



Installation, Start-Up and Service Instructions

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GENERAL

This literature contains installation, start-up, and service instructions for 50TJQ rooftop units bearing the Mark of the European Community (CE). These units are designed

in accordance with European Standard EN60335-2-40 and display the following symbols:

	Check Here		Minimum Unit Disconnect		Ground
	Compressor or Compressor Section		Outdoor (Condenser) Fan		Check Compressor Rotation
	Compressor Test Pressure — High		Phase		Moving Parts Hazard
	Compressor Test Pressure — Low		Number		Filter Section
	Fuse		Single Point Box		Fan Section
	Heater		Fire Hazard		Electrical Hazard
	Minimum Clearance to Combustible Materials 25 mm (1 in.) for First 305 mm (12 in.) of Duct When Electric Heater is Installed on Horizontal Discharge Unit.		Explosion Hazard		
			No Open Flame		

SAFETY CONSIDERATIONS

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

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

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

⚠ WARNING

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

INSTALLATION

Unit is shipped in the vertical 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. Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to curb.* If electric or control power is to be routed through the basepan, attach the accessory thru-the-bottom service connections to the basepan in accordance with the accessory installation instructions. Connections 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. Improperly applied gasket can also result in air leaks and poor unit performance.

Curb should be level. Unit leveling tolerances are shown in Fig. 2. This is necessary for unit drain to function properly. 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 condenser coil 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 a plenum return is used on a vertical unit, the return should be ducted through the roof deck to comply with applicable fire codes.

A minimum clearance to combustibles is not required around ductwork on vertical discharge units. On horizontal discharge units with electric heat, a minimum clearance of 25 mm (1 in.) is required for the first 305 mm (12 in.) of ductwork. Cabinet return-air static should not exceed -87 Pa (-0.35 in. wg) with Durablade economizer, or -12 Pa (-0.45 in. wg) without economizer.

Step 3 — Install Condensate Drain Line and External Trap

— Condensate drain connections are located at the bottom and end of the unit. Unit discharge connections do not determine the use of drain connections; either drain connection can be used in vertical or horizontal applications.

When using the standard end 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 end connection. See Fig. 3. The piping for the condensate drain and external trap can be completed after the unit is in place.

All units must have an external trap for condensate drainage. Install a trap at least 100 mm (4-in.) deep and protect against freeze-up. See Fig. 4. If drain line is installed downstream from the external trap, pitch the line away from the unit at 25 mm per 3 m (1 in. per 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 for additional information. Operating weight is shown in Tables 1A and 1B and Fig. 5.

Lifting holes are provided in base rails as shown in Fig. 5 and 6. 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. 6.

Position 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 in front of unit; 30 mm (1 1/2-in.) clearance between roof curb and rear of unit (see Fig. 1, section C-C).

Do not install unit in an indoor location. Do not locate unit air inlet 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 polyethylene shipping wrapper and rigging skid.

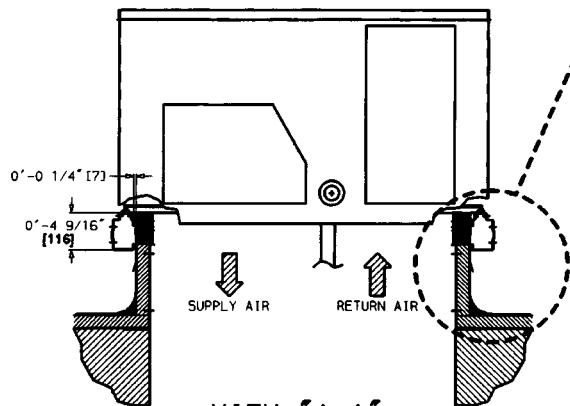
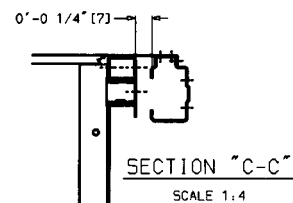
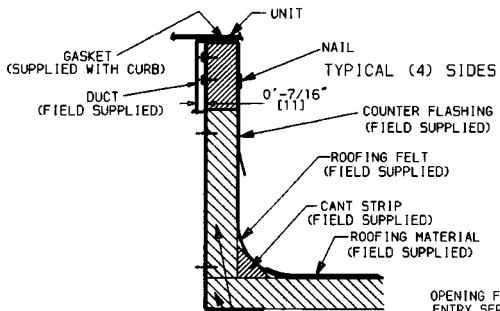
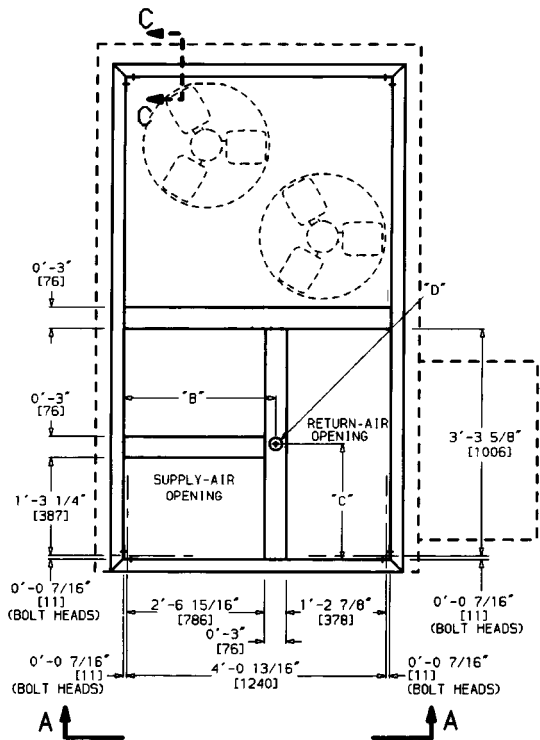
CONNECTION SIZES

UNIT SIZE 50TJQ	“B”	“C”	“D” ALT DRAIN HOLE	POWER CONNECTION	CONTROL CONNECTION	CONNECTOR ACCESSORY PACKAGE
008-012	2'-8 ⁷ / ₁₆ " [827]	1'-10 ¹⁵ / ₁₆ " [583]	1 ³ / ₄ " [45]	¾" NPT	½" NPT	CRBTMPWR00A100 (THRU-THE-BOTTOM)
				1¼" NPT	½" NPT	CRBTMPWR00A200 (THRU-THE-BOTTOM)

UNIT SIZE 50TJQ	"A"	ROOF CURB ACCESSORY
008-012	1'-2" [356]	CRRFCURB003A00
	2'-0" [610]	CRRFCURB004A00

NOTES:

1. Roof curb accessory is shipped unassembled.
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 1.3 m (4 ft) on each side.
7.  Direction of airflow.



VIEW "A-A"

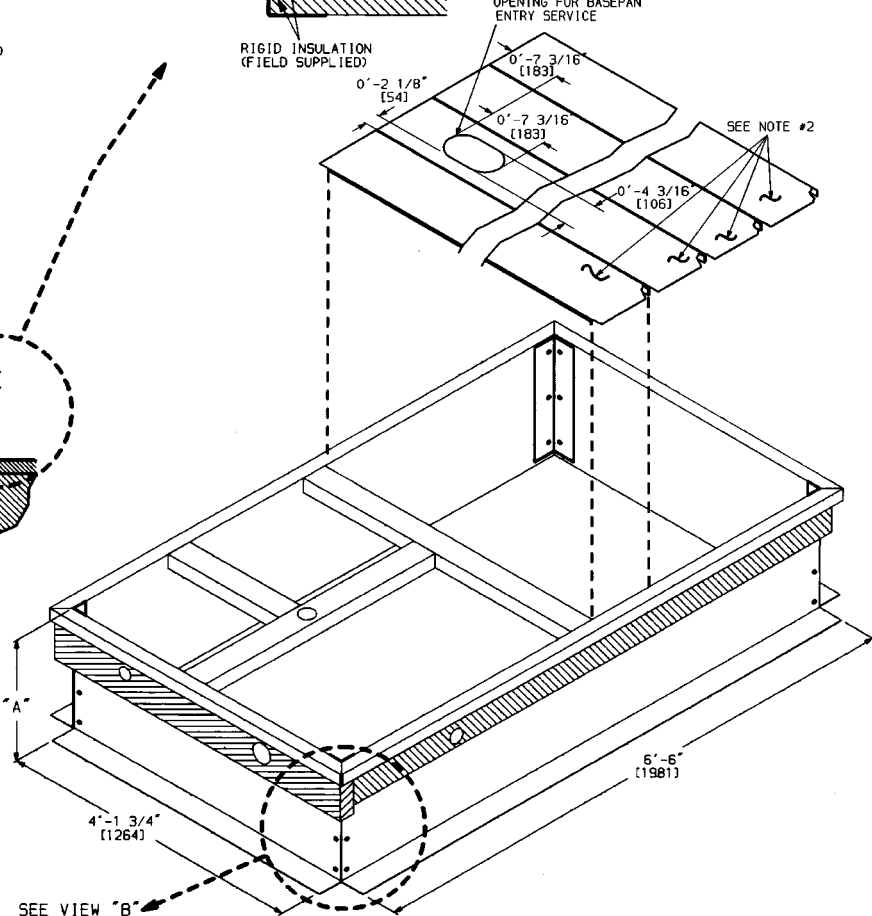
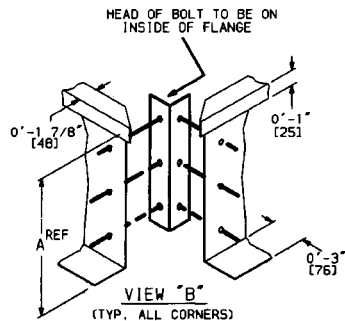


