



Installation, Start-Up and Service Instructions

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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 6 in. beyond unit cabinet. Install a gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow.

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

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, a minimum clearance of 1 in. is required for the first 12 in. of ductwork. Cabinet return-air static should not exceed -0.35 in. wg with Varislide economizer, -0.20 in. wg with PARABLADE economizer, or -0.45 in. wg without economizer.

CONNECTION SIZES

UNIT SIZE	"B"	"C"	"D" ALT DRAIN HOLE	POWER CONNECTION	CONTROL CONNECTION	CONNECTOR ACCESSORY PACKAGE
50HJQ008,012	2'-8 ⁷ / ₁₆ " [827]	1'-10 ¹⁵ / ₁₆ " [583]	1 ³ / ₄ " [45]	3/4" NPT	1/2" NPT	CRBTMPWR00A100 (THRU-THE-BOTTOM)
				1 ¹ / ₄ " NPT	1/2" NPT	CRBTMPWR00A200 (THRU-THE-BOTTOM)

UNIT SIZE	"A"	ROOF CURB ACCESSORY
50HJQ008,012	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 4 ft on each side.
7. ➡ Direction of airflow.

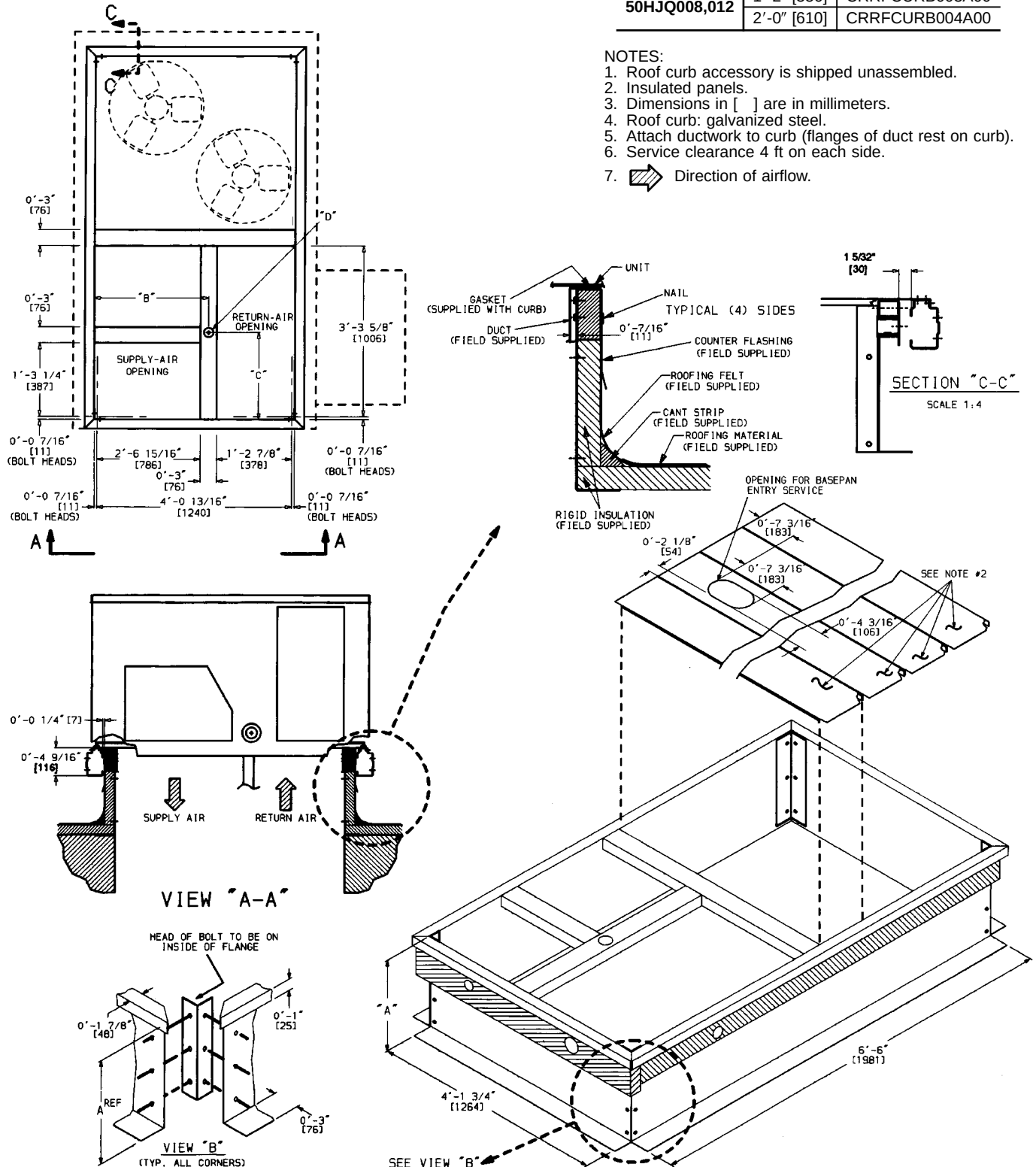
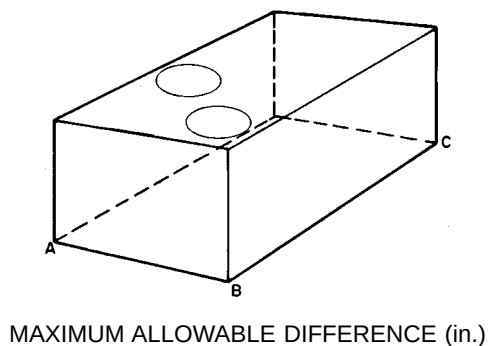


Fig. 1 — Roof Curb Details



MAXIMUM ALLOWABLE DIFFERENCE (in.)

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

Fig. 2 — Unit Leveling Tolerance

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 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 1 in. per 10 ft of run. Do not use a pipe size smaller than the unit connection.

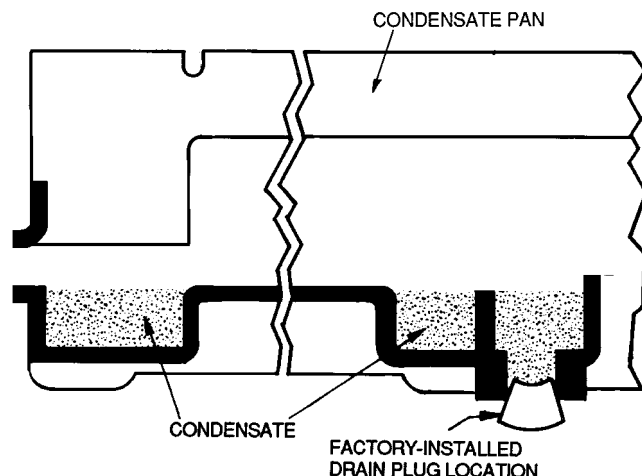
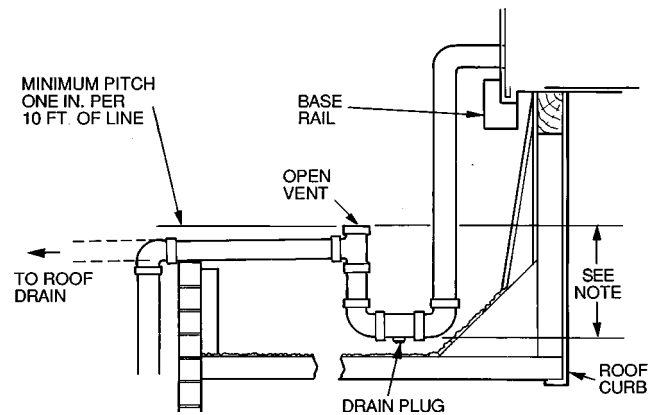


Fig. 3 — Condensate Drain Location



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

Fig. 4 — External Trap Condensate Drain

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 Table 1 and Fig. 5 for additional information. Operating weight is shown in Table 1 and Fig. 5.

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

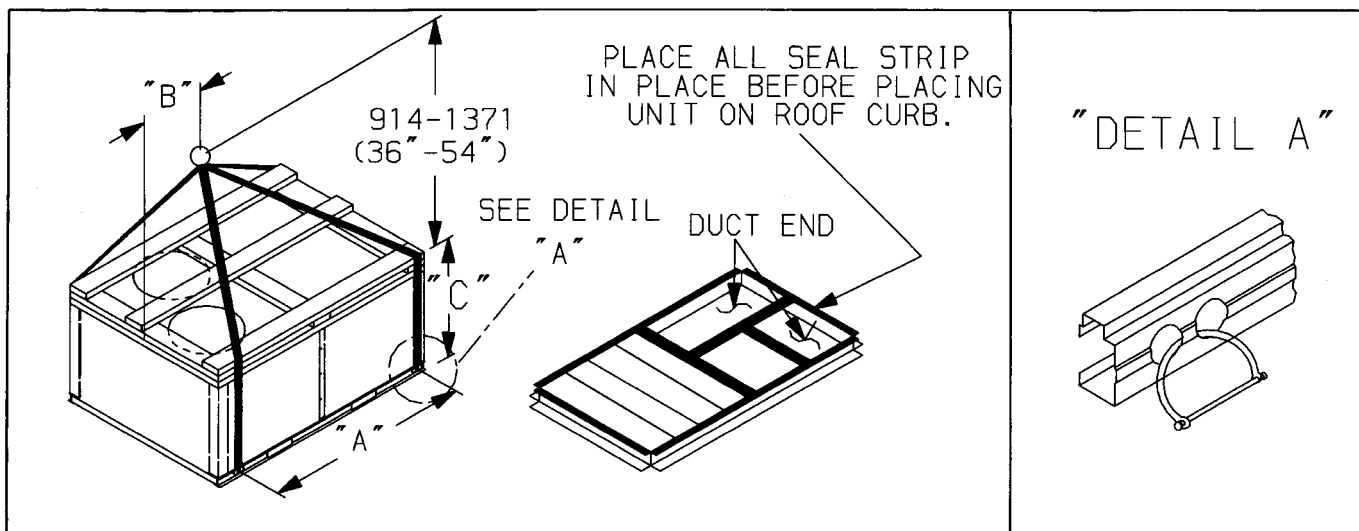
POSITIONING — Maintain clearance around and above unit to provide proper airflow and service access. See Fig. 6.

Position unit on roof curb so that the following clearances are maintained: 1/4-in. clearance between roof curb and base rails on each side and in front of unit; 1 5/32-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.



NOTES:

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

50HJQ	MAX WEIGHT		A		B		C	
	Lb	Kg	in.	mm	in.	mm	in.	mm
008	870	395	77.42	1966.5	41.5	1054	42.12	1070
012	1000	454	77.42	1966.5	41.5	1054	42.12	1070

⚠ CAUTION

All panels must be in place when rigging.

Fig. 5 — Rigging Details

Table 1 — Physical Data

BASE UNIT 50HJQ	008	012
NOMINAL CAPACITY (tons)	7½	10
OPERATING WEIGHT (lb)		
Unit	870	1000
With Varislide™ Economizer	914	1044
With PARABLADE Economizer	932	1062
Roof Curb	143	143
COMPRESSOR	Scroll	
Quantity	2	2
Oil (oz) (each compressor)	57	57
REFRIGERANT TYPE	R-22	
Operating Charge (lb-oz)		
Circuit 1	5-3	9-11
Circuit 2	5-8	9-11
OUTDOOR FAN	Propeller Type	
Qty...Diameter (in.)	2...22	2...22
Nominal Cfm	6500	6500
Motor Hp...Rpm	¼...1100	¼...1100
Watts Input (Total)	650	650
OUTDOOR COIL	High Efficiency Enhanced Copper Tubes, Lanced Aluminum Fin, Acutrol™ Feed Device	
Rows...Fins/in.	2...17	2...17
Total Face Area (sq ft)	20.5	25.1
INDOOR FAN	Centrifugal Type, Belt Drive	
Qty...Size (in.)	1...15 x 15	1...15 x 15
Nominal Cfm	3000	4000
Maximum Continuous Bhp	2.90	4.20
Motor Frame	56	56
Fan Rpm Range	840-1085	860-1080
Motor Bearing Type	Ball	Ball
Maximum Fan Rpm	2100	2100
Motor Pulley Pitch Diameter A/B (in.)	3.4/4.4	4.0/5.0
Nominal Motor Shaft Diameter (in.)	⅞	⅞
Fan Pulley Pitch Diameter (in.)	7.0	8.0
Belt — Qty...Type...Length (in.)	1...A...51	1...A...51
Pulley Center Line Distance (in.)	16.75-19.25	15.85/17.50
Speed Change per Full Turn of Movable Pulley Flange (rpm)	50	45
Movable Pulley Maximum Full Turns From Closed Position	5	5
Factory Setting — Full Turns Open	5	5
Factory Speed Setting (rpm)	840	860
Fan Shaft Diameter at Pulley (in.)	1	1
INDOOR COIL	High Efficiency Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Acutrol Feed Device	
Rows...Fins/in.	3...15	4...15
Total Face Area (sq ft)	8.9	11.1
HIGH-PRESSURE SWITCH (psig)	450 ± 5	
Cutout	428	
Reset (Auto.)	320	
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid Line) (psig)		
Cutout	7 ± 3	
Reset (Auto.)	22 ± 7	
FREEZE-PROTECTION THERMOSTAT		
Opens (F)	30 ± 5	
Closes (F)	45 ± 5	
OUTDOOR-AIR INLET SCREENS	Cleanable	
Qty...Size (in.)	1...20 x 25 x 1	
	1...16 x 25 x 1	
RETURN-AIR FILTERS	Throwaway	
Qty...Size (in.)	4...16 x 20 x 2	4...20 x 20 x 2

LEGEND

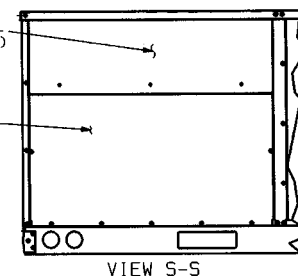
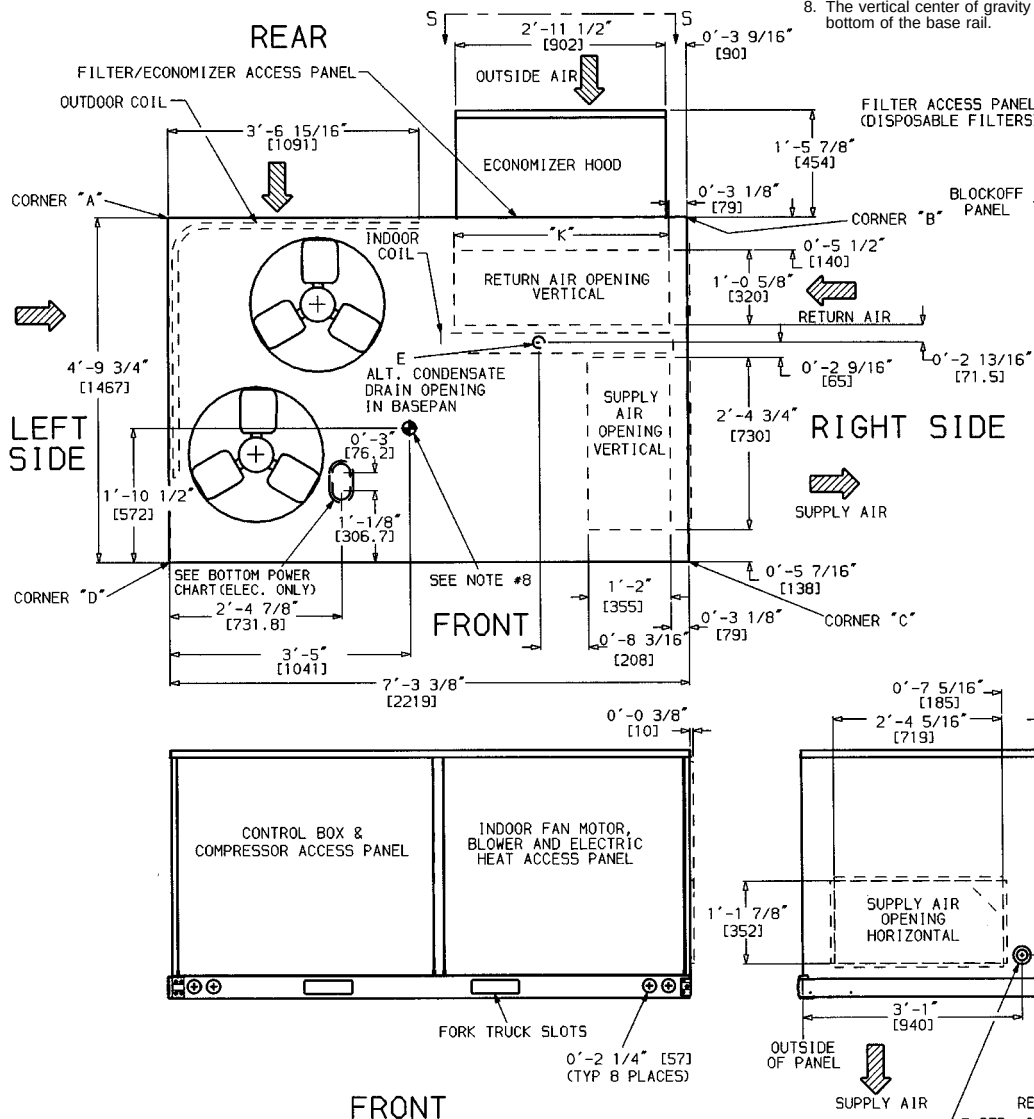
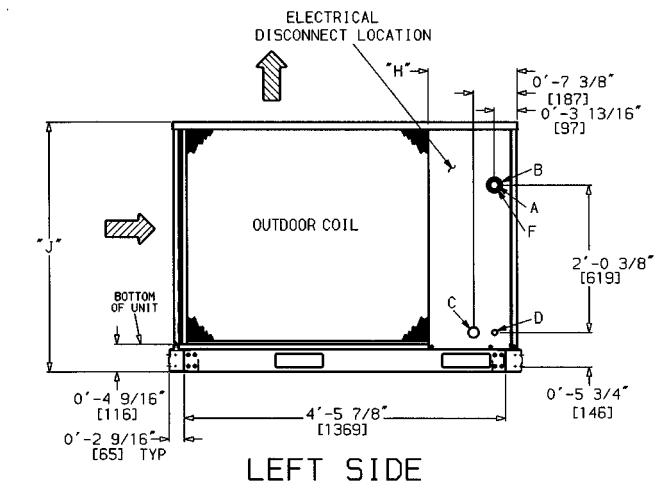
Bhp — Brake Horsepower

UNIT	STD UNIT 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	Ft.-in.	mm	Ft.-in.	mm	Ft.-in.	mm
50HJQ008	870	395	195	90	183	83	237	108	252	114	2'-0 7/8"	632	3'-5 9/16"	1050	2'-9 1/16"	856
50HJQ012	1000	454	231	105	214	97	269	122	286	130	2'-10 7/8"	885	4'-1 1/16"	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

NOTES:

- Dimensions in [] are in millimeters.
-  Center of gravity.
-  Direction of airflow.
- Ductwork to be attached to accessory roof curb only.
- Minimum clearance (local codes or jurisdiction may prevail):
 - Bottom to combustible surfaces (when not using curb) 0 in. on horizontal discharge units with electric heat 1 in. clearance to ductwork for 1 foot.
 - Outdoor coil, for proper airflow, 36 in. on one side, 12 in. the other. The side getting the greater clearance is optional.
 - Overhead, 60 in. to assure proper outdoor fan operation.
 - Between units, control box side, 42 in. per NEC (National Electrical Code).
 - Between unit and ungrounded surfaces, control box side, 36 in. per NEC.
 - Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC.
 - Horizontal supply and return end, 0 inches.
- With the exception of the clearance for the outdoor coil and combustible surfaces as stated in Notes 5a, b, and c, a removable fence or barricade requires no clearance.
- Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material.
- The vertical center of gravity is 1'-7 1/2" for 008, 2'-0" 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"	24V POWER*	7/8" [22.2]
3/4"	1 1/8" POWER*	1 1/8" [28.4]
1 1/4"	1 3/4" POWER*	1 3/4" [44.4]

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

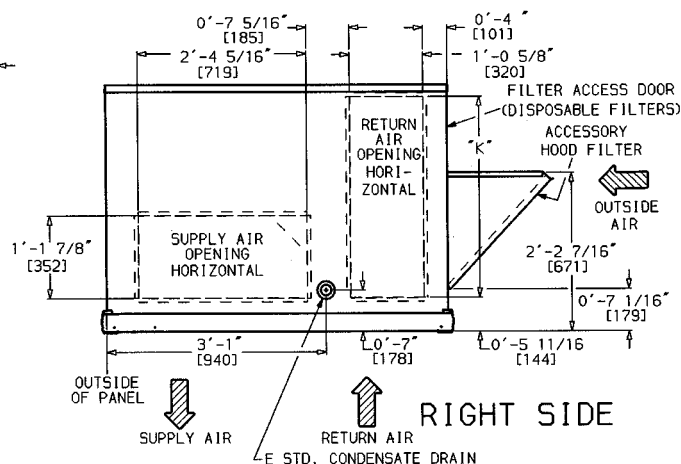


Fig. 6 — Base Unit Dimensions

Step 5 — Make Electrical Connections

⚠ WARNING

Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with NEC (National Electrical Code) ANSI (American National Standards Institute) /NFPA (National Fire Protection Association) 70-1987 and local electrical codes. Failure to follow this warning could result in the installer being liable for personal injury of others.

FIELD POWER SUPPLY — All units except 208/230-v units are factory-wired for the voltage shown on the unit nameplate. If the 208/230-v unit is to be connected to a 208-v power supply, the transformer *must* be rewired by disconnecting the black wire from the 230-v orange wire on the transformer and connecting it to the 200-v red wire from the transformer. The end of the orange wire must then be insulated.

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

When installing units, provide a disconnect per the NEC.

All field wiring must comply with the NEC and local requirements. In Canada, electrical connections must be made in accordance with CSA (Canadian Standards Association) C22.1 Canadian Electrical Code Part One.

Install field wiring as follows:

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

During operation, voltage to compressor terminals must be within range indicated on unit nameplate (see Tables 2A and 2B). On 3-phase units, voltages between phases must be balanced within 2%, and the current within 10%. Use the formula shown in Tables 2A and 2B, Note 2 on page 8 to determine the percentage of voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable Carrier warranty.

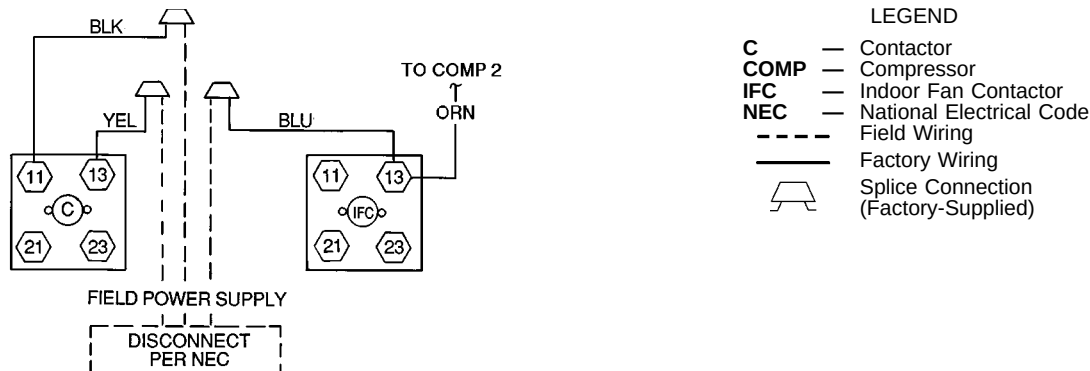


Fig. 7 — Power Wiring Connections

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

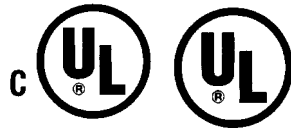
UNIT	NOMINAL VOLTAGE (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR		OFM	IFM	ELECTRIC HEAT*		POWER SUPPLY		MINIMUM UNIT DISCONNECT SIZE	
		Min	Max	RLA	LRA	FLA	FLA	kW†	FLA	MCA	MOCP	FLA	LRA
50HJQ008 (7½ Tons)	208/230-3-60	187	254	12.4	88.0	1.4	7.5	— 7.8/10.4 12.0/16.0 18.6/24.8 24.0/32.0 31.8/42.4	— 21.7/ 25.0 33.3/ 38.5 51.6/ 59.7 66.6/ 77.0 88.3/102.0	38.2/ 38.2 65.3/ 69.5 79.8/ 86.3 102.7/112.8 121.5/134.5 148.6/165.7	40/ 40** 70/ 70 80/ 90 110/125 125/150 150/175	40/ 40 65/ 69 79/ 85 100/109 117/129 142/159	242/242 264/267 275/281†† 294/302†† 309/319†† 330/344††
	460-3-60	414	508	6.4	44.0	0.7	3.4	— 13.9 16.5 27.8 33.0 41.7	— 16.7 19.8 33.4 39.7 50.2	19.2 40.1 44.0 61.0 68.8 82.0	20** 45** 45** 70 70 90	20 39 43 59 66 78	121 138 141 155 161 171
50HJQ012 (10 Tons)	208/230-3-60	187	254	19.3	123.0	1.4	10.6	— 7.8/10.4 12.0/16.0 24.0/32.0 31.8/42.4 37.6/50.0	— 21.7/ 25.0 33.3/ 38.5 66.6/ 77.0 88.3/102.0 104.4/120.3	56.8/ 56.8 84.0/ 88.1 98.5/105.0 140.1/153.1 167.2/184.3 187.3/177.1	60/ 60** 90/ 90 100/110 150/175 175/200 200/200	60/ 60 85/ 89 98/104 136/148 161/177 180/198	337/337 358/362†† 370/375†† 403/414†† 425/439†† 441/457††
	460-3-60	414	508	10.0	62.0	0.7	4.8	— 16.5 27.8 33.0 41.7 50.0	— 19.8 33.4 39.7 50.2 60.1	28.7 53.3 70.5 78.3 91.5 88.8	30** 60** 80 80 100 100	30 53 69 76 88 99	170 189 203 209 220†† 230††

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

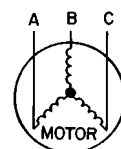
UNIT	NOMINAL VOLTAGE (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR		OFM	IFM	ELECTRIC HEAT*		POWER SUPPLY		MINIMUM UNIT DISCONNECT SIZE	
		Min	Max	RLA	LRA	FLA	FLA	kW†	FLA	MCA	MOCP	FLA	LRA
50HJQ008 (7½ Tons)	208/230-3-60	187	254	12.4	88.0	1.4	7.5	— 7.8/10.4 12.0/16.0 18.6/24.8 24.0/32.0 31.8/42.4	— 21.7/ 25.0 33.3/ 38.5 51.6/ 59.7 66.6/ 77.0 88.3/102.0	43.0/ 43.0 70.1/ 74.3 84.6/ 91.1 107.5/117.6 126.3/139.3 153.4/170.5	45/ 45** 80/ 80 90/100 110/125 150/150 175/175	46/ 46 71/ 75 84/ 90 105/115 122/134 147/163	247/247 269/272 280/285†† 298/307†† 313/324†† 335/349††
	460-3-60	414	508	6.4	44.0	0.7	3.4	— 13.9 16.5 27.8 33.0 41.7	— 16.7 19.8 33.4 39.7 50.2	21.4 42.3 46.1 63.1 71.0 84.1	25** 45** 50** 70 80 90	23 42 46 61 68 80	123 140 143 157 163 174
50HJQ012 (10 Tons)	208/230-3-60	187	254	19.3	123.0	1.4	10.6	— 7.8/10.4 12.0/16.0 24.0/32.0 31.8/42.4 37.6/50.0	— 21.7/ 25.0 33.3/ 38.5 66.6/ 77.0 88.3/102.0 104.4/120.3	61.6/ 61.6 88.8/ 92.9 103.3/109.6 144.9/157.9 172.0/189.1 192.1/181.9	70/ 70 90/100 110/110 150/175 175/200 200/200	65/ 65 90/ 94 104/110 142/154 167/183 185/204	341/341 363/366†† 375/380†† 408/418†† 430/443†† 446/462††
	460-3-60	414	508	10.0	62.0	0.7	4.8	— 16.5 27.8 33.0 41.7 50.0	— 19.8 33.4 39.7 50.2 60.1	30.9 55.6 72.6 80.5 93.6 91.0	35** 60** 80 90 100 100	33 55 71 78 90 102	172 191 205 211 222†† 232††

LEGEND FOR TABLES 2A AND 2B

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



EXAMPLE: Supply voltage is 460-3-60



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

$$\begin{aligned} \text{Average Voltage} &= \frac{452 + 464 + 455}{3} \\ &= \frac{1371}{3} \\ &= 457 \end{aligned}$$

Determine maximum deviation from average voltage:

(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percentage of voltage imbalance:

$$\begin{aligned} \% \text{ Voltage Imbalance} &= 100 \times \frac{7}{457} \\ &= 1.53\% \end{aligned}$$

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

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

*Heaters are field installed only.

†Heater capacity (kW) is based on heater voltage of 208 v, 240 v, or 480 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.

**Fuse or HACR circuit breaker.

††Factory installed disconnect is not available for these units when electric heat package is installed.

NOTES:

1. In compliance with NEC requirements for multimotor and combination load and 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 percentage of voltage imbalance.

% Voltage Imbalance

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

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. 8) as described in Steps 1 through 4 below.

NOTE: For wire runs up to 50 ft, use no. 18 AWG (American Wire Gage) insulated wire (35 C minimum). For 51 to 75 ft, use no. 16 AWG insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C minimum). All wire larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.

1. 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. 9. The raceway provides the UL required clearance between the high- and low-voltage wiring.
4. Connect thermostat wires to screw terminals of low-voltage connector (see Fig. 8).

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. 10. 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 3.

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 VARISLIDE™ 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.

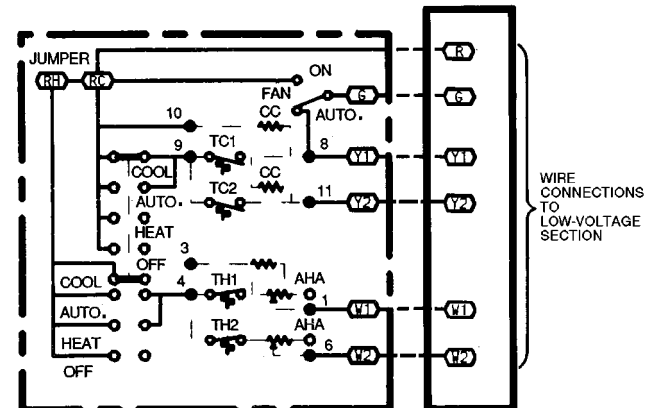
NOTE: Horizontal discharge block-off plate is shipped with the air hood package. If unit is to be used for vertical discharge application, discard this plate.

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. 11. Remove optional outdoor-air damper hood package from filter section.
3. Assemble outdoor-air hood top and side plates as shown in Fig. 12. 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 012 units, install vertical discharge block-off plate over duct openings. See Fig. 13.
5. Slide economizer into unit and secure with screws. See Fig. 14.

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



TYPICAL THERMOSTAT

LEGEND

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

*Used with 2-stage electric heater.

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

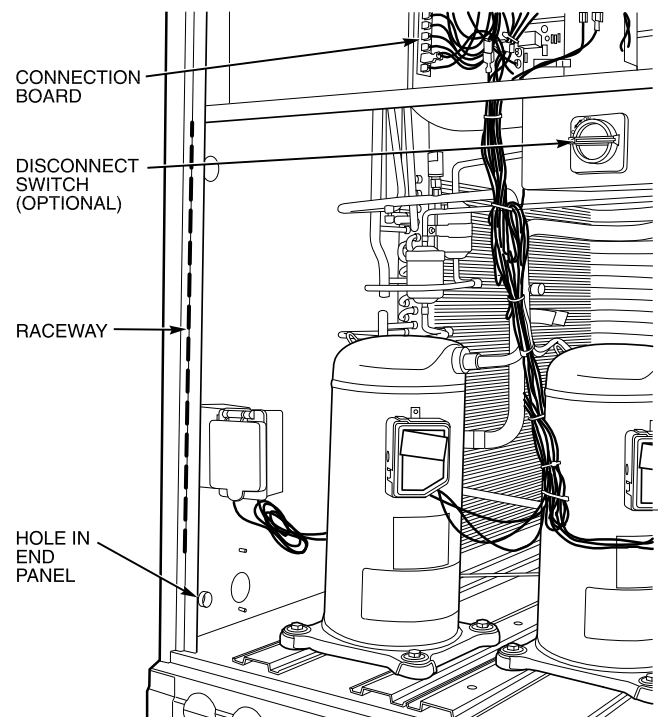


Fig. 9 — Field Control Wiring Raceway

Table 3 — Heat Anticipator Settings

UNIT	UNIT VOLTAGE							
	208/230				460			
	Heater kW*	Configuration			Heater kW	Configuration		
		1-Stage	2-Stage			1-Stage	2-Stage	
Stage 1			Stage 2	Stage 1			Stage 2	
50HJQ	10.4, 16.0	0.3	NA	NA	13.9, 16.5	0.3	NA	NA
	32.0, 24.8	0.6	0.3	0.3	27.7, 33.0			
	42.4, 50.0	0.9	0.6	0.3	41.7, 50.0	0.6	0.3	0.3

*kW is based on 240 v.

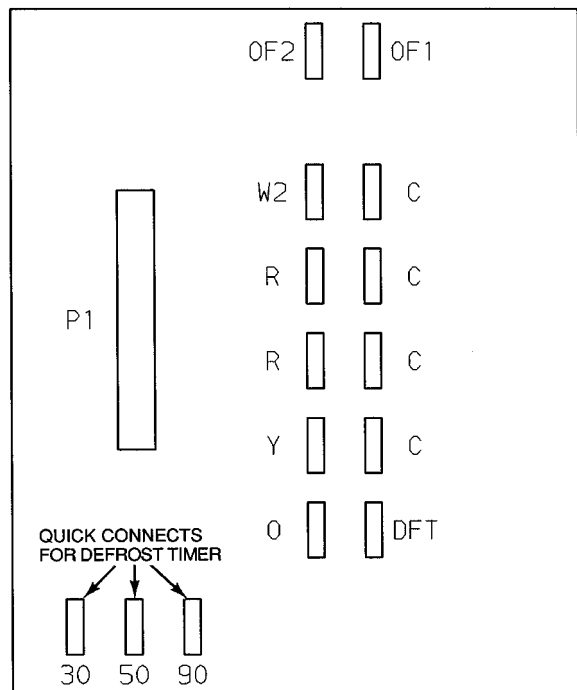


Fig. 10 — Defrost Board

6. To convert to horizontal discharge application:
 - a. Rotate the economizer 90 degrees until the economizer motor faces the outdoor section (see Fig. 15).
 - b. Rotate the barometric relief damper cover 90 degrees.
 - 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. 16.
7. Insert economizer plug into economizer harness. Remove tape from barometric relief damper. See Fig. 14.
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. 17. Adjust minimum position setting by adjusting the screws on the position setting bracket. See Fig. 18. Slide bracket until the top screw is in the position determined by Fig. 17. Tighten screws.
9. Remove tape from outdoor-air thermostat (OAT). Fasten OAT to inside of hood using screws and speed clips provided. See Fig. 19. 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. 19. 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. 19.
13. Connect OAT per Fig. 20.
14. 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. 21 for economizer barometric relief damper characteristics.

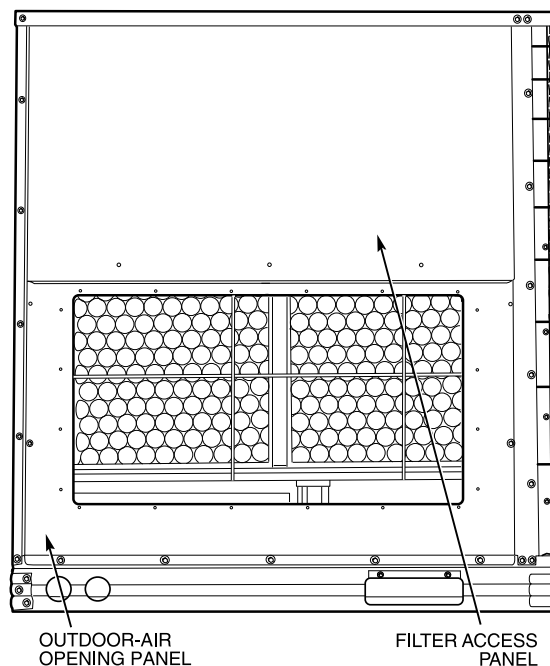


Fig. 11 — Panel Locations

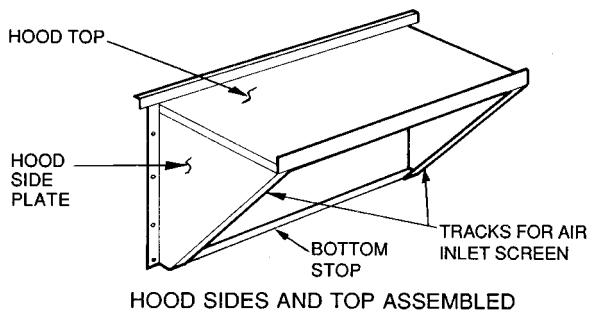
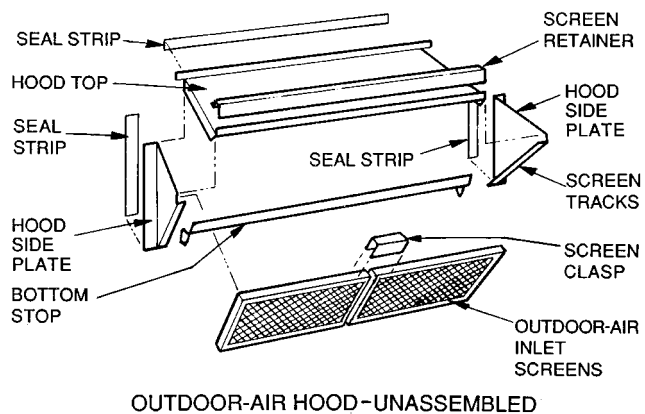


Fig. 12 — Outdoor-Air Hood Details

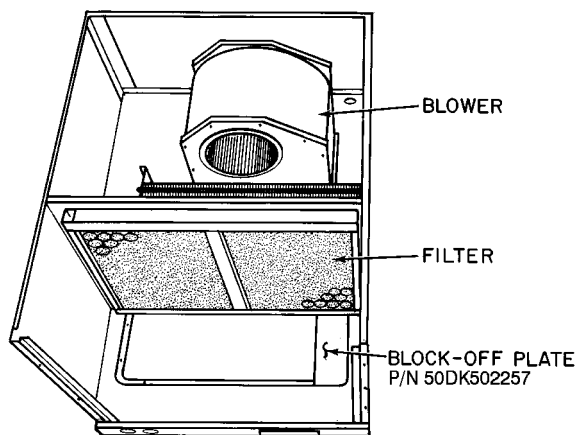


Fig. 13 — Vertical Discharge Block-Off Plate (Size 012 Only)

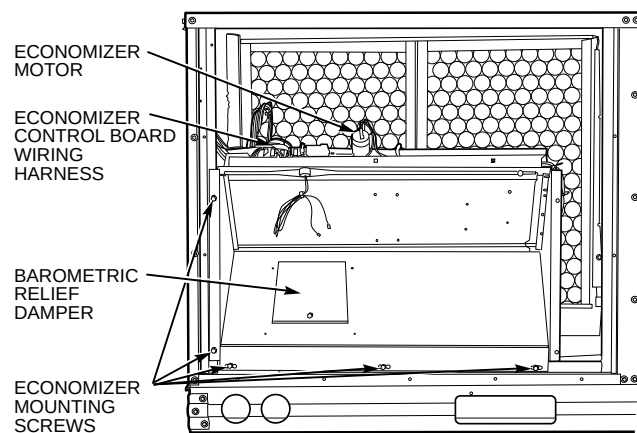


Fig. 14 — Varislide™ Economizer Installed in Unit

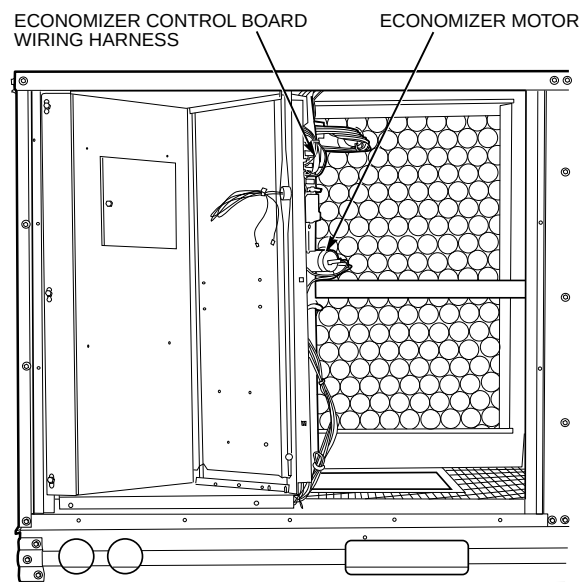


Fig. 15 — Horizontal Varislide Economizer Installation (90 Degree Rotation)

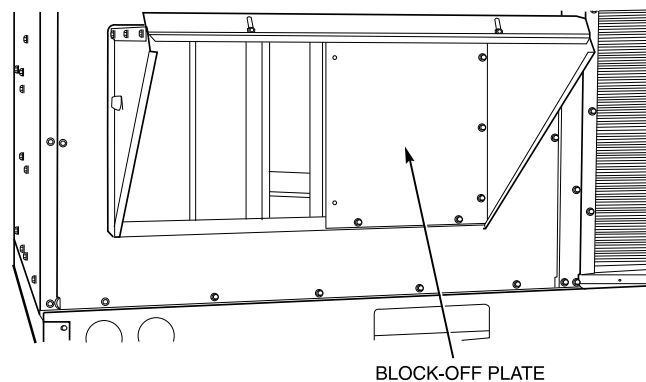
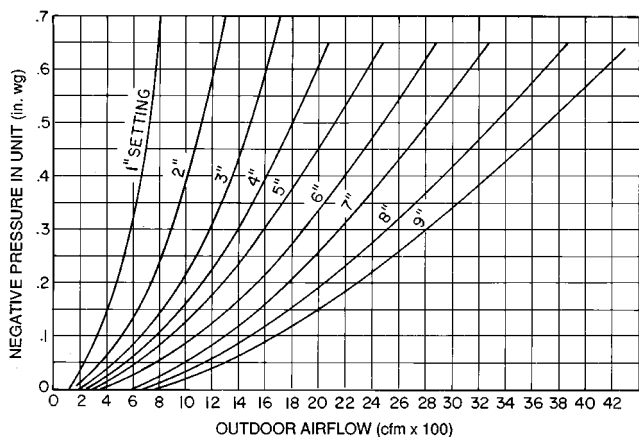


Fig. 16 — Horizontal Discharge Block-Off Plate



EXAMPLE:
 Given — Negative Pressure 0.1 in. wg
 Outdoor Air 1100 cfm
 Determine — Setting = 6

Fig. 17 — Varislide™ Economizer Minimum Position Setting

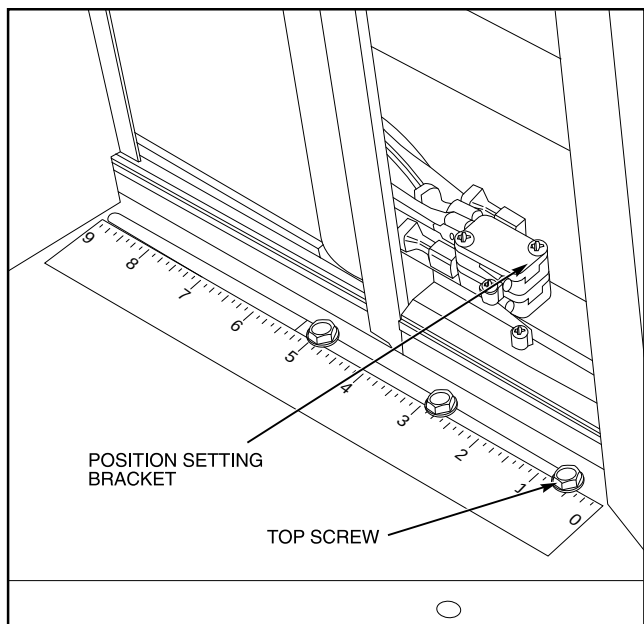


Fig. 18 — Varislide Economizer Minimum Position Damper Setting

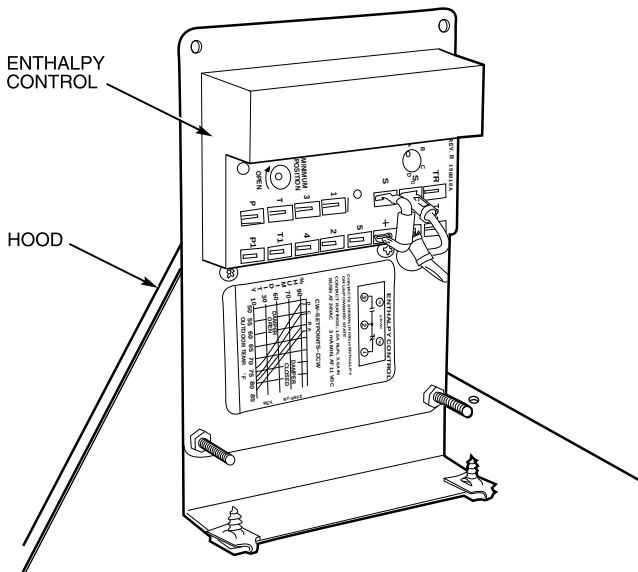
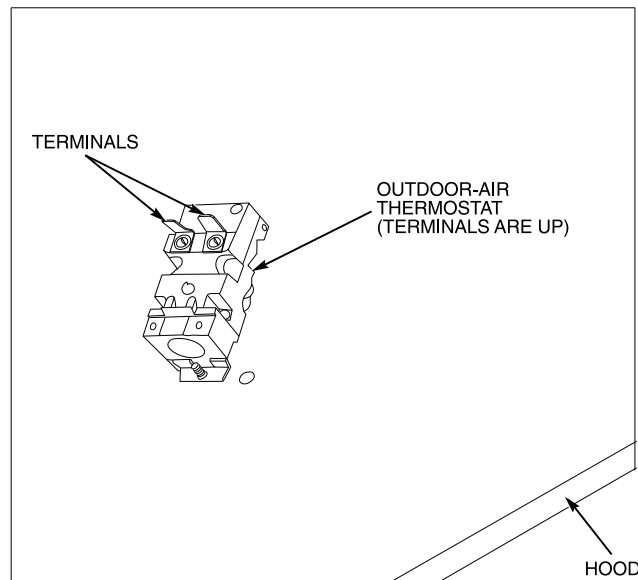
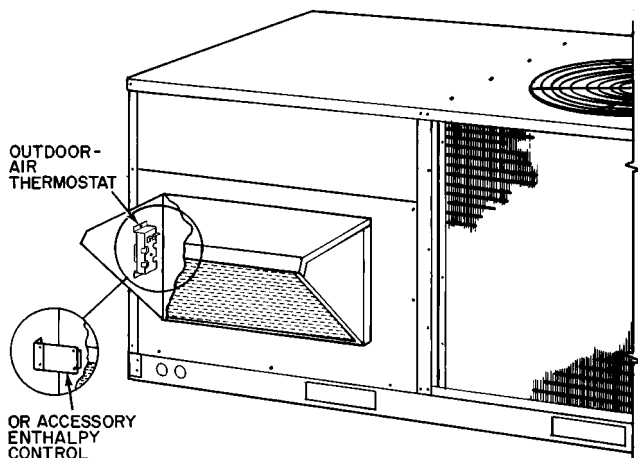


Fig. 19 — Varislide Economizer Outdoor-Air Thermostat/Enthalpy Control Installation

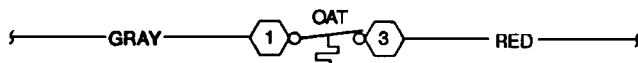


Fig. 20 — Wiring Connections for Outdoor-Air Thermostat

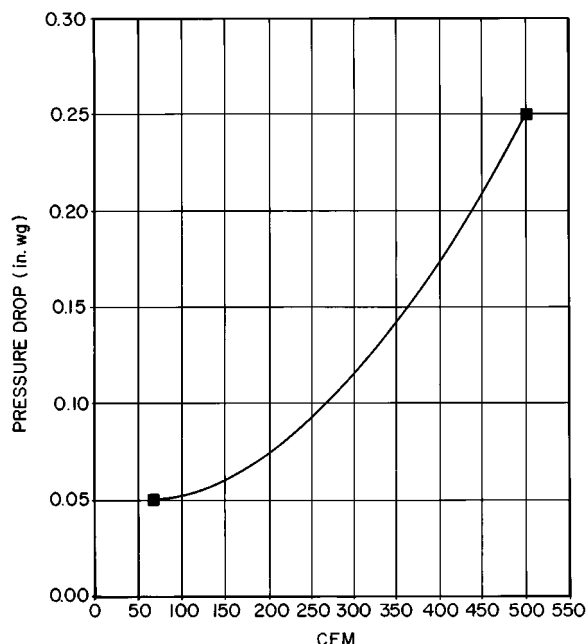


Fig. 21 — Varislide™ Economizer Barometric Relief Damper Characteristics

OPTIONAL PARABLADE ECONOMIZER — The optional PARABLADE 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. The PARABLADE economizer can only be used for vertical discharge applications. 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 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. See Fig. 11. Save panels and screws. Remove optional economizer so the outdoor-air damper hood package can be removed from the filter section.
3. Assemble outdoor-air hood top and side plates as shown in Fig. 12. Install seal strips on the 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 012 units, install vertical discharge block-off plate over duct openings. See Fig. 13.
5. Slide economizer into unit and secure with screws. See Fig. 22.

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

6. Insert economizer plug into economizer harness. Remove tape from barometric relief damper. See Fig. 22.
7. If ventilation air is not required, proceed to Step 8. If ventilation air is required, perform the following:
 - a. Make sure the factory-installed jumper is in place across terminals P and P1 on the economizer logic module. T and T1 should be disconnected during adjustment.

- b. The 2 potentiometers with slots for adjustment are located on the face of the economizer logic module. Turn the lower potentiometer fully clockwise. The dampers should be fully closed. Turn the potentiometer gradually counterclockwise until the desired position is reached.
- c. Connect T and T1 to the 24 V power supply.
- d. After installation is complete, calculate the minimum airflow across the economizer. To calculate the minimum airflow, the following data is needed: total cfm (cfm₃), temperature of the total cfm (T₃), temperature of the return air (T₂), and temperature of the entering outside air (T₁). Cfm₁ is the outside air cfm, which will be the minimum airflow.

Insert the data into the following equations:

$$\frac{T_1 (\text{cfm}_1) + T_2 (\text{cfm}_2)}{\text{cfm}_3} = T_3$$

$$\text{cfm}_2 = (\text{cfm}_3 - \text{cfm}_1)$$

Therefore:

$$\frac{T_1 (\text{cfm}_1) + T_2 (\text{cfm}_3 - \text{cfm}_1)}{\text{cfm}_3} = T_3$$

Use this equation to determine cfm₁, which is the minimum airflow across the economizer.

$$\text{cfm}_1 = \frac{(T_3 - T_2) \text{cfm}_3}{(T_1 - T_2)}$$

If cfm₁ does not match the desired minimum airflow from Step 1, re-adjust the minimum position setting screw.

8. Determine the enthalpy changeover set point from Fig. 23. The enthalpy changeover set point should be set to return the outdoor air damper to the minimum position when enthalpy rises above the set point. The settings are A, B, C, and D. Set the enthalpy changeover per the setting in Fig. 23.
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. See Fig. 24.
10. Fasten hood top and side plate assembly (Fig. 25) to outdoor-air opening panel with screws provided.
11. 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. See Fig. 26.

Step 7 — Adjust Indoor-Fan Speed —

Adjust indoor-fan speed to meet jobsite conditions.

For units with electric heat, required minimum cfm is 2250 for 50HJQ008 and 3000 for 50HJQ012 with the following exceptions:

UNIT	UNIT VOLTAGE	HEATER KW	UNIT CONFIGURATION	REQUIRED MINIMUM CFM
50HJQ012	208/230	42.4	Horizontal	3200
	208/230	50.0	Horizontal	3200
	460	50.0	Horizontal or Vertical	3200

Table 4 shows indoor-fan motor data. Table 5 shows fan rpm at motor pulley settings for standard and alternate motors. Refer to Tables 6-9 to determine fan speed settings. Fan motor pulleys are factory set for speed shown in Table 1.

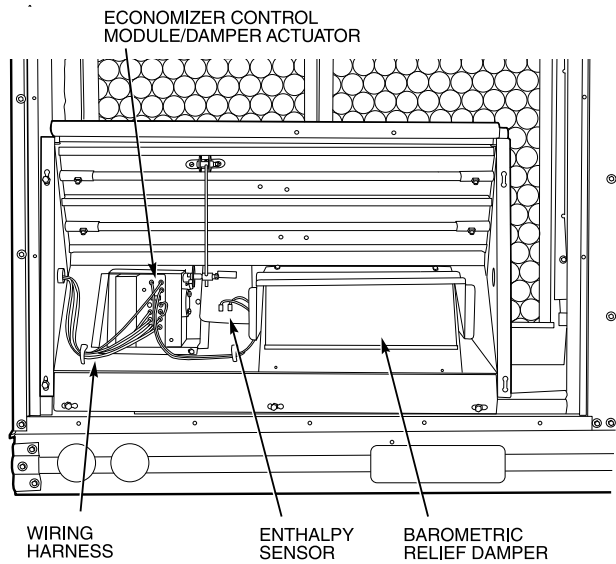


Fig. 22 — PARABLADE Economizer Installed in Unit

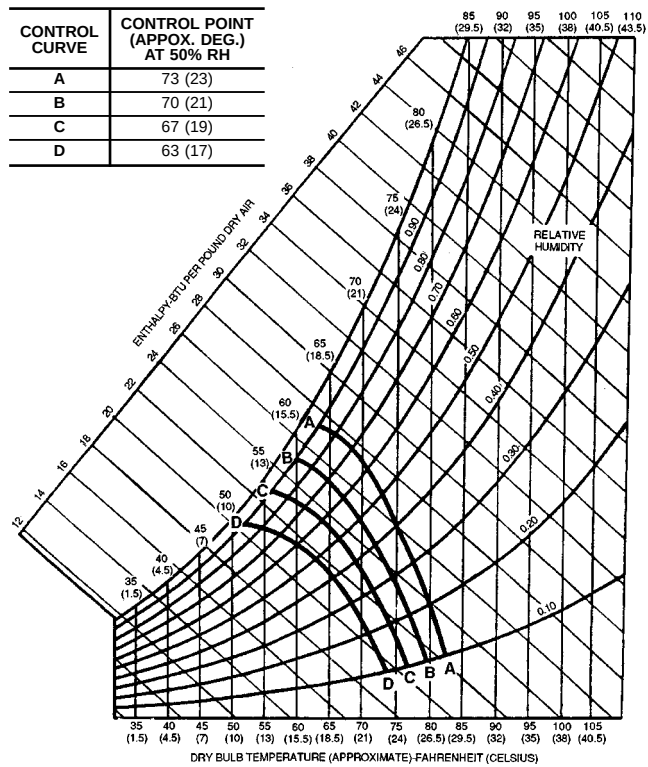


Fig. 23 — Enthalpy Settings for PARABLADE Economizer

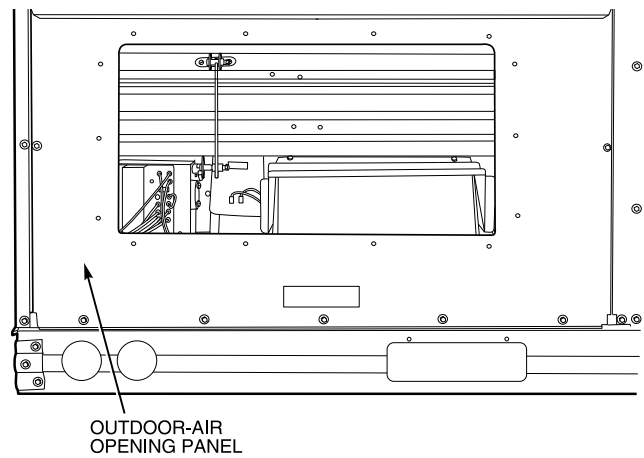


Fig. 24 — Panels Reinstalled on Unit

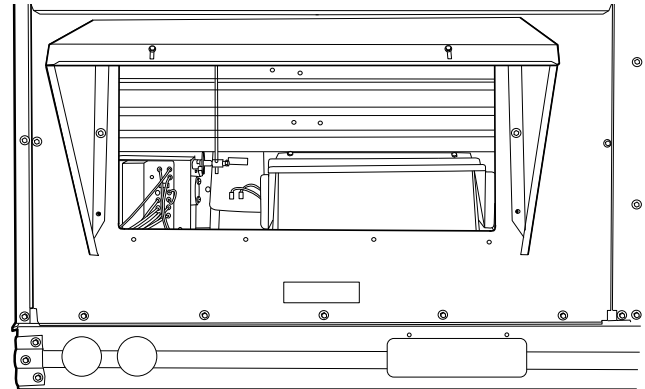


Fig. 25 — Outdoor-Air Hood Installed on Unit

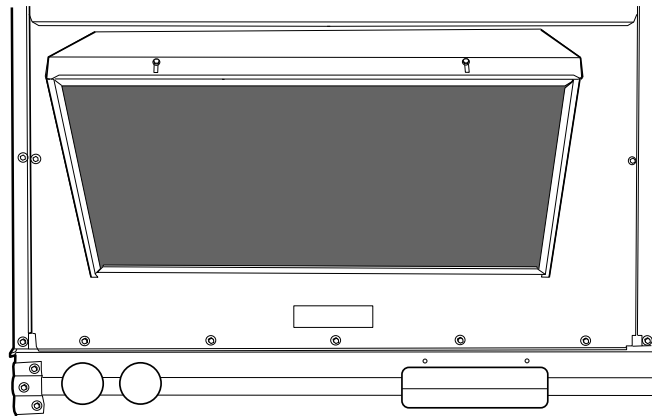


Fig. 26 — Filter Installed on Outdoor-Air Hood

To change fan speeds:

1. Shut off unit power supply.
2. Loosen belt by loosening fan motor mounting nuts. See Fig. 27 and 28.
3. Loosen movable pulley flange setscrew (see Fig. 29).
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 Table 1.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table 1 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 plate.

To adjust belt tension:

1. Loosen fan motor mounting nuts.
2. *Size 008* — Slide motor mounting plate away from fan scroll for proper belt tension ($\frac{1}{2}$ -in. deflection with one finger) and tighten mounting nuts (see Fig. 27).
3. *Size 012* — Slide motor mounting plate downward to tighten belt tension. Secure motor mounting plate nuts. See Fig. 28.
3. Adjust bolt and nut on mounting plate to secure motor evaporator in fixed position.

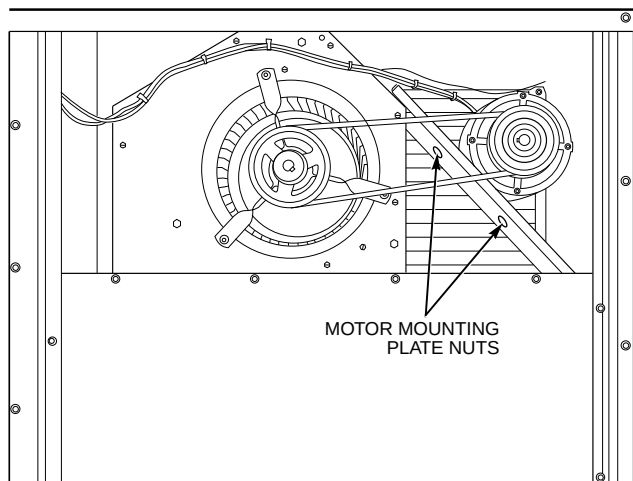


Fig. 27 — Typical Belt-Drive Motor Mounting for Size 008

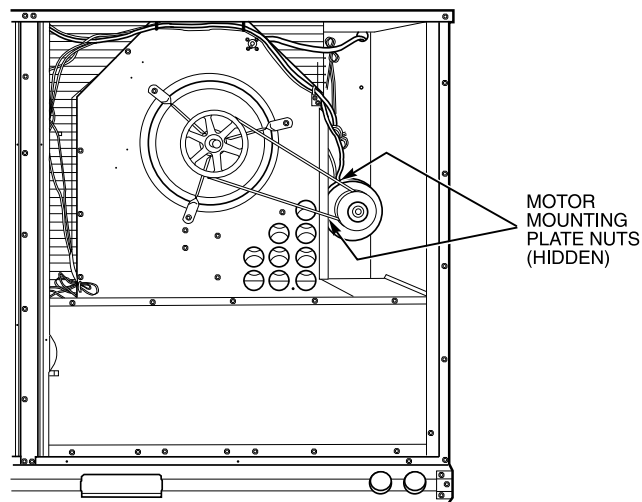


Fig. 28 — Typical Belt-Drive Motor Mounting for Size 012

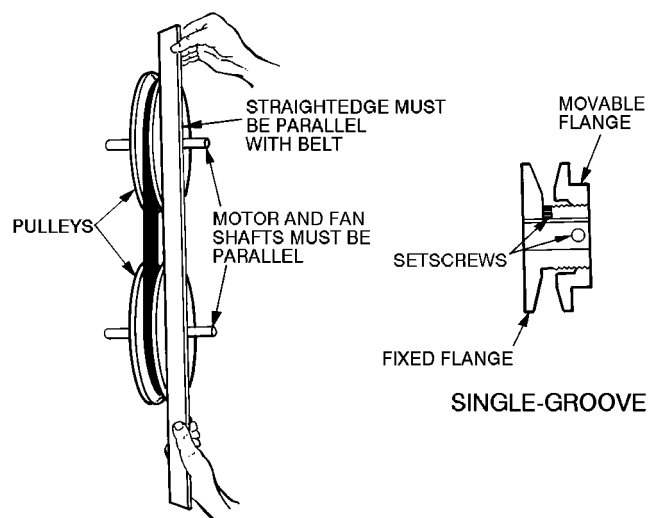


Fig. 29 — Indoor-Fan Pulley Adjustment

Table 4 — Indoor-Fan Motor Data

UNIT 50HJQ	MAXIMUM CONTINUOUS BHP*	MAXIMUM OPERATING WATTS*	UNIT VOLTAGE	MAXIMUM AMP DRAW
008	2.90	2615	208/230 460	7.9 3.6
012	4.20	3775	208/230 460	11.1 5.0

LEGEND

BHP — Brake Horsepower

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

Table 5 — Fan Rpm at Motor Pulley Settings*

UNIT 50HJQ	MOTOR PULLEY TURNS OPEN										
	0	½	1	1½	2	2½	3	3½	4	4½	5
008	1085	1060	1035	1010	985	960	935	910	890	865	840
012	1080	1060	1035	1015	990	970	950	925	905	880	860

*Approximate fan rpm shown.

Table 6 — Fan Performance, 50HJQ008 — Vertical Discharge Units

AIRFLOW (Cfm)	BELT DRIVE MOTOR											
	External Static Pressure (in. wg)											
	0.2		0.4		0.6		0.8		1.0		1.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2250	511	0.52	592	0.74	659	0.95	722	1.19	778	1.43	829	1.68
2300	518	0.55	599	0.77	665	0.98	727	1.22	783	1.47	834	1.72
2400	534	0.61	613	0.84	677	1.06	738	1.30	794	1.55	844	1.81
2500	549	0.67	627	0.90	690	1.14	750	1.38	805	1.64	855	1.91
2550	557	0.71	633	0.94	697	1.18	756	1.42	811	1.69	861	1.96
2600	565	0.74	639	0.97	703	1.22	761	1.46	816	1.74	866	2.01
2700	581	0.81	652	1.04	717	1.31	773	1.55	827	1.83	878	2.12
2800	597	0.89	665	1.12	733	1.40	786	1.66	839	1.93	889	2.23
2900	613	0.97	679	1.20	745	1.50	799	1.76	850	2.04	900	2.34
3000	629	1.06	694	1.29	759	1.59	812	1.88	862	2.15	911	2.46
3100	646	1.15	709	1.39	772	1.70	825	1.99	875	2.28	923	2.58
3200	662	1.25	724	1.50	785	1.80	840	2.11	887	2.41	934	2.71
3300	679	1.35	740	1.61	798	1.91	854	2.24	900	2.54	946	2.85
3400	696	1.46	756	1.73	811	2.02	868	2.37	914	2.69	959	3.00
3500	712	1.57	771	1.85	824	2.14	881	2.50	928	2.84	971	3.16
3600	729	1.69	787	1.98	839	2.21	894	2.64	942	2.99	984	3.22
3700	746	1.85	803	2.12	854	2.42	907	2.78	956	3.15	997	3.49
3750	755	1.89	811	2.20	862	2.49	914	2.85	963	3.23	—	—

AIRFLOW (Cfm)	BELT DRIVE MOTOR (cont)							
	External Static Pressure (in. wg)							
	1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2250	884	1.97	937	2.33	947	2.66	1022	3.10
2300	885	2.00	939	2.36	979	2.69	1025	3.12
2400	892	2.08	944	2.40	987	2.76	1039	3.20
2500	902	2.18	949	2.48	1002	2.84	1041	3.25
2550	908	2.24	953	2.53	1003	2.87	1045	3.28
2600	913	2.29	957	2.58	1004	2.91	1050	3.31
2700	924	2.40	967	2.70	1010	3.01	1056	3.37
2800	935	2.52	978	2.62	1019	3.13	1061	3.47
2900	946	2.65	989	2.96	1030	3.27	—	—
3000	957	2.78	1000	3.09	1040	3.41	—	—
3100	968	2.91	1011	3.24	—	—	—	—
3200	980	3.04	1022	3.38	—	—	—	—
3300	991	3.18	—	—	—	—	—	—
3400	1003	3.32	—	—	—	—	—	—
3500	1014	3.48	—	—	—	—	—	—
3600	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

1. **Boldface** indicates a field-supplied drive is required. (See Note 6.)
2.  indicates field-supplied motor and drive are required.
3. Maximum continuous bhp is 2.90. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

4. Values include losses for filters, unit casing, and wet coils.
5. Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
6. Standard motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive.
7. Interpolation is permissible. Do not extrapolate.

Table 7 — Fan Performance, 50HJQ012 — Vertical Discharge Units

AIRFLOW (Cfm)	BELT DRIVE MOTOR											
	External Static Pressure (in. wg)											
	0.2		0.4		0.6		0.8		1.0		1.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	459	0.46	625	0.85	691	1.01	734	1.10	787	1.30	829	1.50
3100	478	0.57	637	0.90	702	1.08	744	1.16	796	1.36	837	1.56
3200	500	0.62	647	0.97	712	1.16	753	1.23	805	1.43	845	1.63
3300	519	0.69	658	1.03	721	1.23	762	1.30	814	1.50	853	1.71
3400	537	0.77	669	1.10	731	1.30	773	1.38	823	1.57	862	1.78
3500	561	0.86	680	1.17	741	1.37	784	1.47	832	1.65	871	1.86
3600	592	0.98	692	1.24	751	1.45	796	1.57	841	1.72	880	1.95
3700	654	1.12	714	1.31	767	1.50	815	1.67	861	1.85	906	2.08
3800	668	1.20	727	1.40	780	1.60	827	1.77	873	1.95	916	2.18
3900	683	1.28	741	1.49	793	1.70	839	1.88	884	2.05	927	2.28
4000	697	1.37	754	1.59	806	1.80	851	1.99	895	2.16	938	2.38
4100	711	1.46	767	1.69	819	1.90	864	2.10	907	2.28	949	2.49
4200	726	1.56	780	1.80	832	2.01	877	2.22	919	2.41	960	2.60
4300	741	1.66	794	1.91	845	2.12	889	2.35	931	2.54	971	2.72
4400	755	1.77	808	2.03	858	2.24	902	2.48	943	2.68	983	2.86
4500	770	1.89	821	2.15	871	2.37	915	2.61	955	2.82	995	3.01
4600	784	2.00	835	2.27	884	2.49	928	2.75	968	2.96	1006	3.17
4700	799	2.13	849	2.40	897	2.63	941	2.88	981	3.11	1018	3.32
4800	814	2.25	863	2.53	910	2.77	954	3.02	993	3.27	1030	3.48
4900	829	2.39	877	2.67	923	2.92	967	3.17	1006	3.43	1043	3.65
5000	843	2.52	892	2.81	937	3.08	980	3.32	1019	3.60	1055	3.82

AIRFLOW (Cfm)	BELT DRIVE MOTOR (cont)							
	External Static Pressure (in. wg)							
	1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	886	1.73	943	1.88	988	1.91	995	1.95
3100	892	1.78	947	2.00	995	2.05	1008	2.07
3200	899	1.85	951	2.06	1000	2.17	1021	2.20
3300	907	1.93	959	2.10	1004	2.33	1036	2.36
3400	915	2.01	966	2.17	1009	2.46	1043	2.47
3500	924	2.09	974	2.24	1015	2.51	1054	2.59
3600	933	2.18	983	2.32	1023	2.58	1058	2.70
3700	950	2.27	991	2.47	1030	2.65	1064	2.82
3800	959	2.38	1001	2.58	1040	2.78	1075	2.96
3900	969	2.50	1010	2.70	1049	2.91	1085	3.11
4000	979	2.62	1020	2.83	1059	3.04	1095	3.25
4100	989	2.74	1029	2.96	1068	3.18	1105	3.39
4200	1000	2.86	1039	3.10	1077	3.31	1114	3.54
4300	1011	2.97	1049	3.23	1087	3.46	1124	3.69
4400	1022	3.10	1059	3.37	1097	3.61	1133	3.84
4500	1033	3.23	1070	3.51	1107	3.76	1143	4.00
4600	1044	3.37	1081	3.64	1117	3.92	1152	4.17
4700	1056	3.52	1092	3.78	1127	4.07	1162	4.33
4800	1057	3.69	1103	3.93	1138	4.23	1172	4.50
4900	1079	3.87	1114	4.09	1149	4.37	1182	4.68
5000	1091	4.05	1126	4.25	1160	4.53	1193	4.85

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

1. **Boldface** indicates a field-supplied drive is required. (See Note 6.)
2. indicates field-supplied motor and drive are required.
3. Maximum continuous bhp is 4.20 with standard motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

4. Values include losses for filters, unit casing, and wet coils.
5. Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
6. Standard motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.
7. Interpolation is permissible. Do not extrapolate.

Table 8 — Fan Performance, 50HJQ008 — Horizontal Discharge Units

AIRFLOW (Cfm)	BELT DRIVE MOTOR									
	External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2250	465	0.43	554	0.64	630	0.86	695	1.09	757	1.34
2300	471	0.45	559	0.66	635	0.89	699	1.12	760	1.37
2400	482	0.50	569	0.71	645	0.95	708	1.18	768	1.44
2500	494	0.54	581	0.76	654	1.01	717	1.25	776	1.51
2550	501	0.57	587	0.79	659	1.05	722	1.29	780	1.55
2660	507	0.59	592	0.82	663	1.08	727	1.32	784	1.58
2700	520	0.65	604	0.89	672	1.14	737	1.40	793	1.66
2800	533	0.71	615	0.95	683	1.20	747	1.49	802	1.75
2900	546	0.77	626	1.02	693	1.27	756	1.57	813	1.84
3000	559	0.83	637	1.09	704	1.35	765	1.66	823	1.94
3100	572	0.90	648	1.17	715	1.43	775	1.74	832	2.05
3200	585	0.96	660	1.24	727	1.52	785	1.83	841	2.15
3300	598	1.03	671	1.32	739	1.62	795	1.91	851	2.26
3400	610	1.10	682	1.41	750	1.72	806	2.01	860	2.36
3500	623	1.17	694	1.50	761	1.82	817	2.11	870	2.47
3600	636	1.25	707	1.60	772	1.93	828	2.23	880	2.57
3700	649	1.33	720	1.71	783	2.03	840	2.35	890	2.69
3750	655	1.37	727	1.77	789	2.09	846	2.42	896	2.75

AIRFLOW (Cfm)	BELT DRIVE MOTOR (cont)									
	External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2250	810	1.62	850	1.91	873	2.20	883	2.50	895	2.78
2300	816	1.65	859	1.94	888	2.24	903	2.55	911	2.85
2400	824	1.72	872	2.01	909	2.32	931	2.64	935	2.96
2500	832	1.79	882	2.09	925	2.40	955	2.72	972	3.06
2550	836	1.83	887	2.13	931	2.45	964	2.77	986	3.11
2660	839	1.87	891	2.17	936	2.49	973	2.82	999	3.16
2700	846	1.95	898	2.26	946	2.58	987	2.91	1019	3.26
2800	855	2.04	906	2.35	954	2.67	997	3.01	1034	3.36
2900	863	2.13	913	2.44	961	2.77	1006	3.12	—	—
3000	872	2.22	921	2.54	969	2.88	1014	3.22	—	—
3100	882	2.33	930	2.65	976	2.99	1021	3.34	—	—
3200	892	2.45	939	2.76	984	3.10	—	—	—	—
3300	902	2.57	948	2.88	993	3.21	—	—	—	—
3400	912	2.69	958	3.01	1002	3.34	—	—	—	—
3500	921	2.82	968	3.15	—	—	—	—	—	—
3600	930	2.95	978	3.29	—	—	—	—	—	—
3700	940	3.07	—	—	—	—	—	—	—	—
3750	945	3.14	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

1. **Boldface** indicates a field-supplied drive is required. (See Note 6.)

2.  indicates field-supplied motor and drive are required.

3. Maximum continuous bhp is 2.90. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

4. Values include losses for filters, unit casing, and wet coils.

5. Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.

6. Standard motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive.

7. Interpolation is permissible. Do not extrapolate.

Table 9 — Fan Performance, 50HJQ012 — Horizontal Discharge Units

AIRFLOW (Cfm)	BELT DRIVE MOTOR									
	External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	459	0.35	595	0.74	657	0.88	716	1.05	770	1.24
3100	478	0.46	605	0.79	667	0.94	725	1.10	779	1.30
3200	500	0.57	615	0.85	679	1.01	734	1.16	787	1.36
3300	519	0.62	625	0.90	691	1.08	744	1.23	796	1.43
3400	537	0.69	637	0.97	702	1.16	753	1.30	805	1.50
3500	561	0.77	647	1.03	712	1.23	762	1.38	814	1.57
3600	592	0.86	658	1.10	721	1.30	773	1.47	823	1.65
3700	607	0.97	670	1.18	732	1.37	782	1.56	833	1.73
3800	621	1.05	681	1.25	742	1.45	795	1.66	842	1.82
3900	636	1.13	693	1.32	751	1.53	808	1.76	851	1.92
4000	650	1.21	705	1.40	761	1.61	819	1.86	861	2.02
4100	665	1.30	717	1.48	772	1.71	830	1.96	871	2.13
4200	680	1.39	728	1.57	783	1.81	839	2.05	883	2.25
4300	696	1.49	739	1.66	794	1.91	848	2.14	896	2.38
4400	711	1.60	750	1.75	805	2.02	857	2.24	908	2.51
4500	727	1.70	762	1.85	817	2.12	867	2.35	919	2.63
4600	742	1.82	774	1.96	828	2.23	877	2.46	929	2.75
4700	758	1.94	786	2.07	840	2.34	888	2.59	938	2.87
4800	773	2.06	799	2.18	852	2.46	899	2.72	947	2.98
4900	789	2.19	812	2.30	863	2.57	910	2.86	957	3.11
5000	805	2.32	826	2.43	875	2.70	921	2.99	966	3.24

AIRFLOW (Cfm)	BELT DRIVE MOTOR (cont)									
	External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	822	1.44	872	1.69	919	1.88	950	1.70	962	1.82
3100	829	1.50	882	1.73	932	2.00	965	1.80	971	1.95
3200	837	1.56	886	1.78	943	2.06	978	1.91	984	2.07
3300	845	1.63	892	1.85	947	2.10	988	2.05	995	2.20
3400	853	1.71	899	1.93	951	2.17	995	2.17	1008	2.32
3500	862	1.78	907	2.01	959	2.24	1000	2.33	1021	2.47
3600	871	1.86	915	2.09	965	2.32	1005	2.46	1036	2.59
3700	879	1.95	927	2.17	973	2.38	1013	2.57	1046	2.73
3800	889	2.03	934	2.26	980	2.48	1022	2.69	1058	2.87
3900	898	2.12	942	2.36	987	2.59	1030	2.81	1068	3.01
4000	908	2.21	950	2.46	994	2.70	1037	2.92	1077	3.14
4100	917	2.32	960	2.55	1001	2.81	1045	3.04	1085	3.21
4200	925	2.44	969	2.65	1009	2.92	1051	3.17	1092	3.40
4300	935	2.56	979	2.77	1018	3.03	1058	3.29	1100	3.53
4400	945	2.68	988	2.89	1028	3.14	1066	3.41	1106	3.67
4500	955	2.82	996	3.02	1037	3.25	1074	3.54	1113	3.81
4600	967	2.96	1005	3.16	1046	3.38	1084	3.66	1121	3.95
4700	980	3.11	1015	3.30	1056	3.52	1093	3.79	1129	4.09
4800	992	3.26	1025	3.45	1064	3.67	1103	3.92	1137	4.22
4900	1003	3.41	1036	3.61	1073	3.83	1112	4.07	1147	4.36
5000	1014	3.56	1049	3.79	1083	4.00	1121	4.23	1157	4.50

LEGEND

Bhp — Brake Horsepower Input to Fan

NOTES:

1. **Boldface** indicates a field-supplied drive is required. (See Note 6.)
2. indicates field-supplied motor and drive are required.
3. Maximum continuous bhp is 4.20. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

4. Values include losses for filters, unit casing, and wet coils.
5. Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
6. Standard motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.
7. Interpolation is permissible. Do not extrapolate.

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 Table 1). 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 5 Schrader-type service gage ports: 2 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 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 (006 and 007 3-phase units only).
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. Units are equipped with Cycle-LOC™ protection device. Unit shuts down on any safety trip and remains off; an indicator light on the thermostat comes on. Check reason for safety trip.

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), 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) is energized and compressor no. 2 starts.

HEATING, UNITS WITHOUT ECONOMIZER — Upon a call for heating through terminal W1, IFC, OFC, 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 VARISLIDE™ 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. 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. 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 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 55 F or the damper reaches the fully open position.

When the supply-air temperature is between 55 F and 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 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 55 F or the damper reaches the minimum position.

When the supply-air temperature is between 55 F and 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 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.

COOLING, UNITS WITH PARABLADE ECONOMIZER — When the outdoor air is above the enthalpy control setting, and the room thermostat calls for cooling, the compressor contactor no. 1 is energized to start compressor no. 1 and the outdoor fan motors. The indoor fan motor is energized and the economizer damper moves to the minimum position. Upon further call for cooling, compressor contactor no. 2 is energized, starting compressor no. 2. After the room thermostat is satisfied the damper will spring return to the fully closed position.

When the outdoor air is below the enthalpy control setting and the thermostat calls for cooling, the economizer outdoor air damper is opened proportionally to maintain between 50 and 56 F at the mixed air sensor. If outside air alone cannot satisfy the cooling requirements, economizer cooling is integrated with mechanical cooling and the second compressor is locked out. When the room thermostat is satisfied, the damper will spring return to the fully closed position.

HEATING, UNITS WITH ECONOMIZER (If Accessory Heater is Installed) — When the room thermostat calls for heat through terminal W1, the indoor-fan contactor outdoor fan contactor, C1, and C2 are energized. On units equipped for 2 stages of heat, when additional heat is needed, heater contactor is energized through W2. The indoor-fan motor is energized, and the economizer damper moves to the minimum position. If the two-position damper is used, the outdoor-air damper opens to the minimum position whenever the indoor fan opens. When the thermostat is satisfied, the damper moves to the fully closed position.

DEFROST — When the temperature of the outdoor coil drops below 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 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. 14 or 15). 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 condenser coils annually, and as required by location and outdoor-air conditions.

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. 30. To hold top panel open, place coil corner post between top panel and center post. See Fig. 31.
4. Remove device holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 3 to 4 in. from the inner coil section. See Fig. 32.

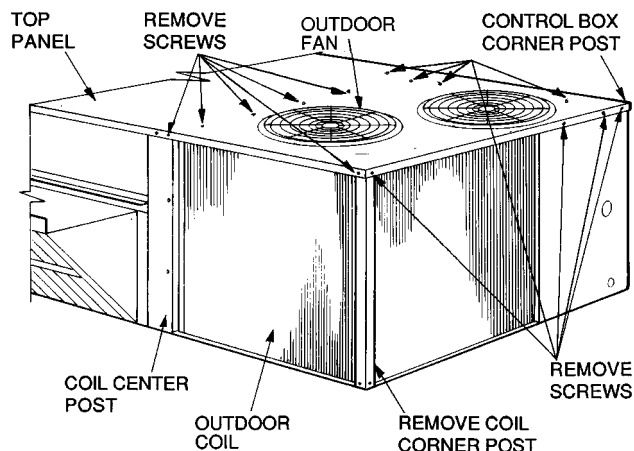


Fig. 30 — Cleaning Outdoor Coil

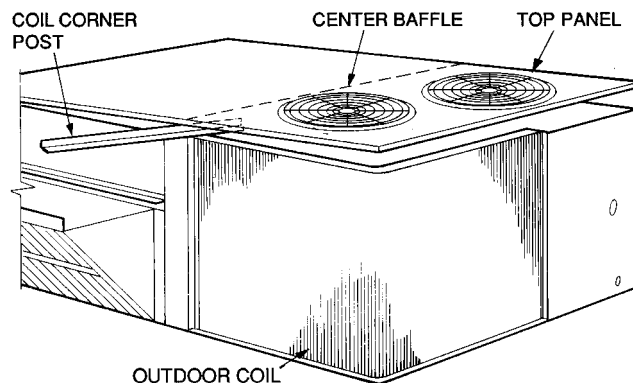


Fig. 31 — Propping Up Top Panel

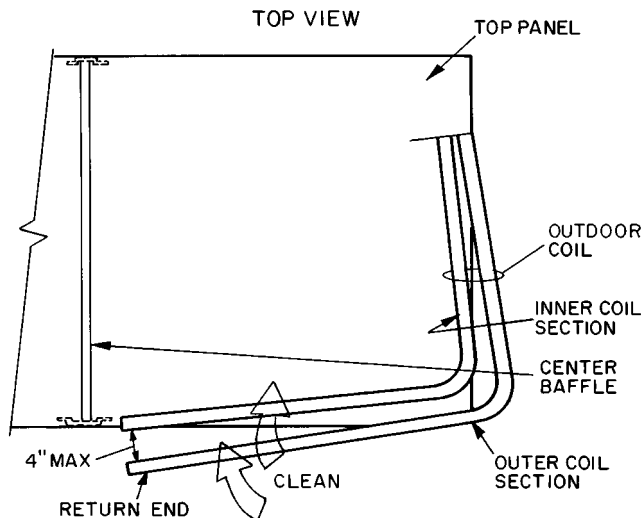


Fig. 32 — Separating Coil Sections

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.

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. 33)

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. 33.
4. Tighten setscrews and replace outdoor-fan assembly.

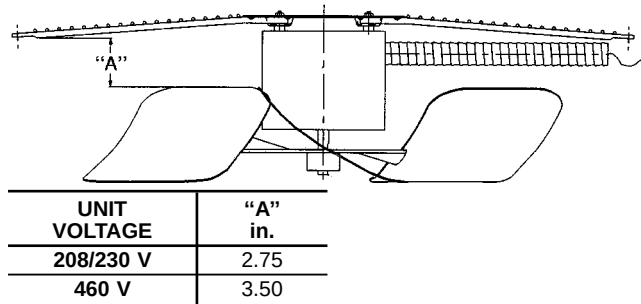


Fig. 33 — Outdoor Fan Adjustment

Economizer Adjustment — Refer to Optional Economizer sections on pages 9 and 13.

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate (also refer to Table 1). 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 Table 1).

LOW CHARGE COOLING — Use Cooling Charging Charts, Fig. 34 and 35. 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. 34)

Outdoor Temperature 85 F
 Suction Pressure 70 psig
 Suction Temperature should be 51 F
 (Suction Temperature may vary $\pm 5^\circ$ F.)

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

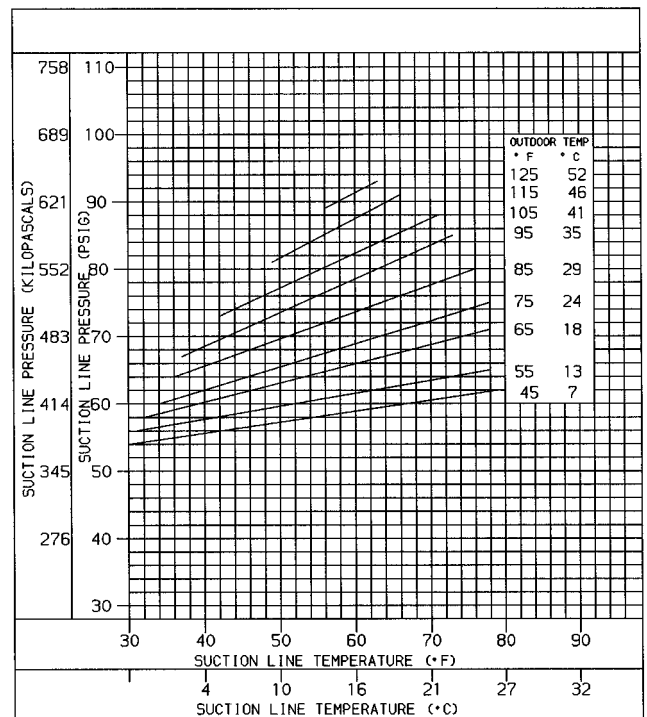


Fig. 34 — Cooling Charging Chart, 50HJQ008

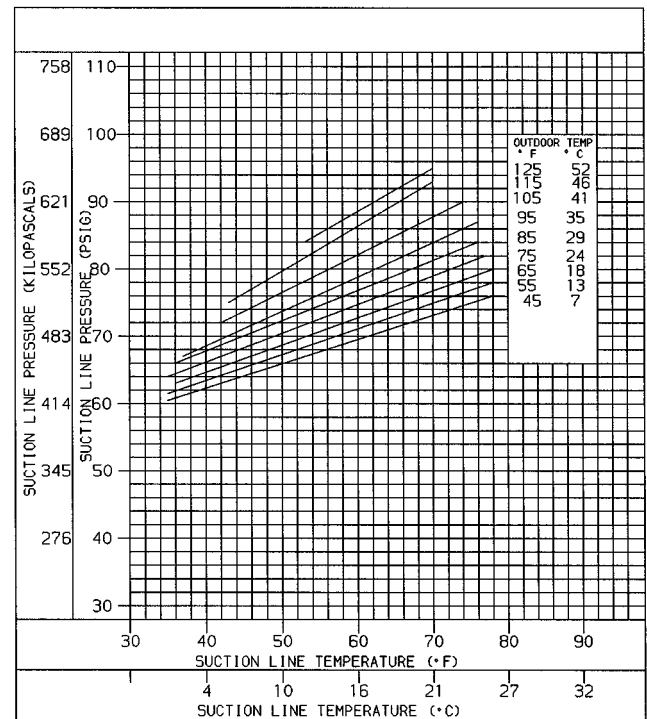


Fig. 35 — Cooling Charging Chart, 50HJQ012

TROUBLESHOOTING

Table 10 — 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.
Scroll compressor makes excessive noise	Outdoor coil dirty or restricted.	Clean coil or remove restriction.
	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.
	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 25 F.	Install low-ambient kit.
Compressor no. 2 will not run.	Unit in economizer mode.	Proper operation; no remedy necessary.

Table 11 — Varislide™ 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 (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 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 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

Table 12 — PARABLADE Economizer Troubleshooting

PROBLEM	CAUSE	REMEDY
Damper does not open.	Indoor fan not on.	Check wiring between G on connection board and indoor fan contactor.
	No power to economizer motor.	1. Disconnect power at TR and TR1. Disconnect jumper across P and P1. 2. Connect jumper across TR and 1. 3. Connect jumper across T1 and T. 4. If connected, remove enthalpy sensor from terminals S_O and +. 5. Apply power (24 vac) to terminals TR and TR1. The LED should be off and the damper should be in the closed position. 6. Disconnect the factory-installed 620 ohm resistor from terminals S_R and +. The LED should light up and the motor should drive towards open. If this does not happen, replace the economizer control module.
	Economizer motor failure.	If the indoor fan and economizer motor are energized, verify that there is a minimum of 24 vac at terminals TR and TR1. If the motor is not operating, replace the motor.
Economizer operation limited to minimum position.	Economizer control module failure.	1. To simulate high or low enthalpy, reconnect the factory-installed 620 ohm resistor across terminals S_R and +. 2. Connect 1.2 Kohm checkout resistor across terminals S_O and +. Turn the enthalpy set point to "A." The LED should turn on, indicating low enthalpy. The motor should drive towards open. If LED does not light, replace module. If motor does not drive open, check motor operation. 3. Turn the enthalpy set point to "D." The LED should turn off, indicating high enthalpy. The motor should drive towards closed. If these actions do not occur, replace module. 4. Disconnect 1.2 Kohm checkout resistor before resuming operation.
Damper does not close.	No power to economizer.	1. Disconnect power at TR and TR1. Disconnect jumper across P and P1. 2. Connect jumper across TR and 1. 3. Connect jumper across T1 and T. 4. If connected, remove enthalpy sensor from terminals S_O and +. Factory-installed 620 ohm resistor should be connected to terminals S_R and +. 5. Apply power (24 Vac) to terminals TR and TR1. The LED should be off and the damper should be in the closed position. 6. Disconnect the factory-installed 620 ohm resistor from terminals S_R and +. The LED should light up and the motor should drive towards open. If this does not happen, replace the economizer control module.
	Spring return failure.	If power to unit is off and damper does not close, check for a bound linkage. If linkage is not bound, then internal spring may be broken. Replace actuator.
	Economizer motor failure.	If the economizer control module is functioning properly, verify that there is a minimum of 24 vac at terminals TR and TR1. If the motor is not operating, replace the motor.
Damper does not open or close according to enthalpy readings.	Sensor incorrectly wired or bad.	To verify sensor operation, reconnect the + lead of the outdoor enthalpy sensor to the + terminal of the economizer control module. Connect a DC milliammeter between terminals S _O of the economizer control module and terminal S of the enthalpy sensor. The milliammeter should indicate between 3 and 25 mA if the sensor is operating properly. If the milliammeter indicates 0, the sensor may be wired backwards. If any other readings are shown, replace the sensor.

LED — Light-Emitting Diode

PACKAGED SERVICE TRAINING

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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	_____					

TEMPERATURES

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

PRESSURES

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

- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR IS ROTATING IN CORRECT DIRECTION
- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS ON PAGE 23.

CUT ALONG DOTTED LINE