



Single-Package Cooling Units

SAFETY CONSIDERATIONS

The 50BA, BB 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 50BA, BB004 thru 024 units are self-contained units arranged for vertical air discharge and wired and piped at the factory.

Size 50BA, BB028 thru 064 units are self-contained units consisting of a base section, fan section, fan motor and fan drive package, each shipped separately and field assembled. The base section consists of factory-wired compressor/evaporator coil unit. The fan section can be mounted for vertical or horizontal air discharge (Fig. 1).

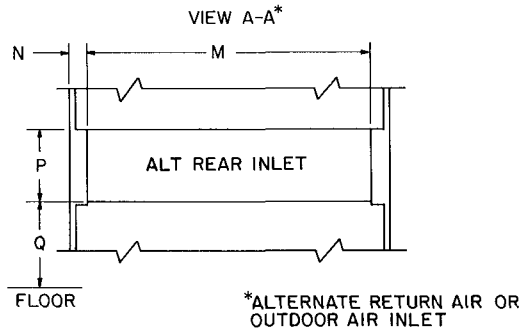
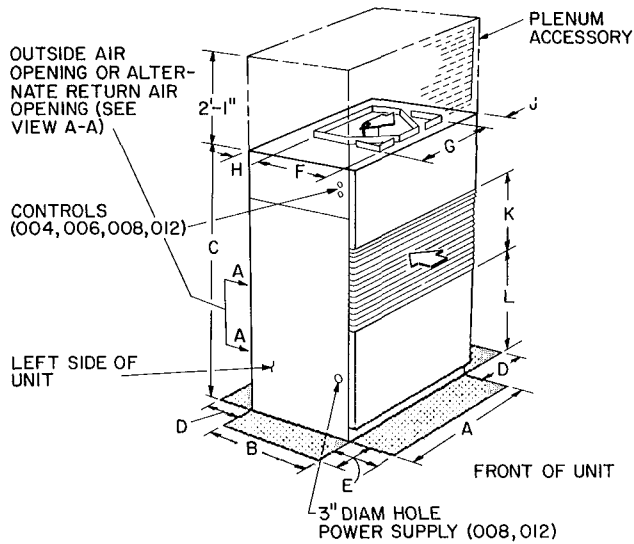
→ **Step 1 — Receive and inspect unit.**

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.

UNITS 50BA,BB004,006,008 AND 012



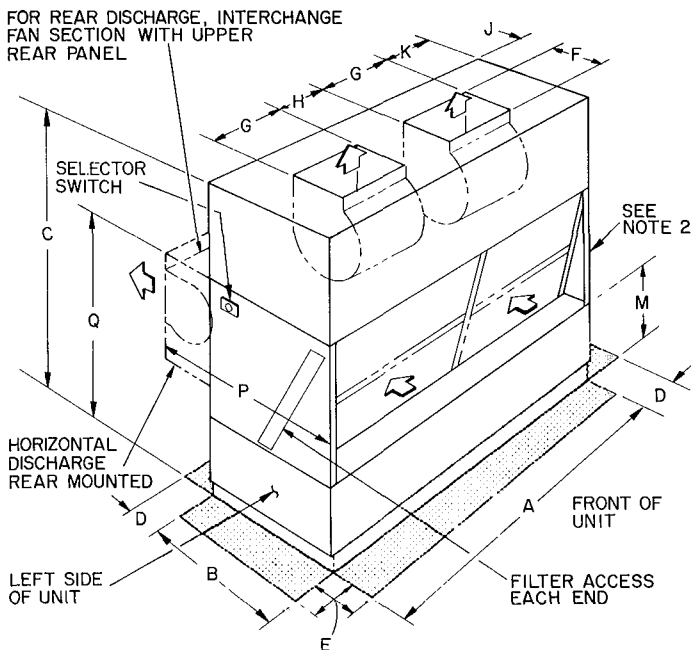
DIMENSIONS (ft-in)

UNIT 50BA,BB	004	006	008, 012
A	3- 2-5/16		4-0
B	1-10-7/8		2- 6-1/8
C	5- 3-7/8		6-5
D	See Note 2		1-0
E			2-0
F	1-1-13/16	1- 4-7/16	1- 7-3/8
G	1-1-1/8	1-3	1- 5-1/4
H	—	0 3/4	0- 1-1/4
J	1-0-1/2	0-10-5/8	0-11-7/8
K	1- 9-1/8		1-11-1/4
L	2- 9-5/8		2- 5-3/8
M	2- 7-7/8		3-6
N	0- 2		0-3
P	0-10		1- 0-1/2
Q	1- 3-9/16		1-4

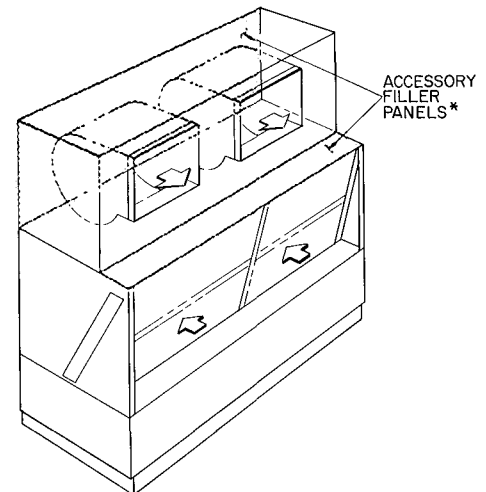
NOTES

- 1 Certified dimension drawings available upon request
- 2 Minimum required clearance at back and right side of unit is zero. Clearance above and at left of unit depends on space required for accessory plenum, ductwork, condenser piping, accessory heater piping, condensate drain line power wiring, and access to unit control center. Clearance required at front of unit for service access and free return airflow is 2 feet
- 3 Water and refrigerant connections for Unit Sizes 50BA, BB004 thru 012 are located on the left side of unit. See Fig. 16 for connection details

UNITS 50BA,BB016 AND 024



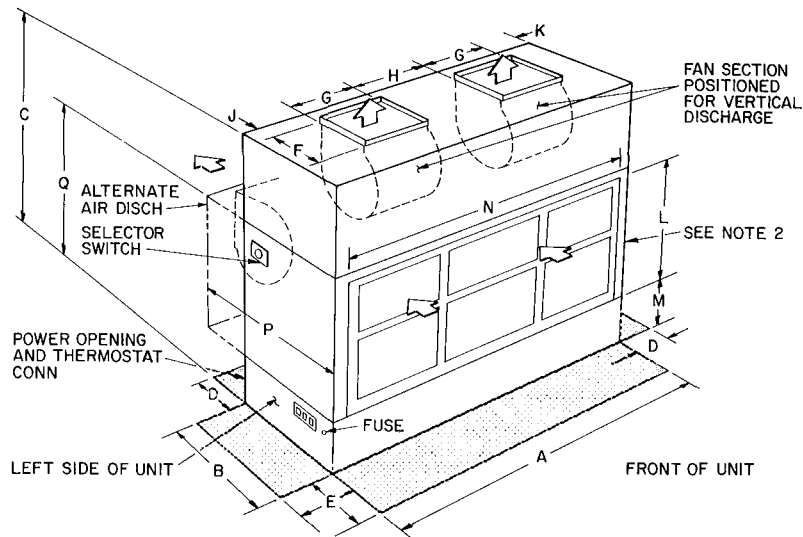
OPTIONAL TOP HORIZONTAL DISCHARGE



*For optional top-mounted horizontal discharge, use accessory filler panel package as shown. See installation instructions in filler panel package

→Fig. 1 — Unit Dimensions

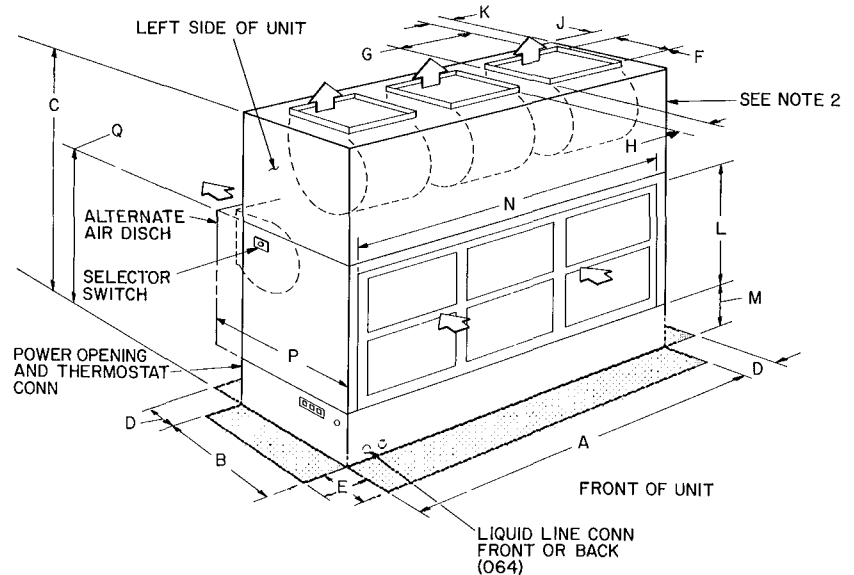
UNITS 50BA,BB028,034 AND 044



NOTES

- 1 Certified dimension drawings available on request
- 2 Water and refrigerant connections for Unit Sizes 50BA,BB016 thru 064 are located on right side of unit See Fig. 16 for connection details

UNITS 50BA,BB054 AND 064



ACCESS AREA

AIRFLOW

DIMENSIONS (ft-in)

UNIT 50BA,BB	016,024	028,034	044	054	064
A	6-8	7- 9-1/4	10- 6-3/8	10- 6-3/8	10- 6-3/8
B	2- 5-1/4	2-11-1/4	3-10-1/4	3-10-1/4	3-10-1/4
C	6-10-1/2	8- 0-1/8	8-10	9-9	10-1
D	2-0	2-0	2- 0	3-0	3-0
E	3-0	3-0	3- 0	3-0	3-0
F	1- 7-1/4	1- 8-7/8	1- 8-7/8	1- 8-7/8	1- 8-7/8
G	1- 5-1/4	1- 8-7/8	1- 8-7/8	1- 8-7/8	1- 8-7/8
H	1- 4-1/8	1- 7-7/8	2- 7-1/2	1- 5-5/8	1- 5-5/8
J	0- 1-5/8	0- 2-3/8	0- 3	0-3	0-3
K	1-7	1-4	2- 2-5/8	1- 2-1/4	1- 2-1/4
L	—	3- 2-1/4	3-10	4-9	4-9
M	1-8	2- 1-1/8	2- 2-1/2	2- 2-1/2	2- 6-1/8
N	—	7- 4-1/4	10- 0	10-0	10-0
P	4- 4-5/8	5- 4-1/8	6- 4-5/8	6- 4-5/8	6- 4-5/8
Q	4-11-1/2	5- 7-1/4	6- 3-5/8	7- 7-1/4	7- 7-1/4

→Fig. 1 — Unit Dimensions (cont)

Table 1 — Physical Data

MODEL 50	BA	BB	BA	BB	BA	BB	BA	BB	BA	BB
	004		006		008		012		016	
OPERATING WEIGHT (lbs)										
Base Unit	390	330	427	360	770	710	950	890	1414	1221
Discharge Plenum	25		25		140		140		140	
OPERATING CHARGE (lbs)										
	Refrigerant 22									
System 1	3 5	2	4 6	2 5	10	7	10	8	24	15
System 2	—	—	—	—	—	—	—	—	—	—
System 3	—	—	—	—	—	—	—	—	—	—
COMPRESSOR — TYPE 06										
	Welded Hermetic, 3450 Rpm					Serviceable Hermetic, 1750 Rpm				
System 1	M34	M34	P53	P67	P77	DA818	DB724	DB824	DD337	DD537
System 2	—	—	—	—	—	—	—	—	—	—
System 3	—	—	—	—	—	—	—	—	—	—
No. of Unloading Cylinders	0		0		0		2		2	
No. of Capacity Steps	1		1		1		2		2	
CONDENSER (BA Only)										
No. . Type	1 TT		1 TT		1 TT		1 TT		1 SC	
INDOOR FAN										
	Adjustable, Belt-Driven Centrifugal; 1750 Rpm Motor									
Nominal Cfm	1200		2000		3000		4000		6000	
Standard Fan Speed Range (Rpm)	512-782		647-915		495-700		600-850		568-720	
Maximum Allowable Rpm	1100		1100		1100		1100		1100	
No. of Belts . Fan Pulley PD (in)	1 6 4		1 6 4		1 8 5		1 7 0		1 11 4	
Motor Pulley PDR (in)	1 9-2 9		2 4-3 4		2 4-3 4		2 4-3 4		3 7-4 7	
Nom Hp Std...Frame Size	1/3 48		3/4 56		1 56		2 145T		2 145T	
Alt...Frame Size	3/4 56		1 56		2 145T		3 182T		3 182T	
Alt.. Frame Size	—		—		3 182T		—		5 184T	
INDOOR COIL										
	Copper Tubes, Aluminum Fins									
No. of Rows . Fins/in	2 13 9		3 13 9		3 12 1		3 12 1		3 10 6	
Total Face Area (sq ft)	5 0		5 0		7 3		8 5		16 9	
RETURN AIR FILTERS										
	Factory-Supplied Throwaway Type									
No. ...Size (in.)	2 16x25x1				4 16x20x1				3 16x25x2	
					(See Note 4)				3 20x25x2	
CONDENSER CONNECTIONS (BA Only)										
	Size (in) . Type									
Water Inlet — Manifolder	1/2 FPT		3/4 FPT		1 FPT		1 FPT		2 FPT	
Water Outlet — Manifolder	1/2 FPT		3/4 FPT		1 FPT		1 FPT		2 FPT	
REFRIGERANT CONNECTIONS (BB Only)										
	Size (in.)...Type									
System 1 Hot Gas Line	1/2 F1		1/2 F1		3/4 ODF		3/4 ODF		1-1/8 ODM	
Liquid Line	1/2 F1		1/2 F1		5/8 ODF		5/8 ODF		5/8 ODM	
System 2 Hot Gas Line	—		—		—		—		—	
Liquid Line	—		—		—		—		—	
System 3 Hot Gas Line	—		—		—		—		—	
Liquid Line	—		—		—		—		—	
CONDENSATE CONNECTION										
	Size (in) Type									
Condensate Drain	3/4 FPT		3/4 FPT		3/4 FPT		3/4 FPT		1 FPT	
ACCESSORY HEATING COIL										
	1 15		1 15		2 14		2 14		2 11 3	
Hot Water Rows ..Fins/in	5 0		5 0		6 0		6 0		15 7	
Total Face Area (sq ft)	—		—		1 14		1 14		1 14	
Steam Rows...Fins/in	—		—		6 9		6 9		14 4	
Total Face Area (sq ft)										
HEATING COILS CONNECTIONS										
	No Size (in.) MPT									
Hot Water Inlet	1 7/8		1 7/8		1 1-1/4		1 1-1/4		2 1-1/2	
Outlet	1 7/8		1 7/8		1 1-1/4		1 1-1/4		2 1-1/2	
Steam Inlet	1 7/8		1 7/8		1 1-1/4		1 1-1/4		1 1-1/4	
Outlet	1 7/8		1 7/8		1 1-1/4		1 1-1/4		1 1-1/4	

Step 3 — Provide unit support.

