50TFQ004-007
Single-Package Rooftop Heat Pump Units

Installation, Start-Up and Service Instructions

CONTENTS

SAFETY CONSIDERATIONS

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

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit and tag 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 horizontal duct opening covers. Using the same screws, install covers on duct openings in basepan of unit with the insulation-side down. Seals around duct openings must be tight.

Step 1 — Provide Unit Support

ROOF CURB — Assemble and install the accessory roof curb in accordance with instructions shipped with the curb. See Fig. 1. Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to the curb, not to the unit.* If electric or control power is to be routed through the basepan, be sure to choose the appropriate accessory kit. See Fig. 1. Attach the accessory thru-the-bottom service connections to the basepan and roof curb in accordance with the accessory installation instructions. Connections must be installed before the unit is set on the roof curb.

IMPORTANT: The gasketing of the unit to the roof curb is critical for watertightness. Install gasket supplied with the roof curb as shown in Fig. 1. Improperly applied gasket can also result in air leaks and poor unit performance.

The roof curb should be level. This is necessary for the unit drain to function properly. Unit leveling tolerances are shown in Fig. 2. Refer to Accessory Roof Curb Installation Instructions for additional information, as required.

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

Book 1 4 Tab 5a 5a   Catalog No. 04-53500018-01   Printed in U.S.A.   Form 50TFQ-8SI   Pg 1   9-05   Replaces: 50TFQ-6SI

SLAB MOUNT (Horizontal Units Only) — Provide a level concrete slab that extends a minimum of 6 in. beyond the unit cabinet. Install a gravel apron in front of the 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 unit with sleepers using unit 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 the roof curb and building structure on vertical discharge units. *Do not connect ductwork to the 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 counterflashing 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 Condensate Drain Line and External Trap — Condensate drain connections are located on 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 discharge units.

When using the standard side drain connection, make sure the 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 plug from the bottom connection to the side connection. The center drain plug looks like a star connection, but can be removed using a $^1/_2$-in. socket drive extension. See Fig. 3. The piping for the condensate drain and external trap can be completed after the unit is in place.

All units must have an external trap for condensate drainage. Install a trap at least 4 in. deep and protect against freeze-up. If the drain line is installed downstream from the external trap, pitch the line away from the 50TFQ unit at $^1/_4$ in. per ft of run. Do not use a pipe size smaller than the unit connection. See Fig. 4.

Step 4 — Rig and Place Unit — Inspect the unit for transportation damage, and file any claim with the transportation agency. Keep the unit upright and do not drop it. Spreader bars are not required if top crating is left on the unit, and rollers may be used to move the unit across a roof. Level by using the unit frame as a reference. See Table 1 and Fig. 5 for additional information. Operating weight is shown in Table 1 and Fig. 5.

Lifting holes are provided in base rails as shown in Fig. 5 and 6. Refer to rigging instructions on the unit.

⚠ CAUTION

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

POSITIONING — Maintain clearance around and above the unit to provide proper airflow and service access. See Fig. 6.

A properly positioned unit will have the following clearances: $^1/_4$-in. clearance between the roof curb and base rails on each side and front of the unit; $^1/_4$-in. clearance between the roof curb and rear of unit. (See Fig. 1, section C-C.)

Do not install the unit indoors. Do not locate the unit air inlets near exhaust vents or other sources of contaminated air.

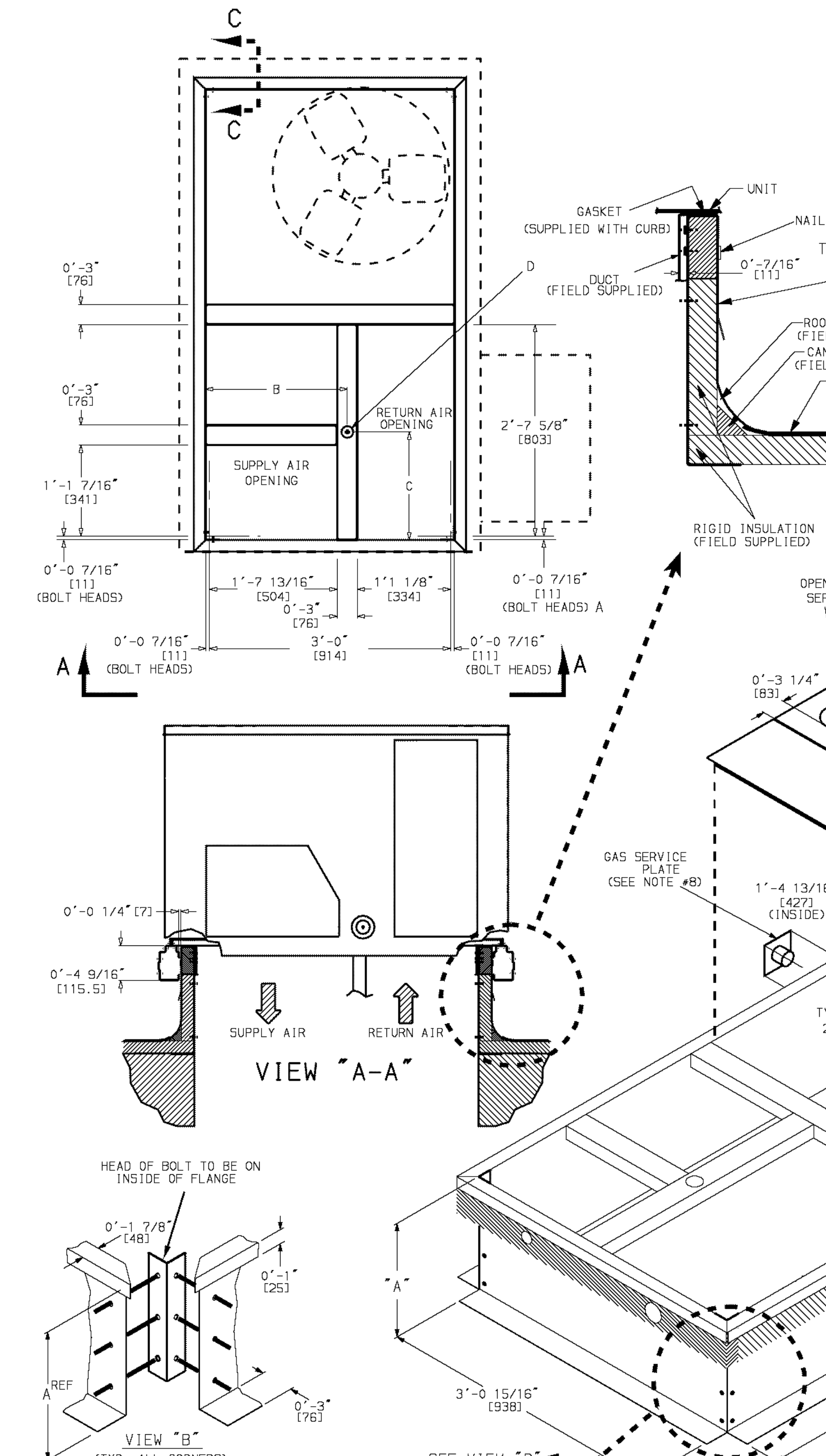
Although the unit is weatherproof, guard against water from higher level runoff and overhangs.

After the unit is in position, remove the polyethylene shipping wrapper and top crating.

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]	50TFQ004-007
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. [arrow symbol] 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.



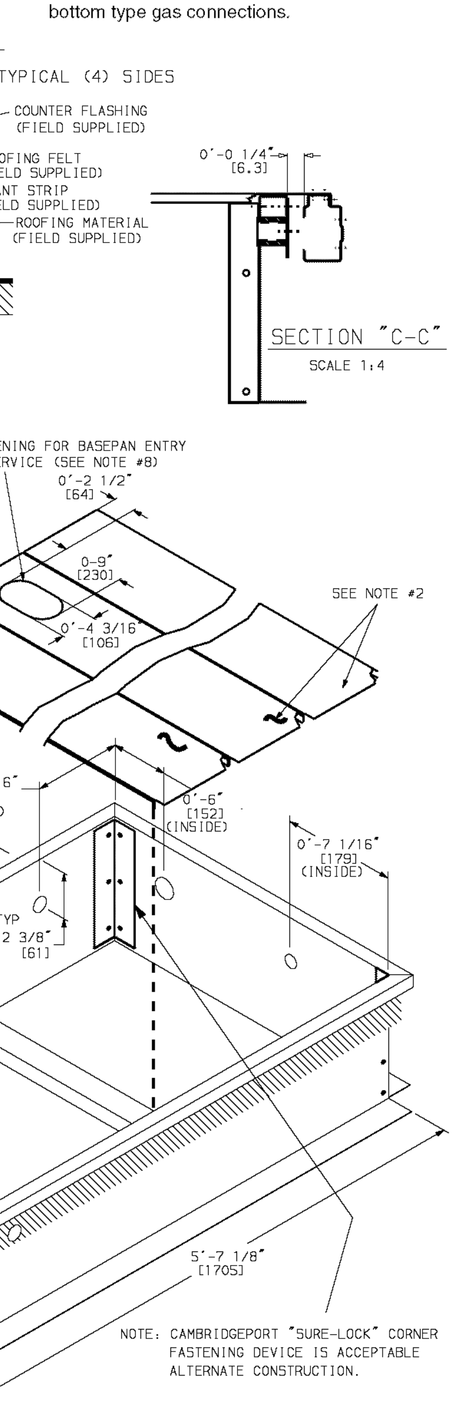
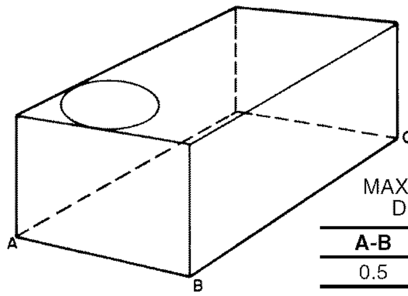


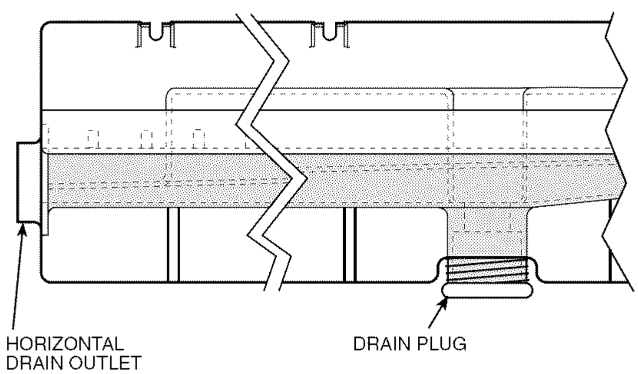
Fig. 1 — Roof Curb Details



MAXIMUM ALLOWABLE DIFFERENCE (in.)

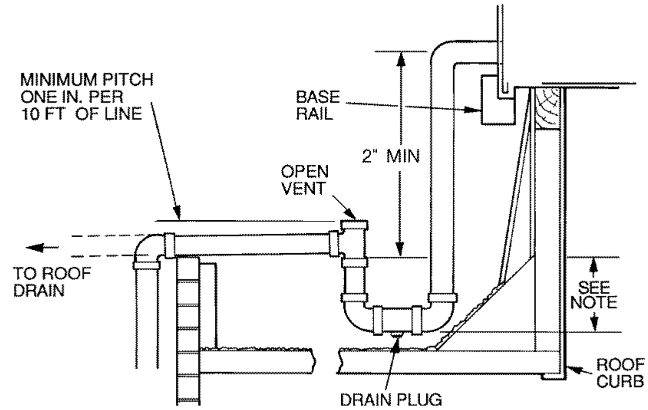
A-B	B-C	A-C
0.5	1.0	1.0

Fig. 2 — Unit Leveling Tolerances



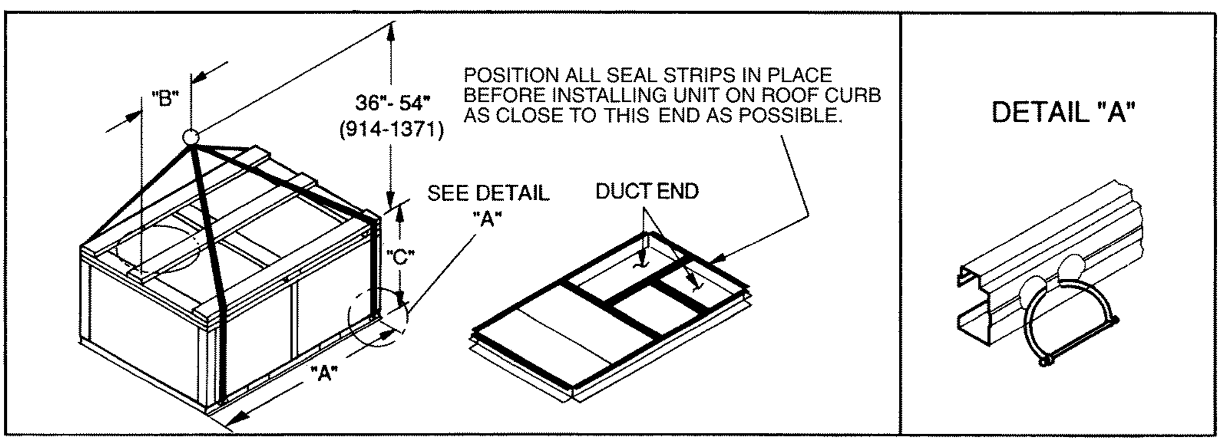
NOTE: Drain plug is shown in factory-installed position.

Fig. 3 — Condensate Drain Connection



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

Fig. 4 — Condensate Drain Piping Details



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. Unit weights do not include economizer. See Table 1 for economizer weights.

50TFQ UNIT SIZE	OPERATING WEIGHT		DIMENSIONS					
			"A"		"B"		"C"	
	lb	kg	in.	mm	in.	mm	in.	mm
004	500	227	73.69	1872	35.50	902	33.31	847
005	520	236	73.69	1872	35.50	902	33.31	847
006	550	249	73.69	1872	35.50	902	33.31	847
007	590	268	73.69	1872	35.50	902	33.31	847

⚠ CAUTION

All panels must be in place when rigging. Unit is not designed for handling by a fork truck.

Fig. 5 — Rigging Details

Table 1 — Physical Data

50TFQ UNIT SIZE		004	005	006	007
NOMINAL CAPACITY (tons)		3	4	5	6
OPERATING WEIGHT (lb)					
Unit		500	520	550	590
Economizer					
EconoMi$er IV		50	50	50	50
Roof Curb*		115	115	115	115
COMPRESSOR		Hermetic			
Quantity		1	1	1	1
Oil (oz)		45	54	50	54
REFRIGERANT TYPE		R-22			
Operating Charge (lb-oz)					
Circuit 1		5-1	6-0	8-0	11-2
Circuit 2		—	—	—	—
OUTDOOR COIL		Enhanced Copper Tubes, Aluminum Lanced Fins, Acutrol™ Metering Device			
Rows...Fins/in.		1...17	1...17	2...17	2...17
Total Face Area (sq ft)		10.31	14.58	12.25	16.53
OUTDOOR FAN		Propeller Type			
Nominal Cfm		4000	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
INDOOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Acutrol Metering Device			
Rows...Fins/in.		2...15	2...15	3...15	3...15
Total Face Area (sq ft)		4.2	4.2	5.5	5.5
INDOOR 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	2400
Maximum Continuous Bhp	Std	.34	.75	1.20	2.40
	Alt	1.00	1.00	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	1075/970	—
	Alt	1620	1620	1725	—
	High-Static	1725	1725	1725	1725
Fan Rpm Range	Std	—	—	—	1070-1460
	Alt	760-1000	770-1175	878-1192	—
	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	2.4/3.4	—
	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	4.5	—
	High-Static	4.5	4.5	4.5	4.5
Belt, Quantity...Type...Length (in.)	Std	—	—	—	1...A...40
	Alt	1...A...34	1...A...34	1...A...39	—
	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	5	—
	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	856	932	1035	—
	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			
Cutout		428			
Reset (Auto.)		320			
LOSS-OF-CHARGE SWITCH (psig)					
Cutout		7 ± 3			
Reset (Auto.)		22 ± 7			
FREEZE-PROTECTION THERMOSTAT (F)					
Opens		30 ± 5			
Closes		45 ± 5			
OUTDOOR-AIR INLET SCREENS		Cleanable. Quantity and size depend on options selected.			
RETURN-AIR FILTERS		Throwaway			
Quantity...Size (in.)		2...16 x 25 x 2			

LEGEND

Bhp — Brake Horsepower

*Weight of 14-in. roof curb.
†Single phase/three phase.

NOTE: The 50TFQ units have a loss-of-charge switch located in the liquid line.

UNIT	STD UNIT WEIGHT		ECONOMI$ER IV WEIGHT		VERT. ECON IV W/ P.E. WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)	
	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG	LB	KG
50TFQ004	500	227	50	22.7	90	40.9	123	57	120	54	125	57	130	59
50TFQ005	520	236					130	59	125	57	130	53	135	61
50TFQ006	550	249					138	63	132	60	138	62	142	64
50TFQ007	590	268	↓	↓	↓	↓	148	68	142	64	148	67	152	69

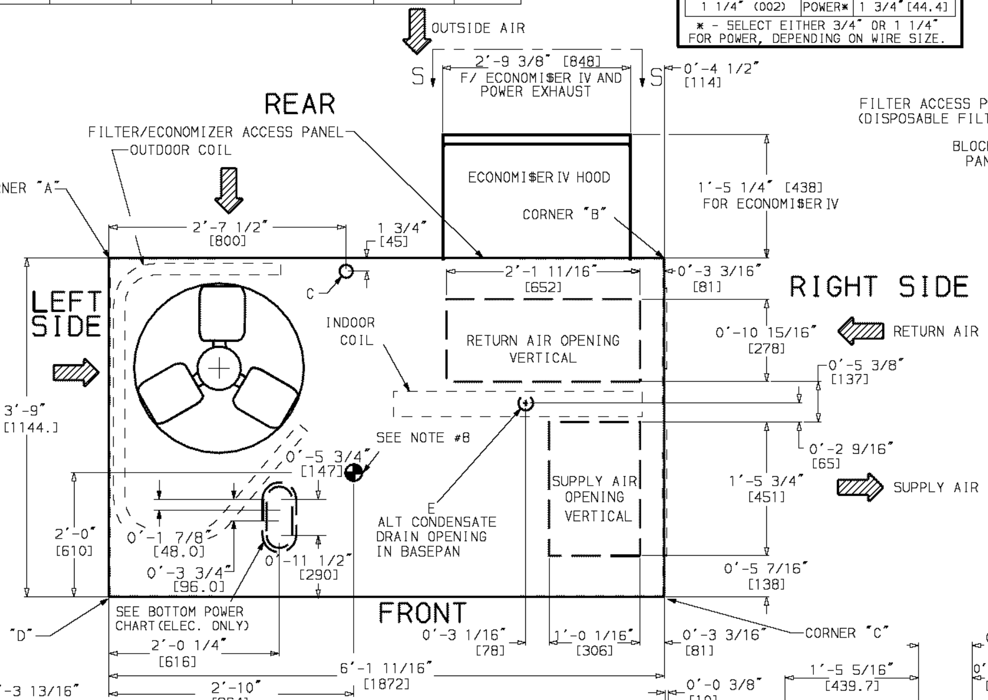
BOTTOM POWER CHART: THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGES – CRBTMPWR001A01, 2A01

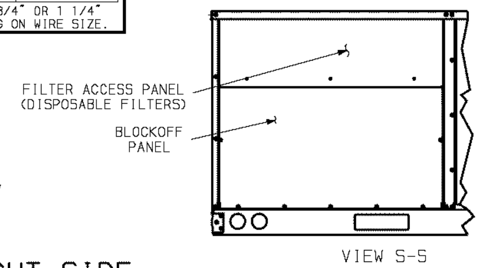
THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
1/2"	ACC.	7/8" [22.2]
1/2"	24V	7/8" [22.2]
3/4" (001)	POWER*	1 1/8" [28.4]
1 1/4" (002)	POWER*	1 3/4" [44.4]

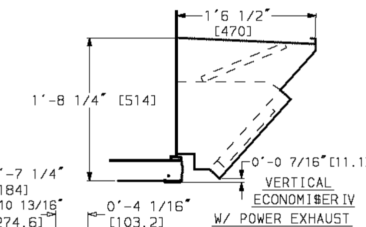
* – SELECT EITHER 3/4" OR 1 1/4" FOR POWER, DEPENDING ON WIRE SIZE.

