Installation, Start-Up and Service Instructions

CONTENTS

SAFETY CONSIDERATIONS

Installation and servicing 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. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit and install lockout tag on disconnect. Ensure voltage listed on unit data plate agrees with electrical supply provided for the unit. Electrical shock could cause serious personal injury.

INSTALLATION

Unit is shipped in the vertical discharge configuration. To convert to horizontal configuration, remove screws from side duct opening covers and remove covers. Using the same screws, install covers on vertical duct openings with the insulation-side down. Seals around duct openings must be tight. See Fig. 1.

Step 1 — Provide Unit Support

ROOF CURB — Assemble and install accessory roof curb in accordance with instructions shipped with curb. See Fig. 2. Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to curb, not to unit.* If electric or control power is to be routed through the basepan, attach the accessory thru-the-bottom service connections to the basepan in accordance with the accessory installation instructions. *Connection must be installed before unit is set on roof curb.*

IMPORTANT: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Fig. 2. Improperly applied gasket can also result in air leaks and poor unit performance.

Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 3. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

SLAB MOUNT (Horizontal Units Only) — Provide a level concrete slab that extends a minimum of 6 in. beyond unit cabinet. Install a gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow.

NOTE: Horizontal units may be installed on a roof curb if required.

ALTERNATE UNIT SUPPORT — When the curb or adapter cannot be used, support the unit with sleepers using the curb or adapter support area. If sleepers cannot be used, support the long sides of the unit with a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

Step 2 — Field Fabricate Ductwork — Secure all ducts to roof curb and building structure on vertical discharge units. *Do not connect ductwork to unit.* For horizontal applications, field-supplied flanges should be attached to horizontal discharge openings and all ductwork should be attached to the flanges. Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier.

If a plenum return is used on a vertical unit, the return should be ducted through the roof deck to comply with applicable fire codes.

A minimum clearance is not required around ductwork. Cabinet return-air static pressure (a negative condition) should not exceed 0.35 in. wg with economizer or 0.45 in. wg without economizer.

Step 3 — Install External Trap for Condensate Drain — The unit's $^{3}/_{4}$-in. condensate drain connections are located at the bottom and side of the unit. Unit discharge connections do not determine the use of drain connections; either drain connection can be used with vertical or horizontal applications.

When using the standard side drain connection, make sure the red plug in the alternate bottom connection is tight before installing the unit.

To use the bottom drain connection for a roof curb installation, relocate the factory-installed red plug from the bottom connection to the side connection. See Fig. 4. The piping for the condensate drain and external trap can be completed after the unit is in place. The center drain plug looks like a star connection, however, it can be removed with a $^{1}/_{2}$-in. socket drive extension.

All units must have an external trap for condensate drainage. Install a trap at least 4 in. deep and protect against freeze-up. If drain line is installed downstream from the external trap, pitch the line away from the unit at 1 in. per 10 ft of run. Do not use a pipe size smaller than the unit connection ($^{3}/_{4}$-in.). See Fig. 5.

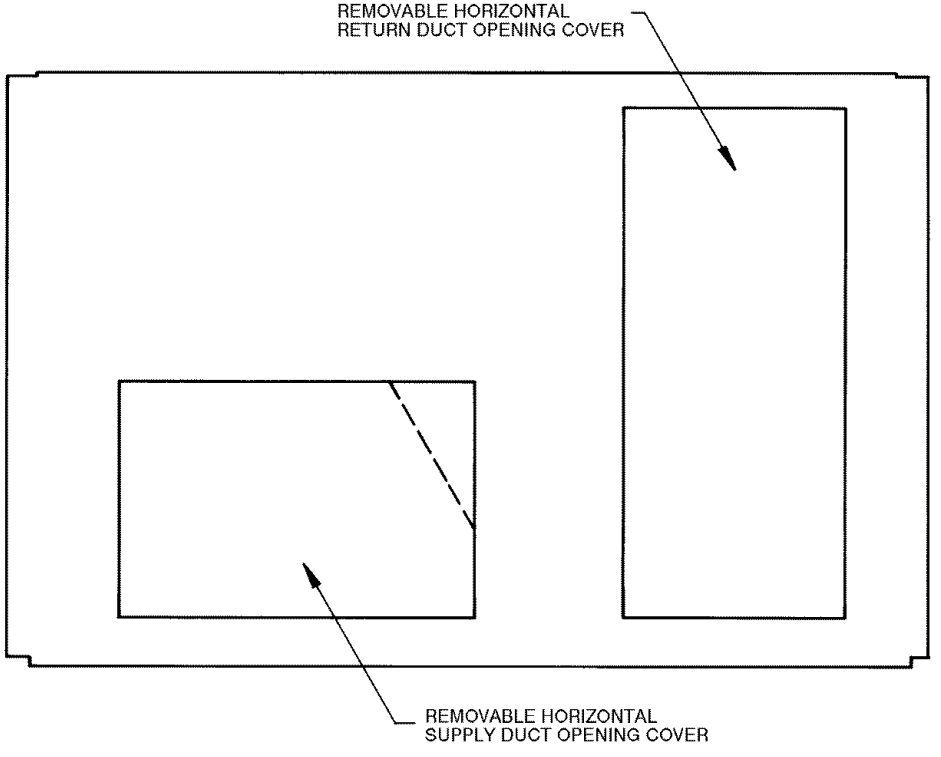


Fig. 1 — Horizontal Conversion Panels

CONNECTOR PKG. ACCY.	B	C	D ALT DRAIN HOLE	GAS	POWER	CONTROL	ACCESSORY PWR
CRBTMPWR001A01	1′-9 11/16″ [551]	1′-4″ [406]	1 3/4″ [44.5]	3/4″ [19] NPT	3/4″ [19] NPT	1/2″ [12.7] NPT	1/2″ [12.7] NPT
CRBTMPWR002A01					1 1/4″ [31.7]		
CRBTMPWR003A01				1/2″ [12.7] NPT	3/4″ [19] NPT		
CRBTMPWR004A01				3/4″ [19] NPT	1 1/4″ [31.7]		

ROOF CURB ACCESSORY	A	UNIT SIZE
CRRFCURB001A01	1′-2″ [356]	50TFF,TM 004-007
CRRFCURB002A01	2′-0″ [610]	

NOTES:
1. Roof curb accessory is shipped disassembled.
2. Insulated panels.
3. Dimensions in [ ] are in millimeters.
4. Roof curb: galvanized steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Service clearance: 4 ft on each side.
7. Direction of airflow.
8. Connector packages CRBTMPWR001A01 and 002A01 are for thru-the-curb type gas. Packages CRBTMPWR003A01 and 004A01 are for thru-the-bottom type gas connections.

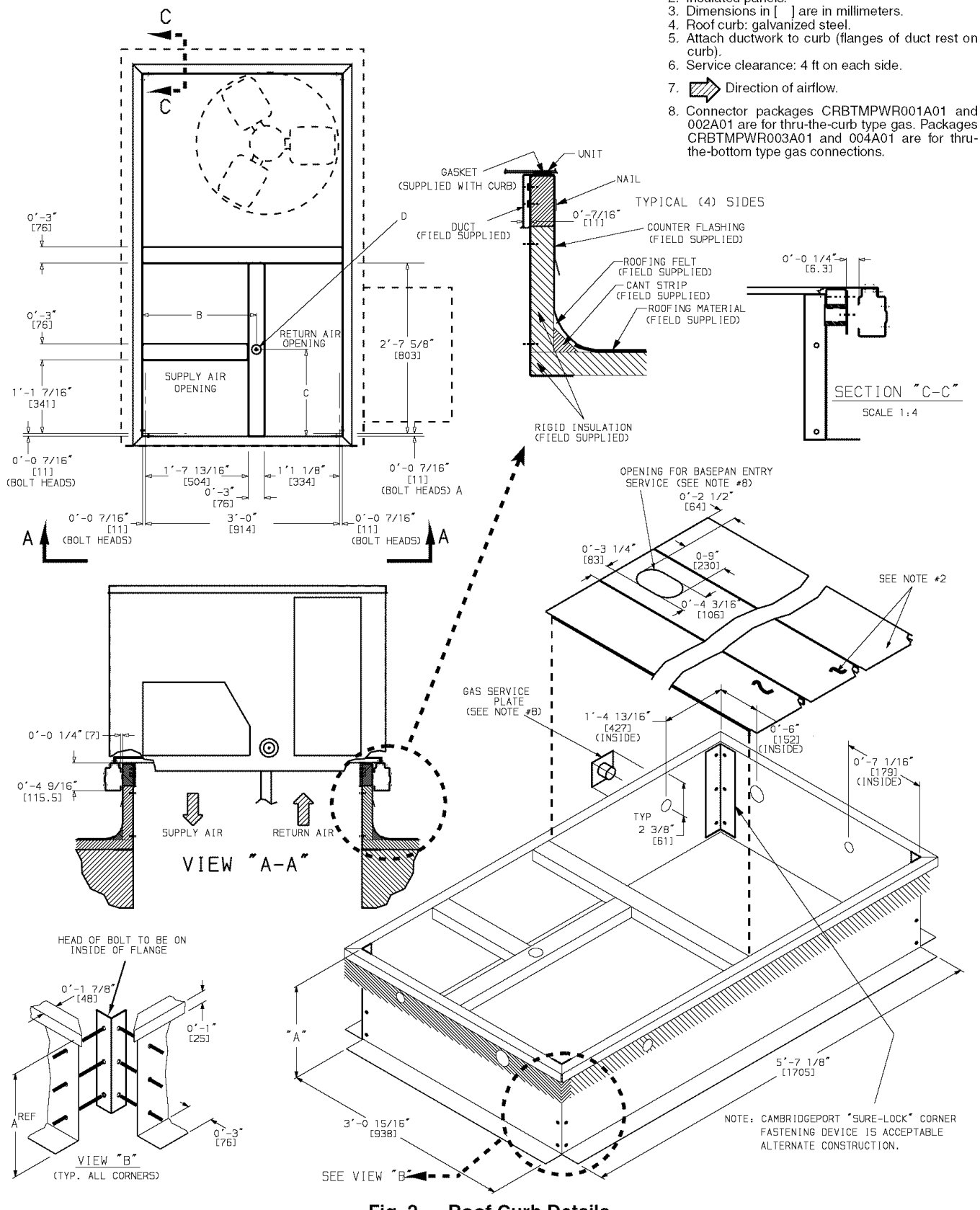
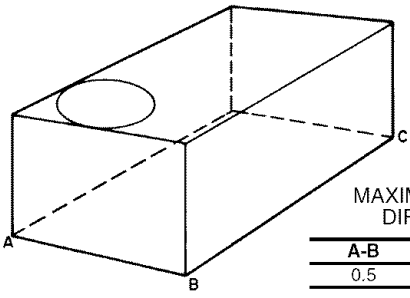


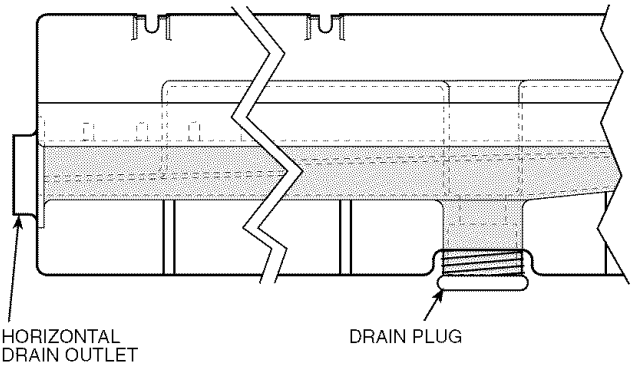
Fig. 2 — Roof Curb Details



MAXIMUM ALLOWABLE DIFFERENCE (in.)

A-B	B-C	A-C
0.5	1.0	1.0

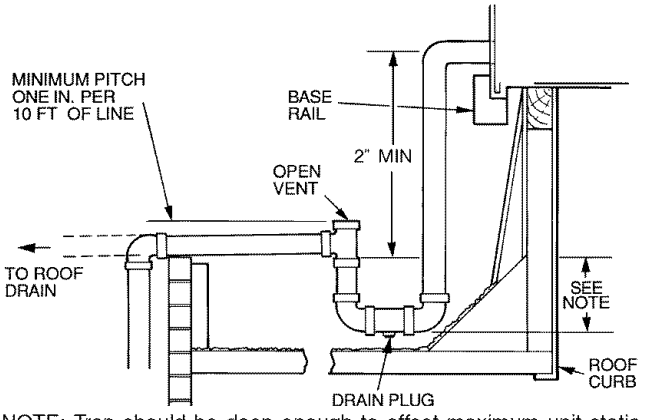
Fig. 3 — Unit Leveling Tolerances



NOTE: Drain plug is shown in factory-installed position.

Fig. 4 — Condensate Drain Pan (Side View)

Step 4 — Rig and Place Unit — Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Tables 1A and 1B and Fig. 6 for additional information. Operating weight is shown in Tables 1A and 1B and Fig. 7A and 7B.



NOTE: Trap should be deep enough to offset maximum unit static difference. A 4-in. trap is recommended.

Fig. 5 — Condensate Drain Piping Details

Lifting holes are provided in base rails as shown in Fig. 7A and 7B. Refer to rigging instructions on unit.

⚠ CAUTION

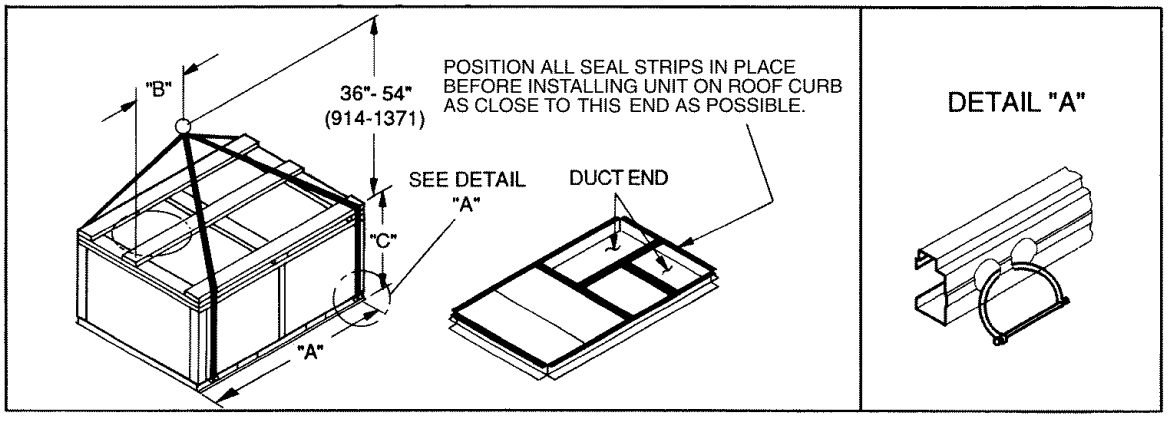
All panels must be in place when rigging. Unit is not designed for handling by fork truck. Damage to unit may result.

POSITIONING — Maintain clearance around and above unit to provide proper airflow and service access. See Fig. 7A and 7B. A properly positioned unit will have the following clearances: $^1/_4$-in. clearance between roof curb and base rails on each side and duct end of unit; $^1/_4$-in. clearance between roof curb and condenser coil end of unit. (See Fig. 2, section C-C.)

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

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

After unit is in position, remove shipping materials and top crating.



NOTES:
1. Dimension in ( ) is in millimeters.
2. Hook rigging shackles through holes in base rail, as shown in detail "A." Holes in base rails are centered around the unit center of gravity. Use wooden top skid when rigging to prevent rigging straps from damaging unit.
3. Weights do not include economizer. See Tables 1A and 1B for economizer weights.

⚠ CAUTION

All panels must be in place when rigging. Unit is not designed for handling by fork truck. Damage to unit may result.

UNIT SIZE	MAX WEIGHT		DIMENSIONS					
			"A"		"B"		"C"	
	lb	kg	in.	mm	in.	mm	in.	mm
50TFF,TM004	415	188	73.69	1872	35.00	889	33.35	847
50TFF,TM005	425	193	73.69	1872	35.00	889	33.35	847
50TFF,TM006	445	202	73.69	1872	35.00	889	33.35	847
50TFF007	520	236	73.69	1872	35.00	889	33.35	847
50TM007	570	259	73.69	1872	35.00	889	33.35	847

Fig. 6 — Rigging Details

UNIT	STD. UNIT WEIGHT		ECONOMI$ERIV WEIGHT		VERT. ECON IV W/ P.E. WEIGHT		(A) CORNER WEIGHT		(B) CORNER WEIGHT		(C) CORNER WEIGHT		(D) CORNER WEIGHT		"A" PANEL LENGTH
	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	
50T__004	365	165.6	50	22.7	90	40.9	126	57.2	89	40.4	111	50.3	39	17.7	1'-10 3/8" [568.0]
50T__005	375	170.1	↓	↓	↓	↓	128	58.1	90	40.8	114	51.7	43	19.5	1'-10 3/8" [568.0]
50T__006	395	179.2	↓	↓	↓	↓	132	59.9	94	42.6	120	54.4	49	22.2	1'-0 3/8" [315.0]
50TFF007	470	213.2	↓	↓	↓	↓	148	67.1	103	46.7	155	70.3	64	29.0	1'-0 3/8" [315.0]

NOTES:

1. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. ⊕ CENTER OF GRAVITY.
3. ⇨ DIRECTION OF AIR FLOW.
4. ON VERTICAL DISCHARGE UNITS, DUCTWORK TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY. FOR HORIZONTAL DISCHARGE UNITS FIELD SUPPLIED FLANGES SHOULD BE ATTACHED TO HORIZONTAL DISCHARGE OPENINGS, AND ALL DUCTWORK SHOULD BE ATTACHED TO THE FLANGES.
5. MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BOTTOM OF UNIT TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 1 INCH. BOTTOM OF BASE RAIL TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES.
   b. CONDENSER COIL, FOR PROPER AIR FLOW, 36 INCHES ONE SIDE, 12 INCHES THE OTHER. THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
   c. OVERHEAD, 60 INCHES TO ASSURE PROPER CONDENSER FAN OPERATION.
   d. BETWEEN UNITS, CONTROL BOX SIDE, 42 IN. PER NEC.
   e. BETWEEN UNIT AND UNGROUNDED SURFACES, CONTROL BOX SIDE, 36 IN. PER NEC.
   f. BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, CONTROL BOX SIDE, 42 IN. PER NEC.
   g. HORIZONTAL SUPPLY AND RETURN END, 0 INCHES WHEN THE ALTERNATE CONDENSATE DRAIN IS USED.
6. WITH THE EXCEPTION OF THE CLEARANCE FOR THE CONDENSER COIL AS STATED IN NOTE #5a, b, AND c, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
7. UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM WOOD OR CLASS A, B, OR C ROOF COVERING MATERIAL IF SET ON BASERAIL.
8. THE VERTICAL CENTER OF GRAVITY IS 1'-6" [457] UP FROM THE BOTTOM OF THE BASE RAIL.

BOTTOM POWER CHART:
THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGES - CRBTMPWR001A01, 2A01

THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
1/2"	ACC.	7/8" [22.2]
1/2"	24V	7/8" [22.2]
3/4" (001)	POWER*	1 1/8" [28.4]
1 1/4" (002)	POWER*	1 3/4" [44.4]

* - SELECT EITHER 3/4" OR 1 1/4" FOR POWER, DEPENDING ON WIRE SIZE.

	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2" DIA. [51] POWER SUPPLY KNOCK-OUT
C	2 1/2" DIA. [64] POWER SUPPLY KNOCK-OUT
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN

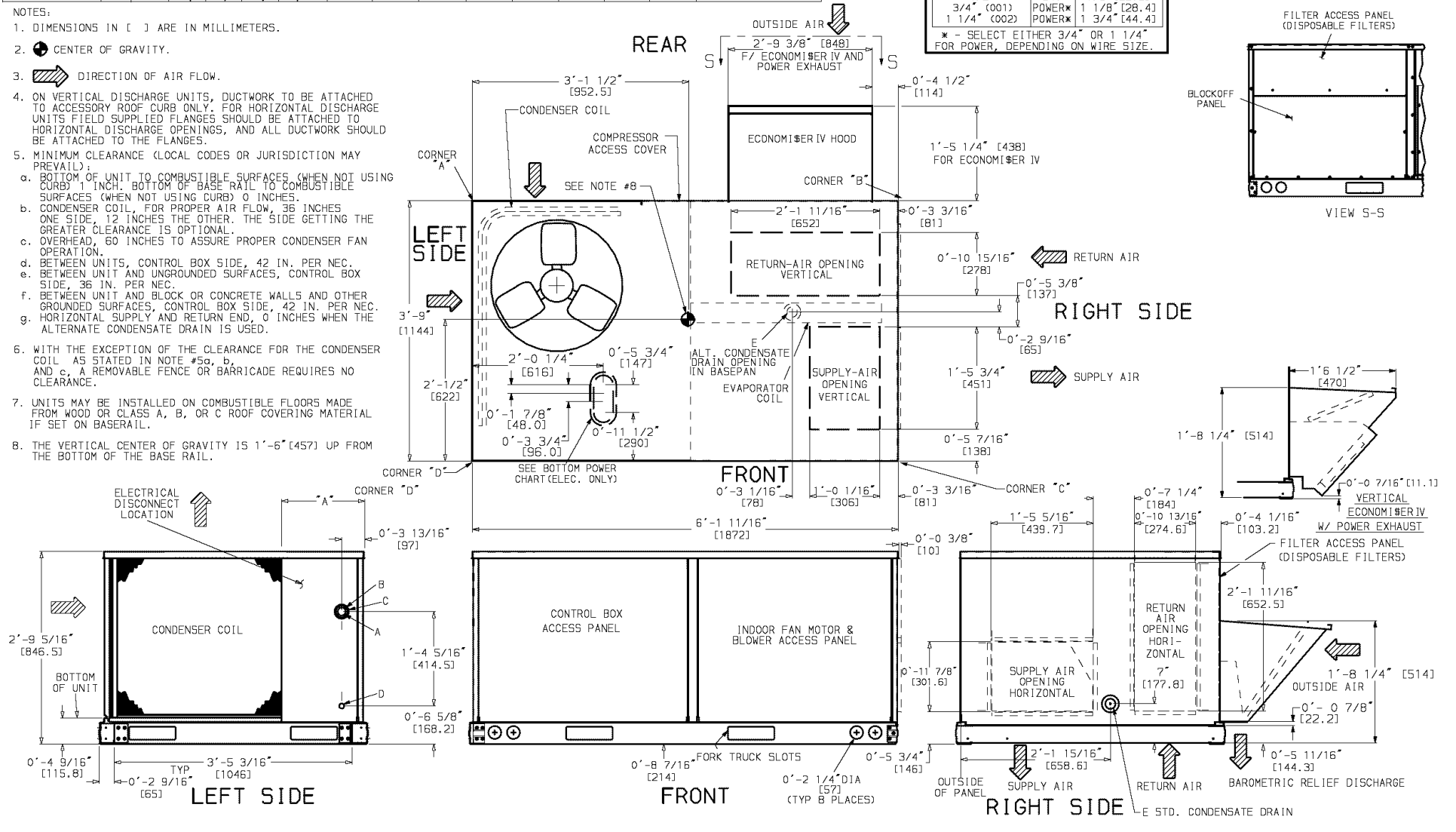


Fig. 7A — Base Unit Dimensions — 50TFF004-007 and 50TM004-006 Units

UNIT	STD. UNIT WEIGHT		ECONOMI$ER IV WEIGHT		VERT. ECON IV W/ P.E. WEIGHT		(A) CORNER WEIGHT		(B) CORNER WEIGHT		(C) CORNER WEIGHT		(D) CORNER WEIGHT		"J"	
	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	FT -IN.	MM
50TM007	520	236	50	22.7	90	40.9	149	67.6	127	57.6	112	50.8	132	59.9	2'-9 5/16"	846.5

BOTTOM POWER CHART:
THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGES - CRBTMPWR001A01, 2A01, 3A01, OR 4A01

THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
1/2"	ACC.	7/8" [22.2]
1/2"	24V	7/8" [22.2]
3/4" (001,003)	POWER*	1 1/8" [28.4]
1 1/4" (002,004)	POWER*	1 3/4" [44.4]
(003) 1/2"FPT	GAS	1 1/4" [31.8]
(004) 3/4"FPT	GAS	1 5/8" [41.3]

* - SELECT EITHER 3/4" OR 1 1/4" FOR POWER, DEPENDING ON WIRE SIZE.

	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2" DIA. [51] POWER SUPPLY KNOCK-OUT
C	1 3/4" DIA. [44] CHARGING PORT HOLE
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	2 1/2" DIA. [64] POWER SUPPLY KNOCK-OUT

NOTES:
1. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. ⊕ CENTER OF GRAVITY.
3. ⇨ DIRECTION OF AIR FLOW.
4. DUCTWORK TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY.
5. MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BOTTOM TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES, ON HORIZONTAL DISCHARGE UNITS WITH ELECTRIC HEAT 1 INCH CLEARANCE TO DUCTWORK FOR 1 FOOT.
   b. CONDENSER COIL, FOR PROPER AIR FLOW, 36 INCHES ONE SIDE, 12 INCHES THE OTHER. THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
   c. OVERHEAD, 60 INCHES TO ASSURE PROPER CONDENSER FAN OPERATION.
   d. BETWEEN UNITS, CONTROL BOX SIDE, 42 IN. PER NEC.
   e. BETWEEN UNIT AND UNGROUNDED SURFACES, CONTROL BOX SIDE, 36 IN. PER NEC.
   f. BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, CONTROL BOX SIDE, 42 IN. PER NEC.
   g. HORIZONTAL SUPPLY AND RETURN END, 0 INCHES WHEN THE ALTERNATE CONDENSATE DRAIN IS USED.
6. WITH THE EXCEPTION OF THE CLEARANCE FOR THE CONDENSER COIL AS STATED IN NOTES 5a, b, AND c, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
7. UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM WOOD OR CLASS A, B, OR C ROOF COVERING MATERIAL.
8. THE VERTICAL CENTER OF GRAVITY IS 1'-6 1/2"[470] UP FROM THE BOTTOM OF THE BASE RAIL.

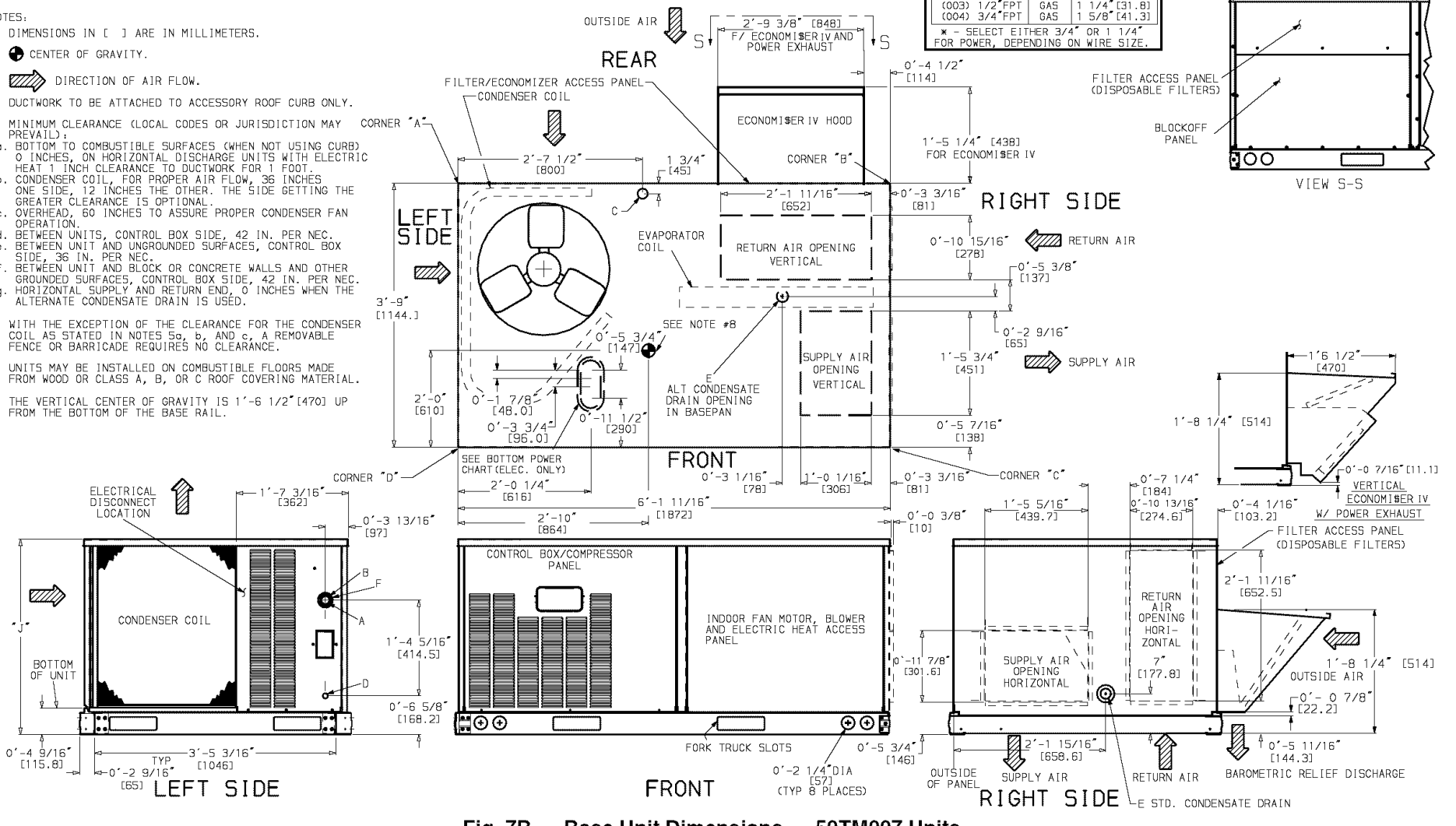


Fig. 7B — Base Unit Dimensions — 50TM007 Units

Table 1A — Physical Data — 50TFF004-007

50TFF UNIT SIZE		004	005	006	007
NOMINAL CAPACITY (tons)		3	4	5	6
OPERATING WEIGHT (lb)					
Unit					
Al/Al*		365	375	395	470
Al/Cu*		370	381	402	479
Cu/Cu*		373	387	410	490
EconoMi$er IV		50	50	50	50
Roof Curb†		115	115	115	115
COMPRESSOR		Reciprocating			Scroll
Quantity		1	1	1	1
No. Cylinders (per circuit)		2	2	2	2
Oil (oz)		50	50	50	54
REFRIGERANT TYPE		R-22			
Operating Charge (lb-oz)					
Circuit 1		4-4	6-6	6-14	9-0
Circuit 2		—	—	—	—
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins			
Rows...Fins/in.		1...17	2...17	2...17	2...17
Total Face Area (sq ft)		8.36	8.36	10.42	10.42
CONDENSER FAN		Propeller Type			
Nominal Cfm		3500	4000	4000	4000
Quantity...Diameter (in.)		1...22.0	1...22.0	1...22.0	1...22.0
Motor Hp...Rpm		1/4...1100	1/4...1100	1/4...1100	1/4...1100
Watts Input (Total)		325	325	325	325
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins			
Expansion Device		Acutrol™ Metering Device			
Rows...Fins/in.		2...15	2...15	3...15	4...15
Total Face Area (sq ft)		4.17	5.5	5.5	5.5
EVAPORATOR FAN		Centrifugal Type			
Quantity...Size (in.)	Std	1...10 x 10	1...10 x 10	1...11 x 10	1...10 x 10
	Alt	1...10 x 10	1...10 x 10	1...10 x 10	—
	High-Static	1...10 x 10	1...10 x 10	1...10 x 10	1...10 x 10
Type Drive	Std	Direct	Direct	Direct	Belt
	Alt	Belt	Belt	Belt	—
	High-Static	Belt	Belt	Belt	Belt
Nominal Cfm		1200	1600	2000	2100
Maximum Continuous Bhp	Std	.34	.75	1.20	2.40
	Alt	1.20	1.20	1.30/2.40**	—
	High-Static	2.40	2.40	2.90	2.90
Motor Frame Size	Std	48	48	48	56
	Alt	48	48	56	—
	High-Static	56	56	56	56
Nominal Rpm High/Low	Std	860/800	1075/970	1075/1040	—
	Alt	1620	1620	1725	—
	High-Static	1725	1725	1725	1725
Fan Rpm Range	Std	—	—	—	1070-1460
	Alt	760-1000	835-1185	900-1300	—
	High-Static	1075-1455	1075-1455	1300-1685	1300-1685
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Allowable Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter Min/Max (in.)	Std	—	—	—	2.8/3.8
	Alt	1.9/2.9	1.9/2.9	2.8/3.8	—
	High-Static	2.8/3.8	2.8/3.8	3.4/4.4	3.4/4.4
Nominal Motor Shaft Diameter (in.)	Std	1/2	1/2	1/2	5/8
	Alt	1/2	1/2	5/8	—
	High-Static	5/8	5/8	5/8	5/8
Fan Pulley Pitch Diameter (in.)	Std	—	—	—	4.5
	Alt	4.5	4.0	5.5	—
	High-Static	4.5	4.5	4.5	4.5
Belt, Quantity...Type...Length (in.)	Std	—	—	—	1...A...39
	Alt	1...A...36	1...A...36	1...A...40	—
	High-Static	1...A...39	1...A...39	1...A...40	1...A...40
Pulley Center Line Distance (in.)	Std	—	—	—	14.7-15.5
	Alt	10.0-12.4	10.0-12.4	14.7-15.5	—
	High-Static	10.0-12.4	10.0-12.4	14.7-15.5	14.7-15.5
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Std	—	—	—	80
	Alt	48	70	80	—
	High-Static	65	65	60	60
Movable Pulley Maximum Full Turns From Closed Position	Std	—	—	—	5
	Alt	5	5	6	—
	High-Static	6	6	5	5
Factory Setting	Std	—	—	—	3
	Alt	3	3	3	—
	High-Static	3 1/2	3 1/2	3 1/2	3 1/2
Factory Speed Setting (rpm)	Std	—	—	—	1226
	Alt	856	975	1100	—
	High-Static	1233	1233	1416	1416
Fan Shaft Diameter at Pulley (in.)		5/8	5/8	5/8	5/8
HIGH-PRESSURE SWITCH (psig)					
Standard Compressor Internal Relief (Differential)			450 ± 50		500 ± 50
Cutout			428		428
Reset (Auto.)			320		320
LOSS-OF-CHARGE (LOW-PRESSURE) SWITCH (psig)					
Cutout			7 ± 3		
Reset (Auto.)			22 ± 7		
FREEZE-PROTECTION THERMOSTAT (F)					
Opens			30 ± 5		
Closes			45 ± 5		
OUTDOOR-AIR INLET SCREENS		Cleanable. Screen size and quantity varies with option selected.			
RETURN-AIR FILTERS		Throwaway			
Quantity...Size (in.)		2...16 x 25 x 2			

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material. Contact your local Carrier representative for details about coated fins.
†Weight of 14-in. roof curb.
**Single phase/three phase.

