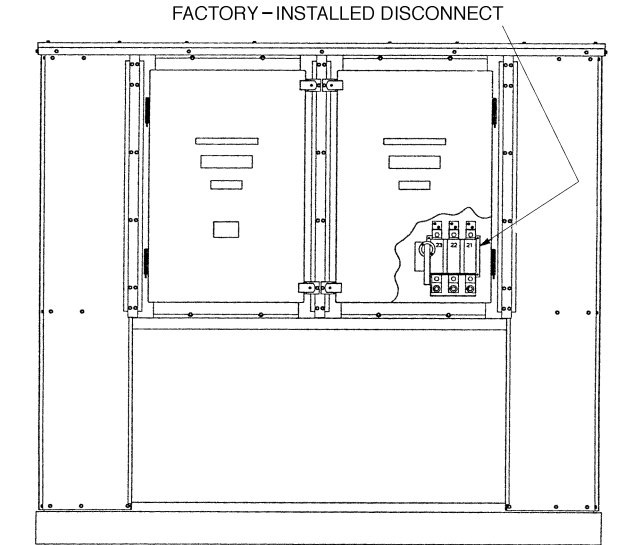


Fig. 59 — Factory-Installed Disconnect Location (Sizes 055-105)

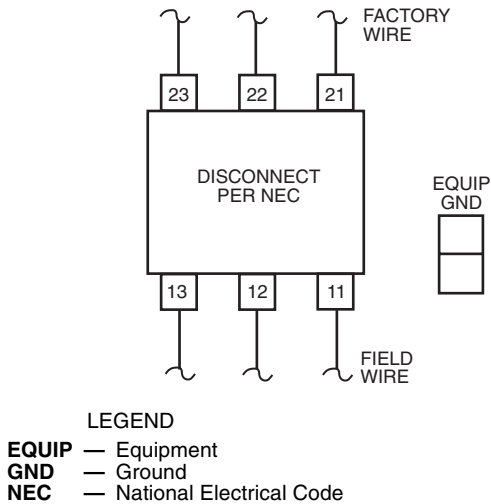


Fig. 60 — Field Power Wiring Connections for Factory-Installed Disconnect

Table 7 — Electrical Data Size 030 Units

208/230-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRICAL HEAT*		POWER SUPPLY	
		No. 1		No. 2											
Min	Max	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
187	253	53.2	266	53.2	266	2	6.6 (ea)	7 1/2	24.2/22.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	157.1/154.9 157.1/154.9 188.0/209.5 266.9/300.5	200/200 200/200 225/250 300/350
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	178.3/174.1 178.3/174.1 214.5/233.5 293.4/324.5	225/225 225/225 250/250 300/350
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	190.5/185.3 190.5/185.3 229.7/247.5 308.6/338.5	225/225 225/225 250/300 350/350
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	205.5/198.9 205.5/198.9 248.5/264.5 327.4/355.5	250/250 250/250 250/300 350/400
								10	30.8/28.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	163.7/160.9 163.7/160.9 196.2/217.0 275.1/308.0	200/200 200/200 250/250 300/350
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	184.9/180.1 184.9/180.1 222.7/241.0 301.6/332.0	225/225 225/225 250/250 350/350
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	197.1/191.3 197.1/191.3 238.0/255.0 316.9/346.0	250/225 250/225 250/300 350/350
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	212.1/204.9 212.1/204.9 256.7/272.0 335.6/363.0	250/250 250/250 300/300 350/400
								15	46.2/42.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	179.1/174.9 179.1/174.9 215.5/234.5 294.4/325.5	225/225 225/225 250/250 300/350
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	200.3/194.1 200.3/194.1 242.0/258.5 320.9/349.5	250/225 250/225 250/300 350/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	212.5/205.3 212.5/205.3 257.2/272.5 336.1/363.5	250/250 250/250 300/300 350/400
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	227.5/218.9 227.5/218.9 276.0/289.5 354.9/380.5	250/250 250/250 300/300 400/400
								20	59.4/54.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	193.9/187.1 193.9/187.1 232.0/249.5 310.9/340.5	250/225 250/225 250/300 350/350
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	215.1/206.3 215.1/206.3 258.5/273.5 337.4/364.5	250/250 250/250 300/300 350/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	227.3/217.5 227.3/219.3 273.7/287.5 352.6/378.5	250/250 250/250 300/300 400/400
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	242.3/231.1 242.3/236.3 292.5/304.5 371.4/395.5	300/250 300/250 300/350 400/400
								25	74.8/68.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	213.1/204.6 213.1/204.6 251.2/267.0 330.1/358.0	250/250 250/250 300/300 400/400
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	234.3/223.8 234.3/223.8 277.7/291.0 356.6/382.0	300/250 300/250 300/350 400/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	246.5/235.0 246.5/236.8 293.0/305.0 371.9/396.0	300/300 300/300 350/350 400/450
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	261.5/248.6 261.5/253.8 311.7/322.0 390.6/413.0	300/300 300/300 350/350 450/450

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 7 — Electrical Data Size 030 Units (cont)
380-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
342	418	34.6	145	34.6	145	2	2.7 (ea)	7½	12.5	—	—	—	—	95.8	125
												38.3	25	95.8	125
												76.8	51	95.8	125
												114.7	76	130.3	150
										6	8.0	—	—	103.8	125
												38.3	25	103.8	125
												76.8	51	103.8	125
												114.7	76	140.3	175
										10	18.2	—	—	114.0	125
												38.3	25	114.0	125
												76.8	51	115.2	150
												114.7	76	153.1	175
										15	26.0	—	—	121.8	150
												38.3	25	121.8	150
												76.8	51	124.9	150
												114.7	76	162.8	175
								10	16.7	—	—	—	—	100.0	125
												38.3	25	100.0	125
												76.8	51	100.0	125
												114.7	76	135.6	150
										6	8.0	—	—	108.0	125
												38.3	25	108.0	125
												76.8	51	108.0	125
												114.7	76	145.6	175
										10	18.2	—	—	118.2	150
												38.3	25	118.2	150
												76.8	51	120.4	150
												114.7	76	158.3	175
										15	26.0	—	—	126.0	150
												38.3	25	126.0	150
												76.8	51	130.2	150
												114.7	76	168.1	200
								15	24.5	—	—	—	—	107.8	125
												38.3	25	107.8	125
												76.8	51	107.8	125
												114.7	76	145.3	175
										6	8.0	—	—	115.8	150
												38.3	25	115.8	150
												76.8	51	117.4	150
												114.7	76	155.3	175
										10	18.2	—	—	126.0	150
												38.3	25	126.0	150
												76.8	51	130.2	150
												114.7	76	168.1	200
										15	26.0	—	—	133.8	150
												38.3	25	133.8	150
												76.8	51	139.9	150
												114.7	76	177.8	200
								20	30.0	—	—	—	—	113.3	125
												38.3	25	113.3	125
												76.8	51	114.3	150
												114.7	76	152.2	175
										6	8.0	—	—	121.3	150
												38.3	25	121.3	150
												76.8	51	124.3	150
												114.7	76	162.2	175
										10	18.2	—	—	131.5	150
												38.3	25	131.5	150
												76.8	51	137.1	150
												114.7	76	175.0	200
										15	26.0	—	—	139.3	150
												38.3	25	139.3	150
												76.8	51	146.8	175
												114.7	76	184.7	200
								25	38.0	—	—	—	—	122.1	150
												38.3	25	122.1	150
												76.8	51	124.3	150
												114.7	76	162.2	200
										6	8.0	—	—	130.1	150
												38.3	25	130.1	150
												76.8	51	134.3	150
												114.7	76	172.2	200
										10	18.2	—	—	140.3	175
												38.3	25	140.3	175
												76.8	51	147.1	175
												114.7	76	185.0	200
										15	26.0	—	—	148.1	175
												38.3	25	148.1	175
												76.8	51	156.8	175
												114.7	76	194.7	225

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.
†Fuse or HACR breaker.

NOTE: Electric resistance heaters are rated at 230-v (for 208/23

Table 7 — Electrical Data Size 030 Units (cont)
460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
414	508	28.8	120	28.8	120	2	3.3 (ea)	7½	11.0	—	—	—	—	82.4	110
												46.3	36	82.4	110
												93.0	72	106.8	125
												139.0	108**	152.8	175
										6	9.6	—	—	92.0	110
												46.3	36	92.0	110
												93.0	72	118.8	125
												139.0	108**	164.8	175
										10	15.2	—	—	97.6	125
												46.3	36	97.6	125
												93.0	72	125.8	150
												139.0	108**	171.8	200
										15	22.0	—	—	104.4	125
												46.3	36	104.4	125
												93.0	72	134.3	150
												139.0	108**	180.3	200
								10	14.0	—	—	—	—	85.4	110
												46.3	36	85.4	110
												93.0	72	110.5	125
												139.0	108**	156.5	175
										6	9.6	—	—	95.0	110
												46.3	36	95.0	110
												93.0	72	122.5	150
												139.0	108**	168.5	175
										10	15.2	—	—	100.6	125
												46.3	36	100.6	125
												93.0	72	129.5	150
												139.0	108**	175.5	200
										15	22.0	—	—	107.4	125
												46.3	36	107.4	125
												93.0	72	138.0	150
												139.0	108**	184.0	200
								15	21.0	—	—	—	—	92.4	110
												46.3	36	92.4	110
												93.0	72	119.3	150
												139.0	108**	165.3	175
										6	9.6	—	—	102.0	125
												46.3	36	102.0	125
												93.0	72	131.3	150
												139.0	108**	177.3	200
										10	15.2	—	—	107.6	125
												46.3	36	107.6	125
												93.0	72	138.3	150
												139.0	108**	184.3	200
										15	22.0	—	—	114.4	125
												46.3	36	114.4	125
												93.0	72	146.8	150
												139.0	108**	192.8	200
								20	27.0	—	—	—	—	98.4	125
												46.3	36	98.4	125
												93.0	72	126.8	150
												139.0	108**	172.8	200
										6	9.6	—	—	108.0	125
												46.3	36	108.0	125
												93.0	72	138.8	150
												139.0	108**	184.8	200
										10	15.2	—	—	113.6	125
												46.3	36	113.6	125
												93.0	72	145.8	150
												139.0	108**	191.8	200
										15	22.0	—	—	120.4	125
												46.3	36	120.4	125
												93.0	72	154.3	175
												139.0	108**	200.3	225
								25	34.0	—	—	—	—	106.7	125
												46.3	36	106.7	125
												93.0	72	135.5	150
												139.0	108**	181.5	200
										6	9.6	—	—	116.3	150
												46.3	36	116.3	150
												93.0	72	147.5	175
												139.0	108**	193.5	225
										10	15.2	—	—	121.9	150
												46.3	36	121.9	150
												93.0	72	154.5	175
												139.0	108**	200.5	225
										15	22.0	—	—	128.7	150
												46.3	36	128.7	150
												93.0	72	163.0	175
												139.0	108**	209.0	225

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.
†Fuse or HACR breaker.
**108 kW available on CV applications only.

Table 7 — Electrical Data Size 030 Units (cont)

575-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
518	632	23.1	96	23.1	96	2	2.4 (ea)	7½	9.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	65.8 65.8 83.3 119.3	80 80 100 125
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	73.6 73.6 93.0 129.0	90 90 110 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	78.0 78.0 98.5 134.5	100 100 110 150
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	83.8 83.8 105.8 141.8	100 100 125 150
								10	11.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	67.8 67.8 85.8 121.8	90 90 110 125
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	75.6 75.6 95.5 131.5	90 90 110 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	80.0 80.0 101.0 137.0	100 100 110 150
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	85.8 85.8 108.3 144.3	100 100 125 150
								15	17.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	73.8 73.8 93.3 129.3	90 90 110 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	81.6 81.6 103.0 139.0	100 100 125 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	86.0 86.0 108.5 144.5	100 100 125 150
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	91.8 91.8 115.8 151.8	110 110 125 175
								20	22.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	78.8 78.8 99.5 135.5	100 100 110 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	86.6 86.6 109.3 145.3	100 100 125 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	91.0 91.0 114.8 150.8	110 110 125 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	96.8 96.8 122.0 158.0	110 110 125 175
								25	27.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	84.8 84.8 105.8 141.8	110 110 125 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	92.6 92.6 115.5 151.5	110 110 125 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	97.0 97.0 121.0 157.0	110 110 125 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	102.8 102.8 128.3 164.3	125 125 150 175

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 8 — Electrical Data Size 035 Units

208/230-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRICAL HEAT*		POWER SUPPLY	
		No. 1		No. 2								FLA		kW	
Min	Max	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
187	253	53.2	266	69.2	345	2	6.6 (ea)	7 1/2	24.2/22.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	177.1/174.9 177.1/174.9 188.0/209.5 266.9/300.5	225/225 225/225 250/250 300/350
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	198.3/194.1 198.3/194.1 214.5/233.5 293.4/324.5	250/250 250/250 250/300 350/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	210.5/205.3 210.5/205.3 229.7/247.5 308.6/338.5	250/250 250/250 300/300 350/400
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	225.5/218.9 225.5/218.9 248.5/264.5 327.4/355.5	250/250 250/250 300/300 350/400
								10	30.8/28.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	183.7/180.9 183.7/180.9 196.2/217.0 275.1/308.0	250/250 250/250 250/250 350/350
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	204.9/200.1 204.9/200.1 222.7/241.0 301.6/332.0	250/250 250/250 250/300 350/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	217.1/211.3 217.1/211.3 238.0/255.0 316.9/346.0	250/250 250/250 300/300 350/400
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	232.1/224.9 232.1/224.9 256.7/272.0 335.6/363.0	300/250 300/250 300/300 400/400
								15	46.2/42.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	199.1/194.9 199.1/194.9 215.5/234.5 294.4/325.5	250/250 250/250 250/300 350/400
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	220.3/214.1 220.3/214.1 242.0/258.5 320.9/349.5	250/250 250/250 300/300 350/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	232.5/225.3 232.5/225.3 257.2/272.5 336.1/363.5	300/250 300/250 300/300 400/400
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	247.5/238.9 247.5/238.9 276.0/289.5 354.9/380.5	300/300 300/300 300/350 400/400
								20	59.4/54.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	212.3/206.9 212.3/206.9 232.0/249.5 310.9/340.5	250/250 250/250 300/300 350/400
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	233.5/226.1 233.5/226.1 258.5/273.5 337.4/364.5	300/250 300/250 300/300 400/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	245.7/237.3 245.7/237.3 273.7/287.5 352.6/378.5	300/300 300/300 300/350 400/400
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	260.7/250.9 260.7/250.9 292.5/304.5 371.4/395.5	300/300 300/300 350/350 400/450
								25	74.8/68.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	229.1/220.9 229.1/220.9 251.2/267.0 330.1/358.0	300/250 300/250 300/300 400/400
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	250.3/240.1 250.3/240.1 277.7/291.0 356.6/382.0	300/300 300/300 300/350 400/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	262.5/251.3 262.5/251.3 293.0/305.0 371.9/396.0	300/300 300/300 350/350 400/450
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	277.5/264.9 277.5/264.9 311.7/322.0 390.6/413.0	350/300 350/300 350/350 450/450

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
(for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 8 — Electrical Data Size 035 Units (cont)
380-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
342	418	34.6	145	35.9	191	2	2.7 (ea)	7½	12.5	—	—	—	—	97.4	125
												38.3	25	97.4	125
												76.8	51	97.4	125
												114.7	76	130.3	150
										6	8.0	—	—	105.4	125
												38.3	25	105.4	125
												76.8	51	105.4	125
												114.7	76	140.3	175
										10	18.2	—	—	115.6	150
												38.3	25	115.6	150
												76.8	51	115.6	150
												114.7	76	153.1	175
										15	26.0	—	—	123.4	150
												38.3	25	123.4	150
												76.8	51	124.9	150
												114.7	76	162.8	175
								10	16.7	—	—	—	—	101.6	125
												38.3	25	101.6	125
												76.8	51	101.6	125
												114.7	76	135.6	175
										6	8.0	—	—	109.6	125
												38.3	25	109.6	125
												76.8	51	109.6	125
												114.7	76	145.6	175
										10	18.2	—	—	119.8	150
												38.3	25	119.8	150
												76.8	51	120.4	150
												114.7	76	158.3	175
										15	26.0	—	—	127.6	150
												38.3	25	127.6	150
												76.8	51	130.2	150
												114.7	76	168.1	200
								15	24.5	—	—	—	—	109.4	125
												38.3	25	109.4	125
												76.8	51	109.4	125
												114.7	76	145.3	175
										6	8.0	—	—	117.4	150
												38.3	25	117.4	150
												76.8	51	117.4	150
												114.7	76	155.3	175
										10	18.2	—	—	127.6	150
												38.3	25	127.6	150
												76.8	51	130.2	150
												114.7	76	168.1	200
										15	26.0	—	—	135.4	150
												38.3	25	135.4	150
												76.8	51	139.9	150
												114.7	76	177.8	200
								20	30.0	—	—	—	—	114.9	150
												38.3	25	114.9	150
												76.8	51	114.9	150
												114.7	76	152.2	175
										6	8.0	—	—	122.9	150
												38.3	25	122.9	150
												76.8	51	124.3	150
												114.7	76	162.2	175
										10	18.2	—	—	133.1	150
												38.3	25	133.1	150
												76.8	51	137.1	150
												114.7	76	175.0	200
										15	26.0	—	—	140.9	175
												38.3	25	140.9	175
												76.8	51	146.8	175
												114.7	76	184.7	200
								25	38.0	—	—	—	—	123.4	150
												38.3	25	123.4	150
												76.8	51	124.3	150
												114.7	76	162.2	200
										6	8.0	—	—	131.4	150
												38.3	25	131.4	150
												76.8	51	134.3	150
												114.7	76	172.2	200
										10	18.2	—	—	141.6	175
												38.3	25	141.6	175
												76.8	51	147.1	175
												114.7	76	185.0	200
										15	26.0	—	—	149.4	175
												38.3	25	149.4	175
												76.8	51	156.8	175
												114.7	76	194.7	225

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

Table 8 — Electrical Data Size 035 Units (cont)

460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
414	508	28.8	120	34.6	173	2	3.3 (ea)	7½	11.0	—	—	—	—	89.7	110
												46.3	36	89.7	110
												93.0	72	106.8	125
												139.0	108**	152.8	175
										6	9.6	—	—	99.3	125
												46.3	36	99.3	125
												93.0	72	118.8	150
												139.0	108**	164.8	200
										10	15.2	—	—	104.9	125
												46.3	36	104.9	125
												93.0	72	125.8	150
												139.0	108**	171.8	200
										15	22.0	—	—	111.7	125
												46.3	36	111.7	125
												93.0	72	134.3	150
												139.0	108**	180.3	200
								10	14.0	—	—	—	—	92.7	125
												46.3	36	92.7	125
												93.0	72	110.5	150
												139.0	108**	156.5	175
										6	9.6	—	—	102.3	125
												46.3	36	102.3	125
												93.0	72	122.5	150
												139.0	108**	168.5	200
										10	15.2	—	—	107.9	125
												46.3	36	107.9	125
												93.0	72	129.5	150
												139.0	108**	175.5	200
										15	22.0	—	—	114.7	125
												46.3	36	114.7	125
												93.0	72	138.0	150
												139.0	108**	184.0	200
								15	21.0	—	—	—	—	99.7	125
												46.3	36	99.7	125
												93.0	72	119.3	150
												139.0	108**	165.3	200
										6	9.6	—	—	109.3	125
												46.3	36	109.3	125
												93.0	72	131.3	150
												139.0	108**	177.3	200
										10	15.2	—	—	114.9	125
												46.3	36	114.9	125
												93.0	72	138.3	150
												139.0	108**	184.3	200
										15	22.0	—	—	121.7	150
												46.3	36	121.7	150
												93.0	72	146.8	175
												139.0	108**	192.8	225
								20	27.0	—	—	—	—	105.7	125
												46.3	36	105.7	125
												93.0	72	126.8	150
												139.0	108**	172.8	200
										6	9.6	—	—	115.3	125
												46.3	36	115.3	125
												93.0	72	138.8	150
												139.0	108**	184.8	200
										10	15.2	—	—	120.9	150
												46.3	36	120.9	150
												93.0	72	145.8	175
												139.0	108**	191.8	200
										15	22.0	—	—	127.7	150
												46.3	36	127.7	150
												93.0	72	154.3	175
												139.0	108**	200.3	225
								25	34.0	—	—	—	—	112.7	125
												46.3	36	112.7	125
												93.0	72	135.5	150
												139.0	108**	181.5	200
										6	9.6	—	—	122.3	150
												46.3	36	122.3	150
												93.0	72	147.5	175
												139.0	108**	193.5	225
										10	15.2	—	—	127.9	150
												46.3	36	127.9	150
												93.0	72	154.5	175
												139.0	108**	200.5	225
										15	22.0	—	—	134.7	150
												46.3	36	134.7	150
												93.0	72	163.0	175
												139.0	108**	209.0	225

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*

Table 8 — Electrical Data Size 035 Units (cont)
575-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
518	632	23.1	96	26.7	120	2	2.4 (ea)	7½	9.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	70.3 70.3 83.3 119.3	90 90 110 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	78.1 78.1 93.0 129.0	100 100 110 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	82.5 82.5 98.5 134.5	100 100 125 150
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	88.3 88.3 105.8 141.8	110 110 125 150
								10	11.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	72.3 72.3 85.8 121.8	90 90 110 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	80.1 80.1 95.5 131.5	100 100 110 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	84.5 84.5 101.0 137.0	110 110 125 150
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	90.3 90.3 108.3 144.3	110 110 125 150
								15	17.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	78.3 78.3 93.3 129.3	100 100 110 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	86.1 86.1 103.0 139.0	110 110 125 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	90.5 90.5 108.5 144.5	110 110 125 150
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	96.3 96.3 115.8 151.8	110 110 125 175
								20	22.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	83.3 83.3 99.5 135.5	100 100 125 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	91.1 91.1 109.3 145.3	110 110 125 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	95.5 95.5 114.8 150.8	110 110 125 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	101.3 101.3 122.0 158.0	125 125 150 175
								25	27.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	88.4 88.4 105.8 141.8	110 110 125 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	96.2 96.2 115.5 151.5	110 110 125 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	100.6 100.6 121.0 157.0	125 125 150 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	106.4 106.4 128.3 164.3	125 125 150 175

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.
†Fuse or HACR breaker.
**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 9 — Electrical Data Size 040 Units

208/230-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRICAL HEAT*		POWER SUPPLY	
		No. 1		No. 2								FLA	kW		
Min	Max	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
187	253	69.2	345	69.2	345	3	6.6	7 1/2	24.2/22.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	199.7/197.5 199.7/197.5 199.7/209.5 266.9/300.5	250/250 250/250 250/250 300/350
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	220.9/216.7 220.9/216.7 220.9/233.5 293.4/324.5	250/250 250/250 250/300 350/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	233.1/227.9 233.1/227.9 233.1/247.5 308.6/338.5	300/250 300/250 300/300 350/400
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	248.1/241.5 248.1/241.5 248.5/264.5 327.4/355.5	300/300 300/300 300/300 350/400
										—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	206.3/203.5 206.3/203.5 206.3/217.0 275.1/308.0	250/250 250/250 250/250 350/350
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	227.5/222.7 227.5/222.7 227.5/241.0 301.6/332.0	250/250 250/250 250/300 350/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	239.7/233.9 239.7/233.9 239.7/255.0 316.9/346.0	300/300 300/300 300/300 350/400
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	254.7/247.5 254.7/247.5 256.7/272.0 335.6/363.0	300/300 300/300 300/300 400/400
								15	46.2/42.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	221.7/217.5 221.7/217.5 221.7/234.5 294.4/325.5	250/250 250/250 250/300 350/400
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	242.9/236.7 242.9/236.7 242.9/258.5 320.9/349.5	300/300 300/300 300/300 350/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	255.1/247.9 255.1/247.9 257.2/272.5 336.1/363.5	300/300 300/300 300/300 400/400
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	270.1/261.5 270.1/261.5 276.0/289.5 354.9/380.5	300/300 300/300 300/350 400/400
										—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	234.9/229.5 234.9/229.5 234.9/249.5 310.9/340.5	300/250 300/250 300/300 350/400
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	256.1/248.7 256.1/248.7 258.5/273.5 337.4/364.5	300/300 300/300 300/300 400/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	268.3/259.9 268.3/259.9 273.7/287.5 352.6/378.5	300/300 300/300 300/350 400/400
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	283.3/273.5 283.3/273.5 292.5/304.5 371.4/395.5	350/300 350/300 350/350 400/450
								25	74.8/68.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	251.7/243.5 251.7/243.5 251.7/267.0 330.1/358.0	300/300 300/300 300/300 400/400
										6	21.2/19.2	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	272.9/262.7 272.9/262.7 277.7/291.0 356.6/382.0	300/300 300/300 300/350 400/400
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	285.1/273.9 285.1/273.9 293.0/305.0 371.9/396.0	350/300 350/300 350/350 400/450
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	300.1/287.5 300.1/287.5 311.7/322.0 390.6/413.0	350/350 350/350 350/350 450/450
										—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	268.2/258.2 268.2/258.2 268.2/282.0 346.6/373.0	350/300 350/300 350/350 400/450
										6	21.2/19.2	— 78.9/ 91.0 147.7/182.0 236.6/273.0	— 36 72 108**	289.4/277.4 289.4/277.4 294.2/306.0 373.1/397.0	350/350 350/350 350/350 450/450
										10	33.4/30.4	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	301.6/286.6 301.6/288.6 309.5/320.0 388.4/411.0	340/350 350/350 350/350 450/450
										15	48.4/44.0	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	316.6/302.2 316.6/302.2 328.2/337.0 407.1/428.0	400/350 400/350 400/400 450/450

Table 9 — Electrical Data Size 040 Units (cont)
380-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
342	418	35.9	191	35.9	191	3	2.7 (ea)	7½	12.5	—	—	—	—	101.4	125
												38.3	25	101.4	125
												76.8	51	101.4	125
												114.7	76	130.3	150
										6	8.0	—	—	109.4	125
												38.3	25	109.4	125
												76.8	51	109.4	125
												114.7	76	140.3	175
										10	18.2	—	—	119.6	150
												38.3	25	119.6	150
												76.8	51	119.6	150
												114.7	76	153.1	175
										15	26.0	—	—	127.4	150
												38.3	25	127.4	150
												76.8	51	127.4	150
												114.7	76	162.8	175
								10	16.7	—	—	—	—	105.6	125
												38.3	25	105.6	125
												76.8	51	105.6	125
												114.7	76	135.6	175
										6	8.0	—	—	113.6	125
												38.3	25	113.6	125
												76.8	51	113.6	125
												114.7	76	145.6	175
										10	18.2	—	—	123.8	150
												38.3	25	123.8	150
												76.8	51	123.8	150
												114.7	76	158.3	175
										15	26.0	—	—	131.6	150
												38.3	25	131.6	150
												76.8	51	131.6	150
												114.7	76	168.1	200
								15	24.5	—	—	—	—	113.4	125
												38.3	25	113.4	125
												76.8	51	113.4	125
												114.7	76	145.3	175
										6	8.0	—	—	121.4	150
												38.3	25	121.4	150
												76.8	51	121.4	150
												114.7	76	155.3	175
										10	18.2	—	—	131.6	150
												38.3	25	131.6	150
												76.8	51	131.6	150
												114.7	76	168.1	200
								20	30.0	—	—	—	—	139.4	175
												38.3	25	139.4	175
												76.8	51	139.9	175
												114.7	76	177.8	200
										6	8.0	—	—	118.9	150
												38.3	25	118.9	150
												76.8	51	118.9	150
												114.7	76	152.2	175
										10	18.2	—	—	126.9	150
												38.3	25	126.9	150
												76.8	51	126.9	150
												114.7	76	162.2	175
								25	38.0	—	—	—	—	137.1	150
												38.3	25	137.1	150
												76.8	51	137.1	150
												114.7	76	175.0	200
										15	26.0	—	—	144.9	175
												38.3	25	144.9	175
												76.8	51	146.8	175
												114.7	76	184.7	200
								25	38.0	—	—	—	—	127.4	150
												38.3	25	127.4	150
												76.8	51	127.4	150
												114.7	76	162.2	200
										6	8.0	—	—	135.4	150
												38.3	25	135.4	150
												76.8	51	135.4	150
												114.7	76	172.2	200
										10	18.2	—	—	145.6	175
												38.3	25	145.6	175
												76.8	51	147.1	175
												114.7	76	185.0	200
										15	26.0	—	—	153.4	175
												38.3	25	153.4	175
												76.8	51	156.8	175
												114.7	76	194.7	225

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

Table 9 — Electrical Data Size 040 Units (cont)
460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
		No. 1		No. 2								FLA	kW	MCA	MOCP†
Min	Max	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
414	508	34.6	173	34.6	173	3	3.3 (ea)	7½	11.0	—	—	46.3 93.0 139.0	— 36 72 108**	98.8 98.8 106.8 152.8	125 125 125 175
										6	9.6	46.3 93.0 139.0	— 36 72 108**	108.4 108.4 118.8 164.8	125 125 150 200
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	114.0 114.0 125.8 171.8	125 125 150 200
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	120.8 120.8 134.3 180.3	150 150 150 200
										—	—	— 46.3 93.0 139.0	— 36 72 108**	101.8 101.8 110.5 156.5	125 125 150 175
										6	9.6	— 46.3 93.0 139.0	— 36 72 108**	111.4 111.4 122.5 168.5	125 125 150 200
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	117.0 117.0 129.5 175.5	150 150 150 200
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	123.8 123.8 138.0 184.0	150 150 150 200
										—	—	— 46.3 93.0 139.0	— 36 72 108**	108.8 108.8 119.3 165.3	125 125 150 200
										6	9.6	— 46.3 93.0 139.0	— 36 72 108**	118.4 118.4 131.3 177.3	150 150 150 200
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	124.0 124.0 138.3 184.3	150 150 150 200
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	130.8 130.8 146.8 192.8	150 150 175 225
										—	—	— 46.3 93.0 139.0	— 36 72 108**	114.8 114.8 126.8 172.8	125 125 150 200
										6	9.6	— 46.3 93.0 139.0	— 36 72 108**	124.4 124.4 138.8 184.8	150 150 150 200
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	130.0 130.0 145.8 191.8	150 150 175 200
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	136.8 136.8 154.3 200.3	150 150 175 225
								—	—	— 46.3 93.0 139.0	— 36 72 108**	121.8 121.8 135.5 181.5	150 150 150 200		
								6	9.6	— 46.3 93.0 139.0	— 36 72 108**	131.4 131.4 147.5 193.5	150 150 175 225		
								10	15.2	— 46.3 93.0 139.0	— 36 72 108**	137.0 137.0 154.5 200.5	150 150 175 225		
								15	22.0	— 46.3 93.0 139.0	— 36 72 108**	143.8 143.8 163.0 209.0	175 175 175 225		
								—	—	— 46.3 93.0 139.0	— 36 72 108**	129.1 129.1 143.0 189.0	150 150 175 225		
								6	9.6	— 46.3 93.0 139.0	— 36 72 108**	138.7 138.7 155.0 201.0	175 175 175 225		
								10	15.2	— 46.3 93.0 139.0	— 36 72 108**	144.3 144.3 162.0 208.0	175 175 175 225		
								15	22.0	— 46.3 93.0 139.0	— 36 72 108**	151.1 151.1 170.5 216.5	175 175 200 250		

Table 9 — Electrical Data Size 040 Units (cont)
575-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
518	632	26.7	120	26.7	120	3	2.4 (ea)	7 1/2	9.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	76.3 76.3 83.3 119.3	100 100 110 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	84.1 84.1 93.0 129.0	110 110 110 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	88.5 88.5 98.5 134.5	110 110 125 150
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	94.3 94.3 105.8 141.8	110 110 125 150
								10	11.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	78.3 78.3 85.8 121.8	100 100 110 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	86.1 86.1 95.5 131.5	110 110 110 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	90.5 90.5 101.0 137.0	110 110 125 150
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	96.3 96.3 108.3 144.3	110 110 125 150
								15	17.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	84.3 84.3 93.3 129.3	110 110 110 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	92.1 92.1 103.0 139.0	110 110 125 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	96.5 96.5 108.5 144.5	110 110 125 150
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	102.3 102.3 115.8 151.8	125 125 125 175
								20	22.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	89.3 89.3 99.5 135.5	110 110 125 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	97.1 97.1 109.3 145.3	110 110 125 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	101.5 101.5 114.8 150.8	125 125 125 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	107.3 107.3 122.0 158.0	125 125 125 175
								25	27.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	94.4 94.4 105.8 141.8	110 110 125 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	102.2 102.2 115.5 151.5	125 125 125 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	106.6 106.6 121.0 157.0	125 125 125 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	112.4 112.4 128.3 164.3	125 125 150 175
								30	32.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	100.6 100.6 112.0 148.0	125 125 125 175
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	108.4 108.4 121.8 157.8	125 125 150 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	112.8 112.8 127.3 163.3	125 125 150 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	118.6 118.6 134.5 170.5	150 150 150 175

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.
†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 10 — Electrical Data Size 050 Units

208/230-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRICAL HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
187	253	89.7	446	69.2	345	3	6.6 (ea)	7 1/2	24.2 / 22.0	—	— / —	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	225.3 / 223.1 225.3 / 223.1 266.9 / 300.5	300/300 300/300 350/400
										6	21.2 / 19.2	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	246.5 / 242.3 246.5 / 242.3 293.4 / 324.5	300/300 300/300 350/400
										10	33.4 / 30.4	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	258.7 / 253.5 258.7 / 253.5 308.6 / 338.5	300/300 300/300 400/400
										15	48.4 / 44.0	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	273.7 / 267.1 273.7 / 267.1 327.4 / 355.5	350/350 350/350 400/450
								10	30.8 / 28.0	—	— / —	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	231.9 / 229.1 231.9 / 229.1 275.1 / 308.0	300/300 300/300 350/400
										6	21.2 / 19.2	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	253.1 / 248.3 253.1 / 248.3 301.6 / 332.0	300/300 300/300 400/400
										10	33.4 / 30.4	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	265.3 / 259.5 265.3 / 259.5 316.9 / 346.0	350/300 350/350 400/400
										15	48.4 / 44.0	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	280.3 / 273.1 280.3 / 273.1 335.6 / 363.0	350/350 350/350 400/450
								15	46.2 / 42.0	—	— / —	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	247.3 / 243.1 247.3 / 243.1 294.4 / 325.5	300/300 300/300 350/400
										6	21.2 / 19.2	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	268.5 / 262.3 268.5 / 262.3 320.9 / 349.5	350/350 350/350 400/400
										10	33.4 / 30.4	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	280.7 / 273.5 280.7 / 273.5 336.1 / 363.5	350/350 350/350 400/450
										15	48.4 / 44.0	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	295.7 / 287.1 295.7 / 287.1 354.9 / 380.5	350/350 350/350 400/450
								20	59.4 / 54.0	—	— / —	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	260.5 / 255.1 260.5 / 255.1 310.9 / 340.5	350/300 350/300 400/400
										6	21.2 / 19.2	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	281.7 / 274.3 281.7 / 274.3 337.4 / 364.5	350/350 350/350 400/450
										10	33.4 / 30.4	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	293.9 / 285.5 293.9 / 285.5 352.6 / 378.5	350/350 350/350 400/450
										15	48.4 / 44.0	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	308.9 / 299.1 308.9 / 299.1 371.4 / 395.5	350/350 350/350 450/450
								25	74.8 / 68.0	—	— / —	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	275.9 / 269.1 275.9 / 269.1 330.1 / 358.0	350/350 350/350 400/450
										6	21.2 / 19.2	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	297.1 / 288.3 297.1 / 288.3 356.6 / 382.0	350/350 350/350 400/450
										10	33.4 / 30.4	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	309.3 / 299.5 309.3 / 299.5 371.9 / 396.0	350/350 350/350 450/450
										15	48.4 / 44.0	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	324.3 / 313.1 324.3 / 313.1 390.6 / 413.0	400/400 400/400 450/450
								30	88.0 / 80.0	—	— / —	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	289.1 / 281.1 289.1 / 281.1 346.6 / 373.0	350/350 350/350 400/450
										6	21.2 / 19.2	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	310.3 / 300.3 310.3 / 306.0 373.1 / 397.0	400/350 400/350 450/450
										10	33.4 / 30.4	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	322.5 / 311.5 322.5 / 320.0 388.4 / 411.0	400/400 400/400 450/450
										15	48.4 / 44.0	78.9 / 91.0 157.7 / 182.0 236.6 / 273.0	36 72 108**	337.5 / 325.1 337.5 / 327.0 407.1 / 428.0	400/400 400/400 450/500

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 10 — Electrical Data Size 050 Units (cont)

380-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
342	418	45.5	247	35.9	191	3	2.7 (ea)	7½	12.5	—	—	— 38.3 76.8 114.7	— 25 51 76	113.4 113.4 113.4 130.3	150 150 150 175
										6	8.0	— 38.3 76.8 114.7	— 25 51 76	121.4 121.4 121.4 140.3	150 150 150 175
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	131.6 131.6 131.6 153.1	175 175 175 200
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	139.4 139.4 139.4 162.8	175 175 175 200
								10	16.7	—	—	— 38.3 76.8 114.7	— 25 51 76	117.6 117.6 117.6 135.6	150 150 150 175
										6	8.0	— 38.3 76.8 114.7	— 25 51 76	125.6 125.6 125.6 145.6	150 150 150 175
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	135.8 135.8 135.8 158.3	175 175 175 200
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	143.6 143.6 143.6 168.1	175 175 175 200
								15	24.5	—	—	— 38.3 76.8 114.7	— 25 51 76	125.4 125.4 125.4 145.3	150 150 150 175
										6	8.0	— 38.3 76.8 114.7	— 25 51 76	133.4 133.4 133.4 155.3	175 175 175 200
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	143.6 143.6 143.6 168.1	175 175 175 200
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	151.4 151.4 151.4 177.8	175 175 175 200
								20	30.0	—	—	— 38.3 76.8 114.7	— 25 51 76	130.9 130.9 130.9 152.2	175 175 175 200
										6	8.0	— 38.3 76.8 114.7	— 25 51 76	138.9 138.9 138.9 162.2	175 175 175 200
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	149.1 149.1 149.1 175.0	175 175 175 200
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	156.9 156.9 156.9 184.7	200 200 200 225
								25	38.0	—	—	— 38.3 76.8 114.7	— 25 51 76	138.9 138.9 138.9 162.2	175 175 175 200
										6	8.0	— 38.3 76.8 114.7	— 25 51 76	146.9 146.9 146.9 172.2	175 175 175 200
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	157.1 157.1 157.1 185.0	200 200 200 225
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	164.9 164.9 164.9 194.7	200 200 200 225

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 10 — Electrical Data Size 050 Units (cont)
460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
414	508	43.6	223	34.6	173	3	3.3 (ea)	7½	11.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	110.0 110.0 110.0 152.8	150 150 150 200
										6	9.6	— 46.3 93.0 139.0	— 36 72 108**	119.6 119.6 119.6 164.8	150 150 150 200
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	125.2 125.2 125.8 171.8	150 150 150 200
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	132.0 132.0 134.3 180.3	175 175 175 225
								10	14.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	113.0 113.0 113.0 156.5	150 150 150 200
										6	9.6	— 46.3 93.0 139.0	— 36 72 108**	122.6 122.6 122.6 168.5	150 150 150 200
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	128.2 128.2 129.5 175.5	150 150 175 200
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	135.0 135.0 138.0 184.0	175 175 175 225
								15	21.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	120.0 120.0 120.0 165.3	150 150 150 200
										6	9.6	— 46.3 93.0 139.0	— 36 72 108**	129.6 129.6 131.3 177.3	150 150 175 200
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	135.2 135.2 138.3 184.3	175 175 175 225
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	142.0 142.0 146.8 192.8	175 175 175 225
								20	27.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	126.0 126.0 126.8 172.8	150 150 150 200
										6	9.6	— 46.3 93.0 139.0	— 36 72 108**	135.6 135.6 138.8 184.8	175 175 175 225
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	141.2 141.2 145.8 191.8	175 175 175 225
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	148.0 148.0 154.3 200.3	175 175 175 225
								25	34.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	133.0 133.0 135.5 181.5	175 175 175 225
										6	9.6	— 46.3 93.0 139.0	— 36 72 108**	142.6 142.6 147.5 193.5	175 175 175 225
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	148.2 148.2 154.5 200.5	175 175 175 225
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	155.0 155.0 163.0 209.0	175 175 200 225
								30	40.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	139.0 139.0 143.0 189.0	175 175 175 225
										6	9.6	— 46.3 93.0 139.0	— 36 72 108**	148.6 148.6 155.0 201.0	175 175 175 225
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	154.2 154.2 162.0 208.0	175 175 200 225
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	161.0 161.0 170.5 216.5	200 200 200 250

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 10 — Electrical Data Size 050 Units (cont)
575-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
518	632	36.5	164	26.7	120	3	2.4 (ea)	7 1/2	9.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	88.5 88.5 88.5 119.3	125 125 125 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	96.3 96.3 96.3 129.0	125 125 125 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	100.7 100.7 100.7 134.5	125 125 125 150
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	106.5 106.5 106.5 141.8	125 125 125 175
								10	11.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	90.5 90.5 90.5 121.8	125 125 125 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	98.3 98.3 98.3 131.5	125 125 125 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	102.7 102.7 102.7 137.0	125 125 125 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	108.5 108.5 108.5 144.3	125 125 125 175
								15	17.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	96.5 96.5 96.5 129.3	125 125 125 150
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	104.3 104.3 104.3 139.0	125 125 125 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	108.7 108.7 108.7 144.5	125 125 125 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	114.5 114.5 115.8 151.8	150 150 150 175
								20	22.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	101.5 101.5 101.5 135.5	125 125 125 175
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	109.3 109.3 109.3 145.3	125 125 125 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	113.7 113.7 114.8 150.8	150 150 150 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	119.5 119.5 122.0 158.0	150 150 150 175
								25	27.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	106.5 106.5 106.5 141.8	125 125 125 175
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	114.3 114.3 115.5 151.5	150 150 150 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	118.7 118.7 121.0 157.0	150 150 150 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	124.5 124.5 128.3 164.3	150 150 150 175
								30	32.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	111.5 111.5 112.0 148.0	125 125 125 175
										6	7.8	— 36.0 72.0 108.0	— 36 72 108**	119.3 119.3 121.8 157.8	150 150 150 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	123.7 123.7 127.3 163.3	150 150 150 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	129.5 129.5 134.5 170.5	150 150 150 200

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 11 — Electrical Data Size 055 Units
208/230-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRICAL HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
187	253	107.7	506	74.4	345	4	6.6 (ea)	15	46.2/ 42.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	281.6/277.4 281.6/277.4 281.6/277.4 294.4/325.5	350/350 350/350 350/350 400/400
										10	33.4/30.4	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	315.0/307.8 315.0/307.8 315.0/307.8 336.1/363.5	400/400 400/400 400/400 450/450
										15	48.4/44.0	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	330.0/321.4 330.0/321.4 330.0/321.4 354.9/380.5	400/400 400/400 400/400 450/450
										20	61.1/56.0	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	342.7/333.4 342.7/333.4 342.7/333.4 370.7/395.5	450/400 450/400 450/400 450/500
									59.4/ 54.0	—	— / —	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	294.8/289.4 294.8/289.4 294.8/289.4 310.9/340.5	400/350 400/350 400/350 400/450
										10	33.4/30.4	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	328.2/319.8 328.2/319.8 328.2/319.8 352.6/378.5	400/400 400/400 400/400 450/450
										15	48.4/44.0	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	343.2/333.4 343.2/333.4 343.2/333.4 371.4/395.5	450/400 450/400 450/400 450/500
										20	61.1/56.0	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	355.9/345.4 355.9/345.4 355.9/345.4 387.2/410.5	450/450 450/450 450/450 450/500
								74.8/ 68.0	88.0/ 80.0	—	— / —	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	310.2/303.4 310.2/303.4 310.2/303.4 330.1/358.0	400/400 400/400 400/400 400/450
										10	33.4/30.4	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	343.6/333.8 343.6/333.8 343.6/333.8 371.9/396.0	450/400 450/400 450/400 450/500
										15	48.4/44.0	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	358.6/347.4 358.6/347.4 358.6/347.4 390.6/413.0	450/450 450/450 450/450 450/500
										20	61.1/56.0	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	371.3/359.4 371.3/359.4 371.3/359.4 406.5/428.0	450/450 450/450 450/450 500/500
								114.4/104.0	154.4/144.0	—	— / —	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	323.4/315.4 323.4/315.4 323.4/315.4 346.6/373.0	400/400 400/400 400/400 450/450
										10	33.4/30.4	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	356.8/345.8 356.8/345.8 356.8/345.8 388.4/411.0	450/450 450/450 450/450 450/500
										15	48.4/44.0	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	371.8/359.4 371.8/359.4 371.8/359.4 407.1/428.0	450/450 450/450 450/450 500/500
										20	61.1/56.0	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	384.5/371.4 384.5/371.4 384.5/371.4 423.0/443.0	450/450 450/450 450/450 500/500
								154.4/144.0	184.4/174.0	—	— / —	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	351.5/339.4 351.5/339.4 351.5/339.4 379.6/403.0	450/400 450/400 450/400 450/500
										10	33.4/30.4	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	384.9/369.8 384.9/369.8 384.9/369.8 421.4/441.0	450/450 450/450 450/450 500/500
										15	48.4/44.0	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	399.9/383.4 399.9/383.4 399.9/383.4 440.1/458.0	500/450 500/450 500/450 500/500
										20	61.1/56.0	78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	412.6/395.4 412.6/395.4 412.6/395.4 456.0/473.0	500/500 500/500 500/500 500/500

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.
†Fuse or HACR breaker.
**108 kW available on CV applications only.
NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 11 — Electrical Data Size 055 Units (cont)
380-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
		No. 1		No. 2											
Min	Max	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCPT†
342	418	56.4	280	35.9	191	4	2.7 (ea)	15	24.5	—	—	— 38.3 76.8 114.7	— 25 51 76	141.7 141.7 141.7 145.3	175 175 175 200
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	159.9 159.9 159.9 168.1	200 200 200 225
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	167.7 167.7 167.7 177.8	200 200 200 225
										20	34.0	— 38.3 76.8 114.7	— 25 51 76	175.7 175.7 175.7 187.8	225 225 225 225
								20	30.0	—	—	— 38.3 76.8 114.7	— 25 51 76	147.2 147.2 147.2 152.2	200 200 200 200
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	165.4 165.4 165.4 175.0	200 200 200 225
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	173.2 173.2 173.2 184.7	225 225 225 225
										20	34.0	— 38.3 76.8 114.7	— 25 51 76	181.2 181.2 181.2 194.7	225 225 225 225
								25	38.0	—	—	— 38.3 76.8 114.7	— 25 51 76	155.2 155.2 155.2 162.2	200 200 200 200
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	173.4 173.4 173.4 185.0	225 225 225 225
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	181.2 181.2 181.2 194.7	225 225 225 225
										20	34.0	— 38.3 76.8 114.7	— 25 51 76	189.2 189.2 189.2 204.7	225 225 225 250

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCPT — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 11 — Electrical Data Size 055 Units (cont)
460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
414	508	50.6	253	34.6	173	4	3.3 (ea)	15	21.0	—	—	—	—	132.1	175
												46.3	36	132.1	175
												93.0	72	132.1	175
												139.0	108**	165.3	200
										10	15.2	—	—	147.3	175
												46.3	36	147.3	175
												93.0	72	147.3	175
												139.0	108**	184.3	225
										15	22.0	—	—	154.1	200
												46.3	36	154.1	200
												93.0	72	154.1	200
												139.0	108**	192.8	225
										20	28.0	—	—	160.1	200
												46.3	36	160.1	200
												93.0	72	160.1	200
												139.0	108**	200.3	250
								20	27.0	—	—	—	—	138.1	175
												46.3	36	138.1	175
												93.0	72	138.1	175
												139.0	108**	172.8	225
										10	15.2	—	—	153.3	200
												46.3	36	153.3	200
												93.0	72	153.3	200
												139.0	108**	191.8	225
										15	22.0	—	—	160.1	200
												46.3	36	160.1	200
												93.0	72	160.1	200
												139.0	108**	200.3	250
										20	28.0	—	—	166.1	200
												46.3	36	166.1	200
												93.0	72	166.1	200
												139.0	108**	207.8	250
								25	34.0	—	—	—	—	145.1	175
												46.3	36	145.1	175
												93.0	72	145.1	175
												139.0	108**	181.5	225
										10	15.2	—	—	160.3	200
												46.3	36	160.3	200
												93.0	72	160.3	200
												139.0	108**	200.5	250
										15	22.0	—	—	167.1	200
												46.3	36	167.1	200
												93.0	72	167.1	200
												139.0	108**	209.0	250
										20	28.0	—	—	173.1	200
												46.3	36	173.1	200
												93.0	72	173.1	200
												139.0	108**	216.5	250
								30	40.0	—	—	—	—	151.1	200
												46.3	36	151.1	200
												93.0	72	151.1	200
												139.0	108**	189.0	225
										10	15.2	—	—	166.3	200
												46.3	36	166.3	200
												93.0	72	166.3	200
												139.0	108**	208.0	250
										15	22.0	—	—	173.1	200
												46.3	36	173.1	200
												93.0	72	173.1	200
												139.0	108**	216.5	250
										20	28.0	—	—	179.1	225
												46.3	36	179.1	225
												93.0	72	179.1	225
												139.0	108**	224.0	250
								40	52.0	—	—	—	—	163.4	200
												46.3	36	163.4	200
												93.0	72	163.4	200
												139.0	108**	204.0	250
										10	15.2	—	—	178.6	225
												46.3	36	178.6	225
												93.0	72	178.6	225
												139.0	108**	223.0	250
										15	22.0	—	—	185.4	225
												46.3	36	185.4	225
												93.0	72	185.5	225
												139.0	108**	231.5	250
										20	28.0	—	—	191.4	225
												46.3	36	191.4	225
												93.0	72	193.0	225
												139.0	108**	239.0	250

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

Table 11 — Electrical Data Size 055 Units (cont)

575-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
518	632	39.1	176	28.8	120	4	2.4 (ea)	15	17.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	104.3 104.3 104.3 129.3	125 125 125 150
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	116.5 116.5 116.5 144.5	150 150 150 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	122.3 122.3 122.3 151.8	150 150 150 175
										20	22.0	— 36.0 72.0 108.0	— 36 72 108**	126.3 126.3 126.3 156.8	150 150 150 175
								20	22.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	109.3 109.3 109.3 135.5	125 125 125 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	121.5 121.5 121.5 150.8	150 150 150 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	127.3 127.3 127.3 158.0	150 150 150 175
										20	22.0	— 36.0 72.0 108.0	— 36 72 108**	131.3 131.3 131.3 163.0	150 150 150 200
								25	27.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	114.3 114.3 114.3 141.8	150 150 150 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	126.5 126.5 126.5 157.0	150 150 150 175
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	132.3 132.3 132.3 164.3	175 150 150 200
										20	22.0	— 36.0 72.0 108.0	— 36 72 108**	136.3 136.3 136.3 169.3	175 175 175 200
								30	32.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	119.3 119.3 119.3 148.0	150 150 150 175
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	131.5 131.5 131.5 163.3	150 150 150 200
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	137.3 137.3 137.3 170.5	175 175 175 200
										20	22.0	— 36.0 72.0 108.0	— 36 72 108**	141.3 141.3 141.3 175.5	175 175 175 200
								40	41.0	—	—	— 36.0 72.0 108.0	— 36 72 108**	128.8 128.8 128.8 159.3	150 150 150 200
										10	12.2	— 36.0 72.0 108.0	— 36 72 108**	141.0 141.0 141.0 174.5	175 175 175 200
										15	18.0	— 36.0 72.0 108.0	— 36 72 108**	146.8 146.8 146.8 181.8	175 175 175 200
										20	22.0	— 36.0 72.0 108.0	— 36 72 108**	150.8 150.8 150.8 186.8	175 175 175 200

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 12 — Electrical Data Size 060 Units
208/230-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRICAL HEAT*		POWER SUPPLY	
		No. 1		No. 2								FLA	kW		
Min	Max	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
187	253	107.7	506	107.7	506	4	6.6 (ea)	15	46.2/ 42.0	—	— / —	78.9/ 91.0	36	314.9/310.7	400/400
												157.7/182.0	72	314.9/310.7	400/400
												236.6/273.0	108**	314.9/325.5	400/400
												—	—	348.3/341.1	450/400
										78.9/ 91.0	36	348.3/341.1	450/400		
										157.7/182.0	72	348.3/341.1	450/400		
										236.6/273.0	108**	348.3/363.5	450/450		
										78.9/ 91.0	36	363.3/354.7	450/450		
										157.7/182.0	72	363.3/354.7	450/450		
										236.6/273.0	108**	363.3/380.5	450/450		
										—	—	376.0/366.7	450/450		
										78.9/ 91.0	36	376.0/366.7	450/450		
								157.7/182.0	72	376.0/366.7	450/450				
								236.6/273.0	108**	376.0/395.5	450/500				
								20	59.4/ 54.0	—	— / —	78.9/ 91.0	36	328.1/322.7	400/400
												157.7/182.0	72	328.1/322.7	400/400
												236.6/273.0	108**	328.1/340.5	400/450
												—	—	361.5/353.1	450/450
										78.9/ 91.0	36	361.5/353.1	450/450		
										157.7/182.0	72	361.5/353.1	450/450		
236.6/273.0	108**	361.5/378.5	450/450												
—	—	376.5/366.7	450/450												
78.9/ 91.0	36	376.5/366.7	450/450												
157.7/182.0	72	376.5/366.7	450/450												
236.6/273.0	108**	376.5/395.5	450/500												
78.9/ 91.0	36	389.2/378.7	450/450												
157.7/182.0	72	389.2/378.7	450/450												
236.6/273.0	108**	389.2/410.5	450/500												
25	74.8/ 68.0	—	— / —	78.9/ 91.0	36	343.5/336.7	450/400								
				157.7/182.0	72	343.5/336.7	450/400								
				236.6/273.0	108**	343.5/358.0	450/450								
				—	—	376.9/367.1	450/450								
		78.9/ 91.0	36	376.9/367.1	450/450										
		157.7/182.0	72	376.9/367.1	450/450										
		236.6/273.0	108**	376.9/396.0	450/500										
		—	—	391.9/380.7	450/450										
		78.9/ 91.0	36	391.9/380.7	450/450										
		157.7/182.0	72	391.9/380.7	450/450										
		236.6/273.0	108**	391.9/413.0	450/500										
		78.9/ 91.0	36	404.6/392.7	500/500										
157.7/182.0	72	404.6/392.7	500/500												
236.6/273.0	108**	406.5/428.0	500/500												
30	88.0/ 80.0	—	— / —	78.9/ 91.0	36	356.7/348.7	450/450								
				157.7/182.0	72	356.7/348.7	450/450								
				236.6/273.0	108**	356.7/373.0	450/450								
				—	—	390.1/379.1	450/450								
		78.9/ 91.0	36	390.1/379.1	450/450										
		157.7/182.0	72	390.1/379.1	450/450										
		236.6/273.0	108**	390.1/411.0	450/500										
		—	—	405.1/392.7	500/500										
		78.9/ 91.0	36	405.1/392.7	500/500										
		157.7/182.0	72	405.1/392.7	500/500										
		236.6/273.0	108**	407.1/428.0	500/500										
		—	—	417.8/404.7	500/500										
78.9/ 91.0	36	417.8/404.7	500/500												
157.7/182.0	72	417.8/404.7	500/500												
236.6/273.0	108**	423.0/443.0	500/500												
40	114.4/104.0	—	— / —	78.9/ 91.0	36	384.8/372.7	450/450								
				157.7/182.0	72	384.8/372.7	450/450								
				236.6/273.0	108**	384.8/403.0	450/500								
				—	—	418.2/403.1	500/500								
		78.9/ 91.0	36	418.2/403.1	500/500										
		157.7/182.0	72	418.2/403.1	500/500										
		236.6/273.0	108**	421.4/441.0	500/500										
		—	—	433.2/416.7	500/500										
		78.9/ 91.0	36	433.2/416.7	500/500										
		157.7/182.0	72	433.2/416.7	500/500										
		236.6/273.0	108**	440.1/458.0	500/500										
		78.9/ 91.0	36	445.9/428.7	500/500										
157.7/182.0	72	445.9/428.7	500/500												
236.6/273.0	108**	456.0/473.0	500/500												

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 12 — Electrical Data Size 060 Units (cont)

208/230-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
		No. 1		No. 2											
Min	Max	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCPT†
342	418	56.4	280	56.4	280	4	2.7 (ea)	15	24.5	—	—	— 38.3 76.8 114.7	— 25 51 76	162.2 162.2 162.2 162.2	200 200 200 200
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	180.4 180.4 180.4 180.4	225 225 225 225
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	188.2 188.2 188.2 188.2	225 225 225 225
										20	34.0	— 38.3 76.8 114.7	— 25 51 76	196.2 196.2 196.2 196.2	250 250 250 250
								20	30.0	—	—	— 38.3 76.8 114.7	— 25 51 76	167.7 167.7 167.7 167.7	200 200 200 200
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	185.9 185.9 185.9 185.9	225 225 225 225
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	193.7 193.7 193.7 193.7	250 250 250 250
										20	34.0	— 38.3 76.8 114.7	— 25 51 76	201.7 201.7 201.7 201.7	250 250 250 250
								25	38.0	—	—	— 38.3 76.8 114.7	— 25 51 76	175.7 175.7 175.7 175.7	225 225 225 225
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	193.9 193.9 193.9 193.9	250 250 250 250
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	201.7 201.7 201.7 201.7	250 250 250 250
										20	34.0	— 38.3 76.8 114.7	— 25 51 76	209.7 209.7 209.7 209.7	250 250 250 250

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCPT — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 12 — Electrical Data Size 060 Units (cont)

460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
414	508	50.6	253	50.6	253	4	3.3 (ea)	15	21.0	—	—	—	—	148.1	175
												46.3	36	148.1	175
												93.0	72	148.1	175
												139.0	108**	165.3	200
										10	15.2	—	—	163.3	200
												46.3	36	163.3	200
												93.0	72	163.3	200
												139.0	108**	184.3	225
										15	22.0	—	—	170.1	200
												46.3	36	170.1	200
												93.0	72	170.1	200
												139.0	108**	192.8	225
										20	28.0	—	—	176.1	225
												46.3	36	176.1	225
												93.0	72	176.1	225
												139.0	108**	200.3	250
								20	27.0	—	—	—	—	154.1	200
												46.3	36	154.1	200
												93.0	72	154.1	200
												139.0	108**	172.8	225
										10	15.2	—	—	169.3	200
												46.3	36	169.3	200
												93.0	72	169.3	200
												139.0	108**	191.8	225
										15	22	—	—	176.1	225
												46.3	36	176.1	225
												93.0	72	176.1	225
												139.0	108**	200.3	250
										20	28.0	—	—	182.1	225
												46.3	36	182.1	225
												93.0	72	182.1	225
												139.0	108**	207.8	250
								25	34.0	—	—	—	—	161.1	200
												46.3	36	161.1	200
												93.0	72	161.1	200
												139.0	108**	181.5	225
										10	15.2	—	—	176.3	225
												46.3	36	176.3	225
												93.0	72	176.3	225
												139.0	108**	200.5	250
										15	22	—	—	183.1	225
												46.3	36	183.1	225
												93.0	72	183.1	225
												139.0	108**	209.0	250
										20	28.0	—	—	189.1	225
												46.3	36	189.1	225
												93.0	72	189.1	225
												139.0	108**	216.5	250
								30	40.0	—	—	—	—	167.1	200
												46.3	36	167.1	200
												93.0	72	167.1	200
												139.0	108**	189.0	225
										10	15.2	—	—	182.3	225
												46.3	36	182.3	225
												93.0	72	182.3	225
												139.0	108**	208.0	250
										15	22	—	—	189.1	225
												46.3	36	189.1	225
												93.0	72	189.1	225
												139.0	108**	216.5	250
										20	28.0	—	—	195.1	225
												46.3	36	195.1	225
												93.0	72	195.1	225
												139.0	108**	224.0	250
								40	52.0	—	—	—	—	179.4	225
												46.3	36	179.4	225
												93.0	72	179.4	225
												139.0	108**	204.0	250
										10	15.2	—	—	194.6	225
												46.3	36	194.6	225
												93.0	72	194.6	225
												139.0	108**	223.0	250
										15	22	—	—	201.4	250
												46.3	36	201.4	250
												93.0	72	201.4	250
												139.0	108**	231.5	250
										20	28.0	—	—	207.4	250
												46.3	36	207.4	250
												93.0	72	207.4	250
												139.0	108**	239.0	250

LEGEND

CV — Constant Volume
 FLA — Full Load Amps
 Hp — Nominal Horsepower
 LRA — Locked Rotor Amps
 MCA — Minimum Circuit Amps (for wire sizing)
 MOCP — Maximum Overcurrent Protection
 RLA — Rated Load Amps



Table 12 — Electrical Data Size 060 Units (cont)
575-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
518	632	39.1	176	39.1	176	4	2.4 (ea)	15	17.0	—	—	—	—	114.6	150
												36.0	36	114.6	150
												72.0	72	114.6	150
												108.0	108**	129.3	150
										10	12.2	—	—	126.8	150
												36.0	36	126.8	150
												72.0	72	126.8	150
												108.0	108**	144.5	175
										15	18.0	—	—	132.6	150
												36.0	36	132.6	150
												72.0	72	132.6	150
												108.0	108**	151.8	175
										20	22.0	—	—	136.6	175
												36.0	36	136.6	175
												72.0	72	136.6	175
												108.0	108**	156.8	175
								20	22.0	—	—	—	—	119.6	150
												36.0	36	119.6	150
												72.0	72	119.6	150
												108.0	108**	135.5	175
										10	12.2	—	—	131.8	150
												36.0	36	131.8	150
												72.0	72	131.8	150
												108.0	108**	150.8	175
										15	18.0	—	—	137.6	175
												36.0	36	137.6	175
												72.0	72	137.6	175
												108.0	108**	158.0	175
										20	22.0	—	—	141.6	175
												36.0	36	141.6	175
												72.0	72	141.6	175
												108.0	108**	163.0	200
								25	27.0	—	—	—	—	124.6	150
												36.0	36	124.6	150
												72.0	72	124.6	150
												108.0	108**	141.8	175
										10	12.2	—	—	136.8	175
												36.0	36	136.8	175
												72.0	72	136.8	175
												108.0	108**	157.0	175
										15	18.0	—	—	142.6	175
												36.0	36	142.6	175
												72.0	72	142.6	175
												108.0	108**	164.3	200
										20	22.0	—	—	146.6	175
												36.0	36	146.6	175
												72.0	72	146.6	175
												108.0	108**	169.3	200
								30	32.0	—	—	—	—	129.6	150
												36.0	36	129.6	150
												72.0	72	129.6	150
												108.0	108**	148.0	175
										10	12.2	—	—	141.8	175
												36.0	36	141.8	175
												72.0	72	141.8	175
												108.0	108**	163.3	200
										15	18.0	—	—	147.6	175
												36.0	36	147.6	175
												72.0	72	147.6	175
												108.0	108**	170.5	200
										20	22.0	—	—	151.6	175
												36.0	36	151.6	175
												72.0	72	151.6	175
												108.0	108**	175.5	200
								40	41.0	—	—	—	—	139.1	175
												36.0	36	139.1	175
												72.0	72	139.1	175
												108.0	108**	159.3	200
										10	12.2	—	—	151.3	175
												36.0	36	151.3	175
												72.0	72	151.3	175
												108.0	108**	174.5	200
										15	18.0	—	—	157.1	175
												36.0	36	157.1	175
												72.0	72	157.1	175
												108.0	108**	181.8	200
										20	22.0	—	—	161.1	200
												36.0	36	161.1	200
												72.0	72	161.1	200
												108.0	108**	186.8	200

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

Table 13 — Electrical Data Size 070 Units

208/230-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRICAL HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
187	253	107.7	506	142.3	690	5	6.6 (ea)	15	46.2/ 42.0	—	— / —	— 78.9/ 91.0 157.7/182.0 236.6/273.0	— 36 72 108**	364.8/360.6 364.8/360.6 364.8/360.6 364.8/360.6	500/500 500/500 500/500 500/500
										10	33.4/30.4	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	398.2/391.0 398.2/391.0 398.2/391.0 398.2/391.0	500/500 500/500 500/500 500/500
										15	48.4/44.0	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	413.2/404.6 413.2/404.6 413.2/404.6 413.2/404.6	500/500 500/500 500/500 500/500
										20	61.1/56.0	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	425.9/416.6 425.9/416.6 425.9/416.6 425.9/416.6	500/500 500/500 500/500 500/500
								20	59.4/ 54.0	—	— / —	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	378.0/372.6 378.0/372.6 378.0/372.6 378.0/372.6	500/500 500/500 500/500 500/500
										10	33.4/30.4	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	411.4/403.0 411.4/403.0 411.4/403.0 411.4/403.0	500/500 500/500 500/500 500/500
										15	48.4/44.0	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	426.4/416.6 426.4/416.6 426.4/416.6 426.4/416.6	500/500 500/500 500/500 500/500
										20	61.1/56.0	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	439.1/428.6 439.1/428.6 439.1/428.6 439.1/428.6	500/500 500/500 500/500 500/500
								25	74.8/ 68.0	—	— / —	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	393.4/386.6 393.4/386.6 393.4/386.6 393.4/386.6	500/500 500/500 500/500 500/500
										10	33.4/30.4	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	426.8/417.0 426.8/417.0 426.8/417.0 426.8/417.0	500/500 500/500 500/500 500/500
										15	48.4/44.0	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	441.8/430.6 441.8/430.6 441.8/430.6 441.8/430.6	500/500 500/500 500/500 500/500
										20	61.1/56.0	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	454.5/442.6 454.5/442.6 454.5/442.6 454.5/442.6	500/500 500/500 500/500 500/500
								30	88.0/ 80.0	—	— / —	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	406.6/398.6 406.6/398.6 406.6/398.6 406.6/398.6	500/500 500/500 500/500 500/500
										10	33.4/30.4	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	440.0/429.0 440.0/429.0 440.0/429.0 440.0/429.0	500/500 500/500 500/500 500/500
										15	48.4/44.0	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	455.0/442.6 455.0/442.6 455.0/442.6 455.0/442.6	500/500 500/500 500/500 500/500
										20	61.1/56.0	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	467.7/454.6 467.7/454.6 467.7/454.6 467.7/454.6	600/500 600/500 600/500 600/500
								40	114.4/104.0	—	— / —	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	433.0/422.6 433.0/422.6 433.0/422.6 433.0/422.6	500/500 500/500 500/500 500/500
										10	33.4/30.4	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	466.4/453.0 466.4/453.0 466.4/453.0 466.4/453.0	600/500 600/500 600/500 600/500
										15	48.4/44.0	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	481.4/466.6 481.4/466.6 481.4/466.6 481.4/466.6	600/600 600/600 600/600 600/600
										20	61.1/56.0	78.9/ 91.0 157.7/182.0 236.6/273.0	36 72 108**	494.1/478.6 494.1/478.6 494.1/478.6 494.1/478.6	600/600 600/600 600/600 600/600

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 13 — Electrical Data Size 070 Units (cont)
380-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
		No. 1		No. 2											
Min	Max	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCPT†
342	418	56.4	280	79.5	382	5	2.7 (ea)	15	24.5	—	—	— 38.3 76.8 114.7	— 25 51 76	193.8 193.8 193.8 193.8	250 250 250 250
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	212.0 212.0 212.0 212.0	250 250 250 250
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	219.8 219.8 219.8 219.8	250 250 250 250
										20	34.0	— 38.3 76.8 114.7	— 25 51 76	227.8 227.8 227.8 227.8	300 300 300 300
								20	30.0	—	—	— 38.3 76.8 114.7	— 25 51 76	199.3 199.3 199.3 199.3	250 250 250 250
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	217.5 217.5 217.5 217.5	250 250 250 250
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	225.3 225.3 225.3 225.3	300 300 300 300
										20	34.0	— 38.3 76.8 114.7	— 25 51 76	233.3 233.3 233.3 233.3	300 300 300 300
								25	38.0	—	—	— 38.3 76.8 114.7	— 25 51 76	207.3 207.3 207.3 207.3	250 250 250 250
										10	18.2	— 38.3 76.8 114.7	— 25 51 76	225.5 225.5 225.5 225.5	300 300 300 300
										15	26.0	— 38.3 76.8 114.7	— 25 51 76	233.3 233.3 233.3 233.3	300 300 300 300
										20	34.0	— 38.3 76.8 114.7	— 25 51 76	241.3 241.3 241.3 241.3	300 300 300 300

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCPT — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 13 — Electrical Data Size 070 Units (cont)

460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
414	508	50-6	253	65.4	345	5	3.3 (ea)	15	21.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	169.9 169.9 169.9 169.9	225 225 225 225
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	185.1 185.1 185.1 185.1	250 250 250 250
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	191.9 191.9 191.9 192.8	250 250 250 250
										20	28.0	— 46.3 93.0 139.0	— 36 72 108**	197.9 197.9 197.9 200.3	250 250 250 250
								20	27.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	175.9 175.9 175.9 175.9	225 225 225 225
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	191.1 191.1 191.1 191.8	250 250 250 250
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	197.9 197.9 197.9 200.3	250 250 250 250
										20	28.0	— 46.3 93.0 139.0	— 36 72 108**	203.9 203.9 203.9 207.8	250 250 250 250
								25	34.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	182.9 182.9 182.9 182.9	225 225 225 225
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	198.1 198.1 198.1 200.5	250 250 250 250
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	204.9 204.9 204.9 209.0	250 250 250 250
										20	28.0	— 46.3 93.0 139.0	— 36 72 108**	210.9 210.9 210.9 216.5	250 250 250 250
								30	40.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	188.9 188.9 188.9 189.0	250 250 250 250
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	204.1 204.1 204.1 208.0	250 250 250 250
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	210.9 210.9 210.9 216.5	250 250 250 250
										20	28.0	— 46.3 93.0 139.0	— 36 72 108**	216.9 216.9 216.9 224.0	250 250 250 250
								40	52.0	—	—	— 46.3 93.0 139.0	— 36 72 108**	200.9 200.9 200.9 204.0	250 250 250 250
										10	15.2	— 46.3 93.0 139.0	— 36 72 108**	216.1 216.1 216.1 223.0	250 250 250 250
										15	22.0	— 46.3 93.0 139.0	— 36 72 108**	222.9 222.9 222.9 231.5	250 250 250 250
										20	28.0	— 46.3 93.0 139.0	— 36 72 108**	228.9 228.9 228.9 239.0	250 250 250 300

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

**108 kW available on CV applications only.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 13 — Electrical Data Size 070 Units (cont)

575-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
Min	Max	No. 1		No. 2		Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
		RLA	LRA	RLA	LRA										
518	632	39.1	176	52.6	276	5	2.4 (ea)	15	17.0	—	—	—	—	133.9	175
												36.0	36	133.9	175
												72.0	72	133.9	175
												108.0	108**	133.9	175
										10	12.2	—	—	146.1	175
												36.0	36	146.1	175
												72.0	72	146.1	175
												108.0	108**	146.1	200
								15	18.0	—	—	—	—	151.9	200
												36.0	36	151.9	200
												72.0	72	151.9	200
												108.0	108**	151.9	200
								20	22.0	—	—	—	—	155.9	200
												36.0	36	155.9	200
												72.0	72	155.9	200
												108.0	108**	156.8	200
								20	22.0	—	—	—	—	138.9	175
												36.0	36	138.9	175
												72.0	72	138.9	175
												108.0	108**	138.9	175
										10	12.2	—	—	151.1	200
												36.0	36	151.1	200
												72.0	72	151.1	200
												108.0	108**	151.1	200
								15	18.0	—	—	—	—	156.9	200
												36.0	36	156.9	200
												72.0	72	156.9	200
												108.0	108**	158.0	200
								20	22.0	—	—	—	—	160.9	200
												36.0	36	160.9	200
												72.0	72	160.9	200
												108.0	108**	163.0	200
								25	27.0	—	—	—	—	143.9	175
												36.0	36	143.9	175
												72.0	72	143.9	175
												108.0	108**	143.9	200
										10	12.2	—	—	156.1	200
												36.0	36	156.1	200
												72.0	72	156.1	200
												108.0	108**	157.0	200
								15	18.0	—	—	—	—	161.9	200
												36.0	36	161.9	200
												72.0	72	161.9	200
												108.0	108**	164.3	200
								20	22.0	—	—	—	—	165.9	200
												36.0	36	165.9	200
												72.0	72	165.9	200
												108.0	108**	169.3	200
								30	32.0	—	—	—	—	148.9	200
												36.0	36	148.9	200
												72.0	72	148.9	200
												108.0	108**	148.9	200
										10	12.2	—	—	161.1	200
												36.0	36	161.1	200
												72.0	72	161.1	200
												108.0	108**	163.3	200
								15	18.0	—	—	—	—	166.9	200
												36.0	36	166.9	200
												72.0	72	166.9	200
												108.0	108**	170.5	200
								20	22.0	—	—	—	—	170.9	200
												36.0	36	170.9	200
												72.0	72	170.9	200
												108.0	108**	175.5	225
								40	41.0	—	—	—	—	157.9	200
												36.0	36	157.9	200
												72.0	72	157.9	200
												108.0	108**	159.3	200
										10	12.2	—	—	170.1	200
												36.0	36	170.1	200
												72.0	72	170.1	200
												108.0	108**	174.5	225
								15	18.0	—	—	—	—	175.9	225
												36.0	36	175.9	225
												72.0	72	175.9	225
												108.0	108**	181.8	225
								20	22.0	—	—	—	—	179.9	225
												36.0	36	179.9	225
												72.0	72	179.9	225
												108.0	108**	186.8	225

LEGEND

Table 14 — Electrical Data, 50ZA,ZB,ZE,ZF,ZJ,ZK075 Units (without High-Capacity Power Exhaust)
460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
		No. 1		No. 2											
Min	Max	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCPT†
414	508	50.6	253	65.4	345	5	3.3 (ea)	30	40.0	—	—	— 130.0 260.0	— 108 216	188.9 188.9 310.0	250 250 350
										10	15.2	— 130.0 260.0	— 108 216	204.1 204.1 329.0	250 250 350
										15	22.0	— 130.0 260.0	— 108 216	210.9 210.9 337.5	250 250 400
										20	28.0	— 130.0 260.0	— 108 216	216.9 216.9 345.0	250 250 400
								40	52.0	—	—	— 130.0 260.0	— 108 216	200.9 200.9 325.0	250 250 350
										10	15.2	— 130.0 260.0	— 108 216	216.1 216.1 344.0	250 250 400
										15	22.0	— 130.0 260.0	— 108 216	222.9 222.9 352.5	250 250 400
										20	28.0	— 130.0 260.0	— 108 216	228.9 230.0 360.0	250 250 400
								50	65.0	—	—	— 130.0 260.0	— 108 216	213.9 213.9 341.3	250 250 400
										10	15.2	— 130.0 260.0	— 108 216	229.1 230.3 360.3	250 250 400
										15	22.0	— 130.0 260.0	— 108 216	235.9 238.8 368.8	300 300 400
										20	28.0	— 130.0 260.0	— 108 216	241.9 246.3 376.3	300 300 400
								60	77.0	—	—	— 130.0 260.0	— 108 216	228.8 228.8 356.3	300 300 400
										10	15.2	— 130.0 260.0	— 108 216	244.0 245.3 375.3	300 300 400
										15	22.0	— 130.0 260.0	— 108 216	250.8 253.8 383.8	300 300 450
										20	28.0	— 130.0 260.0	— 108 216	256.8 261.3 391.3	300 300 450
								75	96.0	—	—	— 130.0 260.0	— 108 216	252.5 252.5 380.0	300 300 450
										10	15.2	— 130.0 260.0	— 108 216	267.7 269.0 399.0	350 350 450
										15	22.0	— 130.0 260.0	— 108 216	274.5 277.5 407.5	350 350 450
										20	28.0	— 130.0 260.0	— 108 216	280.5 285.0 415.0	350 350 500

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCPT — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 15 — Electrical Data, 50ZA,ZB,ZE,ZF,ZJ,ZK090 Units (without High-Capacity Power Exhaust)
460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR				CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
		No. 1		No. 2											
Min	Max	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
414	508	65.4	345	65.4	345	6	3.3 (ea)	30	40.0	—	—	— 130.0 260.0	— 108 216	207.0 207.0 310.0	250 250 350
										10	15.2	— 130.0 260.0	— 108 216	222.2 222.2 329.0	250 250 350
										15	22.0	— 130.0 260.0	— 108 216	229.0 229.0 337.5	250 250 400
										20	28.0	— 130.0 260.0	— 108 216	235.0 235.0 345.0	300 300 400
								40	52.0	—	—	— 130.0 260.0	— 108 216	219.0 219.0 325.0	250 250 350
										10	15.2	— 130.0 260.0	— 108 216	234.2 234.2 344.0	250 250 400
										15	22.0	— 130.0 260.0	— 108 216	241.0 241.0 352.5	300 300 400
										20	28.0	— 130.0 260.0	— 108 216	247.0 247.0 360.0	300 300 400
								50	65.0	—	—	— 130.0 260.0	— 108 216	232.0 232.0 341.3	250 250 400
										10	15.2	— 130.0 260.0	— 108 216	247.2 247.2 360.3	300 300 400
										15	22.0	— 130.0 260.0	— 108 216	254.0 254.0 368.8	300 300 400
										20	28.0	— 130.0 260.0	— 108 216	260.0 260.0 376.3	300 300 400
								60	77.0	—	—	— 130.0 260.0	— 108 216	246.9 246.9 356.3	300 300 400
										10	15.2	— 130.0 260.0	— 108 216	262.1 262.1 375.3	300 300 400
										15	22.0	— 130.0 260.0	— 108 216	268.9 268.9 383.8	300 300 450
										20	28.0	— 130.0 260.0	— 108 216	274.9 274.9 391.3	350 350 450
								75	96.0	—	—	— 130.0 260.0	— 108 216	270.6 270.6 380.0	350 350 450
										10	15.2	— 130.0 260.0	— 108 216	285.8 285.8 399.0	350 350 450
										15	22.0	— 130.0 260.0	— 108 216	292.6 292.6 407.5	350 350 450
										20	28.0	— 130.0 260.0	— 108 216	298.6 298.6 415.0	350 350 500

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 16 — Electrical Data, 50ZA,ZB,ZE,ZF,ZJ,ZK105 Units (without High-Capacity Power Exhaust)
460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY			
		No. 1		No. 2		No. 3		No. 4													
Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†		
414	508	50.6	253	50.6	253	34.6	173	34.6	173	6	3.3 (ea)	30	40.0	—	—	— 130.0 260.0	— 108 216	242.9 242.9 310.0	250 250 350		
														10	15.2	— 130.0 260.0	— 108 216	258.1 258.1 329.0	300 300 350		
														15	22.0	— 130.0 260.0	— 108 216	264.9 264.9 337.5	300 300 350		
														20	28.0	— 130.0 260.0	— 108 216	270.9 270.9 345.0	300 300 350		
														40	52.0	—	—	— 130.0 260.0	— 108 216	255.2 255.2 325.0	300 300 350
																10	15.2	— 130.0 260.0	— 108 216	270.4 270.4 344.0	300 300 350
																15	22.0	— 130.0 260.0	— 108 216	277.2 277.2 352.5	300 300 400
																20	28.0	— 130.0 260.0	— 108 216	283.2 283.2 360.0	300 300 400
												50	65.0	—	—	— 130.0 260.0	— 108 216	271.5 271.5 341.3	300 300 400		
														10	15.2	— 130.0 260.0	— 108 216	286.7 286.7 360.3	350 350 400		
														15	22.0	— 130.0 260.0	— 108 216	293.5 293.5 368.8	350 350 400		
														20	28.0	— 130.0 260.0	— 108 216	299.5 299.5 376.3	350 350 400		
												60	77.0	—	—	— 130.0 260.0	— 108 216	286.5 286.5 356.3	350 350 400		
														10	15.2	— 130.0 260.0	— 108 216	301.7 301.7 375.3	350 350 400		
														15	22.0	— 130.0 260.0	— 108 216	308.5 308.5 383.8	350 350 450		
														20	28.0	— 130.0 260.0	— 108 216	314.5 314.5 391.3	350 350 450		
												75	96.0	—	—	— 130.0 260.0	— 108 216	310.2 310.2 380.0	400 400 450		
														10	15.2	— 130.0 260.0	— 108 216	325.4 325.4 399.0	400 400 450		
														15	22.0	— 130.0 260.0	— 108 216	332.2 332.2 407.5	400 400 450		
														20	28.0	— 130.0 260.0	— 108 216	338.2 338.2 415.0	400 400 500		

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 17 — Electrical Data, 50ZC,ZD,ZL,ZM,ZR,ZS075 Units (with Return/Exhaust Fan)

460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY		
		No. 1		No. 2		No. 3		No. 4								FLA	kW			
Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†	
414	508	50.6	253	65.4	345	—	—	—	—	5	3.3 (ea)	30	40.0	20	27	— 130.0 260.0	— 108 216	215.9 215.9 343.8	250 250 400	
														25	34	— 130.0 260.0	— 108 216	222.9 222.9 352.5	250 250 400	
														30	40	— 130.0 260.0	— 108 216	228.9 230.0 360.0	250 250 400	
														40	52	— 130.0 260.0	— 108 216	240.9 245.0 375.0	300 300 400	
													40	52.0	20	27	— 130.0 260.0	— 108 216	227.9 228.8 358.8	250 250 400
															25	34	— 130.0 260.0	— 108 216	234.9 237.5 367.5	300 300 400
															30	40	— 130.0 260.0	— 108 216	240.9 245.0 375.0	300 300 400
															40	52	— 130.0 260.0	— 108 216	252.9 260.0 390.0	300 300 400
												50	65.0	20	27	— 130.0 260.0	— 108 216	240.9 245.0 375.0	300 300 400	
														25	34	— 130.0 260.0	— 108 216	247.9 253.8 383.8	300 300 400	
														30	40	— 130.0 260.0	— 108 216	253.9 261.3 391.3	300 300 400	
														40	52	— 130.0 260.0	— 108 216	265.9 276.3 406.3	300 300 450	
												60	77.0	20	27	— 130.0 260.0	— 108 216	255.8 260.0 390.0	300 300 450	
														25	34	— 130.0 260.0	— 108 216	262.8 268.8 398.8	300 300 450	
														30	40	— 130.0 260.0	— 108 216	268.8 276.3 406.3	300 300 450	
														40	52	— 130.0 260.0	— 108 216	280.8 291.3 421.3	350 350 450	
												75	96.0	20	27	— 130.0 260.0	— 108 216	279.5 283.8 413.8	350 350 500	
														25	34	— 130.0 260.0	— 108 216	286.5 292.5 422.5	350 350 500	
														30	40	— 130.0 260.0	— 108 216	292.5 300.0 430.0	350 350 500	
														40	52	— 130.0 260.0	— 108 216	304.5 315.0 445.0	400 400 500	

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.
†Fuse or HACR breaker.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 18 — Electrical Data, 50ZC,ZD,ZL,ZM,ZR,ZS090 Units (with Return/Exhaust Fan)

460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY		
		No. 1		No. 2		No. 3		No. 4												
Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†	
414	508	65.4	345	65.4	345	—	—	—	—	6	3.3 (ea)	30	40.0	20	27	130.0 260.0	108 216	234.0 234.0 343.8	250 250 400	
														25	34	130.0 260.0	108 216	241.0 241.0 352.5	300 300 400	
														30	40	130.0 260.0	108 216	247.0 247.0 360.0	300 300 400	
														40	52	130.0 260.0	108 216	259.0 259.0 375.0	300 300 400	
													40	52.0	20	27	130.0 260.0	108 216	246.0 246.0 358.8	300 300 400
															25	34	130.0 260.0	108 216	253.0 253.0 367.5	300 300 400
															30	40	130.0 260.0	108 216	259.0 259.0 375.0	300 300 400
															40	52	130.0 260.0	108 216	271.0 271.0 390.0	300 300 400
												50	65.0	20	27	130.0 260.0	108 216	259.0 259.0 375.0	300 300 400	
														25	34	130.0 260.0	108 216	266.0 266.0 383.8	300 300 400	
														30	40	130.0 260.0	108 216	272.0 272.0 391.3	300 300 400	
														40	52	130.0 260.0	108 216	284.0 284.0 406.3	300 300 450	
												60	77.0	20	27	130.0 260.0	108 216	273.9 273.9 390.0	350 350 450	
														25	34	130.0 260.0	108 216	280.9 280.9 398.8	350 350 450	
														30	40	130.0 260.0	108 216	286.9 286.9 406.3	350 350 450	
														40	52	130.0 260.0	108 216	298.9 298.9 421.3	350 350 450	
												75	96.0	20	27	130.0 260.0	108 216	297.6 297.6 413.8	350 350 500	
														25	34	130.0 260.0	108 216	304.6 304.6 422.5	400 400 500	
														30	40	130.0 260.0	108 216	310.6 310.6 430.0	400 400 500	
														40	52	130.0 260.0	108 216	322.6 322.6 445.0	400 400 500	

LEGEND

CV — Constant Volume
 FLA — Full Load Amps
 Hp — Nominal Horsepower
 LRA — Locked Rotor Amps
 MCA — Minimum Circuit Amps
 (for wire sizing)
 MOCP — Maximum Overcurrent Protection
 RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 19 — Electrical Data, 50ZC,ZD,ZL,ZM,ZR,ZS105 Units (with Return/Exhaust Fan)

460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY		
		No. 1		No. 2		No. 3		No. 4												
Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†	
414	508	50.6	253	50.6	253	34.6	173	34.6	173	6	3.3 (ea)	30	40.0	20	27	— 130.0 260.0	— 108 216	269.9 269.9 343.8	300 300 350	
														25	34	— 130.0 260.0	— 108 216	276.9 276.9 352.5	300 300 400	
														30	40	— 130.0 260.0	— 108 216	282.9 282.9 360.0	300 300 400	
														40	52	— 130.0 260.0	— 108 216	294.9 294.9 375.0	300 300 400	
													40	52.0	20	27	— 130.0 260.0	— 108 216	282.2 282.2 358.8	300 300 400
															25	34	— 130.0 260.0	— 108 216	289.2 289.2 367.5	300 300 400
															30	40	— 130.0 260.0	— 108 216	295.2 295.2 375.0	300 300 400
															40	52	— 130.0 260.0	— 108 216	307.2 307.2 390.0	350 350 400
												50	65.0	20	27	— 130.0 260.0	— 108 216	298.5 298.5 375.0	350 350 400	
														25	34	— 130.0 260.0	— 108 216	305.5 305.5 383.8	350 350 400	
														30	40	— 130.0 260.0	— 108 216	311.5 311.5 391.3	350 350 400	
														40	52	— 130.0 260.0	— 108 216	323.5 323.5 406.3	350 350 450	
												60	77.0	20	27	— 130.0 260.0	— 108 216	313.5 313.5 390.0	350 350 450	
														25	34	— 130.0 260.0	— 108 216	320.5 320.5 398.8	350 350 450	
														30	40	— 130.0 260.0	— 108 216	326.5 326.5 406.3	400 400 450	
														40	52	— 130.0 260.0	— 108 216	338.5 338.5 421.3	400 400 450	
												75	96.0	20	27	— 130.0 260.0	— 108 216	337.2 337.2 413.8	400 400 500	
														25	34	— 130.0 260.0	— 108 216	344.2 344.2 422.5	400 400 500	
														30	40	— 130.0 260.0	— 108 216	350.2 350.2 430.0	400 400 500	
														40	52	— 130.0 260.0	— 108 216	362.2 362.2 445.0	450 450 500	

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps



*Electric heat available on vertical discharge units.

†Fuse or HACR breaker.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.

MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 20 — Electrical Data, 50ZT,ZV,ZW,ZX,ZY,ZZ075 Units (with High-Capacity Power Exhaust)
460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
		No. 1		No. 2		No. 3		No. 4											
Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
414	508	50.6	253	65.4	345	—	—	—	—	5	3.3 (ea)	30	40.0	20	28.0	130.0 260.0	108 216	216.9 216.9 345.0	250 250 400
														30	42.0	130.0 260.0	108 216	230.9 232.5 362.5	250 250 400
														40	54.0	130.0 260.0	108 216	242.9 247.5 377.5	300 300 400
														50	68.0	130.0 260.0	108 216	256.9 265.0 395.0	300 300 400
														60	80.0	130.0 260.0	108 216	268.9 280.0 410.0	300 300 450
												40	52.0	20	28.0	130.0 260.0	108 216	228.9 230.0 360.0	250 250 400
														30	42.0	130.0 260.0	108 216	242.9 247.5 377.5	300 300 400
														40	54.0	130.0 260.0	108 216	254.9 262.5 392.5	300 300 400
														50	68.0	130.0 260.0	108 216	268.9 280.0 410.0	300 300 450
														60	80.0	130.0 260.0	108 216	280.9 295.0 425.0	300 300 450
												50	65.0	20	28.0	130.0 260.0	108 216	241.9 246.3 376.3	300 300 400
														30	42.0	130.0 260.0	108 216	255.9 263.8 393.8	300 300 400
														40	54.0	130.0 260.0	108 216	267.9 278.8 408.8	300 300 450
														50	68.0	130.0 260.0	108 216	281.9 296.3 426.3	300 300 450
														60	80.0	130.0 260.0	108 216	293.9 311.3 441.3	350 350 450
												60	77.0	20	28.0	130.0 260.0	108 216	256.8 261.3 391.3	300 300 450
														30	42.0	130.0 260.0	108 216	270.8 278.8 408.8	300 300 450
														40	54.0	130.0 260.0	108 216	282.8 293.8 423.8	350 350 450
														50	68.0	130.0 260.0	108 216	296.8 311.3 441.3	350 350 500
														60	80.0	130.0 260.0	108 216	308.8 326.3 456.3	350 350 500
												75	96.0	20	28.0	130.0 260.0	108 216	280.5 285.0 415.0	350 350 500
														30	42.0	130.0 260.0	108 216	294.5 302.5 432.5	350 350 500
														40	54.0	130.0 260.0	108 216	306.5 317.5 447.5	400 400 500
														50	68.0	130.0 260.0	108 216	320.5 335.0 465.0	400 400 500
														60	80.0	130.0 260.0	108 216	332.5 350.0 480.0	400 400 500

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps

*Electric heat available on vertical discharge units.
†Fuse or HACR breaker.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.



MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 21 — Electrical Data, 50ZT,ZV,ZW,ZX,ZY,ZZ090 Units (with High-Capacity Power Exhaust)
460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY	
		No. 1		No. 2		No. 3		No. 4								FLA	kW		
Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†
414	508	65.4	345	65.4	345	—	—	—	—	6	3.3 (ea)	30	40.0	20	28.0	— 130.0 260.0	— 108 216	235.0 235.0 345.0	300 300 400
														30	42.0	— 130.0 260.0	— 108 216	249.0 249.0 362.5	300 300 400
														40	54.0	— 130.0 260.0	— 108 216	261.0 261.0 377.5	300 300 400
														50	68.0	— 130.0 260.0	— 108 216	275.0 275.0 395.0	300 300 400
														60	80.0	— 130.0 260.0	— 108 216	287.0 287.0 410.0	350 350 450
												40	52.0	20	28.0	— 130.0 260.0	— 108 216	247.0 247.0 360.0	300 300 400
														30	42.0	— 130.0 260.0	— 108 216	261.0 261.0 377.5	300 300 400
														40	54.0	— 130.0 260.0	— 108 216	273.0 273.0 392.5	300 300 400
														50	68.0	— 130.0 260.0	— 108 216	287.0 287.0 410.0	300 300 450
														60	80.0	— 130.0 260.0	— 108 216	299.0 299.0 425.0	350 350 450
												50	65.0	20	28.0	— 130.0 260.0	— 108 216	260.0 260.0 376.3	300 300 400
														30	42.0	— 130.0 260.0	— 108 216	274.0 274.0 393.8	300 300 400
														40	54.0	— 130.0 260.0	— 108 216	286.0 286.0 408.8	350 350 450
														50	68.0	— 130.0 260.0	— 108 216	300.0 300.0 426.3	350 350 450
														60	80.0	— 130.0 260.0	— 108 216	312.0 312.0 441.3	350 350 450
												60	77.0	20	28.0	— 130.0 260.0	— 108 216	274.9 274.9 391.3	350 350 450
														30	42.0	— 130.0 260.0	— 108 216	288.9 288.9 408.8	350 350 450
														40	54.0	— 130.0 260.0	— 108 216	300.9 300.9 423.8	350 350 450
														50	68.0	— 130.0 260.0	— 108 216	314.9 314.9 441.3	350 350 500
														60	80.0	— 130.0 260.0	— 108 216	326.9 326.9 456.3	400 400 500
												75	96.0	20	28.0	— 130.0 260.0	— 108 216	298.6 298.6 415.0	350 350 500
														30	42.0	— 130.0 260.0	— 108 216	312.6 312.6 432.5	400 400 500
														40	54.0	— 130.0 260.0	— 108 216	324.6 324.6 447.5	400 400 500
														50	68.0	— 130.0 260.0	— 108 216	338.6 338.6 465.0	400 400 500
														60	80.0	— 130.0 260.0	— 108 216	350.6 350.6 480.0	400 400 500

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps

*Electric heat available on vertical discharge units.
†Fuse or HACR breaker.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.



MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Table 22 — Electrical Data, 50ZT,ZV,ZW,ZX,ZY,ZZ105 Units (with High-Capacity Power Exhaust)
460-3-60 (V-Ph-Hz)

VOLTAGE RANGE		COMPRESSOR								CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		POWER EXHAUST		OPTIONAL ELECTRIC HEAT*		POWER SUPPLY		
		No. 1		No. 2		No. 3		No. 4												
Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA	Hp	FLA	Hp	FLA (total)	FLA	kW	MCA	MOCP†	
414	508	50.6	253	50.6	253	34.6	173	34.6	173	6	3.3 (ea)	30	40.0	20	28.0	130.0 260.0	108 216	270.9 270.9 345.0	300 300 350	
														30	42.0	130.0 260.0	108 216	284.9 284.9 362.5	300 300 400	
														40	54.0	130.0 260.0	108 216	296.9 296.9 377.5	300 300 400	
														50	68.0	130.0 260.0	108 216	310.9 310.9 395.0	350 350 400	
														60	80.0	130.0 260.0	108 216	322.9 322.9 410.0	350 350 450	
													40	52.0	20	28.0	130.0 260.0	108 216	283.2 283.2 360.0	300 300 400
															30	42.0	130.0 260.0	108 216	297.2 297.2 377.5	300 300 400
															40	54.0	130.0 260.0	108 216	309.2 309.2 392.5	350 350 400
															50	68.0	130.0 260.0	108 216	323.2 323.2 410.0	350 350 450
															60	80.0	130.0 260.0	108 216	335.2 335.2 425.0	350 350 450
												50	65.0	20	28.0	130.0 260.0	108 216	299.5 299.5 376.3	350 350 400	
														30	42.0	130.0 260.0	108 216	313.5 313.5 393.8	350 350 400	
														40	54.0	130.0 260.0	108 216	325.5 325.5 408.8	350 350 450	
														50	68.0	130.0 260.0	108 216	339.5 339.5 426.3	400 400 450	
														60	80.0	130.0 260.0	108 216	351.5 351.5 441.3	400 400 450	
												60	77.0	20	28.0	130.0 260.0	108 216	314.5 314.5 391.3	350 350 450	
														30	42.0	130.0 260.0	108 216	328.5 328.5 408.8	400 400 450	
														40	54.0	130.0 260.0	108 216	340.5 340.5 423.8	400 400 450	
														50	68.0	130.0 260.0	108 216	354.5 354.5 441.3	400 400 500	
														60	80.0	130.0 260.0	108 216	366.5 366.5 456.3	400 400 500	
												75	96.0	20	28.0	130.0 260.0	108 216	338.2 338.2 415.0	400 400 500	
														30	42.0	130.0 260.0	108 216	352.2 352.2 432.5	400 400 500	
														40	54.0	130.0 260.0	108 216	364.2 364.2 447.5	450 450 500	
														50	68.0	130.0 260.0	108 216	378.2 378.2 465.0	450 450 500	
														60	80.0	130.0 260.0	108 216	390.2 390.2 480.0	450 450 500	

LEGEND

CV — Constant Volume
FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps

*Electric heat available on vertical discharge units.
†Fuse or HACR breaker.

NOTE: Electric resistance heaters are rated at 230-v (for 208/230-v use), 380-v, 460-v, and 575-v. To determine heater capacity (kW) at other unit operating voltage, multiply heater nominal capacity by appropriate multiplier at right.



MULTIPLICATION FACTORS

HEATER kW RATING (VOLTS)	VOLTAGE DISTRIBUTION V-3-60	MULTIPLICATION FACTOR
230	200	0.756
	208	0.818
	230	1.000
	240	1.089
380	360	0.897
	380	1.000
	400	1.108
460	440	0.914
	460	1.000
	480	1.089
575	550	0.915
	575	1.000
	600	1.089

Electric heaters are tested and ETL approved at maximum total external static pressure of 1.9 in. wg.

Use the following formula to determine the percent voltage imbalance.

% Voltage Imbalance

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

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 local utility immediately.

Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components.

Air Pressure Tubing — Before options such as Inlet Guide Vanes (IGV), Variable Frequency Drive (VFD), and/or Modulating Power Exhaust can operate properly, the pneumatic tubing for pressure sensing must be installed. Use fire-retardant plenum tubing (field-supplied). Tubing size depends on type of control device (see Table 23 below). Tubing must be run from the appropriate sensing location (in the duct or in the building space) to the control device location in the unit.

Table 23 — Tubing Size

OPTION	UNIT	NOMINAL TUBE SIZE (OD) (in.)	ACTUAL TUBE SIZE (ID) (in.)
Inlet Guide Vanes (IGV)	50ZE,ZF,ZR,ZS,ZV,ZY	3/8	0.187
	50ZJ,ZK,ZL,ZM,ZW,ZZ	1/4	0.170
Variable Frequency Drive (VFD)	50ZE,ZF,ZR,ZS,ZV,ZY	1/4	0.170
	50ZJ,ZK,ZL,ZM,ZW,ZZ	1/4	0.170
Modulating Power Exhaust	50ZA,ZB,ZE,ZF	3/8	0.187
	50ZJ,ZK	1/4	0.170
High-Capacity Power Exhaust	50ZT,ZV,ZW,ZX,ZY,ZZ	1/4	0.170
Return/Exhaust Fan	50ZC,ZD,ZR,ZS	3/8	0.187
	50ZL,ZM	1/4	0.170

INLET GUIDE VANES — The tubing for the duct pressure (DP) control option should sample supply duct pressure about 2/3 of the way out from the unit in the main trunk duct, at a location where a constant duct pressure is desired.

50ZE,ZF,ZR,ZS,ZV,ZY Units — On these units, the inlet guide vanes are controlled by a differential pressure switch (DPS). On sizes 030-050, the DPS is located in the auxiliary control box at the economizer end of the unit (see Fig. 61). On

sizes 055-105, the DPS is located in the Supply Fan section. See Fig. 62. Use a nominal 3/8-in. plastic tubing.

50ZJ,ZK,ZL,ZM,ZW,ZZ Units — On these units, the duct pressure is sensed by a pressure transducer. The output of the pressure transducer is directed to the unit control module. On all sizes, the DP transducer is located in the unit auxiliary control box. See Fig. 63 and 64. Use a nominal 1/4-in. plastic tubing.

VARIABLE FREQUENCY DRIVE — The tubing for the duct pressure (DP) control option should sample supply duct pressure about 2/3 of the way out from the unit in the main trunk duct, at a location where a constant duct pressure is desired.

50ZE,ZF,ZR,ZS,ZV,ZY Units — On these units, the duct pressure is sensed by a pressure transducer. The pressure transducer output is directed to the VFD. On 030-050 units the DP transducer is located in the auxiliary control box. On 055-105 units, the DP transducer is located in the supply fan section. See Fig. 62. Use a nominal 1/4-in. plastic tubing.

50ZJ,ZK,ZL,ZM,ZW,ZZ Units — On these units, the duct pressure is sensed by a pressure transducer. The pressure transducer output is directed to the unit control module. On all sizes, the DP transducer is located in the unit auxiliary control box. See Fig. 63 and 64. Use a nominal 1/4-in. plastic tubing.

Refer to appropriate base unit Controls and Troubleshooting book for instructions on adjusting set points for Duct Pressure controls.

MODULATING POWER EXHAUST — The tubing for the building pressure control (achieved via the Modulating Power Exhaust option) should sample building pressure in the area near the entrance lobby (or other appropriate and sensitive location) so that location is controlled as closely to design pressures as possible.

50ZA,ZB,ZE,ZF Units — These units use a differential pressure switch (DPS) to control the actuator on the modulating discharge damper in exhaust fan no. 1. The building pressure (BP) DPS is located in the auxiliary control box of the unit. See Fig. 61 and 65. Use a nominal 3/8-in. plastic tubing.

For instructions on adjusting BP control set points, refer to Service, Adjustments section in this book.

50ZJ,ZK Units — These units use a pressure transducer for sensing building pressure. The BP transducer is located in the unit auxiliary control box. See Fig. 61 and 65. Use a nominal 1/4-in. plastic tubing.

For instructions on adjusting BP control set points on PIC units, refer to the Controls and Troubleshooting book for these units.

HIGH-CAPACITY POWER EXHAUST — The tubing for the building pressure control (achieved via the High-Capacity Power Exhaust package) should sample building pressure in the area near the entrance lobby (or other appropriate and sensitive location) so that location is controlled as closely to the design pressures as possible.

50ZT,ZV,ZX,ZY Units — These units use a pressure transducer for sensing building pressure (BP). The pressure transducer output is directed to the power exhaust motor variable frequency drive (VFD). The BP transducer is located in the unit auxiliary control box. See Fig. 66 and Fig. 67. Use a nominal 1/4-in. plastic tubing.

For instructions on adjusting BP control set points, refer to Controls and Troubleshooting book for these units.

50ZW,ZZ Units — These units use a pressure transducer for sensing building pressure (BP). The pressure transducer output is directed to the unit control module. The BP transducer is located in the unit auxiliary control box. See Fig. 68 and Fig. 66. Use a nominal 1/4-in. plastic tubing.

For instructions on adjusting BP control set points on PIC units, refer to Controls and Troubleshooting book for these units.

RETURN/EXHAUST POWER EXHAUST — The tubing for the building pressure control (achieved via the Return/Exhaust Power Exhaust option) should sample building pressure in the area near the entrance lobby (or other appropriate and sensitive location) so that location is controlled as closely to design pressures as possible.

50ZC,ZD,ZR,ZS Units — These units use a building pressure switch (BPS) to control the actuator on the power exhaust damper for the return/exhaust fan. The building pressure BPS is located in the auxiliary control box of the unit. See Fig. 68. Use a nominal $\frac{3}{8}$ -in. plastic tubing.

For instructions on adjusting BP control set points, refer to Service, Adjustments section in this book.

50ZL,ZM Units — The units use a pressure transducer for sensing building pressure. The BP transducer is located in the unit auxiliary control box. See Fig. 64. Use a nominal $\frac{1}{4}$ -in. plastic tubing.

For instructions on adjusting BP control set points on PIC units, refer to the Controls and Troubleshooting book for these units.