Fig. 1 — Roof Curb Details

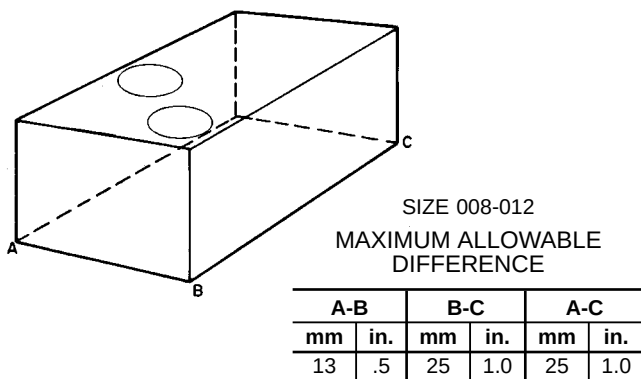


Fig. 2 — Unit Leveling Tolerances

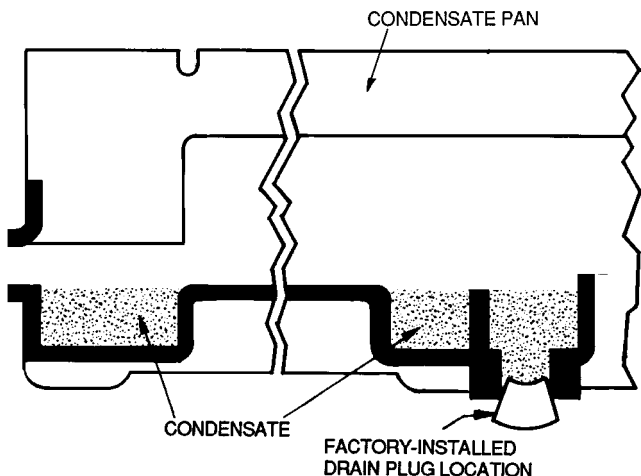
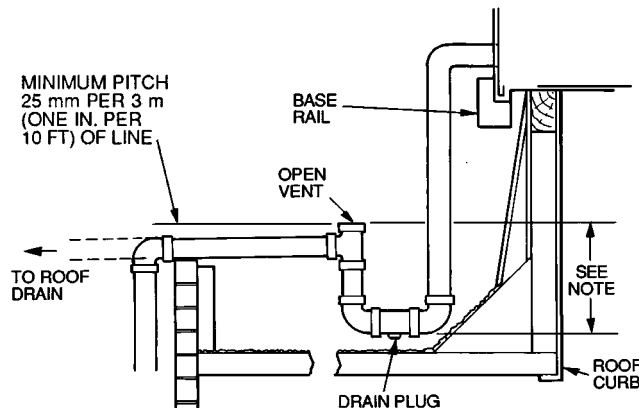
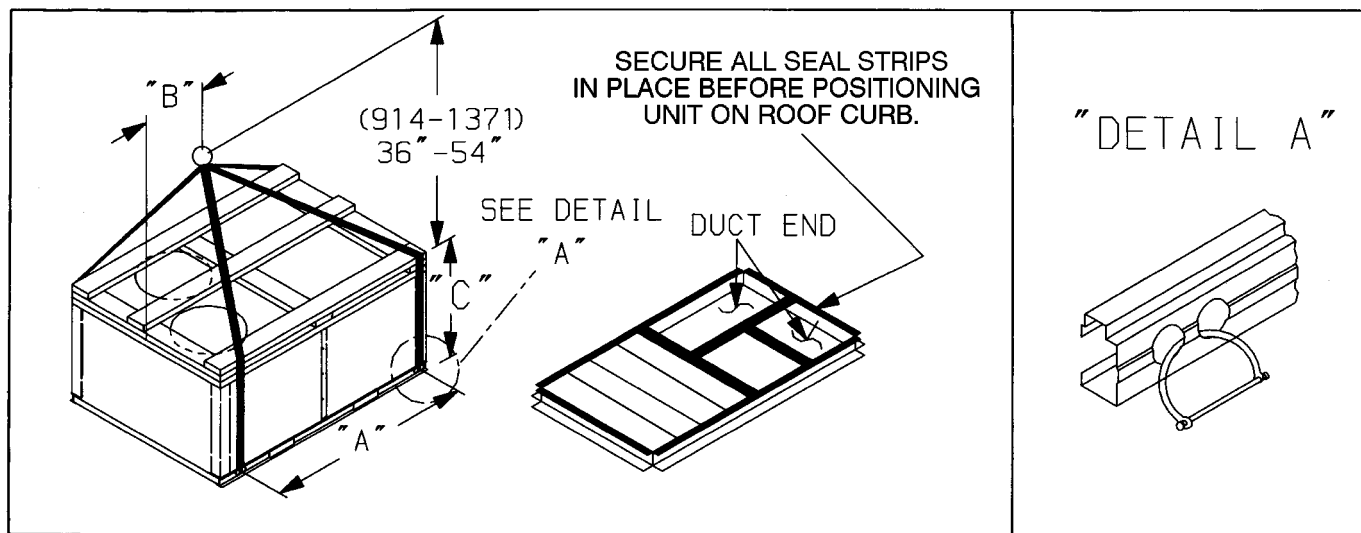


Fig. 3 — Condensate Drain Location



NOTE: Trap should be deep enough to offset maximum unit static difference. A 100 mm (4-in.) trap is recommended.

Fig. 4 — External Trap Condensate Drain



NOTES:

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

50TJQ	MAX WEIGHT		A		B		C	
	Lb	Kg	in.	mm	in.	mm	in.	mm
008	940	426	77.42	1966.5	41.5	1054	42.12	1070
009	965	438	77.42	1966.5	41.5	1054	42.12	1070
012	1015	460	77.42	1966.5	41.5	1054	42.12	1070

CAUTION

All panels must be in place when rigging.

Fig. 5 — Rigging Details

UNIT 50TJQ	STD UNIT WEIGHT		ECONOMIZER WEIGHT (DURABLADE)		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
008	940	426	44	20	207	94	178	81	254	115	301	136	2'-0 7/8"	632	3'-5 5/16"	1050	2'-9 1/16"	856
009	965	438	44	20	212	96	183	83	261	119	309	140	2'-0 7/8"	632	3'-5 5/16"	1050	2'-9 1/16"	856
012	1015	460	44	20	223	101	193	88	274	124	325	147	2'-10 7/8"	885	4'-1 1/16"	1253	3'-0 3/8"	924

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 in., [0] on horizontal discharge units with electric heat 1 in. [25] clearance to ductwork for 1 ft (.3 m).
 - b. Outdoor coil, for proper airflow, 36 in. [914] one side, 12 in. [305] the other. The side getting the greater clearance is optional.
 - c. Overhead, 60 in. [1524] to assure proper outdoor fan operation.
 - d. Between units, control box side, 42 in. [1067] per NEC (National Electrical Code, U.S.A. Standard).
 - e. Between unit and ungrounded surfaces, control box side, 36 in. [914] per NEC.
 - f. Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. [1067] per NEC.
 - g. Horizontal supply and return end, 0 inches.
6. With the exception of the clearance for the outdoor coil and combustibles 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 up from the bottom of the base rail.

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"	POWER*	1 3/4" [44.4]

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

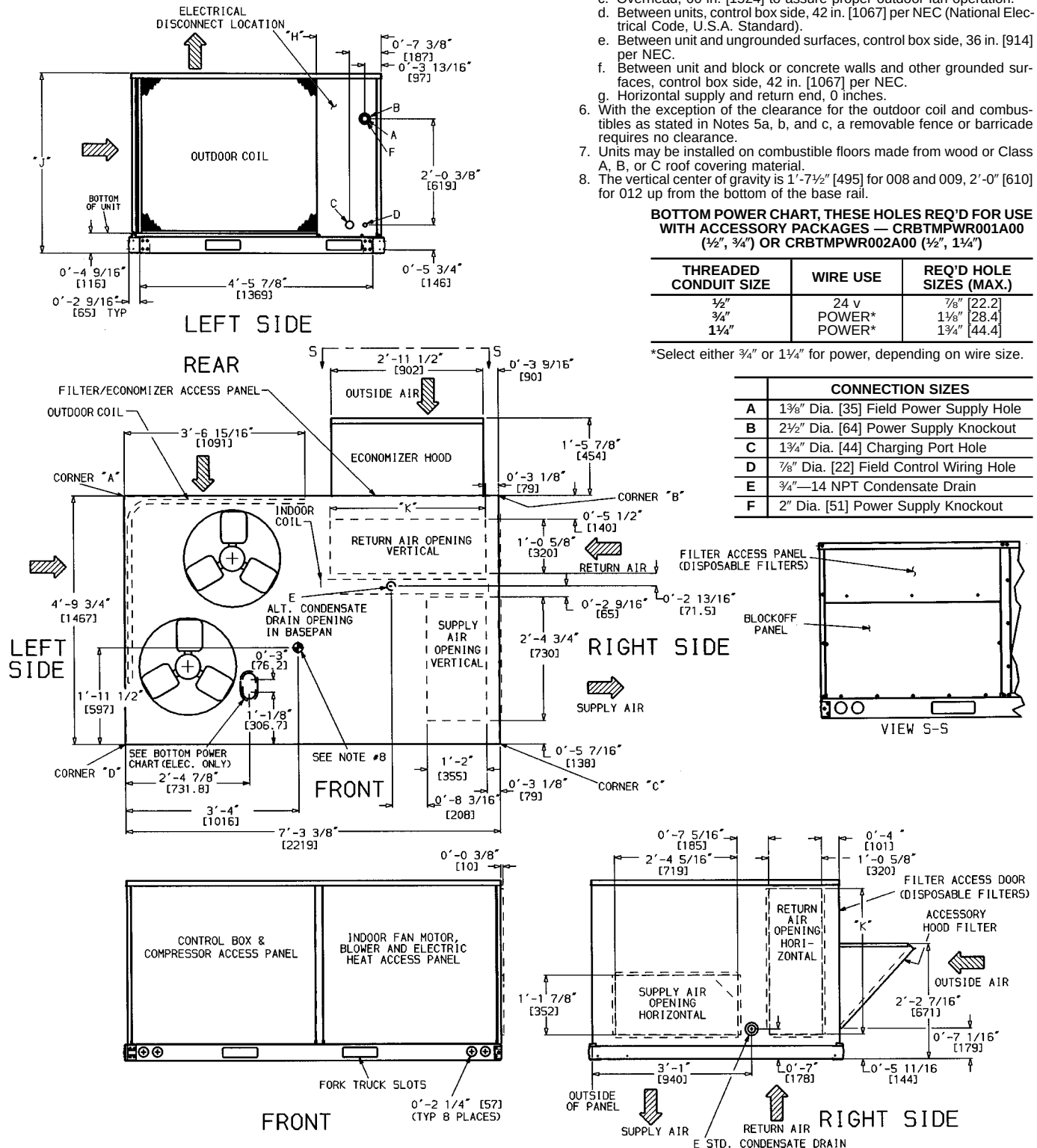


Fig. 6 — Base Unit Dimensions

Table 1A — Physical Data (SI)

UNIT SIZE 50TJQ	008	009	012
NOMINAL CAPACITY (kW)	26.4	29.9	35.2
OPERATING WEIGHT (kg)			
Unit			
AI/AI*	426	438	460
Durablade Economizer	20	20	20
Roof Curb†	65	65	65
COMPRESSOR		Hermetic	
Quantity	2	2	2
Oil (ml)	1331 ea	1597 ea	1597 ea
REFRIGERANT TYPE		R-22	
Operating Charge (kg)			
Circuit 1	2.67	3.40	3.45
Circuit 2	2.72	3.40	3.45
OUTDOOR COIL	Enhanced Copper Tubes, Aluminum Lanced Fins, Acutrol™ Feed Device		
Rows...Fins/m	1...669	2...669	2...669
Total Face Area (sq m)	1.90	1.67	1.70
OUTDOOR FAN		Propeller Type	
Nominal L/s	2880	2880	2880
Quantity...Diameter (mm)	2...559	2...559	2...559
Motor BkW...r/s	.19...15.5	.19...15.5	.19...15.5
Watts Input (Total)	500	500	500
INDOOR COIL	Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Acutrol Feed Device		
Rows...Fins/m	3...590	3...590	3...590
Total Face Area (sq m)	0.74	0.74	1.03
INDOOR FAN		Centrifugal Type	
Quantity...Size (mm x mm)	1...381 x 381	1...381 x 381	1...381 x 381
Type Drive	Belt	Belt	Belt
Nominal L/s	1200	1400	1600
Motor kW	1.12	1.12	1.50
Maximum Continuous BkW	1.79	1.79	2.16
Motor Frame Size	56	56	56
Fan r/s Range	10.33-14.67	10.33-14.67	11.50-15.00
Motor Bearing Type	Ball	Ball	Ball
Maximum Allowable r/s	26.7	26.7	26.7
Motor Pulley Pitch Diameter Min/Max (mm)	61/86	61/86	86/112
Nominal Motor Shaft Diameter (mm)	16	16	16
Fan Pulley Pitch Diameter (mm)	140	140	178
Nominal Fan Shaft Diameter (mm)	25	25	25
Belt, Quantity...Type...Length (mm)	1...A...1219	1...A...1219	1...A...1295
Pulley Center Line Distance (mm)	406	406	495
Speed Change per Full Turn of Movable Pulley Flange (r/s)	.83	.83	.67
Movable Pulley Maximum Full Turns From Closed Position	5	5	5
Factory Setting	5	5	5
Factory Speed Setting (r/s)	10.33	10.33	11.50
Fan Shaft Diameter at Pulley (mm)	25	25	25
HIGH-PRESSURE SWITCH (kPa)**		3103 ± 345	
Standard Compressor Internal Relief (Differential)		2951	
Cutout		2206	
Reset (Auto.)			
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (kPa)**		48 ± 21	
Cutout		152 ± 48	
Reset (Auto.)			
FREEZE PROTECTION THERMOSTAT (C)**		-1 ± 3	
Opens		7 ± 3	
Closes			
OUTDOOR-AIR INLET SCREENS		Cleanable	
Quantity...Size (mm)		1...508 x 635 x 25	
		1...406 x 635 x 25	
RETURN-AIR FILTERS		Throwaway	
Quantity...Size (mm)	4...406 x 558 x 51	4...406 x 508 x 51	4...508 x 508 x 51

LEGEND

AI — Aluminum

*Indoor coil fin material/outdoor coil fin material.

†Weight of 356 mm roof curb.

**Requires an accessory or optional Controls Upgrade Kit.

NOTE: The 50TJQ units have a loss-of-charge/low-pressure switch located in the liquid line available as an option or an accessory. (Standard on 012 units.)

Table 1B — Physical Data (English)

UNIT SIZE 50TJQ	008	009	012
NOMINAL CAPACITY (tons)	7½	8½	10
OPERATING WEIGHT (lb)			
Unit			
AI/AI*	940	965	1015
Durablade Economizer	44	44	44
Roof Curb†	143	143	143
COMPRESSOR		Hermetic	
Quantity	2	2	2
Oil (oz)	45 ea	54 ea	54 ea
REFRIGERANT TYPE		R-22	
Operating Charge (lb-oz)			
Circuit 1	5-14	7-8	7-10
Circuit 2	6-0	7-8	7-10
OUTDOOR COIL	Enhanced Copper Tubes, Aluminum Lanced Fins, Acutrol™ Feed Device		
Rows...Fins/in.	1...17	2...17	2...17
Total Face Area (sq ft)	20.50	18.00	18.30
OUTDOOR FAN		Propeller Type	
Nominal Cfm	6500	6500	6500
Quantity...Diameter (in.)	2...22	2...22	2...22
Motor Hp...Rpm	¼...1100	¼...1100	¼...1100
Watts Input (Total)	500	500	500
INDOOR COIL	Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Acutrol Feed Device		
Rows...Fins/in.	3...15	3...15	3...15
Total Face Area (sq ft)	8.0	8.0	11.1
INDOOR FAN		Centrifugal Type	
Quantity...Size (in.)	1...15 x 15	1...15 x 15	1...15 x 15
Type Drive	Belt	Belt	Belt
Nominal Cfm	2600	3000	3600
Motor Hp	1½	1½	2
Maximum Continuous Bhp	2.40	2.40	2.90
Motor Frame Size	56	56	56
Fan Rpm Range	620-880	620-880	690-900
Motor Bearing Type	Ball	Ball	Ball
Maximum Allowable Rpm	1600	1600	1600
Motor Pulley Pitch Diameter Min/Max (in.)	2.4/3.4	2.4/3.4	3.4/4.4
Nominal Motor Shaft Diameter (in.)	⅝	⅝	⅝
Fan Pulley Pitch Diameter (in.)	5.5	5.5	7.0
Nominal Fan Shaft Diameter (in.)	1.0	1.0	1.0
Belt, Quantity...Type...Length (in.)	1...A...48	1...A...48	1...A...51
Pulley Center Line Distance (in.)	16	16	19.5
Speed Change per Full Turn of Movable Pulley Flange (rpm)	50	50	41
Movable Pulley Maximum Full Turns From Closed Position	5	5	5
Factory Setting	5	5	5
Factory Speed Setting (rpm)	620	620	690
Fan Shaft Diameter at Pulley (in.)	1	1	1
HIGH-PRESSURE SWITCH (psig)**	450 ± 50		
Standard Compressor Internal Relief (Differential)	428		
Cutout	320		
Reset (Auto.)			
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (psig)**	7 ± 3		
Cutout	22 ± 5		
Reset (Auto.)			
FREEZE PROTECTION THERMOSTAT (F)**	30 ± 5		
Opens	45 ± 5		
Closes			
OUTDOOR-AIR INLET SCREENS	Cleanable		
Quantity...Size (in.)	1...20 x 25 x 1		
	1...16 x 25 x 1		
RETURN-AIR FILTERS	Throwaway		
Quantity...Size (in.)	4...16 x 20 x 2	4...16 x 20 x 2	4...20 x 20 x 2

LEGEND

AI — Aluminum
Bhp — Brake Horsepower

*Indoor coil fin material/outdoor coil fin material.

†Weight of 14-in. roof curb.

**Requires an accessory or optional Controls Upgrade Kit.

NOTE: The 50TJQ units have a loss-of-charge/low-pressure switch located in the liquid line available as an option or an accessory. (Standard on 012 units.)

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 local electrical codes. Failure to follow this warning could result in the installer being liable for personal injury of others.

FIELD POWER SUPPLY — All units 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.

All field wiring must comply with local requirements. Install field wiring as follows:

1. Install conduit through side panel openings. Install conduit between disconnect and single-point box. Refer to Fig. 7 and 8.
2. Install power lines to terminal connections as shown in Fig. 9.
3. 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 3 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.

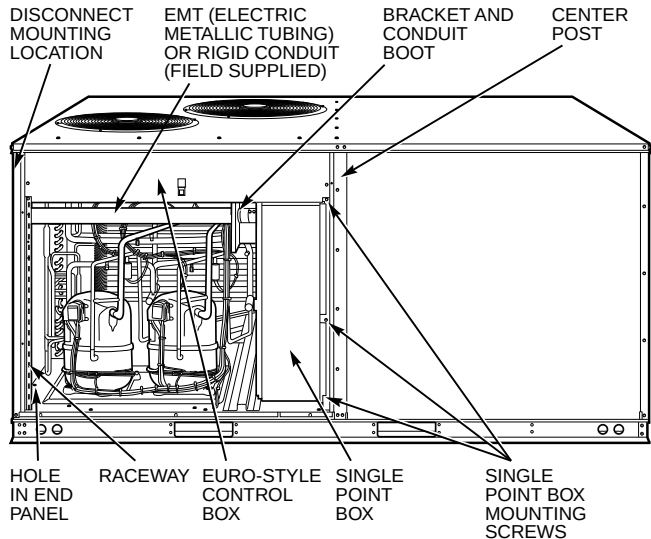


Fig. 7 — Component Location

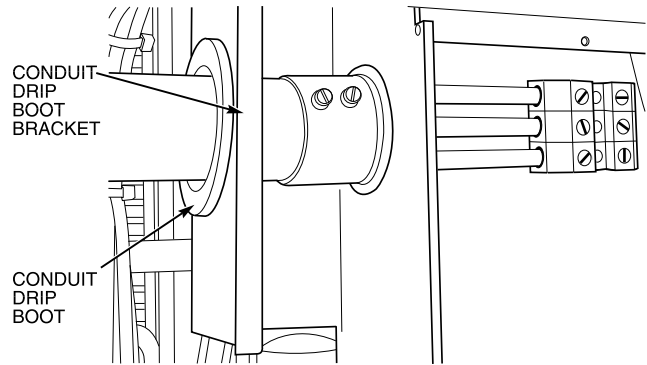
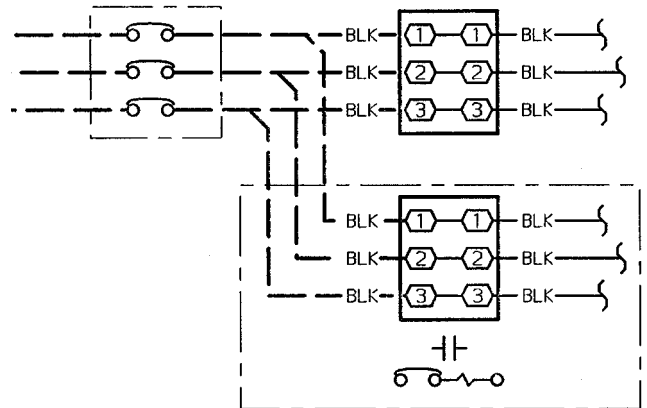


Fig. 8 — Conduit Installation



LEGEND

- Disconnect per Local Codes
- Single Point Box
- Accessory
- Field Wiring

Fig. 9 — Power Wiring Connections

Table 2 — Electrical Data

UNIT 50TJQ	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (each)		OFM FLA	IFM FLA	ELECTRIC HEAT*		POWER SUPPLY		DISCONNECT SIZE	
			Min	Max	RLA	LRA			Nominal kW†	FLA	MCA	MOCP	FLA	LRA
008	400-3-50	STD	360	440	6.7	42.0	0.6	2.6	—	—	18.9	20**	20	108
									9.6	13.9	36.3	40**	36	122
									11.5	16.6	39.6	40**	39	125
									19.3	27.9	53.8	60**	52	136
									22.9	33.1	60.3	70	58	141
									28.9	41.7	71.0	80	68	150
009	400-3-50	STD	360	440	7.2	52.5	0.6	2.6	—	—	20.0	20**	21	129
									9.6	13.9	37.4	40**	37	143
									11.5	16.6	40.8	45**	40	146
									19.3	27.9	54.9	60**	53	157
									22.9	33.1	61.4	70	59	162
									28.9	41.7	72.1	80	69	171
012	400-3-50	STD	360	440	9.2	59.6	0.6	3.4	—	—	25.3	30**	26	152
									11.5	16.6	46.1	50**	46	169
									19.3	27.9	60.2	70	59	180
									22.9	33.1	66.7	70	65	186
									28.9	41.7	77.4	80	74	194
									34.7	50.1	87.9	90	84	203

LEGEND

CE — The Mark of the European Community
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor-Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
OFM — Outdoor-Fan Motor
RLA — Rated Load Amps



*Heaters are field installed only.

†Heater capacity (kW) is based on heater voltage of 400 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.

**Fuse or HACR circuit breaker.

NOTES:

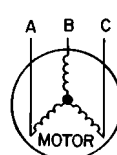
- The overcurrent protective device for the unit shall be fuse or HACR breaker.
- Unit total kW values are determined under test conditions stated in European Standard EN60335-2-40.
- Unbalanced 3-Phase Supply Voltage**

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

% Voltage Imbalance

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

EXAMPLE: Supply voltage is 400-3-50.



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

$$\begin{aligned}
 \text{Average Voltage} &= \frac{393 + 403 + 396}{3} \\
 &= \frac{1192}{3} \\
 &= 397
 \end{aligned}$$

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 percentage of voltage imbalance.

$$\begin{aligned}
 \% \text{ Voltage Imbalance} &= 100 \times \frac{6}{397} \\
 &= 1.5\%
 \end{aligned}$$

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

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

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. 10) as described in Steps 1 through 4 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 (51 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 splice at the thermostat. See Table 3 for American/European wire conversions.

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 in Connection Sizes table in Fig. 6).
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 required clearance between the high- and low-voltage wiring.
4. Connect thermostat wires to screw terminals of low-voltage connector (see Fig. 10).

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

DEFROST BOARD — The defrost board timer cycle is set to 30 minutes. To change the cycle time, remove the wire from defrost board connected to the 30 minute quick-connect. See Fig. 12. Connect the wire to the 50 or 90 minute quick-connects on the defrost board, depending on the desired defrost time.

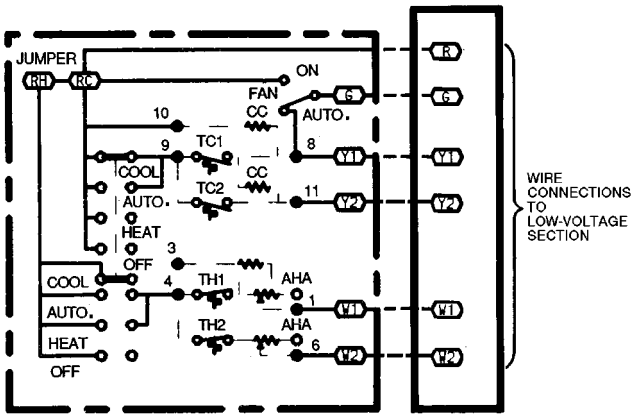
HEAT ANTICIPATOR SETTINGS — For units with electric heat, set heat anticipator settings as shown in Table 4.

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 Mills



TYPICAL THERMOSTAT

LEGEND

AHA* — Adjustable Heat Anticipator
CC — Cooling Compensator
RC — 24V Cooling
RH — 24V Heating
TC — Thermostat-Cooling
TH — Thermostat-Heating
--- Field Wiring
--- Factory Wiring

*Used with accessory electric heater.

Fig. 10 — Low-Voltage Connections With or Without Economizer or Two-Position Damper

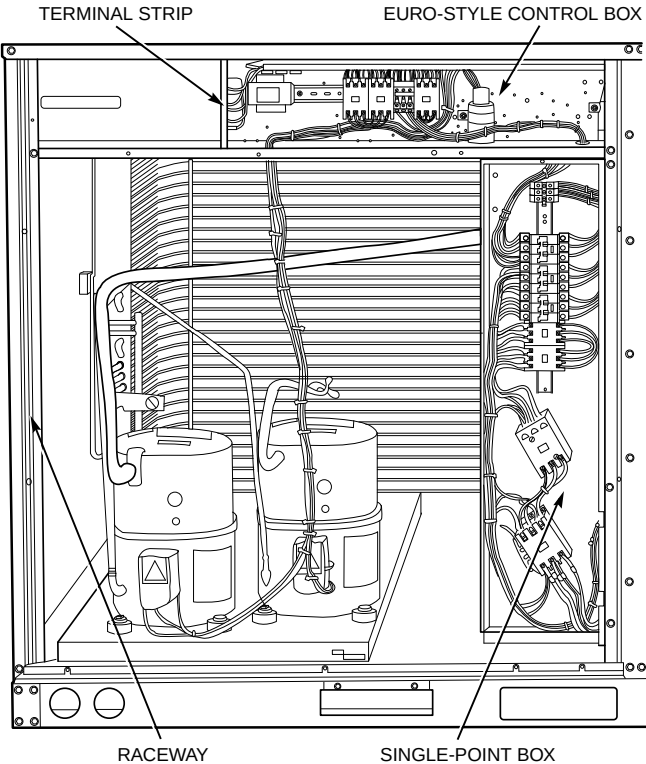


Fig. 11 — Typical Field Control Wiring Raceway

Table 4 — Heat Anticipator Settings

UNIT	UNIT VOLTAGE			
	400			
	Heater kW	Configuration		
		1-Stage	2-Stage	
50TJQ	9.6, 11.5, 19.3, 28.9	0.3	NA	NA
	22.9, 34.7	0.6	0.3	0.3

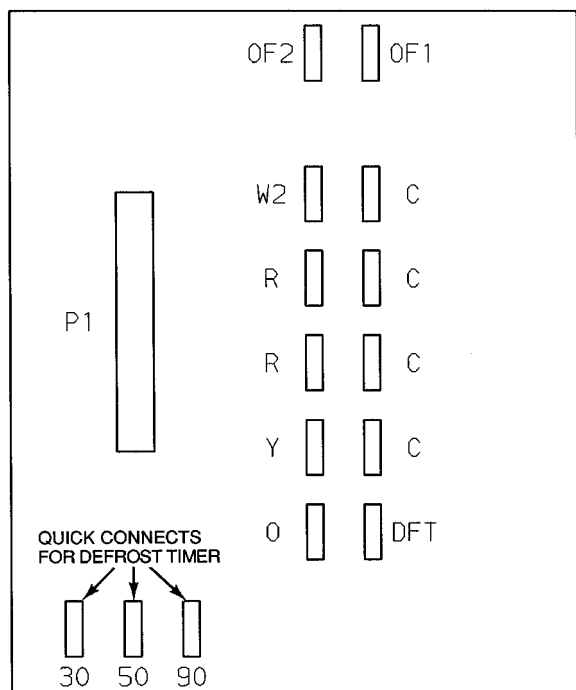


Fig. 12 — Defrost Board

Step 6 — Adjust Factory-Installed Options

DISCONNECT SWITCH — The optional disconnect switch is non-fused. The switch has the capability of being locked in place for safety purposes.

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 discharge application, discard this plate.

Assembly

1. Determine if ventilation air is required in building. If so, determine the minimum amount to be supplied by each unit and record quantity of ventilation air needed for use in Step 8.
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. 13. Remove optional outdoor-air damper hood package from filter section.
3. Assemble outdoor-air hood top and side plates as shown in Fig. 14. Install seal strips on hoop top and sides. Put aside screen retainer and retainer screw for later assembly. *Do not attach hood to unit at this time.*
4. On 012 unit, install vertical discharge block-off plate over duct openings. See Fig. 15.
5. Economizer is factory-installed in unit and secured with screws. See Fig. 16.

NOTE: Be sure rear economizer flange is engaged under tabs in vertical return-air opening.

6. To convert to horizontal discharge application:
 - a. Rotate the economizer 90 degrees until the economizer motor faces the outdoor section (see Fig. 17).
 - b. Rotate the barometric relief damper hinge 90 degrees. Barometric relief damper must open vertically.
 - 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. 18.
7. Insert economizer plug into economizer harness. Remove tape from barometric relief damper. See Fig. 16.
8. If ventilation air is not required, proceed to Step 9. If ventilation air is required, determine the minimum position setting for required airflow. See Fig. 19. Adjust minimum position setting by adjusting the screws on the position setting bracket. See Fig. 20. Slide bracket until the top screw is in the position determined by Fig. 19. Tighten screws.
9. Remove tape from outdoor-air thermostat (OAT). Fasten OAT to inside of hood using screws and speed clips provided. See Fig. 21. Make sure OAT terminals are positioned up.
10. 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.
11. Fasten hood top and side plate assembly to outdoor-air opening panel with screws provided.
12. Place knob supplied with economizer on OAT. See Fig. 21. Set for 2° C (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. 21.
13. Connect OAT per Fig. 22.
14. Slide outdoor-air inlet screens into screen tracks on hood side plate. Hold each screen in place and fasten screen retainers to hood using screws provided.

NOTE: Refer to Fig. 23 for economizer barometric relief damper characteristics.

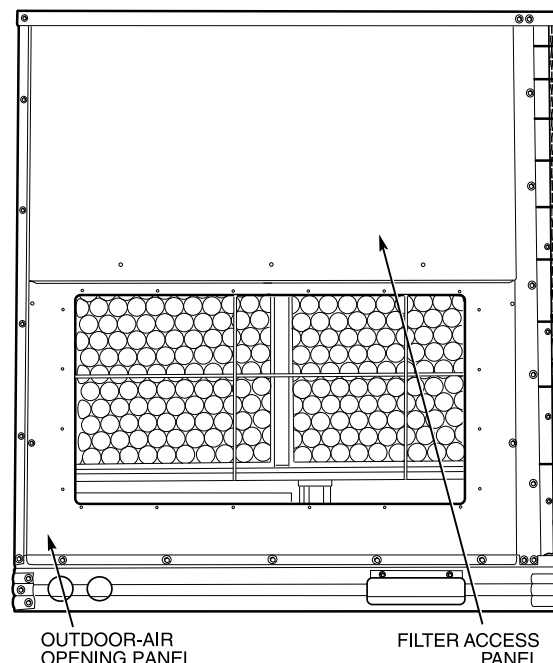
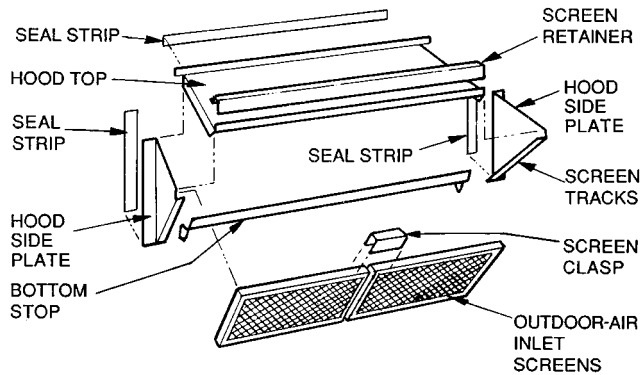
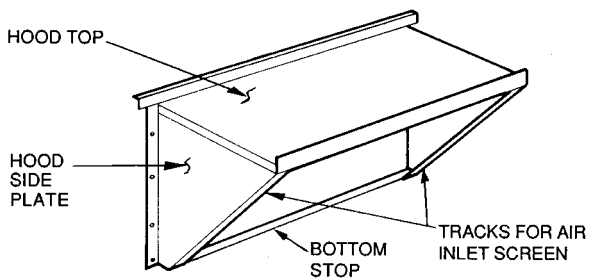


Fig. 13 — Panel Locations



OUTDOOR-AIR HOOD-UNASSEMBLED



HOOD SIDES AND TOP ASSEMBLED

Fig. 14 — Outdoor-Air Hood Details

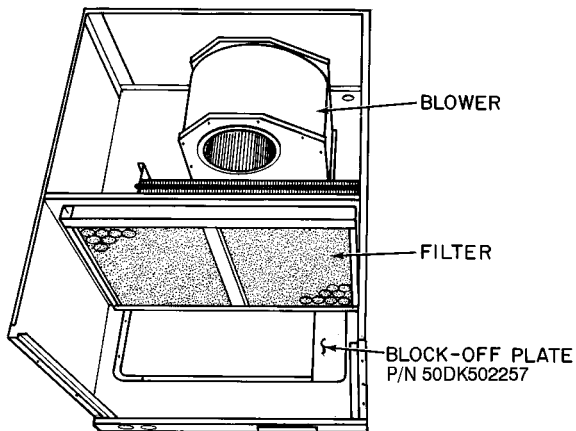


Fig. 15 — Vertical Discharge Block-Off Plate (Size 012 Only)

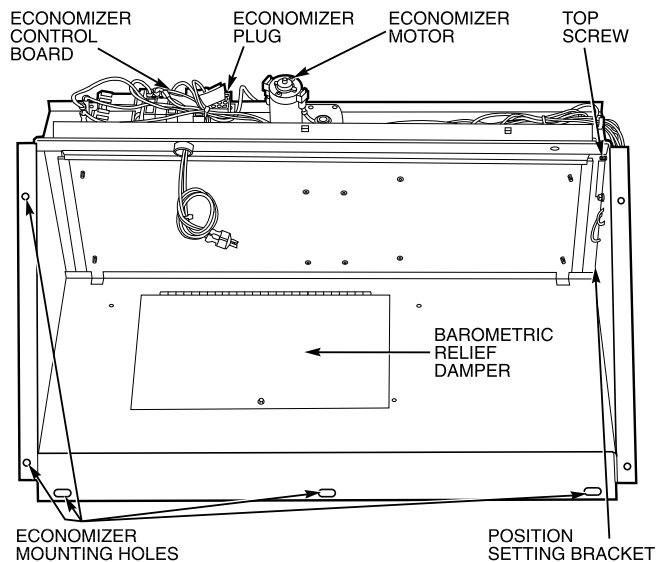


Fig. 16 — Durablade Economizer Installation

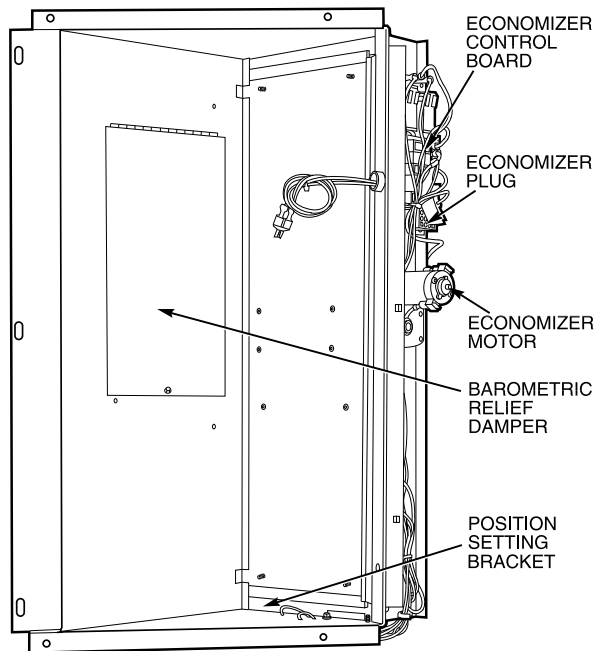


Fig. 17 — Horizontal Discharge Durablade Economizer Installation

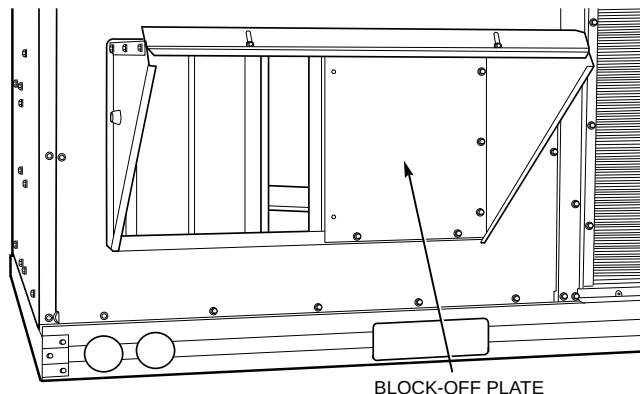
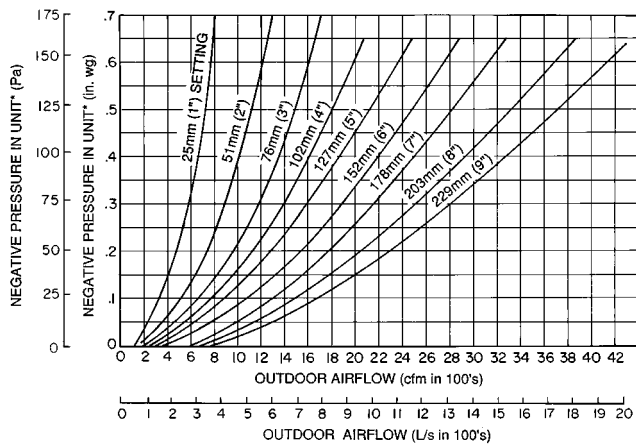


Fig. 18 — Horizontal Discharge Block-Off Plate



*Includes pressure drop for filters and hoods.

Fig. 19 — Durablade Economizer Minimum Position Setting

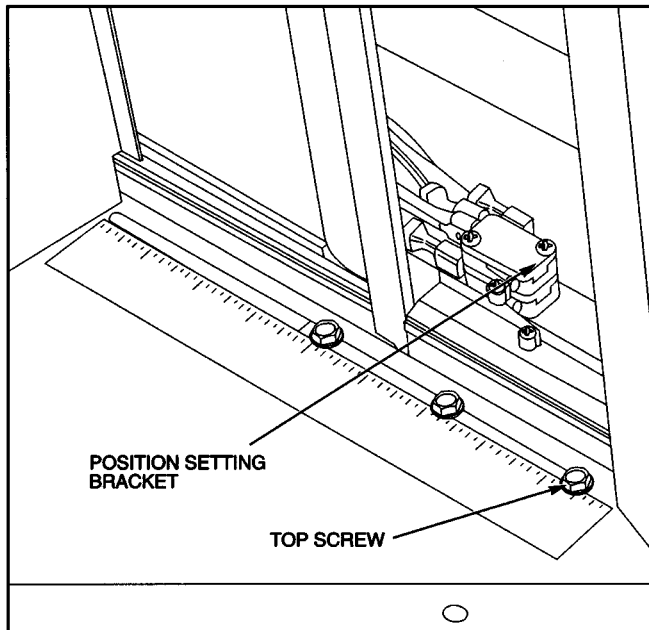


Fig. 20 — Durablade Economizer Minimum Position Damper Setting

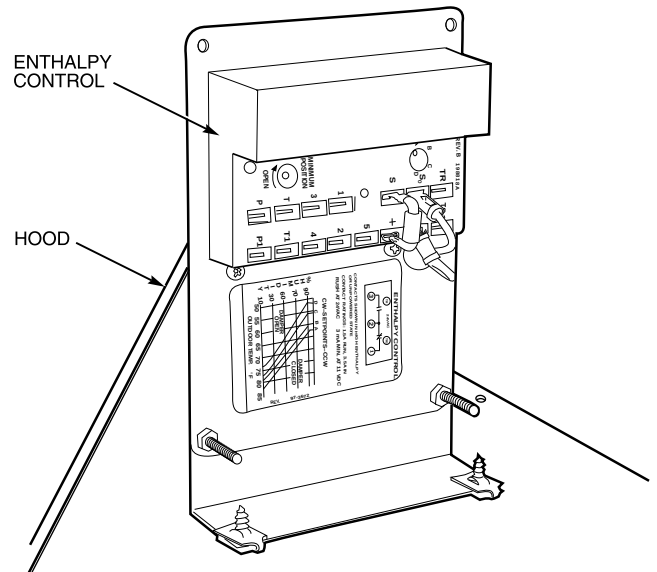
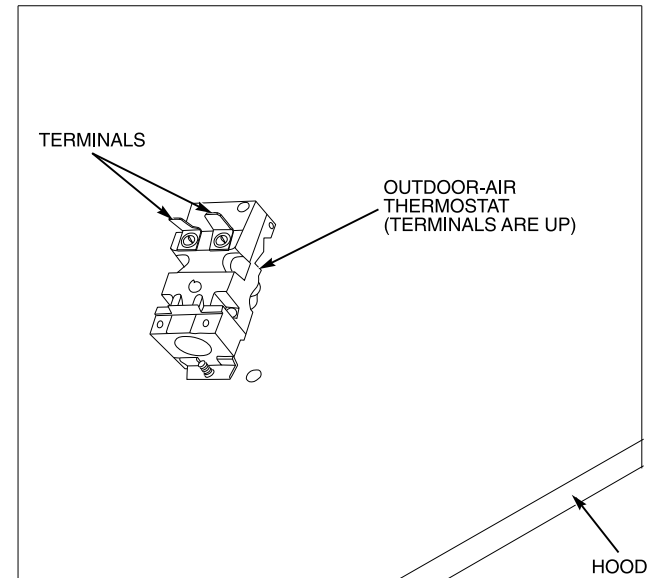
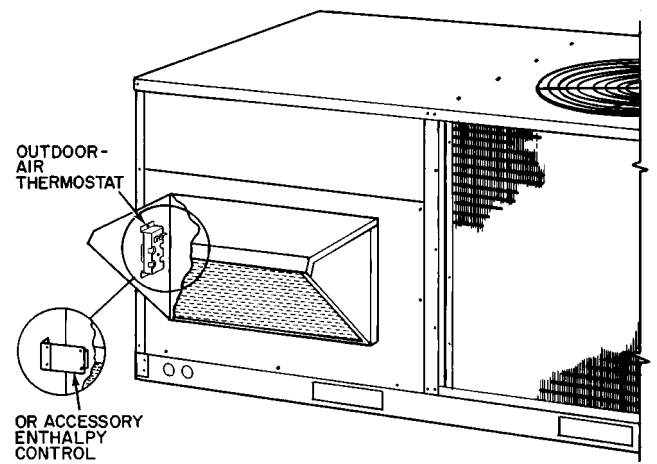


Fig. 21 — Durablade Economizer Outdoor-Air Thermostat/Enthalpy Control Installation

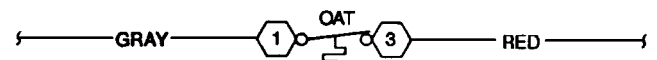


Fig. 22 — Wiring Connections for Outdoor-Air Thermostat

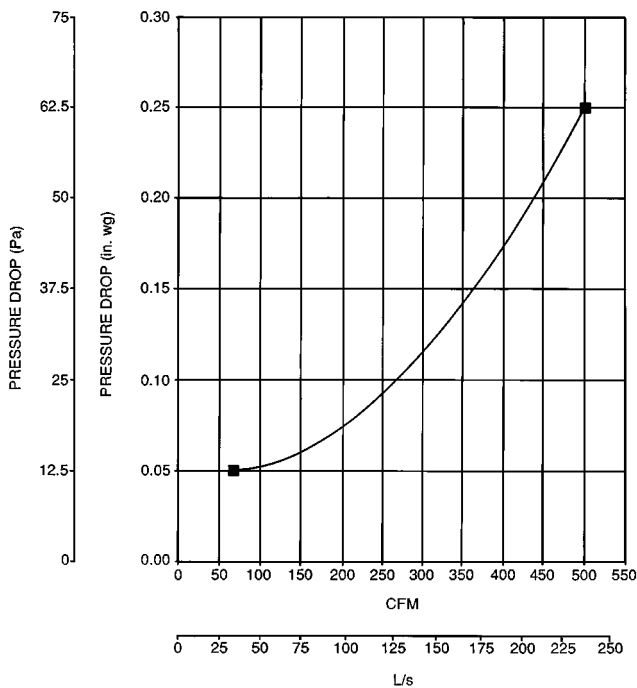


Fig. 23 — Durablade Economizer Barometric Relief Damper Characteristics

Step 7 — Adjust Indoor-Fan Speed — Adjust indoor-fan speed to meet jobsite conditions.

For units with electric heat, required minimum L/s is 1062 (cfm is 2250) for 50TJQ008; 1203 (2550) for 50TJQ009; and 1416 (3000) for 50TJQ012 with the following exceptions:

UNIT 50TJQ	UNIT VOLTAGE	HEATER kW	UNIT CONFIG- URATION	REQUIRED MINIMUM L/s (CFM)
012	400	34.7	Horizontal or Vertical	1510 (3200)

Table 5 shows indoor-fan motor data. Tables 6 and 7 show fan r/s and rpm at motor pulley settings for standard motors. Refer to Tables 8-15 to determine fan speed settings. Fan motor pulleys are factory set for speed shown in Tables 1A and 1B.

To change fan speeds:

1. Shut off unit power supply.
2. Loosen belt by loosening fan motor mounting nuts. See Fig. 24 and 25.
3. Loosen movable pulley flange setscrew (see Fig. 26).
4. Screw movable flange toward fixed flange to increase speed or away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Tables 1A and 1B.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Tables 1A and 1B for speed change for each full turn of pulley flange.)

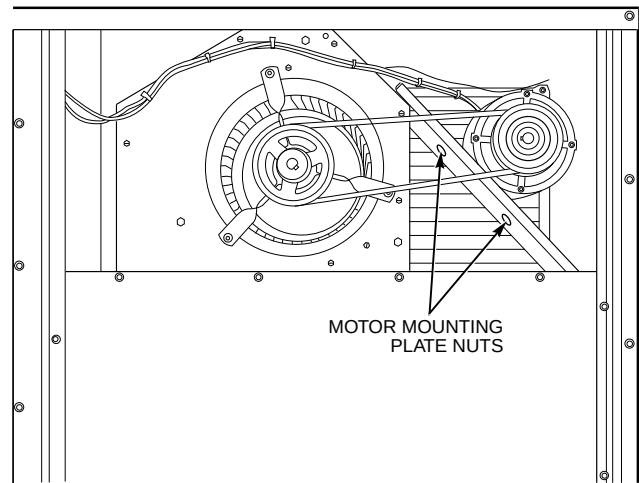


Fig. 24 — Typical Belt-Drive Motor Mounting for Size 008 and 009

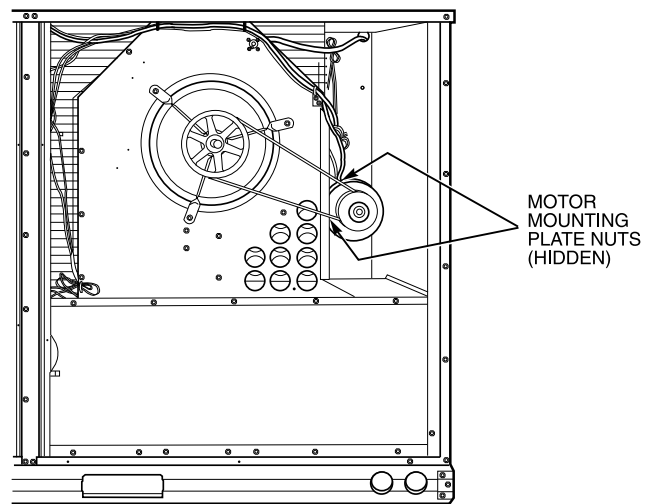


Fig. 25 — Typical Belt-Drive Motor Mounting for Size 012

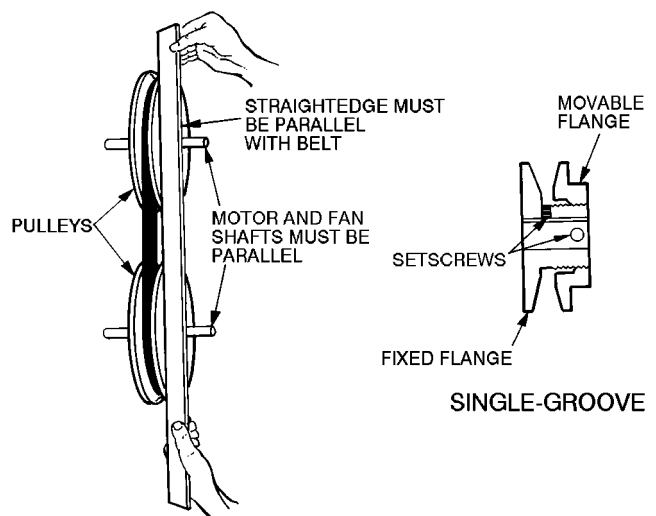


Fig. 26 — Indoor-Fan Pulley Adjustment

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 plate.

To adjust belt tension:

1. Loosen fan motor mounting nuts.

2. *Sizes 008 and 009* — Slide motor mounting plate away from fan scroll for proper belt tension (13 mm [$\frac{1}{2}$ -in.] deflection with one finger) and tighten mounting nuts (see Fig. 24).

Size 012 — Slide motor mounting plate downward to tighten belt tension. Secure motor mounting plate nuts. See Fig. 25.

3. Adjust bolt and nut on mounting plate to secure motor in fixed position.

Table 5 — Indoor-Fan Motor Performance

UNIT 50TJQ	INDOOR-FAN MOTOR	UNIT VOLTAGE	MAXIMUM ACCEPTABLE CONTINUOUS BkW*	MAXIMUM ACCEPTABLE CONTINUOUS BHP*	MAXIMUM ACCEPTABLE OPERATING WATTS	MAXIMUM AMP DRAW
008	Standard	400	1.79	2.40	2120	2.7
009	Standard	400	1.79	2.40	2120	2.7
012	Standard	400	2.16	2.90	2615	3.6

LEGEND

Bhp — Brake Horsepower
BkW — kW x Motor Efficiency

*Extensive motor and electrical testing on these units ensures that the full BkW and horsepower range of the motors can be utilized

with confidence. Using fan motors up to the horsepower ratings shown in this table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 6 — Fan R/s at Motor Pulley Settings (SI)

UNIT 50TJQ	MOTOR PULLEY TURNS OPEN										
	0	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
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

Table 7 — Fan Rpm at Motor Pulley Settings (English)

UNIT 50TJQ	MOTOR PULLEY TURNS OPEN										
	0	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
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

Table 8 — Fan Performance (SI), 50TJQ008,009 — 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 required.
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 brakepower range of the motor can be utilized with confidence. Using your fan motors up to the brake-power ratings shown will not result in nuisance tripping or premature motor failure.

4. Use of 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 10.33 to 14.67 r/s. All other r/s's will require a field-supplied drive.

Table 9 — Fan Performance (SI), 50TJQ012 — 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	14.4	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	13.9	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 required.
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 brakepower range of the motor can be utilized with confidence. Using your fan motors up to the brake-power ratings shown will not result in nuisance tripping or premature motor failure.

4. Use of 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 11.50 to 15.00 r/s. All other r/s's will require a field-supplied drive.

Table 10 — Fan Performance (SI), 50TJQ008,009 — 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	14.7	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 required.

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 brakepower range of the motor can be utilized with confidence. Using your fan motors up to the brake-power ratings shown will not result in nuisance tripping or premature motor failure.

4. Use of 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 10.33 to 14.67 r/s. All other r/s's will require a field-supplied drive.

Table 11 — Fan Performance (SI), 50TJQ012 — 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 required.

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 brakepower range of the motor can be utilized with confidence. Using your fan motors up to the brake-power ratings shown will not result in nuisance tripping or premature motor failure.

4. Use of 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 11.50 to 15.00 r/s. All other r/s's will require a field-supplied drive.

Table 12 — Fan Performance (English), 50TJQ008,009 — 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.
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 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 13 — Fan Performance (English), 50TJQ012 — 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.
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 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 14 — Fan Performance (English), 50TJQ008,009 — 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.
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 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 15 — Fan Performance (English), 50TJQ012 — 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.
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 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.

PRE-START-UP

⚠ WARNING

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

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

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

1. Remove all access panels.
2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to or shipped with unit.
3. Make the following inspections:
 - a. Inspect for shipping and handling damages such as broken lines, loose parts, or disconnected wires.
 - b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, halide torch, or liquid-soap solution.
 - c. Inspect all field- and factory-wiring connections. Be sure that connections are completed and tight.
 - d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
 - a. Make sure that outdoor-fan blades are correctly positioned in fan orifice. Refer to Outdoor Fan Adjustment section on page 23 for more details.
 - b. Make sure that air filter(s) is in place.
 - c. Make sure that condensate drain trap is filled with water to ensure proper drainage.
 - d. Make sure that all tools and miscellaneous loose parts have been removed.

START-UP

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

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

Outdoor-Air Inlet Screen — Outdoor-air inlet screen must be in place before operating unit.

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

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

Refrigerant Service Ports — Each refrigerant system has 4 Schrader-type service gage ports: one on the suction line, one on the cooling mode liquid line, and 2 on the compressor discharge line. Be sure that caps on the ports are tight.

Compressor Rotation — It is important to be certain the scroll compressor (size 012 only) 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 indoor fan is probably also rotating in the wrong direction.
2. Turn off power to the unit.
3. Reverse any two of the unit power leads.
4. Turn on power to the 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 heating/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 23.

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.

Compressor restart is accomplished by manual reset at the thermostat by turning the selector switch to OFF position and then ON position.

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

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

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

If accessory electric heaters do not energize, reset limit switch (located on indoor-fan scroll) by depressing 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 temporarily shuts unit off until space temperature falls below thermostat setting.

Safety Relief — A soft solder joint in the suction line at the loss-of-charge/low-pressure switch fitting provides pressure relief under abnormal temperature and pressure conditions.

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

Operating Sequence

COOLING, UNITS WITHOUT ECONOMIZER — When the thermostat calls for cooling, terminals G and Y1 are energized. The indoor fan contactor (IFC), RVS1 (reversing valve solenoid), and compressor contactor no. 1 (C1) are energized and the indoor-fan motor, compressor no. 1, and outdoor fans start. The outdoor-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) and RVS2 are energized and compressor no. 2 starts.

HEATING, UNITS WITHOUT ECONOMIZER — Upon a call for heating through terminal W1, IFC, OFC (outdoor fan contactor), C1, and C2 are energized. On units equipped for 2 stages of heat, when additional heat is needed, HC is energized through W2.

COOLING, UNITS WITH DURABLADE ECONOMIZER — When the outdoor-air temperature is above the OAT setting and the room thermostat calls for cooling, the compressor contactor no. 1 is energized to start compressor no. 1 and outdoor fan motors. RVS1 (reversing valve solenoid) is energized. The indoor fan motor (IFM) 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. RVS2 is energized. After the thermostat is satisfied and the IFM is deenergized, the damper moves to the fully closed position.

When the outdoor air temperature is below the OAT setting and the thermostat calls for Y1 and G, the economizer damper moves to the minimum position when the indoor fan starts. The first stage of cooling is provided by the economizer. If the supply-air temperature is above 14 C (57 F), a switch on the supply-air thermostat is closed between the T2 terminal and the 24 vac terminal. This causes the damper to continue to modulate open until the supply-air temperature falls below 13 C (55 F) or the damper reaches the fully open position.

When the supply-air temperature is between 13 C (55 F) and 11 C (52 F), the supply-air thermostat has open switches between the T2 and 24 vac terminals and between the T1 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the supply-air temperature falls below 11 C (52 F), a switch on the supply-air thermostat is closed between the T1 terminal and the 24 vac terminal. This causes the damper to modulate closed until the supply-air temperature rises above 13 C (55 F) or the damper reaches the minimum position.

When the supply-air temperature is between 13 C (55 F) and 14 C (57 F), the supply-air thermostat has open switches between the T2 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

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 outdoor fans will be energized, and the position of the economizer damper will be determined by the supply-air temperature. Compressor no. 2 is locked out.

When the second stage of cooling is satisfied, the compressor, RVS2, and outdoor fan motors will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage of cooling is satisfied, the damper will move to fully closed position.

HEATING, UNITS WITH DURABLADE ECONOMIZER — Upon a request for heating from the space thermostat, terminal W1 will be energized with 24 v. The IFC, OFC, C1, and C2 will be energized. The reversing valves switch position and the indoor fan, outdoor fan, compressor no. 1, and compressor no. 2 are energized. The economizer damper moves to the minimum position.

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

When the thermostat is satisfied, the damper moves to the fully closed position.

DEFROST — When the temperature of the outdoor coil drops below -2 C (28 F) as sensed by the defrost thermostat (DFT2) and the defrost timer is at the end of a timed period (adjustable at 30, 50, or 90 minutes), reversing valve solenoids (RVS1 and RVS2) are energized and the OFC is deenergized. This switches the position of the reversing valves and shuts off the outdoor fans. The electric heaters (if installed) will be energized.

The unit continues to defrost until the coil temperature as measured by DFT2 reaches 18 C (65 F), or the duration of defrost cycle completes a 10-minute period.

During the defrost mode, if circuit 1 defrosts first, RVS1 will oscillate between heating and cooling modes until the defrost mode is complete.

At the end of the defrost cycle, the electric heaters (if installed) will be deenergized; the reversing valves switch and the outdoor-fan motors will be energized. The unit will now operate in the heating mode.

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

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 each heating and cooling season or as operating conditions require.

INDOOR COIL

1. Turn unit power off. Remove filter access panel and indoor coil access panel.
2. If economizer or accessory two-position damper is installed, remove economizer/two-position damper by disconnecting economizer plug and removing mounting screws (see Fig. 16 or 17). Refer to Accessory Economizer or Two-Position Damper Installation Instructions for more details.
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, backflush toward return-air section to remove foreign material.
5. Flush condensate pan after completion.
6. Reinstall economizer/two-position damper and filters.
7. Reconnect wiring.
8. Replace access panels.

OUTDOOR COILS — Inspect coils monthly. Clean outdoor coils annually, and as required by location and outdoor-air conditions.

Clean one-row coil as follows:

Remove louvered side panel for easy access to coil. Wash coil with commercial coil cleaner.

Clean 2-row coils as follows:

1. Turn off unit power.
2. Remove top panel screws on outdoor end of unit.
3. Remove outdoor coil corner post. See Fig. 27. To hold top panel open, place coil corner post between top panel and center post. See Fig. 28.
4. Remove device holding coil sections together at return end of outdoor coil. Carefully separate the outer coil section 76 to 102 mm (3 to 4 in.) from the inner coil section. See Fig. 29.
5. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
6. Secure the sections together. Reposition the coil sections, and remove the coil corner post from between the top panel and center post. Install the coil corner post and coil center post, and replace all screws.

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 screens.

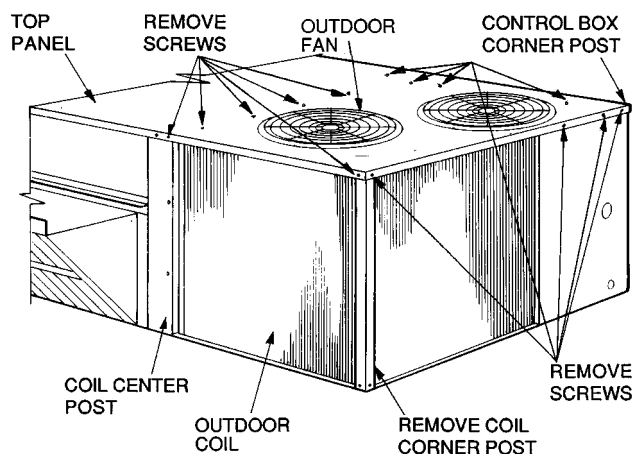


Fig. 27 — Cleaning Outdoor Coil

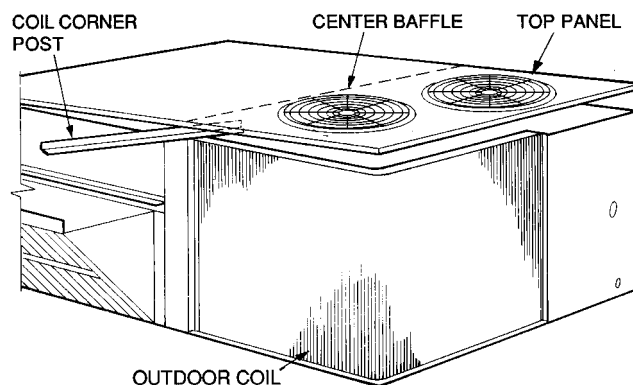


Fig. 28 — Propping Up Top Panel

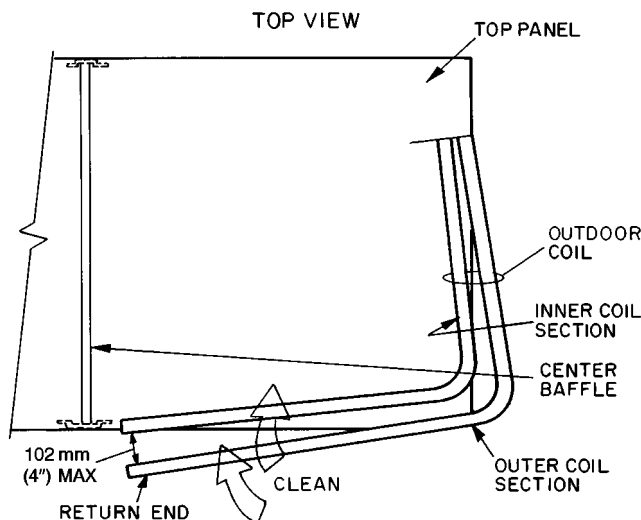


Fig. 29 — Separating Coil Sections

Lubrication

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

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

Outdoor Fan Adjustment (Fig. 30)

1. Shut off unit power supply.
2. Remove outdoor-fan assembly (grille, motor, motor cover, and fan) and loosen fan hub setscrews.
3. Adjust fan height as shown in Fig. 30.
4. Tighten setscrews and replace outdoor-fan assembly.

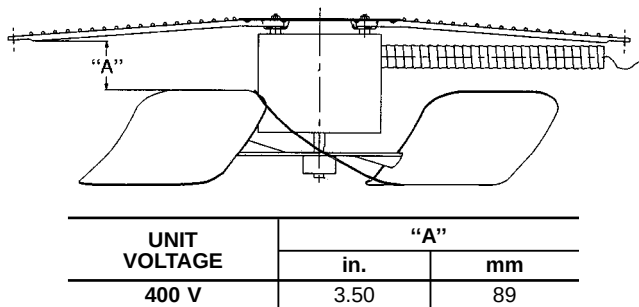


Fig. 30 — Outdoor Fan Adjustment

Economizer Adjustment — Refer to Optional Dura-blade Economizer section on page 11.

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate (also refer to Tables 1A and 1B).

Refer to Carrier Refrigerant Service Techniques Manual, Refrigerants section.

Unit panels must be in place when unit is operating during charging procedure.

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

LOW CHARGE COOLING — Use Cooling Charging Charts, Fig. 31-33. Vary refrigerant until the conditions of the appropriate chart are met. Note that charging charts are different from the type normally used. Charts are based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air cfm must be within the normal operating range of the unit.

TO USE COOLING CHARGING CHARTS — Take the outdoor ambient temperature and read the suction pressure gage. Refer to appropriate chart to determine what the 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. 31)

Outdoor Temperature 29 C (85 F)

Suction Pressure 483 kPa (70 psig)

Suction Temperature should be 8 C (46 F)
(Suction Temperature may vary $\pm 3^\circ\text{C}$ [$\pm 5^\circ\text{F}$].)

If Chargemaster® charging device is used, temperature and pressure readings must be accomplished using the charging chart.

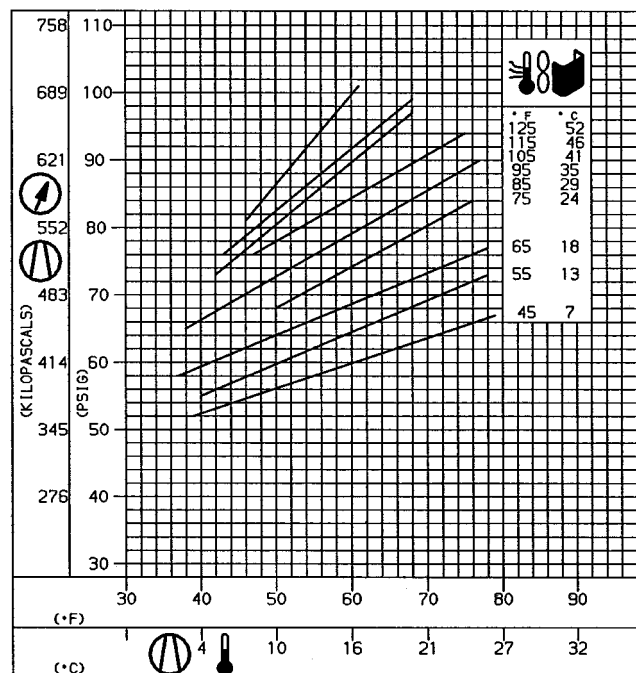
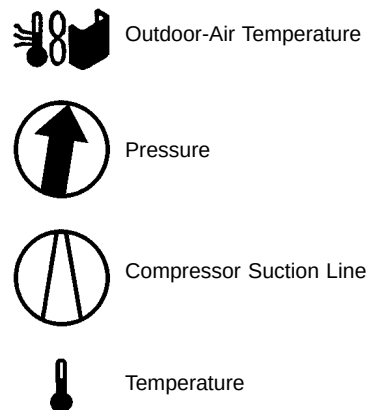


Fig. 31 — Cooling Charging Chart, 50TJQ008

LEGEND (Fig. 31-33)



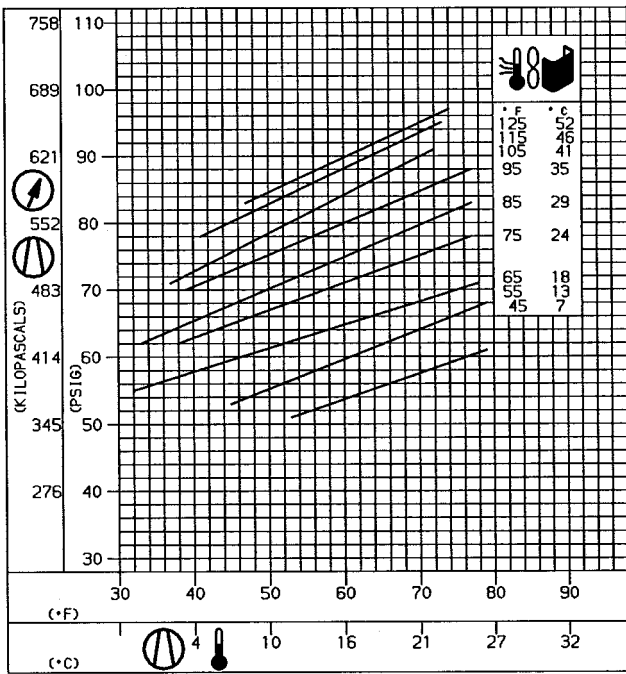


Fig. 32 — Cooling Charging Chart, 50TJQ009

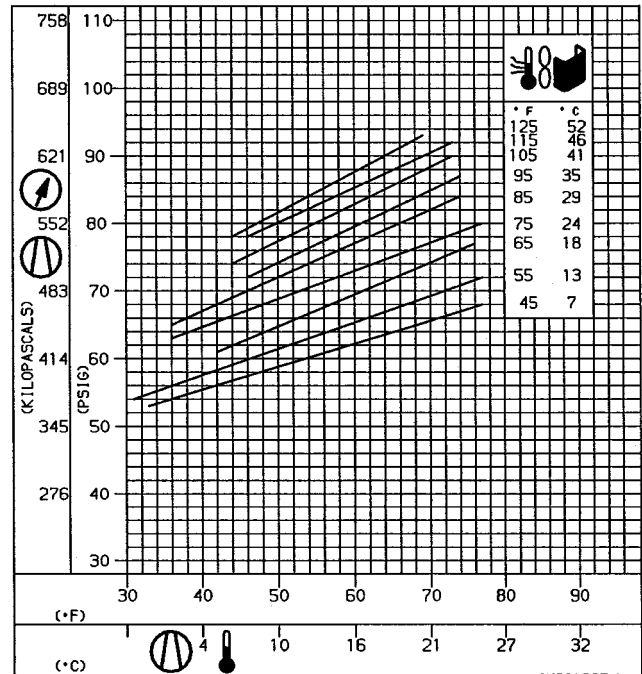
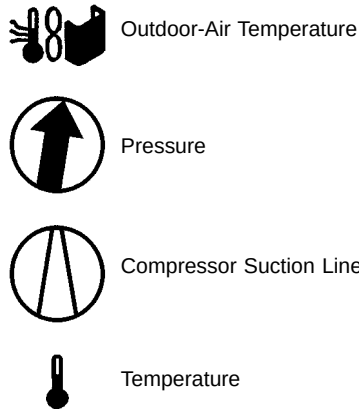


Fig. 33 — Cooling Charging Chart, 50TJQ012

LEGEND (Fig. 31-33)



TROUBLESHOOTING

Table 16 — Heating and Cooling Troubleshooting

PROBLEM	CAUSE	REMEDY
Compressor and outdoor fan will not start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer, 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.
	High-pressure switch tripped.	See problem "Excessive head pressure."
	Low-pressure switch tripped.	Check for leaks, repair, and recharge.
Compressor will not start but outdoor fan runs.	Freeze-up protection thermostat tripped.	See problem "Suction pressure too low."
	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 overload.	Determine cause and replace.
Compressor cycles (other than normally satisfying thermostat).	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked outdoor coil or dirty air filter.	Determine cause and correct.
	Defective overload.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty outdoor-fan (cooling) or indoor-fan (heating) motor or capacitor.	Replace.
Compressor operates continuously.	Restriction in refrigerant system.	Locate restriction and remove.
	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak, repair, and recharge.
	Leaking valves in compressor.	Replace compressor.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Outdoor coil dirty or restricted.	Clean coil or remove restriction.
Scroll compressor makes excessive noise (size 012 only)	Compressor rotating in the wrong direction.	Reverse the 3-phase power leads as described in Start-Up, page 20.
Excessive head pressure.	Dirty air filter.	Replace filter.
	Dirty outdoor coil.	Clean coil.
	Refrigerant overcharged.	Remove excess refrigerant.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condensing air restricted or air short-cycling.	Determine cause and correct.
Head pressure too low.	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Compressor valves leaking.	Replace compressor.
	Restriction in liquid tube.	Remove restriction.
Excessive suction pressure.	High heat load.	Check for source and eliminate.
	Compressor valves leaking.	Replace compressor.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction pressure too low.	Dirty air filter (cooling) or dirty outdoor coil (heating).	Replace filter or clean coil.
	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Metering device or low side restricted.	Remove source of restriction.
	Insufficient indoor airflow (cooling mode).	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Field-installed filter drier restricted.	Replace.
	Outdoor ambient temperature below – 3 C (25 F).	Install low-ambient kit.
Compressor no. 2 will not run.	Unit in economizer mode.	Proper operation; no remedy necessary.

Table 17 — Durablade Economizer Troubleshooting

PROBLEM	CAUSE	REMEDY
Damper does not open.	Indoor 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 D18. If diode is not functioning properly, replace economizer 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 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 -16 C (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.
	Economizer control board incorrectly wired or not functioning.	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.
	Incorrect SAT wiring or inoperative 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 14 C (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 economizer wiring.	1. Verify that SW2 and SW4 are wired and working properly (see unit label diagram). 2. Check diode D19. If diode is not functioning properly, replace economizer control board.
	Incorrect damper actuator wiring or inoperative economizer circuit board.	1. After verifying that the wiring is correct, modulate the damper to the minimum position. Remove the calls for G. 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 control board.
	Incorrect SAT wiring or inoperative 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 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.	Insufficient battery power, inoperative economizer control board.	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 Fan Contactor

IFO — Indoor 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: _____

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

- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK THAT RETURN (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 INSTALLATION INSTRUCTIONS

III. START-UP

ELECTRICAL

SUPPLY VOLTAGE	L1-L2	_____	L2-L3	_____	L3-L1	_____
CIRCUIT 1 COMPRESSOR AMPS	L1	_____	L2	_____	L3	_____
CIRCUIT 2 COMPRESSOR AMPS	L1	_____	L2	_____	L3	_____
INDOOR FAN AMPS	L1	_____	L2	_____	L3	_____

TEMPERATURES

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

PRESSURES (COOLING)

REFRIGERANT SUCTION, CIRCUIT 1	_____	kPa
REFRIGERANT SUCTION, CIRCUIT 2	_____	kPa
REFRIGERANT DISCHARGE, CIRCUIT 1	_____	kPa
REFRIGERANT DISCHARGE, CIRCUIT 2	_____	kPa

- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR IS ROTATING IN CORRECT DIRECTION (SIZE 012 ONLY)
- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS ON PAGES 23 AND 24.