Table 1B — Physical Data — 50TM004-007

50TM UNIT SIZE		004	005	006	007
NOMINAL CAPACITY (tons)		3	4	5	6
OPERATING WEIGHT (lb)					
Unit					
Al/Al*		365	375	395	520
EconoMI$er IV		50	50	50	50
Roof Curb†		115	115	115	115
COMPRESSOR			Reciprocating		Scroll
Quantity		1	1	1	1
No. Cylinders (per circuit)		2	2	2	2
Oil (oz)		50	50	50	60
REFRIGERANT TYPE			R-22		
Operating Charge (lb-oz)					
Circuit 1		4-5	6-6	7-14	9-10
Circuit 2		—	—	—	—
CONDENSER COIL			Enhanced Copper Tubes, Aluminum Lanced Fins		
Rows...Fins/in.		1...17	2...17	2...17	2...17
Total Face Area (sq ft)		8.36	8.36	10.42	16.50
CONDENSER FAN			Propeller Type		
Nominal Cfm		3500	4000	4000	4100
Quantity...Diameter (in.)		1...22.0	1...22.0	1...22.0	1...22.0
Motor Hp...Rpm		1/4...1100	1/4...1100	1/4...1100	1/4...1100
Watts Input (Total)		325	325	325	320
EVAPORATOR COIL			Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Face Split		
Expansion Device			Acutrol™ Metering Device		
Rows...Fins/in.		2...15	2...15	3...15	4...15
Total Face Area (sq ft)		4.17	5.5	5.5	5.5
EVAPORATOR FAN			Centrifugal Type		
Quantity...Size (in.)	Std	1...10 x 10	1...10 x 10	1...11 x 10	1...10 x 10
	Alt	1...10 x 10	1...10 x 10	1...10 x 10	—
	High-Static	1...10 x 10	1...10 x 10	1...10 x 10	1...10 x 10
Type Drive	Std	Direct	Direct	Direct	Belt
	Alt	Belt	Belt	Belt	—
	High-Static	Belt	Belt	Belt	Belt
Nominal Cfm		1200	1600	2000	2100
Maximum Continuous Bhp	Std	.34	.75	1.20	2.40
	Alt	1.20	1.20	1.30/2.40**	—
	High-Static	2.40	2.40	2.90	2.90
Motor Frame Size	Std	48	48	48	56
	Alt	48	48	56	—
	High-Static	56	56	56	56
Nominal Rpm High/Low	Std	860/800	1075/970	1075/1040	—
	Alt	1620	1620	1725	—
	High-Static	1725	1725	1725	1725
Fan Rpm Range	Std	—	—	—	1070-1460
	Alt	685-1045	770-1175	900-1300	—
	High-Static	1075-1455	1075-1455	1300-1685	1300-1685
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Allowable Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter Min/Max (in.)	Std	—	—	—	2.8/3.8
	Alt	1.9/2.9	1.9/2.9	2.8/3.8	—
	High-Static	2.8/3.8	2.8/3.8	3.4/4.4	3.4/4.4
Nominal Motor Shaft Diameter (in.)	Std	1/2	1/2	1/2	5/8
	Alt	1/2	1/2	5/8	—
	High-Static	5/8	5/8	5/8	5/8
Fan Pulley Pitch Diameter (in.)	Std	—	—	—	4.5
	Alt	4.5	4.0	5.5	—
	High-Static	4.5	4.5	4.5	4.5
Belt, Quantity...Type...Length (in.)	Std	—	—	—	1...A...39
	Alt	1...A...36	1...A...36	1...A...40	—
	High-Static	1...A...39	1...A...39	1...A...40	1...A...40
Pulley Center Line Distance (in.)	Std	—	—	—	14.7-15.5
	Alt	10.0-12.4	10.0-12.4	14.7-15.5	—
	High-Static	10.0-12.4	10.0-12.4	14.7-15.5	14.7-15.5
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Std	—	—	—	80
	Alt	48	70	80	—
	High-Static	65	65	60	60
Movable Pulley Maximum Full Turns From Closed Position	Std	—	—	—	5
	Alt	5	5	6	—
	High-Static	6	6	5	5
Factory Setting	Std	—	—	—	3
	Alt	3	3	3	—
	High-Static	3 1/2	3 1/2	3 1/2	3 1/2
Factory Speed Setting (rpm)	Std	—	—	—	1225
	Alt	829	932	1100	—
	High-Static	1233	1233	1416	1416
Fan Shaft Diameter at Pulley (in.)		5/8	5/8	5/8	5/8
HIGH-PRESSURE SWITCH (psig)					
Standard Compressor Internal Relief (Differential)			450 ± 50		500 ± 50
Cutout			428		428
Reset (Auto.)			320		320
LOSS-OF-CHARGE (LOW-PRESSURE) SWITCH (psig)					
Cutout			7 ± 3		
Reset (Auto.)			22 ± 7		
FREEZE-PROTECTION THERMOSTAT (F)					
Opens			30 ± 5		
Closes			45 ± 5		
OUTDOOR-AIR INLET SCREENS			Cleanable. Screen size and quantity varies with option selected.		
RETURN-AIR FILTERS			Throwaway		
Quantity...Size (in.)			2...16 x 25 x 2		

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material. Contact your local Carrier representative for details about coated fins.
†Weight of 14-in. roof curb.
**Single phase/three phase.

Step 5 — Make Electrical Connections

⚠ WARNING

Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with NEC (National Electrical Code), ANSI/NFPA (American National Standards Institute/National Fire Protection Association), latest edition (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22.1), and local electrical codes. Failure to follow this warning could result in the installer being liable for personal injury of others.

FIELD POWER SUPPLY — All units except 208/230-v units are factory wired for the voltage shown on the nameplate. If the 208/230-v unit is to be connected to a 208-v power supply, the transformer *must* be rewired by moving the black wire from 230-v $^1/_4$-in. spade terminal and connecting it to 200-v $^1/_4$-in. spade terminal of transformer.

See Tables 2A and 2B. Refer to unit label diagram for additional information. Pigtails are provided for field wire connections. Use factory-supplied splices or UL (Underwriters' Laboratories) approved copper/aluminum connector.

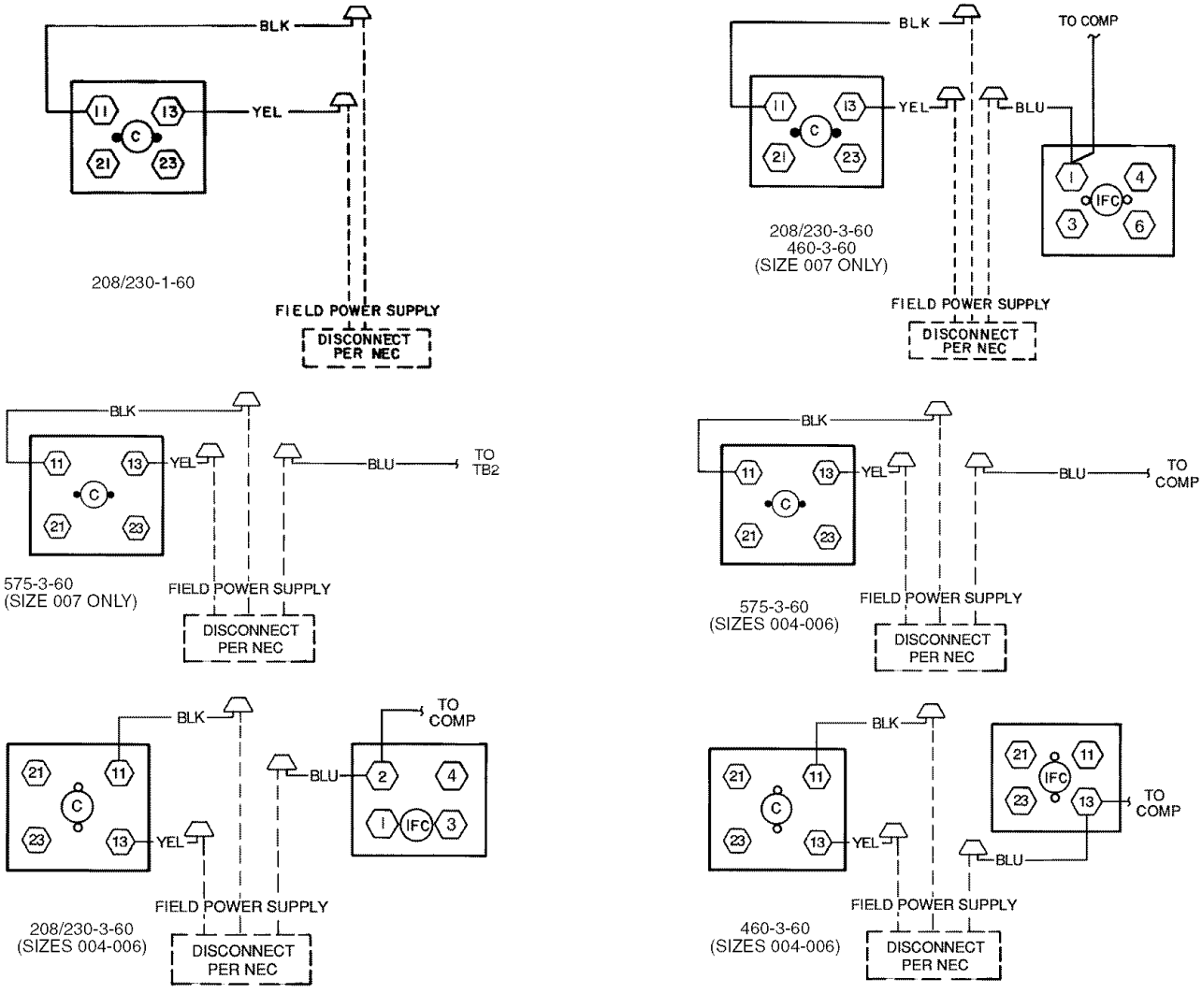
When installing units, provide a disconnect per NEC.

All field wiring must comply with the NEC and local requirements.

Install field wiring as follows:

1. Install conduit through side panel openings. For units without electric heat, install conduit between disconnect and control box.
2. Install power lines to terminal connections as shown in Fig. 8.

Power wiring leads are located inside power wiring access panel.



LEGEND

C	— Contactor
COMP	— Compressor
IFC	— Indoor (Evaporator) Fan Contactor
NEC	— National Electrical Code
TB	— Terminal Block

Fig. 8 — Power Wiring Connections

FIELD CONTROL WIRING — Install a Carrier-approved accessory thermostat assembly according to installation instructions included with the accessory. Locate thermostat assembly on a solid wall in the conditioned space to sense average temperature in accordance with thermostat installation instructions. Connect thermostat wires to terminal board.

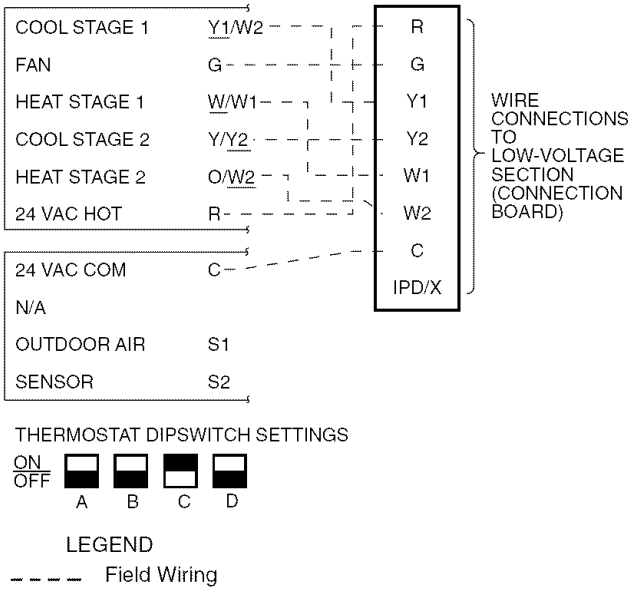
Route thermostat cable or equivalent single leads of colored wire from subbase terminals to low-voltage connections on unit (shown in Fig. 9).

NOTE: For wire runs up to 50 ft, use no. 18 AWG (American Wire Gage) insulated wire (35 C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C minimum). All wire larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.

Pass the control wires through the hole provided in the corner post; then feed wires through the raceway built into the corner post to the 24-v barrier located on the left side of the control box. See Fig. 10. The raceway provides the UL required clearance between high- and low-voltage wiring.

NOTE: If thru-the-bottom power connections are used refer to the accessory installation instructions for information on power wiring. Refer to Fig. 6A and 6B for drilling holes in basepan.

IMPORTANT: Optional factory-installed, alternate evaporator-fan motors are not available for 50TFF, TM007 units. Contact your local Carrier representative for more information about field-installed motors.



NOTES: Underlined letter indicates active thermostat output when configured for A/C operation.

Fig. 9 — Low-Voltage Connections

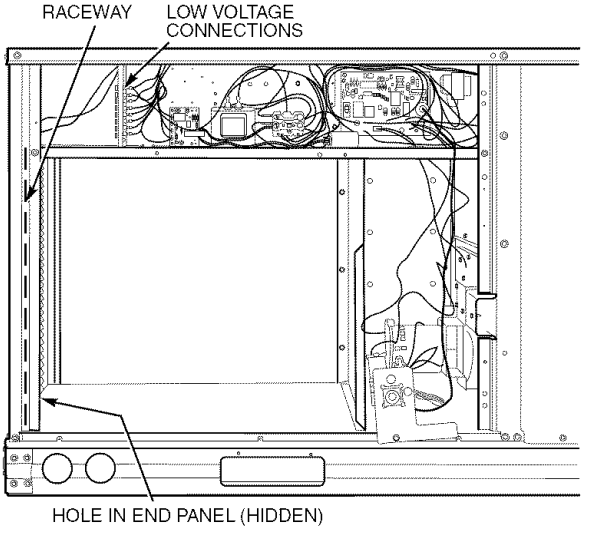


Fig. 10 — Field Control Wiring Raceway

Table 2A — Electrical Data (Without Convenience Outlet)

50TFF,TM UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (ea)			OFM (ea)			IFM FLA	HEATER MODEL NO. CRHEATER---A00	ELECTRIC HEAT		POWER SUPPLY		DISCONNECT SIZE†		SINGLE POINT BOX P/N CRSINGLE---A00
			Min	Max	Qty	RLA	LRA	Qty	Hp	FLA			Nominal kW	FLA	MCA	MOCP*	FLA	LRA	
004	208/230-1-60	STD	187	254	1	16.2	96	1	1/4	1.4	3.5	NONE	—/—	—/—	25.2/25.2	30/30	24/24	106/106	—
												001	3.3/ 4.4	15.9/18.3	25.2/27.3	30/30	24/25	106/106	—
												002	4.9/ 6.5	23.5/27.1	33.7/38.2	35/40	31/35	106/106	—
												003	6.4/ 8.7	31.4/36.3	43.6/49.7	45/50	40/46	106/106	—
												004	7.9/10.5	37.9/43.8	51.8/59.1	60/60	48/54	106/106	—
												002 and 002	9.8/13.0	46.9/54.2	63.0/72.1	70/80	58/66	106/106	004
		ALT									4.9	NONE	—/—	—/—	26.6/26.6	35/35	26/26	111/111	—
												001	3.3/ 4.4	15.9/18.3	26.6/29.0	35/35	26/27	111/111	—
												002	4.9/ 6.5	23.5/27.1	35.5/40.0	40/40	33/37	111/111	—
												003	6.5/ 8.7	31.4/36.3	45.4/51.4	50/60	42/47	111/111	—
												004	7.9/10.5	37.9/43.8	53.5/60.8	60/70	49/56	111/111	004
												002 and 002	9.8/13.0	46.9/54.2	64.8/73.8	70/80	60/68	111/111	004
	208/230-3-60	STD	187	254	1	10.2	75	1	1/4	1.4	3.5	NONE	—/—	—/—	17.7/17.7	25/25	17/17	85/ 85	—
												001	3.3/ 4.4	9.2/10.6	17.7/17.7	25/25	17/17	85/ 85	—
												002	4.9/ 6.5	13.6/15.6	21.3/23.9	25/25	20/22	85/ 85	—
												003	6.5/ 8.7	18.1/20.9	27.0/30.5	30/35	25/28	85/ 85	—
												004	7.9/10.5	21.9/25.3	31.7/35.9	35/40	29/33	85/ 85	—
												005	12.2/16.0	33.4/38.4	46.1/52.4	50/60	42/48	85/ 85	—
		ALT									4.9	NONE	—/—	—/—	19.1/19.1	25/25	19/19	90/ 90	—
												001	3.3/ 4.4	9.2/10.6	19.1/19.4	25/25	19/19	90/ 90	—
												002	4.9/ 6.5	13.6/15.6	23.1/25.7	25/30	21/24	90/ 90	—
												003	6.5/ 8.7	18.1/20.9	28.8/32.3	30/35	26/30	90/ 90	—
												004	7.9/10.5	21.9/25.3	33.5/37.7	35/40	31/35	90/ 90	—
												005	12.3/16.0	33.4/38.4	47.8/54.2	50/60	44/50	90/ 90	—
		HIGH									5.2	NONE	—/—	—/—	19.4/19.4	25/25	19/19	109/109	—
												001	3.3/ 4.4	9.2/10.6	19.4/19.7	25/25	19/19	109/109	—
												002	4.9/ 6.5	13.6/15.6	23.4/26.0	30/30	22/24	109/109	—
												003	6.5/ 8.7	18.1/20.9	29.2/32.7	30/35	27/30	109/109	—
												004	7.9/10.5	21.9/25.3	33.9/38.1	35/40	31/35	109/109	—
												005	12.3/16.0	33.4/38.4	48.2/54.6	50/60	44/50	109/109	—
	460-3-60	STD	414	508	1	4.4	40	1	1/4	0.8	1.3	NONE	—	—	7.6	15	7	44	—
												006	6.0	7.2	10.6	15	10	45	—
												007	8.8	10.6	14.9	15	14	45	—
												008	11.5	13.8	18.9	20	17	45	—
												009	14.0	16.8	22.7	25	21	45	—
		ALT									2.1	NONE	—	—	8.4	15	8	48	—
												006	6.0	7.2	11.6	15	11	48	—
												007	8.8	10.6	15.9	20	15	48	—
												008	11.5	13.8	19.9	20	18	48	—
												009	14.0	16.8	23.7	25	22	48	—
		HIGH									2.6	NONE	—	—	8.9	15	9	57	—
												006	6.0	7.2	12.3	15	11	57	—
												007	8.8	10.6	16.5	20	15	57	—
												008	11.5	13.8	20.5	25	19	57	—
												009	14.0	16.8	24.3	25	22	57	—
	575-3-60	STD	518	632	1	3.7	31	1	1/4	0.8	1.3	NONE	—	—	5.5	15	6	34	—
		ALT									2.1	NONE	—	—	6.0	15	7	37	—
		HIGH									2.6	NONE	—	—	6.3	15	7	56	—

LEGEND

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

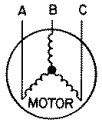
*Used to determine minimum disconnect per NEC.
†Fuse or HACR circuit breaker.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

   % Voltage Imbalance

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

   Example: Supply voltage is 460-3-60.



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

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

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

   $$= 457$$

   Determine maximum deviation from average voltage.
   (AB) 457 – 452 = 5 v
   (BC) 464 – 457 = 7 v
   (AC) 457 – 455 = 2 v

   Maximum deviation is 7 v.

   Determine percent of voltage imbalance.

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

   $$= 1.53\%$$

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

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

3. For units with power exhaust: If a single power source is to be used, size wire to include power exhaust MCA and MOCP. Check MCA and MOCP when power exhaust is powered through the unit (must be in accordance with NEC and/or local codes). Determine the new MCA including the power exhaust using the following formula:

   MCA New = MCA unit only + MCA of Power Exhaust

   For example, using a 50TFF006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

   MCA New = 28.9 amps + 1.6 amps = 30.5 amps

   If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

POWER EXHAUST PART NO.	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A00	1.6	N/A	0.64	15
CRPWREXH021A00	N/A	0.9	N/A	15
CRPWREXH022A00	3.3	N/A	1.32	15
CRPWREXH023A00	N/A	1.8	N/A	15
CRPWREXH028A00	1.7	N/A	0.68	15
CRPWREXH029A00	N/A	1.0	N/A	15

Table 2A — Electrical Data (Without Convenience Outlet) (cont)

50TFF,TM UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (ea)			OFM (ea)			IFM FLA	HEATER MODEL NO CRHEATER---A00	ELECTRIC HEAT		POWER SUPPLY		DISCONNECT SIZE†		SINGLE POINT BOX P/N CRSINGLE---A00
			Min	Max	Qty	RLA	LRA	Qty	Hp	FLA			Nominal kW	FLA	MCA	MOCP*	FLA	LRA	
005	208/230-1-60	STD	187	254	1	23.3	118	1	1/4	1.4	3.5	NONE	—/—	—/—	34.0/ 34.0	40/ 40	32/ 32	129/129	—
												001	3.3/ 4.4	15.9/18.3	34.0/ 34.0	40/ 40	32/ 32	129/129	—
												003	6.5/ 8.7	31.4/36.3	43.6/ 49.7	45/ 50	40/ 46	129/129	—
												002 and 002	9.3/13.0	46.9/54.2	63.0/ 72.1	70/ 80	58/ 66	129/129	004
												003 and 003	13.1/17.4	62.8/72.5	82.9/ 95.0	90/100	76/ 87	129/129	004
												004 and 004	15.8/21.0	75.8/87.5	99.2/113.8	100/125	91/105	129/129	004
		ALT									4.9	NONE	—/—	—/—	35.4/ 35.4	45/ 45	34/ 34	133/133	—
												001	3.3/ 4.4	15.9/18.3	35.4/ 35.4	45/ 45	34/ 34	133/133	—
												003	6.5/ 8.7	31.4/36.3	45.4/ 51.4	50/ 60	42/ 47	133/133	—
												002 and 002	9.3/13.0	46.9/54.2	64.8/ 73.8	70/ 80	60/ 68	133/133	004
												003 and 003	13.1/17.4	62.8/72.5	84.7/ 96.8	90/100	78/ 89	133/133	004
												004 and 004	15.8/21.0	75.8/87.5	100.9/115.5	110/125	93/106	133/133	004
	208/230-3-60	STD	187	254	1	15.4	90	1	1/4	1.4	3.5	NONE	—/—	—/—	24.2/ 24.2	30/ 30	23/ 23	101/101	—
												002	4.9/ 6.5	13.6/15.6	24.2/ 24.2	30/ 30	23/ 23	101/101	—
												003	6.5/ 8.7	18.1/20.9	27.0/ 30.5	30/ 35	25/ 28	101/101	—
												005	12.0/16.0	33.4/38.4	46.1/ 52.4	50/ 60	42/ 48	101/101	—
												004 and 004	15.8/21.0	43.8/50.5	59.1/ 67.5	60/ 70	54/ 62	101/101	002
		ALT									4.9	NONE	—/—	—/—	25.6/ 25.6	30/ 30	25/ 25	105/105	—
												002	4.9/ 6.5	13.6/15.6	25.6/ 25.7	30/ 30	25/ 25	105/105	—
												003	6.5/ 8.7	18.1/20.9	28.8/ 32.3	30/ 35	26/ 30	105/105	—
												005	12.0/16.0	33.4/38.4	47.8/ 54.2	50/ 60	44/ 50	105/105	—
												004 and 004	15.8/21.0	43.8/50.5	60.8/ 69.3	70/ 70	56/ 64	105/105	002
		HIGH									5.2	NONE	—/—	—/—	25.9/ 25.9	30/ 30	25/ 25	124/124	—
												002	4.9/ 6.5	13.6/15.6	25.9/ 26.0	30/ 30	25/ 25	124/124	—
												003	6.5/ 8.7	18.1/20.9	29.2/ 32.7	30/ 35	27/ 30	124/124	—
												005	12.0/16.0	33.4/38.4	48.2/ 54.6	50/ 60	44/ 50	124/124	—
												004 and 004	15.8/21.0	43.8/50.5	61.2/ 69.6	70/ 70	56/ 64	124/124	002
	460-3-60	STD	414	508	1	8.3	45	1	1/4	0.8	1.8	NONE	—	—	13.0	20	13	51	—
												006	6.0	7.2	13.0	20	13	51	—
												008	11.5	13.8	19.5	20	18	51	—
												009	14.0	16.8	23.3	25	21	51	—
												008 and 008	23.0	27.7	36.8	40	34	51	—
		ALT									2.1	NONE	—	—	13.3	20	13	53	—
												006	6.0	7.2	13.3	20	13	53	—
												008	11.5	13.8	19.9	20	18	53	—
												009	14.0	16.8	23.7	25	22	53	—
												008 and 008	23.0	27.7	37.2	40	34	53	—
		HIGH									2.6	NONE	—	—	13.8	20	13	62	—
												006	6.0	7.2	13.8	20	13	62	—
												008	11.5	13.8	20.5	25	19	62	—
												009	14.0	16.8	24.3	25	22	62	—
												008 and 008	23.0	27.7	37.8	40	35	62	—
	575-3-60	STD	518	632	1	6.4	36	1	1/4	0.8	1.8	NONE	—	—	9.2	15	10	41	—
		ALT									2.1	NONE	—	—	9.3	15	10	42	—
		HIGH									2.6	NONE	—	—	9.7	15	10	49	—

LEGEND

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

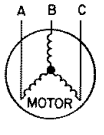
*Used to determine minimum disconnect per NEC.
†Fuse or HACR circuit breaker.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

   % Voltage Imbalance

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

   Example: Supply voltage is 460-3-60.



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

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

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

   $$= 457$$

   Determine maximum deviation from average voltage.
   (AB) 457 – 452 = 5 v
   (BC) 464 – 457 = 7 v
   (AC) 457 – 455 = 2 v

   Maximum deviation is 7 v.

   Determine percent of voltage imbalance.

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

   $$= 1.53\%$$

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

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

3. For units with power exhaust: If a single power source is to be used, size wire to include power exhaust MCA and MOCP. Check MCA and MOCP when power exhaust is powered through the unit (must be in accordance with NEC and/or local codes). Determine the new MCA including the power exhaust using the following formula:

   MCA New = MCA unit only + MCA of Power Exhaust

   For example, using a 50TFF006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

   MCA New = 28.9 amps + 1.6 amps = 30.5 amps

   If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

POWER EXHAUST PART NO.	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A00	1.6	N/A	0.64	15
CRPWREXH021A00	N/A	0.9	N/A	15
CRPWREXH022A00	3.3	N/A	1.32	15
CRPWREXH023A00	N/A	1.8	N/A	15
CRPWREXH028A00	1.7	N/A	0.68	15
CRPWREXH029A00	N/A	1.0	N/A	15

Table 2A — Electrical Data (Without Convenience Outlet) (cont)

50TFF,TM UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (ea)			OFM (ea)			IFM FLA	HEATER MODEL NO. CRHEATER---A00	ELECTRIC HEAT		POWER SUPPLY		DISCONNECT SIZE†		SINGLE POINT BOX P/N CRSINGLE---A00
			Min	Max	Qty	RLA	LRA	Qty	Hp	FLA			Nominal kW	FLA	MCA	MOCP*	FLA	LRA	
006	208/230-1-60	STD	187	254	1	28.8	147	1	1/4	1.4	5.9	NONE	—/—	—/—	43.3/ 43.3	60/ 60	42/ 42	161/161	—
												002	4.9/ 6.5	23.5/27.1	43.3/ 43.3	60/ 60	42/ 42	161/161	—
												003	6.5/ 8.7	31.4/36.3	46.6/ 52.7	50/ 60	43/ 48	161/161	—
												002 and 002	9.8/13.0	46.9/54.2	66.0/ 75.1	70/ 80	61/ 69	161/161	004
												003 and 003	13.1/17.4	62.8/72.5	85.9/ 98.0	90/100	79/ 90	161/161	004
												004 and 004	15.8/21.0	75.8/87.5	102.2/116.8	110/125	94/107	161/161	004
		ALT									6.6	NONE	—/—	—/—	44.0/ 44.0	60/ 60	42/ 42	184/184	—
												002	4.9/ 6.5	23.5/27.1	44.0/ 44.0	60/ 60	42/ 42	184/184	—
												003	6.5/ 8.7	31.4/36.3	47.5/ 53.6	50/ 60	44/ 49	184/184	—
												002 and 002	9.8/13.0	46.9/54.2	66.9/ 76.0	70/ 80	62/ 70	184/184	004
												003 and 003	13.1/17.4	62.8/72.5	86.8/ 98.9	90/100	80/ 91	184/184	004
												004 and 004	15.8/21.0	75.8/87.5	103.0/117.6	110/125	95/108	184/184	004
	208/230-3-60	STD	187	254	1	16	114	1	1/4	1.4	5.9	NONE	—/—	—/—	27.3/ 27.3	35/ 35	27/ 27	128/128	—
												002	4.9/ 6.5	13.6/15.6	27.3/ 27.3	35/ 35	27/ 27	128/128	—
												004	7.9/10.5	21.9/25.3	34.7/ 38.9	40/ 40	32/ 36	128/128	—
												005	12.0/16.0	33.4/38.4	49.1/ 55.4	50/ 60	45/ 51	128/128	—
												004 and 004	15.8/21.0	43.8/50.5	62.1/ 70.5	70 80	57/ 65	128/128	—
												004 and 005	19.9/26.5	55.2/63.8	76.4/ 87.1	80/ 90	70/ 80	128/128	—
		ALT									5.2	NONE	—/—	—/—	26.6/ 26.6	35/ 35	26/ 26	148/148	—
												002	4.9/ 6.5	13.6/15.6	26.6/ 26.6	35/ 35	26/ 26	148/148	—
												004	7.9/10.5	21.9/25.3	33.9/ 38.1	35/ 40	31/ 35	148/148	—
												005	12.0/16.0	33.4/38.4	48.2/ 54.6	50/ 60	44/ 50	148/148	—
												004 and 004	15.8/21.0	43.8/50.5	61.2/ 69.6	70/ 70	56/ 64	148/148	—
												004 and 005	19.9/26.5	55.2/63.8	75.6/ 86.2	80/ 90	70/ 79	148/148	—
		HIGH									7.5	NONE	—/—	—/—	28.9/ 28.9	35/ 35	29/ 29	174/174	—
												002	4.9/ 6.5	13.6/15.6	28.9 28.9	35/ 35	29/ 29	174/174	—
												004	7.9/10.5	21.9/25.3	36.7/ 40.9	40/ 45	34/ 38	174/174	—
												005	12.0/16.0	33.4/38.4	51.1/ 57.4	60/ 60	47/ 53	174/174	—
												004 and 004	15.8/21.0	43.8/50.5	64.1/ 72.5	70/ 80	59/ 67	174/174	002
												004 and 005	19.9/26.5	55.2/63.8	78.4/ 89.1	80/ 90	72/ 82	174/174	002
	460-3-60	STD	414	508	1	7.4	64	1	1/4	0.8	3.1	NONE	—	—	13.2	20	13	71	—
												006	6.0	7.2	13.2	20	13	72	—
												008	11.5	13.8	21.2	25	19	72	—
												009	14.0	16.8	24.9	25	23	72	—
												008 and 008	23.0	27.7	38.5	40	35	72	—
												008 and 009	25.0	30.1	41.5	45	38	72	—
		ALT									2.6	NONE	—	—	13.5	20	13	81	—
												006	6.0	7.2	13.5	20	13	81	—
												008	11.5	13.8	21.5	25	20	81	—
												009	14.0	16.8	25.3	30	23	81	—
												008 and 008	23.0	27.7	38.8	40	36	81	—
												008 and 009	25.0	30.1	41.8	45	38	81	—
		HIGH									3.4	NONE	—	—	13.5	20	13	93	—
												006	6.0	7.2	13.5	20	13	94	—
												008	11.5	13.8	21.5	25	20	94	—
												009	14.0	16.8	25.3	30	23	94	—
												008 and 008	23.0	27.7	38.8	40	36	94	—
												008 and 009	25.0	30.1	41.8	45	38	94	—
	575-3-60	STD	518	632	1	6.2	52	1	1/4	0.8	3.1	NONE	—	—	9.7	15	11	58	—
		ALT									2.6	NONE	—	—	9.9	15	11	65	—
		HIGH									3.4	NONE	—	—	9.9	15	11	75	—

LEGEND

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

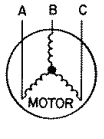
*Used to determine minimum disconnect per NEC.
†Fuse or HACR circuit breaker.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

% Voltage Imbalance

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

Example: Supply voltage is 460-3-60.



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

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

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

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

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

$$= 1.53\%$$

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

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

3. For units with power exhaust: If a single power source is to be used, size wire to include power exhaust MCA and MOCP. Check MCA and MOCP when power exhaust is powered through the unit (must be in accordance with NEC and/or local codes). Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 50TFF006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps

If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

POWER EXHAUST PART NO.	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A00	1.6	N/A	0.64	15
CRPWREXH021A00	N/A	0.9	N/A	15
CRPWREXH022A00	3.3	N/A	1.32	15
CRPWREXH023A00	N/A	1.8	N/A	15
CRPWREXH028A00	1.7	N/A	0.68	15
CRPWREXH029A00	N/A	1.0	N/A	15

Table 2A — Electrical Data (Without Convenience Outlet) (cont)

50TFF,TM UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (ea)			OFM (ea)			IFM FLA	HEATER MODEL NO. CRHEATER---A00	ELECTRIC HEAT		POWER SUPPLY		DISCONNECT SIZE†		SINGLE POINT BOX P/N CRSINGLE---A00
			Min	Max	Qty	RLA	LRA	Qty	Hp	FLA			Nominal kW	FLA	MCA	MOCP*	FLA	LRA	
007	208/230-3-60	STD	187	254	1	20.6	146	1	1/4	1.4	5.2	NONE	—/—	—/—	32.4/32.4	40/40	31/31	180/180	—
												002	4.9/ 6.5	13.6/15.6	32.4/32.4	40/40	31/31	180/180	—
												004	7.9/10.5	21.9/25.3	33.9/38.1	35/40	31/35	180/180	—
												005	12.0/16.0	33.4/38.4	48.2/54.6	50/60	44/50	180/180	—
												004 and 004	15.8/21.0	43.8/50.5	61.2/69.6	70/70	56/64	180/180	—
												004 and 005	19.9/26.5	55.2/63.8	75.6/86.2	80/90	70/79	180/180	—
		HIGH									7.5	NONE	—/—	—/—	34.7/34.7	40/40	34/34	205/205	—
												002	4.9/ 6.5	13.6/15.6	34.7/34.7	40/40	34/34	205/205	—
												004	7.9/10.5	21.9/25.3	36.7/40.9	40/45	34/38	205/205	—
												005	12.0/16.0	33.4/38.4	51.1/57.4	60/60	47/53	205/205	—
												004 and 004	15.8/21.0	43.8/50.5	64.1/72.5	70/80	59/67	205/205	002
												004 and 005	19.9/26.5	55.2/63.8	78.4/89.1	80/90	72/82	205/205	002
	460-3-60	STD	414	508	1	9.5	73	1	1/4	0.9	2.6	NONE	—	—	15.4	20	15	90	—
												006	6.0	7.2	15.4	20	15	90	—
												008	11.5	13.8	20.5	25	19	90	—
												009	14.0	16.8	24.3	25	22	90	—
												008 and 008	23.0	27.7	37.8	40	35	90	—
												008 and 009	25.5	30.7	41.6	45	38	90	—
		HIGH									3.4	NONE	—	—	16.2	20	16	103	—
												006	6.0	7.2	16.2	20	16	103	—
												008	11.5	13.8	21.5	25	20	103	—
												009	14.0	16.8	25.3	30	23	103	—
												008 and 008	23.0	27.7	38.8	40	36	103	—
												008 and 009	25.5	30.7	42.6	45	39	103	—
	575-3-60	STD	518	632	1	7.6	62	1	1/4	0.9	2.6	NONE	—	—	11.4	15	12	75	—
		HIGH									3.4	NONE	—	—	11.9	15	13	86	—

LEGEND

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

*Used to determine minimum disconnect per NEC.
†Fuse or HACR circuit breaker.

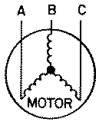
NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

   % Voltage Imbalance

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

   Example: Supply voltage is 460-3-60.

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

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

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

   $$= 457$$

   Determine maximum deviation from average voltage.
   (AB) 457 – 452 = 5 v
   (BC) 464 – 457 = 7 v
   (AC) 457 – 455 = 2 v

   Maximum deviation is 7 v.

   Determine percent of voltage imbalance.

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

   $$= 1.53\%$$

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

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

3. For units with power exhaust: If a single power source is to be used, size wire to include power exhaust MCA and MOCP. Check MCA and MOCP when power exhaust is powered through the unit (must be in accordance with NEC and/or local codes). Determine the new MCA including the power exhaust using the following formula:

   MCA New = MCA unit only + MCA of Power Exhaust

   For example, using a 50TFF006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

   MCA New = 28.9 amps + 1.6 amps = 30.5 amps

   If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

POWER EXHAUST PART NO.	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A00	1.6	N/A	0.64	15
CRPWREXH021A00	N/A	0.9	N/A	15
CRPWREXH022A00	3.3	N/A	1.32	15
CRPWREXH023A00	N/A	1.8	N/A	15
CRPWREXH028A00	1.7	N/A	0.68	15
CRPWREXH029A00	N/A	1.0	N/A	15

Table 2B — Electrical Data (With Convenience Outlet)

50TFF,TM UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (ea)			OFM (ea)			IFM FLA	HEATER MODEL NO. CRHEATER---A00	ELECTRIC HEAT		POWER SUPPLY		DISCONNECT SIZE†		SINGLE POINT BOX P/N CRSINGLE---A00
			Min	Max	Qty	RLA	LRA	Qty	Hp	FLA			Nominal kW	FLA	MCA	MOCP*	FLA	LRA	
004	208/230-1-60	STD	187	254	1	16.2	96	1	1/4	1.4	3.5	NONE	—/—	—/—	31.2/31.2	35/35	30/30	111/111	—
												001	3.3/ 4.4	15.9/18.3	31.2/32.3	35/35	30/31	111/111	—
												002	4.9/ 6.5	23.5/27.1	38.7/43.2	40/45	37/41	111/111	—
												003	6.4/ 8.7	31.4/36.3	48.6/54.7	50/60	46/51	111/111	—
												004	7.9/10.5	37.9/43.8	56.8/64.1	60/70	53/60	111/111	004
												002 and 002	9.8/13.0	46.9/54.2	68.0/77.1	70/80	64/72	111/111	004
		ALT									4.9	NONE	—/—	—/—	32.6/32.6	40/40	31/31	116/116	—
												001	3.3/ 4.4	15.9/18.3	32.6/34.0	40/40	31/32	116/116	—
												002	4.9/ 6.5	23.5/27.1	40.5/45.0	45/45	38/42	116/116	—
												003	6.5/ 8.7	31.4/36.3	50.4/56.4	60/60	47/53	116/116	—
												004	7.9/10.5	37.9/43.8	58.5/65.8	60/70	55/61	116/116	004
												002 and 002	9.8/13.0	46.9/54.2	69.8/78.8	70/80	65/73	116/116	004
	208/230-3-60	STD	187	254	1	10.2	75	1	1/4	1.4	3.5	NONE	—/—	—/—	22.5/22.5	30/30	23/23	90/ 90	—
												001	3.3/ 4.4	9.2/10.6	22.5/23.0	30/30	23/23	90 90	—
												002	4.9/ 6.5	13.6/15.6	27.3/29.4	30/30	25/28	90/ 90	—
												003	6.5/ 8.7	18.1/20.9	33.1/36.0	35/40	30/34	90/ 90	—
												004	7.9/10.5	21.9/25.3	37.7/42.0	40/45	35/39	90/ 90	—
												005	12.2/16.0	33.4/38.4	52.1/57.9	60/60	48/54	90/ 90	—
		ALT									4.9	NONE	—/—	—/—	23.9/23.9	30/30	25/25	95/ 95	—
												001	3.3/ 4.4	9.2/10.6	23.9/24.8	30/30	25/25	95/ 95	—
												002	4.9/ 6.5	13.6/15.6	29.1/31.1	30/35	27/29	95/ 95	—
												003	6.5/ 8.7	18.1/20.9	34.8/37.7	35/40	32/35	95/ 95	—
												004	7.9/10.5	21.9/25.3	39.5/43.7	40/45	36/40	95/ 95	—
												005	12.3/16.0	33.4/38.4	53.8/59.6	60/60	50/55	95/ 95	—
		HIGH									5.2	NONE	—/—	—/—	24.2/24.2	30/30	25/25	114/114	—
												001	3.3/ 4.4	9.2/10.6	24.2/25.2	30/30	25/25	114/114	—
												002	4.9/ 6.5	13.6/15.6	29.5/31.5	35/35	27/29	114/114	—
												003	6.5/ 8.7	18.1/20.9	35.2/38.1	40/40	32/36	114/114	—
												004	7.9/10.5	21.9/25.3	39.9/44.1	40/45	37/41	114/114	—
												005	12.3/16.0	33.4/38.4	54.2/60.0	60/60	50/56	114/114	—
	460-3-60	STD	414	508	1	4.4	40	1	1/4	0.8	1.3	NONE	—	—	9.8	15	10	47	—
												006	6.0	7.2	13.4	15	12	47	—
												007	8.8	10.6	17.6	20	16	47	—
												008	11.5	13.8	21.6	25	20	47	—
												009	14.0	16.8	25.4	30	23	47	—
		ALT									2.1	NONE	—	—	10.6	15	11	50	—
												006	6.0	7.2	14.4	15	13	50	—
												007	8.8	10.6	18.6	20	17	50	—
												008	11.5	13.8	22.6	25	21	50	—
												009	14.0	16.8	26.4	30	24	50	—
		HIGH									2.6	NONE	—	—	11.1	15	11	59	—
												006	6.0	7.2	15.0	20	14	59	—
												007	8.8	10.6	19.2	20	18	59	—
												008	11.5	13.8	23.3	25	21	59	—
												009	14.0	16.8	27.0	30	25	59	—
	575-3-60	STD	518	632	1	3.7	31	1	1/4	0.8	1.3	NONE	—	—	7.2	15	8	36	—
		ALT									2.1	NONE	—	—	7.7	15	9	39	—
		HIGH									2.6	NONE	—	—	8.0	15	9	58	—

LEGEND

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

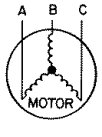
*Used to determine minimum disconnect per NEC.
†Fuse or HACR circuit breaker.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

   % Voltage Imbalance

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

   Example: Supply voltage is 460-3-60.



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

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

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

   $$= 457$$

   Determine maximum deviation from average voltage.
   (AB) 457 – 452 = 5 v
   (BC) 464 – 457 = 7 v
   (AC) 457 – 455 = 2 v

   Maximum deviation is 7 v.

   Determine percent of voltage imbalance.

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

   $$= 1.53\%$$

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

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

3. For units with power exhaust: If a single power source is to be used, size wire to include power exhaust MCA and MOCP. Check MCA and MOCP when power exhaust is powered through the unit (must be in accordance with NEC and/or local codes). Determine the new MCA including the power exhaust using the following formula:

   MCA New = MCA unit only + MCA of Power Exhaust

   For example, using a 50TFF006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

   MCA New = 28.9 amps + 1.6 amps = 30.5 amps

   If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

POWER EXHAUST PART NO.	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A00	1.6	N/A	0.64	15
CRPWREXH021A00	N/A	0.9	N/A	15
CRPWREXH022A00	3.3	N/A	1.32	15
CRPWREXH023A00	N/A	1.8	N/A	15
CRPWREXH028A00	1.7	N/A	0.68	15
CRPWREXH029A00	N/A	1.0	N/A	15

Table 2B — Electrical Data (With Convenience Outlet) (cont)

50TFF,TM UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (ea)			OFM (ea)			IFM FLA	HEATER MODEL NO. CRHEATER---A00	ELECTRIC HEAT		POWER SUPPLY		DISCONNECT SIZE†		SINGLE POINT BOX P/N CRSINGLE---A00
			Min	Max	Qty	RLA	LRA	Qty	Hp	FLA			Nominal kW	FLA	MCA	MOCP*	FLA	LRA	
005	208/230-1-60	STD	187	254	1	23.3	118	1	1/4	1.4	3.5	NONE	—/—	—/—	40.0/ 40.0	45/ 45	38/ 38	134/134	—
												001	3.3/ 4.4	15.9/18.3	40.0/ 40.0	45/ 45	38/ 38	134/134	—
												003	6.5/ 8.7	31.4/36.3	48.6/ 54.7	50/ 60	46/ 51	134/134	—
												002 and 002	9.3/13.0	46.9/54.2	68.0/ 77.1	70/ 80	64/ 72	134/134	004
												003 and 003	13.1/17.4	62.8/72.5	87.9/100.0	90/100	82/ 93	134/134	004
												004 and 004	15.8/21.0	75.8/87.5	104.2/118.8	110/125	97/110	134/134	004
		ALT									4.9	NONE	—/—	—/—	41.4/ 41.4	50/ 50	40/ 40	138/138	—
												001	3.3/ 4.4	15.9/18.3	41.4/ 41.4	50/ 50	40/ 40	138/138	—
												003	6.5/ 8.7	31.4/36.3	50.4/ 56.4	60/ 60	47/ 53	138/138	—
												002 and 002	9.3/13.0	46.9/54.2	69.8/ 78.8	70/ 80	65/ 73	138/138	004
												003 and 003	13.1/17.4	62.8/72.5	89.7/101.8	90/110	83/ 95	138/138	004
												004 and 004	15.8/21.0	75.8/87.5	105.9/120.5	110/125	98/112	138/138	004
	208/230-3-60	STD	187	254	1	15.4	90	1	1/4	1.4	3.5	NONE	—/—	—/—	29.0/ 29.0	35/ 35	29/ 29	106/106	—
												002	4.9/ 6.5	13.6/15.6	29.0/ 29.4	35 35	29/ 29	106/106	—
												003	6.5/ 8.7	18.1/20.9	33.1/ 36.0	35/ 40	30/ 34	106/106	—
												005	12.0/16.0	33.4/38.4	52.1/ 57.9	60/ 60	48/ 54	106/106	
												004 and 004	15.8/21.0	43.8/50.5	65.1/ 73.5	70/ 80	60/ 68	106/106	002
		ALT									4.9	NONE	—/—	—/—	30.4/ 30.4	35/ 35	30/ 30	110/110	—
												002	4.9/ 6.5	13.6/15.6	30.4/ 31.1	35/ 35	30/ 30	110/110	—
												003	6.5/ 8.7	18.1/20.9	34.8/ 37.7	35/ 40	32/ 35	110/110	—
												005	12.0/16.0	33.4/38.4	53.8/ 59.6	60/ 60	50/ 55	110/110	
												004 and 004	15.8/21.0	43.8/50.5	66.9/ 75.3	70/ 80	62/ 69	110/110	002
		HIGH									5.2	NONE	—/—	—/—	30.7/ 30.7	35/ 35	31/ 31	129/129	—
												002	4.9/ 6.5	13.6/15.6	30.7/ 31.5	35/ 35	31/ 31	129/129	—
												003	6.5/ 8.7	18.1/20.9	35.2/ 38.1	40/ 40	32 /36	129/129	—
												005	12.0/16.0	33.4/38.4	54.2/ 60.0	60/ 60	50/ 56	129/129	—
												004 and 004	15.8/21.0	43.8/50.5	67.2/ 75.7	70/ 80	62/ 70	129/129	002
	460-3-60	STD	414	508	1	8.3	45	1	1/4	0.8	1.8	NONE	—	—	15.2	20	15	53	—
												006	6.0	7.2	15.2	20	15	53	—
												008	11.5	13.8	22.3	25	20	53	—
												009	14.0	16.8	26.0	30	24	53	—
												008 and 008	23.0	27.7	39.6	40	36	53	—
		ALT									2.1	NONE	—	—	15.5	20	15	55	—
												006	6.0	7.2	15.5	20	15	55	—
												008	11.5	13.8	22.6	25	21	55	—
												009	14.0	16.8	26.4	30	24	55	—
												008 and 008	23.0	27.7	39.9	40	37	55	—
		HIGH									2.6	NONE	—	—	16.0	20	16	64	—
												006	6.0	7.2	16.0	20	16	64	—
												008	11.5	13.8	23.3	25	21	64	—
												009	14.0	16.8	27.0	30	25	64	—
												008 and 008	23.0	27.7	40.6	45	37	64	—
	575-3-60	STD	518	632	1	6.4	36	1	1/4	0.8	1.8	NONE	—	—	10.9	15	12	42	—
		ALT									2.1	NONE	—	—	11.1	15	12	44	—
		HIGH									2.6	NONE	—	—	11.4	15	12	51	—

LEGEND

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Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

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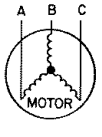
Example: Supply voltage is 460-3-60.



AB = 452 v
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AC = 455 v

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

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

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

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

$$= 1.53\%$$

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

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

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MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 50TFF006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps

If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

POWER EXHAUST PART NO.	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A00	1.6	N/A	0.64	15
CRPWREXH021A00	N/A	0.9	N/A	15
CRPWREXH022A00	3.3	N/A	1.32	15
CRPWREXH023A00	N/A	1.8	N/A	15
CRPWREXH028A00	1.7	N/A	0.68	15
CRPWREXH029A00	N/A	1.0	N/A	15

Table 2B — Electrical Data (With Convenience Outlet) (cont)

50TFF,TM UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (ea)			OFM (ea)			IFM FLA	HEATER MODEL NO. CRHEATER---A00	ELECTRIC HEAT		POWER SUPPLY		DISCONNECT SIZE†		SINGLE POINT BOX P/N CRSINGLE---A00
			Min	Max	Qty	RLA	LRA	Qty	Hp	FLA			Nominal kW	FLA	MCA	MOCP*	FLA	LRA	
006	208/230-1-60	STD	187	254	1	28.8	147	1	1/4	1.4	5.9	NONE	—/—	—/—	49.3/ 49.3	60/ 60	47/ 47	166/166	—
												002	4.9/ 6.5	23.5/27.1	49.3/ 49.3	60/ 60	47/ 47	166/166	—
												003	6.5/ 8.7	31.4/36.3	51.6/ 57.7	60/ 60	48/ 54	166/166	—
												002 and 002	9.8/13.0	46.9/54.2	71.0/ 80.1	80/ 90	66/ 75	166/166	004
												003 and 003	13.1/17.4	62.8/72.5	90.9/103.0	100/110	85/ 96	166/166	004
												004 and 004	15.8/21.0	75.8/87.5	107.2/121.8	110/125	100/113	166/166	004
		ALT									6.6	NONE	—/—	—/—	50.0/ 50.0	60/ 60	48/ 48	188/188	—
												002	4.9/ 6.5	23.5/27.1	50.0/ 50.0	60/ 60	48/ 48	188/188	—
												003	6.5/ 8.7	31.4/36.3	52.5/ 58.6	60/ 60	49/ 55	188/188	—
												002 and 002	9.8/13.0	46.9/54.2	71.9/ 81.0	80/ 90	67/ 75	188/188	004
												003 and 003	13.1/17.4	62.8/72.5	91.8/103.9	100/110	85/ 96	188/188	004
												004 and 004	15.8/21.0	75.8/87.5	108.0/122.6	110/125	100/114	188/188	004
	208/230-3-60	STD	187	254	1	16	114	1	1/4	1.4	5.9	NONE	—/—	—/—	32.1/ 32.1	40/ 40	32/ 32	133/133	—
												002	4.9/ 6.5	13.6/15.6	32.1/ 32.4	40/ 40	32/ 32	133/133	—
												004	7.9/10.5	21.9/25.3	40.7/ 44.4	45/ 45	37/ 41	133/133	—
												005	12.0/16.0	33.4/38.4	55.1/ 60.9	60/ 70	51/ 57	133/133	002
												004 and 004	15.8/21.0	43.8/50.5	68.1/ 76.5	70/ 80	63/ 70	133/133	002
												004 and 005	19.9/26.5	55.2/63.8	82.4/ 92.5	90/100	76/ 86	133/133	002
		ALT									5.2	NONE	—/—	—/—	31.4/ 31.4	40/ 40	32/ 32	153/153	—
												002	4.9/ 6.5	13.6/15.6	31.4/ 31.5	40/ 40	32/ 32	153/153	—
												004	7.9/10.5	21.9/25.3	39.9/ 43.5	40/ 45	37/ 41	153/153	—
												005	12.0/16.0	33.4/38.4	54.2/ 60.0	60/ 60	50/ 56	153/153	—
												004 and 004	15.8/21.0	43.8/50.5	67.2/ 75.7	70/ 80	62/ 70	153/153	002
												004 and 005	19.9/26.5	55.2/63.8	81.6/ 91.6	90/100	75/ 85	153/153	002
		HIGH									7.5	NONE	—/—	—/—	33.7/ 33.7	40/ 40	34/ 34	179/179	—
												002	4.9/ 6.5	13.6/15.6	33.7/ 34.4	40/ 40	34/ 34	179/179	—
												004	7.9/10.5	21.9/25.3	42.7/ 46.4	45/ 50	39/4 3	179/179	—
												005	12.0/16.0	33.4/38.4	57.1/ 62.9	60/ 70	53/ 58	179/179	002
												004 and 004	15.8/21.0	43.8/50.5	70.1/ 78.5	80/ 80	65/ 72	179/179	002
												004 and 005	19.9/26.5	55.2/63.8	84.4/ 94.5	90/100	78/ 87	179/179	002
	460-3-60	STD	414	508	1	7.4	64	1	1/4	0.8	3.1	NONE	—	—	15.3	20	15	74	—
												006	6.0	7.2	15.6	20	15	74	—
												008	11.5	13.8	23.9	25	22	74	—
												009	14.0	16.8	27.6	30	25	74	—
												008 and 008	23.0	27.7	41.2	45	38	74	—
												008 and 009	25.0	30.1	44.2	45	41	74	—
		ALT									2.6	NONE	—	—	15.6	20	16	83	—
												006	6.0	7.2	16.0	20	16	83	—
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												008 and 008	23.0	27.7	41.6	45	38	83	—
												008 and 009	25.0	30.1	44.6	45	41	83	—
		HIGH									3.4	NONE	—	—	15.6	20	16	96	—
												006	6.0	7.2	16.0	20	16	96	—
												008	11.5	13.8	24.3	25	22	96	—
												009	14.0	16.8	28.0	30	26	96	—
												008 and 008	23.0	27.7	41.6	45	38	96	—
												008 and 009	25.0	30.1	44.6	45	41	96	—
	575-3-60	STD	518	632	1	6.2	52	1	1/4	0.8	3.1	NONE	—	—	11.5	15	13	60	—
		ALT									2.6	NONE	—	—	11.7	15	13	67	—
		HIGH									3.4	NONE	—	—	11.7	15	13	77	—

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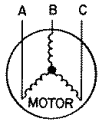

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$$= \frac{1371}{3}$$

$$= 457$$

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(AB) 457 – 452 = 5 v
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Determine percent of voltage imbalance.

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CRPWREXH022A00	3.3	N/A	1.32	15
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CRPWREXH028A00	1.7	N/A	0.68	15
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			Min	Max	Qty	RLA	LRA	Qty	Hp	FLA			Nominal kW	FLA	MCA	MOCP*	FLA	LRA	
007	208/230-3-60	STD	187	254	1	20.6	146	1	1/4	1.4	5.2	NONE	—/—	—/—	37.2/37.2	45/ 45	37/37	184/184	—
												002	4.9/ 6.5	13.6/15.6	37.2/37.2	45/ 45	37/37	184/184	—
												004	7.9/10.5	21.9/25.3	37.2/38.1	40/ 45	37/41	184/184	—
												005	12.0/16.0	33.4/38.4	54.2/60.0	60/ 60	50/56	184/184	—
												004 and 004	15.8/21.0	43.8/50.5	67.2/75.7	70/ 80	62/70	184/184	002
												004 and 005	19.9/26.5	55.2/63.8	81.6/91.6	90/100	75/85	184/184	002
		HIGH									7.5	NONE	—/—	—/—	39.5/39.5	45/ 45	39/39	210/210	—
												002	4.9/ 6.5	13.6/15.6	39.5/39.5	45/ 45	39/39	210/210	—
												004	7.9/10.5	21.9/25.3	39.5/40.9	45/ 50	39/43	210/210	—
												005	12.0/16.0	33.4/38.4	57.1/62.9	60/ 70	53/58	210/210	002
												004 and 004	15.8/21.0	43.8/50.5	70.1/78.5	80/ 80	65/72	210/210	002
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	460-3-60	STD	414	508	1	9.5	73	1	1/4	0.9	2.6	NONE	—	—	17.6	20	17	92	—
												006	6.0	7.2	17.6	20	17	92	—
												008	11.5	13.8	20.5	25	21	92	—
												009	14.0	16.8	27.0	30	25	92	—
												008 and 008	23.0	27.7	40.6	45	37	92	—
												008 and 009	25.5	30.7	44.3	45	41	92	—
		HIGH									3.4	NONE	—	—	18.4	25	18	105	—
												006	6.0	7.2	18.4	25	18	105	—
												008	11.5	13.8	21.5	25	22	105	—
												009	14.0	16.8	28.0	30	26	105	—
												008 and 008	23.0	27.7	41.6	45	38	105	—
												008 and 009	25.5	30.7	45.3	50	42	105	—
	575-3-60	STD	518	632	1	7.6	62	1	1/4	0.9	2.6	NONE	—	—	13.1	20	14	77	—
		HIGH									3.4	NONE	—	—	13.7	20	15	87	—

LEGEND

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

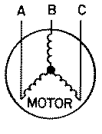
*Used to determine minimum disconnect per NEC.
†Fuse or HACR circuit breaker.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

% Voltage Imbalance

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

Example: Supply voltage is 460-3-60.



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

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

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

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

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

$$= 1.53\%$$

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

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

3. For units with power exhaust: If a single power source is to be used, size wire to include power exhaust MCA and MOCP. Check MCA and MOCP when power exhaust is powered through the unit (must be in accordance with NEC and/or local codes). Determine the new MCA including the power exhaust using the following formula:

MCA New = MCA unit only + MCA of Power Exhaust

For example, using a 50TFF006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

MCA New = 28.9 amps + 1.6 amps = 30.5 amps

If the new MCA does not exceed the published MOCP, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, therefore the MOCP is acceptable. If "MCA New" is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

POWER EXHAUST PART NO.	MCA (230 v)	MCA (460 v)	MCA (575 v)	MOCP (for separate power source)
CRPWREXH030A00	1.6	N/A	0.64	15
CRPWREXH021A00	N/A	0.9	N/A	15
CRPWREXH022A00	3.3	N/A	1.32	15
CRPWREXH023A00	N/A	1.8	N/A	15
CRPWREXH028A00	1.7	N/A	0.68	15
CRPWREXH029A00	N/A	1.0	N/A	15

Step 6 — Adjust Factory-Installed Options

MANUAL OUTDOOR-AIR DAMPER — The outdoor-air hood and screen are attached to the basepan at the bottom of the unit for shipping.

Assembly:

1. Determine quantity of ventilation required for building. Record amount for use in Step 8.
2. Remove and save outdoor-air opening panel and screws. See Fig. 11.
3. Separate hood and screen from basepan by removing the 4 screws securing them. Save all screws.
4. Replace outdoor-air opening panel.
5. Place hood on front of outdoor-air opening panel. See Fig. 12 for hood details. Secure top of hood with the 4 screws removed in Step 3. See Fig. 13.
6. Remove and save 6 screws (3 on each side) from sides of the manual outdoor-air damper assembly.
7. Align screw holes on hood with screw holes on side of manual outdoor-air damper assembly. See Fig. 12 and 13. Secure hood with 6 screws from Step 6.
8. Adjust minimum position setting of the damper blade by adjusting the manual outdoor-air adjustment screws on the front of the damper blade. See Fig. 11. Slide blade vertically until it is in the appropriate position determined by Fig. 14. Tighten screws.
9. Remove and save screws currently on sides of hood. Insert screen. Secure screen to hood using the screws. See Fig. 13.

CONVENIENCE OUTLET — An optional convenience outlet provides power for rooftop use. For maintenance personnel safety, the convenience outlet power is off when the unit disconnect is off. Adjacent unit outlets may be used for service tools. An optional "Hot Outlet" is available from the factory as a special order item.

NOVAR CONTROLS — Optional Novar controls (ETM 3051) are available for replacement or new construction jobs.

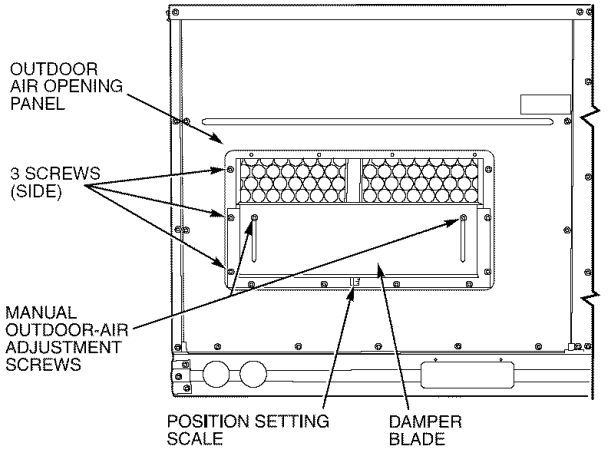


Fig. 11 — Damper Panel with Manual Outdoor-Air Damper Installed

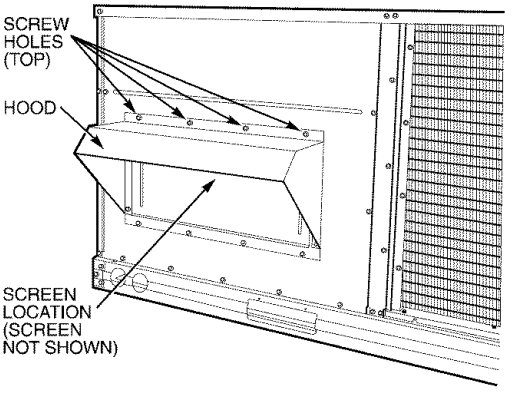


Fig. 13 — Outdoor-Air Damper with Hood Attached

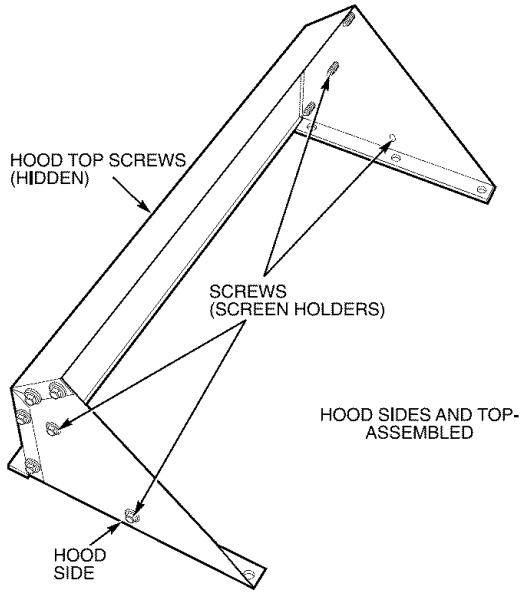


Fig. 12 — Outdoor-Air Hood Details

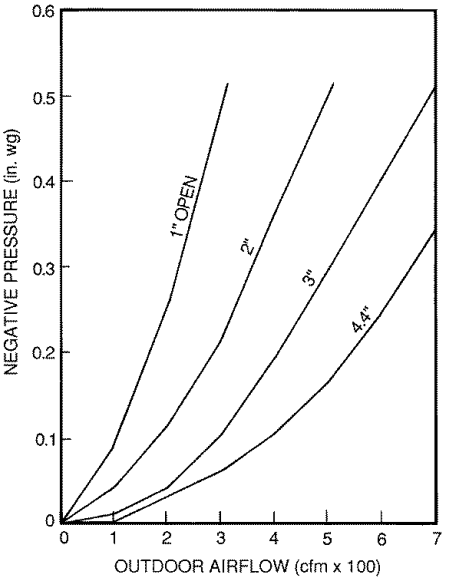


Fig. 14 — Outdoor-Air Damper Position Setting

PREMIERLINK™ CONTROL — The PremierLink controller is compatible with Carrier Comfort Network® (CCN) devices. This control is designed to allow users the access and ability to change factory-defined settings, thus expanding the function of the standard unit control board. Carrier's diagnostic standard tier display tools such as Navigator™ or Scrolling Marquee can be used with the PremierLink controller.

The PremierLink controller (see Fig. 15A and 15B) requires the use of a Carrier electronic thermostat or a CCN connection for time broadcast to initiate its internal timeclock. This is necessary for broadcast of time of day functions (occupied/unoccupied). No sensors are supplied with the field-mounted PremierLink control. The factory-installed PremierLink control includes only the supply-air temperature (SAT) sensor and the outdoor air temperature (OAT) sensor as standard. An indoor air quality (CO_2) sensor can be added as an option. Refer to Table 3 for sensor usage. Refer to Fig. 16 for PremierLink controller wiring. The PremierLink control may be mounted in the control panel or an area below the control panel.

NOTE: PremierLink controller versions 1.3 and later are shipped in Sensor mode. If used with a thermostat, the PremierLink controller must be configured to Thermostat mode.

Install the Supply Air Temperature (SAT) Sensor — When the unit is supplied with a factory-mounted PremierLink control, the supply-air temperature (SAT) sensor (33ZCSENSAT) is factory-supplied and wired. The wiring is routed from the PremierLink control over the control box, through a grommet, into the fan section, down along the back side of the fan, and along the fan deck over to the supply-air opening.

The SAT probe is wire-tied to the supply-air opening (on the horizontal opening end) in its shipping position. Remove the sensor for installation. Re-position the sensor in the flange of the supply-air opening or in the supply air duct (as required by local codes). Drill or punch a $^1/_2$-in. hole in the flange or duct. Use two field-supplied, self-drilling screws to secure the sensor probe in a horizontal orientation.

NOTE: The sensor must be mounted in the discharge airstream downstream of the cooling coil and any heating devices. Be sure the probe tip does not come in contact with any of the unit or heat surfaces.

Outdoor Air Temperature (OAT) Sensor — When the unit is supplied with a factory-mounted PremierLink control, the outdoor-air temperature sensor (OAT) is factory-supplied and wired.

Install the Indoor Air Quality (CO_2) Sensor — Mount the optional indoor air quality (CO_2) sensor according to manufacturer specifications.

A separate field-supplied transformer must be used to power the CO_2 sensor.

Wire the CO_2 sensor to the COM and IAQI terminals of J5 on the PremierLink controller. Refer to the PremierLink Installation, Start-up, and Configuration Instructions for detailed wiring and configuration information.

Enthalpy Sensors and Control — The enthalpy control (HH57AC077) is supplied as a field-installed accessory to be used with the economizer damper control option. The outdoor air enthalpy sensor is part of the enthalpy control. The separate field-installed accessory return air enthalpy sensor (HH57AC078) is required for differential enthalpy control.

NOTE: The enthalpy control must be set to the "D" setting for differential enthalpy control to work properly.

The enthalpy control receives the indoor and return enthalpy from the outdoor and return air enthalpy sensors and provides a dry contact switch input to the PremierLink controller. Locate the controller in place of an existing economizer controller or near the actuator. The mounting plate may not be needed if existing bracket is used.

A closed contact indicates that outside air is preferred to the return air. An open contact indicates that the economizer should remain at minimum position.

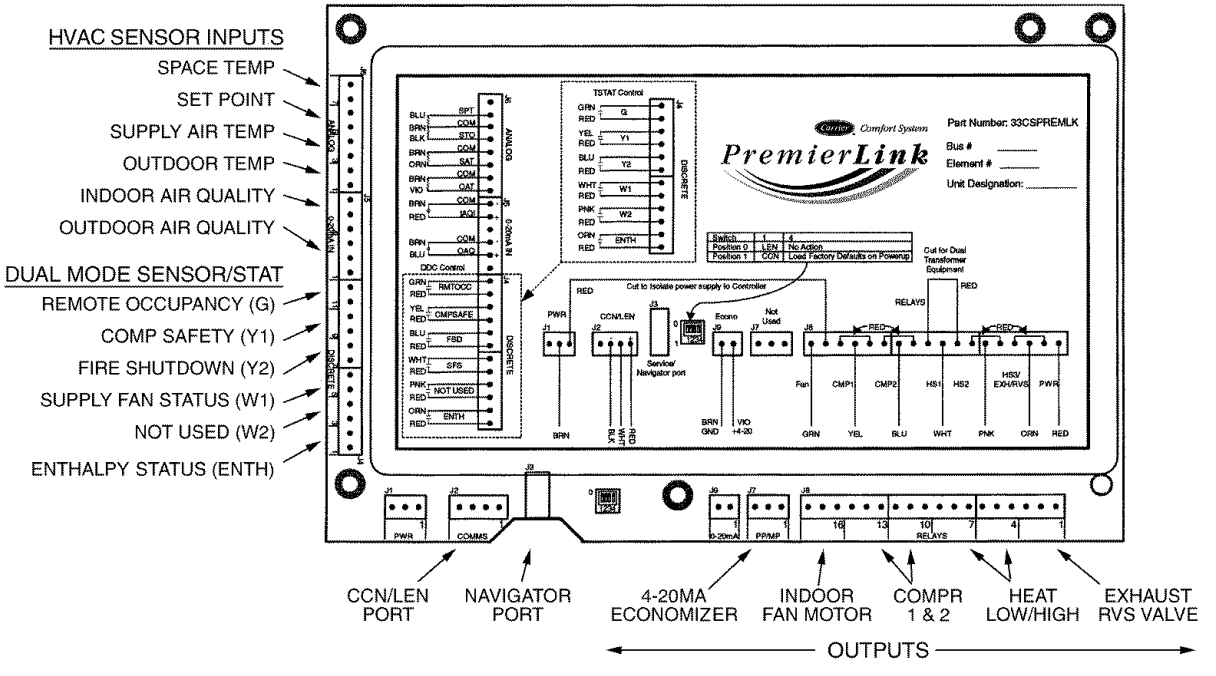


Fig. 15A — PremierLink Controller

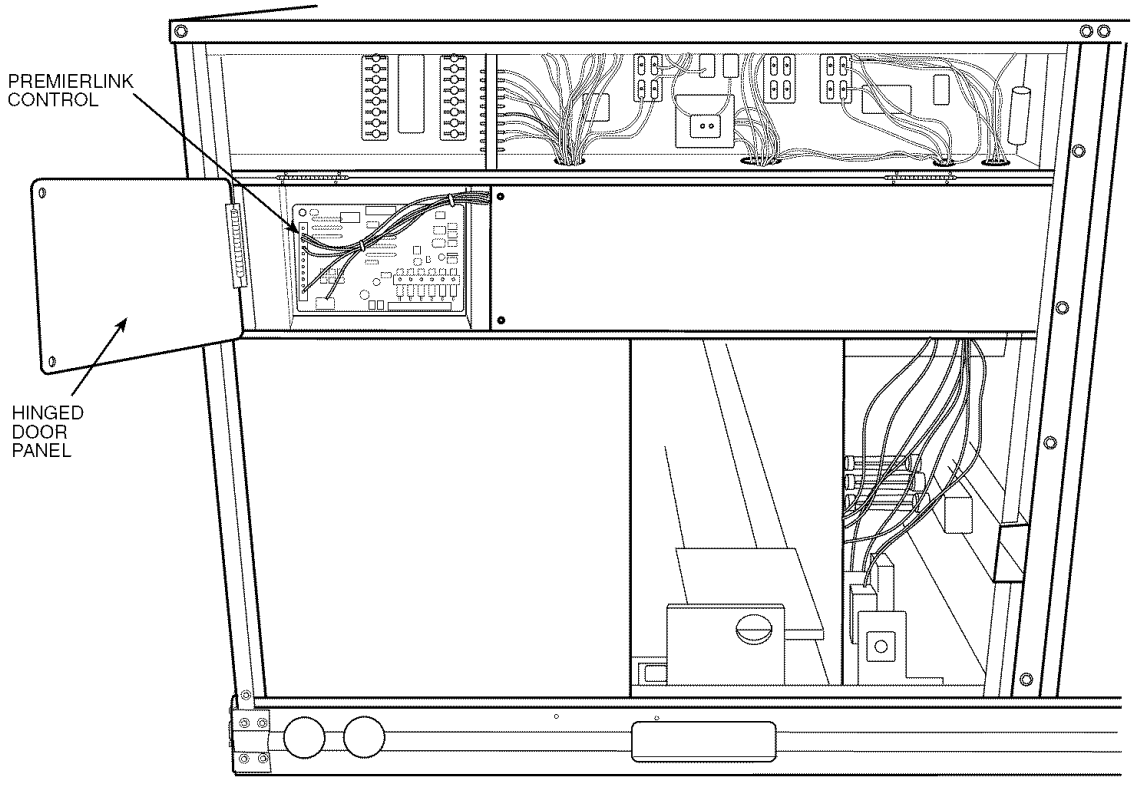


Fig. 15B — PremierLink™ Controller (Installed)

Table 3 — PremierLink Sensor Usage

APPLICATION	OUTDOOR AIR TEMPERATURE SENSOR	RETURN AIR TEMPERATURE SENSOR	OUTDOOR AIR ENTHALPY SENSOR	RETURN AIR ENTHALPY SENSOR
Dry Bulb Temperature with PremierLink* (PremierLink requires 4-20 mA Actuator)	Included — HH79NZ017	—	—	—
Differential Dry Bulb Temperature with PremierLink* (PremierLink requires 4-20 mA Actuator)	Included — HH79NZ017	Required — 33ZCT55SPT or Equivalent	—	—
Single Enthalpy with PremierLink* (PremierLink requires 4-20 mA Actuator)	Included — Not Used	—	Required — HH57AC077	—
Differential Enthalpy with PremierLink* (PremierLink requires 4-20 mA Actuator)	Included — Not Used	—	Required — HH57AC077	Required — HH57AC078

*PremierLink control requires Supply Air Temperature sensor 33ZCSENSAT and Outdoor Air Temperature sensor HH79NZ017 — Included with factory-installed PremierLink control; field-supplied and field-installed with field-installed PremierLink control.

NOTES:

1. CO_2 Sensors (Optional):
   33ZCSENCO2 — Room sensor (adjustable). Aspirator box is required for duct mounting of the sensor.
   33ZCASPCO2 — Aspirator box used for duct-mounted CO_2 room sensor.
   33ZCT55CO2 — Space temperature and CO_2 room sensor with override.
   33ZCT56CO2 — Space temperature and CO_2 room sensor with override and set point.
2. All units include the following Standard Sensors:
   Outdoor-Air Sensor — 50HJ540569 — Opens at 67 F, closes at 52 F, not adjustable.
   Mixed-Air Sensor — HH97AZ001 — (PremierLink control requires Supply Air Temperature sensor 33ZCSENSAT and Outdoor Air Temperature Sensor HH79NZ017).
   Compressor Lockout Sensor — 50HJ540570 — Opens at 35 F, closes at 50 F.