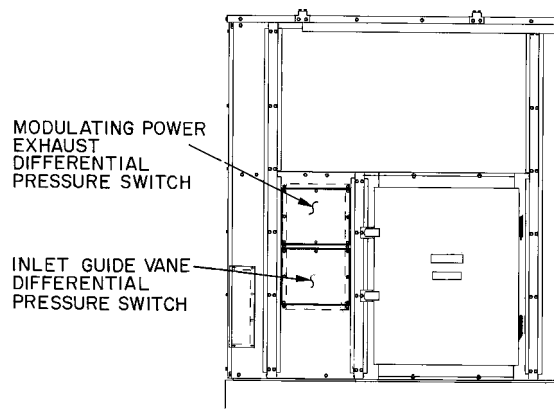


Fig. 61 — Modulating Power Exhaust and Inlet Guide Vane Differential Pressure Switch (Sizes 030-050)

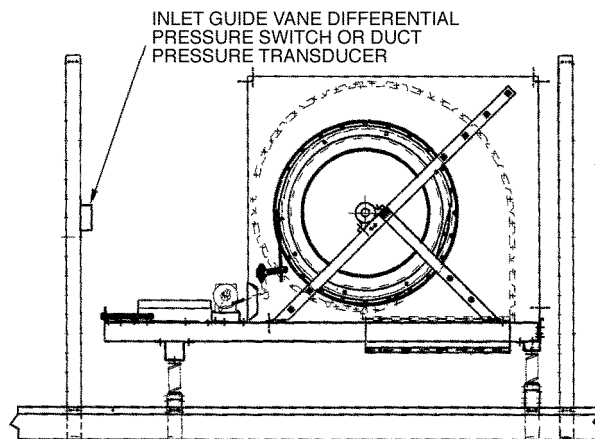


Fig. 62 — Inlet Guide Vane Differential Pressure Switch and Variable Frequency Drive Duct Pressure Transducer (Sizes 055-105)

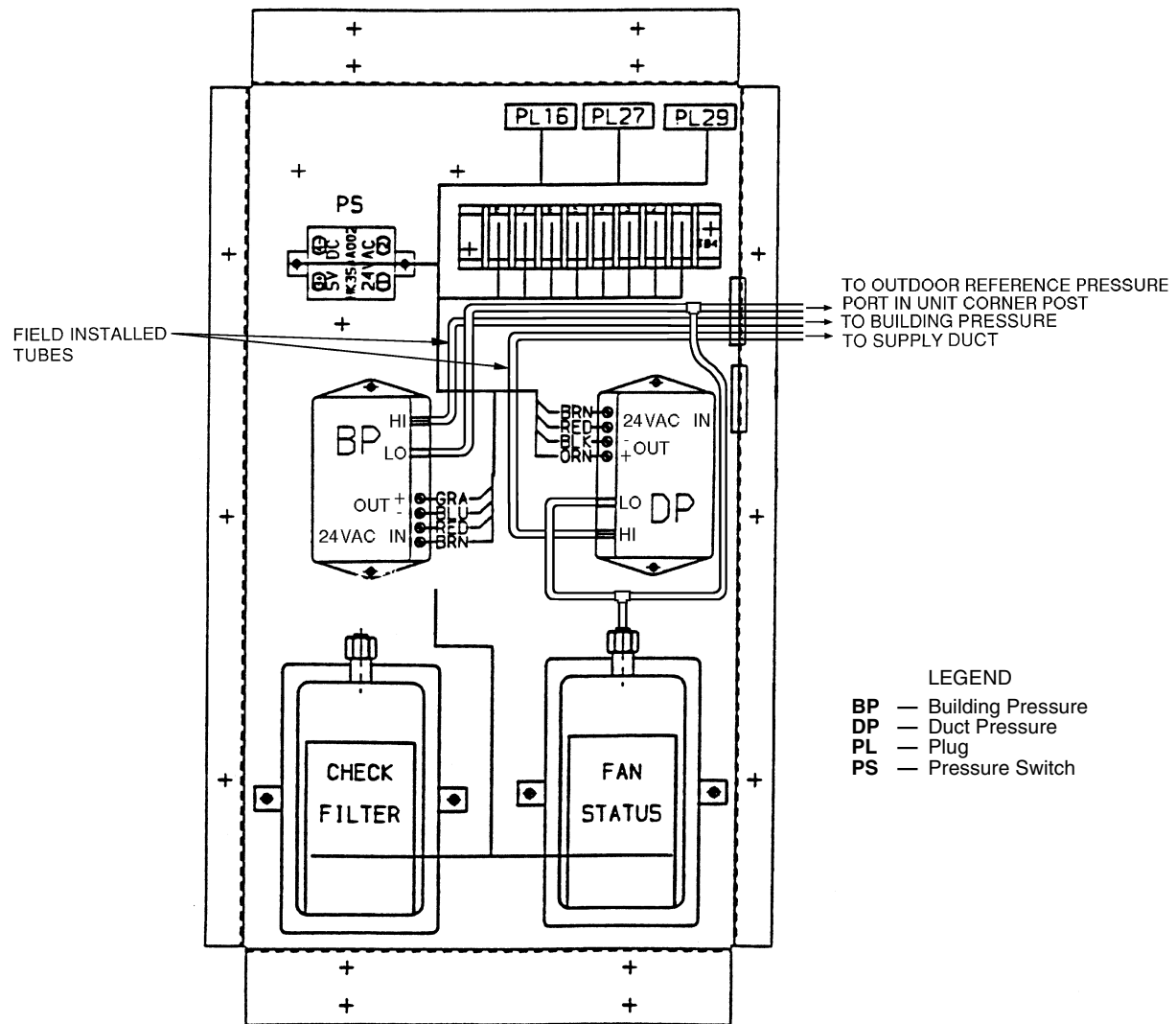


Fig. 63 — Auxiliary Control Box Details; 50ZJ,ZK030-050

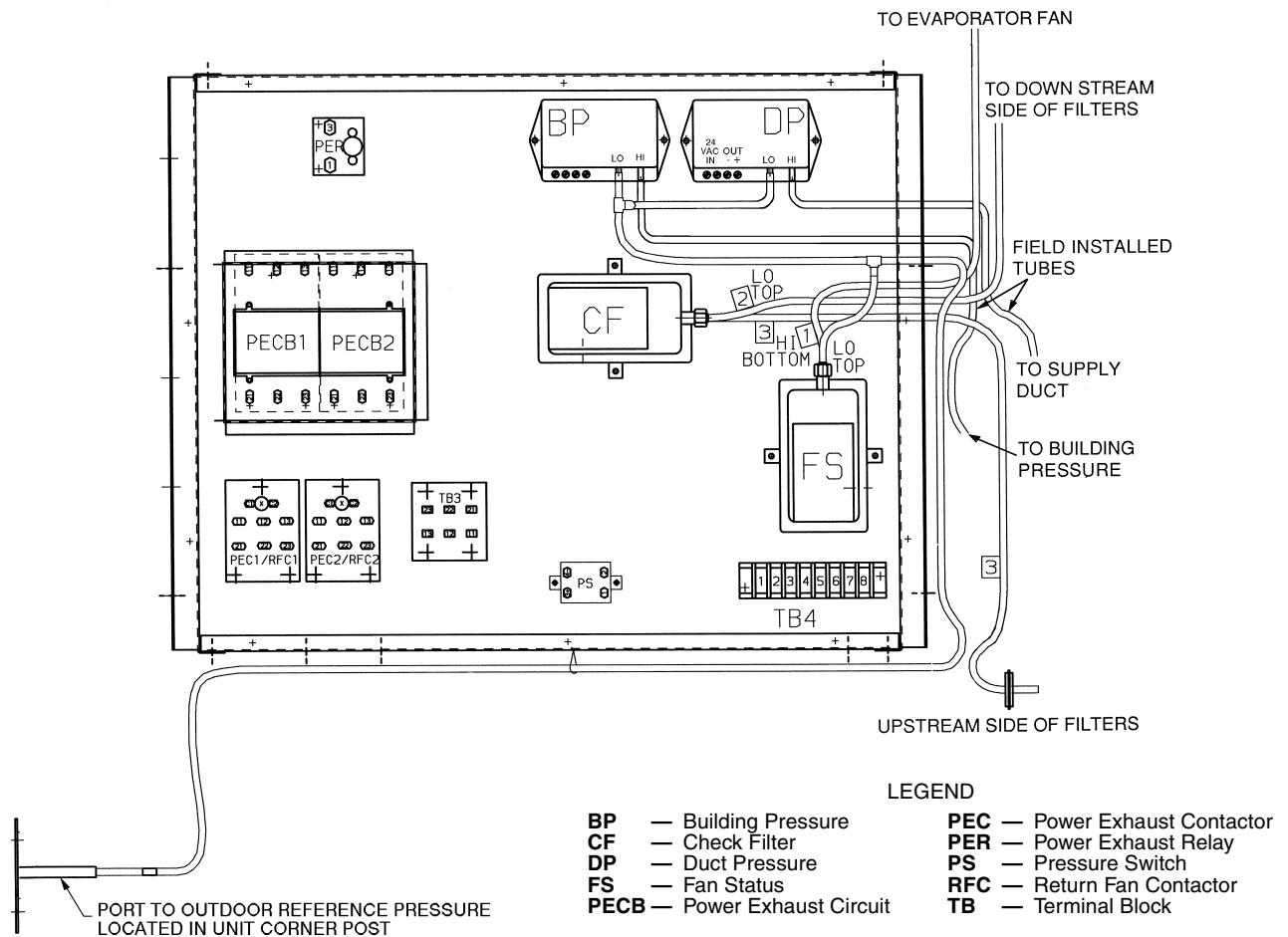


Fig. 64 — Auxiliary Control Box Details; 50ZJ,ZK055-105, 50ZL,ZM075-105, and 50ZW,ZZ075-105

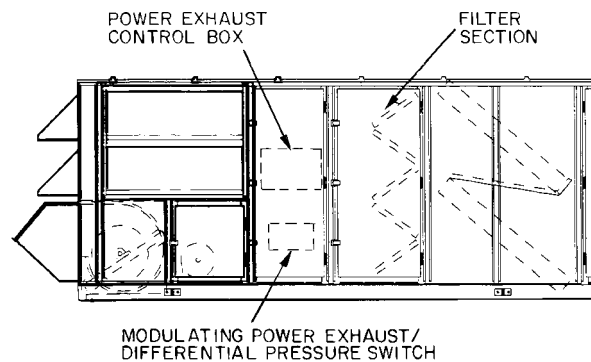
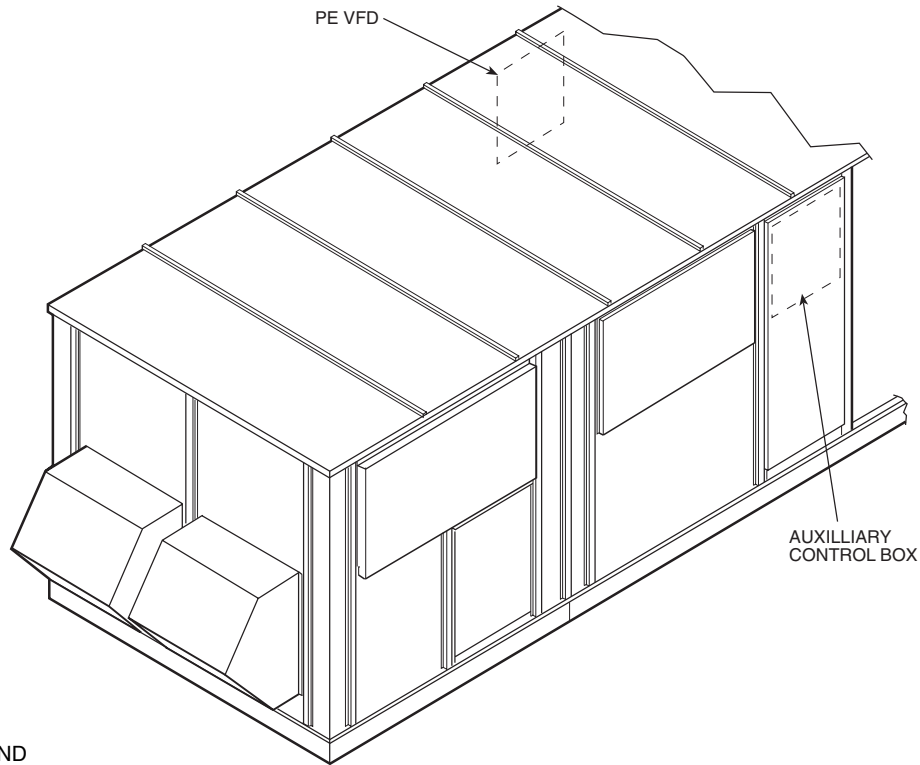


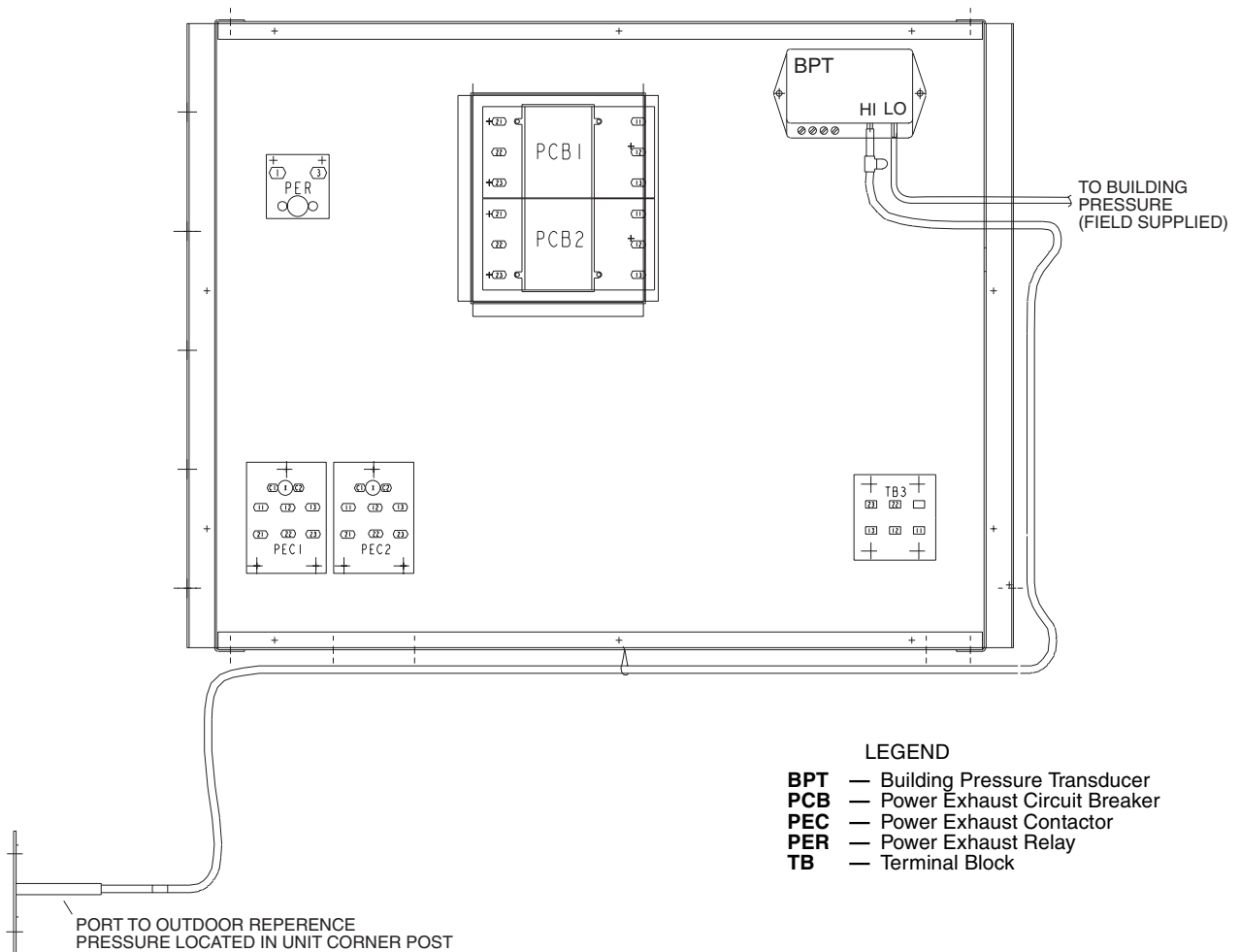
Fig. 65 — Modulating Power Exhaust Differential Pressure Switch (Sizes 055-105)



LEGEND

PE VFD — Power Exhaust Variable Frequency Drive

Fig. 66 — Auxiliary Control Box Location



LEGEND

BPT — Building Pressure Transducer
PCB — Power Exhaust Circuit Breaker
PEC — Power Exhaust Contactor
PER — Power Exhaust Relay
TB — Terminal Block

Fig. 67 — High-Capacity Power Exhaust Differential Pressure Switch

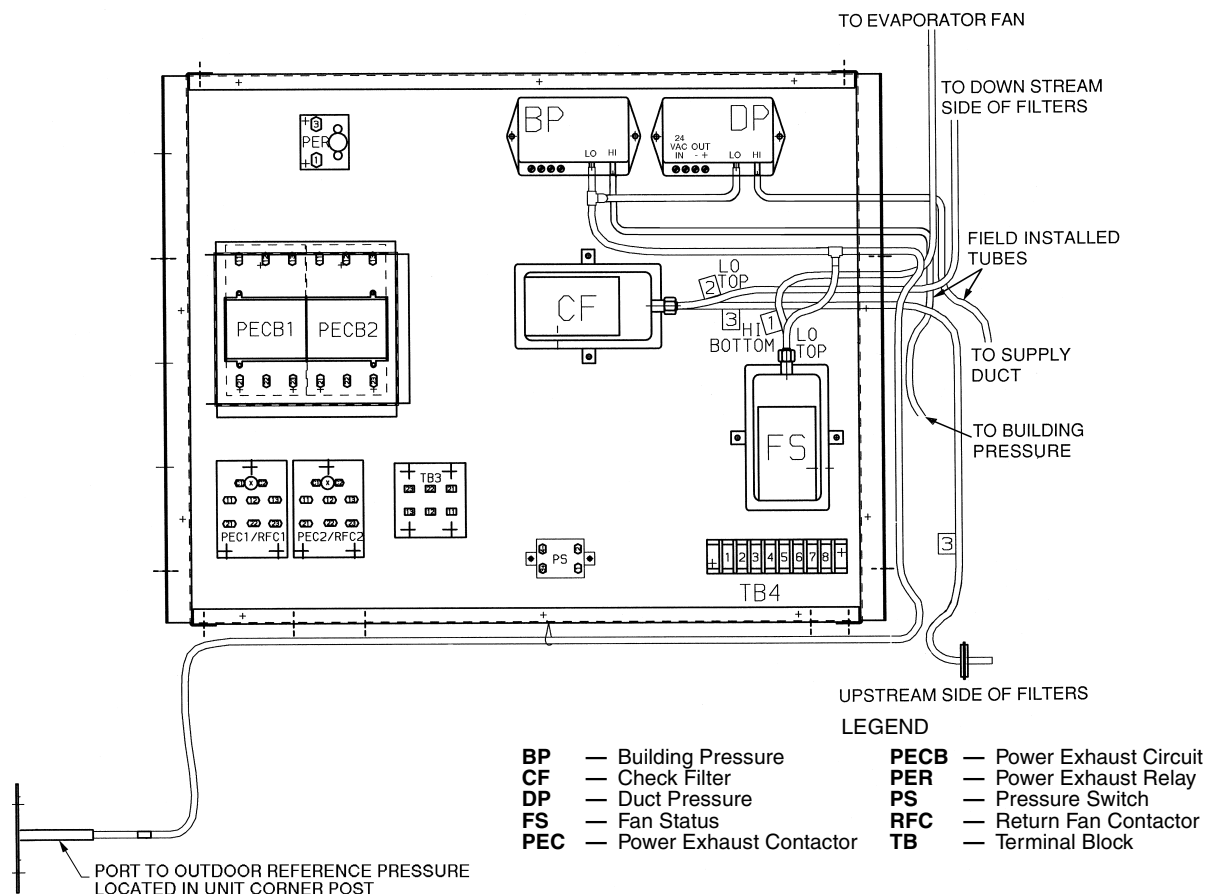


Fig. 68 — Auxiliary Control Box Details; 50ZC,ZD,ZR,ZS,ZW,ZZ Units

Supply-Fan Shipping Brackets — Supply-fan shipping brackets (4 per unit) must be removed from each corner of the fan sled before starting unit.

UNIT SIZES 030-050

1. To remove brackets, raise fan sled by turning adjusting bolt counterclockwise until spring is compressed slightly.
2. Remove screws holding shipping bracket to unit cross rail.
3. Remove shipping bracket (top of bracket is slotted so that it will slide out).
4. After removing all shipping brackets, level fan sled using the adjusting screws. On all 4 corners, dimension from cross rail to fan sled should be as shown in Fig. 69.

UNIT SIZES 055-070 — To remove shipping brackets, remove the 6 screws holding each bracket to the cross rail. There are 8 brackets per unit. See Fig. 69 or 70.

After removing all shipping brackets, level fan sled using the adjusting screws. On all 4 corners dimension from cross rail to fan sled should be as shown in Fig. 69 or 70.

UNIT SIZES 075-105 — The supply-fan shipping brackets must be removed from each corner of the fan sled before starting the unit. To remove shipping brackets, remove 6 screws holding each bracket to the cross rail. There are 4 brackets per unit. See Fig. 71.

After removing all shipping brackets, level fan sled using the adjusting screws. On all 4 corners dimension from cross rail to fan sled should be as shown in Fig. 71.

Return/Exhaust-Fan Shipping Brackets (50ZC,ZD,ZL,ZM,ZR,ZS075-105 Units) — The Return/Exhaust fan shipping brackets must be removed from each corner of the fan sled before starting unit.

To remove shipping brackets, remove 2 screws holding each bracket to the cross rail. There are 4 brackets per unit.

After removing all shipping brackets, level the fan using the adjusting screws. On all 4 corners dimension from cross rail to fan sled should be as shown in Fig. 72.

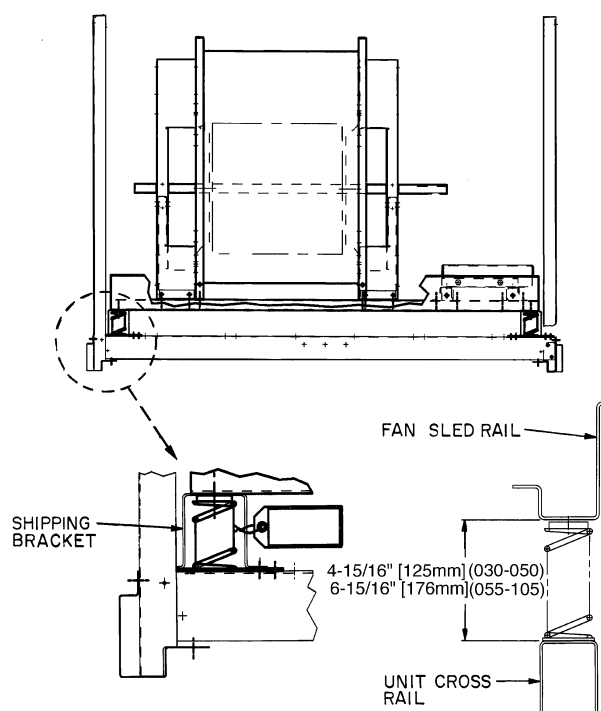


Fig. 69 — Shipping Brackets; 030-050 Units and Vertical Discharge 055-070 Units

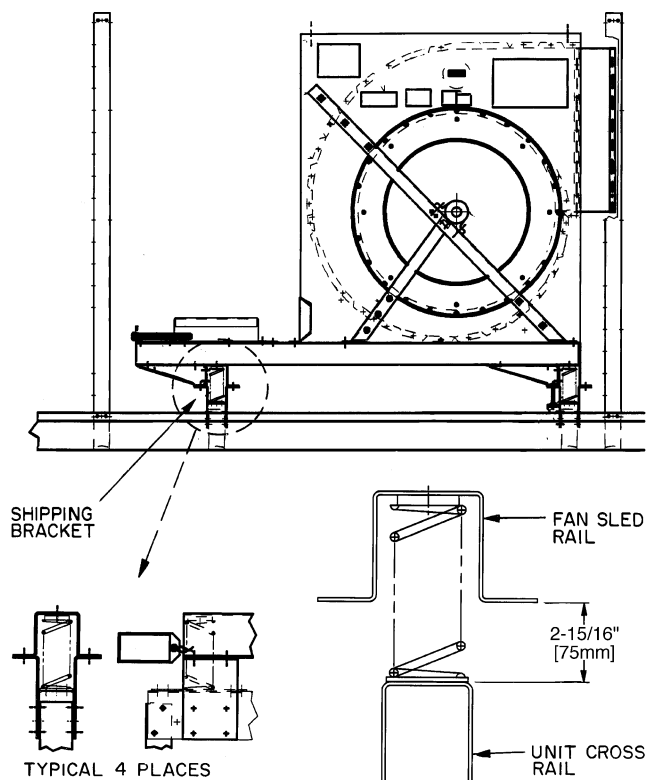


**Fig. 70 — Shipping Brackets; Horizontal Discharge
055-070 Units**

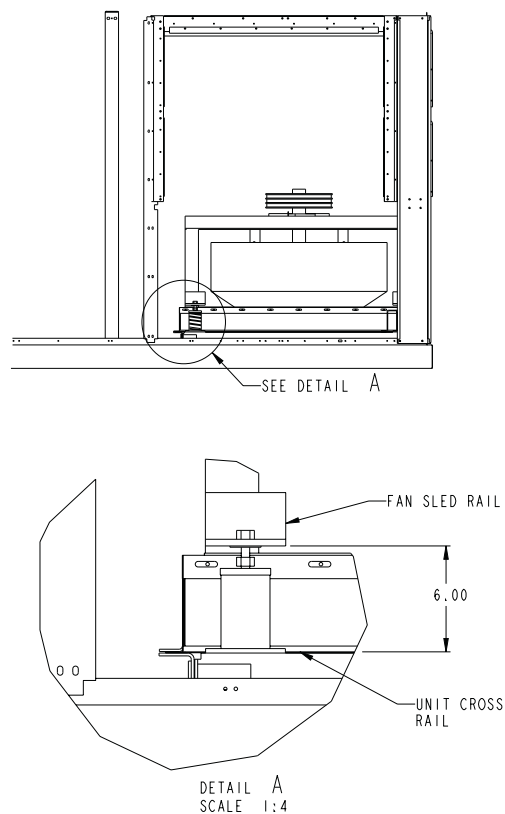


Fig. 72 — Return/Exhaust Fan Shipping Brackets

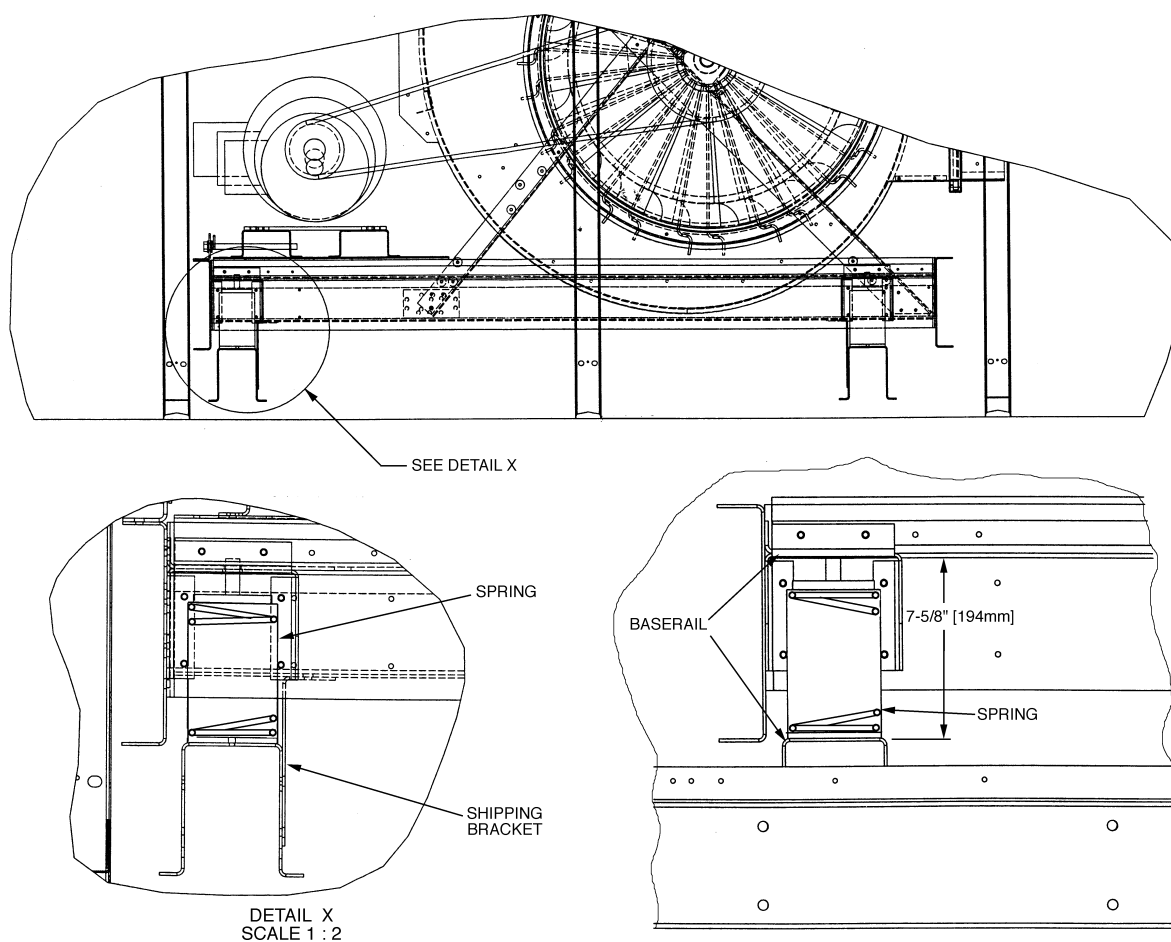


Fig. 71 — Shipping Brackets (Sizes 075-105)

Compressor Mounting

SIZES 030-090 — Each compressor is supported on 4 springs. The springs are compressed for shipment. After the unit is installed, the holddown nuts need to be loosened for normal operation. See Fig. 73 for compressor mounting details. Loosen each bolt using nut indicated until the flatwasher ($\frac{3}{8}$ -in.) can be moved with finger pressure. Do not remove the

locknuts. Check each compressor mounting to ensure all 4 springs have been loosened properly.

SIZE 105 — Compressors are mounted on rails and held down by rail bolts during shipment. After unit is installed, loosen the rail bolts to allow the rails and compressors to float freely on the springs located under the rails. See Fig. 74 and 75.

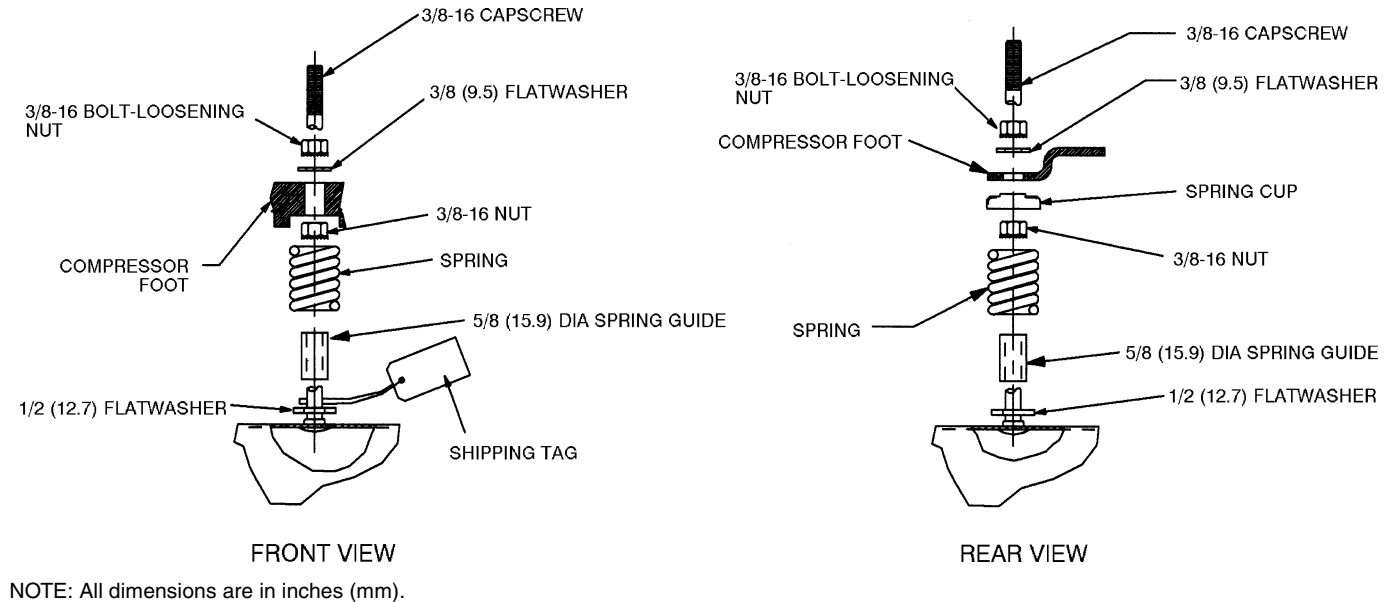


Fig. 73 — Compressor Mounting (Sizes 030-090)

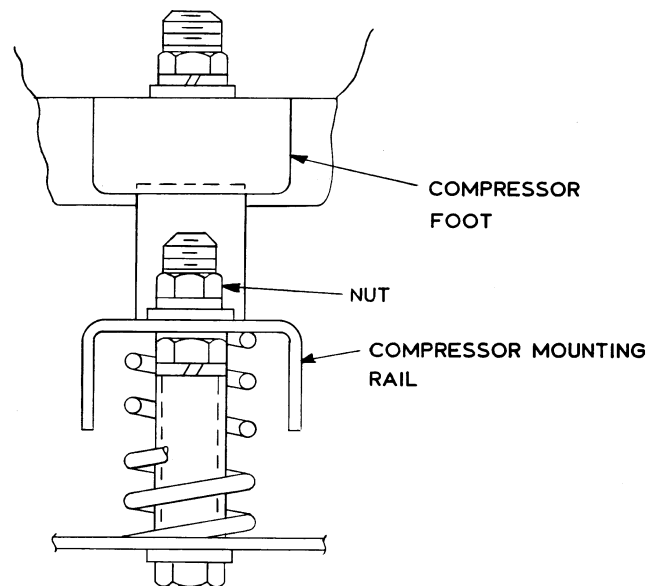


Fig. 74 — Front View of Compressor Mounting Rail Assembly — Size 105 Units

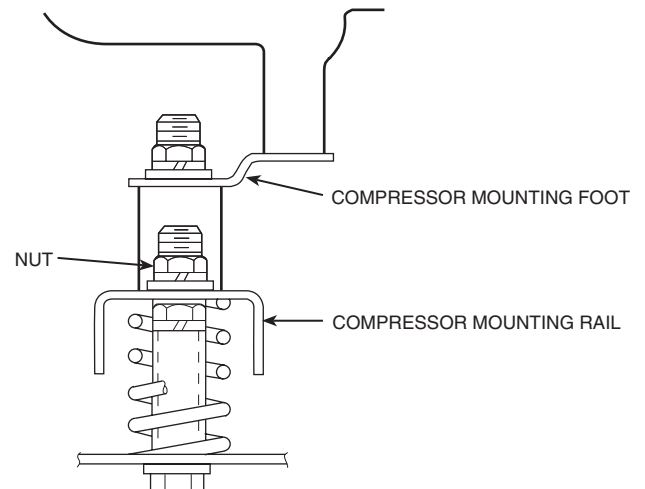


Fig. 75 — Rear View of Compressor Mounting Rail Assembly — Size 105 Units

Install Accessories — For applications requiring accessories, the following packages are available:

All Units:

- Barometric relief
- Condenser hail guard
- Differential enthalpy sensor
- Motormaster® I Control

All Vertical Return/Supply Units:

- Electric Heaters

50ZA,ZB,ZC,ZD,ZT,ZX Units

- Time Guard® II time delay
- Modulating power exhaust
- Pressure operated unloaders

50ZE,ZF,ZR,ZS,ZV,ZY Units:

- Demand limit
- Space temperature reset
- VAV (variable air volume) remote panel
- Modulating power exhaust

50ZJ,ZK,ZL,ZM,ZW,ZZ Units:

- HSIO keypad and display module
- PSIO2 control options module
- Pressure transducers
- Indoor air quality sensor
- Relative humidity sensor(s)
- Outdoor air control package

Refer to the individual accessory installation instructions in each package for information on installing accessories.

MOTORMASTER I CONTROL ACCESSORY INSTALLATION — The accessory Motormaster I head pressure controller is used to control the speed of the outdoor (condenser) fan motor, permitting the unit to operate in cooling down to -20 F (-29 C) outdoor ambient temperature. See Motormaster I accessory instructions for complete installation information. See Fig. 76A-76D for location of Motormaster I sensor. See Fig. 77A and 77B for location of evaporator coil freezestat. Attach the freezestat to any convenient 1/2-in. tube between the heater and the evaporator coil. See Fig. 78 for wind baffle dimensions.

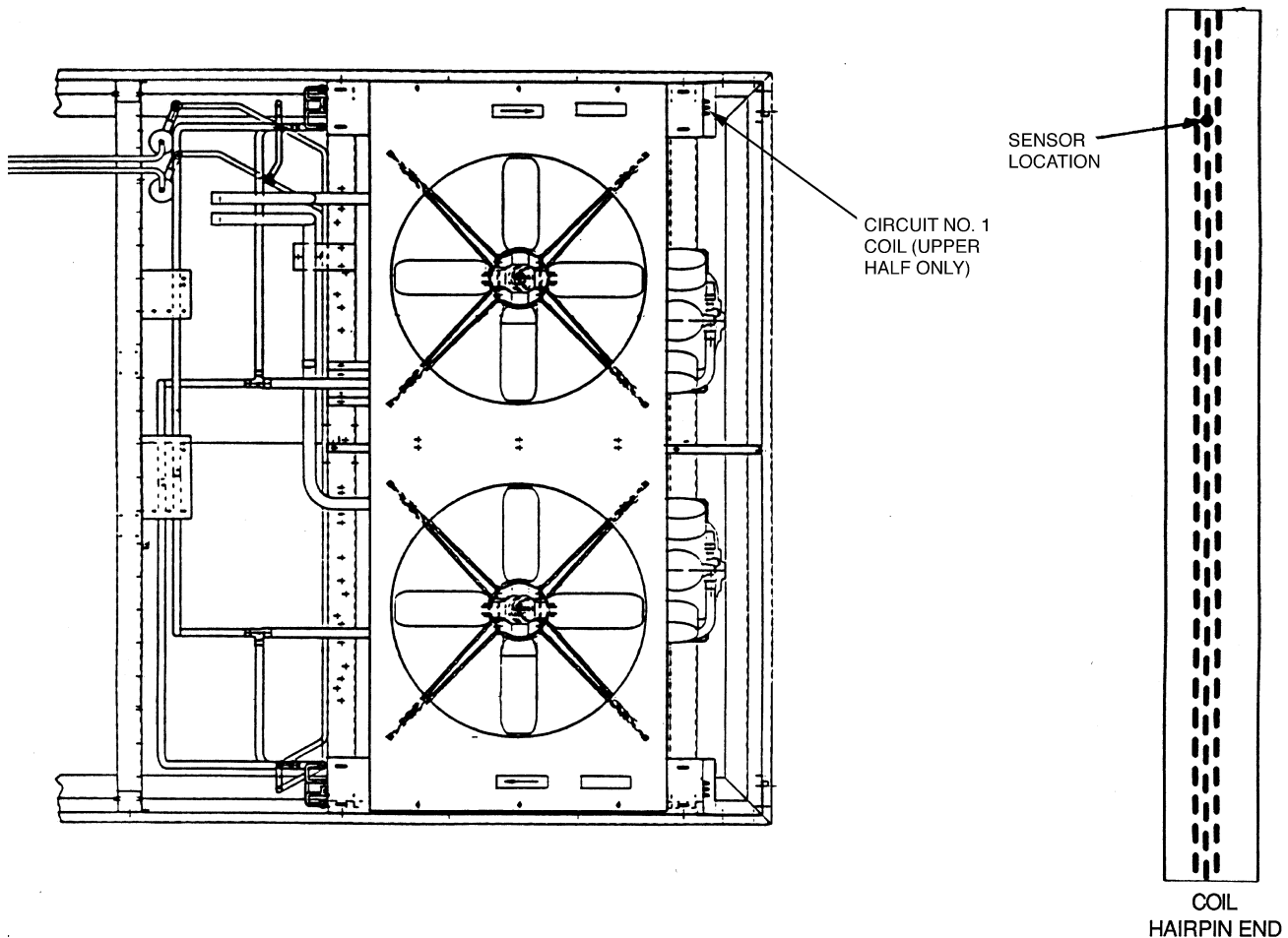


Fig. 76A — Motormaster I Control Sensor Location, Sizes 030,035

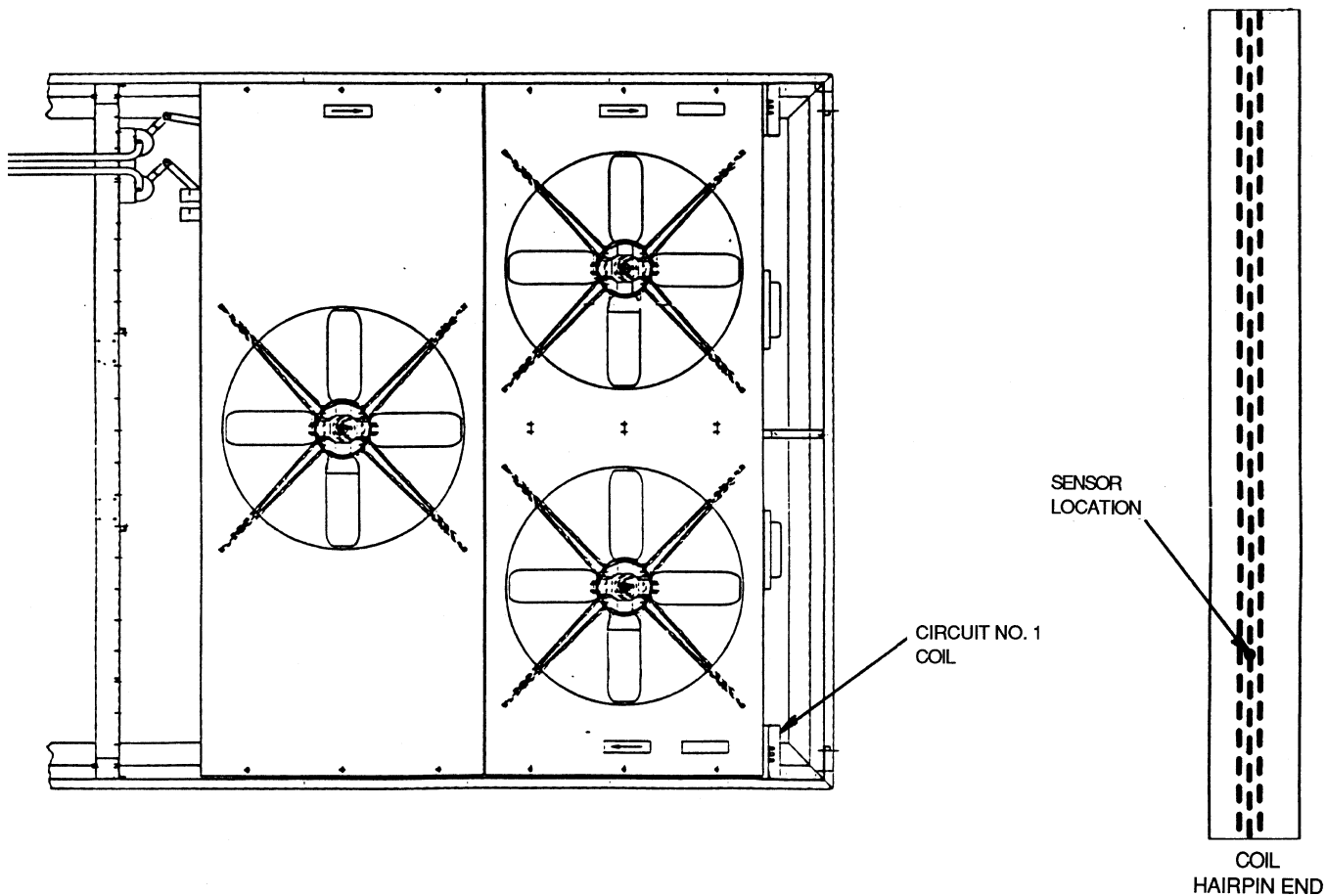


Fig. 76B — Motormaster® I Control Sensor Location, Sizes 040 and 050

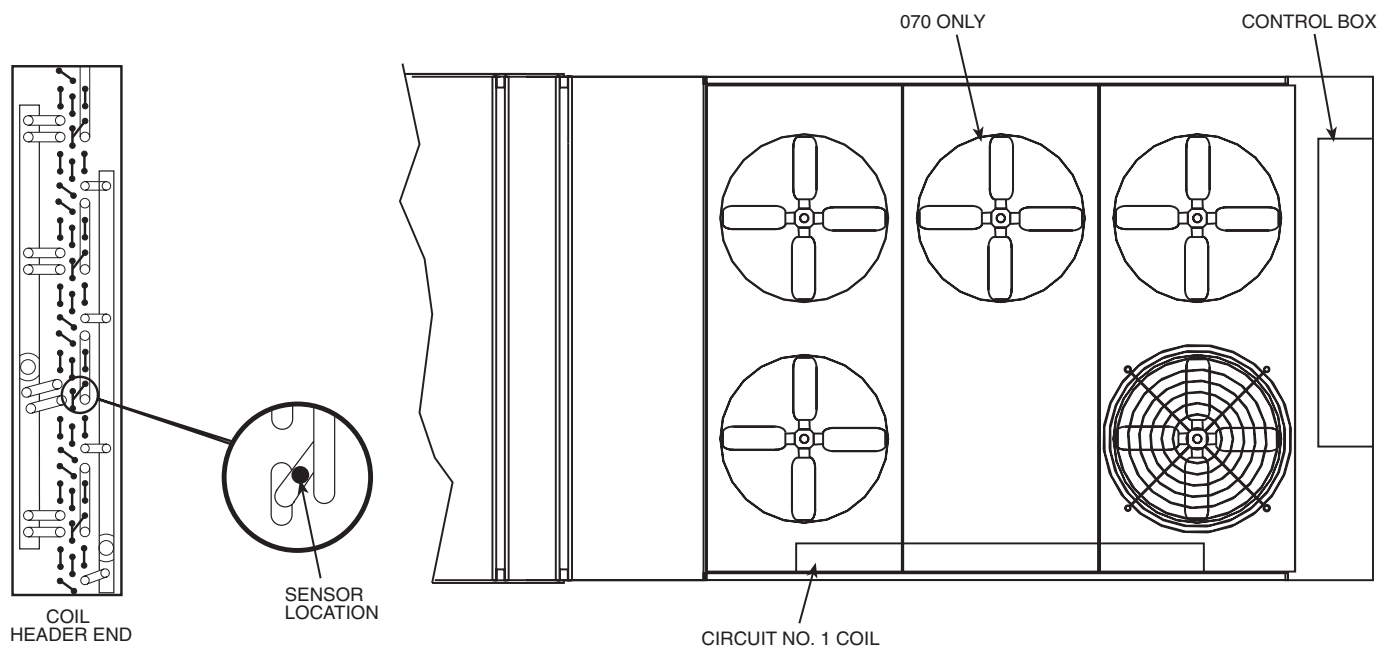


Fig. 76C — Motormaster I Control Sensor Location, Sizes 055-070

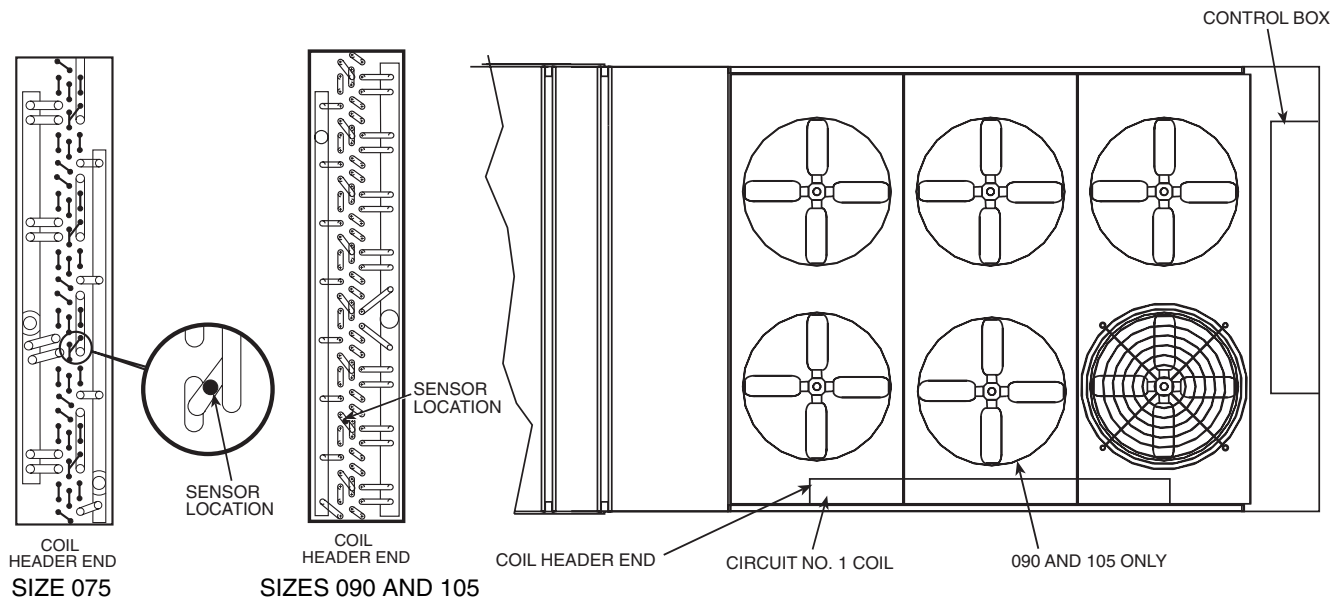


Fig. 76D — Motormaster® I Control Sensor Location, Sizes 075-105

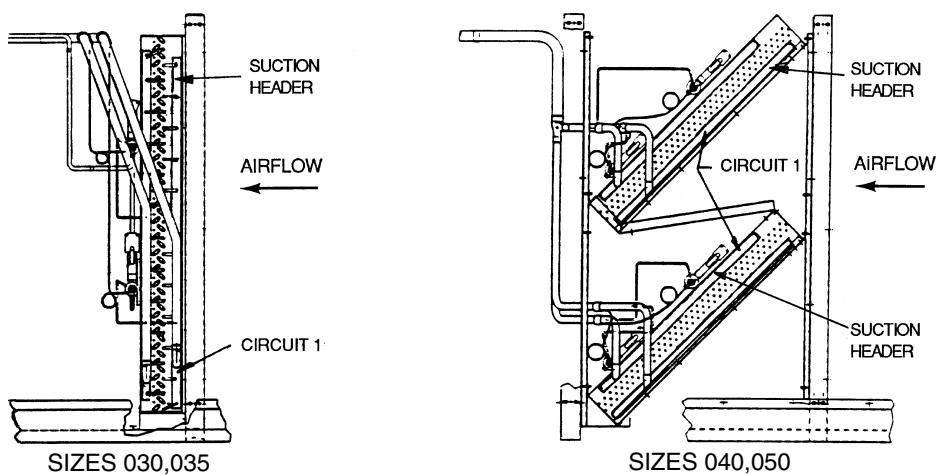


Fig. 77A — Circuit 1 Evaporator Suction Headers for Freeze Protection Thermostat Location, Sizes 030-050

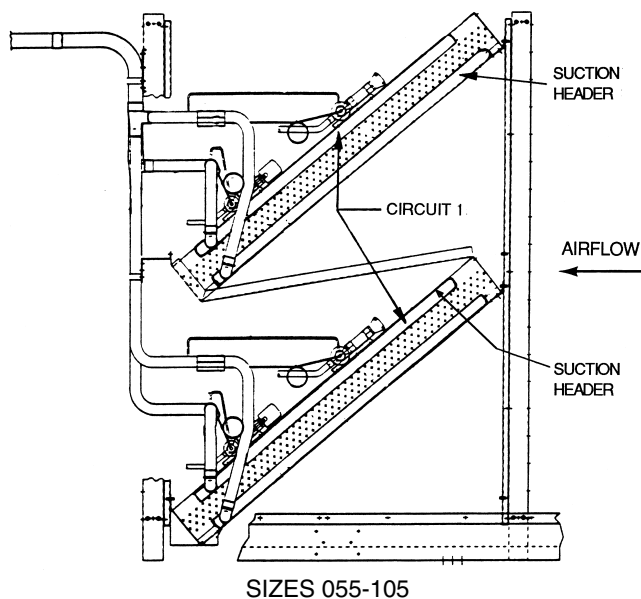
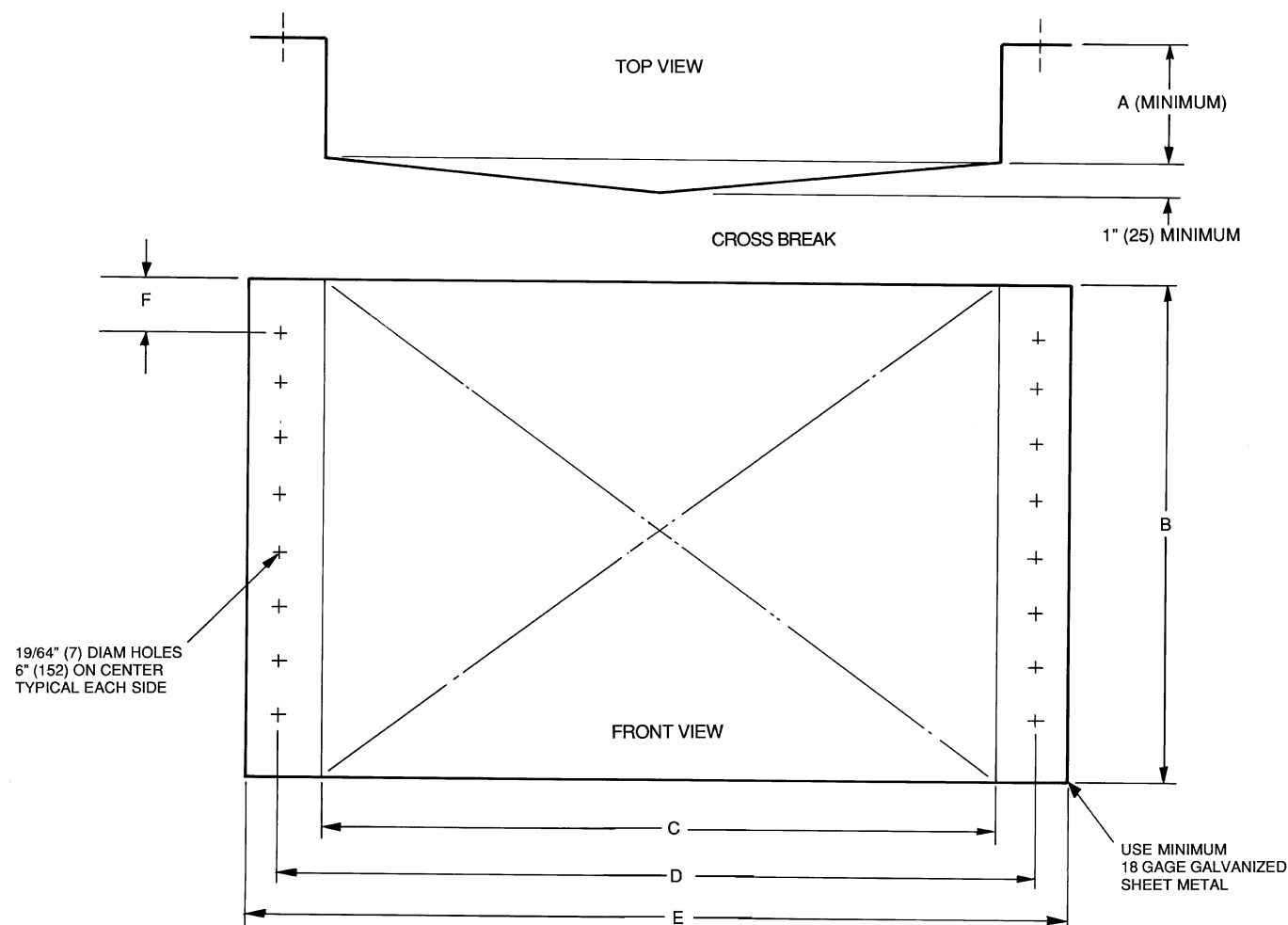


Fig. 77B — Circuit 1 Evaporator Suction Headers for Freeze Protection Thermostat Location, Sizes 055-105



NOTES:

1. Dimensions shown in () are in millimeters.
2. Two baffles are required per unit.

UNIT SIZES	DIMENSIONS											
	A		B		C		D		E		F	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
030,035	10	254	59	1500	44	1118	45 ¹ / ₂	1156	47 ¹ / ₂	1207	2	51
040,050	10	254	59	1500	59	1500	60 ¹ / ₂	1537	62 ¹ / ₂	1588	2	51
055,060	10	254	31	787	72	1829	73 ³ / ₄	1873	75 ³ / ₄	1924	1	25
070-105	10	254	31	787	108	2743	109 ¹ / ₂	2781	111 ¹ / ₂	2832	1	25

Fig. 78 — Wind Baffle Mounting Details

CONTROLS INSTALLATION

Constant Volume (CV) Units — The 50ZA,ZB,ZC, ZD,ZT,ZX units may be used in applications with additional control features, options, or accessories. Refer to the appropriate accessory installation instructions for more information on installing that accessory. Control options and accessories available for CV units are:

- Thermostats
- Differential enthalpy sensor
- Electric heaters
- Modulating power exhaust
- Motormaster® I control
- 115-v convenience outlet

CONTROL WIRING — Install a Carrier-approved accessory 24-v thermostat assembly according to the installation instructions shipped with the accessory. Locate thermostat assembly to sense average temperature. Route thermostat cable

or equivalent leads of colored wire from subbase terminals to low voltage terminal board (P1). The low voltage terminal board (P1) is located on the constant volume control board on units without an economizer and on the economizer board on units with an economizer.

Total wire lengths should not exceed the following limits: 50 ft of 18 AWG, 80 ft of 16 AWG or 125 ft of 14 AWG. See Fig. 79 for field wiring connections between the thermostat and the unit 24-v terminal block. Once wire length from unit to thermostat is determined, the length should be doubled to obtain total wire length required. Voltage drop is dependent on length of current path.

There are no required 115-v field wiring connections, therefore no provisions have been made in the unit for running 115-v wiring. If any of the field-installed options requiring 115-v connections are desired, the unit must be modified in the field for 115-v wiring.

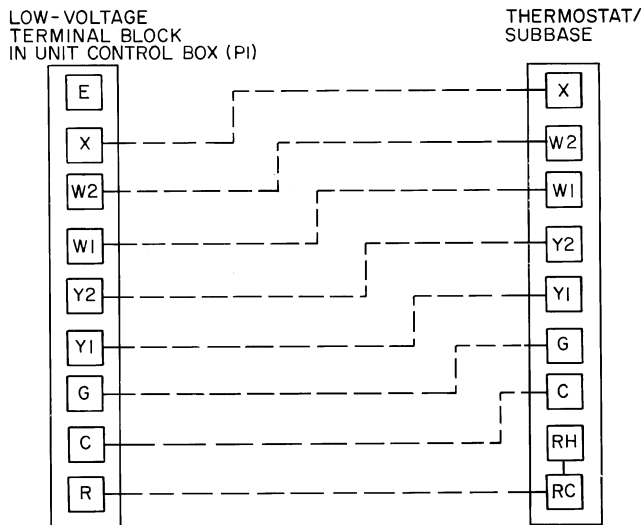


Fig. 79 — Field Control Thermostat Wiring (Constant Volume Units)

Variable Air Volume Units — The 50ZE,ZF,ZR, ZS,ZV,ZY units may be used in applications with additional control features, options, or accessories. Refer to the appropriate accessory installation instructions for more information on installing that accessory. Control options and accessories available for VAV units are:

- Smoke control modes
- Differential enthalpy sensor
- Electric heaters
- Modulating power exhaust
- Motormaster® I control
- Space temperature reset
- Night setback thermostat (field-supplied)
- Single step demand limit (field-supplied)
- Two-step demand limit
- Inlet guide vanes
- Variable frequency drive
- Variable frequency drive remote display kit

CONTROL WIRING, VARIABLE AIR VOLUME UNITS — A switch or timeclock (field supplied) must be wired in to control when unit will go into and out of Occupied mode. Connect switch or timeclock between terminals 1 and 2 on terminal block 3 (sizes 030-050) or terminal block 4 (sizes 055-105) in unit control box. See Fig. 80. The circuit potential is 24 v.