Refer to Fig. 1 — Dimensions, and Table 1 — 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.

50BA, BB004 AND 006 — Use rollers under shipping rails. Unit may be moved by hand truck on any side. Do not remove shipping rails until unit is in final position.

50BA008 THRU 064 — Use slings with spacer under base skid to prevent panel damage when using hoist. Raise base skid on blocks and remove bolts. On 028 thru 064 units, unbolt fan section from skid.

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.

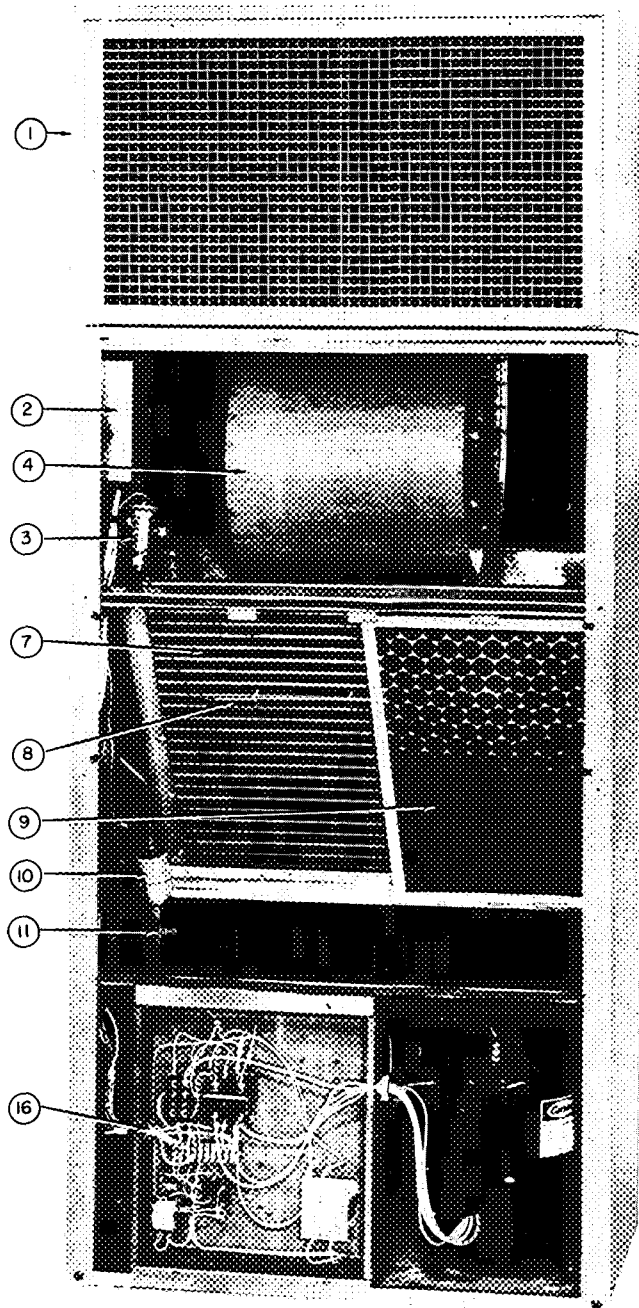
→ Table 1 — Physical Data (cont)

MODEL 50	BA	BB	BA	BB	BA	BB	BA	BB	BA	BB	BA	BB
	024		028		034		044		054		064	
OPERATING WEIGHT (lbs)												
Base Unit	1894	1464	2491	2397	2598	2430	3800	3100	4100	3300	4404	3550
Discharge Plenum	140		—		—		—		—		—	
OPERATING CHARGE (lbs)	Refrigerant 22											
System 1	17	7	24	15	24	15	24	15	29	15	52	25
System 2	17	7	17	12	24	15	24	15	29	15	52	25
System 3	—		—		—		17	11	29	15	—	
COMPRESSOR — TYPE 06	Serviceable Hermetic, 1750 Rpm											
System 1	DA724	DA824	DA337	DA537	DA337	DA537	DA337	DA537	DA337	DA537	EA275	EA275
System 2	DA724	DA824	DA724	DA824	DA337	DA537	DA337	DA537	DA337	DA537	E5275	E5275
System 3	—		—		—		DA724	DA824	DA337	DA537	—	
No. of Unloading Cylinders	0		0		0		0		0		4	
No. of Capacity Steps	2		2		2		3		3		6	
CONDENSER (BA Only)												
No. . Type	2 SC		2 SC		2 SC		2 SC		2 SC		2 ST	
INDOOR FAN	Adjustable, Belt-Driven Centrifugal; 1750 Rpm Motor											
Nominal Cfm	8000		10,000		12,000		16,000		20,000		24,000	
Standard Fan Speed Range (Rpm)	700-875		605-750		685-845		627,672,717		650,695,762		785,828,895	
Maximum Allowable Rpm	1100		1100		1100		1100		1100		1100	
No. of Belts...Fan Pulley PD (in)	2 10 0		2 12 4		2 11 0		2 15 4		2 15 4		2 15 4	
Motor Pulley PDR (in.)	4 0-5 0		4 3-5 3		4 3-5 3		5 6,6 0,6 4		5 8,6 2,6 8		7 0,7 4,8 0	
Nom HP Std...Frame Size	3 182T		5 184T		5 184T		7-1/2 213T		10 215T		15 254T	
Alt. .Frame Size	5 182T		7-1/2 213T		7-1/2 213T		10 215T		15 254T		—	
Alt. .Frame Size	—		10 215T		10 215T		—		—		—	
INDOOR COIL	Copper Tubes — Aluminum Fins											
No. of Rows. .Fins/in.	4 10 6		4 8 9		4 8 9		4 9 0		4 9 0		4 10 6	
Total Face Area (sq ft)	18 0		22 6		26 9		36 5		46 3		46 3	
RETURN AIR FILTERS	Factory-Supplied Throwaway Type											
No. ...Size (in)	3 16x25x2		6 25x20x2				11 25x20x2		10 20x25x2			
	3 20x25x2		2 16x20x2						5...16x25x2			
CONDENSER CONNECTIONS (BA Only)	Size (in) ..Type											
Water Inlet — Manifoldd	2-1/2 FPT		1-1/2, 2 FPT		2, 2 FPT		3 FPT		3 FPT		3 FPT	
Water Outlet — Manifoldd	2-1/2 FPT		1-1/2, 2 FPT		2, 2 FPT		3 FPT		3 FPT		3 MPT	
REFRIGERANT CONNECTIONS (BB Only)	Size (in.)...Type											
System 1 Hot Gas Line	7/8 ODM		1-1/8 ODS		1-1/8 ODS		1-1/8 ODM		1-1/8 ODM		1-3/8 ODM	
Liquid Line	5/8 ODM		5/8 ODS		5/8 ODS		5/8 ODM		5/8 ODM		7/8 ODM	
System 2 Hot Gas Line	7/8 ODM		7/8 ODS		1-1/8 ODS		1-1/8 ODM		1-1/8 ODM		1-3/8 ODM	
Liquid Line	5/8 ODM		5/8 ODS		5/8 ODS		5/8 ODM		5/8 ODM		7/8 ODM	
System 3 Hot Gas Line	—		—		—		7/8 ODM		1-1/8 ODM		—	
Liquid Line	—		—		—		5/8 ODM		5/8 ODM		—	
CONDENSATE CONNECTION	Size (in.) . .Type											
Condensate Drain	1 FPT		1-1/4 MPT		1-1/4 MPT		1-1/4 MPT		1-1/2 MPT		1-1/2 MPT	
ACCESSORY HEATING COIL												
Hot Water Rows .Fins/in.	2 11 3		2 14		2 14		2 11 3		2 11 3		2 11 3	
Total Face Area (sq ft)	15 7		11 7		11 7		35 0		44 8		44 8	
Steam Rows. Fins/in.	1 14		1 14		1 14		1 10		1 10		1 10	
Total Face Area (sq ft)	14 4		11 4		11 4		32 6		38 8		38 8	
HEATING COIL CONNECTIONS	No. . .Size (in) MPT											
Hot Water Inlet	2 1-1/2		2 1-1/2		2 1-1/2		3 1-1/2		3 1-1/2		3 1-1/2	
Outlet	2 1-1/2		2 1-1/2		2 1-1/2		3 1-1/2		3 1-1/2		3 1-1/2	
Steam Inlet	1 1-1/4		2 1-1/2		2 1-1/2		2 2-1/2		2 2-1/2		2 2-1/2	
Outlet	1 1-1/4		2 1-1/4		2 1-1/4		2 1-1/2		2 1-1/2		2 1-1/2	

FPT — Female Pipe Thread
 Hp — Horsepower
 MPT — Male Pipe Thread
 PD — Pitch Diameter
 PDR — Pitch Diameter Range
 SC — Shell and Coil
 ST — Shell and Tube
 TT — Tube in Tube

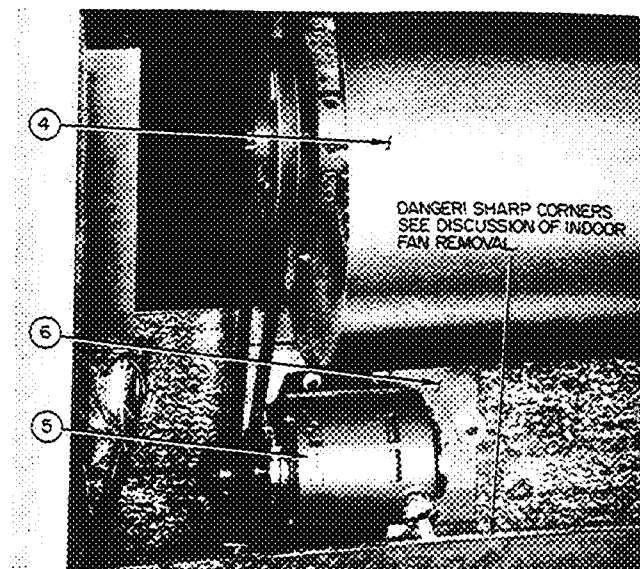
NOTES

- 50BB008 has serviceable hermetic 1750 rpm compressor
- Operating charge for 50BB units does not include charge for remote air-cooled condenser or connecting pipe. All 50BB units are shipped with a holding charge. Operating charge values are approximate. See installation instructions.
- Fan motor pulleys on 50BA, BB044, 054 and 064 are fixed-pitch type.
- Field-supplied 2-in. filters will fit.
- Motors and drives other than those furnished with unit must be purchased locally. Installation may require field modification. Contact your local Carrier representative.

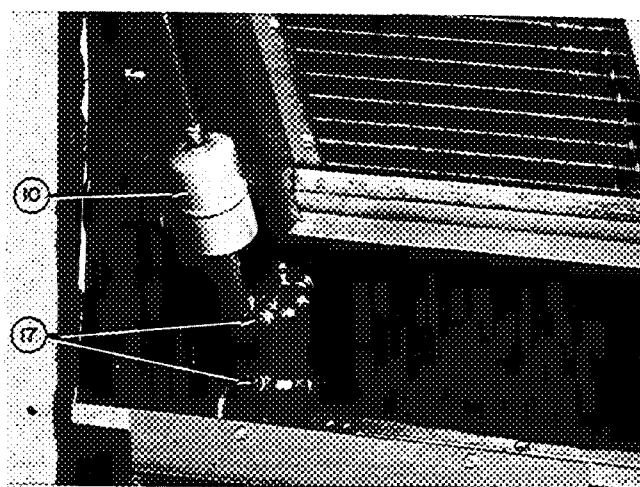


BASE UNIT GENERAL VIEW

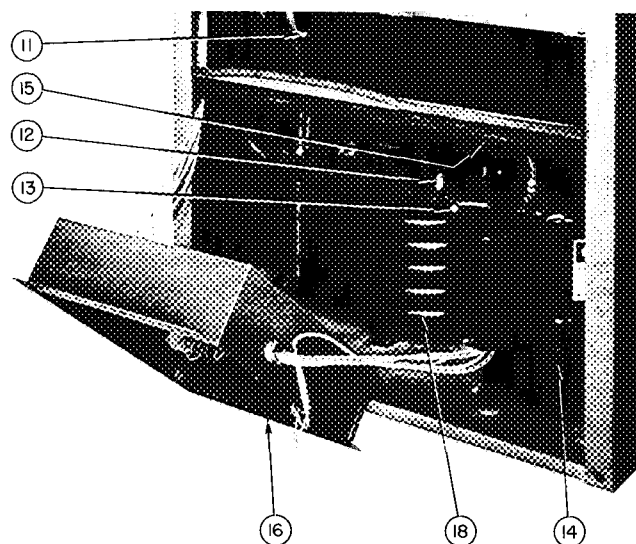
- 1 — Accessory Plenum
- 2 — Selector Switch and Thermostat
- 3 — Thermostatic Expansion Valve
- 4 — Indoor Air Fan
- 5 — Indoor Air Fan Motor
- 6 — Indoor Air Fan Motor Mounting Bracket
- 7 — Evaporator
- 8 — Thermostat Sensing Bulb
- 9 — Return Air Filter
- 10 — Refrigerant Filter-Drier
- 11 — Water Regulating Valve Fitting on Refrigerant Liquid Line (50BA)
- 12 — Low-Pressure Cutout Switch (50BA, BB006 only)
- 13 — Suction Pressure Gage Connection
- 14 — Compressor
- 15 — Discharge Pressure Gage Connection (50BA)
- 16 — Control Box
- 17 — Service Valves, Suction and Discharge, with Gage connections (50BB)
- 18 — Water-Cooled Condenser (50BA)