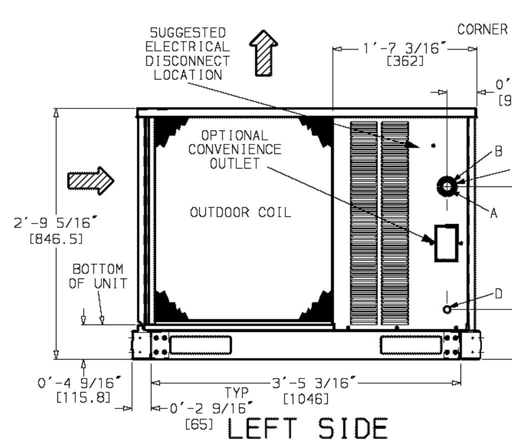
	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2" DIA. [51] POWER SUPPLY KNOCK-OUT
C	1 3/4" DIA. [44] CHARGING PORT HOLE
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	2 1/2" DIA. [64] POWER SUPPLY KNOCK-OUT

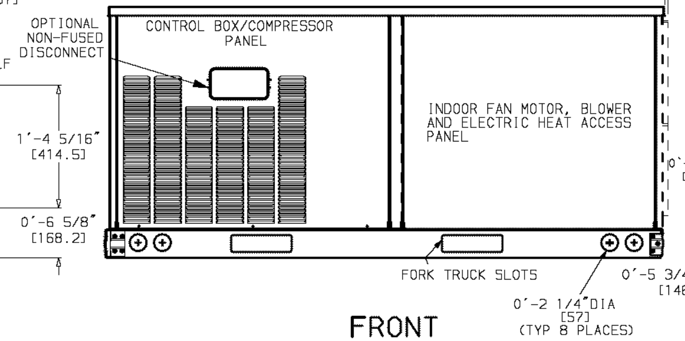
NOTES:
1. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. ⊕ CENTER OF GRAVITY.
3. ⇨ DIRECTION OF AIR FLOW.
4. DUCTWORK TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY.
5. MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BOTTOM TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES, ON HORIZONTAL DISCHARGE UNITS WITH ELECTRIC HEAT 1 INCH CLEARANCE TO DUCTWORK FOR 1 FOOT.
   b. OUTDOOR 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 OUTDOOR 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 OUTDOOR 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.











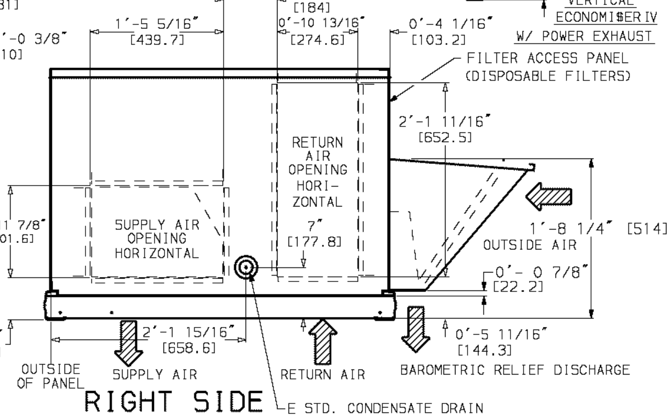


Fig. 6 — Base Unit Dimensions

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) 70 (latest year), 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 will be connected to a 208-v power supply, the transformer *must* be rewired by disconnecting the black wire from the 230-v terminal on the transformer and connecting it to the 200-v terminal from the transformer.

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

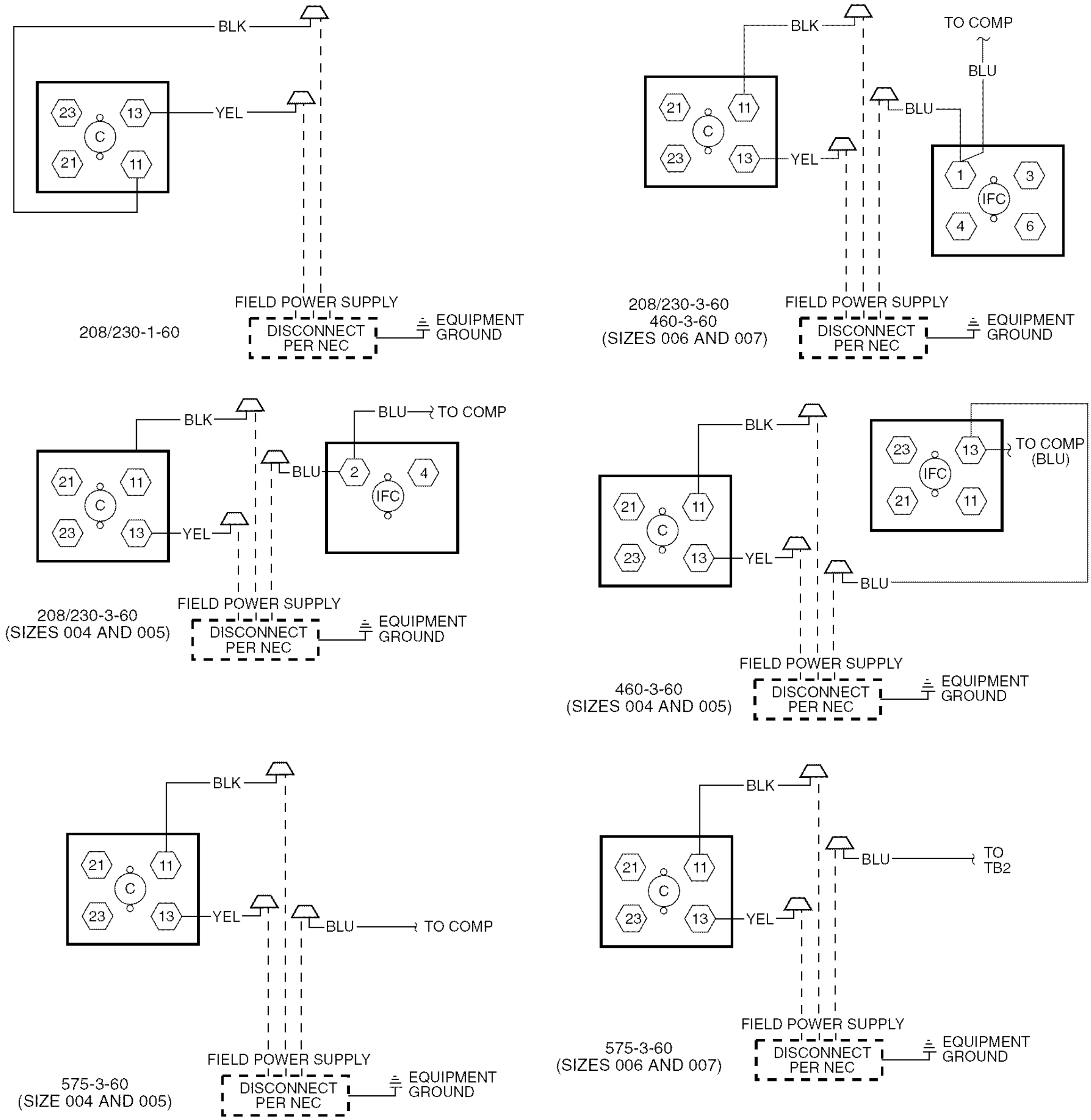
When installing units, provide a disconnect per the NEC. All field wiring must comply with the NEC and local requirements.

Install field wiring as follows:

1. Install conduit through the side panel openings. For units without electric heat, install conduit between the disconnect and control box.
2. Install power lines to terminal connections as shown in Fig. 7.
3. For units with electric heat, refer to Table 2 and Accessory Electric Heat Installation Instructions.

During operation, voltage to compressor terminals must be within the range indicated on the unit nameplate (also see Tables 3A and 3B). On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in Tables 3A and 3B and Note 2, on page 12 to determine the percentage of voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation invalidates any applicable Carrier warranty.

NOTE: If the unit is mounted on a roof curb and the electrical power will be run up "thru-the-bottom," be sure to choose the proper accessory kit shown in Fig. 1. This kit, available from your local distributor, ensures a reliable watertight connection. Refer to the thru-the-bottom accessory installation instructions for information on wiring the unit.



LEGEND

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

Fig. 7 — Power Wiring Connections

Table 2 — Electric Heating Capacities

50TFQ UNIT SIZE	VOLTAGE (60 Hz)	ACCESSORY kW	ACCESSORY HEATER PART NUMBER CRHEATER - - - A00	SINGLE POINT BOX PACKAGE NO. CRSINGLE---A00
004	208/230/240 (single phase)	3.3/ 4.0/ 4.4	001	—
		4.9/ 5.8/ 6.5	002	—†
		6.5/ 8.0/ 8.7	003	004
		7.9/ 9.6/10.5	004	004
		9.8/11.6/13.0*	002 & 002	004**
	208/230/240 (3 phase)	3.3/ 4.0/ 4.4	001	—
		4.9/ 5.8/ 6.5	002	—
		6.5/ 8.0/ 8.7	003	—
		7.9/ 9.6/10.5	004	—
		12.0/14.7/16.0	005	002
	460/480 (3 phase)	5.5/ 6.0	006	—
		8.1/ 8.8	007	—
		10.6/11.5	008	—
		12.9/14.0	009	—
005	208/230/240 (single phase)	3.3/ 4.0/ 4.4	001	—†
		6.5/ 8.0/ 8.7	003	004
		9.8/11.6/13.0*	002 & 002	004
		13.1/16.0/17.4*	003 & 003	005
		15.8/19.3/21.0*	004 & 004	005
	208/230/240 (3 phase)	4.9/ 5.8/ 6.5	002	—
		6.5/ 8.0/ 8.7	003	—
		12.0/14.7/16.0	005	002
		15.8/19.3/21.0*	004 & 004	003
	460/480 (3 phase)	5.5/ 6.0	006	—
		10.6/11.5	008	—
		12.9/14.0	009	—
		21.1/23.0*	008 & 008	—
006	208/230/240 (single phase)	4.9/ 5.8/ 6.5	002	004
		6.5/ 8.0/ 8.7	003	004
		9.8/11.6/13.0*	002 & 002	005
		13.1/16.0/17.4*	003 & 003	005
		15.8/19.3/21.0*	004 & 004	005
	208/230/240 (3 phase)	4.9/ 5.8/ 6.5	002	—
		7.9/ 9.6/10.5	004	—††
		12.0/14.7/16.0	005	002
		15.8/19.3/21.0*	004 & 004	003
		19.9/24.3/26.5*	004 & 005	003
	460/480 (3 phase)	5.5/ 6.0	006	—
		10.6/11.5	008	—
		12.9/14.0	009	—
		21.1/23.0*	008 & 008	—
		23.4/25.5*	008 & 009	—
007	208/230/240 (3 phase)	4.9/ 5.8/ 6.5	002	—***
		7.9/ 9.6/10.5	004	002
		12.0/14.7/16.0	005	002
		15.8/19.3/21.0*	004 & 004	003
		19.9/24.3/26.5*	004 & 006	003
	460/480 (3 phase)	5.5/ 6.0	006	—
		10.6/11.5	008	—
		12.9/14.0	009	—
		21.1/23.0*	008 & 008	—
		23.4/25.5*	008 & 009	—

*Two heater packages required to provide kW indicated.
†Use CRSINGLE004A00 for units with convenience outlet.
**Use CRSINGLE005A00 for units with convenience outlet.
††Use CRSINGLE002A00 for units with convenience outlet.
***Use CRSINGLE002A00 for units with high-static motor *and* convenience outlet.

NOTES:
1. The rated heater voltage is 240 and 480 v. If power distribution voltage varies from rated heater voltage, heater kW will vary accordingly.
2. To determine heater kW at voltages other than those shown in table, use the following formula:
   Heater kW new = Heater kW rated x (unit power distribution voltage/rated heater voltage)^2

   As an example:
   For a 16 kW heater rated at 240 v with a power distribution voltage of 215 v
   kW new = 16 kW (215/240)^2
   kW new = 12.8 kW (rating at 215 v)

Table 3A — Electrical Data (Units Without Electrical Convenience Outlet)

50TFQ UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE Min	VOLTAGE RANGE Max	COMPRESSOR (each) RLA	COMPRESSOR (each) LRA	OFM FLA	IFM FLA	ELECTRIC HEAT* Nominal kW**	ELECTRIC HEAT* FLA	POWER SUPPLY MCA	POWER SUPPLY MOCP	DISCONNECT SIZE† FLA	DISCONNECT SIZE† LRA
004 (3 Tons)	208/230-1-60	STD	187	254	16.4	96.0	1.5	3.1	—	—	25.5/ 25.5	30/ 30††	25/ 25	107/107
									3.3/ 4.4	15.9/18.3	45.4/ 48.4	50/ 50††	43/ 46	123/125
									4.9/ 6.5	23.6/27.1	55.0/ 59.4	60/ 60††	52/ 56	131/184
									6.5/ 8.7	31.3/36.3	64.6/ 70.9	70/ 80	61/ 66	138/143
									7.9/10.5	38.0/43.8	73.0/ 80.3	80/ 90	68/ 75	145/151
									9.8/13.0	47.1/54.2	84.4/ 93.3	90/100	79/ 87	154/161***
		ALT	187	254	16.4	96.0	1.5	4.9	—	—	26.9/ 26.9	30/ 30††	26/ 26	111/111
									3.3/ 4.4	15.9/18.3	46.8/ 49.8	50/ 50††	45/ 47	127/130
									4.9/ 6.5	23.6/27.1	56.4/ 60.8	60/ 70	53/ 57	135/138
									6.5/ 8.7	31.3/36.3	66.0/ 72.3	70/ 80	62/ 68	143/148
									7.9/10.5	38.0/43.8	74.4/ 81.7	80/ 90	70/ 77	149/155
									9.8/13.0	47.1/54.2	85.8/ 94.7	90/100	80/ 89	158/166***
	208/230-3-60	STD	187	254	10.2	75.0	1.5	3.1	—	—	17.8/ 17.8	20/ 20††	17/ 17	86/ 86
									3.3/ 4.4	9.2/10.6	29.3/ 31.0	30/ 35††	28/ 30	95/ 97
									4.9/ 6.5	13.6/15.6	34.8/ 37.3	35/ 40††	33/ 35	100/102
									6.5/ 8.7	18.0/20.9	40.3/ 43.9	45/ 45††	38/ 42	104/107
									7.9/10.5	21.9/25.3	45.1/ 49.4	50/ 50††	43/ 47	108/111
									12.0/16.0	33.3/38.5	59.4/ 65.9	60/ 70	56/ 62	119/124
		ALT	187	254	10.2	75.0	1.5	4.9	—	—	19.2/ 19.2	20/ 20††	19/ 19	90/ 90
									3.3/ 4.4	9.2/10.6	30.7/ 32.4	35/ 35††	30/ 31	100/101
									4.9/ 6.5	13.6/15.6	36.2/ 38.7	40/ 40††	35/ 37	104/106
									6.5/ 8.7	18.0/20.9	41.7/ 45.3	45/ 50††	40/ 43	108/111
									7.9/10.5	21.9/25.3	46.5/ 50.8	50/ 60††	44/ 48	112/116
									12.0/16.0	33.3/38.5	60.8/ 67.3	70/ 70	57/ 63	124/129
		HIGH-STATIC	187	254	10.2	75.0	1.5	5.8	—	—	20.1/ 20.1	25/ 25††	20/ 20	120/120
									3.3/ 4.4	9.2/10.6	31.6/ 33.3	35/ 35††	31/ 32	129/130
									4.9/ 6.5	13.6/15.6	37.1/ 39.6	40/ 40††	36/ 38	133/135
									6.5/ 8.7	18.0/20.9	42.6/ 46.2	45/ 50††	41/ 44	138/141
									7.9/10.5	21.9/25.3	47.4/ 51.7	50/ 60††	45/ 49	142/145
									12.0/16.0	33.3/38.5	61.7/ 68.2	70/ 70	58/ 64	153/158
	460-3-60	STD	414	508	4.8	40.0	0.8	1.7	—	—	8.1	15††	8	45
									6.0	7.2	17.1	20††	16	52
									8.8	10.6	21.4	25††	20	55
									11.5	13.8	25.4	30††	24	59
									14.0	16.8	29.1	30††	27	62
		ALT	414	508	4.8	40.0	0.8	2.1	—	—	8.9	15††	9	48
									6.0	7.2	17.9	20††	17	55
									8.8	10.6	22.2	25††	21	59
									11.5	13.8	26.2	30††	25	62
									14.0	16.8	29.9	30††	28	65
		HIGH-STATIC	414	508	4.8	40.0	0.8	2.6	—	—	9.4	15††	9	62
									6.0	7.2	18.4	20††	18	70
									8.8	10.6	22.7	25††	22	73
									11.5	13.8	26.7	30††	25	76
									14.0	16.8	30.4	35††	29	79
	575-3-60	STD	518	632	3.8	31.0	0.8	1.7	—	—	6.4	15††	6	35
		ALT	518	632	3.8	31.0	0.8	2.1	—	—	7.1	15††	7	37
		HIGH-STATIC	518	632	3.8	31.0	0.8	2.6	—	—	7.5	15††	7	49
005 (4 Tons)	208/230-1-60	STD	187	254	29.1	132.0	1.5	3.5	—	—	41.4/ 41.4	45/ 45††	39/ 39	143/143
									3.3/ 4.4	15.9/18.3	61.3/ 64.3	70/ 70	58/ 60	159/161
									6.5/ 8.7	31.3/36.3	80.5/ 86.8	90/ 90	75/ 81	174/179
									9.8/13.0	47.1/54.2	100.3/109.1	110/110	93/102	190/197
									13.1/17.4	63.0/72.5	120.1/132.0	125/150	112/123	206/215
									15.8/21.0	76.0/87.5	136.4/150.8	150/175	127/140	219/230
		ALT	187	254	29.1	132.0	1.5	4.9	—	—	42.8/ 42.8	45/ 45††	41/ 41	147/147
									3.3/ 4.4	15.9/18.3	62.7/ 65.7	70/ 70	59/ 62	163/166
									6.5/ 8.7	31.3/36.3	81.9/ 88.2	90/ 90	77/ 83	179/184
									9.8/13.0	47.1/54.2	107.7/110.5	110/125	95/103	194/202
									13.1/17.4	63.0/72.5	121.5/133.4	125/150	113/124	210/220
									15.8/21.0	76.0/87.5	137.8/152.2	150/175	128/141	223/235
	208/230-3-60	STD	187	254	16.8	91.0	1.5	3.5	—	—	26.0/ 26.0	30/ 30††	25/ 25	102/102
									4.9/ 6.5	13.6/15.6	43.0/ 45.5	45/ 50††	41/ 43	115/117
									6.5/ 8.7	18.0/20.9	48.5/ 52.1	50/ 60††	46/ 49	120/123
									12.0/16.0	33.3/38.5	67.6/ 74.1	70/ 80	63/ 69	135/140
									15.8/21.0	43.9/50.5	80.9/ 89.1	90/ 90	76/ 83	146/152
		ALT	187	254	16.8	91.0	1.5	4.9	—	—	27.4/ 27.4	30/ 30††	27/ 27	106/106
									4.9/ 6.5	13.6/15.6	44.4/ 46.9	45/ 50††	42/ 45	120/122
									6.5/ 8.7	18.0/20.9	49.9/ 53.5	50/ 60††	47/ 51	124/127
									12.0/16.0	33.3/38.5	69.0/ 75.5	70/ 80	65/ 71	140/145
									15.8/21.0	43.9/50.5	82.3/ 90.5	90/100	77/ 85	150/157
		HIGH-STATIC	187	254	16.8	91.0	1.5	5.8	—	—	28.3/ 28.3	30/ 30††	28/ 28	136/136
									4.9/ 6.5	13.6/15.6	45.3/ 47.8	50/ 50††	43/ 46	149/151
									6.5/ 8.7	18.0/20.9	50.8/ 54.4	60/ 60††	48/ 52	154/157
									12.0/16.0	33.3/38.5	69.9/ 76.4	70/ 80	66/ 72	169/174
									15.8/21.0	43.9/50.5	83.2/ 91.4	90/100	78/ 86	180/186***

NOTE: Legend and Notes for Electrical Data are on page 12.