Variable air volume units equipped with warm-up heat require that room terminals be controlled to go fully open when unit goes into the Heating mode. Heating interlock relay (HIR) is provided for this function. The relay is located in the unit control box. When unit goes into Heating mode, the heating

interlock relay is energized providing switch closure or opening (depending on how field power source is set up) to open the room terminals. Field connections for interlock relays are terminals 3 and 4 (for normally open contacts) and terminals 3 and 7 (for normally closed contacts) on terminal block 3 (sizes 030-050) or terminal block 4 (sizes 055-105). See Fig. 81. Note that a field-supplied power source is required.

There are no required 115-volt field wiring connections, therefore no provisions have been made in the unit for running 115-volt wiring. If any of the field-installed options requiring 115-volt connections are desired, the unit must be modified in the field for 115-volt wiring. Options requiring 24-volt or 115-volt control wiring are shown in Fig. 82-85.

Night Setback Thermostat — Wire field-supplied thermostat (suitable for 24-v circuit) between terminals 1 and 2 on terminal block 3 (sizes 030-050) or terminal block 4 (sizes 055-105). This thermostat is used to bypass the timeclock occupied/unoccupied switch and is used to operate unit during unoccupied times at more economical temperatures. See Fig. 80.

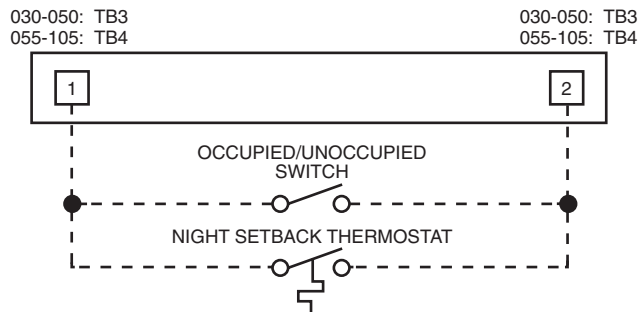
Space Temperature Reset Accessory (50DJ900021) — Consists of a thermistor (T10) and a reset board with a potentiometer (P7) that is used to set space temperature at which reset starts. Mount reset board in unit control box or other convenient place. Wire thermistor in series with P7 and connect to terminals 12 and 15 on terminal block 3 (sizes 030-050) or terminal block 4 (sizes 055-105) in unit control box. If there is a long run to conditioned space, it is necessary to splice additional wire to thermistor. The reset board has 2 pressure connectors for field wiring. See Fig. 82.

Single-Step Demand Limit Potentiometer — Potentiometer is a field-supplied, 3-wire potentiometer with a resistance of 5-K to 20-K ohms. Connect 3 wires from potentiometer to terminals 8, 9 and 10 on terminal block 3 (sizes 030-050) or terminal block 4 (sizes 055-105) in unit control box, as shown in Fig. 83.

Accessory 2-Step Demand Limit (Fig. 84) — Install the 2-step demand limit module in unit control box as close as possible to the processor board. Mount using four no. 8 x 3/4-in. long screws.

24-Volt Connection — The 2-step demand limit module is equipped with a connector for hookup to processor board. Prior to hookup, plugs and wires running between terminals 1, 2 and 3 on J3 of the processor board and terminals 1, 2 and 3 on terminal block 3 in unit control box must be removed. After removing these plugs, attach connector from demand limit module to terminals 1, 2 and 3 on processor board. The 115-volt wiring for field-controlled input signals must be completed before demand limit board will operate.

115-Volt Connection — Field-controlled input signals to the accessory 2-step demand limit module. Connect field input signals to terminal strips INT1 and INT2 located on the module (see Fig. 84). These are pressure-type terminals. The terminals will accept up to 12-gage wire. See Fig. 85 for wiring details.



NOTES:

1. Occ/Unocc switch closes when occupied.
2. Night setback thermostat closes when in night setback heating.

Fig. 80 — Occupied/Unoccupied Switch with Night Setback Thermostat

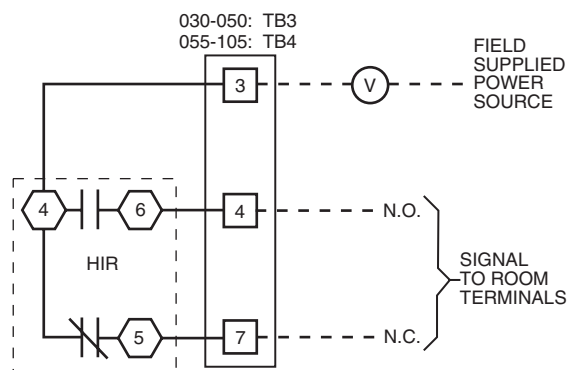


Fig. 81 — Heat Interlock Relay (VAV Units)

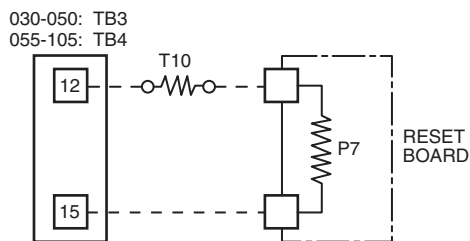


Fig. 82 — Accessory Reset Board

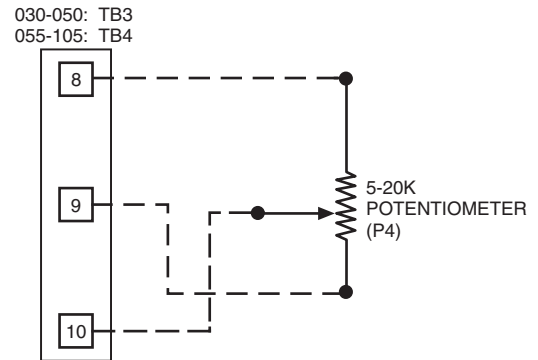
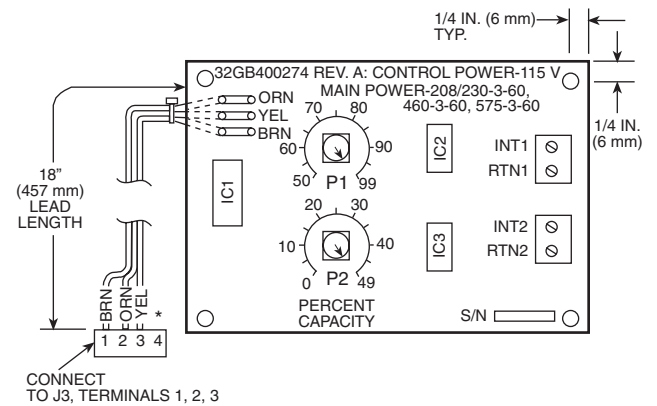


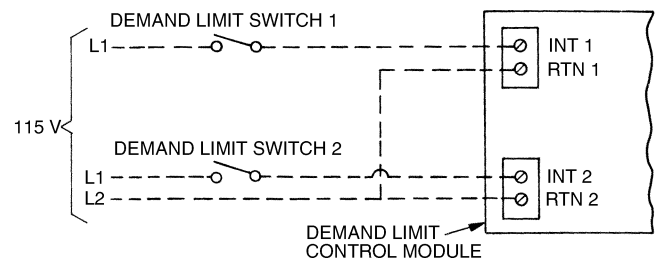
Fig. 83 — Single-Step Demand Limit



- LEGEND
- INT — Input Terminal
 - RTN — Return Terminal

*Connector wiring must be as shown.

Fig. 84 — Two-Step Demand Limit Module Details



NOTES:

1. Demand limit switches are field supplied and wired.
2. Demand limit control module terminal blocks will accept up to 12-gage wire.
3. - - - - is field wiring.

Fig. 85 — 115-Volt Field Wiring to Accessory 2-Step Demand Limit Control Module

PIC Control Wiring — The recommended types of control wiring for 50ZJ,ZK,ZL,ZM,ZW,ZZ unit devices are shown below:

MANUFACTURER	PART NO.	
	Regular Wiring	Plenum Wiring
Alpha	1895	—
American	A21451	A48301
Belden	8205	884421
Columbia	D6451	—
Manhattan	M13402	M64430
Quabik	6130	—

SENSORS — Sensors should be wired using single twisted pairs of 20 AWG (American Wire Gage) conductor cable rated for the application, except for the T-56 accessory sensor which requires 3-conductor cable.

NOTE: Humidity and CO₂ sensors must be powered from isolated 24-v power supplies.

HUMIDITY CONTROL AND HOT WATER AND STEAM VALVES — These devices require 20 AWG twisted pair conductor cables rated for the application for the 4 to 20 mA signal.

SPACE TEMPERATURE SENSOR (T-55) — The space temperature sensor (P/N CEC0121448-01) is shipped standard with every unit, and is located in the main control box. Space temperature sensor wires are to be connected to terminals in the unit main control box. The space temperature sensor includes a terminal block (TB1), a jumper between pins E2 and E3, and an RJ11 female connector. The RJ11 connector is used to tap into the Carrier Comfort Network (CCN) at the sensor. See RJ11 Plug Wiring section on page 110 to connect the RJ11 connector to the CCN. A 3-lead cable must run from the RJ11 connector to the unit for communication through the sensor.

⚠ CAUTION

Jumper **MUST** be in place between pins E2 and E3 or inaccurate readings could result.

To connect the space temperature sensor (Fig. 86):

1. Connect 1 wire of the twisted pair to terminal T1 (T-55) and connect the other wire to terminal T2 on terminal block 1 (TB1) located on the cover of the space temperature sensor using a 20 AWG twisted pair conductor cable rated for the application.
2. Connect the other ends of the wires to terminals 1 and 3 on TB3 (sizes 030-050) or terminals 1 and 2 of TB2 (sizes 055-105) located in the unit main control box.

NOTE: This sensor should be installed for all applications. For VAV applications, it is used to control heating and cooling during unoccupied periods. For DAV (digital air volume) applications, it is used to maintain control of the space during linkage failures with the TSM (terminal system manager).

NOTE: Either the T-55 or T-56 sensor must be connected for CV (constant volume) applications to function properly.

SPACE TEMPERATURE SENSOR (T-56) (CV [constant volume] Applications Only) — Space temperature sensor (P/N CEC0121503-01) wires are to be connected to terminals in the unit main control box. The space temperature sensor includes a terminal block (TB1), a jumper between pins E2 and E3, and an RJ11 female connector. The RJ11 connector is used to tap into the CCN at the sensor. See RJ11 Plug Wiring section on page 110 to connect the RJ11 connector to the CCN.

⚠ CAUTION

Jumper **MUST** be in place between pins E2 and E3 or inaccurate readings could result.

To connect the space temperature sensor (Fig. 86):

1. Connect one wire of the 3-conductor cable to terminal TH, one wire to terminal COM, and the other wire to terminal SW on terminal block 1 (TB1) located on the cover of the space temperature sensor using a 20 AWG twisted 3-conductor cable rated for the application.
2. Connect the other ends of the wires to terminals 1, 3, and 7 on TB3 (sizes 030-050) or 1, 2, and 7 on TB2 (sizes 055-105) located in the unit main control box. The wire from terminal SW **MUST** be connected to terminal 7.

NOTE: Either the T-55 or the T-56 sensor must be connected for CV applications to function properly.

SPACE TEMPERATURE AVERAGING — Applications that require averaging using multiple space temperature sensors can be satisfied using either 4 or 9 sensors as shown in Fig. 87.

NOTE: Only Carrier sensors may be used for standard T-55 space averaging. Sensors must be used in multiples of 1, 4, and 9 only, with total sensors wiring not to exceed 1000 ft. However, space temperature reset can be accomplished with only one sensor.

NOTE: Do not use T-56 sensors for space temperature averaging because the 5-degree offset function will not work in a multiple sensor application.

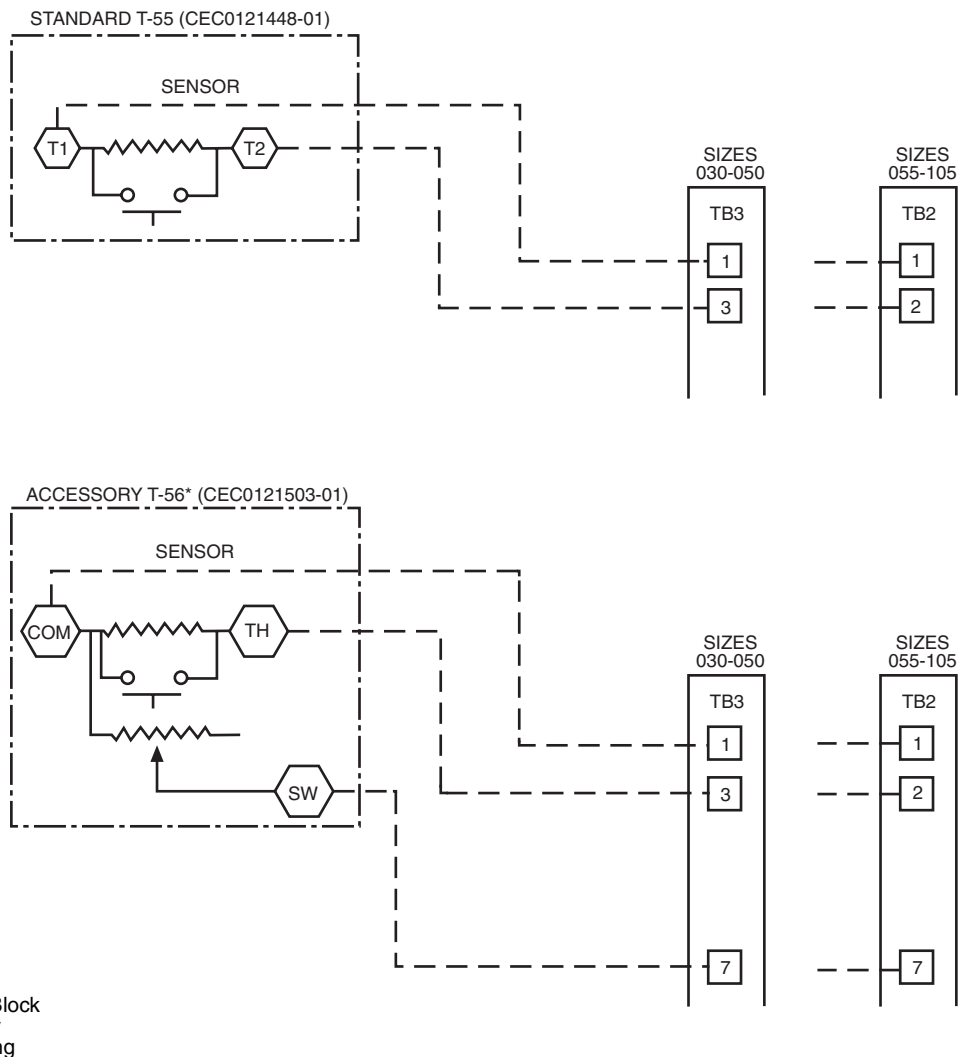
HEAT INTERLOCK RELAY (VAV Units Only — Not Necessary For Digital Air Volume Applications) — Variable air volume (VAV) units using optimal start (morning warm-up) and/or occupied heating require that room terminals be controlled to the fully open position when the unit goes into Heating mode. The HIR1 (Heat Interlock Relay) function is provided for this control. When the unit goes into Heating mode, the HIR is energized to provide switch closure or opening (depending on how the field-supplied power source is set up) to open the room terminals. The field connections for the HIR1 are at TB3 (sizes 030-050) or TB2 (sizes 055-105). See Table 24.

OPTION AND ACCESSORY CONTROL WIRING — The 50ZJ,ZK,ZL,ZM,ZW,ZZ units may be used in applications with additional control features, options, or accessories. Refer to the Controls and Troubleshooting manual for more information concerning installation and configuration of options and accessories. Figures 88-101 contain wiring information on the following features:

- Heat interlock relay (Fig. 88)
- Differential enthalpy sensor (Fig. 89)
- Remote start (Fig. 90)
- Accessory humidity control (Fig. 91)
- Smoke control (Fig. 92)
- Indoor air quality (Fig. 93)
- Outdoor airflow control (Fig. 94)
- Timed discrete output (Fig. 95)
- Humidifier (Fig. 96)
- Hydronic heating (Fig. 97)
- Freezestat (Fig. 98)
- Remote supply-air temperature/space temperature offset (Fig. 99)
- Refrigerant transducer/thermistor (Fig. 100)
- CCN Building Supervisor (Fig. 101)

REMOTE START — The 50ZJ,ZK,ZL,ZM,ZW,ZZ units have the ability to be able to be started remotely through a discrete 24 VAC input to Channel 49, DSIO-2, plug J3 terminals 1 and 2. A separate field-supplied, field-installed transformer is required. The 24 VAC input can then be switched with a time-clock or other set of contacts.

The use of the 24 VAC input can also be used to take the unit out of standby. However, once taken out of standby, the unit cannot be put back into standby by simply removing the 24 VAC power supply. The use of the HSIO is necessary to put the unit back into standby.

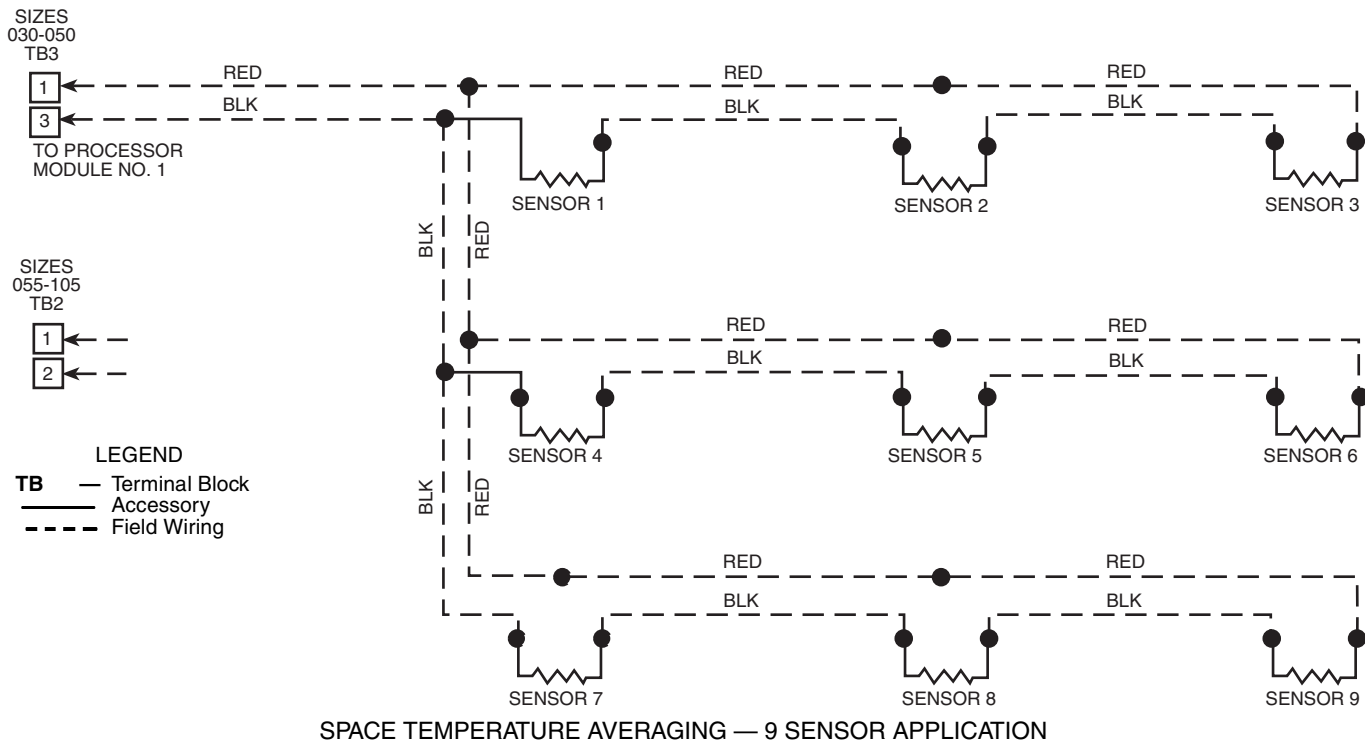
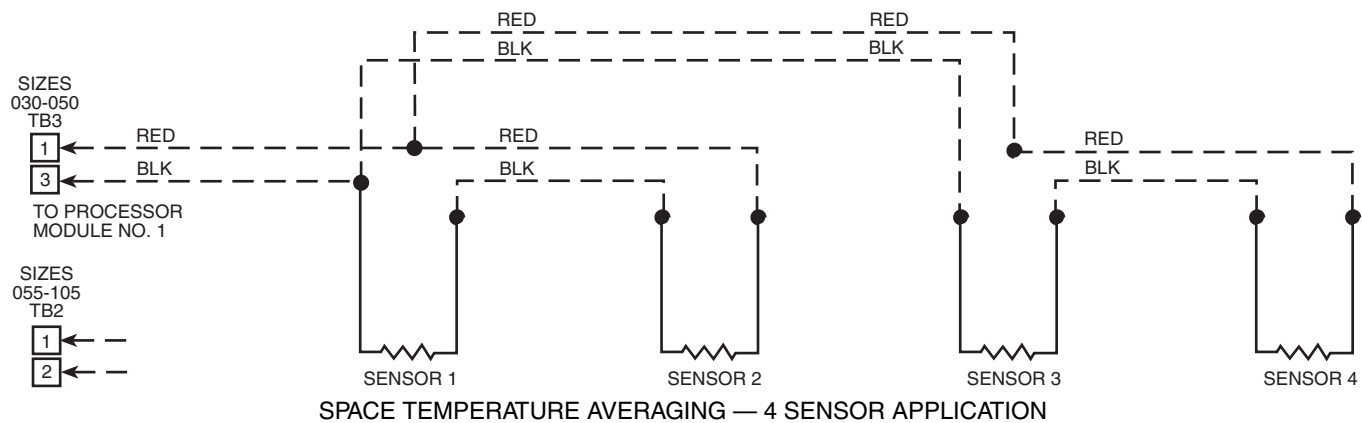


*Constant volume applications only.

Fig. 86 — Space Temperature Sensor Wiring

Table 24 — Field Connections for HIR1

HEAT INTERLOCK RELAY	TERMINALS	
	Sizes 030-050	Sizes 055-105
Normally Closed	2 and 4	8 and 10
Normally Open	4 and 5	8 and 9



LEGEND
TB — Terminal Block
— Accessory
--- Field Wiring

Fig. 87 — Space Temperature Sensor Averaging

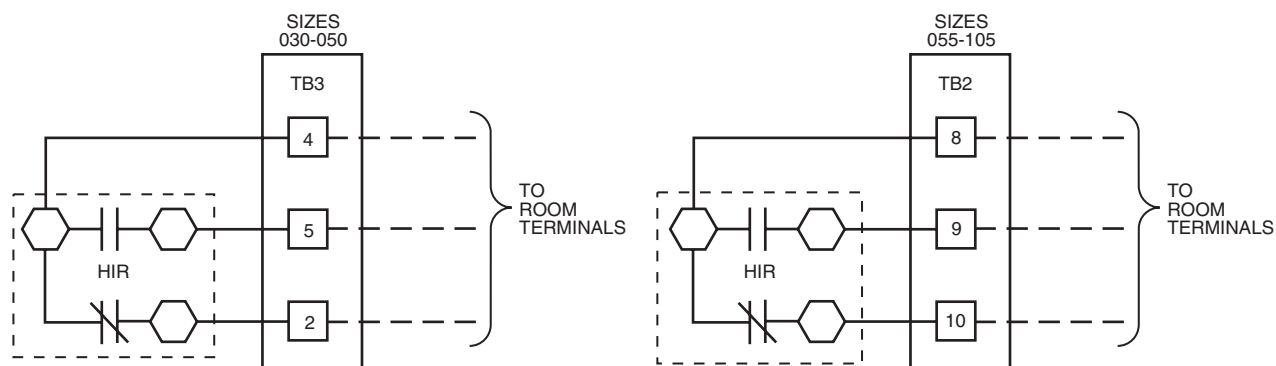


Fig. 88 — Heat Interlock Relay Wiring (PIC Units)

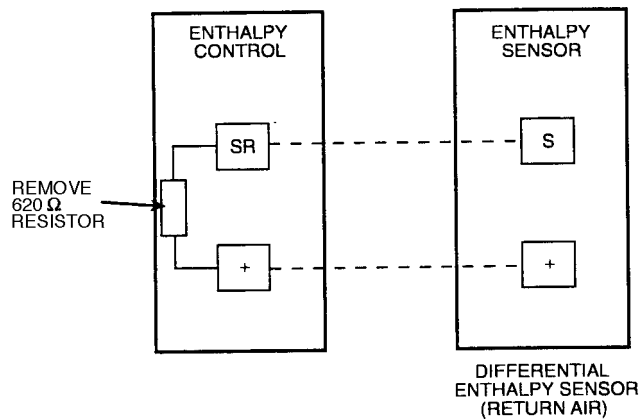


Fig. 89 — Differential Enthalpy Sensor

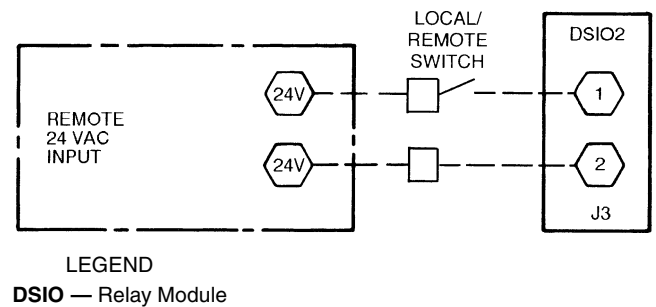
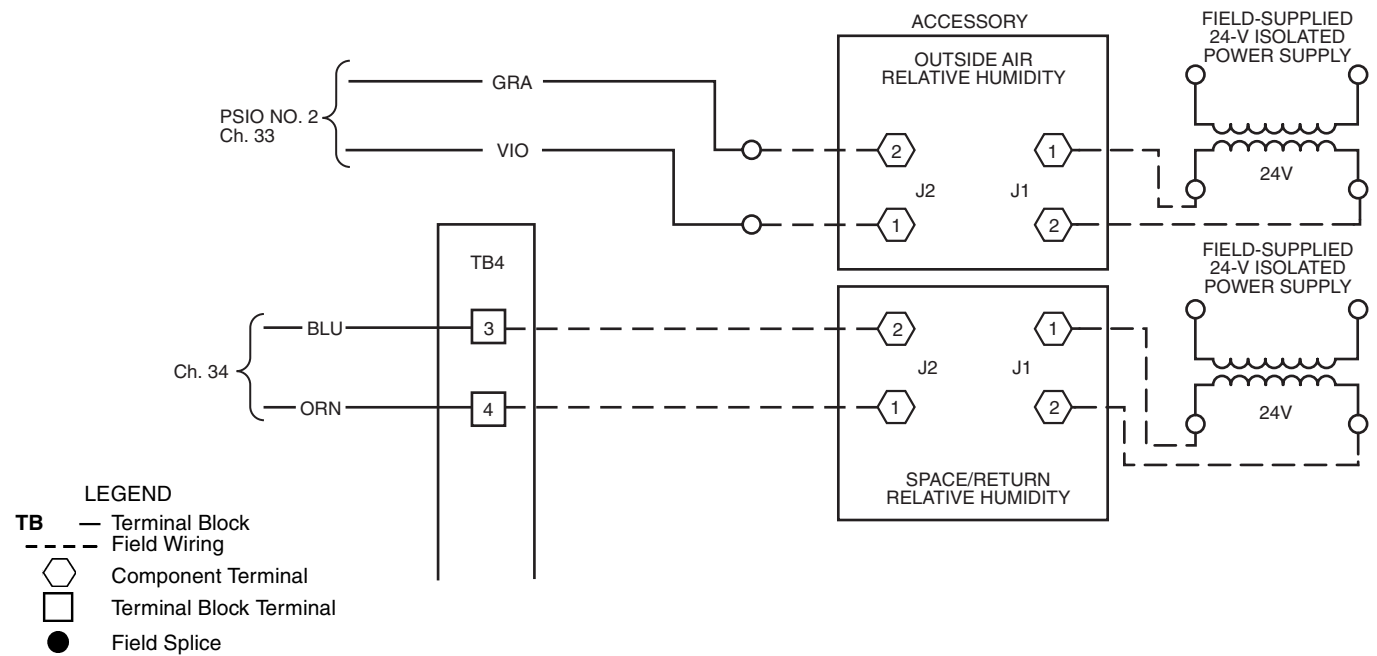


Fig. 90 — Remote Start



NOTE: TB4 is located in auxiliary controller.

Fig. 91 — Accessory Humidity Control

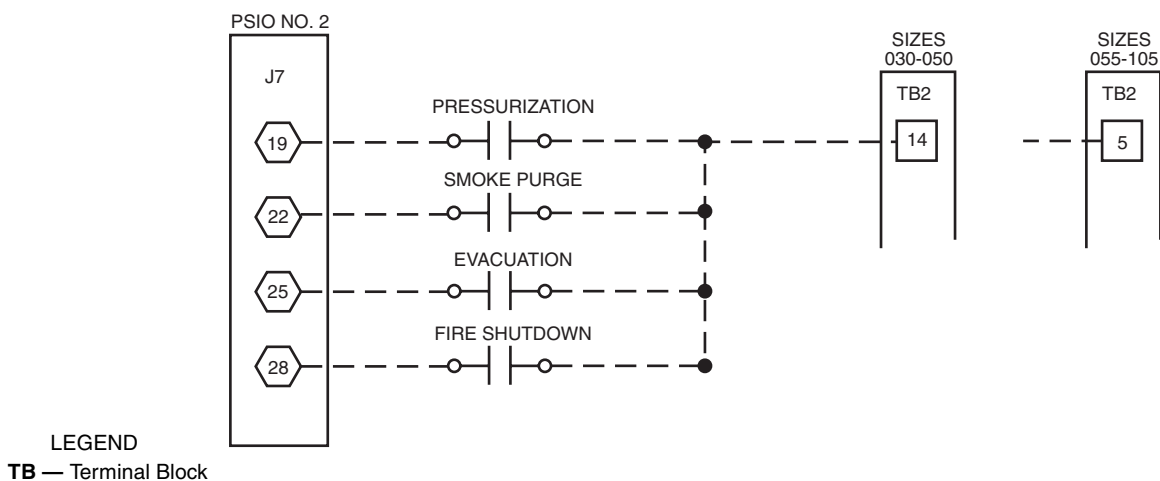
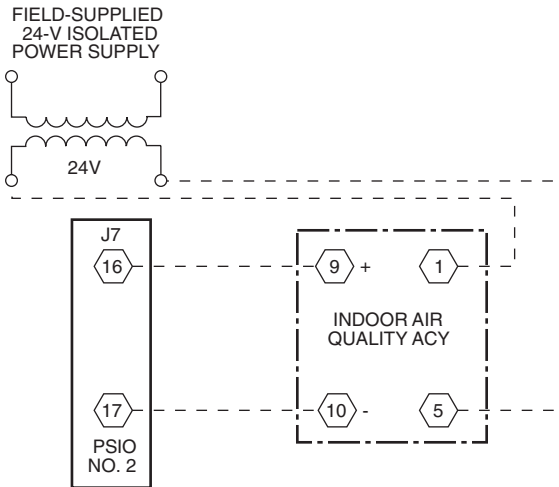


Fig. 92 — Building Pressurization and Fire/Smoke Control

CGCDXSEN001A00, CGCDXSEN002A00,
CGCDXSEN003A00



33ZCSENC02

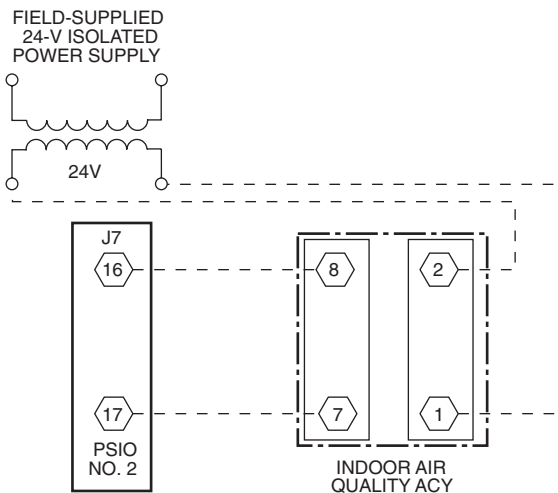


Fig. 93 — Indoor-Air Quality

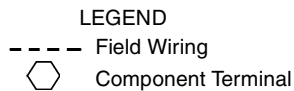
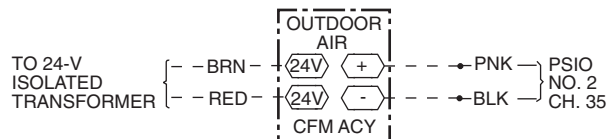


Fig. 94 — Outdoor Airflow Control

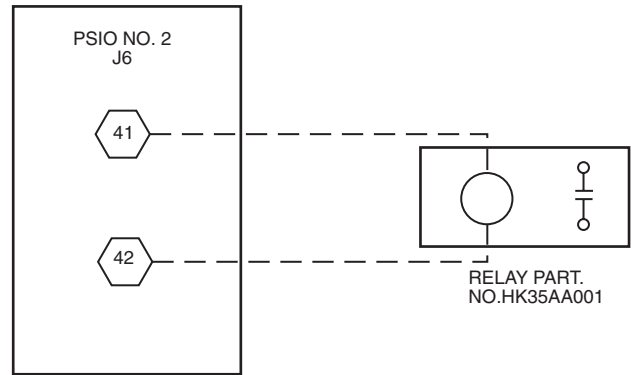


Fig. 95 — Timed Discrete Output

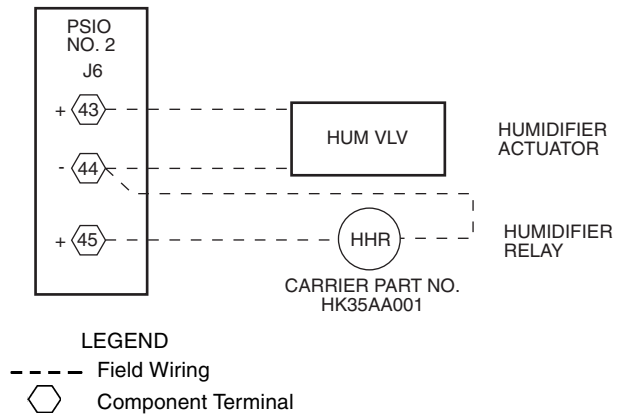


Fig. 96 — Humidifier

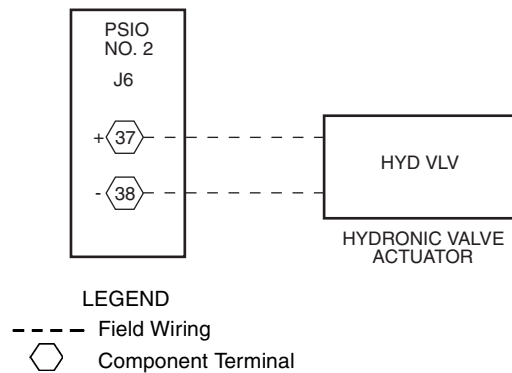


Fig. 97 — Hydronic Heating

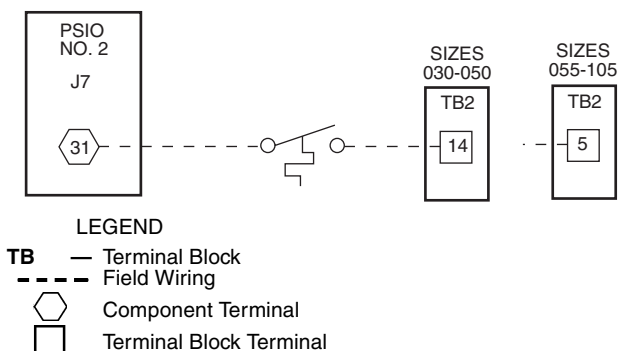
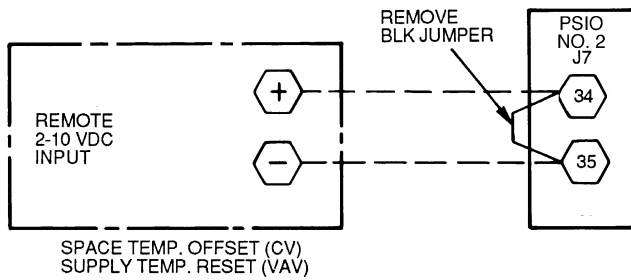


Fig. 98 — Freezestat



LEGEND

CV — Constant Volume

VAV — Variable Air Volume

Fig. 99 — Remote Supply-Air Temperature Reset/Space Temperature Offset

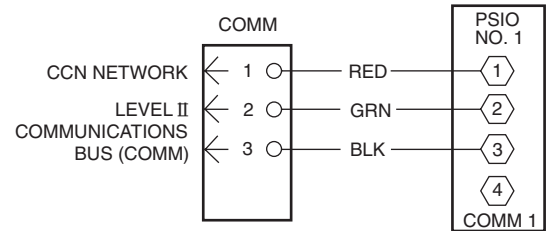
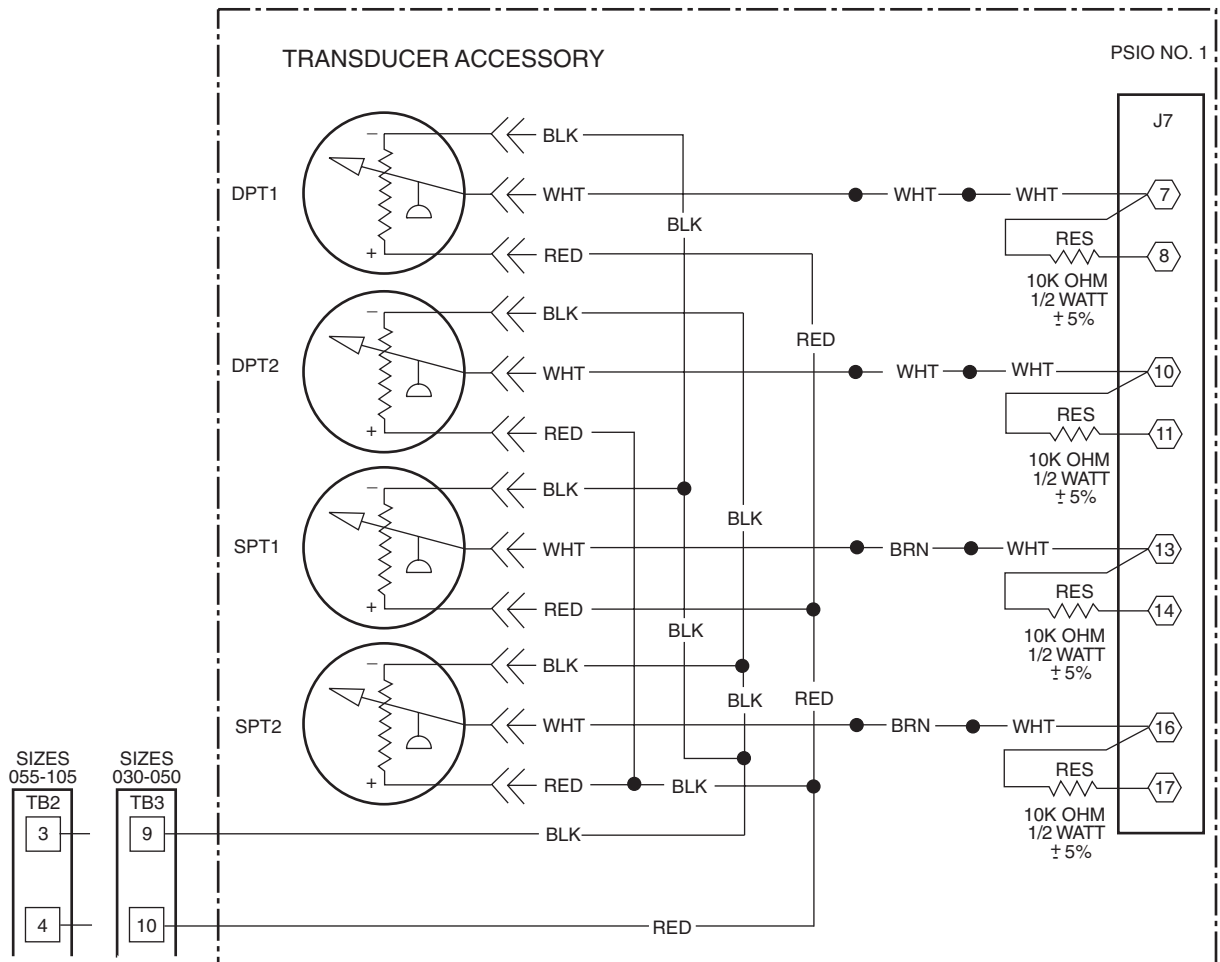


Fig. 101 — CCN Building Supervisor



LEGEND

DPT — Discharge Pressure Transducer

SPT — Suction Pressure Transducer

TB — Terminal Block

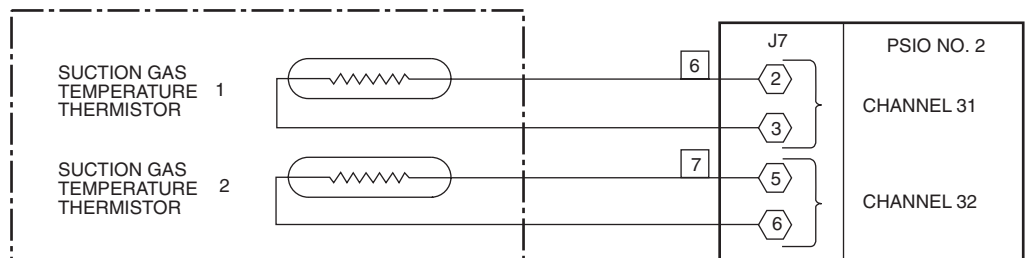


Fig. 100 — Transducer/Thermistor

Carrier Comfort Network Interface — The 50ZJ, ZK,ZL,ZM,ZW,ZZ units can be connected to the CCN if desired. The communication bus wiring is supplied and installed in the field. It consists of shielded, 3-conductor cable with drain wire.

The system elements are connected to the communication bus in a daisy chain arrangement. The positive pin of each system element communication connector must be wired to the positive pins of the system element on either side of it, the negative pins must be wired to the negative pins, and the signal pins must be wired to signal ground pins. Wiring connections for CCN should be made at the 4-pin plug (COMM) located at the bottom right side of the fuse bracket in the main control box. Consult CCN Contractor's Manual for further information.

NOTE: Conductors and drain wire must be 20 AWG minimum stranded, tinned copper. Individual conductors must be insulated with PVC, PVC/nylon, vinyl, Teflon, or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/nylon, chrome vinyl, or Teflon with a minimum operating temperature range of -4 to 140 F (-20 C to 60 C) is required. See Table 25 for cables that meet the requirements.

Table 25 — CCN Connection Approved Shielded Cables

MANUFACTURER	CABLE PART NO.
Alpha	2413 or 5463
American	A22503
Belden	8772
Columbia	02525

IMPORTANT: When connecting the CCN communication bus to a system element, use a color coding system for the entire network to simplify installation and checkout.

The following color code is recommended:

SIGNAL TYPE	CCN BUS CONDUCTOR INSULATION COLOR	COMM1 PLUG PIN NO.
+	RED	1
GROUND	WHITE	2
-	BLACK	3

NOTE: If a cable with a different color scheme is selected, a similar color code should be adopted for the entire network.

At each system element, the shields of its communication bus cables must be tied together. If the communication bus is entirely within one building, the resulting continuous field must be connected to a ground at one point only. If the communication bus cable exits from one building and enters another, the shields must be connected to grounds at the lightning suppressor in each building where the cable enters or exits the building (one point per building only).

To connect the unit to the network:

1. Turn off power to the control box.
2. Cut the CCN wire and strip the ends of the red (+), white (ground) and black (-) conductors. (If a different network color scheme is used, substitute appropriate colors.)
3. Remove the 4-pin female plug from the fuse and control circuit breaker bracket in the main control box, and connect the wires as follows:
 - a. Insert and secure the red (+) wire to terminal 1 of the 4-pin plug.

- b. Insert and secure the white (ground) wire to terminal 2 of the 4-pin plug.
 - c. Insert and secure the black (-) wire to terminal 3 of the 4-pin plug.
4. Insert the plug into the existing 4-pin mating connector on the fuse or control circuit breaker bracket in the main control box.

IMPORTANT: A shorted CCN bus cable will prevent some routines from running and may prevent unit from starting. If abnormal conditions occur, unplug the connector. If conditions return to normal, check CCN connector, and run new cable if necessary. A short in one section of the bus can cause problems with all system elements on the bus.

RJ11 PLUG WIRING — Units on the CCN can be monitored from the space at the sensor through the RJ11 connector, if desired. To wire the RJ11 connector into the CCN (Fig. 102):

IMPORTANT: The cable selected for the RJ11 connector wiring **MUST** be identical to the CCN communication bus wire used for the entire network. Refer to Table 25 for acceptable wiring.

1. Cut the CCN wire and strip ends of the red (+), white (ground), and black (-) conductors. (If another wire color scheme is used, strip ends of appropriate wires.)
2. Insert and secure the red (+) wire to pin J2 of the space temperature sensor terminal block (TB1).
3. Insert and secure the white (ground) wire to pin J3 of the space temperature sensor TB1.
4. Insert and secure the black (-) wire to pin J5 of the space temperature sensor TB1.
5. Connect the other end of the communication bus cable to the remainder of the CCN communication bus at the COMM1 plug located on the fuse and control circuit breaker bracket in the unit main control box.

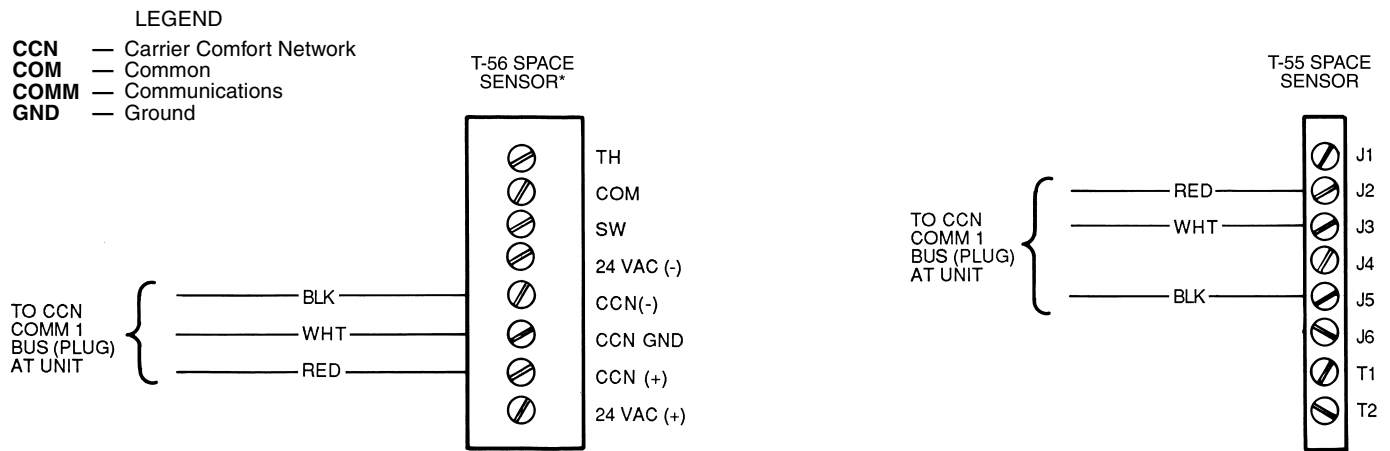
Smoke Control Modes — Rooftop units can be used for aid in building smoke control in the event of a building fire. The available functions include: Fire Shutdown, Pressurization, Evacuation, and Smoke Purge. These functions are enhanced when multiple rooftop units are used to zone a building. See Table 26.

FIRE SHUTDOWN — Fire Shutdown mode terminates all unit operation (cooling, heating, supply fan, and power exhaust). This mode prevents recirculation of contaminated air back into the space. The mode will not allow admission into the space of unsuitable outside air.

PRESSURIZATION — Pressurization mode is intended to keep smoke out of a zone. The factory-installed optional economizer is required for this function. Pressurization is accomplished by the following:

- opening the economizer (option)
- running the supply fan (optional inlet guide vanes open or optional VFD at normal duct static pressure set point)
- closing the power exhaust dampers (if installed as option or accessory)
- shutting off the power exhaust fans (if installed as option or accessory)

This allows the space to be overpressurized relative to adjacent zones and prevents or slows entry of smoke into this space from adjacent zones.



*Constant volume applications only.

Fig. 102 — Space Sensor to Communication Bus Wiring

EVACUATION — Evacuation mode removes smoke or undesirable air from interior spaces without reintroducing unsuitable air. The factory-installed optional economizer with option/ accessory power exhaust is required for this function. Evacuation is accomplished by the following:

- turning the supply fan off
- opening the economizer (option required)
- running the exhaust fans (option or accessory required)
- opening the exhaust dampers.

SMOKE PURGE — Smoke Purge mode removes smoke from the interior spaces and replaces it with fresh outside air. The factory-installed optional economizer with option/ accessory power exhaust are required for this function. Smoke purge is accomplished by the following:

- turning supply fan on
- opening the economizer (option required)
- running the exhaust fans (option or accessory required)
- opening the exhaust dampers

SMOKE CONTROL INSTALLATION — Implementation of the various Smoke Control Modes on these units requires the installer to modify the unit wiring to add contacts (via either manual switches or relays) that will selectively interrupt and

override standard factory control sequences. See Tables 27-32 and Fig. 103-107 for more information.

Table 26 — Smoke Control Modes

FUNCTION	MODE			
	Fire Shutdown	Pressurization	Evacuation*	Smoke Purge*
Supply Fan	Off	On	Off	On
IGV/VFD†	—	Open/On	—	Open/On
Economizer	Closed	Open	Open	Open
Return Air Damper	Open	Closed	Closed	Closed
Exhaust Fans	Off	Off	On	On
Exhaust Damper	Closed	Closed	Open	Open

LEGEND

IGV — Inlet Guide Vane
PIC — Product Integrated Control
VAV — Variable Air Volume
VFD — Variable Frequency Drive

*Power exhaust option required for this mode.

†Applicable to VAV and PIC units with appropriate options.

**Table 27 — Smoke Control Switches — Constant Volume Units
(50ZA,ZB,ZC,ZD,ZT,ZX)**

SMOKE CONTROL MODE	FIRE SHUTDOWN	PRESSURIZATION	EVACUATION (Non-Modulating Power Exhaust)	EVACUATION (Modulating Power Exhaust)	SMOKE PURGE
SWITCHES USED	SW-1	SW-1	SW-1	SW-1	SW-1
	SW-2*	SW-2	SW-2	SW-2	SW-2
		SW-3	SW-3	SW-3	SW-3
		SW-4	SW-4	SW-4	SW-4
		SW-5A/B	SW-6	SW-6	SW-5A/B
		SW-6	SW-7	SW-7	SW-8
				SW-8	
				SW-9	

*Required ONLY if Fire Shutdown PLUS a second Smoke Control mode will be configured. If Fire Shutdown is the only mode to be configured, SW-1 is only switch required. If Fire Shutdown AND (Pressurization and/or Evacuation and/or Smoke Purge) modes will be configured, then SW-1 AND SW-2 are required to implement Fire Shutdown mode.

NOTE: All switches are shown in “as installed” (power OFF or de-energized) position. In these positions, none of these modes will be activated and normal unit operation is permitted by the base unit controls. To initiate any mode, all switches listed under this mode in the table must be energized, causing the contact position to change to energized position. Switches may be manually or electrically operated.

**Table 28 — Smoke Control Switch Functions — Constant Volume Units
(50ZA,ZB,ZC,ZD,ZT,ZX)**

SWITCH NUMBER	CONFIGURATION	VOLTAGE	FUNCTION
SW-1	N.C.	115	Disconnect 115-v Control Power
SW-2*	N.C.	24	Disconnect 24-v Control Power
SW-3	N.O.	24	Supply Power to Economizer Motor
SW-4	N.C.	24	Opens Economizer Dampers to Wide-Open
SW-5A/B	A: N.C. B: N.O.	115	A: Prevent Backfeed through K3 B: Energize IFC
SW-6	N.C.	115	Isolate IFC and PEC, for Separate Operation
SW-7	N.O.	115	Energize Power Exhaust
SW-8	N.O.	24	Force Power Exhaust Damper for Open
SW-9	N.C.	24	Prevent DPS or BPS (50ZC,ZD Units) Control from Reclosing Exhaust Damper Due to Low BP

LEGEND

BP — Building Pressure
 BPS — Building Pressure Switch
 DPS — Differential Pressure Switch
 IFC — Indoor Fan Contactor
 N.C. — Normally Closed
 N.O. — Normally Open
 PEC — Power Exhaust Contactor

*Required ONLY if Fire Shutdown PLUS a second Smoke Control mode will be configured. If Fire Shutdown is the only mode to be configured, SW-1 is only switch required. If Fire Shutdown AND (Pressurization and/or Evacuation and/or Smoke Purge) modes will be configured, then SW-1 AND SW-2 are required to implement Fire Shutdown mode.

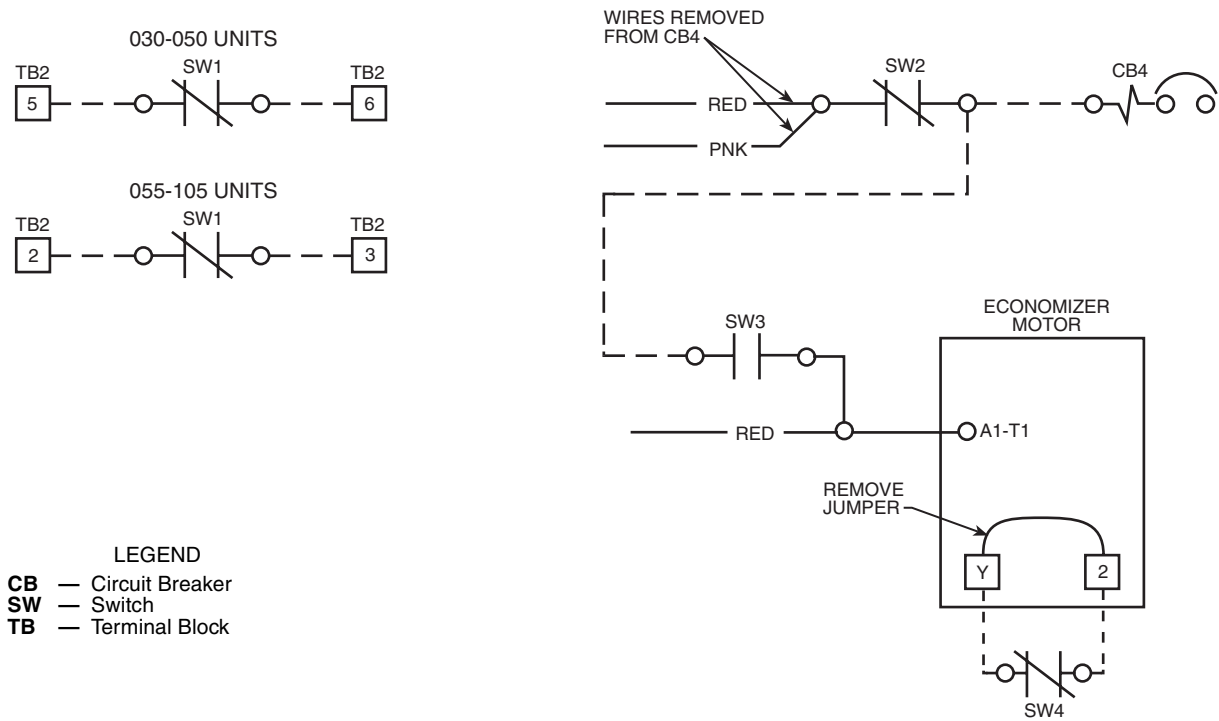


Fig. 103 — Constant Volume Smoke Control Wiring (SW-1 Through SW-4)

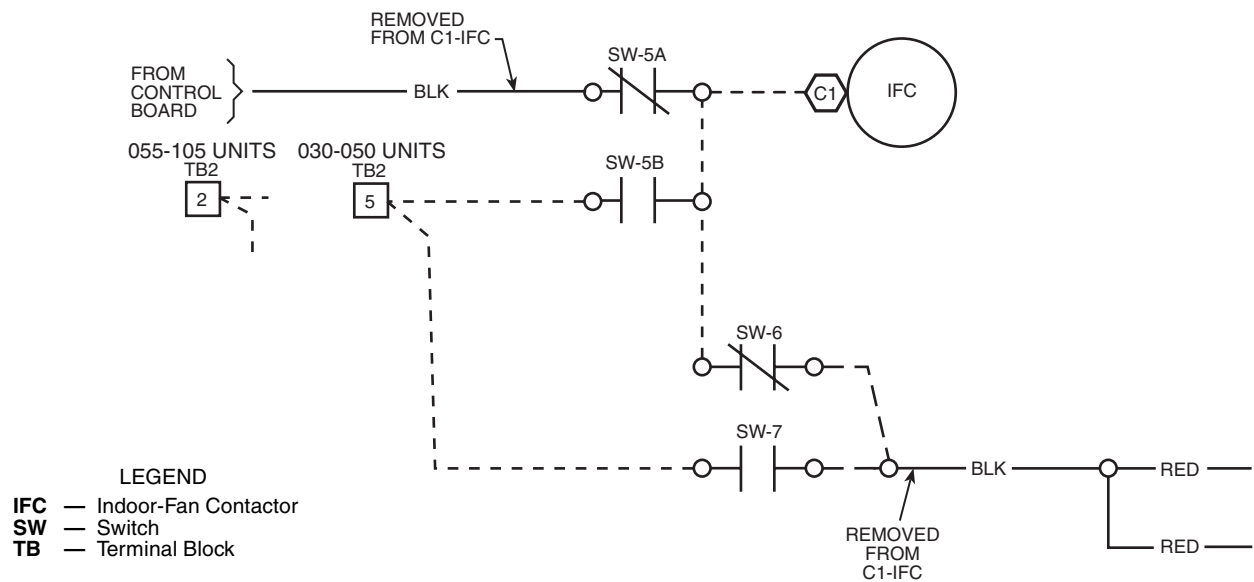


Fig. 104 — Constant Volume Units with Non-Modulating Power Exhaust, Smoke Control Wiring (SW-5 Through SW-7)

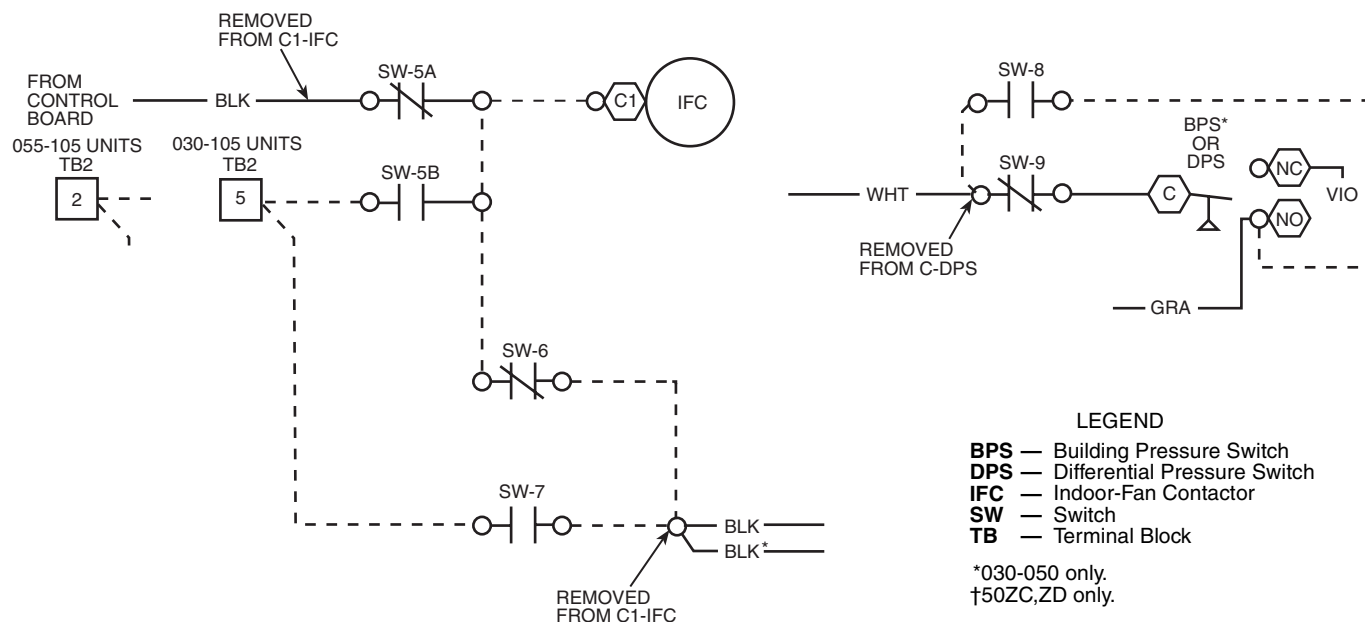


Fig. 105 — Constant Volume Units with Modulating Power Exhaust, Smoke Control Wiring (SW-5 Through SW-9)

Table 29 — Smoke Control Switches — Variable Air Volume Units (50ZE,ZF,ZR,ZS,ZV,ZY)

SMOKE CONTROL MODE	FIRE SHUTDOWN	PRESSURIZATION	EVACUATION (Modulating Power Exhaust)	SMOKE PURGE
SWITCHES USED	SW-1	SW-1	SW-1	SW-1
	SW-2	SW-2	SW-2	SW-2
		SW-4	SW-3	SW-3
		SW-5	SW-5	SW-4
		SW-6	SW-6	SW-9A/B
		SW-9A/B	SW-7	
			SW-8	

NOTE: All switches are shown in “as installed” (power OFF or deenergized) position. In these positions, none of these modes will be activated and normal unit operation is permitted by the base unit controls. To initiate any mode, all switches listed under this mode in the table must be energized, causing the contact position to change to energized position. Switches may be manually or electrically operated.

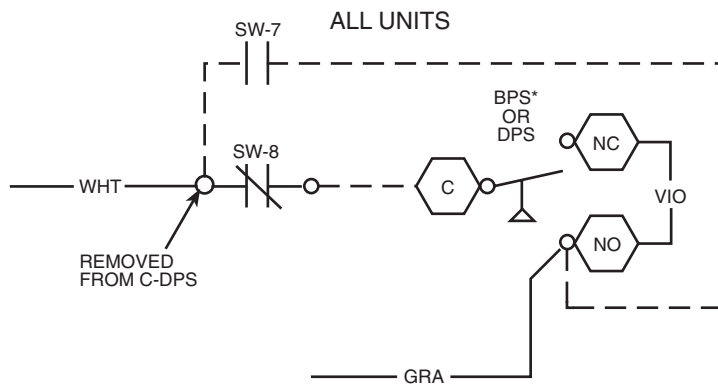
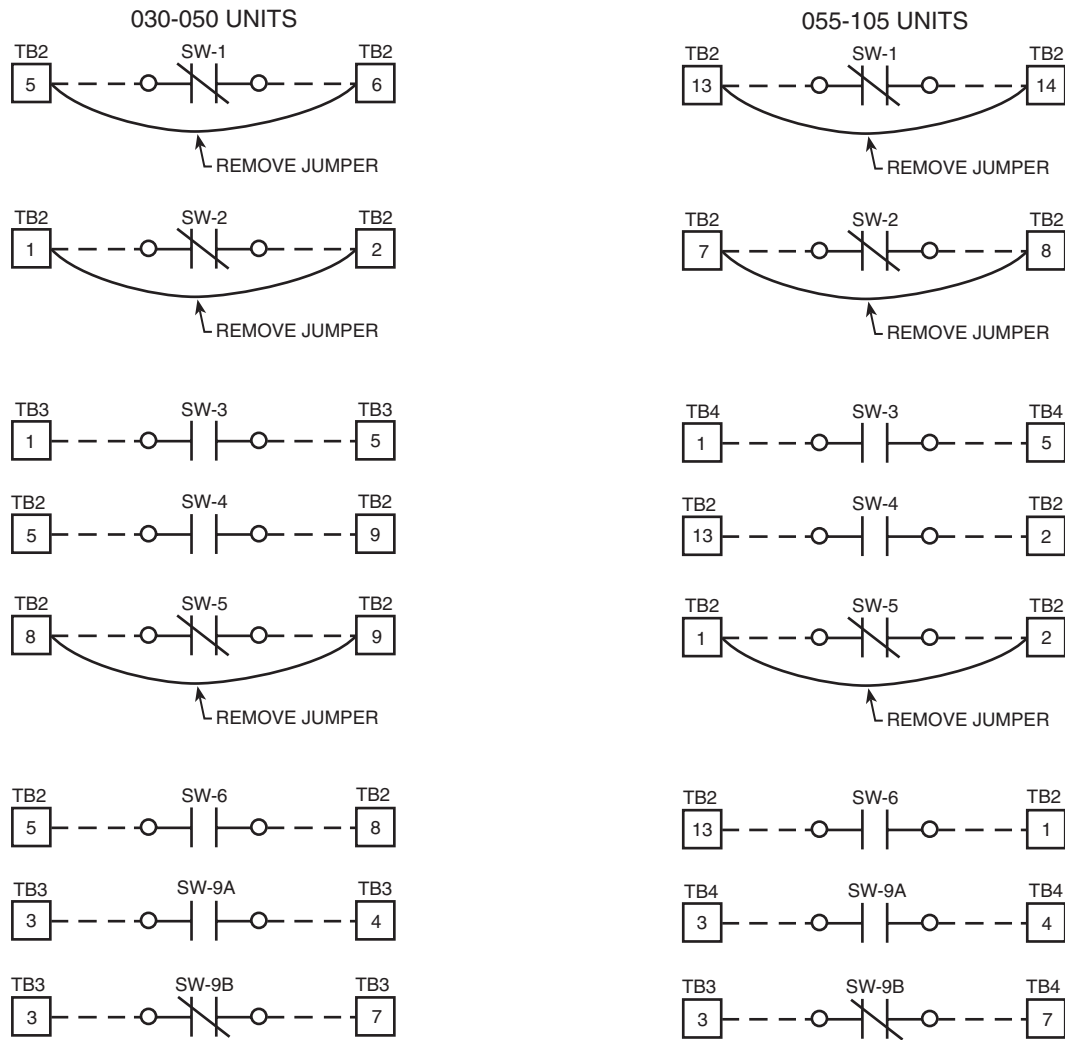
Table 30 — Smoke Control Switch Functions — Variable Air Volume Units (50ZE,ZF,ZR,ZS,ZV,ZY)

SWITCH NUMBER	CONFIGURATION	VOLTAGE	FUNCTION
SW-1	N.C.	115	Deenergize 115-v (OFC, Comp, IFC, Electric Heaters)
SW-2	N.C.	115	Deenergize TRAN7 (Process Board)
SW-3	N.O.	24	Energize EOR (Open Economizer Outside Air Dampers)
SW-4	N.O.	115	Energize IFC and CR-3 (IGV/VFD)
SW-5	N.C.	115	Isolate IFC and PEC for Separate Operation
SW-6	N.O.	115	Energize PEC (Power Exhaust)
SW-7	N.O.	24	Open PED at DPS
SW-8	N.C.	24	Block Auto-Close at DPS or BPS* (Due to Low BP)
SW-9A/B	A: N.O. B: N.C.	115 max	Single Room Terminals to Open (HIR1)

LEGEND

BP — Building Pressure	N.C. — Normally Closed
BPS — Building Pressure Switch	N.O. — Normally Open
DPS — Differential Pressure Switch	PEC — Power Exhaust Contactor
EOR — Economizer Open Relay	PED — Power Exhaust Damper
HIR — Heat Interlock Relay	OFC — Outdoor Fan Contactor
IFC — Indoor Fan Contactor	VFD — Variable Frequency Drive
IGV — Inlet Guide Vane	

*BPS is used on 50ZR,ZS units only.



LEGEND

BPS — Building Pressure Switch
DPS — Differential Pressure Switch
SW — Switch
TB — Terminal Block

*Used on 50ZR,ZS units only.

Fig. 106 — Variable Air Volume Units, Smoke Control Wiring

**Table 31 — Smoke Control Switches — PIC Control Units
(50ZJ,ZK,ZL,ZM,ZW,ZZ)**

SMOKE CONTROL MODE	FIRE SHUTDOWN	BUILDING PRESSURIZATION	EVACUATION (Modulating Power Exhaust)	SMOKE PURGE
SWITCHES USED	SW-1	SW-2	SW-3	SW-4
		SW-5A/B		SW-5A/B

*Units with PIC controls require installation of Controls Option Module (PSIO2), via factory-option or field-installed accessory, for implementation of any Smoke Control mode.

NOTE: All switches are shown in “as installed” (power OFF or de-energized) position. In these positions, none of these modes will be activated and normal unit operation is permitted by the base unit controls. To initiate any mode, all switches listed under this mode in the table must be energized, causing the contact position to change to energized position. Switches may be manually or electrically operated.

**Table 32 — Smoke Control Switch Functions — PIC Control Units
(50ZJ,ZK,ZL,ZM,ZW,ZZ)**

SWITCH NUMBER	SWITCH CONFIGURATION	VOLTAGE	FUNCTION
SW-1	N.O.	24	Activate Fire Shutdown Mode
SW-2	N.O.	24	Activate Pressurization Mode
SW-3	N.O.	24	Activate Evacuation Mode
SW-4	N.O.	24	Activate Smoke Purge Mode
SW-5 A/B	A: N.O. B: N.C.	115	Signal Room Terminals to Open (HIR1)

LEGEND

HIR — Heat Interlock Relay
N.C. — Normally Closed
N.O. — Normally Open
PIC — Product Integrated Controls

NOTE: Units with PIC controls require installation of Controls Option Module (PSIO2), via factory-option or field-installed accessory, for implementation of any Smoke Control mode.

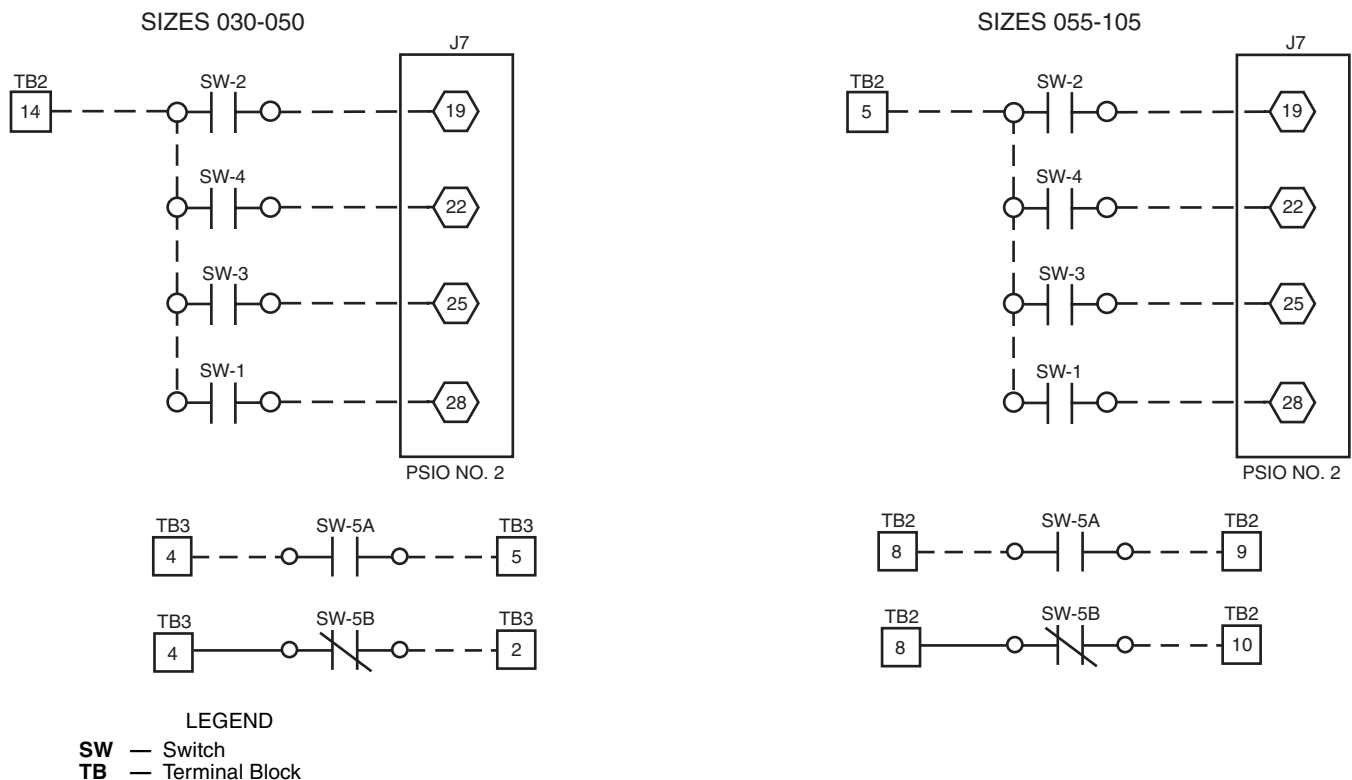


Fig. 107 — PIC Units, Smoke Control Wiring

PRE-START-UP

IMPORTANT: Before beginning Pre-Start-Up or Start-Up, review Start-Up Checklist at the end of this publication. The Checklist assures proper start-up of a unit and provides a record of unit condition, application requirements, system information, and operation at initial start-up.

Do not attempt to start the air-conditioning system until following checks have been completed.

System Check

1. Check the outside air hoods to ensure the hoods are fully opened and secure, with filters in place.
2. Check the supply fan suspension brackets. Shipping spacers should be removed and sleds levelled to specification.
3. Check compressor suspension. Snubber washers can be moved with finger pressure.
4. Electrical power source must agree with unit nameplate.
5. Check tightness of all electrical connections.

⚠ CAUTION

Failure to open discharge service valve prior to starting compressor can result in damage to or failure of the compressor.

6. Check caps on suction line service ports. Make sure caps are tight.
7. Backseat (open) compressor suction and discharge shutoff valves. Close valves one turn to allow refrigerant pressure to reach the test gauges.
8. Oil should be visible in the compressor sight glasses. See Fig. 108. All units are factory charged with oil. Adjust the oil level as required. No oil should be removed unless the crankcase heater has been energized for at least 24 hours. Oil Charge section on page 152 for Carrier-approved oils.
9. Perform leak test. Be sure there are no refrigerant leaks. All units are shipped with a complete operating charge of R-22 and should be under sufficient pressure for leak testing after installation. If there is no system pressure, add refrigerant until a pressure is observed and check for leaks. After leaks are repaired, remove and recover refrigerant from system. For leak testing procedures, see GTAC 2, Module 5, Charging, Recovery, Recycling and Reclamation section. Do not use the system compressors to remove refrigerant from the system.
10. *Crankcase heaters must be firmly locked into compressors, and must be on for 24 hours prior to start-up.*

⚠ CAUTION

Crankcase heaters on all units are wired into the control circuit, so they are always operable as long as the main power supply disconnect is on (closed), even if any safety device is open. Compressor heaters must be on for 24 hours prior to the start-up of any compressor.

11. Check supply fan belts, sheaves, and bearings. Check the lubrication of the fan and motor bearings. Check bearing

and bearing set screws for tightness. Check sheave alignment and belt tension. Hand turn fan to ensure fan wheel does not rub on housing. The fan shaft and motor shaft must turn freely before power is applied to the unit.

12. Check exhaust fan belts, sheaves, and bearings. Check the lubrication of the fan and motor bearings. Check bearing and bearing set screws for tightness. Check sheave alignment and belt tension. Hand turn fans to ensure fan wheels do not rub on housing.
13. Check economizer linkage. Economizer dampers should be fully closed. Linkage should permit full and free travel.
14. Check that the correct return air filters are installed in the filter tracks. Do not operate unit without return air filters.
15. Check that all access doors on the air handler section have been closed and secured.
16. Check rotation of outdoor fans during first start-up check. Fan rotation is clockwise as viewed from top of unit. Fan motors are 3-phase. If fan is not turning clockwise, reverse 2 of the power wires. For supply fan and exhaust fan, check rotation per label on fan housing.

25% Outdoor-Air Damper — On units without economizer, be sure 25% outdoor-air damper is set at the desired position. Also, be sure hood is installed properly.

Economizer Inlet Screens — Check that they are in place before operating the unit.

Economizer Dampers — With no power to the unit, the economizer outdoor-air dampers should be fully closed. Check by opening the access door marked FILTER SECTION. On units with economizer, be sure economizer minimum position is set at the desired setting. Be sure hood is installed properly.

Compressor Oil — Check that compressor oil is visible in the sight glass of the compressor. All units are factory charged with oil. Observe oil level closely at start-up. If oil level is below the sight glass and cannot be seen, add oil until the level is approximately as shown in Fig. 108. See Oil Charge section on page 152 for information on adding or removing oil.

If oil charge is above sight glass, do not remove any oil until the compressor crankcase heater has been on for at least 24 hours. When additional oil or a complete charge is needed, use only Carrier-approved compressor oil.

Do not reuse drained oil and do not use any oil that has been exposed to the atmosphere.

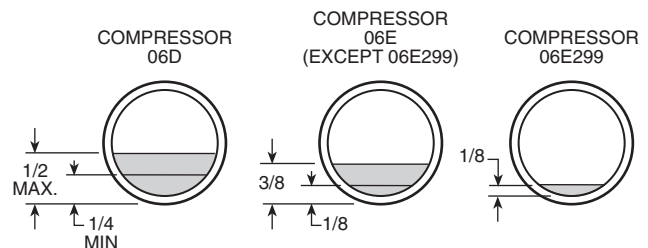


Fig. 108 — Operating Oil Levels (Sight Glass)

Supply-Fan Belts, Pulleys, and Sheaves —

Belts, pulleys, and sheaves are factory installed. All pulleys are nonadjustable.

See Table 3 for fan shaft center distance ranges and shaft sizes when making selections for field-supplied drives.

Factory-installed drives are fixed-speed and are nonadjustable. Refer to Tables 1A-1C for factory-supplied wheel speeds and drive set data.

If different wheel speeds are required for an application, Carrier recommends that the installer contact the nearest Browning dealer. The Browning dealer can develop the required information for the fan drive set.

Observe the maximum wheel speed and unit airflow limits for the specific unit size and fan type.

See Tables 33-55 for supply fan performance. See Table 56 for component pressure drops.

Check rotation of wheel with arrow on the fan housing. Check fan speed with a strobe-type tachometer, or use this formula:

$$\text{Fan Rpm} = \frac{\text{motor rpm} \times \text{motor sheave pitch diameter (in.)}}{\text{fan sheave pitch diameter (in.)}}$$

(Obtain motor rpm from the fan motor nameplate and read sheave pitch diameters marked on the fan and motor sheaves.)

EXAMPLE:

Nameplate motor rpm 1750
Motor sheave pitch diameter (in.) 3.4
Fan sheave pitch diameter (in.) 13.6

$$\text{Fan Rpm} = \frac{1750 \times 3.4}{13.6} = 438 \text{ Rpm}$$

The maximum allowable fan speeds are shown in the table below.

UNIT SIZE 50Z	MAXIMUM ALLOWABLE FAN SPEED (RPM)	
	Supply Fan Speed	Exhaust Fan Speed
030-050	900	1300
055-070	750	925
075-105	680 (FC) 1846 (AF)	925 (Std.) 1175 (High Cap.) 1447 (Return/Exhaust Fan)

LEGEND

AF — Air Foil
FC — Forward Curved

Excessive fan speed may result in condensate carryover from the evaporator coil, fan motor overload, or wheel failure. See Table 57 for Air Quantity Limits on page 139.

Table 33 — Fan Performance — 50ZA,ZE,ZJ030 Units without Extended Plenum

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
6,000	222	0.59	284	0.91	339	1.27	388	1.66	430	2.07	469	2.50	504	2.93	536	3.38
7,500	248	0.94	300	1.28	350	1.68	395	2.11	437	2.57	475	3.05	511	3.54	544	4.05
9,000	278	1.46	323	1.80	366	2.22	407	2.69	446	3.19	483	3.71	517	4.25	550	4.81
10,500	311	2.16	349	2.52	387	2.95	424	3.43	459	3.96	493	4.51	526	5.10	558	5.70
12,000	344	3.08	378	3.44	412	3.89	445	4.39	477	4.93	508	5.51	539	6.12	569	6.75
13,500	379	4.25	410	4.62	440	5.07	469	5.58	498	6.13	527	6.73	555	7.36	583	8.02
15,000	415	5.69	442	6.06	470	6.52	496	7.04	523	7.61	549	8.22	575	8.87	601	9.55

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
6,000	567	3.84	595	4.30	622	4.78	647	5.26	671	5.75	695	6.25	717	6.76	738	7.27
7,500	575	4.57	604	5.10	632	5.63	658	6.18	683	6.73	707	7.29	730	7.86	752	8.43
9,000	581	5.38	611	5.97	639	6.56	665	7.16	691	7.78	715	8.40	739	9.03	761	9.66
10,500	588	6.31	617	6.95	645	7.59	672	8.25	697	8.92	722	9.59	746	10.28	769	10.97
12,000	598	7.41	625	8.08	652	8.77	679	9.47	704	10.19	728	10.91	752	11.65	775	12.39
13,500	610	8.71	637	9.41	662	10.14	687	10.88	712	11.63	736	12.40	759	13.18	782	13.98
15,000	626	10.25	651	10.98	675	11.74	699	12.51	723	13.30	746	14.10	768	14.92	790	15.75

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
6,000	759	7.79	779	8.32	799	8.85	817	9.39
7,500	773	9.01	794	9.60	814	10.20	833	10.80
9,000	783	10.30	805	10.95	825	11.60	845	12.26
10,500	791	11.67	812	12.38	833	13.09	854	13.81
12,000	797	13.15	819	13.91	840	14.68	860	15.45
13,500	804	14.77	825	15.59	846	16.41	867	17.23
15,000	812	16.59	833	17.45	853	18.31	874	19.19

LEGEND

VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 34 — Fan Performance — 50ZA,ZE,ZJ035 Units without Extended Plenum

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
7,000	246	0.84	301	1.19	352	1.58	398	2.01	440	2.46	479	2.93	514	3.40	547	3.90
8,000	266	1.14	315	1.50	362	1.92	406	2.37	447	2.85	484	3.35	519	3.87	552	4.39
10,000	310	1.98	350	2.36	389	2.80	427	3.30	464	3.83	499	4.38	532	4.96	564	5.55
12,000	357	3.20	390	3.60	424	4.06	457	4.58	489	5.15	520	5.74	551	6.36	580	7.01
14,000	406	4.87	435	5.28	463	5.76	492	6.30	520	6.89	548	7.52	576	8.18	603	8.86
15,000	430	5.89	458	6.31	485	6.80	511	7.35	538	7.95	564	8.59	590	9.26	616	9.96

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
7,000	577	4.40	606	4.91	633	5.43	659	5.95	684	6.49	707	7.03	730	7.58	752	8.14
8,000	583	4.94	612	5.49	640	6.05	666	6.62	691	7.19	715	7.78	738	8.37	760	8.97
10,000	594	6.16	623	6.79	651	7.42	677	8.07	703	8.73	727	9.39	751	10.06	774	10.74
12,000	609	7.67	636	8.36	663	9.05	689	9.77	714	10.49	738	11.22	762	11.97	785	12.72
14,000	629	9.57	655	10.30	680	11.04	704	11.81	728	12.59	751	13.38	774	14.18	796	14.99
15,000	641	10.69	666	11.44	690	12.20	714	12.99	737	13.79	760	14.61	782	15.44	804	16.28

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
7,000	773	8.70	793	9.27	813	9.85	832	10.43
8,000	782	9.57	802	10.18	823	10.80	842	11.43
10,000	796	11.42	817	12.11	838	12.81	858	13.52
12,000	807	13.48	828	14.25	849	15.02	869	15.80
14,000	818	15.82	840	16.66	860	17.50	880	18.35
15,000	825	17.13	846	18.00	866	18.87	886	19.76

LEGEND

 VAV units only.

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.

3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 35 — Fan Performance — 50ZA,ZE,ZJ040 Units without Extended Plenum

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
8,000	252	0.98	303	1.33	350	1.72	394	2.14	434	2.58	472	3.06	507	3.55	540	4.07
10,000	290	1.67	333	2.11	373	2.55	412	3.01	448	3.51	483	4.03	517	4.58	549	5.16
12,000	330	2.65	369	3.18	404	3.70	438	4.23	470	4.78	501	5.35	532	5.94	562	6.56
14,000	372	3.96	407	4.61	439	5.22	469	5.83	498	6.44	526	7.07	554	7.72	581	8.38
16,000	415	5.67	447	6.44	476	7.15	504	7.85	530	8.54	556	9.24	581	9.95	605	10.67
18,000	459	7.84	488	8.72	515	9.55	541	10.34	565	11.12	589	11.91	612	12.69	634	13.47
20,000	503	10.51	530	11.51	555	12.46	579	13.36	602	14.24	624	15.11	645	15.98	666	16.84

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
8,000	571	4.60	600	5.14	628	5.70	654	6.27	679	6.85	703	7.44	726	8.04	748	8.65
10,000	579	5.75	608	6.36	636	6.98	662	7.62	688	8.28	712	8.94	736	9.62	758	10.30
12,000	590	7.21	618	7.87	645	8.55	671	9.25	696	9.96	720	10.69	744	11.43	766	12.19
14,000	607	9.07	633	9.78	658	10.51	683	11.25	707	12.02	730	12.80	753	13.60	775	14.41
16,000	629	11.41	653	12.16	676	12.94	699	13.73	722	14.54	744	15.37	766	16.22	787	17.08
18,000	656	14.28	678	15.09	700	15.91	721	16.76	742	17.62	762	18.49	783	19.39	803	20.29
20,000	687	17.71	707	18.60	727	19.48	747	20.38	766	21.30	785	22.22	804	23.17	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
8,000	770	9.27	791	9.90	811	10.54	830	11.18
10,000	780	11.00	802	11.71	822	12.43	842	13.15
12,000	789	12.96	810	13.73	831	14.52	851	15.32
14,000	797	15.24	818	16.07	839	16.93	859	17.79
16,000	808	17.95	828	18.85	849	19.75	868	20.67
18,000	823	21.21	842	22.15	862	23.11	—	—
20,000	—	—	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 36 — Fan Performance — 50ZA,ZE,ZJ050 Units without Extended Plenum

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
9,000	276	1.34	323	1.73	366	2.15	407	2.60	445	3.08	482	3.58	516	4.11	549	4.66
10,000	296	1.74	339	2.17	379	2.62	418	3.09	454	3.59	489	4.12	522	4.68	554	5.26
12,000	339	2.76	376	3.29	411	3.81	445	4.35	477	4.91	509	5.49	539	6.09	568	6.71
14,000	382	4.15	416	4.79	448	5.40	478	6.01	506	6.63	535	7.26	562	7.92	589	8.60
16,000	427	5.96	458	6.71	487	7.42	514	8.11	540	8.81	565	9.52	590	10.23	615	10.97
18,000	473	8.26	501	9.12	527	9.93	552	10.72	576	11.50	600	12.29	623	13.08	645	13.88
20,000	519	11.10	545	12.06	570	12.99	593	13.88	615	14.76	637	15.63	658	16.50	679	17.38

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
9,000	579	5.23	608	5.81	636	6.41	662	7.02	687	7.64	712	8.27	735	8.91	757	9.57
10,000	584	5.85	613	6.47	641	7.10	667	7.74	692	8.40	717	9.07	740	9.75	763	10.44
12,000	597	7.36	625	8.03	651	8.72	677	9.42	702	10.14	726	10.88	750	11.63	772	12.39
14,000	615	9.29	641	10.01	666	10.74	690	11.50	714	12.27	738	13.06	760	13.87	783	14.69
16,000	639	11.71	663	12.48	686	13.27	709	14.07	731	14.89	753	15.73	775	16.58	796	17.45
18,000	667	14.69	689	15.51	711	16.35	732	17.20	753	18.07	773	18.96	793	19.86	813	20.78
20,000	699	18.25	719	19.14	739	20.04	759	20.95	778	21.88	797	22.82	816	23.77	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
9,000	779	10.23	800	10.90	821	11.58	840	12.27
10,000	785	11.14	806	11.85	826	12.57	846	13.30
12,000	794	13.16	816	13.94	836	14.73	857	15.54
14,000	804	15.52	825	16.37	846	17.22	866	18.10
16,000	817	18.34	837	19.24	857	20.15	877	21.08
18,000	833	21.71	853	22.66	872	23.62	—	—
20,000	—	—	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 37 — Fan Performance — 50ZA,ZE,ZJ055 Units without Extended Plenum

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
10,000	207	1.04	253	1.50	295	2.03	334	2.66	371	3.41	405	4.26	438	5.20	468	6.20
12,500	235	1.69	276	2.23	312	2.78	346	3.40	379	4.10	410	4.88	440	5.75	469	6.70
15,000	265	2.59	302	3.23	335	3.85	365	4.51	394	5.20	422	5.96	449	6.78	476	7.67
17,500	295	3.78	331	4.52	361	5.24	389	5.97	415	6.71	440	7.48	465	8.30	489	9.17
20,000	327	5.31	360	6.15	388	6.98	414	7.79	439	8.60	462	9.43	485	10.28	507	11.17
22,500	359	7.23	390	8.16	417	9.09	442	10.00	465	10.90	487	11.81	508	12.72	528	13.65
25,000	392	9.59	421	10.60	447	11.62	470	12.64	492	13.64	513	14.63	533	15.62	552	16.62

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
10,000	497	7.27	523	8.39	549	9.55	573	10.75	596	11.98	618	13.23	639	14.51	659	15.81
12,500	497	7.73	523	8.83	549	10.00	573	11.22	597	12.49	619	13.81	641	15.16	662	16.55
15,000	501	8.63	526	9.67	550	10.77	574	11.94	597	13.17	619	14.46	641	15.80	662	17.19
17,500	512	10.09	535	11.07	557	12.11	579	13.21	601	14.38	622	15.60	643	16.88	663	18.21
20,000	528	12.09	549	13.06	570	14.07	590	15.12	610	16.24	630	17.40	649	18.62	668	19.89
22,500	548	14.60	567	15.59	587	16.61	605	17.66	624	18.75	642	19.88	660	21.06	678	22.28
25,000	571	17.63	589	18.66	607	19.71	624	20.78	642	21.89	659	23.02	676	24.19	692	25.39

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
10,000	679	17.13	697	18.46	715	19.81	733	21.17
12,500	682	17.98	702	19.43	721	20.90	739	22.40
15,000	682	18.63	702	20.10	721	21.62	740	23.17
17,500	683	19.60	702	21.04	721	22.53	740	24.06
20,000	687	21.20	706	22.57	724	24.00	742	25.46
22,500	696	23.55	713	24.86	731	26.22	748	27.62
25,000	709	26.62	725	27.91	741	29.22	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 38 — Fan Performance — 50ZA,ZE,ZJ060 Units without Extended Plenum

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
12,000	234	1.54	276	2.03	312	2.57	348	3.20	382	3.93	415	4.74	446	5.63	476	6.58
15,000	271	2.65	309	3.27	341	3.88	370	4.53	399	5.24	428	6.04	455	6.91	482	7.85
18,000	308	4.22	344	5.00	374	5.73	400	6.46	426	7.22	450	8.02	474	8.88	498	9.81
21,000	348	6.36	380	7.29	408	8.18	434	9.04	457	9.88	479	10.74	501	11.64	522	12.58
24,000	390	9.19	417	10.24	444	11.29	469	12.29	491	13.27	512	14.23	532	15.21	551	16.20
27,000	433	12.80	456	13.93	481	15.14	504	16.30	526	17.44	546	18.53	565	19.62	583	20.71
30,000	476	17.29	497	18.50	519	19.82	541	21.15	562	22.45	581	23.70	599	24.93	617	26.14

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
12,000	504	7.56	530	8.57	555	9.61	578	10.66	600	11.73	621	12.81	641	13.91	660	15.01
15,000	509	8.87	535	9.95	559	11.07	583	12.25	606	13.45	628	14.68	650	15.95	670	17.23
18,000	521	10.79	544	11.85	567	12.97	590	14.14	612	15.38	633	16.66	654	17.99	675	19.36
21,000	543	13.56	563	14.60	583	15.69	603	16.84	623	18.05	643	19.31	662	20.63	682	21.99
24,000	570	17.22	588	18.28	607	19.39	625	20.53	642	21.72	660	22.95	678	24.24	695	25.58
27,000	601	21.81	618	22.93	635	24.07	651	25.25	667	26.46	684	27.70	700	28.98	715	30.31
30,000	634	27.34	650	28.56	666	29.78	681	31.02	696	32.28	711	33.56	726	34.88	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
12,000	679	16.11	697	17.23	714	18.35	730	19.49
15,000	690	18.52	709	19.84	727	21.15	745	22.49
18,000	695	20.76	714	22.20	733	23.66	—	—
21,000	701	23.41	719	24.87	738	26.38	—	—
24,000	713	26.97	730	28.40	747	29.89	—	—
27,000	731	31.67	747	33.08	—	—	—	—
30,000	—	—	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 39 — Fan Performance — 50ZA,ZE,ZJ070 Units without Extended Plenum

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
14,000	258	2.23	297	2.80	330	3.38	362	4.02	392	4.73	422	5.53	451	6.42	480	7.37
17,500	302	3.92	338	4.67	368	5.39	395	6.10	421	6.84	446	7.64	471	8.50	495	9.42
21,000	348	6.36	380	7.29	408	8.18	434	9.04	457	9.88	479	10.74	501	11.64	522	12.57
24,500	397	9.74	424	10.80	450	11.88	475	12.91	497	13.91	517	14.89	537	15.88	556	16.89
28,000	447	14.18	470	15.35	494	16.60	516	17.82	538	19.01	558	20.16	576	21.29	594	22.41
30,000	476	17.29	497	18.50	519	19.82	541	21.15	562	22.45	581	23.70	599	24.93	617	26.14

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
14,000	507	8.39	533	9.46	558	10.57	582	11.71	605	12.89	627	14.08	648	15.29	668	16.52
17,500	519	10.42	542	11.48	565	12.60	588	13.78	610	15.02	632	16.30	653	17.62	674	18.99
21,000	543	13.56	563	14.60	583	15.69	603	16.84	623	18.05	643	19.31	662	20.63	682	21.99
24,500	575	17.93	593	18.99	611	20.10	629	21.24	646	22.43	664	23.67	681	24.96	698	26.29
28,000	612	23.55	628	24.69	645	25.86	661	27.05	677	28.27	692	29.53	708	30.82	723	32.15
30,000	634	27.34	650	28.56	666	29.78	681	31.02	696	32.28	711	33.56	726	34.88	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
14,000	687	17.76	706	19.01	724	20.27	741	21.54
17,500	694	20.38	713	21.79	732	23.24	—	—
21,000	701	23.41	719	24.87	738	26.38	—	—
24,500	715	27.67	732	29.10	749	30.58	—	—
28,000	739	33.51	—	—	—	—	—	—
30,000	—	—	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

- See Component Pressure Drop data in Table 56 before using Fan Performance tables.
- Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

NOTES:

- Fan performance is based on wet coils and clean 2-in. filters.

Table 40 — Fan Performance — 50ZA,ZE,ZJ030 Units with Extended Plenum and 50ZB,ZF,ZK030 Units

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
6,000	255	0.95	313	1.35	364	1.82	411	2.35	454	2.92	494	3.52	530	4.14	563	4.78
7,500	291	1.51	340	1.93	386	2.41	428	2.94	468	3.51	505	4.13	541	4.78	574	5.46
9,000	330	2.28	372	2.73	413	3.22	451	3.76	487	4.34	522	4.96	555	5.61	587	6.30
10,500	371	3.28	408	3.76	444	4.28	479	4.84	512	5.43	544	6.06	574	6.71	604	7.40
12,000	413	4.56	447	5.07	479	5.61	510	6.19	540	6.80	570	7.44	598	8.11	626	8.80
13,500	456	6.12	487	6.66	516	7.23	544	7.83	572	8.46	599	9.12	626	9.81	651	10.51
15,000	500	7.99	528	8.58	555	9.18	581	9.80	606	10.45	631	11.13	656	11.83	680	12.56

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
6,000	594	5.43	623	6.09	651	6.75	676	7.41	701	8.08	725	8.75	747	9.42	769	10.10
7,500	605	6.16	635	6.88	664	7.62	691	8.36	716	9.11	741	9.88	765	10.64	787	11.41
9,000	617	7.02	646	7.76	674	8.52	702	9.31	728	10.11	753	10.93	777	11.76	800	12.60
10,500	633	8.12	660	8.86	687	9.64	713	10.43	739	11.25	764	12.09	788	12.95	811	13.82
12,000	652	9.52	679	10.27	704	11.04	729	11.84	753	12.66	777	13.50	800	14.37	823	15.26
13,500	676	11.25	701	12.00	725	12.78	748	13.58	771	14.40	794	15.24	816	16.11	838	16.99
15,000	703	13.30	726	14.07	749	14.86	771	15.66	793	16.49	814	17.34	835	18.20	856	19.09

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
6,000	789	10.77	809	11.45	829	12.13	848	12.81
7,500	809	12.18	830	12.96	851	13.73	870	14.51
9,000	823	13.44	844	14.29	866	15.15	886	16.01
10,500	833	14.71	856	15.61	877	16.52	898	17.44
12,000	845	16.16	867	17.08	888	18.01	—	—
13,500	859	17.90	880	18.82	—	—	—	—
15,000	876	20.00	896	20.92	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 41 — Fan Performance — 50ZA,ZE,ZJ035 Units with Extended Plenum and 50ZB,ZF,ZK035 Units

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
7,000	285	1.35	337	1.78	384	2.26	428	2.80	469	3.38	507	4.00	542	4.66	576	5.34
8,000	311	1.81	358	2.25	402	2.75	442	3.29	481	3.87	517	4.50	551	5.16	584	5.86
10,000	367	3.04	406	3.52	443	4.05	479	4.61	512	5.21	545	5.84	576	6.51	606	7.21
12,000	426	4.74	459	5.26	491	5.82	522	6.42	552	7.05	581	7.70	609	8.38	637	9.09
14,000	486	6.98	515	7.55	543	8.15	570	8.78	597	9.44	623	10.12	649	10.83	674	11.55
15,000	517	8.33	544	8.92	570	9.54	596	10.18	621	10.85	646	11.55	671	12.27	694	13.01

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
7,000	607	6.03	637	6.74	665	7.46	691	8.18	717	8.91	741	9.65	764	10.39	786	11.13
8,000	615	6.58	645	7.32	673	8.07	700	8.84	726	9.62	751	10.41	775	11.20	797	12.00
10,000	636	7.94	664	8.70	691	9.48	717	10.29	743	11.11	768	11.96	792	12.82	815	13.69
12,000	663	9.83	689	10.59	715	11.38	739	12.19	764	13.03	787	13.88	810	14.76	833	15.66
14,000	698	12.31	722	13.08	745	13.88	768	14.69	791	15.53	813	16.39	834	17.27	856	18.17
15,000	718	13.78	741	14.56	763	15.36	785	16.19	807	17.03	828	17.90	849	18.78	869	19.69

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
7,000	807	11.88	828	12.62	848	13.37	867	14.12
8,000	819	12.80	841	13.61	861	14.42	881	15.23
10,000	837	14.57	859	15.47	881	16.37	—	—
12,000	855	16.57	876	17.51	897	18.45	—	—
14,000	876	19.10	897	20.04	—	—	—	—
15,000	890	20.61	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

Table 42 — Fan Performance — 50ZA,ZE,ZJ040 Units with Extended Plenum and 50ZB,ZF,ZK040 Units

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
8,000	293	1.62	344	2.10	390	2.62	432	3.18	470	3.76	507	4.36	541	4.97	573	5.60
10,000	343	2.66	385	3.19	425	3.76	463	4.36	498	4.99	532	5.64	563	6.31	594	7.00
12,000	395	4.09	431	4.68	466	5.29	500	5.93	532	6.60	562	7.30	592	8.01	620	8.75
14,000	449	5.97	481	6.62	512	7.28	541	7.96	570	8.67	598	9.40	626	10.16	652	10.93
16,000	504	8.32	533	9.06	560	9.77	587	10.50	613	11.25	638	12.02	663	12.81	688	13.62
18,000	559	11.20	586	12.04	611	12.82	635	13.59	659	14.38	682	15.19	705	16.01	727	16.86
20,000	615	14.66	640	15.59	663	16.44	685	17.28	707	18.11	728	18.96	749	19.83	770	20.71

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
8,000	603	6.23	632	6.87	659	7.50	685	8.14	710	8.78	734	9.43	757	10.07	779	10.71
10,000	623	7.70	651	8.41	678	9.13	703	9.86	728	10.60	752	11.33	776	12.08	798	12.82
12,000	648	9.50	674	10.26	699	11.04	724	11.83	748	12.63	772	13.44	794	14.25	817	15.07
14,000	677	11.73	702	12.54	726	13.35	750	14.19	772	15.04	795	15.89	817	16.76	838	17.64
16,000	712	14.45	735	15.30	757	16.16	779	17.03	801	17.92	822	18.82	843	19.73	863	20.65
18,000	749	17.73	771	18.61	792	19.50	813	20.42	833	21.34	853	22.27	873	23.23	—	—
20,000	790	21.61	811	22.52	830	23.45	—	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
8,000	800	11.35	821	12.00	841	12.64	860	13.28
10,000	820	13.57	841	14.31	862	15.06	882	15.81
12,000	838	15.90	859	16.73	880	17.57	900	18.40
14,000	859	18.53	879	19.42	899	20.32	—	—
16,000	883	21.58	—	—	—	—	—	—
18,000	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 43 — Fan Performance — 50ZA,ZE,ZJ050 Units with Extended Plenum and 50ZB,ZF,ZK050 Units

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
9,000	324	2.15	369	2.67	412	3.23	452	3.83	488	4.44	523	5.08	556	5.73	587	6.40
10,000	349	2.74	392	3.28	431	3.87	469	4.48	504	5.12	537	5.78	569	6.46	599	7.16
12,000	403	4.23	439	4.82	474	5.45	507	6.11	539	6.80	570	7.51	599	8.23	627	8.98
14,000	459	6.17	490	6.83	521	7.50	550	8.20	579	8.93	607	9.69	634	10.46	660	11.25
16,000	515	8.63	544	9.34	571	10.07	597	10.82	623	11.59	649	12.38	674	13.20	698	14.03
18,000	573	11.65	599	12.44	623	13.21	647	14.00	671	14.82	694	15.65	716	16.50	739	17.37
20,000	630	15.28	654	16.14	677	16.97	699	17.81	720	18.66	741	19.53	762	20.43	783	21.34

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
9,000	617	7.08	645	7.77	672	8.47	698	9.18	723	9.90	747	10.62	770	11.34	793	12.07
10,000	628	7.87	656	8.59	682	9.33	708	10.07	733	10.82	757	11.58	780	12.35	802	13.12
12,000	654	9.74	680	10.51	706	11.30	730	12.10	754	12.90	778	13.73	800	14.56	822	15.39
14,000	686	12.06	710	12.88	734	13.71	757	14.55	780	15.41	802	16.27	824	17.15	845	18.04
16,000	721	14.88	744	15.74	767	16.62	789	17.51	810	18.41	831	19.32	852	20.24	872	21.17
18,000	761	18.27	782	19.17	803	20.09	824	21.02	844	21.96	864	22.92	884	23.88	—	—
20,000	803	22.27	823	23.21	—	—	—	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
9,000	814	12.79	835	13.52	855	14.25	875	14.99
10,000	824	13.89	845	14.67	866	15.45	886	16.23
12,000	844	16.24	865	17.09	885	17.95	—	—
14,000	866	18.94	886	19.85	—	—	—	—
16,000	892	22.12	—	—	—	—	—	—
18,000	—	—	—	—	—	—	—	—
20,000	—	—	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 44 — Fan Performance — 50ZA,ZE,ZJ055 Units with Extended Plenum and 50ZB,ZF,ZK055 Units

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
10,000	217	1.21	258	1.71	296	2.29	334	2.97	371	3.76	407	4.63	440	5.56	471	6.51
12,500	248	2.01	286	2.63	319	3.26	349	3.95	380	4.71	410	5.58	440	6.52	469	7.54
15,000	281	3.13	317	3.90	347	4.64	374	5.38	400	6.18	425	7.03	450	7.95	476	8.95
17,500	315	4.64	348	5.55	378	6.43	403	7.29	426	8.16	449	9.05	471	10.00	493	10.99
20,000	351	6.64	381	7.64	409	8.68	433	9.68	456	10.66	477	11.64	497	12.65	516	13.68
22,500	389	9.20	414	10.25	440	11.43	464	12.59	486	13.71	506	14.81	525	15.91	543	17.03
25,000	427	12.39	449	13.48	473	14.75	496	16.06	517	17.34	537	18.59	555	19.82	573	21.04

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
10,000	500	7.48	527	8.46	552	9.45	576	10.44	598	11.42	619	12.41	639	13.41	659	14.41
12,500	498	8.63	525	9.76	552	10.93	577	12.12	601	13.32	624	14.54	646	15.76	667	16.99
15,000	501	10.03	526	11.17	550	12.38	575	13.65	598	14.97	621	16.32	644	17.71	666	19.11
17,500	514	12.05	536	13.17	557	14.35	579	15.60	600	16.91	621	18.28	643	19.70	663	21.18
20,000	535	14.76	554	15.88	573	17.06	592	18.29	611	19.58	630	20.91	649	22.31	668	23.77
22,500	561	18.17	579	19.34	596	20.54	613	21.78	629	23.06	646	24.40	663	25.78	680	27.20
25,000	590	22.27	606	23.51	622	24.78	637	26.07	653	27.39	668	28.75	683	30.13	699	31.56

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
10,000	677	15.40	695	16.40	712	17.40	728	18.41
12,500	687	18.22	706	19.45	725	20.69	742	21.92
15,000	687	20.54	707	21.98	727	23.43	746	24.89
17,500	684	22.69	704	24.24	724	25.83	743	27.43
20,000	686	25.27	705	26.84	723	28.44	742	30.09
22,500	697	28.68	713	30.21	730	31.79	747	33.42
25,000	714	33.04	729	34.55	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 45 — Fan Performance — 50ZA,ZE,ZJ060 Units with Extended Plenum and 50ZB,ZF,ZK060 Units

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
12,000	241	1.82	280	2.41	314	3.04	346	3.72	376	4.47	405	5.26	433	6.11	460	7.01
15,000	281	3.14	316	3.87	346	4.61	374	5.38	400	6.19	426	7.05	450	7.95	474	8.90
18,000	323	5.03	355	5.92	382	6.80	408	7.68	431	8.58	454	9.53	476	10.50	498	11.52
21,000	366	7.61	395	8.66	421	9.69	444	10.71	466	11.73	487	12.78	507	13.85	527	14.94
24,000	410	10.97	437	12.20	460	13.39	482	14.55	503	15.71	523	16.88	541	18.07	560	19.27
27,000	455	15.23	479	16.65	501	18.00	522	19.33	542	20.64	560	21.95	578	23.26	595	24.58
30,000	500	20.52	522	22.11	543	23.64	563	25.14	581	26.61	599	28.06	616	29.52	632	30.97

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
12,000	486	7.94	511	8.91	535	9.91	559	10.94	581	11.99	603	13.07	624	14.16	645	15.28
15,000	498	9.90	520	10.93	543	12.01	564	13.11	586	14.26	606	15.43	627	16.63	646	17.86
18,000	518	12.57	539	13.66	559	14.78	579	15.95	598	17.15	617	18.39	636	19.65	654	20.95
21,000	546	16.07	564	17.23	583	18.42	600	19.64	618	20.90	635	22.19	653	23.51	669	24.86
24,000	577	20.49	594	21.74	611	23.00	628	24.31	644	25.63	660	26.99	676	28.38	691	29.77
27,000	611	25.91	628	27.26	643	28.63	659	30.03	674	31.44	689	32.87	703	34.33	718	35.82
30,000	648	32.43	663	33.90	678	35.38	—	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
12,000	664	16.40	683	17.55	702	18.70	720	19.87
15,000	666	19.12	685	20.39	703	21.69	721	23.01
18,000	672	22.28	690	23.64	708	25.02	725	26.44
21,000	686	26.25	703	27.67	719	29.11	735	30.59
24,000	707	31.23	722	32.71	737	34.20	—	—
27,000	—	—	—	—	—	—	—	—
30,000	—	—	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 46 — Fan Performance — 50ZA,ZE,ZJ070 Units with Extended Plenum and 50ZB,ZF,ZK070 Units

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
14,000	268	2.64	304	3.32	335	4.02	364	4.76	391	5.55	418	6.39	444	7.27	468	8.20
17,500	316	4.67	348	5.54	376	6.39	402	7.25	426	8.14	449	9.06	472	10.03	493	11.03
21,000	366	7.61	395	8.66	421	9.69	444	10.71	466	11.73	487	12.78	507	13.85	527	14.94
24,500	417	11.61	444	12.87	467	14.09	489	15.28	509	16.47	529	17.66	547	18.86	565	20.08
28,000	470	16.88	493	18.35	515	19.77	536	21.15	555	22.51	573	23.87	590	25.22	607	26.59
30,000	500	20.52	522	22.11	543	23.64	563	25.14	581	26.61	599	28.06	616	29.52	632	30.97

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
14,000	493	9.17	516	10.19	539	11.24	562	12.33	583	13.45	605	14.60	625	15.77	645	16.96
17,500	515	12.07	535	13.14	556	14.26	576	15.42	595	16.61	615	17.84	634	19.09	652	20.39
21,000	546	16.07	564	17.23	583	18.42	600	19.64	618	20.90	635	22.19	653	23.51	669	24.86
24,500	583	21.32	600	22.59	616	23.87	633	25.18	649	26.53	664	27.89	680	29.29	695	30.71
28,000	623	27.96	639	29.35	655	30.75	670	32.18	685	33.63	699	35.09	—	—	—	—
30,000	648	32.43	663	33.90	678	35.38	—	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
14,000	665	18.18	684	19.42	703	20.68	721	21.95
17,500	671	21.70	689	23.05	706	24.42	724	25.82
21,000	686	26.24	703	27.67	719	29.11	735	30.59
24,500	711	32.17	726	33.65	741	35.16	—	—
28,000	—	—	—	—	—	—	—	—
30,000	—	—	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
 3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 47 — Fan Performance — 50ZA,ZB,ZC,ZD,ZE,ZF,ZJ,ZK,ZL,ZM,ZR,ZS075 Units

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
14,000	211	2.35	243	3.06	272	3.80	299	4.59	325	5.43	349	6.30	372	7.21	395	8.15
16,000	232	3.27	261	4.06	288	4.88	313	5.74	337	6.65	360	7.59	381	8.57	402	9.58
18,000	253	4.42	281	5.31	305	6.21	329	7.14	351	8.11	372	9.12	393	10.17	413	11.25
20,000	275	5.83	301	6.82	324	7.81	346	8.82	366	9.86	386	10.94	406	12.05	425	13.20
22,000	298	7.53	321	8.62	343	9.70	364	10.80	383	11.92	402	13.07	420	14.25	438	15.46
24,000	320	9.55	342	10.75	363	11.93	383	13.11	401	14.31	419	15.54	436	16.79	453	18.07
26,000	343	11.91	364	13.22	384	14.50	402	15.78	420	17.07	437	18.37	453	19.70	469	21.05
28,000	367	14.65	386	16.06	405	17.45	422	18.83	439	20.20	455	21.59	471	23.00	486	24.43
30,000	390	17.78	408	19.31	426	20.80	443	22.28	459	23.75	474	25.24	489	26.73	504	28.24

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	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
14,000	416	9.12	437	10.10	457	11.10	476	12.13	495	13.17	513	14.22	531	15.29	548	16.38
16,000	423	10.62	442	11.68	462	12.77	480	13.88	498	15.00	516	16.15	533	17.31	550	18.48
18,000	432	12.36	450	13.50	469	14.66	486	15.84	504	17.05	521	18.27	537	19.53	553	20.78
20,000	443	14.38	460	15.58	478	16.82	495	18.07	511	19.35	527	20.65	543	21.98	559	23.32
22,000	455	16.70	472	17.98	489	19.28	505	20.60	521	21.96	536	23.33	551	24.72	566	26.14
24,000	470	19.38	486	20.72	501	22.08	517	23.48	532	24.89	547	26.34	561	27.80	576	29.29
26,000	485	22.43	500	23.83	515	25.27	530	26.73	544	28.22	559	29.72	573	31.26	586	32.81
28,000	501	25.89	516	27.36	530	28.86	544	30.38	558	31.94	572	33.51	585	35.11	599	36.74
30,000	518	29.76	533	31.32	546	32.89	560	34.48	573	36.10	586	37.74	599	39.41	612	41.11

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Hp	Rpm	Hp	Rpm	Hp	Rpm	Hp
14,000	564	17.47	581	18.58	596	19.71	612	20.84
16,000	566	19.68	582	20.88	597	22.10	613	23.33
18,000	569	22.06	585	23.36	600	24.66	615	25.99
20,000	574	24.68	589	26.06	604	27.45	618	28.85
22,000	581	27.57	596	29.04	610	30.51	624	31.99
24,000	590	30.80	604	32.33	617	33.88	631	35.44
26,000	600	34.39	613	35.99	627	37.61	640	39.24
28,000	612	38.38	624	40.05	637	41.74	650	43.44
30,000	624	42.81	637	44.54	649	46.29	661	48.06

LEGEND

 VAV units only.
Bhp — Brake Horsepower

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

See Physical Data in Tables 1A-1C for motor efficiency.

Table 48 — Fan Performance — 50ZA,ZB,ZC,ZD,ZE,ZF,ZJ,ZK,ZL,ZM,ZR,ZS090 Units

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
16,000	232	3.27	261	4.06	288	4.88	313	5.74	337	6.65	360	7.59	381	8.57	402	9.58
18,000	253	4.42	281	5.31	305	6.21	329	7.14	351	8.11	372	9.12	393	10.17	413	11.25
20,000	275	5.83	301	6.82	324	7.81	346	8.82	366	9.86	386	10.94	406	12.05	425	13.20
22,000	298	7.53	321	8.62	343	9.70	364	10.80	383	11.92	402	13.07	420	14.25	438	15.46
24,000	320	9.55	342	10.75	363	11.93	383	13.11	401	14.31	419	15.54	436	16.79	453	18.07
26,000	343	11.91	364	13.22	384	14.50	402	15.78	420	17.07	437	18.37	453	19.70	469	21.05
28,000	367	14.65	386	16.06	405	17.45	422	18.83	439	20.20	455	21.59	471	23.00	486	24.43
30,000	390	17.78	408	19.31	426	20.80	443	22.28	459	23.75	474	25.24	489	26.73	504	28.24
32,000	414	21.36	431	22.99	448	24.59	464	26.17	479	27.75	494	29.32	508	30.90	523	32.49
34,000	437	25.39	454	27.13	470	28.84	485	30.53	500	32.20	514	33.87	528	35.55	542	37.23

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
16,000	423	10.62	442	11.68	462	12.77	480	13.88	498	15.00	516	16.15	533	17.31	550	18.48
18,000	432	12.36	450	13.50	469	14.66	486	15.84	504	17.05	521	18.27	537	19.53	553	20.78
20,000	443	14.38	460	15.58	478	16.82	495	18.07	511	19.35	527	20.65	543	21.98	559	23.32
22,000	455	16.70	472	17.98	489	19.28	505	20.60	521	21.96	536	23.33	551	24.72	566	26.14
24,000	470	19.38	486	20.72	501	22.08	517	23.48	532	24.89	547	26.34	561	27.80	576	29.29
26,000	485	22.43	500	23.83	515	25.27	530	26.73	544	28.22	559	29.72	573	31.26	586	32.81
28,000	501	25.89	516	27.36	530	28.86	544	30.38	558	31.94	572	33.51	585	35.11	599	36.74
30,000	518	29.76	533	31.32	546	32.89	560	34.48	573	36.10	586	37.74	599	39.41	612	41.11
32,000	536	34.11	550	35.73	563	37.38	576	39.04	589	40.73	601	42.45	614	44.18	626	45.94
34,000	555	38.92	568	40.63	581	42.36	593	44.10	605	45.87	618	47.64	630	49.45	641	51.27

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
16,000	566	19.68	582	20.88	597	22.10	613	23.33
18,000	569	22.06	585	23.36	600	24.66	615	25.99
20,000	574	24.68	589	26.06	604	27.45	618	28.85
22,000	581	27.57	596	29.04	610	30.51	624	31.99
24,000	590	30.80	604	32.33	617	33.88	631	35.44
26,000	600	34.39	613	35.99	627	37.61	640	39.24
28,000	612	38.38	624	40.05	637	41.74	650	43.44
30,000	624	42.81	637	44.54	649	46.29	661	48.06
32,000	638	47.72	650	49.51	662	51.33	674	53.17
34,000	653	53.12	665	54.98	676	56.87	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 49 — Fan Performance — 50ZA,ZB,ZC,ZD,ZE,ZF,ZJ,ZK,ZL,ZM,ZR,ZS105 Units

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
20,000	275	5.83	301	6.82	324	7.81	346	8.82	366	9.86	386	10.94	406	12.05	425	13.20
22,000	298	7.53	321	8.62	343	9.70	364	10.80	383	11.92	402	13.07	420	14.25	438	15.46
24,000	320	9.55	342	10.75	363	11.93	383	13.11	401	14.31	419	15.54	436	16.79	453	18.07
26,000	343	11.91	364	13.22	384	14.50	402	15.78	420	17.07	437	18.37	453	19.70	469	21.05
28,000	367	14.65	386	16.06	405	17.45	422	18.83	439	20.20	455	21.59	471	23.00	486	24.43
30,000	390	17.78	408	19.31	426	20.80	443	22.28	459	23.75	474	25.24	489	26.73	504	28.24
32,000	414	21.36	431	22.99	448	24.59	464	26.17	479	27.75	494	29.32	508	30.90	523	32.49
34,000	437	25.39	454	27.13	470	28.84	485	30.53	500	32.20	514	33.87	528	35.55	542	37.23
36,000	461	29.92	477	31.77	492	33.58	506	35.38	521	37.16	534	38.93	548	40.69	561	42.47
38,000	485	34.96	500	36.91	514	38.85	528	40.74	542	42.63	555	44.50	568	46.36	581	48.23
40,000	509	40.54	523	42.61	537	44.65	550	46.66	563	48.64	576	50.62	589	52.59	601	54.56

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
20,000	443	14.38	460	15.58	478	16.82	495	18.07	511	19.35	527	20.65	543	21.98	559	23.32
22,000	455	16.70	472	17.98	489	19.28	505	20.60	521	21.96	536	23.33	551	24.72	566	26.14
24,000	470	19.38	486	20.72	501	22.08	517	23.48	532	24.89	547	26.34	561	27.80	576	29.29
26,000	485	22.43	500	23.83	515	25.27	530	26.73	544	28.22	559	29.72	573	31.26	586	32.81
28,000	501	25.89	516	27.36	530	28.86	544	30.38	558	31.94	572	33.51	585	35.11	599	36.74
30,000	518	29.76	533	31.32	546	32.89	560	34.48	573	36.10	586	37.74	599	39.41	612	41.11
32,000	536	34.11	550	35.73	563	37.38	576	39.04	589	40.73	601	42.45	614	44.18	626	45.94
34,000	555	38.92	568	40.63	581	42.36	593	44.10	605	45.87	618	47.64	630	49.45	641	51.27
36,000	574	44.25	586	46.03	599	47.85	611	49.67	623	51.51	634	53.37	646	55.25	657	57.14
38,000	593	50.10	605	51.98	617	53.87	629	55.77	640	57.71	652	59.63	663	61.59	674	63.54
40,000	613	56.52	625	58.49	636	60.48	648	62.46	659	64.47	—	—	—	—	—	—

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
20,000	574	24.68	589	26.06	604	27.45	618	28.86
22,000	581	27.57	596	29.04	610	30.51	624	31.99
24,000	590	30.80	604	32.33	617	33.88	631	35.44
26,000	600	34.39	613	35.99	627	37.61	640	39.24
28,000	612	38.38	624	40.05	637	41.74	650	43.44
30,000	624	42.81	637	44.54	649	46.29	661	48.06
32,000	638	47.72	650	49.51	662	51.33	674	53.17
34,000	653	53.12	665	54.98	676	56.87	—	—
36,000	669	59.06	680	60.98	—	—	—	—
38,000	—	—	—	—	—	—	—	—
40,000	—	—	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

See Physical Data in Tables 1A-1C for motor efficiency.

Table 50 — Fan Performance — 50ZT,ZV,ZW,ZX,ZY,ZZ075 Units

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
15,000	235	3.10	264	3.86	291	4.66	317	5.51	341	6.40	364	7.32	386	8.28	407	9.26
16,000	247	3.65	275	4.45	300	5.30	325	6.18	348	7.10	370	8.06	392	9.06	413	10.09
18,000	270	4.97	296	5.86	320	6.78	342	7.74	364	8.74	385	9.77	405	10.83	424	11.93
20,000	295	6.58	318	7.57	341	8.58	362	9.61	382	10.68	401	11.79	420	12.93	438	14.09
22,000	319	8.53	341	9.62	362	10.71	382	11.83	401	12.98	419	14.16	437	15.37	454	16.61
24,000	344	10.85	365	12.03	384	13.22	403	14.43	421	15.65	438	16.91	455	18.19	471	19.51
26,000	370	13.58	389	14.86	407	16.13	425	17.43	441	18.74	458	20.08	474	21.44	489	22.83
28,000	395	16.74	413	18.12	430	19.49	447	20.88	463	22.27	479	23.70	494	25.14	509	26.61
30,000	421	20.36	438	21.84	454	23.32	470	24.80	485	26.29	500	27.79	514	29.32	528	30.86

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
15,000	428	10.28	448	11.32	467	12.37	486	13.44	504	14.54	522	15.65	539	16.76	556	17.91
16,000	433	11.14	452	12.21	471	13.31	489	14.43	507	15.56	524	16.72	541	17.89	558	19.07
18,000	443	13.06	462	14.21	480	15.39	497	16.59	514	17.81	531	19.05	547	20.30	563	21.58
20,000	456	15.29	474	16.52	491	17.77	507	19.05	524	20.35	540	21.67	555	23.00	571	24.37
22,000	471	17.88	488	19.18	504	20.50	520	21.85	535	23.22	550	24.62	565	26.04	580	27.48
24,000	487	20.85	503	22.22	518	23.62	533	25.04	548	26.48	563	27.95	577	29.44	591	30.95
26,000	505	24.25	520	25.69	534	27.15	549	28.65	563	30.17	577	31.71	590	33.27	604	34.85
28,000	523	28.10	537	29.61	551	31.15	565	32.71	579	34.31	592	35.91	605	37.54	618	39.20
30,000	542	32.43	556	34.03	569	35.63	582	37.27	595	38.94	608	40.61	621	42.31	633	44.05

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
15,000	572	19.06	588	20.22	603	21.40	619	22.58
16,000	574	20.27	589	21.48	605	22.70	620	23.93
18,000	579	22.87	594	24.17	609	25.49	624	26.82
20,000	586	25.74	600	27.13	615	28.53	629	29.95
22,000	594	28.92	609	30.39	623	31.88	636	33.39
24,000	605	32.49	619	34.04	632	35.60	645	37.18
26,000	617	36.45	630	38.08	643	39.72	656	41.38
28,000	631	40.88	643	42.57	656	44.29	668	46.03
30,000	646	45.80	658	47.56	670	49.35	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 51 — Fan Performance — 50ZT,ZV,ZW,ZX,ZY,ZZ090 Units

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
17,000	258	4.27	285	5.12	310	6.00	333	6.92	356	7.88	377	8.88	398	9.91	418	10.97
18,000	270	4.97	296	5.86	320	6.78	342	7.74	364	8.74	385	9.77	405	10.83	424	11.93
20,000	295	6.58	318	7.57	341	8.58	362	9.61	382	10.68	401	11.79	420	12.93	438	14.09
22,000	319	8.53	341	9.62	362	10.71	382	11.83	401	12.98	419	14.16	437	15.37	454	16.61
24,000	344	10.85	365	12.03	384	13.22	403	14.43	421	15.65	438	16.91	455	18.19	471	19.51
26,000	370	13.58	389	14.86	407	16.13	425	17.43	441	18.74	458	20.08	474	21.44	489	22.83
28,000	395	16.74	413	18.12	430	19.49	447	20.88	463	22.27	479	23.70	494	25.14	509	26.61
30,000	421	20.36	438	21.84	454	23.32	470	24.80	485	26.29	500	27.79	514	29.32	528	30.86
32,000	447	24.49	463	26.08	478	27.65	493	29.22	508	30.80	522	32.40	536	34.01	549	35.64
34,000	472	29.16	488	30.84	502	32.51	517	34.19	531	35.87	544	37.55	557	39.25	570	40.96

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
17,000	438	12.06	457	13.17	475	14.31	493	15.47	510	16.65	527	17.85	544	19.07	560	20.29
18,000	443	13.05	462	14.21	480	15.39	497	16.59	514	17.81	531	19.05	547	20.30	563	21.58
20,000	456	15.29	474	16.52	491	17.77	507	19.05	524	20.35	540	21.67	555	23.00	571	24.37
22,000	471	17.88	488	19.18	504	20.50	520	21.85	535	23.22	550	24.62	565	26.04	580	27.48
24,000	487	20.85	503	22.22	518	23.62	533	25.04	548	26.48	563	27.95	577	29.44	591	30.95
26,000	505	24.25	520	25.69	534	27.15	549	28.65	563	30.17	577	31.71	590	33.27	604	34.85
28,000	523	28.10	537	29.61	551	31.15	565	32.71	579	34.31	592	35.91	605	37.54	618	39.20
30,000	542	32.43	556	34.03	569	35.63	582	37.27	595	38.94	608	40.61	621	42.31	633	44.05
32,000	562	37.29	575	38.95	588	40.64	601	42.36	613	44.09	626	45.85	638	47.63	650	49.42
34,000	583	42.70	596	44.45	608	46.22	620	48.00	632	49.80	644	51.63	655	53.49	667	55.36

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
17,000	576	21.54	592	22.80	607	24.07	622	25.35
18,000	579	22.87	594	24.17	609	25.49	624	26.82
20,000	586	25.74	600	27.13	615	28.53	629	29.95
22,000	594	28.92	609	30.39	623	31.88	636	33.39
24,000	605	32.49	619	34.04	632	35.60	645	37.18
26,000	617	36.45	630	38.08	643	39.72	656	41.38
28,000	631	40.88	643	42.57	656	44.29	668	46.03
30,000	646	45.80	658	47.56	670	49.35	—	—
32,000	661	51.23	673	53.07	—	—	—	—
34,000	678	57.25	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 52 — Fan Performance — 50ZT,ZV,ZW,ZX,ZY,ZZ105 Units

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
20,000	295	6.58	318	7.57	341	8.58	362	9.61	382	10.68	401	11.79	420	12.93	438	14.09
22,000	319	8.53	341	9.62	362	10.71	382	11.83	401	12.98	419	14.16	437	15.37	454	16.61
24,000	344	10.85	365	12.03	384	13.22	403	14.43	421	15.65	438	16.91	455	18.19	471	19.51
26,000	370	13.58	389	14.86	407	16.13	425	17.43	441	18.74	458	20.08	474	21.44	489	22.83
28,000	395	16.74	413	18.12	430	19.49	447	20.88	463	22.27	479	23.70	494	25.14	509	26.61
30,000	421	20.36	438	21.84	454	23.32	470	24.80	485	26.29	500	27.79	514	29.32	528	30.86
32,000	447	24.49	463	26.08	478	27.65	493	29.22	508	30.80	522	32.40	536	34.01	549	35.64
34,000	472	29.16	488	30.84	502	32.51	517	34.19	531	35.87	544	37.55	557	39.25	570	40.96
36,000	498	34.39	513	36.19	527	37.96	541	39.72	554	41.50	567	43.28	580	45.07	592	46.86
38,000	525	40.24	538	42.13	552	44.01	565	45.87	577	47.73	590	49.61	602	51.49	614	53.39
40,000	551	46.72	564	48.70	577	50.68	589	52.65	601	54.61	613	56.59	625	58.55	637	60.55

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
20,000	456	15.29	474	16.52	491	17.77	507	19.05	524	20.35	540	21.67	555	23.00	571	24.37
22,000	471	17.88	488	19.18	504	20.50	520	21.85	535	23.22	550	24.62	565	26.04	580	27.48
24,000	487	20.85	503	22.22	518	23.62	533	25.04	548	26.48	563	27.95	577	29.44	591	30.95
26,000	505	24.25	520	25.69	534	27.15	549	28.65	563	30.17	577	31.71	590	33.27	604	34.85
28,000	523	28.10	537	29.61	551	31.15	565	32.71	579	34.31	592	35.91	605	37.54	618	39.20
30,000	542	32.43	556	34.03	569	35.63	582	37.27	595	38.94	608	40.61	621	42.31	633	44.05
32,000	562	37.29	575	38.95	588	40.64	601	42.36	613	44.09	626	45.85	638	47.63	650	49.42
34,000	583	42.70	596	44.45	608	46.22	620	48.00	632	49.80	644	51.63	655	53.49	667	55.36
36,000	604	48.68	616	50.52	628	52.36	640	54.24	651	56.12	663	58.02	674	59.95	—	—
38,000	626	55.28	637	57.20	649	59.13	660	61.08	671	63.04	—	—	—	—	—	—
40,000	648	62.53	659	64.54	—	—	—	—	—	—	—	—	—	—	—	—

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
20,000	586	25.74	600	27.13	615	28.53	629	29.95
22,000	594	28.92	609	30.39	623	31.88	636	33.39
24,000	605	32.49	619	34.04	632	35.60	645	37.18
26,000	617	36.45	630	38.08	643	39.72	656	41.38
28,000	631	40.88	643	42.57	656	44.29	668	46.03
30,000	646	45.80	658	47.56	670	49.35	—	—
32,000	661	51.23	673	53.07	—	—	—	—
34,000	678	57.25	—	—	—	—	—	—
36,000	—	—	—	—	—	—	—	—
38,000	—	—	—	—	—	—	—	—
40,000	—	—	—	—	—	—	—	—

LEGEND

 VAV units only.
Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils and clean 2-in. filters.

2. See Component Pressure Drop data in Table 56 before using Fan Performance tables.
3. Conversion — Bhp to kW:

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

See Physical Data in Tables 1A-1C for motor efficiency.

Table 53 — Fan Performance — Power Exhaust Fans

SIZES 030-050

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	0.2		0.4		0.6		0.8	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
6,000	700	1.5	880	2.3	1050	3.5	1220	5.4
8,000	720	2.6	920	3.4	1100	3.8	1250	6.3
10,000	840	4.3	950	4.9	1120	6.4	1280	7.8
12,000	970	7.0	1040	7.6	1160	8.6	1300	10.0
14,000	1090	10.8	1160	11.6	1240	12.3	—	—
16,000	1220	16.3	1280	17.2	—	—	—	—

LEGEND

Bhp — Brake Horsepower

Table 54 — Fan Performance — Power Exhaust*

SIZES 055-105

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
10,000	415	1.5	475	1.9	525	2.2	575	2.8	625	3.3	675	4.0	725	4.7	770	5.5	810	6.2	850	6.7
12,000	480	2.6	525	3.0	570	3.5	610	4.0	660	4.6	700	5.3	740	6.0	780	6.7	820	7.4	860	8.1
14,000	540	3.9	580	4.5	620	4.8	660	5.6	700	6.4	730	7.0	770	7.6	810	8.5	840	9.0	880	10.0
16,000	610	5.7	640	6.3	675	7.0	710	7.6	750	8.5	780	9.2	810	9.7	840	10.5	875	11.3	910	12.3
18,000	680	8.3	720	9.2	740	9.7	770	10.2	800	11.0	830	11.6	860	12.3	880	13.3	—	—	—	—
20,000	750	11.4	780	12.2	810	12.7	830	13.4	860	14.0	880	14.7	920	15.6	—	—	—	—	—	—
22,000	820	14.6	850	15.5	870	16.5	900	17.2	925	17.6	—	—	—	—	—	—	—	—	—	—
24,000	890	18.8	915	19.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

*Power exhaust available on vertical supply and discharge units only.

Table 55 — Fan Performance — Return/Exhaust Fan (50ZC,ZD,ZL,ZM,ZR,ZS075-105 Units)

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
14,000	594	3.61	594	3.61	617	4.02	646	4.58	674	5.16	700	5.75	725	6.36	749	6.99	772	7.62	795	8.25
16,000	619	4.09	652	4.76	681	5.40	708	6.02	733	6.65	757	7.29	781	7.94	803	8.61	825	9.30	847	9.99
18,000	687	5.57	718	6.35	746	7.07	771	7.76	795	8.45	817	9.14	839	9.85	860	10.56	881	11.20	901	11.96
20,000	756	7.37	786	8.25	812	9.06	836	9.84	858	10.59	879	11.25	900	12.03	920	12.82	939	13.62	958	14.43
22,000	825	9.50	853	10.50	878	11.31	901	12.20	923	13.06	943	13.90	962	14.75	981	15.60	1000	16.46	1018	17.33
24,000	895	11.94	922	13.08	945	14.12	967	15.10	988	16.05	1007	16.99	1026	17.91	1044	18.83	1061	19.76	1079	20.69
26,000	965	14.94	990	16.21	1013	17.36	1034	18.46	1054	19.51	1073	20.53	1091	21.54	1108	22.54	1125	23.54	1141	24.54
28,000	1035	18.43	1059	19.81	1081	21.09	1101	22.29	1120	23.45	1138	24.57	1156	25.67	1172	26.76	1189	27.83	1204	28.91
30,000	1105	22.42	1128	23.93	1149	25.33	1169	26.65	1187	27.92	1205	29.14	1222	30.34	1238	31.51	1253	32.67	1269	33.83
32,000	1176	26.96	1198	28.59	1218	30.11	1237	31.55	1255	32.93	1272	34.26	1288	35.56	1304	36.83	1319	38.08	1333	39.32
34,000	1246	32.09	1267	33.83	1287	35.47	1305	37.03	1322	38.53	1339	39.97	1355	41.38	1370	42.75	1385	44.10	1399	45.43
36,000	1317	37.83	1337	39.69	1356	41.46	1374	43.14	1391	44.75	1407	46.31	—	—	—	—	—	—	—	—
38,000	1388	44.22	1407	46.21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
40,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)																			
	2.2		2.4		2.6		2.8		3.0		3.2		3.4		3.6		3.8		4.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
14,000	816	8.89	836	9.52	856	10.15	874	10.67	892	11.31	910	11.94	926	12.57	942	13.19	958	13.80	973	14.42
16,000	867	10.59	887	11.31	907	12.05	926	12.78	944	13.52	961	14.25	978	14.98	995	15.71	1011	16.44	1026	17.16
18,000	921	12.74	940	13.52	959	14.33	977	15.13	995	15.95	1012	16.77	1029	17.59	1046	18.42	1062	19.24	1078	20.07
20,000	977	15.25	995	16.10	1013	16.96	1031	17.82	1048	18.70	1065	19.59	1081	20.49	1097	21.39	1113	22.30	1129	23.21
22,000	1035	18.21	1052	19.10	1069	20.01	1086	20.93	1103	21.86	1119	22.81	1135	23.76	1150	24.73	1166	25.71	1181	26.69
24,000	1095	21.62	1112	22.58	1128	23.54	1144	24.51	1159	25.49	1175	26.49	1190	27.50	1205	28.52	1220	29.55	1234	30.58
26,000	1157	25.54	1173	26.55	1188	27.57	1203	28.59	1218	29.64	1233	30.68	1247	31.74	1262	32.81	1276	33.89	1290	34.98
28,000	1220	29.98	1235	31.06	1249	32.14	1264	33.23	1278	34.32	1292	35.42	1306	36.53	1320	37.65	1334	38.78	1347	39.93
30,000	1283	34.98	1298	36.13	1312	37.28	1326	38.42	1340	39.58	1353	40.74	1367	41.92	1380	43.09	1393	44.27	1406	45.46
32,000	1348	40.55	1362	41.78	1375	43.00	1389	44.22	1402	45.45	1415	46.67	—	—	—	—	—	—	—	—
34,000	1413	46.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
36,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
38,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
40,000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTE: The 50ZC,ZD,ZL,ZM,ZR,ZS units come standard with economizer and exhaust/return power exhaust.

Table 56 — Component Pressure Drops (in. wg)
SIZES 030-050

COMPONENT	CFM							
	6,000	8,000	10,000	12,000	14,000	16,000	18,000	20,000
ECONOMIZER	0.06	0.09	0.12	0.16	0.21	0.25	0.29	0.35
INLET GUIDE VANES*	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.10
FILTERS								
Pleated (2-in.)	0.01	0.01	0.01	0.02	0.04	0.04	0.03	0.02
Bags With Prefilter†	0.36	0.38	0.41	0.51	0.64	0.77	0.91	1.01
ELECTRIC HEAT**								
36 kW	0.03	0.04	0.07	0.11	0.17	0.25	0.35	0.47
72 kW	0.03	0.06	0.12	0.18	0.25	0.35	0.46	0.64
108 kW	0.09	0.12	0.18	0.26	0.34	0.45	0.59	0.78
POWER EXHAUST**	0.07	0.08	0.09	0.13	0.18	0.24	0.32	0.41

SIZES 055-070

COMPONENT	CFM										
	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000	26,000	28,000	30,000
ECONOMIZER	0.05	0.07	0.08	0.10	0.12	0.14	0.16	0.19	0.21	0.24	0.26
INLET GUIDE VANES*	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.10	0.11	0.13	0.15
FILTERS											
Pleated (2-in.)	0.00	0.00	0.00	0.01	0.02	0.03	0.03	0.04	0.04	0.05	0.05
Bags With Prefilters†	0.45	0.57	0.68	0.80	0.94	1.07	1.23	1.38	—	—	—
ELECTRIC HEAT**											
36 kW	0.04	0.05	0.07	0.09	0.12	0.15	0.18	0.21	0.24	0.28	0.33
72 kW	0.05	0.07	0.10	0.13	0.17	0.20	0.24	0.29	0.34	0.39	0.46
108 kW	0.07	0.09	0.13	0.17	0.22	0.27	0.32	0.38	0.44	0.51	0.59
POWER EXHAUST**	0.16	0.22	0.29	0.37	0.46	0.55	0.65	0.77	0.87	0.99	1.12

*Available on variable air volume units only.

†Bag filter cfm limit is 25,000.

**Available on vertical supply and discharge units only.

SIZES 075-105

COMPONENT	CFM											
	15,000	18,000	20,000	22,000	24,000	26,000	28,000	30,000	34,000	36,000	38,000	40,000
ECONOMIZER*	0.10	0.12	0.14	0.16	0.19	0.21	0.23	0.26	0.31	0.34	0.37	0.40
INLET GUIDE VANES†	N/A											
POWER EXHAUST**	0.08	0.13	0.17	0.21	0.25	0.29	0.33	0.38	0.46	0.51	0.55	0.60
65% PLEATED FILTER	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.19	0.20	0.20
108 kW ELECTRIC HEAT	0.05	0.07	0.09	0.11	0.13	0.15	0.17	0.20	0.26	0.29	0.32	0.36
216 kW ELECTRIC HEAT	0.08	0.12	0.14	0.17	0.20	0.24	0.28	0.32	0.41	0.46	0.51	0.57
HIGH-CAPACITY COIL 075 UNIT	0.08	0.11	0.13	0.15	0.18	0.21	0.23	0.26	0.33	0.36	0.40	0.43
HIGH-CAPACITY COIL 090, 105 UNITS	0.01	0.02	0.03	0.04	0.05	0.07	0.08	0.10	0.14	0.16	0.19	0.21

*The 50ZT,ZV,ZW,ZX,ZY,ZZ units come standard with economizer and high-capacity power exhaust.

†Not available with airfoil supply fan.

**Available on vertical return and discharge units only.

Table 57 — Air Quantity Limits (cfm)

UNIT		MINIMUM	MAXIMUM
50ZA,ZB,ZC,ZD, ZT,ZX	030	9,000	15,000
	035	10,500	17,500
	040	12,000	20,000
	050	13,500	20,000
	055	15,000	25,000
	060	18,000	30,000
	070	21,000	30,000
	075	21,000	30,000
	090	26,000	34,000
	105	30,000	40,000
50ZE,ZF,ZJ,ZK, ZL,ZM,ZR,ZS,ZV, ZW,ZY,ZZ	030	6,000	15,000
	035	7,000	17,500
	040	8,000	20,000
	050	9,000	20,000
	055	10,000	25,000
	060	12,000	30,000
	070	14,000	30,000
	075	15,000	30,000
	090	17,000	34,000
	105	20,000	40,000

Manual Outdoor-Air Inlet Adjustments

MANUAL OUTDOOR-AIR DAMPER (Units Without Economizer Option) — All units except those equipped with a factory-installed economizer have a manual outdoor-air damper to provide ventilation air. This damper can be preset to admit up to 25% outdoor air into the return-air compartment. The manual outside air dampers are located behind each outside air hood. On sizes 030-050, there is one damper on each side of the unit. On sizes 055-105, there are two dampers on the end of the unit. To adjust, loosen the blade limiter screws as shown in Fig. 109 and move the damper to the desired position. Then retighten the blade limiter screws to secure the damper. See Fig. 109. (To make this adjustment, it is necessary to remove the screens covering the hood opening and make adjustments from inside the hood.)

Economizer Settings

NOTE: The following text applies to CV units only. For economizer operation on VAV and PIC units, refer to the appropriate Controls and Troubleshooting literature.

The economizer system consists of a combination actuator/economizer control, an enthalpy sensor, and a mixed-air temperature sensor. The actuator/economizer control is located in the return-air section and is accessed by opening the access panel labeled FILTER SECTION.

COMPONENT	LOCATION
Actuator Control	Filter Section
Mixed-Air Thermistor	On Filter Rack
Enthalpy Sensor	Behind filters in the Economizer Hood

ENTHALPY SENSOR (See Fig. 110) — This sensor is located behind the filters in the end economizer hood (the upper hood on sizes 055-105). See Fig. 111.

For maximum benefit of outdoor air, set enthalpy sensor control to the A setting. At this setting, when the relative humidity is 50%, and the outdoor air is below 74 F, the sensor's relay contacts will be closed. See Fig. 112 and 113.

NOTE: Enthalpy control setting dial is on the economizer motor.

MIXED-AIR THERMISTOR (MAT) — This control set point adjustment is on the top of the economizer motor. This motor is located in the return-air section, and is accessed by opening the access panel marked FILTER SECTION. See Fig. 114. Set MAT set point adjustment dial to the desired setting. The factory setting is 55 F $\pm$ 5° F; range is 40 to 90 F. The MAT is located on the filter rack.

DAMPER VENT POSITION — The position setting adjustment is located on the cover of the economizer motor. See Fig. 114. Adjust by setting the fan switch at ON position (continuous fan operation), and setting the system selector switch to OFF position. Then turn adjustment screw slowly until the dampers assume the desired vent position. Do not manually operate the damper motor; damage to the motor may result.

ECONOMIZER DAMPER LINKAGE ADJUSTMENT — When replacing economizer damper motors, or if the linkage has come loose, it is critical that the linkages be adjusted correctly. They are sensitive, and incorrect adjustment can cause the motor to stall.

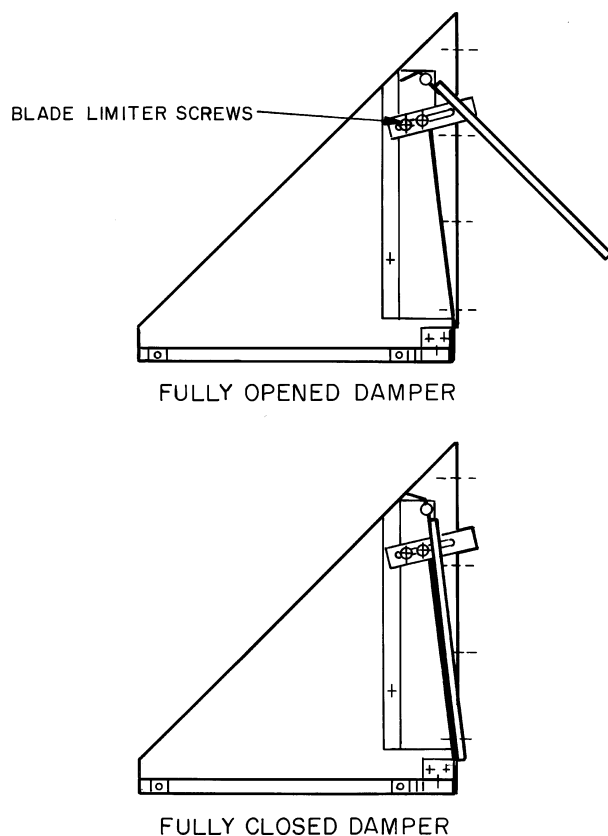


Fig. 109 — Outdoor-Air Damper Adjustments (Inside of Hood Shown)

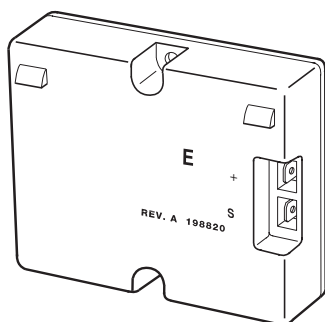


Fig. 110 — Enthalpy Sensor

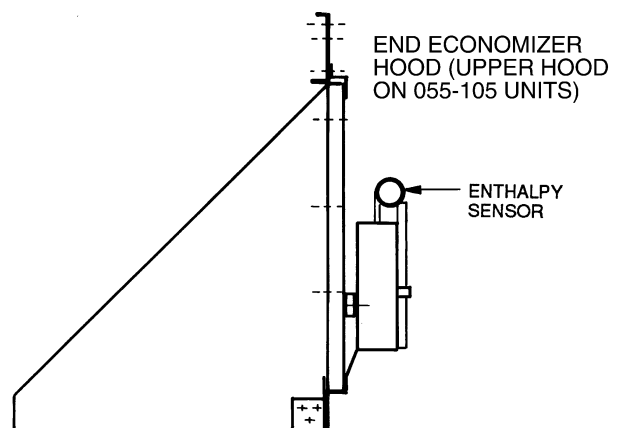


Fig. 111 — Enthalpy Sensor Location

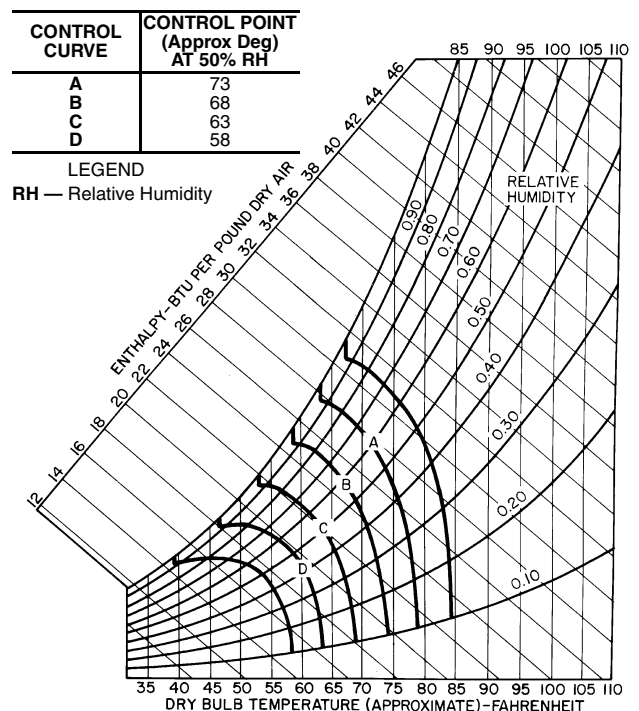
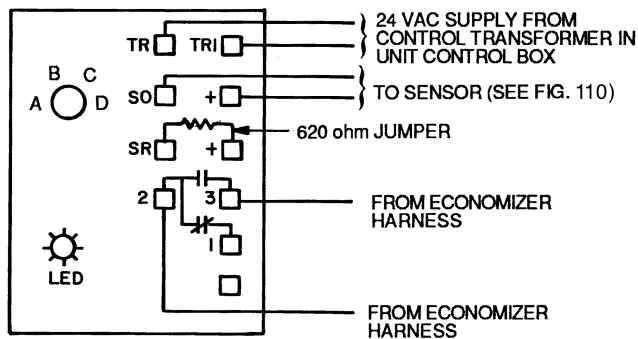


Fig. 112 — Psychrometric Chart for Enthalpy Control



NOTES:

1. Switches shown in high enthalpy state. Terminals 2 and 3 close on enthalpy decrease.
2. When standard economizer is used with accessory differential enthalpy sensor, set enthalpy control to "D" setting.

Fig. 113 — Wiring Connections for Solid-State Enthalpy Sensor (HH57AC077)

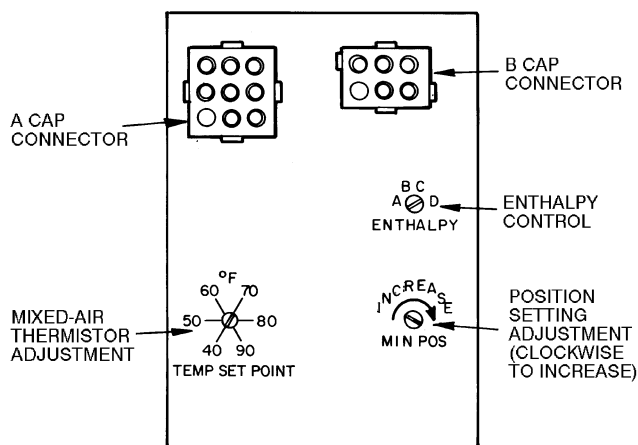


Fig. 114 — Mixed-Air Thermistor and Economizer Position Setting Adjustments (Top of Economizer Motor)

START-UP

For 50ZA,ZB,ZC,ZD,ZT,ZX (constant volume) units, complete the Initial Check and Start-Up sections in this book.

For 50ZE,ZF,ZR,ZS,ZV,ZY (variable air volume) units, refer to the separate Controls and Troubleshooting provided with the unit for start-up and controls information.

For 50ZJ,ZK,ZL,ZM,ZW,ZZ (PIC) units, refer to the separate Controls and Troubleshooting provided with the unit for start-up and controls information.

Initial Check (Constant Volume Units)

IMPORTANT: Do not attempt to start unit, even momentarily, until all items on the Start-Up Checklist and the following steps have been completed

1. Verify unit has been installed per the Installation section of this literature.
2. Certify that all auxiliary components (thermostats, sensors, controls, etc.) have been installed and wired to the control boxes per these instructions and the unit wiring label diagrams.

3. Verify that static pressure hoses (if applicable) are properly attached, routed, and free from pinches or crimps that may affect proper control operation.
4. Set any control configurations that are required (field-installed accessories, etc.).
5. Enter unit set points (if applicable).
6. Enter occupancy schedules (if applicable).
7. Verify that control time periods programmed meet current requirements.
8. Check all electrical connections to be sure they are tight.

General

1. Close the control circuit breaker (CCB), which will energize the control circuit and the crankcase heaters.
2. Complete Pre-Start-Up section items and Start-Up Checklist.

Operating Sequences — Base unit operating sequences are presented below. Refer to unit Controls and Troubleshooting literature for details on VAV and PIC controls operation.

COOLING, UNITS WITHOUT ECONOMIZER — Unit power ON, system selector switch set at COOL or AUTO., fan switch at AUTO., thermostat at setting below room temperature.

Y1 on the thermostat subbase closes, energizing indoor fan and return fan (if equipped) and energizing compressor no. 1 as first stage of cooling. If cooling load cannot be satisfied with only first-stage cooling, Y2 on the thermostat will close energizing compressor no. 2.

Size 030 and 035 Units — Condenser fan no. 1 is energized with compressor no. 1. The no. 1 fan runs continuously while the unit is in mechanical cooling. The no. 2 fan is staged for head pressure control.

Check cooling effects at a thermostat setting below room temperature. Reset thermostat at a setting above room temperature. Compressors will shut off.

Size 040 and 050 Units — Condenser fan no. 1 is energized with compressor no. 1. Condenser fan no. 3 is energized with compressor no. 2. The no. 2 fan is staged for head pressure control.

Check cooling effects at a setting below room temperature. Reset thermostat at a setting above room temperature. Compressors will shut off.

Size 055-075 — Condenser fan no. 1 is energized with compressor no. 1. Condenser fan no. 2 (and no. 4 on size 070,075) is energized with compressor no. 2. Condenser fans 3 and 4 (sizes 055 and 060) or 3 and 5 (size 070,075) are staged for head pressure control.

Check cooling effects at a setting below room temperature. Reset thermostat at a setting above room temperature. Compressor and indoor fan will shut off.

Sizes 090 and 105 — Condenser fans 1 and 3 are energized with circuit 1. Condenser fans 2 and 4 are energized with circuit 2. Condenser fans 5 and 6 are staged for head pressure control.

Check cooling effects at a setting below room temperature. Reset thermostat at a setting above room temperature. Compressor and indoor fan will shut off.

HEATING, UNITS WITHOUT ECONOMIZER — Unit power ON, system selector switch at HEAT, fan switch at AUTO.; thermostat at setting above room temperature.

When W1 on the thermostat closes, the first stage of electric heat, indoor fan and return fan (if equipped) are energized. On a further drop in room temperature, W2 on the thermostat closes, energizing the second stage of electric heat.

Reset thermostat to a setting below room temperature. Unit should shut off.

COOLING, UNITS WITH ECONOMIZER — With subbase switch set at COOL and fan switch set at AUTO., indoor fan and return fan (if equipped) are energized when Y1 on thermostat closes. If enthalpy is “good” (below setting on enthalpy switch), the economizer outside air dampers will modulate open to satisfy the cooling requirement. If outside air alone will not meet the cooling requirements, Y2 on the thermostat will close, energizing compressor no. 1 to work in conjunction with the modulating economizer to meet the cooling requirement. While the unit is operating using outside air, compressor no. 2 cannot be energized.

If enthalpy is “not good” (above setting on enthalpy switch), the economizer outside air dampers move to the minimum (ventilation) position, and condenser fans cycle on and off as described in Cooling, Units Without Economizer.

NOTE: If fan switch is ON and the room thermostat is satisfied, the outside air dampers move to the minimum position.

HEATING, UNITS WITH ECONOMIZER — Operation is the same as described in Heating, Units Without Economizer, except that the outside air dampers move from closed to the minimum ventilation position on a call for heating.

VENTILATION-AIR CIRCULATION (Continuous Fan) — Turn unit power on. Set system selector switch at OFF, HEAT, or COOL position, and set fan switch at ON position.

Evaporator-fan contactor is energized through the switch on the thermostat and the evaporator fan runs continuously. The damper moves to the minimum position.

AUTOMATIC CHANGEOVER USING AUTOMATIC CHANGEOVER THERMOSTAT — Turn unit power on. Set system selector switch at AUTO. position.

When the temperature of the conditioned space rises to the cooling selector lever setting, unit automatically switches to Cooling mode. When the temperature of the conditioned space falls to the heating selector switch setting, unit automatically changes to Heating mode. The thermostat is interlocked so that cooling and heating systems do not operate at the same time. There is a deadband between Heating and Cooling modes.

POWER EXHAUST — The power exhaust assembly consists of two parallel and independent belt-drive forward curve fans. The fans, motors, and drives are located over the return air opening of the unit, in a plenum beneath the outside air intake plenum. The fans discharge horizontally out the back of the unit through individual barometric backdraft dampers with hoods. Operation is interlocked with economizer operation.

NON-MODULATING POWER EXHAUST (CV Units Only) — Operation of the non-modulating power exhaust is 2-stage, dictated by economizer position.

As the economizer actuator opens past 35% open, auxiliary switch DMS1 (in the economizer actuator) closes, energizing exhaust fan contactor PEC1. Fan motor no. 1 starts and runs. The power exhaust operates at 50% of available exhaust airflow.

As the economizer actuator opens further (to approximately 75% open), auxiliary switch DMS2 closes, energizing fan contactor PEC2. Fan motor no. 2 starts and runs. The power exhaust operates at 100% of available airflow.

DMS2 opens as damper closes below 65% open.

DMS1 opens as damper closes below 25% open.

MODULATING POWER EXHAUST (CV Units Only) — Fan no. 1 is equipped with a variable position discharge damper located in the outlet of the fan housing. This damper is controlled by an actuator (PEDM), based on signals from the building pressure differential pressure switch (DPS). Available range on the DPS is ± 0.50 in. wg, which is adjustable. Building pressure is sensed by a pick-up (field-supplied and -installed) located in the occupied space.

Operation of the Modulating Power Exhaust is a combination modulating/staged control, with Fan no. 1 providing modulating control from 0 to 100%, and Fan no. 2 being staged On/Off according to damper position on fan no.1.

As the economizer actuator opens past 35% open, auxiliary switch DMS1 closes, energizing fan contactor PEC1. Fan motor no. 1 starts and runs.

The capacity of fan no. 1 is controlled by the position of the outlet damper. As building pressure increases above set point, the DPS will close its contact and drive the power exhaust damper motor (PEDM) open until set point is achieved. The DPS then opens its control contacts and PEDM maintains current position.

When space demand moves PEDM to 90% of full-open position, auxiliary switch PEDMS closes, energizing fan contactor PEC2. Fan motor no. 2 starts and runs. Increased exhaust airflow will lower space pressure, causing DPS to drive PEDM back toward its closed position, until set point is achieved.

If space pressure decreases until PEDM position is reduced to 10% of open position, PEDMS will open, deenergizing fan contactor PEC2 and shutting off fan no. 2.

RETURN/EXHAUST FAN POWER EXHAUST (CV Units Only) — The 50ZC,ZD units have a return/exhaust fan power exhaust. The return/exhaust fan power exhaust assembly consists of one belt-drive plenum fan. The fan, motor and drive are located over the return air opening of the unit, in a plenum beneath the outside air intake plenum. The plenum fan pressurizes the plenum section so that the air can either be discharged horizontally out the back of the unit through motorized exhaust damper with hood, or discharged through the return air section of the economizer.

The return/exhaust fan is equipped with a variable frequency drive (RE VFD), matched to the motor size. The VFD output is determined by the VFD's internal PID logic in response to the actual space pressure as monitored by the Mixing Box Pressure Transducer (MBPT). Set point for MBPT control is established at the RE VFD (factory set up). Mixing box pressure is sensed by a pick-up located in the filter section and connected to the transducer by 1/4-in. tubing (factory installed).

The return/exhaust fan is also equipped with a motorized power exhaust damper at the end of the unit. This damper is controlled by a motor actuator (PEDM), based on signals from the building pressure switch (BPS). Available range on the BPS is ± 0.25 in. wg (64 Pa), which is adjustable. Building pressure is sensed by a pick-up (field-supplied and -installed) located in the occupied space. The BPS will sense the occupied space pressure and control the power exhaust damper to open or close.

The return/exhaust fan will be turn on/off simultaneously with the supply fan, and the fan speed will change automatically to meet the return/exhaust air volume needs.

Operation of the return/exhaust fan is controlled by the MBPT through the RE VFD. The MBPT will maintain the plenum fan to run at certain speed in order to keep the mixing box pressure set point. When the power exhaust damper is closed, all return air will be discharged through the economizer into the mixing box. The set point is normally a slightly negative pressure in the mixing box so that certain amount of outside air can brought in. During the situation when the supply fan speed is increased, or when economizer opens, the MBPT will command the RE VFD to increase the return/exhaust fan speed in order to maintain the set point. When the power exhaust is open, the return air will be discharged partially through the power exhaust damper to the outside and returned partially through the economizer. The return/exhaust fan usually will increase speed during the situation when the power exhaust damper is open.

For detailed set-up instructions, see the Controls Operation and Troubleshooting book.

Head Pressure Control — All units have a fan cycling thermostat which cycles the no. 2 condenser fan. This switch opens at 70 F ± 3° F and closes at 80 F ± 3° F. This allows the unit to operate down to 45 F outdoor ambient temperature.

NOTE: Accessory -20 F Low Ambient Kit is available, which allows mechanical cooling to -20 F outdoor ambient. See accessory installation instructions for mounting and operation details.

High-Capacity Power Exhaust Building Pressure Control Set Point (50ZT,ZV,ZX,ZY Units Only) — For instructions on adjusting BP Control set points on PIC units, refer to the Controls and Troubleshooting book for these units.

The power exhaust VFD will modulate the power exhaust fan motor no. 1 speed and also stage on/off power exhaust fan motor no. 2 to maintain the building pressure. Set point for the BP control is set at the PE VFD, using the display keyboard on the front of the PE VFD enclosure. See Fig. 115.

NOTE: The VFD will always provide the proper phase sequence to the supply-fan motor. The supply-fan motor operates in proper rotation regardless of the phase sequence to the unit. If, upon start-up, the outdoor fans operate backwards but the supply fan operates in the correct direction, reverse any two leads to the main terminal block. All fans will then operate in the correct direction.

To set the building static pressure, perform the following steps. The factory setting is 0 in. wg. The duct transducer has a range from -0.5 to +0.5 in. wg. The transducer output is 4 to 20 mA, therefore, -0.5 to +0.5 in. wg is proportional to the 4 to 20 mA and must be expressed to the PE VFD in terms of percentage of the frequency range. Refer to Table 58. The set point value is a percentage of the maximum output frequency. Locate the building static pressure closest to that desired and use the corresponding set point value. If necessary, interpolation between duct static pressures is permissible.

DETERMINE PE VFD SET POINT — The unit of measure for the Building Pressure set point at the PE VFD is output frequency (Hz), representing the desired BP set point (BPSP) in inches of water gage (in. wg). To convert desired BPSP into the PE VFD set point, refer to Table 58. Locate the pressure value in the table closest to the desired BPSP for this installation and use the corresponding PE VFD set point (Hz) value. If necessary, interpolation between duct static pressure values is permissible.

ADJUST PE VFD SET POINT — To adjust the PE VFD set point, the PE VFD must be powered. Since it is located in the indoor section of the unit, use caution to ensure that the service access door is blocked open and will not close suddenly.

Change PE VFD set point according to Table 59 shown below.

The economizer end switch can be bypassed by placing a jumper from PEC1-DU1 to PEC-C1 during unit setup (the supply fan must be running and the IFC must be energized).

Table 58 — Power Exhaust VFD Set Point (Frequency Command) for Building Pressure

PRESSURE (in. wg)	VFD SET POINT	CONTROL SIGNAL (mA)	PRESSURE (in. wg)	VFD SET POINT	CONTROL SIGNAL (mA)
0.50	0.0	4.00	0.00	30.0	12.00
0.45	3.0	4.80	-0.05	33.0	12.80
0.40	6.0	5.60	-0.10	36.0	13.60
0.35	9.0	6.40	-0.15	39.0	14.40
0.30	12.0	7.20	-0.20	42.0	15.20
0.25	15.0	8.00	-0.25	45.0	16.00
0.20	18.0	8.80	-0.30	48.0	16.80
0.15	21.0	9.60	-0.35	51.0	17.60
0.10	24.0	10.40	-0.40	54.0	18.40
0.05	27.0	11.20	-0.45	57.0	19.20
			-0.50	60.0	20.00

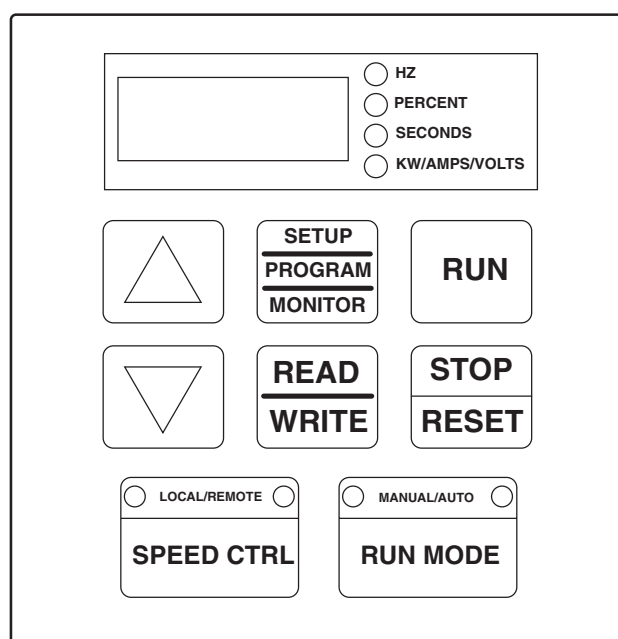


Fig. 115 — Power Exhaust Variable Frequency Drive (TOSVERT130-E3) Keypad

Table 59 — Changing the Power Exhaust VFD (TOSVERT130-E3) Set Point (Frequency Command)*

KEY OPERATION	LED MESSAGE	EXPLANATION
	XX.X or OFF	Standard Monitor Mode (output frequency). If drive is disabled, display will read "OFF." If enabled, display will show current output frequency.
↓	60.0	Pressing arrow key once will display the current frequency set point
↓↑	45.0 (flashing)	Pressing up/down arrow keys changes the desired set point
READ/WRITE	FC and 45.0 (flashing)	When read/write is pressed, the parameter name (FC) and the new value (45.0) will alternately flash to indicate that the new value has been stored. After 2 cycles, the display will return to the standard monitor mode.
	XX.X or OFF	Standard Monitor Mode (output frequency). If drive is disabled, display will read "OFF." If enabled, display will show current output frequency.