INDOOR AIR FAN DETAIL



SERVICE VALVE DETAILS (50BB)



COMPRESSOR COMPARTMENT

Fig. 2 — Base Unit Interior Details (50BA, BB004, 006, 008 and 012)

**LEGEND FOR
50BA024 UNIT**

- 1 — Indoor Air Fan
- 2 — Selector Switch
- 3 — Return Air Filters
- 4 — Evaporator Coil
- 5 — Control Box
- 6 — Compressor No. 1
- 7 — Compressor No. 2
- 8 — Condensers

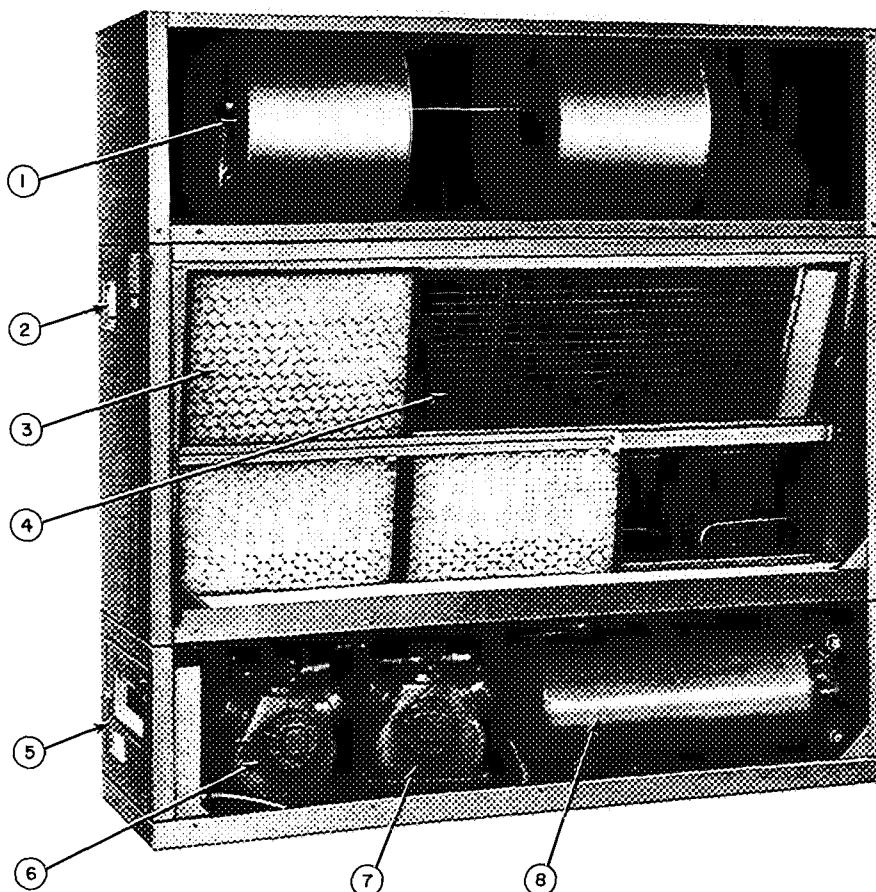


Fig. 3 — Base Unit Interior Details (50BA024 Unit Shown)

Step 5 — Install accessory plenum if supplied.

On unit Sizes 004 thru 024, holes in the unit top panel match holes in plenum. Use screws (shipped in cloth bag taped inside plenum) to attach plenum to unit top. See Fig. 1 and 2.

Step 6 — Position fan section as desired.

UNIT SIZES 50BA,BB004 THRU 024 are shipped for vertical discharge. To set up these units for horizontal discharge, separately purchased accessory filler panels must be field installed (see Fig. 1).

To set up unit Sizes 50BA,BB016 and 024 for backmounted horizontal discharge (Fig. 1), proceed as follows:

1. Remove:
 - a. Rear fan-section panel.
 - b. Upper rear coil-section panel.
 - c. Power connections from indoor fan 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 indoor fan motor power connections.
5. Adjust the following items per Installation Step 8:
 - 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.

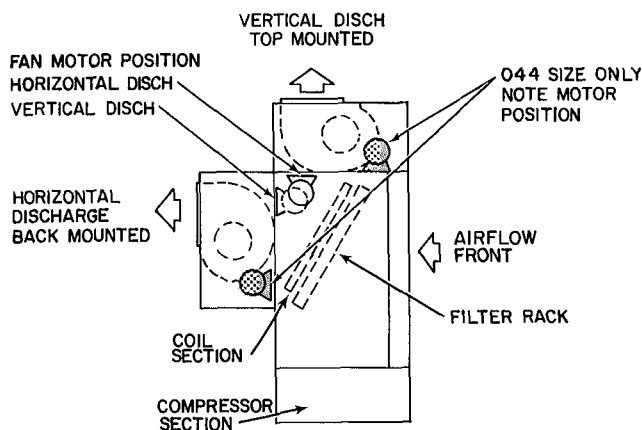
UNIT SIZES 50BA,BB028 THRU 064 are shipped in sections as noted previously. They can be field assembled for either vertical or horizontal discharge.

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

To set up Sizes 50BA,BB028 thru 064 for horizontal discharge (Fig. 4 and 5), proceed as follows:

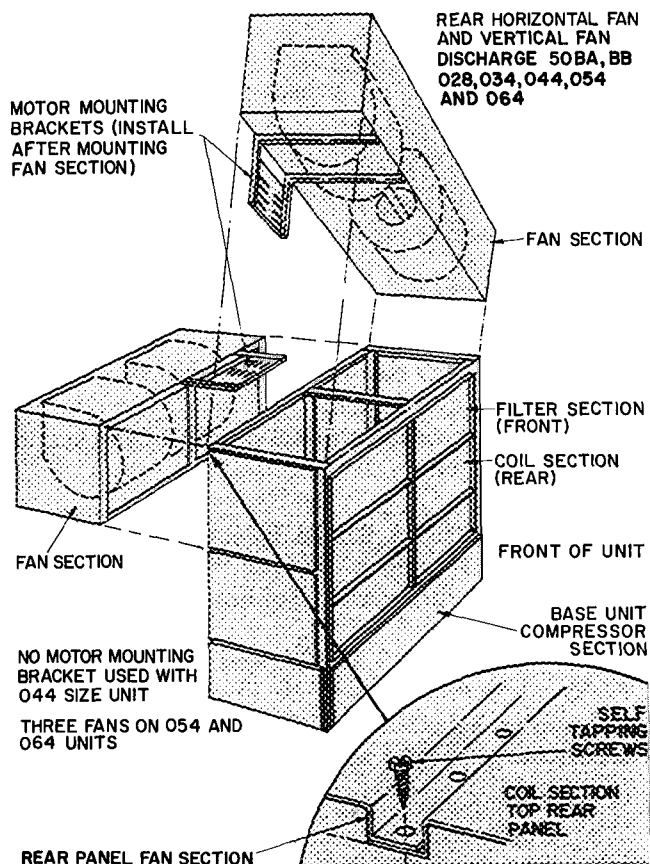
1. Remove:
 - a. Upper rear and end panels of coil section.
 - b. End panels on fan section.
 - c. Fasteners holding lower rear edge of fan panel.

2. Lift and position fan section on rear of coil section (Fig. 4). Secure with fasteners provided.
3. Install the following per Installation Step 7:
 - 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 8:
 - a. Shaft alignment.
 - b. Fan wheel position.
 - c. Pulleys.
 - d. Fan belts.



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

**Fig. 4 — Fan and Motor Arrangements
50BA, BB028, 034, 044, 054, 064**



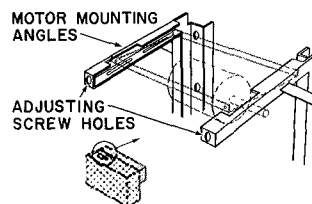
**Fig. 5 — Fan Section Mounting
(50BA, BB028-064)**

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. 5).
 - b. All end panels.

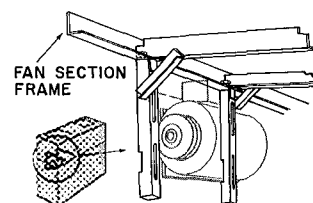
NOTE: On Size 044 units, motor mounting channels are factory installed and no angles, plates or fasteners are necessary. In this position, the fan motor is located on right side within fan section.

To set up Sizes 50BA, BB028 thru 064 for vertical air discharge (Fig. 4 and 5):

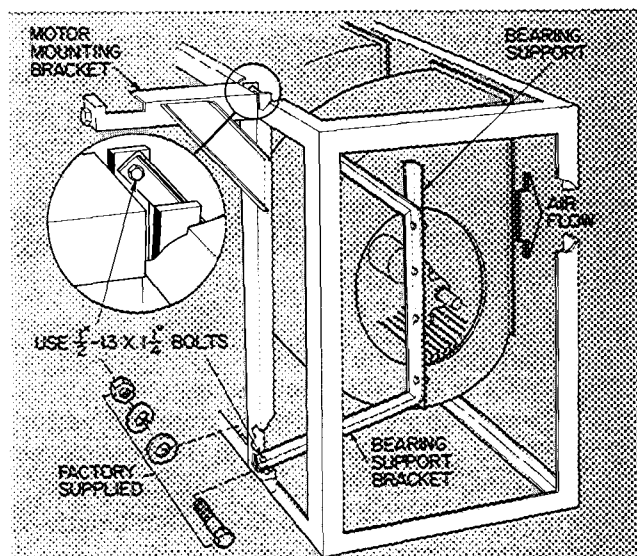
1. Remove:
 - a. Front, rear and end panels of fan section.
 - b. Upper-rear and end panels of coil section.
 - c. Filters from coil section.
 - d. Fasteners holding filter frame top. Push frame out and away from coil section frame (on 028 and 034 units only).
2. Lift up and position fan section on coil section (Fig. 5).
3. Fasten fan-section frame to coil-section frame with fasteners provided, then (on 028 and 034 units) reposition and fasten the filter frame moved in Step 1d.
4. Install the following per Installation Step 7:
 - a. Motor mounting frame angles.
 - b. Motor on motor-plate assembly.
 - c. Motor-plate assembly on frame angles.
 - d. Balance of drive package components.



**Fig. 6 — 028 and 034
Horizontal Fan Motor
Mounting Angles**



**Fig. 7 — 054 and 064
Vertical Fan Motor
Mounting Angles**



**Fig. 8 — Fan Motor Mounting Detail
(50BA, BB054 and 064)**

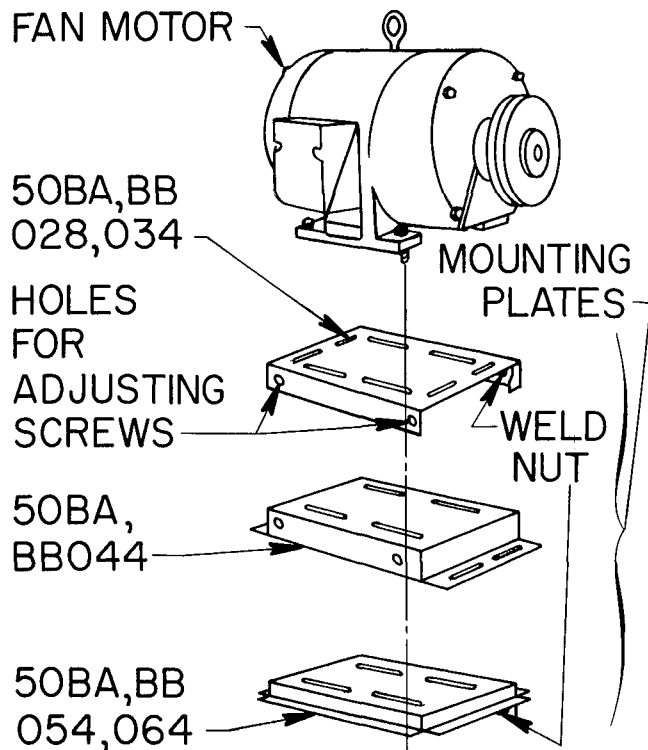


Fig. 9 — Motor Mounting

NOTE: On 044 units, motor mounting plate and channels are factory installed within fan section. No angle frame plates or fasteners are necessary. In this position, motor is on right side of fan section.

5. Adjust the following per Installation Step 8:

- Fan wheel alignment.
- Shaft alignment.
- Pulleys.
- Fan belts.

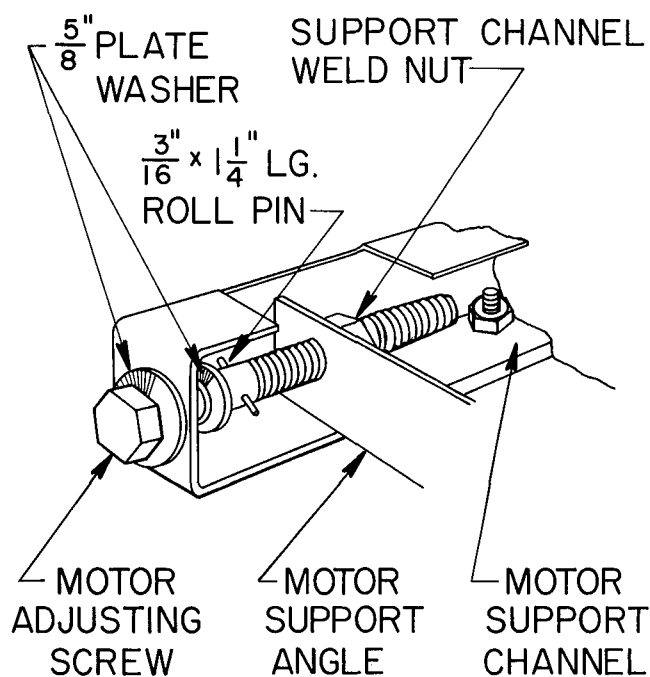


Fig. 10 — Assembled Fan Motor Adjusting Screw

6. Replace panels as follows:

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

Step 7 — Install fan motor.

This step applies to unit Sizes 50BA, BB028, 034, 054 and 064. 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:

- Fasten motor mounting angle bracket to fan section. Use Fig. 4 or 5 for position reference and Fig. 6, 7 and 8 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.

On Sizes 50BA, BB054 and 064, align bearing support bracket holes with holes in motor mounting bracket. Fasten with bolts, flat washers, lock washers and nuts as shown in Fig. 8.

- Position motor on motor plate (Fig. 9) and fasten with fasteners provided.
- 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-frame assembly may be lowered to the bottom of the support angle channels.
- Assemble and install motor adjusting screws as shown in Fig. 10. Drive roll pins into screws to prevent screws from backing out during motor position adjustment.
- Adjust motor position. Fasten motor mounting plate to mounting angles.

→ Table 2 — Alternate Fan Motors and Drives

UNIT 50BA, BB	NEMA FRAME SIZE*	HP	CENTER LINE DISTANCE (in.)		FAN SHAFT DIAM (in.)
			Max	Min	
004	56	3/4	17.5	15.7	1/2
006	56	1	17.1	15.4	5/8
008, 012	184, 56, 145T 182T, 213	2 3	10.2 10.2	6.8 6.8	3/4
016, 024	184, 56, 145T 213, 182T 184T, 215	2 3 5	11.8 11.8 11.8	9.4 8.4 8.4	1
028, 034	182T, 213 184T, 215 254U, 213T 256U, 215T	3 5 7-1/2 10	34.4 34.4 33.3 33.3	28.8 28.8 29.8 29.8	1-3/16
044	213T 215T	7-1/2 10	14.3 14.3	10.1 10.1	1-7/16
054, 064	213T 215T 254T	7-1/2 10 15	33.5 33.5 33.5	29.0 29.0 29.0	1-7/16

*Range of motor sizes unit will accept

NOTE: Motors and drives other than those furnished with unit must be purchased locally

Step 8 — Align fan shaft and wheel.

HORIZONTAL WHEEL CENTERING — All wheels must be horizontally centered between the inside edges of their fan scroll venturis (Fig. 11).

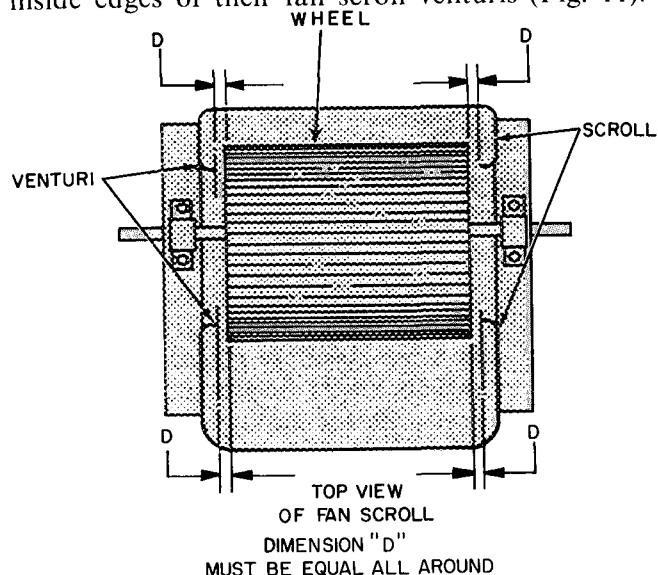


Fig. 11 — Horizontal Wheel Centering

Adjust as follows:

Unit Sizes 50BA, BB004 thru 024

1. Loosen setscrews holding wheel support to shaft (Fig. 12).
2. Center the wheel by sliding it horizontally.
3. Retighten setscrews.

Unit Sizes 50BA, BB028 thru 064

1. Loosen fan wheel locking clamps on each side of fan support (Fig. 12).
2. Center the wheel by sliding it horizontally.
3. Retighten locking clamp bolts to torque specified in Table 3.

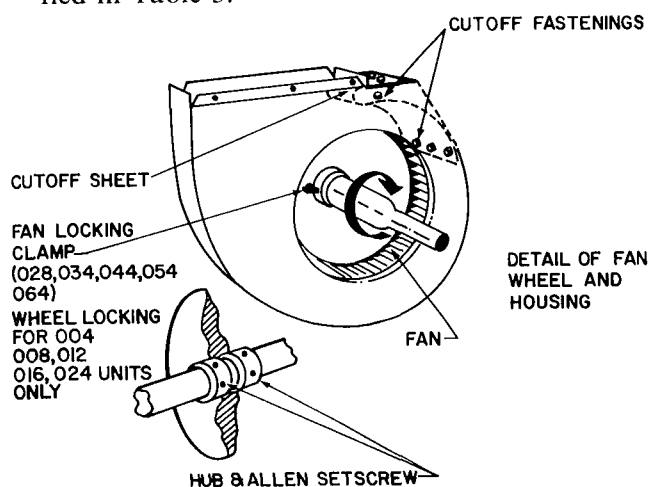


Fig. 12 — Fan Locking Detail

Table 3 — Torque Requirements

BOLT SIZE (in.)	FAN CLAMP BOLT RECOMMENDED TORQUE (lb-ft)
5/16	15-18
7/16	30-35

CONCENTRIC ALIGNMENT — Shaft and wheels must be concentrically centered with the venturi or air inlet of the fan housing (Fig. 13).

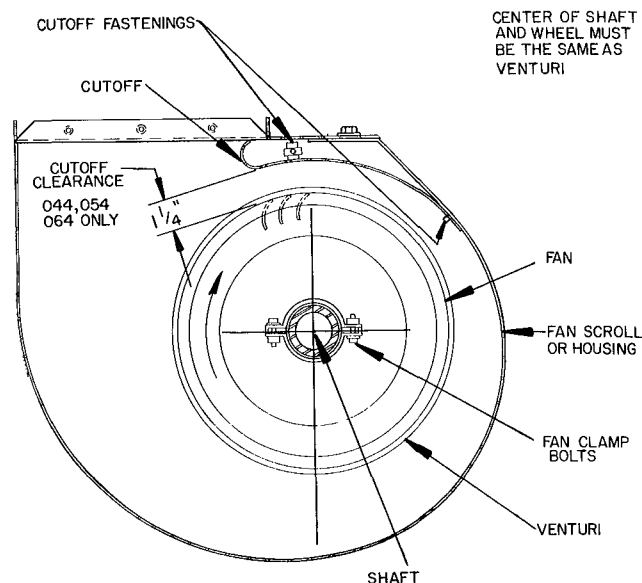


Fig. 13 — Concentric Alignment

Unit Sizes 50BA, BB004 thru 024 — Shaft bearings are supported by spider (Fig. 14). If shaft and wheels are concentrically misaligned from shipping shock, it is possible to rebend spider arms to original positions. Replace the spider if it has been extensively damaged by shipping shock.

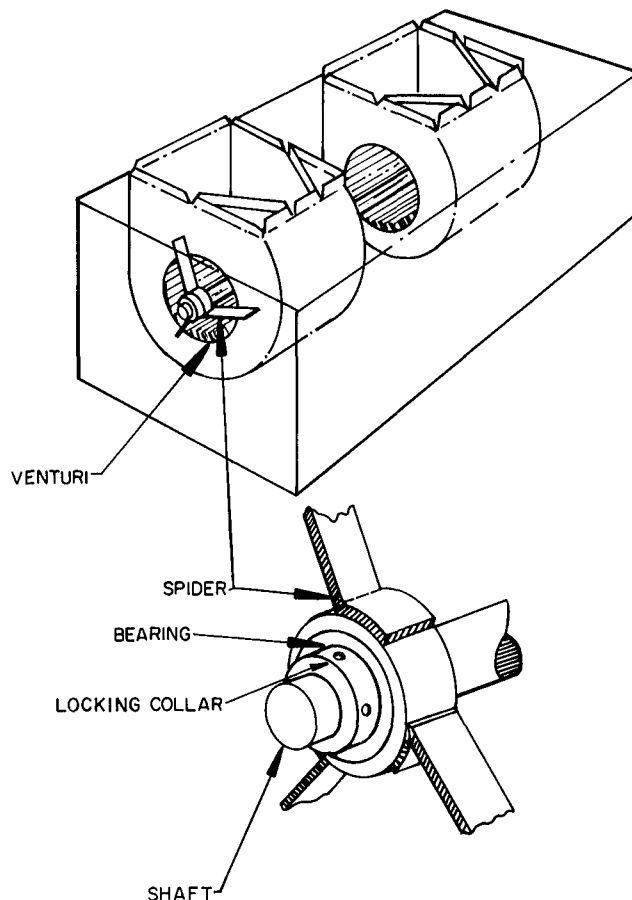


Fig. 14 — Fan Shaft Bearings — 004, 006, 008, 012, 016, 024

Unit Sizes 50BA028 thru 064 — Bearings are bolted to an angle support fastened to fan scroll (Fig. 15). 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 the setscrews holding bearing locking collar at each end of shaft (Fig. 14 or 15).
2. Slide shaft and wheel assembly horizontally until wheels are horizontally centered (Fig. 11).
3. Slide the bearing locking collars against the bearing race and turn in direction of shaft rotation until tight.
4. Retighten locking collar setscrews.

CUTOFF CLEARANCE (Unit Sizes 044, 054 and 064) — After centering and aligning the fan wheel, loosen cutoff sheet (Fig. 13), adjust for 1-1/4 in. clearance as shown and then tighten securely.

FAN, PULLEY AND BELT ADJUSTMENT — Refer to the Service section entitled Indoor-Air Fan Adjustment.

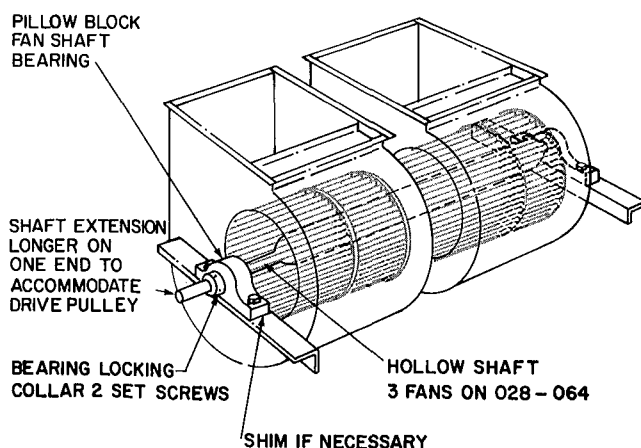


Fig. 15 — Horizontal Shaft Alignment

Step 9 — Install heating coil if supplied.

On 50BA,BB004 and 006 units, any water or steam heating coil must be installed thru the back of the unit as described in the Installation Instructions shipped with the accessory coil.

Step 10 — Install supply air (evaporator) ductwork.

Connect supply ducts to flanges on air supply opening (Fig. 1), using a flexible connection.

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.

Step 11 — Install return air ductwork (004 — 012 units).

The unit back panel is stamped to indicate alternate return air (or outdoor air inlet) opening as indicated in Fig. 1.

1. Cut out the alternate return air opening as required.
2. Attach a 1-in. flange to unit back panel or attach a flanged, flexible duct connection directly to unit as desired.

If an outdoor makeup air damper is to be installed, attach it directly to unit back panel and install flexible connection between damper assembly and remaining ductwork.

Use accepted ductwork installation procedures. Follow all applicable codes.

3. Restrict or completely blank off the standard return air opening with a field-fabricated filler panel. This panel must be removable for service access. Refer to Service section entitled Return Air Grille Removal as required.

Step 12 — Check return-air filters.

Be sure filters shipped with unit are the correct size (see Table 1). *Never operate unit without return-air filters in place.*

Step 13 — Check compressor spring mounts (50BB008 and 50BA,BB012 thru 064).

The compressors are held rigid in shipment by bolts extending thru a washer, grommet and compressor foot into a weld nut (for 064 unit, see paragraph below).

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

The 50BA,BB064 units are shipped with 4 special flanged washers and neoprene grommets in a cloth bag tied to the compressor. Remove the compressor hold-down bolts. Then install the neoprene grommets between the compressor feet and the special washers. Reinstall the hold-down bolts and tighten until there is slight pressure on the grommets.

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

NOTE: Do not loosen bolts on 50BA008 compressor.

Step 14 — Make condenser connections.

WATER-COOLED (50BA) UNITS — GENERAL — Condensers have water inlet and outlet connections as shown in Fig. 16. Piping arrangements for city, waste or recirculating water are shown in Fig. 17 thru 24.

WATER-COOLED UNITS, SIZE 50BA004 THRU 012 — Connect condenser water supply and return lines as indicated in Fig. 16 and 17. When connecting water lines, hold the condenser inlet and outlet stubs firmly with a wrench at the FPT hex fitting to prevent twisting. Do not use water lines smaller than connection sizes shown in Fig. 17. Observe all applicable plumbing and sanitary codes. To assemble Carrier Compatible Fittings:

1. Cut tubing to length with tube cutter and remove burrs.
2. Mark required insertion depth on tube (1-1/4 in. for 5/8- and 3/4-in. OD tubing).
3. Remove plug from fitting and loosen nut one turn.
4. Position and insert tube into fitting. Bottom tube past depth mark.
5. Leave nuts on condenser end of tubing. Loosen and purge one line at a time, using holding charge in base unit.
6. Tighten nuts to stop on unit fitting collar.
7. Open all service valves.

Make sweat connections as follows:

1. Clean tube; then remove plug and nut from fitting.
2. Remove O-ring from inside fitting with bent pin.
3. *Wrap entire valve with wet rag.*
4. Bottom tube in fitting and apply low temperature solder, such as Allstate 430.

If specified, install field-supplied water-regulating valve in water supply line outside cabinet as follows:

1. Route the regulating valve capillary with its flare nut to the fitting on refrigerant liquid line (Fig. 2), using any convenient unused opening on side of unit. Use a grommet in unit panel to prevent chafing of capillary.

Table 4 — Maximum Water-Side Working Pressure

UNIT SIZE 50BA	MAXIMUM WORKING PRESSURE
004,006,008,012	450 psig
016	550 psig
024,028,034,044,054,064	150 psig*
	250 psig

*550 psig if factory-installed dresser adapters are removed and field-fabricated manifold is installed

2. Remove cap from liquid line fitting.
3. Remove cotter pin taped to liquid line near fitting. Insert pin, split end first, into water regulating valve flare nut.
4. Connect flare nut to fitting. Round end of cotter pin will depress core of fitting. The opened fitting allows refrigerant pressure to act on water regulating valve. Tighten flare nut to prevent leakage.

The fitting automatically seals (closes) when flare nut is removed; a slight amount of refrigerant is lost each time, however. Do not lose cotter pin.

WATER-COOLED UNITS, SIZE 016 THRU 064 — Connect condenser water supply and return lines as indicated in Fig. 16. Unit Size 50BA024, 044, 054 and 064 require field modification to condenser piping when used on city or waste water. Refer to Fig. 18, 21 and 24.

Install a water regulating valve on the inlet of each condenser with any size unit used on waste or city water (Fig. 19, 20, 22, 23 and 24). Connect regulating valve capillary to a back-seated liquid service valve. Arrow on valve body must point in direction of liquid flow. After connecting capillary, open regulating valve one turn from back-seated position. Adjust valve to maintain proper condensing temperature.

Install a full size gate valve and strainer in water supply line. Valve and strainer must be accessible. See Table 4.

Table 5 — Recommended Line Sizes (in.) (Condenserless Models)

UNIT 50BB	SYSTEM	CONN SIZES*		LENGTH OF LINE					
				20		40		60-80	
		L	HG	L	HG	L	HG	L	HG
004	—	1/2	1/2	1/2	1/2	1/2	5/8	1/2	7/8
006	—	1/2	1/2	1/2	7/8	1/2	7/8	5/8	7/8
008	—	1/2	7/8	1/2	7/8	1/2	7/8	1/2	7/8
012	—	5/8	7/8	5/8	7/8	5/8	1-1/8	3/4	1-1/8
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	5/8	1-1/8	5/8	1-1/8	7/8	1-1/8	7/8	1-3/8
	3	5/8	7/8	5/8	7/8	5/8	1-1/8	7/8	1-1/8
054	1,2,3	5/8	1-1/8	5/8	1-1/8	7/8	1-1/8	7/8	1-3/8
064	1 & 2	7/8	1-3/8	7/8	1-3/8	7/8	1-5/8	7/8	1-5/8

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

*Sweat connections

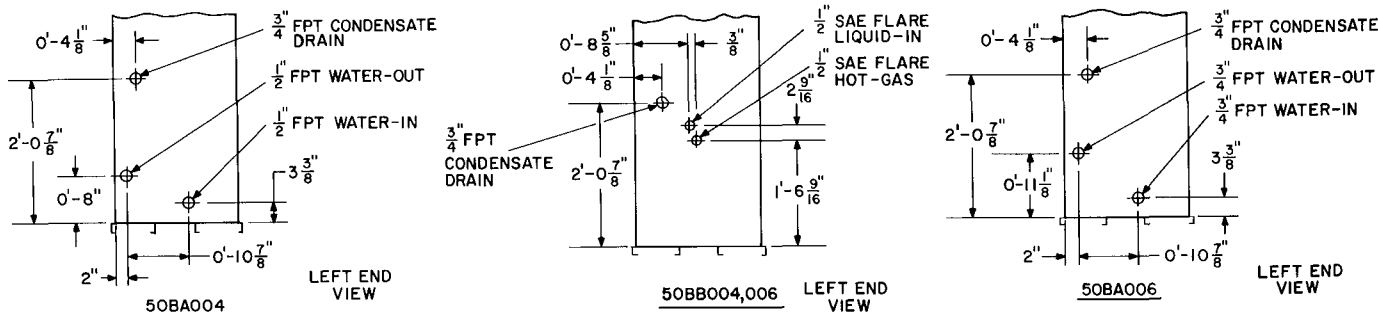


Fig. 16 — Water and Refrigerant Connections

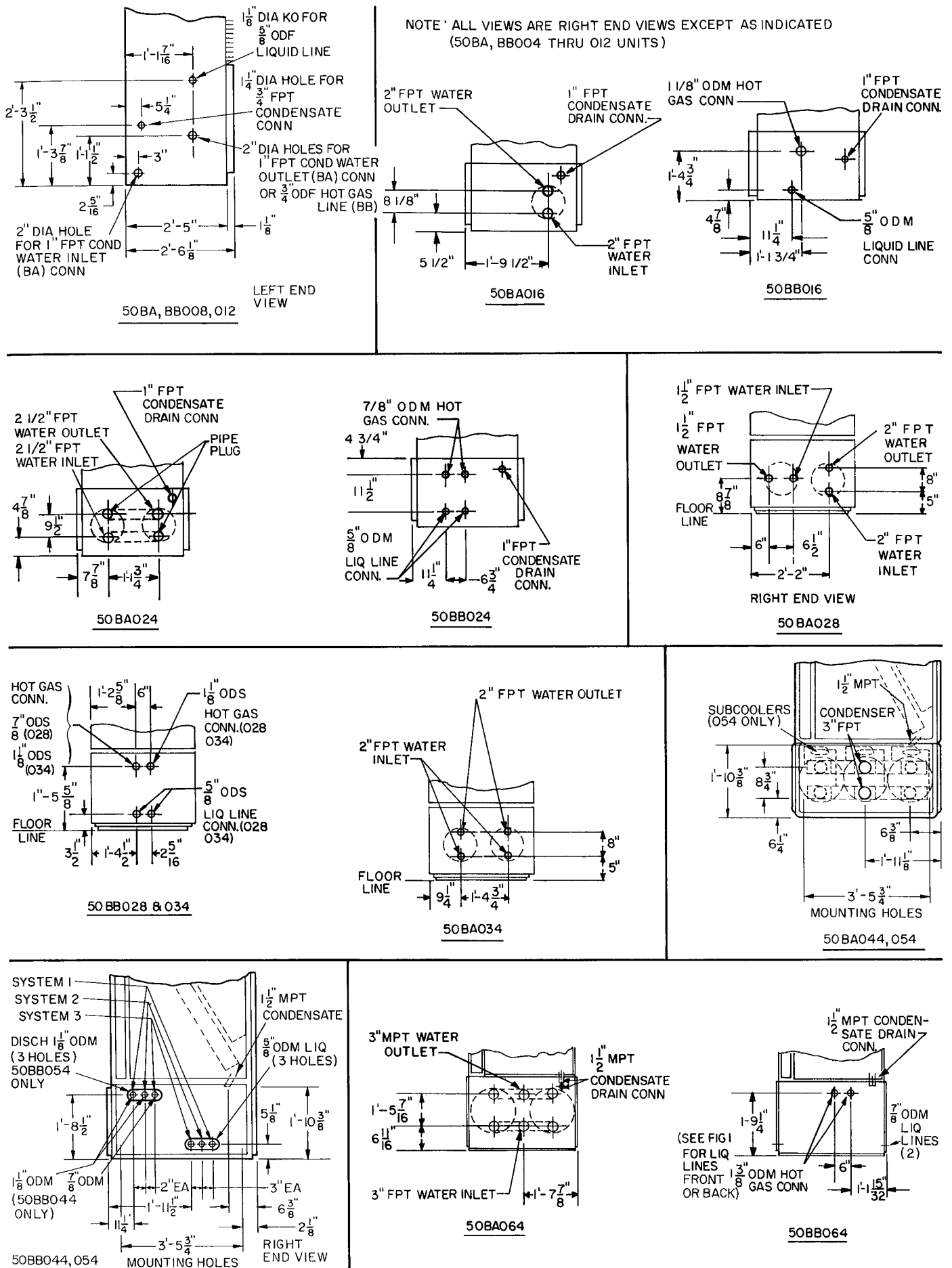


Fig. 16 — Water and Refrigerant Connections (cont)

ALL 50BB (AIR-COOLED) UNITS — Install air-cooled condenser in accordance with the installation instructions provided with condenser. Connection locations for liquid and hot gas service lines are shown in Fig. 16. Recommended line sizes are given in Table 5. Refer to Carrier System Design Manual, Part 3, for standard refrigerant piping techniques.

Condenserless (50BB) units are shipped with a holding charge. After refrigerant connections are made, evacuate, leak test and charge system as

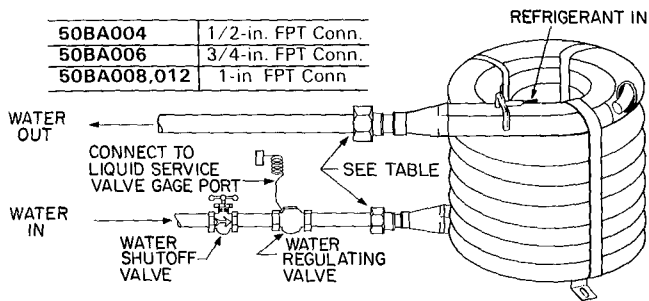


Fig. 17 — Condenser Water Piping (50BA004-012)

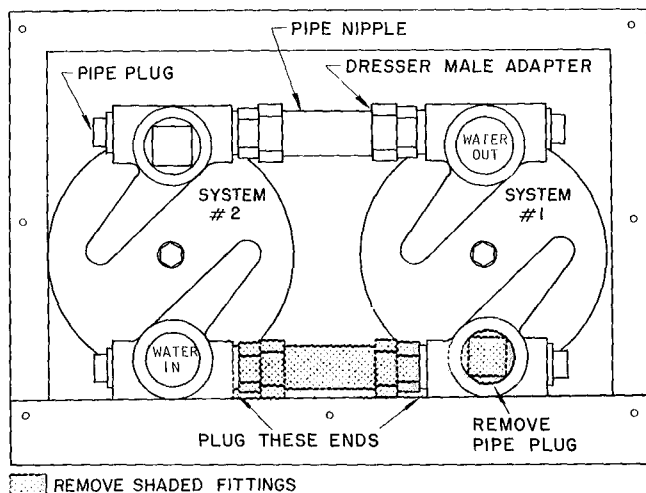


Fig. 18 — 50BA024 Condenser City Water Piping Conversion

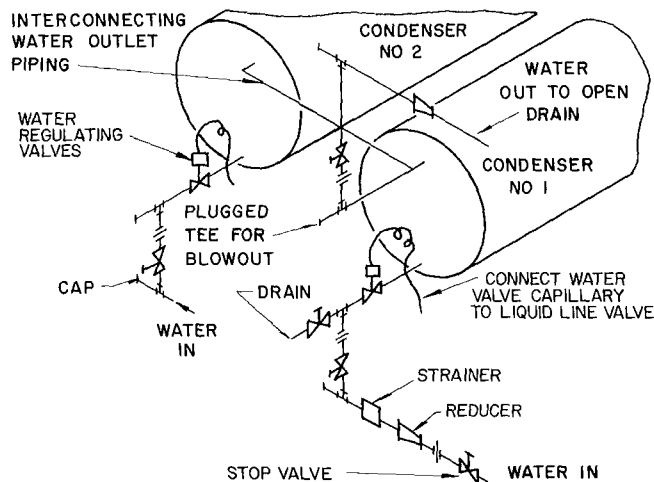


Fig. 19 — 50BA024 Typical Waste or City Water Piping

described in the Service section entitled, Charging the System. Unit refrigerant operating charge is listed in Table 1.

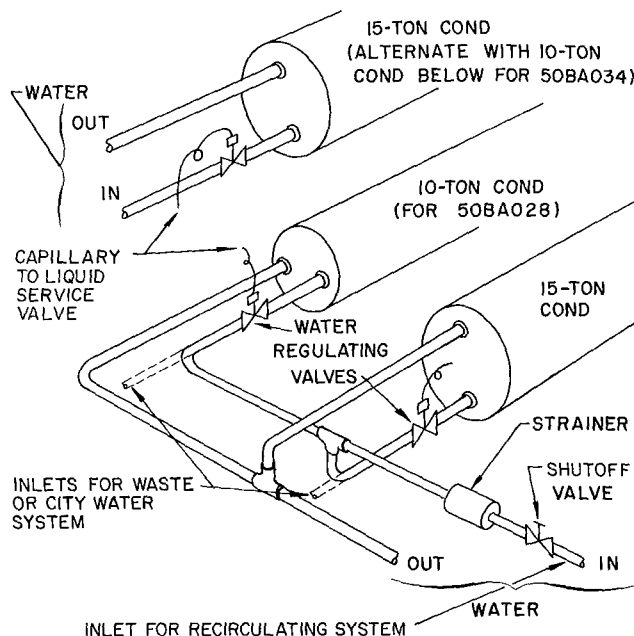
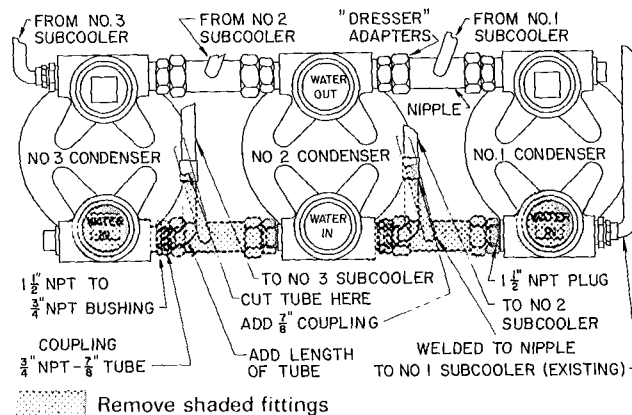


Fig. 20 — 50BA028 and 034 Condenser Water Piping



- NOTE 50BA044 units same less subcoolers
- 1 Use one outlet for water discharge
 - 2 Remove interconnecting nipples and "dresser" adapters on inlet side of condensers
 - 3 Remove 3-in. plugs from no 1 and 3 condenser inlet headers

Fig. 21 — Field Conversion to City or Waste Water System (50BA044 and 054)

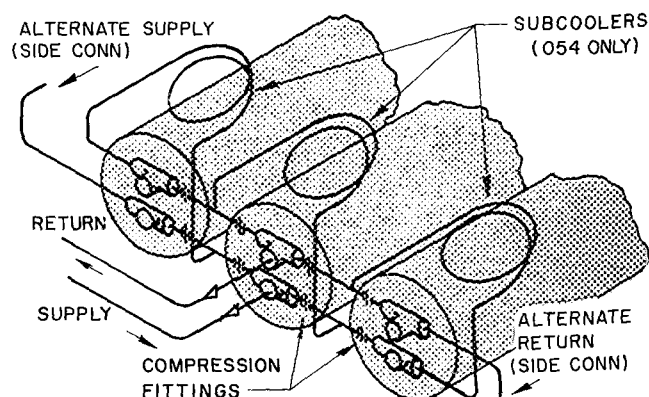


Fig. 22 — Recirculating Water System Piping (50BA044 and 054)

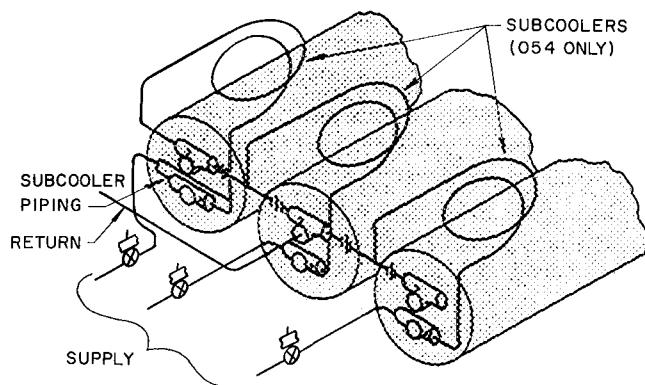
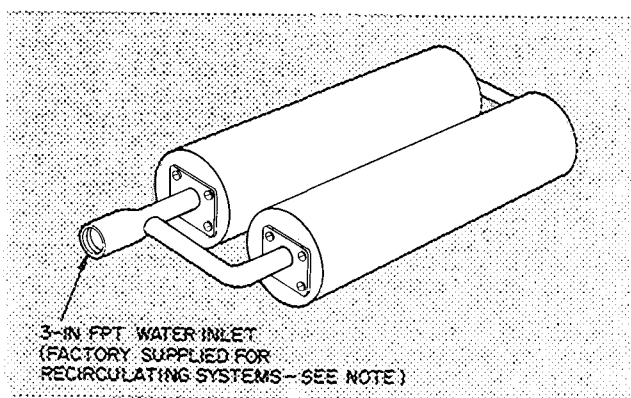
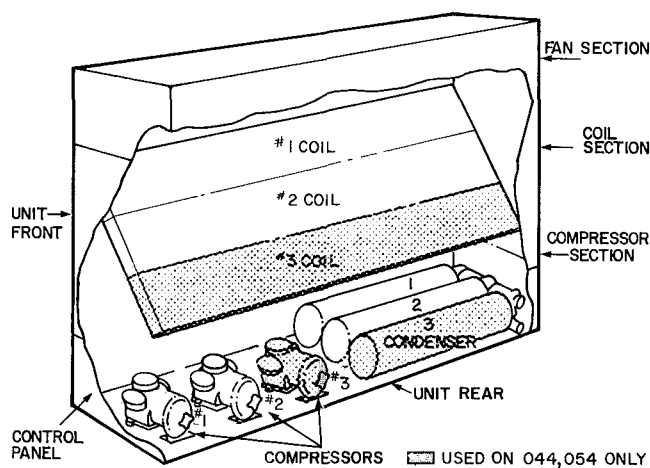


Fig. 23 — Waste or City Water System Piping (50BA044 and 054)



NOTE For waste or city water, remove inlet manifold and supply condensers individually

→ Fig. 24 — 50BA064 Condenser Water Piping



50BA,BB*	COIL NO.	COMPR NO.	COND NO.*
016	1	1	1
024,028, 034,064	1, 2	1, 2	1, 2
044,054	1, 2, 3	1, 2, 3	1, 2, 3

*50BB units are condenserless

Fig. 25 — Refrigeration Circuits (016-064)

Step 15 — Install unit drain line.

Install a trapped condensate drain line at unit drain connection (Fig. 16). The drain requires standard pipe connected to condensate pan nipple as shown in Table 6. Figure 26 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.

Referring to Fig. 26, 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 6. 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 6 — Condensate Drain Connections (in.)

UNIT SIZE	004,006, 008,012	016,024	028,034, 044,054	064
PIPE SIZE	3/4	1	1-1/4	1-1/2

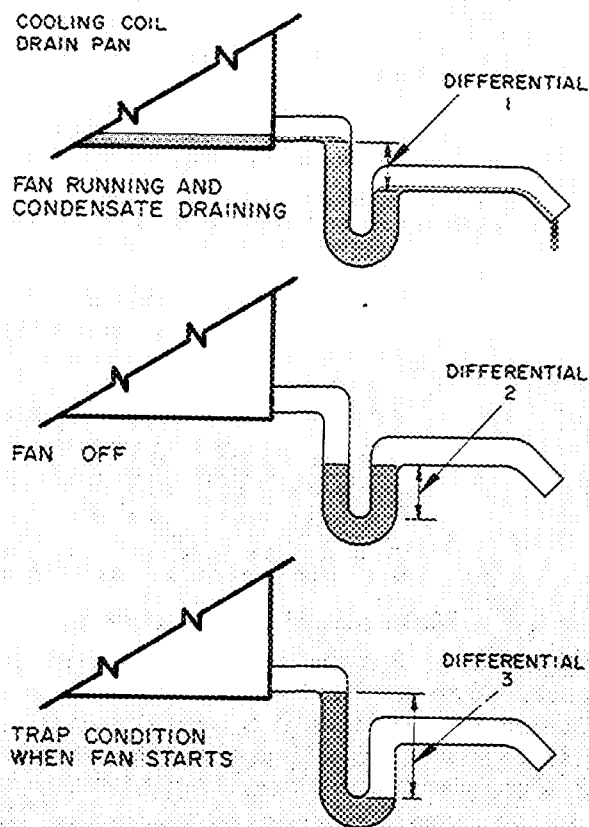


Fig. 26 — Condensate Drain

→ Table 7 — Electrical Data

UNIT 50BA, BB	VOLTS/PH/HZ	VOLT- AGE RANGE		COMPRESSOR NO. 1				COMPRESSOR NO. 2				INDOOR FAN MOTOR*		POWER SUPPLY			
				RLA		LRA		RLA		LRA				Min Ckt Amps†		MOCP Amps†	
		Min	Max	BA	BB	BA	BB	BA	BB	BA	BB	Hp	FLA	BA	BB	BA	BB
004	230/1/60	207	253	19 8	19 8	88 0	88 0	—	—	—	—	1/3	3 3	28 1	28 1	45	45
	208-230/3/60	187	253	13 0	13 0	87 0	87 0	—	—	—	—	1/3	3 3	19 6	19 6	30	30
	460/3/60	414	528	5 5	5 5	30 0	30 0	—	—	—	—	1/3	0.8	7.7	7.7	15	15
006	230/1/60	207	264	27 9	39 0	106 0	135 0	—	—	—	—	3/4	5 3	40 2	54 1	70	90
	208-230/3/60	187	253	18 3	20 6	105 0	136 0	—	—	—	—	3/4	7 1	30 0	32 9	45	50
	460/3/60	414	528	8 8	10 4	35 0	49 0	—	—	—	—	3/4	1 6	12 6	14 6	20	25
	575/3/60	518	632	6 4	8 4	27 0	41 0	—	—	—	—	3/4	1 1	9 1	11.6	15	25
008	208-230/3/60	187	253	23 7	31 3	184 0	137 0	—	—	—	—	1	4 0	33 7	44 0	50	70
	460/3/60	414	506	11 4	14 1	69 0	62 0	—	—	—	—	1	1 6	15 9	19 4	25	30
	575/3/60	518	632	9 6	11 3	55 0	50 0	—	—	—	—	1	1 4	13 4	15 5	20	25
012	208-230/3/60	187	253	36 3	40 0	137 0	170 0	—	—	—	—	2	6 0	52 0	56 0	80	90
	460/3/60	414	506	14 6	18 0	62 0	77 0	—	—	—	—	2	2 8	21 1	25 9	35	40
	575/3/60	518	632	11 4	14 4	50 0	62 0	—	—	—	—	2	2 3	16 6	20.7	25	35
016	208-230/3/60	187	253	50 0	64 0	191 0	266 0	—	—	—	—	2	7 0	70 0	87 0	110	150
	460/3/60	414	506	22 1	29 0	86 0	120 0	—	—	—	—	2	3 1	31 0	40 0	50	50
	575/3/60	518	632	17 9	23 0	69 0	96 0	—	—	—	—	2	2 5	25 0	32 0	40	35
024	208-230/3/60	187	253	36 0	45 0	137 0	170 0	36 0	45 0	137 0	170 0	3	9 2	91 0	111 0	125	150
	460/3/60	414	506	16 0	20 0	62 0	77 0	16 0	20 0	62 0	77 0	3	4 6	40 8	49 8	50	60
	575/3/60	518	632	12 9	16 0	50 0	62 0	12 9	16 0	50 0	62 0	3	3 4	32 9	40 0	45	45
028	208-230/3/60	187	253	49 3	64 0	191 0	266 0	35 7	45 0	137 0	170 0	5	16 2	114 0	142 0	150	200
	460/3/60	414	506	22 2	29 0	86 0	120 0	16 0	20 0	62 0	77 0	5	6 6	51 4	63 9	60	70
	575/3/60	518	632	18 0	23 0	69 0	96 0	13 0	17 0	50 0	62 0	5	5 6	41 0	51.9	45	70
034	208-230/3/60	187	253	49 3	64 0	191 0	266 0	49 3	64 0	191 0	266 0	5	16 2	128 0	161 0	175	200
	460/3/60	414	506	22 2	29 0	86 0	120 0	22 2	29 0	86 0	120 0	5	6 6	57 6	72 9	60	80
	575/3/60	518	632	18 0	23 0	69 0	96 0	18 0	23 0	69 0	96 0	5	5 6	46 0	57 9	50	80
044‡	208-230/3/60	187	253	50 0	64 0	191 0	266 0	36 0	45 0	137 0	170 0	7-1/2	21 6	171 0	211 0	200	250
	460/3/60	414	506	23 0	29 0	86 0	120 0	16 0	20 0	62 0	77 0	7-1/2	9 5	77 0	95 0	90	110
	575/3/60	518	632	18 0	—	69 0	—	13 0	—	50 0	—	7-1/2	8 4	62 5	—	80	—
054‡	208-230/3/60	187	253	50 0	64 0	191 0	266 0	50 0	64 0	191 0	266 0	10	28 0	191 0	236 0	225	300
	460/3/60	414	506	23 0	29 0	86 0	120 0	23 0	29 0	86 0	120 0	10	13 0	88 0	107 0	100	125
	575/3/60	518	632	18 0	—	69 0	—	18 0	—	69 0	—	10	10 5	69 5	—	80	—
064	208-230/3/60	187	253	102 0	119 0	506 0	506 0	102 0	119 0	506 0	506 0	15	46 2	276 0	314 0	350	400
	460/3/60	414	506	50 0	50 0	253 0	253 0	50 0	50 0	253 0	253 0	15	21 0	134 0	134 0	175	175
	575/3/60	518	632	38 0	50 0	176 0	176 0	38 0	50 0	176 0	176 0	15	16 4	102 0	129 0	125	175

FLA — Full Load Amps
Hp — Horsepower
LRA — Locked Rotor Amps
MOCP — Maximum Overcurrent Protective Device (See Note 1)
RLA — Rated Load Amps

*Indoor fan motors are 3-phase motors of same voltage as unit except those with FLA values in italics. These motors are single-phase motors of same voltage as unit.

†Min Ckt Amps and MOCP Amps values per NEC (See Note 1)

‡Units 50BA, BB044 and 054 have 3 compressors. Compressor no. 1 data applies to Systems 1 and 2; compressor no. 2 data applies to System 3.

NOTES:

- 1 In compliance with NEC requirements for multimotor and combination load equipment (NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse only.
- 2 Phase imbalance must not exceed 2%.
- 3 Fan motor power wiring, circuit breakers and other electrical components are sized to accommodate special motors on the 50BA, BB016, 024, 028 and 034 units.
- 4 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.
- 5 Maximum instantaneous current flow during starting is the sum of the LRA for last compressor to start plus the FLA for all other compressors in the unit.

→ Table 8 — Maximum Wire Sizes for Terminal Block (AWG or MCM)*

VOLT/ PHASE	UNIT 50BA,BB										
	008	012	016	024	028, 034	044		054		064	
						BA	BB	BA	BB	BA	BB
208-230/3	00	00	00	00	350	0000	350	350	350	350	500
460/3	00	00	00	00	00	00	0000	0000	0000	350	350
575/3	00	00	00	00	00	00	—	00	—	350	350

*Terminal block not supplied on 004 and 006 unit sizes. Wire size to be selected per NEC and supply wires to be connected to factory-supplied pigtail wire connectors.

→ Step 16 — Make electrical connections.

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

On 50BA, BB016 thru 064 size units, power may be supplied thru a branch circuit. Branch circuit protection is provided in these units by manual reset

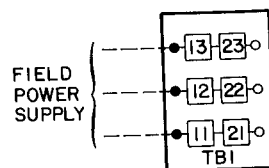
circuit breakers. Branch circuit must be in accordance with NEC or local code, whichever takes precedence. Power supplied to auxiliary equipment, such as fan motors for air-cooled condenser or for cooling tower, must be run separately.

POWER WIRING — Conduit opening for 50BA, BB004 thru 012 units is on left side of unit near control box; for 50BA, BB016 thru 064 units, the opening is on back of unit near control box.

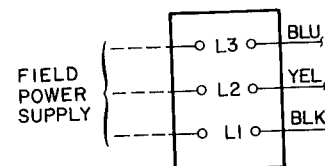
On 50BA, BB004 and 006 units, field power wires are spliced to factory wires at the compressor contactor. On all other sizes, field power connections are made at a terminal block within the control box (see Fig. 27). Refer to Table 8 for maximum wire size at terminal block.

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. Contact your local power company for correction of improper voltage or phase imbalance (see Table 7). Failure of unit because of phase imbalance constitutes abuse and can void the warranty.

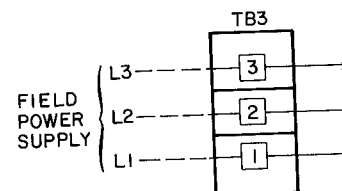
CONTROL WIRING — On extended voltage (208-230-v) units, Sizes 50BA, BB006 thru 064, the control transformer is factory wired for 208-v usage. If unit is to be used on 230-v system, reconnect primary wiring on transformer as shown on unit wiring diagram.



50BA, BB008, 012



50BA, BB016-054

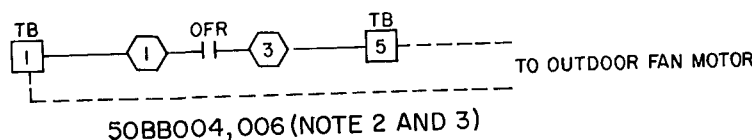


50BA, BB064

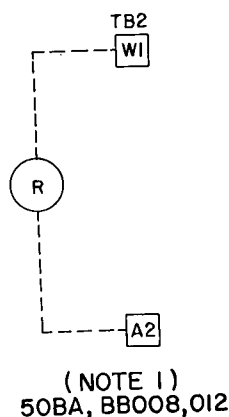
--- FIELD WIRING
— FACTORY WIRING

NOTE: Field power wiring connections on 004 and 006 unit sizes are attached to factory wiring using factory-supplied wire connectors

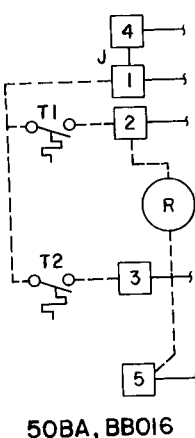
Fig. 27 — Field Power Wiring Connections (008-064)



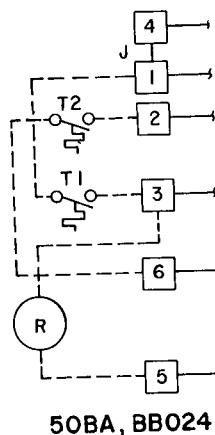
50BB004, 006 (NOTE 2 AND 3)



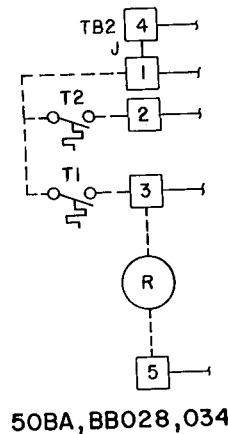
(NOTE 1)
50BA, BB008, 012



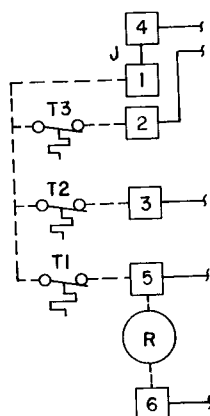
50BA, BB016



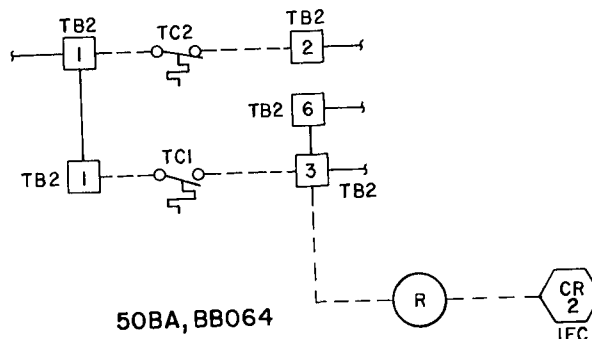
50BA, BB024



50BA, BB028, 034



50BA, BB044, 054



50BA, BB064

CR — Control Relay
IFC — Indoor Fan Contactor
J — Jumper
OFR — Outdoor Fan Motor Relay
R — Condenser Fan Relay, 50BB; Pump Relay, 50BA
T or TC — Thermostat
TB — Terminal Board

NOTES

- 1 Condenser Fan Relay (OFR) shipped with 50BB008 and 012 units
- 2 Condenser Fan Relay contacts integral to control circuit with 50BB004 and 006 units
- 3 No provisions for pump relay connection on 50BA004 and 006 units

Fig. 28 — Field Control Wiring Connections

Refer to Fig. 28 for field control wiring to pump relay (50BA unit), condenser fan relay (50BB unit) and remote thermostat (unit sizes 016 thru 064).

On 50BA, BB004 thru 012 units, the thermostat is factory installed with a sensing bulb in the return air. To wire these units to a remote thermostat, or to a remote control switch and thermostat, refer to unit Wiring book or contact your Carrier representative.

On 50BA, BB016 thru 064 units, a field-supplied thermostat must be installed (Fig. 28). Table 9 lists the recommended connecting sequence for a 2-step thermostat.

Table 9 — Two-Step Thermostat Connection for Capacity Control

UNIT 50BA, BB	THERMO STEP	TERMINAL CONN.	COMPONENT ENERGIZED
012	One	2	Compressor
016	Two	3	Liquid line solenoid
024	One	3	Compressor No 2
028	Two	2	Compressor No 1
034			
044	One	3 and 5	Compressor No 2 and 3
054	Two	2	Compressor No 1
064	One	3 and 6	Capacity control solenoid valve and liquid line solenoid valve No 2 and compressor No 2
	Two	2	Liquid line solenoid No 1 and compressor No 1

FREEZE-PROTECTION THERMOSTAT — An accessory freeze-protection thermostat is required on Size 008, 012 and 064 units when the low-pressure switch setting (Table 1) 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.

HEATING COILS — Accessory heating coils are available for field installation. Separate installation instructions are shipped with the accessory.

START-UP

Unit Size 50BA, BB004 and 006

1. Set selector switch at OFF and thermostat at highest setting.
2. Turn on unit power. On 50BB units, check that crankcase heater is on. Compressor shell in vicinity of heater should become warm to the touch.
3. On 50BA unit, turn on condenser water supply. On 50BB unit, open refrigerant line service valves.
4. Set selector switch at FAN position. Check fan speed (Table 1) and rotation. Fan direction arrow is attached to fan scroll. If fan requires adjustment, refer to Service section entitled, Indoor Air Fan Adjustment.
5. On 50BA (water-cooled) units, set selector switch on COOL and thermostat at lowest setting. Compressor will start within 5 minutes.

On 50BB (condenserless) units, allow crankcase heater to remain energized (unit power on) for at least 6 - 8 hours; then set selector switch on COOL and thermostat at lowest setting. Compressor will start within 5 minutes.

6. Set thermostat at highest setting to shut off compressor.

7. Set thermostat at lowest setting. Compressor will start within 5 minutes as described in the Service section, Time Guard® Control Circuit.

On 50BB remote condenser unit, the outdoor air fans cycle with compressor.

8. Set thermostat for comfort as desired.

→ **TO SHUT DOWN UNIT** — Set selector switch at OFF. Do not shut off main power except to service unit. Crankcase heater (50BB unit) is operative only when unit power is on (see Service section, Crankcase Heaters).

Unit Size 50BA, BB008 thru 064

1. Thoroughly clean and inspect unit.
 2. *Open compressor discharge and suction service valves and liquid shutoff valves.*
 3. With selector switch in OFF position, turn circuit breakers on. On 50BA008 and 064 unit, and on all 50BB units, leave unit in this condition for 24 hours so that crankcase heater can drive off any accumulated refrigerant.
 4. Turn selector switch to COOL. Time Guard circuit will delay unit start for 5 to 6 minutes.
 5. Set thermostat at desired comfort temperature.
- TO SHUT DOWN UNIT**
1. If unit may be exposed to freezing temperatures, drain water from condenser and all water piping.
 2. Add a noncorrosive antifreeze to any residual water in the system.
 3. Turn selector switch to OFF position and turn circuit breakers off.
 4. If unit is to be used for winter heating, leave circuit breakers on, set selector switch at FAN position and turn cooling thermostat off.

Service Valves — *Always be sure that compressor suction and discharge service valves and liquid shutoff valves are open before operating unit.*

The liquid shutoff valves are accessible from the rear of Size 064 unit and from front or rear of all other units. To open valve, turn counterclockwise (backseat). After opening, replace and tighten valve cap to prevent leakage.

→ Capacity Control Valve Adjustment (Fig. 29)

The capacity control valves are factory set as indicated in Table 10. If valve adjustment is required, for any reason, use the following procedures.

The control set point (cylinder load point) is adjustable from 0 psig to 85 psig. The pressure differential between the cylinder load point and cylinder unload point is adjustable from 6 psig to 22 psig (see Table 10).

Table 10 — Factory Set Points (psig)

UNIT 50BA,BB	ACTION	UNLOADER NO. 1	UNLOADER NO. 2
012	Load	69	—
	Unload	58	
016	Load	69	—
	Unload	58	
064	Load	77	74
	Unload	58	55

TO REGULATE CONTROL SET POINT

1. Turn adjustment nut (Fig. 29) clockwise to its bottom stop. Set point is now 85 psig.
2. Turn adjustment nut counterclockwise to reach desired pressure. Each full turn decreases the set point by 7.5 psig. (Approximately 1 1/2 counterclockwise turns decreases set point to 0 psig.)

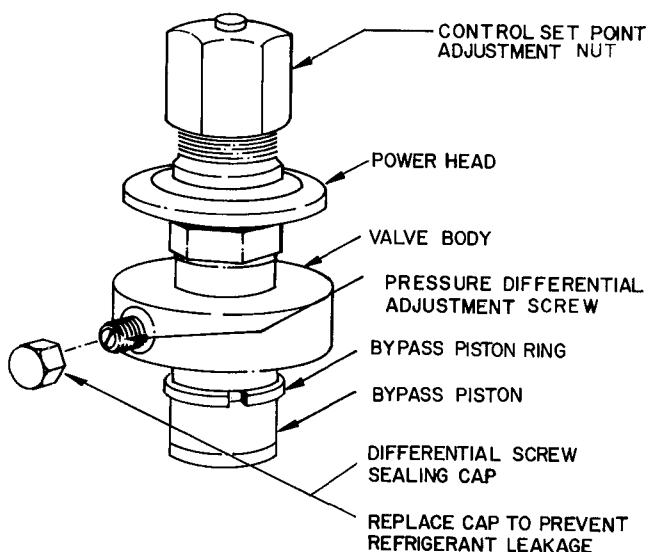


Fig. 29 — Capacity Control Valve

TO ADJUST PRESSURE DIFFERENTIAL — Turn differential adjustment screw (Fig. 29) counterclockwise to its back-stop position. Differential is now 6 psig.

Then turn screw clockwise to desired differential. Each full turn increases differential by 1.6 psig. (Approximately 10 clockwise turns increases differential to 22 psig.)

SERVICE

CAUTION: Before servicing fan compartment:

1. Sharp edges of evaporator coil fins are exposed. To prevent arm injury, cover top edge of evaporator with cardboard strip or a few layers of heavy tape.
2. To avoid coil damage, cover evaporator coil face with plywood or other rigid sheet material. If any coil fins are mashed or bent, straighten with a coil fin comb of the proper tooth spacing (see coil fins/in. in Table 1). Check for refrigerant leaks.

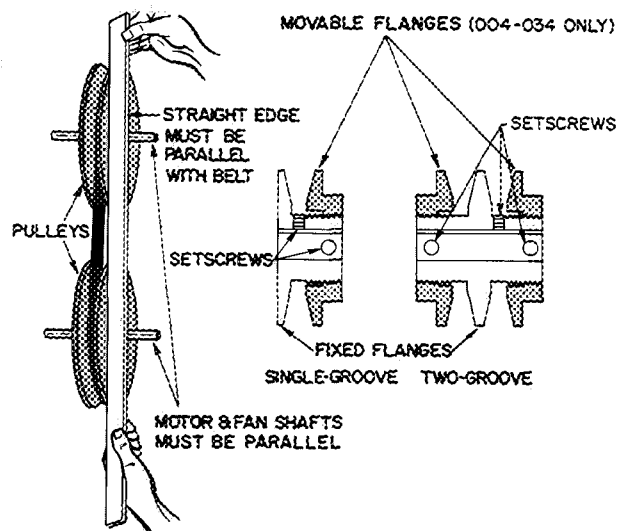
Indoor Air Fan Adjustment — Observe fan compartment CAUTION note above. The fan motor pulleys are factory set at the fan speeds listed in Table 1. Unit Sizes 50BA,BB044,054 and 064 have fixed pulleys.

TO CHANGE FAN SPEED (004-034)

1. **Shut off unit power supply.**
2. Loosen fan belt by loosening fan motor from mounting bracket. Do not loosen fan motor mounting bracket from unit.
3. Loosen movable pulley flange setscrew (Fig. 30).
4. Screw movable flange toward fixed flange to increase fan speed and away from fixed flange to decrease speed, using 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 indicated on motor nameplate and Table 7.*
5. Set movable flange setscrew at nearest flat of pulley hub and tighten setscrew.
6. Check Pulley Alignment and Belt Tension Adjustment as described below.
7. Check fan operation. Repeat above procedure as required.

PULLEY ALIGNMENT — **Shut off unit power supply.** Loosen fan motor pulley setscrews and slide fan pulley along fan shaft. Make angular alignment by loosening motor from mounting bracket. See Fig. 30.

BELT TENSION ADJUSTMENT — **Shut off unit power supply.** Loosen fan motor from mounting bracket. Do not loosen motor mounting bracket from unit. Move fan motor up or down until proper belt tension is achieved (approximately 3/4-in. deflection with 8-lb tension at midpoint of belt span).



→ Fig. 30 — Indoor Air Fan Pulley Adjustment

Lubrication — Observe fan compartment CAUTION note.

The fan motor bearings are factory lubricated and will need no lubrication for the first 5 years of operation (3 years at continuous service or excessively dirty conditions).

Inspect bearings and relubricate or replace as required. If heating coil is installed, oil bearings every 6 months. Follow lubrication instructions on special field-supplied motors.

Fan shaft bearings on 50BA, BB004 thru 034 units are lubricated for the life of the bearings. The 50BA, BB044, 054 and 064 units have alemite grease fittings. Lubricate annually with a good grade of mixed base grease or lithium base grease with rust inhibitor. Add grease until air bubbles form under the seal. Do not overgrease.

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

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

Do not operate the unit at any time without return-air filters in place. For access to filters, refer to the Service sections entitled, Access Panel Removal, and Return-Air Grille Removal as required.

Condensate Drains — Clean the drain line and unit drain pan at the start of each cooling season. Check flow by pouring water into drain. Be sure trap is filled as shown in Fig. 26 to maintain an air seal.

Evaporator Coil — Observe fan compartment CAUTION note at the beginning of the SERVICE section.

Remove dirt and debris from evaporator coil as required by condition. Clean coil with a stiff brush, vacuum cleaner or compressed air. Use a fin comb of the correct fins/in. spacing (Table 1) when straightening mashed or bent coil fins.

Water-Cooled Condenser (50BA units) may require cleaning of water-deposited scale.

Condensers are best cleaned with an inhibited hydrochloric acid solution such as Oakite 32. 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.

Warm solution acts more readily but cold solution is just as effective if applied for a longer period.

GRAVITY FLOW METHOD (Fig. 31) — 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.

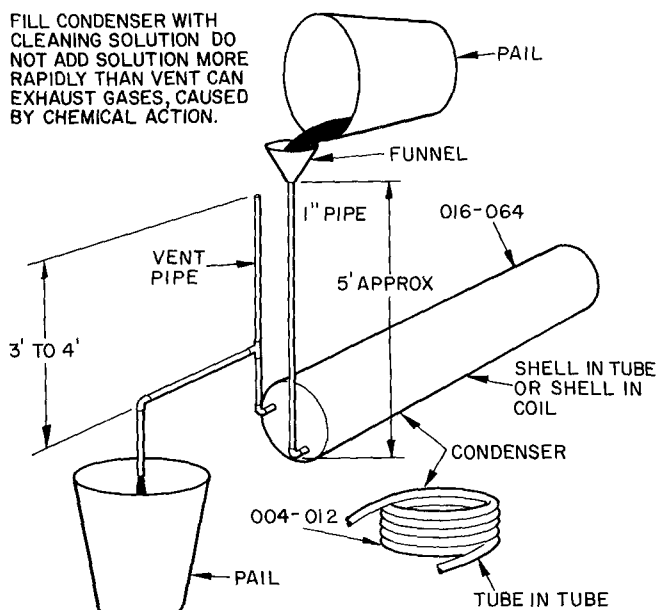


Fig. 31 — Gravity Flow Method

FORCED CIRCULATION METHOD (Fig. 32) — Fully open vent pipe when filling condenser. The vent may be closed when condenser is full and pump is operating.

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.

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

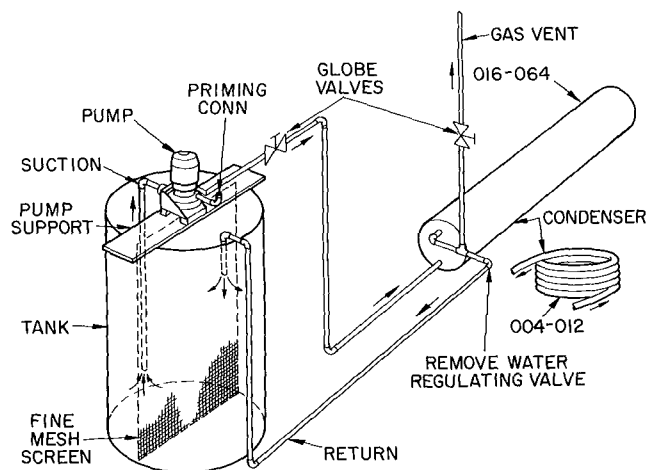


Fig. 32 — Forced Circulation Method

Air-Cooled Condenser (50BB units) — Inspect and clean periodically, depending upon operating conditions. Follow the service instructions provided for the make of condenser used.

Charging the System — On unit Sizes 008 thru 064, sight glasses are provided at inlet of each expansion valve. These glasses are used in the field charging procedure.

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

UNIT SIZE 50BA004 AND 006 — Units are shipped with full operating charge. If recharging is necessary:

1. Insert thermometer bulb in insulating rubber sleeve on liquid line near filter-drier.
2. Add pressure gage to discharge line near compressor.
3. After unit conditions have stabilized, read head pressure on discharge line gage.
4. From standard Pressure-Temperature chart for R-22, find equivalent saturated condensing temperature.
5. Read liquid line temperature on thermometer; then subtract from saturated condensing temperature. The difference equals subcooling temperature.
6. Compare the subcooling temperature with the normal temperature listed in the following table. If subcooling is low, add charge; if high, remove charge.

UNIT	SUBCOOLING*
50BA004	25 ± 2 F
50BA006	22 ± 2 F

*Saturated condensing temperature at compressor minus liquid line temperature

EXAMPLE:

Head pressure (from gage) = 220 psig
 Saturated cond temp (from chart) = 108 F
 Liquid line temp (from thermometer) = 96 F
 Subcooling (by subtraction) = 12 F
 (add charge)

UNIT SIZE 50BB004 AND 006 — Units are shipped with a holding charge only. To charge:

1. Open suction and discharge line service valves.
2. Blow holding charge, evacuate and leaktest system.
3. Using standard refrigerant charging techniques and the charts which follow (Fig. 33 and 34), add refrigerant as required to maintain proper operating conditions.

UNIT SIZE 50BA008 THRU 064 — These units, with water-cooled condensers, are shipped with a full operating charge. If recharging is necessary (complete charge lost), weigh in amount of refrigerant indicated on unit nameplate and Table 1.

If unit has partial charge, it may be charged with sight glass using standard charging techniques. Adjust the water regulating valve to maintain proper saturated condensing temperature (168 - 226 psig).

Refrigerant can be added to 50BA008 and 012 units after sight glass is cleared to take advantage

of the condenser subcooling feature. Add refrigerant as follows:

50BA008 — 2.6 lb

50BA012 — 0.5 lb

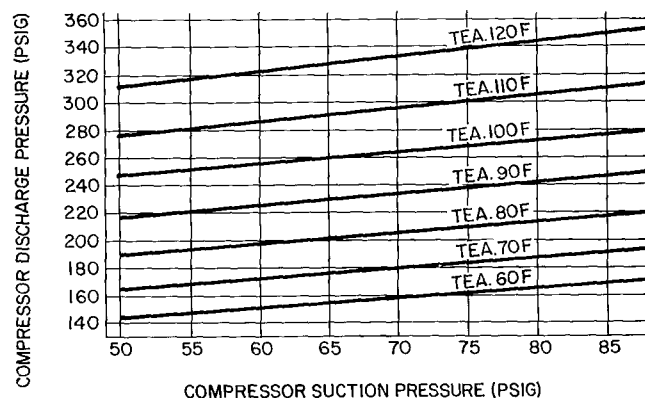
On 50BA064 units, adding liquid refrigerant to the level of condenser test cock will provide 12 to 15 F subcooling.

UNIT SIZE 50BB008 THRU 064 — These units, with remote air-cooled condensers, are shipped with a holding charge only. To charge:

1. Open suction and discharge line service valves.
2. Blow 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; then, using standard charging techniques, add refrigerant as required to maintain normal operating conditions.

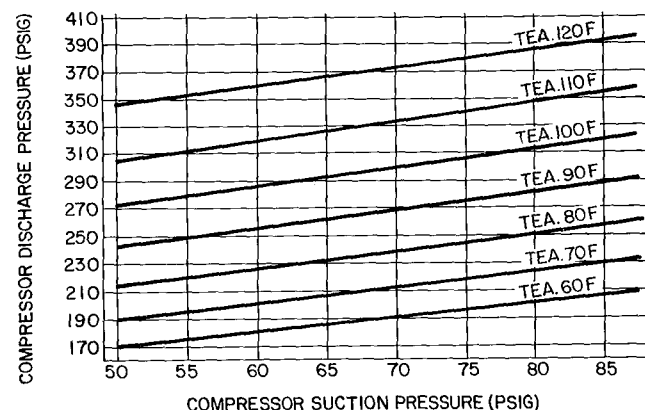
Use charging chart supplied with condenser. If information is not available, block off enough of condenser coil to maintain 220 psig discharge pressure and charge to a clear sight glass.

Return-Air Grille Removal (50BA, BB004-012) — Loosen 2 screws visible thru grille at upper and lower corner of one side. Slide grille side frame off unit; then slide grille sideways and pull it away from unit. To reassemble, reverse procedure.



TEA — Temperature, Entering Air

Fig. 33 — Charging Chart, 50BB004



TEA — Temperature, Entering Air

Fig. 34 — Charging Chart, 50BB006

Access Panel Removal — On Size 004-012 units, remove return air grille as described above. Remove remaining grille side frame. Remove the panel fastening screws now exposed.

TOP PANEL — Pull out and down.

BOTTOM PANEL — Pull out and up.

→ Indoor-Air Fan Motor Removal

⚠ CAUTION

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

50BA,BB004 THRU 012 — Motor power wires need not be disconnected from motor terminals before motor is removed from unit.

1. **Shut off unit main power supply.**
2. Loosen motor holddown bolts on mounting bracket so that fan belt can be removed.
3. Loosen but do not remove the 2 motor mounting bracket bolts on left side of bracket.
4. Slide motor/bracket assembly to extreme right and lift out thru space between fan scroll and side frame. Rest motor on a high platform such as a step ladder. Do not allow motor to hang by its power wires.

Field-Supplied Motors — The factory-installed mounting bracket for a 48 frame motor will not fit a 56 frame motor. If replacing 48 frame motor with 56 frame motor, use mounting bracket for 56 frame motor.

50BA,BB016 AND 024 — 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 base bolts and slide motor over so that fan belt can be removed.
4. Disconnect motor ground wire and remove motor.

0BA,BB028 AND 034 — Proceed as follows:

Remove unit access panel and motor junction box cover.

Disconnect motor wires and remove conduit connection.

Remove the 2 motor adjusting screws and the fan belt.

Slide motor assembly out thru slots in mounting angles.

BA,BB044 THRU 064 — To remove motor:

Remove unit access panel and motor junction box cover.

Disconnect motor wires and remove conduit connection.

Remove bolts holding motor mounting plate to channels.

Back out the motor adjusting screws, remove the fan belt and slide motor out thru channel lip guides.

TO REINSTALL MOTORS — Reverse the above procedures. Align pulleys and adjust belt tension as described in the section, Indoor-Air Fan Adjustment.

Pressure Relief Devices — The 50BB (condenserless) units are equipped with a fusible-plug type safety relief device on the compressor. The relief setting is 197 or 203 F on all units.

All 50BA (water-cooled) units, except Size 50BA064, have a frangible disc on each condenser. Disc setting is 385 \pm 5% psig.

The 50BA064 unit has a condenser pressure relief valve set at 385 psig plus a pressure relief valve on the compressor set at 450 psig.

Crankcase Heaters are supplied on all 50BB (condenserless) units and on 50BA008 and 064 water-cooled units.

The heater prevents liquid refrigerant from accumulating in the compressor crankcase during extended shutdown periods. Heater is automatically energized whenever unit main power is on and compressor is stopped. Heater is de-energized when compressor starts.

Do not shut off unit main power supply for an extended period except for servicing unit. Turn on power supply for at least the following time interval after an extended shutdown before starting compressor:

UNIT TYPE/SIZE	TIME INTERVAL*
50BB004,006	6 - 8 hr.
50BA008 and 064 50BB008 thru 064	24 hrs

*Refer to Start-Up procedures

If 50BA units are installed in unheated rooms, they should be equipped with crankcase heaters.

High and Low Pressurestats — Refer to Table I for cut-in and cutout settings for these safety devices.

The high pressurestat is located in the electrical panel. The low pressurestat is located on top of compressor except as follows.

50BA008 unit — on suction line

50BA,BB064 units — in electrical panel

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 50BA,BB	CIRCUIT NO	A	B
		Full Cycle (minutes)	Delayed Start (seconds)
008,012	1	5	15
016	2	6.4	19
044,054	1 and 3	5	15
024,028	1	6.4	19
034,064	2	5	15

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

For unit Size 016 thru 064 sequence of operation, see Table II. This table is useful in troubleshooting

Table 11 — Sequence of Operation with Two-Step Thermostat (016-064)

UNIT 50BA,BB	COMPONENT	THERMOSTAT			
		Calls For Cooling		Satisfied	
		1st Step	2nd Step	2nd Step	1st Step
All Unit Sizes†	Evaporator Fan				
	Cooling Tower*				
	Pump Motor*				
044 & 054	Crankcase Heater #3*	15 sec			
	Timer Motor #3				
	Compressor #3				4 min 45 sec
All Unit Sizes†	Air-Cooled Cond #2* (#1 on 016)				
	Crankcase Heater #2* (#1 on 016)				
	Timer Motor #2 (#1 on 016)	15 sec‡			4 min 45 sec**
	Compressor #2 (#1 on 016)				
	Cap Cont Solenoid (on 064 only)				
	Liquid Line Solenoid (on 016 only)				
024 028 034 044 054 064†	Air-Cooled Cond #1*				
	Crankcase Heater #1*				
	Timer Motor #1				
	Compressor #1		15 sec	4 min 45 sec	
BB064	Liquid Line Solenoid #2				
	Pumpout Relay #2				
	Crankcase Heater #2				
	Timer Motor #2	15 sec			4 min 45 sec
	Compressor #2				30 sec
	Cap Cont Solenoid				
	Low Pressure Switch #2				
	Liquid Line Solenoid #1				
	Pumpout Relay #1				
	Crankcase Heater #1				
	Timer Motor #1		15 sec	4 min 45 sec	
	Compressor #1			30 sec	
	Low Pressure Switch #1				

Components energized

*When used

†Except 50BB064

‡19 sec (044,054 only)

**6 min 5 sec (044,054 only)

NOTES:

- 1 If compressor operation is interrupted by protective devices or a power failure, timer motor will run 4 min 45 sec (or 6 min 5 sec) before above cycle can be repeated
- 2 When liquid line solenoid (016) or capacity control solenoid (064) is energized, it allows refrigerant to flow to complete coil

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.

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Form 50BA, BB-9SI Supersedes 50BA, BB-8SI

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