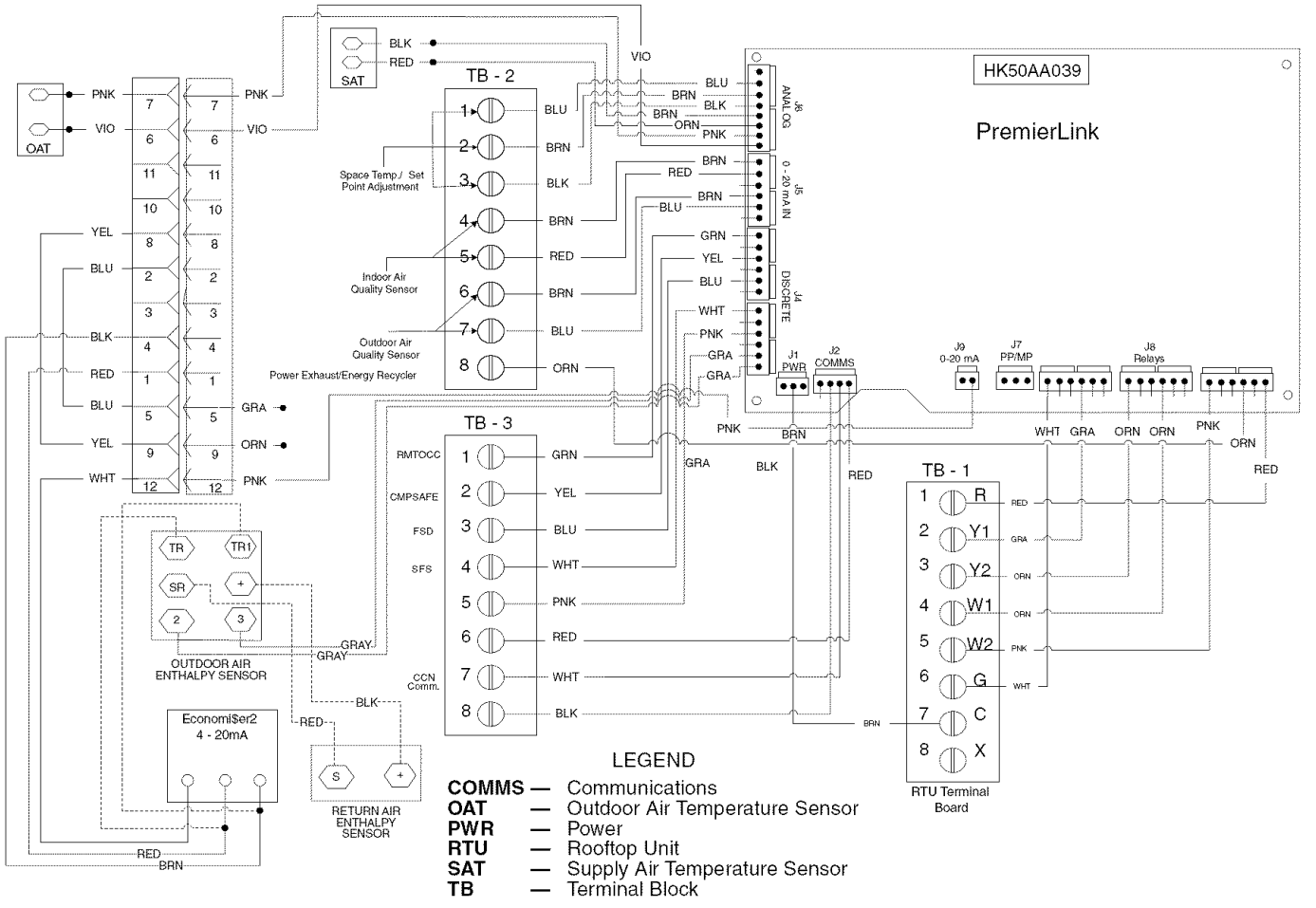


Fig. 16 — Typical PremierLink™ Controls Wiring

Outdoor Air Enthalpy Sensor/Enthalpy Controller (HH57AC077) — To wire the outdoor air enthalpy sensor, perform the following (see Fig. 17 and 18):

NOTE: The outdoor air sensor can be removed from the back of the enthalpy controller and mounted remotely.

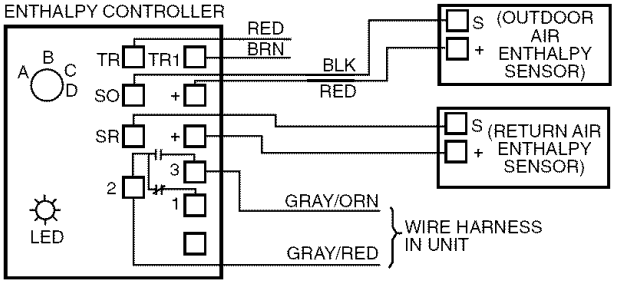
1. Use a 4-conductor, 18 or 20 AWG cable to connect the enthalpy control to the PremierLink controller and power transformer.
2. Connect the following 4 wires from the wire harness located in rooftop unit to the enthalpy controller:
   a. Connect the BRN wire to the 24 vac terminal (TR1) on enthalpy control and to pin 1 on 12-pin harness.
   b. Connect the RED wire to the 24 vac GND terminal (TR) on enthalpy sensor and to pin 4 on 12-pin harness.
   c. Connect the GRAY/ORN wire to J4-2 on PremierLink controller and to terminal (3) on enthalpy sensor.
   d. Connect the GRAY/RED wire to J4-1 on PremierLink controller and to terminal (2) on enthalpy sensor.

NOTE: If installing in a Carrier rooftop, use the two gray wires provided from the control section to the economizer to connect PremierLink controller to terminals 2 and 3 on enthalpy sensor.

Return Air Enthalpy Sensor — Mount the return-air enthalpy sensor (HH57AC078) in the return-air duct. The return air sensor is wired to the enthalpy controller (HH57AC077). The outdoor enthalpy changeover set point is set at the controller.

To wire the return air enthalpy sensor, perform the following (see Fig. 17):

1. Use a 2-conductor, 18 or 20 AWG, twisted pair cable to connect the return air enthalpy sensor to the enthalpy controller.
2. At the enthalpy control remove the factory-installed resistor from the (SR) and (+) terminals.
3. Connect the field-supplied RED wire to (+) spade connector on the return air enthalpy sensor and the (SR+) terminal on the enthalpy controller. Connect the BLK wire to (S) spade connector on the return air enthalpy sensor and the (SR) terminal on the enthalpy controller.



NOTES:
1. Remove factory-installed jumper across SR and + before connecting wires from return air sensor.
2. Switches shown in high outdoor air enthalpy state. Terminals 2 and 3 close on low outdoor air enthalpy relative to indoor air enthalpy.
3. Remove sensor mounted on back of control and locate in outside airstream.

Fig. 17 — Outdoor and Return Air Sensor Wiring Connections for Differential Enthalpy Control

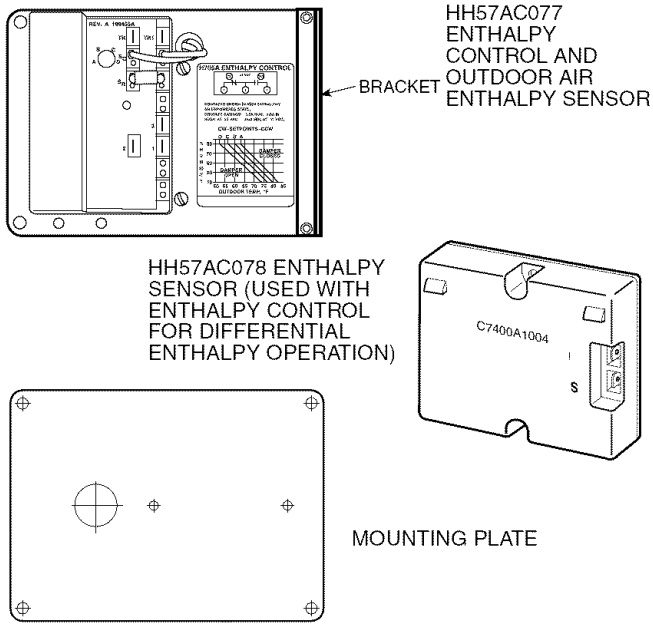


Fig. 18 — Differential Enthalpy Control, Sensor and Mounting Plate (33AMKITENT006)

OPTIONAL ECONOMI$ER IV AND ECONOMI$ER2 — See Fig. 19 for EconoMi$er IV component locations. See Fig. 20 for EconoMi$er2 component locations.

NOTE: These instructions are for installing the optional EconoMi$er IV and EconoMi$er2 only. Refer to the accessory EconoMi$er IV or EconoMi$er2 installation instructions when field installing an EconoMi$er IV or EconoMi$er2 accessory.

1. To remove the existing unit filter access panel, raise the panel and swing the bottom outward. The panel is now disengaged from the track and can be removed. See Fig. 21.
2. The box with the economizer hood components is shipped in the compartment behind the economizer. The EconoMi$er IV controller is mounted on top of the EconoMi$er IV in the position shown in Fig. 19. The optional EconoMi$er2 with 4 to 20 mA actuator signal control does not include the EconoMi$er IV controller. To remove the component box from its shipping position, remove the screw holding the hood box bracket to the top of the economizer. Slide the hood box out of the unit. See Fig. 22.

IMPORTANT: If the power exhaust accessory is to be installed on the unit, the hood shipped with the unit will not be used and must be discarded. **Save the aluminum filter for use in the power exhaust hood assembly.**

3. The indoor coil access panel will be used as the top of the hood. Remove the screws along the sides and bottom of the indoor coil access panel. See Fig. 23.
4. Swing out indoor coil access panel and insert the hood sides under the panel (hood top). Use the screws provided to attach the hood sides to the hood top. Use screws provided to attach the hood sides to the unit. See Fig. 24.

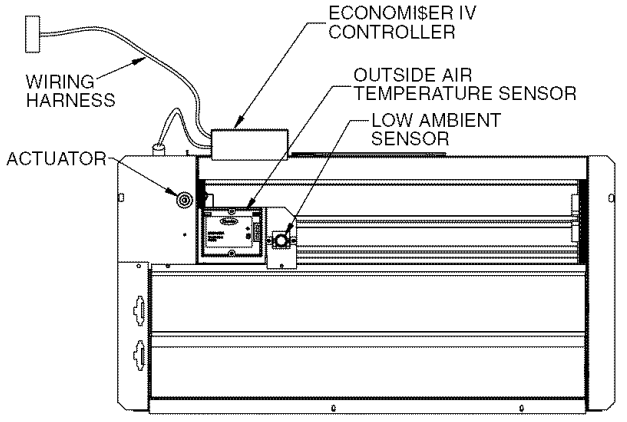


Fig. 19 — EconoMi$er IV Component Locations

5. Remove the shipping tape holding the economizer barometric relief damper in place.
6. Insert the hood divider between the hood sides. See Fig. 24 and 25. Secure hood divider with 2 screws on each hood side. The hood divider is also used as the bottom filter rack for the aluminum filter.
7. Open the filter clips which are located underneath the hood top. Insert the aluminum filter into the bottom filter rack (hood divider). Push the filter into position past the open filter clips. Close the filter clips to lock the filter into place. See Fig. 25.
8. Caulk the ends of the joint between the unit top panel and the hood top. See Fig. 23.
9. Replace the filter access panel.
10. Install all EconoMi$er IV accessories. EconoMi$er IV wiring is shown in Fig. 26. EconoMi$er2 wiring is shown in Fig. 27.

Barometric flow capacity is shown in Fig. 28. Outdoor air leakage is shown in Fig. 29. Return air pressure drop is shown in Fig. 30.

ECONOMI$ER IV STANDARD SENSORS

Outdoor Air Temperature (OAT) Sensor — The outdoor air temperature sensor (HH57AC074) is a 10 to 20 mA device used to measure the outdoor-air temperature. The outdoor-air temperature is used to determine when the EconoMi$er IV can be used for free cooling. The sensor is factory-installed on the EconoMi$er IV in the outdoor airstream. See Fig. 19. The operating range of temperature measurement is 40 to 100 F.

Supply Air Temperature (SAT) Sensor — The supply air temperature sensor is a 3 K thermistor located at the inlet of the indoor fan. See Fig. 31. This sensor is factory installed. The operating range of temperature measurement is 0° to 158 F. See Table 4 for sensor temperature/resistance values.

The temperature sensor looks like an eyelet terminal with wires running to it. The sensor is located in the "crimp end" and is sealed from moisture.

Outdoor Air Lockout Sensor — The Economi$er IV is equipped with an ambient temperature lockout switch located in the outdoor air stream which is used to lockout the compressors below a 42 F ambient temperature. See Fig. 19.

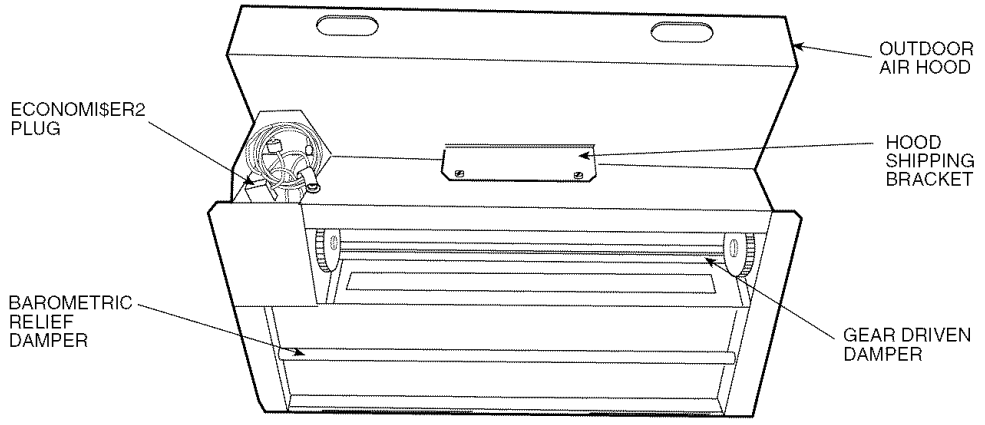


Fig. 20 — EconMi$er2 Component Locations

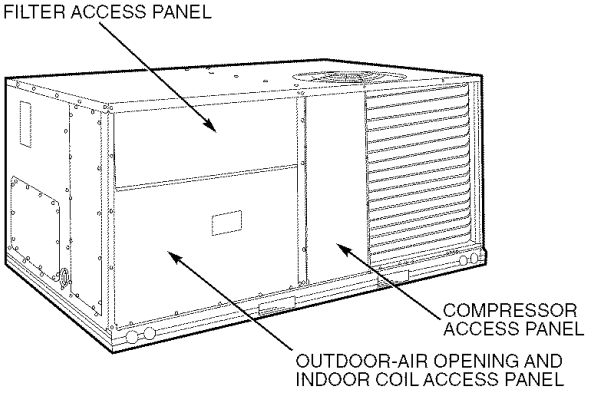


Fig. 21 — Typical Access Panel Locations

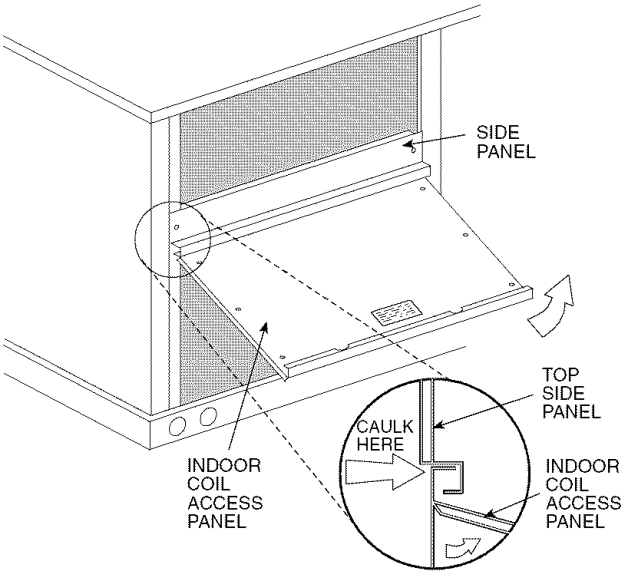


Fig. 23 — Indoor Coil Access Panel Relocation

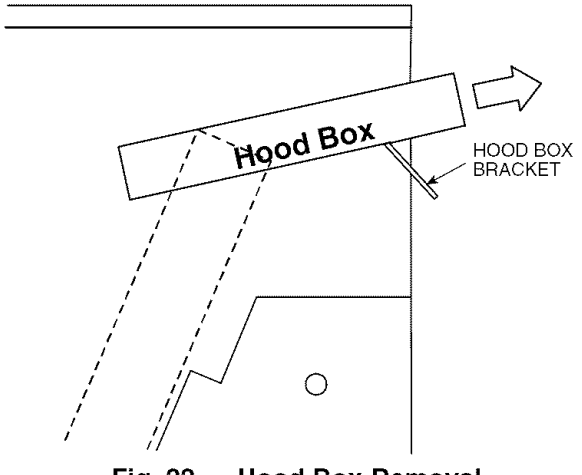


Fig. 22 — Hood Box Removal

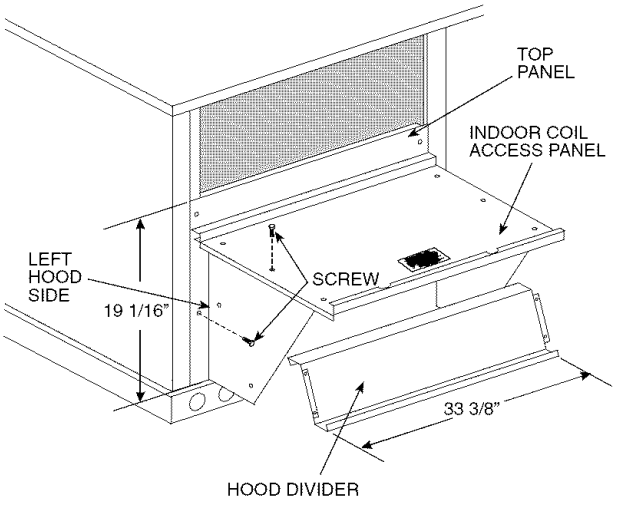


Fig. 24 — Outdoor-Air Hood Construction

Table 4 — Supply Air Sensor Temperature/Resistance Values

TEMPERATURE (F)	RESISTANCE (ohms)
–58	200,250
–40	100,680
–22	53,010
–4	29,091
14	16,590
32	9,795
50	5,970
68	3,747
77	3,000
86	2,416
104	1,597
122	1,080
140	746
158	525
176	376
185	321
194	274
212	203
230	153
248	116
257	102
266	89
284	70
302	55

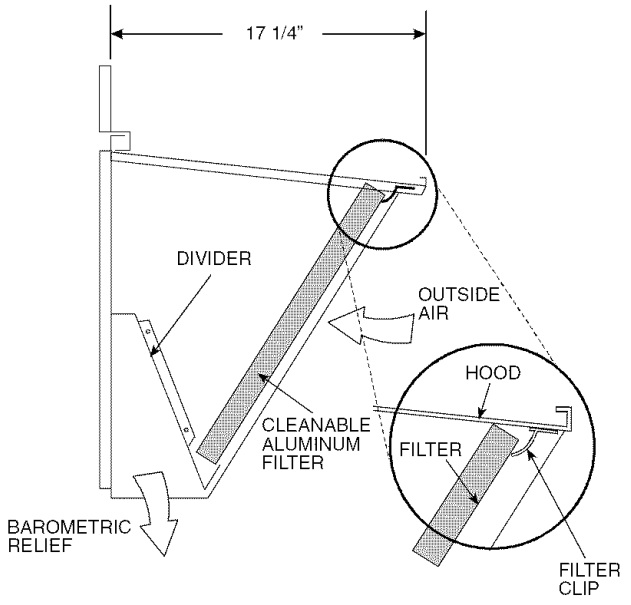
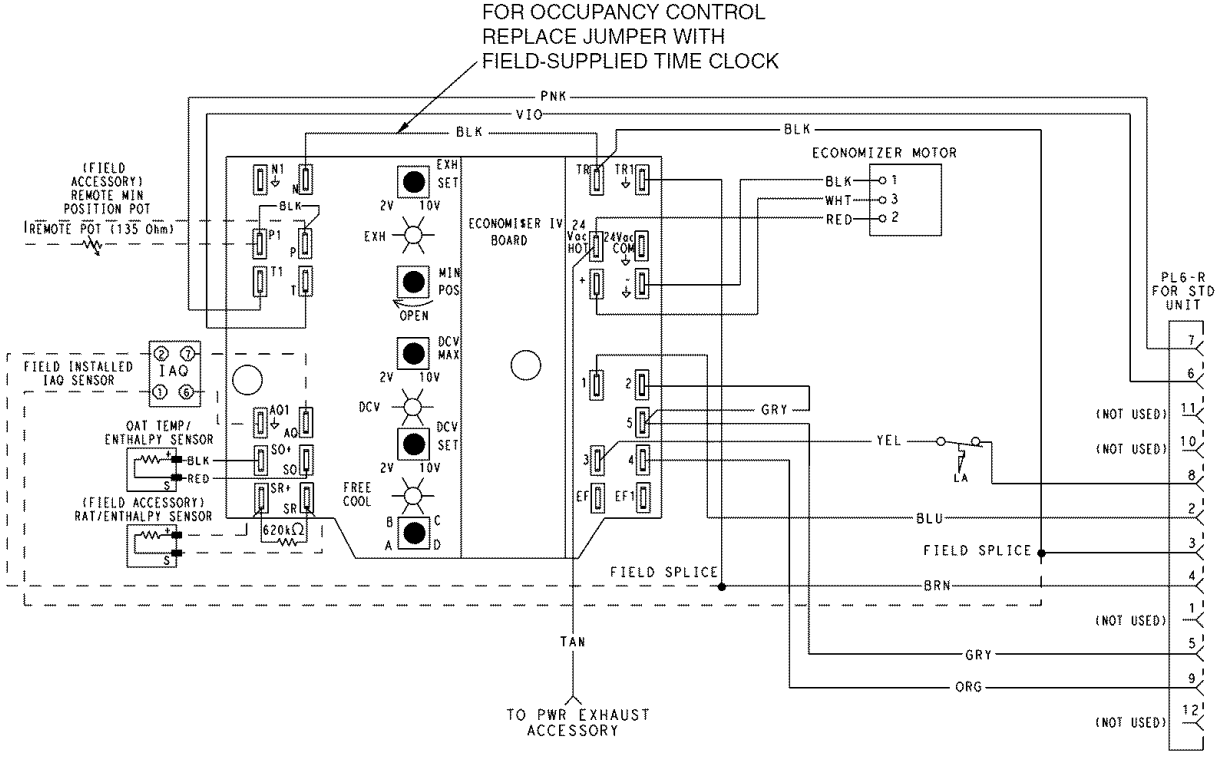


Fig. 25 — Filter Installation



LEGEND

DCV— Demand Controlled Ventilation
IAQ — Indoor Air Quality
LA — Low Ambient Lockout Device
OAT— Outdoor-Air Temperature
POT— Potentiometer
RAT— Return-Air Temperature

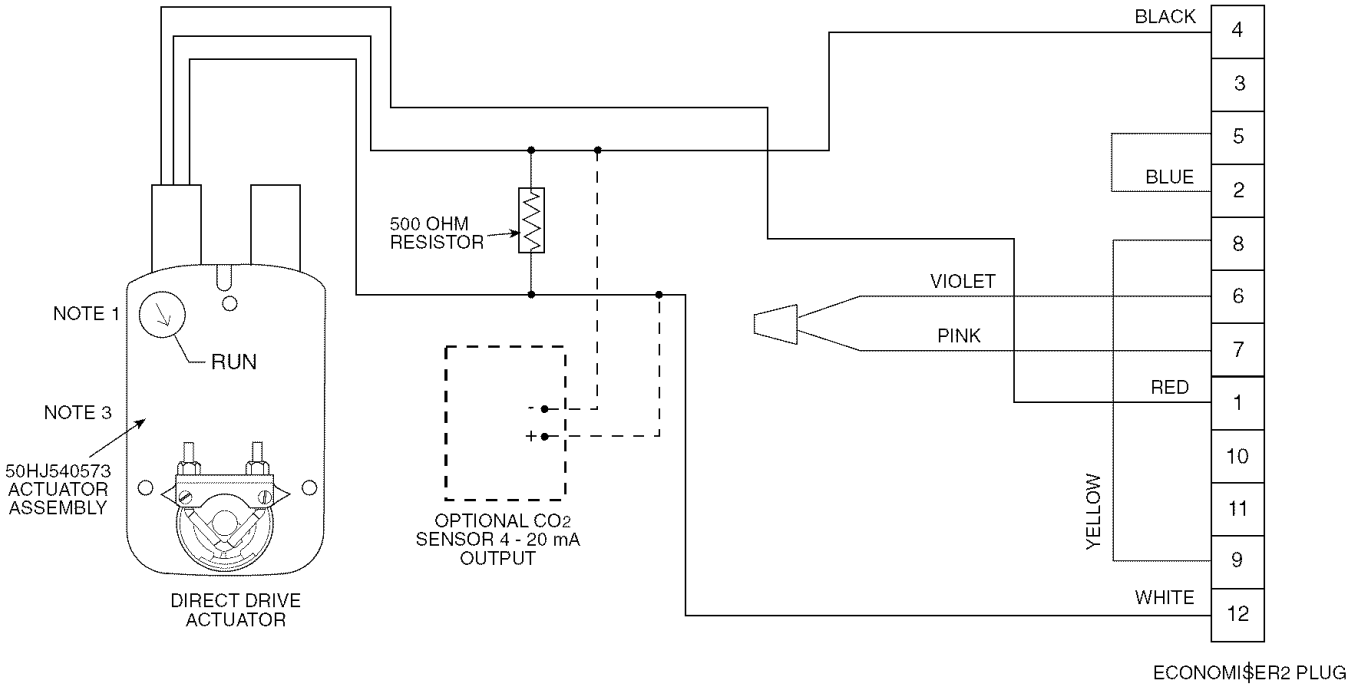
Potentiometer Defaults Settings:

Power Exhaust	Middle
Minimum Pos.	Fully Closed
DCV Max.	Middle
DCV Set	Middle
Enthalpy	C Setting

NOTES:

1. 620 ohm, 1 watt 5% resistor should be removed only when using differential enthalpy or dry bulb.
2. If a separate field-supplied 24 v transformer is used for the IAQ sensor power supply, it cannot have the secondary of the transformer grounded.
3. For field-installed remote minimum position POT, remove black wire jumper between P and P1 and set control minimum position POT to the minimum position.

Fig. 26 — EconoMi$er IV Wiring



NOTES:
1. Switch on actuator must be in run position for economizer to operate.
2. PremierLink™ control requires that the standard 50HJ540569 outside-air sensor be replaced by either the CROASENR001A00 dry bulb sensor or HH57A077 enthalpy sensor.
3. 50HJ540573 actuator consists of the 50HJ540567 actuator and a harness with 500-ohm resistor.

Fig. 27 — EconoMi$er2 with 4 to 20 mA Control Wiring

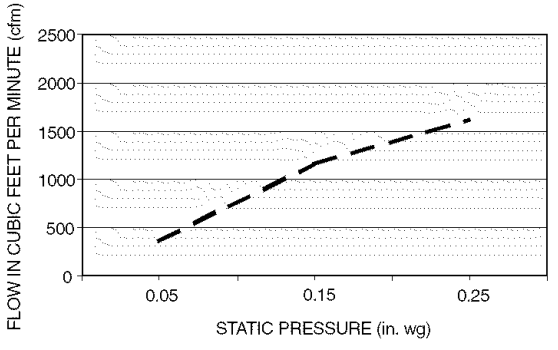


Fig. 28 — Barometric Flow Capacity

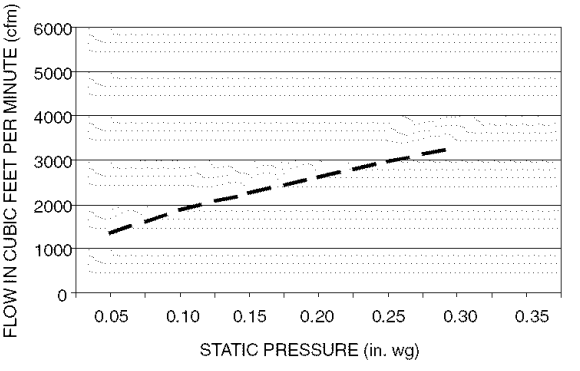


Fig. 30 — Return-Air Pressure Drop

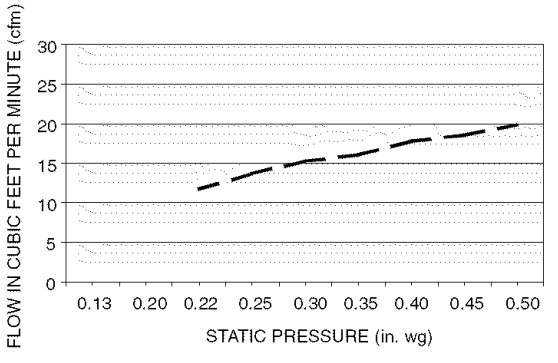


Fig. 29 — Outdoor-Air Damper Leakage

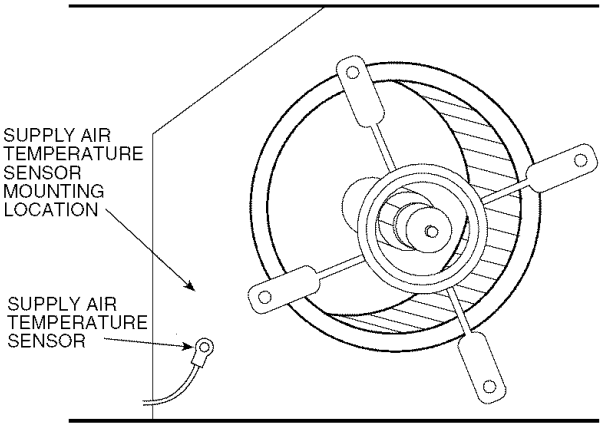


Fig. 31 — Supply Air Sensor Location

ECONOMI$ER IV CONTROL MODES

IMPORTANT: The optional EconoMi$er2 does not include a controller. The EconoMi$er2 is operated by a 4 to 20 mA signal from an existing field-supplied controller (such as PremierLink™ control). See Fig. 27 for wiring information.

Determine the EconoMi$er IV control mode before set up of the control. Some modes of operation may require different sensors. Refer to Table 5. The EconoMi$er IV is supplied from the factory with a supply air temperature sensor and an outdoor air temperature sensor. This allows for operation of the EconoMi$er IV with outdoor air dry bulb changeover control. Additional accessories can be added to allow for different types of changeover control and operation of the EconoMi$er IV and unit.

Table 5 — EconoMi$er IV Sensor Usage

APPLICATION	ECONOMI$ER IV WITH OUTDOOR AIR DRY BULB SENSOR		
	Accessories Required		
Outdoor Air Dry Bulb	None. The outdoor air dry bulb sensor is factory installed.		
Differential Dry Bulb	CRTEMPSN002A00*		
Single Enthalpy	HH57AC078		
Differential Enthalpy	HH57AC078 and CRENTDIF004A00*		
CO_2 for DCV Control using a Wall-Mounted CO_2 Sensor	33ZCSENCO2		
CO_2 for DCV Control using a Duct-Mounted CO_2 Sensor	33ZCSENCO2† and 33ZCASPCO2**	OR	CRCBDIOX005A00††

*CRENTDIF004A00 and CRTEMPSN002A00 accessories are used on many different base units. As such, these kits may contain parts that will not be needed for installation.
†33ZCSENCO2 is an accessory CO_2 sensor.
**33ZCASPCO2 is an accessory aspirator box required for duct-mounted applications.
††CRCBDIOX005A00 is an accessory that contains both 33ZCSENCO2 and 33ZCASPCO2 accessories.

Outdoor Dry Bulb Changeover — The standard controller is shipped from the factory configured for outdoor dry bulb changeover control. The outdoor air and supply air temperature sensors are included as standard. For this control mode, the outdoor temperature is compared to an adjustable set point selected on the control. If the outdoor-air temperature is above the set point, the EconoMi$er IV will adjust the outdoor-air dampers to minimum position. If the outdoor-air temperature is below the set point, the position of the outdoor-air dampers will be controlled to provide free cooling using outdoor air. When in this mode, the LED next to the free cooling set point potentiometer will be on. The changeover temperature set point is controlled by the free cooling set point potentiometer located on the control. See Fig. 32. The scale on the potentiometer is A, B, C, and D. See Fig. 33 for the corresponding temperature changeover values.

Differential Dry Bulb Control — For differential dry bulb control the standard outdoor dry bulb sensor is used in conjunction with an additional accessory dry bulb sensor (part number CRTEMPSN002A00). The accessory sensor must be mounted in the return airstream. See Fig. 34. Wiring is provided in the EconoMi$er IV wiring harness. See Fig. 26.

In this mode of operation, the outdoor-air temperature is compared to the return air temperature and the lower temperature airstream is used for cooling. When using this mode of changeover control, turn the enthalpy set point potentiometer fully clockwise to the D setting. See Fig. 32.

Outdoor Enthalpy Changeover — For enthalpy control, accessory enthalpy sensor (part number HH57AC078) is required. Replace the standard outdoor dry bulb temperature sensor with the accessory enthalpy sensor in the same mounting location. See Fig. 19. When the outdoor air enthalpy rises above the outdoor enthalpy changeover set point, the outdoor-air damper moves to its minimum position. The outdoor enthalpy changeover set point is set with the outdoor enthalpy set point potentiometer on the EconoMi$er IV controller. The set points are A, B, C, and D. See Fig. 35. The factory-installed 620-ohm jumper must be in place across terminals SR and SR+ on the EconoMi$er IV controller. See Fig. 19 and 36.

Differential Enthalpy Control — For differential enthalpy control, the EconoMi$er IV controller uses two enthalpy sensors (HH57AC078 and CRENTDIF004A00), one in the outside air and one in the return air duct. The EconoMi$er IV controller compares the outdoor air enthalpy to the return air enthalpy to determine EconoMi$er IV use. The controller selects the lower enthalpy air (return or outdoor) for cooling. For example, when the outdoor air has a lower enthalpy than the return air, the EconoMi$er IV opens to bring in outdoor air for free cooling.

Replace the standard outside air dry bulb temperature sensor with the accessory enthalpy sensor in the same mounting location. See Fig. 19. Mount the return air enthalpy sensor in the return air duct. See Fig. 34. Wiring is provided in the EconoMi$er IV wiring harness. See Fig. 26. The outdoor enthalpy changeover set point is set with the outdoor enthalpy set point potentiometer on the EconoMi$er IV controller. When using this mode of changeover control, turn the enthalpy set point potentiometer fully clockwise to the D setting.

Indoor Air Quality (IAQ) Sensor Input — The IAQ input can be used for demand control ventilation control based on the level of CO_2 measured in the space or return air duct.

Mount the accessory IAQ sensor according to manufacturer specifications. The IAQ sensor should be wired to the AQ and AQ1 terminals of the controller. Adjust the DCV potentiometers to correspond to the DCV voltage output of the indoor air quality sensor at the user-determined set point. See Fig. 37.

If a separate field-supplied transformer is used to power the IAQ sensor, the sensor must not be grounded or the EconoMi$er IV control board will be damaged.

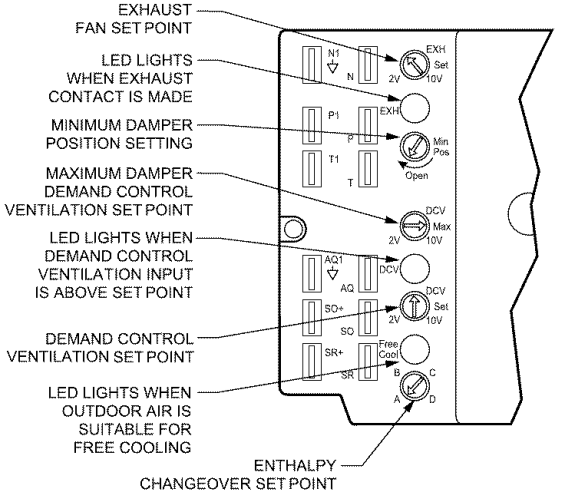


Fig. 32 — EconoMi$er IV Controller Potentiometer and LED Locations

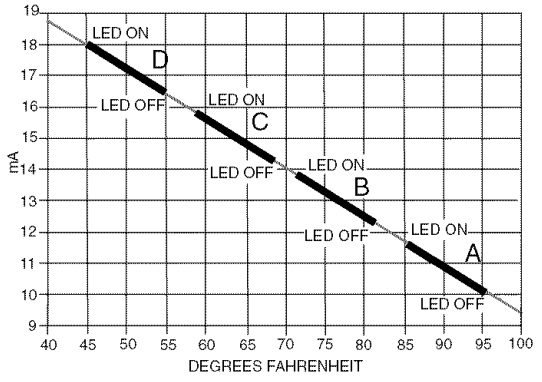


Fig. 33 — Outside Air Temperature Changeover Set Points

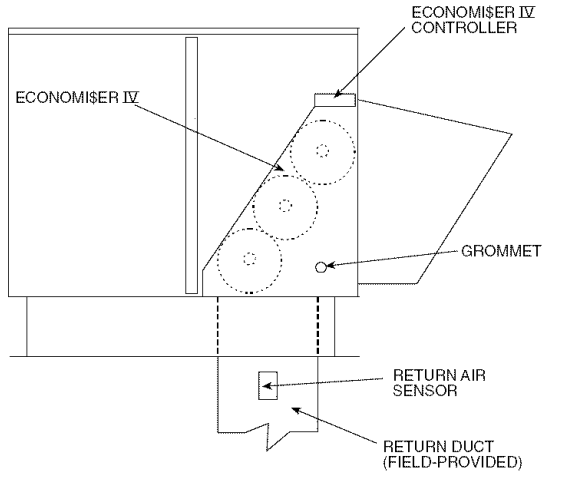


Fig. 34 — Return Air Temperature or Enthalpy Sensor Mounting Location

CONTROL CURVE	CONTROL POINT APPROX. °F (°C) AT 50% RH
A	73 (23)
B	70 (21)
C	67 (19)
D	63 (17)

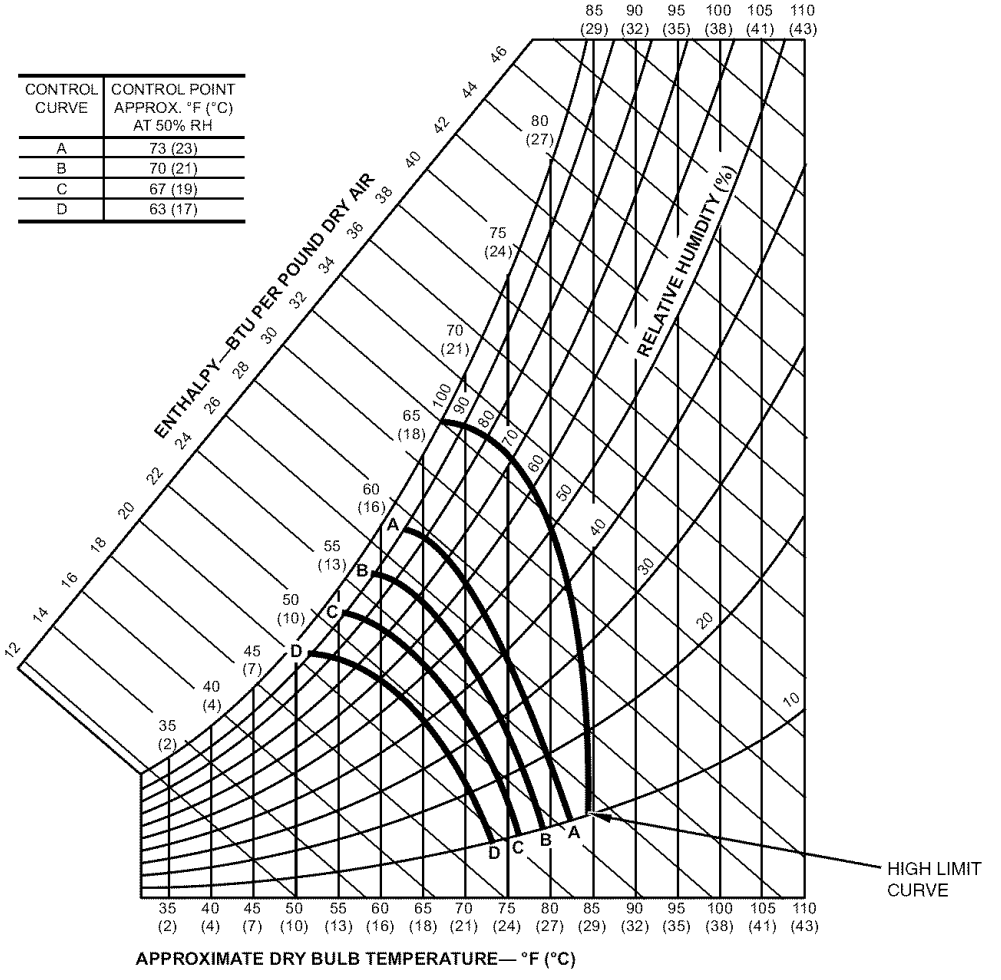


Fig. 35 — Enthalpy Changeover Set Points

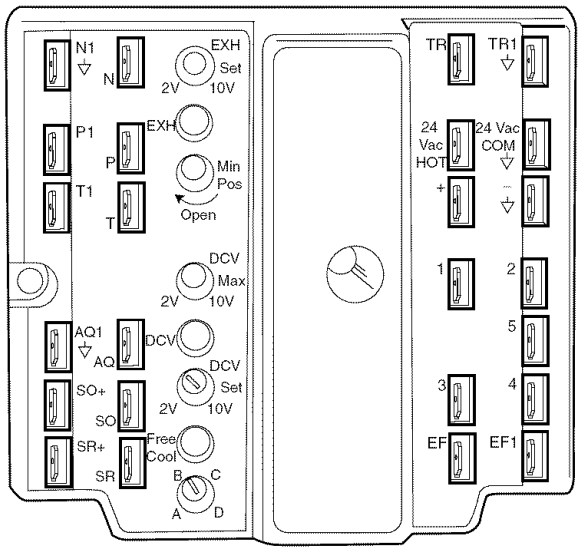


Fig. 36 — EconoMi$er IV Control

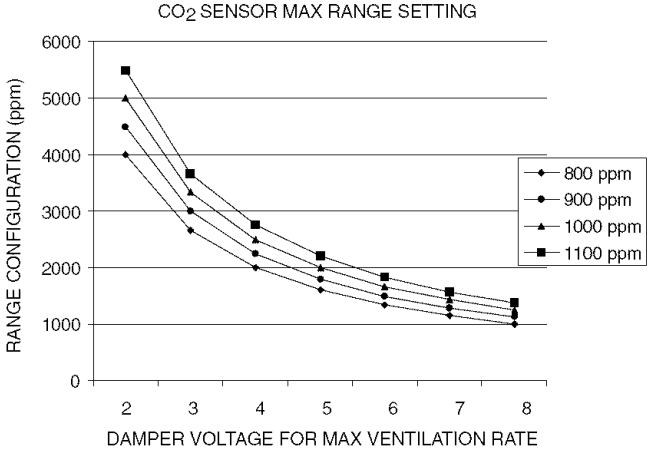


Fig. 37 — CO_2 Sensor Maximum Range Setting

Exhaust Set Point Adjustment — The exhaust set point will determine when the exhaust fan runs based on damper position (if accessory power exhaust is installed). The set point is modified with the Exhaust Fan Set Point (EXH SET) potentiometer. See Fig. 32. The set point represents the damper position above which the exhaust fans will be turned on. When there is a call for exhaust, the EconoMi$er IV controller provides a 45 ± 15 second delay before exhaust fan activation to allow the dampers to open. This delay allows the damper to reach the appropriate position to avoid unnecessary fan overload.

Minimum Position Control — There is a minimum damper position potentiometer on the EconoMi$er IV controller. See Fig. 32. The minimum damper position maintains the minimum airflow into the building during the occupied period.

When using demand ventilation, the minimum damper position represents the minimum ventilation position for VOC (volatile organic compound) ventilation requirements. The maximum demand ventilation position is used for fully occupied ventilation.

When demand ventilation control is not being used, the minimum position potentiometer should be used to set the occupied ventilation position. The maximum demand ventilation position should be turned fully clockwise.

Adjust the minimum position potentiometer to allow the minimum amount of outdoor air, as required by local codes, to enter the building. Make minimum position adjustments with at least 10 F temperature difference between the outdoor and return-air temperatures.

To determine the minimum position setting, perform the following procedure:

1. Calculate the appropriate mixed air temperature using the following formula:

$$(T_O \times \frac{OA}{100}) + (TR \times \frac{RA}{100}) = T_M$$

T_O = Outdoor-Air Temperature
OA = Percent of Outdoor Air
T_R = Return-Air Temperature
RA = Percent of Return Air
T_M = Mixed-Air Temperature

As an example, if local codes require 10% outdoor air during occupied conditions, outdoor-air temperature is 60 F, and return-air temperature is 75 F.

(60 x .10) + (75 x .90) = 73.5 F

2. Disconnect the supply air sensor from terminals T and T1.
3. Ensure that the factory-installed jumper is in place across terminals P and P1. If remote damper positioning is being used, make sure that the terminals are wired according to Fig. 26 and that the minimum position potentiometer is turned fully clockwise.
4. Connect 24 vac across terminals TR and TR1.
5. Carefully adjust the minimum position potentiometer until the measured mixed-air temperature matches the calculated value.
6. Reconnect the supply air sensor to terminals T and T1.

Remote control of the EconoMi$er IV damper is desirable when requiring additional temporary ventilation. If a field-supplied remote potentiometer (Honeywell part number S963B1128) is wired to the EconoMi$er IV controller, the minimum position of the damper can be controlled from a remote location.

To control the minimum damper position remotely, remove the factory-installed jumper on the P and P1 terminals on the EconoMi$er IV controller. Wire the field-supplied potentiometer to the P and P1 terminals on the EconoMi$er IV controller. See Fig. 36.

Damper Movement — Damper movement from full open to full closed (or vice versa) takes $2^1/_2$ minutes.

Thermostats — The EconoMi$er IV control works with conventional thermostats that have a Y1 (cool stage 1), Y2 (cool stage 2), W1 (heat stage 1), W2 (heat stage 2), and G (fan). The EconoMi$er IV control does not support space temperature sensors. Connections are made at the thermostat terminal connection board located in the main control box.

Occupancy Control — The factory default configuration for the EconoMi$er IV control is occupied mode. Occupied status is provided by the black jumper from terminal TR to terminal N. When unoccupied mode is desired, install a field-supplied timeclock function in place of the jumper between TR and N. See Fig. 26. When the timeclock contacts are closed, the EconoMi$er IV control will be in occupied mode. When the timeclock contacts are open (removing the 24-v signal from terminal N), the EconoMi$er IV will be in unoccupied mode.

Demand Controlled Ventilation (DCV) — When using the EconoMi$er IV for demand controlled ventilation, there are some equipment selection criteria which should be considered. When selecting the heat capacity and cool capacity of the equipment, the maximum ventilation rate must be evaluated for design conditions. The maximum damper position must be calculated to provide the desired fresh air.

Typically the maximum ventilation rate will be about 5 to 10% more than the typical cfm required per person, using normal outside air design criteria.

A proportional anticipatory strategy should be taken with the following conditions: a zone with a large area, varied occupancy, and equipment that cannot exceed the required ventilation rate at design conditions. Exceeding the required ventilation rate means the equipment can condition air at a maximum ventilation rate that is greater than the required ventilation rate for maximum occupancy. A proportional-anticipatory strategy will cause the fresh air supplied to increase as the room CO_2 level increases even though the CO_2 set point has not been reached. By the time the CO_2 level reaches the set point, the damper will be at maximum ventilation and should maintain the set point.

In order to have the CO_2 sensor control the economizer damper in this manner, first determine the damper voltage output for minimum or base ventilation. Base ventilation is the ventilation required to remove contaminants during unoccupied periods. The following equation may be used to determine the percent of outside-air entering the building for a given damper position. For best results there should be at least a 10 degree difference in outside and return-air temperatures.

$$(T_O \times \frac{OA}{100}) + (TR \times \frac{RA}{100}) = T_M$$

T_O = Outdoor-Air Temperature
OA = Percent of Outdoor Air
T_R = Return-Air Temperature
RA = Percent of Return Air
T_M = Mixed-Air Temperature

Once base ventilation has been determined, set the minimum damper position potentiometer to the correct position.

The same equation can be used to determine the occupied or maximum ventilation rate to the building. For example, an output of 3.6 volts to the actuator provides a base ventilation rate of 5% and an output of 6.7 volts provides the maximum ventilation rate of 20% (or base plus 15 cfm per person). Use Fig. 37 to determine the maximum setting of the CO_2 sensor. For example, a 1100 ppm set point relates to a 15 cfm per person design. Use the 1100 ppm curve on Fig. 37 to find the point when the CO_2 sensor output will be 6.7 volts. Line up the point on the graph with the left side of the chart to determine that the range configuration for the CO_2 sensor should be 1800 ppm. The EconoMi$er IV controller will output the 6.7 volts from the CO_2 sensor to the actuator when the CO_2 concentration in the space is at 1100 ppm. The DCV set point may be left at 2 volts since the CO_2 sensor voltage will be ignored by the EconoMi$er IV controller until it rises above the 3.6 volt setting of the minimum position potentiometer.

Once the fully occupied damper position has been determined, set the maximum damper demand control ventilation potentiometer to this position. Do not set to the maximum position as this can result in over-ventilation to the space and potential high-humidity levels.

CO_2 Sensor Configuration — The CO_2 sensor has preset standard voltage settings that can be selected anytime after the sensor is powered up. See Table 6.

Use setting 1 or 2 for Carrier equipment. See Table 6.

1. Press Clear and Mode buttons. Hold at least 5 seconds until the sensor enters the Edit mode.
2. Press Mode twice. The STDSET Menu will appear.
3. Use the Up/Down button to select the preset number. See Table 6.
4. Press Enter to lock in the selection.
5. Press Mode to exit and resume normal operation.

The custom settings of the CO_2 sensor can be changed anytime after the sensor is energized. Follow the steps below to change the non-standard settings:

1. Press Clear and Mode buttons. Hold at least 5 seconds until the sensor enters the Edit mode.
2. Press Mode twice. The STDSET Menu will appear.
3. Use the Up/Down button to toggle to the NONSTD menu and press Enter.
4. Use the Up/Down button to toggle through each of the nine variables, starting with Altitude, until the desired setting is reached.
5. Press Mode to move through the variables.
6. Press Enter to lock in the selection, then press Mode to continue to the next variable.

Dehumidification of Fresh Air with DCV Control — Information from ASHRAE indicates that the largest humidity load on any zone is the fresh air introduced. For some applications, a device such as a 62AQ energy recovery unit is added to reduce the moisture content of the fresh air being brought into the building when the enthalpy is high. In most cases, the normal heating and cooling processes are more than adequate to remove the humidity loads for most commercial applications.

If normal rooftop heating and cooling operation is not adequate for the outdoor humidity level, an energy recovery unit and/or a dehumidification option should be considered.

Table 6 — CO_2 Sensor Standard Settings

SETTING	EQUIPMENT	OUTPUT	VENTILATION RATE (cfm/Person)	ANALOG OUTPUT	CO_2 CONTROL RANGE (ppm)	OPTIONAL RELAY SETPOINT (ppm)	RELAY HYSTERESIS (ppm)
1	Interface w/Standard Building Control System	Proportional	Any	0-10V 4-20 mA	0-2000	1000	50
2		Proportional	Any	2-10V 7-20 mA	0-2000	1000	50
3		Exponential	Any	0-10V 4-20 mA	0-2000	1100	50
4	Economizer	Proportional	15	0-10V 4-20 mA	0-1100	1100	50
5		Proportional	20	0-10V 4-20 mA	0- 900	900	50
6		Exponential	15	0-10V 4-20 mA	0-1100	1100	50
7		Exponential	20	0-10V 4-20 mA	0- 900	900	50
8	Health & Safety	Proportional	—	0-10V 4-20 mA	0-9999	5000	500
9	Parking/Air Intakes/ Loading Docks	Proportional	—	0-10V 4-20 mA	0-2000	700	50

LEGEND
ppm — Parts Per Million

Step 7 — Adjust Evaporator-Fan Speed — Adjust evaporator-fan rpm to meet jobsite conditions. See Table 7 for fan rpm at motor pulley settings. See Table 8 for motor performance data. See Tables 9 and 10 for accessory and option static pressure drops. See Table 11 for evaporator motor efficiency. Refer to Tables 12-41 to determine fan speed settings.

For units with accessory electric heating, required minimum cfm is 900 for 50TFF,TM004; 1200 for 50TFF,TM005; 1500 for 50TFF,TM006; and 1800 for 50TFF,TM007.

DIRECT-DRIVE MOTORS — The evaporator-fan motor factory speed setting is shown on label diagram affixed to base unit. If other than factory setting is desired, refer to label located on motor for motor reconnection. Insert wire into the speed tap corresponding to desired speed.

BELT-DRIVE MOTORS — Fan motor pulleys are factory set for speed shown in Tables 1A and 1B. See Fig. 38.

To change fan rpm:

1. Shut off unit power supply. Install lockout tag.
2. Loosen belt by loosening fan motor mounting nuts.
3. Loosen movable pulley flange setscrew (see Fig. 39).
4. Screw movable flange toward fixed flange to increase fan rpm and away from fixed flange to decrease fan rpm. Increasing fan rpm increases load on motor. Do not exceed maximum speed specified in Tables 1A and 1B.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Tables 1A and 1B for speed change for each full turn of pulley flange.)

To align fan and motor pulleys:

1. Loosen fan pulley setscrews.
2. Slide fan pulley along fan shaft.
3. Make angular alignment by loosening motor from mounting.

To adjust belt tension:

1. Loosen fan motor mounting nuts.
2. Slide motor mounting plate away from fan scroll for proper belt tension ($^1/_2$-in. deflection with 8 to 10 lb of force).
3. Tighten nuts.
4. Adjust bolt and tighten nut to secure motor in fixed position.
5. Re-inspect pulley alignment.

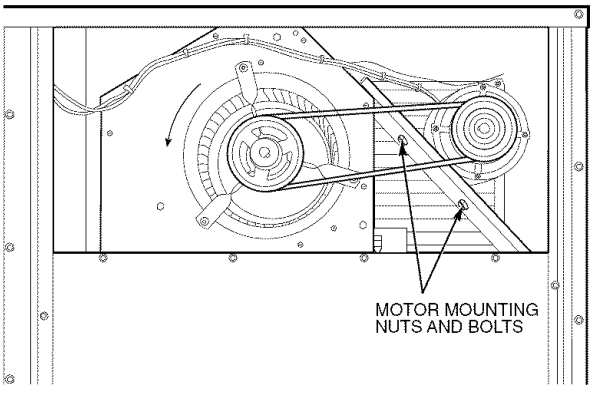


Fig. 38 — Belt-Drive Motor Mounting

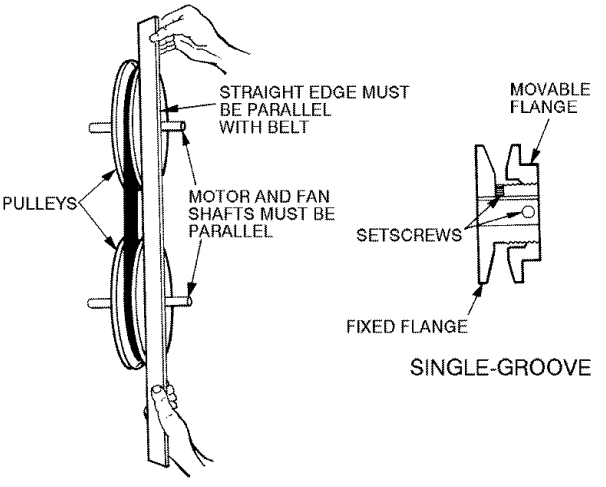


Fig. 39 — Evaporator-Fan Pulley Adjustment

Table 7 — Fan Rpm at Motor Pulley Settings*

UNIT	MOTOR PULLEY TURNS OPEN												
	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
50TM004†	1045	1009	973	937	901	865	829	793	757	721	685	—	—
50TFF004†	1000	976	952	928	904	880	856	832	808	784	760	—	—
50TFF,TM004**	1455	1423	1392	1360	1328	1297	1265	1233	1202	1170	1138	1107	1075
50TFF005†	1185	1150	1115	1080	1045	1010	975	940	905	810	835	—	—
50TM005†	1175	1135	1094	1054	1013	973	932	892	851	811	770	—	—
50TFF,TM005**	1455	1423	1392	1360	1328	1297	1265	1233	1202	1170	1138	1107	1075
50TFF006†	1300	1267	1233	1200	1167	1133	1100	1067	1033	1000	967	933	900
50TM006†	1190	1164	1138	1112	1086	1060	1034	1008	982	956	930	904	878
50TFF,TM006**	1685	1647	1608	1570	1531	1493	1454	1416	1377	1339	1300	—	—
50TFF,TM007††	1460	1421	1382	1343	1304	1265	1225	1187	1148	1109	1070	—	—
50TFF,TM007**	1685	1647	1608	1570	1531	1493	1454	1416	1377	1339	1300	—	—

*Approximate fan rpm shown.
†Indicates alternate motor and drive package.
**Indicates high-static motor and drive package.
††Indicates standard motor and drive package.

Table 8 — Evaporator-Fan Motor Performance

UNIT 50TFF,TM	EVAPORATOR-FAN MOTOR	UNIT VOLTAGE	MAXIMUM ACCEPTABLE CONTINUOUS BHP*	MAXIMUM ACCEPTABLE OPERATING WATTS	MAXIMUM AMP DRAW
004	Standard	208/230	0.34	440	2.8
		460			1.3
		575			1.3
	Alternate	208/230	1.20	1000	4.9
		460			2.1
		575			2.1
	High Static	208/230	2.40	2120	6.0
		460			3.0
		575			3.0
005	Standard	208/230	0.75	850	3.5
		460			1.8
		575			1.8
	Alternate	208/230	1.20	1000	4.9
		460			2.1
		575			2.1
	High Static	208/230	2.40	2120	6.0
		460			3.0
		575			3.0
006	Standard	208/230	1.20	1340	5.9
		460			3.2
		575			3.2
	Alternate	208/230	1.30/2.40†	2120	6.6/5.2†
		460			2.6
		575			3.0
	High Static	208/230	2.90	2562	8.6
		460			3.9
		575			3.9
007	Standard	208/230	2.40	2120	5.2
		460			3.0
		575			3.0
	High Static	208/230	2.90	2562	8.6
		460			3.9
		575			3.9

LEGEND

Bhp — Brake Horsepower

*Extensive motor and electrical testing on these units ensures that the full horsepower range of the motors can be utilized with confidence. Using the fan motors up to the horsepower ratings shown in this table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

†Single phase/three-phase.

NOTES:

1. All indoor-fan motors 5 hp and larger meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT) effective October 24, 1997.
2. High-static motor not available on single-phase units.

Table 9 — Accessory Electric Heaters Static Pressure Drop (in. wg) 50HJ004-007

COMPONENT	CFM								
	900	1200	1400	1600	1800	2000	2200	2400	2600
1 Heater Module	0.05	0.07	0.09	0.09	0.10	0.11	0.11	0.12	0.13
2 Heater Modules	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.18	0.18

Table 10 — Accessory/FIOP EconoMi$er IV and EconoMi$er2 Static Pressure* (in. wg)

COMPONENT	CFM							
	1250	1500	1750	2000	2250	2500	2750	3000
Vertical EconoMi$er IV and EconoMi$er2	0.045	0.065	0.08	0.12	0.145	0.175	0.22	0.255
Horizontal EconoMi$er IV and EconoMi$er2	—	—	0.1	0.125	0.15	0.18	0.225	0.275

LEGEND

FIOP — Factory-Installed Option

*The static pressure must be added to external static pressure. The sum and the evaporator entering-air cfm should be used in conjunction with the Fan Performance tables to determine indoor blower rpm and watts.

Table 11 — Evaporator-Fan Motor Efficiency

MOTOR 50TFF,TM	EFFICIENCY
004,005	75
006	74/84*
007	84

*Single-phase/3-phase.

NOTE: Convert watts to bhp using the following formula:

$$bhp = \frac{\text{watts input x motor efficiency}}{746}$$

Table 12 — Fan Performance 50TFF,TM004 — Vertical Discharge Units; Standard Motor (Direct Drive)

AIRFLOW (Cfm)	LOW SPEED						HIGH SPEED					
	208 v			230, 460, 575 v			208 v			230, 460, 575 v		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
900	0.67	0.21	253	0.68	0.23	277	0.69	0.26	307	0.69	0.31	363
1000	0.60	0.23	270	0.61	0.25	292	0.61	0.27	321	0.63	0.32	374
1100	0.55	0.24	287	0.56	0.26	307	0.57	0.28	335	0.58	0.33	385
1200	0.51	0.26	304	0.51	0.27	323	0.52	0.29	349	0.53	0.34	397
1300	0.45	0.27	321	0.46	0.29	338	0.46	0.31	364	0.47	0.34	408
1400	0.38	0.29	338	0.41	0.30	354	0.43	0.32	378	—	—	—
1500	0.34	0.30	355	0.36	0.31	369	0.38	0.33	392	—	—	—

LEGEND

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

See general fan performance notes below.

Table 13 — Fan Performance 50TFF004 — Vertical Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**643**	**0.15**	**152**	768	0.22	222	870	0.30	296	958	0.37	373	**1037**	**0.46**	**454**
1000	**683**	**0.19**	**191**	804	0.27	268	904	0.35	348	991	0.43	430	**1069**	**0.52**	**517**
1100	**725**	**0.24**	**237**	842	0.32	321	939	0.41	407	**1025**	**0.50**	**496**	**1102**	**0.59**	**588**
1200	767	0.29	291	880	0.38	382	976	0.48	474	**1060**	**0.57**	**570**	**1136**	**0.67**	**668**
1300	811	0.35	352	920	0.45	451	**1013**	**0.55**	**550**	**1095**	**0.66**	**652**	**1170**	**0.76**	**756**
1400	855	0.43	423	960	0.53	529	**1051**	**0.64**	**636**	**1132**	**0.75**	**744**	**1205**	**0.86**	**855**
1500	900	0.51	504	**1002**	**0.62**	**617**	**1090**	**0.74**	**731**	**1169**	**0.85**	**846**	**1242**	**0.97**	**963**

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**1110**	**0.54**	**538**	**1177**	**0.63**	**627**	**1239**	**0.72**	**718**	**1298**	**0.82**	**813**	**1355**	**0.92**	**911**
1000	**1141**	**0.61**	**607**	**1207**	**0.70**	**700**	**1269**	**0.80**	**796**	**1328**	**0.90**	**895**	**1384**	**1.00**	**998**
1100	**1173**	**0.69**	**683**	**1238**	**0.79**	**781**	**1300**	**0.89**	**883**	**1358**	**0.99**	**987**	**1414**	**1.10**	**1094**
1200	**1205**	**0.77**	**768**	**1270**	**0.88**	**872**	**1332**	**0.98**	**979**	**1389**	**1.09**	**1088**	—	—	—
1300	**1239**	**0.87**	**863**	**1303**	**0.98**	**972**	**1364**	**1.09**	**1084**	—	—	—	—	—	—
1400	**1273**	**0.97**	**967**	**1337**	**1.09**	**1082**	—	—	—	—	—	—	—	—	—
1500	**1309**	**1.09**	**1082**	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 760 to 1000 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See below for general fan performance notes.

GENERAL FAN PERFORMANCE NOTES

1. Values include losses for filters, unit casing, and wet coils.
2. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 8 on page 32.
3. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
4. Interpolation is permissible. Do not extrapolate.

Table 14 — Fan Performance 50TM004 — Vertical Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**643**	**0.15**	**152**	768	0.22	222	870	0.30	296	958	0.37	373	1037	0.46	454
1000	**683**	**0.19**	**191**	804	0.27	268	904	0.35	348	991	0.43	430	**1069**	**0.52**	**517**
1100	725	0.24	237	842	0.32	321	939	0.41	407	1025	0.50	496	**1102**	**0.59**	**588**
1200	767	0.29	291	880	0.38	382	976	0.48	474	**1060**	**0.57**	**570**	**1136**	**0.67**	**668**
1300	811	0.35	352	920	0.45	451	1013	0.55	550	**1095**	**0.66**	**652**	**1170**	**0.76**	**756**
1400	855	0.43	423	960	0.53	529	**1051**	**0.64**	**636**	**1132**	**0.75**	**744**	**1205**	**0.86**	**855**
1500	900	0.51	504	1002	0.62	617	**1090**	**0.74**	**731**	**1169**	**0.85**	**846**	**1242**	**0.97**	**963**

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**1110**	**0.54**	**538**	**1177**	**0.63**	**627**	**1239**	**0.72**	**718**	**1298**	**0.82**	**813**	**1355**	**0.92**	**911**
1000	**1141**	**0.61**	**607**	**1207**	**0.70**	**700**	**1269**	**0.80**	**796**	**1328**	**0.90**	**895**	**1384**	**1.00**	**998**
1100	**1173**	**0.69**	**683**	**1238**	**0.79**	**781**	**1300**	**0.89**	**883**	**1358**	**0.99**	**987**	**1414**	**1.10**	**1094**
1200	**1205**	**0.77**	**768**	**1270**	**0.88**	**872**	**1332**	**0.98**	**979**	**1389**	**1.09**	**1088**	—	—	—
1300	**1239**	**0.87**	**863**	**1303**	**0.98**	**972**	**1364**	**1.09**	**1084**	—	—	—	—	—	—
1400	**1273**	**0.97**	**967**	**1337**	**1.09**	**1082**	—	—	—	—	—	—	—	—	—
1500	**1309**	**1.09**	**1082**	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 685 to 1045 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 33 for general fan performance notes.

Table 15 — Fan Performance 50TFF,TM004 — Vertical Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**643**	**0.15**	**152**	**768**	**0.22**	**222**	**870**	**0.30**	**296**	**958**	**0.37**	**373**	**1037**	**0.46**	**454**
1000	**683**	**0.19**	**191**	**804**	**0.27**	**268**	**904**	**0.35**	**348**	**991**	**0.43**	**430**	**1069**	**0.52**	**517**
1100	**725**	**0.24**	**237**	**842**	**0.32**	**321**	**939**	**0.41**	**407**	**1025**	**0.50**	**496**	1102	0.59	588
1200	**767**	**0.29**	**291**	**880**	**0.38**	**382**	**976**	**0.48**	**474**	**1060**	**0.57**	**570**	1136	0.67	668
1300	**811**	**0.35**	**352**	**920**	**0.45**	**451**	**1013**	**0.55**	**550**	1095	0.66	652	1170	0.76	756
1400	**855**	**0.43**	**423**	**960**	**0.53**	**529**	**1051**	**0.64**	**636**	1132	0.75	744	1205	0.86	855
1500	**900**	**0.51**	**504**	**1002**	**0.62**	**617**	1090	0.74	731	1169	0.85	846	1242	0.97	963

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	1110	0.54	538	1177	0.63	627	1239	0.72	718	1298	0.82	813	1355	0.92	911
1000	1141	0.61	607	1207	0.70	700	1269	0.80	796	1328	0.90	895	1384	1.00	998
1100	1173	0.69	683	1238	0.79	781	1300	0.89	883	1358	0.99	987	1414	1.10	1094
1200	1205	0.77	768	1270	0.88	872	1332	0.98	979	1389	1.09	1088	1444	1.21	1200
1300	1239	0.87	863	1303	0.98	972	1364	1.09	1084	1421	1.21	1199	**1475**	**1.32**	**1316**
1400	1273	0.97	967	1337	1.09	1082	1397	1.21	1200	1453	1.33	1320	**1507**	**1.45**	**1443**
1500	1309	1.09	1082	1371	1.21	1204	1430	1.33	1327	**1486**	**1.46**	**1453**	**1540**	**1.59**	**1581**

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 1075 to 1455 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 33 for general fan performance notes.

Table 16 — Fan Performance 50TFF,TM005 — Vertical Discharge Units; Standard Motor (Belt Drive)

AIRFLOW (Cfm)	LOW SPEED						HIGH SPEED					
	208 v			230, 460, 575 v			208 v			230, 460, 575 v		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
1200	0.93	0.41	458	0.94	0.45	506	0.94	0.51	572	0.99	0.56	632
1300	0.86	0.42	471	0.87	0.46	521	0.87	0.52	589	0.92	0.58	651
1400	0.78	0.45	503	0.79	0.49	556	0.79	0.54	616	0.87	0.60	681
1500	0.70	0.47	536	0.73	0.52	593	0.73	0.56	631	0.80	0.62	698
1600	0.61	0.49	557	0.64	0.54	616	0.66	0.58	654	0.76	0.64	723
1700	0.51	0.52	584	0.54	0.57	646	0.58	0.60	678	0.68	0.66	750
1800	0.40	0.54	610	0.44	0.60	674	0.51	0.62	698	0.63	0.68	772
1900	0.29	0.56	629	0.37	0.62	696	0.46	0.64	720	0.56	0.70	796
2000	0.25	0.58	651	0.30	0.64	720	0.39	0.66	744	0.50	0.73	823

See general fan performance notes on page 33.

LEGEND

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

Table 17 — Fan Performance 50TFF005 — Vertical Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**666**	**0.25**	**252**	**778**	**0.36**	**361**	873	0.48	476	956	0.60	594	1031	0.72	718
1300	**701**	**0.30**	**300**	**809**	**0.42**	**418**	902	0.54	540	983	0.67	665	1057	0.80	796
1400	**737**	**0.36**	**355**	842	0.48	481	932	0.61	610	1012	0.75	744	1085	0.89	881
1500	**774**	**0.42**	**417**	875	0.55	551	962	0.69	689	1041	0.83	830	1112	0.98	974
1600	**811**	**0.49**	**487**	909	0.63	629	994	0.78	774	1071	0.93	923	1141	1.08	1076
1700	849	0.57	565	943	0.72	715	1026	0.87	869	1101	1.03	1025	1170	1.19	1185
1800	887	0.65	651	978	0.81	810	1059	0.98	972	1133	1.14	1136	—	—	—
1900	926	0.75	746	1014	0.92	914	1092	1.09	1084	—	—	—	—	—	—
2000	965	0.86	852	1050	1.03	1028	—	—	—	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1100	0.85	845	1165	0.98	977	**1225**	**1.12**	**1112**	—	—	—	—	—	—
1300	1126	0.94	930	**1189**	**1.07**	**1069**	—	—	—	—	—	—	—	—	—
1400	1152	1.03	1023	**1215**	**1.17**	**1168**	—	—	—	—	—	—	—	—	—
1500	1179	1.13	1123	—	—	—	—	—	—	—	—	—	—	—	—
1600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 835 to 1185 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 33 for general fan performance notes.

Table 18 — Fan Performance 50TM005 — Vertical Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**666**	**0.25**	**252**	778	0.36	361	873	0.48	476	956	0.60	594	1031	0.72	718
1300	**701**	**0.30**	**300**	809	0.42	418	902	0.54	540	983	0.67	665	1057	0.80	796
1400	**737**	**0.36**	**355**	842	0.48	481	932	0.61	610	1012	0.75	744	1085	0.89	881
1500	774	0.42	417	875	0.55	551	962	0.69	689	1041	0.83	830	1112	0.98	974
1600	811	0.49	487	909	0.63	629	994	0.78	774	1071	0.93	923	1141	1.08	1076
1700	849	0.57	565	943	0.72	715	1026	0.87	869	1101	1.03	1025	1170	1.19	1185
1800	887	0.65	651	978	0.81	810	1059	0.98	972	1133	1.14	1136	—	—	—
1900	926	0.75	746	1014	0.92	914	1092	1.09	1084	—	—	—	—	—	—
2000	965	0.86	852	1050	1.03	1028	—	—	—	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1100	0.85	845	1165	0.98	977	**1225**	**1.12**	**1112**	—	—	—	—	—	—
1300	1126	0.94	930	**1189**	**1.07**	**1069**	—	—	—	—	—	—	—	—	—
1400	1152	1.03	1023	**1215**	**1.17**	**1168**	—	—	—	—	—	—	—	—	—
1500	**1179**	**1.13**	**1123**	—	—	—	—	—	—	—	—	—	—	—	—
1600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 770 to 1175 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 33 for general fan performance notes.

Table 19 — Fan Performance 50TFF,TM005 — Vertical Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**666**	**0.25**	**252**	**778**	**0.36**	**361**	**873**	**0.48**	**476**	**956**	**0.60**	**594**	**1031**	**0.72**	**718**
1300	**701**	**0.30**	**300**	**809**	**0.42**	**418**	**902**	**0.54**	**540**	**983**	**0.67**	**665**	**1057**	**0.80**	**796**
1400	**737**	**0.36**	**355**	**842**	**0.48**	**481**	**932**	**0.61**	**610**	**1012**	**0.75**	**744**	1085	0.89	881
1500	**774**	**0.42**	**417**	**875**	**0.55**	**551**	**962**	**0.69**	**689**	**1041**	**0.83**	**830**	1112	0.98	974
1600	**811**	**0.49**	**487**	**909**	**0.63**	**629**	**994**	**0.78**	**774**	**1071**	**0.93**	**923**	1141	1.08	1076
1700	**849**	**0.57**	**565**	**943**	**0.72**	**715**	**1026**	**0.87**	**869**	1101	1.03	1025	1170	1.19	1185
1800	**887**	**0.65**	**651**	**978**	**0.81**	**810**	**1059**	**0.98**	**972**	1133	1.14	1136	1200	1.31	1304
1900	**926**	**0.75**	**746**	**1014**	**0.92**	**914**	1092	1.09	1084	1164	1.26	1257	1231	1.44	1432
2000	**965**	**0.86**	**852**	**1050**	**1.03**	**1028**	1127	1.21	1206	1197	1.39	1387	1262	1.58	1570

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1100	0.85	845	1165	0.98	977	1225	1.12	1112	1282	1.26	1252	1337	1.40	1395
1300	1126	0.94	930	1189	1.07	1069	1249	1.22	1211	1306	1.36	1356	1360	1.51	1506
1400	1152	1.03	1023	1215	1.17	1168	1274	1.32	1317	1330	1.48	1469	1384	1.63	1625
1500	1179	1.13	1123	1241	1.28	1275	1300	1.44	1431	1355	1.60	1590	1408	1.76	1752
1600	1206	1.24	1231	1268	1.40	1391	1326	1.56	1553	1381	1.73	1719	1433	1.90	1888
1700	1235	1.36	1349	1295	1.52	1515	1352	1.69	1685	1407	1.87	1858	**1459**	**2.04**	**2034**
1800	1264	1.48	1475	1323	1.66	1649	1380	1.84	1826	1434	2.02	2006	**1485**	**2.20**	**2189**
1900	1293	1.62	1611	1352	1.80	1792	1408	1.99	1976	**1461**	**2.17**	**2163**	**1512**	**2.37**	**2353**
2000	1324	1.77	1756	1381	1.96	1945	1436	2.15	2137	**1489**	**2.34**	**2332**	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 1075 to 1455 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 33 for general fan performance notes.

Table 20 — Fan Performance 50TFF,TM006 — Vertical Discharge Units; Standard Motor (Belt Drive)

AIRFLOW (Cfm)	LOW SPEED						MEDIUM SPEED						HIGH SPEED					
	208 v			230, 460, 575 v			208 v			230, 460, 575 v			208 v			230, 460, 575 v		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
1500	0.88	0.67	750	1.20	0.71	791	1.19	0.70	782	1.36	0.76	845	1.38	0.79	875	1.44	0.85	949
1600	0.68	0.70	780	1.04	0.74	824	1.04	0.74	821	1.22	0.79	883	1.25	0.82	913	1.33	0.89	988
1700	0.51	0.73	810	0.89	0.77	857	0.89	0.77	861	1.09	0.83	921	1.13	0.85	950	1.22	0.92	1027
1800	0.35	0.75	839	0.73	0.80	891	0.74	0.81	900	0.96	0.86	959	1.00	0.89	988	1.11	0.96	1066
1900	0.26	0.78	873	0.58	0.83	924	0.59	0.84	940	0.86	0.90	997	0.88	0.92	1025	1.00	0.99	1105
2000	0.18	0.81	905	0.42	0.86	957	0.44	0.88	979	0.73	0.93	1035	0.78	0.95	1063	0.92	1.03	1144
2100	0.08	0.84	940	0.27	0.89	990	0.29	0.91	1018	0.59	0.96	1073	0.63	0.99	1101	0.81	1.06	1183
2200	—	—	—	0.19	0.92	1023	0.19	0.93	1035	0.46	1.00	1111	0.49	1.02	1138	0.69	1.10	1222
2300	—	—	—	0.11	0.95	1056	0.11	0.97	1076	0.34	1.03	1149	0.41	1.06	1176	0.59	1.13	1261
2400	—	—	—	0.03	0.98	1096	0.04	1.00	1113	0.19	1.07	1187	0.22	1.09	1213	0.43	1.17	1300
2500	—	—	—	—	—	—	—	—	—	0.09	1.10	1225	0.12	1.12	1251	0.34	1.20	1340

LEGEND

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

See general fan performance notes on page 33.

Table 21 — Fan Performance 50TFF006 — Vertical Discharge Units; Alternate (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**807**	**0.42**	**369**	913	0.56	489	1011	0.71	621	1103	0.87	766	1188	1.05	923
1600	**847**	**0.49**	**432**	948	0.63	557	1042	0.79	694	1130	0.96	843	1213	1.14	1003
1700	**887**	**0.57**	**501**	983	0.72	632	1073	0.88	774	1158	1.06	928	1239	1.24	1092
1800	928	0.66	579	1020	0.82	715	1106	0.98	863	1188	1.16	1021	1266	1.35	1189
1900	969	0.76	666	1057	0.92	808	1140	1.09	960	1219	1.28	1123	1295	1.48	1296
2000	1010	0.87	761	1095	1.04	909	1175	1.21	1066	1251	1.41	1234	**1325**	**1.61**	**1411**
2100	1052	0.99	866	1133	1.16	1019	1211	1.35	1182	1285	1.54	1355	**1355**	**1.75**	**1537**
2200	1095	1.12	981	1173	1.30	1140	1247	1.49	1308	**1319**	**1.69**	**1486**	**1387**	**1.91**	**1673**
2300	1137	1.26	1105	1212	1.45	1271	1284	1.65	1445	**1353**	**1.85**	**1628**	**1420**	**2.07**	**1820**
2400	1180	1.41	1241	1252	1.61	1412	**1322**	**1.81**	**1592**	**1389**	**2.03**	**1781**	**1454**	**2.25**	**1977**
2500	1223	1.58	1388	1293	1.78	1565	**1360**	**1.99**	**1751**	**1425**	**2.22**	**1945**	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1270	1.24	1091	**1347**	**1.45**	**1269**	**1421**	**1.66**	**1458**	**1492**	**1.89**	**1657**	**1561**	**2.13**	**1865**
1600	1292	1.34	1174	**1367**	**1.54**	**1356**	**1440**	**1.76**	**1547**	**1509**	**1.99**	**1748**	**1576**	**2.23**	**1959**
1700	**1315**	**1.44**	**1267**	**1389**	**1.65**	**1451**	**1459**	**1.88**	**1646**	**1527**	**2.11**	**1849**	**1593**	**2.35**	**2062**
1800	**1341**	**1.56**	**1368**	**1412**	**1.77**	**1556**	**1481**	**2.00**	**1753**	**1547**	**2.23**	**1960**	—	—	—
1900	**1367**	**1.68**	**1478**	**1437**	**1.90**	**1670**	**1504**	**2.13**	**1871**	**1569**	**2.37**	**2080**	—	—	—
2000	**1395**	**1.82**	**1598**	**1463**	**2.04**	**1794**	**1528**	**2.28**	**1998**	—	—	—	—	—	—
2100	**1424**	**1.97**	**1728**	**1490**	**2.20**	**1928**	—	—	—	—	—	—	—	—	—
2200	**1454**	**2.13**	**1869**	**1518**	**2.36**	**2073**	—	—	—	—	—	—	—	—	—
2300	**1485**	**2.30**	**2020**	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 900 to 1300 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.30 for single-phase units and 2.40 for three-phase units.
3. See page 33 for general fan performance notes.

Table 22 — Fan Performance 50TM006 — Vertical Discharge; Alternate Motor (Belt Drive)* — Single-Phase Units

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**807**	**0.42**	**369**	913	0.56	489	1011	0.71	621	1103	0.87	766	1188	1.05	923
1600	**847**	**0.49**	**432**	948	0.63	557	1042	0.79	694	1130	0.96	843	**1213**	**1.14**	**1003**
1700	887	0.57	501	983	0.72	632	1073	0.88	774	1158	1.06	928	**1239**	**1.24**	**1092**
1800	928	0.66	579	1020	0.82	715	1106	0.98	863	1188	1.16	1021	—	—	—
1900	969	0.76	666	1057	0.92	808	1140	1.09	960	**1219**	**1.28**	**1123**	—	—	—
2000	1010	0.87	761	1095	1.04	909	1175	1.21	1066	**1251**	**1.41**	**1234**	—	—	—
2100	1052	0.99	866	1133	1.16	1019	—	—	—	—	—	—	—	—	—
2200	1095	1.12	981	1173	1.30	1140	—	—	—	—	—	—	—	—	—
2300	1137	1.26	1105	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**1270**	**1.24**	**1091**	—	—	—	—	—	—	—	—	—	—	—	—
1600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 900 to 1300 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.30.
3. See page 33 for general fan performance notes.

Table 23 — Fan Performance 50TM006 — Vertical Discharge; Alternate Motor (Belt Drive)* — Three-Phase Units

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**807**	**0.42**	**369**	913	0.56	489	1011	0.71	621	1103	0.87	766	1188	1.05	923
1600	**847**	**0.49**	**432**	948	0.63	557	1042	0.79	694	1130	0.96	843	**1213**	**1.14**	**1003**
1700	887	0.57	501	983	0.72	632	1073	0.88	774	1158	1.06	928	**1239**	**1.24**	**1092**
1800	928	0.66	579	1020	0.82	715	1106	0.98	863	1188	1.16	1021	**1266**	**1.35**	**1189**
1900	969	0.76	666	1057	0.92	808	1140	1.09	960	**1219**	**1.28**	**1123**	**1295**	**1.48**	**1296**
2000	1010	0.87	761	1095	1.04	909	1175	1.21	1066	**1251**	**1.41**	**1234**	**1325**	**1.61**	**1411**
2100	1052	0.99	866	1133	1.16	1019	**1211**	**1.35**	**1182**	**1285**	**1.54**	**1355**	**1355**	**1.75**	**1537**
2200	1095	1.12	981	1173	1.30	1140	**1247**	**1.49**	**1308**	**1319**	**1.69**	**1486**	**1387**	**1.91**	**1673**
2300	1137	1.26	1105	**1212**	**1.45**	**1271**	**1284**	**1.65**	**1445**	**1353**	**1.85**	**1628**	**1420**	**2.07**	**1820**
2400	1180	1.41	1241	**1252**	**1.61**	**1412**	**1322**	**1.81**	**1592**	**1389**	**2.03**	**1781**	**1454**	**2.25**	**1977**
2500	**1223**	**1.58**	**1388**	**1293**	**1.78**	**1565**	**1360**	**1.99**	**1751**	**1425**	**2.22**	**1945**	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**1270**	**1.24**	**1091**	**1347**	**1.45**	**1269**	**1421**	**1.66**	**1458**	**1492**	**1.89**	**1657**	**1561**	**2.13**	**1865**
1600	**1292**	**1.34**	**1174**	**1367**	**1.54**	**1356**	**1440**	**1.76**	**1547**	**1509**	**1.99**	**1748**	**1576**	**2.23**	**1959**
1700	**1315**	**1.44**	**1267**	**1389**	**1.65**	**1451**	**1459**	**1.88**	**1646**	**1527**	**2.11**	**1849**	**1593**	**2.35**	**2062**
1800	**1341**	**1.56**	**1368**	**1412**	**1.77**	**1556**	**1481**	**2.00**	**1753**	**1547**	**2.23**	**1960**	—	—	—
1900	**1367**	**1.68**	**1478**	**1437**	**1.90**	**1670**	**1504**	**2.13**	**1871**	**1569**	**2.37**	**2080**	—	—	—
2000	**1395**	**1.82**	**1598**	**1463**	**2.04**	**1794**	**1528**	**2.28**	**1998**	—	—	—	—	—	—
2100	**1424**	**1.97**	**1728**	**1490**	**2.20**	**1928**	—	—	—	—	—	—	—	—	—
2200	**1454**	**2.13**	**1869**	**1518**	**2.36**	**2073**	—	—	—	—	—	—	—	—	—
2300	**1485**	**2.30**	**2020**	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 900 to 1300 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 33 for general fan performance notes.

Table 24 — Fan Performance 50TFF,TM006 — Vertical Discharge; High-Static Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	807	0.42	369	913	0.56	489	1011	0.71	621	1103	0.87	766	1188	1.05	923
1600	847	0.49	432	948	0.63	557	1042	0.79	694	1130	0.96	843	1213	1.14	1003
1700	887	0.57	501	983	0.72	632	1073	0.88	774	1158	1.06	928	1239	1.24	1092
1800	928	0.66	579	1020	0.82	715	1106	0.98	863	1188	1.16	1021	1266	1.35	1189
1900	969	0.76	666	1057	0.92	808	1140	1.09	960	1219	1.28	1123	1295	1.48	1296
2000	1010	0.87	761	1095	1.04	909	1175	1.21	1066	1251	1.41	1234	1325	1.61	1411
2100	1052	0.99	866	1133	1.16	1019	1211	1.35	1182	1285	1.54	1355	1355	1.75	1537
2200	1095	1.12	981	1173	1.30	1140	1247	1.49	1308	1319	1.69	1486	1387	1.91	1673
2300	1137	1.26	1105	1212	1.45	1271	1284	1.65	1445	1353	1.85	1628	1420	2.07	1820
2400	1180	1.41	1241	1252	1.61	1412	1322	1.81	1592	1389	2.03	1781	1454	2.25	1977
2500	1223	1.58	1388	1293	1.78	1565	1360	1.99	1751	1425	2.22	1945	1488	2.45	2147

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1270	1.24	1091	1347	1.45	1269	1421	1.66	1458	1492	1.89	1657	1561	2.13	1865
1600	1292	1.34	1174	1367	1.54	1356	1440	1.76	1547	1509	1.99	1748	1576	2.23	1959
1700	1315	1.44	1267	1389	1.65	1451	1459	1.88	1646	1527	2.11	1849	1593	2.35	2062
1800	1341	1.56	1368	1412	1.77	1556	1481	2.00	1753	1547	2.23	1960	1612	2.48	2175
1900	1367	1.68	1478	1437	1.90	1670	1504	2.13	1871	1569	2.37	2080	1632	2.62	2299
2000	1395	1.82	1598	1463	2.04	1794	1528	2.28	1998	1591	2.52	2212	1653	2.77	2433
2100	1424	1.97	1728	1490	2.20	1928	1554	2.43	2136	1615	2.68	2353	—	—	—
2200	1454	2.13	1869	1518	2.36	2073	1580	2.60	2285	1641	2.85	2505	—	—	—
2300	1485	2.30	2020	1547	2.54	2228	1608	2.79	2445	—	—	—	—	—	—
2400	1516	2.49	2182	1577	2.73	2395	—	—	—	—	—	—	—	—	—
2500	1549	2.69	2357	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 1300 to 1685 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.
3. See page 33 for general fan performance notes.

Table 25 — Fan Performance 50TFF,TM007 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	905	0.62	551	1001	0.77	687	1087	0.94	832	1165	1.11	985	1238	1.29	1148
1900	944	0.71	633	1037	0.87	774	1120	1.04	925	1197	1.22	1084	1268	1.41	1251
2000	983	0.81	723	1073	0.98	870	1154	1.16	1026	1229	1.34	1190	1299	1.53	1362
2100	1023	0.92	821	1110	1.10	975	1189	1.28	1137	1262	1.47	1306	1330	1.67	1483
2200	1063	1.05	929	1147	1.23	1089	1224	1.41	1256	1295	1.61	1431	1362	1.82	1614
2300	1104	1.18	1046	1185	1.37	1212	1260	1.56	1386	1329	1.76	1567	1395	1.98	1754
2400	1145	1.32	1174	1223	1.52	1346	1296	1.72	1526	1364	1.93	1712	1428	2.15	1905
2500	1185	1.48	1311	1262	1.68	1490	1333	1.89	1676	1399	2.10	1868	1462	2.33	2067
2600	1227	1.64	1460	1301	1.85	1646	1370	2.07	1837	1435	2.29	2035	—	—	—
2700	1268	1.82	1621	1340	2.04	1812	1407	2.26	2010	—	—	—	—	—	—
2800	1309	2.02	1793	1379	2.24	1991	—	—	—	—	—	—	—	—	—
2900	1351	2.23	1977	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	1306	1.48	1318	1370	1.69	1497	1431	1.90	1683	1489	2.11	1877	1545	2.34	2078
1900	1335	1.61	1426	1398	1.81	1609	1458	2.03	1799	1515	2.25	1997	—	—	—
2000	1364	1.74	1542	1427	1.95	1730	1486	2.17	1925	1542	2.39	2126	—	—	—
2100	1395	1.88	1668	1456	2.09	1860	1514	2.32	2060	—	—	—	—	—	—
2200	1426	2.03	1804	1486	2.25	2001	—	—	—	—	—	—	—	—	—
2300	1457	2.19	1949	—	—	—	—	—	—	—	—	—	—	—	—
2400	1489	2.37	2106	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 1070 to 1460 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 33 for general fan performance notes.

Table 26 — Fan Performance 50TFF,TM007 — Vertical Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	905	0.62	551	1001	0.77	687	1087	0.94	832	1165	1.11	985	1238	1.29	1148
1900	944	0.71	633	1037	0.87	774	1120	1.04	925	1197	1.22	1084	1268	1.41	1251
2000	983	0.81	723	1073	0.98	870	1154	1.16	1026	1229	1.34	1190	1299	1.53	1362
2100	1023	0.92	821	1110	1.10	975	1189	1.28	1137	1262	1.47	1306	1330	1.67	1483
2200	1063	1.05	929	1147	1.23	1089	1224	1.41	1256	1295	1.61	1431	1362	1.82	1614
2300	1104	1.18	1046	1185	1.37	1212	1260	1.56	1386	1329	1.76	1567	1395	1.98	1754
2400	1145	1.32	1174	1223	1.52	1346	1296	1.72	1526	1364	1.93	1712	1428	2.15	1905
2500	1185	1.48	1311	1262	1.68	1490	1333	1.89	1676	1399	2.10	1868	1462	2.33	2067
2600	1227	1.64	1460	1301	1.85	1646	1370	2.07	1837	1435	2.29	2035	1496	2.52	2240
2700	1268	1.82	1621	1340	2.04	1812	1407	2.26	2010	1470	2.49	2214	1531	2.73	2424
2800	1309	2.02	1793	1379	2.24	1991	1445	2.47	2195	1507	2.71	2405	—	—	—
2900	1351	2.23	1977	1419	2.46	2181	1483	2.69	2392	—	—	—	—	—	—
3000	1393	2.45	2174	1459	2.69	2385	—	—	—	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	1306	1.48	1318	1370	1.69	1497	1431	1.90	1683	1489	2.11	1877	1545	2.34	2078
1900	1335	1.61	1426	1398	1.81	1609	1458	2.03	1799	1515	2.25	1997	1570	2.48	2202
2000	1364	1.74	1542	1427	1.95	1730	1486	2.17	1925	1542	2.39	2126	1596	2.63	2335
2100	1395	1.88	1668	1456	2.09	1860	1514	2.32	2060	1570	2.55	2265	1623	2.79	2478
2200	1426	2.03	1804	1486	2.25	2001	1543	2.48	2204	1598	2.72	2415	—	—	—
2300	1457	2.19	1949	1516	2.42	2151	1573	2.66	2360	1627	2.90	2574	—	—	—
2400	1489	2.37	2106	1547	2.60	2312	1603	2.84	2526	—	—	—	—	—	—
2500	1522	2.56	2272	1579	2.80	2484	—	—	—	—	—	—	—	—	—
2600	1555	2.76	2451	—	—	—	—	—	—	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 1300 to 1685 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.
3. See page 33 for general fan performance notes.

Table 27 — Fan Performance 50TFF,TM004 — Horizontal Discharge Units; Standard Motor (Direct Drive)

AIRFLOW (Cfm)	LOW SPEED						HIGH SPEED					
	208 v			230, 460, 575 v			208 v			230, 460, 575 v		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
900	0.72	0.21	253	0.75	0.23	277	0.73	0.26	307	0.76	0.31	363
1000	0.67	0.23	270	0.69	0.25	292	0.70	0.27	321	0.71	0.32	374
1100	0.61	0.24	287	0.63	0.26	307	0.64	0.28	335	0.65	0.33	385
1200	0.57	0.26	304	0.58	0.27	323	0.56	0.29	349	0.59	0.34	397
1300	0.51	0.27	321	0.53	0.29	338	0.53	0.31	364	0.54	0.34	408
1400	0.44	0.29	338	0.46	0.30	354	0.47	0.32	378	—	—	—
1500	0.39	0.30	355	0.41	0.31	369	0.43	0.33	392	—	—	—

LEGEND

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

See general fan performance notes on page 33.

Table 28 — Fan Performance 50TFF004 — Horizontal Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**607**	**0.14**	**142**	**745**	**0.22**	**221**	856	0.31	304	952	0.39	393	**1037**	**0.49**	**485**
1000	**640**	**0.18**	**174**	775	0.26	261	884	0.35	351	978	0.45	446	**1062**	**0.55**	**545**
1100	**674**	**0.21**	**212**	805	0.31	307	912	0.41	404	**1005**	**0.51**	**506**	**1089**	**0.61**	**611**
1200	**708**	**0.26**	**256**	836	0.36	359	941	0.47	464	**1033**	**0.57**	**572**	**1116**	**0.69**	**683**
1300	**743**	**0.31**	**307**	868	0.42	417	971	0.53	530	**1062**	**0.65**	**645**	**1143**	**0.77**	**764**
1400	780	0.37	364	900	0.49	483	**1002**	**0.61**	**603**	**1091**	**0.73**	**726**	**1172**	**0.86**	**851**
1500	816	0.43	428	934	0.56	556	**1033**	**0.69**	**685**	**1121**	**0.82**	**815**	**1201**	**0.95**	**947**

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**1114**	**0.59**	**582**	**1186**	**0.69**	**684**	**1253**	**0.79**	**789**	**1316**	**0.90**	**898**	**1375**	**1.02**	**1010**
1000	**1139**	**0.65**	**648**	**1210**	**0.76**	**754**	**1277**	**0.87**	**865**	**1340**	**0.98**	**979**	**1399**	**1.10**	**1097**
1100	**1165**	**0.72**	**720**	**1236**	**0.84**	**832**	**1302**	**0.95**	**948**	**1364**	**1.07**	**1068**	**1423**	**1.20**	**1191**
1200	**1191**	**0.80**	**799**	**1261**	**0.92**	**917**	**1327**	**1.04**	**1039**	**1389**	**1.17**	**1165**	—	—	—
1300	**1218**	**0.89**	**885**	**1288**	**1.02**	**1010**	**1353**	**1.14**	**1138**	—	—	—	—	—	—
1400	**1246**	**0.99**	**980**	**1315**	**1.12**	**1111**	—	—	—	—	—	—	—	—	—
1500	**1274**	**1.09**	**1083**	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 760 to 1000 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 33 for general fan performance notes.

Table 29 — Fan Performance 50TM004 — Horizontal Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**607**	**0.14**	**142**	745	0.22	221	856	0.31	304	952	0.39	393	1037	0.49	485
1000	**640**	**0.18**	**174**	775	0.26	261	884	0.35	351	978	0.45	446	**1062**	**0.55**	**545**
1100	**674**	**0.21**	**212**	805	0.31	307	912	0.41	404	1005	0.51	506	**1089**	**0.61**	**611**
1200	708	0.26	256	836	0.36	359	941	0.47	464	1033	0.57	572	**1116**	**0.69**	**683**
1300	743	0.31	307	868	0.42	417	971	0.53	530	**1062**	**0.65**	**645**	**1143**	**0.77**	**764**
1400	780	0.37	364	900	0.49	483	1002	0.61	603	**1091**	**0.73**	**726**	**1172**	**0.86**	**851**
1500	816	0.43	428	934	0.56	556	1033	0.69	685	**1121**	**0.82**	**815**	**1201**	**0.95**	**947**

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**1114**	**0.59**	**582**	**1186**	**0.69**	**684**	**1253**	**0.79**	**789**	**1316**	**0.90**	**898**	**1375**	**1.02**	**1010**
1000	**1139**	**0.65**	**648**	**1210**	**0.76**	**754**	**1277**	**0.87**	**865**	**1340**	**0.98**	**979**	**1399**	**1.10**	**1097**
1100	**1165**	**0.72**	**720**	**1236**	**0.84**	**832**	**1302**	**0.95**	**948**	**1364**	**1.07**	**1068**	**1423**	**1.20**	**1191**
1200	**1191**	**0.80**	**799**	**1261**	**0.92**	**917**	**1327**	**1.04**	**1039**	**1389**	**1.17**	**1165**	—	—	—
1300	**1218**	**0.89**	**885**	**1288**	**1.02**	**1010**	**1353**	**1.14**	**1138**	—	—	—	—	—	—
1400	**1246**	**0.99**	**980**	**1315**	**1.12**	**1111**	—	—	—	—	—	—	—	—	—
1500	**1274**	**1.09**	**1083**	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 685 to 1045 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 33 for general fan performance notes.

Table 30 — Fan Performance 50TFF,TM004 — Horizontal Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	607	0.14	142	745	0.22	221	856	0.31	304	952	0.39	393	1037	0.49	485
1000	640	0.18	174	775	0.26	261	884	0.35	351	978	0.45	446	1062	0.55	545
1100	674	0.21	212	805	0.31	307	912	0.41	404	1005	0.51	506	1089	0.61	611
1200	708	0.26	256	836	0.36	359	941	0.47	464	1033	0.57	572	1116	0.69	683
1300	743	0.31	307	868	0.42	417	971	0.53	530	1062	0.65	645	1143	0.77	764
1400	780	0.37	364	900	0.49	483	1002	0.61	603	1091	0.73	726	1172	0.86	851
1500	816	0.43	428	934	0.56	556	1033	0.69	685	1121	0.82	815	1201	0.95	947

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	1114	0.59	582	1186	0.69	684	1253	0.79	789	1316	0.90	898	1375	1.02	1010
1000	1139	0.65	648	1210	0.76	754	1277	0.87	865	1340	0.98	979	1399	1.10	1097
1100	1165	0.72	720	1236	0.84	832	1302	0.95	948	1364	1.07	1068	1423	1.20	1191
1200	1191	0.80	799	1261	0.92	917	1327	1.04	1039	1389	1.17	1165	1448	1.30	1293
1300	1218	0.89	885	1288	1.02	1010	1353	1.14	1138	1414	1.28	1270	1473	1.41	1404
1400	1246	0.99	980	1315	1.12	1111	1379	1.25	1246	1440	1.39	1383	1499	1.53	1523
1500	1274	1.09	1083	1342	1.23	1221	1406	1.37	1362	1467	1.51	1505	1525	1.66	1652

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 1075 to 1455 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 33 for general fan performance notes.

Table 31 — Fan Performance 50TFF,TM005 — Horizontal Discharge Units; Standard Motor (Direct Drive)

AIRFLOW (Cfm)	LOW SPEED						HIGH SPEED					
	208 v			230, 460, 575 v			208 v			230, 460, 575 v		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
1200	0.93	0.41	458	0.97	0.45	506	1.04	0.51	572	1.09	0.56	632
1300	0.86	0.42	471	0.90	0.46	521	0.96	0.52	589	1.02	0.58	651
1400	0.78	0.45	503	0.84	0.49	556	0.90	0.54	616	0.96	0.60	681
1500	0.73	0.47	536	0.76	0.52	593	0.83	0.56	631	0.89	0.62	698
1600	0.67	0.49	557	0.70	0.54	616	0.75	0.58	654	0.82	0.64	723
1700	0.60	0.52	584	0.63	0.57	646	0.67	0.60	678	0.74	0.66	750
1800	0.51	0.54	610	0.54	0.60	674	0.62	0.62	698	0.69	0.68	772
1900	0.40	0.56	629	0.45	0.62	696	0.54	0.64	720	0.62	0.70	796
2000	0.32	0.58	661	0.33	0.65	731	0.47	0.66	744	0.54	0.73	823

LEGEND

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

See general fan performance notes on page 33.

Table 32 — Fan Performance 50TFF005 — Horizontal Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**643**	**0.23**	**233**	**762**	**0.35**	**344**	860	0.46	459	944	0.58	579	1020	0.71	705
1300	**674**	**0.28**	**276**	**791**	**0.40**	**395**	887	0.52	517	970	0.65	645	1045	0.78	777
1400	**706**	**0.33**	**324**	**820**	**0.45**	**451**	914	0.59	582	997	0.72	717	1071	0.86	857
1500	**738**	**0.38**	**379**	849	0.52	515	942	0.66	653	1024	0.80	796	1097	0.95	942
1600	**771**	**0.44**	**440**	879	0.59	584	971	0.74	731	1051	0.89	881	1124	1.04	1035
1700	**804**	**0.51**	**507**	910	0.66	661	1000	0.82	816	1079	0.98	974	1151	1.14	1136
1800	837	0.59	582	941	0.75	745	1029	0.91	909	1107	1.08	1075	—	—	—
1900	871	0.67	665	972	0.84	837	1059	1.02	1010	1136	1.19	1184	—	—	—
2000	906	0.76	756	1004	0.94	938	1089	1.12	1119	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1089	0.84	835	1153	0.98	971	**1212**	**1.12**	**1111**	—	—	—	—	—	—
1300	1114	0.92	915	1177	1.06	1056	—	—	—	—	—	—	—	—	—
1400	1139	1.01	1000	**1202**	**1.15**	**1149**	—	—	—	—	—	—	—	—	—
1500	1164	1.10	1093	—	—	—	—	—	—	—	—	—	—	—	—
1600	**1190**	**1.20**	**1193**	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 835 to 1185 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 33 for general fan performance notes.

Table 33 — Fan Performance 50TM005 — Horizontal Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**554**	**0.14**	**134**	**681**	**0.22**	**222**	783	0.32	316	870	0.42	416	947	0.53	523
1000	**583**	**0.16**	**163**	**707**	**0.26**	**257**	808	0.36	358	894	0.47	465	971	0.58	578
1100	**612**	**0.20**	**195**	**735**	**0.30**	**298**	834	0.41	406	919	0.52	519	995	0.64	638
1200	**643**	**0.23**	**233**	**762**	**0.35**	**344**	860	0.46	459	944	0.58	579	1020	0.71	705
1300	**674**	**0.28**	**276**	791	0.40	395	887	0.52	517	970	0.65	645	1045	0.78	777
1400	**706**	**0.33**	**324**	820	0.45	451	914	0.59	582	997	0.72	717	1071	0.86	857
1500	**738**	**0.38**	**379**	849	0.52	515	942	0.66	653	1024	0.80	796	1097	0.95	942
1600	771	0.44	440	879	0.59	584	971	0.74	731	1051	0.89	881	1124	1.04	1035
1700	804	0.51	507	910	0.66	661	1000	0.82	816	1079	0.98	974	1151	1.14	1136
1800	837	0.59	582	941	0.75	745	1029	0.91	909	1107	1.08	1075	—	—	—
1900	871	0.67	665	972	0.84	837	1059	1.02	1010	1136	1.19	1184	—	—	—
2000	906	0.76	756	1004	0.94	938	1089	1.12	1119	1165	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	1017	0.64	635	1082	0.76	753	1143	0.88	876	**1200**	**1.01**	**1004**	**1254**	**1.14**	**1136**
1000	1041	0.70	696	1105	0.82	820	1166	0.95	948	**1223**	**1.09**	**1081**	—	—	—
1100	1065	0.77	763	1129	0.90	892	**1189**	**1.03**	**1026**	**1245**	**1.17**	**1165**	—	—	—
1200	1089	0.84	835	1153	0.98	971	**1212**	**1.12**	**1111**	—	—	—	—	—	—
1300	1114	0.92	915	**1177**	**1.06**	**1056**	—	—	—	—	—	—	—	—	—
1400	1139	1.01	1000	**1202**	**1.15**	**1149**	—	—	—	—	—	—	—	—	—
1500	1164	1.10	1093	—	—	—	—	—	—	—	—	—	—	—	—
1600	**1190**	**1.20**	**1193**	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 770 to 1175 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See page 33 for general fan performance notes.

Table 34 — Fan Performance 50TFF,TM006 — Horizontal Discharge Units; Standard Motor (Direct Drive)*

AIRFLOW CFM	LOW SPEED						MEDIUM SPEED						HIGH SPEED					
	208 v			230, 460, 575 v			208 v			230, 460, 575 v			208 v			230, 460, 575 v		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
1500	1.01	0.67	750	1.25	0.71	791	1.26	0.70	782	1.46	0.76	845	1.46	0.79	875	1.52	0.85	949
1600	0.82	0.70	780	1.09	0.74	824	1.11	0.74	821	1.32	0.79	883	1.33	0.82	913	1.41	0.89	988
1700	0.64	0.73	810	0.97	0.77	857	0.99	0.77	861	1.22	0.83	921	1.24	0.85	950	1.33	0.92	1027
1800	0.44	0.75	839	0.81	0.80	891	0.84	0.80	900	1.09	0.86	959	1.11	0.89	988	1.22	0.96	1066
1900	0.32	0.78	869	0.66	0.83	924	0.69	0.83	940	0.96	0.90	997	0.99	0.92	1025	1.11	0.99	1105
2000	0.21	0.81	899	0.47	0.86	957	0.51	0.86	979	0.80	0.93	1035	0.83	0.95	1063	0.97	1.03	1144
2100	0.13	0.83	929	0.32	0.89	990	0.36	0.89	1018	0.64	0.96	1073	0.71	0.99	1101	0.86	1.06	1183
2200	0.05	0.86	959	0.19	0.92	1023	0.21	0.92	1058	0.50	1.00	1111	0.58	1.02	1138	0.75	1.10	1222
2300	—	—	—	0.08	0.95	1057	0.08	0.95	1097	0.34	1.03	1149	0.39	1.06	1176	0.57	1.13	1261
2400	—	—	—	—	—	—	—	—	—	0.24	1.07	1187	0.29	1.09	1213	0.49	1.17	1300
2500	—	—	—	—	—	—	—	—	—	0.15	1.10	1225	0.15	1.12	1251	0.34	1.20	1340

LEGEND

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

See general fan performance notes on page 33.

Table 35 — Fan Performance 50TFF,TM005 — Horizontal Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**643**	**0.23**	**233**	**762**	**0.35**	**344**	**860**	**0.46**	**459**	**944**	**0.58**	**579**	**1020**	**0.71**	**705**
1300	**674**	**0.28**	**276**	**791**	**0.40**	**395**	**887**	**0.52**	**517**	**970**	**0.65**	**645**	**1045**	**0.78**	**777**
1400	**706**	**0.33**	**324**	**820**	**0.45**	**451**	**914**	**0.59**	**582**	**997**	**0.72**	**717**	**1071**	**0.86**	**857**
1500	**738**	**0.38**	**379**	**849**	**0.52**	**515**	**942**	**0.66**	**653**	**1024**	**0.80**	**796**	1097	0.95	942
1600	**771**	**0.44**	**440**	**879**	**0.59**	**584**	**971**	**0.74**	**731**	**1051**	**0.89**	**881**	1124	1.04	1035
1700	**804**	**0.51**	**507**	**910**	**0.66**	**661**	**1000**	**0.82**	**816**	1079	0.98	974	1151	1.14	1136
1800	**837**	**0.59**	**582**	**941**	**0.75**	**745**	**1029**	**0.91**	**909**	1107	1.08	1075	1178	1.25	1244
1900	**871**	**0.67**	**665**	**972**	**0.84**	**837**	**1059**	**1.02**	**1010**	1136	1.19	1184	1206	1.37	1361
2000	**906**	**0.76**	**756**	**1004**	**0.94**	**938**	1089	1.12	1119	1165	1.31	1301	1234	1.49	1486

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1089	0.84	835	1153	0.98	971	1212	1.12	1111	1269	1.26	1256	1322	1.41	1404
1300	1114	0.92	915	1177	1.06	1056	1236	1.21	1202	1292	1.36	1353	1346	1.52	1508
1400	1139	1.01	1000	1202	1.15	1149	1261	1.31	1301	1316	1.47	1457	1369	1.63	1618
1500	1164	1.10	1093	1227	1.25	1248	1285	1.41	1407	1341	1.58	1570	1394	1.75	1736
1600	1190	1.20	1193	1252	1.36	1355	1311	1.53	1520	1366	1.70	1690	1418	1.87	1863
1700	1217	1.31	1301	1278	1.48	1470	1336	1.65	1642	1391	1.83	1818	1443	2.01	1998
1800	1244	1.42	1417	1305	1.60	1593	1362	1.78	1772	1416	1.97	1955	**1468**	**2.15**	**2141**
1900	1271	1.55	1541	1331	1.73	1724	1388	1.92	1911	1442	2.11	2101	**1494**	**2.31**	**2294**
2000	1298	1.68	1674	1358	1.87	1865	1415	2.07	2059	**1468**	**2.27**	**2256**	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 1075 to 1455 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 33 for general fan performance notes.

Table 36 — Fan Performance 50TFF006 — Horizontal Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**776**	**0.38**	**340**	**883**	**0.51**	**454**	977	0.65	579	1061	0.80	715	1138	0.97	860
1600	**813**	**0.45**	**397**	916	0.58	517	1007	0.73	646	1089	0.89	786	1165	1.05	935
1700	**851**	**0.52**	**461**	949	0.66	586	1038	0.81	721	1118	0.97	865	1192	1.15	1018
1800	**888**	**0.60**	**532**	984	0.75	662	1069	0.90	802	1148	1.07	951	1221	1.25	1109
1900	927	0.69	610	1019	0.84	747	1102	1.00	892	1179	1.18	1046	1250	1.36	1208
2000	965	0.78	697	1054	0.94	839	1135	1.11	990	1210	1.29	1149	1280	1.48	1316
2100	1004	0.89	792	1090	1.06	940	1169	1.23	1096	1242	1.42	1260	**1310**	**1.61**	**1432**
2200	1044	1.01	896	1127	1.18	1050	1203	1.36	1211	1274	1.55	1381	**1341**	**1.75**	**1557**
2300	1084	1.14	1009	1164	1.32	1169	1238	1.50	1336	**1308**	**1.70**	**1511**	**1373**	**1.91**	**1693**
2400	1123	1.27	1132	1201	1.46	1298	1273	1.66	1471	**1341**	**1.86**	**1651**	**1405**	**2.07**	**1838**
2500	1164	1.42	1265	1239	1.62	1437	**1309**	**1.82**	**1616**	**1375**	**2.03**	**1801**	**1438**	**2.24**	**1994**

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1210	1.14	1014	1278	1.33	1178	**1342**	**1.52**	**1350**	**1403**	**1.72**	**1530**	**1461**	**1.93**	**1717**
1600	1236	1.23	1094	**1302**	**1.42**	**1261**	**1365**	**1.62**	**1436**	**1425**	**1.82**	**1618**	**1483**	**2.04**	**1809**
1700	1262	1.33	1181	**1328**	**1.52**	**1351**	**1390**	**1.72**	**1530**	**1449**	**1.93**	**1716**	**1505**	**2.15**	**1910**
1800	1289	1.44	1276	**1354**	**1.63**	**1450**	**1415**	**1.84**	**1632**	**1473**	**2.05**	**1822**	**1529**	**2.27**	**2019**
1900	**1317**	**1.55**	**1379**	**1380**	**1.75**	**1557**	**1441**	**1.96**	**1743**	**1498**	**2.18**	**1937**	—	—	—
2000	**1345**	**1.68**	**1491**	**1408**	**1.88**	**1673**	**1467**	**2.10**	**1863**	**1524**	**2.32**	**2060**	—	—	—
2100	**1375**	**1.81**	**1611**	**1436**	**2.03**	**1798**	**1494**	**2.24**	**1993**	—	—	—	—	—	—
2200	**1405**	**1.96**	**1742**	**1465**	**2.18**	**1933**	**1522**	**2.40**	**2132**	—	—	—	—	—	—
2300	**1435**	**2.12**	**1882**	**1494**	**2.34**	**2078**	—	—	—	—	—	—	—	—	—
2400	**1466**	**2.29**	**2032**	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 900 to 1300 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.30 for single-phase units and 2.40 for three-phase units.
3. See page 33 for general fan performance notes.

Table 37 — Fan Performance 50TM006 — Single-Phase, Horizontal Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**776**	**0.38**	**340**	883	0.51	454	977	0.65	579	1061	0.80	715	1138	0.97	860
1600	**813**	**0.45**	**397**	916	0.58	517	1007	0.73	646	1089	0.89	786	1165	1.05	935
1700	**851**	**0.52**	**461**	949	0.66	586	1038	0.81	721	1118	0.97	865	1192	1.15	1018
1800	888	0.60	532	984	0.75	662	1069	0.90	802	1148	1.07	951	**1221**	**1.25**	**1109**
1900	927	0.69	610	1019	0.84	747	1102	1.00	892	1179	1.18	1046	—	—	—
2000	965	0.78	697	1054	0.94	839	1135	1.11	990	**1210**	**1.29**	**1149**	—	—	—
2100	1004	0.89	792	1090	1.06	940	1169	1.23	1096	—	—	—	—	—	—
2200	1044	1.01	896	1127	1.18	1050	—	—	—	—	—	—	—	—	—
2300	1084	1.14	1009	—	—	—	—	—	—	—	—	—	—	—	—
2400	1123	1.27	1132	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**1210**	**1.14**	**1014**	**1278**	**1.33**	—	—	—	—	—	—	—	—	—	—
1600	**1236**	**1.23**	**1094**	**1302**	**1.42**	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 900 to 1300 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.30.
3. See page 33 for general fan performance notes.

Table 38 — Fan Performance 50TM006 — Three-Phase, Horizontal Discharge Units; Alternate Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**776**	**0.38**	**340**	883	0.51	454	977	0.65	579	1061	0.80	715	1138	0.97	860
1600	**813**	**0.45**	**397**	916	0.58	517	1007	0.73	646	1089	0.89	786	1165	1.05	935
1700	**851**	**0.52**	**461**	949	0.66	586	1038	0.81	721	1118	0.97	865	1192	1.15	1018
1800	888	0.60	532	984	0.75	662	1069	0.90	802	1148	1.07	951	**1221**	**1.25**	**1109**
1900	927	0.69	610	1019	0.84	747	1102	1.00	892	1179	1.18	1046	**1250**	**1.36**	**1208**
2000	965	0.78	697	1054	0.94	839	1135	1.11	990	**1210**	**1.29**	**1149**	**1280**	**1.48**	**1316**
2100	1004	0.89	792	1090	1.06	940	1169	1.23	1096	**1242**	**1.42**	**1260**	**1310**	**1.61**	**1432**
2200	1044	1.01	896	1127	1.18	1050	**1203**	**1.36**	**1211**	**1274**	**1.55**	**1381**	**1341**	**1.75**	**1557**
2300	1084	1.14	1009	1164	1.32	1169	**1238**	**1.50**	**1336**	**1308**	**1.70**	**1511**	**1373**	**1.91**	**1693**
2400	1123	1.27	1132	**1201**	**1.46**	**1298**	**1273**	**1.66**	**1471**	**1341**	**1.86**	**1651**	**1405**	**2.07**	**1838**
2500	1164	1.42	1265	**1239**	**1.62**	**1437**	**1309**	**1.82**	**1616**	**1375**	**2.03**	**1801**	**1438**	**2.24**	**1994**

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**1210**	**1.14**	**1014**	**1278**	**1.33**	**1178**	**1342**	**1.52**	**1350**	**1403**	**1.72**	**1530**	**1461**	**1.93**	**1717**
1600	**1236**	**1.23**	**1094**	**1302**	**1.42**	**1261**	**1365**	**1.62**	**1436**	**1425**	**1.82**	**1618**	**1483**	**2.04**	**1809**
1700	**1262**	**1.33**	**1181**	**1328**	**1.52**	**1351**	**1390**	**1.72**	**1530**	**1449**	**1.93**	**1716**	**1505**	**2.15**	**1910**
1800	**1289**	**1.44**	**1276**	**1354**	**1.63**	**1450**	**1415**	**1.84**	**1632**	**1473**	**2.05**	**1822**	**1529**	**2.27**	**2019**
1900	**1317**	**1.55**	**1379**	**1380**	**1.75**	**1557**	**1441**	**1.96**	**1743**	**1498**	**2.18**	**1937**	—	—	—
2000	**1345**	**1.68**	**1491**	**1408**	**1.88**	**1673**	**1467**	**2.10**	**1863**	**1524**	**2.32**	**2060**	—	—	—
2100	**1375**	**1.81**	**1611**	**1436**	**2.03**	**1798**	**1494**	**2.24**	**1993**	—	—	—	—	—	—
2200	**1405**	**1.96**	**1742**	**1465**	**2.18**	**1933**	**1522**	**2.40**	**2132**	—	—	—	—	—	—
2300	**1435**	**2.12**	**1882**	**1494**	**2.34**	**2078**	—	—	—	—	—	—	—	—	—
2400	**1466**	**2.29**	**2032**	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 900 to 1300 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 33 for general fan performance notes.

Table 39 — Fan Performance 50TFF,TM006 — Horizontal Units; High-Static Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**776**	**0.38**	**340**	**883**	**0.51**	**454**	**977**	**0.65**	**579**	**1061**	**0.80**	**715**	**1138**	**0.97**	**860**
1600	**813**	**0.45**	**397**	**916**	**0.58**	**517**	**1007**	**0.73**	**646**	**1089**	**0.89**	**786**	**1165**	**1.05**	**935**
1700	**851**	**0.52**	**461**	**949**	**0.66**	**586**	**1038**	**0.81**	**721**	**1118**	**0.97**	**865**	**1192**	**1.15**	**1018**
1800	**888**	**0.60**	**532**	**984**	**0.75**	**662**	**1069**	**0.90**	**802**	**1148**	**1.07**	**951**	**1221**	**1.25**	**1109**
1900	**927**	**0.69**	**610**	**1019**	**0.84**	**747**	**1102**	**1.00**	**892**	**1179**	**1.18**	**1046**	**1250**	**1.36**	**1208**
2000	**965**	**0.78**	**697**	**1054**	**0.94**	**839**	**1135**	**1.11**	**990**	**1210**	**1.29**	**1149**	**1280**	**1.48**	**1316**
2100	**1004**	**0.89**	**792**	**1090**	**1.06**	**940**	**1169**	**1.23**	**1096**	**1242**	**1.42**	**1260**	1310	1.61	1432
2200	**1044**	**1.01**	**896**	**1127**	**1.18**	**1050**	**1203**	**1.36**	**1211**	**1274**	**1.55**	**1381**	1341	1.75	1557
2300	**1084**	**1.14**	**1009**	**1164**	**1.32**	**1169**	**1238**	**1.50**	**1336**	1308	1.70	1511	1373	1.91	1693
2400	**1123**	**1.27**	**1132**	**1201**	**1.46**	**1298**	**1273**	**1.66**	**1471**	1341	1.86	1651	1405	2.07	1838
2500	**1164**	**1.42**	**1265**	**1239**	**1.62**	**1437**	1309	1.82	1616	1375	2.03	1801	1438	2.24	1994

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**1210**	**1.14**	**1014**	**1278**	**1.33**	**1178**	1342	1.52	1350	1403	1.72	1530	1461	1.93	1717
1600	**1236**	**1.23**	**1094**	1302	1.42	1261	1365	1.62	1436	1425	1.82	1618	1483	2.04	1809
1700	**1262**	**1.33**	**1181**	1328	1.52	1351	1390	1.72	1530	1449	1.93	1716	1505	2.15	1910
1800	**1289**	**1.44**	**1276**	1354	1.63	1450	1415	1.84	1632	1473	2.05	1822	1529	2.27	2019
1900	1317	1.55	1379	1380	1.75	1557	1441	1.96	1743	1498	2.18	1937	1553	2.41	2137
2000	1345	1.68	1491	1408	1.88	1673	1467	2.10	1863	1524	2.32	2060	1579	2.55	2264
2100	1375	1.81	1611	1436	2.03	1798	1494	2.24	1993	1550	2.47	2194	1604	2.70	2401
2200	1405	1.96	1742	1465	2.18	1933	1522	2.40	2132	1578	2.63	2337	1631	2.87	2548
2300	1435	2.12	1882	1494	2.34	2078	1551	2.57	2280	1605	2.80	2490	—	—	—
2400	1466	2.29	2032	1524	2.51	2232	1580	2.75	2440	—	—	—	—	—	—
2500	1498	2.47	2193	1555	2.70	2398	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 1300 to 1685 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.
3. See page 33 for general fan performance notes.

Table 40 — Fan Performance 50TFF,TM007 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	**823**	**0.52**	**458**	**924**	**0.65**	**579**	**1015**	**0.80**	**712**	1099	0.96	857	1177	1.14	1013
1900	**857**	**0.59**	**525**	**955**	**0.73**	**650**	**1043**	**0.89**	**787**	1125	1.05	936	1201	1.23	1096
2000	**892**	**0.67**	**599**	**986**	**0.82**	**729**	1072	0.98	870	1151	1.15	1022	1226	1.33	1185
2100	**927**	**0.77**	**680**	**1017**	**0.92**	**815**	1101	1.08	960	1178	1.26	1116	1251	1.44	1283
2200	**962**	**0.87**	**769**	**1050**	**1.02**	**909**	1131	1.19	1059	1206	1.37	1218	1277	1.56	1389
2300	**997**	**0.97**	**865**	1082	1.14	1010	1161	1.31	1165	1235	1.50	1329	1304	1.69	1503
2400	**1033**	**1.09**	**970**	1115	1.26	1120	1192	1.44	1279	1264	1.63	1448	1332	1.83	1625
2500	**1069**	**1.22**	**1084**	1149	1.39	1239	1223	1.58	1403	1293	1.77	1576	1360	1.98	1757
2600	1106	1.36	1206	1183	1.54	1367	1255	1.73	1535	1323	1.93	1713	1389	2.14	1898
2700	1142	1.51	1338	1217	1.69	1503	1287	1.89	1677	1354	2.09	1859	1418	2.31	2049
2800	1179	1.67	1480	1251	1.86	1650	1320	2.06	1829	1385	2.27	2015	—	—	—
2900	1216	1.84	1632	1286	2.04	1807	1353	2.24	1991	—	—	—	—	—	—
3000	1253	2.02	1794	1321	2.22	1975	—	—	—	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	1250	1.33	1181	1319	1.53	1360	1385	1.74	1549	1448	1.97	1748	**1508**	**2.20**	**1957**
1900	1273	1.43	1266	1341	1.63	1447	1405	1.84	1638	**1467**	**2.07**	**1839**	**1527**	**2.31**	**2050**
2000	1296	1.53	1359	1363	1.74	1542	1427	1.95	1736	**1488**	**2.18**	**1939**	—	—	—
2100	1320	1.64	1459	1386	1.85	1646	1448	2.07	1842	**1508**	**2.30**	**2047**	—	—	—
2200	1345	1.77	1568	1409	1.98	1758	**1471**	**2.20**	**1956**	—	—	—	—	—	—
2300	1371	1.90	1686	1434	2.11	1878	**1494**	**2.34**	**2080**	—	—	—	—	—	—
2400	1397	2.04	1812	1459	2.26	2008	—	—	—	—	—	—	—	—	—
2500	1424	2.19	1948	—	—	—	—	—	—	—	—	—	—	—	—
2600	1451	2.36	2093	—	—	—	—	—	—	—	—	—	—	—	—
2700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 1070 to 1460 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See page 33 for general fan performance notes.

Table 41 — Fan Performance 50TFF,TM007 — Horizontal Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW CFM	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	**823**	**0.52**	**458**	**924**	**0.65**	**579**	**1015**	**0.80**	**712**	**1099**	**0.96**	**857**	**1177**	**1.14**	**1013**
1900	**857**	**0.59**	**525**	**955**	**0.73**	**650**	**1043**	**0.89**	**787**	**1125**	**1.05**	**936**	**1201**	**1.23**	**1096**
2000	**892**	**0.67**	**599**	**986**	**0.82**	**729**	**1072**	**0.98**	**870**	**1151**	**1.15**	**1022**	**1226**	**1.33**	**1185**
2100	**927**	**0.77**	**680**	**1017**	**0.92**	**815**	**1101**	**1.08**	**960**	**1178**	**1.26**	**1116**	**1251**	**1.44**	**1283**
2200	**962**	**0.87**	**769**	**1050**	**1.02**	**909**	**1131**	**1.19**	**1059**	**1206**	**1.37**	**1218**	**1277**	**1.56**	**1389**
2300	**997**	**0.97**	**865**	**1082**	**1.14**	**1010**	**1161**	**1.31**	**1165**	**1235**	**1.50**	**1329**	1304	1.69	1503
2400	**1033**	**1.09**	**970**	**1115**	**1.26**	**1120**	**1192**	**1.44**	**1279**	**1264**	**1.63**	**1448**	1332	1.83	1625
2500	**1069**	**1.22**	**1084**	**1149**	**1.39**	**1239**	**1223**	**1.58**	**1403**	**1293**	**1.77**	**1576**	1360	1.98	1757
2600	**1106**	**1.36**	**1206**	**1183**	**1.54**	**1367**	**1255**	**1.73**	**1535**	1323	1.93	1713	1389	2.14	1898
2700	**1142**	**1.51**	**1338**	**1217**	**1.69**	**1503**	**1287**	**1.89**	**1677**	1354	2.09	1859	1418	2.31	2049
2800	**1179**	**1.67**	**1480**	**1251**	**1.86**	**1650**	1320	2.06	1829	1385	2.27	2015	1447	2.49	2210
2900	**1216**	**1.84**	**1632**	**1286**	**2.04**	**1807**	1353	2.24	1991	1416	2.46	2182	1477	2.68	2381
3000	**1253**	**2.02**	**1794**	1321	2.22	1975	1386	2.44	2163	1448	2.66	2359	1508	2.89	2563

AIRFLOW CFM	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1800	**1250**	**1.33**	**1181**	1319	1.53	1360	1385	1.74	1549	1448	1.97	1748	1508	2.20	1957
1900	**1273**	**1.43**	**1266**	1341	1.63	1447	1405	1.84	1638	1467	2.07	1839	1527	2.31	2050
2000	**1296**	**1.53**	**1359**	1363	1.74	1542	1427	1.95	1736	1488	2.18	1939	1546	2.42	2151
2100	1320	1.64	1459	1386	1.85	1646	1448	2.07	1842	1508	2.30	2047	1566	2.55	2262
2200	1345	1.77	1568	1409	1.98	1758	1471	2.20	1956	1530	2.44	2164	1587	2.68	2380
2300	1371	1.90	1686	1434	2.11	1878	1494	2.34	2080	1553	2.58	2290	1609	2.83	2509
2400	1397	2.04	1812	1459	2.26	2008	1518	2.49	2213	1576	2.73	2425	—	—	—
2500	1424	2.19	1948	1484	2.42	2147	1543	2.65	2355	1599	2.89	2571	—	—	—
2600	1451	2.36	2093	1511	2.58	2295	1568	2.82	2507	—	—	—	—	—	—
2700	1479	2.53	2248	1537	2.76	2454	—	—	—	—	—	—	—	—	—
2800	1507	2.72	2412	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

*Motor drive range: 1300 to 1685 rpm. All other rpms require field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.
3. See page 33 for general fan performance notes.

PRE-START-UP

⚠ WARNING

Failure to observe the following warnings could result in serious personal injury:

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources are disconnected.
4. Relieve all pressure from system before touching or disturbing anything inside compressor terminal box if refrigerant leak is suspected around compressor terminals. Use accepted methods to recover refrigerant.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power to unit.
   b. Recover refrigerant to relieve all pressure from system using both high- and low-pressure ports.
   c. Cut component connection tubing with tubing cutter, and remove component from unit.
   d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels.
2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to (or shipped) with unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, or disconnected wires.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, halide torch, or liquid-soap solution.
   c. Inspect all field-wiring and factory-wiring connections. Be sure that connections are completed and tight. Ensure no electrical wiring is in contact with refrigerant tubing or sharp edges.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that condenser-fan blades are correctly positioned in fan orifice. Refer to Condenser-Fan Adjustment section on page 52 for more details.
   b. Make sure that air filters are in place.
   c. Make sure that condensate drain trap is filled with water to ensure proper drainage.
   d. Make sure that all tools and miscellaneous loose parts have been removed.

START-UP

Unit Preparation — Make sure that unit has been installed in accordance with installation instructions and applicable codes.

Return-Air Filters — Make sure correct filters are installed in unit (see Tables 1A and 1B). Do not operate unit without return-air filters.

Compressor Mounting — Compressors are internally spring mounted. Do not loosen or remove compressor hold-down bolts.

Internal Wiring — Check all electrical connections in unit control boxes; tighten as required. Ensure wiring does not come in contact with sharp metal edges.

Refrigerant Service Ports — To service refrigerant service ports, remove access panel. Each unit system has 4 Schrader-type service ports: one on the suction line, one on the liquid line, and two on the compressor discharge line. Be sure that caps on the ports are tight. The Schrader-type valve that is located under the high-pressure switch does not have a Schrader core.

High Flow Refrigerant Valves — Two high flow valves are located on the hot gas tube coming out of the compressor and the suction tube going into the compressor. Large black plastic caps identify these valves with O-rings inside screwing the cap and onto a brass body. No field access to these valves is available at this time. Ensure the plastic caps remain on the valves and are tight or the possibility of refrigerant leakage could occur.

Compressor Rotation — On 50TFF,TM007 scroll compressor units, it is important to be certain compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect service gages to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.

If the suction pressure does not drop and the discharge pressure does not rise to normal levels:

1. Note that the evaporator fan is probably also rotating in the wrong direction.
2. Turn off power to the unit. Install lock-out tag.
3. Reverse any two of the unit power leads.
4. Reapply power to the unit.

The suction and discharge pressure levels should now move to their normal start-up levels.

NOTE: When the compressor is rotating in the wrong direction, the unit makes an elevated level of noise and does not provide cooling.

Cooling — Set space thermostat to OFF position. Set system selector switch at COOL position and fan switch at AUTO. position. Adjust thermostat to a setting below room temperature. Compressor starts on closure of contactor.

Check cooling effects at a setting below room temperature. Check unit charge. Refer to Refrigerant Charge section, page 52.

Reset thermostat at a position above room temperature. Compressor will shut off.

TO SHUT OFF UNIT — Set system selector switch at OFF position. Resetting thermostat at a position above room temperature shuts unit off temporarily until space temperature exceeds thermostat setting.

Safety Relief — A soft solder joint in the suction line at the low-pressure service port provides pressure relief under abnormal temperature and pressure conditions.

Ventilation (Continuous Fan) — Set fan and system selector switches at ON and OFF positions, respectively. Evaporator fan operates continuously to provide constant air circulation.

Operating Sequence

COOLING, UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor-fan contactor (IFC) and compressor contactor are energized and indoor-fan motor, compressor, and outdoor fan starts. The outdoor-fan motor runs continuously while unit is cooling.

HEATING, UNITS WITHOUT ECONOMIZER — Upon a request for heating from the space thermostat, terminal W1 will be energized with 24 v. The IFC and heater contactor (HC1) are energized.

COOLING, UNITS WITH ECONOMI$ER IV — When free cooling is not available, the compressors will be controlled by the zone thermostat. When free cooling is available, the outdoor-air damper is modulated by the EconoMi$er IV control to provide a 50 to 55 F supply-air temperature into the zone. As the supply-air temperature fluctuates above 55 or below 50 F, the dampers will be modulated (open or close) to bring the supply-air temperature back within the set point limits.

Integrated EconoMi$er IV operation on single-stage units requires a 2-stage thermostat (Y1 and Y2).

For EconoMi$er IV operation, there must be a thermostat call for the fan (G). This will move the damper to its minimum position during the occupied mode.

If the increase in cooling capacity causes the supply-air temperature to drop below 45 F, then the outdoor-air damper position will be fully closed. If the supply-air temperature continues to fall, the outdoor-air damper will close. Control returns to normal once the supply-air temperature rises above 48 F.

If optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the EconoMi$er IV control, a demand controlled ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed. Damper position will follow the higher demand condition from DCV mode or free cooling mode.

Damper movement from full closed to full open (or vice versa) will take between $1^1/_2$ and $2^1/_2$ minutes.

If free cooling can be used as determined from the appropriate changeover command (switch, dry bulb, enthalpy curve, differential dry bulb, or differential enthalpy), a call for cooling (Y1 closes at the thermostat) will cause the control to modulate the dampers open to maintain the supply air temperature set point at 50 to 55 F.

As the supply-air temperature drops below the set point range of 50 to 55 F, the control will modulate the outdoor-air dampers closed to maintain the proper supply-air temperature.

HEATING, UNITS WITH ECONOMI$ER IV — When the room temperature calls for heat, the heating controls are energized as described in the Heating, Units Without Economizer section. When the thermostat is satisfied, the economizer damper moves to the minimum position.

COOLING, UNITS WITH ECONOMI$ER2, PREMIERLINK™ CONTROL AND A THERMOSTAT — When free cooling is not available, the compressors will be controlled by the PremierLink control in response to the Y1 and Y2 inputs from the thermostat.

The PremierLink control will use the following information to determine if free cooling is available:

- Indoor fan has been on for at least 30 seconds.
- The SPT, SAT, and OAT inputs must have valid readings.
- OAT must be less than 75 F.
- OAT must be less than SPT.
- Enthalpy must be LOW (may be jumpered if an enthalpy sensor not available).
- Economizer position is NOT forced.

Pre-cooling occurs when the is no call from the thermostat except G. Pre-cooling is defined as the economizer modulates to provide 70 F supply air.

When free cooling is available the PremierLink control will control the compressors and economizer to provide a supply-air temperature determined to meet the Y1 and Y2 calls from the thermostat using the following three routines. The three control routines are based on OAT.

The 3 routines are based on OAT where:

SASP = Supply Air Set Point
DXCTLO = Direct Expansion Cooling Lockout Set Point
PID = Proportional Integral

Routine 1 (OAT < DXCTLO)

- Y1 energized – economizer maintains a SASP = (SATLO1 + 3).
- Y2 energized – economizer maintains a SASP = (SATLO2 + 3).

Routine 2 (DXCTLO < OAT < 68 F)

- If only Y1 energized, the economizer maintains a SASP = (SATLO1 + 3).
- If SAT > SASP + 5 and economizer position > 80%, economizer will go to minimum position for 3 minutes or until SAT > 68 F.
- First stage of mechanical cooling will be energized.
- Integrator resets.
- Economizer opens again and controls to current SASP after stage one on for 90 seconds.
- With Y1 and Y2 energized Economizer maintains an SASP = SATLO2 + 3.
- If SAT > SASP + 5 and economizer position >80%, economizer will go to minimum position for 3 minutes or until SAT > 68 F.
- If compressor one is on then second stage of mechanical cooling will be energized. Otherwise the first stage will be energized.
- Integrator resets.
- Economizer opens again and controls to SASP after stage one on for 90 seconds.

Routine 3 (OAT > 68)

- Economizer is opened 100%.
- Compressors 1 and 2 are cycled based on Y1 and Y2 using minimum on and off times and watching the supply air temperature as compared to SATLO1 and SATLO2 set points.

If optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the PremierLink control, a PID-controlled demand ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

HEATING, UNITS WITH ECONOMI$ER2, PREMIERLINK™ CONTROL AND A THERMOSTAT — When the thermostat calls for heating, terminal W1 is energized. The PremierLink control will move the economizer damper to the minimum position if there is a call for G and closed if there is a call for W1 without G. The IFC and heater contactor (HC1) are energized.

When the thermostat is satisfied and W1 is deenergized, the IFM stops after a 45-second time-off delay unless G is still maintained.

COOLING, UNITS WITH ECONOMI$ER2, PREMIERLINK CONTROL AND A ROOM SENSOR — When free cooling is not available, the compressors will be controlled by the PremierLink controller using a PID Error reduction calculation as indicated by Fig 40.

The PremierLink controller will use the following information to determine if free cooling is available:

- Indoor fan has been on for at least 30 seconds.
- The SPT, SAT, and OAT inputs must have valid readings.
- OAT must be less than 75 F.
- OAT must be less than SPT.
- Enthalpy must be LOW (may be jumpered if and enthalpy sensor is not available).
- Economizer position is NOT forced.

When free cooling is available, the outdoor-air damper is positioned through the use of a Proportional Integral (PID) control process to provide a calculated supply-air temperature into the zone. The supply air will maintain the space temperature between the heating and cooling set points as indicated in Fig. 41.

The PremierLink controller will integrate the compressors stages with the economizer based on similar logic as the three routines listed in the previous section. The SASP will float up and down based on the error reduction calculations that compare space temperature and space set point.

When outside-air temperature conditions require the economizer to close for a compressor stage-up sequence, the economizer control integrator is reset to zero after the stage-up sequence is completed. This prevents the supply-air temperature from dropping too quickly and creating a freeze condition that would make the compressor turn off prematurely.

The high space set point is used for DX (direct expansion) cooling control, while the economizer space set point is a calculated value between the heating and cooling set points. The economizer set point will always be at least one degree below the cooling set point, allowing for a smooth transition from mechanical cooling with economizer assist, back to economizer cooling as the cooling set point is achieved. The compressors may be used for initial cooling then the PremierLink controller will modulate the economizer using an error reduction calculation to hold the space temperature between the heating and cooling set points. See Fig. 41.

The controller uses the following conditions to determine economizer cooling:

- Enthalpy is Low
- SAT reading is available
- OAT reading is available
- SPT reading is available
- OAT ≤ SPT
- Economizer Position is NOT forced

If any of the above conditions are **not** met, the economizer submaster reference (ECSR) is set to maximum limit and the damper moves to minimum position. The operating sequence is complete. The ECSR is recalculated every 30 seconds.

If an optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the PremierLink™ control, a PID-controlled demand ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

HEATING, UNIT WITH ECONOMI$ER2, PREMIERLINK CONTROL AND A ROOM SENSOR — Every 40 seconds the controller will calculate the required heat stages (maximum of 3) to maintain supply-air temperature (SAT) if the following qualifying conditions are met:

- Indoor fan has been on for at least 30 seconds.
- COOL mode is not active.
- OCCUPIED, TEMP.COMPENSATED START or HEAT mode is active.
- SAT reading is available.
- Fire shutdown mode is not active.

If all of the above conditions are met, the number of heat stages is calculated; otherwise the required number of heat stages will be set to 0.

If the PremierLink controller determines that heat stages are required, the economizer damper will be moved to minimum position if occupied and closed if unoccupied.

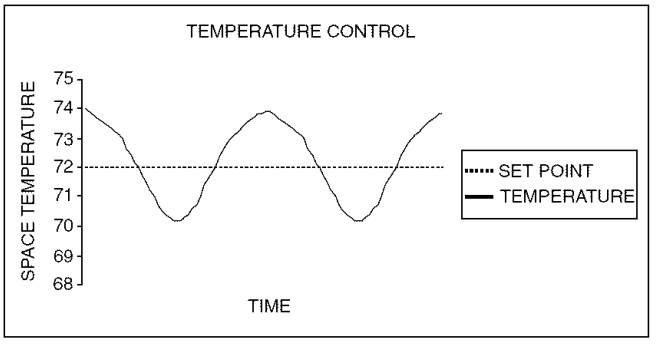
Staging should be as follows:

If Heating PID STAGES=2

- HEAT STAGES=1 (50% capacity) will energize HS1
- HEAT STAGES=2 (100% capacity) will energize HS2

If Heating PID STAGES=3 and AUXOUT = HS3

- HEAT STAGES=1 (33% capacity) will energize HS1
- HEAT STAGES=2 (66% capacity) will energize HS2
- HEAT STAGES=3 (100% capacity) will energize HS3



NOTE: PremierLink control performs smart staging of 2 stages of DX cooling and up to 3 stages of heat.

Fig. 40 — DX Cooling Temperature Control Example

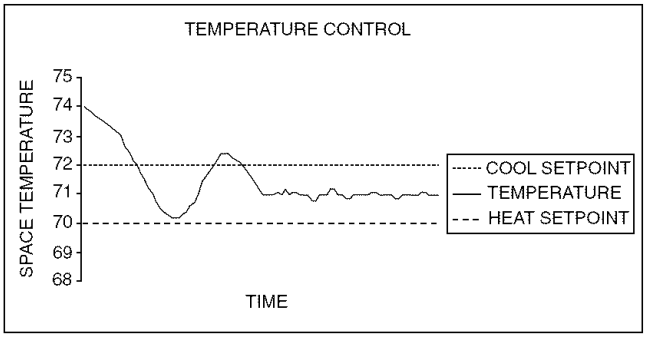


Fig. 41 — Economizer Temperature Control Example

SERVICE

⚠ CAUTION

When servicing unit, shut off all electrical power to unit to avoid shock hazard or injury from rotating parts.

Cleaning — Inspect unit interior at the beginning of heating and cooling season and as operating conditions require.

EVAPORATOR COIL

1. Turn unit power off. Install lockout tag. Remove evaporator coil access panel.
2. If economizer or two-position damper is installed, remove economizer by disconnecting Molex plug and removing mounting screws.
3. Slide filters out of unit.
4. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, back-flush toward return-air section to remove foreign material. Flush condensate pan after completion.
5. Reinstall economizer and filters.
6. Reconnect wiring.
7. Replace access panels.

CONDENSER COIL — Inspect coil monthly. Clean condenser coil annually, and as required by location and outdoor air conditions.

One-Row Coils — Size 004 — Wash coil with commercial coil cleaner. It is not necessary to remove the top panel.

2-Row Coils — Sizes 005-007

Clean coil as follows:

1. Turn off unit power. Install lockout tag.
2. Remove top panel screws on condenser end of unit.
3. Remove condenser coil corner post. See Fig. 42. To hold top panel open, place coil corner post between top panel and center post. See Fig. 43.
4. Remove screws securing coil to compressor plate and compressor access panel.
5. Remove fastener holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 3 to 4 in. from the inner coil section. See Fig. 44.
6. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
7. Secure inner and outer coil rows together with a field-supplied fastener.
8. Reposition the outer coil section and remove the coil corner post from between the top panel and center post. Reinstall the coil corner post and replace all screws.

CONDENSATE DRAIN — Check and clean each year at start of cooling season. In winter, protect condensate drain against freeze-up.

FILTERS — Clean or replace at start of each heating and cooling season, or more often if operating conditions require it. Replacement filters must be same dimensions as original filters.

OUTDOOR-AIR INLET SCREEN — Clean screen with steam or hot water and a mild detergent. Do not use disposable filters in place of screen.

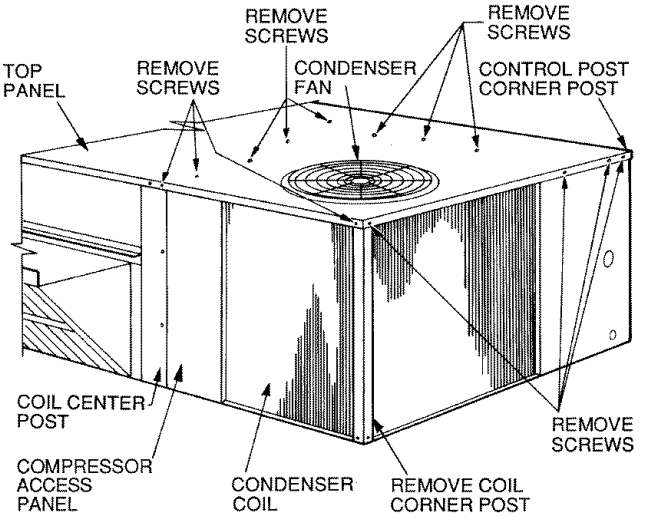


Fig. 42 — Cleaning Condenser Coil

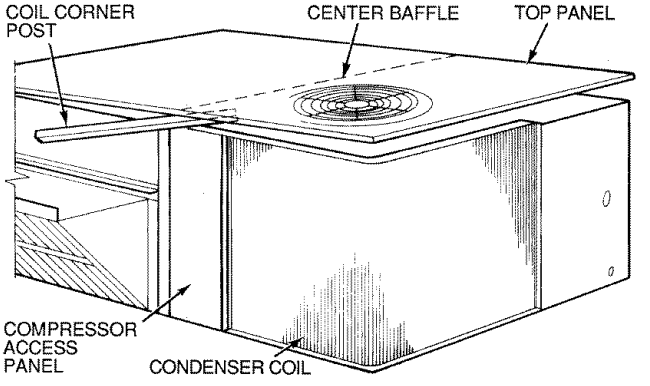


Fig. 43 — Propping Up Top Panel

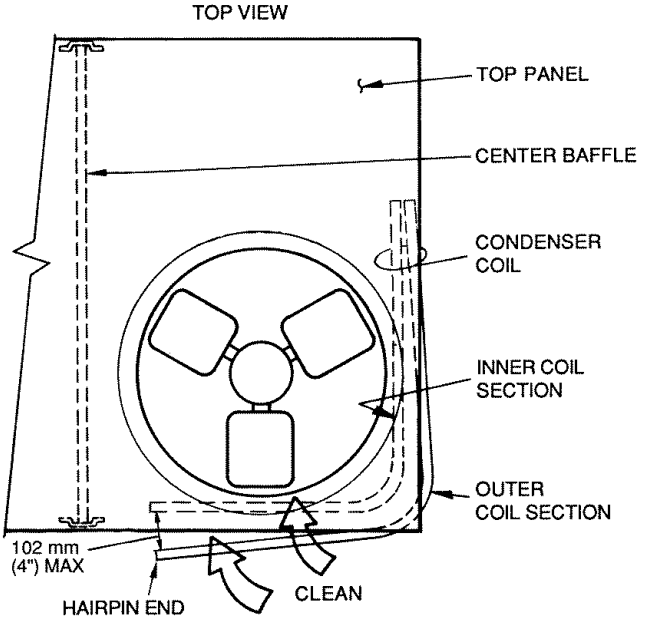


Fig. 44 — Separating Coil Sections

Lubrication

COMPRESSORS — Each compressor is charged with the correct amount of oil at the factory.

