

Installation, Start-Up and Service Instructions

NOTE: When installing 50BJP,BKP units with product integrated controls (PIC), use these installation instructions in conjunction with the installation instructions supplied with the 50BJP,BKP unit.

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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 this 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.

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 35 Series Modubox® and 37 Series Moduline® variable-air volume (VAV) air terminals. For air terminal installation and service, refer to the separate 35 Series and 37 Series installation booklets.

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

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

Size 50BJ,BK044-064 are shipped with all components assembled, piped and wired.

INSTALLATION

The 50BJ,BK units are intended for indoor installation only.

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 Corporation immediately.*

Step 2 — Protect Unit From Damage — To maintain warranty, protect unit against adverse weather, theft and vandalism on jobsite.

Step 3 — Provide Unit Support — Refer to Fig. 1 and Tables 1a and 1b for unit size and weight. Floor unit loading should be adequate to support unit.

Step 4 — Rig and Place Unit With Accessories — Collect all unit parts together and move them to actual installation site. 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 package or skids until unit is at final position. Follow rigging label instructions to prevent cabinet damage during unit positioning. **DO NOT USE CHAINS.** Raise base skid on blocks and remove bolts. Unbolt fan section from skid (028 and 034 units only).

If any 39 Series accessories (e.g. filters) are to be used on 50BJ,BK044-064 units, refer to latest 39 Series Installation Instructions. The 50BJ,BK044-064 units do not contain installed filters or racks.

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

NOTE: Unit sizes 50BJ,BK044-064 skip to Step 7, Align Fan Shaft and Wheel on page 12.

Step 5 — Position Fan Section As Desired

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

NOTE: If factory configured vertical discharge is desired, proceed to Step 8, Install Field-Fabricated Ductwork on page 13.

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

1. Remove:
 - a. Rear fan-section panel.
 - b. Upper rear coil-section panel.
 - c. Power connections from evaporator-fan motor.
 - d. Corner bolts holding fan section to coil section.
2. Remove fan section and rotate it 180 degrees lengthwise so that motor is on left side of unit.
3. Place fan section on rear of coil section and refasten.
4. Replace evaporator-fan motor wire and conduit.
5. Align fan shaft and wheel.

Horizontal Wheel Centering — All wheels must be horizontally centered between the inside edges of their fan scroll venturis (Fig. 2).

Adjust as follows:

- a. Loosen setscrews holding wheel support to shaft (Fig. 3).
- b. Center the wheel by sliding it horizontally (Fig. 2).
- c. Retighten setscrews.

Concentric Alignment — Shaft and wheels must be concentrically centered with the venturi or air inlet of the fan housing.

Bearings are bolted to supports. To correct shaft and wheel concentric misalignment:

- a. Loosen bearing support bolts and shim or move as required.
- b. Retighten bearing support bolts.

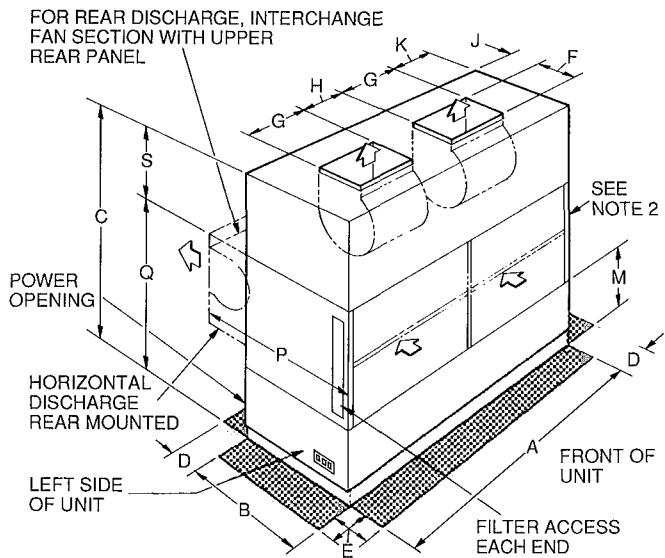
Horizontal Shaft Alignment — If the shaft has moved and all wheels are off horizontal center, recenter the shaft as follows:

- a. Loosen setscrews holding bearing locking collar at each end of shaft.
- b. Slide shaft and wheel assembly horizontally until wheels are horizontally centered (Fig. 2).
- c. Slide the bearing locking collars against the bearing race; turn in direction of shaft rotation until tight.
- d. Retighten locking collar setscrews.

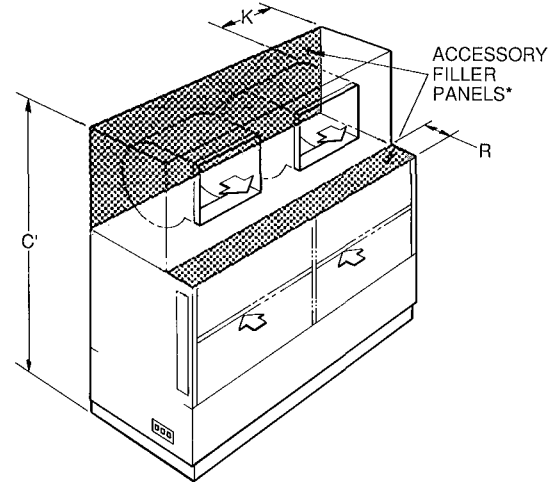
Fan, Pulley and Belt Adjustment — Refer to Evaporator-Fan Adjustment section on page 24.

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.

(Instructions continued on page 8.)

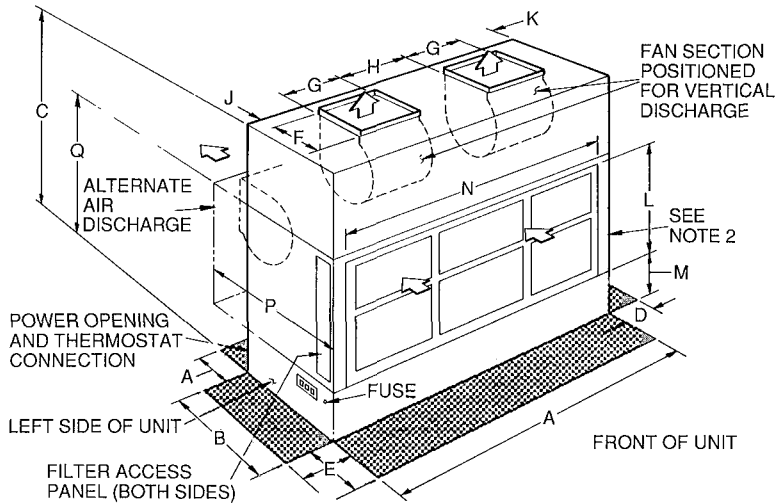


OPTIONAL TOP HORIZONTAL DISCHARGE



*For optional top-mounted horizontal discharge, use accessory filler panel package as shown. See unit price pages for accessory part number.

UNITS 50BJ, BK016, 024



UNITS 50BJ, BK028, 034

NOTES:

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



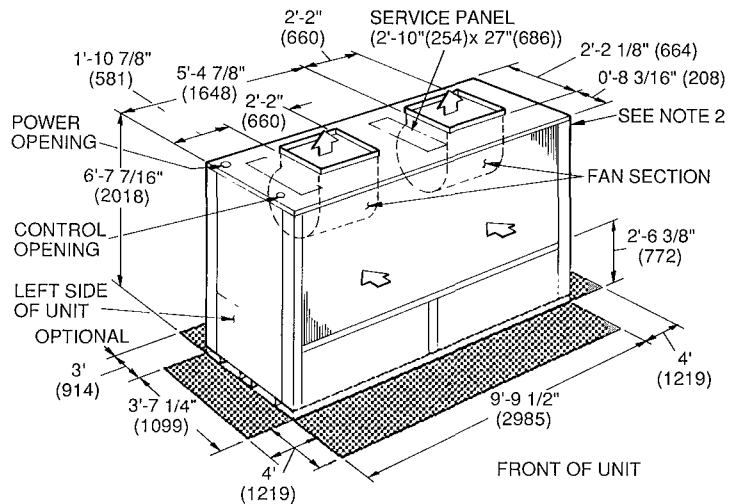
SERVICE ACCESS AREA



AIRFLOW

DIMENSIONS

UNIT 50BJ, BK	016	024	028	034
	ft.-in.	mm	ft.-in.	mm
A	6- 8	2032	7- 9 1/4	2369
B	2- 4	711	2-11 1/4	895
C	6-10 1/2	2096	8- 0 1/8	2442
D	7- 3 1/2	2223	13- 7 1/4	4147
E	2- 0	610	2- 0	610
F	3- 0	914	3- 0	914
G	1- 3 3/4	400	1- 8 7/8	530
H	1- 2 5/8	371	1- 8 7/8	530
I	1- 4 1/4	413	1- 7 7/8	505
J	0- 1 5/8	41	0- 2 3/8	60
K	2- 0	610	1- 4	406
L	—	—	3- 2 1/4	972
M	1- 8	508	2- 1 1/8	638
N	—	—	7- 4 1/4	2242
P	4- 4 5/8	1337	5- 4 1/8	1629
Q	4-11 1/2	1511	5- 7 1/4	1708
R	0- 5	127	0- 6 1/2	165
S	1-11	584	2- 4 3/4	730



UNITS 50BJ, BK044-064

NOTES:

1. Certified dimension drawings available on request
2. Water and refrigerant connections for unit sizes 50BJ, BK044-064 are located on right side of unit. Refer to Make Condenser Connection Section on page 13 for connection details
3. Filters are not supplied with base unit. All models are directly compatible with 39 Series (size 36) air-handling unit components. Refer to 39 Series literature for physical data for accessories
4. Fan section positioned for standard vertical discharge. For horizontal and alternate vertical discharge, see certified prints.
5. Dimensions in () are in millimeters

Fig. 1 – Unit Dimensions

Table 1a – Physical Data (English)

UNIT 50	BJ BK		BJ BK		BJ BK		BJ BK		BJ BK		BJ BK		BJ BK	
	016		024		028		034		044		054		064	
NOMINAL CAPACITY (tons)	15		20		25		30		40		50		60	
OPERATING WEIGHT (lb)	1420	1225	1900	1470	2500	2335	2610	2440	3660	3155	3888	3298	4030	3305
REFRIGERANT	R-22													
Operating Charge (lb)														
System 1	24	15	17	7	24	15	24	15	26	18	33	18	34	18
System 2	—	—	17	7	17	12	24	15	26	18	33	18	34	18
COMPRESSOR — TYPE 06	Serviceable Hermetic, 1750 Rpm													
System 1	DC337	DC537	DC724	DC824	DC337	DC537	DC337	DC537	E2150	E2250	E7265	E7265	E7175	E7275
System 2	—	—	DA724	DA824	DA724	DA824	DA337	DA537	EA150	EA250	EA150	EA250	EF175	EF275
No. of Unloading Cylinders	4	—	4	—	4	—	4	—	2	2	4	4	4	4
No. of Capacity Steps	3	—	6	—	6	—	6	—	4	4	6	6	6	6
HPS Setting (psig)	280	376	280	376	275	376	275	376	†	426	†	426	†	426
LPS Setting (psig)	27	—	27	—	27	—	27	—	27	27	27	27	27	27
TT (Non-Cleanable) CONDENSER (BJ Only)														
No. ...Type	1...SC		2 . SC		2...SC		2...SC		2 .TT		2 .TT		2 .TT	
Max. Working Pressure (psig)	550		150**		550		550		400		400		400	
HPS Setting (psig)	—		—		—		—		426		426		426	
Connection Size (in.)														
Water Inlet (Quantity) Size...Type	(1) 2	FPT	(1) 2.5	FPT	1.5 + 2	FPT	(2) 2	FPT	(2) 2½	IDF	(2) 2½	IDF	(2) 2½	IDF
Water Outlet (Quantity) Size...Type	(1) 2	FPT	(1) 2.5	FPT	1.5 + 2...	FPT	(2) 2	FPT	(1) 3½	IDF	(1) 3½...	IDF	(1) 3½	IDF
ST (Cleanable) CONDENSER (BJ Only)														
No. ...Type	—		—		—		—		2 .ST		2 .ST		2 .ST	
Max. Working Pressure (psig)	—		—		—		—		150		150		150	
HPS Setting (psig)	—		—		—		—		280		280		280	
Connection Size (in.)														
Water Inlet (Quantity) Size...Type	—		—		—		—		(2) 2 FPT		(1) 2, (1) 2.5 FPT		(2) 2.5 FPT	
Water Outlet (Quantity) Size...Type	—		—		—		—		(2) 2 FPT		(1) 2, (1) 2.5. FPT		(2) 2.5 FPT	
Condenser Pressure Relief														
Connection Size (in.)...Type	—		—		—		—		¾ SAE Flare		¾. SAE Flare		¾ SAE Flare	
Setting (psig)	—		—		—		—		350		350		350	
CONDENSER (BK only)														
Connection (Quantity) Size (in.)...Type														
Liquid Discharge	(1) ¾	ODM	(2) ¾	ODM	(2) ¾	..ODM	(2) ¾	ODM	(2) ¾	ODS	(2) ¾	ODS	(2) ¾	ODS
	(1) 1½	...ODM	(2) ¾	...ODM	(1) ¾ + 1½	...ODM	(2) 1½	...ODM	(2) 1½	ODS	(2) 1½	ODS	(2) 1½	...ODS
CONDENSATE CONNECTION														
Condensate Drain Size (in.)...Type	1...FPT		1 . FPT		1¼ .MPT		1¼ .MPT		1½ FPT		1½ FPT		1½ . FPT	
EVAPORATOR COIL	Copper Tubes — Aluminum Plate Fins													
No. of Rows...Fins/in.	3 .11 0		4 ..11 0		4 . 10 7		4 ..14.6		3...15		4...15		4...15	
Total Face Area (sq ft)	16 3		17.4		21.9		24.8		37 5		37 5		37 5	
RETURN-AIR FILTERS	Factory Supplied — Disposable													
No. ...Size (in.)	3	16 x 25 x 2	3	16 x 25 x 2	6	25 x 20 x 2	6	25 x 20 x 2	None	††	None	††	None	††
	3	20 x 25 x 2	3	20 x 25 x 2	2...	16 x 20 x 2	2...	16 x 20 x 2	None	††	None	††	None	††
EVAPORATOR FAN	Adjustable, Belt-Driven Centrifugal; 1750 Rpm Motor													
Number	2		2		2		2		2		2		2	
Size (in.)	15 x 11		15 x 11		18 x 18		18 x 18		20 x 10		20 x 18		20 x 18	
Nominal Cfm	6,000		8,000		10,000		12,000		16,000		20,000		24,000	
Maximum Allowable Rpm	1,200		1,200		1,100		1,100		1,200		1,200		1,200	
Fan Shaft Diameter — (in.)	1⅞		1⅞		1⅞		1⅞		1⅞		1⅞		1⅞	

Table 1a – Physical Data (English) (cont)

UNIT 50	BJ	BK	BJ	BK	BJ	BK	BJ	BK	BJ	BK	BJ	BK
	016	024	028	034	044	054	064					
STANDARD MOTOR												
Motor Size (hp)	3 0	5 0	7 5	7 5	15.0	20.0	25.0					
Frame Size	182T	184T	213T	213T	254T	256T	284T					
No. of Belts...Fan Pulley PD (in.)	1 9.0	2 9.0	2 10 6	2 10 6	2 18 7	2 18 7	2 18 7					
Motor Pulley A Diameter (in.)	4 5-5 5	4 6-5 6	6 5	6 5	9.0	9.75	9.75					
Motor Pulley B Diameter (alternate) (in.)	—	—	5 6	5 6	10 3	10 9	10 9					
Motor Efficiency (%)	79	84	84	84	85 8	86 3	87 0					
Motor Shaft Diameter (in.)	1 1/8	1 1/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8					
Center to Center (standard & horizontal)	8 8-11 1	8 8-11 1	29 8-33 3	29 8-33 3	17 9-21 1	17 9-21 1	17 0-20 4					
Center to Center (alternate top discharge)	—	—	—	—	18 4-22 0	18 4-22 0	17 6-21 5					
Fan Speed (rpm)	875-1069	894-1089	925	925	842	912	912					
Pulley A	—	—	1073	1073	964	1020	1020					
Pulley B	—	—	—	—	—	—	—					
ALTERNATE MOTOR NO. 1												
Motor Size (hp)	5 0	7 5	10.0	10.0	20.0	25.0	30.0					
Frame Size	184T	213T	215T	215T	256T	284T	286T					
No. of Belts...Fan Pulley PD (in.)†	—	—	—	—	2 18 7	2 18 7	2 18 7					
Motor Pulley A Diameter	—	—	—	—	10 9	10 9	10 9					
Motor Pulley B Diameter (alternate)	—	—	—	—	11 8	12.5	11 8					
Motor Efficiency (%)	—	—	—	—	86 3	87 0	92 2					
Motor Shaft Diameter (in.)	—	—	—	—	1 3/8	1 3/8	1 3/8					
Center to Center (standard & horizontal)	—	—	—	—	17 9-21 1	17 0-20 4	17 0-20 4					
Center to Center (alternate top discharge)	—	—	—	—	18 4-22 0	17 6-21 5	17 6-21 5					
Fan Speed (rpm)	—	—	—	—	—	—	—					
Pulley A	—	—	—	—	1020	1020	1020					
Pulley B	—	—	—	—	1104	1170	1104					
ALTERNATE MOTOR NO. 2												
Motor Size (hp)	—	—	—	—	25.0	30.0	40.0					
Frame Size	—	—	—	—	284T	286T	324T					
No. of Belts...Fan Pulley PD (in.)†	—	—	—	—	2 16 0	2 16 0	2 16 0					
Motor Pulley A Diameter	—	—	—	—	10 9	10 9	10 9					
Motor Pulley B Diameter (alternate)	—	—	—	—	11 8	11 8	11 8					
Motor Efficiency (%)	—	—	—	—	87 0	92 2	92 5					
Motor Shaft Diameter (in.)	—	—	—	—	1 3/8	1 3/8	2 1/8					
Center to Center (standard & horizontal)	—	—	—	—	17 0-20 4	17 0-20 4	17 9-19 0					
Center to Center (alternate top discharge)	—	—	—	—	17 6-21 5	17 6-21 5	17 5-19 5					
Fan Speed (rpm)	—	—	—	—	—	—	—					
Pulley A	—	—	—	—	1192	1192	1192					
Pulley B	—	—	—	—	1291	1291	1291					

LEGEND

HPS — High-Pressure Switch
LPS — Low-Pressure Switch
ODS — Outside Diameter Solder
PD — Pitch Diameter
SAE — Society of Automotive Engineers
SC — Shell and Coil
ST — Shell and Tube
TT — Tube-in-Tube

NOTES:

*Operating charge for 50BK units does not include charge for matching air-cooled condenser or refrigerant connecting piping. All 50BK units are shipped with a holding charge. Operating charge values are approximate.

†Refer to type of condenser (TT or ST) for 50BJ044-064 HPS setting.

**Condenser working pressure is 550 psig if factory-installed dresser adapters are removed and field-fabricated manifold is installed. Refer to Installation Step 11, Make Condenser Connections, page 13.

††No filters are supplied with the 50BJ,BK044-064 base units. Refer to 39 Series literature (size 36) for accessory information.

‡Alternate motors and drives for 016-034 units must be purchased locally. Installation may require field modification. On sizes 044-064, alternate motor is available as a factory-installed option (except on size 064, 575-v unit), but may require field modification if locally purchased and field installed.

§Fan motor pulleys on 50BJ,BK028-064 are fixed-pitch type. The smallest of the 2 pulleys is factory installed on 044-064 units.

Table 1b – Physical Data (SI)

UNIT 50	BJ BK		BJ BK		BJ BK		BJ BK		BJ BK		BJ BK			
	016		024		028		034		044		054		064	
NOMINAL CAPACITY (kW)	4.5		6.8		8.0		9.6		12.5		15.0		18.0	
OPERATING WEIGHT (kg)	644	555	862	667	1134	1059	1184	1107	1660	1431	1764	1496	1828	1499
REFRIGERANT	R-22													
Operating Charge (kg)	10.9		6.8		7.7		6.8		10.9		8.2		15.4	
System 1	—		7.7		7.7		10.9		11.8		15.0		15.4	
System 2	—		3.2		3.2		6.8		8.2		8.2		8.2	
COMPRESSOR — TYPE 06	Serviceable Hermetic, 29 R/s													
System 1	DC337	DC537	DC724	DC824	DC337	DC537	DC337	DC537	E2150	E2250	E7265	E7265	E7175	E7275
System 2	—	—	DA724	DA824	DA724	DA824	DA337	DA537	EA150	EA250	EA150	EA250	EF175	EF275
No. of Unloading Cylinders	4		4		4		4		2		4		4	
No. of Capacity Steps	3		6		6		6		4		6		6	
HPS Setting (kPa)	1931	2593	1931	2593	1896	2593	1896	2593	†	2937	†	2937	†	2937
LPS Setting (kPa)	186		186		186		186		186		186		186	
TT (non-cleanable) CONDENSER (BJ only)														
No. ...Type	1...SC		2...SC		2...SC		2...SC		2...TT		2...TT		2...TT	
Max. Working Pressure (kPa)	3792		1034*		3792		3792		2758		2758		2758	
HPS Setting (kPa)	—		—		—		—		2937		2937		2937	
Connection Size (in.)	—		—		—		—		—		—		—	
Water Inlet (Quantity) Size...Type	(1) 2 FPT		(1) 2.5 .FPT		1.5 + 2 FPT		(2) 2 FPT		(2) 2 1/2 IDF		(2) 2 1/2 IDF		(2) 2 1/2 IDF	
Water Outlet (Quantity) Size...Type	(1) 2 .FPT		(1) 2.5 .FPT		1.5 + 2...FPT		(2) 2...FPT		(1) 3 1/2 .IDF		(1) 3 1/2 .IDF		(1) 3 1/2 .IDF	
ST (cleanable) CONDENSER (BJ only)														
No. ...Type	—		—		—		—		2...ST		2...ST		2...ST	
Max. Working Pressure (kPa)	—		—		—		—		1034		1034		1034	
HPS Setting (kPa)	—		—		—		—		1931		1931		1931	
Connection Size (in.)	—		—		—		—		—		—		—	
Water Inlet (Quantity) Size...Type	—		—		—		—		(2) 2 .FPT		(1) 2, (1) 2.5 .FPT		(2) 2.5 .FPT	
Water Outlet (Quantity) Size...Type	—		—		—		—		(2) 2 .FPT		(1) 2, (1) 2.5 .FPT		(2) 2.5 .FPT	
Condenser Pressure Relief Connection Size (in.)...Type	—		—		—		—		5/8 SAE Flare 2413		5/8 SAE Flare 2413		5/8 SAE Flare 2413	
Setting (kPa)	—		—		—		—		—		—		—	
CONDENSER (BK only)														
Connection (Quantity) Size (in.)...Type														
Liquid Discharge	(1) 5/8 ODM		(2) 5/8 ODM		(2) 5/8 .ODM		(2) 5/8 ODM		(2) 7/8 .ODS		(2) 7/8 ODS		(2) 7/8 .ODS	
	(1) 1 1/2 .ODM		(2) 7/8 .ODM		(1) 1 1/2 + 1 1/8 .ODM		(2) 1 1/8 ODM		(2) 1 3/8 .ODS		(2) 1 3/8 ODS		(2) 1 3/8 .ODS	
CONDENSATE CONNECTION														
Condensate Drain Size (in.)...Type	1 .FPT		1 FPT		1 1/4 MPT		1 1/4...MPT		1 1/2 FPT		1 1/2...FPT		1 1/2...FPT	
EVAPORATOR COIL														
No. of Rows...Fins/m	3.. 40		4.. 40		4.. 39		4.. 53		3.. 55		4.. 55		4.. 55	
Total Face Area (sq m)	1.5		1.6		2.0		2.3		3.5		3.5		3.5	
RETURN-AIR FILTERS	Factory-Supplied — Throwaway													
No. ...Size (mm)	3 406 x 635 x 50				6 635 x 508 x 50				None		None		None	
	3...508 x 635 x 50				2...406 x 508 x 50				††		††		††	
EVAPORATOR FAN	Adjustable, Belt-Driven Centrifugal; 29 R/s													
Number	2		2		2		2		2		2		2	
Size (mm)	367 x 270		367 x 270		441 x 441		441 x 441		490 x 245		490 x 441		490 x 441	
Nominal L/s	2831		3775		4719		5663		7550		9438		11,326	
Maximum Allowable R/s	20		20		18		18		20		20		20	
Fan Shaft Diameter (mm)	30		30		43		43		43		43		43	

Table 1b — Physical Data (SI) (cont)

UNIT 50	BJ	BK	BJ	BK	BJ	BK	BJ	BK	BJ	BK	BJ	BK
	016		024		028		034		044		054	064
STANDARD MOTOR												
Motor Size (kW)	2.2		3.7		5.6		5.6		11.2		14.9	18.6
Frame Size	182T		184T		213T		213T		254T		256T	284T
No. of Belts...Fan Pulley PD (mm)	1..229		2..229		2..269		2..269		2..475		2..475	2..475
Motor Pulley A Diameter (mm)	114-140		117-142		165		165		229		248	248
Motor Pulley B Diameter (alternate) (mm)	—		—		142		142		262		277	277
Motor Efficiency (%)	79		84		84		84		85.8		86.3	87.0
Motor Shaft Diameter (mm)	29		29		35		35		41		41	48
Center to Center (standard and horizontal)	224-282		224-282		757-846		757-846		455-536		455-536	432-518
Center to Center (alternate top discharge)	—		—		—		—		467-559		467-559	447-546
Fan Speed (R/s)	—		—		—		—		—		—	—
Pulley A	14.6-17.8		14.9-18.2		15.4		15.4		14.0		15.2	15.2
Pulley B	—		—		17.9		17.9		16.1		17.0	17.0
ALTERNATE MOTOR NO. 1												
Motor Size (kW)	3.7		5.6		7.5		7.5		14.9		18.6	22.4
Frame Size	184T		213T		215T		215T		256T		284T	286T
No. of Belts...Fan Pulley PD (mm)	—		—		—		—		2..475		2..475	2..475
Motor Pulley A Diameter (mm)	—		—		—		—		277		277	277
Motor Pulley B Diameter (alternate) (mm)	—		—		—		—		300		318	300
Motor Efficiency (%)	—		—		—		—		86.3		87.0	92.2
Motor Shaft Diameter (mm)	—		—		—		—		41		48	48
Center to Center (standard and horizontal)	—		—		—		—		455-536		432-518	432-518
Center to Center (alternate top discharge)	—		—		—		—		467-559		447-546	447-546
Fan Speed (R/s)	—		—		—		—		—		—	—
Pulley A	—		—		—		—		17.0		17.0	17.0
Pulley B	—		—		—		—		18.4		19.5	18.4
ALTERNATE MOTOR NO. 2												
Motor Size (kW)	—		—		—		—		18.6		22.4	29.8
Frame Size	—		—		—		—		284T		286T	324T
No. of Belts...Fan Pulley PD (mm)	—		—		—		—		2..406		2..406	2..406
Motor Pulley A Diameter (mm)	—		—		—		—		277		277	277
Motor Pulley B Diameter (alternate) (mm)	—		—		—		—		300		300	300
Motor Efficiency (%)	—		—		—		—		87.0		92.2	92.5
Motor Shaft Diameter (mm)	—		—		—		—		48		48	54
Center to Center (standard and horizontal)	—		—		—		—		432-518		432-518	455-483
Center to Center (alternate top discharge)	—		—		—		—		447-546		447-546	445-495
Fan Speed (R/s)	—		—		—		—		—		—	—
Pulley A	—		—		—		—		19.8		19.8	19.8
Pulley B	—		—		—		—		21.5		21.5	21.5

LEGEND

HPS	—	High-Pressure Switch
LPS	—	Low-Pressure Switch
ODS	—	Outside Diameter Solder
PD	—	Pitch Diameter
SAE	—	Society of Automotive Engineers
SC	—	Shell and Coil
ST	—	Shell and Tube
TT	—	Tube-in-Tube

NOTES:

*Operating charge for 50BK units does not include charge for matching air-cooled condenser or refrigerant connecting piping. All 50BK units are shipped with a holding charge. Operating charge values are approximate.

†Refer to type of condenser (TT or ST) for 50BJ044-064 HPS setting.

**Condenser working pressure is 3792 kPa if factory-installed dresser adapters are removed and field-fabricated manifold is installed. Refer to Installation Step 11, Make Condenser Connections, page 13.

††No filters are supplied with the 50BJ, BK044-064 base units. Refer to 39 Series literature (size 36) for accessory information.

‡Alternate motors and drives for 016-034 units must be purchased locally. Installation may require field modification. On sizes 044-064, alternate motor is available as a factory-installed option (except on size 064, 575-v unit), but may require field modification if locally purchased and field installed.

§Fan motor pulleys on 50BJ, BK028-064 are fixed-pitch type. The smallest of the 2 pulleys is factory installed on 044-064 units.

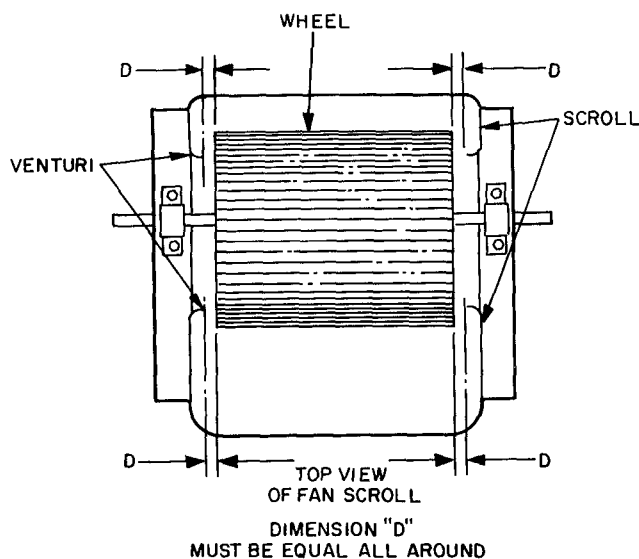


Fig. 2 - Horizontal Wheel Centering

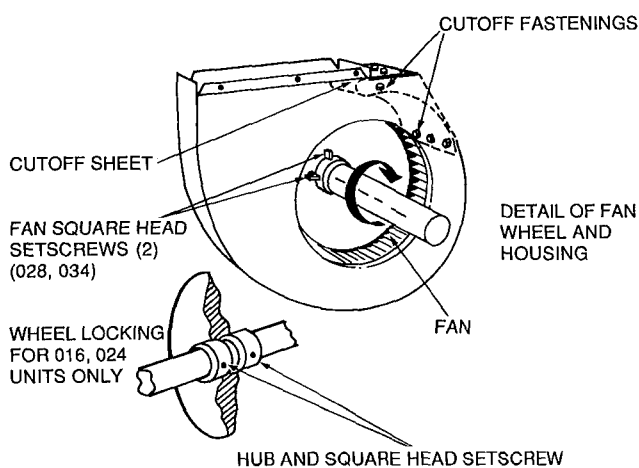


Fig. 3 - Fan Locking Detail

UNIT SIZES 50BJ, BK028 AND 034 — These units are shipped in sections. 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 unit sizes 50BJ, BK028 and 034 up for horizontal discharge (Fig. 4), 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. 4). Secure with fasteners provided.
3. Install fan motor. 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:

- a. Fasten motor mounting angle bracket to fan section. Use Fig. 4 or 5 for position reference and Fig. 6 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.
 - b. Position motor on motor plate (Fig. 7) and fasten with fasteners provided.
 - c. Lift motor-plate assembly and slide into motor mounting angles as shown in Fig. 6. Plate fits into angle slots. On vertical mounts, the motor mounting assembly can be lowered to bottom of motor support channels.
 - d. Assemble and install motor adjusting screws as shown in Fig. 8. Drive roll pins into screws to prevent the screws from backing out during motor position adjustment.
 - e. Adjust motor position. Fasten motor mounting plate to mounting angles.
4. Align fan shaft and wheel.

Horizontal Wheel Centering — All wheels must be horizontally centered between the inside edges of their fan scroll venturis (Fig. 2).

Adjust as follows:

- a. Loosen fan wheel square head setscrews on each side of fan support (Fig. 3).
- b. Center wheel by sliding it horizontally (Fig. 2).
- c. Retighten locking setscrews to torque specified in Table 2.

Concentric Alignment — Shaft and wheels must be concentrically centered with the venturi or air inlet of the fan housing.

Bearings are bolted to supports. To correct shaft and wheel concentric misalignment:

- a. Loosen bearing support bolts and shim or move as required.
- b. Retighten bearing support bolts.

Horizontal Shaft Alignment — If the shaft has moved and all wheels are off horizontal center, recenter the shaft as follows:

- a. Loosen setscrews holding bearing locking collar at each end of shaft.
- b. Slide shaft and wheel assembly horizontally until wheels are horizontally centered (Fig. 2).
- c. Slide the bearing locking collars against the bearing race; turn in direction of shaft rotation until tight.
- d. Retighten locking collar setscrews.

Fan, Pulley and Belt Adjustment — Refer to Evaporator-Fan Adjustment section on page 24.

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. 4).
- b. All end panels.

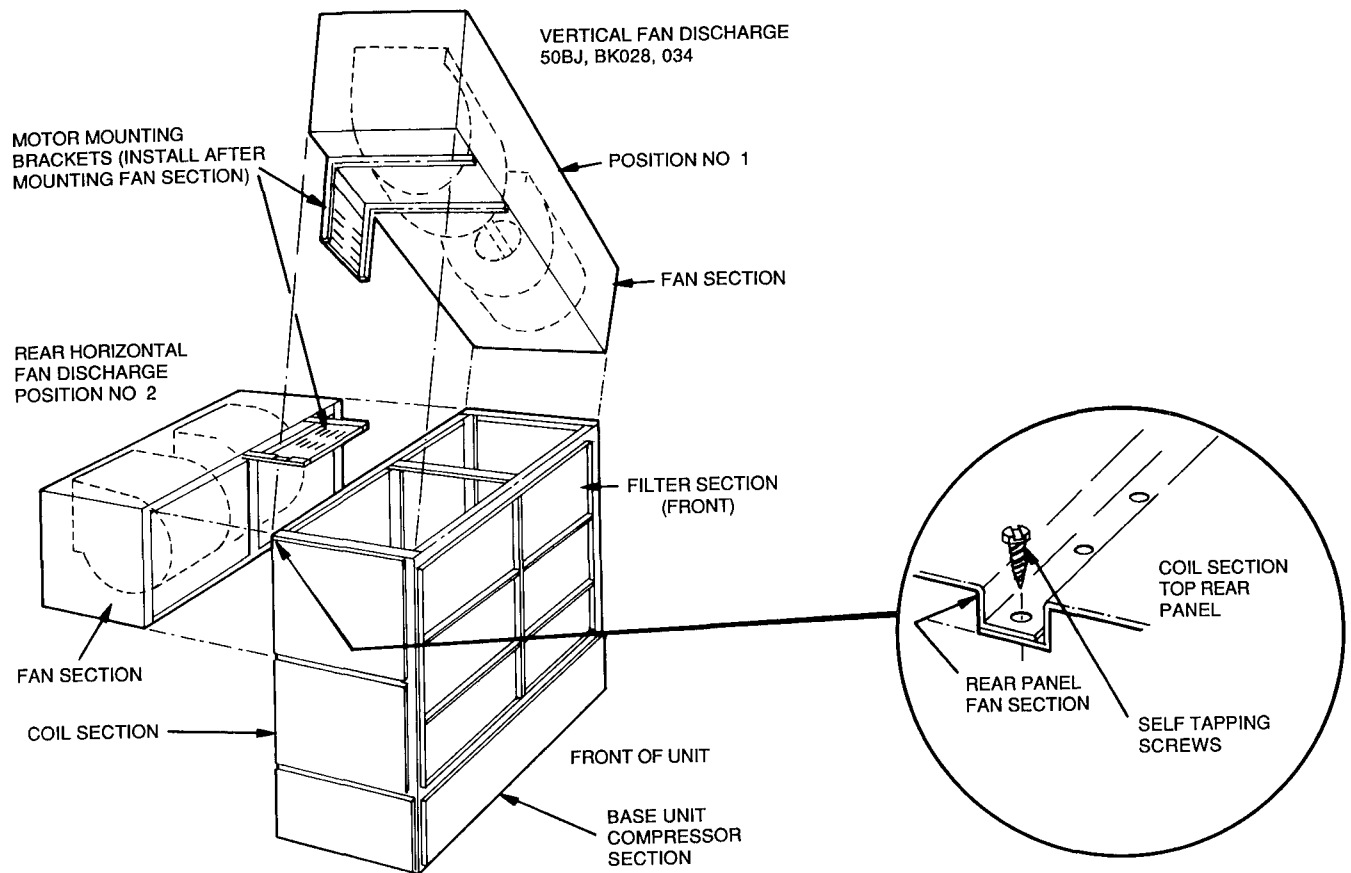
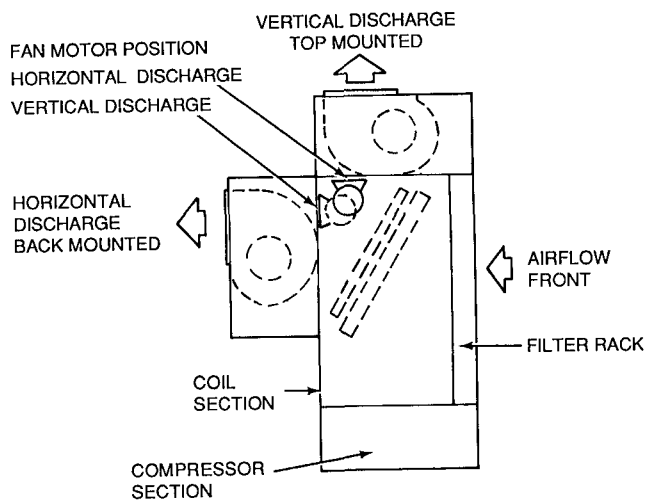


Fig. 4 – Fan Mounting (028, 034 Units)



NOTE Motor pulley should be on left side of unit for vertical discharge. Motor pulley should be on right side of unit for horizontal discharge.

**Fig. 5 – Fan and Motor Arrangements
50BJ,BK028,034**

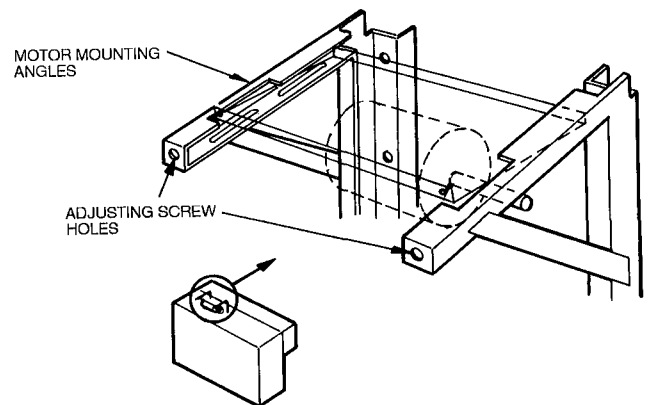


**Fig. 6 – 50BJ,BK028 and 034 Horizontal
Fan Motor Mounting Angles**

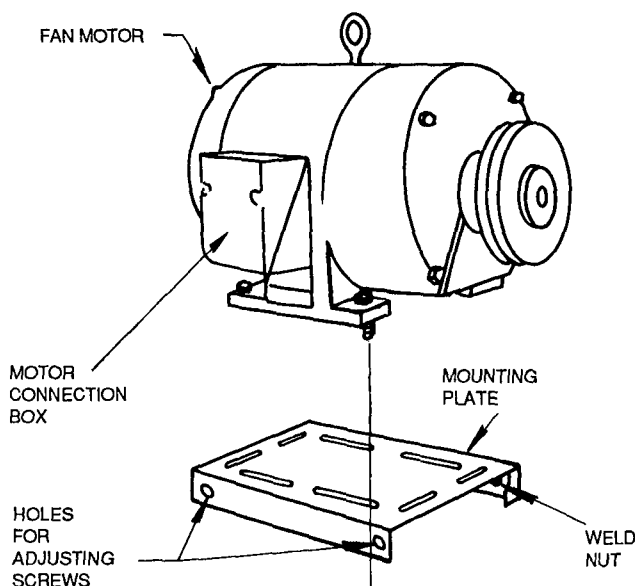
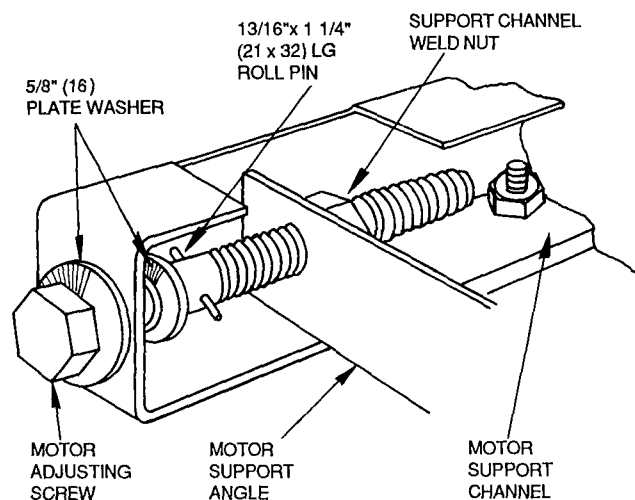


Fig. 7 — 50BJ, BK028 and 034 Motor Mounting



NOTE: Dimensions in () are in millimeters.

Fig. 8 — Assembled Fan Motor Adjusting Screw

To set unit sizes 50BJ, BK028 and 034 up for vertical discharge (Fig. 4):

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 frame out and away from coil section frame.
2. Lift up and position fan section on coil section (Fig. 4).

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 fan motor. 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:

- a. Fasten motor mounting angle bracket to fan section. Use Fig. 4 or 5 for position reference and Fig. 6 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.
- b. Position motor on motor plate (Fig. 7) and fasten with fasteners provided.
- c. Lift motor-plate assembly and slide into motor mounting angles as shown in Fig. 6. Plate fits in angle slots. On vertical mounts, the motor mounting assembly can be lowered to bottom of motor support channels.
- d. Assemble and install motor adjusting screws as shown in Fig. 8. Drive roll pins into screws to prevent the screws from backing out during motor position adjustment.
- e. Adjust motor position. Fasten motor mounting plate to mounting angles.

5. Align fan shaft and wheel.

Horizontal Wheel Centering — All wheels must be horizontally centered between the inside edges of their fan scroll venturis (Fig. 2).

Adjust as follows:

- a. Loosen fan wheel square head setscrews on each side of fan support (Fig. 3).
- b. Center wheel by sliding it horizontally (Fig. 2).
- c. Retighten locking setscrews to torque specified in Table 2.

Concentric Alignment — Shaft and wheels must be concentrically centered with the venturi or air inlet of the fan housing.

Bearings are bolted to supports. To correct shaft and wheel concentric misalignment:

- a. Loosen bearing support bolts and shim or move as required.
- b. Retighten bearing support bolts.

Horizontal Shaft Alignment — If the shaft has moved and all wheels are off horizontal center, recenter the shaft as follows:

- a. Loosen setscrews holding bearing locking collar at each end of shaft.
- b. Slide shaft and wheel assembly horizontally until wheels are horizontally centered (Fig. 2).
- c. Slide the bearing locking collars against the bearing race; turn in direction of shaft rotation until tight.
- d. Retighten locking collar setscrews.

Fan, Pulley and Belt Adjustment — Refer to Evaporator Fan Adjustment section on page 24.

6. Replace panels as follows:

- a. Rear coil-section panels, front and rear fan-section panels.
- b. All end panels.

Step 6 — Route Fan Motor Wire (Unit 50BJ,BK 028 and 034 only) — Fan motor must be field wired. Fan motor wires are factory supplied, and are located in the coil section. *Proper wire routing is essential to the operation of these units. Follow wire routing instructions carefully.*

⚠ CAUTION

Turn off electrical power to base unit before routing wiring to fan motor.

CHECK EQUIPMENT — Refer to Fig. 9 and 10 for location of base unit components. Fan motor wiring is shipped coiled on top of evaporator coil. Wire tie locations are shown in Fig. 9, 10 and 11.

ROUTE WIRING

⚠ CAUTION

Route wiring with sufficient slack to permit motor adjustment. Wiring should not be pinched or touch any moving parts or sharp edges.

Vertical Discharge (Fig. 4, Position No. 1) — Run wiring through wire tie No. 1 (Fig. 11) on motor mounting bracket to the fan motor and secure. Route wiring from wire tie around motor side of mounting bracket to fan motor connection box on top of motor (Fig. 7). Cut off and discard excess wire. Refer to base unit label diagram for wiring connection details.

Horizontal Discharge (Fig. 4, Position No. 2) — Run wiring through wire tie No. 2 and 3 (Fig. 11) to the fan motor and secure. Run wiring to connection box at back of motor (Fig. 7). Cut off and discard excess wire. Refer to unit label diagram for wiring connection details.

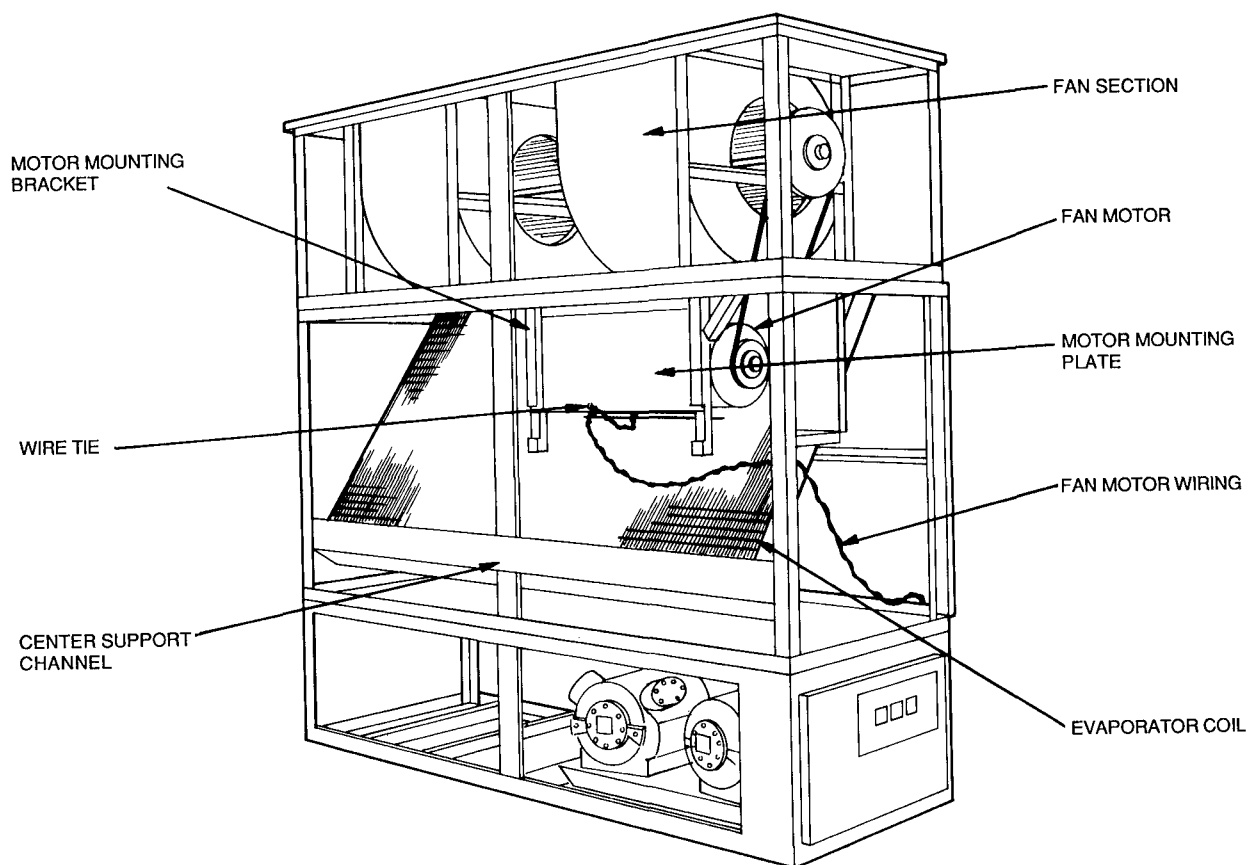


Fig. 9 — Typical 50BJ,BK028,034 Unit — Vertical Discharge

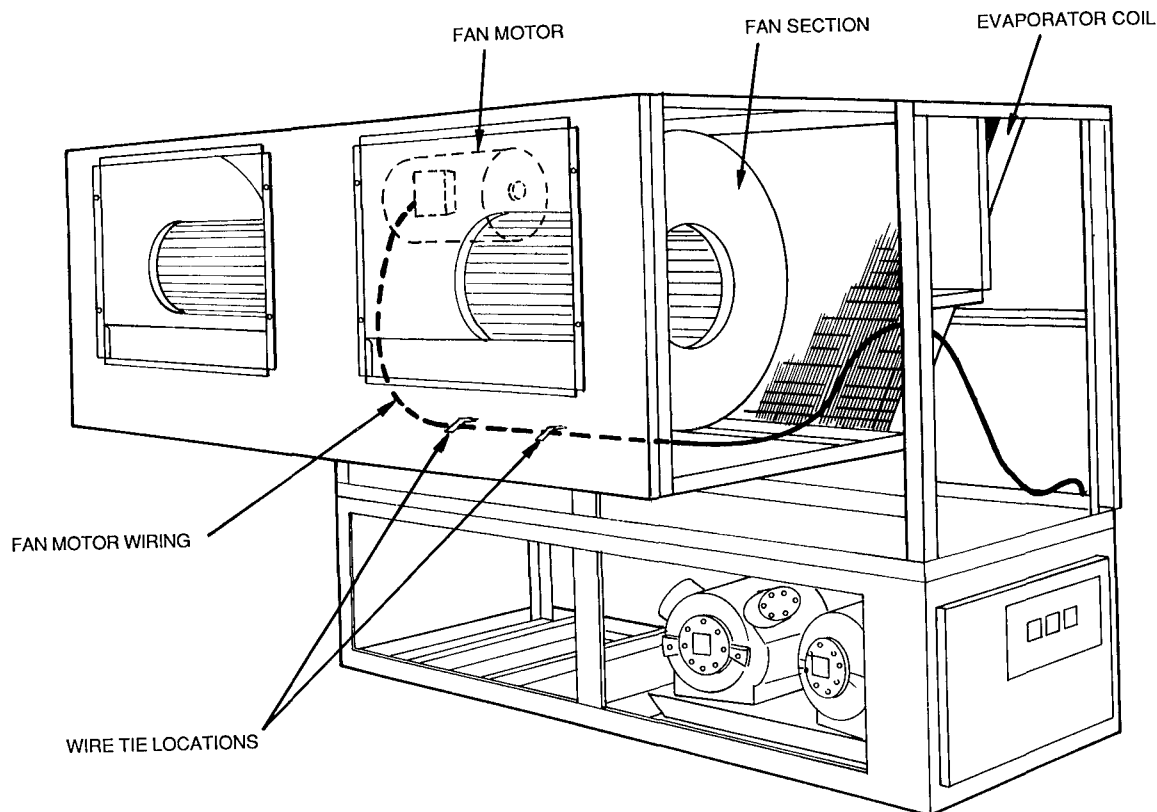


Fig. 10 - Typical 50BJ,BK028,034 Unit - Horizontal Discharge

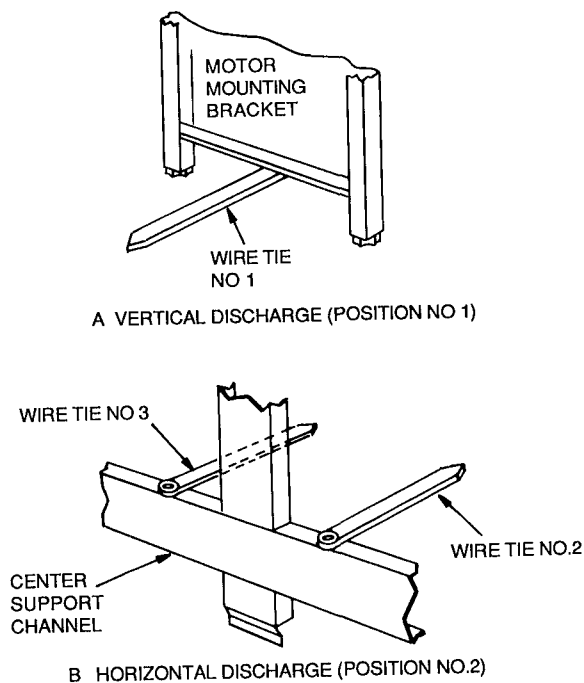


Fig. 11 - Wire Tie Locations

Step 7 - Align Fan Shaft and Wheel (50BJ,BK044-064 only)

HORIZONTAL WHEEL CENTERING - All wheels must be horizontally centered between the inside edges of their fan scroll venturis (Fig. 2).

Adjust as follows:

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

CONCENTRIC ALIGNMENT - Shaft and wheels must be concentrically centered with the venturi or air inlet of the fan housing.

Bearings are bolted to supports. To correct shaft and wheel concentric misalignment:

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

Table 2 - Setscrew Torque Requirements

BOLT SIZE (in.)	RECOMMENDED TORQUE	
	Lb-ft	Kg-m
5/16	15-18	2.08-2.49
3/8	22-25	3.04-3.46

HORIZONTAL SHAFT ALIGNMENT — 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.
2. Slide shaft and wheel assembly horizontally until wheels are horizontally centered (Fig. 2).
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 Evaporator-Fan Adjustment section on page 24.

Step 8 — Install Field-Fabricated Ductwork —

Connect ducts to unit using flexible connections as required. Duct angles are supplied with each 50BJ,BK044-064 unit. Install duct angles at duct openings using flexible connections. Connect supply ducts to flanges. Supply ducts should not be manifolded together for *at least* 4 ft (1.2 m).

Attach ductwork to building structure and insulate. Add a vapor barrier to reduce sound transmission and prevent vapor condensation.

Weatherproof external ductwork, joints, and 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 to prevent condensation and heat gain.

Step 9 — Check Return-Air Filters (50BJ,BK016-034 only) — Be sure that the filters shipped with the unit are the correct size; refer to Tables 1a and 1b. *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 through a washer, lockwasher and compressor foot into a weld nut.

To adjust spring mounts for start-up:

1. Loosen and remove each bolt (4 per compressor) until compressor floats free on springs.
2. Remove and discard washer and lockwasher.
3. Take bag provided with compressor and remove grommet and new washer.
4. Install grommet and new washer.
5. Replace and tighten bolts so that there is slight pressure on grommet. This will steady compressor and prevent start and stop rocking.

The compressors have reversible oil pumps that operate in either direction; therefore the direction of rotation need not be checked.

Step 11 — Make Condenser Connections

WATER-COOLED (50BJ) — Condensers have water inlet and outlet connections as shown in Fig. 12A and 12B. Piping arrangements for city, waste, or recirculating water are shown in Fig. 13-16.

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. Refer to Fig. 13-16 for typical applications and conversions.

To make connections:

1. Connect the regulating valve capillary to a back-seated liquid service valve or compressor, as shown in Fig. 14-16. Arrow on valve body must point in direction of water flow.
2. After connecting capillary, open regulating valve one turn from back-seated position.
3. Adjust valve as required to maintain proper condensing temperature.
4. Install full-size gate valve and strainer in the water supply line. See maximum working pressures in Table 3. Valve and strainer must be accessible.

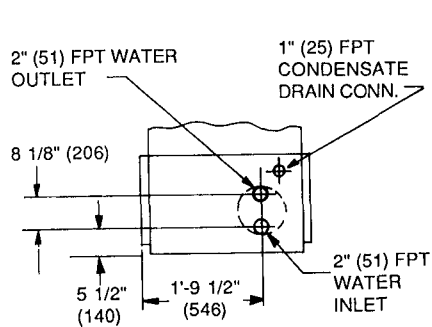
The 50BJ units with cleanable condensers also have refrigerant pressure relief valves. The connections are shown in Fig. 12B. Most local codes require that a relief valve be vented directly to the outdoors. The vent line must not be smaller than the relief line connection, which is a 3/8-in SAE (Society of Automotive Engineers) flare connection.

Table 3 — Maximum Water-Side Working Pressure

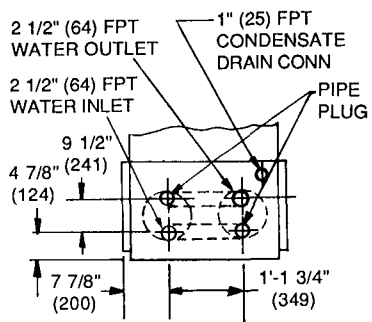
UNIT SIZE 50BJ,BK	MAXIMUM WORKING PRESSURE	
	psig	kPa Gage
016	550	3792
024	150*	1034
028,034	550	3792
044,054,064	400	2758
044,054,064†	150	1034

*550 psig (3792 kPa gage) if factory-installed dresser adapters are removed and field-fabricated manifold is installed.

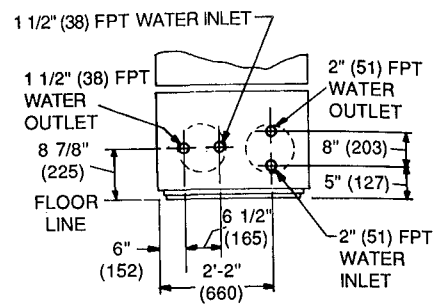
†With cleanable condensers.



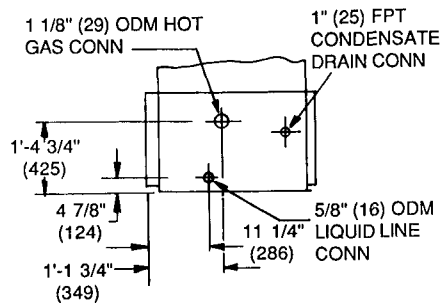
50BJ016



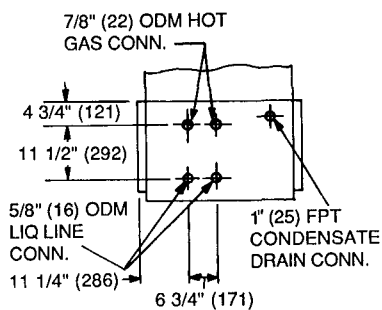
50BJ024



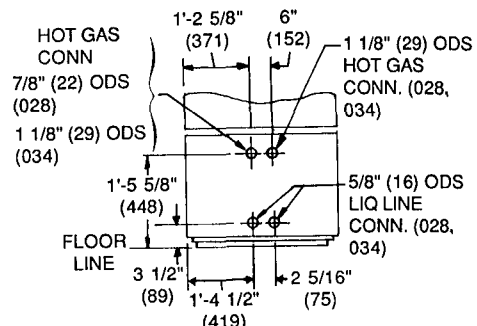
50BJ028



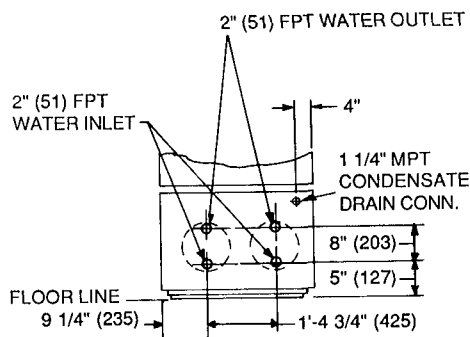
50BK016



50BK024

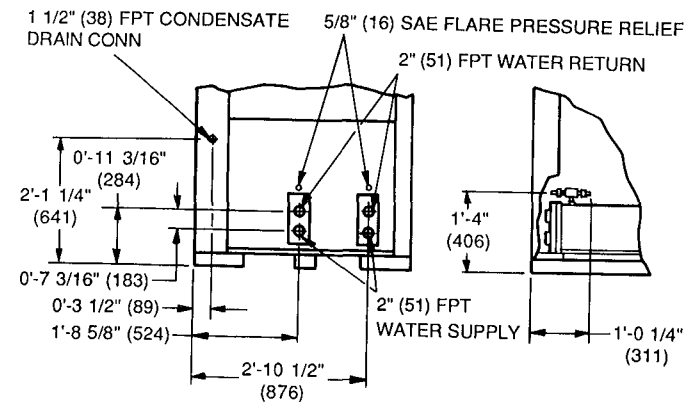


50BK028,034

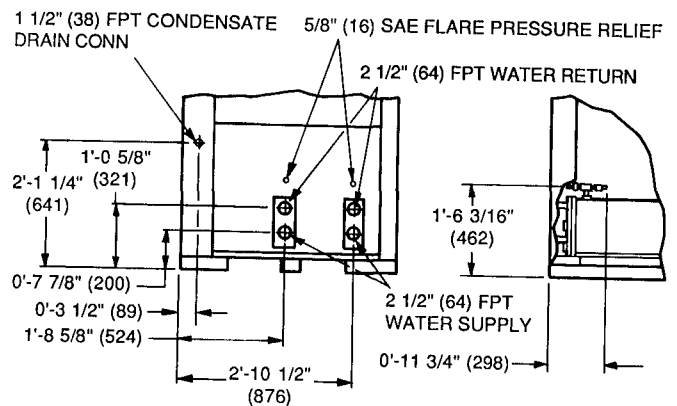


50BJ034

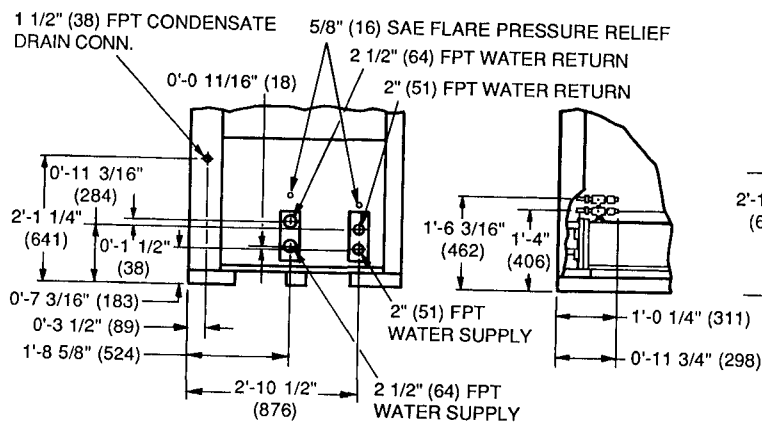
Fig. 12A — Water and Refrigerant Connections, 50BJ,BK016-034 Units
With Tube-In-Tube Non-Cleanable Condensers



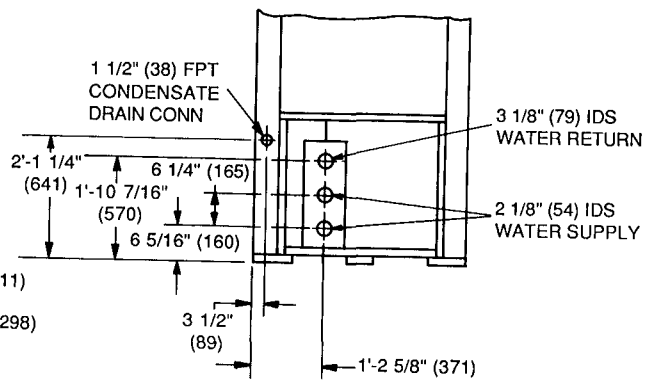
50BJ044
With Shell and Tube Cleanable Condensers



50BJ064
With Shell and Tube Cleanable Condensers



50BJ054
With Shell and Tube Cleanable Condensers



50BJ044-064
With Tube-In-Tube Non-Cleanable Condensers

LEGEND FOR FIG. 12A AND 12B

IDS — Inside Diameter Sweat
ODS — Outside Diameter Sweat
SAE — Society of Automotive Engineers

NOTES FOR FIG. 12A AND 12B:
1. Dimensions in () are in millimeters.
2. All views are right end views.

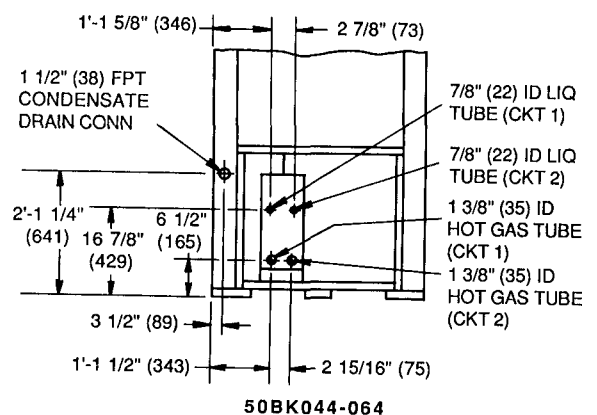
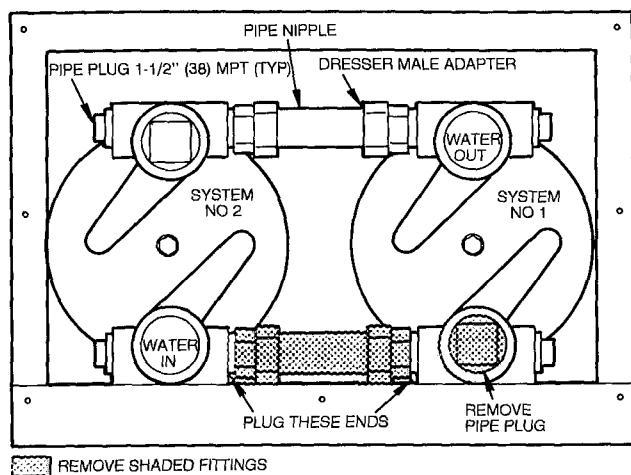
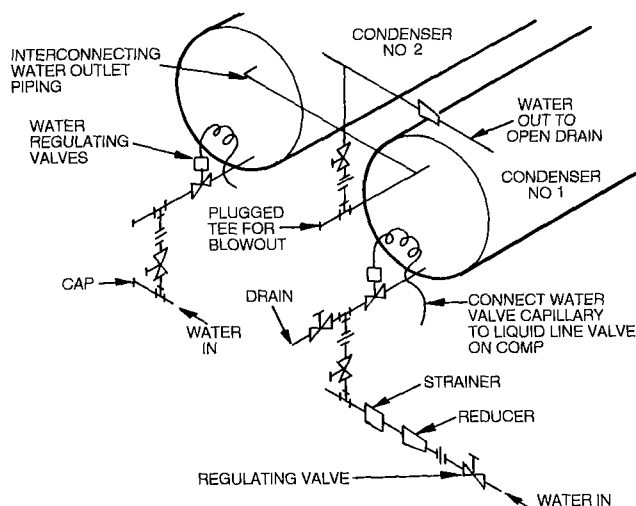


**Fig. 12B — Water and Refrigerant Connections,
50BJ,BK044-064 Units**



NOTE: Dimensions in () are in millimeters.

Fig. 13 - 50BJ024 City Water Condenser Piping Conversion



NOTE: All items except condensers are field supplied.

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

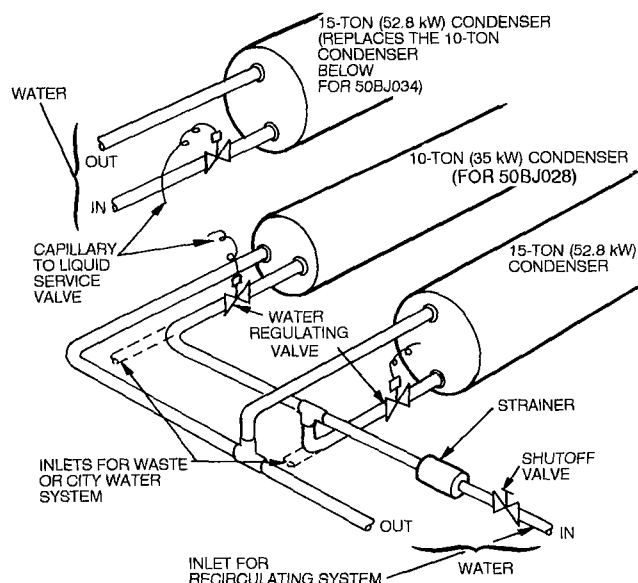
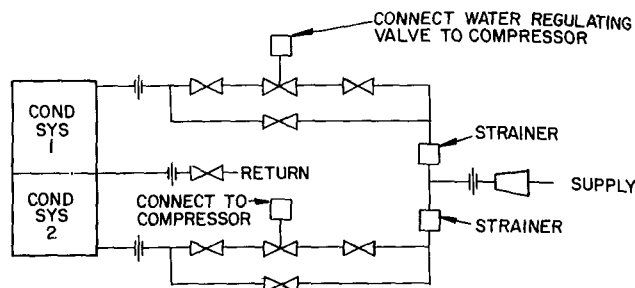


Fig. 15 - 50BJ028 and 034 Condenser Water Piping



NOTE: Nominal supply and return lines must be sized to provide required gallons per minute at condenser. All supply piping and valves are 2 inches. Return piping is 3 inches. Condensate drain is 1 1/2 in. FPT. A field-supplied and installed external trap is required.

Fig. 16 - 50BJ044-064 Condenser Water Piping

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

Consult Carrier System Design Manual for standard refrigerant piping techniques. Connection locations for liquid and hot gas service lines are shown in Fig. 12A and 12B. Recommended line sizes are listed in Table 4.

Condenserless (50BK) units are shipped with a holding charge. After refrigerant connections are made, reclaim refrigerant, leak-test and charge the system as described in Charging the System section on page 27.

Table 4 - Recommended Line Sizes (in.) (50BK Condenserless Units)

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
044	1, 2	7/8	1 3/8	7/8	1 3/8	7/8	1 3/8	7/8	1 5/8
054	1, 2	7/8	1 3/8	7/8	1 3/8	7/8	1 3/8	7/8	1 5/8
064	1, 2	7/8	1 3/8	7/8	1 3/8	7/8	1 3/8	7/8	1 5/8

LEGEND

HG — Hot Gas (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. 12A and 12B). The drain requires standard pipe connected to condensate pan nipple as shown in Table 5. 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 evaporator fan. Always assume the worst conditions, such as having return-air filters clogged with dirt.

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.

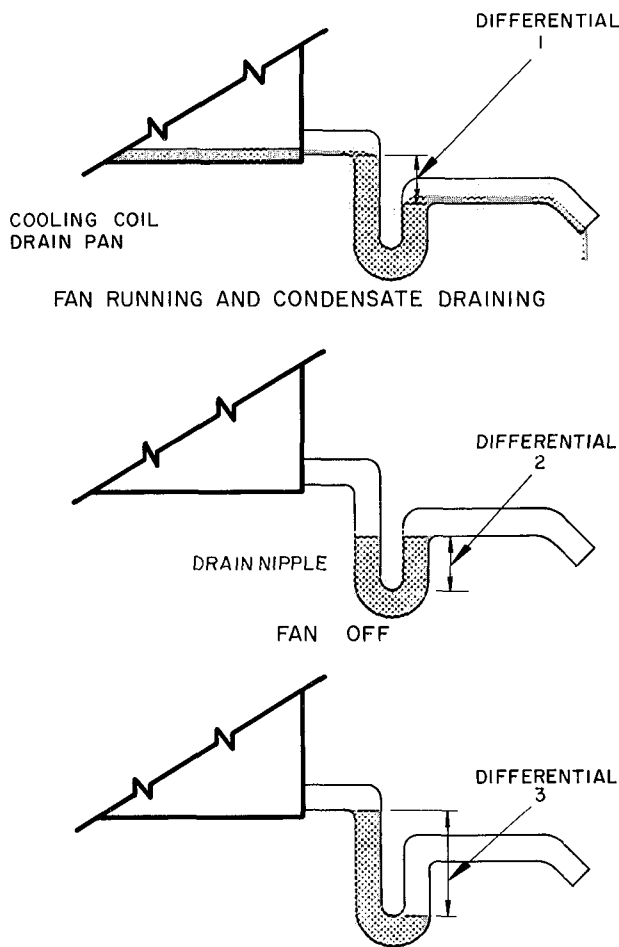


Fig. 17 — Condensate Drain

Do not use drain line smaller than size listed in Table 5. If required, cut hole in panel for drain line. Pitch drain downward toward an open drain sump. Provide a trap at least 3 in. (76 mm) high. Installation of a plugged tee is recommended for cleaning. Fill trap with water to make an air seal. Observe all sanitary codes.

Table 5 — Condensate Drain Connections (in.)

UNIT SIZE	016,024	028,034	044-064
PIPE SIZE (MPT)	1	1¼	1½

Step 13 — Make Electrical Connections

GENERAL — Provide an adequate fused disconnect switch per NEC (National Electrical Code) within sight from the unit. Provision for locking switch open (OFF) is recommended to prevent power from being turned on when unit is being serviced.

On all units, power may be supplied through a branch circuit. Branch circuit protection is provided in these units by manual reset circuit breakers. Branch circuit must be in accordance with NEC or local code, whichever takes precedence. Power supplied to auxiliary equipment, such as fan motors for air-cooled condenser or for cooling tower, must be run separately.

POWER WIRING — Conduit opening for 016-034 units is on the back of the unit near the control box. Conduit opening for 044-064 units is on top of the unit near the control box. Refer to Fig. 1 for exact location. On all sizes, field power connections are made at a terminal block within the control box (see Fig. 18). Refer to Table 6 for maximum wire size at terminal block.

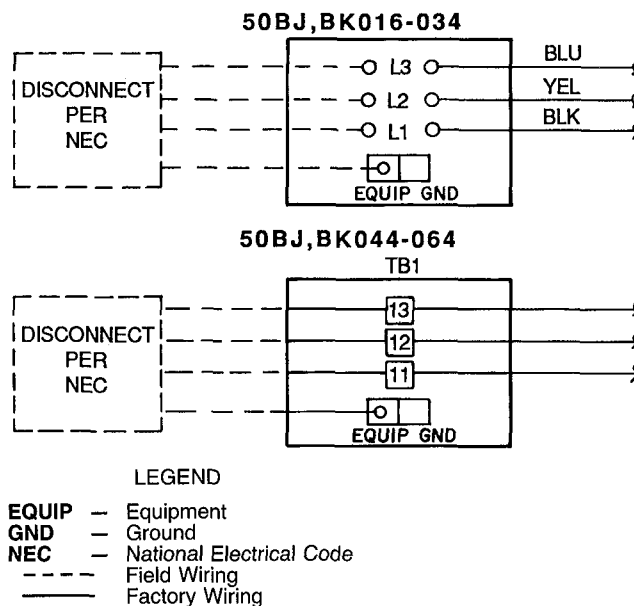


Fig. 18 — Field Power Wiring Connections

Table 6 — Maximum Wire Size for Power Terminal Block*

VOLTS-PHASE	UNIT 50BJ,BK				
	016	024	028,034	044	054,064
208/230-3	2/0	2/0	350	350	500
460-3	2/0	2/0	2/0	350	350
575-3	2/0	2/0	2/0	350	350

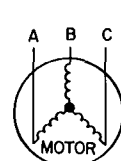
*Select wire size per NEC and connect supply wires to factory-supplied pigtail wire connectors.

Supply voltage must be in accordance with nameplate voltage. On 3-phase units, voltage between phases must be balanced within 2% and current within 10% with compressor running. If supply voltage is not in accordance with nameplate voltage, a phase imbalance may occur. Voltage at compressor must be within the minimum and maximum shown in Tables 7 and 8.

Contact local power company for line voltage corrections. Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent voltage imbalance:

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

Example: Supply voltage is 240-3-60.



AB = 243 v
BC = 236 v
AC = 238 v

$$\text{Average Voltage} = \frac{243 + 236 + 238}{3}$$

$$\text{Average Voltage} = \frac{717}{3} = 239 \text{ v}$$

Determine maximum deviation from average voltage:

$$(AB) 243 - 239 = 4 \text{ v}$$

$$(BC) 239 - 236 = 3 \text{ v}$$

$$(AC) 239 - 238 = 1 \text{ v}$$

Maximum deviation is then 4 v. To determine the percent voltage imbalance:

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{239} = 1.7\%$$

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

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

Compressor operation on improper line voltage or excessive phase imbalance may be considered abuse, and any resulting damage may not be covered by Carrier warranty.

All wiring must be in accordance with local or NEC regulations.

CONTROL WIRING — On extended voltage (208/230-v) units, control transformer is factory wired for 208-v usage. If unit is to be used on 230-v system, reconnect primary wiring on transformer as shown on unit wiring diagram.

For field control wiring to the condenser-fan relay (50BK units) or pump relay (50BJ units), refer to Fig. 19.

To control remote condenser-fan motor (50BK units) or remote condenser water pump (50BJ units), connect pilot

relay (Carrier part number HN61KK041) across appropriate terminals (see chart below) on terminal board 2 (TB2). Pilot relay can be mounted inside control box using factory pre-drilled holes. Pilot relay (double-pole, double-throw) can carry a maximum of 125 va at 120/250 v at either 50 or 60 Hz.

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

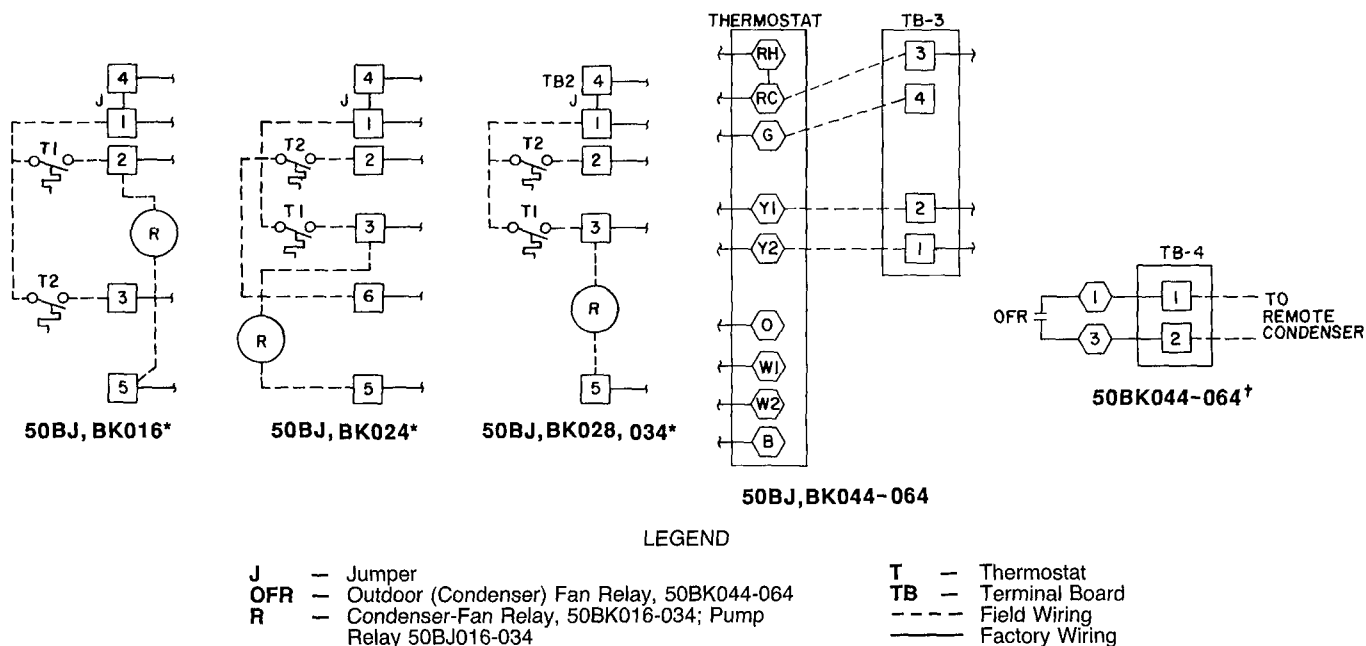
Pilot Relay Terminal Connections

UNIT	TERMINAL NUMBERS
50BJ,BK016-034	2, 5
50BJ,BK044-064	6, 7

FREEZE PROTECTION THERMOSTAT — An accessory freeze protection thermostat is required on size 016-034 units when the low-pressure switch setting is lowered, or when a liquid line low-pressure switch is installed for intermediate or cold weather operation. Installation instructions are shipped with the thermostat.

WINTER START-UP PACKAGE — On 50BK044-064 units, an accessory winter start-up package is available, providing a 3-minute time delay by bypassing the low-pressure switch on each compressor. This enables each compressor to start even during low ambient conditions.

HEATING COILS — Accessory heating coils are available for field installation. Separate installation instructions are shipped with the accessory (016-034 only). For 50BJ,BK044-064 units, refer to the latest 39 Series (size 36) literature.



*Requires high-voltage thermostat (115-v or 230-v)

†Contact rating 125 va at 120/230-v

Fig. 19 — Control Wiring Connections

Table 7 — Electrical Data, 50BJ Units

UNIT	V-PH-HZ	VOLTAGE RANGE		COMP 1		COMP 2		EVAPORATOR-FAN MOTOR		POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	Hp	FLA	MCA*	MOCP†
50BJ016	208/230-3-60	187	254	50.0	191	—	—	3	9.2	71.7	110
	460-3-60	414	508	22.1	86	—	—	3	4.6	32.2	50
	575-3-60	518	632	17.9	69	—	—	3	3.7	26.2	40
50BJ024	208/230-3-60	187	254	36.0	137	36.0	137	5	13.2	94.2	125
	460-3-60	414	508	16.0	62	16.0	62	5	6.6	42.6	50
	575-3-60	518	632	12.9	50	12.9	50	5	5.6	35.1	45
50BJ028	208/230-3-60	187	254	49.3	191	35.7	137	7½	22.0	120.0	150
	460-3-60	414	508	22.2	86	16.0	62	7½	11.0	54.8	70
	575-3-60	518	632	18.0	69	13.0	50	7½	8.7	44.2	60
50BJ034	208/230-3-60	187	254	49.3	191	49.3	191	7½	22.0	132.9	175
	460-3-60	414	508	22.2	86	22.2	86	7½	11.0	61.0	80
	575-3-60	518	632	18.0	69	18.0	69	7½	8.7	49.2	60
50BJ044	208/230-3-60	187	254	57.9	283	57.9	283	15	46.2	176.5	225
	460-3-60	414	508	26.5	142	26.5	142	15	21.0	80.6	100
	575-3-60	518	632	22.2	98	22.2	98	15	15.4	65.4	80
50BJ044 Alt Motor 1	208/230-3-60	187	254	57.9	283	57.9	283	20	59.4	190.0	225
	460-3-60	414	508	26.5	142	26.5	142	20	27.0	86.8	110
	575-3-60	518	632	22.2	98	22.2	98	20	20.0	70.0	90
50BJ044 Alt Motor 2	208/230-3-60	187	254	57.9	283	57.9	283	25	74.8	209.3	250
	460-3-60	414	508	26.5	142	26.5	142	25	34.0	95.5	125
	575-3-60	518	632	22.2	98	22.2	98	25	25.6	76.4	100
50BJ054	208/230-3-60	187	254	80.8	446	60.0	283	20	59.4	220.4	300
	460-3-60	414	508	35.8	223	26.5	142	20	27.0	98.3	125
	575-3-60	518	632	30.0	164	22.2	98	20	20.0	79.7	100
50BJ054 Alt Motor 1	208/230-3-60	187	254	80.8	446	60.0	283	25	74.8	235.8	300
	460-3-60	414	508	35.8	223	26.5	142	25	34.0	105.3	125
	575-3-60	518	632	30.0	164	22.2	98	25	25.6	85.3	110
50BJ054 Alt Motor 2	208/230-3-60	187	254	80.8	446	60.0	283	30	88.0	250.8	300
	460-3-60	414	508	35.8	223	26.5	142	30	40.0	112.3	150
	575-3-60	518	632	30.0	164	22.2	98	30	30.0	89.7	110
50BJ064	208/230-3-60	187	254	91.5	446	91.5	446	25	74.8	280.7	350
	460-3-60	414	508	42.6	253	42.6	253	25	34.0	129.9	150
	575-3-60	518	632	32.2	164	32.2	164	25	25.6	98.1	125
50BJ064 Alt Motor 1	208/230-3-60	187	254	91.5	446	91.5	446	30	88.0	293.9	350
	460-3-60	414	508	42.6	253	42.6	253	30	40.0	135.9	175
	575-3-60	518	632	32.2	164	32.2	164	30	30.0	102.5	125
50BJ064 Alt Motor 2	208/230-3-60	187	254	91.5	446	91.5	446	40	96.0	303.0	350
	460-3-60	414	508	42.6	253	42.6	253	40	48.0	145.2	175

LEGEND

FLA — Full Load Amps
Hp — Nominal Horsepower
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection Device (amps)
NEC — National Electrical Code
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 (Refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse only

NOTES:

1. Compressor circuit breakers are current sensitive and temperature compensated to ensure compressor cutoff if current draw becomes excessive. Breakers must be manually reset.
2. Internal protection with automatic reset deenergizes the control circuit if extreme compressor motor temperature should occur from motor overloading.
3. Low- and high-pressure switches automatically shut off compressor(s) if refrigerant pressure exceeds switch settings.
4. Evaporator-fan motor circuit breaker protects against motor overload. Breaker requires manual reset.
5. The 50BJ units are ETL (Electrical Testing Laboratories) listed at 208/230 and 460 v and CSA (Canadian Standards Association) certified at all voltages.
6. Three-phase voltage imbalance shall not exceed 2%.
7. Wire sizing amps are a sum of 125% of the FLA for largest motor plus 100% of FLA for all other motors in the unit.
8. All motors are internally protected against primary single-phasing condition.

Table 8 — Electrical Data, 50BK Units

UNIT	V-PH-HZ	VOLTAGE RANGE		COMP 1		COMP 2		EVAPORATOR-FAN MOTOR		POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	Hp	FLA	MCA*	MOCP†
50BK016	208/230-3-60	187	254	50.0	191	—	—	3	9.2	71.7	110
	460-3-60	414	508	22.1	86	—	—	3	4.6	32.2	50
	575-3-60	518	632	17.9	69	—	—	3	3.7	26.2	40
50BK024	208/230-3-60	187	254	36.0	137	36.0	137	5	13.2	94.2	125
	460-3-60	414	508	16.0	62	16.0	62	5	6.6	42.6	50
	575-3-60	518	632	12.9	50	12.9	50	5	5.6	35.1	45
50BK028	208/230-3-60	187	254	49.3	191	39.7	198	7½	22.0	141.7	150
	460-3-60	414	508	22.2	86	19.9	99	7½	11.0	67.2	90
	575-3-60	518	632	18.0	69	15.9	79	7½	8.7	53.4	60
50BK034	208/230-3-60	187	254	49.3	191	49.3	191	7½	22.0	132.9	175
	460-3-60	414	508	22.2	86	22.2	86	7½	11.0	61.0	80
	575-3-60	518	632	18.0	69	18.0	69	7½	8.7	49.2	60
50BK044	208/230-3-60	187	254	77.2	345	77.2	345	15	46.2	219.9	250
	460-3-60	414	508	35.8	173	35.8	173	15	21.0	101.6	125
	575-3-60	518	632	30.0	120	30.0	120	15	15.4	82.9	110
50BK044 Alt Motor 1	208/230-3-60	187	254	77.2	345	77.2	345	20	59.4	233.1	300
	460-3-60	414	508	35.8	173	35.8	173	20	27.0	107.6	125
	575-3-60	518	632	30.0	120	30.0	120	20	20.0	87.5	110
50BK044 Alt Motor 2	208/230-3-60	187	254	77.2	345	77.2	345	25	74.8	248.5	300
	460-3-60	414	508	35.8	173	35.8	173	25	34.0	114.6	150
	575-3-60	518	632	30.0	120	30.0	120	25	25.6	93.1	110
50BK054	208/230-3-60	187	254	101.5	446	77.2	345	20	59.4	263.5	350
	460-3-60	414	508	48.6	223	37.9	173	20	27.0	125.7	150
	575-3-60	518	632	38.6	164	30.0	120	20	20.0	98.3	125
50BK054 Alt Motor 1	208/230-3-60	187	254	101.5	446	77.2	345	25	74.8	278.9	350
	460-3-60	414	508	48.6	223	37.9	173	25	34.0	132.7	175
	575-3-60	518	632	38.6	164	30.0	120	25	25.6	103.9	125
50BK054 Alt Motor 2	208/230-3-60	187	254	101.5	446	77.2	345	30	88.0	292.1	350
	460-3-60	414	508	48.6	223	37.9	173	30	40.0	138.7	175
	575-3-60	518	632	38.6	164	30.0	120	30	30.0	108.3	125
50BK064	208/230-3-60	187	254	120.0	506	120.0	506	25	74.8	344.8	450
	460-3-60	414	508	56.5	253	56.5	253	25	34.0	161.1	200
	575-3-60	518	632	42.9	176	42.9	176	25	25.6	122.1	150
50BK064 Alt Motor 1	208/230-3-60	187	254	120.0	506	120.0	506	30	88.0	358.0	450
	460-3-60	414	508	56.5	253	56.5	253	30	40.0	167.1	200
	575-3-60	518	632	42.9	176	42.9	176	30	30.0	126.5	150
50BK064 Alt Motor 2	208/230-3-60	187	254	120.0	506	120.0	506	40	96.0	366.0	450
	460-3-60	414	508	56.5	253	56.5	253	40	48.0	175.1	225

LEGEND

FLA	—	Full Load Amps
Hp	—	Nominal Horsepower
LRA	—	Locked Rotor Amps
MCA	—	Minimum Circuit Amps
MOCP	—	Maximum Overcurrent Protection Device (amps)
NEC	—	National Electrical Code
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 (Refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse only.

NOTES:

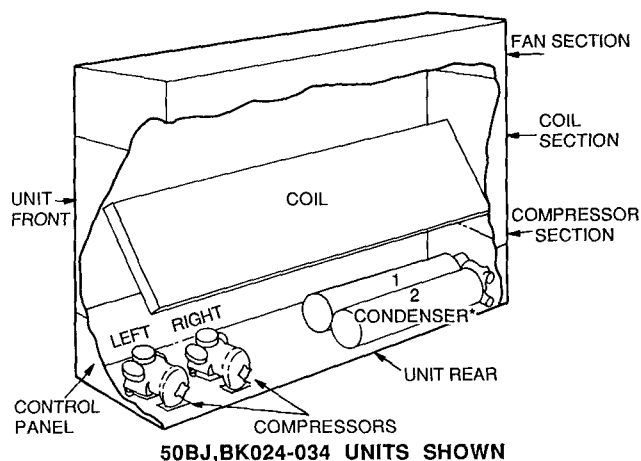
1. Compressor circuit breakers are current sensitive and temperature compensated to ensure compressor cutoff if current draw becomes excessive. Breakers must be manually reset.
2. Internal protection with automatic reset deenergizes the control circuit if extreme compressor motor temperature should occur from motor overloading.
3. Low- and high-pressure switches automatically shut off compressor(s) if refrigerant pressure exceeds switch settings.
4. Evaporator-fan motor circuit breaker protects against motor overload. Breaker requires manual reset.
5. The 50BK units are ETL (Electrical Testing Laboratories) listed at 208/230 and 460 v and CSA (Canadian Standards Association) certified at all voltages.
6. Three-phase voltage imbalance shall not exceed 2%.
7. Wire sizing amps are a sum of 125% of the FLA for largest motor plus 100% of FLA for all other motors in the unit.
8. All motors are internally protected against primary single-phasing condition.

START-UP

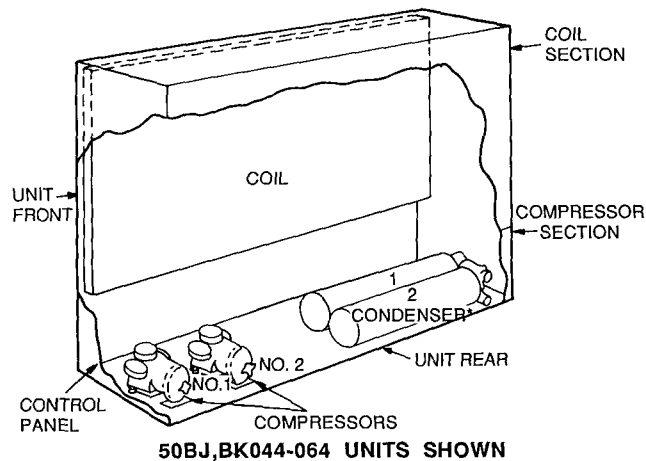
General — The 50BJ,BK units are designed for use in Modu-Vac Variable Air Volume Systems using Carrier 37 Series Moduline® and 35 Series Modubox® Air Terminals. For air terminal installation and adjustment, refer to 37 or 35 Series literature as required.

CAPACITY CONTROL — The units are equipped with electric unloaders on the lead compressor (Fig. 20) 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. 21). This controller provides the number of capacity control steps as shown in Table 9.



UNIT 50BJ,BK*	COMPRESSOR LOCATION	
	Left	Right
016	No. 1	—
024	No. 2	No. 1
028	No. 1	No. 2
034	No. 1	No. 2



*50BK units are condenserless.

Fig. 20 — Refrigerant Systems (016-064)

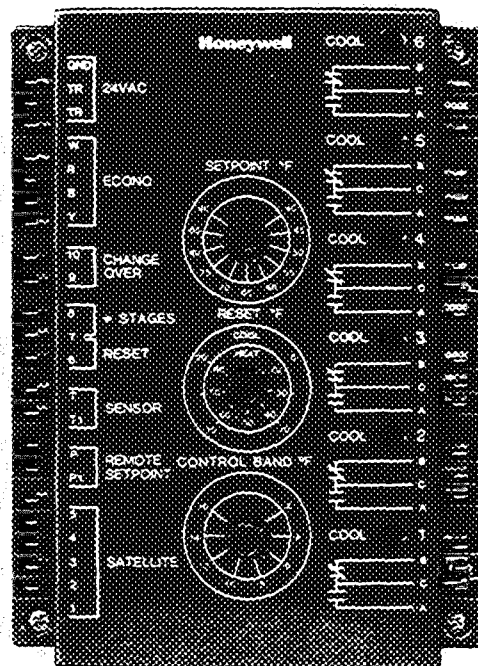


Fig. 21 — Honeywell Microprocessor

Table 9 — Capacity Control Steps

UNITS 50BJ,BK	CAPACITY CONTROL (No. Steps)
016	3
024-034	6
044	4
054,064	6

A tester kit (Carrier Part No. 50DJ680001) is available to check out the operating modes of the Honeywell W7100 microprocessor. An instruction sheet (No. 99TA526089) is included with the kit.

Inlet Guide Vane — The Inlet Guide Vane option (044-064 units) is used to maintain a desired static pressure within the VAV system. This option consists of a set of inlet guide vanes (one clockwise and one counterclockwise) for each blower assembly, an actuator motor and a differential pressure switch. The actuator motor and differential pressure switch are mounted on a channel located under the right-hand blower assembly of the unit. Differential pressure switch and actuator motor are factory wired; no field wiring is required. The actuator motor is mechanically connected to the inlet guide vane arms with a heavy duty linkage. See Fig. 22 for location of the above-mentioned components in the unit.

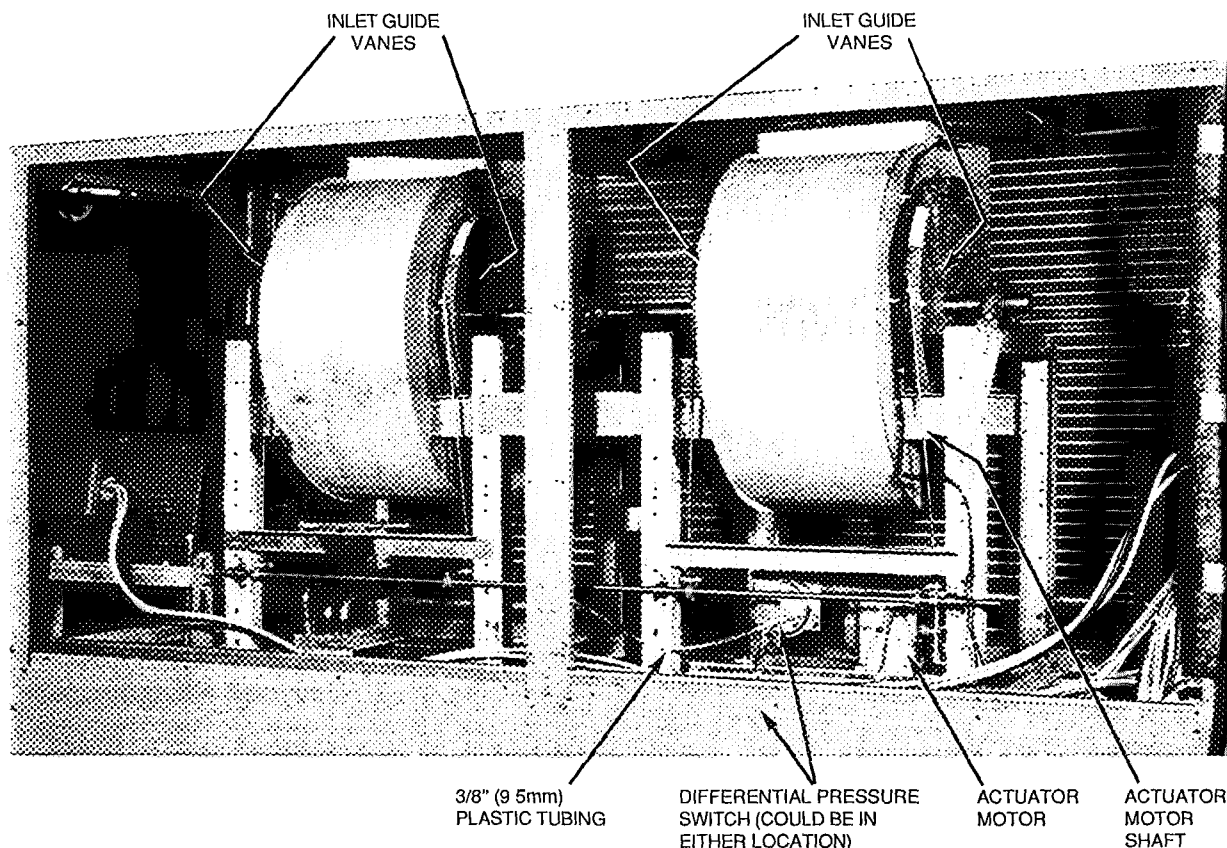


Fig. 22 — Inlet Guide Vane Option

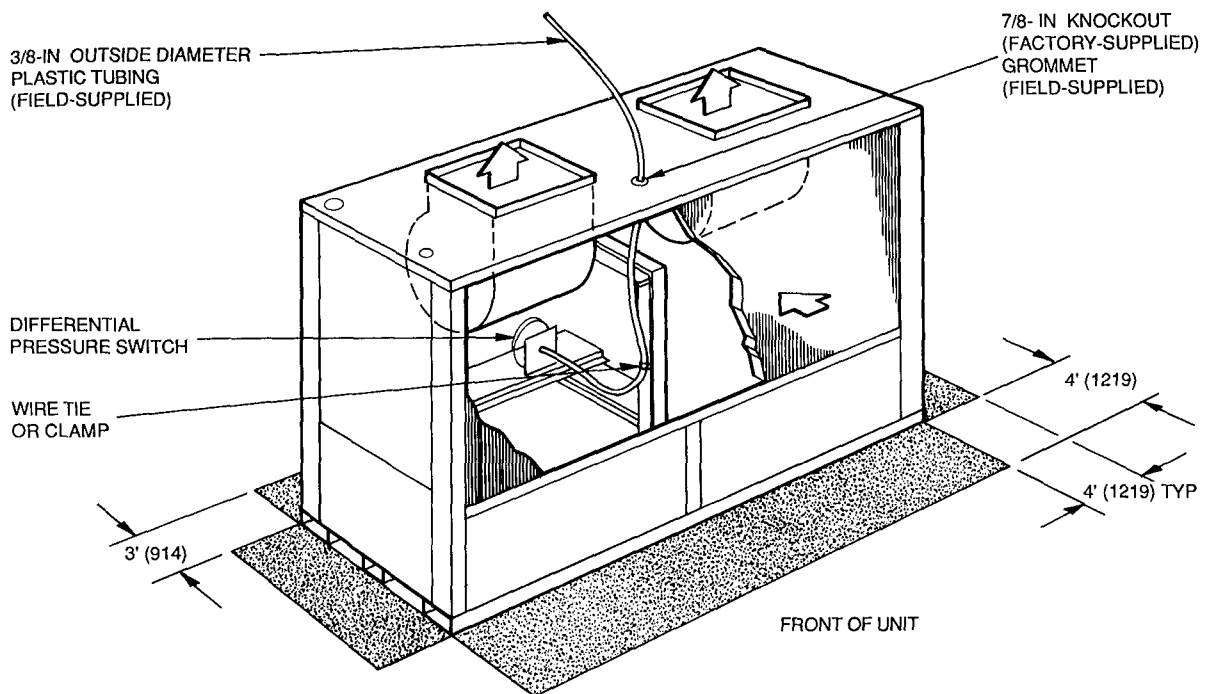
DIFFERENTIAL PRESSURE SWITCH — The differential pressure switch controls the variable-inlet guide vane motors of the supply-air fan to maintain a constant pressure in the supply-air duct system. See Fig. 22 for location of differential pressure switch in the unit.

The variable-inlet guide vanes should operate from a normally-closed position to avoid a rapid build-up of pressure in the supply-air ductwork. The static pressure tap should be located in the main header duct where it can measure 50 to 75% of the total system flow. The tap should be located at least 8 to 10 duct diameters downstream and 3 duct diameters upstream from any elbow or fittings. If the reference tap of the regulator is located outdoors, it should be free from the effects of wind direction and velocity.

STATIC PRESSURE CONTROL PLASTIC TUBING — Plastic tubing is run from the low-side pressure tap on the differential pressure switch to a pressure tap on the center

post of the unit. Another piece of tubing must be field-run from the high-pressure tap on the differential pressure switch to a pressure tap on the supply-air ductwork. Tubing should be $\frac{3}{8}$ -in. (9.5 mm) outside diameter plastic tubing. Route tubing as shown in Fig. 23 through $\frac{1}{8}$ -in. (22 mm) knockout in top cover of unit.

Install grommet in knockout to protect tubing from sharp metal edges. Secure tubing in several places using field-supplied clamps or wire ties and self-drilling screws. After tubing is outside of unit, route it to a pressure tap located in the last third of the supply-air ductwork *in a non-turbulent area*. The static pressure tap probe on the duct can be constructed from $\frac{1}{4}$ -in. (6 mm) outside diameter copper, brass or aluminum tubing (ends of the probe should be cut square to the sides of the tube and deburred) or the probe can be purchased.



NOTES:

1. Clearances shown are for easy serviceability. No clearances are necessary for operation of units.
2. Dimensions in () are in millimeters.

Fig. 23 – Static Pressure Control Plastic Tubing Routing

TIMER CONTROL — Carrier strongly recommends use of an accessory timer control panel with the 50BJ,BK units.

The accessory control panel contains a programmable 7-day electronic clock suitable for ON/OFF control of the 50BJ,BK units. A window is provided in the hinged cover to allow observation of the clock display. A keyed latch is provided to prevent tampering with clock settings. See Fig. 24.

IMPORTANT: If accessory timer is not used, install field-installed manual switch between TB3 terminals **1** and **8** in the variable volume control box for the 016-034 units. The switch is factory-installed on the 044-064 units.

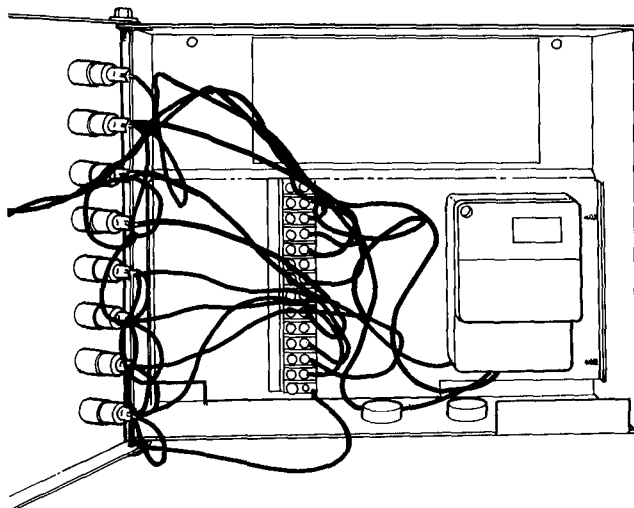


Fig. 24 – Accessory Timer Control Panel

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 VALVES (50BK) — Valves use teflon seat washers to ensure position seal with minimum stem torque (10 lb-ft [1.38 kg-m] max). Do not overtighten valve stem. Use wet rag on valve when soldering. If refrigerant has been lost, midseat valve. Always replace stem cap.

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 control power. 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 section.
2. Turn on unit main power supply.
3. Set the control band knob on microprocessor (Fig. 21) at 2.
4. Turn on evaporator-fan motor circuit breaker. Be sure fan is rotating in the proper direction. See Fan Rotation section on page 24.

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 Timer Control section on page 23).
6. Close compressor circuit breakers.
7. Check for cooling by turning microprocessor SET-POINT knob to 40 F (4 C). Light-emitting diodes (LEDs) 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 set point and discharge temperatures, minimum time for all stages to come on is 22 minutes.
8. Turn microprocessor SETPOINT knob to 90 F (32 C). The LEDs 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 (32 C) 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 [13 C]). Reset the control board to the proper set point as listed in the Control Sequence section on page 23. Replace all unit panels.

SERVICE

⚠ WARNING

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

⚠ 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 metal. If any coil fins are mashed or bent, straighten with a coil fin comb of the proper tooth spacing (see Tables 1a and 1b). Check for refrigerant leaks.

Fan Rotation — Correct fan rotation in respect to fan outlet is shown in Fig. 25. To check for proper fan rotation, remove service access panels and jog fan motor switch. If fan rotation is incorrect, it must be reversed.

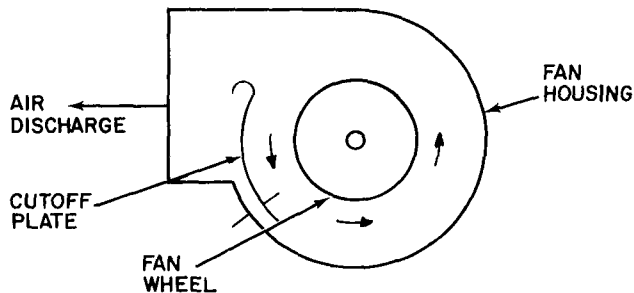


Fig. 25 — Fan Rotation

To reverse the direction of rotation of a 3-phase fan motor:

1. Reverse any 2 of the power leads.
2. Pulleys and fan belts should be aligned and adjusted as shown in Fig. 26-28.
3. Tighten motor holddown bolts.
4. Replace service access panels.

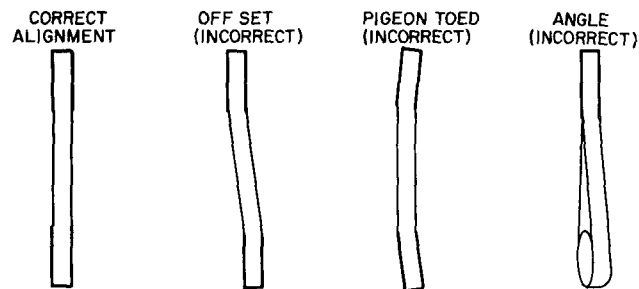


Fig. 26 — Pulley Alignment

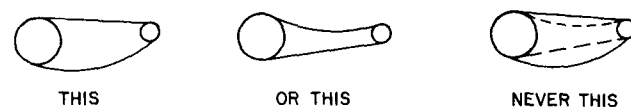


Fig. 27 — Fan Belt Adjustment

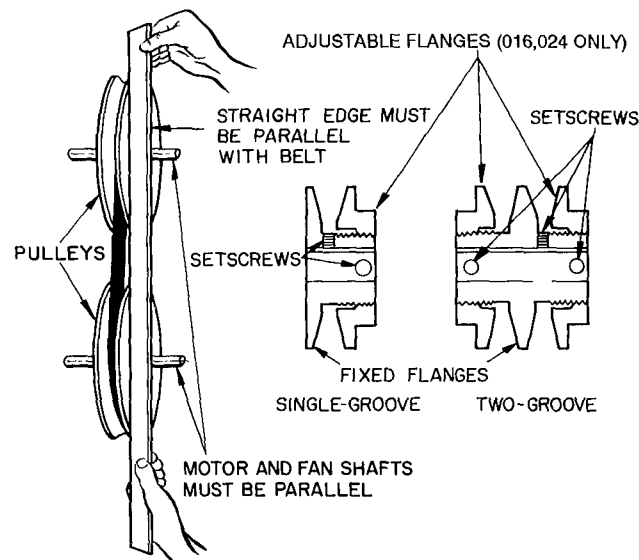


Fig. 28 — Evaporator-Fan Pulley Adjustment and Alignment (50BJ,BK016-034 shown)

Evaporator-Fan Adjustment — Fan motor pulley is factory set for speed shown in Tables 1a and 1b. Unit sizes 028-064 have fixed pulleys. A second pulley is shipped with drive package.

IMPORTANT: Increasing fan speed increases load on motor. Do not exceed maximum allowable fan speed (Tables 1a and 1b) or motor full load amps shown on motor nameplate and in Tables 7 and 8.

TO CHANGE FAN SPEED

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 (016,024). See Fig. 28.

4. Select motor pulley diameter. See Tables 1a and 1b.
5. To increase fan speed, screw movable flange towards fixed flange; to decrease speed, screw movable flange away from fixed flange. Use values shown in Tables 1a and 1b (016,024).
6. Set movable flange setscrew at nearest pulley hub flat and tighten (016,024).
7. Check pulley alignment and adjust belt tension as described below.
8. Check fan operation. Repeat above procedure as required.

V-Belt Installation and Tensioning (See Fig. 26-29)

Installation — Use the following steps when installing drive belts:

1. **Sheave Conditions** — Check condition of all new and old sheaves. Sheave must have smooth finish and no sharp edges or burrs. Check for groove uniformity. *Excessively worn sheaves or improperly machined grooves can lead to early belt failure.* Non-uniformity of grooves will create an unequal load distribution in a matched set of belts.
2. **Mounting Sheaves** — Mount sheaves as close to bearing as possible. Excessive overlap may cause bearing failure.
3. **Matched Set of Belts** — Always use a matched set of belts. *NEVER mix new and used belts and/or mix belts from different manufacturers.*
4. **Belt Installation:**
 - a. Move pulleys together to facilitate belt installation. *NEVER pry or roll belt onto pulleys, as this may cause serious damage to belts.*
 - b. Work belts around pulleys by hand. All belts should be slack on same side of drive. *Mixing slack and tight sides together may result in serious damage to belts when drive is tensioned.*
 - c. Move pulleys apart until belts are snug. Make preliminary check of sheave and shaft alignment. Operate drive at no load for several minutes to seat belts and then check belt tension. Excessively high or low tensions adversely affect the life and operation of V-belts.
 - d. Check sheave and shaft alignment after belt tension is applied.

Pulley Alignment

1. Shut off unit power supply. Make sure motor and fan shafts are parallel.
2. Align shafts by loosening motor on mounting bracket if required.
3. Loosen fan pulley setscrews.
4. Slide pulley along fan shaft and align with straightedge as shown in Fig. 28.

Tensioning (see Fig. 29) — Use the following steps when adjusting belt tension:

1. Measure belt span in in. (mm).
2. Use spring scale at center of span to deflect belt $\frac{1}{64}$ in. (.4 mm) for every in. (mm) of span length. Record scale reading.
Example: For span of 10 in. (254 mm) — deflection will be $\frac{10}{64}$ or $\frac{5}{32}$ in. (4 mm).
3. Spring scale reading should be in range of 12 to 18 lb (5.4 to 8 Kg). Maximum tension for a new belt is 18 lb (8 Kg).
4. Adjust tension to maximum after 15 minutes. Check belt tension after 2 to 4 hours of operation.
5. After 24 to 48 hours of operation, check drive to see if normal tension is obtained. *Excessively high or low tension will adversely affect life and operation of V-belt.*

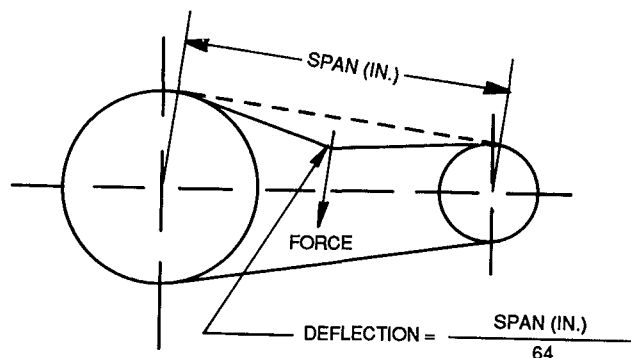


Fig. 29 — Fan Belt Tensioning

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 of operation (3 years with continuous service or excessively dirty conditions). At that point, inspect fan-motor bearings and relubricate as required. Follow manufacturer's instructions for lubrication of special field-supplied motors.

Fan shaft bearings on 50BJ,BK016,024 units are lubricated for the life of the bearings. Bearings for 50BJ,BK028-064 units have grease fittings. Lubricate annually with a good grade of mixed-base or lithium-based grease with rust inhibitor. Add grease until air bubbles form under the seal. Do not overgrease.

On 50BJ,BK044-064 units, the fan shaft universal joint requires the same lubrication as the fan shaft bearings. The fan shaft universal joint has a factory-supplied grease fitting.

IMPORTANT: Fan shaft bearings (50BJ,BK028-064) and fan shaft universal joint (50BJ,BK044-064) **MUST** be lubricated annually. Failure to do so may cause bearing failure. Access is provided through two 10 x 27-in. (254 x 686 mm) service panels in unit top cover, as well as through removable rear panel.

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

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 service section CAUTION note, page 24.)

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. Tables 1a and 1b list the fins per in. (m) for each coil.

Water-Cooled Condenser(s) — Water-cooled condensers may require cleaning of scale (water deposits) due to improperly maintained closed-loop water systems. Sludge buildup may need to be cleaned in an open water tower system due to induced contaminants.

Local water conditions may cause excessive fouling or pitting of tubes. Condenser tubes should therefore be cleaned at least once a year, or more often if the water is contaminated.

Proper water treatment can minimize tube fouling and pitting. If such conditions are anticipated, water treatment analysis is recommended. Refer to the Carrier System Design Manual, Part 5, for general water conditioning information.

To inspect and clean condenser (all 016-034 units and 044-064 units equipped with cleanable condensers), drain water and remove condenser heads. To drain condenser:

1. Shut off water supply and disconnect inlet and outlet piping.
2. Remove drain plugs and vent plug.
3. With condenser heads removed, inspect tubes for refrigerant leaks. (Refer to Carrier Standard Service Techniques Manual, Chapter 1, Section 1-6, Leak Testing, for instructions).
4. Clean condenser tubes with nylon brush (available from Carrier Service Department). Do not use brushes that will scrape or scratch tubes.
5. Flush water through tubes while cleaning. If hard scale had formed, clean tubes chemically using an inhibited hydrochloric acid solution. The acid can stain hands and clothing, attack concrete and, without inhibitor, can attack steel. Cover surroundings to guard against splashing. Vapors from vent pipe are not harmful, but take care to prevent liquid from being carried over by the gases.

NOTE: Warm solution acts faster, but cold solution is just as effective if applied for a longer period.

GRAVITY FLOW METHOD (Fig. 30) — Do not add solution faster than vent can exhaust the generated gases.

When condenser is full, allow solution to remain overnight, then drain condenser and flush with clean water. Follow acid manufacturer's instructions.

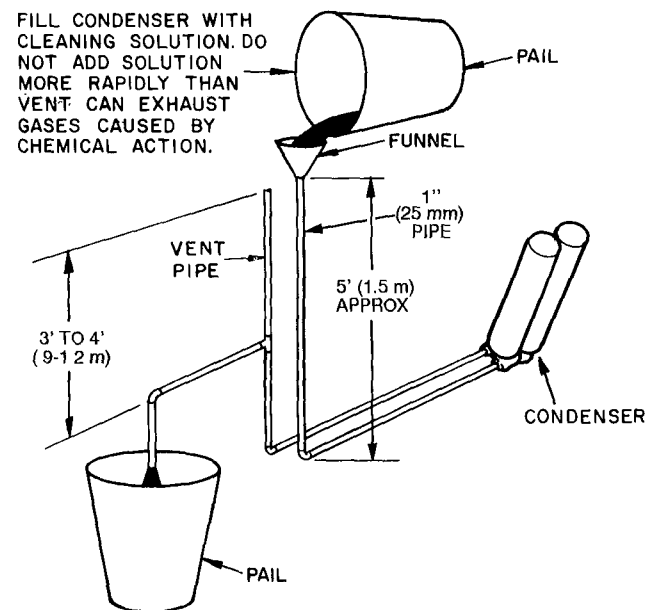
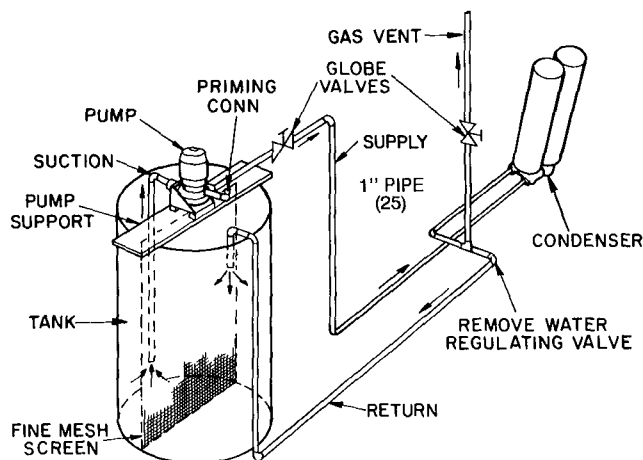


Fig. 30 — Gravity Flow Method

FORCED CIRCULATION METHOD (Fig. 31)

1. Fully open vent pipe when filling condenser. The vent may be closed when condenser is full and pump is operating.
2. Regulate flow to condenser with a supply line valve. If pump is a nonoverloading type, the valve may be fully closed while pump is running.
3. For average scale deposit, allow solution to remain in condenser overnight. For heavy scale deposit, allow 24 hours.
4. Drain condenser and flush with clean water.
5. Follow acid manufacturer's instructions.



NOTE: Dimension in () is in millimeters.

Fig. 31 — 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 — 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 section below).

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 in Tables 1a and 1b.

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

NOTE: Water regulating valve (water-cooled condenser) or condenser airflow (air-cooled condenser) must be properly set before checking system charge.

Adjust the water regulating valve to proper saturated condensing temperature (168 to 226 psig [1158 to 1558 kPa Gage]).

UNITS WITH AIR-COOLED CONDENSER (50BK) — Units are shipped with a holding charge only. To charge:

1. Open suction and discharge line service valves.
2. Reclaim holding charge, evacuate and leaktest system.
3. Add sufficient refrigerant vapor to permit continuous operation after starting unit.

4. Start unit per Start-Up section on page 21; then, using standard charging techniques, add refrigerant as required to maintain normal operating conditions.

Use charging chart supplied with condenser. If information is not available, block off enough of condenser coil to maintain 220 psig (1517 kPa Gage) discharge pressure and charge to a clear sight glass.

Evaporator-Fan Motor Removal — Shut off and lock out unit power supply.

⚠ CAUTION

Before attempting to remove fan motors or motor mounts, place a piece of plywood over evaporator coils to prevent coil damage.

Remove motor as follows:

1. Remove unit access panel and cover of motor junction box.
2. Disconnect motor wires and remove conduit connection.
3. Remove motor bolts and slide motor over so that fan belt can be removed.
4. Disconnect motor ground wire (if present) and remove motor.

TO REINSTALL MOTORS — Reverse Steps 1 through 4 above. Align pulleys and adjust belt tension as described in Evaporator-Fan Adjustment section on page 24.

Pressure Relief Devices — The 50BK (condenserless) and 50BJ044-064 (water-cooled) units are equipped with a fusible-plug type safety relief device on the compressor. The relief setting is 197 F or 203 F (92 or 95 C) on all 50BK and 50BJ044-064 units.

The 50BJ016-034 (water-cooled) units have a fragile disc on each condenser. Disc setting is $385 \pm 5\%$ psig (2655 kPa Gage).

The 50BJ044-064 (water-cooled) units equipped with shell-and-tube condensers have a pressure-relief device. The relief setting is 350 psig ± 10 psig (2413 kPa Gage ± 69 kPa Gage).

Crankcase Heaters — Crankcase heaters are supplied on all 50BK (condenserless) units and on 50BJ044-064 (water-cooled) units.

The heater reduces the possibility of liquid refrigerant accumulating in the compressor crankcase during extended shutdown periods. Heater is automatically energized whenever unit control power is on and compressor is stopped. Heater is deenergized when compressor starts.

Do not shut off unit main power supply for an extended period except for servicing unit. After an extended shutdown period, turn power supply on at least 24 hours prior to starting compressor.

If 50BJ units are installed in unheated rooms, they should be equipped with crankcase heaters. All units equipped with crankcase heaters require 24 hours warm up time.

High- and Low-Pressure Switches — The high- and low-pressure switches are located in the compressor compartment and are non-adjustable. See Tables 1a and 1b.

Inlet Guide Vane Adjustments — Periodic inspections of the inlet guide vanes should be made to ensure all parts are operating efficiently. If adjustments need to be made, follow specific instructions given below for linkage, differential pressure switch and actuator motor shaft adjustments.

LINKAGE ADJUSTMENTS — Routine inspection of linkage connectors should be made to ensure they are securely tightened. If re-adjustment of linkages is necessary, proceed as follows:

Remove power from actuator motor. With power removed, the vanes should move to the fully closed position (motor is a spring-return type). All adjustments should be made with the vanes closed.

NOTE: Failure of some vanes to close completely is normal and not a cause for concern.

With vanes closed, the connectors that attach the linkage between the inlet guide vane arms and the jack shaft should be approximately 20 degrees above the horizontal plane (for optional horizontal discharge, the guide vane arms and jack shaft should be approximately 20 degrees below the horizontal plane). The connector that attaches the actuator motor crank arm to the jack shaft should be in the vertical down position.

Any necessary adjustment should be made at the linkage between the actuator motor crank arm and the crank arm connector on the jack shaft. Refer to Fig. 32.

DIFFERENTIAL PRESSURE SWITCH ADJUSTMENT

The differential pressure switch has an adjustable set point between 1.1 in. wg and 3.5 in. wg (273 Pa and 870 Pa). The factory setting is 1.9 in. wg (472 Pa). To adjust the set point, turn set point adjusting screw (see Fig. 33) clockwise to decrease set point and counterclockwise to increase set point.

The differential pressure switch also has an adjustable null span. The null span is the pressure change that can be made without contacts opening or closing. The null span on the switch is adjustable from 0.06 in. wg to 0.17 in. wg (15 Pa to 42 Pa) when the set point is at its minimum position (1.1 in. wg [273 Pa]) and 0.11 in. wg to 0.31 in. wg (27 Pa to 77 Pa) when the set point is at its maximum position (3.5 in. wg [870 Pa]). To adjust the null span, turn null adjusting screw (see Fig. 33) clockwise to decrease span and counterclockwise to increase span. The factory setting for the null span is the maximum position. The smaller the null span, the closer the pressure will be maintained to desired set point.

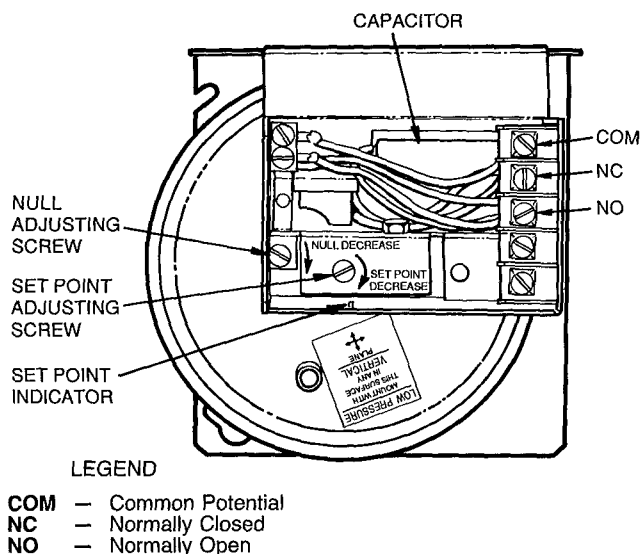


Fig. 33 — Static Pressure Control and Differential Pressure Switch

ACTUATOR MOTOR SHAFT ADJUSTMENT — The actuator motor controls the opening and closing of the inlet guide vanes by movement of a shaft attached to the vanes (see Fig. 22). The travel of the shaft is adjustable from zero to 180 degrees, and comes factory set at 45 degrees. Changes to this setting should not be necessary. If adjustment becomes necessary for proper guide vane opening and closing, the travel adjustment screws are located under the top cover of the actuator motor.

To check motor operation:

1. Disconnect wires from terminals 1, 2 and 3. Tape end of wires with electrical tape or make other provisions to keep wires from grounding out.
2. Short between terminals 1 and 2 with a jumper wire. Motor should run clockwise (viewing from the power end) to end of travel.
3. Short between terminals 1 and 3 with a jumper wire. Motor should run counterclockwise (viewing from the power end) to end of travel.

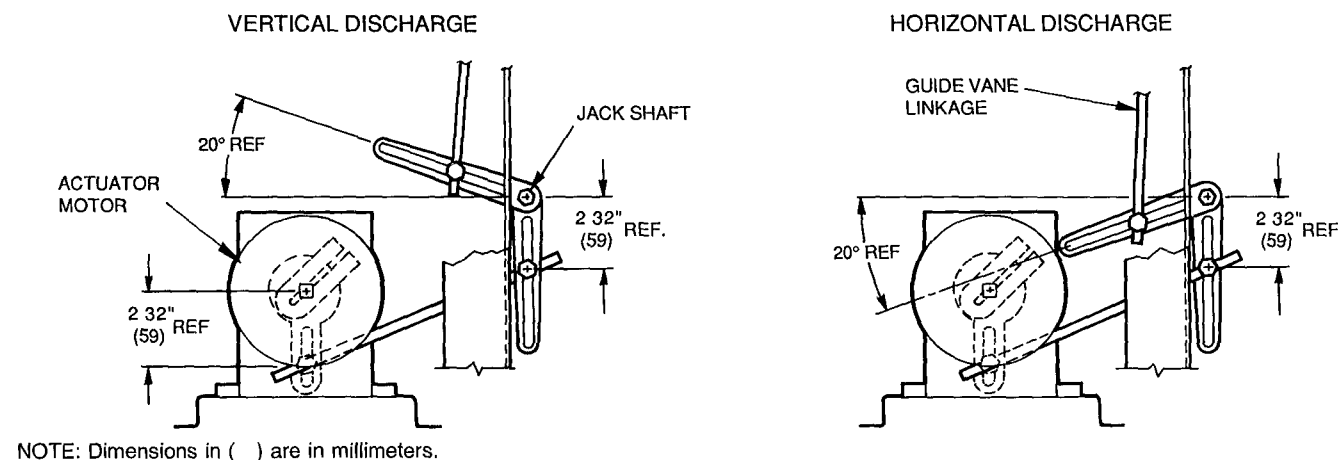


Fig. 32 — Inlet Guide Vane Linkage Adjustments

Oil Charge — All units are factory charged with oil; see Table 10. On 06D compressors, observe the oil level in the sight glass at start-up. If unit oil level is below sight glass, add oil until level is approximately ¼ sight glass. Refer to Carrier Standard Service Techniques Manual, Refrigerant section, for procedures to add or remove oil.

If oil charge is above sight glass, do not remove any oil until the compressor crankcase heater has been energized for at least 24 hours.

When additional oil or a complete charge is required, use only Carrier-approved compressor oil.

The approved oils are:

Petroleum Specialties, Inc. Cryol 150*
Witco Chemical Corp Sunisco 3GS
Texaco, Inc. Capella WF-32

*Factory oil charge

Do not reuse any drained oil, and do not use any oil that has been exposed to the atmosphere.

NOTE: Whenever possible, take care to maintain same type of oil (synthetic or non-synthetic) in system as is currently in use.

Table 10 — Oil Charge

UNIT	OIL CHARGE			
	Circuit 1		Circuit 2	
	PT	L	PT	L
50BJ,BK016	9.5	4.5	—	—
50BJ,BK024-034	9.5	4.5	9.5	4.5
50BJ,BK044	17.0	8.0	17.0	8.0
50BJ,BK054	21.0	9.9	17.0	8.0
50BJ,BK064	21.0	9.9	21.0	9.9

LEGEND

L — Liter
PT — Pint

Time Guard® Control Circuit provides automatic reset protection (except circuit breaker), time delay in starting and controlled cycling. If compressor shuts down for any reason, the control circuit prevents restart for time periods as follows:

UNIT 50BJ,BK	CIRCUIT NO.	A	B
		Full Cycle (minutes)	Delayed Start (seconds)
016	1	5	15
024-034	1	6.4	19
	2	5	15
044,054 064	2	5	15
	1 and 2	6.4	19

Column B shows time delay between compressor starts under normal thermostat cycling.

CONTROL SEQUENCE

All Units — The circuit breaker from which control power is sourced (either the indoor [evaporator] fan circuit breaker [IFCB] or the compressor no. 1 circuit breaker) must be closed for the control circuit to be energized (refer to unit label diagram for correct circuit breaker). When breaker is closed, the SYSTEM light will be on.

The 044-064 units are equipped with a switch labeled STANDBY. When switch is closed, the indoor (evaporator) fan contactor (IFC) is energized and the evaporator fan will start and run continuously. A light labeled FAN will come on. To use accessory timer control, switch must be put in STANDBY position.

All units are equipped with the improved Honeywell W7100 discharge air controller. The controller has 3 control knobs: set point, reset and control band. The controller regulates the leaving-air temperature to the set point. A setting below 50 F (10 C) may decrease unit efficiency due to use of hot gas bypass at light loads. The reset knob adjusts reset control range from 5 F to 20 F (– 15 C to – 7 C). The reset feature requires field-supplied components and wiring (refer to Carrier unit pricing pages for available accessories). The control band knob adjusts controller for the required number of stages. The control band should be set at 6 F (– 14 C) for the 016-034, 054 and 064 units, and 8 F (– 13 C) for the 044 units. Increasing control band setting above these recommended settings will decrease compressor cycling and increase leaving-air temperature variations. Decreasing setting will not reduce discharge-air temperature variations but will increase compressor cycling.

The controller is also factory equipped with 2 fixed resistors. One resistor corrects for the number of steps. This is done by placing a ¼-watt, 5%-resistor across terminals [7] and [8] on the microprocessor. A 3-stage, 300-ohm resistor is used on the 016 unit. A 4-stage, 400-ohm resistor is used on 044 units and a 600-ohm resistor is used on 024-034, 054 and 064 units. A second 510-ohm resistor is connected between terminals [9] and [Y] to indicate unit does not have an economizer. If a field-supplied economizer is added, remove the 510-ohm resistor. Consult your Carrier representative for more details.

If the discharge air deviates 1° F above or below the control band while unit is running, a cooling capacity stage will either be added or removed according to Tables 11 and 12. Additional capacity steps will be turned on or off until discharge-air temperature is within control band or is charging at a rate that will allow it to be within control band within 10 minutes. The controller also has a fixed guaranteed minimum on and off time of 4 minutes to prevent compressor cycling.

These units are equipped with a Time Guard® circuit. This circuit prevents compressor no. 1 from restarting until 4 minutes, 45 seconds have elapsed from last shutdown. Compressor no. 2 will not restart until 6 minutes, 10 seconds have elapsed.

Each compressor is equipped with a high-pressure switch (HPS), discharge gas thermostat (DGT) or internal protection (IP) and low-pressure switch (LPS). If any of these protection devices trip, the compressor will shut down. If, after 4 minutes, 45 seconds for compressor no. 1 and 6 minutes, 10 seconds for compressor no. 2, the switch resets, compressor no. 1 will restart within 15 seconds and compressor no. 2 within 19 seconds.

The 50BK044-064 condenserless units are equipped with a liquid line solenoid (LLS). When a stage calls for compressor shutdown, the liquid line solenoid will close first. The compressor will continue to run until the LPS opens.

Table 11 — Capacity Steps

UNIT 50BJ,BK	STAGE					
	1	2	3	4	5	6
016	33%	67%	100%	—	—	—
024	17%	34%	50%	67%	84%	100%
028	17%	34%	50%	67%	84%	100%
034	17%	34%	50%	67%	84%	100%
044	25%	50%	75%	100%	—	—
054	19%	38%	57%	63%	84%	100%
064	17%	34%	50%	67%	84%	100%

Table 12 – Loading Sequence

UNIT 50BJ,BK	STAGE	COMP 1	UNLOADER 1	UNLOADER 2	COMP 2
016	0	OFF	OFF	OFF	—
	1	ON	UNLOADED	UNLOADED	—
	2	ON	LOADED	UNLOADED	—
	3	ON	LOADED	LOADED	—
024-034	0	OFF	OFF	OFF	OFF
	1	ON	UNLOADED	UNLOADED	OFF
	2	ON	LOADED	UNLOADED	OFF
	3	ON	LOADED	LOADED	OFF
	4	ON	UNLOADED	UNLOADED	ON
	5	ON	LOADED	UNLOADED	ON
	6	ON	LOADED	LOADED	ON
044	0	OFF	OFF	—	OFF
	1	ON	UNLOADED	—	OFF
	2	ON	LOADED	—	OFF
	3	ON	UNLOADED	—	ON
	4	ON	LOADED	—	ON
054,064	0	OFF	OFF	OFF	OFF
	1	ON	UNLOADED	UNLOADED	OFF
	2	ON	LOADED	UNLOADED	OFF
	3	ON	LOADED	LOADED	OFF
	4	ON	UNLOADED	UNLOADED	ON
	5	ON	LOADED	UNLOADED	ON
	6	ON	LOADED	LOADED	ON

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Book	1	PC 111	Catalog No 565-052	Printed in U.S A	Form 50BJ,BK-5SI	Pg 32	5-92	Replaces: 50BJ,BK-4SI
Tab	2a							