Table 3A — Electrical Data (Units Without Electrical Convenience Outlet) (cont)

50TFQ UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (each)		OFM FLA	IFM FLA	ELECTRIC HEAT*		POWER SUPPLY		DISCONNECT SIZE†	
			Min	Max	RLA	LRA			Nominal kW**	FLA	MCA	MOCP	FLA	LRA
005 (4 Tons) (cont)	460-3-60	STD	414	508	8.4	50.0	0.8	1.8	—	—	13.1	15††	13	56
									6.0	7.2	22.1	25††	21	63
									11.5	13.8	30.4	35††	29	70
									14.0	16.8	34.1	35††	32	73
									23.0	27.7	47.7	50††	45	84
		ALT	414	508	8.4	50.0	0.8	2.1	—	—	13.4	15††	13	58
									6.0	7.2	22.4	25††	21	65
									11.5	13.8	30.7	35††	29	72
									14.0	16.8	34.4	35††	32	75
									23.0	27.7	48.0	50††	45	86
		HIGH-STATIC	414	508	8.4	50.0	0.8	2.6	—	—	13.9	15††	14	72
									6.0	7.2	22.9	25††	22	80
									11.5	13.8	31.2	35††	29	86
									14.0	16.8	34.9	35††	33	89
									23.0	27.7	48.5	50††	45	100
	575-3-60	STD	518	632	6.7	37.0	0.8	1.8	—	—	10.5	15††	10	42
		ALT	518	632	6.7	37.0	0.8	2.1	—	—	10.7	15††	10	43
		HIGH-STATIC	518	632	6.7	37.0	0.8	2.6	—	—	11.1	15††	11	55
006 (5 Tons)	208/230-1-60	STD	187	254	26.7	170.0	1.5	5.9	—	—	40.8/ 40.8	45/ 45††	39/ 39	184/184
									4.9/ 6.5	23.6/27.1	70.3/ 74.7	80/ 80	66/ 70	208/211
									6.5/ 8.7	31.3/36.3	79.9/ 86.2	80/ 90	75/ 81	215/220***
									9.8/13.0	47.1/54.2	99.7/108.5	100/110	93/102	231/238***
									13.1/17.4	63.0/72.5	119.5/131.4	125/150	112/123	247/257***
									15.8/21.0	76.0/87.5	135.8/150.2	150/175	127/140	260/272***
		ALT	187	254	26.7	170.0	1.5	8.8	—	—	48.5/ 48.5	50/ 50††	48/ 48	222/222
									4.9/ 6.5	23.6/27.1	78.0/ 82.4	80/ 90	75/ 79	246/249
									6.5/ 8.7	31.3/36.3	87.6/ 93.9	90/100	84/ 90	253/258***
									9.8/13.0	47.1/54.2	107.4/116.2	110/125	102/110	269/276***
									13.1/17.4	63.0/72.5	127.2/139.1	150/150	121/131	285/294***
									15.8/21.0	76.0/87.5	143.5/157.9	150/175	135/149	298/309***
	208/230-3-60	STD	187	254	15.4	124.0	1.5	5.9	—	—	26.7/ 26.7	30/ 30††	26/ 26	138/138
									4.9/ 6.5	13.6/15.6	43.7/ 46.2	45/ 50††	42/ 44	152/154
									7.9/10.5	21.9/25.3	54.0/ 58.3	60/ 60††	51/ 55	160/163
									12.0/16.0	33.3/38.5	68.3/ 74.8	70/ 80	65/ 70	171/177
									15.8/21.0	43.9/50.5	81.5/ 89.8	90/ 90	77/ 84	182/189***
									19.9/26.5	55.2/63.8	95.7/106.4	100/110	90/100	193/202***
		ALT	187	254	15.4	124.0	1.5	5.8	—	—	26.6/ 26.6	30/ 30††	26/ 26	169/169
									4.9/ 6.5	13.6/15.6	43.6/ 46.1	45/ 50††	42/ 44	182/184
									7.9/10.5	21.9/25.3	53.9/ 58.2	60/ 60	51/ 55	191/194
									12.0/16.0	33.3/38.5	68.2/ 74.7	70/ 80	64/ 70	202/207
									15.8/21.0	43.9/50.5	81.4/ 89.7	90/ 90	77/ 84	213/219***
									19.9/26.5	55.2/63.8	95.6/106.3	100/110	90/ 99	224/233***
		HIGH-STATIC	187	254	15.4	124.0	1.5	7.5	—	—	28.3/ 28.3	30/ 30††	28/ 28	188/188
									4.9/ 6.5	13.6/15.6	45.3/ 47.8	50/ 50††	44/ 46	201/203
									7.9/10.5	21.9/25.3	55.6/ 59.9	60/ 60††	53/ 57	210/213
									12.0/16.0	33.3/38.5	69.9/ 76.4	70/ 80	66/ 72	221/226
									15.8/21.0	43.9/50.5	83.1/ 91.4	90/100	79/ 86	232/238***
									19.9/26.5	55.2/63.8	97.3/108.0	100/110	92/101	243/252***
	460-3-60	STD	414	508	7.7	59.6	0.8	3.2	—	—	13.6	15††	13	67
									6.0	7.2	22.6	25††	22	75
									11.5	13.8	30.9	35††	29	81
									14.0	16.8	34.6	35††	33	84
									23.0	27.7	48.3	50††	45	95
									25.5	30.7	52.0	60††	49	98
		ALT	414	508	7.7	59.6	0.8	2.6	—	—	13.0	15††	13	82
									6.0	7.2	22.0	25††	21	89
									11.5	13.8	30.3	35††	29	96
									14.0	16.8	34.0	35††	32	99
									23.0	27.7	47.7	50††	45	110
									25.5	30.7	51.4	60††	48	113
		HIGH-STATIC	414	508	7.7	59.6	0.8	3.4	—	—	13.8	15††	14	92
									6.0	7.2	22.8	25††	22	99
									11.5	13.8	31.1	35††	30	105
									14.0	16.8	34.8	35††	33	108
									23.0	27.7	48.5	50††	46	119
									25.5	30.7	52.2	60††	49	122
	575-3-60	STD	518	632	6.2	49.4	0.8	3.2	—	—	11.0	15††	11	56
		ALT	518	632	6.2	49.4	0.8	2.6	—	—	10.5	15††	10	67
		HIGH-STATIC	518	632	6.2	49.4	0.8	3.4	—	—	11.1	15††	11	75

NOTE: Legend and Notes for Electrical Data are on page 12.

Table 3A — Electrical Data (Units Without Electrical Convenience Outlet) (cont)

50TFQ UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (each)		OFM FLA	IFM FLA	ELECTRIC HEAT*		POWER SUPPLY		DISCONNECT SIZE†	
			Min	Max	RLA	LRA			Nominal kW**	FLA	MCA	MOCP	FLA	LRA
007 (6 Tons)	208/230-3-60	STD	187	254	22.7	146.0	1.4	5.8	—	—	35.6/ 35.6	40/ 40††	34/ 34	190/190
									4.9/ 6.5	13.6/15.6	52.6/ 55.1	60/ 60††	50/ 52	204/206
									7.9/10.5	21.9/25.3	63.0/ 67.2	70/ 70	60/ 63	212/215
									12.0/16.0	33.3/38.5	77.2/ 83.7	80/ 90	73/ 79	223/229
									15.8/21.0	43.9/50.5	90.5/ 98.7	100/100	85/ 92	234/241***
									19.9/26.5	55.2/63.8	104.6/115.3	110/125	98/108	245/254***
		HIGH-STATIC	187	254	22.7	146.0	1.4	7.5	—	—	37.3/ 37.3	40/ 40††	36/ 36	209/209
									4.9/ 6.5	13.6/15.6	54.3/ 56.8	60/ 60††	52/ 54	223/225
									7.9/10.5	21.9/25.3	64.7/ 68.9	70/ 70	62/ 65	231/234
									12.0/16.0	33.3/38.5	78.9/ 85.4	80/ 90	75/ 81	242/248***
									15.8/21.0	43.9/50.5	92.2/100.4	100/110	87/ 94	253/260***
									19.9/26.5	55.2/63.8	106.3/117.0	110/125	100/110	264/273***
	460-3-60	STD	414	508	11.4	73.0	0.7	2.6	—	—	17.6	20††	17	95
									6.0	7.2	26.6	30††	25	102
									11.5	13.8	34.8	35††	33	109
									14.0	16.8	38.6	40††	36	112
									23.0	27.7	52.2	60††	49	123
									25.5	30.7	55.9	60††	52	126
		HIGH-STATIC	414	508	11.4	73.0	0.7	3.4	—	—	18.4	20††	18	105
									6.0	7.2	27.4	30††	26	112
									11.5	13.8	35.6	40††	34	118
									14.0	16.8	39.4	40††	37	121
									23.0	27.7	53.0	60††	50	132
									25.5	30.7	56.7	60††	53	135
	575-3-60	STD	518	632	9.1	58.4	0.7	2.6	—	—	14.0	15††	14	76
		HIGH-STATIC	518	632	9.1	58.4	0.7	3.4	—	—	14.7	15††	14	84

LEGEND

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

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*Heaters are field installed only.
†Used to determine minimum disconnect size per NEC.
**Heater capacity (kW) is based on heater voltage of 208 v, 240 v and 480 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.
††Fuse or HACR circuit breaker.
***Optional disconnect switch is unavailable.

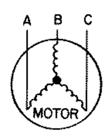
NOTES:

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

Table 3B — Electrical Data (Units With Electrical Convenience Outlet)

50TFQ UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (each)		OFM FLA	IFM FLA	ELECTRIC HEAT*		POWER SUPPLY		DISCONNECT SIZE†	
			Min	Max	RLA	LRA			Nominal kW**	FLA	MCA	MOCP	FLA	LRA
004 (3 Tons)	208/230-1-60	STD	187	254	16.4	96.0	1.5	3.1	—	—	30.3/ 30.3	35/ 35††	30/ 30	112/112
									3.3/ 4.4	15.9/18.3	50.2/ 53.2	60/ 60††	48/ 51	128/130
									4.9/ 6.5	23.6/27.1	59.8/ 64.2	60/ 70	57/ 61	135/139
									6.5/ 8.7	31.3/36.3	69.4/ 75.7	70/ 80	66/ 72	143/148
									7.9/10.5	38.0/43.8	77.8/ 85.1	80/ 90	74/ 81	150/156***
									9.8/13.0	47.1/54.2	89.2/ 98.1	90/100	84/ 92	159/166***
		ALT	187	254	16.4	96.0	1.5	4.9	—	—	31.7/ 31.7	35/ 35††	32/ 32	116/116
									3.3/ 4.4	15.9/18.3	51.6/ 54.6	60/ 60††	50/ 53	132/134
									4.9/ 6.5	23.6/27.1	61.2/ 65.6	70/ 70	59/ 63	140/143
									6.5/ 8.7	31.3/36.3	70.8/ 77.1	80/ 80	68/ 73	147/152
									7.9/10.5	38.0/43.8	79.2/ 86.5	80/ 90	75/ 82	154/160***
									9.8/13.0	47.1/54.2	90.6/ 99.5	100/110	86/ 94	163/170***
	208/230-3-60	STD	187	254	10.2	75.0	1.5	3.1	—	—	22.6/ 22.6	25/ 25††	23/ 23	91/ 91
									3.3/ 4.4	9.2/10.6	34.1/ 35.8	35/ 40††	34/ 35	100/101
									4.9/ 6.5	13.6/15.6	39.6/ 42.1	40/ 45††	39/ 41	104/106
									8.5/ 8.7	18.0/20.9	45.1/ 48.7	50/ 50††	44/ 47	109/112
									7.9/10.5	21.9/25.3	49.9/ 54.2	50/ 60††	48/ 52	113/116
									12.0/16.0	33.3/38.5	64.2/ 70.7	70/ 80††	61/ 67	124/129
		ALT	187	254	10.2	75.0	1.5	4.9	—	—	24.0/ 24.0	30/ 30††	25/ 25	95/ 95
									3.3/ 4.4	9.2/10.6	35.5/ 37.2	40/ 40††	35/ 37	104/106
									4.9/ 6.5	13.6/15.6	41.0/ 43.5	45/ 45††	40/ 43	109/111
									6.5/ 8.7	18.0/20.9	46.5/ 50.1	50/ 60††	45/ 49	113/116
									7.9/10.5	21.9/25.3	51.3/ 55.6	60/ 60††	50/ 54	117/120
									12.0/16.0	33.3/38.5	65.6/ 72.1	70/ 80	63/ 69	128/134
		HIGH-STATIC	187	254	10.2	75.0	1.5	5.8	—	—	24.9/ 24.9	25/ 25††	26/ 26	125/125
									3.3/ 4.4	9.2/10.6	36.4/ 38.1	40/ 40††	36/ 38	134/135
									4.9/ 6.5	13.6/15.6	41.9/ 44.4	45/ 45††	41/ 44	138/140
									6.5/ 8.7	18.0/20.9	47.4/ 51.0	50/ 60††	46/ 50	143/145
									7.9/10.5	21.9/25.3	52.2/ 56.5	60/ 60††	51/ 55	146/150
									12.0/16.0	33.3/38.5	66.5/ 73.0	70/ 80	64/ 70	158/163
	460-3-60	STD	414	508	4.8	40.0	0.8	1.7	—	—	10.3	15††	10	47
									6.0	7.2	19.3	20††	19	54
									8.8	10.6	23.5	25††	23	58
									11.5	13.8	27.5	30††	26	61
									14.0	16.8	31.3	35††	30	64
		ALT	414	508	4.8	40.0	0.8	2.1	—	—	11.1	15††	11	50
									6.0	7.2	20.1	25††	20	57
									8.8	10.6	24.3	25††	24	61
									11.5	13.8	28.3	30††	27	64
									14.0	16.8	32.1	35††	31	67
		HIGH-STATIC	414	508	4.8	40.0	0.8	2.6	—	—	11.6	15††	12	65
									6.0	7.2	20.6	25††	20	72
									8.8	10.6	24.8	25††	24	75
									11.5	13.8	28.8	30††	28	78
									14.0	16.8	32.6	35††	31	81
	575-3-60	STD	518	632	3.8	31.0	0.8	1.7	—	—	8.2	15††	8	37
		ALT	518	632	3.8	31.0	0.8	2.1	—	—	8.8	15††	9	39
		HIGH-STATIC	518	632	3.8	31.0	0.8	2.6	—	—	9.2	15††	9	51
005 (4 Tons)	208/230-1-60	STD	187	254	29.1	132.0	1.5	3.5	—	—	46.2/ 46.2	50/ 50††	45/ 45	148/148
									3.3/ 4.4	15.9/18.3	66.1/ 69.1	70/ 70	63/ 66	163/166
									6.5/ 8.7	31.3/36.3	85.3/ 91.6	90/100	81/ 86	179/184
									9.8/13.0	47.1/54.2	105.1/113.9	110/125	99/107	195/202
									13.1/17.4	63.0/72.5	124.1/136.8	125/150	117/128	211/220
									15.8/21.0	76.0/87.5	141.2/155.6	150/175	132/145	224/235
		ALT	187	254	29.1	132.0	1.5	4.9	—	—	47.6/ 47.6	50/ 50††	46/ 46	152/152
									3.3/ 4.4	15.9/18.3	67.5/ 70.5	70/ 80	65/ 67	168/170
									6.5/ 8.7	31.3/36.3	86.7/ 93.0	90/100	82/ 88	183/188
									9.8/13.0	47.1/54.2	106.5/115.3	110/125	101/109	199/206
									13.1/17.4	63.0/72.5	126.3/138.2	150/150	119/130	215/225
									15.8/21.0	76.0/87.5	142.6/157.0	150/175	134/147	228/240
	208/230-3-60	STD	187	254	16.8	91.0	1.5	3.5	—	—	30.8/ 30.8	35/ 35††	31/ 31	107/107
									4.9/ 6.5	13.6/15.6	47.8/ 50.3	50/ 60††	46/ 49	120/122
									6.5/ 8.7	18.0/20.9	53.3/ 56.9	60/ 60††	51/ 55	125/127
									12.0/16.0	33.3/38.5	72.4/ 78.9	80/ 80	69/ 75	140/145
									15.8/21.0	43.9/50.5	85.7/ 93.9	90/100	81/ 89	150/157
		ALT	187	254	16.8	91.0	1.5	4.9	—	—	32.2/ 32.2	35/ 35††	32/ 32	111/111
									4.9/ 6.5	13.6/15.6	49.2/ 51.7	50/ 60††	48/ 50	125/127
									6.5/ 8.7	18.0/20.9	54.7/ 58.3	60/ 60††	53/ 56	129/132
									12.0/16.0	33.3/38.5	73.8/ 80.3	80/ 90	71/ 76	144/150
									15.8/21.0	43.9/50.5	87.1/ 95.3	90/100	83/ 90	155/162
		HIGH-STATIC	187	254	16.8	91.0	1.5	5.8	—	—	33.1/ 33.1	35/ 35††	33/ 33	141/141
									4.9/ 6.5	13.6/15.6	50.1/ 52.6	60/ 60††	49/ 51	154/156
									6.5/ 8.7	18.0/20.9	55.6/ 59.2	60/ 60††	54/ 57	159/161
									12.0/16.0	33.3/38.5	74.7/ 81.2	80/ 90	72/ 78	174/179
									15.8/21.0	43.9/50.5	88.0/ 96.2	90/100	84/ 91	184/191***

NOTE: Legend and Notes for Electrical Data are on page 15.

Table 3B — Electrical Data (Units With Electrical Convenience Outlet) (cont)

50TFQ UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (each)		OFM FLA	IFM FLA	ELECTRIC HEAT*		POWER SUPPLY		DISCONNECT SIZE†	
			Min	Max	RLA	LRA			Nominal kW**	FLA	MCA	MOCP	FLA	LRA
005 (4 Tons) (cont)	460-3-60	STD	414	508	8.4	50.0	0.8	1.8	—	—	15.3	20††	15	58
									6.0	7.2	24.3	25††	23	66
									11.5	13.8	32.5	35††	31	72
									14.0	16.8	36.3	40††	34	75
									23.0	27.7	49.9	50††	47	86
		ALT	414	508	8.4	50.0	0.8	2.1	—	—	15.6	20††	15	60
									6.0	7.2	24.6	25††	24	67
									11.5	13.8	32.8	35††	31	74
									14.0	16.8	36.6	40††	35	77
									23.0	27.7	50.2	60††	47	88
		HIGH-STATIC	414	508	8.4	50.0	0.8	2.6	—	—	16.1	20††	16	75
									6.0	7.2	25.1	30††	24	82
									11.5	13.8	33.3	35††	32	88
									14.0	16.8	37.1	40††	35	91
									23.0	27.7	50.7	60††	48	102
	575-3-60	STD	518	632	6.7	37.0	0.8	1.8	—	—	12.2	15††	12	44
		ALT	518	632	6.7	37.0	0.8	2.1	—	—	12.4	15††	12	45
		HIGH-STATIC	518	632	6.7	37.0	0.8	2.6	—	—	12.8	15††	13	57
006 (5 Tons)	208/230-1-60	STD	187	254	26.7	170.0	1.5	5.9	—	—	45.6/ 45.6	50/ 50††	45/ 45	189/189
									4.9/ 6.5	23.6/27.1	75.1/ 79.5	80/ 80	72/ 76	213/216
									6.5/ 8.7	31.3/36.3	84.7/ 91.0	90/100	81/ 86	220/225***
									9.8/13.0	47.1/54.2	104.3/113.3	110/125	99/107	236/243***
									13.1/17.4	63.0/72.5	124.3/136.2	125/150	117/128	252/261***
									15.8/21.0	76.0/87.5	140.6/155.0	150/175	132/145	265/276***
		ALT	187	254	26.7	170.0	1.5	8.8	—	—	48.5/ 48.5	50/ 50††	48/ 48	222/222
									4.9/ 6.5	23.6/27.1	78.0/ 82.4	80/ 90	75/ 79	246/249
									6.5/ 8.7	31.3/36.3	87.6/ 93.9	90/100	84/ 90	253/258***
									9.8/13.0	47.1/54.2	107.4/116.2	110/125	102/110	269/276***
									13.1/17.4	63.0/72.5	127.2/139.1	150/150	121/131	285/294***
									15.8/21.0	76.0/87.5	143.5/157.9	150/175	135/149	298/309***
	208/230-3-60	STD	187	254	15.4	124.0	1.5	5.9	—	—	31.5/ 31.5	35/ 40††	32/ 32	143/143
									4.9/ 6.5	13.6/15.6	48.5/ 51.0	50/ 60††	47/ 50	157/159
									7.9/10.5	21.9/25.3	58.8/ 63.1	60/ 70	57/ 61	165/168
									12.0/16.0	33.3/38.5	73.1/ 79.6	80/ 90	70/ 76	176/181
									15.8/21.0	43.9/50.5	86.3/ 94.6	90/100	82/ 90	187/193***
									19.9/26.5	55.2/63.8	100.5/111.2	110/125	95/105	198/207***
		ALT	187	254	15.4	124.0	1.5	5.8	—	—	31.4/ 31.4	35/ 35††	32/ 32	174/174
									4.9/ 6.5	13.6/15.6	48.4/ 50.9	50/ 60††	47/ 50	187/189
									7.9/10.5	21.9/25.3	58.7/ 63.0	60/ 70	57/ 61	195/199
									12.0/16.0	33.3/38.5	73.0/ 79.5	80/ 80	70/ 76	207/212
									15.8/21.0	43.9/50.5	86.2/ 94.5	90/100	82/ 90	217/224***
									19.9/26.5	55.2/63.8	100.4/111.1	110/125	95/105	229/237***
		HIGH-STATIC	187	254	15.4	124.0	1.5	7.5	—	—	33.1/ 33.1	35/ 35††	34/ 34	193/193
									4.9/ 6.5	13.6/15.6	50.1/ 52.6	60/ 60††	49/ 52	206/208
									7.9/10.5	21.9/25.3	60.4/ 64.7	70/ 70	59/ 63	214/218
									12.0/16.0	33.3/38.5	74.7/ 81.2	80/ 80	72/ 78	226/231
									15.8/21.0	43.9/50.5	87.9/ 96.2	90/100	84/ 92	236/243***
									19.9/26.5	55.2/63.8	102.1/112.8	110/125	97/107	248/256***
	460-3-60	STD	414	508	7.7	59.6	0.8	3.2	—	—	15.8	20††	16	70
									6.0	7.2	24.8	25††	24	77
									11.5	13.8	33.1	35††	32	83
									14.0	16.8	36.8	40††	35	86
									23.0	27.7	50.4	60††	48	97
									25.5	30.7	54.2	60††	51	100
		ALT	414	508	7.7	59.6	0.8	2.6	—	—	15.2	20††	15	84
									6.0	7.2	24.2	25††	24	91
									11.5	13.8	32.5	35††	31	98
									14.0	16.8	36.2	40††	35	101
									23.0	27.7	49.8	60††	47	112
									25.5	30.7	53.6	60††	51	115
		HIGH-STATIC	414	508	7.7	59.6	0.8	3.4	—	—	16.0	20††	16	94
									6.0	7.2	25.0	25††	24	101
									11.5	13.8	33.3	35††	32	107
									14.0	16.8	37.0	40††	36	110
									23.0	27.7	50.6	60††	48	121
									25.5	30.7	54.4	60††	51	124
	575-3-60	STD	518	632	6.2	49.4	0.8	3.2	—	—	12.7	15††	13	57
		ALT	518	632	6.2	49.4	0.8	2.6	—	—	12.2	15††	12	69
		HIGH-STATIC	518	632	6.2	49.4	0.8	3.4	—	—	12.9	15††	13	77

NOTE: Legend and Notes for Electrical Data are on page 15.

Table 3B — Electrical Data (Units With Electrical Convenience Outlet) (cont)

50TFQ UNIT SIZE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (each)		OFM FLA	IFM FLA	ELECTRIC HEAT*		POWER SUPPLY		DISCONNECT SIZE†	
			Min	Max	RLA	LRA			Nominal kW**	FLA	MCA	MOCP	FLA	LRA
007 (6 Tons)	208/230-3-60	STD	187	254	22.7	146.0	1.4	5.8	—	—	40.4/ 40.4	45/ 45††	40/ 40	195/195
									4.9/ 6.5	13.6/15.6	57.4/ 59.9	60/ 60††	56/ 58	208/211
									7.9/10.5	21.9/25.3	67.8/ 72.0	70/ 80	65/ 69	217/220
									12.0/16.0	33.3/38.5	82.0/ 88.5	90/ 90	78/ 84	228/233***
									15.8/21.0	43.9/50.5	95.3/103.5	100/110	90/ 98	239/245***
									19.9/26.5	55.2/63.8	109.4/120.1	110/125	103/113	250/259***
		HIGH-STATIC	187	254	22.7	146.0	1.4	7.5	—	—	42.1/ 42.1	45/ 45††	42/ 42	214/214
									4.9/ 6.5	13.6/15.6	59.1/ 61.6	60/ 70	58/ 60	227/229
									7.9/10.5	21.9/25.3	69.5/ 73.7	70/ 80	67/ 71	236/239
									12.0/16.0	33.3/38.5	83.7/ 90.2	90/100	80/ 86	247/252***
									15.8/21.0	43.9/50.5	97.0/105.2	100/110	92/100	258/264***
									19.9/26.5	55.2/63.8	111.1/121.8	125/125	105/115	269/278***
	460-3-60	STD	414	508	11.4	73.0	0.7	2.6	—	—	19.7	20††	19	97
									6.0	7.2	28.7	30††	28	104
									11.5	13.8	37.0	40††	35	111
									14.0	16.8	40.7	45††	39	114
									23.0	27.7	54.4	60††	51	125
									25.5	30.7	58.1	60††	55	128
		HIGH-STATIC	414	508	11.4	73.0	0.7	3.4	—	—	20.5	25††	20	107
									6.0	7.2	29.5	30††	29	114
									11.5	13.8	37.8	40††	36	121
									14.0	16.8	41.5	45††	40	124
									23.0	27.7	55.2	60††	52	134
									25.5	30.7	58.9	60††	56	137
	575-3-60	STD	518	632	9.1	58.4	0.7	2.6	—	—	15.8	20††	16	78
		HIGH-STATIC	518	632	9.1	58.4	0.7	3.4	—	—	16.4	20††	16	85

LEGEND

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

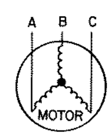
*Heaters are field installed only.
†Used to determine minimum disconnect size per NEC.
**Heater capacity (kW) is based on heater voltage of 208 v, 240 v and 480 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.
††Fuse or HACR circuit breaker.
***Optional disconnect switch is unavailable.

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

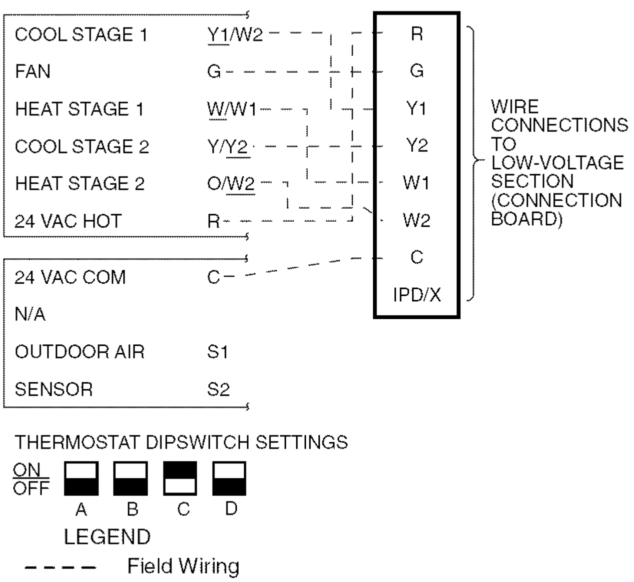
FIELD CONTROL WIRING — Install a Carrier-approved accessory thermostat assembly according to installation instructions included with the accessory. Locate the thermostat assembly on a solid wall in the conditioned space to sense average temperature.

NOTE: If using a Carrier electronic thermostat, set the thermostat configuration for "non-heat pump operation." This family of products does not require an O terminal to energize the reversing valve.

Route the thermostat cable or equivalent single leads of colored wire from the subbase terminals to the low-voltage connections on the unit (shown in Fig. 8 and 9) as described in Steps 1 through 3 below.

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.

1. Connect the thermostat wires to the screw terminals of the low voltage connection board.



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

Fig. 8 — Low-Voltage Connections With or Without Economizer or Two-Position Damper

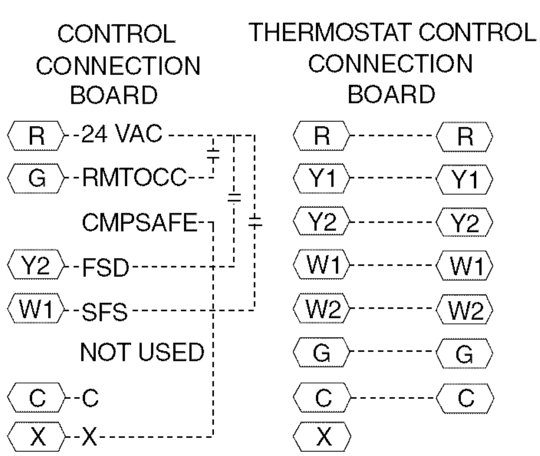


Fig. 9 — Low Voltage Connections (Units with PremierLink™ Controls)

2. Pass the control wires through the hole provided in the corner post.
3. Feed the wire 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 the high-voltage and low-voltage wiring.

DEFROST BOARD — The defrost board timer is set for a 30 minute defrost cycle from the factory. To adjust to a 50 or 90 minute cycle, remove the wire connected to the 30 minute quick connect on the defrost board. See Fig. 11. Connect the lead to the 50 or 90 minute quick connect on the defrost board, depending on the application.

HEAT ANTICIPATOR SETTINGS — Set the first-stage heat anticipator setting at 0.8 and set the second-stage heat anticipator setting at 0.3.

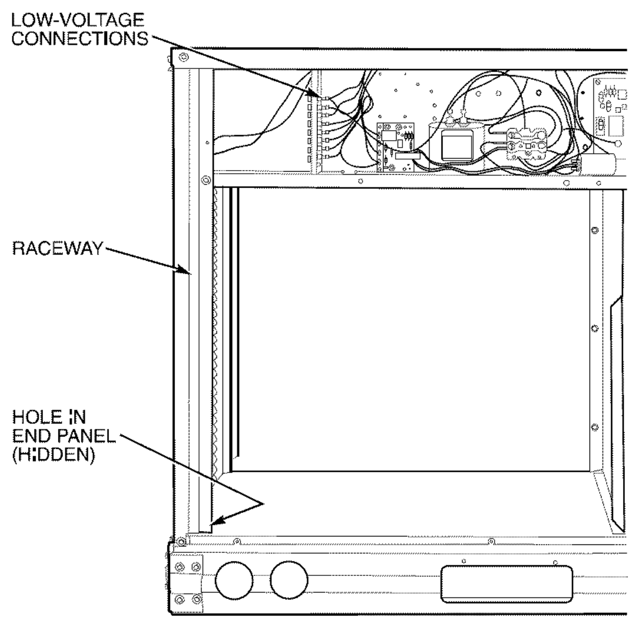


Fig. 10 — Field Control Wiring Raceway

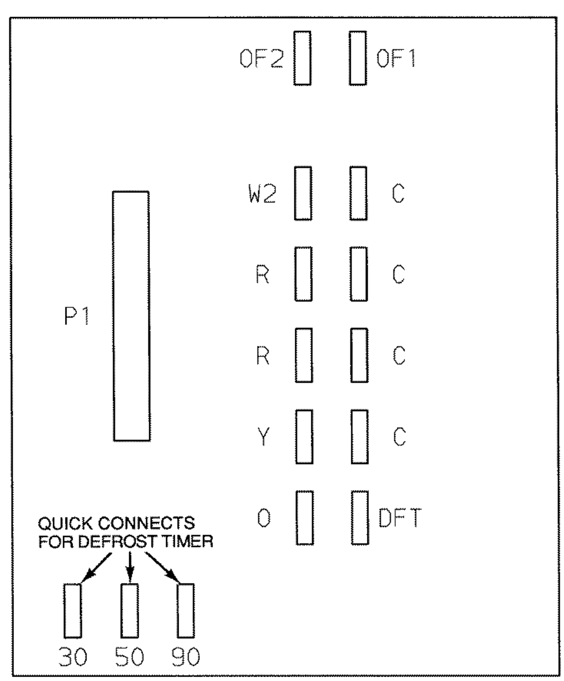


Fig. 11 — Defrost Board

Step 6 — Adjust Factory-Installed Options

DISCONNECT SWITCH — The optional disconnect switch is non-fused. The switch can be locked in place for safety purposes. The disconnect switch is only available for limited applications. See electrical data tables on pages 10-15 for disconnect switch usage.

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.

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 the amount of ventilation required for building. Record the amount for use in Step 8.
2. Remove the filter access panel by raising the panel and swinging it outward. The panel is now disengaged from the track and can be removed. No tools are required to remove the filter access panel. Remove the outdoor-air opening panel. Save the panels and screws. See Fig. 12.
3. Separate the hood and screen from the basepan by removing the screws and brackets securing them. Save all screws and discard the brackets.
4. Replace the outdoor air opening panel.
5. Place the hood on the front of the outdoor air opening panel. See Fig. 13 for hood details. Secure the top of the hood with the 6 screws removed in Step 3. See Fig. 14.
6. Remove and save the 8 screws (4 on each side) from the sides of the manual outdoor-air damper.
7. Align the screw holes on the hood with the screw holes on the side of the manual outdoor-air damper. See Fig. 13 and 14. Secure the hood with the 8 screws from Step 6.
8. Adjust the minimum position setting of the damper blade by adjusting the manual outdoor-air adjustment screws on the front of the damper blade. See Fig. 12. Slide the blade vertically until it is in the appropriate position determined by Fig. 15. Tighten the screws.
9. Remove and save the screws currently on the sides of hood. Insert the screen. Secure the screen to the hood using the screws. See Fig. 14.
10. Replace the filter access panel. Ensure that the filter access panel slides along the tracks and is securely engaged.

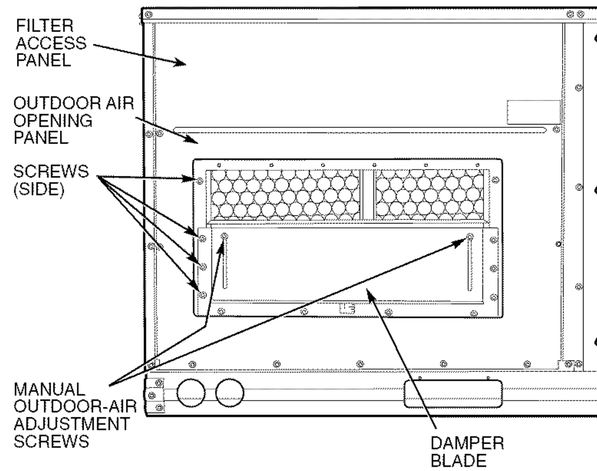


Fig. 12 — Damper Panel with Manual Outdoor-Air Damper Installed

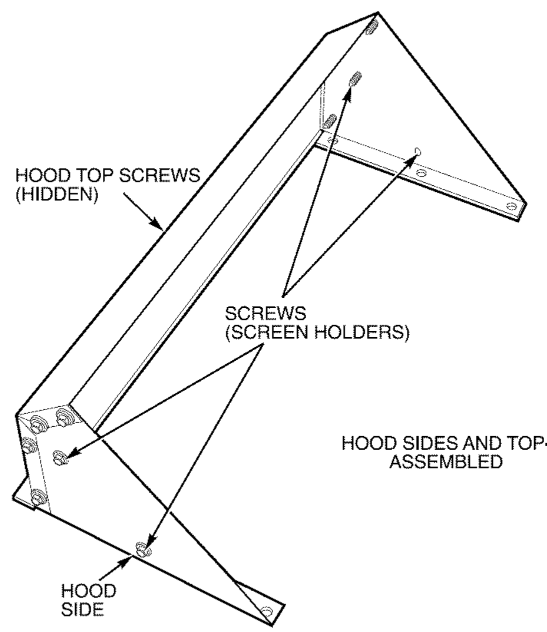


Fig. 13 — Outdoor-Air Hood Details

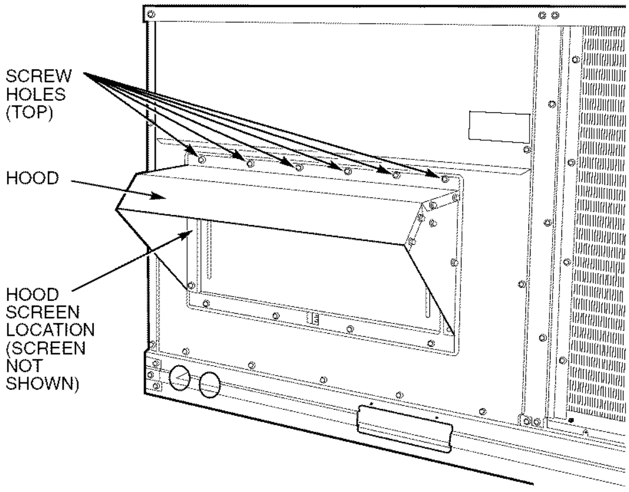


Fig. 14 — Optional Manual Outdoor-Air Damper with Hood Attached

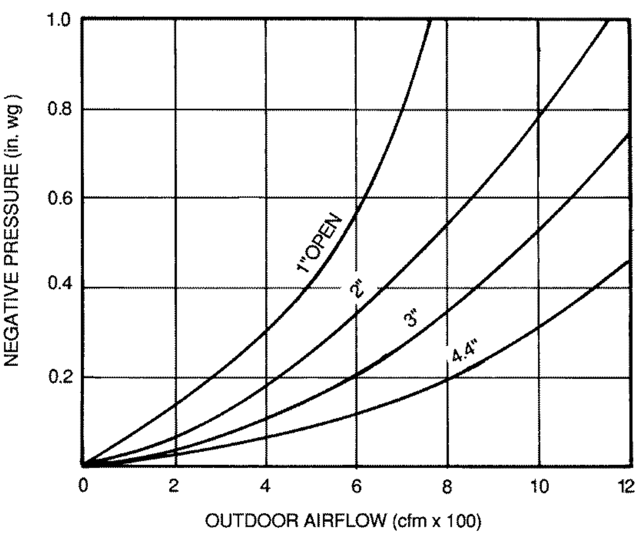


Fig. 15 — Outdoor Air Damper Position Setting

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. 16 and 17) 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 4 for sensor usage. Refer to Fig. 18 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 (OAT) sensor 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.

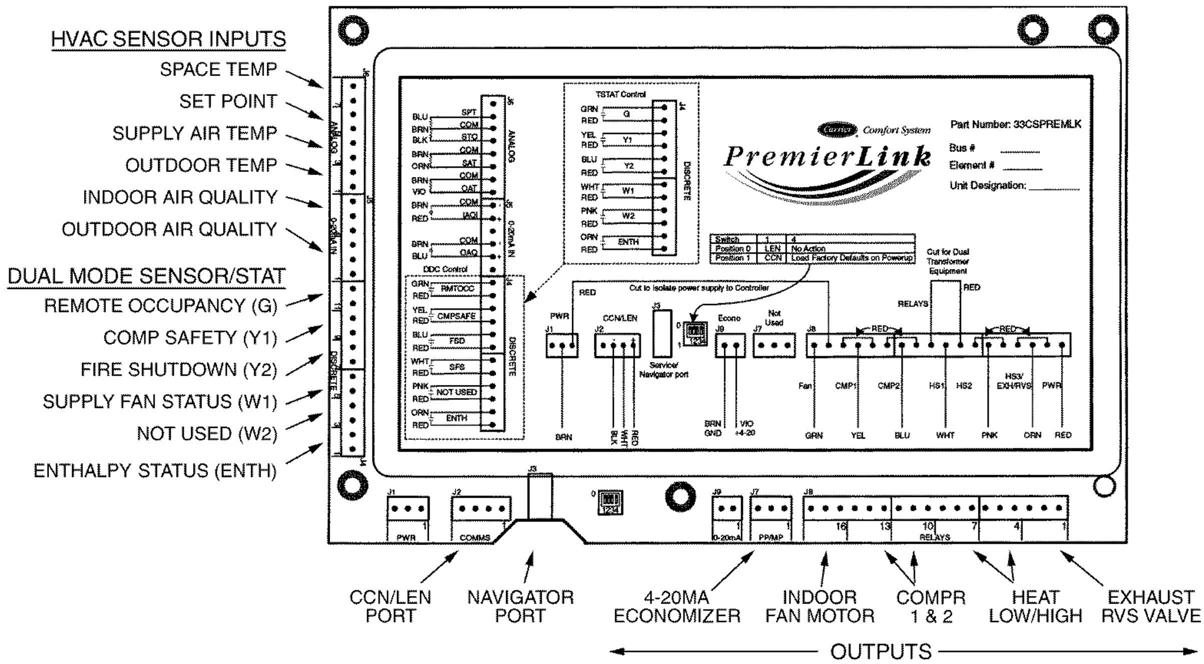


Fig. 16 — PremierLink™ Controller

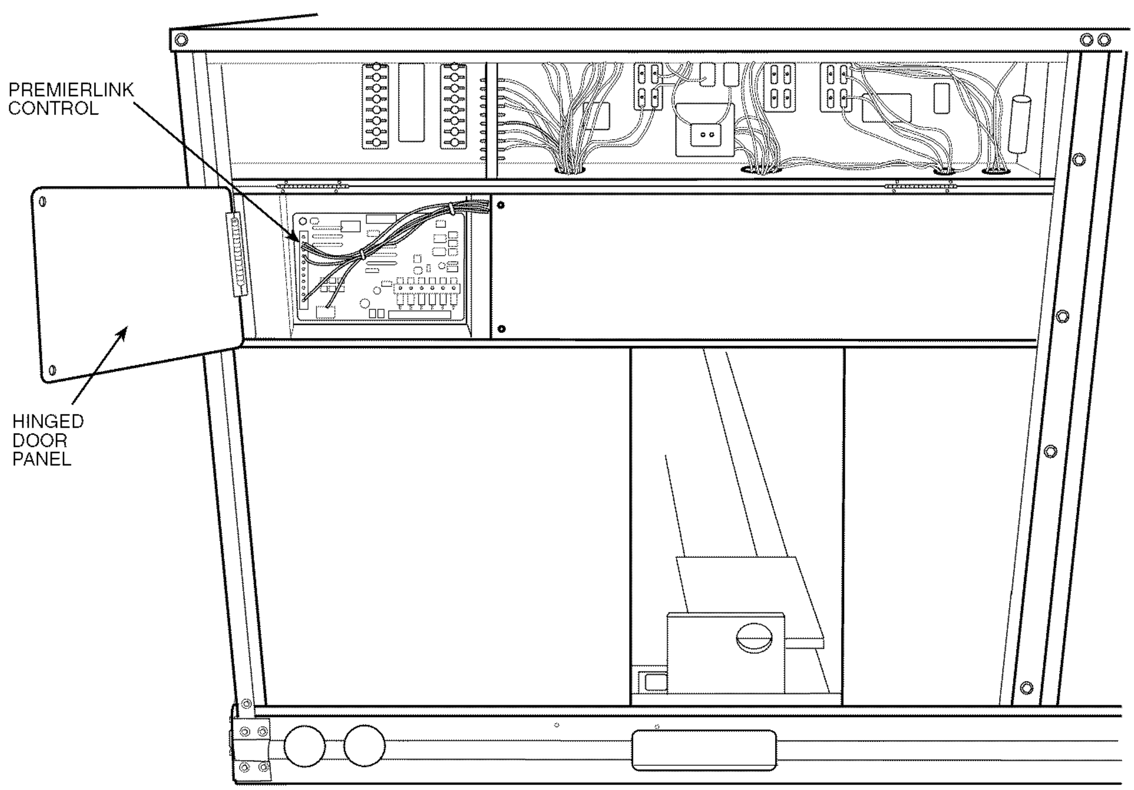


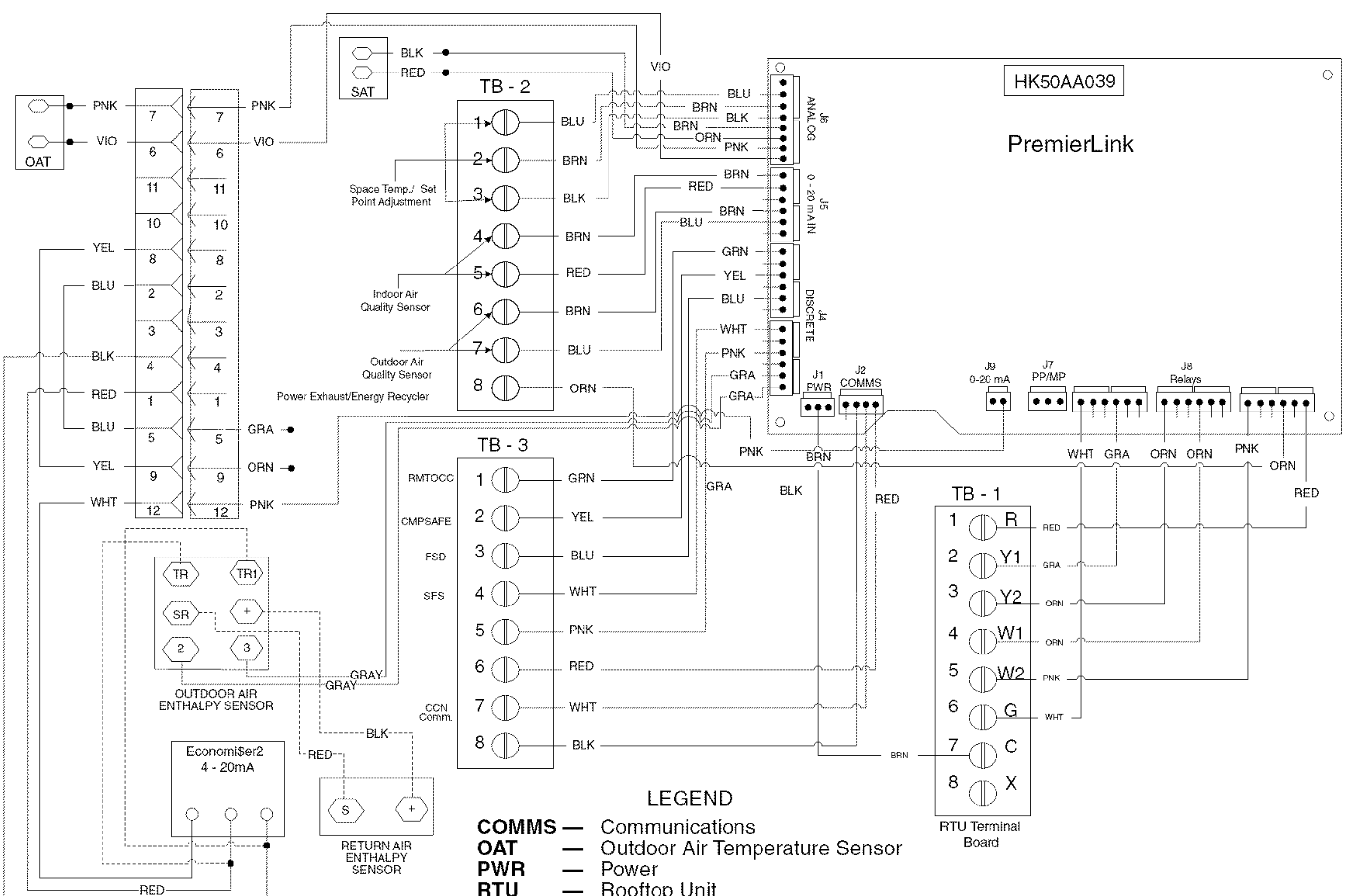
Fig. 17 — PremierLink Controller (Installed)

Table 4 — 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.



LEGEND

COMMS	— Communications
OAT	— Outdoor Air Temperature Sensor
PWR	— Power
RTU	— Rooftop Unit
SAT	— Supply Air Temperature Sensor
TB	— Terminal Block

Fig. 18 — Typical PremierLink Controls Wiring

Enthalpy Sensors and Control — The enthalpy control (HH57AC077) is supplied as a field-installed accessory to be used with the EconoMi$er2 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.

Outdoor Air Enthalpy Sensor/Enthalpy Controller (HH57AC077) — To wire the outdoor air enthalpy sensor, perform the following (see Fig. 19 and 20):

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

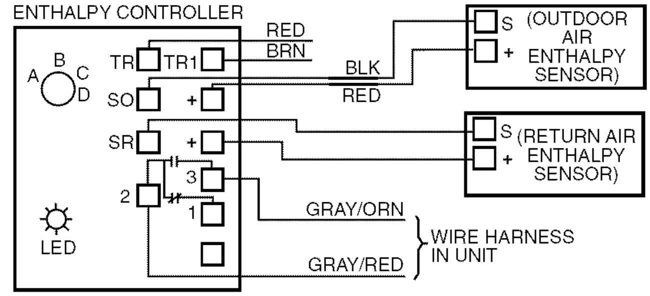
1. Use a 4-conductor, 18 or 20 AWG cable to connect the enthalpy control to the PremierLink controller and power transformer.
2. Connect the following 4 wires from the wire harness located in rooftop unit to the enthalpy controller:
   a. Connect the BRN wire to the 24 vac terminal (TR1) on enthalpy 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. 19):

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

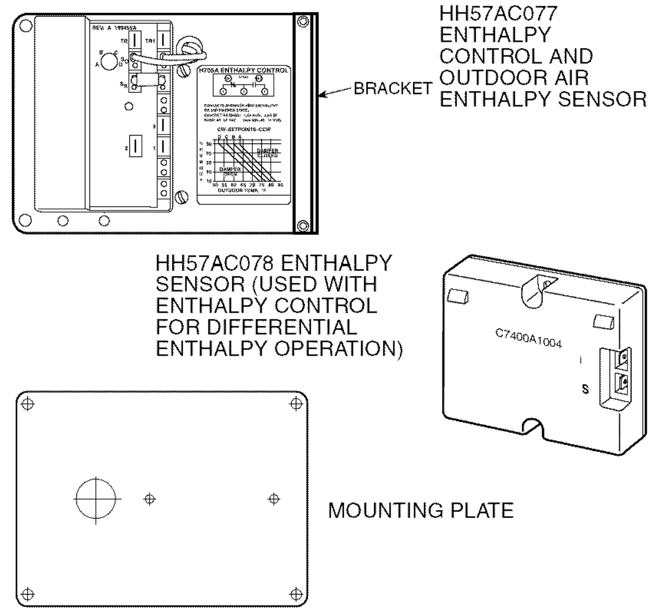


Fig. 20 — Differential Enthalpy Control, Sensor and Mounting Plate (33AMKITENT006)

OPTIONAL ECONOMI$ER IV AND ECONOMI$ER2 — See Fig. 21 for EconoMi$er IV component locations. See Fig. 22 for EconoMi$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. 23.
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. 21. 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. 24.

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. 25.
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. 26.
5. Remove the shipping tape holding the economizer barometric relief damper in place.
6. Insert the hood divider between the hood sides. See Fig. 26 and 27. 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. 27.
8. Caulk the ends of the joint between the unit top panel and the hood top. See Fig. 25.

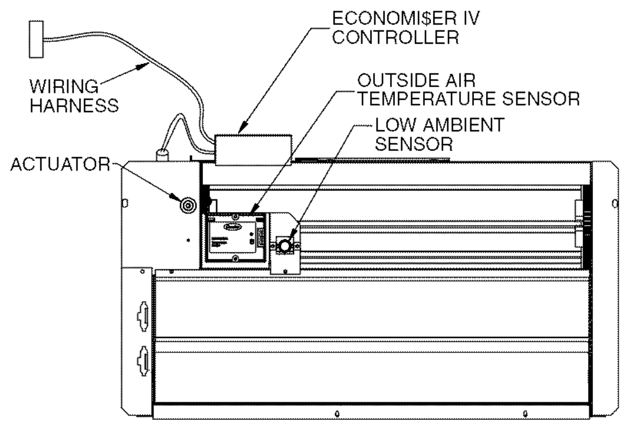


Fig. 21 — EconoMi$er IV Component Locations

9. Replace the filter access panel.
10. Install all EconoMi$er IV accessories. EconoMi$er IV wiring is shown in Fig. 28. EconoMi$er2 wiring is shown in Fig. 29.

Barometric flow capacity is shown in Fig. 30. Outdoor air leakage is shown in Fig. 31. Return air pressure drop is shown in Fig. 32.

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. 21. 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. 33. This sensor is factory installed. The operating range of temperature measurement is 0° to 158 F. See Table 5 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. 21.

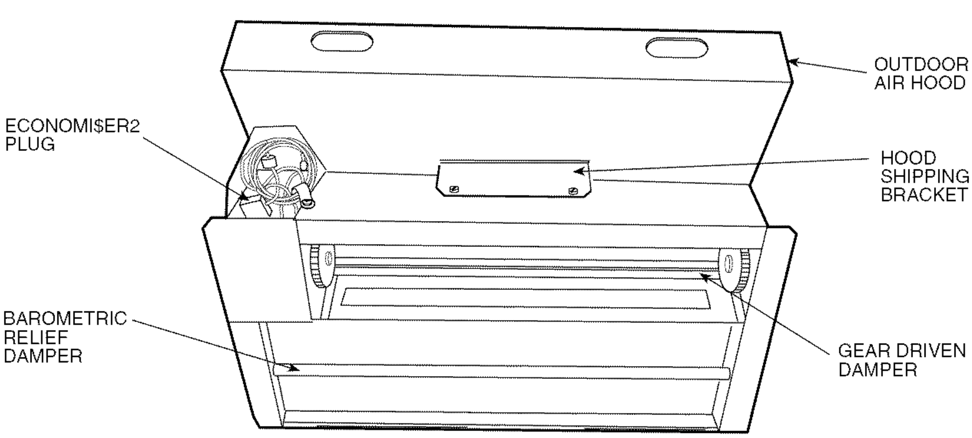


Fig. 22 — EconMi$er2 Component Locations

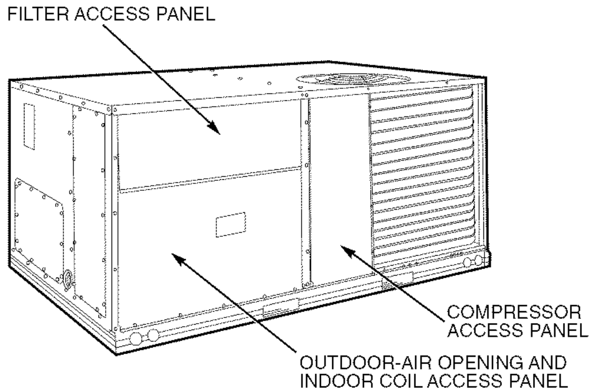


Fig. 23 — Typical Access Panel Locations

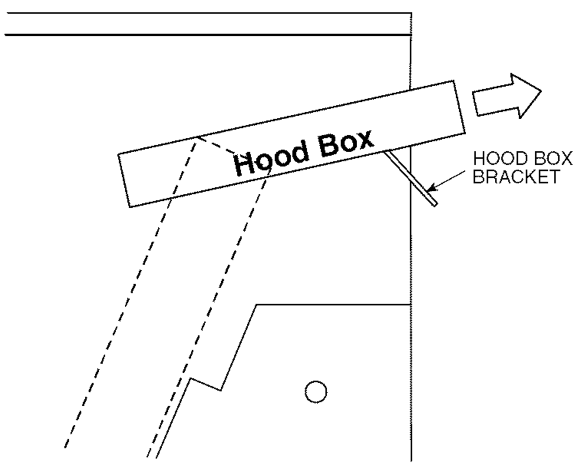


Fig. 24 — Hood Box Removal

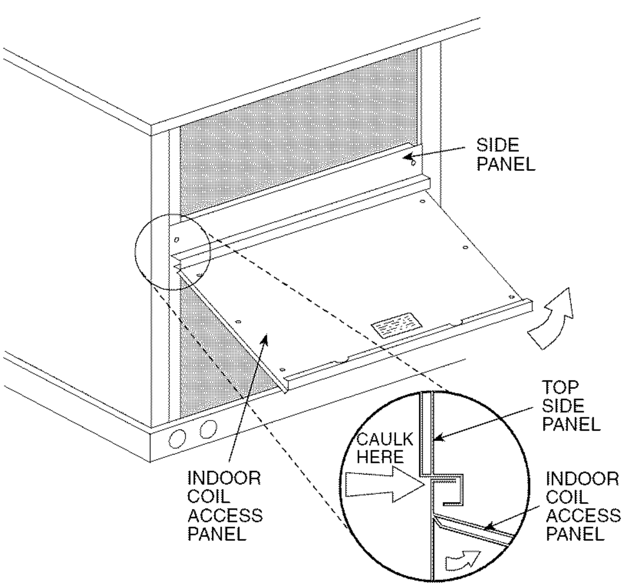


Fig. 25 — Indoor Coil Access Panel Relocation

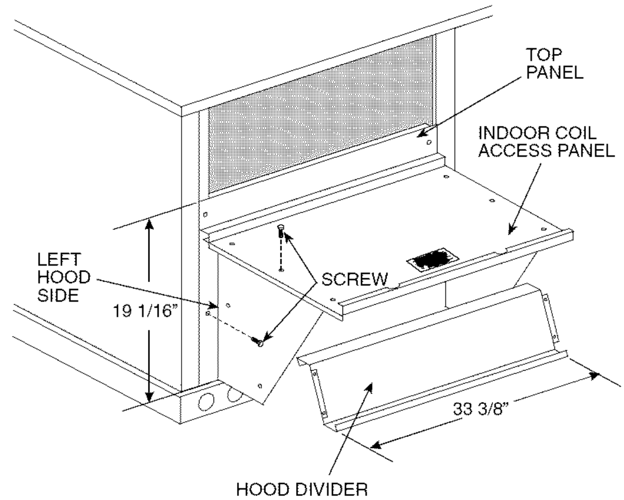


Fig. 26 — Outdoor-Air Hood Construction

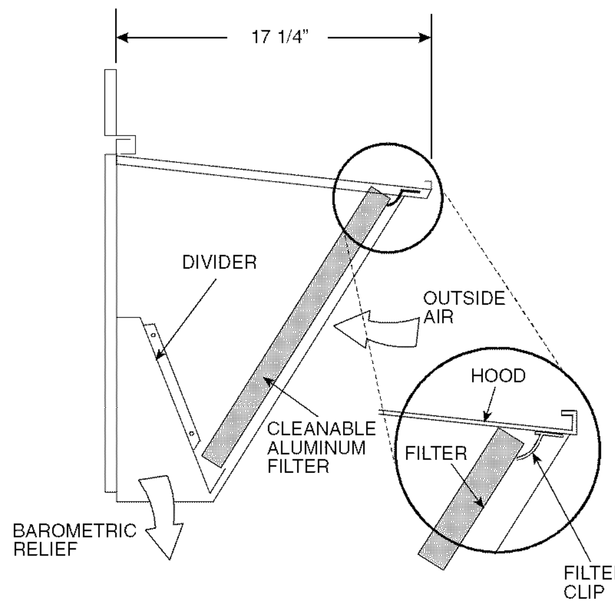
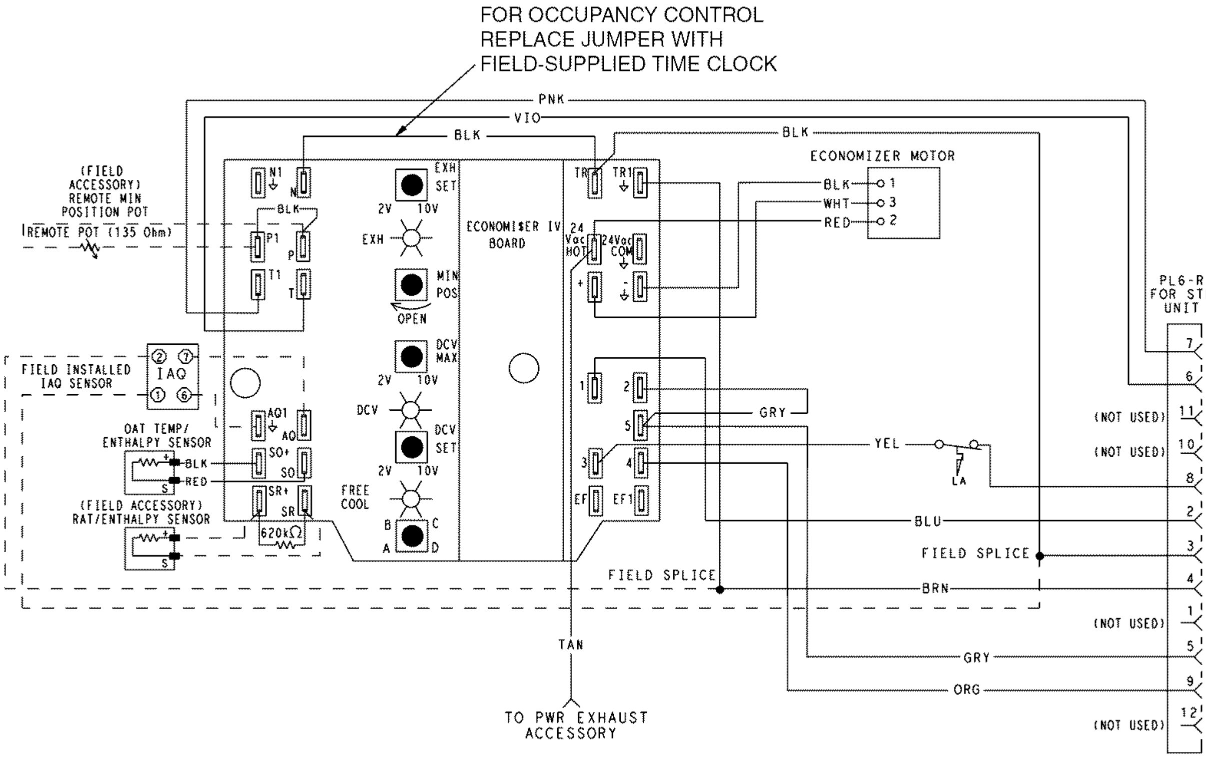


Fig. 27 — Filter Installation

Table 5 — 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



LEGEND

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

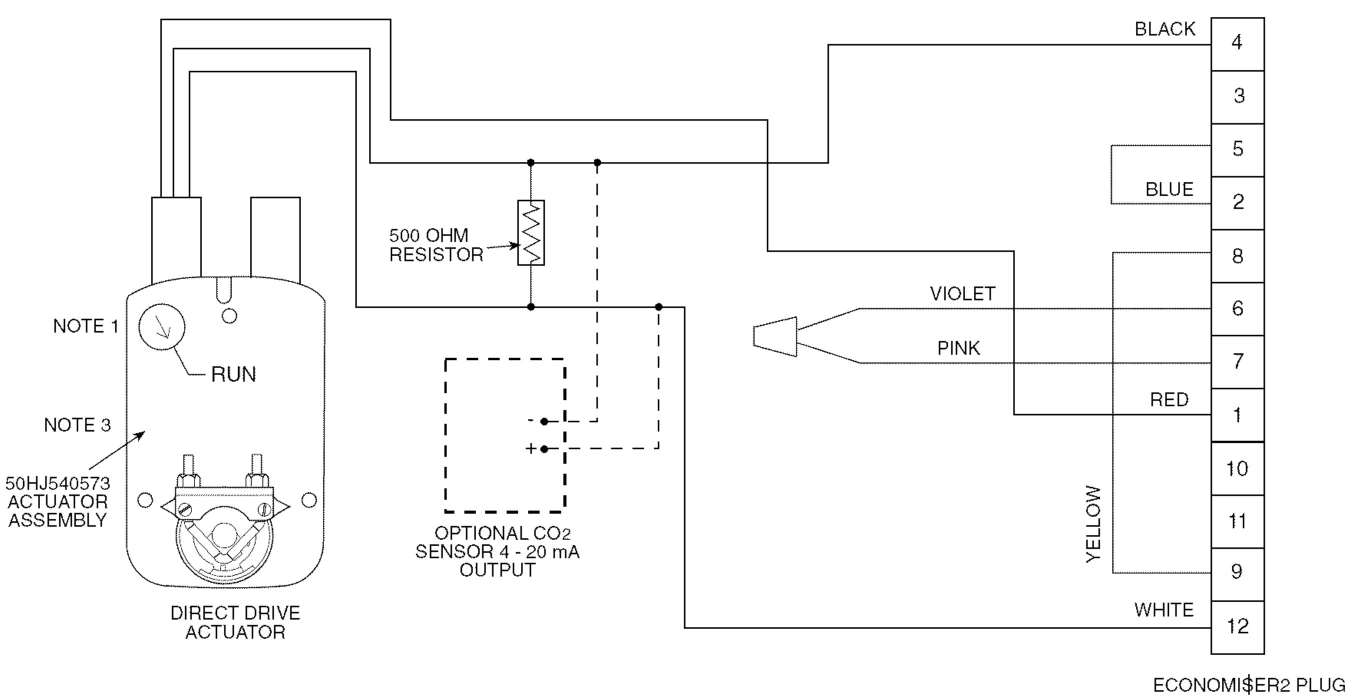
Potentiometer Defaults Settings:

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. 28 — 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. 29 — EconoMi$er2 with 4 to 20 mA Control Wiring

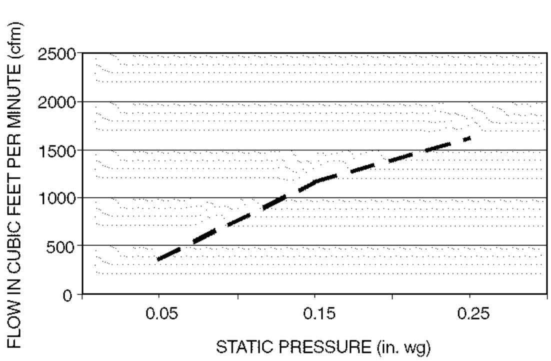


Fig. 30 — Barometric Flow Capacity

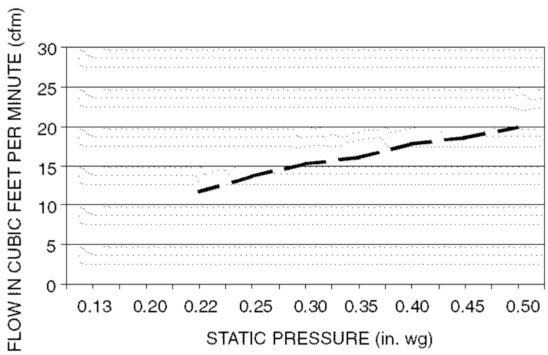


Fig. 31 — Outdoor-Air Damper Leakage

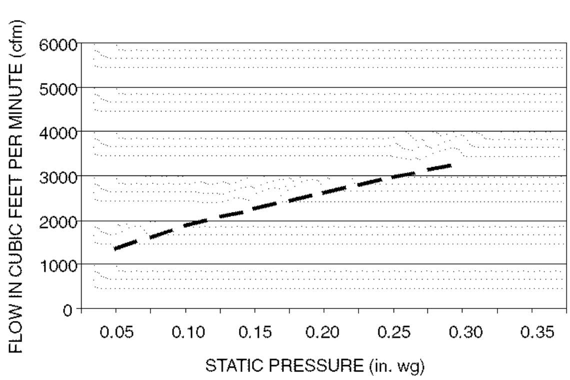


Fig. 32 — Return-Air Pressure Drop

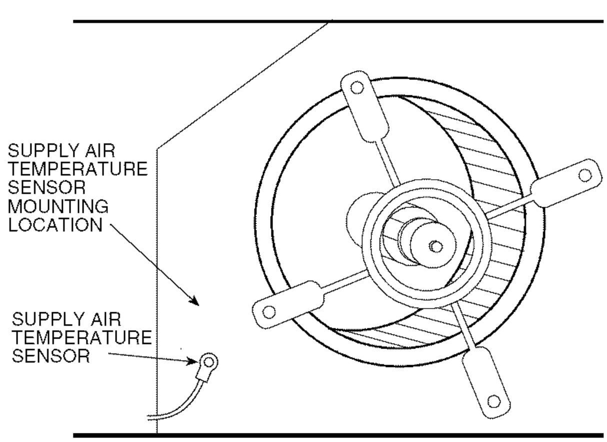


Fig. 33 — Supply Air Sensor Location

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. 29 for wiring information.

Determine the EconoMi$er IV control mode before set up of the control. Some modes of operation may require different sensors. Refer to Table 6. The EconoMi$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.

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. 34. The scale on the potentiometer is A, B, C, and D. See Fig. 35 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. 36. Wiring is provided in the EconoMi$er IV wiring harness. See Fig. 28.

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. 34.

Table 6 — 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.

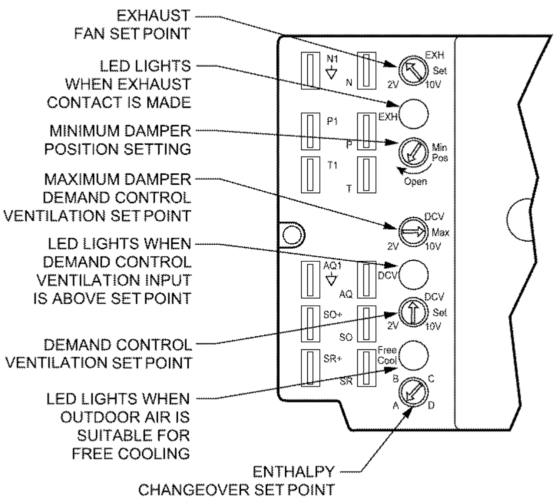


Fig. 34 — EconoMi$er IV Controller Potentiometer and LED Locations

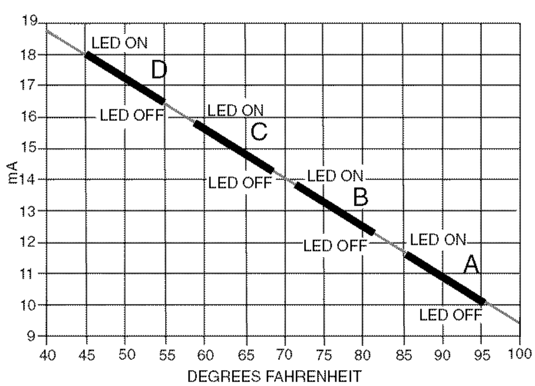


Fig. 35 — Outside Air Temperature Changeover Set Points

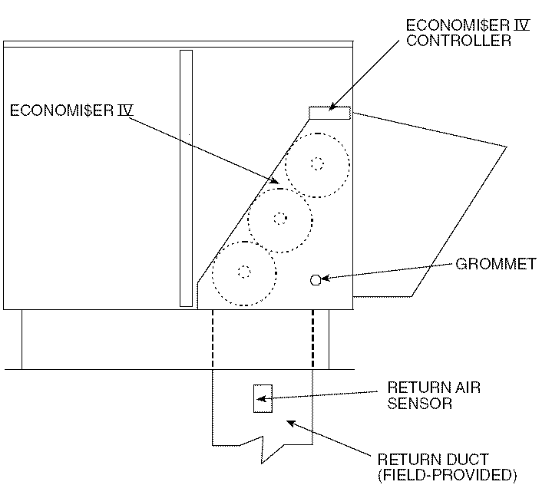


Fig. 36 — Return Air Temperature or Enthalpy Sensor Mounting Location

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. 21. 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$er IV controller. The set points are A, B, C, and D. See Fig. 37. The factory-installed 620-ohm jumper must be in place across terminals SR and SR+ on the EconoMi$er IV controller. See Fig. 21 and 38.

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. 21. Mount the return air enthalpy sensor in the return air duct. See Fig. 36. Wiring is provided in the EconoMi$er IV wiring harness. See Fig. 28. The outdoor enthalpy changeover set point is set with the outdoor enthalpy set point potentiometer on the EconoMi$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. 39.

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.

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. 34. 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. 34. 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.

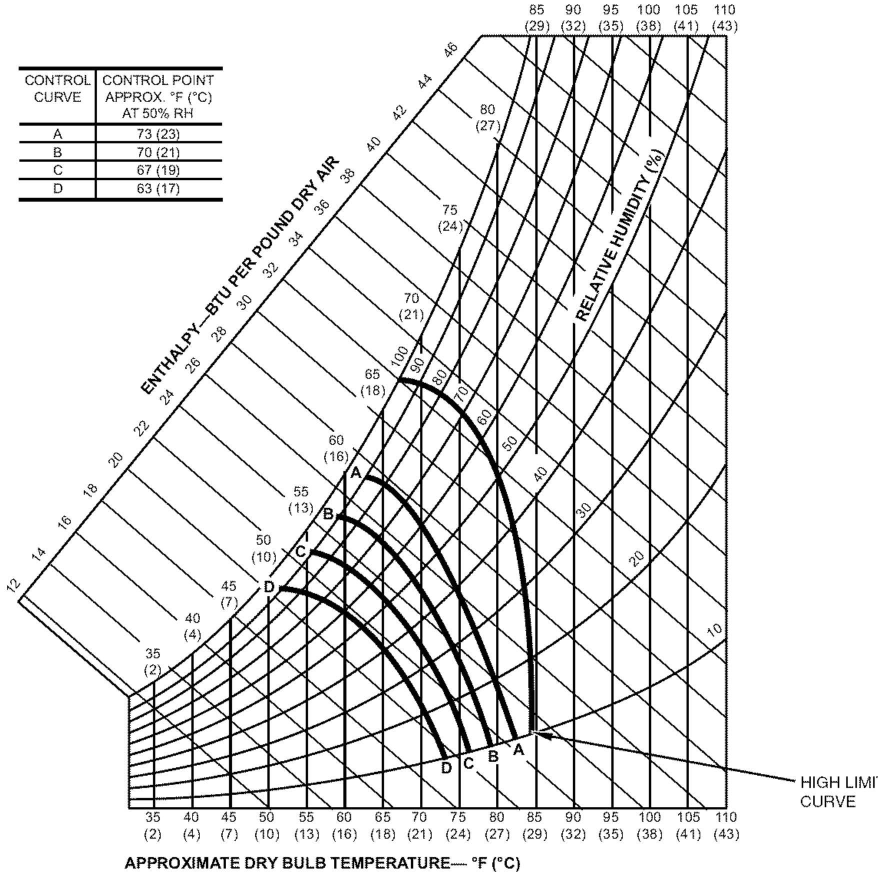


Fig. 37 — Enthalpy Changeover Set Points

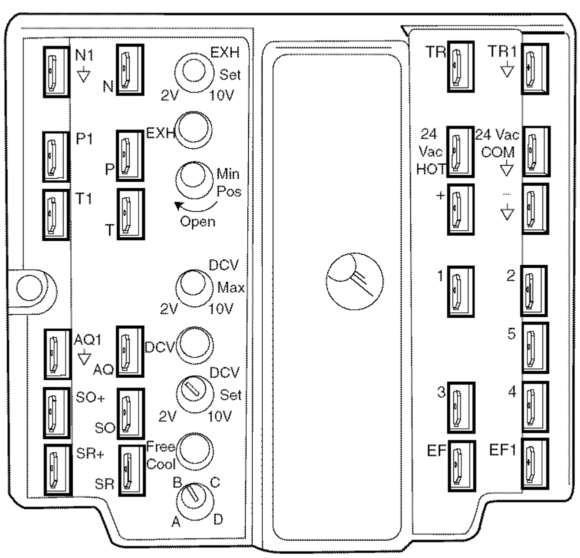


Fig. 38 — EconoMi$er IV Control

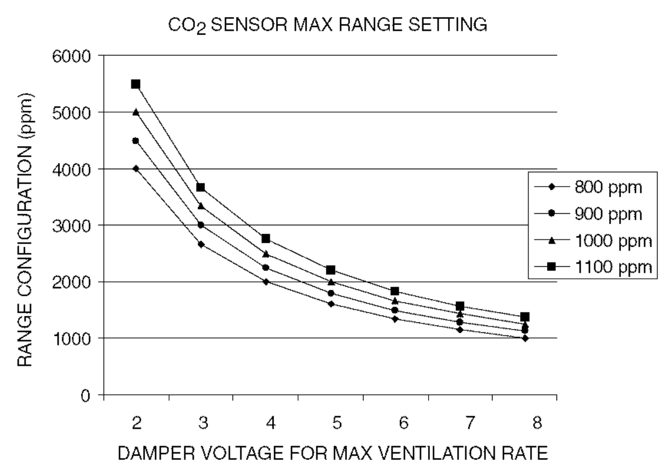


Fig. 39 — CO_2 Sensor Maximum Range Setting

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. 28 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$er IV control is occupied mode. Occupied status is provided by the black jumper from terminal TR to terminal N. When unoccupied mode is desired, install a field-supplied timeclock function in place of the jumper between TR and N. See Fig. 28. When the timeclock contacts are closed, the EconoMi$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. 39 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. 39 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 7.

Use setting 1 or 2 for Carrier equipment. See Table 7.

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 7.
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 7 — 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 Indoor-Fan Speed — Adjust the indoor-fan rpm to meet jobsite conditions.

Table 8 shows fan rpm at motor pulley settings for the 50TFQ004-007 units. Table 9 shows data for indoor-fan motors. Tables 10A and 10B show Accessory Static Pressure. Refer to Tables 11-32 to determine fan speed settings.

For units with electric heating, required minimum cfm is 900 for 50TFQ004; 1200 for 50TFQ005; 1500 for 50TFQ006 and 1800 for 50TFQ007.

DIRECT-DRIVE MOTORS — The indoor fan motor factory speed setting is shown on the label diagram affixed to base unit. If other speed setting is desired, refer to label diagram for motor reconnection.

BELT-DRIVE MOTORS — Fan motor pulleys are factory-set for speed shown in Table 1. Check pulley alignment and belt tension prior to start-up.

To change fan speed:

1. Shut off the unit power supply and tag disconnect.
2. Loosen the belt by loosening the fan motor mounting nuts. See Fig. 40.
3. Loosen the movable pulley flange setscrew (see Fig. 41).
4. Screw the movable flange toward the fixed flange to increase speed or away from the fixed flange to decrease speed. Increasing fan rpm increases the load on the motor. Do not exceed the maximum speed specified in Table 1.
5. Set the movable flange at the nearest flat edge of the pulley hub and tighten the setscrew. (See Table 1 for speed change for each full turn of the pulley flange.)
6. Adjust the belt tension to $^{5}/_{8}$-in. deflection at 7 to 10 lb of downward force.
7. Realign the fan and motor pulleys.

To align the fan and motor pulleys (see Fig. 41):

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

To adjust the belt tension:

1. Loosen the fan motor mounting nuts.
2. Slide the motor mounting plate away from the fan scroll for proper belt tension ($^{5}/_{8}$-in. deflection with 7 to 10 lb of downward force).
3. Tighten the motor mounting nuts.
4. Adjust the bolt and tighten the nut to secure the motor in a fixed position.
5. Recheck pulley alignment.

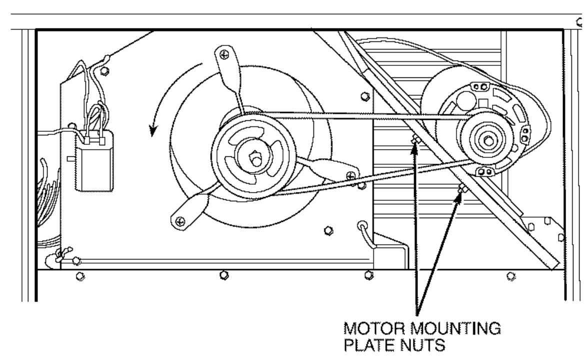


Fig. 40 — Belt-Drive Motor Mounting

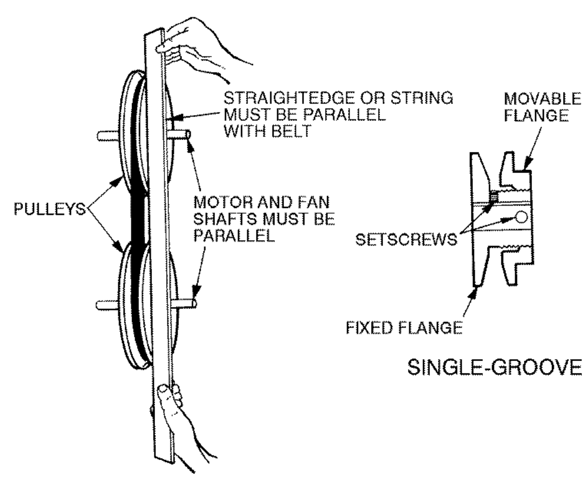


Fig. 41 — Indoor-Fan Pulley Adjustment

Table 8 — Fan RPM at Motor Pulley Settings*

UNIT 50TFQ	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
004†	1000	976	952	928	904	880	856	832	808	784	760	—	—
004**	1455	1423	1392	1360	1328	1297	1265	1233	1202	1170	1138	1107	1075
005†	1175	1135	1094	1054	1013	973	932	892	851	811	770	—	—
005**	1455	1423	1392	1360	1328	1297	1265	1233	1202	1170	1138	1107	1075
006†	1192	1166	1140	1114	1087	1061	1035	1009	983	957	930	904	878
006**	1685	1647	1608	1570	1531	1493	1454	1416	1377	1339	1300	—	—
007††	1460	1421	1382	1343	1304	1265	1226	1187	1148	1109	1070	—	—
007**	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 9 — Indoor-Fan Motor Performance

UNIT 50TFQ	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	1.00	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	1.00	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	7.6/6.0†
		460			3.0
		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	6.0
		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.

Table 10A — Accessory Static Pressure* (in. wg) — 50TFQ004-007

COMPONENT	CFM									
	900	1200	1400	1600	1800	2000	2200	2400	2600	3000
1 Heater Module	0.05	0.07	0.09	0.09	0.10	0.11	0.11	0.12	0.13	0.15
2 Heater Modules	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.18	0.18	0.19

Table 10B — Accessory/FIOP EconoMi$er IV and EconoMi$er2 Static Pressure* (in. wg) — 50TFQ004-007

COMPONENT	CFM							
	1250	1500	1750	2000	2250	2500	2750	3000
Vertical Economizer	0.045	0.065	0.08	0.12	0.145	0.175	0.22	0.255
Horizontal Economizer	—	—	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 then be used in conjunction with the Fan Performance tables to determine blower rpm and watts.

Table 11 — Fan Performance 50TFQ004 — 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 12 — Fan Performance 50TFQ004 — Vertical Discharge Units; Alternate Motor and 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**	—	—	—
1200	**1205**	**0.77**	**768**	**1270**	**0.88**	**872**	**1332**	**0.98**	**979**	—	—	—	—	—	—
1300	**1239**	**0.87**	**863**	**1303**	**0.98**	**972**	—	—	—	—	—	—	—	—	—
1400	**1273**	**0.97**	**967**	—	—	—	—	—	—	—	—	—	—	—	—
1500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

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

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.00.

See General Fan Performance notes below.

GENERAL FAN PERFORMANCE NOTES

1. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using the 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 9.
2. Values include losses for filters, unit casing, and wet coils. See Tables 10A and 10B for accessory static pressure information.
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 13 — Fan Performance 50TFQ004 — Vertical Discharge Units; High-Static Motor and 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 a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

See General Fan Performance notes on page 31.

Table 14 — Fan Performance 50TFQ005 — 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
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

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 31.

Table 15 — Fan Performance 50TFQ005 — Vertical Discharge Units; Alternate Motor and 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	**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**
1600	945	0.60	594	1044	0.72	716	1130	0.84	837	**1207**	**0.96**	**959**	—	—	—
1700	991	0.70	696	1086	0.83	825	1170	0.96	954	—	—	—	—	—	—
1800	1038	0.81	810	1130	0.95	947	—	—	—	—	—	—	—	—	—
1900	1085	0.94	936	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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	**1205**	**0.77**	**768**	**1270**	**0.88**	**872**	**1332**	**0.98**	**979**	—	—	—	—	—	—
1300	**1239**	**0.87**	**863**	**1303**	**0.98**	**972**	—	—	—	—	—	—	—	—	—
1400	**1273**	**0.97**	**967**	—	—	—	—	—	—	—	—	—	—	—	—
1500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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 a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.00.

See General Fan Performance notes on page 31.

Table 16 — Fan Performance 50TFQ005 — Vertical Discharge Units; High-Static Motor and 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	**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
1600	**945**	**0.60**	**594**	**1044**	**0.72**	**716**	1130	0.84	837	1207	0.96	959	1278	1.09	1083
1700	**991**	**0.70**	**696**	1086	0.83	825	1170	0.96	954	1246	1.09	1083	1316	1.22	1214
1800	**1038**	**0.81**	**810**	1130	0.95	947	1211	1.09	1083	1286	1.23	1219	1354	1.36	1357
1900	1085	0.94	936	1174	1.09	1081	1253	1.23	1224	1326	1.38	1368	1393	1.52	1513
2000	1132	1.08	1075	1218	1.23	1228	1296	1.39	1379	1367	1.54	1531	1432	1.69	1682

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	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**
1600	1344	1.21	1208	1406	1.34	1336	**1465**	**1.47**	**1465**	**1520**	**1.61**	**1597**	**1573**	**1.74**	**1731**
1700	1381	1.35	1346	1442	1.49	1480	**1500**	**1.62**	**1616**	**1555**	**1.76**	**1753**	**1607**	**1.90**	**1893**
1800	1418	1.50	1496	**1478**	**1.64**	**1636**	**1535**	**1.79**	**1778**	**1589**	**1.93**	**1922**	**1641**	**2.08**	**2068**
1900	**1456**	**1.67**	**1658**	**1515**	**1.82**	**1806**	**1571**	**1.96**	**1954**	**1625**	**2.12**	**2104**	**1676**	**2.27**	**2256**
2000	**1494**	**1.84**	**1835**	**1553**	**2.00**	**1989**	**1608**	**2.16**	**2144**	**1661**	**2.31**	**2301**	—	—	—

LEGEND

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

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

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

See General Fan Performance notes on page 31.

Table 17 — Fan Performance 50TFQ006 — Vertical 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	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 31.

Table 18 — Fan Performance 50TFQ006 — Vertical Discharge Units; Alternate Motor and 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: 878 to 1192 rpm. All other rpms require a 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.

See General Fan Performance notes on page 31.

Table 19 — Fan Performance 50TFQ006 — Vertical Discharge Units; High-Static Motor and 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 a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

See General Fan Performance notes on page 31.

Table 20 — Fan Performance 50TFQ007 — Vertical Discharge Units; Standard Motor and 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	**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	—	—	—
2600	1267	1.76	1546	1334	1.97	1730	1399	2.19	1921	—	—	—	—	—	—
2700	1310	1.96	1717	1375	2.17	1907	1438	2.40	2104	—	—	—	—	—	—
2800	1354	2.17	1901	1417	2.39	2096	—	—	—	—	—	—	—	—	—
2900	1398	2.39	2098	—	—	—	—	—	—	—	—	—	—	—	—
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	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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 a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

See General Fan Performance notes on page 31.

Table 21 — Fan Performance 50TFQ007 — Vertical Discharge Units; High-Static Motor and 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	**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
2600	**1267**	**1.76**	**1546**	1334	1.97	1730	1399	2.19	1921	1462	2.42	2121	1523	2.65	2328
2700	1310	1.96	1717	1375	2.17	1907	1438	2.40	2104	1499	2.63	2309	1559	2.87	2522
2800	1354	2.17	1901	1417	2.39	2096	1478	2.62	2300	1537	2.86	2510	—	—	—
2900	1398	2.39	2098	1459	2.62	2299	1518	2.86	2508	—	—	—	—	—	—
3000	1442	2.63	2308	1501	2.87	2516	—	—	—	—	—	—	—	—	—

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	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	—	—	—	—	—	—	—	—	—	—	—	—
2600	1583	2.90	2543	—	—	—	—	—	—	—	—	—	—	—	—
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 a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

See General Fan Performance notes on page 31.

Table 22 — Fan Performance 50TFQ004 — 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 31.

Table 23 — Fan Performance 50TFQ004 — 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**	—	—	—
1000	**1139**	**0.65**	**648**	**1210**	**0.76**	**754**	**1277**	**0.87**	**865**	**1340**	**0.98**	**979**	—	—	—
1100	**1165**	**0.72**	**720**	**1236**	**0.84**	**832**	**1302**	**0.95**	**948**	—	—	—	—	—	—
1200	**1191**	**0.80**	**799**	**1261**	**0.92**	**917**	—	—	—	—	—	—	—	—	—
1300	**1218**	**0.89**	**885**	—	—	—	—	—	—	—	—	—	—	—	—
1400	**1246**	**0.99**	**980**	—	—	—	—	—	—	—	—	—	—	—	—
1500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

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

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.00.

See General Fan Performance notes on page 31.

Table 24 — Fan Performance 50TFQ004 — 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 a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

See General Fan Performance notes on page 31.

Table 25 — Fan Performance 50TFQ005 — 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 31.

Table 26 — Fan Performance 50TFQ005 — 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	**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**
1600	854	0.50	501	968	0.64	638	1065	0.78	774	1152	0.92	912	—	—	—
1700	892	0.59	582	1002	0.73	728	1098	0.88	872	—	—	—	—	—	—
1800	930	0.68	672	1038	0.83	826	1131	0.99	980	—	—	—	—	—	—
1900	969	0.78	772	1073	0.94	935	—	—	—	—	—	—	—	—	—
2000	1008	0.89	881	—	—	—	—	—	—	—	—	—	—	—	—

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	**1191**	**0.80**	**799**	**1261**	**0.92**	**917**	—	—	—	—	—	—	—	—	—
1300	**1218**	**0.89**	**885**	—	—	—	—	—	—	—	—	—	—	—	—
1400	**1246**	**0.99**	**980**	—	—	—	—	—	—	—	—	—	—	—	—
1500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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 a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 1.00.

See General Fan Performance notes on page 31.

Table 27 — Fan Performance 50TFQ005 — 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	**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
1600	**854**	**0.50**	**501**	**968**	**0.64**	**638**	**1065**	**0.78**	**774**	1152	0.92	912	1230	1.06	1052
1700	**892**	**0.59**	**582**	**1002**	**0.73**	**728**	1098	0.88	872	1183	1.02	1018	1260	1.17	1166
1800	**930**	**0.68**	**672**	**1038**	**0.83**	**826**	1131	0.99	980	1215	1.14	1134	1291	1.30	1289
1900	**969**	**0.78**	**772**	**1073**	**0.94**	**935**	1165	1.10	1097	1247	1.27	1259	1322	1.43	1422
2000	**1008**	**0.89**	**881**	1110	1.06	1054	1199	1.23	1224	1280	1.40	1395	1354	1.57	1566

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	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**
1600	1303	1.20	1194	1370	1.35	1339	1434	1.49	1487	**1494**	**1.65**	**1637**	**1551**	**1.80**	**1790**
1700	1332	1.32	1315	1399	1.48	1467	**1462**	**1.63**	**1622**	**1522**	**1.79**	**1778**	**1579**	**1.95**	**1938**
1800	1362	1.45	1446	1428	1.61	1605	**1490**	**1.78**	**1767**	**1550**	**1.94**	**1930**	**1606**	**2.11**	**2096**
1900	1392	1.60	1587	**1458**	**1.76**	**1753**	**1519**	**1.93**	**1922**	**1578**	**2.10**	**2092**	**1634**	**2.28**	**2265**
2000	1423	1.75	1738	**1488**	**1.92**	**1912**	**1549**	**2.10**	**2088**	**1607**	**2.28**	**2266**	—	—	—

LEGEND

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

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

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

See General Fan Performance notes on page 31.

Table 28 — Fan Performance 50TFQ006 — Horizontal Discharge Units; Standard Motor (Direct Drive)

AIRFLOW (Cfm)	LOW SPEED 208 v			LOW SPEED 230, 460, 575 v			MEDIUM SPEED 208 v			MEDIUM SPEED 230, 460, 575 v			HIGH SPEED 208 v			HIGH SPEED 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 31.

Table 29 — Fan Performance 50TFQ006 — 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: 878 to 1192 rpm. All other rpms require a 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.

See General Fan Performance notes on page 31.

Table 30 — Fan Performance 50TFQ006 — Horizontal Discharge Units; High-Static Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIIC 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 a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

See General Fan Performance notes on page 31.

Table 31 — Fan Performance 50TFQ007 — 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	**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
2600	1204	1.59	1409	1277	1.79	1586	1345	1.99	1771	1410	2.21	1962	—	—	—
2700	1244	1.76	1563	1315	1.97	1747	1382	2.18	1938	1445	2.40	2135	—	—	—
2800	1285	1.95	1729	1354	2.16	1919	1419	2.38	2116	—	—	—	—	—	—
2900	1326	2.15	1907	1393	2.37	2104	—	—	—	—	—	—	—	—	—
3000	1367	2.36	2097	—	—	—	—	—	—	—	—	—	—	—	—

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	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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 a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.40.

See General Fan Performance notes on page 31.

Table 32 — Fan Performance 50TFQ007 — 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	**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
2600	**1204**	**1.59**	**1409**	**1277**	**1.79**	**1586**	1345	1.99	1771	1410	2.21	1962	1471	2.43	2160
2700	**1244**	**1.76**	**1563**	1315	1.97	1747	1382	2.18	1938	1445	2.40	2135	1505	2.63	2338
2800	**1285**	**1.95**	**1729**	1354	2.16	1919	1419	2.38	2116	1481	2.61	2319	1539	2.85	2527
2900	1326	2.15	1907	1393	2.37	2104	1456	2.60	2306	1517	2.83	2514	—	—	—
3000	1367	2.36	2097	1432	2.59	2300	1494	2.82	2508	—	—	—	—	—	—

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	**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	—	—	—	—	—	—	—	—	—
2600	1530	2.66	2364	1586	2.90	2574	—	—	—	—	—	—	—	—	—
2700	1563	2.87	2547	—	—	—	—	—	—	—	—	—	—	—	—
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 a field-supplied drive.

NOTES:
1. **Boldface** indicates field-supplied drive is required.
2. Maximum continuous bhp is 2.90.

See General Fan Performance notes on page 31.

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 the refrigerant system.
2. Do not operate the compressor or provide any electric power to the unit unless compressor terminal cover is in place and secured.
3. Do not remove the compressor terminal cover until all electrical sources are disconnected.
4. Relieve all pressure from the system before touching or disturbing anything inside the compressor terminal box, if refrigerant leak is suspected around compressor terminals. Use accepted methods to recover refrigerant.
5. Never attempt to repair a soldered connection while the refrigerant system is under pressure.
6. Do not use a torch to remove any component. The system contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power to the unit and tag disconnect.
   b. Recover refrigerant to relieve all pressure from the system using both high-pressure and low-pressure ports.
   c. Cut component connection tubing with a tubing cutter, and remove the component from the unit.
   d. Carefully unsweat the 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) the 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 the unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using an 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 that wiring does not contact refrigerant tubing or sharp metal edges.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten the fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that outdoor-fan blades are correctly positioned in the fan orifice. Refer to Outdoor-Fan Adjustment section on page 45 for more details.
   b. Make sure that the air filter(s) is in place.
   c. Make sure that the 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 the unit has been installed according to installation instructions and applicable codes.

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

Outdoor-Air Inlet Screens — Outdoor-air inlet screen(s) must be in place before operating the unit.

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

Internal Wiring — Check all electrical connections in the unit control boxes; tighten as required.

Refrigerant Service Ports — Each unit system has 3 Schrader-type service ports: one on the suction line, one on the liquid line, and one on the compressor discharge line. Be sure that caps on the ports are tight.

HIGH FLOW VALVES — Located on the compressor hot gas and suction tubes are high flow valves. Large black plastic caps distinguish these valves with o-rings located inside the caps. These valves cannot be accessed for service in the field. To prevent refrigerant leakage, ensure that the plastic caps are in place and tight.

Compressor Rotation — On 3-phase (sizes 005, 006 and 007) units be certain that the compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect service gages to the 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 indoor fan (006 and 007 three-phase units only) is probably also rotating in the wrong direction.
2. Turn off power to the unit and tag disconnect.
3. Reverse any two of the unit power leads.
4. Turn on 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 more noise and does not provide cooling.

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

Check cooling effects at a setting below room temperature. Check the unit charge. Refer to Refrigerant Charge section on page 46. The unit must operate for at least 15 minutes before adjusting the charge.

Reset the thermostat at a position above room temperature. The compressor will shut off.

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

Heating — To start the unit, turn on the main power supply.

Set the system selector switch at the HEAT position, and set the thermostat at a setting above room temperature. Set the fan at the AUTO position.

The first stage of the thermostat energizes the indoor fan, compressor, and outdoor fan; the second stage energizes the electric heater elements, if installed. Check heating effects at the air supply grille(s).

If the electric heaters do not energize, reset the limit switch (located on indoor-fan scroll) by pressing the button located between terminals on the switch.

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

Safety Relief — A soft solder joint at the suction line fitting provides pressure relief under abnormal temperature and pressure conditions.

Ventilation (Continuous Fan) — Set the fan and system selector switches at the ON and OFF positions, respectively. The indoor 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), reversing valve solenoid (RVS1) and compressor contactor no. 1 (C1) are energized and indoor-fan motor, compressor no. 1, and outdoor fan starts. The outdoor-fan motor(s) run 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, outdoor-fan contactor (OFC) and C1 will be energized. The reversing valve switches position and the indoor fan, outdoor fan, and compressor no. 1 are energized.

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

When the space thermostat is satisfied, W2 will be deenergized first, and the electric heater(s) will be deenergized.

Upon a further rise in space temperature, W1 will be deenergized, and the reversing valve solenoid (RVS1) will be 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.

Above 50 F supply-air temperature, the dampers will modulate from 100% open to the minimum open position. From 50 F to 45 F supply-air temperature, the dampers will maintain at the minimum open position. Below 45 F the dampers will be completely shut. As the supply-air temperature rises, the dampers will come back open to the minimum open position once the supply-air temperature rises to 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 $1\frac{1}{2}$ and $2\frac{1}{2}$ 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, where:

SASP = Supply Air Set Point

DXCTLO = Direct Expansion Cooling Lockout Set Point

<u>Routine 1</u> — (OAT < DXCTLO)

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

<u>Routine 2</u> — (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 no. 1 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. In order to prevent thermostat from short cycling, the unit is locked into the heating mode for at least 10 minutes when W1 is energized.

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 (proportional integral) Error reduction calculation as indicated by Fig 42.

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. 43.

The PremierLink control will integrate the compressor 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 outdoor-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. 43.

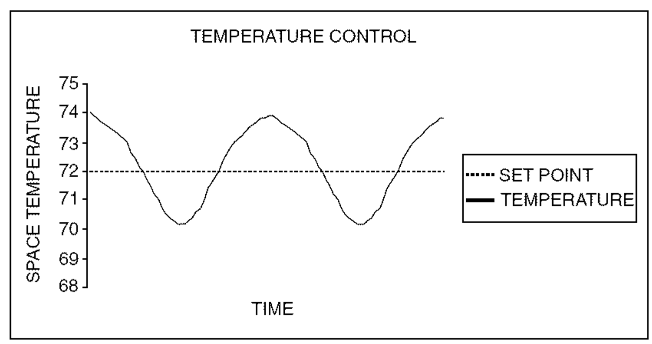
The controller uses the following conditions to determine economizer cooling:

- 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.



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

Fig. 42 — DX Cooling Temperature Control Example

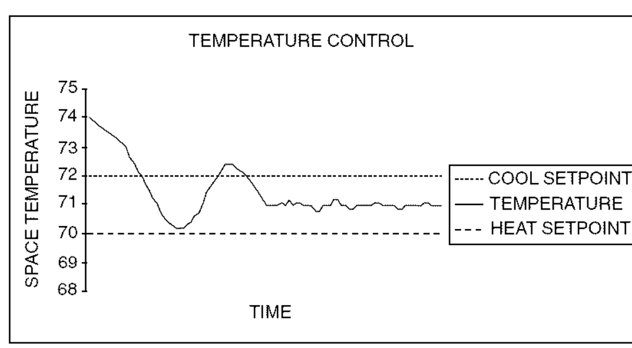


Fig. 43 — Economizer Temperature Control Example

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.

DEFROST — As frost builds up on the outdoor coil, the coil temperature drops below 28 F. When this outdoor-coil temperature drop is sensed by the defrost thermostat (DFT) and the defrost timer is at the end of a timed period (adjustable at 30, 50, or 90 minutes), the unit operates in a defrost cycle controlled by the defrost timer and thermostat. During this cycle, the reversing valve solenoid (RVS) is energized and the outdoor fan shuts off. The electric heaters (if installed) will be energized.

The unit continues to defrost until the coil temperature as measured by DFT reaches 65 F, or the duration of defrost cycle completes a 10-minute period.

At the end of the defrost cycle, the electric heaters (if installed) and the reversing valve will be deenergized, and the outdoor-fan motor will be energized. The unit will now operate in the Heating mode.

If the thermostat is satisfied during a defrost cycle, the unit will continue in the Defrost mode until the time or temperature constraints are satisfied.

SERVICE

⚠ WARNING

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

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

INDOOR COIL

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

OUTDOOR COIL — Inspect the coil monthly. Clean the outdoor coil annually, and as required by location or outdoor-air conditions.

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

2-Row Coils — Clean coil as follows:

1. Turn off the unit power.
2. Remove the top panel screws on the outdoor end of the unit.
3. Remove the outdoor coil corner post. See Fig. 44. To hold the top panel open, place the coil corner post between the top panel and the center post. See Fig. 45.
4. Remove the device holding the coil sections together at the return end of the outdoor coil. Carefully separate the outer coil section 3 to 4 in. from the inner coil section. See Fig. 46.
5. 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.
6. Secure the sections together. Reposition the outer coil section, and remove the coil corner post from between the top panel and center post. Install the coil corner and center posts, and replace all screws.

CONDENSATE DRAIN — Check and clean each year at the start of the cooling season. In winter, keep the drain dry or protect it against freeze-up.

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

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

Lubrication

COMPRESSOR — The compressor is charged with the correct amount of oil at the factory.

FAN MOTOR BEARINGS — Fan motor bearings are permanently lubricated. No further lubrication of outdoor- or indoor-fan motors is required.

Indoor Fan Belt Inspection — Check the condition of the indoor belt or tension during heating and cooling inspections or as conditions require. Replace the belt or adjust it as necessary. Refer to Step 7 — Adjust Indoor-Fan Speed on page 29 for proper adjustment procedures and belt tension.

Outdoor-Fan Adjustment (Fig. 47)

1. Shut off the unit power supply and tag disconnect.
2. Remove the outdoor-fan assembly (grille, motor, motor cover, and fan) by removing the screws and flipping the assembly onto the unit top cover.
3. Loosen the fan hub setscrews.
4. Adjust the fan height as shown in Fig. 47.
5. Tighten the setscrews.
6. Replace the outdoor-fan assembly.

Economizer Adjustment — Refer to the Optional EconoMi$er IV and EconoMi$er2 section on page 22.

High-Pressure Switch — Located on the compressor hot gas line is a high-pressure switch, which contains a Schrader core depressor. This switch opens at 428 psig and closes at 320 psig. No adjustment is necessary. Refer to Table 1.

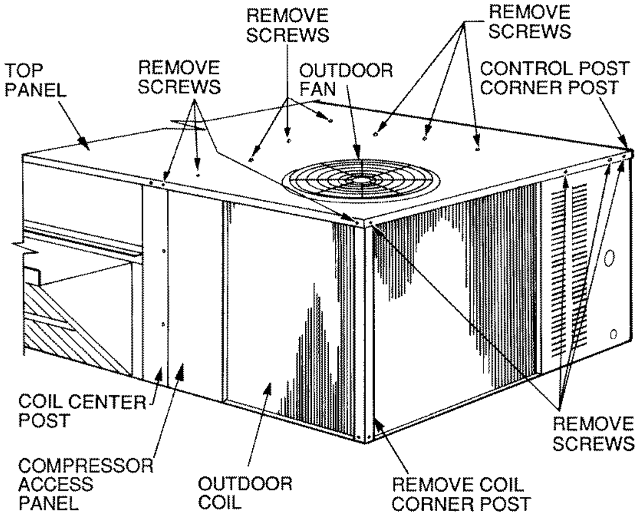


Fig. 44 — Cleaning Outdoor Coil

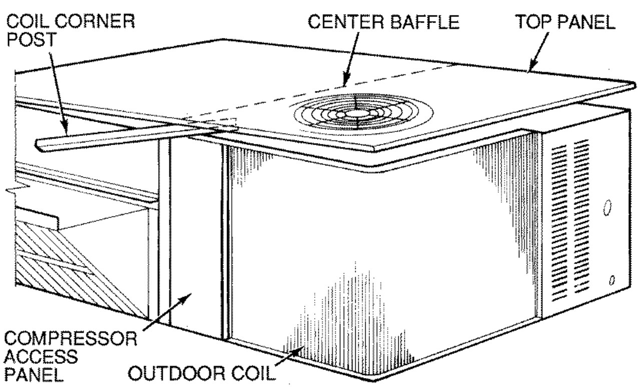


Fig. 45 — Propping Up Top Panel

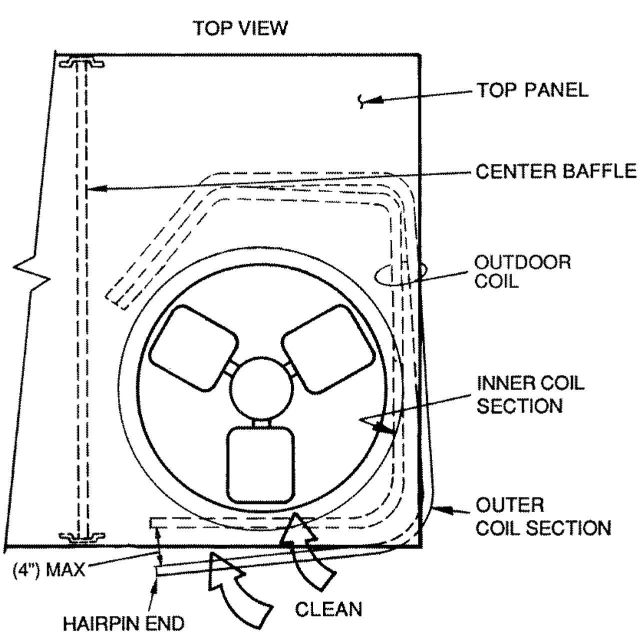
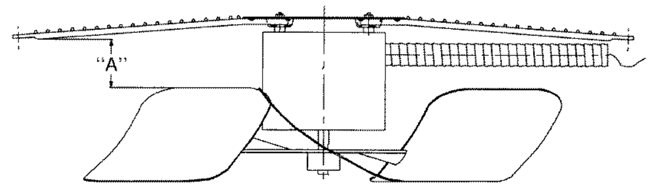


Fig. 46 — Separating Coil Sections



UNIT 50TFQ	FAN HEIGHT — "A" (in.)
004-006 AND 007 (208/230 v)	2.75
007 (460 v and 575 v)	3.50

Fig. 47 — Outdoor-Fan Adjustment

Loss-of-Charge Switch — Located on the outdoor liquid line is a low-pressure switch which functions as a loss-of-charge switch. This switch contains a Schrader core depressor. This switch opens at 7 psig and closes at 22 psig. No adjustment is necessary. Refer to Table 1.

Freezestat — Located on the "hair pin" end of the indoor coil is a bimetal temperature sensing switch. This switch protects the indoor coil from freeze-up due to lack of airflow. The switch opens at 30 F and closes at 45 F. No adjustment is necessary. Refer to Table 1.

Refrigerant Charge — The refrigerant charge is listed on the unit information plate (also refer to Table 1). Refer to Carrier Refrigerant Service Techniques Manual, Refrigerants section.

Unit panels must be in place when the unit is operating during charging procedure. The unit must operate for a minimum of 15 minutes before checking the charge.

NO CHARGE — Refer to Carrier Refrigerant Service Techniques. Use standard evacuating techniques. After evacuating the system, weigh in the specified amount of refrigerant to 500 microns. (Refer to Table 1.)

LOW CHARGE COOLING — Use Cooling Charging Charts, Fig. 48-51. Vary refrigerant until the conditions of the charts are met. Note that the charging charts are different from type normally used. The charts are based on charging the units to the correct superheat for the various operating conditions. An accurate pressure gage and a 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 near the compressor 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 CHARTS — Use this method in Cooling mode only. Take the outdoor ambient temperature and read the suction pressure gage. Refer to the charging charts to determine what the suction temperature should be. If the suction temperature is high, add refrigerant. If the suction temperature is low, carefully recover some of the charge. Recheck the suction pressure as the charge is adjusted.

Example: (Fig. 48)

Outdoor Temperature . . . . 85 F
Suction Pressure . . . . 74 psig
Suction Temperature should be . . . . 70 F
(Suction Temperature may vary ± 5° F.)

HEATING MODE CHARGE — Do not attempt to adjust the charge by cooling methods while in Heating mode. When charging is necessary in Heating mode, recover refrigerant and weigh in according to the unit data plate refrigerant data.

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

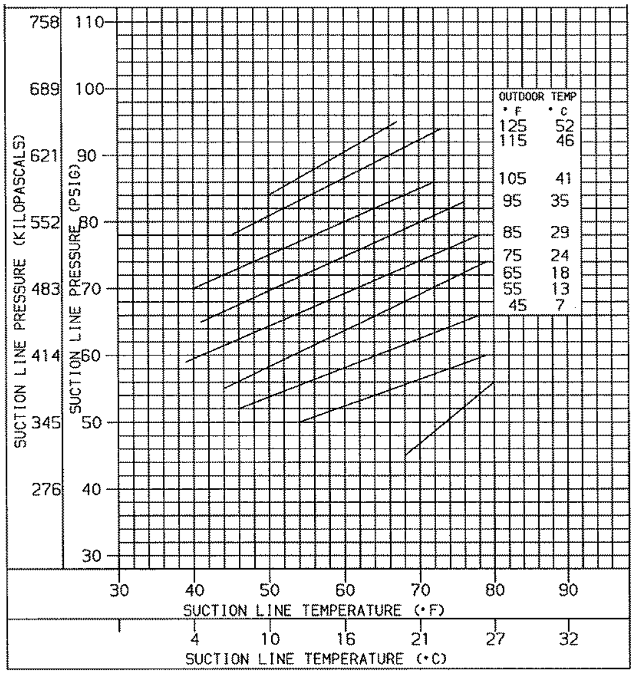


Fig. 48 — Cooling Charging Chart — 50TFQ004

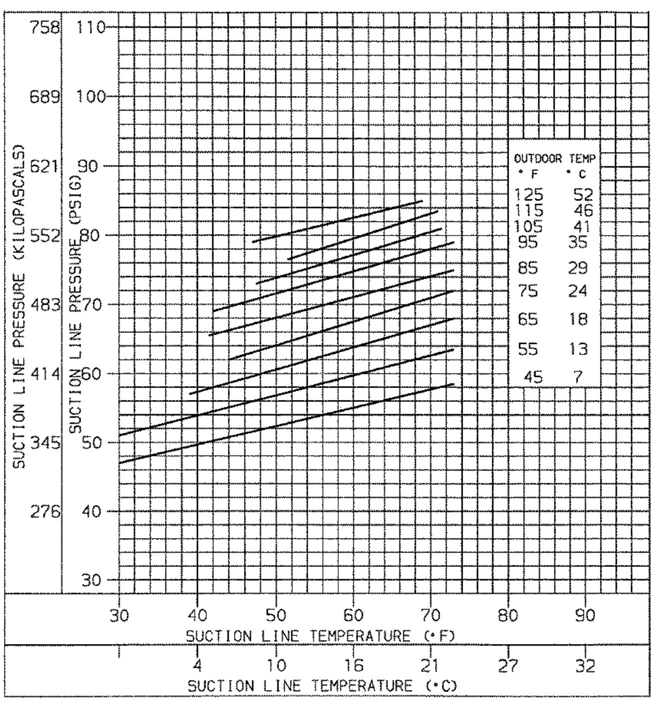


Fig. 49 — Cooling Charging Chart — 50TFQ005

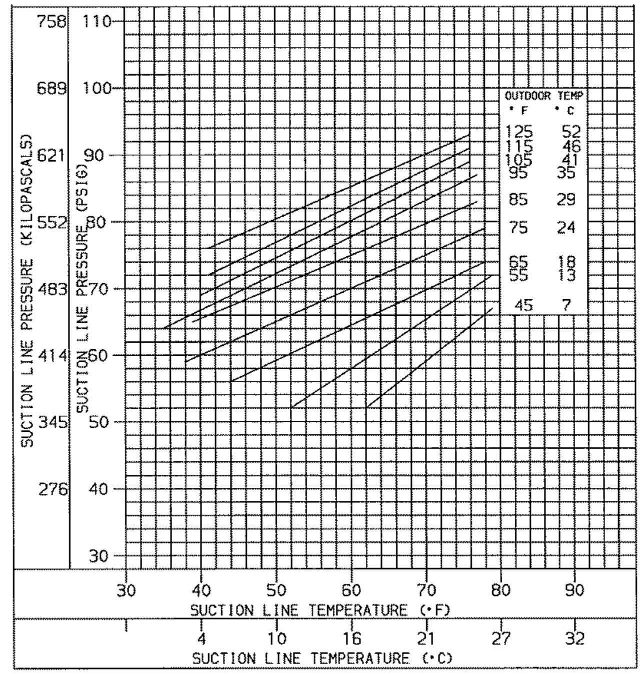


Fig. 50 — Cooling Charging Chart — 50TFQ006

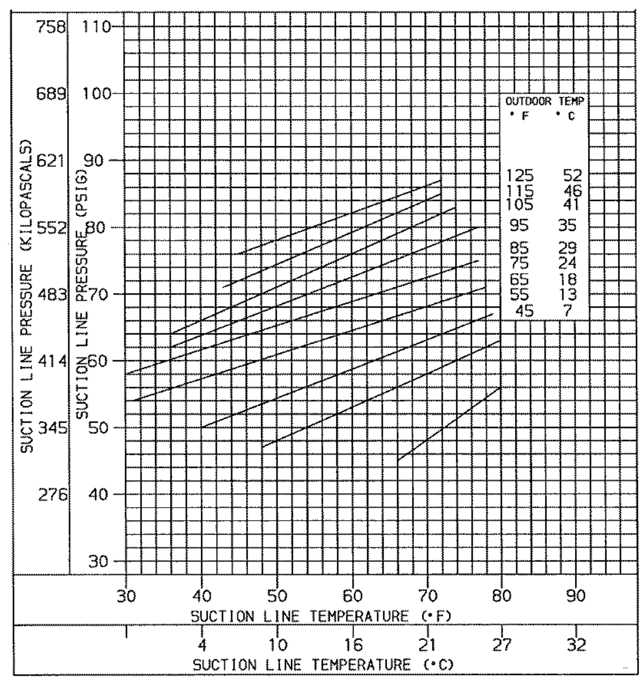


Fig. 51 — Cooling Charging Chart — 50TFQ007

TROUBLESHOOTING

Unit Troubleshooting — For unit troubleshooting, refer to Fig. 52 and Table 33.

**EconoMi$er IV Troubleshooting —** See Table 34 for EconoMi$er IV logic.

A functional view of the EconoMi$er IV is shown in Fig. 53. Typical settings, sensor ranges, and jumper positions are also shown. An EconoMi$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:

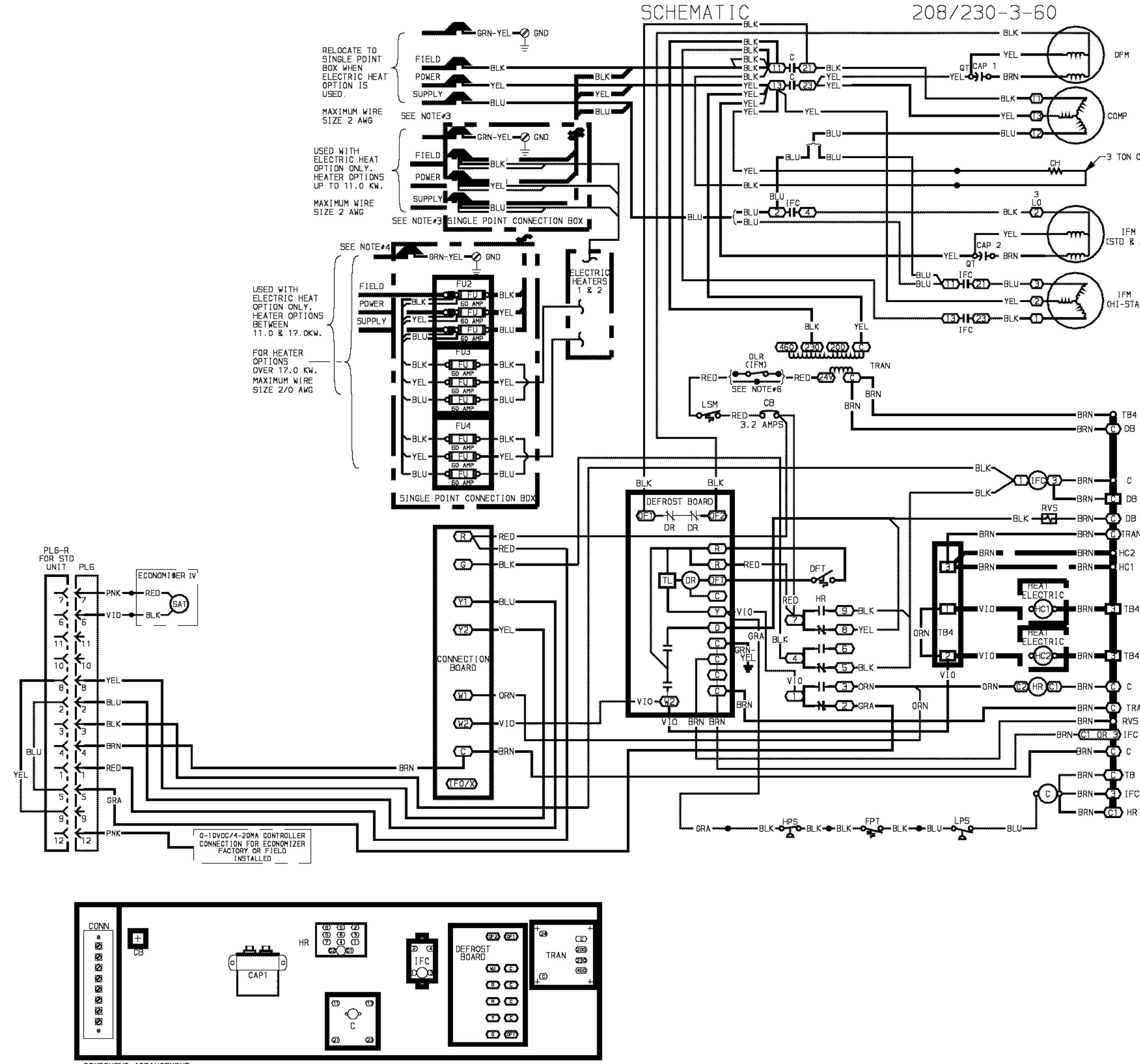
1. Make sure EconoMi$er IV preparation procedure has been performed.
2. Connect a 9-v battery to AQ (positive node) and AQ1 (negative node). The DCV LED should turn on. The actuator should drive to between 90 and 95% open.
3. Turn the DCV Maximum Position potentiometer to midpoint. The actuator should drive to between 20 and 80% open.
4. Turn the DCV Maximum Position potentiometer to fully CCW. The actuator should drive fully closed.
5. Turn the Minimum Position potentiometer to midpoint. The actuator should drive to between 20 and 80% open.
6. Turn the Minimum Position Potentiometer fully CW. The actuator should drive fully open.
7. Remove the jumper from TR and N. The actuator should drive fully closed.
8. Return EconoMi$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
CH — Crankcase Heater
COMP — Compressor Motor
DB — Defrost Board
EQUIP — Equipment
FPT — Freeze-Up Protection Thermostat
FU — Fuse
GND — Ground
HPS — High-Pressure Switch
HR — Heater Relay
IFC — Indoor Fan Contactor
IFM — Indoor-Fan Motor
LPS — Low-Pressure Switch
LSM — Limit Switch (Motor)
OFM — Outdoor-Fan Motor
OLR — Overload Relay
P — Plug
PL — Plug Assembly
QT — Quadruple Terminal
RVS — Reversing Valve Solenoid
SAT — Supply Air Thermostat
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.

VOLTAGE RATING	CB MFG. PT. NO.	MUST TRIP AMPS
24V	POTTER & BRUMFIELD W2BX-1024-3.2	3.2

6. Unit will have either LSM or OLR, but not both.

Fig. 52 — Typical Wiring Schematic

Table 33 — Heating and Cooling Troubleshooting

PROBLEM	CAUSE	REMEDY
Compressor and Outdoor 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, control relay, or capacitor.	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.
	High pressure switch tripped.	See problem “Excessive head pressure.”
	Low pressure switch tripped.	Check system for leaks. Repair as necessary.
	Freeze-up protection thermostat tripped.	See problem “Suction pressure too low.”
Compressor Will Not Start But Outdoor 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 3-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 outdoor coil or dirty air filter.	Determine cause and correct.
	Defective run/start capacitor, overload, or start relay.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty outdoor-fan (cooling) or indoor-fan (heating) 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.
	Outdoor coil dirty or restricted.	Clean coil or remove restriction.
Compressor Makes Excessive Noise. (Sizes 005, 006 and 007 Only)	Compressor rotating in the wrong direction.	Reverse the 3-phase power leads as described in Start-Up, page 42.
Excessive Head Pressure.	Dirty air filter.	Replace filter.
	Dirty outdoor coil.	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condensing 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.
	Compressor rotating in the wrong direction (unit sizes 005, 006, 007)	Reverse the 3-phase power leads as described in Start-Up, page 45.
Excessive Suction Pressure.	High heat load.	Check for source and eliminate.
	Compressor valves leaking.	Replace compressor.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction Pressure Too Low.	Dirty air filter (cooling) or dirty outdoor coil (heating).	Replace filter.
	Low refrigerant charge.	Check for leaks; repair and recharge.
	Metering device or low side restricted.	Remove source of restriction.
	Insufficient indoor airflow (cooling mode).	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Field-installed filter drier restricted.	Replace.
	Outdoor ambient below 25 F.	Install low-ambient temperature kit.

Table 34 — 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 mixed air sensor signals, between closed and either maximum position (DCV) or fully open (supply-air signal).

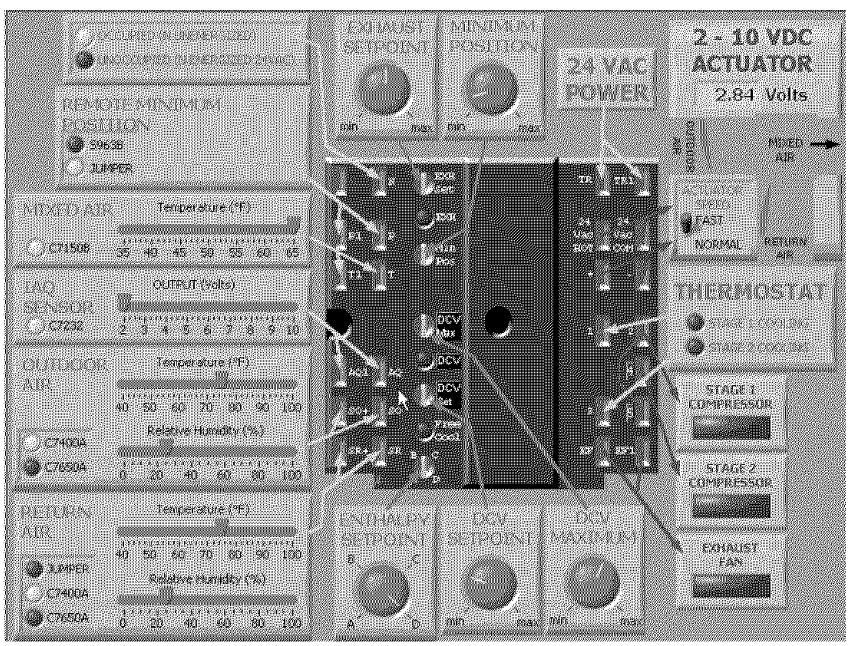


Fig. 53 — EconoMi$er IV Functional View

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

I. PRELIMINARY INFORMATION

MODEL NO.: ______________________ SERIAL NO.: ______________________

DATE: ______________________ TECHNICIAN: ______________________

BUILDING NAME: ______________________ BUILDING LOCATION: ______________________

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

- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK THAT INDOOR AIR FILTER ARE CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT INSTALLATION IS LEVEL
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS
- ☐ CHECK PULLEY ALIGNMENT AND BELT TENSION REFER INSTALLATION INSTRUCTIONS (Size 007 Standard Motor and Sizes 004-006 Alternate Motor and Drives)
- ☐ CHECK THAT NO ELECTRICAL WIRES ARE IN CONTACT WITH REFRIGERANT TUBING OR SHARP EDGES.
- ☐ VERIFY INSTALLATION OF ECONOMIZER HOOD (IF EQUIPPED)

III. START-UP:

ELECTRICAL

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

TEMPERATURES AND PRESSURES

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

REFRIGERANT SUCTION	______	PSIG
SUCTION LINE TEMPERATURE	______	F
REFRIGERANT DISCHARGE	______	PSIG
LIQUID LINE TEMPERATURE	______	F

- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR IS ROTATING IN THE CORRECT DIRECTION
- ☐ VERIFY REFRIGERANT CHARGE USING COOLING CHARGING CHARTS ON PAGE 47 (COOLING MODE ONLY). UNIT MUST OPERATE A MINIMUM OF 15 MINUTES BEFORE ADJUSTING CHARGE.

GENERAL

- ☐ SET ECONOMIZER MINIMUM VENT AND CHANGEOVER SETTINGS TO MATCH JOB REQUIREMENTS (IF EQUIPPED)

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

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