FAN-MOTOR BEARINGS — Fan-motor bearings are of the permanently lubricated type. No further lubrication is required. No lubrication of condenser or evaporator-fan motors is required.

Evaporator Fan Belt Inspection — Check condition of evaporator belt or tension during heating and cooling inspections or as conditions require. Replace belt or adjust as necessary. Refer to Step 7 — Adjust Evaporator-Fan Speed on page 31 for proper adjusting procedures and belt tension.

Condenser-Fan Adjustment (Fig. 45)

1. Shut off unit power supply. Install lockout tag.
2. Remove condenser-fan assembly (grille, motor, and fan).
3. Loosen fan hub setscrews.
4. Adjust fan height as shown in Fig. 45.
5. Tighten setscrews.
6. Replace condenser-fan assembly.

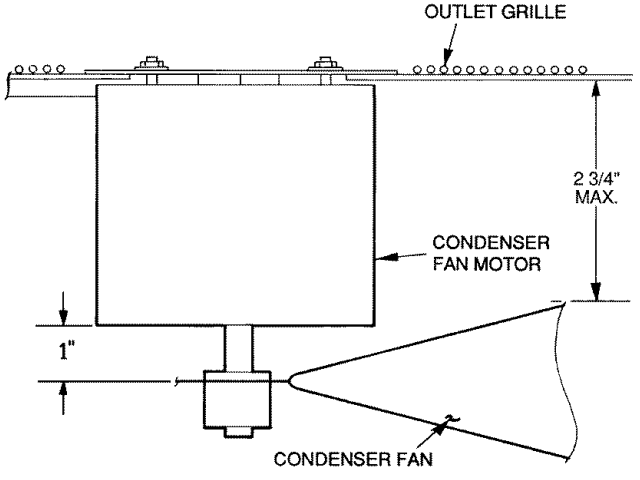


Fig. 45 — Condenser Fan Adjustment

Manual Outdoor-Air Damper — If outdoor-air damper blade adjustment is required, see Manual Outdoor-Air Damper section on page 19.

**EconoMi$er IV Adjustment —** Refer to Optional EconoMi$er IV and EconoMi$er2 section on page 23.

Condenser Coil Grille — Condenser coil grille is shipped factory-installed. No adjustments are required.

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate (also refer to Tables 1A and 1B). Refer to Carrier GTAC2-5 Charging, Recovery, Recycling, and Reclamation training manual and the following procedures. Unit panels must be in place when unit is operating during charging procedure.

NO CHARGE — Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant. (Refer to Tables 1A and 1B.)

LOW CHARGE COOLING — Use Cooling Charging Charts, Fig. 46-49. Vary refrigerant until the conditions of the appropriate chart are met. Note the charging chart is different from type normally used. Chart is based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air cfm must be within the normal operating range of the unit.

TO USE COOLING CHARGING CHART — Take the outdoor ambient temperature and read the suction pressure gage. Refer to appropriate chart to determine what suction temperature should be. If suction temperature is high, add refrigerant. If suction temperature is low, carefully recover some of the charge. Recheck the suction pressure as charge is adjusted.

Example: (Fig. 48)

Outdoor Temperature ..... 85 F
Suction Pressure ..... 80 psig
Suction Temperature should be ..... 77 F
(Suction Temperature may vary ± 5 F.)

Replacement Parts — A complete list of replacement parts may be obtained from any Carrier distributor upon request.

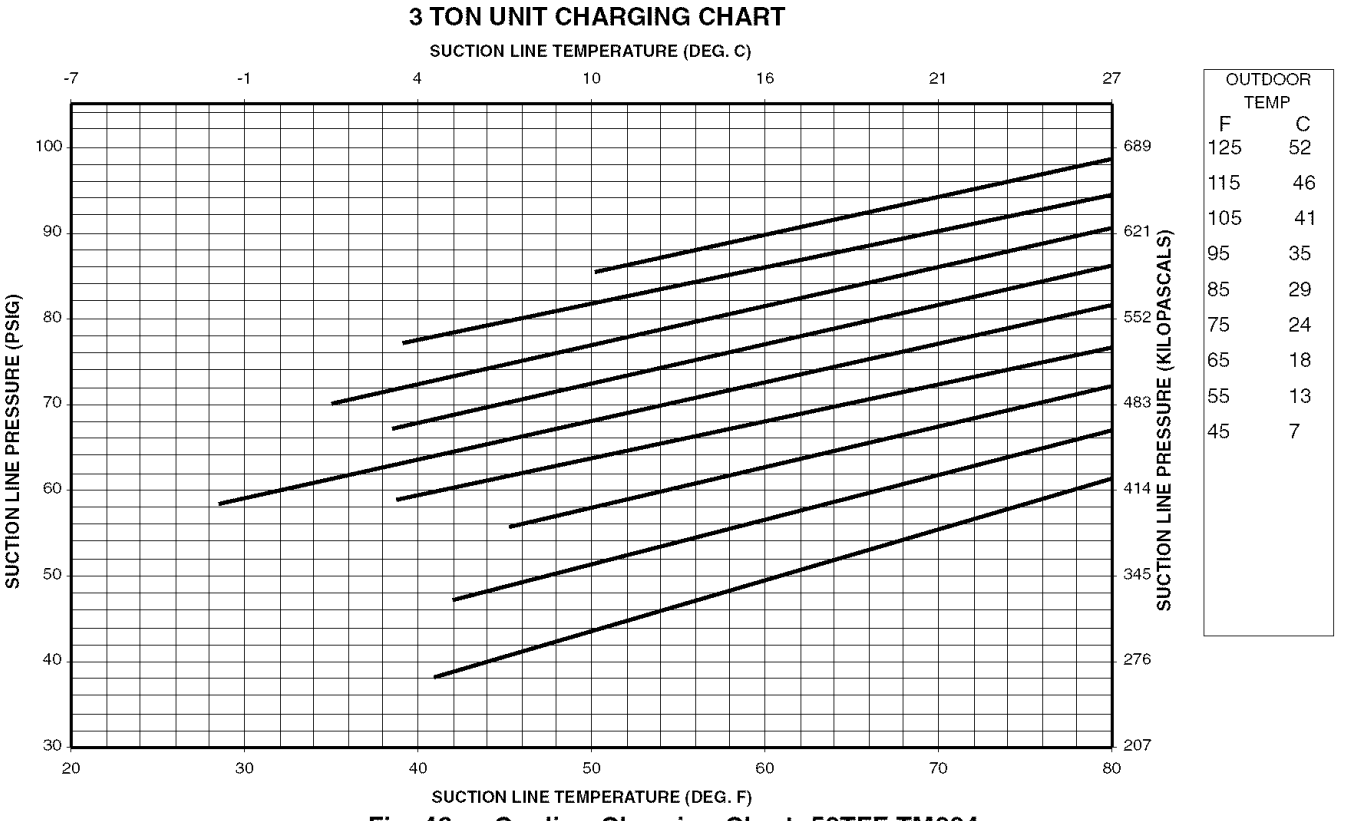


Fig. 46 — Cooling Charging Chart; 50TFF,TM004

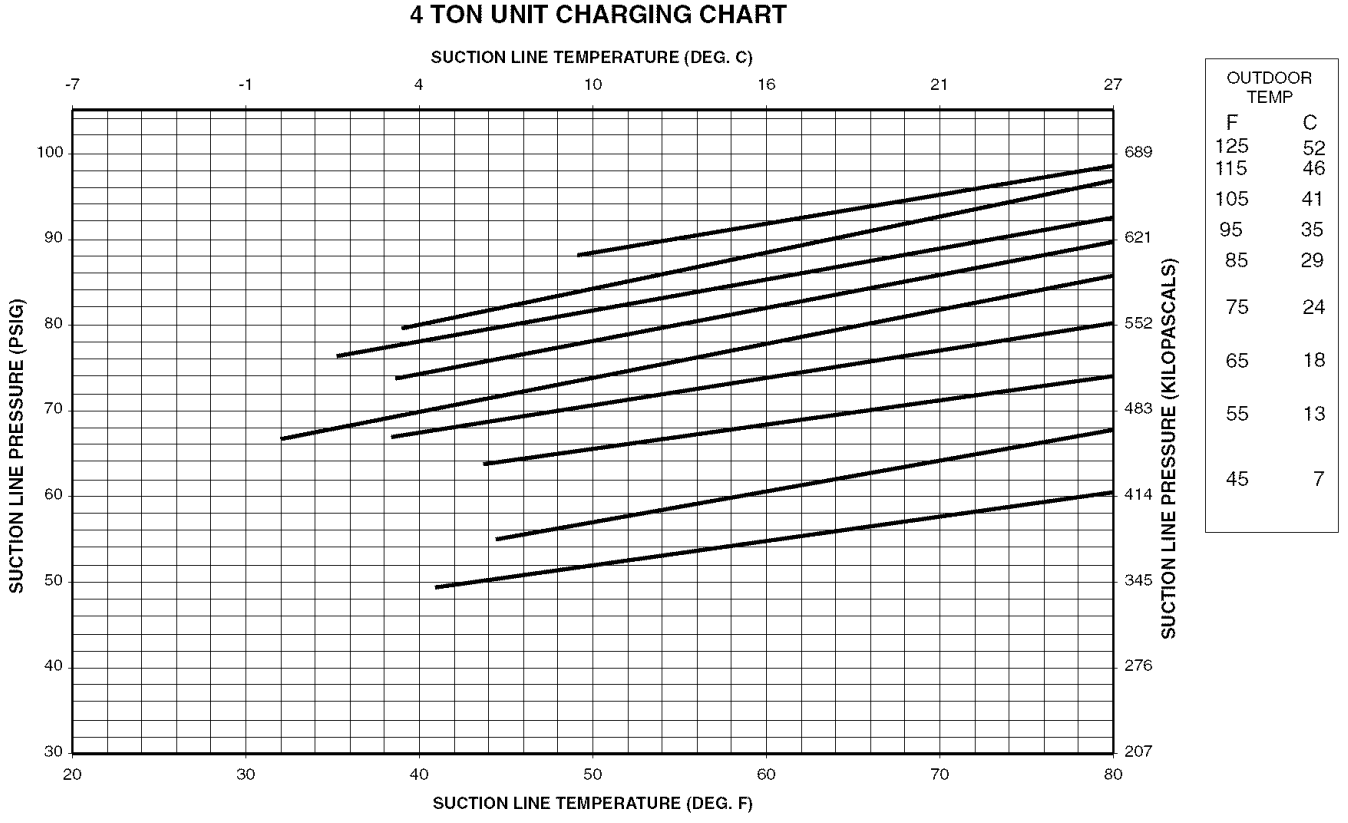


Fig. 47 — Cooling Charging Chart; 50TFF,TM005

5 TON UNIT CHARGING CHART

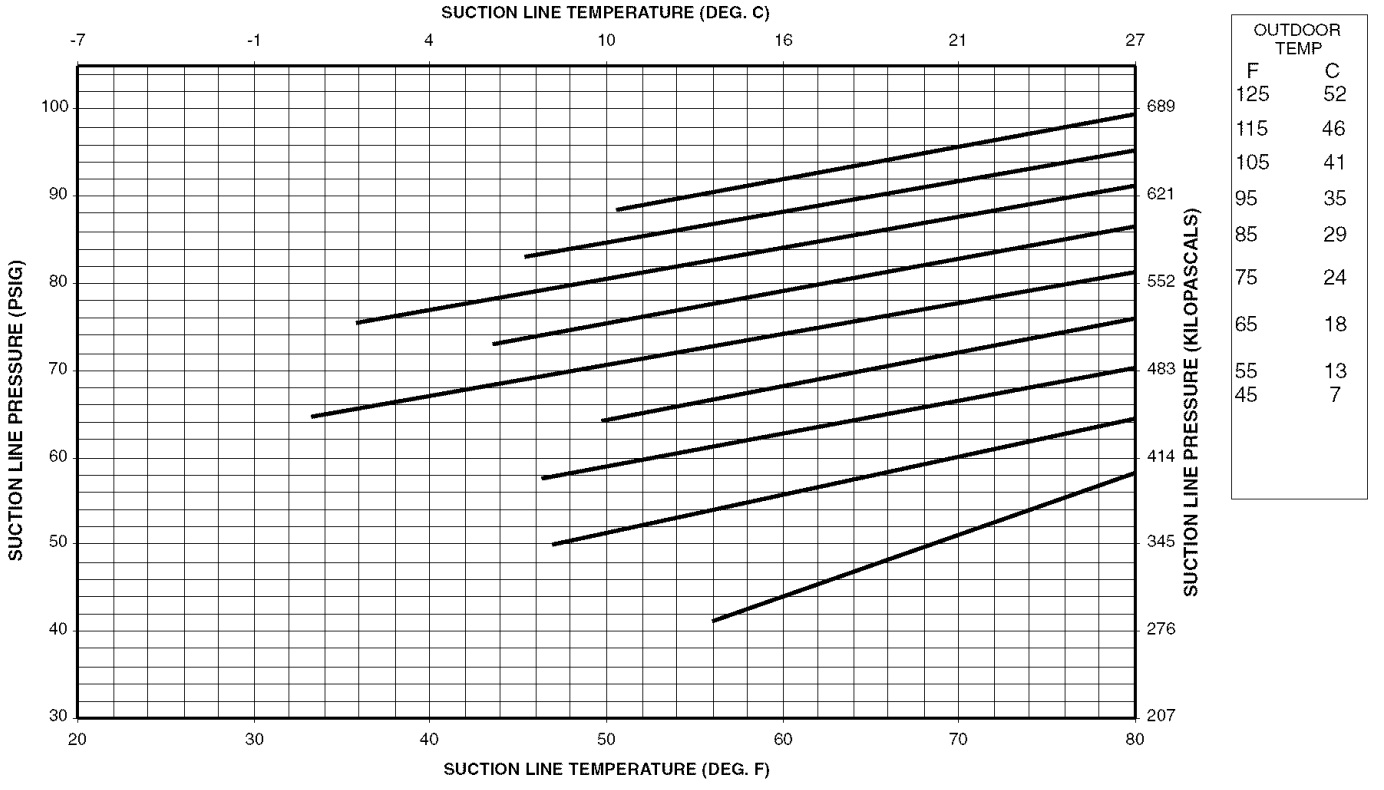


Fig. 48 — Cooling Charging Chart; 50TFF,TM006

6 TON UNIT (60 Hz) CHARGING CHART

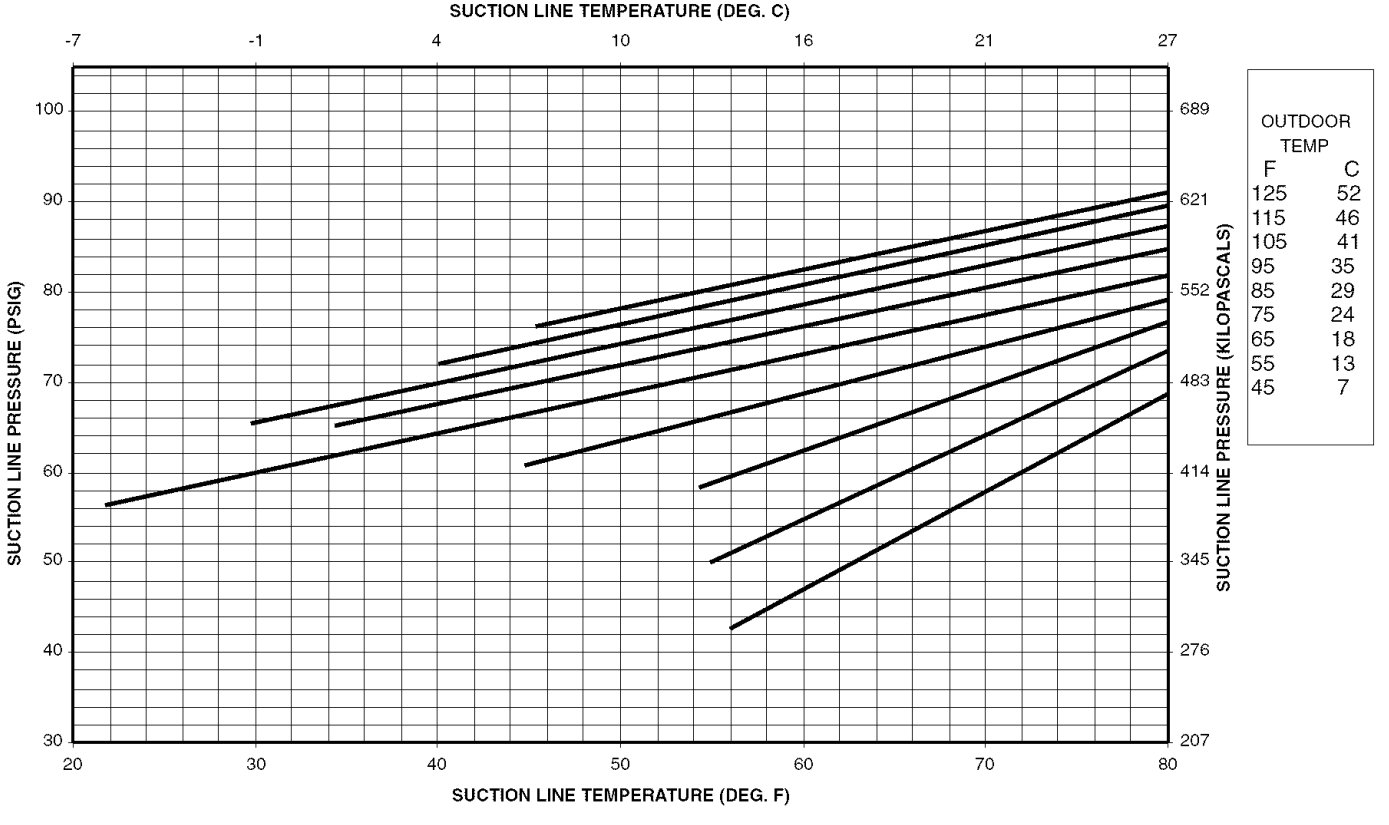


Fig. 49 — Cooling Charging Chart; 50TFF,TM007

TROUBLESHOOTING

Unit Troubleshooting — Refer to Fig. 50 and Table 42 for unit troubleshooting information.

**EconoMi$er IV Troubleshooting —** See Table 43 for EconoMi$er IV logic.

A functional view of the EconoMi$er is shown in Fig. 51. Typical settings, sensor ranges, and jumper positions are also shown. An EconoMi$er IV simulator program is available from Carrier to help with EconoMi$er IV training and troubleshooting.

ECONOMI$ER IV PREPARATION — This procedure is used to prepare the EconoMi$er IV for troubleshooting. No troubleshooting or testing is done by performing the following procedure.

NOTE: This procedure requires a 9-v battery, 1.2 kilo-ohm resistor, and a 5.6 kilo-ohm resistor which are not supplied with the EconoMi$er IV.

IMPORTANT: Be sure to record the positions of all potentiometers before starting troubleshooting.

1. Disconnect power at TR and TR1. All LEDs should be off. Exhaust fan contacts should be open.
2. Disconnect device at P and P1.
3. Jumper P to P1.
4. Disconnect wires at T and T1. Place 5.6 kilo-ohm resistor across T and T1.
5. Jumper TR to 1.
6. Jumper TR to N.
7. If connected, remove sensor from terminals S_O and +. Connect 1.2 kilo-ohm 4074EJM checkout resistor across terminals S_O and +.
8. Put 620-ohm resistor across terminals S_R and +.
9. Set minimum position, DCV set point, and exhaust potentiometers fully CCW (counterclockwise).
10. Set DCV maximum position potentiometer fully CW (clockwise).
11. Set enthalpy potentiometer to D.
12. Apply power (24 vac) to terminals TR and TR1.

DIFFERENTIAL ENTHALPY — To check differential enthalpy:

1. Make sure EconoMi$er IV preparation procedure has been performed.
2. Place 620-ohm resistor across S_O and +.
3. Place 1.2 kilo-ohm resistor across S_R and +. The Free Cool LED should be lit.
4. Remove 620-ohm resistor across S_O and +. The Free Cool LED should turn off.
5. Return EconoMi$er IV settings and wiring to normal after completing troubleshooting.

SINGLE ENTHALPY — To check single enthalpy:

1. Make sure EconoMi$er IV preparation procedure has been performed.
2. Set the enthalpy potentiometer to A (fully CCW). The Free Cool LED should be lit.
3. Set the enthalpy potentiometer to D (fully CW). The Free Cool LED should turn off.
4. Return EconoMi$er IV settings and wiring to normal after completing troubleshooting.

DCV (Demand Controlled Ventilation) AND POWER EXHAUST — To check DCV and Power Exhaust:

1. Make sure EconoMi$er IV preparation procedure has been performed.
2. Ensure terminals AQ and AQ1 are open. The LED for both DCV and Exhaust should be off. The actuator should be fully closed.
3. Connect a 9-v battery to AQ (positive node) and AQ1 (negative node). The LED for both DCV and Exhaust should turn on. The actuator should drive to between 90 and 95% open.
4. Turn the Exhaust potentiometer CW until the Exhaust LED turns off. The LED should turn off when the potentiometer is approximately 90%. The actuator should remain in position.
5. Turn the DCV set point potentiometer CW until the DCV LED turns off. The DCV LED should turn off when the potentiometer is approximately 9 v. The actuator should drive fully closed.
6. Turn the DCV and Exhaust potentiometers CCW until the Exhaust LED turns on. The exhaust contacts will close 30 to 120 seconds after the Exhaust LED turns on.
7. Return EconoMi$er IV settings and wiring to normal after completing troubleshooting.

DCV MINIMUM AND MAXIMUM POSITION — To check the DCV minimum and maximum position:

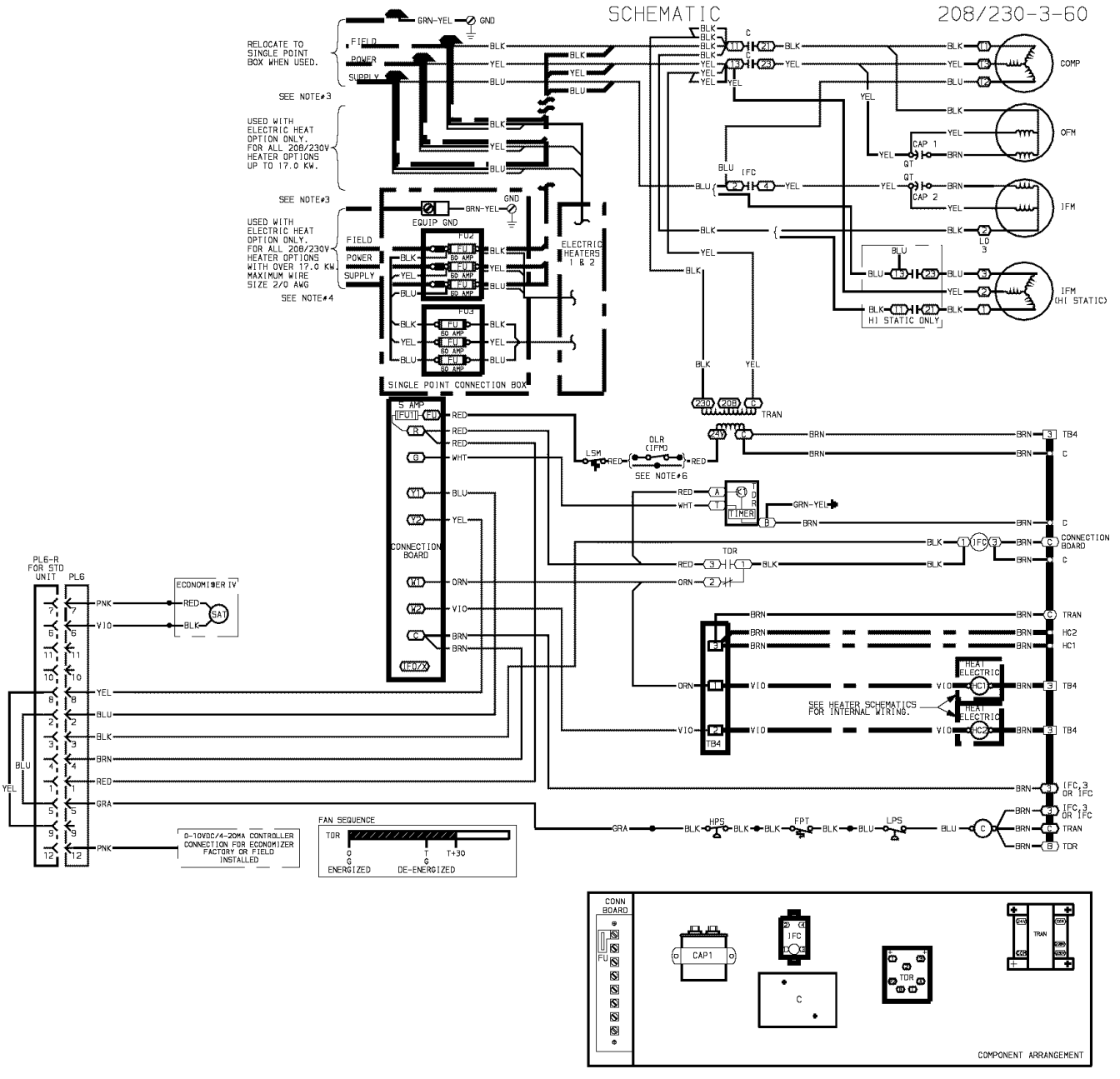
1. Make sure EconoMi$er IV preparation procedure has been performed.
2. Connect a 9-v battery to AQ (positive node) and AQ1 (negative node). The DCV LED should turn on. The actuator should drive to between 90 and 95% open.
3. Turn the DCV Maximum Position potentiometer to midpoint. The actuator should drive to between 20 and 80% open.
4. Turn the DCV Maximum Position potentiometer to fully CCW. The actuator should drive fully closed.
5. Turn the Minimum Position potentiometer to midpoint. The actuator should drive to between 20 and 80% open.
6. Turn the Minimum Position Potentiometer fully CW. The actuator should drive fully open.
7. Remove the jumper from TR and N. The actuator should drive fully closed.
8. Return EconoMi$er IV settings and wiring to normal after completing troubleshooting.

SUPPLY-AIR INPUT — To check supply-air input:

1. Make sure EconoMi$er IV preparation procedure has been performed.
2. Set the Enthalpy potentiometer to A. The Free Cool LED turns on. The actuator should drive to between 20 and 80% open.
3. Remove the 5.6 kilo-ohm resistor and jumper T to T1. The actuator should drive fully open.
4. Remove the jumper across T and T1. The actuator should drive fully closed.
5. Return EconoMi$er IV settings and wiring to normal after completing troubleshooting.

ECONOMI$ER IV TROUBLESHOOTING COMPLETION — This procedure is used to return the EconoMi$er IV to operation. No troubleshooting or testing is done by performing the following procedure.

1. Disconnect power at TR and TR1.
2. Set enthalpy potentiometer to previous setting.
3. Set DCV maximum position potentiometer to previous setting.
4. Set minimum position, DCV set point, and exhaust potentiometers to previous settings.
5. Remove 620-ohm resistor from terminals S_R and +.
6. Remove 1.2 kilo-ohm checkout resistor from terminals S_O and +. If used, reconnect sensor from terminals S_O and +.
7. Remove jumper from TR to N.
8. Remove jumper from TR to 1.
9. Remove 5.6 kilo-ohm resistor from T and T1. Reconnect wires at T and T1.
10. Remove jumper from P to P1. Reconnect device at P and P1.
11. Apply power (24 vac) to terminals TR and TR1.



LEGEND

C	—	Contactor, Compressor
CAP	—	Capacitor
COMP	—	Compressor Motor
EQUIP	—	Equipment
FPT	—	Freeze Up Protection Thermostat
FU	—	Fuse
GND	—	Ground
HC	—	Heater Contactor
HPS	—	High-Pressure Switch
IFC	—	Indoor Fan Contactor
IFM	—	Indoor (Evaporator) Fan Motor
LPS	—	Low-Pressure/Loss-of-Charge Switch
LSM	—	Limit Switch (Motor)
OFM	—	Outdoor (Condenser) Fan Motor
OLR	—	Overload Relay
P	—	Plug
PL	—	Plug Assembly
QT	—	Quadruple Terminal
SAT	—	Supply Air Temperature Sensor
TB	—	Terminal Block
TDR	—	Time Delay Relay
TRAN	—	Transformer

- Field Splice
- Marked Wire
- Terminal (Marked)
- Terminal (Unmarked)
- Terminal Block
- Splice
- Splice (Marked)
- Factory Wiring
- Field Control Wiring
- Field Power Wiring
- Accessory or Optional Wiring
- To indicate common potential only; not to represent wiring.

NOTES:

1. If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
2. Three-phase motors are protected under primary single-phasing conditions.
3. Use copper conductors only.
4. Use copper, copper clad aluminum or aluminum conductors.
5. TRAN is wired for 230-v unit. If unit is to be run with 208-v power supply disconnect BLK wire from 230-v tap (ORN) and connect to 208-v tap (RED). Insulate end of 230-v tap.
6. Unit will have either LSM or OLR, but not both.

Fig. 50 — Typical Wiring Schematic (208/230-3-60 Unit Shown)

Table 42 — Cooling Service Analysis

PROBLEM	CAUSE	REMEDY
Compressor and Condenser Fan Will Not Start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer, or control relay.	Replace component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high.	Lower thermostat setting below room temperature.
Compressor Will Not Start But Condenser Fan Runs.	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor.
	Defective run/start capacitor, overload, start relay.	Determine cause and replace.
	One leg of three-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor Cycles (Other Than Normally Satisfying Thermostat).	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked condenser.	Determine cause and correct.
	Defective run/start capacitor, overload, or start relay.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty condenser-fan motor or capacitor.	Replace.
	Restriction in refrigerant system.	Locate restriction and remove.
Compressor Operates Continuously.	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak; repair and recharge.
	Leaking valves in compressor.	Replace compressor.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser coil dirty or restricted.	Clean coil or remove restriction.
Compressor Makes Excessive Noise (50TFF,TM007 Scroll Only).	Compressor rotating in wrong direction.	Reverse the 3-phase power leads as described in Start-Up section on page 48.
Excessive Head Pressure.	Dirty air filter.	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser air restricted or air short-cycling.	Determine cause and correct.
Head Pressure Too Low.	Low refrigerant charge.	Check for leaks; repair and recharge.
	Compressor valves leaking.	Replace compressor.
	Restriction in liquid tube.	Remove restriction.
Excessive Suction Pressure.	High head load.	Check for source and eliminate.
	Compressor valves leaking.	Replace compressor.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction Pressure Too Low.	Dirty air filter.	Replace filter.
	Low refrigerant charge.	Check for leaks; repair and recharge.
	Metering device or low-side restricted.	Remove source of restriction.
	Insufficient evaporator airflow.	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Outdoor ambient below 25 F.	Install low-ambient kit.
Evaporator Fan Will Not Shut Off. (Sizes 004-006 Only.)	Time off delay not finished.	Wait for 30-second off delay.

Table 43 — EconoMi$er IV Input/Output Logic

INPUTS					OUTPUTS			
Demand Control Ventilation (DCV)	Enthalpy*		Y1	Y2	Compressor		N Terminal†	
	Outdoor	Return			Stage 1	Stage 2	Occupied	Unoccupied
							Damper	
Below set (DCV LED Off)	High (Free Cooling LED Off)	Low	On	On	On	On	Minimum position	Closed
			On	Off	On	Off		
			Off	Off	Off	Off		
	Low (Free Cooling LED On)	High	On	On	On	Off	Modulating** (between min. position and full-open)	Modulating** (between closed and full-open)
			On	Off	Off	Off		
			Off	Off	Off	Off	Minimum position	Closed
Above set (DCV LED On)	High (Free Cooling LED Off)	Low	On	On	On	On	Modulating†† (between min. position and DCV maximum)	Modulating†† (between closed and DCV maximum)
			On	Off	On	Off		
			Off	Off	Off	Off		
	Low (Free Cooling LED On)	High	On	On	On	Off	Modulating***	Modulating†††
			On	Off	Off	Off		
			Off	Off	Off	Off		

*For single enthalpy control, the module compares outdoor enthalpy to the ABCD set point.
†Power at N terminal determines Occupied/Unoccupied setting: 24 vac (Occupied), no power (Unoccupied).
**Modulation is based on the supply-air sensor signal.
††Modulation is based on the DCV signal.
***Modulation is based on the greater of DCV and supply-air sensor signals, between minimum position and either maximum position (DCV) or fully open (supply-air signal).
†††Modulation is based on the greater of DCV and supply-air sensor signals, between closed and either maximum position (DCV) or fully open (supply-air signal).

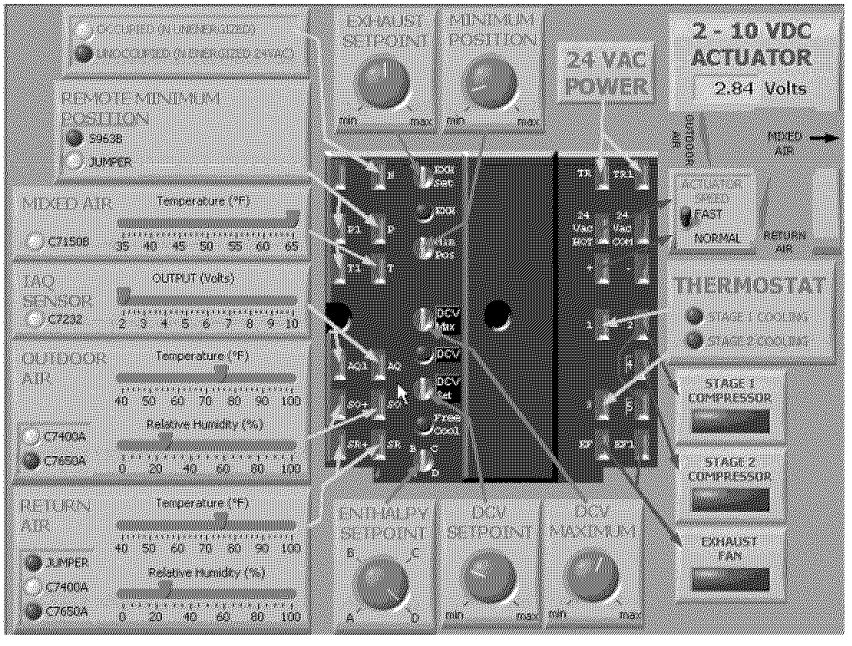


Fig. 51 — EconoMi$er IV Functional View

INDEX

SERVICE TRAINING

Packaged Service Training programs are an excellent way to increase your knowledge of the equipment discussed in this manual, including:

- Unit Familiarization
- Installation Overview
- Maintenance
- Operating Sequence

A large selection of product, theory, and skills programs are available, using popular video-based formats and materials. All include video and/or slides, plus companion book.

Classroom Service Training which includes "hands-on" experience with the products in our labs can mean increased confidence that really pays dividends in faster troubleshooting and fewer callbacks. Course descriptions and schedules are in our catalog.

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[ ] Packaged Service Training [ ] Classroom Service Training

START-UP CHECKLIST
(Remove and Store in Job File)

I. PRELIMINARY INFORMATION

MODEL NO. _____ SERIAL NO. _____

DATE: _____ TECHNICIAN: _____

BUILDING LOCATION: _____

II. PRE-START-UP (insert checkmark in box as each item is completed)

- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED AS SHOWN IN THE INSTALLATION INSTRUCTIONS
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK THAT RETURN-AIR FILTERS ARE CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT INSTALLATION IS LEVEL WITHIN TOLERANCES LISTED IN THE INSTALLATION INSTRUCTIONS
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS
- ☐ CHECK PULLEY ALIGNMENT AND BELT TENSION; REFER TO INSTALLATION INSTRUCTIONS
- ☐ CHECK TO ENSURE THAT ELECTRICAL WIRING IS NOT IN CONTACT WITH REFRIGERANT LINES OR SHARP METAL EDGES.

III. START-UP:

ELECTRICAL

SUPPLY VOLTAGE	L1-L2	_____	L2-L3	_____	L3-L1	_____
COMPRESSOR AMPS	L1	_____	L2	_____	L3	_____
INDOOR-FAN AMPS	L1	_____	L2	_____	L3	_____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE	_____	DB		
RETURN-AIR TEMPERATURE	_____	DB	_____	WB
COOLING SUPPLY AIR	_____	DB	_____	WB

REFRIGERANT

REFRIGERANT SUCTION	_____	PSIG	_____	F
REFRIGERANT DISCHARGE	_____	PSIG	_____	F

- ☐ VERIFY REFRIGERANT CHARGE USING COOLING CHARGING CHARTS ON PAGES 53 AND 54
- ☐ VERIFY 3-PHASE SCROLL COMPRESSOR IS ROTATING IN THE CORRECT DIRECTION (50TFF,TM007 SCROLL ONLY)

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE