

Single-Package Cooling Units

SAFETY CONSIDERATIONS

The 50BJ,BK Single-Package Cooling Units are designed to provide safe and reliable service when operated within design specifications. However, due to system pressures, electrical components and equipment location, some aspects of installation, start-up and servicing of this equipment can be hazardous.

Only trained, qualified installers and service mechanics should install, start up and service this equipment.

When working on the equipment, observe all precautions on tags or labels attached to the unit, safety notes in the literature and any other safety precautions that apply.

- Follow all safety codes.
- Wear safety glasses and work gloves.
- Use care in handling, rigging and placing bulky equipment.

▲ DANGER

NEVER reach into unit while fan is running. LOCK OPEN AND TAG fan motor power disconnect before working on a fan. Remove the fuses and take them with you after noting this on tag.

▲ WARNING

CHECK assembly and component weights to be sure rigging equipment can handle them safely. Note also any specific rigging instructions.

WHEN STEAM CLEANING COILS, be sure area is clear of personnel.

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INSTALLATION

General — The 50BJ water-cooled condenser type units and the 50BK condenserless units are single-package, vertical air conditioning units designed specifically for application with 35B Modubox and 37A Moduline® variable volume air terminals. For air terminal installation and service refer to the separate 35B and 37A installation booklets.

Sizes 50BJ,BK016 and 024 units are shipped with all components assembled, piped and wired. The larger units, 50BJ,BK028 and 034 are shipped as follows:

1. Base unit — containing evaporator coil unit, compressors and condensers (50BJ unit only).
2. Fan section.
3. Fan motor and drive.

Step 1 — Receive and inspect unit — Check unit against shipping order. Inspect carefully for concealed shipping damage. *If shipment is damaged or incomplete, file claim with transportation company and advise Carrier immediately.*

Step 2 — Protect units from damage — To maintain warranty, protect unit against adverse weather, theft or vandalism on jobsite.

Step 3 — Provide unit support — Refer to Fig. 1 — Unit Dimensions, and Table 1 — Unit Physical Data for unit size and weight.

Construct a stand or frame of I-beams or angle iron that supports unit adequately, if desired. The floor and floor joists of existing buildings may require reinforcement; follow applicable codes.

Step 4 — Rig and place unit — Provide space around unit for service, filter access and overhead clearance as indicated in Fig. 1.

Move and store unit in upright position. Do not remove shipping skid until unit is at final position. Use slings with spacer under base skid to prevent panel damage when using hoist. Raise base skid on blocks and remove bolts. Unbolt fan section from skid.

The units, as shipped, are adequately dampened against vibration. If additional dampening is desired, however, place sponge rubber, rubber mat or fiberglass roof insulation between floor and base of unit, or install vibration isolators.

Step 5 — Position fan section as desired.

UNIT SIZES 50BJ, BK016 and 024 are shipped for vertical discharge. To set up these units for top-mounted horizontal discharge, accessory filler panels must be field installed (see Fig. 1).

To set up unit Sizes 50BJ, BK016 and 024 for back-mounted horizontal discharge (Fig. 1), proceed as follows:

1. Remove:
 - a. rear fan-section panel.
 - b. upper rear coil-section panel.
 - c. flexible conduit and wires from motor.
 - d. corner bolts holding fan section to coil section.
2. Remove fan section and rotate it 180° lengthwise so that motor is on left side of unit.
3. Place fan section on rear of coil section and refasten.
4. Replace motor wire and conduit.
5. Adjust the following items per Installation Step 7:
 - a. Shaft alignment.
 - b. Fan wheel position.
 - c. Pulleys.
 - d. Fan belt.
6. Replace panels as follows:
 - a. Upper rear coil-section panel on top of coil section and fasten.
 - b. Rear fan-section panel on top of fan section and fasten.

Table 1 — Unit Physical Data

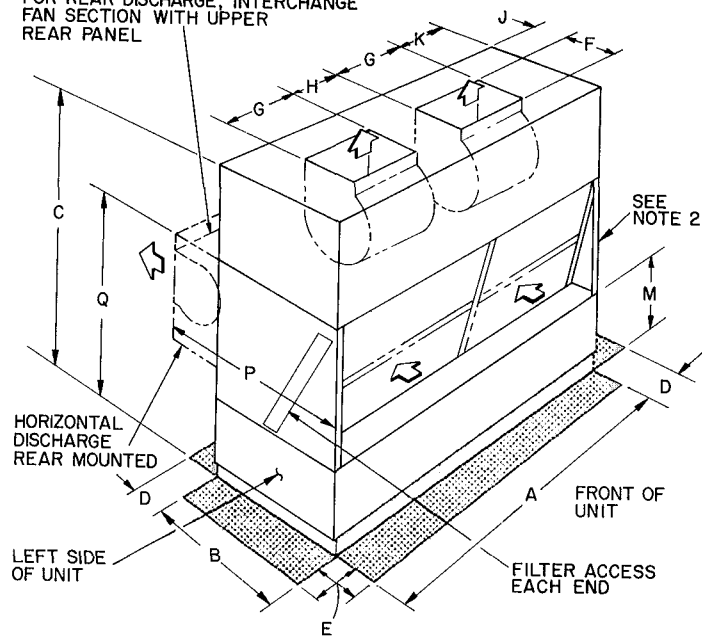
MODEL 50	BJ	BK	BJ	BK	BJ	BK	BJ	BK
SIZE	016		024		028		034	
OPERATING WEIGHT (lb)	1420	1225	1900	1470	2500	2335	2610	2440
OPERATING CHARGE (lb)*	Refrigerant 22							
System 1	24	15	17	7	24	15	24	15
System 2	—	—	17	7	17	12	24	15
COMPRESSOR	Serviceable Hermetic, 1750 rpm							
System 1 06DC	337	537	724	824	337	537	337	537
System 2 06DA	—	—	724	824	724	824	337	537
No. Unloading Cyl	4	—	4	—	4	—	4	—
No. Unloading Steps	3	—	6	—	6	—	6	—
CONDENSER (BJ only)	Shell and Coil							
Number	1	—	2	—	2	—	2	—
Max Working Pressure (psig)	385	—	150	—	385	—	385	—
INDOOR FAN	Adjustable, Belt Driven Centrifugal							
Number	2	—	2	—	2	—	2	—
Size (in.)	15 x 15	—	15 x 15	—	18 x 18	—	18 x 18	—
Nominal Cfm	6000	—	8000	—	10,000	—	12,000	—
Max. Rpm	1100	—	1100	—	1,100	—	1,100	—
Std FSR (rpm)	875–1069	—	894–1089	—	925 or 1073	—	925 or 1073	—
Nominal Hp (1750 rpm)	—	—	—	—	—	—	—	—
Standard Hp ... Frame Size	3 182T	—	5 184T	—	7½ 213T	—	7½ 213T	—
Alternate Hp ... Frame Size	5 184T	—	—	—	10 215T	—	10 215T	—
EVAPORATOR COIL	Copper Tubes, Aluminum Plate Fins							
Rows ... Fins/in.	3 13	—	4 11	—	4 11	—	4 15	—
Total Face Area (sq ft)	16.9	—	18.0	—	22.6	—	24.9	—
RETURN AIR FILTERS	Factory Supplied — Throwaway							
Number ... Size (in.)	3 . 16 x 25 x 2				6 25 x 20 x 2			
	3 20 x 25 x 2				2 . 16 x 20 x 2			

FSR — Fan Speed Range

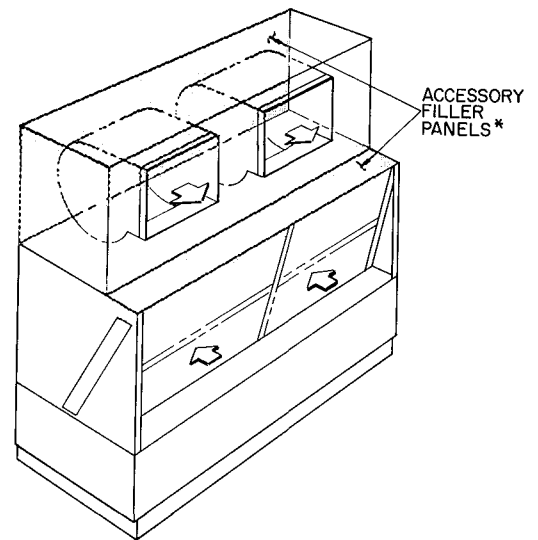
*The 50BK operating charge does not include charge for matching air-cooled condenser or refrigerant connecting piping

†Water-side pressure on Model 50BJ024 is 385 psig if the factory-installed condenser header coupling is removed (field modification)

FOR REAR DISCHARGE, INTERCHANGE
FAN SECTION WITH UPPER
REAR PANEL

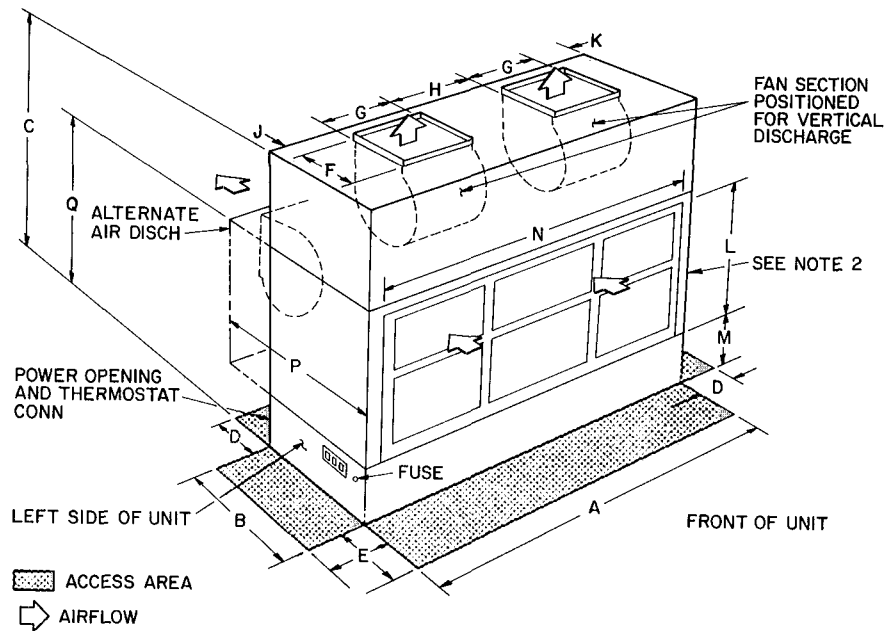


OPTIONAL TOP HORIZONTAL DISCHARGE



*For optional top-mounted horizontal discharge, use
accessory filler panel package as shown

UNITS 50BJ,BK016 AND 024



NOTES:

- 1 Certified dimension drawings available on request
- 2 Water and refrigerant connections located on right side of unit

UNITS 50BJ,BK028 AND 034

DIMENSIONS (ft-in.)

UNIT 50BJ,BK	016	024	028	034	UNIT 50BJ,BK	016	024	028	034
A	6- 8		7- 9-1/4		J	0- 0-5/8		0- 2-3/8	
B	2- 5-1/4		2-11-1/4		K	1- 7		1- 4	
C	6-10-1/2		8- 0-1/8		L	-		3- 2-1/4	
D	2- 0		2- 0		M	1- 8		2- 1-1/8	
E	3- 0		3- 0		N	-		7- 4-1/4	
F	1- 7-1/4		1- 8-7/8		P	4- 4-5/8		5- 4-1/8	
G	1- 5-1/4		1- 8-7/8		Q	4-11-1/2		5- 7-1/4	
H	1- 4-1/8		1- 7-7/8						

Fig. 1 — Unit Dimensions

UNIT SIZES 50BJ,BK028 AND 034 are shipped in sections as noted previously. They can be field assembled for either vertical or horizontal discharge.

NOTE: Fan section panels may be removed for easier lifting and to facilitate motor installation.

To set up Sizes 50BJ,BK028 and 034 units for horizontal discharge (Fig. 2), proceed as follows:

1. Remove:
 - a. Upper rear and end panels of coil section.
 - b. End panels on fan section.
 - c. Fasteners holding lower rear edge of fan panel.
2. Lift and position fan section on rear of coil section (Fig. 2). Secure with fasteners provided.
3. Install the following per Installation Step 6:
 - a. Motor mounting frame angles.
 - b. Motor on plate assembly.
 - c. Motor-plate assembly on frame angles.
 - d. Balance of drive package components.
4. Adjust the following per Installation Step 7:
 - a. Shaft alignment.
 - b. Fan wheel position.
 - c. Pulleys.
 - d. Fan belts.
5. Replace panels as follows:
 - a. Rear coil section panel on top of coil section. Rear holes will overlap fan section top panel.

Fasten using hole vacated in step 1c (see Fig. 2).

- b. All end panels.

To set up Sizes 50BJ,BK028 and 034 units for vertical discharge (Fig. 2):

1. Remove:
 - a. Front, rear and end panels of fan section.
 - b. Upper-rear and end panels of coil section.
 - c. Filters from coil section.
 - d. Fasteners holding filter frame top. Push out frame away from coil section frame.
2. Lift up and position fan section on coil section (Fig. 2).
3. Fasten fan-section frame to coil-section frame with fasteners provided; then reposition and refasten the filter frame moved in step 1d.
4. Install the following per Installation Step 6:
 - a. Motor mounting frame angles.
 - b. Motor on motor-plate assembly.
 - c. Motor-plate assembly on frame angles.
 - d. Balance of drive package components.
5. Adjust the following per Installation Step 7:
 - a. Fan wheel alignment
 - b. Shaft alignment
 - c. Pulleys
 - d. Fan belts
6. Replace panels as follows:
 - a. Rear coil-section panels, front and rear fan-section panels.
 - b. All end panels.

Step 6 – Install fan motor (Unit 50BJ,BK028 and 034) – Install items after fan section frame has been placed in position on coil section.

NOTE: Place plywood over evaporator coil to prevent damage while installing motor and mounts.

To install motor:

1. Fasten motor mounting angle bracket to fan section. Use Fig. 2 or 3 for position reference and Fig. 4 for assembly guidance. Be sure that lips of angle brackets are around fan section frame and that slots for motor mounting plate face each other.
2. Position motor on motor plate (Fig. 5) and fasten with fasteners provided.
3. Lift motor-plate assembly and slide into motor mounting angles as shown in Fig. 4. Plate fits in angle slots. On vertical mounts, the motor mounting assembly can be lowered to bottom of motor support channels.
4. Assemble and install motor adjusting screws as shown in Fig. 6. Drive roll pins into screws to prevent the screws from backing out during motor position adjustment.
5. Adjust motor position. Fasten motor mounting plate to mounting angles.

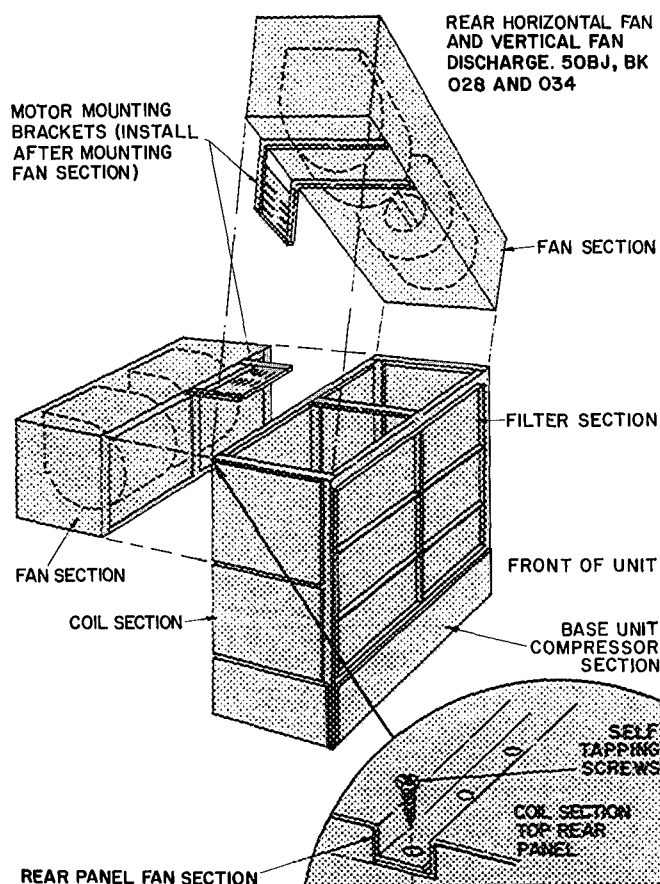
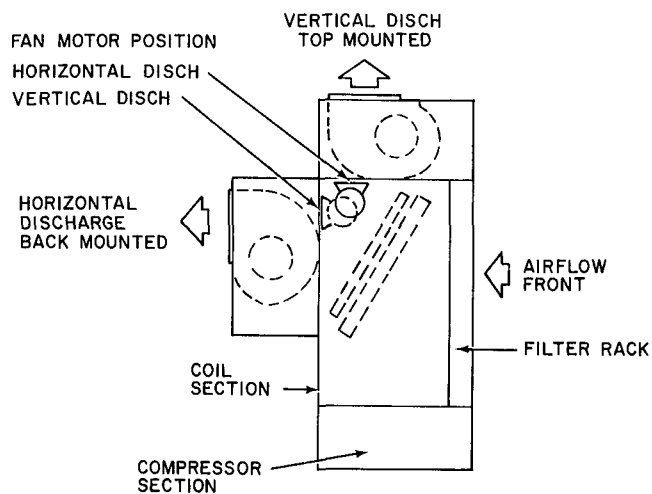


Fig. 2 – Fan Mounting (028,034 Units)



NOTE:
 Motor pulley on left side of unit — vertical discharge
 Motor pulley on right side of unit — horizontal discharge.

**Fig. 3 – Fan and Motor Arrangements
 50BJ, BK028,034**

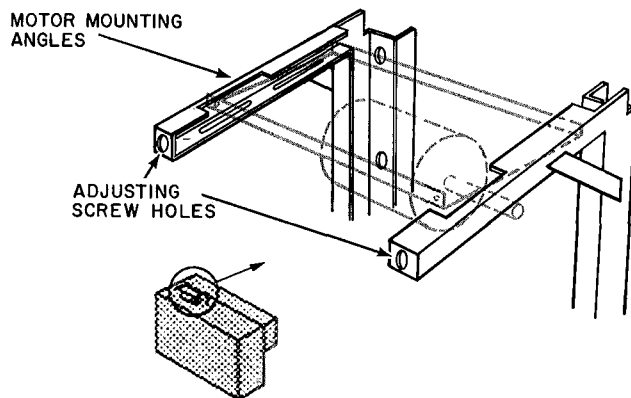


**Fig. 4 – 028 and 034 Horizontal Fan Motor
 Mounting Angles**

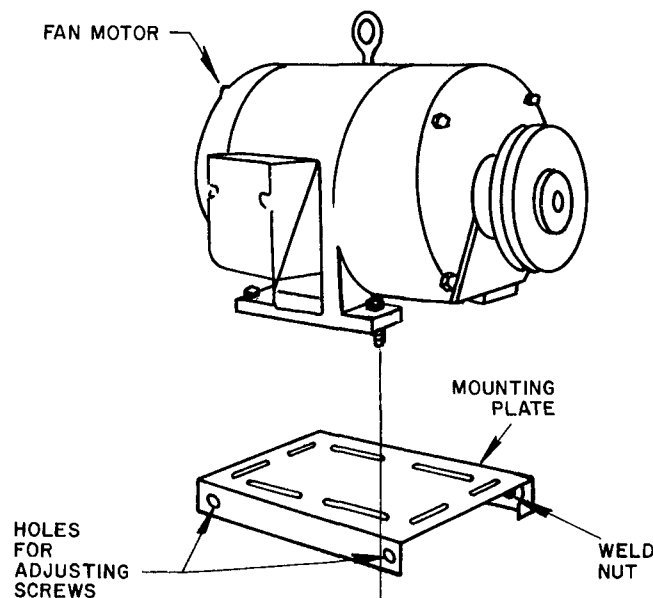


Fig. 5 – 028 and 034 Motor Mounting

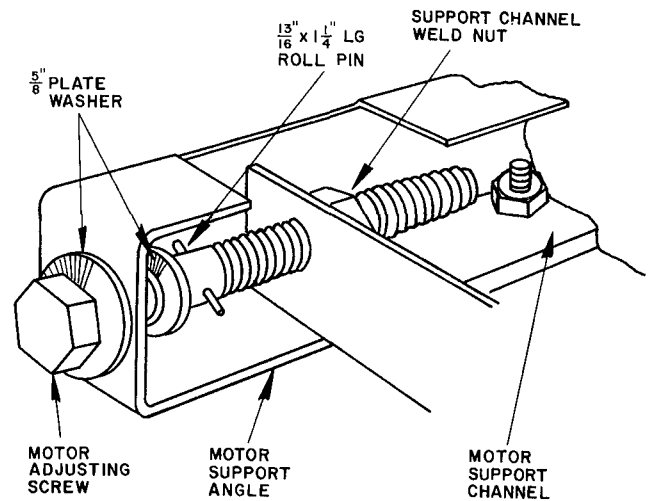


Fig. 6 – Assembled Fan Motor Adjusting Screw

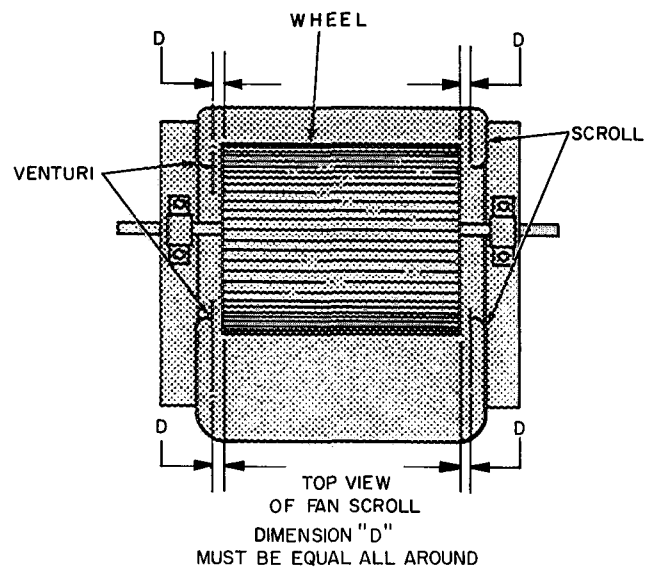


Fig. 7 – Horizontal Wheel Centering

Step 7 – Align fan shaft and wheel.

HORIZONTAL WHEEL CENTERING — All wheels must be horizontally centered between the inside edges of their fan scroll venturis (Fig. 7). Adjust as follows:

Units 50BJ, BK016 and 024

1. Loosen setscrews holding wheel support to shaft (Fig. 8).
2. Center the wheel by sliding it horizontally (Fig. 7).
3. Retighten setscrews.

Units 50BJ, BK028 and 034

1. Loosen fan wheel sq hd setscrews on each side of fan support (Fig. 8).
2. Center wheel by sliding it horizontally (Fig. 7).
3. Retighten locking setscrews to torque specified in Table 2.

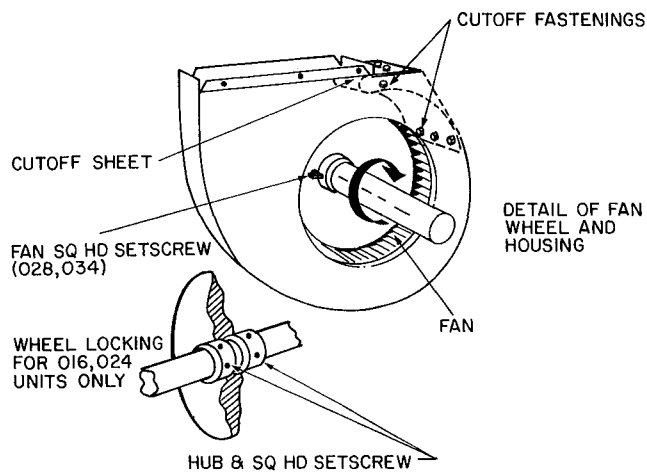


Fig. 8 – Fan Locking Detail

Table 2 – Fan Setscrew Torque Requirements

BOLT SIZE (in.)	RECOMMENDED TORQUE (lb–ft)
5/16	15–18

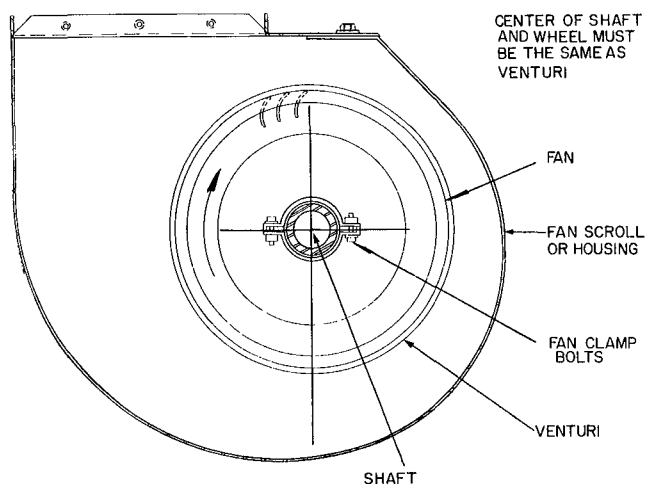


Fig. 9 – Concentric Alignment

CONCENTRIC ALIGNMENT – Shaft and wheels must be concentric with the venturi or air inlet of fan housing (Fig. 9).

Units 50BJ,BK016 and 024 – Shaft bearings are supported by spider (Fig. 10). If shaft and wheels are concentrically misaligned due to shipping shock, it is possible to rebend spider arms to original positions. Replace the spider if it has been extensively damaged by shipping shock.

Units 50BJ,BK028 and 034 – Bearings are bolted to angle support fastened to fan scroll (Fig. 11). To correct shaft and wheel concentric misalignment:

1. Loosen bearing support bolts and shim or move as required.
2. Retighten bearing support bolts.

HORIZONTAL SHAFT ALIGNMENT (All Units) – If the shaft has moved and all wheels are off horizontal center, recenter the shaft as follows:

1. Loosen setscrews holding bearing locking collar at each end of shaft (Fig. 10 or 11).
2. Slide shaft and wheel assembly horizontally until wheels are horizontally centered (Fig. 7).
3. Slide the bearing locking collars against the bearing race; turn in direction of shaft rotation until tight.
4. Retighten locking collar setscrews.

FAN, PULLEY AND BELT ADJUSTMENT – Refer to the **SERVICE** section entitled Indoor-Air Fan Adjustment.

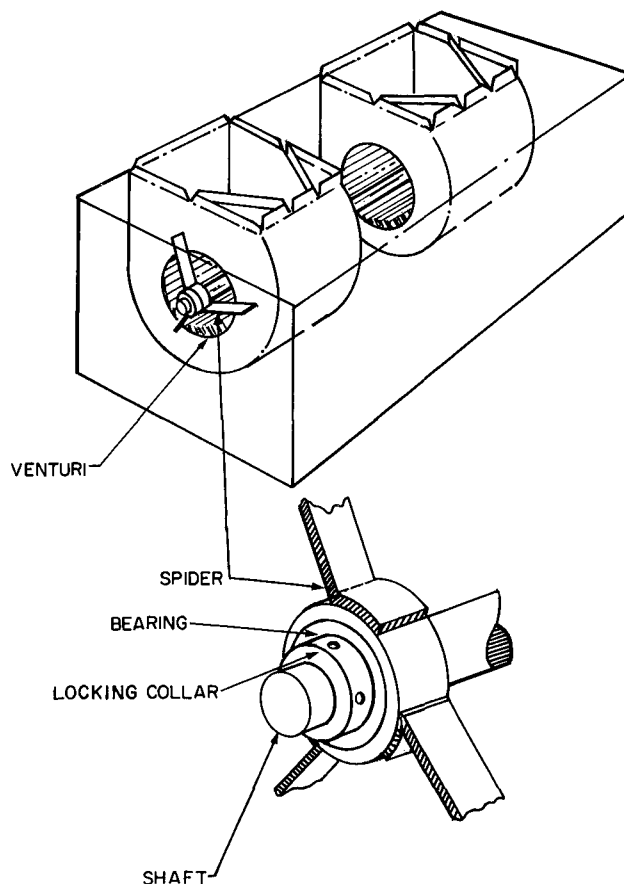


Fig. 10 – Size 016 and 024 Fan Shaft and Bearing Arrangement

Step 8 – Install field-fabricated ductwork – Connect ducts to unit, using flexible connections as required.

Attach ductwork to building structure and insulate with fiberglass and vapor barrier to prevent sound transmission and vapor condensation.

Weatherproof external ductwork, joints and openings with flashing and mastic in accordance with applicable codes.

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

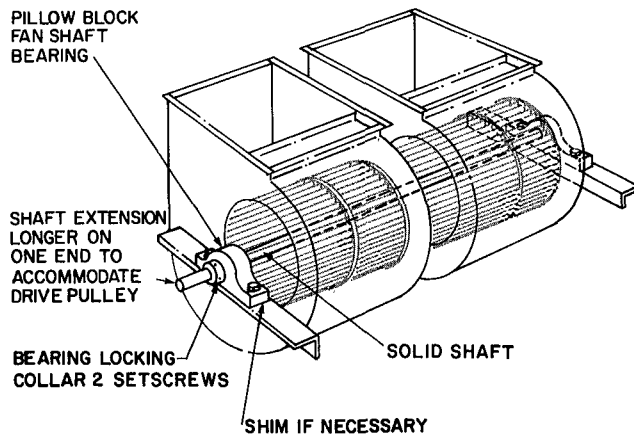


Fig. 11 – Size 028 and 034 Fan Shaft and Bearing Arrangement

Step 9 – Check return air filters – Be sure that the filters are the correct size; refer to Table 1. *Do not operate the unit without these filters in place.*

Step 10 – Check compressor spring mounts – The compressors are held rigid in shipment by bolts extending thru a washer, grommet and compressor foot into a weld nut.

Loosen each bolt (4 per compressor) until compressor floats free on springs. Then retighten bolts so that there is slight pressure on the neoprene gasket. This will steady compressor and prevent start and stop rocking.

Compressors have reversible oil pumps; therefore the direction of rotation need not be checked.

Step 11 – Make condenser connections.

WATER-COOLED (50BJ) UNITS – Condensers have water inlet and outlet connections as shown in Fig. 12.

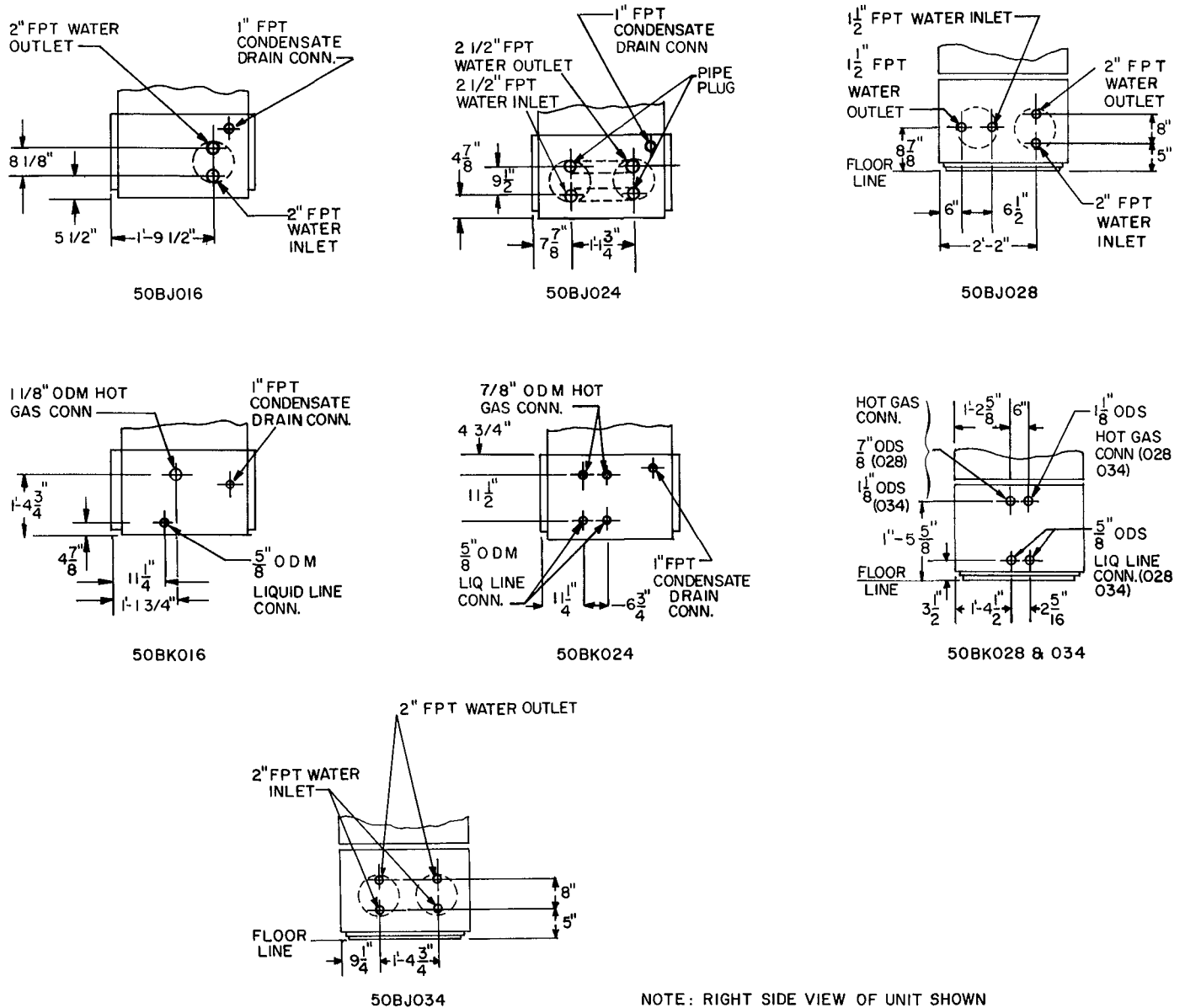


Fig. 12 – Water and Refrigerant Connections

Recirculating systems with low-temperature water returning to the condenser may require a water regulating valve. Units used on waste or city water must have a regulating valve on the inlet of each condenser and will require field modification for separate condenser piping (except 016). Refer to Fig. 13, 14, 15 and 16 for typical applications and conversions.

Connect the regulating valve capillary to a back-seated liquid service valve. Arrow on valve body must point in direction of water flow. After connecting capillary, open regulating valve one turn from back-seated position. Adjust valve as required to maintain proper condensing temperature.

Install full size gate valve and strainer in the water supply line. See max working pressures in Table 1. Valve and strainer must be accessible.

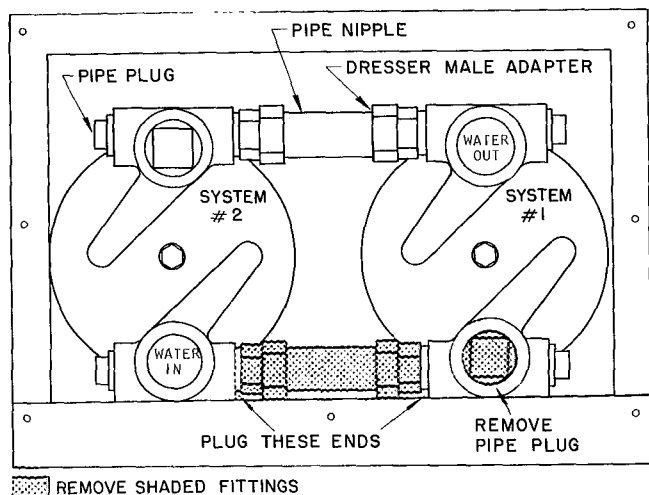


Fig. 13 - 50BJ024 City Water Condenser Piping Conversion

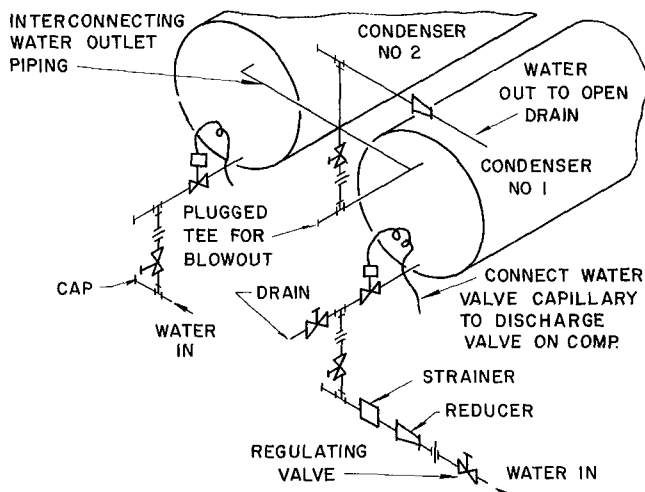


Fig. 14 - 50BJ024 Typical Waste or City Water Piping

AIR-COOLED (50BK) UNITS - Install air-cooled condenser in accordance with the installation instructions shipped with condenser.

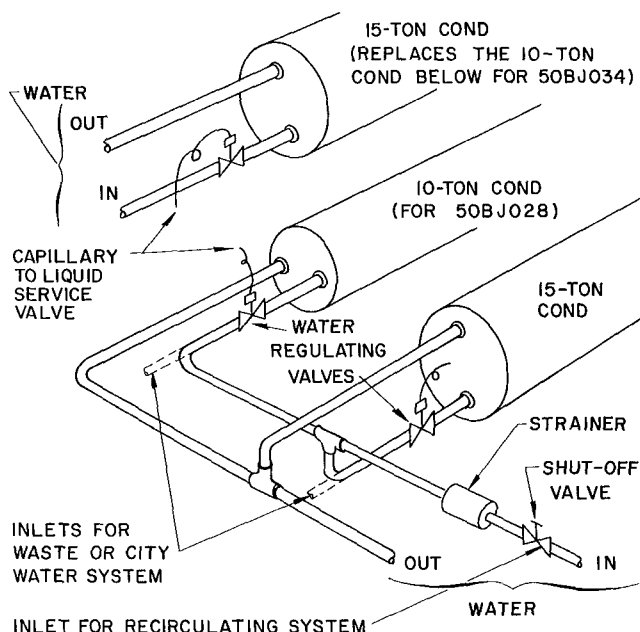
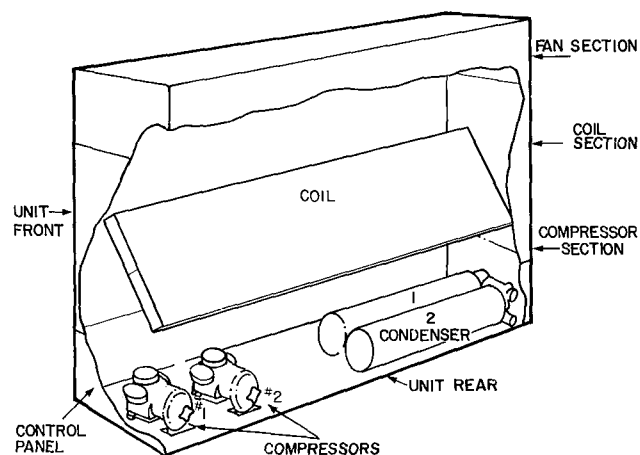


Fig. 15 - 50BJ028 and 034 Condenser Water Piping



50BJ.BK*	COMPR NO.	COND NO.*
016	1	1
024,028,034	1, 2	1, 2

*50BK units are condenserless

Fig. 16 - Refrigerant Systems (016-034)

Consult Carrier System Design Manual for standard refrigerant piping techniques. Connection locations for liquid and hot gas service lines are shown in Fig. 12. Recommended line sizes are listed in Table 3.

Condenserless (50BK) units are shipped with a holding charge. After refrigerant connections are made, evacuate, leak test and charge the system as described in the SERVICE section entitled Charging the System. Refer to Table 1 for unit charge.

**Table 3 — Recommended Line Sizes (in.)
(50BK Condenserless Models)**

UNIT 50BK	SYSTEM	CONN. SIZES*		LENGTH OF LINE (ft)					
				20		40		60-80	
		L	HG	L	HG	L	HG	L	HG
016	—	5/8	1-1/8	5/8	1-1/8	7/8	1-1/8	7/8	1-3/8
024	1 & 2	5/8	7/8	5/8	7/8	5/8	1-1/8	7/8	1-1/8
028	1	5/8	1-1/8	5/8	1-1/8	7/8	1-1/8	7/8	1-3/8
	2	5/8	7/8	5/8	7/8	5/8	1-1/8	7/8	1-1/8
034	1 & 2	5/8	1-1/8	5/8	1-1/8	7/8	1-1/8	7/8	1-3/8

HG — Hot Gas Line (OD in)
L — Liquid Line (OD in)

*Sweat connections

Step 12 — Install unit drain line — Install a trapped condensate drain line at unit drain connection (Fig. 1). The drain requires standard pipe connected to condensate pan nipple as shown in Table 4. Figure 17 shows proper trap design.

Determine design negative static pressure. This pressure is not the same as fan total pressure, which includes pressure losses downstream as well as upstream from the indoor air fan. Always assume the worst conditions, such as having return air filters clogged with dirt.

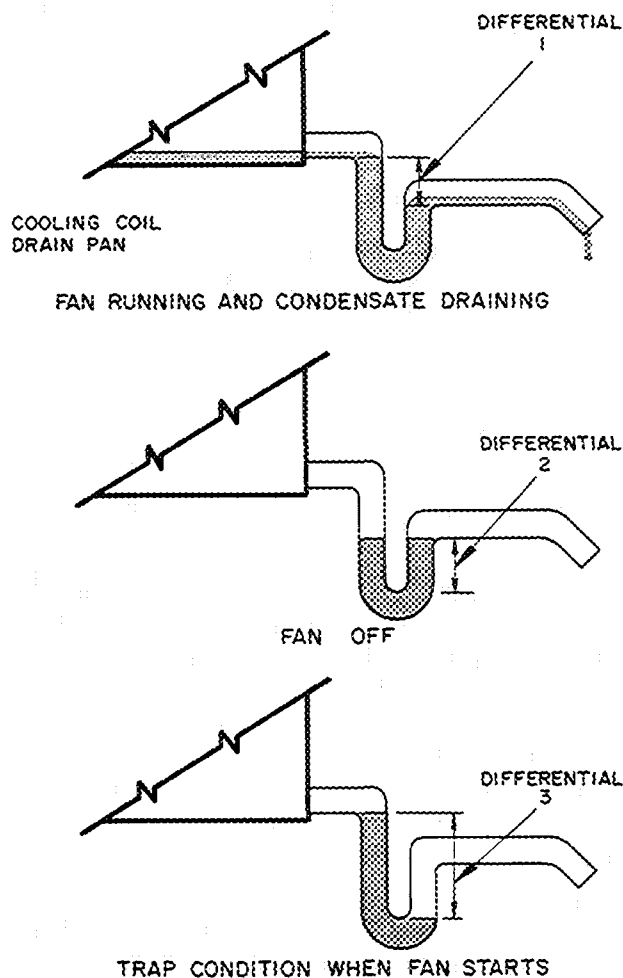


Fig. 17 — Condensate Drains

Referring to Fig. 17, Differential 1 must be equal to or larger than negative static pressure at design operating conditions. Store enough water in trap to prevent losing seal (Differential 2). This differential must be equal to or larger than one-half the maximum negative static pressure. When the fan starts, Differential 3 is equal to the maximum negative static pressure.

Do not use drain line smaller than size listed in Table 4. If required, cut hole in panel for drain line. Pitch drain downward toward an open drain sump. Provide a trap at least 3 in. high with plugged tee for cleaning. Fill trap with water to make an air seal. Observe all sanitary codes.

Table 4 — Condensate Drain Connections (in.)

UNIT SIZE	016,024	028,034
PIPE SIZE	1	1-1/4

Step 13 — Make electrical connections.

GENERAL — Disconnect switch, fuses and all field wiring must comply with NEC and local codes.

Provide an adequate fused disconnect switch within sight of the unit and out of reach of children. Provision for locking switch open (OFF) is advisable to prevent power from being turned on when unit is being serviced.

POWER WIRING — Voltage at unit with compressors operating must be within the voltage range indicated on unit nameplate (see also Table 5).

On 3-phase units, voltage between phases must be balanced within 2% and current within 10%. Contact local power company for correction of improper voltage or phase imbalance. Failure of unit due to phase imbalance constitutes abuse and can invalidate any applicable warranty.

Field power may be supplied to the unit thru a feeder circuit. The branch circuit protection is provided in the unit by manual-reset circuit breakers. The feeder circuit must be sized in accordance with NEC or local code, whichever takes precedence. Power supply to any auxiliary equipment such as air-cooled condenser fan motors and cooling tower must be run separately.

See Table 5 — Unit Electrical Data for base unit power requirements. Power wiring (Fig. 18) is brought into the unit thru a conduit opening in the unit back panel near the control box. The field power connections are made at a terminal block inside the control box. Refer to Table 6 for maximum wire sizes at the terminal block. Remove the metal shield to gain access to the terminal block and replace shield after connecting power wires.

FIELD CONTROL WIRING — When accessory timer control panel is used, connect panel to factory-supplied control panel as indicated on unit label diagram.

Table 5 – Unit Electrical Data

UNIT	VOLTS/PH/HZ	VOLTAGE RANGE		COMP #1		COMP #2		INDOOR FAN MOTOR		POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	Hp	FLA	MCA*	MOCPT†
50BJ016	208-230/3/50	187	253	50.0	191	—	—	3	9.2	71.7	110
	460/3/60	414	528	22.1	86	—	—	3	4.6	32.2	50
	575/3/60	518	660	17.9	69	—	—	3	3.7	26.2	40
50BJ024	208-230/3/60	187	253	36.0	137	36.0	137	5	13.2	94.2	125
	460/3/60	414	528	16.0	62	16.0	62	5	6.6	42.6	50
	575/3/60	518	660	12.9	50	12.9	50	5	5.6	35.1	45
50BJ028	208-230/3/60	187	253	49.3	191	35.7	137	7½	22.0	120.0	150
	460/3/60	414	528	22.2	86	16.0	62	7½	11.0	54.8	70
	575/3/60	518	660	18.0	69	13.0	50	7½	8.7	44.2	45
50BJ034	208-230/3/60	187	253	49.3	191	49.3	191	7½	22.0	120.0	175
	460/3/60	414	528	22.2	86	22.2	86	7½	11.0	54.8	80
	575/3/60	518	660	18.0	69	18.0	69	7½	8.7	44.2	50
50BK016	208-230/3/60	187	253	64.0	266	—	—	3	9.2	89.2	150
	460/3/60	414	528	29.0	120	—	—	3	4.6	40.9	50
	575/3/60	518	660	23.0	96	—	—	3	3.7	32.5	35
50BK024	208-230/3/60	187	253	45.0	170	45.0	170	5	13.2	114.5	150
	460/3/60	414	528	20.0	77	20.0	77	5	6.6	51.6	60
	575/3/60	518	660	16.0	62	16.0	62	5	5.6	41.6	45
50BK028	208-230/3/60	187	253	64.0	266	45.0	170	7½	22.0	147.4	200
	460/3/60	414	528	29.0	120	20.0	77	7½	11.0	66.8	70
	575/3/60	518	660	23.0	96	17.0	62	7½	8.7	54.7	70
50BK034	208-230/3/60	187	253	64.0	266	64.0	266	7½	22.0	166.0	200
	460/3/60	414	528	29.0	120	29.0	120	7½	11.0	76.3	80
	575/3/60	518	660	23.0	96	23.0	96	7½	8.7	60.5	80

FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCPT — Maximum Overcurrent Protection Device (amps)
RLA — Rated Load Amps

*Minimum circuit amps (MCA) for wire sizing complies with NEC Section 430.24

†In compliance with NEC requirements for multimotor and combination load equipment (Ref: NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse only

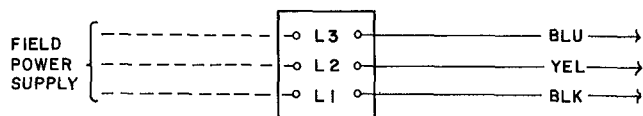


Fig. 18 – Field Power Wiring Connections

START-UP

General — The 50BJ,BK units are designed for use in Modu-Vac Variable Air Volume Systems using Carrier 37A Moduline® and 35B Modubox Air Terminals. For air terminal installation and adjustment, refer to 37A or 35B literature as required.

CAPACITY CONTROL — The units are equipped with electric unloaders on the no. 1 compressor (Fig. 16) and hot gas bypass on the no. 1 refrigerant system. (Size 016 units have only one refrigerant system.)

Unit capacity is monitored and controlled by a Honeywell W7100 microprocessor (Fig. 19). This controller provides 3 steps of capacity control on size 016 units and 6 steps of control on size 024, 028 and 034 units.

Table 6 – Maximum Wire Size for Power Terminal Block*

VOLTS/PHASE	UNIT 50BJ,BK		
	016	024	028,034
208-230/3	2/0	2/0	350
460/3	2/0	2/0	2/0
575/3	2/0	2/0	2/0

*Select wire size per NEC and connect supply wires to factory-supplied pigtail wire connectors

TIMER CONTROL — Carrier strongly recommends use of an accessory timer control panel with the 50BJ,BK units. Installation and adjustment of this device (Fig. 20) is covered in separate Installation, Start-Up and Service Instructions included in the accessory package.

If accessory timer is not used, install field-supplied manual switch between TB3 terminals **1** and **8** in the variable volume control box.

MOISTURE INDICATORS are located ahead of thermal expansion valves. They must be full of liquid to properly indicate moisture content. Operate system for 30 minutes before determining moisture content.

SERVICE VALVE (50BK) – Valves use teflon seat washers to ensure position seal with minimum stem torque (10 lb-ft max). Do not overtighten valve stem. Use wet rag on valve when soldering. If refrigerant has been lost, midseat valve. Always replace stem cap.

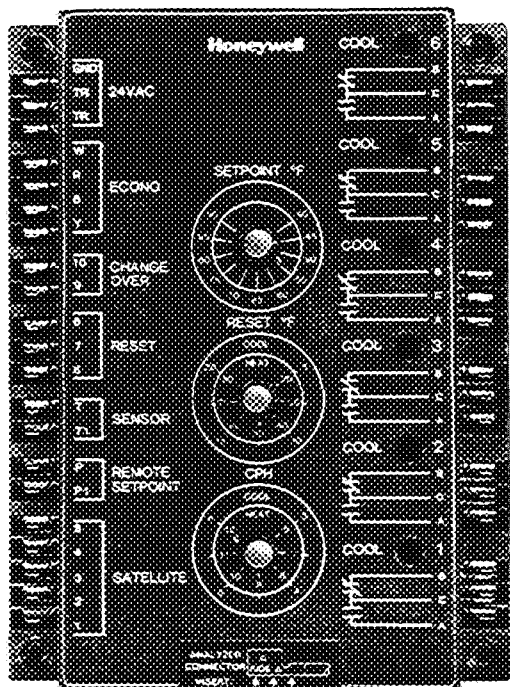


Fig. 19 – Honeywell Microprocessor

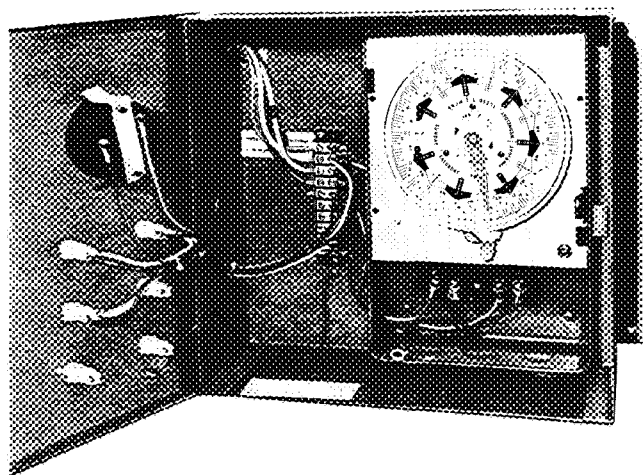


Fig. 20 – Accessory Timer Control Panel

Prior to Unit Start

1. Clean and inspect the unit.
2. Open (backseat) compressor service valves and liquid line shutoff valves. Replace and tighten valve caps to prevent leakage.
3. On 50BK (air-cooled condenser) units, turn on indoor fan motor circuit breaker. Check that compressor crankcase heaters are energized and crankcase oil level is half full.
4. Leave crankcase heaters energized for 24 hours to ensure safe oil/refrigerant mixture in crankcases for unit start-up.

Control Sequence Checkout

1. Perform all applicable steps described above under Prior to Unit Start.
2. Turn on unit main power supply.
3. Set the CPH (Cycles per Hour) knob on microprocessor (Fig. 19) at 6.
4. Turn on indoor fan motor circuit breaker.
5. If unit is equipped with accessory timer control panel and 7-day clock is not calling for cooling, turn on unit by overriding clock with manual bypass switch (see Start-Up General section entitled, **TIMER CONTROL**).
6. Close compressor circuit breakers.
7. Check for cooling by turning microprocessor SETPOINT knob to 40 F. Light-emitting diodes (LED's) should glow as corresponding cooling stages come on. In addition, indicating lights on cover of accessory timer control panel should light.

NOTE: Depending on job conditions and differential between setpoint and discharge temperatures, it may take as much as one hour for all cooling stages to come on.
8. Turn microprocessor SETPOINT knob to 90 F. The LED's on microprocessor and indicating lights on accessory timer control panel should go off as corresponding cooling stages drop out. Ambient temperature must be less than 90 F for this test.
9. When checkout and unit operation are satisfactory, turn off manual bypass switch (step 5), position microprocessor SETPOINT knob at desired temperature (approximately 55 F) and replace all unit panels.

SERVICE

WARNING: Lock open and tag unit disconnect before servicing equipment.

CAUTION: Before servicing fan compartment –

1. Sharp edges of evaporator coil fins are exposed. To prevent arm injury, cover top edge of evaporator with strip of cardboard or a few layers of heavy tape.
2. To avoid coil damage, cover coil face with a piece of plywood or other suitable rigid sheet material. If any coil fins are mashed or bent, straighten with a coil fin comb. Check for refrigerant leaks.

Indoor-Air Fan Adjustment – Fan motor pulley is factory set for speed shown in Table 1. Unit Sizes 028 and 034 have fixed pulleys. A second pulley is shipped with drive package.

TO CHANGE FAN SPEED (028,034)

1. Shut off power supply.

2. Loosen fan belt by loosening fan motor on mounting bracket. Do not loosen mounting bracket from unit.
3. Select motor pulley of 5-, 6- or 7-in. pitch diameter as desired to replace 6.5-in. PD pulley provided. A 5.6 in. PD pulley is supplied with the drive package.
4. Check pulley alignment and adjust belt tension as described below.
5. Check fan operation.

TO CHANGE FAN SPEED (016, 024)

1. *Shut off power supply*
2. Loosen fan belt by loosening fan motor on mounting bracket. Do not loosen mounting bracket from unit.
3. Loosen movable pulley flange setscrew (Fig. 21).
4. To increase fan speed, screw movable flange towards fixed flange; to decrease speed, screw movable flange away from fixed flange. Use values shown in Table 1.

Increasing fan speed increases load on motor. Do not exceed maximum allowable fan speed (Table 1) or motor full load amps shown on motor nameplate and in Table 5.

5. Set movable flange setscrew at nearest pulley hub flat and tighten.
6. Check pulley alignment and adjust belt tension as described in sections below.
7. Check fan operation. Repeat above procedure as required.

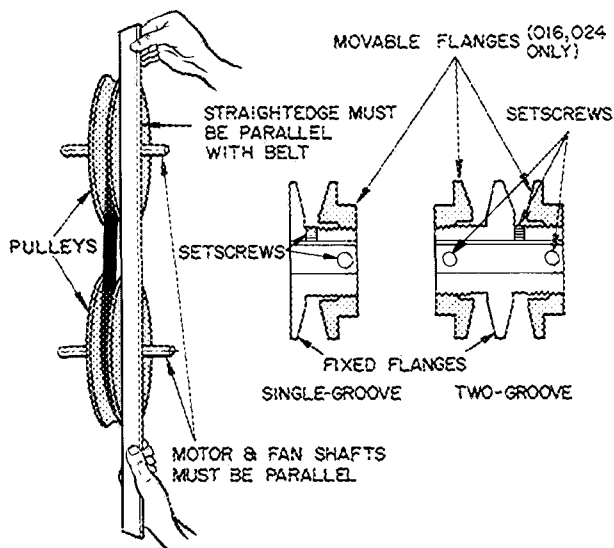


Fig. 21 — Indoor Air Fan Pulley Adjustment and Alignment

PULLEY ALIGNMENT — *Shut off unit power supply* Make sure motor and fan shafts are parallel. Align shafts by loosening motor on mounting bracket if required. Then loosen fan pulley set-screws, slide pulley along fan shaft and align with straightedge as shown in Fig. 21.

ADJUST BELT TENSION

1. *Shut off power supply.*
2. Loosen fan motor on mounting bracket (do not loosen mounting bracket from unit).
3. Move fan motor as required until proper belt tension is achieved (approximately 3/4-in. deflection when applying 8-lb force at midpoint of belt span).
4. Tighten motor on mounting bracket.

Fan Motor Lubrication — *Shut off power supply. Protect coil from damage.*

Fan motor bearings are factory lubricated and will need no lubrication for the first 5 years (3 years with continuous service or excessively dirty conditions).

Inspect bearings and relubricate or replace as required. Follow manufacturer's instructions for lubrication of special field-supplied motors.

Fan shaft bearings for 016 and 024 units are lubricated for the life of the bearings. Bearings for 028 and 034 units have grease fittings. Lubricate annually with a lithium base grease containing rust inhibitor or with a mixed base grease.

Return-Air Filters — Inspect filters twice monthly and replace as often as required by operating conditions. Filter type and size is given in Table 1.

If field-supplied, cleanable filters are used, flush them with hot water or steam, or soak them in a mild solution of soap or detergent and water. Refer to filter manufacturer's instructions as applicable.

Never operate the unit without return-air filters in place.

Condensate Drains — Clean drain line and unit drain pan at start of each cooling season. Check flow by pouring water into drain. Be sure trap is filled to maintain air seal (Fig. 17).

Evaporator Coil — Protect coil when working inside unit. (See screened CAUTION note, page 11.)

Remove dirt and debris from evaporator coil as required. Clean with a stiff brush, vacuum cleaner or compressed air. Straighten mashed or bent coil fins with a fin comb of the correct spacing. Table 1 lists the fins per inch for each coil.

Water-Cooled Condenser(s) may require cleaning of scale (water deposits). Condensers are best cleaned with an inhibited hydrochloric acid solution such as Oakite 32.

Use caution while cleaning. Acid will stain hands and clothing and attack concrete. Without inhibitor, it can attack steel. Cover surroundings to guard against splashing. Vapors from vent pipe

(Fig. 22 and 23) are not harmful but take care to prevent liquid from being carried over with the vapor. Warm solution acts more readily but cold solution applied for a longer time is just as effective.

Two cleaning methods are described here:

GRAVITY FLOW METHOD (Fig. 22) – Do not add solution faster than vent can exhaust generated gases. When condenser is full, allow solution to remain overnight, then drain condenser and flush with clean water. Follow acid manufacturer's instructions.

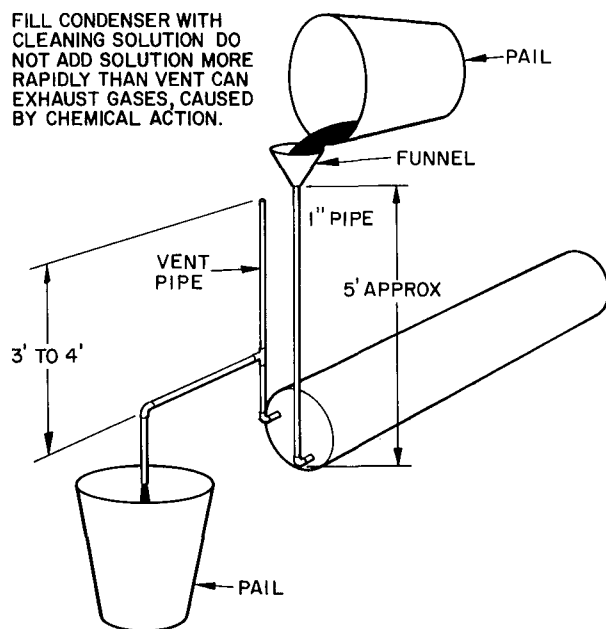


Fig. 22 – Gravity Flow Method

FORCED CIRCULATION METHOD (Fig. 23) – Fully open vent pipe when filling condenser. Vent may be closed when condenser is full and pump is operating. Regulate flow to condenser with supply line valve. If pump is a nonoverloading type, valve may be fully closed when pump is running.

For average scale deposit, allow solution to remain in condenser overnight. For heavy deposits, allow 24 hours. Drain condenser and then flush with clean water. Follow acid manufacturer's instructions.

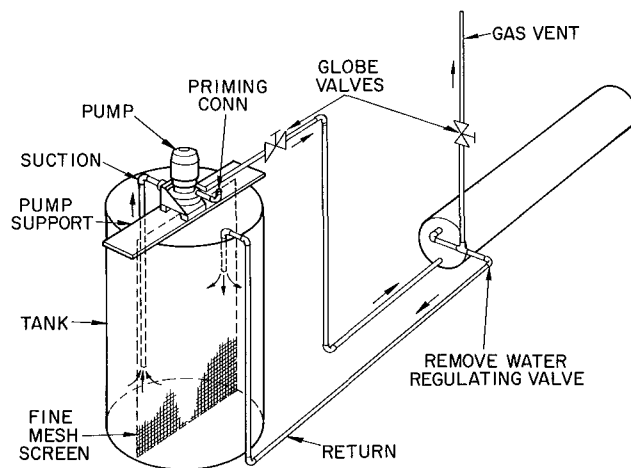


Fig. 23 – Forced Circulation Method

Air-Cooled Condensers – Periodically inspect and clean depending on operating conditions. Follow the service instructions provided with the air-cooled condenser used.

Sight Glasses are provided at the inlet of each expansion valve. Units may be field charged by using the sight glass (see Charging the System).

Charging the System

UNITS WITH WATER-COOLED CONDENSER (50BJ) – Units are shipped with a full operating charge of refrigerant. If recharging is necessary (complete charge lost) weigh in amount of refrigerant indicated on unit nameplate and Table 1.

If unit has a partial charge, unit may be charged with sight glass using standard charging techniques. See Carrier Standard Service Techniques Manual entitled Chapter 1, Refrigerants for applicable procedures.

Adjust the water regulating valve to proper saturated condensing temperature (168 to 226 psig).

UNITS WITH AIR-COOLED CONDENSER (50BK) – Units are shipped with a holding charge only. Open suction and discharge line service valves. Blow holding charge, evacuate and leak test system. Add sufficient refrigerant vapor to permit continuous operation after starting unit.

For replacement items use Carrier Specified Parts.

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

Book	1
Tab	2a

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