Installation, Start-Up and Service Instructions

CONTENTS

	Page
SAFETY CONSIDERATIONS	1
INSTALLATION	1-11
Step 1 – Provide Unit Support	1
• ROOF CURB	
• SLAB MOUNT	
Step 2 – Field Fabricate Ductwork	1
Step 3 – Determine Location of Drain Connection for Internally Trapped Condensate Drain	3
Step 4 – Rig and Place Unit	3
Step 5 – Make Electrical Connections	3
• FIELD POWER SUPPLY	
• FIELD CONTROL WIRING	
• HEAT ANTICIPATOR SETTINGS	
Step 6 – Make Outdoor Air Inlet Adjustments and Install Outdoor Air Hood	8
• OPTIONAL OUTDOOR AIR DAMPER	
• OPTIONAL ECONOMIZER	
Step 7 – Adjust Evaporator Fan Speed	10
START-UP	12
SERVICE	14,15

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 discharge configuration. To convert to horizontal discharge configuration, remove horizontal duct opening covers. Using the same screws, install covers with insulation located outside the unit on vertical duct openings. 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 and flashing as shown. *Ductwork must be attached to curb.* If electric power or control power are to be routed through the curb, attach the accessory thru-the-curb service connection plates to the roof curb in accordance with the accessory installation instructions. Connection plates must be installed before unit is set on roof curb.

IMPORTANT: The gasketing of the unit to the roof curb is critical for water integrity. Install gasketing material supplied with the roof curb as shown in Fig. 1. Improperly applied gasketing 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 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 Fabricated 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 duct openings and all ductwork should be attached to the flanges. Insulate and weatherproof all external ductwork, joints and roof openings with 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 25 mm (1.0 in.) is required for the first 305 mm (12 in.) of ductwork. Cabinet return air static shall not exceed -87 Pa (-35 in. wg) with economizer or -112 Pa (-45 in. wg) without economizer.

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

ROOF CURB ACCESSORY	A	UNIT SIZE
50DJ900771	1'-2" (356)	50DJ007

SERVICE PLATE SIZES			
Unit Size	"F" Power	"G" Control	Connector Pkg Acy.
50DJ007	¾" (19) or 1¼" (31 7)	¾" (19)	50DJ900801

NOTE:

1 Roof curb accessory is shipped disassembled
2 Dimensions in parentheses are in millimeters
3 Roof curb is 16-gage steel
4 Attach ductwork to curb Flanges of duct rest on curb
5 Service clearance is 1219 mm (4 ft) each side.
6 Direction of air flow
7 Control and power service plates are part of a separately shipped accessory package

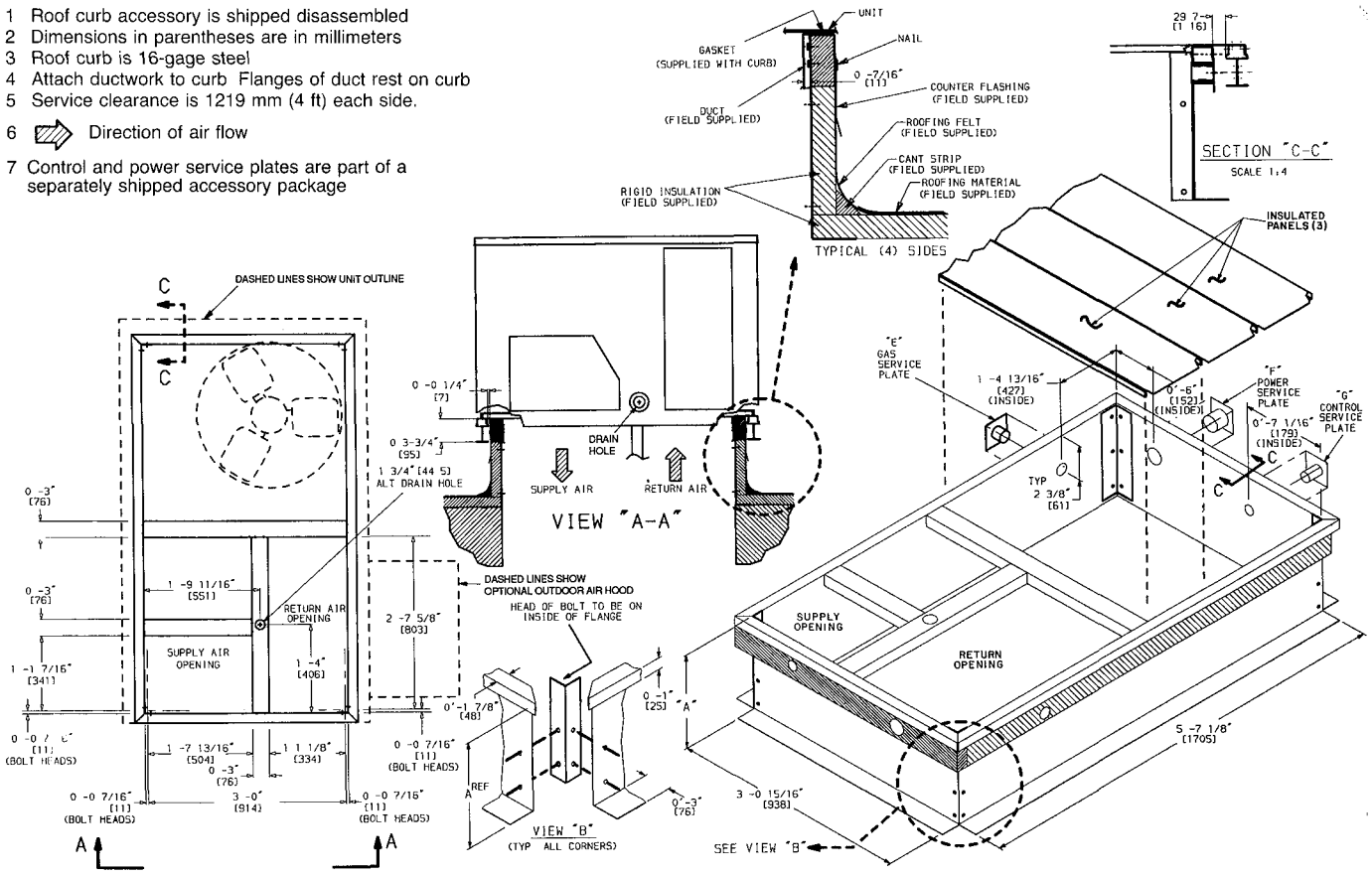
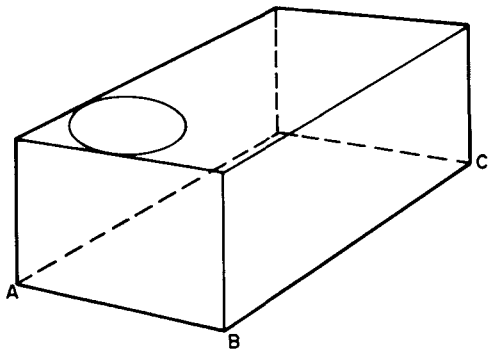


Fig. 1 — Roof Curb Details



MAXIMUM ALLOWABLE DIFFERENCE

A-B		B-C		A-C	
mm	in.	mm	in.	mm	in.
13	.5	25	1.0	25	1 0

Fig. 2 — Unit Leveling Tolerance

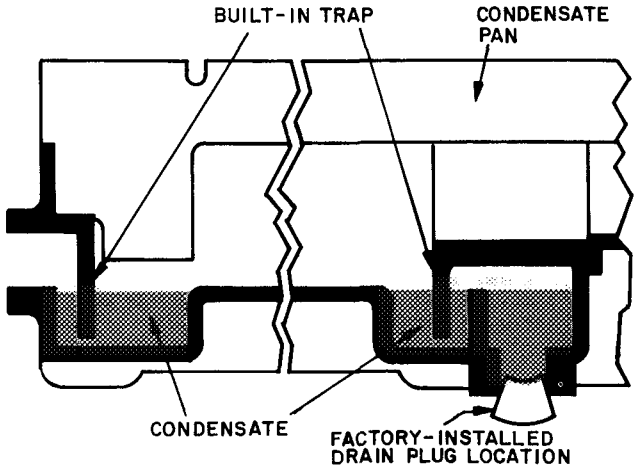


Fig. 3 — Internally Trapped Condensate Drain

Step 3 — Determine Location of Drain Connection for Internally Trapped Condensate Drain (Fig. 3) —

Units have internally trapped condensate drains. The condensate can be drained through a drain in the bottom of the condensate pan, or through the side panel. A drain plug is shipped installed in the basepan drain connections. If condensate is to be drained through the bottom of the unit, the plug must be relocated to the side panel drain connection before unit is placed on the roof curb. The piping for the condensate can be completed after the unit is in place. Unit discharge connections do not determine the location of drain connections. Both side panel and basepan drains may be used with either vertical or horizontal units.

IMPORTANT: The condensate pan is internally trapped. An external trap is not required and should not be installed. If an external trap is attached, water may leak into building.

Step 4 — Rig and Place Unit —

Inspect unit for transportation damage. File any claim with transportation agency. Keep 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. 4 for additional information. Weight is shown in Table 1 and Fig. 4.

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

POSITIONING — Maintain clearance around and above unit to provide proper airflow and service access. See Fig. 5. A properly positioned unit will have the following clearances: 6.35 mm (¼ in.) clearance between roof curb and base rails on each side and front of unit; 82.5 mm (3¼ in.) clearance between roof curb and rear of unit.

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

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

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

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.

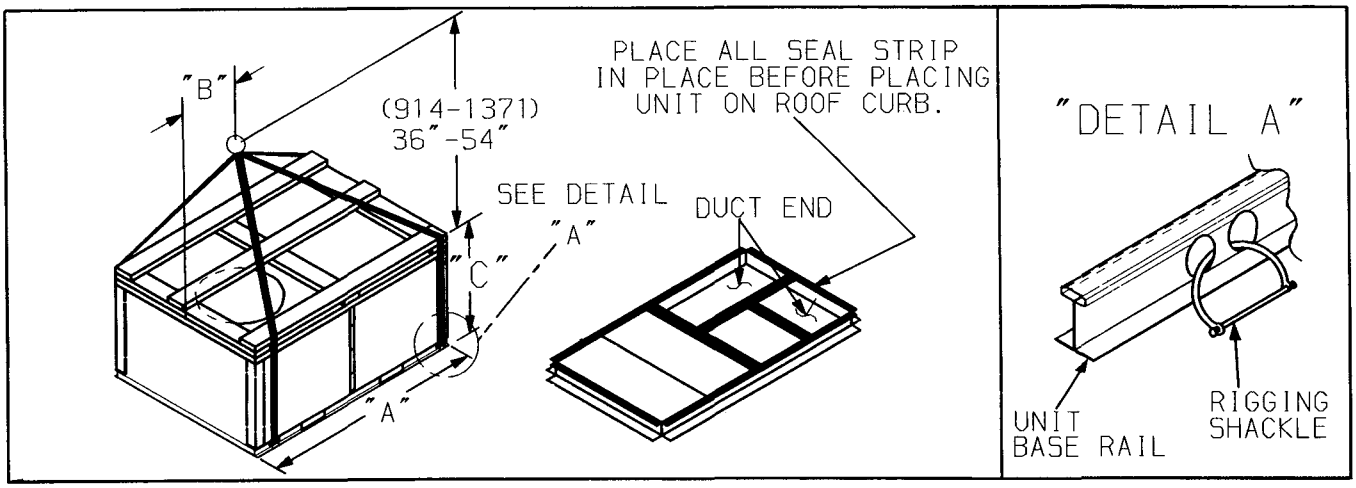
FIELD POWER SUPPLY — Pigtails are provided for field wire connections. Use factory-supplied splices or copper/aluminum connector.

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

Install conduit connectors in side panel openings. For units without electric heat, install conduit between disconnect and control box. Install power lines to terminal connections as shown in Fig. 6. For units with electric heat, refer to Table 2 to determine appropriate power wiring figure (Fig. 7 and 8) and route power lines as indicated in appropriate figure.

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate (also see Table 2). On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in the notes following Table 2 to determine the % 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 warranty.

When electric heat is installed, remove knockouts for appropriate size conduit from unit block-off panel and single point box. Install conduit (rigid or electro-metallic tubing) through conduit drip boot as shown in Fig. 9 and 10. Drip boot eliminates the need for water tight conduit fittings at the single point box.



NOTES:
1. Dimension in parentheses is in millimeters.
2. Hook rigging shackles through holes in base rails, 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.

⚠ CAUTION

All panels must be in place when rigging.

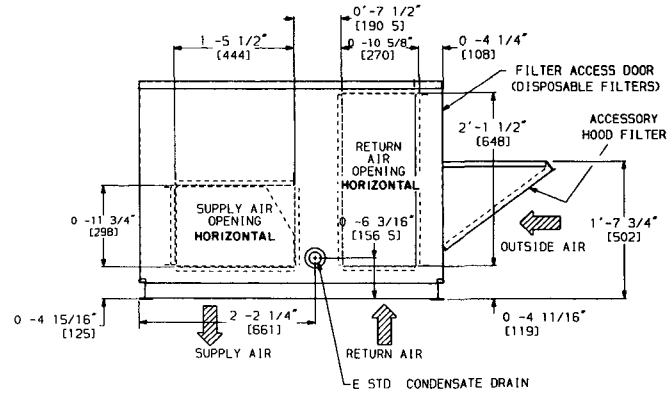
UNIT	MAX UNIT WEIGHT		DIMENSIONS					
			A		B		C	
	lb	kg	in.	mm	in.	mm	in.	mm
50DJ007	570	259	73.69	1872	33 00	838	32.52	826

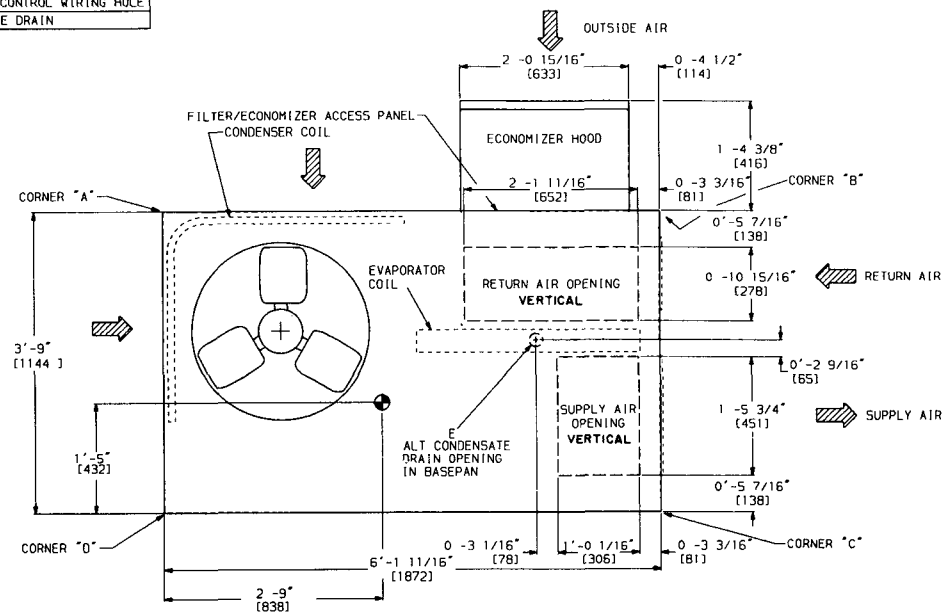
Fig. 4 — Rigging Details

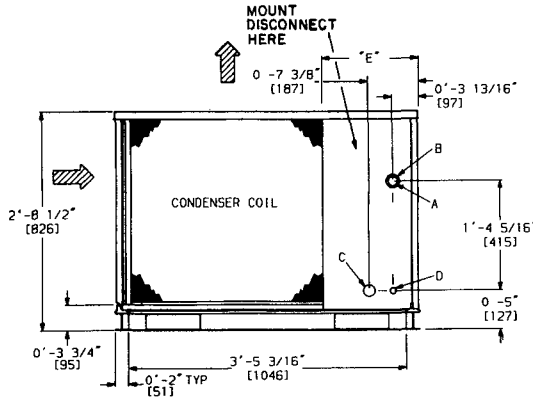
UNIT	STD. UNIT WEIGHT		ECONOMIZER WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		"E"	
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	FT.-IN.	MM
50DJ007	520	236	18	8.2	108	49.0	88	40.0	145	65.8	178	80.7	1 -1 1/4	362

NOTES:
1 Dimensions in ( ) are in millimeters.
2. Center of Gravity
3 Direction of air flow.
4. Ductwork to be attached to accessory roof curb only
5. Service clearance 1.2 m (4 ft) on all five sides
6. Refer to print for roof curb accessory dimensions.
7 Filter must be located in return duct on horizontal return applications.

	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2" DIA. [50.5] POWER SUPPLY KNOCK-OUT
C	2 3/16" DIA. [55] CHARGING PORT HOLE
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN







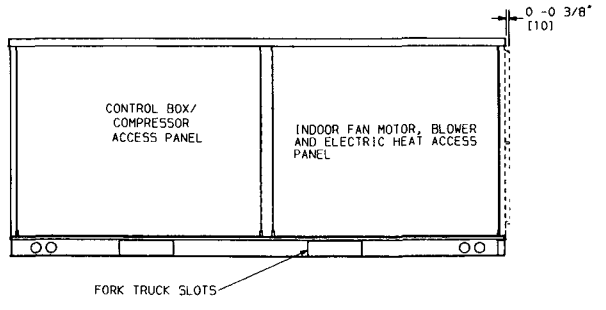


Fig. 5 – Base Unit Dimensions

Table 1 – Physical Data

BASE UNIT, 50DJ007	SI METRIC		ENGLISH	
NOMINAL CAPACITY	kW	20.5	tons	6
OPERATING WEIGHT	kg		lb	
Unit		236		520
With Economizer		250		550
Roof Curb		52		115
COMPRESSOR (Hermetic)				
Manufacturer		Carlyle		Carlyle
Qty...Type		1...W72		1 ..W72
Oil	g	1814	oz	64
REFRIGERANT (R-22)				
Operating Charge	kg	4.08	lb-oz	9-0
CONDENSER FAN (Propeller Type)				
Qty...Diameter	mm	1. .660	in.	1...26.0
Nominal Airflow	l/s	1790	cfm	3800
Motor Output...Speed	bkW...r/s	.37...14.2	hp...rpm	½.. 850
CONDENSER COIL*				
Rows...Fins	/m	2...669	/in.	2.. 17
Total Face Area	sq. m	1.14	sq. ft	12 25
EVAPORATOR FAN (Centrifugal Type)				
Size (Diameter x Width)	mm	254 x 254	in.	10 x 10
Type Drive		Belt		Belt
Nominal Airflow	l/s	1130	cfm	2400
Motor Output	bkW	1.12	hp	1.5
Motor Frame		56		56
Fan Speed Range (min/max)	r/s	15.7/20.2	rpm	940/1210
Maximum Fan Speed	r/s	35 0	rpm	2100
Motor Pulley Pitch				
Diameter A/B	mm	86/112	in.	3.4/4.4
Fan Pulley Pitch				
Diameter	mm	132	in.	5 2
Belt: Type...Length	mm	A 109	in.	A 43
Movable Pulley Maximum Full Turns				
From Closed Position		5		5
Factory Setting – Full Turns Open		5		5
Factory Speed Setting	r/s	15 7	rpm	940
EVAPORATOR COIL†				
Rows...Fins	/m	4 ..590	/in.	4.. 15
Total Face Area	sq. m	0.51	sq. ft	5.5
HIGH-PRESSURE SWITCH SETTING	kPa		psig	
Cutout		2951		428
Reset		2206		320
LOW-PRESSURE SWITCH SETTING	kPa		psig	
Cutout		186 ± 28		27 ± 4
Reset		462 ± 48		67 ± 7
OUTSIDE AIR INLET SCREENS**				
Qty...Size	mm	1 . 508 x 610 x 25	in.	1...20 x 24 x 1
RETURN AIR FILTERS††				
Qty...Size	mm	2...406 x 535 x 51	in.	2...16 x 25 x 2

* Enhanced copper tubes, aluminum lanced fins

† Enhanced copper tubes, aluminum double-wavy fins

** Cleanable

†† Disposable

Table 2 — Electrical Data

UNIT	NOMINAL VOLTAGE (v-Ph-Hz)	VOLTAGE RANGE		COMPR		OFM	IFM		ELECTRIC HEAT		POWER SUPPLY		ELECTRIC HEAT POWER WIRING FIGURE NO.
		Min	Max	RLA	LRA	FLA	Hp	FLA	Nominal kW	FLA	MCA	MOCP*	
50DJ007	230-3-50	198	254	18.2	126	2.1	1 5	5.8	—	—	30.7	40	—
									6.5†	15.7	30.7	40	7
									10.5	25.3	38.8	40	7
									16.0	38.2	55.0	60	7
									21.0	50.2	70 0	70	8
									26.5†	63 7	86.9	90	8
	400-3-50	342	440	10.4	69	2.1	1.5	3.2	—	—	18.3	25	—
									4.2†	6.1	18.3	25	7
									8.0	11.5	18.4	25	7
									9.7	14.0	21.5	25	7
									16.0	23.1	32.9	35	7
									17.7†	25.6	36.0	40	7

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

*Fuse or HACR circuit breaker.
†Heaters are field-installed only.

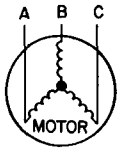
NOTES:

1. MCA and MOCP values are calculated in accordance with National Electric Code (NEC; USA), Article 440
2. Motor RLA and FLA values are established in accordance with Underwriters Laboratories (UL) Standard 465
3. **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 % 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 volts
BC = 403 volts
AC = 396 volts

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

$$= \frac{1192}{3} = 397$$

Determine maximum deviation from average voltage

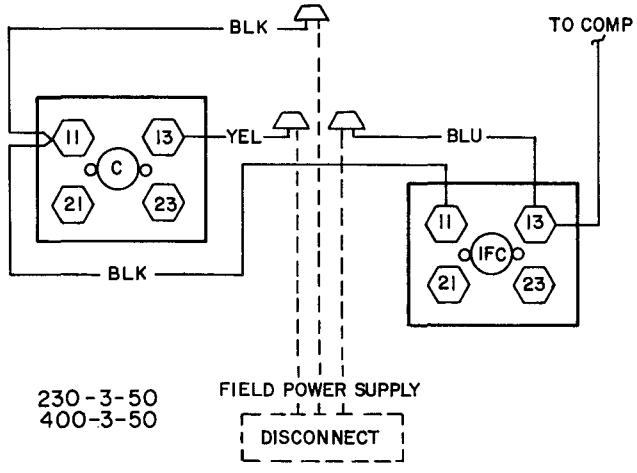
(AB) 397 – 393 = 4 volts
(BC) 403 – 397 = 6 volts
(AC) 397 – 396 = 1 volt

Maximum deviation is 6 volts.
Determine % voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{6}{397} = 1.5\%$$

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

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



LEGEND:
C — Compressor Contactor
IFC — Indoor Fan Motor Contactor

Fig. 6 — Power Wiring Connections (without electric heat)

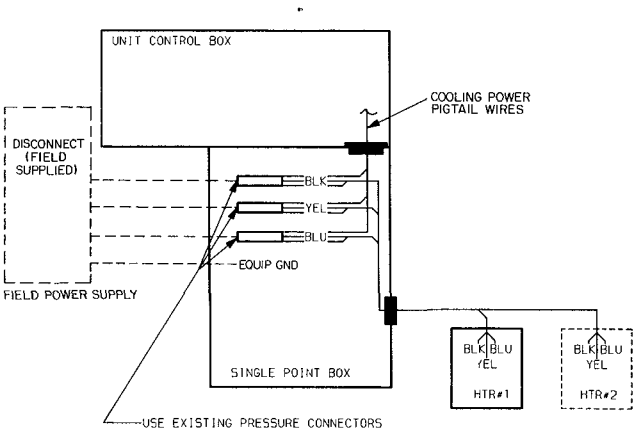


Fig. 7 — Electric Heater Power Wiring Connections — 230-3-50, 400-3-50 Units; Single Point Kit 50DJ901261

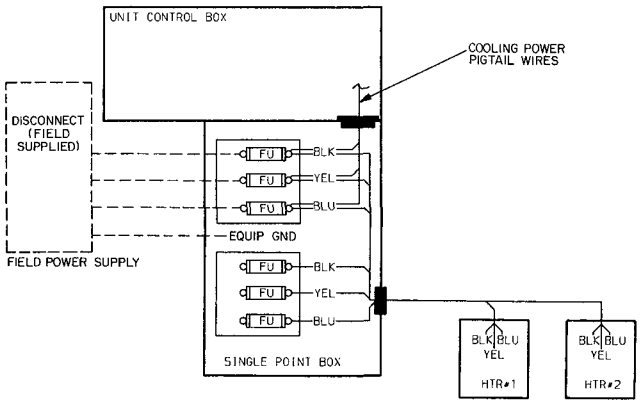


Fig. 8 — Electric Heater Power Wiring Connections — 230-3-50 Units; Single Point Kit 50DJ901271

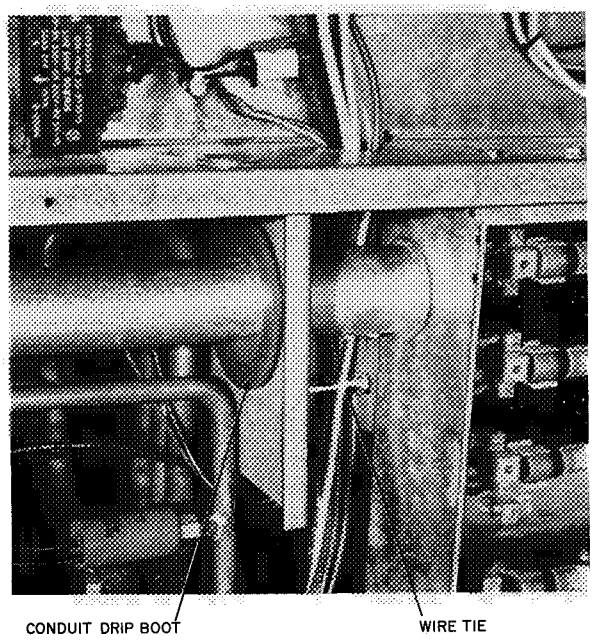


Fig. 9 — Conduit Installation

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.

Route thermostat cable or equivalent single leads of colored wire from subbase terminals through bushing on unit to low-voltage connections as shown in Fig. 11.

Connect thermostat wires to screw terminals of low voltage connector. The connector plugs into the control board and may be removed to make connection. Plug connector back into control board or unit will not operate.

NOTE: For wire runs up to 15.2 m (50 ft), use no. 18 AWG insulated wire (35 C minimum). For 15.2 to 22.9 m (50 to 75 ft), use no. 16 AWG insulated wire (35 C minimum). For over 22.9 m (75 ft) no. 14 AWG insulated wire (35 C minimum).

Pass the control wires through the hole provided in the corner post; then 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. 12. The raceway provides the required clearance between the high and low voltage wiring.

HEAT ANTICIPATOR SETTINGS — Set first-stage heat anticipator settings at .8 and set second-stage heat anticipator settings at .3.

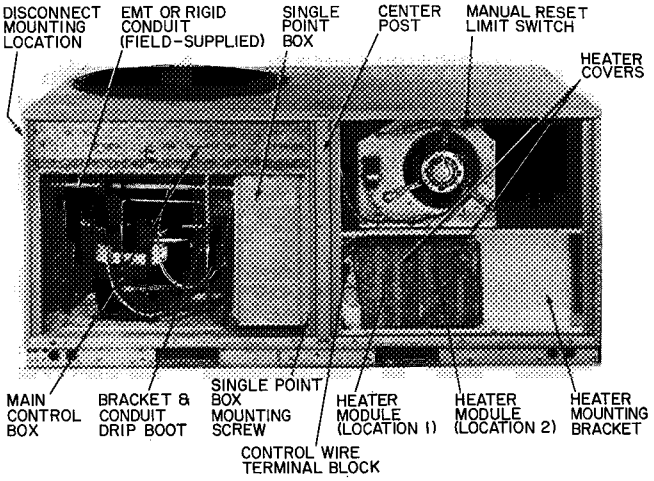


Fig. 10 — Component Location

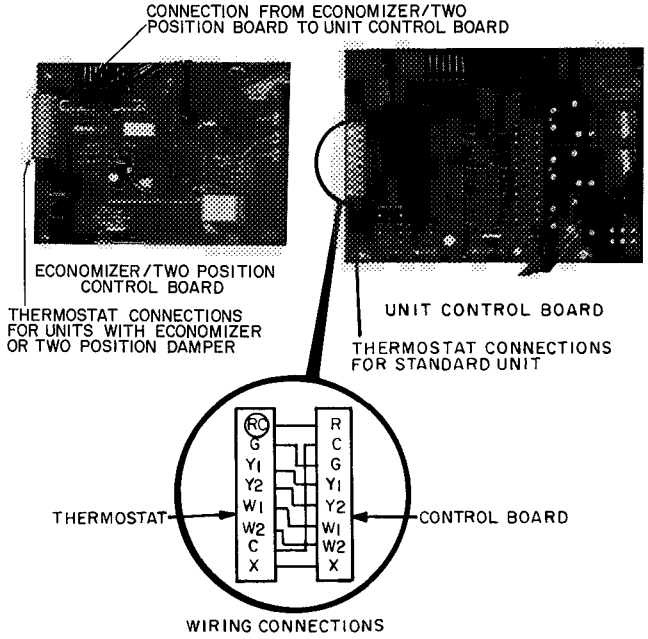


Fig. 11 — Control Wiring Connections

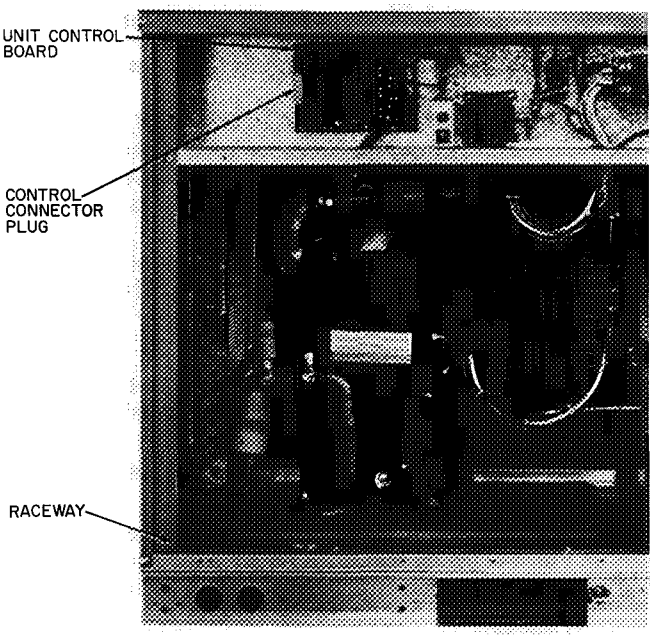


Fig. 12 — Field Control Wiring Raceway

Step 6 — Make Manual Outdoor Air Inlet Adjustments and Install Outdoor Air Hood

OPTIONAL OUTDOOR AIR DAMPER — Optional Manual outdoor air damper hood is packaged and shipped strapped to the air filter tracks in the filter section. See Fig. 13.

NOTE: Horizontal discharge blockoff plate is shipped with the air hood. If unit is to be used for vertical discharge applications, discard this panel.

Assembly

1. Remove evaporator coil access panel. Save panel and screws. See Fig. 13.
2. Assemble outdoor air hood top and side plates as shown in Fig. 14. Install seal strips on hood top and sides. Put aside screen retainer and retainer screws for later assembly. *Do not attach hood to unit at this time.*
3. Remove block-off panel from evaporator coil access panel and discard. Save screws. See Fig. 13.
4. Adjust ventilation air position setting of the outdoor damper blade by adjusting the screws on the ventilation air position bracket to the position determined by Fig. 15. Tighten screws. (Fig. 16)
5. Fasten hood top and side plate assembly (Fig. 17) to unit with screws saved from step 4.
6. 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. (Fig. 17).

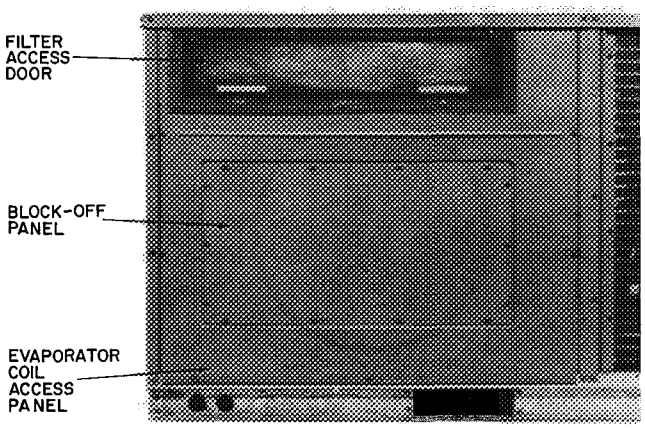


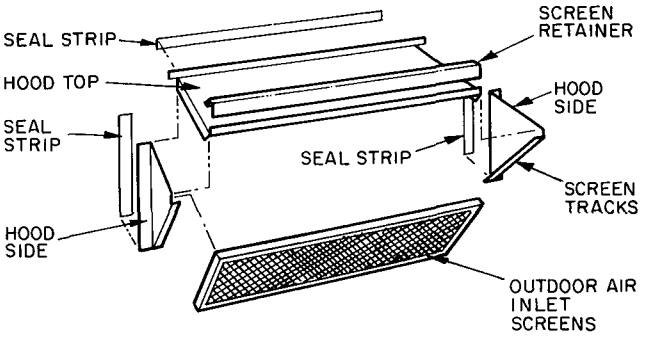
Fig. 13 — Access Panel Location

OPTIONAL ECONOMIZER/TWO-POSITION DAMPER — The economizer/two-position damper hood 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.

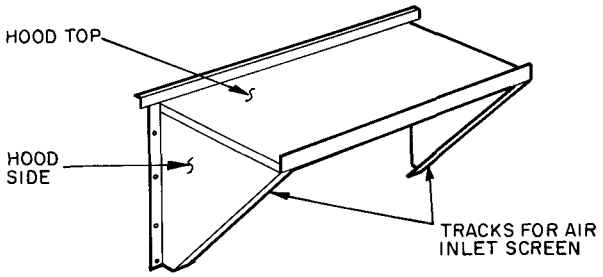
NOTE: Horizontal discharge block-off plate is shipped with the air hood. If unit is to be used for vertical discharge application, discard this panel.

Assembly

1. Determine if ventilation air is required in building. If so, record quantity of ventilation air needed for use in step 7.
2. Remove evaporator coil access panel. Save panel and screws. See Fig. 13.
3. Assemble outdoor air hood top and side plates as shown in Fig. 14. Install seal strips on hood top and sides. Put aside screen retainer and retainer screws for later assembly. *Do not attach hood to unit at this time.*
4. Remove block-off panel from evaporator coil access panel and discard. Save screws. See Fig. 13.

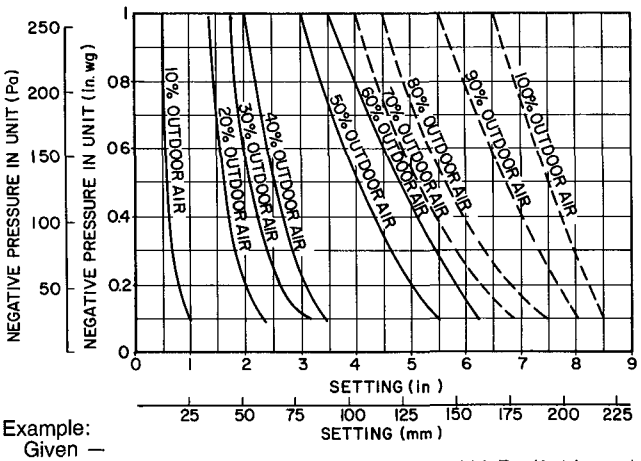


OUTDOOR AIR HOOD - UNASSEMBLED



HOOD SIDES AND TOP ASSEMBLED

Fig. 14 — Outdoor Air Hood Details



Example:
Given —
Negative Pressure ..... 100 Pa (0 4 in. wg)
Outdoor Air 20%
Determine Setting ..... 43 mm (1.7 in.)

Fig. 15 — Ventilation Air Position Setting

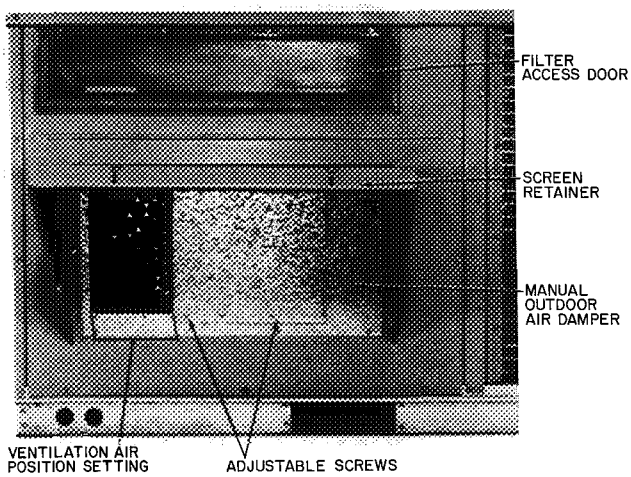


Fig. 16 — Manual Outdoor Air Damper

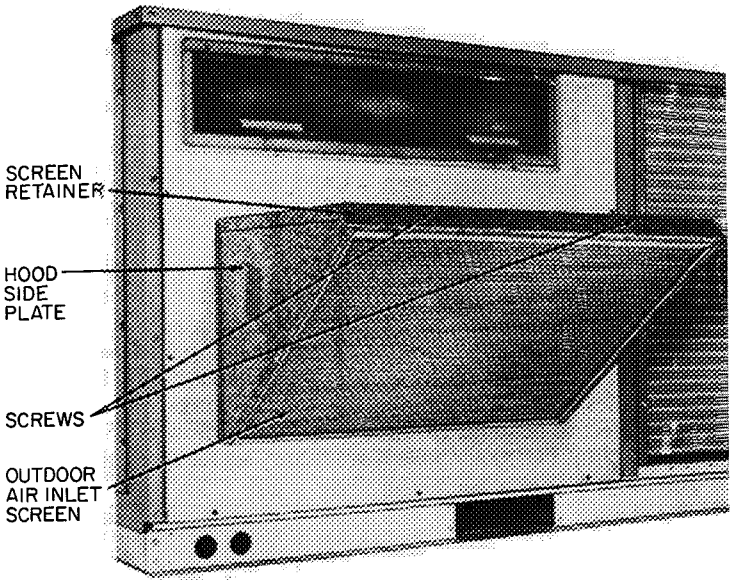


Fig. 17 — Air Hood Details

5. Slide economizer/two-position damper into unit and secure with screws. See Fig. 18.
   To convert to horizontal discharge:
   a. Rotate economizer/two-position damper 90 degrees until the economizer motor faces the condenser section. (See Fig. 19.)
   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.)

IMPORTANT: Filters must be field installed outside the unit on horizontal discharge applications with economizer or two-position damper. The area of the field-installed filters should be equal to the area of the factory installed filters.

6. Insert economizer/two-position damper into economizer/two-position damper harness. Remove tape from barometric relief damper. See Fig. 18.
7. If ventilation air is not required, proceed to step 8. If ventilation air is required, determine minimum position setting for required airflow. See Fig. 20.
   Adjust minimum position setting by adjusting the screws on the minimum position bracket. Slide bracket until the top screw is in the position determined by Fig. 20. Tighten screws. See Fig. 18.
8. Remove tape from Outdoor Air Thermostat (OAT.). Fasten OAT. to inside of economizer hood, using screws and speed clips provided. See Fig. 21. Make sure OAT. terminals are up.
9. Replace evaporator coil access panel with screws saved from step 2.
10. Fasten hood top and side plate assembly (Fig. 14) to unit with screws saved from step 4.
11. Place knob supplied with economizer on OAT.. See Fig. 21. Set for 3 degrees below indoor room thermostat setting. If accessory enthalpy control (EC) is used in lieu of OAT., see instructions shipped with enthalpy control for installation and adjustment. See Fig. 21.
12. Connect OAT. per Fig. 22.

13. Slide outdoor air inlet screen into screen track on hood side plates. While holding screen in place, fasten screen retainer to hood using screws provided.

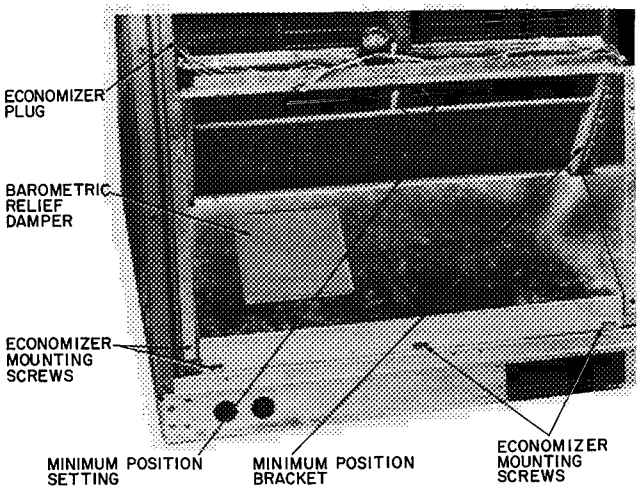


Fig. 18 — Economizer/Two-Position Damper Installed in Unit

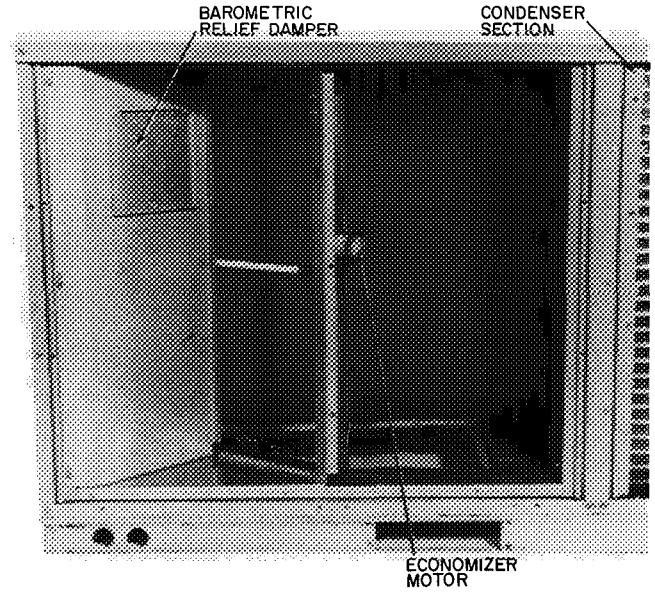
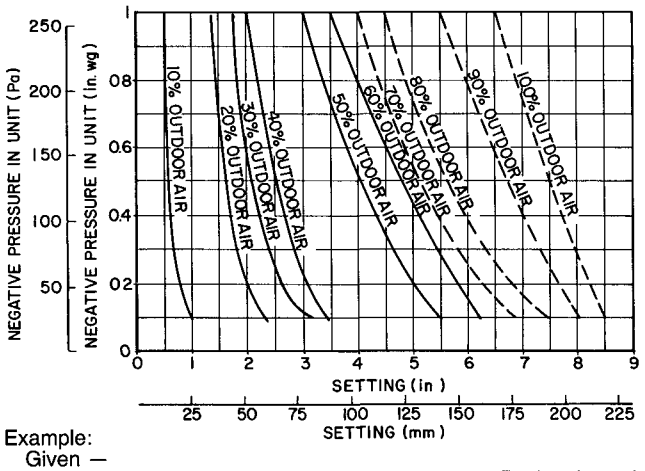
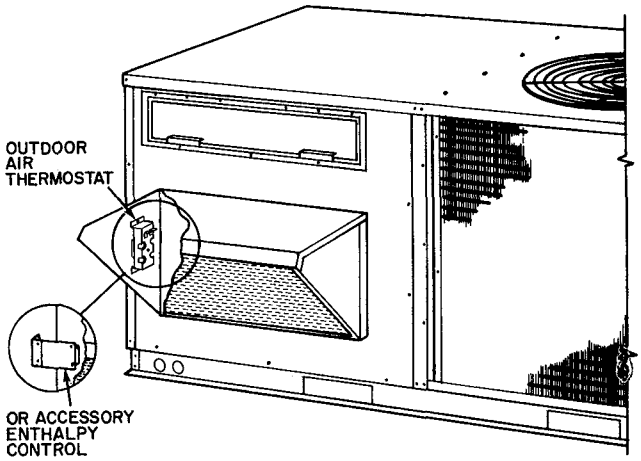


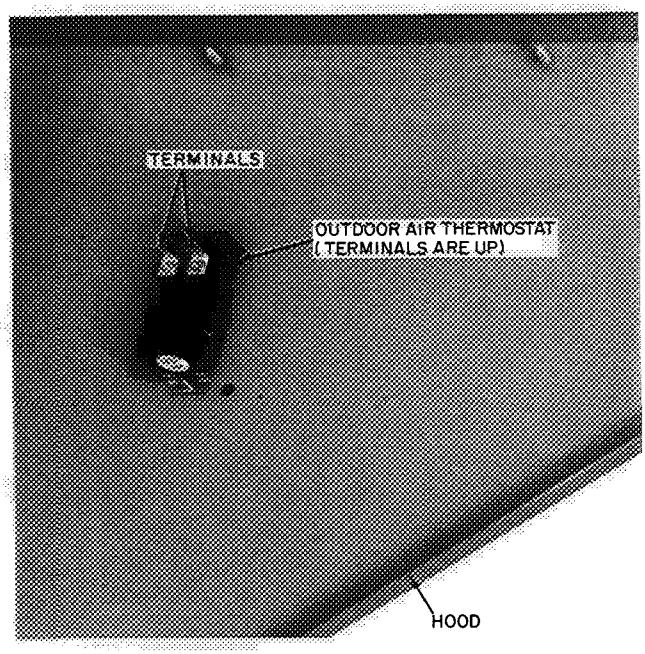
Fig. 19 — Economizer/Two-Position Damper Installation for Horizontal Discharge Applications



Example:
Given —
Negative Pressure..... .... 100 Pa (0.4 in. wg)
Outdoor Air 20%
Determine Setting. . . .. 43 mm (1 7 in.)

Fig. 20 — Economizer Minimum Position Setting





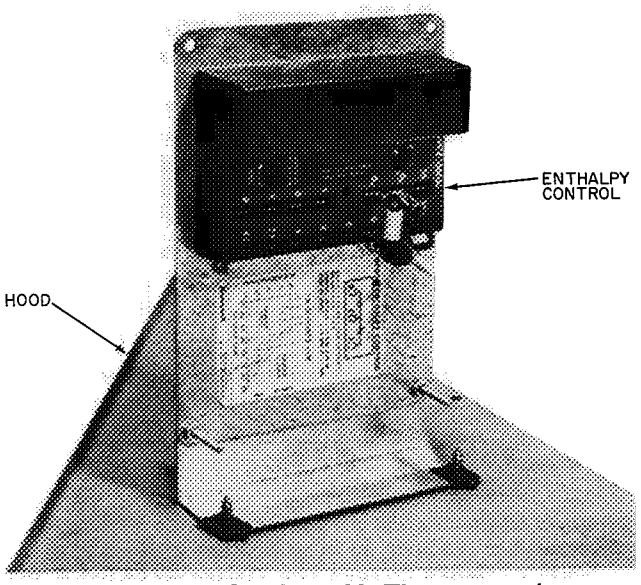
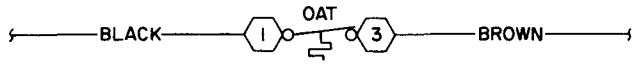


Fig. 21 — Outdoor Air Thermostat/ Enthalpy Control Installation



OAT. — Outdoor Air Thermostat

Fig. 22 — Wiring Connections for Outdoor Air Thermostat

Step 7 — Adjust Evaporator Fan Speed — Adjust evaporator fan speed to meet jobsite conditions. Refer to Tables 3 - 6 to determine fan speed settings. For units with electric heating, required minimum airflow is 850 l/s (1800 cfm). Fan motor pulleys are factory set for speed shown in Table 1.

To change fan speed:

1. Shut off unit power supply
2. Loosen belt by loosening fan motor mounting nuts. See Fig. 23.
3. Loosen movable pulley flange setscrew (See Fig. 24).
4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Table 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, loosen fan pulley setscrews and slide fan pulley along fan shaft. Make angular alignment by loosening motor from mounting plate.

TO ADJUST BELT TENSION — Loosen fan motor mounting bolts. Move motor sideways for proper belt tension (13 mm [0.5 in.]) deflection with one finger) and tighten motor mounting bolts.

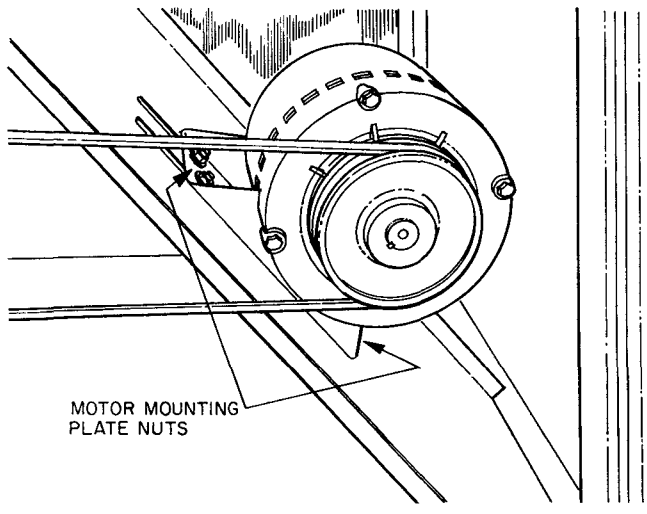


Fig. 23 — Motor Mounting

Table 3 – Fan Performance, Horizontal Discharge Units – SI Metric

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																	
	25		50		100		150		200		250		300		350		400	
	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW
850	**12.8**	**0.34**	**13.7**	**0.38**	**15.4**	**0.49**	17 0	0 60	18 3	0 72	19 6	0.85	**20.8**	**0.99**				
900	**13.4**	**0.39**	**14.3**	**0.44**	15 9	0.55	17 5	0 68	18 8	0.80	20 0	0 92						
950	**14.1**	**0.46**	**14.9**	**0.50**	16 5	0.62	17 9	0 75	19 3	0.88	**20.5**	**1.00**						
1000	**14.7**	**0.52**	**15.5**	**0.57**	17 0	0.69	18 4	0 82	19 8	0.96	**21.0**	**1.10**						
1050	**15.4**	**0.59**	16.1	0 66	17 6	0 78	18 9	0 91	**20.3**	**1.06**								
1100	16 1	0.69	16 7	0 74	18.2	0 87	19 5	1 01										
1150	16 8	0 78	17 4	0 83	18 7	0 97	20.0	1.10										
1200	17.5	0.88	18 0	0 94	19.3	1.08												
1250	18 2	0.99	19.7	1.05													—	—
1300	18.8	1.12													—	—	—	—
1350															—	—	—	—
1400													—	—	—	—	—	—

Table 4 – Fan Performance, Vertical Discharge Units – SI Metric

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																	
	25		50		100		150		200		250		300		350		400	
	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW	R/s	BkW
850	**14.2**	**0.41**	**15.1**	**0.46**	16.7	0.58	18.1	0 69	19 4	0 82	**20.6**	**0.96**	**21.7**	**1.10**				
900	**14.9**	**0.48**	15.8	0.54	17.3	0.66	18 7	0 78	19 9	0.91	**21.1**	**1.05**						
950	15 7	0 56	16 5	0.62	17.9	0 74	19 3	0.88	**20.5**	**1.01**								
1000	16 4	0 65	17 2	0 71	18 6	0 84	19.9	0 98	**21.1**	**1.12**								
1050	17 2	0 75	17 9	0.81	19.2	0 94	**20.6**	**1.09**										
1100	18.0	0 85	18.6	0.91	19.9	1.05												
1150	18 7	0 97	19.2	1.03														
1200	19.5	1.09															—	—
1250															—	—	—	—
1300													—	—	—	—	—	—
1350													—	—	—	—	—	—
1400													—	—	—	—	—	—

LEGEND

BkW — Motor Brake (Output) Power, kilowatts
L/s — Liters per second
R/s — Fan wheel speed, revolutions per second

NOTES:

1 Shading indicates field-supplied motor and drive
2 **Boldface** indicates field-supplied drive required
3 Maximum usable motor output power (BkW) is 1 12 BkW with factory-equipped fan motor
4 Use of a field-supplied motor may affect wire sizing
5 Fan performance tables include internal losses for standard filters, wet coil and unit casing

Table 5 – Fan Performance, Horizontal Discharge Units – English

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.1		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1800	**765**	**0.45**	**821**	**0.51**	**923**	**0.65**	1019	0 81	1099	0.96	1178	1.14	**1249**	**1.32**				
1900	**802**	**0.52**	**854**	**0.58**	953	0 73	1046	0 90	1126	1 06	1201	1 23	**1274**	**1.43**				
2000	**840**	**0.60**	**888**	**0.66**	984	0 82	1073	0 99	1154	1 16	**1226**	**1.33**						
2100	**876**	**0.69**	**923**	**0.75**	1015	0 91	1101	1 08	1182	1.27	**1252**	**1.45**						
2200	**916**	**0.76**	958	0.85	1046	1.01	1129	1 19	1209	1.39								
2300	954	0.89	993	0 96	1079	1.13	1160	1 31										
2400	993	1.00	1029	1 07	1112	1.25	1190	1.43										
2500	1031	1.13	1066	1 20	1145	1.39												
2600	1070	1 26	1103	1 34														
2700	1109	1.41	1140	1.48													—	—
2800																	—	—
2900															—	—	—	—
3000													—	—	—	—	—	—

Table 6 – Fan Performance, Vertical Discharge Units – English

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.1		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1800	**852**	**0.55**	**905**	**0.62**	1002	0.78	1084	0.93	1163	1 10	**1235**	**1.29**						
1900	**894**	**0.64**	945	0.72	1037	0 88	1119	1 04	1194	1.21	**1266**	**1.40**						
2000	**936**	**0.74**	984	0.82	1072	0.98	1154	1 16	**1226**	**1.33**								
2100	978	0 85	1024	0 93	1108	1 10	1190	1 29	**1259**	**1.47**								
2200	1021	0.97	1064	1.05	1145	1 22	**1225**	**1.43**										
2300	1064	1.10	1104	1 18	1183	1.36												
2400	1107	1 24	1145	1 32														
2500	1150	1.39	1166	1.48														
2600																	—	—
2700																	—	—
2800																	—	—
2900																	—	—
3000																	—	—

LEGEND

Bhp — Motor Brake (Output) Power (horsepower)
Cfm — Cubic Feet per Minute
Rpm — Fan wheel speed, Revolutions per Minute

NOTES:

1. Shading indicates field-supplied motor and drive required
2 **Boldface** indicates field-supplied drive required
3 Maximum usable brake horsepower (Bhp) is 1 5-Bhp with factory-equipped fan motor
4 Use of a field-supplied motor may affect wire sizing
5 Fan performance tables include internal losses for standard filters, wet coil and unit casing

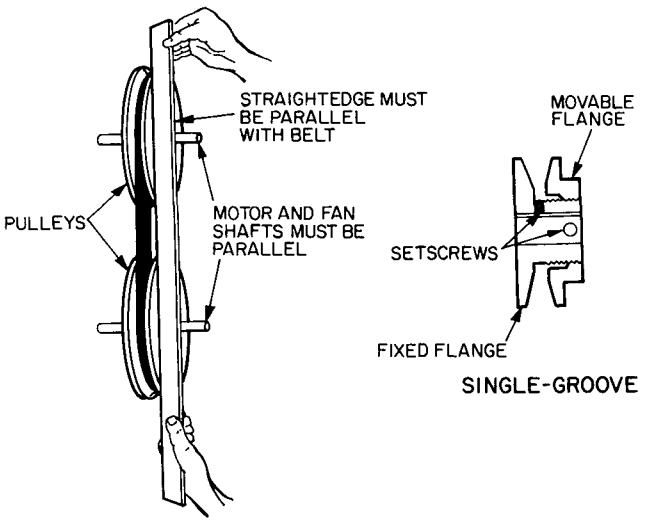


Fig. 24 — Indoor Air Fan Pulley Adjustment

START-UP

IMPORTANT: Energize crankcase heater(s) 24 hours prior to base unit start-up to remove entrapped oil from refrigerant. Heaters are energized as long as there is power to the unit.

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

Return Air Filters — Make sure correct filters are installed in unit. See Table 1. Do not operate unit without return air filters.

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

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

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

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

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

Check cooling effects at a setting above room temperature. Check unit charge. Refer to Refrigeration Charge in Service section.

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 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 and then to ON.

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

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

First stage of thermostat energizes the first-stage electric heater; second stage energizes second-stage electric heater elements if installed. Check heating effects at air supply grille(s).

If electric heaters do not energize, reset limit switch (located on indoor fan scroll) by depressing button located between terminals on the switch. See Fig. 9.

TO SHUT OFF UNIT — Set system selector switch at OFF. 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 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 respectively. Evaporator air fan operates continuously to provide constant air circulation.

Economizer Operating Sequence

COOLING MODE — When the outdoor ambient temperature is above the outdoor air thermostat (OAT.) or enthalpy control setting and the thermostat calls for cooling, terminals G and Y1 are energized. The indoor fan contactor (IFC) is energized, the economizer damper blade opens to the minimum position, and the compressor is energized.

If the outdoor ambient temperature is below the OAT. setting and the thermostat calls for cooling, the indoor fan contactor is energized, the indoor fan is started and the economizer modulates open. The economizer acts as the first stage of cooling, providing free cooling with outside air. The damper blade opens for 5 seconds and stops for 30 seconds. The discharge air thermistor (DAT) sends a signal to the economizer board to determine if further adjustment is required. See Fig. 25 for the resistance of the discharge air thermistor at various temperatures.

If outside air alone cannot satisfy the cooling requirements of the conditioned space, Y2 on the thermostat (second stage cooling) is energized and the compressor starts.

As conditioned space temperature approaches the thermostat's cooling set-point, the second cooling stage cycles off. After mechanical cooling shuts off, the economizer modulates to the minimum position.

HEATING MODE — Upon a call for heat through W1, the indoor fan contactor energizes to start the indoor fan and the economizer damper blade opens to the minimum position.

When W1 is de-energized, the indoor fan motor stops.

As space temperature approaches the heating temperature set point, heating stage cycles off.

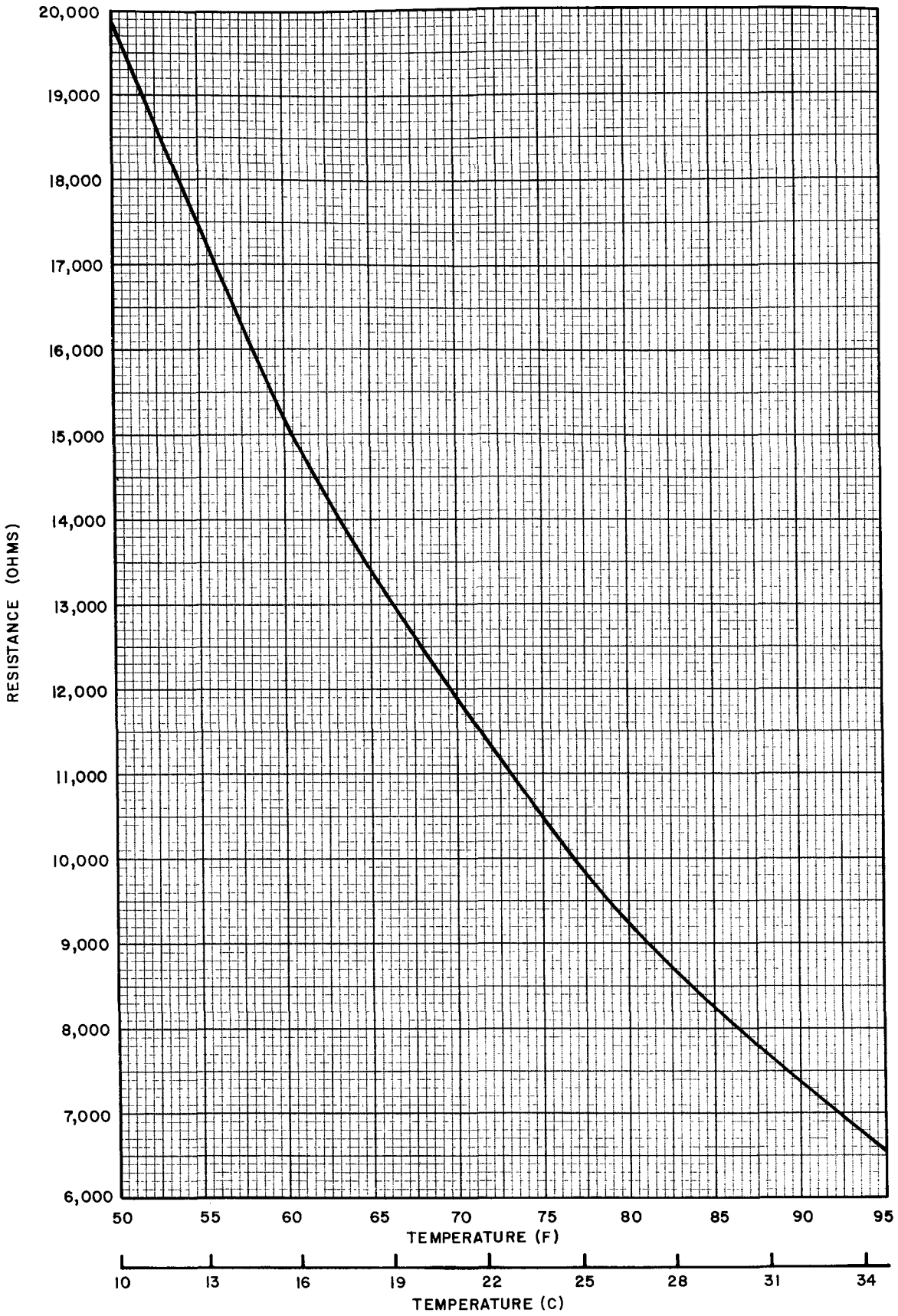


Fig. 25 — Discharge Air Thermistor Resistance vs Temperature

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.

EVAPORATOR COIL

1. Turn unit power off. Remove evaporator coil access panel.
2. Remove economizer by disconnecting Molex plug and removing economizer mounting screws. See Fig. 18 and 19.
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. Flush condensate pan after completion.
5. Reinstall economizer and filters, reconnect wiring and replace access panels.

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

Clean coil as follows:

1. Turn off unit power.
2. Remove top cover screws on condenser end of unit.
3. Remove condenser coil corner post. See Fig. 26. To hold top cover open, place coil corner post between top cover and center post. See Fig. 27.
4. Remove device holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 75 to 100 mm (3 to 4 in.) from the inner coil section. See Fig. 28.
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. Reposition the outer coil section, remove the coil corner post from between the top cover and center post. Secure the sections together. Install the coil corner post, coil center post and replace all screws.

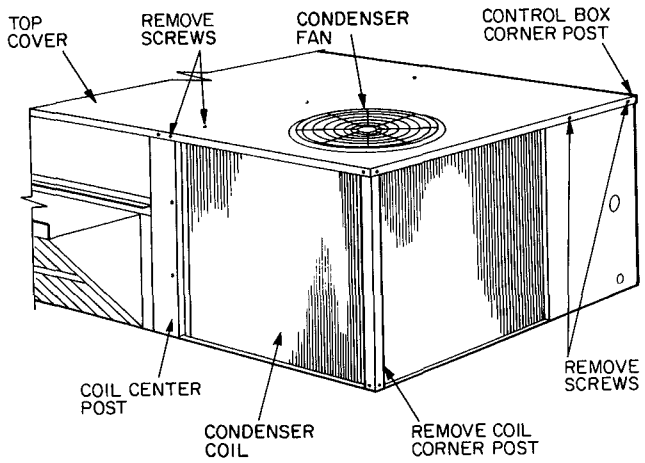


Fig. 26 — Cleaning Condenser Coil

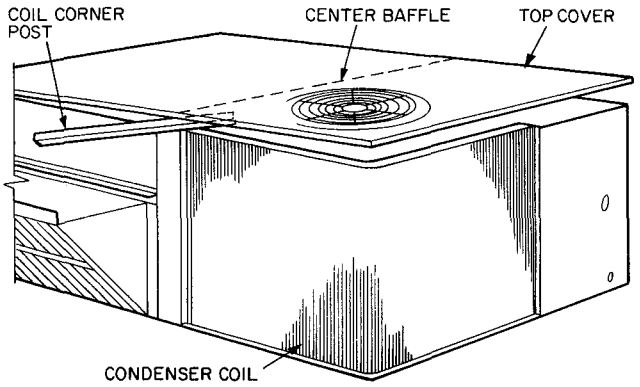


Fig. 27 — Propping Up Top Panel

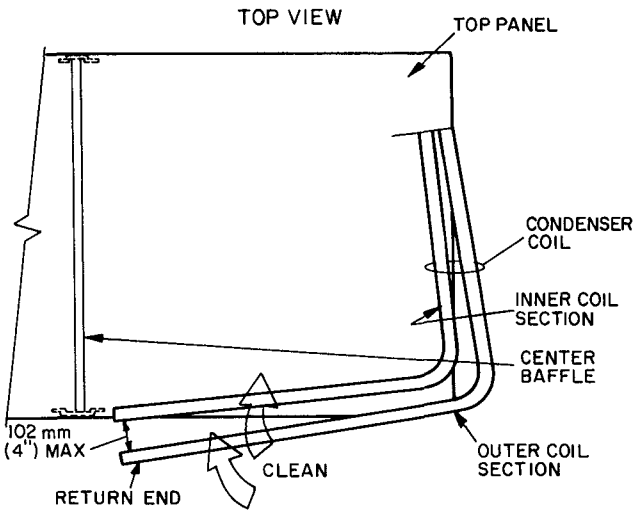


Fig. 28 — Separating Coil Sections

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 SCREENS — Clean screens with steam or hot water and a mild detergent. Do not use throwaway filters in place of screens.

Lubrication

COMPRESSORS — Each compressor is charged with correct amount of oil at the factory. No further lubrication is required.

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

Condenser Air Fan Adjustment (Fig. 29) — Shut off unit power supply. Measure the distance between the fan and grille. If the distance exceeds 4½ in. remove condenser fan assembly (grille, motor, motor cover and fan) and loosen fan hub setscrews. Adjust fan height as shown in Fig. 29. Tighten setscrews and replace condenser fan assembly.

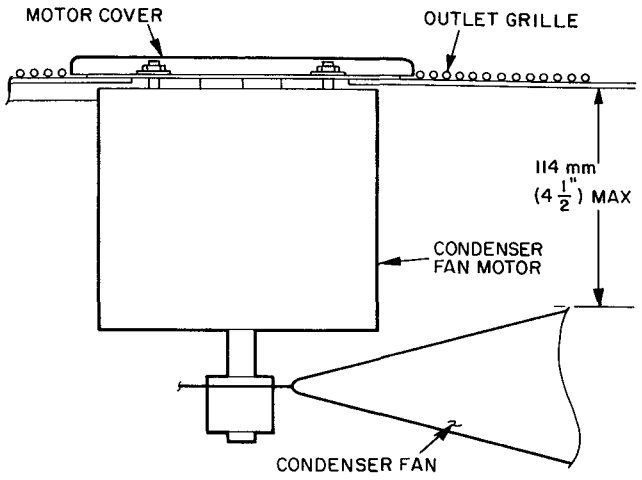


Fig. 29 — Condenser Air Fan Adjustment

Manual Outdoor Air Damper — If outdoor air damper blade adjustment is required, see Optional Manual Air Damper section.

Economizer Adjustment — Refer to Economizer section under Installation.

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate (also refer to Table 1). Refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants.

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 Chart, Fig. 30. Vary refrigerant until the conditions of the chart are met. Note the charging chart is different from type normally used. Chart is based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor airflow rate must be within the normal operating range of the unit.

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

Example: (Fig. 30)

Outdoor Temperature ..... 29 C (85 F)
Suction Pressure ..... 483 kPa (70 psig)
Suction Temperature should be ..... 7 C (45 F)
(Suction Temperature may vary ± 2.5° C [5° F])

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

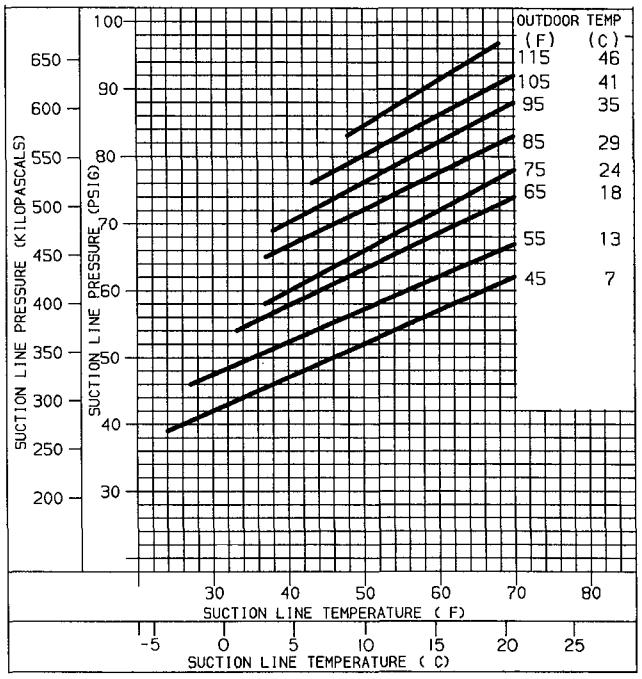


Fig. 30 — Charging Chart

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