*Choose set point from Table 58 according to desired duct pressure.

SERVICE

Service Access — All unit components can be reached through clearly labeled hinged access doors. These doors are not equipped with tiebacks, so if heavy duty servicing is needed, either remove them or prop them open to prevent accidental closure.

Each door is held closed with 3 latches. The latches are secured to the unit with a single $\frac{1}{4}$ -in. 220 x $\frac{1}{2}$ -in. long bolt. See Fig. 116.

To open, loosen the latch bolt using a $\frac{7}{16}$ -in. wrench. Pivot the latch so it is not in contact with the door. Open the door. To shut, reverse the above procedure.

NOTE: Disassembly of the top cover may be required under special service circumstances. It is very important that the orientation and position of the top cover be marked on the unit prior to disassembly. This will allow proper replacement of the top cover onto the unit and prevent rainwater from leaking into the unit.

IMPORTANT: After servicing is completed, make sure door is closed and relatched properly, and that the latches are tight. Failure to do this can result in water leakage into the indoor-air section of the unit.

COMPRESSORS

Sizes 030-050 — Access to the compressors is through the doors on the condenser end of the unit. This door also provides access to the discharge and suction service valves, the crank-case heaters, and the high- and low-pressure switches. Compressor no. 1 is always the compressor on the left when facing main control box.

Sizes 055-105 — The oil pump end (compressor access) of each compressor is readily accessible from sides of unit as shown in Fig. 56. Access the motor end of the compressor through the condenser end of the unit or by removing compressor.

LIQUID SERVICE VALVES, FILTER DRIERS, AND SIGHT GLASSES

Sizes 030-050 — Access to these components is through the access panel on the right side of the unit. See Fig. 117. There is also a Schrader port in each suction line that is accessible through this same panel. When charging unit, route service line through the round holes and replace panel to minimize air bypass.

Sizes 055-105 — Access to these components is from the side of the unit as shown in Fig. 117.

EVAPORATOR-FAN MOTORS, PULLEYS, AND BELTS — Access to these components is through the 2 doors labeled FAN SECTION on each side of the unit.

POWER EXHAUST MOTORS, PULLEYS, AND BELTS — Access to these components is through the door below the side economizer hoods on both sides of the unit. See Fig. 118 and 119.

RETURN-AIR FILTERS — Access to these filters is through the door marked FILTER SECTION on the right side of the unit.

UNIT CONTROL BOX — Access to this component is through the doors marked ELECTRICAL SECTION on the condenser end of the unit (when facing the condenser coil).

ECONOMIZER DAMPER MOTOR — On units so equipped, the economizer motor is located in the mixing box section. Access to it is through the door labeled FILTER SECTION on the right hand side of the unit.

ELECTRIC HEATER CONTROL BOX — Access to the electric heater control box is through the door on the right side of the unit next to the condenser section. See Fig. 55 and 56.

The electric heater control box contains:

- power terminal block HTB, HTB1, HTB2 (not used on all voltages)
- fuse blocks FB1, FB2, etc.
- fuses FU (3 per fuse block)
- heater contactors HC1, HC1A, etc.
- plug No. 20 (PL20)

HEATER BOX — Access to the heater box is through the door on the left side (sizes 030-035) or right side (sizes 055-105) of the unit next to the condenser section. See Fig. 55 and 56. See Fig. 120 for heater box contents.

CONDENSER FANS AND FAN MOTORS — Remove the wire fan guard on top of the unit to gain access to the condenser fans and motors.

Adjustments

EVAPORATOR FAN AND POWER EXHAUST MOTOR PLATE — Adjust using a $\frac{15}{16}$ -in. wrench on the adjusting bolts:

1. Loosen holddown bolts. (See Fig. 121.)
2. Turn the adjusting bolts to move the motor mounting plate toward or away from the fan to loosen or tighten the belts. Make the same number of turns to each bolt.
3. Retighten holddown bolts.

RETURN/EXHAUST FAN MOTOR PLATE — Adjust using a $\frac{3}{4}$ -in. wrench on the adjusting bolts:

1. Loosen holddown bolts. (See Fig. 122.)
2. Turn the adjusting bolts to move the motor mounting plate toward or away from the fan to loosen or tighten the belts. Make the same number of turns to each bolt.
3. Retighten holddown bolts.

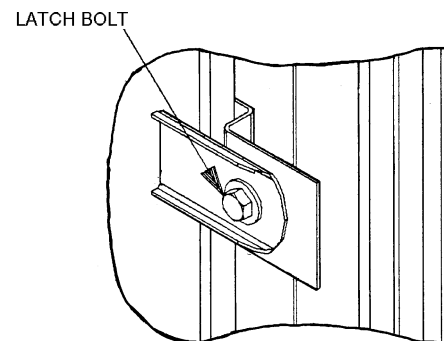


Fig. 116 — Door Latch

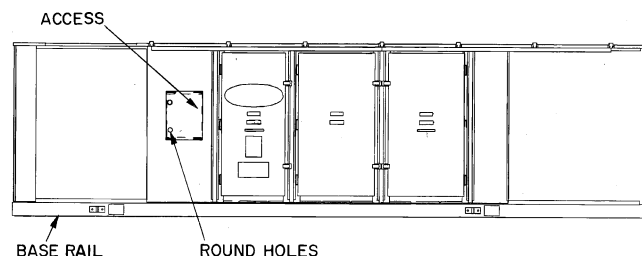


Fig. 117 — Typical Filter Drier and Liquid Service Valve Access

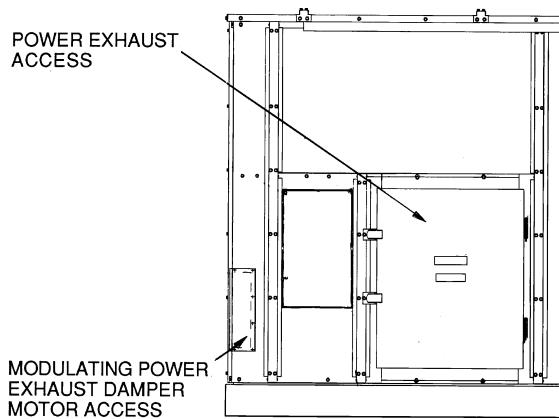


Fig. 118 — Modulating Power Exhaust Damper Motor Access, 030-050 Units

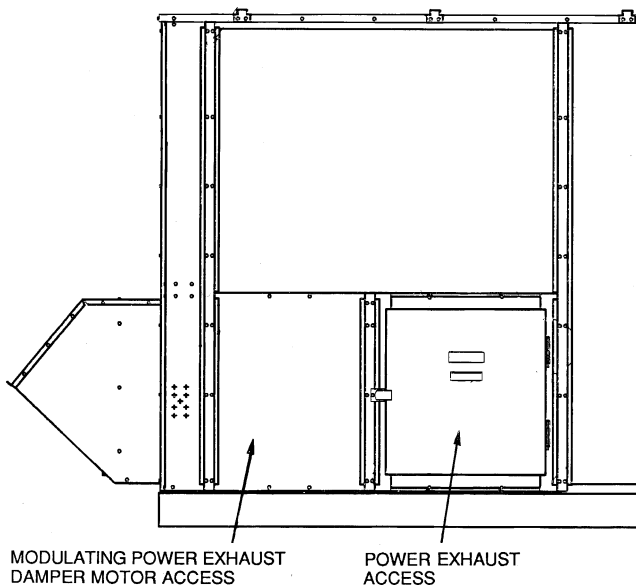
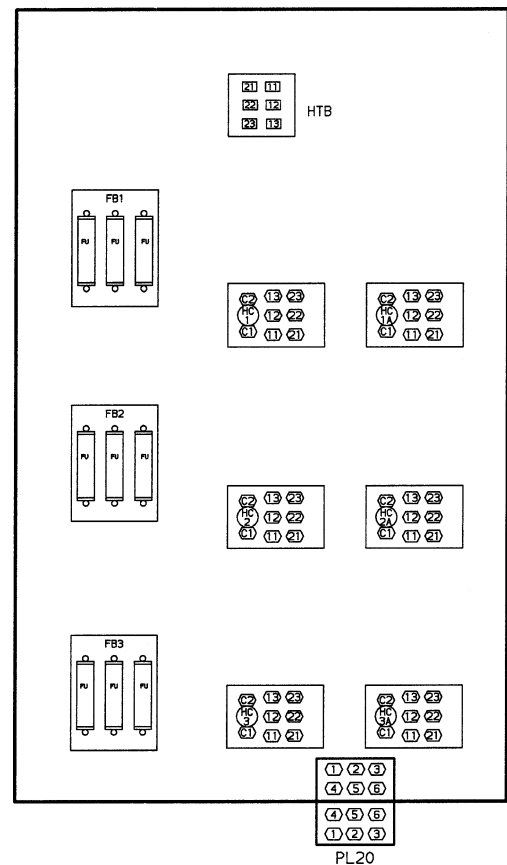


Fig. 119 — Modulating Power Exhaust Damper Motor Access, 055-105 Units



- LEGEND**
- C — Contactor
 - FB — Fuse Block
 - FU — Fuse
 - HC — Heat Element Contactor
 - HTB — Heater Terminal Block
 - PL — Plug Assembly

Fig. 120 — Typical Electric Heat Control Box

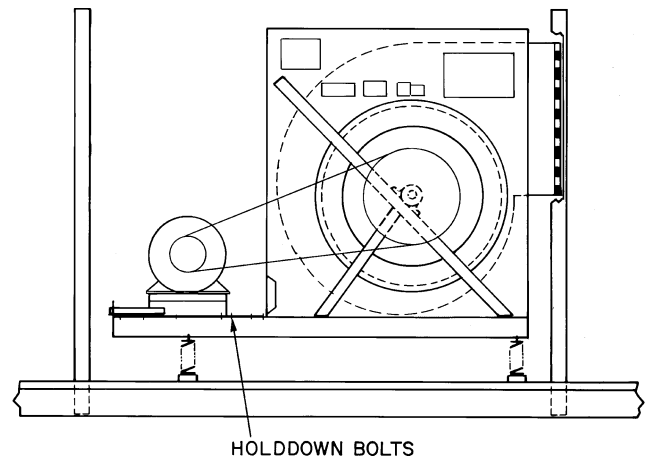


Fig. 121 — Motor Plate Adjustment

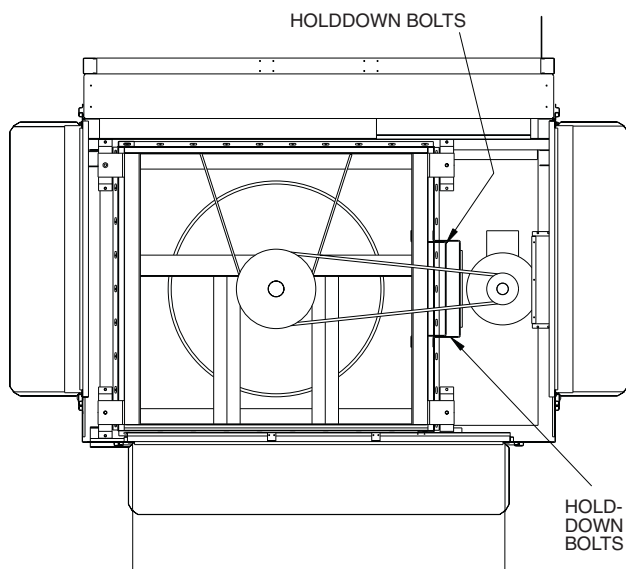


Fig. 122 — Return/Exhaust Fan Motor Plate Adjustment

MODULATING POWER EXHAUST DIFFERENTIAL PRESSURE SWITCH — On size 030-050 units, the differential pressure switch is located in the auxiliary control box. The auxiliary control box is mounted in the corner next to the power exhaust motor door. See Fig. 123. To gain access to the auxiliary control box, remove the auxiliary control box cover. When replacing the auxiliary control box cover, be sure to secure the cover properly in order to prevent water from being drawn into the auxiliary control box.

On size 055-105 units, the differential pressure switch is mounted below the auxiliary control box next to the access door labeled **FILTER SECTION**. See Fig. 124.

INLET GUIDE VANE DIFFERENTIAL PRESSURE SWITCH (Units With Optional Inlet Guide Vanes and Static Pressure Control) — On size 030-050 units, the inlet guide vane differential pressure switch is located in the auxiliary control box. The auxiliary control box is mounted in the corner of the unit under the side air hood that is next to the access door marked **FILTER SECTION**. To gain access to the auxiliary box, remove the auxiliary control box cover. When replacing the auxiliary control box cover, be sure to secure the cover properly in order to prevent water from being drawn into the auxiliary control box.

On size 055-105 units, the inlet guide vane differential pressure switch is mounted on an upright located behind the evaporator-fan motor. See Fig. 125.

RETURN/EXHAUST BUILDING PRESSURE SWITCH (50ZC,ZD,ZL,ZM,ZR,ZS075-105 Units Only) — The building pressure switch (BPS) is mounted below the auxiliary control box next to the access door labeled **FILTER SECTION**. See Fig. 126.

The return/exhaust BPS has a set point range limit of -0.25 in. wg to 0.25 in. wg. The building pressure can be set up

at any range not exceeding the upper and lower limits of the BPS. Factory setting is 0 in. wg lower limit and 0.1 in. wg upper limit. To adjust lower limit (left) set point, use the left adjusting knob located at the bottom of the front cover to point the left set point pointer to desired pressure reading. To adjust upper limit (right) set point, use the right adjusting knob located at the bottom of the front cover. The smaller the lower/upper range is, the closer the pressure will be maintained to desired set point range.

To set the pressure indicating pointer to zero, use the zero adjust screw located at the bottom of the front cover. Note that this adjustment can only be made with the high and low pressure taps both open to atmosphere.

ECONOMIZER SWITCH ADJUSTMENT — Units with an optional economizer have an auxiliary switch located on the economizer damper motor. If other than the factory setting is desired, follow the steps below:

⚠ CAUTION

Do not turn motor shaft by hand or with a wrench. Damage to the gear train will result.

1. Remove top cover from motor to gain access to motor terminals and cam adjustments.
2. Disconnect controller from motor. Connect RED, WHITE, and BLUE terminals on the 135-ohm manual potentiometer to corresponding RED, WHITE, and BLUE terminals on the motor. Connect 24-vac power to Terminals 1 and 2. See Fig. 127.
3. Adjust the 135-ohm potentiometer so that the motor shaft turns to the position where auxiliary equipment is to be switched.
4. Adjust auxiliary cam by inserting a $\frac{1}{8}$ -in. straight blade screwdriver into slot on cam and moving TOP of screwdriver to the right or left. See Fig. 128.
5. To close auxiliary switch RED and BLUE contacts as the motor travels open (energizing the power exhaust motor), the switch differential can only be 10 degrees on both switches. To adjust either cam, perform the following steps:
 - a. If RED and BLUE contacts are open, rotate the cam counterclockwise until the contacts close.
 - b. If the RED and BLUE contacts are closed, rotate the cam clockwise until the contacts open.
6. The auxiliary switch is set as follows:

UNIT	SWITCH	CONTROLS	ECON OPEN (Switch Closes)
CONSTANT VOLUME UNITS	Switch 1	1st Stage PE or MPE	35%
	Switch 2	2nd Stage PE	75%

LEGEND

ECON — Economizer
MPE — Modulating Power Exhaust
PE — Power Exhaust

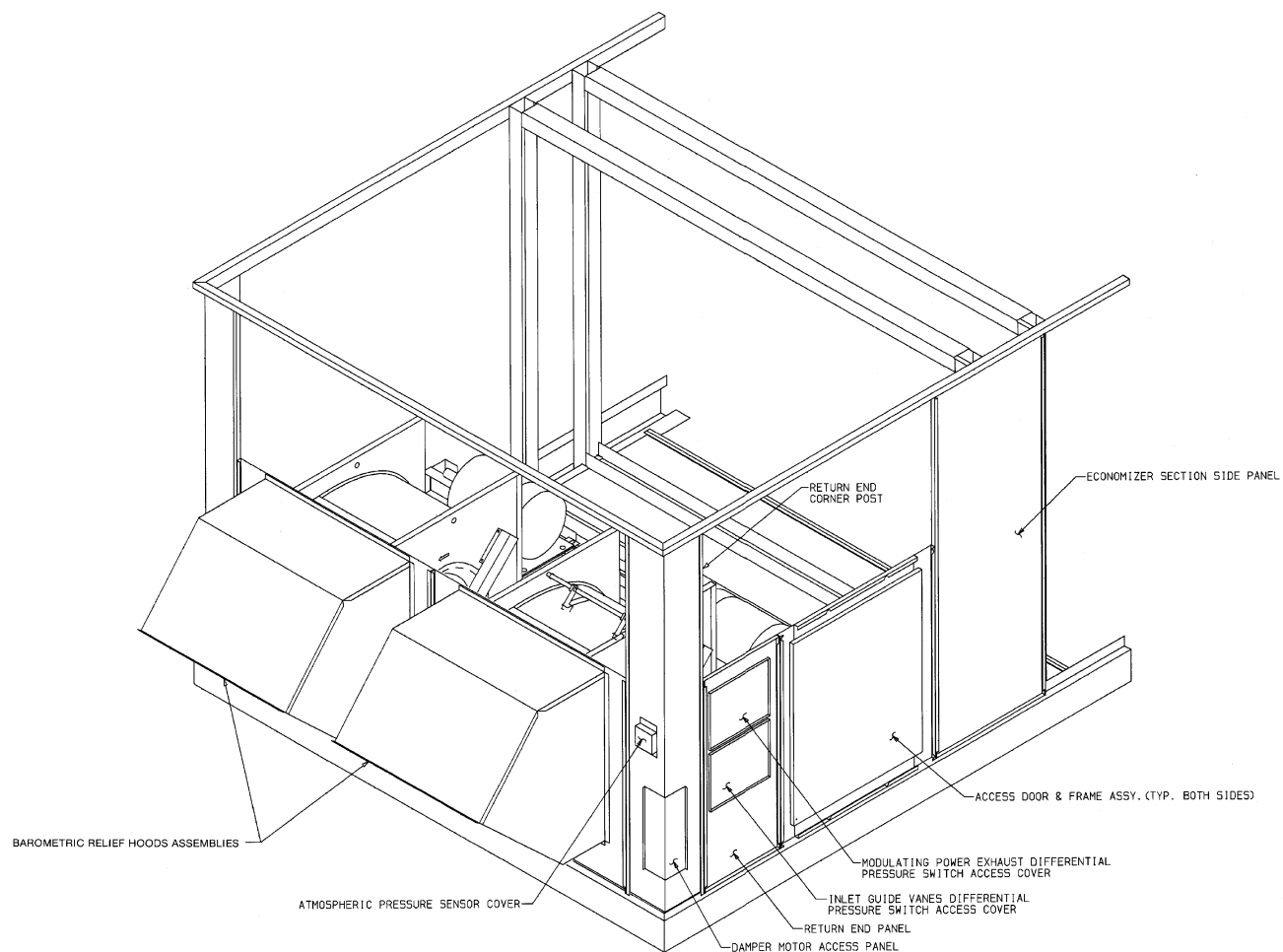


Fig. 123 — Power Exhaust Detail; Sizes 030-050

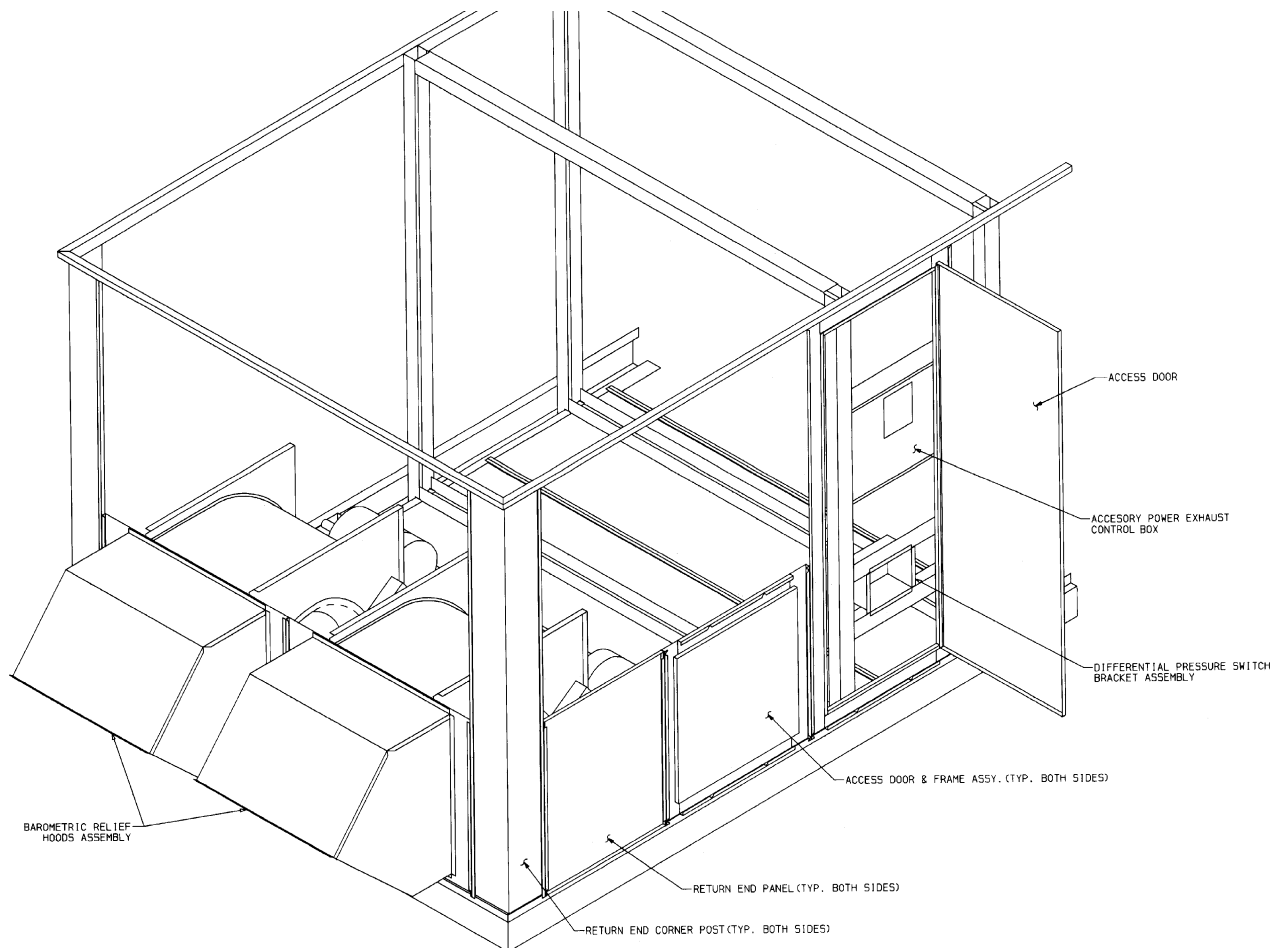


Fig. 124 — Power Exhaust Detail; Sizes 055-105

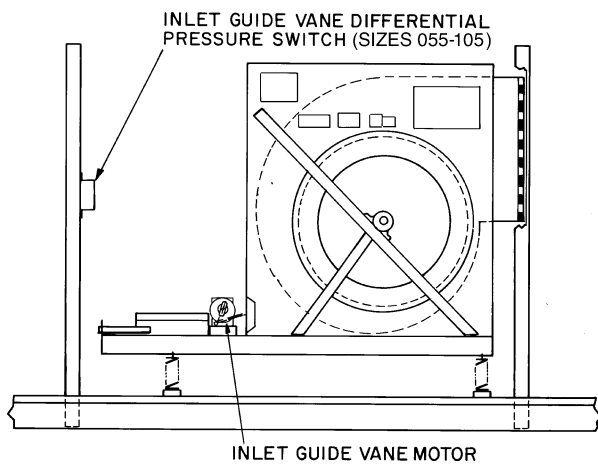


Fig. 125 — Inlet Guide Vane Motor

BELT INSTALLATION AND TENSIONING

IMPORTANT: When installing or replacing belts, always use a complete set of new, matched belts to prevent potential vibration problems. Mixing belts often results in premature breakage of the new belts.

1. Turn off unit power.
2. Adjust motor plate so belts can be installed without stretching over the grooves of the pulley. (Forcing the belts can result in uneven belt stretching and a mismatched set of belts.)
3. Before tensioning the belts, equalize belt slack so that it is on the same side of the belt for all belts. Failure to do so may result in uneven belt stretching.
4. Tighten belts using the motor plate adjusting bolts.
5. Adjust until proper belt tension ($1\frac{1}{2}$ -in. deflection with one finger) is obtained. Be sure to adjust both adjusting bolts the same number of turns.

NOTE: Check the tension at least twice during the first day of operation, as there is normally a rapid decrease in tension until the belts have run in. Check tension periodically thereafter and keep it at the recommended tension.

With the correct belt tension, belts may slip and squeal momentarily on start-up. This slippage is normal and disappears after wheel reaches operating speed. Excessive belt tension shortens belt life and may cause bearing and shaft damage.

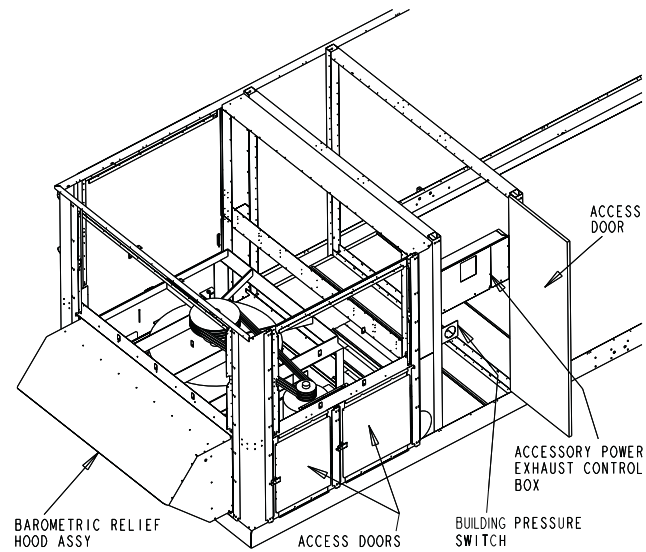


**Fig. 126 — Return/Exhaust Fan Details
(50ZC,ZD,ZL,ZM,ZR,ZS)**

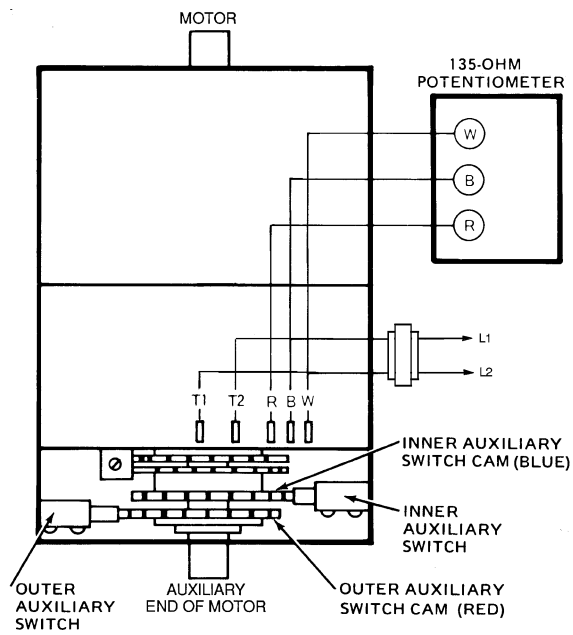


Fig. 127 — Auxiliary Switch Stroke Adjustment

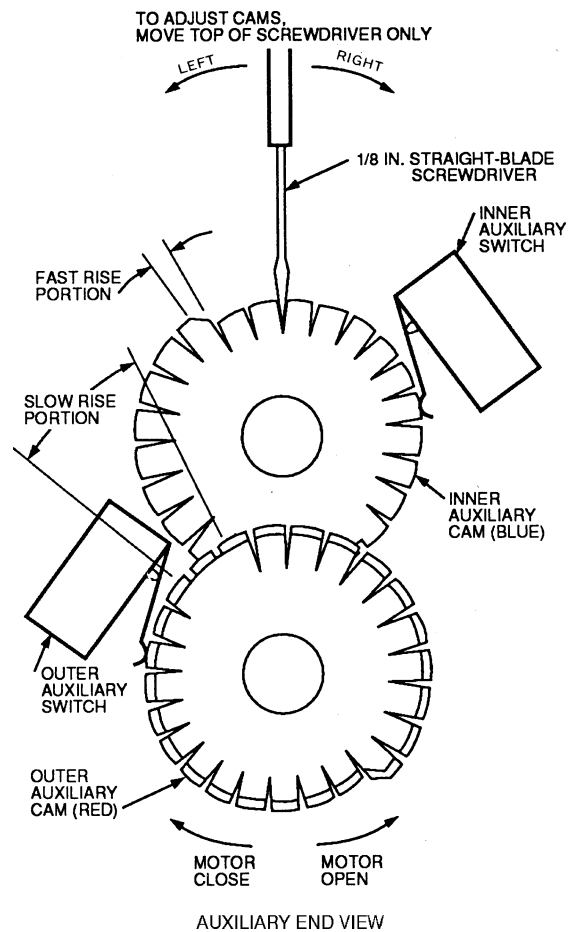


Fig. 128 — Auxiliary Switch Adjustment

PULLEY ALIGNMENT — For proper belt life, the motor and fan pulleys must be properly aligned. To check, first turn off unit power. Place a straightedge against the motor and fan pulleys. See Fig. 129. If the pulleys are properly aligned, the straightedge should be parallel to the belts.

If they are not parallel, check that the motor shaft and fan shaft are parallel. If they are not, adjust the motor plate adjusting bolts until they are.

After verifying that the shafts are parallel, loosen the setscrews on the motor pulley. Move pulley on the shaft until the pulleys are parallel. To move the sheave on the shaft, loosen the belts. If necessary, blower sheave can also be moved on the shaft.

INSTALLING REPLACEMENT MOTOR PULLEY (Evaporator Fan Only) — To install a field-supplied replacement pulley:

1. Turn off unit power.
2. Loosen belts using motor adjusting bolts until belts can be removed without stretching them over the grooves of the pulley.
3. Remove belts.
4. Loosen setscrews on motor pulley.
5. Slide pulley off motor shaft. Make sure setscrews on new pulley are loose.
6. Slide new pulley onto fan shaft and align it with the fan pulley as described in Pulley Alignment section above.
7. Tighten setscrews.

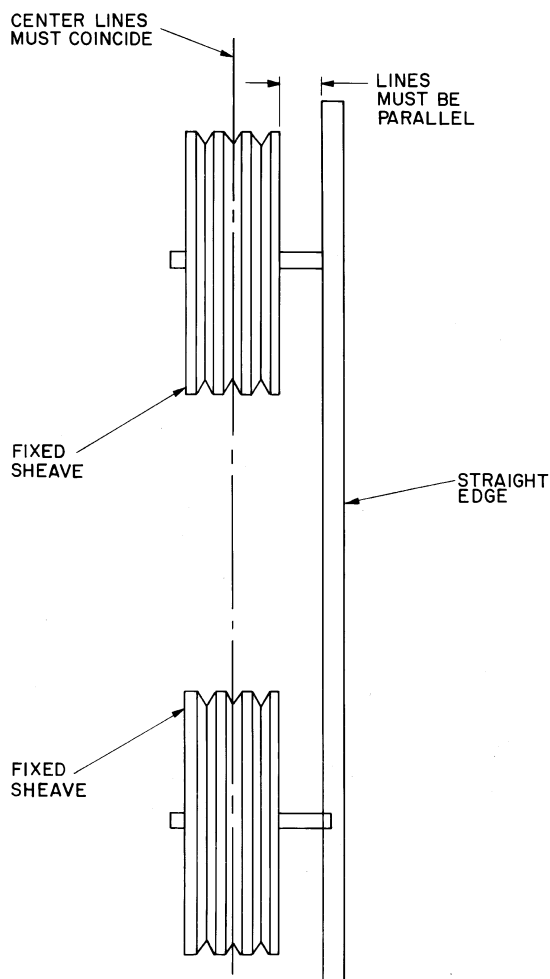


Fig. 129 — Pulley Alignment

8. Install belts and tension properly as described in Pulley Alignment section above.

CONDENSER FAN ADJUSTMENT

1. Turn off unit power.
2. Remove fan guard and loosen fan hub setscrew.
3. See Fig. 130 and adjust fan height using a straight edge laid across the fan deck.
4. Tighten setscrew and replace rubber hubcap to prevent hub from rusting to the motor shaft. Fill hub recess with Permagum if hub has no rubber hubcap.
5. Replace fan guard.

CONDENSER FANS (Sizes 050,070,075 with High-Capacity Evaporator Coil Option) — Each fan is supported by a formed wire mount bolted to a fan deck and covered with a wire guard. The exposed end of the fan motor shaft is protected from weather by grease. If the fan motor must be removed for service or replacement, be sure to regrease fan shaft and reinstall fan cover, retaining clips, and fan guard. For proper performance, the fans should be positioned as shown in Fig. 131. Tighten setscrews to 14 ± 1 ft-lb (18 ± 1.3 N-m).

Check for proper rotation of the fan(s) once reinstalled (counterclockwise, viewed from above). If necessary to reverse, switch leads at contactor(s) in control box.

25% OUTDOOR-AIR DAMPER — Access to adjust the damper is through the hoods. Remove filters to gain access into unit to adjust linkage arms.

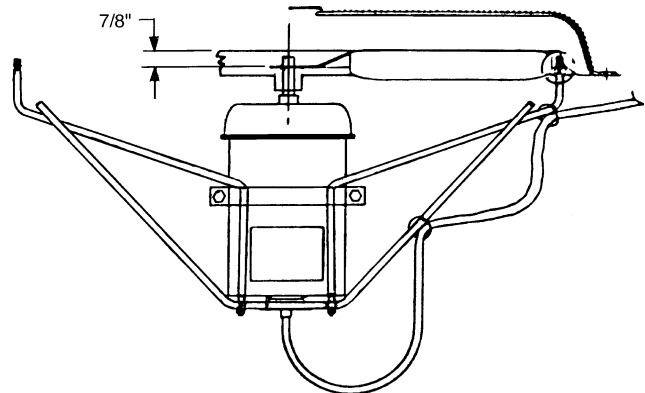


Fig. 130 — Condenser-Fan Adjustment (Standard Fan)

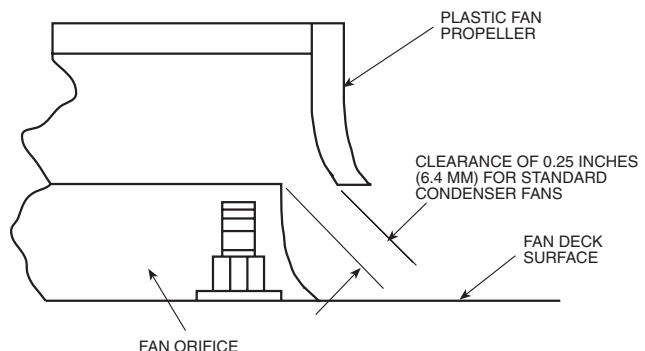


Fig. 131 — Condenser Fan Position (Sizes 050,070,075 with High-Capacity Evaporator Coil Option)

Cleaning — Inspect unit at the beginning of each heating and cooling season and during each season as operating conditions may require.

Clean condenser coil with a vacuum cleaner, fresh water, compressed air, or a bristle brush (not wire). Coil cleaning should be a part of the planned maintenance program. Clean evaporator coil with a stiff bristle brush (not wire), vacuum cleaner, or compressed air.

Check and clean condensate drain annually at the start of the cooling season.

Replace return-air filters at the start of each heating and cooling season or as often as necessary during each season, depending on operating conditions. See Tables 1A-1C for filter types, quantities, and sizes.

1. Remove economizer outdoor-air filters from the hoods by removing the filter retainers.
2. Clean filters with steam or hot water and mild detergent.
3. Reinstall filters in hoods after cleaning. Never replace cleanable filters with throwaway filters.

Lubrication

COMPRESSORS — Each compressor is correctly charged at the factory. Refer to 06D and 06E Compressor Service Manuals if additional information regarding compressor lubrication system is required. See Compressor Oil section on page 117.

FAN SHAFT BEARINGS — Lubricate fan shaft bearings at least once a year with suitable bearing grease. Extended grease lines are provided on pulley side of blower. Typical lubricants are given below:

MANUFACTURER	LUBRICANT
Texaco Mobil Sunoco Texaco	Regal AFB-2* Mobilplex EP No. 1 Prestige 42 Multifak 2

*Preferred lubricant because it contains rust and oxidation inhibitors.

INLET GUIDE VANE BEARINGS (Units With Optional Inlet Guide Vanes) — These bearings are oil impregnated. Lubricate annually with a few drops of nondetergent SAE 20 oil.

FAN MOTOR BEARINGS — The condenser- and evaporator-fan motors have sealed bearings so no field lubrication is required.

DOOR HINGES — All door hinges should be lubricated at least once a year.

Refrigerant Feed Components — Each refrigerant circuit (2 per unit) has all the necessary refrigerant controls.

Thermostatic Expansion Valve (TXV) — On size 030 and 035, each circuit has one. On size 040 and 050 each circuit has 2. The superheat is nonadjustable. On sizes 055-105, each circuit has 2 TXVs on which superheat may be adjusted if absolutely necessary.

The TXV is set to maintain 10 to 13 F superheat leaving the evaporator coil. It controls the flow of refrigerant to the evaporator coils.

Compressor Discharge Service Valve — Each compressor has one.

Compressor Suction Service Valve — Each compressor has one.

Protective Devices

COMPRESSOR PROTECTION

Overcurrent — Each compressor has one manual reset, calibrated trip, magnetic circuit breaker. Do not bypass connections

or increase the size of the circuit breaker to correct trouble. Determine the cause and correct it before resetting the breaker.

Overtemperature — Each 06D compressor has an internal protector to protect it against excessively high discharge gas temperatures. Each 06E compressor has an external discharge gas thermostat. See Fig. 132. They will reset, but the circuit will automatically be locked out by the control board. Unit must be manually reset by interrupting control power.

Crankcase Heater — Each compressor has a crankcase heater to prevent absorption of liquid refrigerant by oil in the crankcase when the compressor is idle. Since 115-v power for the crankcase heaters is drawn from the unit control circuit, main unit power must be on for the heaters to be energized.

IMPORTANT: After a prolonged shutdown or service job, energize the crankcase heaters for 24 hours before starting the compressor.

Compressor Lockout — If any of the safeties (compressor internal thermostat [06D compressors only], high-pressure, or low-pressure) trip, or if there is a loss of power to the compressors, the compressors will be locked out. To reset 50ZA,ZB, ZC,ZD,ZT,ZX units, manually move the thermostat setting. To reset 50ZE,ZF,ZJ,ZK,ZL,ZM,ZR,ZS,ZW,ZV,ZY,ZZ units, consult the controls and troubleshooting literature for the appropriate unit for details.

EVAPORATOR-FAN MOTOR PROTECTION — A manual reset, calibrated trip, magnetic circuit breaker protects against overcurrent. Do not bypass connections or increase the size of the breaker to correct trouble. Determine the cause and correct it before resetting the breaker.

CONDENSER-FAN MOTOR PROTECTION — Each condenser-fan motor is internally protected against overtemperature. They are also protected against a severe overcurrent condition by manual reset, calibrated trip, magnetic circuit breakers on a common circuit. As with the circuit breakers, do not bypass connections or increase breaker size to correct trouble. Determine the cause and correct it before resetting the breaker.

HIGH- AND LOW-PRESSURE SWITCHES — See Fig. 132 for compressor mounting locations. Settings for these switches are shown in Table 60. If either switch trips, that refrigerant circuit will be automatically locked out by the controls. To reset, interrupt control power.

Table 60 — Pressure Switch Settings (psig)

SWITCH	CUTOUT	CUT-IN
High	426 ± 7	320 ± 20
Low	27 ± 4	67 ± 7

Relief Devices — All units have relief devices to protect against damage from excessive pressures (i.e., fire). These devices protect the high and low side.

Refrigeration Circuits

LEAK TESTING — Units are shipped with a full operating charge of R-22 (see Tables 1A-1C). If there is no pressure in the system, introduce enough nitrogen to search for the leak. Repair the leak using good refrigeration practices. After leaks are repaired, system must be evacuated and dehydrated using methods described in GTAC II, Module 4, System Dehydration.

REFRIGERANT CHARGE (Refer to Tables 1A-1C) — At the liquid line connection point on each circuit is a factory-installed liquid line service valve. On each valve is a 1/4-in. Schrader connection for charging liquid refrigerant.

All units are shipped with a complete operating charge of R-22. See unit nameplate and Tables 1A-1C for amount of charge. When adding a complete charge, evacuate system using standard evacuating procedures and weigh in the specified amount of charge. All units use the same charging chart. See Fig. 133.

Charging with Unit Off and Evacuated — Close liquid line service valve before charging. Weigh in charge shown in Tables 1A-1C. Open liquid line service valve; start unit and allow it to run several minutes fully loaded. Check for a clear sight glass. Be sure clear condition is liquid and not vapor. Complete charging the unit.

Charging with Unit Running — If charge is to be added while unit is operating, it is necessary to have all condenser fans and compressors operating. It may be necessary to block condenser coils at low-ambient temperatures to raise condensing pressure to approximately 280 psig (1931 kPag) to turn all condenser fans on. Do not totally block a coil to do this. Partially block all coils in uniform pattern. Charge vapor into compressor low-side service port located above oil pump crankshaft housing. Charge each circuit until sight glass shows clear liquid.

Oil Charge — All units are factory charged with oil. Acceptable oil level for each compressor is shown in Table 61 and Fig. 108, page 117).

When additional oil or a complete charge is required, use only Carrier-approved compressor oil.

Approved oils are:

Petroleum Specialties, Inc.— Cryol 150A (factory oil charge)

Texaco, Inc. — Capella WF-32-150

Witco Chemical Co. — Suniso 3GS

Do not reuse drained oil, and do not use any oil that has been exposed to atmosphere.

ADD OIL — Close suction shutoff valve and pump down crankcase to 2 psig (14 kPa). (Low-pressure cutout must be jumped.) Wait a few minutes and repeat until pressure remains steady at 2 psig (14 kPa). Remove oil fill plug above the oil level sight glass, add oil through plug hole, and replace plug. Run compressor for 20 minutes and check oil level.

REMOVE OIL — Pump down compressor to 2 psig (14 kPa). Loosen the 1/4-in. (6.4-mm) pipe plug at the compressor base and allow the oil to seep out past the threads of the plug.

NOTE: The crankcase will be slightly pressurized. Do not remove the plug, or the entire oil charge will be lost.

Small amounts of oil can be removed through the oil pump discharge connection while the compressor is running.

Table 61 — Oil Charge

COMPRESSOR	OIL CHARGE (Pints)
06D	10.0
06E250	14.0
All other 06E	19.0

Moisture/Liquid Indicator — A clear flow of liquid refrigerant indicates sufficient charge in the system. Bubbles indicate undercharged system or the presence of non-condensables. Moisture in the system measured in parts per million (ppm) changes the color of the indicator:

Green — moisture below 45 ppm (dry)

Chartreuse — 45 to 130 ppm (caution!)

Yellow — moisture above 130 ppm (wet)

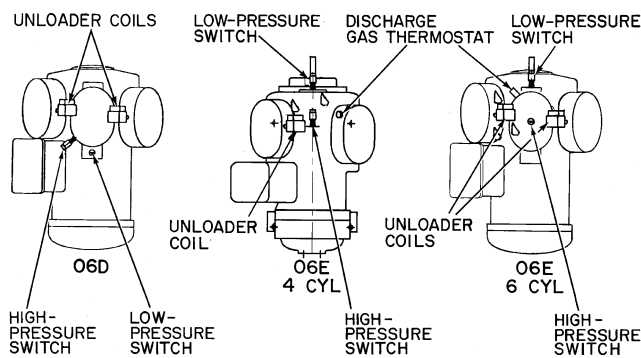


Fig. 132 — Typical Compressor Overtemperature, High- and Low-Pressure Switch Locations

Change filter driers at the first sign of moisture in the system. See Carrier Charging Handbook for more information.

IMPORTANT: Unit must be in operation at least 12 hours before moisture indicator can give an accurate reading. With unit running, indicating element must be in contact with liquid refrigerant to give a true reading.

Filter Driers — These units use sealed type filter driers, one in each refrigeration circuit. The filter driers are located in the condenser sections, accessible from the right side of the unit.

Replace the filter cores whenever the moisture/liquid indicator shows moisture in the system.

Liquid Line Service Valve — Located immediately ahead of the filter drier, this valve has a 1/4-in. flare connection for field charging. With the liquid circuit shut, the compressor can be used to pump the refrigerant down into the high side. The refrigerant can then be stored there by closing the compressor discharge valve.

Compressor Removal — Access to the pump end of the compressor is from the compressor side of the unit. Access to the motor end of the compressor is from the inside of the unit. All compressors can be removed from the compressor side of the unit.

IMPORTANT: All compressor mounting hardware and support brackets removed during servicing must be reinstalled prior to start-up.

1. Disconnect power to unit; lockout power to compressor.
2. Close suction and discharge service valves.
3. Relieve refrigerant pressure into a refrigerant recovery system.
4. Remove:
 - a. Fan-cycling pressure switch (FCPS)
 - b. High-pressure switch
 - c. Low-pressure switch
5. Disconnect power wires at terminal box and disconnect conduit.
6. Disconnect wires from crankcase heater.
7. Disconnect service valves from compressor.
8. Remove 4 large locknuts securing compressor to the spring assemblies.
9. Lift compressor off mounting bolts and remove.

Compressor Replacement — Perform the following:

1. Reverse procedure in Compressor Removal section to end of Step 4.
2. Reinstall service valves and safety switches, and tighten to torques as listed:

TORQUE	COMPRESSOR(S)
Tighten discharge valves to —	
20-25 ft-lbs (27- 34 N-m)	06D-537, 06E-250
80-90 ft-lbs (109-122 N-m)	06E-265,275,299
Tighten suction valves to —	
80- 90 ft-lbs (109-122 N-m)	06E-250
90-120 ft-lbs (122-163 N-m)	06E-265,275,299
Tighten the following fittings as specified —	
120 in.-lbs (13.5 N-m)	High-Pressure Switch
120 in.-lbs (13.5 N-m)	Low-Pressure Switch

3. Leak-check and evacuate system, reclaim refrigerant.
4. Recharge system per pre-start-up and start-up sequences. Recheck oil levels.
5. Energize crankcase heater for 24 hours prior to restart of system.

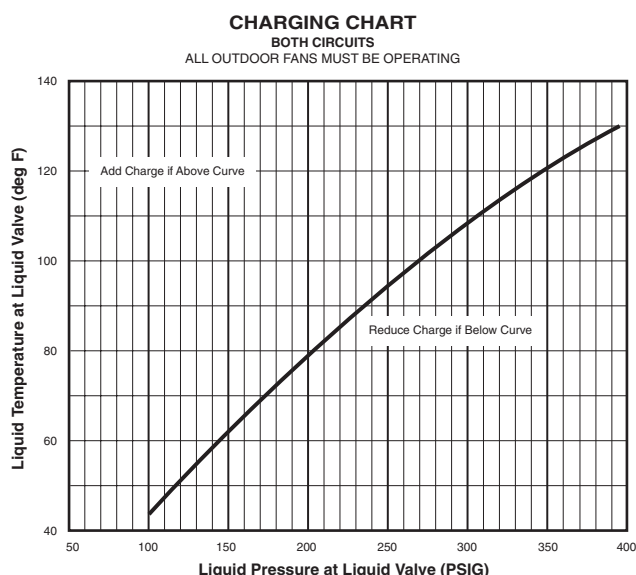


Fig. 133 — Charging Chart — All Units

TROUBLESHOOTING

The following Troubleshooting section applies to CV units (50ZA,ZB,ZC,ZD,ZT,ZX) only. For expanded controls and troubleshooting on other units (VAV and PIC), refer to the Controls and Troubleshooting literature provided in the installation packet with the unit.

Economizer — The economizer control consists of an electronic control board mounted on the back of the cover plate of the economizer motor with the adjustments and electrical plugs accessible through the top of the cover. The economizer control is factory wired to the terminals on the motor. All potentiometers and adjustments are a part of the control board.

ECONOMIZER MOTOR CHECKOUT — The motor may be checked out separately from the control board. See Table 62 for motor checkout. To check out the motor, apply 24 VAC power to terminals T0 and T2 of the control board.

NOTE: The connections to motor terminals T1 and R must remain in place.

Table 62 — Economizer Motor Checkout

MOTOR TEST	PROCEDURE	EXPECTED RESULT AND RESPONSE
A	Remove wire connected to terminal W on the motor.	Motor drives open. If not, replace the motor.
B	Remove wire connected to terminal B on the motor, leaving W wire disconnected (Test A).	Motor drives closed. If not, replace the motor.

CONTROL BOARD CHECKOUT — To check out the control board motor, conduct the following 4 tests.

Test 1:

1. Apply 24 VAC power to terminals T0 and T2 of control board.
2. Remove mixed air sensor connected between terminals S1 and S2.
3. Remove outdoor-air enthalpy sensor between terminals 11 and SO.
4. Refer to Table 63.

Table 63 — Economizer Control Board Checkout, Test 1

MOTOR TEST	PROCEDURE	EXPECTED RESULT AND RESPONSE
A	Turn minimum position potentiometer fully counterclockwise.	Motor drives closed. If not, check minimum position jumper between terminals Z and Y, and check terminal W and T1 connections to motor.
B	Turn minimum position potentiometer fully clockwise.	Motor drives open. If not, check terminal B and R connections to the motor.

Test 2:

1. Apply 24 VAC power to terminals T0 and T2 of the control board.
2. Apply 24 v between terminals 1 and T2, and jumper terminal T0 to terminal 1.
3. Remove the mixed-air sensor connected between terminals S1 and S2, and replace it with a 5490-ohm resistor.
4. Remove outdoor-air enthalpy sensor between terminals 11 and SO, and replace it with a 1.2 kOhm resistor.
5. Turn the minimum position potentiometer fully counterclockwise.
6. Refer to Table 64.

Table 64 — Economizer Control Board Checkout, Test 2

MOTOR TEST	PROCEDURE	EXPECTED RESULT AND RESPONSE
A	Turn enthalpy set point potentiometer to the A position.	1. The relays energize. If not, check return enthalpy resistor. If resistor is o.k., control board is faulty. 2. Motor drives open. If relays energize, but motor does not drive open, the control board is faulty.
B	Turn enthalpy set point potentiometer to the D position.	1. The relays deenergize. If not, control board is faulty. 2. Motor drives closed. If relays deenergize by motor does not drive closed, the control board is faulty.

Test 3:

1. Apply 24 VAC power to terminals T0 and T2 of the control board.
2. Apply 24 v between terminals 1 and T2, and jumper terminal T0 to terminal 1.
3. Remove the mixed-air sensor connected between terminals S1 and S2, and replace it with a 5490-ohm resistor.
4. Remove outdoor-air enthalpy sensor between terminals 11 and SO, and replace it with a 1.2 kOhm resistor.
5. Turn the minimum position potentiometer fully counter-clockwise.
6. Turn enthalpy set point potentiometer to the A setting.
7. Refer to Table 65.

Table 65 — Economizer Control Board Checkout, Test 3

MOTOR TEST	PROCEDURE	EXPECTED RESULT AND RESPONSE
A	Turn mixed-air potentiometer to the midpoint position.	Motor should drive to mid-stroke with the set point set between 60 and 70 F. If not, the control board is faulty.
B	Turn mixed-air potentiometer fully counter-clockwise.	Motor drives open. If not, the control board is faulty.
C	Turn mixed-air potentiometer fully clockwise.	Motor drives closed. If not, the control board is faulty.

Test 4 — Refer to Table 66 for the correct procedure for test 4.

Unit Control Board Checkout — The following tools are required to perform the troubleshooting tasks detailed in this section:

- 1.5-v battery
- 2 sets of jumper wires with alligator clips
- Multimeter
- Toggle switch with 14-in. wires terminated with 1/4-in. spade connectors

⚠ DANGER

Read these instructions completely before attempting to troubleshoot the control board. Failure to follow the steps precisely could result in damage to unit, personal injury, or death.

The control board checkout procedure consists of 2 parts: A basic check to verify availability of 24 and 115 v to the control board and a detailed check of each circuit within the board.

Table 66 — Economizer Control Board Checkout, Test 4

MOTOR TEST	PROCEDURE	EXPECTED RESULT AND RESPONSE
A (Outdoor-Air Sensor)	1. Connect the enthalpy sensor terminal 1 to terminal 1 on the motor. 2. Connect the positive terminal of a DC milliammeter to terminal S of the sensor. 3. Connect the negative terminal of a DC milliammeter to terminal S_O of the enthalpy board.	Milliammeter reading should be between 3 and 24 mA if the sensor is operating correctly. If the reading is 0 mA, the sensor is either wired backward or is defective.
B (Indoor-Air Sensor)	1. Connect the enthalpy sensor terminal 1 to terminal 1 on the motor. 2. Connect the positive terminal of a DC milliammeter to terminal S of the sensor. 3. Connect the negative terminal of a DC milliammeter to terminal S_R of the enthalpy board.	Milliammeter reading should be between 3 and 24 mA if the sensor is operating correctly. If the reading is 0 mA, the sensor is either wired backward or is defective.

BASIC CHECK — Refer to Fig. 134 for control board component identification.

NOTE: All plugs (except P1) are labeled for easy identification. Plug P1 can be identified by its orange color.

1. Turn unit power off. Disconnect plug P1 from control board.
2. Turn unit power on and check voltage across Pin R and Pin C at plug P1. If voltage reads 18 to 30 v, skip to Step 5.
3. Turn unit power off. Disconnect plug P3.
4. Turn unit power on and measure voltage across wires on plug P3, Pins 1 and 2 (wires coming from the unit). If voltage reads 18 to 30 v, there is either a bad connection between plug P3 and control board, or the control board is defective. Verify the connection at this point and proceed to Step 5. If there is no voltage, check the circuit breaker and transformer in the 24-v control circuit of the unit.
5. Turn unit power off and disconnect plug P4 from the control board.
6. Switch scale on meter to read 115 v.
7. Turn unit power on and check voltage across Pin 6 on P4 and unit ground (wires coming from the unit). If voltage reads 104 to 122 v, there is adequate power available to the board. Verify connection at this point and proceed to Step 8. If there is no voltage, check the circuit breaker and transformer in the 115-v control circuit of the unit.
8. After verifying that 24-v and 115-v supply power is available to the control board, turn unit power off and reconnect plugs P1, P3, and P4. Proceed to Detailed Check section on page 155.

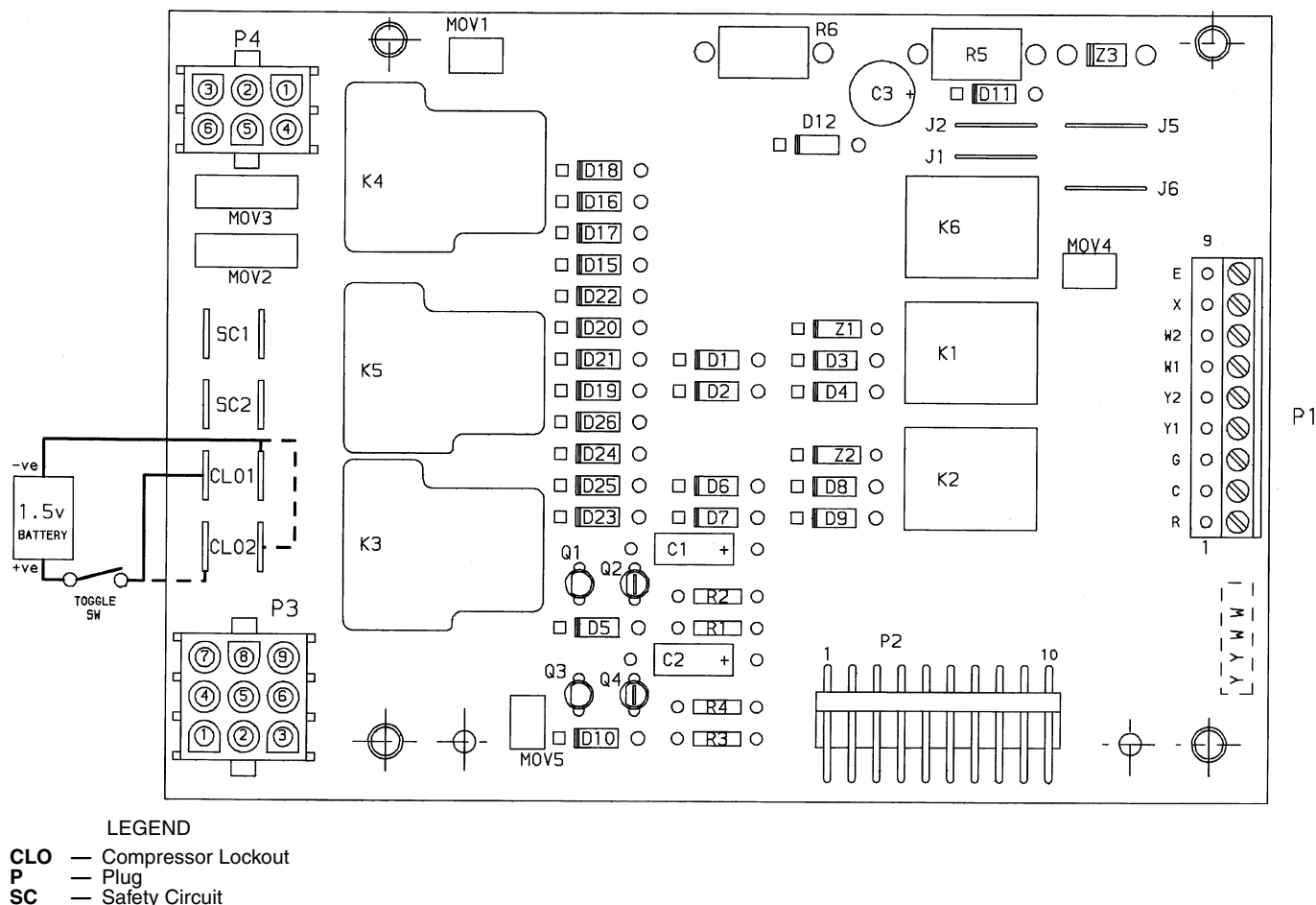


Fig. 134 — Compressor Lockout Conditions

DETAILED CHECK

NOTE: Plug P1 must be disconnected in order to perform any of the troubleshooting steps detailed in this section. To save time, reconnect plug P1 only after you have completed all of the required troubleshooting.

Symptom: Evaporator fan will not operate.

1. Turn unit power off and disconnect plug P1 from the control board.
2. Install a jumper across Pin R and Pin G at plug P1 on the control board.
3. Turn unit power on and check if the indoor (evaporator) fan contactor (IFC) coil has been pulled in. If the contactor has not been pulled in, check the voltage across the IFC coil. If there is voltage at this point, the IFC contactor is defective. If there is no voltage, proceed to Step 4.
4. Turn unit power off and disconnect plug P4 from the control board.
5. Turn unit power on and check for continuity across Pin 6 and Pin 3 at plug P4 on the control board. If there is no continuity, the board is defective. Replace control board. If there is continuity, then there is a bad connection between the board and plug P4. Correct the connection.
6. Turn unit power off. Reconnect plug P1 (if troubleshooting is complete) and plug P4.

Symptom: Condenser fan no. 1 will not operate.

1. Turn unit power off. Disconnect plugs P1 and P3 from the control board.

2. Check for continuity between Pin 8 at plug P3 on the control board and Pin Y1 at plug P1 on the control board. If there is no continuity, the board is defective. If there is continuity, either the connection is bad between plug P3 and the control board or the problem is external to the board. Reconnect plug P1 (if troubleshooting is complete) and plug P3 to the board.

Symptom: Condenser fan no. 2-5 will not operate.

1. Check operation of condenser fan no. 1. If fan no. 1 operates properly, the problem is external to the board.

Symptom: Compressor no. 1 will not operate.

1. Turn unit power off. Disconnect the 2 wires attached to the terminals marked SC1.
2. Check continuity between the 2 wires. If there is no continuity, the problem is external to the control board (possibly the pressure switches). If there is continuity, proceed to Step 3.
3. Reconnect the wires removed in Step 1.
4. With the unit power still off, disconnect plug P1 from control board. Install a jumper wire across Pin R and Pin Y1 at plug P1 on the control board.
5. Connect a voltmeter across the coil for compressor no. 1 contactor.
6. Energize unit and monitor the voltage for a few seconds.

IMPORTANT: Do not run compressor too long.

7. a. If proper voltage is indicated at the contactor, but contactor fails to close, replace contactor.
- b. If voltage is indicated for a few seconds (i.e., the contactor momentarily pulls in and is then deenergized), the compressor lockout (CLO) logic has shut down the unit. This is an indication that the board is not sensing proper compressor current, or that one of the safeties has tripped. Proceed to Step 8 to verify compressor lockout logic operation.
- c. If proper voltage is indicated at the contactor and contactor closes, the board is operating properly.
8. To verify compressor lockout logic:
 - a. Disconnect CLO sensor wires connected to CLO1 at the control board. Check wires for continuity. If there is no continuity, replace the sensor.
 - b. Connect the multimeter to read voltage between Pin X at plug P1 and ground.
 - c. Turn unit power on and check the multimeter. Within a few seconds the meter should indicate 24 v. If it does not, the control board is defective and must be replaced.
 - d. Turn unit power off. Use a toggle switch to connect a fresh 1.5-v battery to the terminals marked CLO1 as shown in Fig. 135.

⚠ CAUTION

The negative (–Ve) pole of the battery must be connected to the inner terminal, and the positive (+Ve) pole must be connected to the outer terminal as shown in Fig. 135.

- e. Turn unit power on and use the toggle switch to make and break the connection between the outer CLO1 terminal and the positive (+Ve) pole of the battery.
- f. If the multimeter shows 24 v when the battery is disconnected and no voltage when the battery is connected, the CLO logic is good. If the multimeter shows no change, the CLO logic is defective and the board must be replaced.

Symptom: Compressor no. 2 will not operate.

1. Be sure unit power is off. Disconnect the 2 wires attached to the terminals marked SC2.
2. Check continuity between the 2 wires. If there is no continuity, the problem is external to the control board (possibly the pressure switches). If there is continuity, proceed to Step 3.
3. Reconnect the wires removed in Step 1.
4. With unit power still off, disconnect plug P1 from the control board and install jumper wire across Pins R and Y2 at plug P1.
5. Connect a voltmeter across the coil for compressor no. 2 contactor.
6. Energize unit and monitor the voltage for a few seconds.

IMPORTANT: Do not run compressor too long.

7. a. If proper voltage is indicated at the contactor, but contactor fails to close, replace contactor.
- b. If voltage is indicated for a few seconds (i.e., the contactor momentarily pulls in and is then deenergized), the Compressor Lockout (CLO) logic has shut down the unit. This is an indication that the board is not sensing proper compressor current, or

that one of the safeties has tripped. Proceed to Step 8 to verify compressor lockout logic operation.

- c. If proper voltage is indicated at the contactor and contactor closes, the board is operating properly.
8. To verify compressor lockout logic:
 - a. Disconnect CLO sensor wires connected to CLO2 at the control board. Check wires for continuity. If there is no continuity, replace the sensor.
 - b. Connect the multimeter to read voltage between Pin X on plug P1 and ground.
 - c. Turn unit power on and check the multimeter. Within a few seconds the meter should indicate 24 v. If it does not, the control board is defective and must be replaced.
 - d. Turn unit power off. Connect a fresh 1.5-v battery to terminals marked CLO2 as shown in Fig. 135.

⚠ CAUTION

The negative (–Ve) pole of the battery must be connected to the inner terminal, and the positive (+Ve) pole must be connected to the outer terminal as shown in Fig. 135.

- e. Turn unit power on. Make and break the connection between the outer CLO2 terminal and the positive (+Ve) pole of the battery.
- f. If the multimeter shows 24 v when the battery is disconnected and no voltage when the battery is connected, the CLO logic is good. If the multimeter shows no change, the CLO logic is defective and the board must be replaced. Remove all jumpers and replace all plugs except plug P1. (Replace plug P1 only if no further troubleshooting is required.)

Symptom: First or second stage of heating will not operate.

1. Turn unit power off. Disconnect plugs P1 and P3.
2. Check continuity between Pin W1 at plug P1 and Pin 5 at plug P3. If there is continuity, the board is good and the problem is either the connection at P3, or external to the control board. If there is no continuity, the control board is defective and must be replaced.
3. Check continuity between Pin W2 at plug P1 and Pin 7 at plug P3. If there is continuity, the board is good and the problem is either at the connection at plug P3 or external to the board. If there is not continuity, the board is defective and must be replaced. Reconnect plug P3 to the control board. (Reconnect plug P1 only if no further troubleshooting is required.)

Symptom: Evaporator fan will not energize on a call for heat.

1. Turn unit power off. Disconnect plug P1 and plug P4.
2. Install jumper wire between Pin R and Pin W1 at plug P1.
3. Turn unit power on. Check for continuity between Pin 6 and Pin 3 at plug P4 on control board.
4. If there is no continuity between these points, the board is defective and must be replaced.

NOTE: The control board (part number HK37AA001) has no time delay.

5. If there is continuity between these points, the problem is at the connection at plug P4 or external to the control board.
6. Turn unit power off. Reconnect plugs P1 and P4.

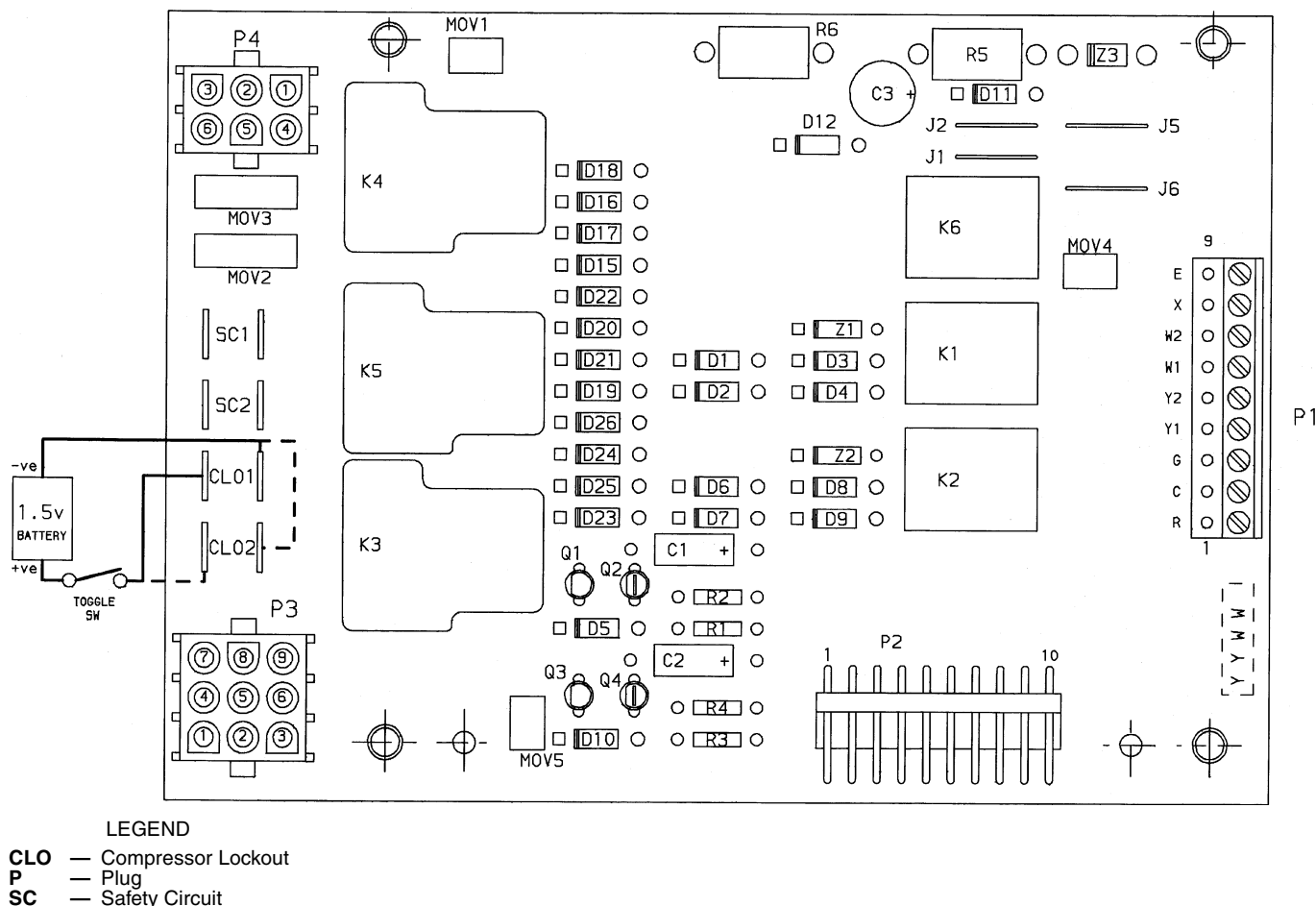


Fig. 135 — Compressor Lockout Conditions

Power Exhaust Variable Frequency Drive

NOTE: The VFDs (part no. TOSVERT130-E3) are specially modified for use on Carrier equipment. Some specifications and control configuration defaults for Carrier applications will differ from the VFD manufacturer manual included in the packet. See Table 67 for listing of Carrier-specific default values.

BUILDING PRESSURE TRANSDUCER CONTROL — The VFD monitors and controls building pressure (BP) via a differential pressure transducer. The pressure transducer is located in the auxiliary control box. The pressure transducer's high-pressure reference port is connected to the outside of the unit cabinet by a factory-installed tubing section. The pressure transducer's low-pressure reference point must be field-connected to the building pressure pick-up (field-supplied and installed in the building).

The BP transducer monitors the static pressure in the occupied space and provides a 4 to 20 mA signal directly to the power exhaust VFD. (Refer to Table 58 for transducer output signal [mA] for actual building static pressure.) The internal logic of the power exhaust VFD compares this signal representing actual duct pressure to the user-configured BP set point. The power exhaust VFD automatically adjusts its output to the power exhaust fan motor to maintain the desired BP set point. When operating with the factory-standard BP transducer, the internal PID logic of the power exhaust VFD is enabled.

EXTERNAL SIGNAL CONTROL — If the power exhaust VFD is to be controlled by an external control system other than the factory-supplied pressure transducer, the internal PID

logic function of the power exhaust VFD must be disabled. To disable the PID control:

1. Disconnect and lock out all power to the Carrier rooftop unit.
2. Remove the VFD access cover.

⚠ WARNING

Ensure the "CHARGE" lamp on the VFD is unlit. This may take up to 4 minutes. The "CHARGE" lamp indicates that the main capacitors in the VFD are charged. Internal components of the VFD should not be touched until the "CHARGE" lamp is completely out. Electrical shock can cause injury or death.

3. Install a jumper across S2-CC (see Fig. 136 for power exhaust VFD terminal board connections).
4. Remove factory-supplied cable attached to IV and CC.
5. Remove other end of the same cable from the pressure sensor.
6. Connect field-supplied speed reference (4 to 20 mA) across terminals IV-P24.
7. Disable the supply fan motor operation.
8. Reconnect power to the unit and power exhaust VFD.
9. Reprogram the power exhaust VFD to accept an external reference (in the Utility parameters group [GR.Ut], set parameter item Fnod [no.312] = 4).
10. Enable supply fan motor and return power to the unit.

Table 67 — Carrier Power Exhaust VFD Default Program Parameter Values

PARAMETER GROUP	PARAMETER	DEFAULT VALUE
SEtP (Setup)	ACC1	60.0 Sec
	DEC1	60.0 Sec
	UL	60.0 Hz*
	LL	10.0 Hz*
	Luln	1
	P3	20%
	F-P3	0.0 Hz
	P4	100%*
	F-P4	60 Hz
	tHr1	See Tables 69 and 70
	StC1	0
	StL1	110%
	OLN	1
	tYP	5*
Gr.F (Fundamental)	FH	60 Hz
	Pt	12
Gr.Fb (Feedback)	FbP1	1*
	Fbin	2
	GP	.30
	GI	2 sec
	GA	0
	GFS	80
	P1LL	10
	PuL	1
	PuUI	10
	PuLL	10
Gr.SF (Frequency Settings)	Fsor	60 Hz
Gr.Pn (Panel Control)	Fr	0*
Gr.St (Terminal Selection)	1t	1
	1t0	0
	1t1	56
	1t2	13
	1t3	3
	1t4	10
	Ot1	4*
	Ot2	2*
	Ot2d	5*
	Ot2H	100*
	LF	15*
Gr.Pr (Protection)	UuC	1*
	UuCt	2
	ArSt	3
Gr.Ut (Utility)	Cnod	1*
	Fnod	2*
	bLPn	1*

*These settings differ from the Toshiba defaults and are required for Carrier applications.

NOTE: To restore original factory settings, change tYP to 6 in SEtup mode (SEtP). This restores the VFD original factory settings.

POWER EXHAUST FAN MOTOR NO. 1 OVERLOAD PROTECTION — The VFD provides operating overload protection for the supply fan motor. The factory has programmed the power exhaust VFD overload function to match the factory-installed motor (motor size and efficiency). If the power exhaust fan motor is changed from the original factory selection, the overload value may need to be changed by the service person. Contact your local Carrier representative for assistance in determining the proper overload setting.

NOTE: Variable frequency drive size is matched to factory-installed motor size. Do not increase motor size without also changing to equivalent VFD size.

POWER EXHAUST VFD OPERATION — When troubleshooting the power exhaust VFD, check first that all required conditions for power exhaust VFD operation are satisfied.

For the power exhaust VFD to run, the following conditions must be met at the power exhaust VFD:

1. Drive enable jumper is installed from terminals ST-CC (factory supplied) (see Fig. 136).
2. Proper rotation jumper is installed at terminals R-CC (reverse rotation, factory supplied).
3. Emergency stop jumper is installed from terminals S4-CC (factory supplied).

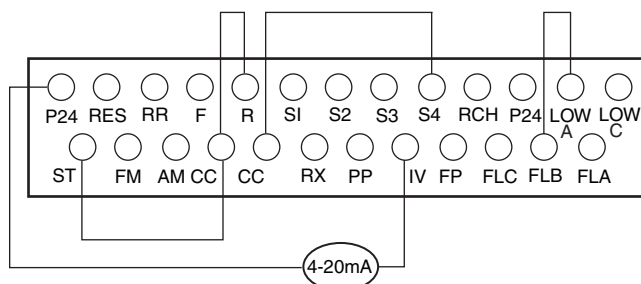


Fig. 136 — Power Exhaust Variable Frequency Drive Terminal Block

- A 4 to 20 mA signal is applied across terminals IV-P24 (from pressure transducer, factory supplied).
- DIP switch SW1 (located on the VFD's printed circuit control panel) must be set to "I" (indicating usage of a 4 to 20 mA input signal at terminals "IV").
- Speed Control (located on the VFD's keypad/display) set for "Remote" (press the "Speed Ctrl" button until LED "Remote" is illuminated).
- Programmed according to Carrier defaults.
- Building Pressure set point established by user, or use factory default (30 Hz indicating 0.0 in. wg).

POWER EXHAUST VFD OPERATIONAL STATUS — The power exhaust VFDs contain extensive self-diagnostic functions which are accessed through the power exhaust VFD display panel (located on the front of the power exhaust VFD or at a remote location when the accessory remote display package has been installed.)

⚠ CAUTION

If using the VFD display panel, **disconnect all power to the unit and the VFD before entering unit**, or use the accessory remote display module. Disable supply fan and motor operation before accessing VFD-mounted display module.

When power is first supplied to the power exhaust VFD, the display automatically starts with the frequency monitor function of its standard monitor mode. In the frequency monitor function, the output frequency is displayed. Push the **S/P/M (Setup/Program/Monitor)** key to switch to the Mode Selection menu. Push the **S/P/M** key again to toggle the display back to the standard monitor mode.

From the Mode Selection menu, the service person can view all of the monitored status variables, including up to four user-selected variables and any trip history in the memory.

Refer to the separate VFD Operation Manual for detailed instructions on accessing diagnostic information, initiating troubleshooting, and clearing any trip history.

RESTORING FACTORY POWER EXHAUST VFD DEFAULTS — The original factory configuration values are saved in the memory of the power exhaust VFD and can be restored by the service person if required. There are two types of saved file data: Carrier-factory settings (factory programmed settings made to the power exhaust VFD which apply specifically to the unit it is installed on) and standard defaults for general Carrier unit use.

The Carrier-factory settings are maintained as user settings. These can be restored by entering the Setup mode (in the **S/P/M** menu) and setting parameter tYP = 6 on the keypad/display. This will recall the specific factory defaults for this unit.

Occasionally it may be necessary to restore the power exhaust VFD defaults to the general Carrier use values. These are stored in an OPTION ROM (read-only memory chip). However,

some variables may need to be manually changed to match the specific unit's factory default settings. To recall the general Carrier defaults, enter the Setup mode and set parameter tYP = 3. Refer to Tables 68-70 for items requiring manual adjustment.

Table 68 — Power Exhaust VFD Required User Adjusted Defaults

UNIT	ITEM
ALL	Motor Overload Settings (See Table 69 and 70)
	Gr.St/Ot1 = 4
	Gr.St/Ot2 = 2
	Gr.St/Ot2d = 5
	Gr.St/Ot2H = 100
	Gr.St/LF = 15
	SEtP/UL = 60.0
	SEtP/P4 = 100
	SEtP/LL = 10.0
	SEtP/tYP = 5
	Gr. Fb/FbP1 = 1
	Gr. Pn/Fr = 0
	Gr. Pr/UuC = 1
	Gr. Ut/Cnod = 1
	Gr. Ut/Fnod = 2
	Gr. Ut/bLPn = 1

Table 69 — Power Exhaust Fan Motor Overload Setting (tHr1) — Sizes 030-070

MOTOR (hp)	HIGH EFFICIENCY				PREMIUM EFFICIENCY		
	PE Letter*	230V	460V	575V	PE Letter*	230V	460V
6	G†	98.4	75.08	84.04	Q†	98.4	75.08
10	H	96.6	97.3	90.9	R	96.6	97.3
15	J	78.3	100.0	100.0	S	78.3	100.0
20	K	87.3	100.0	95.1	T	87.3	100.0

*Outdoor Air Power Exhaust Option of the unit model number in the 16th Position.

†030-050 units only.

Table 70 — Power Exhaust Fan Motor Overload Setting (tHr1) — Sizes 075 to 105

MOTOR (hp)	HIGH EFFICIENCY			PREMIUM EFFICIENCY	
	PE Letter*	460V	575V	PE Letter*	460V
10	F	97.3	90.9	M	97.3
15	G	100.0	100.0	N	100.0
20	H	100.0	95.1	P	100.0
High-Capacity Power Exhaust (Size 75 to 105 ton)					
20	—	100.0	95.1	E	100.0
30	A	92.3	100.0	F	92.3
40	B	84.6	90.1	G	84.6
50	C	92.2	—	H	92.2
60	D	86.0	—	J	86.0
High-Capacity Power Exhaust with Plenum (Size 75 to 105 ton)					
20	Q	100.0	95.1	V	100.0
25	R	93.5	100.0	W	93.5
30	S	92.3	100.0	Z	92.3
40	T	84.6	90.1	Y	84.6

*Outdoor Air Power Exhaust Option of the unit model number in the 16th Position.

Return/Exhaust Fan Variable Frequency Drive

⚠ WARNING

Factory-installed optional VFD is located near the return/exhaust fan and motor. During any service work or programming at the VFD, operation of the fan and motor is not desirable. Either disable the return/exhaust fan or install an accessory VFD remote display. Physical injury could result.

NOTE: The RE VFD (part no. TOSVERT130-E3) is specially modified for use on Carrier equipment. Some specifications and control configuration defaults for Carrier applications will differ

from the VFD manufacturer manual included in the packet. See Table 71 for listing of Carrier-specific default values.

TRANSDUCER CONTROL — The VFD monitors and controls the mixing box pressure at the filter section via a differential pressure transducer. The pressure transducer is located in the auxiliary control box. The pressure transducer's high-pressure reference port is connected to the outside of the unit cabinet. The pressure transducer's low-pressure reference port is connected to the pick-up sensor at the filter section. Both ports are factory-installed.

The mixing box pressure transducer (MBPT) monitors the static pressure in the mixing box and provides a 4 to 20 mA signal directly to the return/exhaust VFD. The internal logic of the RE VFD compares this signal representing actual mixing box pressure to the pressure set point. The RE VFD automatically adjusts its output to the power exhaust fan motor to maintain the desired set point.

The MBPT has a range of -0.5 to $+0.5$ in. wg. The output is a 4 to 20 mA signal, scaled to this range. The RE VFD

translates the 4 to 20 mA signal to represent a frequency value over the control range of 0 to 60 Hz. See Table 58. The set point for the mixing box pressure control is established at the RE VFD keypad in terms of Hz. The factory default set point is 21 Hz, representing a mixing box pressure of -0.15 in. wg.

DETERMINE RE VFD SET POINT — The mixing box pressure set point will control the amount of outside air volume at a given minimum economizer damper position. By increasing the set point, there will be less outside air coming in from the economizer. Decreasing the set point will bring in more outside air. The factory default set point should meet most of the application needs, but it can be changed through the VFD keypad. To convert the desired MBP into the RE VFD set point, refer to Table 58. Locate the pressure value in the table closest to the desired MBP for the application and use the corresponding set point (Hz) value. If necessary, interpolation between duct static pressure values is permissible. The set point should always be lower than 30 Hz (0.0 in. wg).

Table 71 — Carrier Default Program Parameter Values (Return Fan VFD)

PARAMETER GROUP	PARAMETER	DEFAULT VALUE
SEtP (Setup)	ACC1	120.0 Sec*
	DEC1	120.0 Sec*
	UL	60.0 Hz
	LL	10.0 Hz*
	Luln	1
	P3	20%
	F-P3	0.0 Hz
	P4	100%
	F-P4	60 Hz
	tHr1	See Table 73
	StC1	0
	StL1	110%
	OLN	1
Gr.F (Fundamental)	tYP	5*
	FH	60 Hz*
	Pt	2
Gr.Fb (Feedback)	FbP1	1*
	Fbln	2
	GP	.30
	GI	2 sec
	GA	0
	GFS	80
	P1LL	5*
	PuL	1
	PuUI	10
Gr.St (Terminal Selection)	PuLL	10
	1t	1
	1t0	0
	1t1	56
	1t2	13
	1t3	3
Gr.Pr (Protection)	1t4	10
	UuC	1*
	UuCt	2
Gr.Ut (Utility)	ArSt	3
	Cnod	1*
	bLSF	1*
	Fnod	2*
	bLPn	1*

*These settings differ from the Toshiba defaults and are required for Carrier applications.

NOTE: To restore original factory settings, change tYP to 6 in Setup mode (SEtP). This restores the VFD original factory settings.

ADJUST RE VFD SET POINT — To adjust the RE VFD set point, the RE VFD must be powered. Since it is located in the indoor section of the unit, use caution to ensure that the service access door is blocked open and will not close suddenly. Change RE VFD set point according to Table 58.

RETURN/EXHAUST FAN MOTOR OVERLOAD PROTECTION — The VFD provides operating overload protection for the supply fan motor. The factory has programmed the RE VFD overload function to match the factory-installed motor (motor size and efficiency). If the power exhaust fan motor is changed from the original factory selection, the overload value may need to be changed by the service person. Contact your local Carrier representative for assistance in determining the proper overload setting.

NOTE: Variable frequency drive size is matched to factory-installed motor size. Do not increase motor size without also changing to equivalent VFD size.

RETURN/EXHAUST VFD OPERATION — When troubleshooting the power exhaust VFD, check first that all required conditions for RE VFD operation are satisfied.

For the RE VFD to run, the following conditions must be met at the power exhaust VFD (see Fig. 137):

1. Drive enable jumper is installed from terminals ST-CC (factory supplied).
2. Proper rotation jumper is installed at terminals F-CC (forward rotation, factory installed).
3. Emergency stop jumper is installed from terminals S4-CC (factory installed).
4. A 4 to 20 mA signal is applied across terminals IV-P24 (from pressure transducer, factory supplied).
5. DIP switch SW1 (located on the VFD's printed circuit control panel) must be set to "I" (indicating usage of a 4 to 20 mA input signal at terminals "IV").
6. Speed Control (located on the VFD's keypad/display) set to "Remote" (press the "Speed Ctrl" button until LED "Remote" is illuminated).
7. Programmed according to Carrier defaults.
8. Mixing Box Pressure set point established by user, or use factory default (21 Hz indicating -0.15 in. wg).

RETURN/EXHAUST VFD OPERATIONAL STATUS — The RE VFDs contain extensive self-diagnostic functions which are accessed through the RE VFD display panel (located on the front of the RE VFD or at a remote location when the accessory remote display package has been installed).

⚠ CAUTION

If using the VFD display panel, **disconnect all power to the unit and the VFD before entering unit**, or use the accessory remote display module. Disable supply fan and motor operation before accessing VFD-mounted display module.

When power is first supplied to the return/exhaust fan VFD, the display automatically starts with the frequency monitor function of its standard monitor mode. In the frequency monitor function, the output frequency is displayed. Push the S/P/M (**Setup/Program/Monitor**) key to switch to the Mode Selection menu. Push the S/P/M key again to toggle the display back to the standard monitor mode.

From the Mode Selection menu, the service person can view all of the monitored status variables, including up to four user-selected variables and any trip history in the memory.

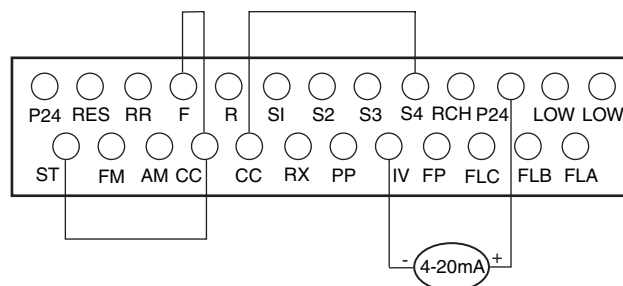


Fig. 137 — Return Fan Variable Frequency Drive Terminal Block

Refer to the separate VFD Operation Manual for detailed instructions on accessing diagnostic information, initiating troubleshooting and clearing any trip history.

RESTORING FACTORY RE VFD DEFAULTS — The original factory configuration values are saved in the memory of the RE VFD and can be restored by the service person if required. There are two types of saved file data: Carrier-factory settings (factory programmed settings made to the RE VFD which apply specifically to the unit it is installed on) and standard defaults for general Carrier unit use.

The Carrier-factory settings are maintained as user settings. These can be restored by entering the Setup mode (in the S/P/M menu) and setting parameter tYP=6 on the keypad/display. This will recall the specific factory defaults for this unit.

Occasionally it may be necessary to restore the RE VFD defaults to the general Carrier use values. These are stored in an OPTION ROM (read-only memory chip). However, some variables may need to be manually changed to match the specific unit's factory default settings. To recall the general Carrier defaults, enter the Setup mode and set parameter tYP=3. Refer to Tables 72 and 73 for items requiring manual adjustment.

Table 72 — Return/Exhaust Fan VFD Required User Adjusted Defaults

UNIT	ITEM
50ZC,ZD,ZL,ZM,ZR,ZS	Motor Overload Settings (see Table 73)
	1. Check jumper CC-F
	2. Gr. UT/bLSF = 1
	3. SetP/tYP = 5 (Save User Settings)
	4. SetP/ACC1 = 120.0
	5. SetP/DEC1 = 120.0
	6. SetP/LL = 10.0
	7. Gr. F/FH = 60
	8. Gr. Fb/FbP1 = 1
	9. Gr. Fb/P1LL = 5
	10. Gr. Pr/UuC = 1
	11. Gr. Ut/Cnod = 1
	12. Gr. Ut/Fnod = 2
	13. Gr. Ut/bLPn = 1

Table 73 — Return/Exhaust Fan Motor Overload Settings

UNIT 50	UNIT VOLTAGE DESIGNATION		MOTOR HP DESIGNATION	tHr1 SETTING
	Model No. Position 12		Model No. Position 16	
ZC,ZD,ZL,ZM,ZR,ZS	6	and	Q,V	98.0
	6	and	R,W	87.0
	6	and	S,X	82.0
	6	and	T,Y	85.0

Unit Wiring — A typical wiring schematic is shown in Fig. 138.

LEGEND AND NOTES FOR FIG. 138

C	— Contactor	IFM	— Indoor (Supply) Fan Motor
CB	— Circuit Breaker	LPS	— Low-Pressure Switch
CCB	— Control Circuit Breaker	MAT	— Mixed Air Thermostat
CH	— Crankcase Heater	OFC	— Outdoor (Condenser) Fan Contactor
CLO	— Compressor Lockout	OFM	— Outdoor (Condenser) Fan Motor
CO	— Convenience Outlet	PCB	— Power Exhaust Circuit Breaker
COMP	— Compressor	PEC	— Power Exhaust Contactor
CV	— Constant Volume	PEDM	— Power Exhaust Damper Motor
DMS	— Damper Motor Switch	PEDMS	— Power Exhaust Damper Motor Switch
DPS	— Duct Pressure Switch	PEM	— Power Exhaust Motor
DU	— Dummy	P, PL	— Plug
EQUIP	— Equipment	RCB	— Return Fan Circuit Breaker
FLA	— Full Load Amps	RFC	— Return Fan Contactor
GND	— Ground	RFM	— Return Fan Motor
HC	— Heater Contactor	TB	— Terminal Block
HPCT	— Head Pressure Control Thermostat	TRAN	— Transformer
HPS	— High-Pressure Switch	— — — —	Field Wiring
HR	— Heat Relay	—————	Factory Wiring
IDM	— Induced Draft Motor		
IFC	— Indoor (Supply) Fan Contactor		
IFCB	— Indoor (Supply) Fan Circuit Breaker		

NOTES:

1. Connect TRAN1 to  for 460-v units. Connect to  for 230-v units. If 208/230-v units are run with a 208-v power supply connect to .
2. Connect TRAN2 to BLK lead for 460-v units. Connect to ORN lead for 230-v units. If 208/230-v units are run with a 208-v power supply connect to RED lead.
3. Circuit breaker must trip amps are equal to or less than 156% FLA for CB1 and CB2. All others are 140%.
4. If any of the original wire furnished must be replaced, it must be replaced with type 90° C wire or its equivalent.
5. Number(s) indicates the line location of contacts. A bracket over (2) numbers signifies single-pole double-throw contacts. An underlined number signifies a normally closed contact. Plain number(s) (no lines), signifies a normally opened contact.
6. Condenser-fan motors are thermally protected.
7. Three-phase motors are protected under primary single phasing conditions.

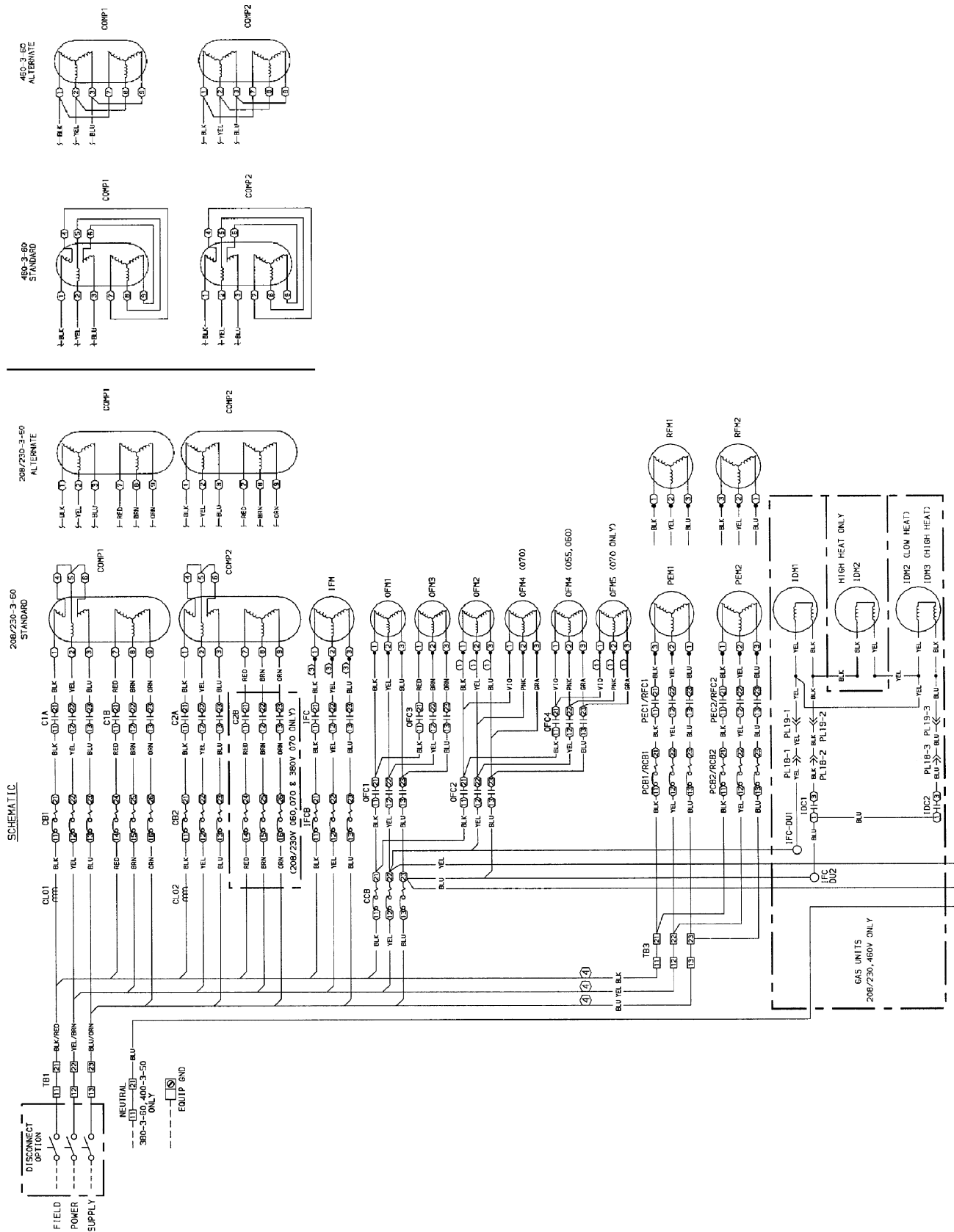


Fig. 138 — Typical Wiring Schematic; 50ZA,ZB Units (055-070 Shown)

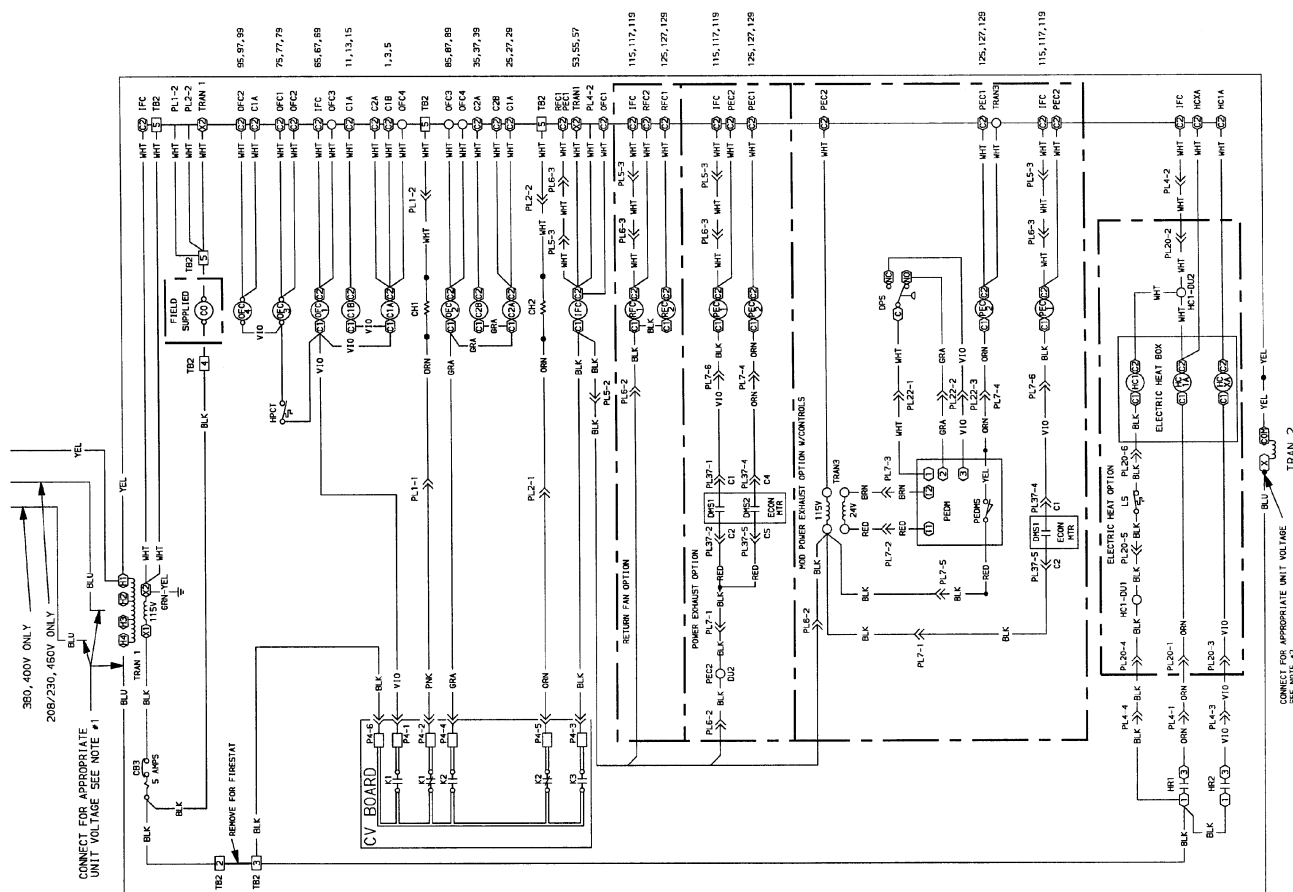


Fig. 138 — Typical Wiring Schematic; 50ZA,ZB Units (055-070 Shown) (cont)

TROUBLESHOOTING AND DIAGNOSTICS

PROBLEM	SOLUTION
COMPRESSOR DOES NOT RUN Contactors Open 1. Power off. 2. Fuses blown in field power circuit. 3. No control power. 4. Compressor circuit breaker tripped. 5. Safety device lockout circuit active. 6. Low-pressure switch open. 7. High-pressure switch open. 8. Loose electrical connections. 9. Compressor stuck.	1. Restore power. 2. After finding cause and correcting, replace with correct size fuse. 3. Check secondary fuse(s); replace with correct type and size. Replace transformer if primary windings receiving power. 4. Check for excessive compressor current draw. Reset breaker; replace if defective. 5. Reset lockout circuit at circuit breaker. 6. Check for refrigerant undercharge, obstruction of indoor airflow, or whether compressor suction shutoff valve is fully open. Make sure liquid line solenoid valve(s) is open. 7. Check for refrigerant overcharge, obstruction of outdoor airflow, air in system or whether compressor discharge valve is fully open. Be sure outdoor fans are operating correctly. 8. Tighten all connections. 9. See 06D and 06E compressor service literature.
Contactors Closed 1. Compressor leads loose. 2. Motor windings open. 3. Single phasing.	1. Check connections. 2. See 06D and 06E compressor service literature. 3. Check for blown fuse. Check for loose connection at compressor terminal.
COMPRESSOR STOPS ON HIGH-PRESSURE SWITCH Outdoor Fan On 1. High-pressure switch faulty. 2. Airflow restricted. 3. Air recirculating. 4. Noncondensables in system. 5. Refrigerant overcharge. 6. Line voltage incorrect. 7. Refrigerant system restrictions.	1. Replace switch. 2. Remove obstruction. 3. Clear airflow area. 4. Purge and recharge as required. 5. Purge as required. 6. Consult power company. 7. Check or replace filter drier, expansion valve, etc. Check that compressor discharge valve is fully open.
Outdoor Fan Off 1. Fan slips on shaft. 2. Motor not running. 3. Motor bearings stuck. 4. Motor overload open. 5. Motor burned out.	1. Tighten fan hub setscrews. 2. Check power and capacitor. 3. Replace bearings. 4. Check overload rating. Check for fan blade obstruction. 5. Replace motor.
COMPRESSOR CYCLES ON LOW-PRESSURE SWITCH Indoor-Air Fan Running 1. Filter drier plugged. 2. Expansion valve power head defective. 3. Low refrigerant charge.	1. Replace filter drier. 2. Replace power head. 3. Add charge. Check low-pressure switch setting.
Airflow Restricted 1. Coil iced up. 2. Coil dirty. 3. Air filters dirty. 4. Dampers closed.	1. Check refrigerant charge. 2. Clean coil fins. 3. Clean or replace filters. 4. Check damper operation and position.
Indoor-Air Fan Stopped 1. Electrical connections loose. 2. Fan relay defective. 3. Motor overload open. 4. Motor defective. 5. Fan belt broken or slipping.	1. Tighten all connections. 2. Replace relay. 3. Power supply. 4. Replace motor. 5. Replace or tighten belt.

LEGEND

PSIO — Processor Module
VFD — Variable Frequency Drive

TROUBLESHOOTING AND DIAGNOSTICS (cont)

PROBLEM	SOLUTION
COMPRESSOR RUNNING BUT COOLING INSUFFICIENT Suction Pressure Low 1. Refrigerant charge low. 2. Head pressure low. 3. Air filters dirty. 4. Expansion valve power head defective. 5. Indoor coil partially iced. 6. Indoor airflow restricted.	1. Add refrigerant. 2. Check refrigerant charge. 3. Clean or replace filters. 4. Replace power head. 5. Check low-pressure setting. 6. Remove obstruction.
Suction Pressure High 1. Unloaders not functioning. 2. Compressor valve defective. 3. Heat load excessive.	1. Check unloader adjustments. Check unloader setting. 2. See 06D and 06E compressor service literature. 3. Check for open doors or windows in vicinity of fan coil.
UNIT OPERATES TOO LONG OR CONTINUOUSLY 1. Low refrigerant charge. 2. Control contacts fused. 3. Air in system. 4. Partially plugged expansion valve or filter drier.	1. Add refrigerant. 2. Replace control. 3. Purge and evacuate system. 4. Clean or replace.
SYSTEM IS NOISY 1. Piping vibration. 2. Compressor noisy.	1. Support piping as required. 2. Check valve plates for valve noise. Replace compressor if bearings are worn.
COMPRESSOR LOSES OIL 1. Leak in system. 2. Crankcase heaters not energized during shutdown.	1. Repair leak. 2. Check wiring and relays. Check heater and replace if defective.
FROSTED SUCTION LINE Expansion valve admitting excess refrigerant.	Adjust expansion valve.
HOT LIQUID LINE 1. Shortage of refrigerant due to leak. 2. Expansion valve opens too wide.	1. Repair leak and recharge. 2. Adjust expansion valve.
FROSTED LIQUID LINE Restricted filter drier.	Remove restriction or replace.
CONTACTOR OPEN 1. Power off. 2. Fuses blown in field power circuit. 3. No control power.	1. Restore power. 2. After finding cause and correcting, replace with correct fuses. 3. Check secondary fuses. Replace with correct type and size. Replace transformer if primary windings are receiving power.
CONTACTOR CLOSED 1. VFD overload function tripped. 2. Motor leads loose. 3. Motor windings open. 4. Single phasing. 5. Belts broken or thrown. 6. Fan status switch contacts defective.	1. Refer to separate VFD technical manual for troubleshooting instructions. 2. Check connections at motor lead junction box. 3. Check motor windings. 4. Check for blown fuse. Check for loose connections at motor junction box. 5. Check belts. Replace as complete set if necessary. 6. Check for input signal at PSIO no. 1, channel 12. Replace switch if defective.

LEGEND

PSIO — Processor Module
 VFD — Variable Frequency Drive

START-UP CHECKLIST

MODEL NO.: _____

SERIAL NO.: _____

DATE: _____

TECHNICIAN: _____

PRE-START-UP:

- ☐ VERIFY THAT UNIT IS LEVEL
- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ LOOSEN ALL SHIPPING HOLDDOWN BOLTS AND REMOVE SHIPPING BRACKETS PER INSTRUCTIONS
- ☐ VERIFY THAT COMPRESSOR SUSPENSION SPRINGS HAVE BEEN LOOSENEED PER INSTRUCTIONS
- ☐ VERIFY OPENING OF ECONOMIZER HOODS
- ☐ VERIFY INSTALLATION OF EXHAUST HOODS
- ☐ VERIFY THAT CONDENSATE CONNECTIONS ARE INSTALLED PER INSTRUCTIONS
- ☐ VERIFY THAT POWER SUPPLY MATCHES UNIT DATA PLATE
- ☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT
- ☐ CHECK THAT INDOOR-AIR FILTERS ARE CLEAN AND IN PLACE
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE, AND VERIFY SET SCREWS ARE TIGHT
- ☐ VERIFY THAT FAN SHEAVES ARE ALIGNED AND BELTS ARE PROPERLY TENSIONED
- ☐ OPEN SUCTION, DISCHARGE, AND LIQUID LINE SERVICE VALVES
- ☐ CHECK COMPRESSOR OIL LEVEL SIGHT GLASS AND VERIFY PROPER LEVEL
- ☐ VERIFY THAT CRANKCASE HEATERS HAVE BEEN ENERGIZED FOR 24 HOURS
- ☐ CHECK VOLTAGE IMBALANCE

LINE-TO-LINE VOLTS: AB _____ V AC _____ V BC _____ V

$(AB + AC + BC)/3 = \text{AVERAGE VOLTAGE} = \text{_____ V}$

MAXIMUM DEVIATION FROM AVERAGE VOLTAGE = _____ V

VOLTAGE IMBALANCE = $100 \times (\text{MAX DEVIATION})/(\text{AVERAGE VOLTAGE}) = \text{_____ \%}$

IF OVER 2% VOLTAGE IMBALANCE, DO NOT ATTEMPT TO START SYSTEM!
CALL LOCAL POWER COMPANY FOR ASSISTANCE.

START-UP

CHECK SUPPLY FAN SPEED AND RECORD. _____

CHECK CONDENSER FAN SPEED AND RECORD. _____

AFTER AT LEAST 10 MINUTES RUNNING TIME, RECORD THE FOLLOWING MEASUREMENTS:

	COMP 1	COMP 2
OIL PRESSURE	_____	_____
SUCTION PRESSURE	_____	_____
SUCTION LINE TEMP	_____	_____
DISCHARGE PRESSURE	_____	_____
DISCHARGE LINE TEMP	_____	_____
ENTERING CONDENSER AIR TEMP	_____	_____
LEAVING CONDENSER AIR TEMP	_____	_____
EVAP ENTERING AIR DB TEMP	_____	_____
EVAP ENTERING AIR WB TEMP	_____	_____
EVAP LEAVING AIR DB TEMP	_____	_____
EVAP LEAVING AIR WB TEMP	_____	_____
COMPRESSOR AMPS (L1)	_____	_____
COMPRESSOR AMPS (L2)	_____	_____
COMPRESSOR AMPS (L3)	_____	_____

ELECTRICAL

SUPPLY FAN AMPS _____ EXHAUST FAN AMPS _____

ELECTRIC HEAT AMPS L1 _____ L2 _____ L3 _____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE _____ F DB (Dry-Bulb)

RETURN-AIR TEMPERATURE _____ F DB _____ F WB (Wet-Bulb)

COOLING SUPPLY AIR _____ F

PRESSURES

REFRIGERANT SUCTION CIRCUIT NO. 1 _____ PSIG CIRCUIT NO. 2 _____ PSIG

REFRIGERANT DISCHARGE CIRCUIT NO. 1 _____ PSIG CIRCUIT NO. 2 _____ PSIG

☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHART ON PAGE 153.

GENERAL

☐ ECONOMIZER MINIMUM VENT AND CHANGEOVER SETTINGS TO JOB REQUIREMENTS

CHECK THE COMPRESSOR OIL LEVEL SIGHT GLASSES; ARE THE SIGHT GLASSES SHOWING OIL LEVEL PER INSTRUCTIONS ON PAGE 117. (Y/N) _____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE