50TFF007-014
Single-Package Rooftop Cooling Units
50 Hz

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 extinguishers available for all brazing operations.

⚠ WARNING

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

⚠ CAUTION

Ensure voltage listed on unit data plate agrees with electrical supply provided for the unit.

INSTALLATION

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

Step 1 — Provide Unit Support

ROOF CURB — Assemble and install accessory roof curb in accordance with instructions shipped with curb. See Fig. 1 and 2. Install insulation, cant strips, roofing, and counter flashing as shown. *Ductwork must be attached to curb, not to unit.* If electric or control power is to be routed through the curb, attach the accessory thru-the-bottom service connection plates to the roof curb in accordance with the accessory installation instructions. Connection plates must be installed before unit is set on 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 and 2. Improperly applied gasket can also result in air leaks and poor unit performance.

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

SLAB MOUNT (Horizontal Units Only) — Provide a level concrete slab that extends a minimum of 152 mm (6 in.) beyond unit cabinet. The slab should be 203 mm (8 in.) thick with 102 mm (4 in.) above grade. Install a gravel apron in front of outdoor-air inlet to prevent grass and foliage from obstructing airflow.

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

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

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

If 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 to combustibles is not required around ductwork on vertical discharge units. On horizontal discharge units, a minimum clearance of 25 mm (1 in.) is required for the first 305 mm (12 in.) of ductwork. Cabinet return-air static shall not exceed –87 Pa (–.35 in. wg) with economizer or –12 Pa (–.45 in. wg) without economizer.

ROOF CURB ACCESSORY	"A"	UNIT SIZE 50TFF
CRRFCURB001A00	1′-2″ [356]	007
CRRFCURB002A00	2′-0″ [610]	

B	C	D ALT DRAIN HOLE	"E" GAS	"F" POWER	"G" CONTROL	CONNECTOR PKG. ACCY.
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]	CRBTMPWR001A00
				1 1/4″ [31.7] NPT		CRBTMPWR002A00
			1/2″ [12.7] NPT	3/4″ [19] NPT	1/2″ [12.7]	CRBTMPWR003A00
			3/4″ [19] NPT	1 1/4″ [31.7] NPT		CRBTMPWR004A00

NOTES:
1. Roof curb accessory is shipped disassembled.
2. Insulated panels.
3. Dimensions in [ ] are in millimeters.
4. Roof curb: galvanized steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Service clearance 4 ft on each side.
7. Direction of airflow.
8. Connector packages CRBTMPWR001A00 and 002A00 are for thru-the-curb connections. Packages CRBTMP003A00 and 004A00 are for thru-the-bottom connections.

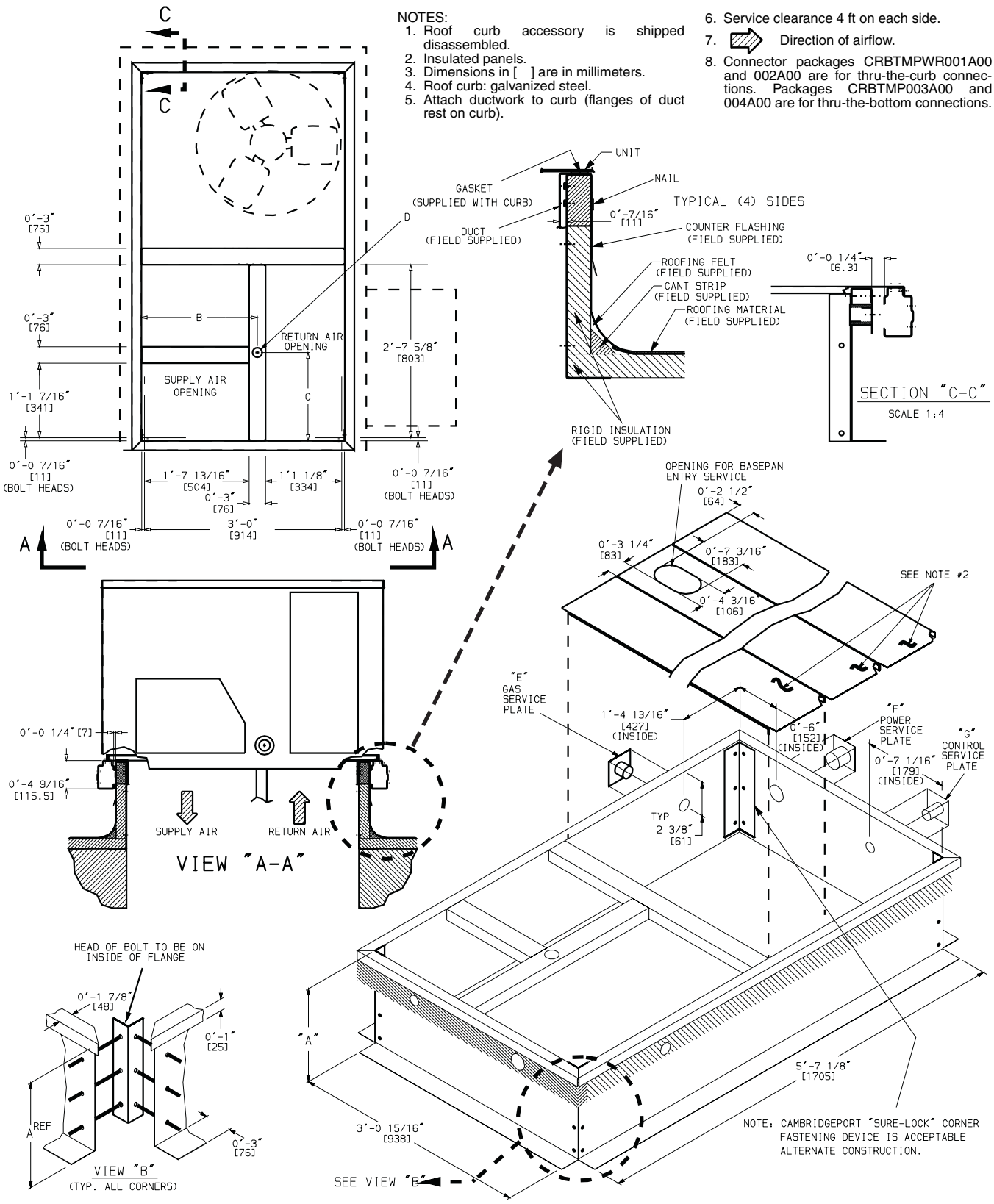


Fig. 1 — Roof Curb Details, 50TFF007

ROOF CURB ACCESSORY	"A"	UNIT SIZE 50TFF
CRRFCURB003A00	1′-2″ [356]	008-014
CRRFCURB004A00	2′-0″ [610]	

"B"	"C"	"D" ALT DRAIN HOLE	"E" GAS	"F" POWER	"G" CONTROL	CONNECTOR PACKAGE ACCESSORY
2′-8 7/16″ [827]	1′-10 15/16″ [583]	1 3/4″ [44.5]	3/4″ [19] NPT	3/4″ [19] NPT	1/2″ [12.7] NPT	CRBTMPWR001A00
				1 1/4″ [31.7] NPT		CRBTMPWR002A00
			1/2″ [12.7] NPT	3/4″ [19] NPT	1/2″ [12.7] NPT	CRBTMPWR003A00
			3/4″ [19] NPT	1 1/4″ [31.7] NPT		CRBTMPWR004A00

NOTES:
1. Roof curb accessory is shipped disassembled.
2. Insulated panels, 1 in. thick polyurethane foam, 1 3/4 lb density.
3. Dimensions in [ ] are in millimeters.
4. Roof curb: 16 gage steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Service clearance 4 ft on each side.
7. Direction of airflow.
8. Connector packages CRBTMPWR001A00 and 002A00 are for thru-the-curb connections. Packages CRBTMP003A00 and 004A00 are for thru-the-bottom connections.

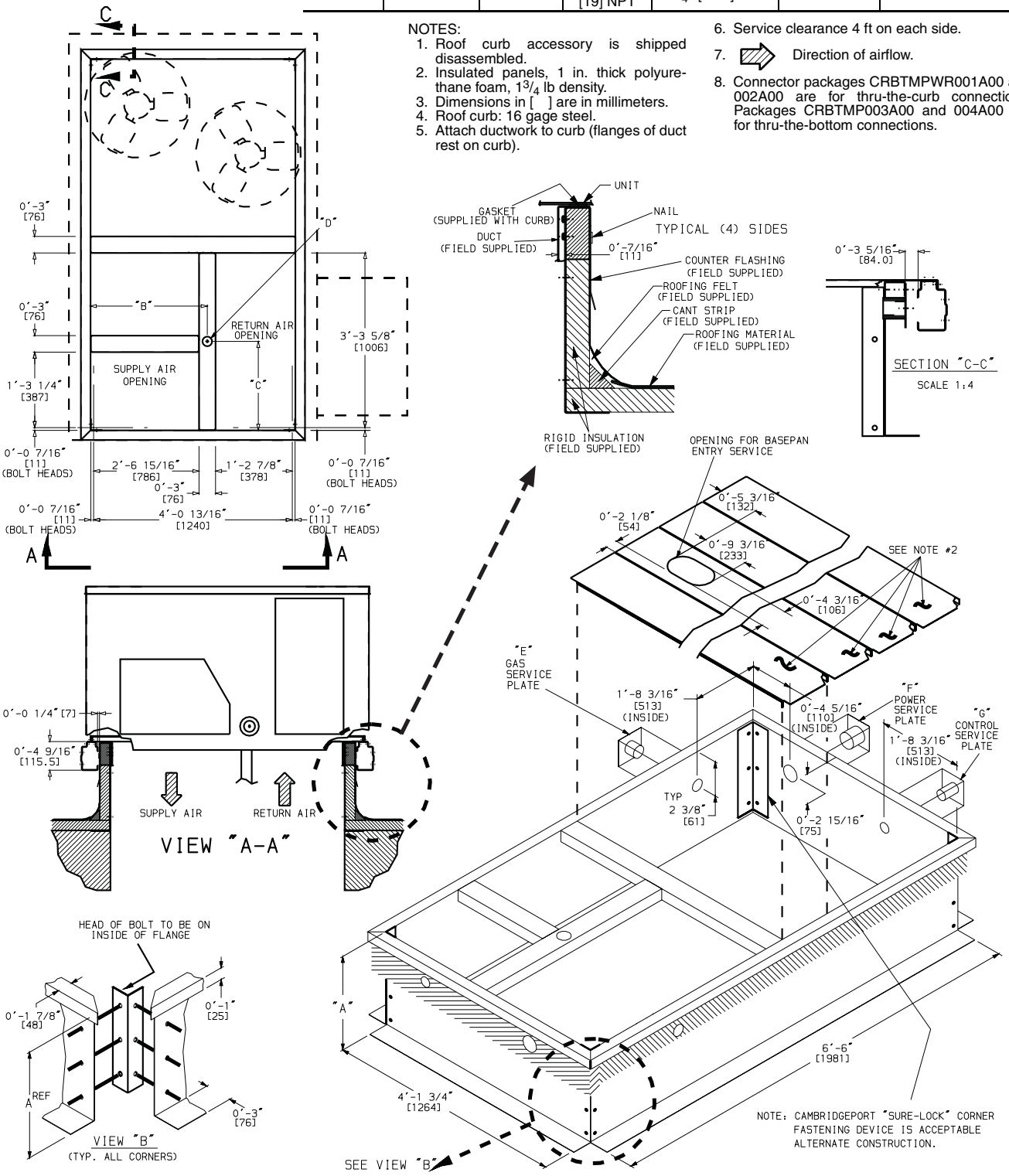
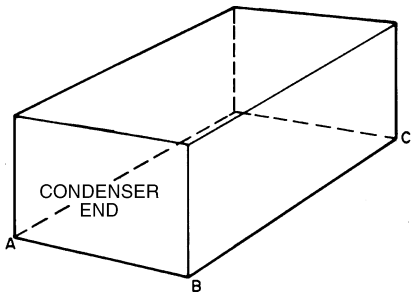


Fig. 2 — Roof Curb Details, 50TFF008-014

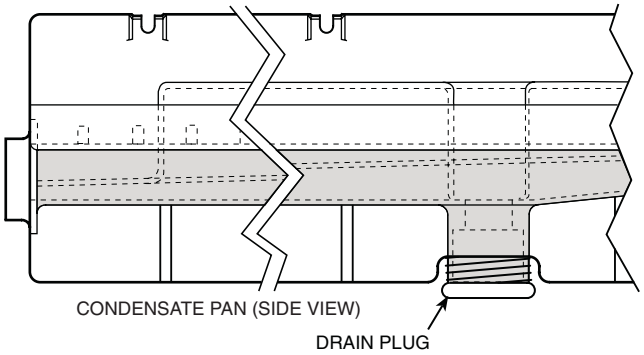


(Size 007-014)

MAXIMUM ALLOWABLE DIFFERENCE (in.)

A-B		B-C		A-C	
mm	in.	mm	in.	mm	in.
13	.5	25	1.0	25	1.0

Fig. 3 — Unit Leveling Tolerances



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

Fig. 4 — Condensate Drain Connection

Step 3 — Install External Trap for Condensate Drain — The unit's 19-mm ($^3/_4$-in.) condensate drain connections are located at the bottom and side of the unit. Unit discharge connections do not determine the use of drain connections; either drain connection can be used with either vertical or horizontal applications.

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. See Fig. 4. 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 100 mm (4 in.) deep and protect against freeze-up. If drain line is installed downstream from the external trap, pitch the line away from the unit at 25 mm (1 in.) per 3 mm (10 ft) of run. Do not use a pipe size smaller than the unit connection.

Step 4 — Rig and Place Unit — Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Tables 1A and 1B and Fig. 5 and 6 for additional information. Operating weight is shown in Table 1A and 1B and Fig. 5 and 6.

Lifting holes are provided in base rails as shown in Fig. 8 and 9. Refer to rigging instructions on unit.

⚠ CAUTION

All panels must be in place when rigging.

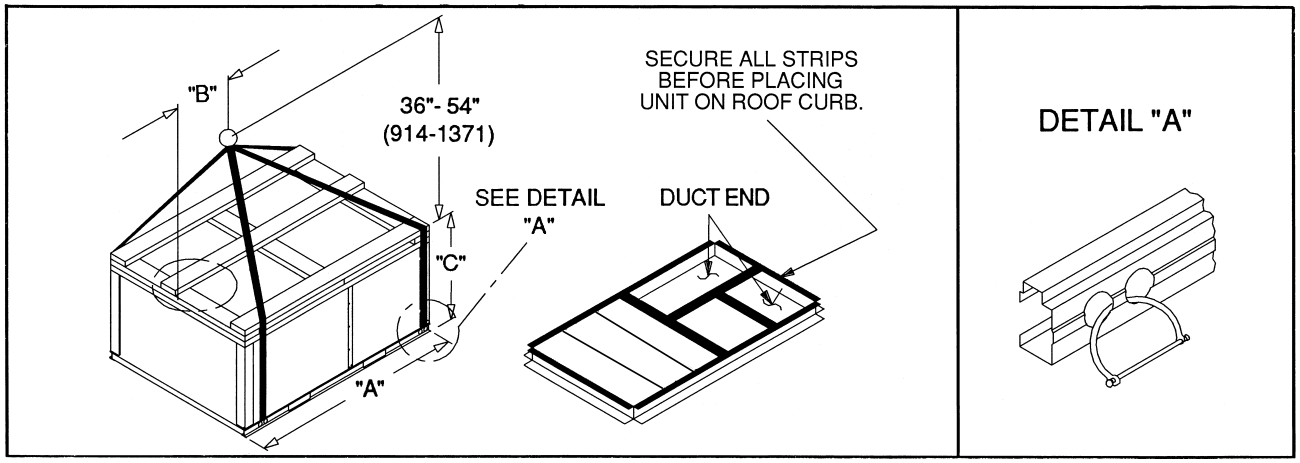
POSITIONING — Maintain clearance around and above unit to provide proper airflow and service access. See Fig. 7 and 8.

Positioned unit on roof curb so that the following clearances are maintained: 7 mm ($^1/_4$-in.) clearance between roof curb and base rails on each side and duct end of unit: size 007 6.3 mm ($^1/_4$-in.), sizes 008-014 84 mm ($3^5/_{16}$-in.) clearance between roof curb and rear of unit (condenser end) (see Fig. 1 and 2, section C-C.)

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

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

After unit is in position, remove shipping materials.



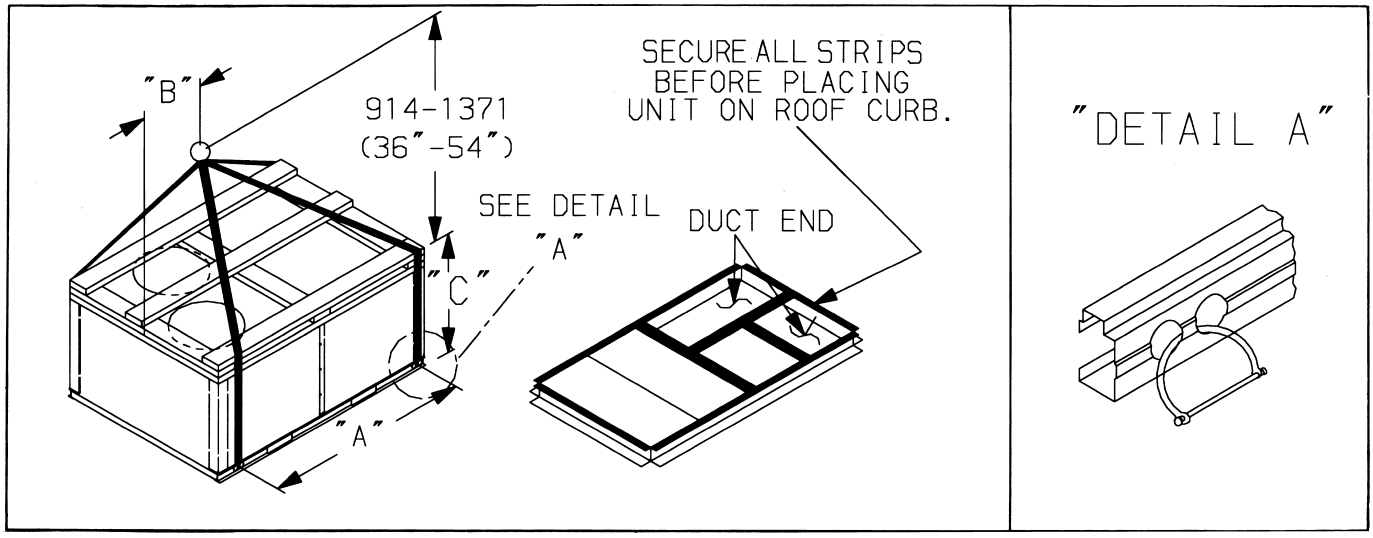
NOTES:
1. Dimension in ( ) is in millimeters.
2. Hook rigging shackles through holes in base rail, as shown in detail "A." Holes in base rails are centered around the unit center of gravity. Use wooden top skid, when rigging, to prevent rigging straps from damaging unit.
3. Weights do not include economizer.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

UNIT 50TFF	MAX WEIGHT		DIMENSIONS					
			"A"		"B"		"C"	
	lb	kg	in.	mm	in.	mm	in.	mm
007	470	213	73.69	1872	35	889	33.35	847

⚠ CAUTION

All panels must be in place when rigging.

Fig. 5 — Rigging Details, 50TFF007



UNIT 50TFF	MAX WEIGHT		DIMENSIONS					
			"A"		"B"		"C"	
	lb	kg	in.	mm	in.	mm	in.	mm
008	755	342	77.42	1967	40.25	1022	41.31	1050
009	760	345	77.42	1967	40.25	1022	41.31	1050
012	915	415	77.42	1967	40.25	1022	49.31	1253
014	930	422	77.42	1967	40.25	1022	49.31	1253

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

⚠ CAUTION

All panels must be in place when rigging.

Fig. 6 — Rigging Details, 50TFF008-014

UNIT	STD UNIT WEIGHT		DURABLADE ECON WEIGHT		(A) CORNER WEIGHT		(B) CORNER WEIGHT		(C) CORNER WEIGHT		(D) CORNER WEIGHT		"A" PANEL LENGTH
	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs	Kg	
50TFF007	470	213.2	34	15.4	148	67.1	103	46.7	155	70.3	64	29.0	1′-0 3/8″ [315.0]

	CONNECTION SIZES
A	1 3/8″ Dia. [35] Field Power Supply Hole
B	2″ Dia. [51] Power Supply Knockout
C	2 1/2″ Dia. [64] Power Supply Knockout
D	7/8″ Dia. [22] Field Control Wiring Hole
E	3/4″– 14 NPT Condensate Drain

BOTTOM POWER CHART, THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGES — CRBTMPWR001A00 (1/2″, 3/4″)

THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (Max.)
1/2″ 3/4″	24 V Power	7/8″ [22.2] 1 1/8″ [28.4]

NOTES:
1. Dimensions in [ ] are in millimeters.
2. Center of gravity.
3. Direction of airflow.
4. On vertical discharge units, ductwork to be attached to accessory roof curb only. For horizontal discharge units field-supplied flanges should be attached to horizontal discharge openings, and all ductwork should be attached to the flanges.
5. Minimum clearance (local codes or jurisdiction may prevail):
   a. Between unit, flue side and combustible surfaces, 36 inches.
   b. Bottom of unit to combustible surfaces (when not using curb) 1 inch. Bottom of base rail to combustible surfaces (when not using curb) 0 inches.
   c. Condenser coil, for proper airflow, 36 in. one side, 12 in. the other. The side getting the greater clearance is optional.
   d. Overhead, 60 in. to assure proper condenser fan operation.
   e. Between units, control box side, 42 in. per NEC.
   f. Between unit and ungrounded surfaces, control box side, 36 in. per NEC.
   g. Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC.
   h. Horizontal supply and return end, 0 inches.
6. With the exception of the clearance for the condenser coil and combustion side as stated in Note 5a, b, and c, a removable fence or barricade requires no clearance.
7. Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material if set on base rail.
8. The vertical center of gravity is 1′-6″ [457] up from the bottom of the base rail.

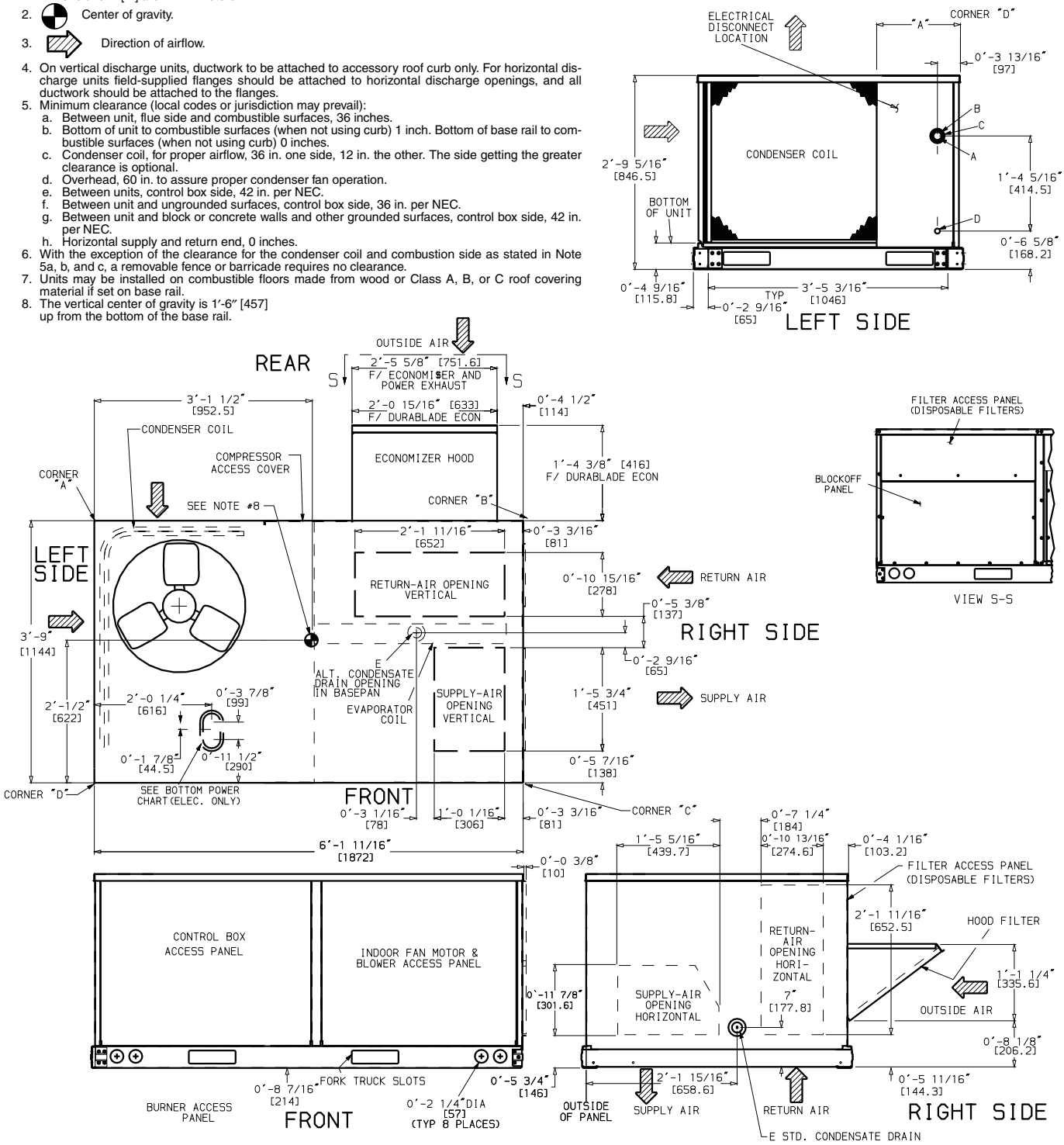


Fig. 7 — Base Unit Dimensions — 50TFF007

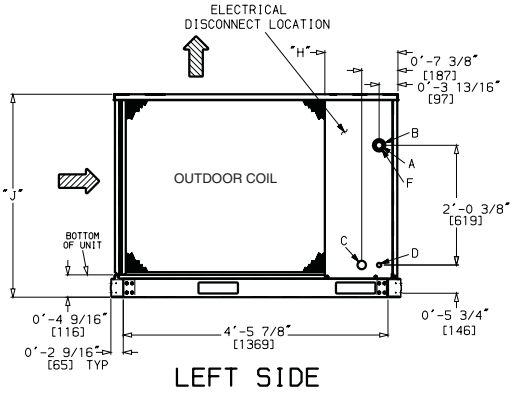
UNIT	STD UNIT WEIGHT		DURABLADE ECONOMIZER WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		"H"		"J"		"K"	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm
50TFF008	755	342	44	20	164	74	140	64	208	94	243	110	1-2 7/8	378	3-5 5/16	1050	2-9 11/16	856
50TFF009	760	345	44	20	165	75	141	64	209	94	245	111	3-3 7/8	1013	3-5 5/16	1050	2-9 11/16	856
50TFF012	915	415	44	20	199	90	170	77	252	114	294	134	2-5 7/8	759	4-1 5/16	1253	3-0 3/8	924
50TFF014	930	422	44	20	202	92	172	78	256	116	300	136	1-2 7/8	378	4-1 5/16	1253	3-0 3/8	924

	CONNECTION SIZES
A	1 3/8″ Dia. [35] Field Power Supply Hole
B	2 1/2″ Dia. [64] Power Supply Knockout
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″ Dia. [51] Power Supply Knockout

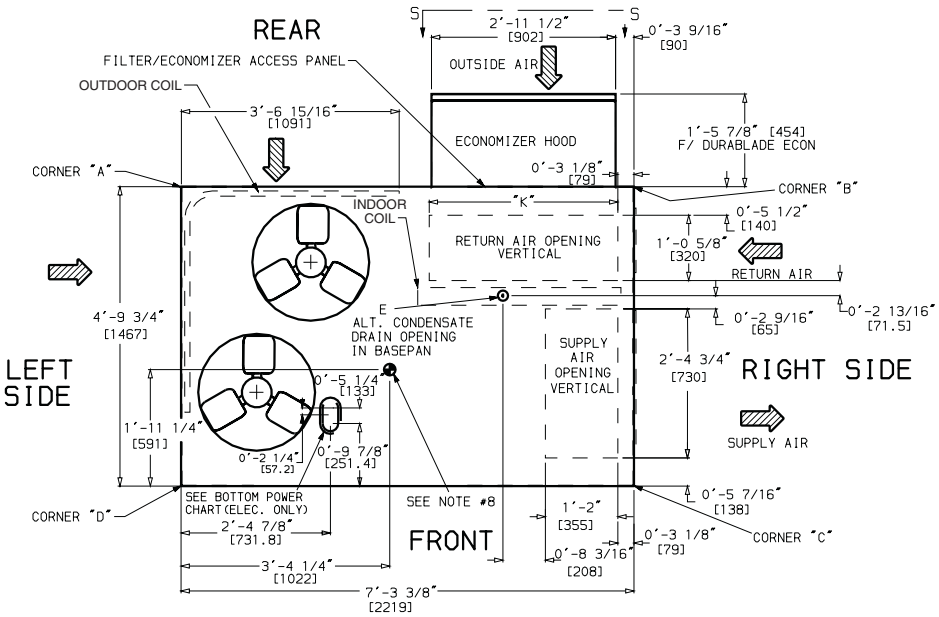
BOTTOM POWER CHART, THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGES — CRBTMPWR001A00 (1/2″, 3/4″) OR CRBTMPWR002A00 (1/2″, 1 1/4″)

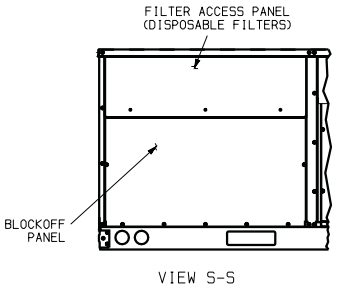
THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (Max.)
1/2″	24 V	7/8″ [22.2]
3/4″	Power*	1 1/8″ [28.4]
1 1/4″ FPT	Power*	1 3/4″ [44.4]

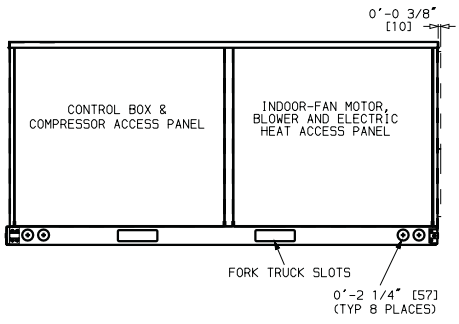
*Select either 3/4″ or 1 1/4″ for power, depending on wire size.



NOTES:
1. Dimensions in [ ] are in millimeters.
2. Center of gravity.
3. Direction of airflow.
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 in. clearance to ductwork for 1 ft.
   b. Condenser coil, for proper airflow, 36 in. one side, 12 in. the other. The side getting the greater clearance is optional.
   c. Overhead, 60 in. to assure proper condenser fan operation.
   d. Between units, control box side, 42 in. per NEC (National Electrical Code).
   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.
6. With the exception of the clearance for the condenser coil as stated in Notes 5a, b, and c, a removable fence or barricade requires no clearance.
7. Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material.
8. The vertical center of gravity is 1'-7 1/2″ [495] for 008 and 009, 2'-0″ [610] for 012 and 014 up from the bottom of the base rail.







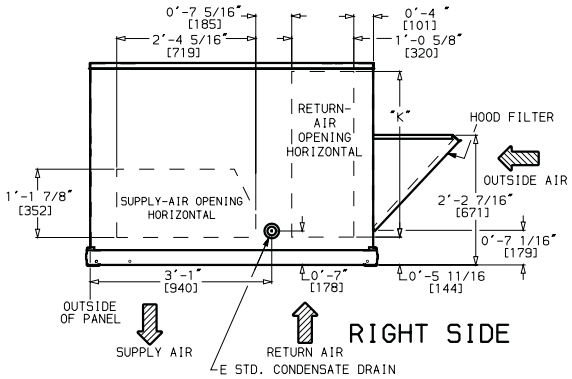


Fig. 8 — Base Unit Dimensions — 50TFF008-014

Table 1A — Physical Data (SI)

UNIT SIZE 50TFF	007	008	009	012	014
NOMINAL CAPACITY (kW)	21.1	26.4	29.9	35.2	44.0
OPERATING WEIGHT (kg)					
Unit	213	342	345	415	422
Durablade Economizer	15.4	20	20	20	20
Roof Curb	52	65	65	65	65
COMPRESSOR TYPE	Scroll	Reciprocating	Reciprocating	Reciprocating	Scroll
Quantity	1	2	2	2	2
Oil (ml)	1597	1479 ea	1479 ea	1479 ea	1597 ea
REFRIGERANT TYPE	R-22				
Operating Charge (kg)					
Circuit 1	3.22	2.10	2.54	2.49	3.49
Circuit 2	—	2.13	2.54	2.55	3.40
CONDENSER COIL	Enhanced Copper Tubes, Aluminum Lanced Fins				
Rows. Fins/m	2...669	1...6669	2...669	2...669	2...669
Total Face Area (sq m)	0.97	1.90	1.67	1.62	2.30
CONDENSER FAN	Propeller Type				
Nominal L/s	1415	2880	2880	3050	3050
Quantity...Diameter (mm)	1...559	2...559	2...559	2...559	2...559
Motor BkW...r/s	.25...16.0	.19...15.5	.19...15.5	.19...15.5	.19...15.5
Watts Input (Total)	230	500	500	500	500
EVAPORATOR COIL	Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Acutrol™ Feed Device				
Rows...Fins/m	4...590	3...590	3...590	3...590	4...590
Total Face Area (sq m)	0.51	0.74	0.74	0.93	1.03
EVAPORATOR FAN	Centrifugal Type				
Quantity...Size (mm x mm)	1...254 x 254	1...381 x 381	1...381 x 381	1...381 x 381	1...381 x 381
Type Drive	Belt	Belt	Belt	Belt	Belt
Nominal L/s	1130	1230	1420	1700	1980
Motor kW	1.12	1.12	1.12	1.50	2.24
Maximum Continuous BkW	1.79	1.79	1.79	2.16	3.13
Motor Frame Size	56	56	56	56	56
Fan r/s Range	15.50-20.08	10.33-14.67	10.33-14.67	11.50-15.00	11.50-15.00
Motor Bearing Type	Ball	Ball	Ball	Ball	Ball
Maximum Allowable r/s	35.0	26.7	26.7	26.7	26.7
Motor Pulley Pitch Diameter Min/Max (mm)	86/112	61/86	61/86	86/12	102/127
Nominal Motor Shaft Diameter (mm)	16	16	16	16	22
Fan Pulley Pitch Diameter (mm)	132	140	140	178	203
Nominal Fan Shaft Diameter (mm)	—	25	25	25	25
Belt, Quantity...Type...Length (mm)	1...A...1092	1...A...1219	1...A...1219	1...A...1295	1...A...1448
Pulley Center Line Distance (mm)	406	406	406	495	495
Speed Change per Full Turn of Movable Pulley Flange (r/s)	.92	.83	.83	.67	.58
Movable Pulley Maximum Full Turns From Closed Position	5	5	5	5	5
Factory Setting	5	5	5	5	5
Factory Speed Setting (r/s)	15.50	10.33	10.33	11.50	11.83
Fan Shaft Diameter at Pulley (mm)	16	25	25	25	25
HIGH-PRESSURE SWITCH (kPa)*					
Standard Compressor Internal Relief (Differential)	3448 ± 345	3103 ± 345			3448 ± 345
Cutout		2951			
Reset (Auto.)		2206			
LOW-PRESSURE SWITCH (kPa)*					
Cutout		48 ± 21			
Reset (Auto.)		152 ± 48			
FREEZE PROTECTION THERMOSTAT*					
Opens (C)		–1			
Closes (C)		7			
OUTDOOR-AIR INLET SCREENS	Cleanable				
Quantity...Size (mm)	1...508 x 610 x 25	1...508 x 635 x 25 1...406 x 635 x 25			
RETURN-AIR	Throwaway				
Quantity...Size (mm)	2...406 x 635 x 51	4...406 x 508 x 51	4...406 x 508 x 51	4...508 x 508 x 51	4...508 x 508 x 51

LEGEND

Bhp — Brake Horsepower
BkW — Fan Input Watts x Motor Efficiency

*Requires the accessory Controls Upgrade Kit.

NOTE: The 50TFF007-014 units have a loss-of-charge/low-pressure switch (accessory) located in the liquid line.

Table 1B — Physical Data (English)

UNIT SIZE 50TFF	007	008	009	012	014
NOMINAL CAPACITY (tons)	6	7 1/2	8 1/2	10	12 1/2
OPERATING WEIGHT (lb)					
Unit	470	755	760	915	930
Durablade Economizer	34	44	44	44	44
Roof Curb	115	143	143	143	143
COMPRESSOR TYPE	Scroll	Reciprocating	Reciprocating	Reciprocating	Scroll
Quantity	1	2	2	2	2
Oil (oz)	54 ea	50 ea	50 ea	50 ea	54 ea
REFRIGERANT TYPE	R-22				
Operating Charge (lb-oz)					
Circuit 1	8-1	4-10	5-7	5- 8	7-11
Circuit 2	—	4-11	5-7	5-10	7- 8
CONDENSER COIL	Enhanced Copper Tubes, Aluminum Lanced Fins				
Rows. Fins/in.	2...17	1...17	2...17	2...17	2...17
Total FAce Area (sq ft)	10.42	20.50	18.00	17.42	25.00
CONDENSER FAN	Propeller Type				
Nominal Cfm	3000	6100	6100	6500	6500
Quantity...Diameter (in.)	1...22.0	2...22	2...22	2...22	2...22
Motor Hp...Rpm	1/3...960	1/4...930	1/4...930	1/4...930	1/4...930
Watts Input (Total)	230	500	500	500	500
EVAPORATOR COIL	Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Acutrol™ Feed Device				
Rows...Fins/in.	4...15	3...15	3...15	3...15	4...15
Total Face Area (sq ft)	5.5	8.0	8.0	10.0	11.1
EVAPORATOR FAN	Centrifugal Type				
Quantity...Size (in.)	1...10 x 10	1...15 x 15	1...15 x 15	1...15 x 15	1...15 x 15
Type Drive	Belt	Belt	Belt	Belt	Belt
Nominal Cfm	2400	2600	3000	3600	4200
Motor Hp	1 1/2	1 1/2	1 1/2	2	3
Maximum Continuous Bhp	2.40	2.40	2.40	2.90	4.20
Motor Frame Size	56	56	56	56	56
Fan Rpm Range	930-1205	620-880	620-880	690-900	710-890
Motor Bearing Type	Ball	Ball	Ball	Ball	Ball
Maximum Allowable Rpm	2100	1600	1600	1600	1600
Motor Pulley Pitch Diameter Min/Max (in.)	3.3/4.4	2.4/3.4	2.4/3.4	3.4/4.4	4.0/5.0
Nominal Motor Shaft Diameter (in.)	1/2	5/8	5/8	5/8	7/8
Fan Pulley Pitch Diameter (in.)	5.2	5.5	5.5	7.0	8.0
Nominal Fan Shaft Diameter (in.)	—	1.0	1.0	1.0	1.0
Belt, Quantity...Type...Length (in.)	1...A...40	1...A...48	1...A...48	1...A...51	1...A...51
Pulley Center Line Distance (in.)	16	16	16	19.5	19.5
Speed Change per Full Turn of Movable Pulley Flange (rpm)	55	50	50	41	35
Movable Pulley Maximum Full Turns From Closed Position	5	5	5	5	5
Factory Setting	5	5	5	5	5
Factory Speed Setting (rpm)	930	620	620	690	710
Fan Shaft Diameter at Pulley (in.)	5/8	1	1	1	1
HIGH-PRESSURE SWITCH (psig)*					
Standard Compressor Internal Relief (Differential)	500 ± 50	450 ± 50			500 ± 50
Cutout		428			
Reset (Auto.)		320			
LOW-PRESSURE SWITCH (psig)*					
Cutout		7 ± 3			
Reset (Auto.)		22 ± 7			
FREEZE PROTECTION THERMOSTAT*					
Opens		30 ± 5			
Closes		45 ± 5			
OUTDOOR-AIR INLET SCREENS	Cleanable	Cleanable			
Quantity...Size (in.)	1...20 x 24 x 1	1...20 x 25 x 1 1...16 x 25 x 1			
RETURN-AIR	Throwaway				
Quantity...Size (in.)	2...16 x 25 x 2	4...16 x 20 x 2	4...16 x 20 x 2	4...20 x 20 x 2	4...20 x 20 x 2

LEGEND

Bhp — Brake Horsepower
BkW — Fan Input Watts x Motor Efficiency

*Requires the accessory Controls Upgrade Kit.

NOTE: The 50TFF007-014 units have a loss-of-charge/low-pressure switch (accessory) located in the liquid line.

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 U.S.A. National Electrical Code (Ref: ANSI/NFPA, [American National Standards Institute/National Fire Protection Association], latest revision) or equivalent local electrical codes. Failure to follow this warning could result in the installer being liable for personal injury of others.

DISCONNECT BOX LOCATION — On 50TFF007 units, the field-supplied disconnect box may be mounted on the unit's end panel or on the corner post. Mount disconnect box on the left side of the rating plate when mounting on the unit's end panel. Do not mount the disconnect box over the unit rating plate. When mounitng disconnect box on corner post, secure disconnect box to corner post and condenser coil top cover. See Fig. 10.

A disconnect box mounting space is available on 50TFF007 units when the optional or accessory condenser coil grille is used. Mount the disconnect on the sheet metal provided with the condenser coil grille. The sheet metal is located adjacent to the corner post on the left side of the power wiring access panel. For 50TFF008-014 units, refer to Fig. 7 and 8 for disconnect mounting location.

FIELD POWER SUPPLY — All units are factory wired for the voltage shown on the nameplate.

Refer to unit label diagram for additional information. Lead wires are provided for field wire connections. Use factory-supplied splices or suitable copper connector.

When installing units, provide a disconnect.

NOTE: If accessory thru-the-bottom connections are used, refer to the accessory installation instructions for power wiring. Refer to Fig. 7 and 8 for drilling holes in basepan.

All field wiring must comply with local requirements.

Install field wiring as follows:

Size 007:

1. Install conduit between disconnect and power wiring access panel. See Fig. 9.
2. Install power lines to power wiring leads as shown in Fig. 10.
3. Power wiring leads are located inside power wiring panel.

Sizes 008-014:

1. Install conduit through side panel openings. Install conduit between disconnect and control box. Refer to Fig. 11 and 12.
2. Install power lines to terminal connections as shown in Fig. 13.

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate (see Table 2). Voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in Table 2, Note 2 to determine the percent voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable Carrier warranty.

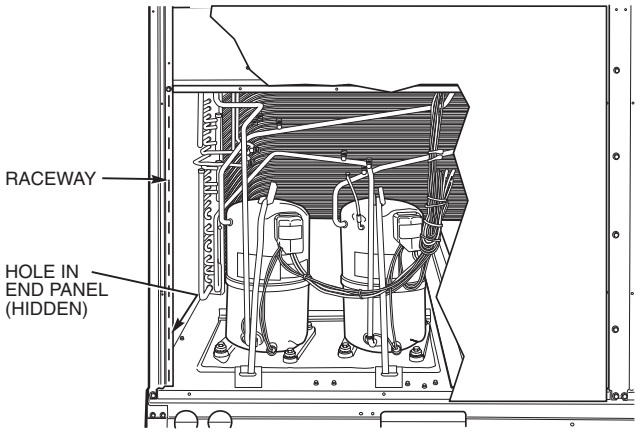
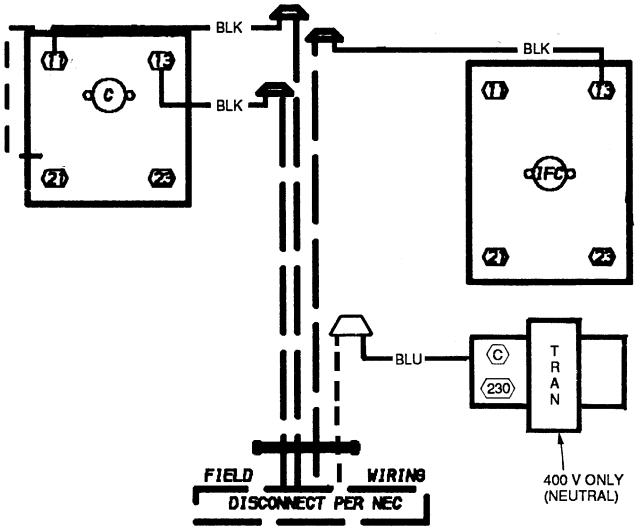


Fig. 9 — Typical Field Control Wiring Raceway



LEGEND

C	— Contactor	———	Factory Wiring
IFC	— Indoor (Evaporator) Fan Contactor	- - - -	Field Wiring
NEC	— National Electrical Code (U.S.A.)		Splice Connection (Factory Supplied)
TRAN	— Transformer		

Fig. 10 — Power Wiring Connections, 50TFF007

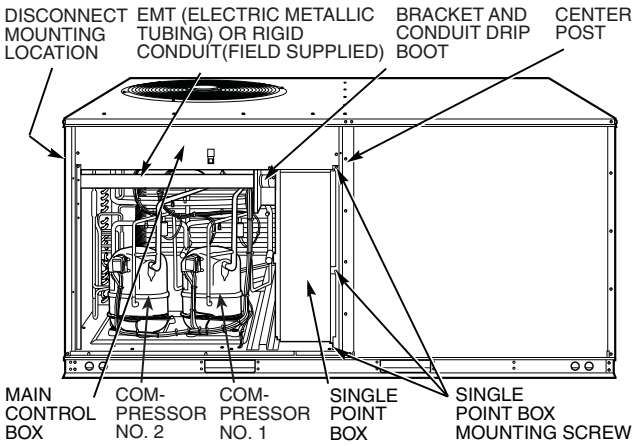


Fig. 11 — Component Location (50TFF008-014 Shown)

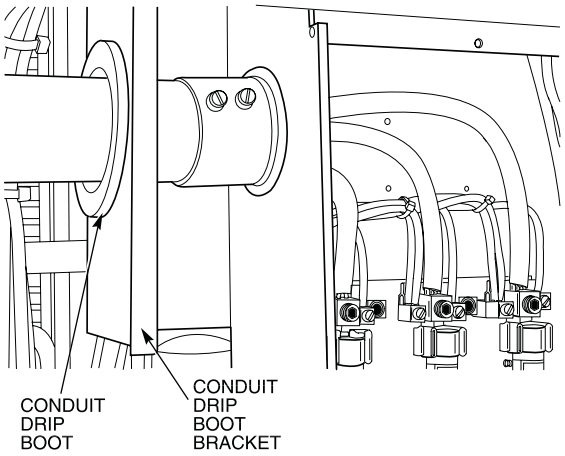
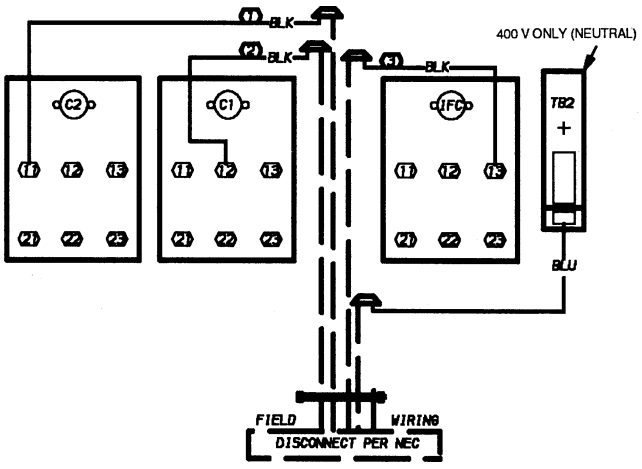


Fig. 12 — Conduit Installation (50TFF008-014 Shown)



LEGEND

C — Contactor
IFC — Indoor (Evaporator) Fan Contactor
NEC — National Electrical Code (U.S.A.)
TB — Terminal Block
Field Wiring
Factory Wiring
Splice Connection (Factory Supplied)

Fig. 13 — Power Wiring Connections, 50TFF008-014

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

Route thermostat cable or equivalent single leads of colored wire from subbase terminals to low-voltage connections on unit (shown in Fig. 14 and 15) as described below.

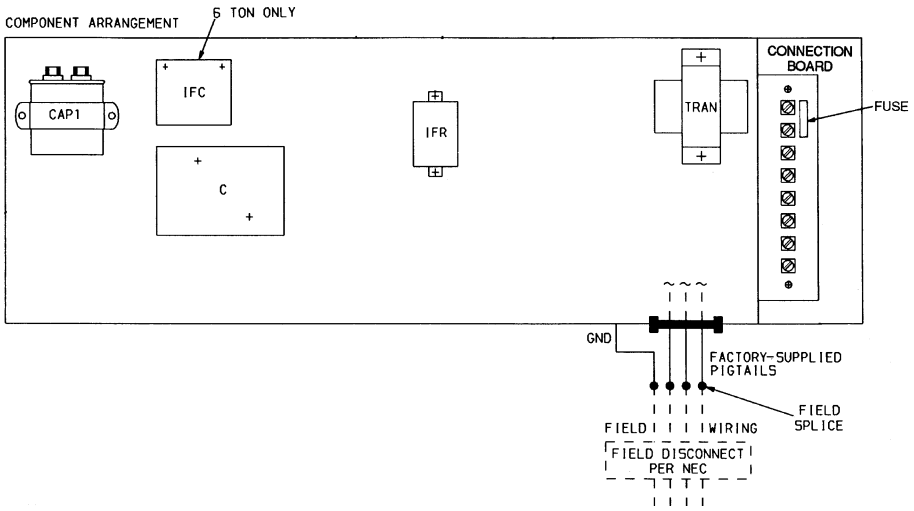
NOTE: For wire runs up to 15 m (50 ft), use no. 18 AWG (American Wire Gage) insulated wire (35 C minimum). For 15 m to 23 m (50 to 75 ft), use no. 16 AWG insulated wire (35 C minimum). For over 23 m (75 ft), use no. 14 AWG insulated wire (35 C minimum). All wire larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and a splice at the thermostat. See Table 3 for American/European wire conversions.

50TFF007 Units:

1. Feed control wires through the raceway located between the condenser coil top cover and burner side panel. See Fig. 9.
2. Connect control wires to corresponding screw terminals (the low-voltage connections located inside low-voltage access panel). The low-voltage connections provide the UL (Underwriters' Laboratories, U.S.A.) required clearance between high- and low-voltage wiring.

50TFF008-014 Units:

1. If unit is mounted on roof curb and accessory thru-the-curb service plate connection is used, route wire through connection plate.
2. Pass control wires through the hole provided on unit (see connection D, Connection Sizes table, Fig 8).
3. Feed 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. 11. The raceway provides the UL-required (Underwriters' Laboratories, U.S.A.) clearance between the high- and low-voltage wiring.
4. Connect thermostat wires to screw terminals of low-voltage connector.
5. If unit is to be equipped with electric resistance heat, ensure thermostat on a call for heat "W" energizes "G" output. This allows fan operation on a call for heat.



LEGEND

C — Contactor
CAP — Capacitor
GND — Ground
IFC — Indoor (Evaporator) Fan Contactor
IFR — Indoor (Evaporator) Fan Relay
NEC — National Electrical Code (U.S.A.)
TRAN — Transformer

Fig. 14 — Field Control Wiring Connections, 50TFF007

Table 2 — Electrical Data

UNIT 50TFF	NOMINAL VOLTAGE (50 Hz)	VOLTAGE RANGE		COMPR		OFM (ea)	IFM	ELECTRIC HEAT*		POWER SUPPLY		MINIMUM UNIT DISCONNECT	
		Min	Max	RLA	LRA	FLA	FLA	Nominal kW†	FLA	MCA	MOCP**	FLA	LRA
007	400 (3 phase)	360	440	10.6	73.0	1.6	2.6	— 6.0 11.5 14.0 23.0 25.5	— 7.2 13.8 16.8 27.8 30.7	17.5 17.5 17.6 20.8 32.0 35.2	25 25 25 25 35 40	17 17 17 19 29 32	95
008	220/240 (3 phase)	187	254	13.6	73.4	1.4	5.8	—/— 8.7/10.4 13.4/16.0 20.8/24.8 26.9/32.0 35.6/42.4	—/— 22.9/ 25.0 35.3/ 38.5 54.7/ 59.7 70.5/ 77.0 93.5/102.0	39.2/ 39.2 39.2/ 39.2 51.3/ 55.4 75.6/ 81.8 95.4/103.5 124.1/134.8	45/ 45 45/ 45 60/ 60 80/ 90†† 100/110†† 125/150††	41/ 41 41/ 41 47/ 51 70/ 75 88/ 95 114/124	194/194
	400 (3 phase)	360	440	6.2	37.7	0.8	2.6	— 9.7 11.5 19.3 22.9 29.0	— 15.2 18.0 30.3 36.1 45.5	18.0 22.2 25.8 41.1 48.4 60.1	25 25 30 45 50 70††	19 21 24 38 45 55	99
009	220/240 (3 phase)	187	254	15.8	92.0	1.4	5.8	—/— 8.7/10.4 13.4/16.0 20.8/24.8 26.9/32.0 35.6/42.4	—/— 22.9/ 25.0 35.3/ 38.5 54.7/ 59.7 70.5/ 77.0 93.5/102.0	44.2/ 442 44.2/ 44.2 51.3/ 55.4 75.6/ 81.8 95.4/103.5 124.1/134.8	50/ 50 50/ 50 50/ 60 80/ 90†† 100/110†† 125/150††	46/ 46 46/ 46 47/ 51 70/ 75 88/ 95 114/124	231/231
	400 (3 phase)	360	440	7.4	46.0	0.8	2.6	— 9.7 11.5 19.3 22.9 29.0	— 15.2 18.0 30.3 36.1 45.5	20.7 23.2 25.8 41.1 48.4 60.1	25 30 30 45 50 70††	22 24 24 38 45 54	116
012	220/240 (3 phase)	187	254	17.9	110.0	1.4	7.5	—/— 8.7/10.4 13.4/16.0 26.9/32.0 42.0/50.0	—/— 22.9/ 25.0 35.3/ 38.5 70.5/ 77.0 110.2/120.3	48.9/ 48.9 48.9/ 48.9 53.5/ 57.5 97.6/105.6 147.2/129.7	60/ 60 60/ 60 60/ 60 100/110†† 150/150††	51/ 51 51/ 51 52/ 53 90/ 97 135/147	267/267
	400 (3 phase)	360	440	8.6	55.0	0.8	3.4	— 9.7 19.3 22.9 29.0 34.7	— 18.0 30.3 36.1 45.5 54.6	23.4 23.4 42.1 49.4 61.1 72.5	30 30 45 50 70†† 80††	24 24 39 45 56 67	134
014	400 (3 phase)	360	440	10.4	73.0	0.8	6.2	— 11.5 19.3 22.9 29.0 34.7	— 18.0 30.3 36.1 45.5 54.6	29.4 29.4 40.8 47.3 58.2 68.6	35 35 45 50 60 70††	31 31 38 44 54 63	190

LEGEND

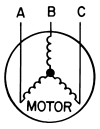
COMPR — Compressor
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Heater capacity (kW) is based on heater voltage of 220 v, 240 v, and 400 v.
†If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly. Heaters are field installed only.
**Fuse or HACR circuit breaker.
††Fusing in single point box provides the required branch circuit protection.

NOTES:
1. In compliance with NEC requirements (U.S.A. Standard) 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.

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

Example: Supply voltage is 460-3-50.



AB = 393 v
BC = 403 v
AC = 396 v

$$\text{Average Voltage} = \frac{393 + 403 + 396}{3}$$

$$= \frac{1192}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 397 – 393 = 4 v
(BC) 403 – 397 = 6 v
(AC) 397 – 396 = 1 v

Maximum deviation is 6 v.

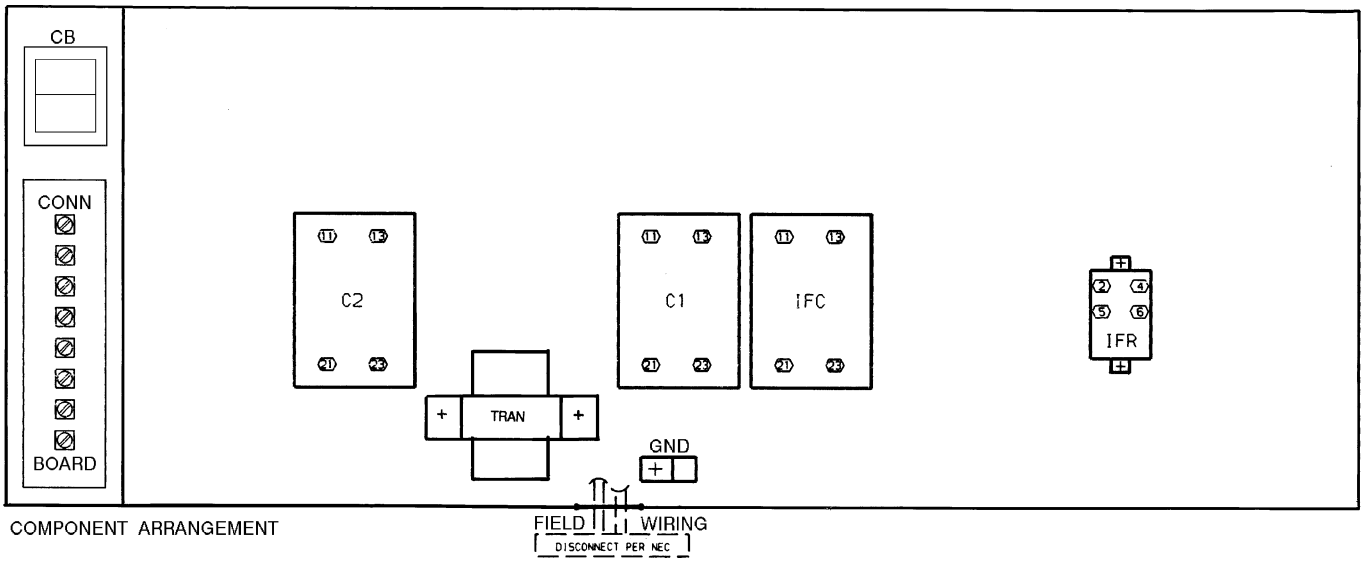
Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{6}{397}$$

$$= 1.5\%$$

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.



COMPONENT ARRANGEMENT

LEGEND

C	— Contactor	**IFC**	— Indoor (Evaporator) Fan Contactor
CB	— Circuit Breaker	**IFR**	— Indoor (Evaporator) Fan Relay
CONN	— Connection	**NEC**	— National Electrical Code (U.S.A.)
GND	— Ground	**TRAN**	— Transformer

Fig. 15 — Field Control Wiring Connections, 50TFF008-014

Table 3 — American/European Wire Conversions

AMERICAN		EUROPEAN
Industry Standard Size	**American Conversion (mm^2)**	**Industry Standard Size (mm^2)**
18 AWG	0.82	1.0
16 AWG	1.30	1.5
14 AWG	2.08	2.5
12 AWG	3.30	4.0
10 AWG	5.25	6.0
8 AWG	6.36	10.0
6 AWG	13.29	16.0
4 AWG	21.14	25.0
3 AWG	26.65	—
2 AWG	33.61	35.0
1 AWG	42.39	50.0
1/0 AWG	53.49	—
2/0 AWG	67.42	70.0
3/0 AWG	85.00	95.0
4/0 AWG	107.19	120.0
250 kcmil	126.64	150.0
300 kcmil	151.97	—
350 kcmil	177.90	185.0
400 kcmil	202.63	240.0
500 kcmil	253.29	300.0
600 kcmil	303.95	—

LEGEND

AWG — American Wire Gage
kcmil — Thousand Circular Mils

HEAT ANTICIPATOR SETTING FOR ACCESSORY ELECTRIC HEATERS — Set heat anticipator setting as shown in Table 4.

Step 6 — Adjust Factory-Installed Options

APOLLO CONTROL — The optional Apollo control is used to actively monitor all modes of operation as well as indoor (evaporator) fan status, filter status, and indoor-air quality. The Apollo control is designed to work with Carrier TEMP and VVT® systems.

The thermostat must be wired to the Apollo control before starting the unit. Refer to the Apollo control installation instructions for information on installing the thermostat. See Fig. 16 for Apollo control location.

MANUAL OUTDOOR-AIR DAMPER

1. Determine quantity of ventilation air required for building. Record amount for use in Step 9.
2. Remove filter access panel by raising panel and swinging panel outward. Panel is now disengaged from track and can be removed. No tools are required to remove filter access panel. Remove and save outdoor-air opening panel and screws. See Fig. 17.

Table 4 — Heat Anticipator Settings

UNIT 50TFF	220 v				
	Heater kW	Configuration			Part No. CRHEATER
		1 Stage	2 Stage		
		Stage 1	Stage 1	Stage 2	
008, 009, 012	8.7	.3	NA	NA	117A00
	13.4	.3	NA	NA	110A00
	20.8	.6	.3	.3	111A00
	26.9	.6	.3	.3	112A00
	35.6	.9	.6	.3	117A00, 112A00
	42.0*	.9	.6	.3	110A00, 112A00
UNIT 50TFF	**400 v**				
	Heater kW	**Configuration**			**Part No. CRHEATER**
		1 Stage	**2 Stage**		
		Stage 1	**Stage 1**	**Stage 2**	
007	6.0	1.1	.8	.3	106A00
	11.5	1.1	.8	.3	108A00
	14.0	1.1	.8	.3	109A00
	23.0	1.1	.8	.3	108A00, 108A00
	25.5	1.1	.8	.3	108A00, 109A00
008-014	9.7*	.3	NA	NA	116A00
	11.5**	.3	NA	NA	113A00
	19.3	.3	NA	NA	114A00
	22.9	.3	NA	NA	115A00
	29.0	.6	.3	.3	116A00, 114A00
	34.7††	.6	.3	.3	113A00, 115A00

*Not available for sizes 007-009.
†Not available for size 014.
**Not available for size 012.
††Not available for sizes 008,009.

3. Separate hood and screen from basepan by removing the screws and brackets securing them. Save all screws and discard brackets.
4. Replace outdoor-air opening panel.
5. Place hood on front of outdoor-air opening panel. See Fig. 18 for hood details.
6. Secure top of hood with the screws removed in Step 3. See Fig. 19.
7. Remove and save screws from sides of the manual outdoor-air damper.
8. Align screw holes on hood with screw holes on side of manual outdoor-air damper assembly. See Fig. 18 and 19. Secure hood with screws saved from Step 7.
9. Adjust minimum position setting of the damper blade by adjusting the manual outdoor-air adjustment screws on the front of the damper blade. See Fig. 17. Slide blade vertically until it is in the appropriate position determined by Fig. 20 or 21. Tighten screws.
10. Remove and save screws currently on sides of hood.
11. Insert screen and secure to the hood using the screws saved in Step 10. See Fig. 19.

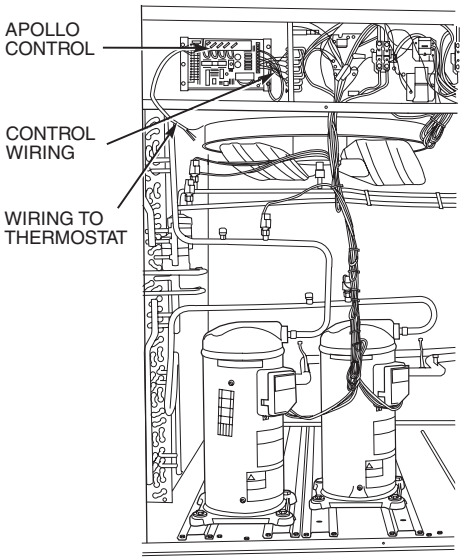


Fig. 16 — Apollo Control Factory-Installed in Typical Unit

OPTIONAL DURABLADE ECONOMIZER — The optional economizer hood assembly is packaged and shipped in the filter section. Damper blades and control boards are installed at the factory and the economizer is shipped in the vertical discharge position.

NOTE: Horizontal discharge block-off plate is shipped with the air hood package. If unit is to be used for vertical duct application, discard this plate.

Assembly

1. Determine if ventilation air is required in building. If so, determine minimum amount to be supplied by each unit and record quantity of ventilation air needed for use in Step 7.
2. Remove filter access panel by raising panel and swinging panel outward. Panel is now disengaged from track and can be removed. No tools are required to remove filter access panel. Remove outdoor-air opening panel. Save panels and screws. See Fig. 22. Remove optional outdoor-air damper hood package from filter section.

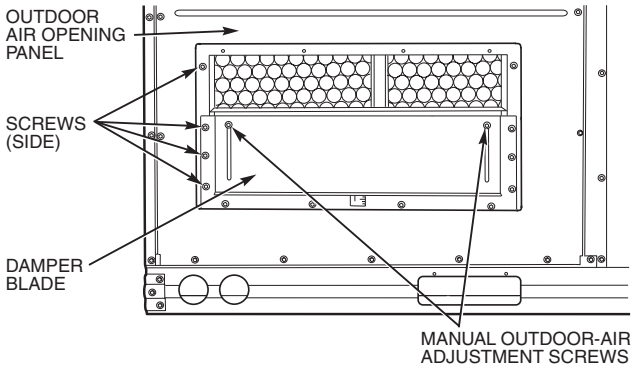


Fig. 17 — Damper Panel with Manual Outdoor-Air Damper Installed

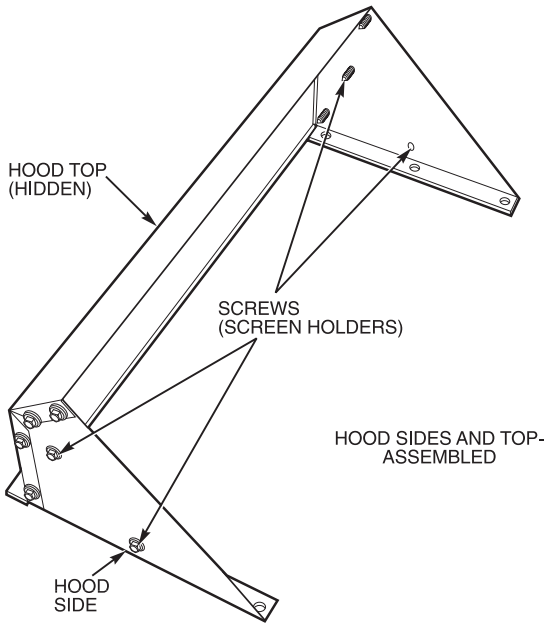


Fig. 18 — Outdoor-Air Hood Details

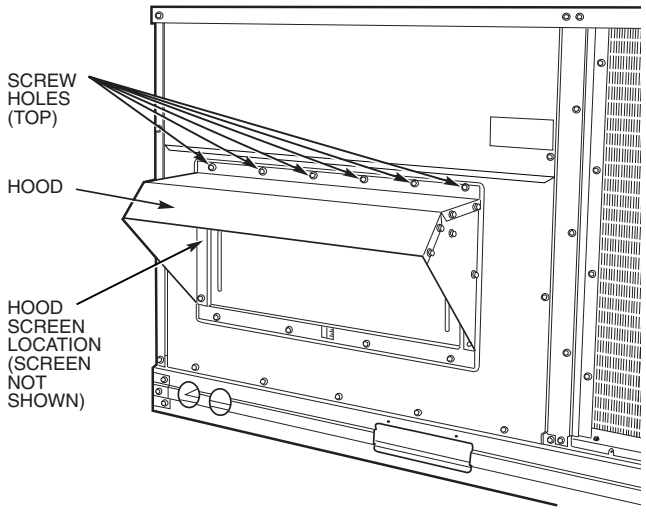


Fig. 19 — Damper with Hood Attached

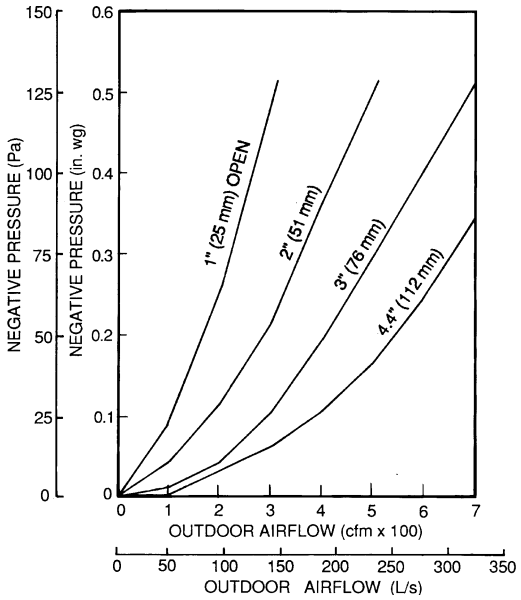


Fig. 20 — Position Setting (50TFF007 Units)

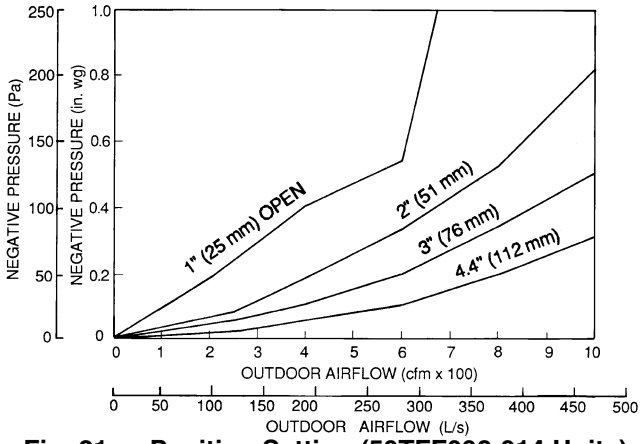


Fig. 21 — Position Setting (50TFF008-014 Units)

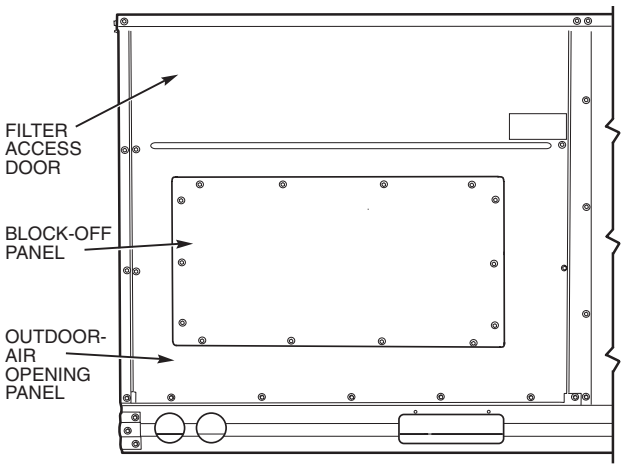
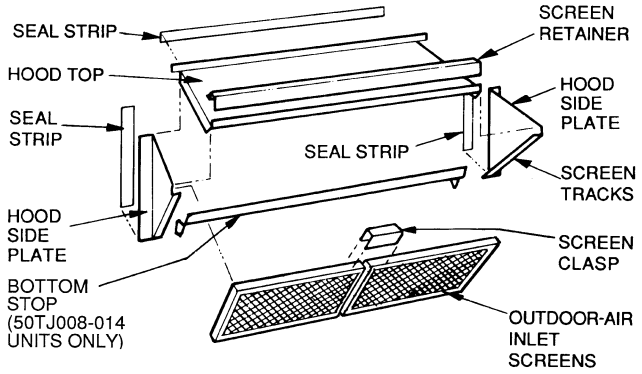
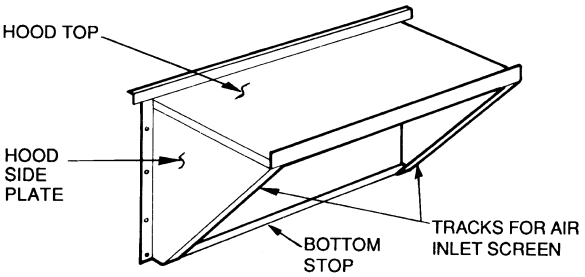


Fig. 22 — Typical Access Panel Location



OUTDOOR-AIR HOOD–UNASSEMBLED



HOOD SIDES AND TOP ASSEMBLED

Fig. 23 — Outdoor-Air Hood Details

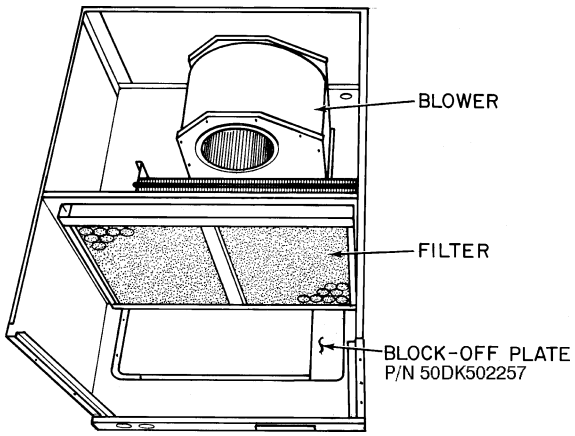


Fig. 24 — Block-Off Plate Location (50TFF012,014 only)

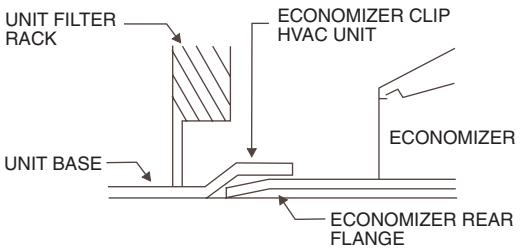


Fig. 25 — Rear Economizer Flange Installation

3. Assemble outdoor-air hood top and side plates as shown in Fig. 23. Install seal strips on hood top and sides. Put aside screen retainer and retainer screw for later assembly. *Do not attach hood to unit at this time.*
4. On size 012 and 014 units, install vertical discharge block-off plate over duct openings. See Fig. 24.

   NOTE: Be sure to engage rear economizer flange under tabs in vertical return-air opening. See Fig. 25.

5. To convert to horizontal duct application:
   a. Rotate economizer 90 degrees until the economizer motor faces the condenser section (see Fig. 26).
   b. Remove shipping screw and tape from barometric damper, then rotate the barometric relief damper hinge 90 degrees. Barometric relief damper should open vertically to operate properly.

c. Install horizontal discharge block-off plate over the opening on the access panel. (Block-off plate MUST be installed before installing hood assembly.) See Fig. 27.

6. Remove 12-pin blue and yellow wire jumper plug from factory wiring harness and store. Insert economizer plug into12-pin plug of factory wiring harness. Remove tape and shipping screw from barometric relief damper. See Fig. 28.
7. If ventilation air is not required, proceed to Step 8. If ventilation air is required, determine minimum position setting for required airflow. See Fig. 29 and 30. Adjust minimum position setting by adjusting the screws on the position setting bracket. See Fig. 31. Slide bracket until the top screw is in the position determined by Fig. 29 or 30. Tighten screws.
8. Remove tape from outdoor-air thermostat (OAT). Fasten OAT to inside of hood using screws and speed clips provided. See Fig. 32. Make sure OAT terminals are positioned up.
9. Replace outdoor-air opening panel using screws from Step 2. Replace filter access panel. Ensure the filter access panel slides along the tracks and is securely engaged.
10. Fasten hood top and side plate assembly to outdoor-air opening panel with screws provided.
11. Place knob supplied with economizer on OAT. See Fig. 32. Set for 3° F below indoor room thermostat setting. If accessory enthalpy control (EC) is used in place of OAT, see instructions shipped with EC for installation and adjustment. See Fig. 32.
12. Connect OAT per Fig. 33.
13. Slide outdoor-air inlet screen into screen track on hood side plate. While holding screen in place, fasten screen retainer to hood using screws provided.

NOTE: Refer to Fig. 34 for Durablade economizer barometric relief damper characteristics.

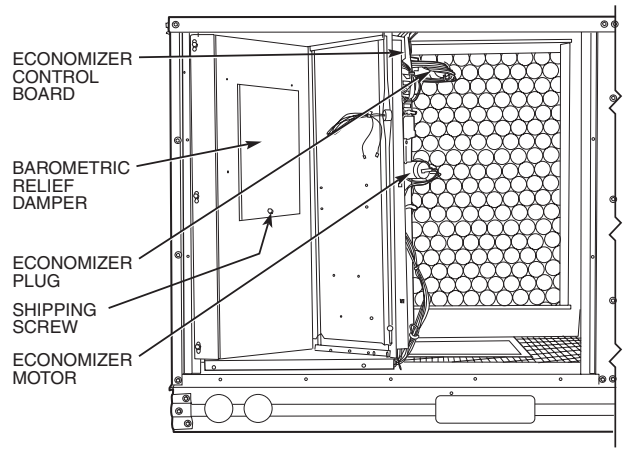


Fig. 26 — Horizontal Durablade Economizer Installation (90 Degrees Rotation)

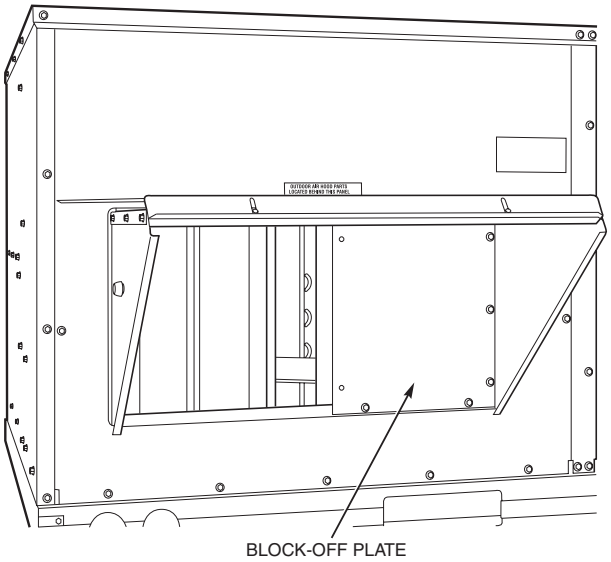


Fig. 27 — Horizontal Discharge Block-Off Plate

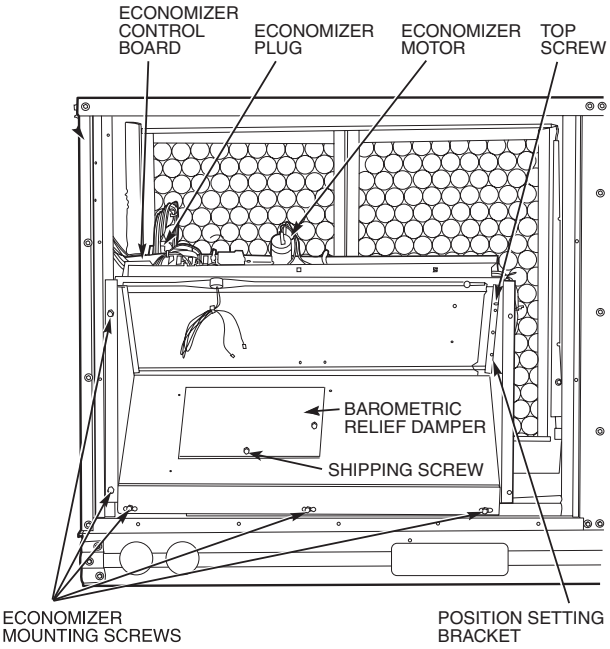
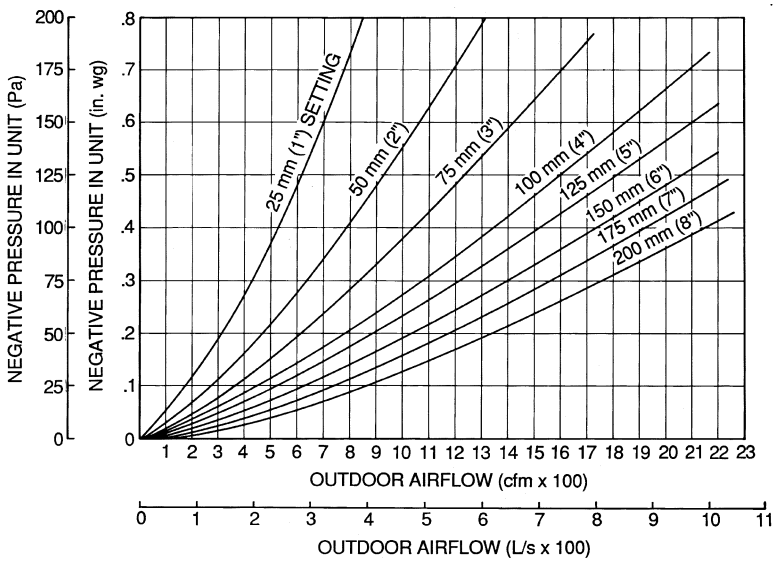
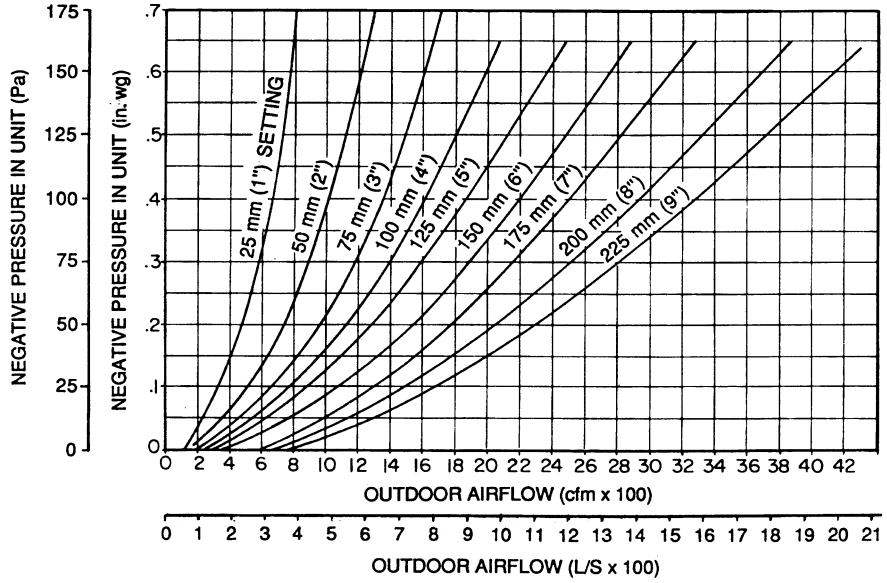


Fig. 28 — Durablade Economizer Installed in Unit



Example:
Given —
Return-Air Negative Static Pressure . . 50 Pa (0.2 in. wg)
Outdoor Airflow . . . . . 425 L/s (900 cfm)
Determine —
Setting = 125 mm (5 in.)

Fig. 29 — Durablade Economizer Damper Minimum Position Setting, 50TFF007



Example:
Given —
Negative Pressure . . . . . 25 Pa (0.1 in. wg)
Outdoor Airflow . . . . . 520 L/s (1100 cfm)
Determine —
Setting = 150 mm (6 in.)

Fig. 30 — Durablade Economizer Damper Minimum Position Setting, 50TFF008-014

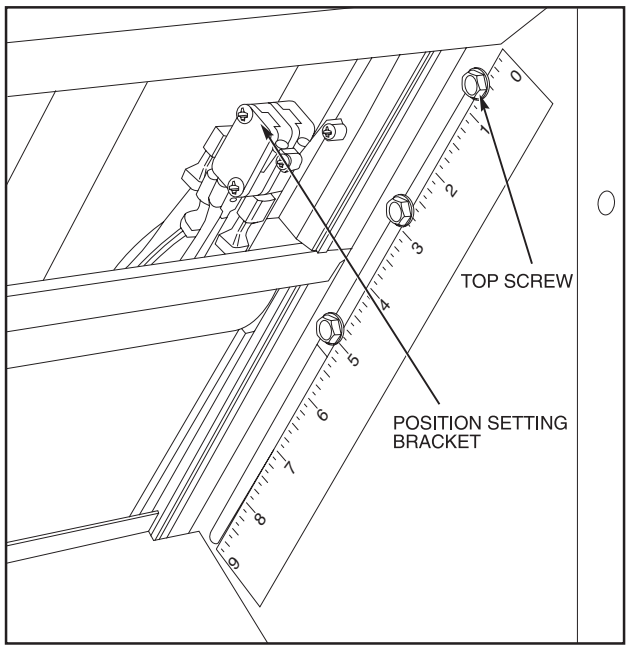


Fig. 31 — Durablade Economizer Minimum Position Damper Setting

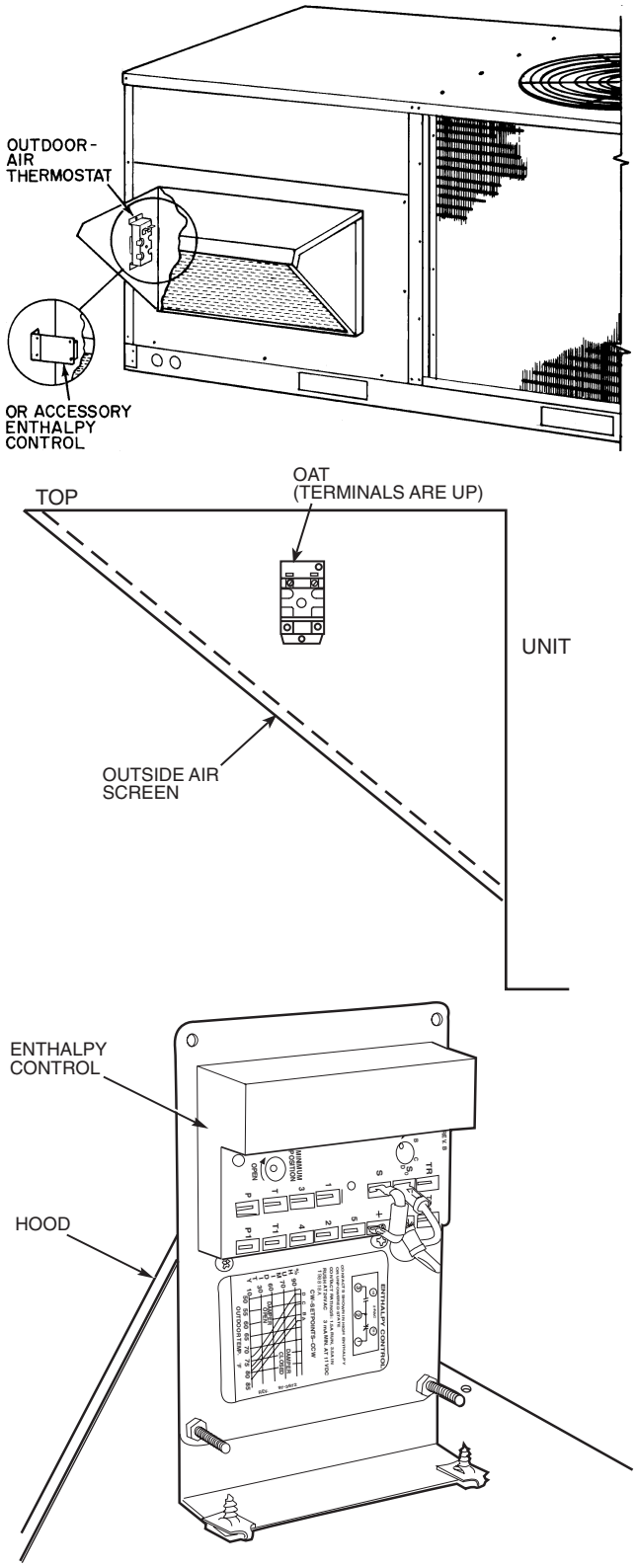


Fig. 32 — Outdoor-Air Thermostat/ Enthalpy Control Installation

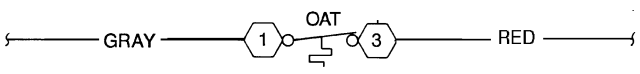


Fig. 33 — Wiring Connections for Outdoor-Air Thermostat (OAT)

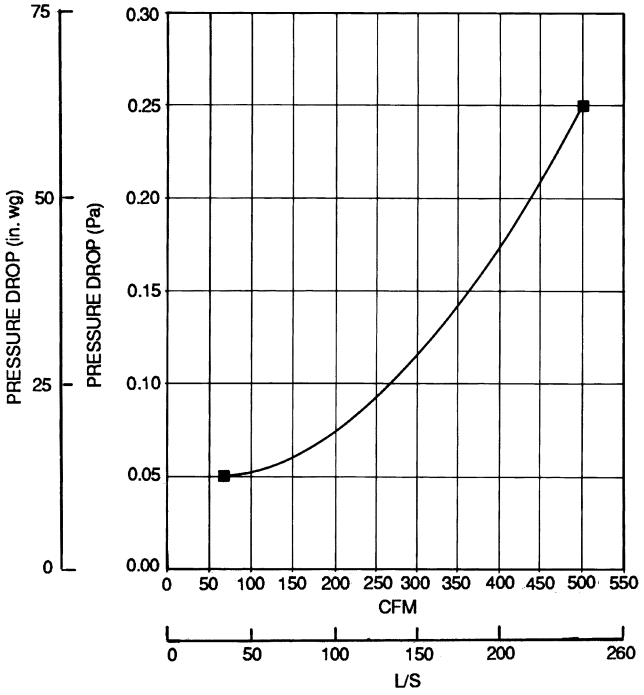


Fig. 34 — Durablade Economizer Barometric Relief Damper Characteristics

Step 7 — Adjust Evaporator-Fan Speed — Adjust evaporator-fan speed to meet jobsite conditions.

For units with electric heating, required minimum L/s (cfm) is 850 (1800) for 50TFF007, 1062 (2250) for 50TFF008; 1062 (2250) for 50TFF009; and 1416 (3000) for 50TFF012 and 014 with the following exceptions:

UNIT 50TFF	UNIT VOLTAGE	HEATER kW	UNIT CONFIGURATION	REQUIRED MINIMUM	
				L/s	Cfm
012	220	42.0	Horizontal	1510	3200
012, 014	400	34.7	Horizontal or Vertical	1510	3200

Tables 5 and 6 show fan r/s and rpm at motor pulley settings for standard motors. See Table 7 for evaporator-fan motor performance. Refer to Tables 8-23 to determine fan speed settings. Fan motor pulleys are factory set for speed shown in Tables 1A and 1B. Check pulley alignment and belt tension prior to start-up.

To change fan speed:

1. Shut off unit power supply, and tag disconnect.
2. Loosen belt by loosening fan motor mounting nuts. See Fig. 35 and 36.
3. Loosen movable pulley flange setscrew (see Fig. 37).
4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Table 1A and 1B.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table 1A and 1B for speed change for each full turn of pulley flange.)

To align fan and motor pulleys:

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

To adjust belt tension:

1. Loosen fan motor mounting nuts.
2. *Sizes 007-009* — Slide motor mounting plate away from fan scroll for proper belt tension (13 mm [1/2-in.] deflection with 8 to 10 lbs of force) and tighten mounting nuts. See Fig. 35.

   Sizes 012,014 — Slide motor mounting plate downward to tighten belt tension (13 mm [1/2-in.] deflection with 5 to 10 lbs of force) and tighten mounting nuts. See Fig. 36.
3. Adjust bolt and nut on mounting plate to secure motor in fixed position. See Fig. 37.

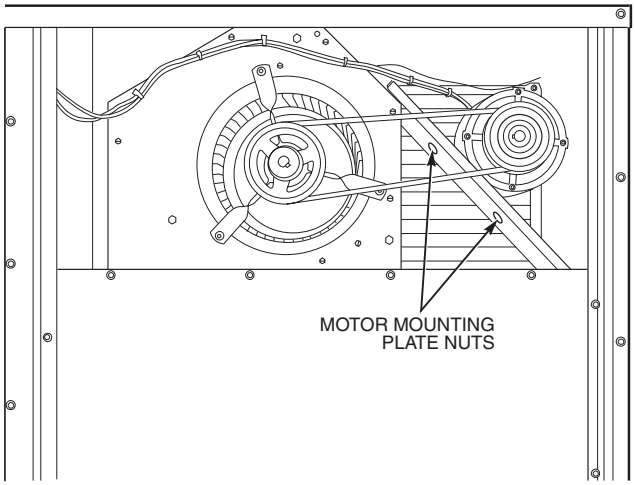


Fig. 35 — Belt Drive Motor Mounting, 50TFF007-009

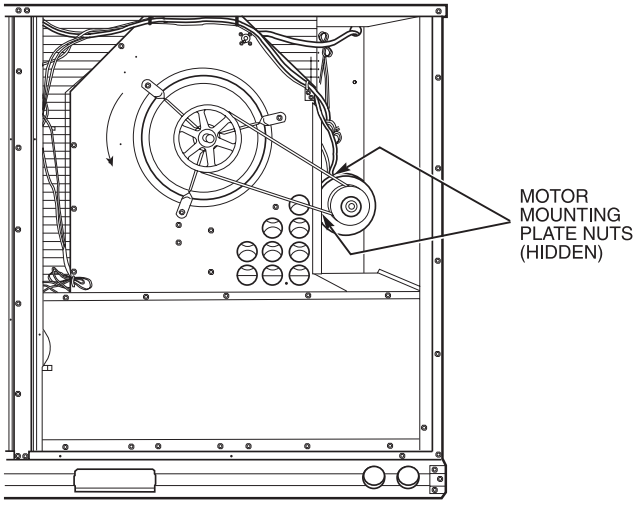


Fig. 36 — Belt Drive Motor Mounting, 50TFF012,014

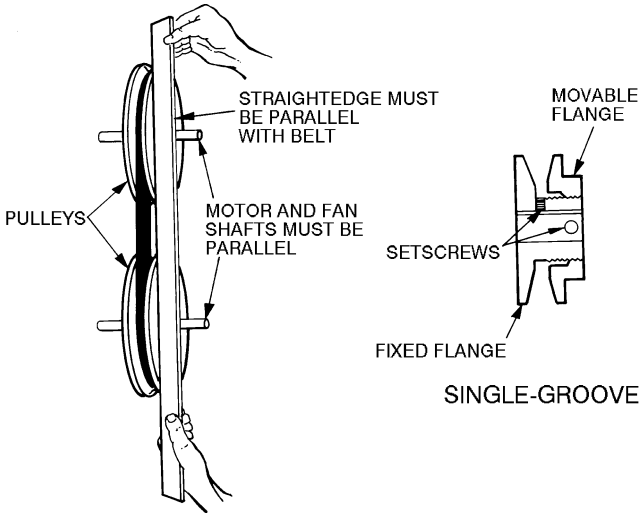


Fig. 37 — Evaporator-Fan Pulley Adjustment

Table 5 — Fan R/s at Motor Pulley Settings (SI)

UNIT 50TFF	MOTOR PULLEY TURNS OPEN										
	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
007	20.08	19.67	19.17	18.75	18.25	17.83	17.33	16.92	16.42	16.00	15.50
008, 009	14.67	14.25	13.83	13.33	12.92	12.50	12.08	11.67	11.25	10.83	10.33
012	15.00	14.58	14.25	13.92	13.58	13.25	12.92	12.58	12.25	11.92	11.50
014	14.83	14.58	14.25	13.72	13.67	13.33	13.08	12.75	12.50	12.17	11.83

Table 6 — Fan Rpm at Motor Pulley Settings (English)

UNIT 50TFF	MOTOR PULLEY TURNS OPEN										
	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
007	1205	1180	1150	1125	1095	1070	1040	1015	985	960	930
008, 009	880	855	830	800	775	750	725	700	675	650	620
012	900	875	855	835	815	795	775	755	735	715	690
014	890	875	855	835	820	800	785	765	750	730	710

Table 7 — Motor Data

UNIT 50TFF	EVAPORATOR-FAN MOTOR	UNIT RATED VOLTAGE	MAXIMUM ACCEPTABLE CONTINUOUS BkW*	MAXIMUM ACCEPTABLE CONTINUOUS BHP*	MAXIMUM ACCEPTABLE OPERATING WATTS	MAXIMUM AMP DRAW
007	Standard	400	1.79	2.40	2120	2.7
008	Standard	220	1.79	2.40	2120	6.1
		400				2.7
009	Standard	220	1.79	2.40	2120	6.1
		400				2.7
012	Standard	220	2.16	2.90	2120	6.1
		400				2.7
014	Standard	220	3.13	4.20	3775	12.6
		400				5.7

LEGEND

BHP — Brake Horsepower
BkW — kW x Motor Efficiency

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

Table 8 — Fan Performance (SI), 50TFF007 — Vertical Discharge Units

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																	
	25		50		100		150		200		250		300		350		400	
	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW
850	**14.2**	**0.41**	**15.1**	**0.46**	16.7	0.58	18.1	0.69	19.4	0.82	**20.6**	**0.96**	**21.7**	**1.10**	**22.9**	**1.26**	**23.9**	**1.42**
900	**14.9**	**0.48**	15.8	0.54	17.3	0.66	18.7	0.78	19.9	0.91	**21.1**	**1.05**	**22.2**	**1.19**	**23.3**	**1.36**	**24.4**	**1.52**
950	15.7	0.56	16.5	0.62	17.9	0.74	19.3	0.88	**20.5**	**1.01**	**21.7**	**1.15**	**22.8**	**1.30**	**23.8**	**1.46**	**24.8**	**1.63**
1000	16.4	0.65	17.2	0.71	18.6	0.84	19.9	0.98	**21.1**	**1.12**	**22.2**	**1.26**	**23.3**	**1.42**	**24.3**	**1.57**	**25.2**	**1.74**
1050	17.2	0.75	17.9	0.81	19.2	0.94	**20.6**	**1.09**	**21.7**	**1.24**	**22.8**	**1.38**	**23.8**	**1.54**	**24.9**	**1.70**	25.7	1.87
1100	18.0	0.85	18.6	0.91	19.9	1.05	**21.2**	**1.21**	**22.3**	**1.37**	**23.4**	**1.51**	**24.4**	**1.67**	25.4	1.84	26.3	2.02
1150	18.7	0.97	19.2	1.03	**20.6**	**1.18**	**21.8**	**1.33**	**23.0**	**1.50**	**24.0**	**1.66**	24.9	1.81	25.9	1.98	—	—
1200	19.5	1.09	19.9	1.16	**21.3**	**1.31**	**22.4**	**1.47**	**23.6**	**1.64**	24.6	1.81	25.5	1.97	—	—	—	—
1250	**20.2**	**1.23**	**20.8**	**1.30**	**22.0**	**1.46**	**23.1**	**1.61**	24.2	1.80	25.2	1.97	—	—	—	—	—	—
1300	**21.0**	**1.38**	**21.5**	**1.45**	**22.7**	**1.61**	**23.8**	**1.77**	24.8	1.96	—	—	—	—	—	—	—	—
1350	**21.8**	**1.54**	**22.3**	**1.61**	**23.4**	**1.78**	24.4	1.94	25.5	2.13	—	—	—	—	—	—	—	—
1400	**22.6**	**1.71**	**23.0**	**1.78**	24.1	1.95	25.1	2.12	—	—	—	—	—	—	—	—	—	—

LEGEND.

BkW — Motor Brake (Output) Power (kW)
R/s — Fan Wheel Speed, Revolutions per second

NOTES:
1. **Boldface** indicates field-supplied drive is required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable output power (BkW) is 1.79 with standard 1.12-BkW motor. Extensive motor and electrical testing on these units ensures that the full BkW range of the motor can be utilized with confidence. Using your fan motors up to the BkW ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 10.33 to 14.67 r/s. All other r/s's will require a field-supplied drive.

Table 9 — Fan Performance (SI), 50TFF008,009 — Vertical Discharge Units

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																	
	50		100		150		200		250		300		350		400		450		500	
	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW
1100	**8.7**	**0.42**	**10.1**	**0.59**	11.1	0.75	12.2	0.93	13.1	1.12	14.0	1.30	**14.8**	**1.51**	**15.7**	**1.77**	16.4	2.02	17.2	2.35
1200	**9.3**	**0.52**	10.5	0.69	11.6	0.87	12.6	1.05	13.5	1.26	14.3	1.46	**15.1**	**1.66**	15.9	1.88	16.7	2.14	17.4	2.44
1300	**9.8**	**0.64**	11.0	0.81	12.1	1.01	13.0	1.20	13.9	1.41	**14.7**	**1.63**	15.5	1.84	16.2	1.98	16.9	2.29	17.6	2.56
1400	10.4	0.77	11.5	0.94	12.6	1.16	13.5	1.37	14.3	1.58	15.1	1.80	15.9	2.04	16.6	2.27	17.3	2.51	—	—
1500	11.0	0.92	12.0	1.10	13.0	1.33	13.9	1.56	**14.7**	**1.78**	15.5	2.00	16.3	2.25	17.0	2.50	—	—	—	—
1600	11.6	1.08	12.6	1.28	13.5	1.50	14.4	1.76	15.2	2.00	16.0	2.23	16.7	2.47	—	—	—	—	—	—
1700	12.2	1.26	13.1	1.48	14.0	1.70	14.9	1.97	15.7	2.23	16.4	2.48	—	—	—	—	—	—	—	—

LEGEND.

BkW — Motor Brake (Output) Power (kW)
R/s — Fan Wheel Speed, Revolutions per second

NOTES:
1. **Boldface** indicates field-supplied drive is required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable output power (BkW) is 1.79 with standard 1.12-BkW motor. Extensive motor and electrical testing on these units ensures that the full BkW range of the motor can be utilized with confidence. Using your fan motors up to the BkW ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 10.33 to 14.67 r/s. All other r/s's will require a field-supplied drive.

Table 10 — Fan Performance (SI), 50TFF012 — Vertical Discharge Units

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW
1300	**8.4**	**0.37**	**9.6**	**0.51**	**10.8**	**0.61**	11.7	0.69	12.6	0.81	13.3	0.90	14.3	1.05	**15.1**	**1.27**	**15.9**	**1.48**	**16.7**	**1.67**
1400	**8.8**	**0.46**	**10.0**	**0.59**	**11.1**	**0.71**	12.0	0.82	12.9	0.93	13.7	1.04	14.5	1.17	**15.4**	**1.35**	**16.2**	**1.56**	**16.8**	**1.75**
1500	**9.2**	**0.55**	**10.4**	**0.68**	11.5	0.81	12.4	0.94	13.2	1.06	14.0	1.19	14.8	1.26	**15.6**	**1.44**	**16.4**	**1.62**	**17.1**	**1.83**
1600	**9.7**	**0.65**	**10.8**	**0.79**	11.8	0.93	12.8	1.07	13.6	1.19	1.44	1.33	**15.1**	**1.46**	**15.8**	**1.59**	**16.5**	**1.72**	**17.3**	**1.91**
1700	**10.2**	**0.75**	**11.2**	**0.91**	12.2	1.06	13.1	1.20	13.9	1.34	14.7	1.48	**15.4**	**1.63**	**16.1**	**1.76**	**16.7**	**1.89**	**17.4**	**2.04**
1800	**10.6**	**0.87**	11.7	1.05	12.6	1.20	13.5	1.35	14.3	1.51	15.0	1.65	**15.7**	**1.80**	**16.4**	**1.95**	**17.1**	**2.10**	17.7	2.24
1900	**11.1**	**1.01**	12.1	1.19	13.0	1.35	12.9	1.52	14.7	1.68	**15.4**	**1.84**	**16.1**	**1.99**	**16.8**	**2.14**	17.4	2.31	18.0	2.46
2000	11.6	1.16	12.5	1.35	13.4	1.52	14.3	1.69	15.0	1.86	**15.8**	**2.04**	16.5	2.21	17.1	2.36	17.7	2.53	—	—
2100	12.0	1.32	13.0	1.53	13.8	1.70	14.6	1.88	**15.4**	**2.07**	16.1	2.25	16.8	2.43	—	—	—	—	—	—
2200	12.5	1.50	13.4	1.71	14.3	1.91	**15.1**	**2.09**	15.8	2.29	16.5	2.48	—	—	—	—	—	—	—	—
2300	13.0	1.70	13.9	1.91	14.7	2.13	15.5	2.31	16.2	2.52	—	—	—	—	—	—	—	—	—	—

LEGEND.

BkW — Motor Brake (Output) Power (kW)
R/s — Fan Wheel Speed, Revolutions per second

NOTES:
1. **Boldface** indicates field-supplied drive is required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable output power (BkW) is 2.16 with standard 1.50-BkW motor. Extensive motor and electrical testing on these units ensures that the full BkW range of the motor can be utilized with confidence. Using your fan motors up to the BkW ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 11.50 to 15.00 r/s. All other r/s's will require a field-supplied drive.

Table 11 — Fan Performance (SI), 50TFF014 — Vertical Discharge Units

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW
1750	**10.9**	**0.84**	11.9	0.98	12.8	1.12	13.6	1.25	14.4	1.38	**15.1**	**1.55**	**15.8**	**1.69**	**16.5**	**1.84**	**17.2**	**1.98**	**17.7**	**2.10**
1800	**11.1**	**0.89**	12.1	1.04	13.0	1.19	13.8	1.32	14.6	1.45	**15.3**	**1.63**	**16.0**	**1.77**	**16.7**	**1.92**	**17.3**	**2.07**	**17.9**	**2.21**
1850	**11.4**	**0.95**	12.4	1.11	13.2	1.27	14.0	1.40	14.7	1.53	**15.5**	**1.70**	**16.2**	**1.86**	**16.8**	**2.01**	**17.5**	**2.17**	**18.1**	**2.32**
1900	**11.6**	**1.02**	12.6	1.19	13.4	1.34	14.2	1.48	**14.9**	**1.61**	**15.6**	**1.77**	**16.3**	**1.95**	**17.0**	**2.11**	**17.7**	**2.27**	**18.3**	**2.42**
1950	11.9	1.09	12.8	1.26	13.7	1.42	14.4	1.57	**15.1**	**1.70**	**15.8**	**1.86**	**16.5**	**2.04**	**17.2**	**2.21**	**17.8**	**2.37**	**18.4**	**2.53**
2000	12.1	1.16	13.0	1.34	13.9	1.50	14.6	1.66	**15.3**	**1.80**	**16.0**	**1.94**	**16.7**	**2.13**	**17.3**	**2.31**	**18.0**	**2.47**	**18.6**	**2.64**
2050	12.4	1.24	13.2	1.42	14.1	1.58	14.8	1.75	**15.5**	**1.89**	**16.2**	**2.03**	**16.9**	**2.21**	**17.5**	**2.41**	**18.1**	**2.58**	**18.7**	**2.75**
2100	12.6	1.32	13.5	1.51	14.3	1.67	**15.0**	**1.85**	**15.7**	**2.00**	**16.4**	**2.13**	**17.0**	**2.31**	**17.7**	**2.51**	**18.3**	**2.69**	**18.9**	**2.86**
2150	12.8	1.41	13.7	1.60	14.5	1.77	**15.3**	**1.95**	**15.9**	**2.10**	**16.6**	**2.24**	**17.2**	**2.41**	**17.8**	**2.62**	**18.5**	**2.80**	**19.1**	**2.98**
2200	13.1	1.49	13.9	1.69	14.7	1.86	**15.5**	**2.05**	**16.1**	**2.21**	**16.8**	**2.36**	**17.4**	**2.51**	**18.0**	**2.71**	**18.6**	**2.92**	**19.2**	**3.11**
2250	13.3	1.59	14.2	1.79	**15.0**	**1.96**	**15.7**	**2.15**	**16.4**	**2.32**	**17.0**	**2.48**	**17.6**	**2.62**	**18.2**	**2.82**	**18.8**	**3.03**	19.4	3.23
2300	13.6	1.68	14.4	1.89	**15.2**	**2.07**	**15.9**	**2.25**	**16.6**	**2.44**	**17.2**	**2.60**	**17.8**	**2.75**	**18.4**	**2.93**	19.0	3.15	19.5	3.36
2350	13.8	1.78	14.6	1.99	**15.4**	**2.18**	**16.1**	**2.36**	**16.8**	**2.56**	**17.4**	**2.72**	**18.0**	**2.89**	**18.6**	**3.05**	19.2	3.26	19.7	3.49
2400	14.1	1.88	**14.9**	**2.10**	**15.6**	**2.30**	**16.3**	**2.48**	**17.0**	**2.68**	**17.6**	**2.85**	**18.2**	**3.02**	18.8	3.17	19.3	3.38	19.9	3.62
2450	14.3	1.99	**15.1**	**2.20**	**15.8**	**2.42**	**16.6**	**2.60**	**17.2**	**2.80**	**17.8**	**2.98**	18.4	3.15	19.0	3.32	19.5	3.50	20.1	3.74
2500	14.6	2.10	**15.3**	**2.31**	**16.1**	**2.54**	**16.8**	**2.72**	**17.4**	**2.93**	**18.0**	**3.12**	18.6	3.30	19.2	3.47	19.7	3.64	20.3	3.86
2550	14.8	2.21	**15.6**	**2.43**	**16.3**	**2.66**	**17.0**	**2.85**	**17.6**	**3.06**	18.2	3.27	18.8	3.45	19.4	3.62	19.9	3.78	20.4	4.00
2600	**15.1**	**2.33**	**15.8**	**2.56**	**16.5**	**2.80**	**17.2**	**2.98**	17.9	3.20	18.4	3.41	19.0	3.59	19.6	3.77	20.1	3.94	20.6	4.14
2650	**15.3**	**2.46**	**16.1**	**2.68**	**16.7**	**2.92**	**17.4**	**3.12**	18.1	3.33	18.7	3.56	19.2	3.75	19.8	3.93	20.3	4.11	20.8	4.29
2700	**15.6**	**2.59**	**16.3**	**2.81**	**17.0**	**3.06**	17.6	3.27	18.3	3.47	18.9	3.71	19.4	3.91	20.0	4.09	20.5	4.28	—	—
2750	**15.8**	**2.72**	**16.5**	**2.95**	17.2	3.21	17.9	3.42	18.5	3.62	19.1	3.86	19.6	4.07	20.2	4.27	—	—	—	—
2800	**16.1**	**2.86**	**16.8**	**3.09**	17.4	3.36	18.1	3.57	18.7	3.78	19.3	4.02	19.9	4.24	—	—	—	—	—	—
2850	**16.3**	**2.98**	17.0	3.24	17.7	3.50	18.3	3.74	18.9	3.94	19.5	4.18	—	—	—	—	—	—	—	—
2900	16.6	3.15	17.3	3.39	17.9	3.65	18.5	3.90	19.2	4.10	—	—	—	—	—	—	—	—	—	—
2950	16.8	3.30	17.5	3.54	18.2	3.80	18.8	4.06	19.4	4.27	—	—	—	—	—	—	—	—	—	—
3000	17.1	3.45	17.8	3.70	18.4	3.97	19.0	4.24	—	—	—	—	—	—	—	—	—	—	—	—
3050	17.3	3.62	18.0	3.87	18.6	3.98	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND.

BkW — Motor Brake (Output) Power (kW)
R/s — Fan Wheel Speed, Revolutions per second

NOTES:
1. **Boldface** indicates field-supplied drive is required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Values include losses for filters, unit casing, and wet coils.
4. Use of a field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Maximum usable output power BkW is 3.13 with standard 2.24-kW motor. Extensive motor and electrical testing on these units ensures that the full BkW range of the motor can be utilized with confidence. Using your fan motors up to the BkW ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Motor drive range: 11.83 to 14.83 r/s. All other r/s's require field-supplied drive.

Table 12 — Fan Performance (SI), 50TFF007 — Horizontal Discharge Units

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																	
	25		50		100		150		200		250		300		350		400	
	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW
850	**12.8**	**0.34**	**13.7**	**0.38**	**15.4**	**0.49**	17.0	0.60	18.3	0.72	19.6	0.85	**20.8**	**0.99**	**21.9**	**1.13**	**23.0**	**1.28**
900	**13.4**	**0.39**	**14.3**	**0.44**	15.9	0.55	17.5	0.68	18.8	0.80	20.0	0.92	**21.3**	**1.07**	**22.3**	**1.21**	**23.4**	**1.37**
950	**14.1**	**0.46**	**14.9**	**0.50**	16.5	0.62	17.9	0.75	19.3	0.88	**20.5**	**1.00**	**21.7**	**1.15**	**22.8**	**1.30**	**23.8**	**1.46**
1000	**14.7**	**0.52**	15.5	0.57	17.0	0.69	18.4	0.82	19.8	0.96	**21.0**	**1.10**	**22.1**	**1.24**	**23.2**	**1.40**	**24.2**	**1.56**
1050	**15.4**	**0.59**	16.1	0.66	17.6	0.78	18.9	0.91	**20.3**	**1.06**	**21.5**	**1.20**	**22.5**	**1.35**	**23.6**	**1.50**	**24.6**	**1.67**
1100	16.1	0.69	16.7	0.74	18.2	0.87	19.5	1.01	**20.8**	**1.15**	**22.0**	**1.31**	**23.0**	**1.46**	**24.0**	**1.61**	**25.1**	**1.77**
1150	16.8	0.78	17.4	0.83	18.7	0.97	20.0	1.10	**21.2**	**1.25**	**22.4**	**1.42**	**23.5**	**1.58**	**24.5**	**1.73**	25.5	1.89
1200	17.5	0.88	18.0	0.94	19.3	1.08	**20.6**	**1.22**	**21.7**	**1.37**	**22.9**	**1.54**	**24.0**	**1.71**	25.0	1.87	25.9	2.03
1250	18.2	0.99	18.7	1.05	19.9	1.19	**21.1**	**1.33**	**22.3**	**1.49**	**23.4**	**1.66**	24.5	1.84	25.5	2.02	—	—
1300	18.8	1.12	19.3	1.17	**20.5**	**1.31**	**21.7**	**1.47**	**22.8**	**1.63**	**23.9**	**1.79**	25.0	1.98	—	—	—	—
1350	19.5	1.25	20.0	1.30	**21.1**	**1.44**	**22.3**	**1.60**	**23.4**	**1.77**	24.4	1.94	25.4	2.12	—	—	—	—
1400	**20.2**	**1.39**	**20.7**	**1.44**	**21.7**	**1.59**	**22.8**	**1.75**	23.9	1.91	24.9	2.10	—	—	—	—	—	—

LEGEND.

BkW — Motor Brake (Output) Power (kW)
R/s — Fan Wheel Speed, Revolutions per second

NOTES:
1. **Boldface** indicates field-supplied drive is required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable output power (BkW) is 1.79 with standard 1.12-BkW motor. Extensive motor and electrical testing on these units ensures that the full BkW range of the motor can be utilized with confidence. Using your fan motors up to the BkW ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 15.50 to 20.08 r/s. All other r/s's will require a field-supplied drive.

Table 13 — Fan Performance (SI), 50TFF008,009 — Horizontal Discharge Units

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW
1100	**7.9**	**0.35**	**9.4**	**0.50**	10.6	0.68	11.7	0.85	12.7	1.03	13.6	1.25	14.4	1.46	**14.9**	**1.69**	15.1	1.92	15.0	2.15
1200	**8.3**	**0.42**	**9.8**	**0.59**	11.0	0.78	12.0	0.95	13.0	1.15	13.9	1.36	**14.8**	**1.58**	15.5	1.82	16.0	2.06	16.4	2.31
1300	**8.8**	**0.51**	**10.2**	**0.69**	11.3	0.88	12.4	1.08	13.3	1.28	14.2	1.49	**15.0**	**1.72**	15.8	1.96	16.5	2.21	17.1	2.47
1400	**9.2**	**0.60**	10.6	0.80	11.7	0.99	12.7	1.22	13.7	1.42	14.5	1.63	15.3	1.87	16.1	2.12	16.9	2.38	—	—
1500	**9.7**	**0.71**	11.0	0.91	12.1	1.12	13.0	1.35	14.0	1.59	14.8	1.81	15.6	2.04	16.4	2.30	—	—	—	—
1600	**10.1**	**0.82**	11.3	1.04	12.5	1.28	13.4	1.49	14.3	1.75	15.2	2.00	15.9	2.24	—	—	—	—	—	—
1700	10.6	0.93	11.8	1.20	12.9	1.44	13.8	1.67	1.47	1.92	15.5	2.20	—	—	—	—	—	—	—	—

LEGEND.

BkW — Motor Brake (Output) Power (kW)
R/s — Fan Wheel Speed, Revolutions per second

NOTES:
1. **Boldface** indicates field-supplied drive is required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable output power (BkW) is 1.79 with standard 1.12-BkW motor. Extensive motor and electrical testing on these units ensures that the full BkW range of the motor can be utilized with confidence. Using your fan motors up to the BkW ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 10.33 to 14.67 r/s. All other r/s's will require a field-supplied drive.

Table 14 — Fan Performance (SI), 50TFF012 — Horizontal Discharge Units

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW
1300	**7.6**	**0.30**	**8.9**	**0.41**	**10.2**	**0.56**	**11.1**	**0.64**	12.1	0.77	13.1	0.92	13.9	0.93	14.0	0.52	15.0	1.13	**15.6**	**1.32**
1400	**8.0**	**0.40**	**9.3**	**0.51**	**10.5**	**0.64**	**11.4**	**0.75**	12.4	0.88	13.3	1.01	14.1	1.11	14.6	0.96	**15.4**	**1.32**	**16.0**	**1.42**
1500	**8.4**	**0.48**	**9.6**	**0.60**	**10.7**	**0.72**	11.8	0.86	12.7	0.99	13.5	1.12	14.3	1.26	**15.1**	**1.35**	**15.7**	**1.49**	**16.4**	**1.54**
1600	**8.8**	**0.58**	**10.0**	**0.69**	**11.1**	**0.82**	12.1	0.96	12.9	1.10	13.8	1.24	14.5	1.38	**15.3**	**1.54**	**16.0**	**1.64**	**16.7**	**1.72**
1700	**9.1**	**0.69**	**10.3**	**0.78**	**11.3**	**0.93**	12.3	1.07	13.2	1.22	14.0	1.37	14.8	1.52	**15.5**	**1.66**	**16.3**	**1.84**	**17.0**	**1.95**
1800	**9.5**	**0.81**	**10.7**	**0.90**	11.7	1.05	12.6	1.20	13.5	1.36	14.3	1.52	15.0	1.67	**15.8**	**1.83**	**16.4**	**1.99**	17.2	2.17
1900	**9.9**	**0.95**	**11.0**	**1.02**	12.0	1.18	12.9	1.34	13.8	1.50	14.6	1.68	**15.3**	**1.83**	**16.0**	**2.00**	**16.7**	**2.16**	17.3	2.33
2000	**10.3**	**1.11**	**11.4**	**1.17**	12.3	1.32	13.2	1.48	14.1	1.66	14.9	1.83	**15.6**	**2.01**	16.3	2.18	17.0	2.36	17.6	2.53
2100	**10.7**	**1.29**	11.8	1.33	12.7	1.47	13.5	1.65	14.4	1.84	**15.1**	**2.00**	15.9	2.20	16.6	2.38	—	—	—	—
2200	**11.2**	**1.48**	12.1	1.51	13.1	1.64	13.9	1.83	14.6	2.01	15.4	2.20	16.2	2.38	—	—	—	—	—	—
2300	11.6	1.70	12.5	1.71	13.4	1.83	14.2	2.01	15.0	2.20	15.7	2.41	—	—	—	—	—	—	—	—

LEGEND.

BkW — Motor Brake (Output) Power (kW)
R/s — Fan Wheel Speed, Revolutions per second

NOTES:
1. **Boldface** indicates field-supplied drive is required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable output power (BkW) is 2.16 with standard 1.50-BkW motor. Extensive motor and electrical testing on these units ensures that the full BkW range of the motor can be utilized with confidence. Using your fan motors up to the BkW ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 11.50 to 15.00 r/s. All other r/s's will require a field-supplied drive.

Table 15 — Fan Performance (SI), 50TFF014 — Horizontal Discharge Units

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW
1750	**10.1**	**0.72**	**11.2**	**0.88**	12.2	1.02	13.0	1.16	13.9	1.29	14.7	1.45	**15.5**	**1.62**	**16.2**	**1.77**	**16.9**	**1.92**	**17.4**	**2.04**
1800	**10.4**	**0.78**	**11.4**	**0.93**	12.4	1.08	13.3	1.24	14.0	1.36	14.8	1.51	**15.6**	**1.69**	**16.3**	**1.85**	**17.0**	**2.01**	**17.6**	**2.14**
1850	**10.6**	**0.84**	**11.6**	**0.98**	12.5	1.14	13.5	1.31	14.2	1.43	**15.0**	**1.58**	**15.7**	**1.76**	**16.5**	**1.93**	**17.2**	**2.10**	**17.8**	**2.24**
1900	**10.8**	**0.90**	11.8	1.04	12.7	1.20	13.7	1.39	14.4	1.51	**15.1**	**1.65**	**15.8**	**1.83**	**16.6**	**2.01**	**17.3**	**2.18**	**18.0**	**2.34**
1950	**11.1**	**0.97**	12.0	1.10	12.9	1.28	13.8	1.46	14.5	1.59	**15.3**	**1.73**	**16.0**	**1.90**	**16.7**	**2.10**	**17.4**	**2.27**	**18.1**	**2.44**
2000	**11.3**	**1.04**	12.1	1.17	13.1	1.35	14.0	1.53	14.7	1.68	**15.4**	**1.82**	**16.2**	**1.98**	**16.8**	**2.18**	**17.5**	**2.36**	**18.2**	**2.54**
2050	**11.6**	**1.11**	12.3	1.24	13.2	1.42	14.1	1.60	**14.9**	**1.77**	**15.6**	**1.91**	**16.3**	**2.07**	**17.0**	**2.26**	**17.6**	**2.45**	**18.3**	**2.63**
2100	11.9	1.19	12.5	1.30	13.4	1.51	14.3	1.67	**15.1**	**1.87**	**15.8**	**2.00**	**16.5**	**2.16**	**17.1**	**2.34**	**17.8**	**2.54**	**18.4**	**2.74**
2150	12.0	1.27	12.7	1.38	13.6	1.58	14.5	1.75	**15.3**	**1.96**	**15.9**	**2.10**	**16.6**	**2.25**	**17.3**	**2.42**	**17.9**	**2.64**	**18.6**	**2.84**
2200	12.4	1.36	12.9	1.46	13.8	1.66	14.6	1.83	**15.5**	**2.05**	**16.1**	**2.21**	**16.8**	**2.36**	**17.4**	**2.52**	**18.1**	**2.73**	**18.7**	**2.95**
2250	12.6	1.45	13.1	1.54	14.0	1.74	14.8	1.93	**15.6**	**2.14**	**16.3**	**2.32**	**16.9**	**2.46**	**17.6**	**2.62**	**18.2**	**2.83**	**18.8**	**3.05**
2300	12.9	1.54	13.3	1.63	14.2	1.83	**15.0**	**2.03**	**15.8**	**2.22**	**16.5**	**2.43**	**17.1**	**2.57**	**17.7**	**2.74**	**18.4**	**2.92**	19.0	3.15
2350	13.2	1.63	13.5	1.72	14.4	1.92	**15.2**	**2.13**	**16.0**	**2.32**	**16.7**	**2.54**	**17.3**	**2.69**	**17.9**	**2.86**	**18.5**	**3.03**	19.1	3.25
2400	13.4	1.73	13.8	1.81	14.6	2.01	**15.4**	**2.23**	**16.1**	**2.42**	**16.9**	**2.65**	**17.5**	**2.83**	**18.1**	**2.98**	18.7	3.15	19.3	3.36
2450	13.7	1.84	14.0	1.92	14.8	2.11	**15.5**	**2.33**	**16.3**	**2.52**	**17.1**	**2.77**	**17.7**	**2.95**	**18.2**	**3.11**	18.8	3.28	19.4	3.47
2500	14.0	1.95	14.2	2.02	**15.0**	**2.21**	**15.7**	**2.45**	**16.5**	**2.63**	**17.2**	**2.86**	**17.9**	**3.09**	18.4	3.24	19.0	3.42	19.6	3.59
2550	14.2	2.06	14.5	2.13	**15.2**	**2.30**	**15.9**	**2.55**	**16.6**	**2.75**	**17.4**	**2.97**	18.1	3.21	18.6	3.38	19.1	3.55	19.7	3.74
2600	14.5	2.18	14.7	2.24	**15.3**	**2.42**	**16.1**	**2.66**	**16.8**	**2.88**	**17.5**	**3.09**	18.3	3.35	18.8	3.53	19.3	3.69	19.9	3.88
2650	14.8	2.30	**15.0**	**2.36**	**15.5**	**2.52**	**16.3**	**2.77**	**17.2**	**3.01**	**17.7**	**3.01**	18.4	3.47	19.0	3.68	19.5	3.84	20.0	4.03
2700	**15.0**	**2.43**	**15.2**	**2.48**	**15.7**	**2.64**	**16.5**	**2.89**	**17.2**	**3.13**	17.9	3.33	18.6	3.59	19.2	3.83	19.7	4.00	20.2	4.18
2750	**15.3**	**2.57**	**15.4**	**2.61**	**15.9**	**2.76**	**16.7**	**3.01**	17.4	3.19	18.0	3.46	18.7	3.71	19.4	3.98	19.9	4.17	—	—
2800	**15.6**	**2.70**	**15.7**	**2.74**	**16.1**	**2.89**	**16.9**	**3.13**	17.6	3.40	18.2	3.61	20.5	3.84	19.6	4.13	—	—	—	—
2850	**15.8**	**2.84**	**15.9**	**2.89**	**16.4**	**3.02**	17.1	3.26	17.8	3.53	18.4	3.76	19.0	3.98	19.7	4.27	—	—	—	—
2900	**16.1**	**2.99**	**16.2**	**3.03**	16.6	3.15	17.3	3.39	17.9	3.67	18.6	3.91	19.2	4.12	—	—	—	—	—	—
2950	16.4	3.14	16.5	3.18	16.8	3.30	17.5	3.53	18.1	3.80	18.8	4.06	19.4	4.27	—	—	—	—	—	—
3000	16.6	3.30	16.7	3.33	17.0	3.45	17.6	3.66	18.3	3.94	18.9	4.22	—	—	—	—	—	—	—	—
3050	16.9	3.46	17.0	3.49	17.3	3.60	17.8	3.81	18.5	4.09	—	—	—	—	—	—	—	—	—	—

LEGEND.

BkW — Motor Brake (Output) Power (kW)
R/s — Fan Wheel Speed, Revolutions per second

NOTES:
1. **Boldface** indicates field-supplied drive is required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Values include losses for filters, unit casing, and wet coils.
4. Use of a field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Maximum usable output power BkW is 3.13 with standard 2.24-kW motor. Extensive motor and electrical testing on these units ensures that the full BkW range of the motor can be utilized with confidence. Using your fan motors up to the BkW ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Motor drive range: 11.83 to 14.83 r/s. All other r/s's require field-supplied drive.

Table 16 — Fan Performance (English), 50TFF007 — Vertical Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.1		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1800	**852**	**0.55**	**905**	**0.62**	1002	0.78	1084	0.93	1163	1.10	**1235**	**1.29**	**1303**	**1.48**	**1371**	**1.69**	**1433**	**1.90**
1900	**894**	**0.64**	945	0.72	1037	0.88	1119	1.04	1194	1.21	**1266**	**1.40**	**1330**	**1.59**	**1396**	**1.81**	**1460**	**2.03**
2000	936	0.74	984	0.82	1072	0.98	1154	1.16	**1226**	**1.33**	**1297**	**1.53**	**1362**	**1.73**	**1422**	**1.94**	**1485**	**2.16**
2100	978	0.85	1024	0.93	1108	1.10	1190	1.29	**1259**	**1.47**	**1327**	**1.66**	**1393**	**1.87**	**1452**	**2.08**	**1510**	**2.31**
2200	1021	0.97	1064	1.05	1145	1.22	**1225**	**1.43**	**1294**	**1.62**	**1359**	**1.81**	**1423**	**2.02**	**1483**	**2.24**	1538	2.46
2300	1064	1.10	1104	1.18	1183	1.36	**1260**	**1.57**	**1330**	**1.78**	**1392**	**1.97**	**1454**	**2.18**	1515	2.41	1569	2.64
2400	1107	1.24	1145	1.32	**1222**	**1.52**	**1296**	**1.73**	**1365**	**1.94**	**1426**	**2.15**	**1485**	**2.36**	1544	2.59	1601	2.84
2500	1150	1.39	1186	1.48	**1262**	**1.68**	**1331**	**1.89**	**1400**	**2.12**	**1461**	**2.34**	1518	2.55	1575	2.78	—	—
2600	1193	1.56	**1228**	**1.65**	**1301**	**1.86**	**1367**	**2.07**	**1435**	**2.31**	1497	2.54	1552	2.76	—	—	—	—
2700	**1237**	**1.74**	**1269**	**1.83**	**1341**	**2.05**	**1404**	**2.26**	1471	2.51	1532	2.75	—	—	—	—	—	—
2800	**1280**	**1.94**	**1311**	**2.03**	**1381**	**2.25**	1442	2.47	1506	2.72	—	—	—	—	—	—	—	—
2900	**1324**	**2.15**	**1354**	**2.24**	1420	2.47	1481	2.69	1542	2.94	—	—	—	—	—	—	—	—
3000	**1368**	**2.37**	1396	2.46	1460	2.69	1521	2.93	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Rpm — Fan Wheel Speed, Revolutions per Minute

NOTES:
1. **Boldface** indicates field-supplied drive required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable bhp is 2.40 with standard 1.5-hp motor. Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 930 to 1205 rpm. All other rpm's will require a field-supplied drive.

Table 17 — Fan Performance (English), 50TFF008,009 — Vertical Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	**503**	**0.50**	**585**	**0.71**	653	0.92	716	1.15	772	1.38	824	1.63	**884**	**1.95**	**934**	**2.30**	916	2.64	1019	3.09
2400	**534**	**0.61**	**613**	**0.84**	677	1.06	738	1.30	794	1.55	844	1.81	**892**	**2.08**	**944**	**2.40**	987	2.76	1039	3.20
2600	**565**	**0.74**	639	0.97	703	1.20	761	1.46	816	1.74	866	2.01	**913**	**2.29**	957	2.58	1004	2.91	1050	3.31
2800	**597**	**0.89**	665	1.12	731	1.40	786	1.66	839	1.93	**889**	**2.23**	935	2.52	978	2.62	1019	3.13	1061	3.47
3000	629	1.06	694	1.29	759	1.59	812	1.88	862	2.15	911	2.46	957	2.78	1000	3.09	1040	3.41	—	—
3200	662	1.25	724	1.50	785	1.80	840	2.11	887	2.41	934	2.71	980	3.04	1022	3.38	—	—	—	—
3400	696	1.46	756	1.73	811	2.02	868	2.37	914	2.69	959	3.00	1003	3.32	—	—	—	—	—	—
3600	729	1.69	787	1.98	839	2.27	894	2.64	942	2.99	984	3.32	—	—	—	—	—	—	—	—
3800	763	1.95	819	2.27	869	2.56	920	2.92	970	3.31	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Rpm — Fan Wheel Speed, Revolutions per Minute

NOTES:
1. **Boldface** indicates field-supplied drive required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable bhp is 2.40 with standard 1.5-hp motor. Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 620 to 880 rpm. All other rpm's will require a field-supplied drive.

Table 18 — Fan Performance (English), 50TFF012 — Vertical Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	**532**	**0.64**	**605**	**0.81**	**670**	**0.97**	725	1.12	778	1.28	825	1.43	874	1.60	**926**	**1.82**	**974**	**2.11**	**1012**	**2.36**
3200	**557**	**0.75**	**628**	**0.93**	690	1.10	746	1.28	796	1.44	844	1.61	888	1.70	**934**	**1.94**	**988**	**2.18**	**1025**	**2.47**
3400	**583**	**0.88**	**651**	**1.06**	711	1.25	767	1.44	815	1.61	863	1.79	**907**	**1.97**	**947**	**2.14**	**991**	**2.32**	**1038**	**2.57**
3600	**609**	**1.01**	**674**	**1.22**	732	1.42	787	1.61	836	1.80	880	1.98	**926**	**2.18**	**966**	**2.36**	**1004**	**2.54**	**1045**	**2.74**
3800	**535**	**1.16**	698	1.39	755	1.59	808	1.80	857	2.01	**901**	**2.20**	**943**	**2.39**	**985**	**2.60**	**1023**	**2.79**	1059	2.98
4000	**662**	**1.33**	722	1.57	778	1.78	829	2.01	878	2.22	**922**	**2.44**	**962**	**2.63**	**1003**	**2.84**	1042	3.06	1078	3.26
4200	**689**	**1.52**	746	1.77	801	1.99	851	2.23	898	2.45	**943**	**2.69**	983	2.91	1021	3.11	1060	3.34	—	—
4400	715	1.72	772	1.99	825	2.22	873	2.46	**919**	**2.71**	963	2.94	1004	3.19	1042	3.41	—	—	—	—
4600	742	1.94	797	2.22	848	2.48	896	2.72	940	2.98	984	3.22	1025	3.48	—	—	—	—	—	—
4800	770	2.18	823	2.46	872	2.75	919	3.00	963	3.27	—	—	—	—	—	—	—	—	—	—
5000	797	2.44	849	2.73	897	3.04	943	3.30	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Rpm — Fan Wheel Speed, Revolutions per Minute

NOTES:
1. **Boldface** indicates field-supplied drive required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable bhp is 2.90 with standard 2.0-hp motor. Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 690 to 900 rpm. All other rpm's will require a field-supplied drive.

Table 19 — Fan Performance (English), 50TFF014 — Vertical Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3700	**654**	**1.12**	714	1.31	767	1.50	815	1.67	861	1.85	**906**	**2.08**	**950**	**2.27**	**991**	**2.47**	**1030**	**2.65**	**1064**	**2.82**
3800	**668**	**1.20**	727	1.40	780	1.60	827	1.77	873	1.95	**916**	**2.18**	**959**	**2.38**	**1001**	**2.58**	**1040**	**2.78**	**1075**	**2.96**
3900	**683**	**1.28**	741	1.49	793	1.70	839	1.88	884	2.05	**927**	**2.28**	**969**	**2.50**	**1010**	**2.70**	**1049**	**2.91**	**1085**	**3.11**
4000	**697**	**1.37**	754	1.59	806	1.80	851	1.99	**895**	**2.16**	**938**	**2.38**	**979**	**2.62**	**1020**	**2.83**	**1059**	**3.04**	**1095**	**3.25**
4100	711	1.46	767	1.69	819	1.90	864	2.10	**907**	**2.28**	**949**	**2.49**	**989**	**2.74**	**1029**	**2.96**	**1068**	**3.18**	**1105**	**3.39**
4200	726	1.56	780	1.80	832	2.01	877	2.22	**919**	**2.41**	**960**	**2.60**	**1000**	**2.86**	**1039**	**3.10**	**1077**	**3.31**	**1114**	**3.54**
4300	741	1.66	794	1.91	845	2.12	889	2.35	**931**	**2.54**	**971**	**2.72**	**1011**	**2.97**	**1049**	**3.23**	**1087**	**3.46**	**1124**	**3.69**
4400	755	1.77	808	2.03	858	2.24	**902**	**2.48**	**943**	**2.68**	**983**	**2.86**	**1022**	**3.10**	**1059**	**3.37**	**1097**	**3.61**	**1133**	**3.84**
4500	770	1.89	821	2.15	871	2.37	**915**	**2.61**	**955**	**2.82**	**995**	**3.01**	**1033**	**3.23**	**1070**	**3.51**	**1107**	**3.76**	**1143**	**4.00**
4600	784	2.00	835	2.27	884	2.49	**928**	**2.75**	**968**	**2.96**	**1006**	**3.17**	**1044**	**3.37**	**1081**	**3.64**	**1117**	**3.92**	**1152**	**4.17**
4700	799	2.13	849	2.40	**897**	**2.63**	**941**	**2.88**	**981**	**3.11**	**1018**	**3.32**	**1056**	**3.52**	**1092**	**3.78**	**1127**	**4.07**	1162	4.33
4800	814	2.25	863	2.53	**910**	**2.77**	**954**	**3.02**	**993**	**3.27**	**1030**	**3.48**	**1067**	**3.69**	**1103**	**3.93**	1138	4.23	1172	4.50
4900	829	2.39	877	2.67	**923**	**2.92**	**967**	**3.17**	**1006**	**3.43**	**1043**	**3.65**	**1079**	**3.87**	**1114**	**4.09**	1149	4.37	1182	4.68
5000	843	2.52	**892**	**2.81**	**937**	**3.08**	**980**	**3.32**	**1019**	**3.60**	**1055**	**3.82**	**1091**	**4.05**	1126	4.25	1160	4.53	1193	4.85
5100	858	2.67	**906**	**2.95**	**950**	**3.24**	**993**	**3.48**	**1032**	**3.76**	**1068**	**4.00**	1103	4.23	1137	4.45	1171	4.70	1204	5.01
5200	873	2.82	**920**	**3.10**	**963**	**3.40**	**1006**	**3.65**	**1045**	**3.93**	**1081**	**4.19**	1115	4.42	1149	4.65	1182	4.88	1215	5.18
5300	888	2.97	**934**	**3.26**	**977**	**3.57**	**1019**	**3.82**	**1058**	**4.11**	1094	4.38	1127	4.62	1161	4.85	1194	5.07	1226	5.36
5400	**903**	**3.13**	**949**	**3.43**	**991**	**3.75**	**1032**	**4.00**	1071	4.29	1106	4.57	1139	4.82	1173	5.06	1205	5.29	1237	5.55
5500	**918**	**3.30**	**963**	**3.59**	**1004**	**3.92**	**1045**	**4.18**	1084	4.47	1119	4.77	1152	5.03	1185	5.27	1217	5.51	1248	5.75
5600	**933**	**3.47**	**978**	**3.77**	**1018**	**4.11**	1058	4.38	1097	4.66	1132	4.97	1165	5.24	1197	5.49	1229	5.74	—	—
5700	**948**	**3.65**	**992**	**3.95**	1032	4.30	1072	4.58	1110	4.86	1145	5.18	1178	5.46	1209	5.72	—	—	—	—
5800	**963**	**3.83**	**1006**	**4.14**	1046	4.50	1085	4.79	1123	5.07	1158	5.39	1191	5.69	—	—	—	—	—	—
5900	**978**	**4.00**	1021	4.34	1060	4.69	1098	5.01	1136	5.28	1171	5.60	—	—	—	—	—	—	—	—
6000	993	4.22	1035	4.54	1074	4.89	1112	5.23	1149	5.50	—	—	—	—	—	—	—	—	—	—
6100	1008	4.42	1050	4.75	1089	5.10	1125	5.45	1162	5.73	—	—	—	—	—	—	—	—	—	—
6200	1023	4.63	1065	4.96	1103	5.32	1139	5.68	—	—	—	—	—	—	—	—	—	—	—	—
6300	1038	4.85	1079	5.19	1117	5.54	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Rpm — Fan Wheel Speed, Revolutions per Minute

NOTES:
1. **Boldface** indicates field-supplied drive required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Values include losses for filters, unit casing, and wet coils.
4. Use of a field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Maximum usable bhp is 4.20 with standard 3.0-hp motor. Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Motor drive range: 710 to 890 rpm. All other rpm's require field-supplied drive.

Table 20 — Fan Performance (English), 50TFF007 Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.1		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1800	**765**	**0.45**	**821**	**0.51**	**923**	**0.65**	1019	0.81	1099	0.96	1178	1.14	**1249**	**1.32**	**1316**	**1.52**	**1382**	**1.72**
1900	**802**	**0.45**	**854**	**0.58**	953	0.73	1046	0.90	1126	1.06	1201	1.23	**1274**	**1.43**	**1338**	**1.62**	**1402**	**1.83**
2000	**840**	**0.60**	**888**	**0.66**	984	0.82	1073	0.99	1154	1.16	**1226**	**1.33**	**1297**	**1.53**	**1363**	**1.73**	**1424**	**1.94**
2100	**878**	**0.69**	**923**	**0.75**	1015	0.91	1101	1.08	1182	1.27	**1252**	**1.45**	**1320**	**1.64**	**1388**	**1.85**	**1448**	**2.07**
2200	**916**	**0.76**	958	0.85	1046	1.01	1129	1.19	**1209**	**1.39**	**1280**	**1.58**	**1345**	**1.77**	**1410**	**1.97**	**1473**	**2.20**
2300	954	0.89	993	0.96	1079	1.13	1160	1.31	**1237**	**1.51**	**1309**	**1.71**	**1372**	**1.91**	**1434**	**2.11**	**1496**	**2.34**
2400	993	1.00	1029	1.07	1112	1.25	1190	1.43	**1264**	**1.63**	**1336**	**1.85**	**1400**	**2.06**	**1459**	**2.26**	1519	2.48
2500	1031	1.13	1066	1.20	1145	1.39	**1220**	**1.57**	**1292**	**1.77**	**1363**	**2.00**	**1428**	**2.22**	1486	2.43	1543	2.65
2600	1070	1.26	1103	1.34	1179	1.52	**1251**	**1.71**	**1322**	**1.92**	**1390**	**2.15**	**1456**	**2.38**	1514	2.61	1569	2.83
2700	1109	1.41	1140	1.48	**1212**	**1.67**	**1283**	**1.87**	**1352**	**2.09**	**1418**	**2.31**	1483	2.56	1543	2.80	—	—
2800	1148	1.57	1177	1.64	**1246**	**1.83**	**1316**	**2.04**	**1383**	**2.26**	1446	2.48	1510	2.73	—	—	—	—
2900	1188	1.74	**1215**	**1.81**	**1281**	**2.00**	**1349**	**2.22**	1413	2.44	1476	2.67	1537	2.92	—	—	—	—
3000	**1227**	**1.92**	**1253**	**2.00**	**1316**	**2.19**	1382	2.42	1444	2.63	1506	2.88	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Rpm — Fan Wheel Speed, Revolutions per Minute

NOTES:
1. **Boldface** indicates field-supplied drive required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable bhp is 2.40 with standard 1.5-hp motor. Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of a field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 930 to 1205 rpm. All other rpm's will require field-supplied drive.

Table 21 — Fan Performance (English), 50TFF008,009 Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8	2.0
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	**459**	**0.42**	**549**	**0.62**	625	0.83	691	1.06	753	1.31	805	1.58	842	1.87	857	2.16	851	2.45	823	2.70
2400	**482**	**0.50**	**569**	**0.71**	645	0.95	708	1.18	768	1.40	824	1.72	872	2.01	**909**	**2.32**	931	2.64	935	2.96
2600	**507**	**0.59**	**592**	**0.82**	663	1.08	727	1.32	784	1.58	839	1.87	**891**	**2.17**	936	2.49	973	2.82	999	3.16
2800	**533**	**0.71**	**615**	**0.95**	683	1.20	747	1.49	802	1.75	855	2.04	**906**	**2.35**	954	2.67	997	3.01	1034	3.36
3000	**559**	**0.83**	637	1.09	704	1.35	765	1.66	823	1.94	872	2.22	921	2.54	969	2.88	1014	3.22	—	—
3200	**585**	**0.96**	660	1.24	727	1.52	785	1.83	841	2.15	892	2.45	939	2.76	984	3.10	—	—	—	—
3400	**610**	**1.10**	682	1.41	750	1.72	806	2.01	860	2.36	912	2.69	958	3.01	1002	3.34	—	—	—	—
3600	636	1.25	707	1.60	772	1.93	828	2.23	880	2.57	930	2.95	978	3.29	—	—	—	—	—	—
3800	661	1.41	733	1.82	795	2.15	852	2.48	901	2.80	949	3.20	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Rpm — Fan Wheel Speed, Revolutions per Minute

NOTES:
1. **Boldface** indicates field-supplied drive required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable bhp is 2.40 with standard 1.5-hp motor. Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of a field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 620 to 880 rpm. All other rpm's will require field-supplied drive.

Table 22 — Fan Performance (English), 50TFF008,009 Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	**484**	**0.55**	**560**	**0.70**	**631**	**0.87**	690	1.03	747	1.20	800	1.38	850	1.52	879	1.38	**925**	**1.81**	**964**	**1.92**
3200	**505**	**0.66**	**579**	**0.81**	**646**	**0.98**	708	1.16	761	1.34	812	1.51	862	1.71	**908**	**1.85**	**944**	**2.01**	**984**	**2.09**
3400	**527**	**0.78**	**599**	**0.93**	**664**	**1.11**	724	1.30	775	1.48	827	1.67	873	1.85	**920**	**2.07**	**963**	**2.21**	**1001**	**2.31**
3600	**548**	**0.92**	**619**	**1.05**	**680**	**1.24**	738	1.43	794	1.64	840	1.83	888	2.04	**931**	**2.23**	**976**	**2.47**	**1017**	**2.62**
3800	**571**	**1.08**	**639**	**1.19**	698	1.39	756	1.60	810	1.81	856	2.02	**901**	**2.23**	**945**	**2.44**	**986**	**2.65**	**1029**	**2.89**
4000	**593**	**1.25**	**659**	**1.35**	717	1.56	773	1.78	823	1.98	875	2.22	**915**	**2.42**	**960**	**2.65**	**1000**	**2.87**	1039	3.10
4200	**616**	**1.45**	**680**	**1.53**	737	1.74	789	1.95	841	2.18	889	2.41	**934**	**2.65**	**972**	**2.87**	1015	3.12	1053	3.34
4400	**639**	**1.67**	701	1.73	757	1.92	807	2.16	858	2.41	**903**	**2.62**	**951**	**2.89**	990	3.12	1028	3.36	—	—
4600	**662**	**1.91**	722	1.95	777	2.13	827	2.38	874	2.62	**921**	**2.87**	965	3.11	1008	3.39	—	—	—	—
4800	**686**	**2.17**	744	2.20	797	2.36	846	2.62	891	2.85	938	3.14	980	3.37	—	—	—	—	—	—
5000	710	2.45	766	2.47	816	2.61	866	2.86	910	3.12	934	3.39	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Rpm — Fan Wheel Speed, Revolutions per Minute

NOTES:
1. **Boldface** indicates field-supplied drive required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Maximum usable bhp is 2.90 with standard 2.0-hp motor. Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure.
4. Use of a field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Values include losses for filters, unit casing, and wet coils.
6. Motor drive range is 690 to 900 rpm. All other rpm's will require field-supplied drive.

Table 23 — Fan Performance (English), 50TFF014 Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3700	**607**	**0.97**	**670**	**1.18**	732	1.37	782	1.56	833	1.73	879	1.95	**927**	**2.17**	**973**	**2.38**	**1013**	**2.57**	**1046**	**2.73**
3800	**621**	**1.05**	**681**	**1.25**	742	1.45	795	1.66	842	1.82	889	2.03	**934**	**2.26**	**980**	**2.48**	**1022**	**2.69**	**1058**	**2.87**
3900	**636**	**1.13**	**693**	**1.32**	751	1.53	808	1.76	851	1.92	**898**	**2.12**	**942**	**2.36**	**987**	**2.59**	**1030**	**2.81**	**1068**	**3.01**
4000	**650**	**1.21**	**705**	**1.40**	761	1.61	819	1.86	861	2.02	**908**	**2.21**	**950**	**2.46**	**994**	**2.70**	**1037**	**2.92**	**1077**	**3.14**
4100	**665**	**1.30**	717	1.48	772	1.71	830	1.96	871	2.13	**917**	**2.32**	**960**	**2.55**	**1001**	**2.81**	**1045**	**3.04**	**1085**	**3.27**
4200	**680**	**1.39**	728	1.57	783	1.81	839	2.05	883	2.25	**925**	**2.44**	**969**	**2.65**	**1009**	**2.92**	**1051**	**3.17**	**1092**	**3.40**
4300	**696**	**1.49**	739	1.66	794	1.91	848	2.14	**896**	**2.38**	**935**	**2.56**	**979**	**2.77**	**1018**	**3.03**	**1058**	**3.29**	**1100**	**3.53**
4400	711	1.60	750	1.75	805	2.02	857	2.24	**908**	**2.51**	**945**	**2.68**	**988**	**2.89**	**1028**	**3.14**	**1066**	**3.41**	**1106**	**3.67**
4500	727	1.70	762	1.85	817	2.12	867	2.35	**919**	**2.63**	**955**	**2.82**	**996**	**3.02**	**1037**	**3.25**	**1074**	**3.54**	**1113**	**3.81**
4600	742	1.82	774	1.96	828	2.23	877	2.46	**929**	**2.75**	**967**	**2.96**	**1005**	**3.16**	**1046**	**3.38**	**1084**	**3.66**	**1121**	**3.95**
4700	758	1.94	786	2.07	840	2.34	888	2.59	**938**	**2.87**	**980**	**3.11**	**1015**	**3.30**	**1056**	**3.52**	**1093**	**3.79**	**1129**	**4.09**
4800	773	2.06	799	2.18	852	2.46	**899**	**2.72**	**947**	**2.98**	**992**	**3.26**	**1025**	**3.45**	**1064**	**3.67**	**1103**	**3.92**	1137	4.22
4900	789	2.19	812	2.30	863	2.57	**910**	**2.86**	**957**	**3.11**	**1003**	**3.41**	**1036**	**3.61**	**1073**	**3.83**	**1112**	**4.07**	1147	4.36
5000	805	2.32	826	2.43	875	2.70	**921**	**2.99**	**966**	**3.24**	**1014**	**3.56**	**1049**	**3.78**	**1083**	**4.00**	1121	4.23	1157	4.50
5100	821	2.47	840	2.57	887	2.83	**932**	**3.13**	**976**	**3.38**	**1024**	**3.71**	**1061**	**3.96**	**1093**	**4.17**	1129	4.40	1168	4.66
5200	837	2.61	854	2.71	**898**	**2.96**	**943**	**3.28**	**987**	**3.53**	**1033**	**3.84**	**1073**	**4.14**	1103	4.34	1138	4.58	1175	4.82
5300	853	2.76	868	2.85	**909**	**3.09**	**955**	**3.42**	**998**	**3.69**	**1042**	**3.98**	1084	4.31	1115	4.53	1148	4.76	1184	5.01
5400	869	2.92	882	3.01	**920**	**3.24**	**967**	**3.57**	**1009**	**3.86**	**1051**	**4.14**	1095	4.49	1128	4.74	1158	4.95	1193	5.20
5500	885	3.09	**897**	**3.17**	**932**	**3.38**	**978**	**3.72**	**1029**	**4.03**	**1061**	**4.03**	1105	4.66	1140	4.94	1168	5.15	1202	5.40
5600	**901**	**3.26**	**911**	**3.33**	**943**	**3.54**	**990**	**3.87**	**1031**	**4.20**	1071	4.46	1114	4.81	1152	5.14	1180	5.36	1211	5.60
5700	**917**	**3.44**	**926**	**3.50**	**956**	**3.70**	**1002**	**4.03**	1042	4.38	1081	4.64	1123	4.98	1163	5.34	1193	5.59	—	—
5800	**933**	**3.62**	**941**	**3.68**	**968**	**3.87**	**1013**	**4.20**	1053	4.56	1092	4.84	1132	5.15	1174	5.54	—	—	—	—
5900	**949**	**3.81**	**956**	**3.87**	**981**	**4.05**	1025	4.37	1065	4.74	1103	5.04	1142	5.34	1183	5.72	—	—	—	—
6000	**965**	**4.01**	**972**	**4.06**	995	4.23	1037	4.55	1076	4.92	1114	5.24	1152	5.53	—	—	—	—	—	—
6100	981	4.21	987	4.26	1008	4.42	1047	4.73	1088	5.10	1125	5.45	1162	5.73	—	—	—	—	—	—
6200	997	4.42	1002	4.46	1022	4.62	1058	4.91	1100	5.29	1136	5.66	—	—	—	—	—	—	—	—
6300	1014	4.64	1018	4.68	1036	4.83	1070	5.11	1112	5.49	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:
1. **Boldface** indicates field-supplied drive required (see Note 6).
2. ▭ indicates field-supplied motor and drive required.
3. Values include losses for filters, unit casing, and wet coils.
4. Use of a field-supplied motor may affect wire sizing. Contact Carrier representataive to verify.
5. Maximum usable bhp is 4.20 with standard 3.0-hp motor. Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Motor drive range is 710 to 890 rpm. All other rpm's will require field-supplied drive.

START-UP

Unit Preparation — Make sure that unit has been installed in accordance with these installation instructions and applicable codes. Ensure Start-Up Checklist on back page of booklet is completely filled out.

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

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

Compressor Mounting — Compressors are internally spring mounted. Do not loosen or remove compressor hold-down bolts. Remove the tiedown bands that hold the compressors together on 50TFF014 units.

Internal Wiring — Check all electrical connections in unit control boxes; tighten as required. Verify and correct if necessary. Ensure that electrical component wiring does not come in contact with refrigerant tubing or sharp edges.

Refrigerant Service Ports — Each refrigerant system has 4 Schrader-type service gage ports: one on the suction line, one on the liquid line, and two on the compressor discharge line. Be sure that caps on the ports are tight.

HIGH FLOW REFRIGERANT VALVES — Two high flow valves are located on the hot gas tube coming out of the compressor and the suction tube going into the compressor. Large black plastic caps identify these valves. These valves have O-rings inside which screw the cap onto a brass body to prevent leaks. No field access to these valves is available at this time. Ensure the plastic caps remain on the valves and are tight or the possibility of refrigerant leakage could occur.

Compressor Rotation — On 3-phase scroll compressor units, it is important to be certain compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

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

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

1. Note that the evaporator fan is probably also rotating in the wrong direction.
2. Turn off power to the unit, tag disconnect.
3. Reverse any two of the unit power leads.
4. Turn on power to the unit, reenergize compressor.

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

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

Cooling — To start unit, turn on main power supply. Set system selector switch at COOL position and fan switch at AUTO. position. Adjust thermostat to a setting below room temperature. Compressor starts on closure of contactor.

Check unit charge. Refer to Refrigerant Charge section on page 31. Unit must operate a minimum of 10 minutes before adjusting charge.

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

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

Heating (If Accessory Electric Heater is Installed) — To start unit, turn on main power supply.

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

First stage of thermostat energizes the first-stage electric heater; second stage energizes second-stage electric heater elements, if installed. Check air supply grille(s) to ensure proper heat supply.

If unit does not energize, reset limit switch (located on evaporator-fan scroll) by pressing button located between terminals on the switch.

TO SHUT OFF UNIT — Set system selector switch at OFF position. Resetting heating selector lever below room temperature will shut unit off temporarily until space temperature falls below thermostat setting.

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

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

Operating Sequence

COOLING, UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC), outdoor fan contactor (OFC), and compressor contactor no. 1 (C1) are energized and evaporator-fan motor, condenser fans and compressor no. 1 start. The condenser-fan motors run continuously while unit is cooling. If the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts (sizes 008-014 only).

HEATING, UNITS WITHOUT ECONOMIZER (If Optional or Accessory Heater is Installed) — Upon a call for heating through terminal W1, IFC and heater contactor no. 1 (HC1) are energized. On units equipped for 2 stages of heat, when additional heat is needed HC2 is energized through W2 (sizes 008-014 only).

COOLING, UNITS WITH DURABLADE ECONOMIZER — When the outdoor-air temperature is above the OAT (outdoor-air thermostat) setting and the room thermostat calls for cooling, compressor contactor no. 1 and OFC (outdoor-fan contactor) are energized to start compressor no. 1 and the condenser-fan motors. The evaporator-fan motor is energized and the economizer damper moves to the minimum position. Upon a further call for cooling, compressor contactor no. 2 will be energized, starting compressor no. 2 (sizes 008-014 only). After the thermostat is satisfied, the damper moves to the fully closed position.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for cooling, the economizer dampers move to the minimum position. If the supply-air temperature is above 14 C (57 F), the damper continues to open until it reaches the fully open position or until the supply-air temperature drops below 14 C (57 F).

When the supply-air temperature falls to between 14 C (57 F) and 11 C (52 F), the damper will remain at an intermediate open position. If the supply-air temperature falls below 11 C (52 F), the damper will modulate closed until it reaches the minimum position or until the supply-air temperature is above 11 C (52 F).

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing second-stage cooling. Compressor no. 1 and the condenser fan will be energized and the position of the economizer damper will be determined by the supply-air temperature. Compressor no. 2 (sizes 008-014 only) is locked out.

When the second stage of cooling is satisfied, the compressor and condenser-fan motors will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage of cooling is satisfied and the indoor (evaporator) fan motor is deenergized, the damper will move to fully closed position.

COOLING, UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC), compressor contactor and outdoor (condenser) fan contactor (OFC) are energized and evaporator-fan motor, compressor no. 1, and condenser fan start. The condenser-fan motor runs continuously while unit is cooling.

ACCESSORY HEATING, UNITS WITHOUT ECONOMIZER — Upon a call for heating through terminal W1, IFC and heater contactor no. 1 (HC1) are energized. On units equipped for 2 stages of heat, when additional heat is needed HC2 is energized through W2.

SERVICE

⚠ CAUTION

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

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

EVAPORATOR COIL

1. Turn unit power off. Install lockout tag. Remove evaporator coil access panel.
2. If economizer or two-position damper is installed, remove economizer by disconnecting Molex plug and removing mounting screws. Refer to accessory economizer installation instructions or Optional Economizer section on page 14 for more information.
3. Slide filters out of unit.
4. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, back-flush toward return-air section to remove foreign material. Flush condensate pan after completion.
5. Reinstall economizer and filters.
6. Reconnect wiring.
7. Replace access panels.

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

One-Row Coils — Size 008 — Wash coil with commercial coil cleaner. It is not necessary to remove the top panel.

2-Row Coils — Size 007

Clean coil as follows:

1. Turn off unit power. Install lockout tag.
2. Remove top panel screws on condenser end of unit.
3. Remove condenser coil corner post. See Fig. 38. To hold top panel open, place coil corner post between top panel and center post. See Fig. 39.
4. Remove screws securing coil to compressor plate and compressor access panel.
5. Remove fastener holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 75 to 100 mm (3 to 4 in.) from the inner coil section. See Fig. 40.
6. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
7. Secure inner and outer coil rows together with a field-supplied fastener.
8. Reposition the outer coil section and remove the coil corner post from between the top panel and center post. Reinstall the coil corner post and replace all screws.

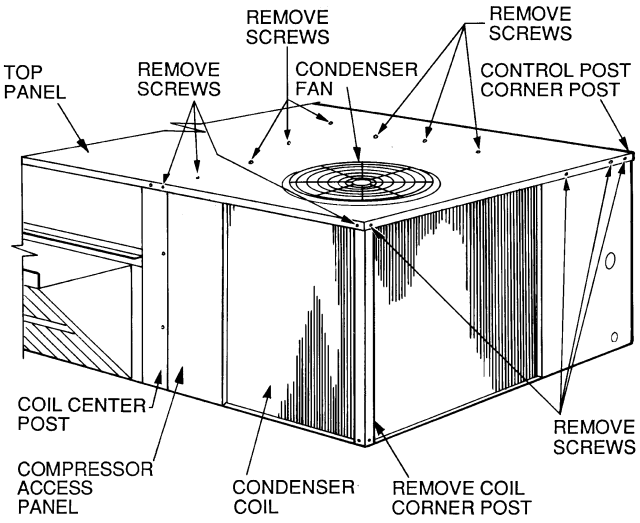


Fig. 38 — Cleaning Condenser Coil (50TFF007)

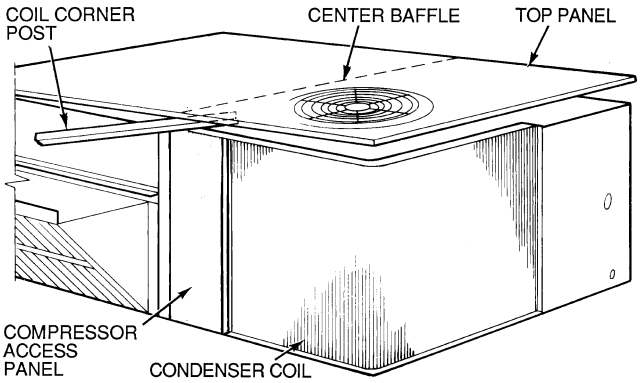


Fig. 39 — Propping Up Top Panel (50TFF007)

Two-Row Coils Cleaning (Sizes 009-014 Units) — Clean coils as follows:

1. Turn off unit power and tag disconnect.
2. Remove top panel screws on condenser end of unit.
3. Remove condenser coil corner post. See Fig. 41. To hold top panel open, place coil corner post between top panel and center post. See Fig. 42.
4. Remove screws securing coil to center post.
5. Remove fastener holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 75 to 100 mm (3 to 4 in.) from the inner coil section. See Fig. 40.
6. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
7. Secure inner and outer coil rows together with a field-supplied fastener.
8. Reposition the outer coil section, and remove the coil corner post between the top panel and center post.
9. Reinstall the coil corner post.
10. Replace all screws.

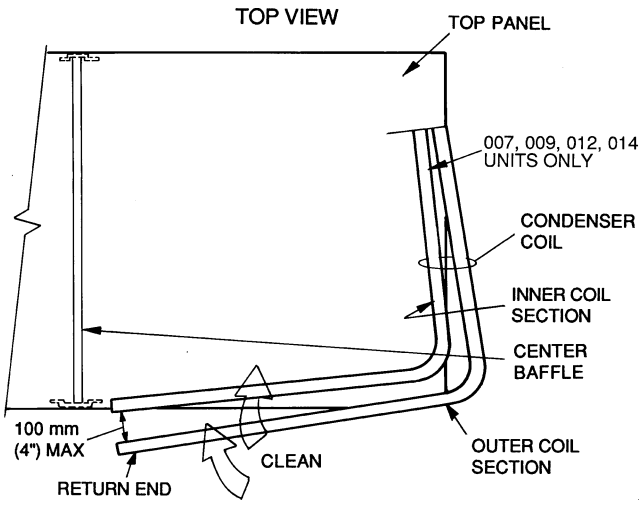


Fig. 40 — Separating Coil Sections

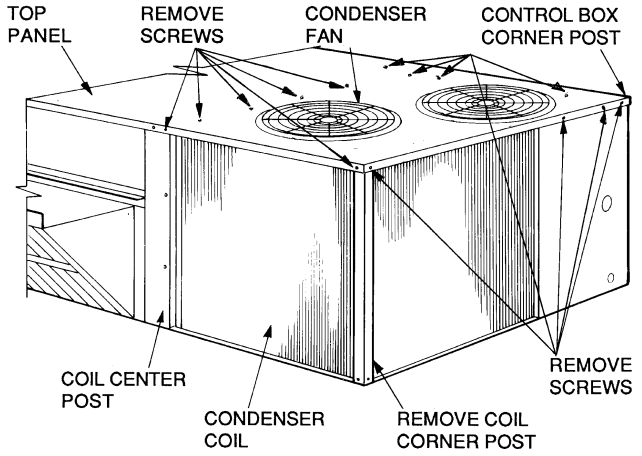


Fig. 41 — Cleaning Condenser Coil (50TFF008-014)

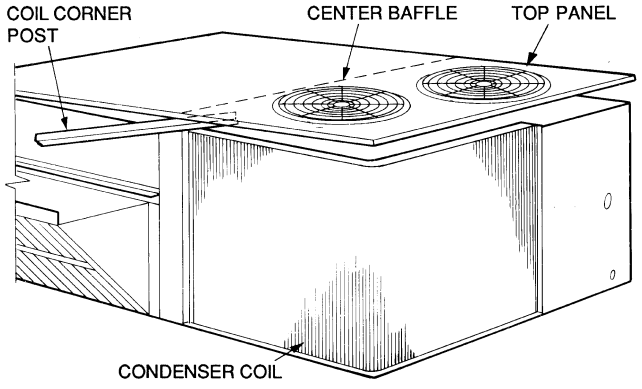


Fig. 42 — Propping Up Top Panel (50TFF008-014)

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

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

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

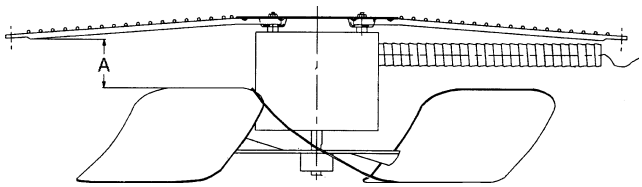
Lubrication

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

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

EVAPORATOR FAN BELT INSPECTION — Check condition of evaportor belt or tension during heating and cooling inspections or as conditions require. Replace belt or adjust as necessary. Refer to Step 7 — Adjust Evaporator-Fan Speed on page 18 for proper adjusting procedures and belt tension.

Condenser Fan Adjustment (Fig. 43) — Shut off unit power supply. Remove condenser-fan assembly (grille, motor, motor cover, and fan) and loosen fan hub setscrews. Adjust fan height as shown in Fig. 43. Tighten setscrews and replace condenser-fan assembly.



UNIT 50TFF007-014	FAN HEIGHT A	
	in.	mm
220/240 V	2.75	70
400 V	3.50	89

Fig. 43 — Condenser Fan Adjustment

High-Pressure Switch — The high-pressure switch contains a Schrader core depressor, and is located on the compressor hot gas line. This switch opens at 428 psig and closes at 320 psig. No adjustments are necessary.

Loss-of-Charge Switch — The loss-of-charge switch contains a Schrader core depressor, and is located on the compressor liquid line. This switch opens at 7 psig and closes at 22 psig. No adjustment is necessary.

Freeze-Stat — The Freeze-stat is a bimetal temperature-sensing switch that is located on the "hair pin" end of the evaporator coil. The switch protects the evaporator coil from freeze-up due to lack of airflow. The switch opens at 30 F and closes at 45 F. No adjustment is necessary.

Refrigerant Charge

CHECKING AND ADJUSTING REFRIGERANT CHARGE — The refrigerant system is fully charged with R-22 refrigerant, tested, and factory-sealed. Unit must operate in Cooling mode a minimum of 10 minutes before checking charge.

NOTE: Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper R-22 charge.

A superheat charging chart is attached to the outside of the service access panel. The chart includes the required suction line temperature at given suction line pressures and outdoor ambient temperatures.

An accurate superheat, thermocouple- or thermistor-type thermometer, and a gage manifold are required when using the superheat charging method for evaluating the unit charge. *Do not use mercury or small dial-type thermometers because they are not adequate for this type of measurement.*

⚠ CAUTION

When evaluating the refrigerant charge, an indicated adjustment to the specified factory charge must always be very minimal. If a substantial adjustment is indicated, an abnormal condition exists somewhere in the cooling system, such as insufficient airflow across either coil or both coils.

Proceed as follows:

1. Remove caps from low- and high-pressure service fittings.
2. Using hoses with valve core depressors, attach low- and high-pressure gage hoses to low- and high-pressure service fittings, respectively.
3. Start unit in Cooling Mode and let unit run until system pressures stabilize.
4. Measure and record the following:
   a. Outdoor ambient-air temperature (F db).
   b. Evaporator inlet-air temperature (F wb).
   c. Suction-tube temperature (F) at low-side service fitting.
   d. Suction (low-side) pressure (psig).
5. Using "Cooling Charging Charts" compare outdoor-air temperature (F db) with the suction line pressure (psig) to determine desired system operating suction line temperature. See Fig. 44-48.
6. Compare actual suction-tube temperature with desired suction-tube temperature. Using a tolerance of ± 3° F, add refrigerant if actual temperature is more than 3° F higher than proper suction-tube temperature, or remove refrigerant if actual temperature is more than 3° F lower than required suction-tube temperature.

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

EXAMPLE: (Fig. 48; Circuit 1)

Outdoor Temperature . . . . . 85 F

Suction Pressure . . . . . 74 psig

Suction Temperature should be . . . . . 54 F
(Suction Temperature may vary ± 3 F.)

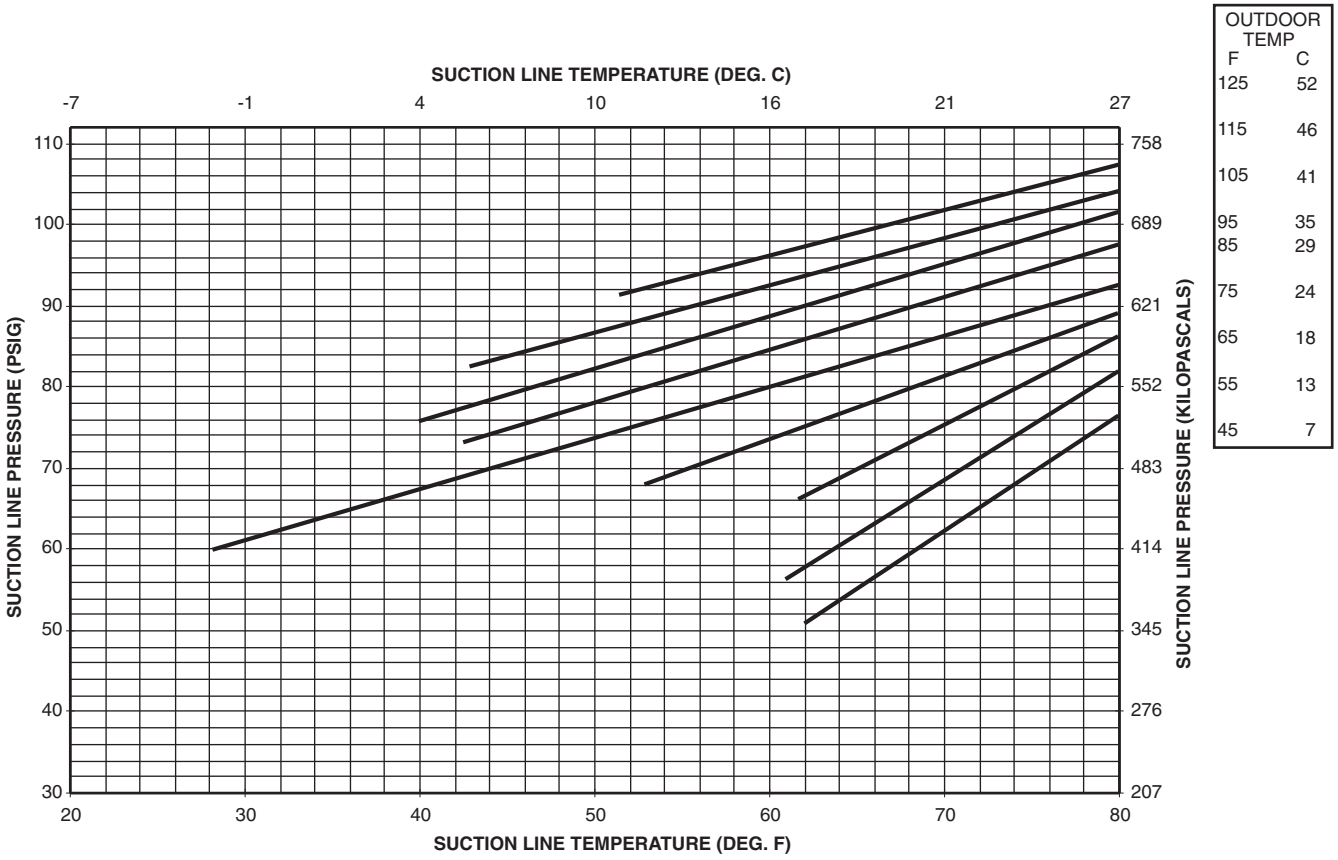


Fig. 44 — Cooling Charging Chart, 50TFF007

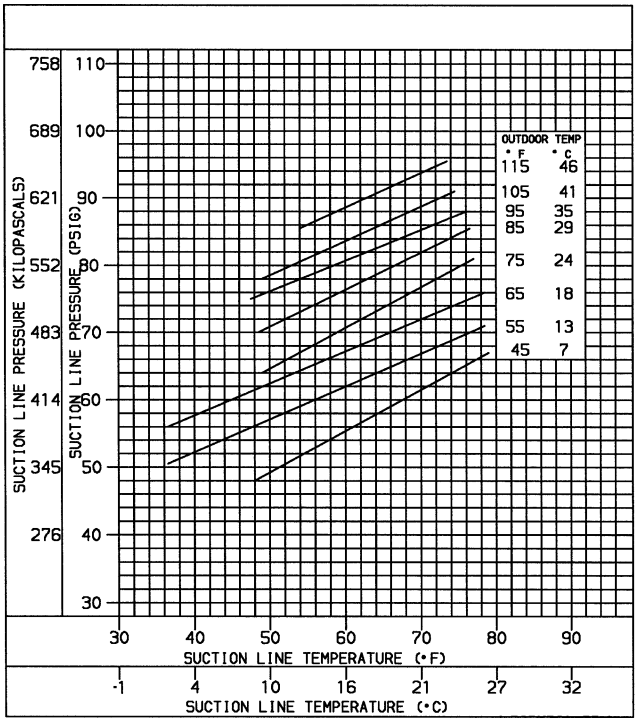


Fig. 45 — Cooling Charging Chart; 50TFF008

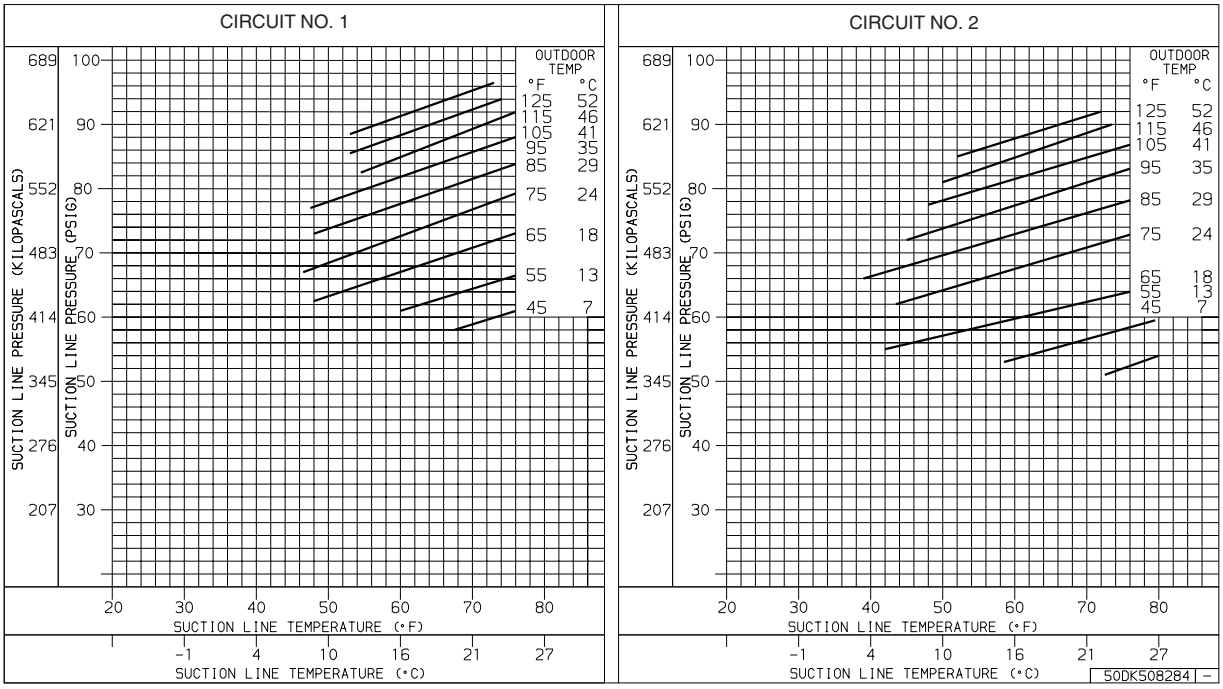


Fig. 46 — Cooling Charging Chart; 50TFF009

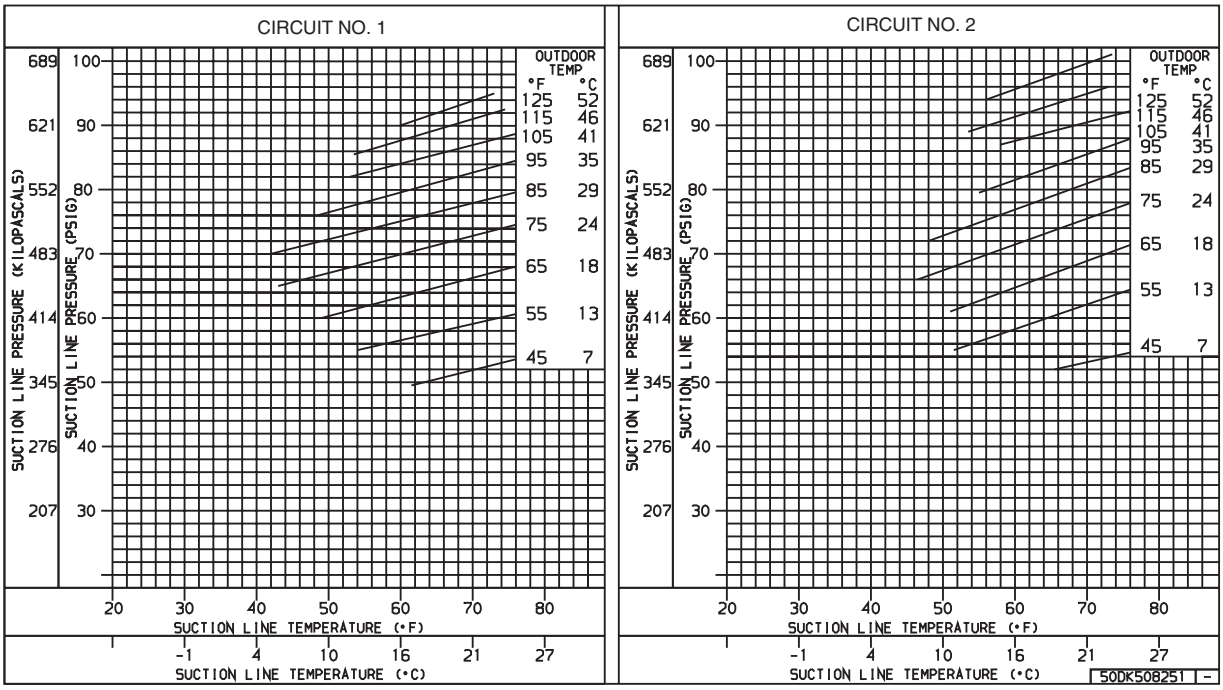


Fig. 47 — Cooling Charging Chart; 50TFF012

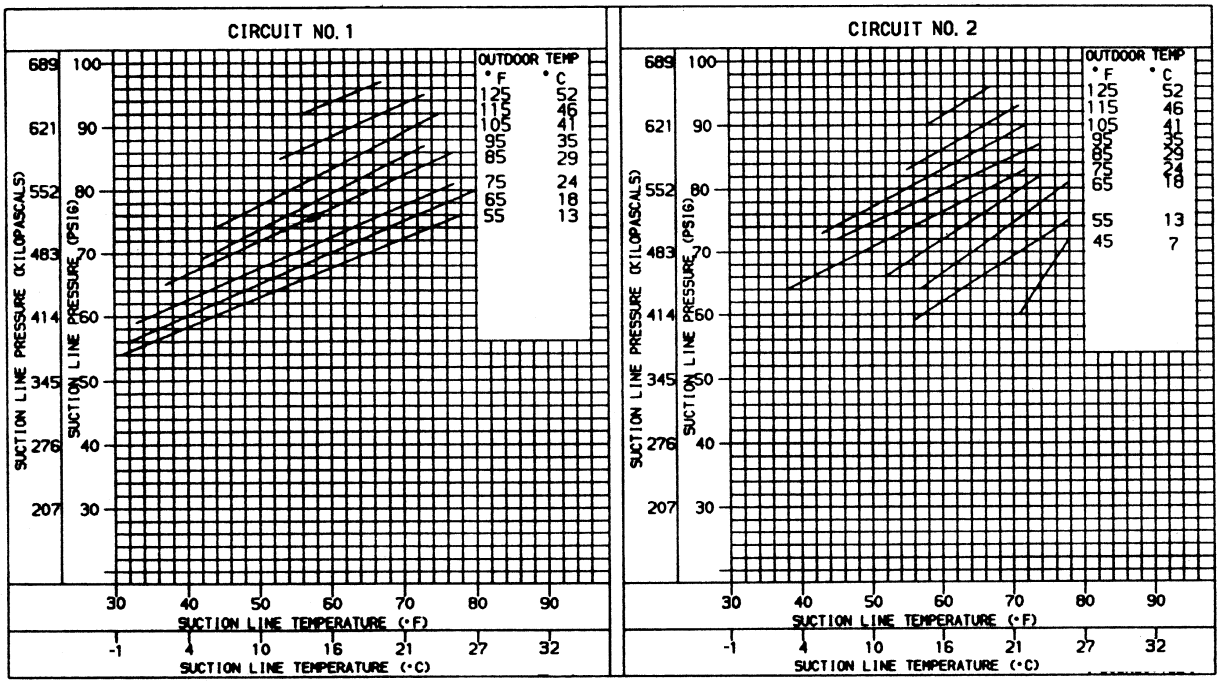


Fig. 48 — Cooling Charging Chart; 50TFF014

TROUBLESHOOTING

Refer to Table 24 for cooling troubleshooting details. Refer to Table 25 for economizer troubleshooting.

Table 24 — Cooling Service Analysis

PROBLEM	CAUSE	REMEDY
Compressor(s) and condenser fan will not start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer, or control relay.	Replace component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high.	Lower thermostat setting below room temperature.
Compressor(s) will not start but condenser fan runs.	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor.
	Defective run/start capacitor, overload, start relay.	Determine cause and replace.
	One leg of three-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor(s) cycles (other than normally satisfying thermostat).	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked condenser.	Determine cause and correct.
	Defective run/start capacitor, overload, or start relay.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty condenser-fan motor or capacitor.	Replace.
	Restriction in refrigerant system.	Locate restriction and remove.
Compressor(s) operates continuously.	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak; repair and recharge.
	Leaking valves in compressor.	Replace compressor.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser coil dirty or restricted.	Clean coil or remove restriction.
Excessive head pressure.	Dirty air filter.	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser air restricted or air short-cycling.	Determine cause and correct.
Head pressure too low.	Low refrigerant charge.	Check for leaks; repair and recharge.
	Compressor valves leaking.	Replace compressor.
	Restriction in liquid tube.	Remove restriction.
Excessive suction pressure.	High head load.	Check for source and eliminate.
	Compressor valves leaking.	Replace compressor.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction pressure too low.	Dirty air filter.	Replace filter.
	Low refrigerant charge.	Check for leaks; repair and recharge.
	Metering device or low-side restricted.	Remove source of restriction.
	Insufficient evaporator airflow.	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Outdoor ambient below –3.8 C (25 F).	Install low-ambient kit.
Compressor no. 2 will not run (008-014 only).	Unit in economizer mode.	Proper operation; no remedy necessary.
Compressor makes excessive noise (007 and 014 scroll only).	Compressor rotating in wrong direction.	Reverse the 3-phase power load as described in Start-Up section on page 29.

Table 25 — Durablade Economizer Service Analysis

PROBLEM	CAUSE	REMEDY
Damper does not open.	Indoor (evaporator) fan is off.	1. Check to ensure that 24 vac is present at terminal C1 on the IFC or that 24 vac is present at the IFO terminal. Check whether 24 vac is present at PL6-1 (red wire) and/or PL6-3 (black wire). If 24 vac is not present, check wiring (see unit label diagram). 2. Check proper thermostat connection to G on the connection board.
	No power to economizer motor.	1. Check that SW3 is properly making contact with the damper blade. Check that SW1 is in the NC (normally closed) position. 2. Check diode D1. If diode is not functioning properly, replace control board. 3. Confirm that the economizer control board is grounded properly at PL6-4 (brown wire) and at brown terminal of the economizer control board (brown wire). The economizer motor must also be grounded properly at the negative motor terminal (brown wire). 4. Verify SW1 and SW3 are working and wired properly (see unit label diagram). 5. Check for 24 vac input at both PL6-1 (red wire) and PL6-3 (black wire). If 24 vac not present, check unit wiring (see unit label diagram). If 24 vac is found in both places, check for 24 vac at the yellow terminal of the economizer control board (yellow wire). If 24 vac power is not present, replace the economizer control board.
	Economizer motor failure.	If the indoor (evaporator) fan and economizer motor are energized, verify that there is a minimum of 18 vdc at the positive motor terminal. If the motor is not operating, replace the motor.
Economizer operation limited to minimum position.	OAT or EC set too high.	1. Set at correct temperature (3 F below indoor space temperature). 2. Check OAT or EC by setting above outdoor temperature or humidity level. If the OAT or EC switches do not close, replace OAT or EC.
	Verify economizer control board is correctly wired and works properly.	1. Perform the following tests when OAT or EC is closed, Y1 is called for, and damper is at minimum position. Confirm 24 vac on gray terminal of the economizer control board (gray wire). If 24 vac is not present, check wiring (see unit label diagram). 2. Verify that SW1 and SW3 are wired correctly and working properly (see unit label diagram). 3. Check to ensure that 24 vac exists at PL6-2 (blue wire). If 24 vac is not present, check wiring (see unit wiring label diagram). 4. Check 24 vac output at PL6-10 (white wire). If 24 vac is not present, replace economizer control board.
	Check SAT.	1. After verifying that the OAT and EC settings and the economizer control board wiring are correct, check to ensure that the 24 vac terminal of the SAT has 24 vac (white wire). If OAT, EC, and control board are functioning and wired properly and no 24 vac exists, check wiring (see unit label diagram). 2. If supply-air temperature is greater than 57 F, 24 vac should be found at terminal T2 on the SAT (pink wire). If 24 vac is not present, replace SAT.
Damper does not close.	Incorrect wiring of economizer.	1. Verify that SW2 and SW4 are wired and working properly (see unit label diagram). 2. Check diode D2. If diode is not functioning properly, replace control board.
	Verify economizer control board is functioning properly.	1. After verifying that the wiring is correct, modulate the damper to the minimum position. Remove the calls for G (evaporator fan). 2. If the damper does not move, check for 24 vac at PL6-1 (red wire). If 24 vac is not present, check wiring (see unit label diagram). 3. If damper still does not move, check for 24 vac at blue terminal of economizer control board (blue wire). If 24 vac is not present, replace the economizer circuit board.
	Check SAT.	1. After verifying that the wiring is correct and the economizer control board is functioning properly, place the OAT or EC switch in the closed position. Place a call for Y1 and open the damper to the fully open position. Confirm that the 24 vac terminal of the SAT has 24 vac (white wire). If 24 vac is not present, check wiring (see unit label diagram). 2. If supply-air temperature is less than 11.1 C (52 F), 24 vac should be found at terminal T1 on the SAT (violet wire). If 24 vac not found, replace SAT.
	Economizer motor failure.	If economizer control board and SAT are functioning properly, verify that there is a minimum of 18 vdc at the positive motor terminal. If a minimum of 18 vdc is present and the motor is still not operating, replace the motor.
Economizer damper does not close on power loss.	Verify that close-on-power-loss and economizer control board are functioning properly.	1. Check voltage potential across batteries. If lower than 14 vdc, replace close-on-power-loss power supply (9-v alkaline batteries). Check this emergency power supply on a regular basis or whenever the filters are changed. 2. If the close-on-power-loss and economizer control board are functioning properly, check for 14 vdc or higher at the blue terminal of the economizer control board (blue wire) when power is disconnected from unit. If 14 vdc is not present, replace the control board.

LEGEND

C1 — Common Power
EC — Enthalpy Control
IFC — Indoor (Evaporator) Fan Contactor
IFO — Indoor (Evaporator) Fan On
OAT — Outdoor-Air Thermostat
PL — Plug
SAT — Supply-Air Thermostat
SW — Economizer Position Switch

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

I. PRELIMINARY INFORMATION

MODEL NO.: _____ SERIAL NO.: _____

DATE: _____ TECHNICIAN: _____

BUILDING LOCATION: _____

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

- ☐ ON SIZE 014, REMOVE TIE-DOWN BANDS ON COMPRESSORS PER INSTALLATION INSTRUCTIONS
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK THAT INDOOR AIR FILTERS 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 PER PAGE 18
- ☐ CHECK WIRING TO ENSURE THAT IT DOES NOT COME INTO CONTACT WITH ANY REFRIGERANT TUBING OR SHARP EDGES

III. START-UP

ELECTRICAL

SUPPLY VOLTAGE	L1-L2	_____	L2-L3	_____	L3-L1	_____
CIRCUIT NO. 1 COMPRESSOR AMPS	L1	_____	L2	_____	L3	_____
CIRCUIT NO. 2 COMPRESSOR AMPS	L1	_____	L2	_____	L3	_____
EVAPORATOR FAN AMPS	L1	_____	L2	_____		

TEMPERATURES

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

PRESSURES

REFRIGERANT SUCTION CIRCUIT NO. 1	_____	kPa (PSIG)	CIRCUIT NO. 2	_____	kPa (PSIG)
	_____	°C (°F)		_____	°C (°F)
REFRIGERANT DISCHARGE CIRCUIT NO. 1	_____	kPa (PSIG)	CIRCUIT NO. 2	_____	kPa (PSIG)
	_____	°C (°F)		_____	°C (°F)

- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS ON PAGES 32-34
- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR IS ROTATING IN CORRECT DIRECTION (007 AND 014 ONLY)

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE