



Installation, Start-Up and Service Instructions

50HQ, VQ
014-080

Carrier Corporation • Syracuse, N.Y. 13221

Single-Package Water-Source Heat Pumps

CONTENTS

	Page
SAFETY CONSIDERATIONS	1
INSTALLATION	1-8
Step 1 — Check Equipment and Jobsite	1
• UNPACK UNIT	
• INSPECT EQUIPMENT	
• COMPLETE OR CONSIDER THESE SYSTEM REQUIREMENTS	
Step 2 — Connect Ductwork	2
• SUPPLY DUCTWORK	
• RETURN DUCTWORK	
Step 3 — Make Piping Connections	2
• CHECK WATER SUPPLY QUALITY AND QUANTITY	
• CONNECT WATER SUPPLY AND RETURN LINES	
• INSTALL BALANCING VALVES	
• MAKE CONDENSATE DRAIN LINE CONNECTION	
Step 4 — Make Electrical Connections .	6
• VOLTAGE TO COMPRESSOR	
• INSTALL A BRANCH CIRCUIT DISCONNECT PER NEC	
• BRING POWER LEADS INTO UNIT	
• CONNECT GROUND LEAD TO GROUND LUG IN SPLICE BOX	
• SET FAN MOTOR SPEED	
• CONNECT CONTROL POWER WIRING	
START-UP	8
SERVICE	9-14
TROUBLESHOOTING CHART	15-16

SAFETY CONSIDERATIONS

Installation and servicing of air conditioning equipment can be hazardous due to system pressure and electrical components.

Untrained personnel can perform basic maintenance functions of cleaning coils and cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on air conditioning equipment, observe precautions in the literature, tags and labels

attached to the unit and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available for all brazing operations.



ELECTRIC SHOCK HAZARD

Open all remote disconnects before servicing this equipment.

INSTALLATION

Step 1 — Check Equipment and Jobsite

UNPACK UNIT — Move to final location.

INSPECT EQUIPMENT — File claim with shipping company if shipment is damaged or incomplete. **COMPLETE OR CONSIDER THESE SYSTEM REQUIREMENTS** before installation:

- Consult local building codes and National Electrical Code (NEC) for special installation requirements.
- Consider type of water source. Be sure there is an adequate supply of water with minimum pressure of 20 psig.
 - Standard units* for closed loop water systems require water temperature range of 60 to 90 F.
 - Modified units* for closed or open loop systems can be used where temperature range is between 45 to 60 F. Modifications include: optional cupro-nickel heat exchanger, reduced refrigerant charge and addition of drain pan when needed. Modified units also require Singer 265 water regulating valve and shutoff valves.
- Provide sufficient space for water piping, condensate drain, wiring and servicing unit. See Fig. 2 and 3. (Units installed with insufficient clearances may have to be removed for major servicing such as compressor or fan motor replacement.)
- Provide sufficient clearance to slide out filter on all units.

- e. Mount unit on floor or solid platform. (The 50HQ units can be suspended from ceiling. See "f" below.) To reduce sound transmission, especially when 50VQ unit is located in a closet or utility room with louvered doors, place an isolation pad under unit. Pad must be same size as unit base. Construct a one-in. fiberglass sound shield in front of unit.
- f. 50HQ units include a suspension package for ceiling installation. To attach hanging brackets, install 4 bolts (5/16 x 18-3/8 in. lg) through bracket into the 4 weld nuts located on bottom of unit. Insert the threaded rod through rubber grommet, located in hanging bracket, and attach with flat washer and double nut. See Fig. 1.

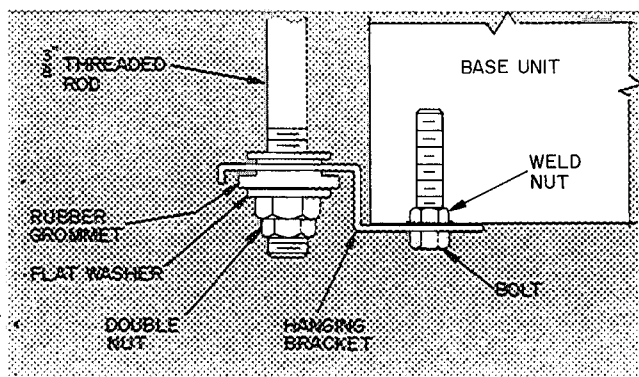


Fig. 1 — Suspension Kit Installation — 50HQ

- g. When unit is exposed to extreme temperature and/or high humidity, provisions should be made to protect the unit from condensation and freeze-up.

Step 2 — Connect Ductwork

SUPPLY DUCTWORK — Supply air duct flange is shipped inside unit. Remove flange from shipping location and install on unit supply air opening. Connect supply air ductwork to unit supply air duct connection flange. Refer to Fig. 2 and 3 and Tables 1 and 2 for connection size and location. If necessary, refer to Carrier System Design Manual, Part 2, for system air duct design.

When designing and installing ductwork, consider the following:

- a. Size duct for 350 to 450 cfm per ton of cooling capacity.
- b. Avoid abrupt duct size increases and reductions.
- c. Use flexible connectors between ductwork and unit to prevent transmission of vibration.
- d. Ducts passing through an unconditioned space must be insulated and covered with vapor barrier in accordance with the latest issue of SMACNA (Sheet Metal and Air Conditioning Contractors National Association) and NESCA (National Environmental Systems Contractors Association) minimum installation standards for residential heating and air conditioning systems.

RETURN DUCTWORK

(50VQ014-042) — Return air filter/duct flanges are shipped inside fan section. Remove from shipping location and install on unit return air opening utilizing pan head screws supplied.

If return air ductwork is to be installed, bend out filter flanges for ductwork connections.

(50HQ014-080; 50VQ042-080) — Remove bottom filter retainer from shipping location. On HQ units, retainer is shipped in compressor compartment. On VQ units, retainers are shipped at fan opening. Install bottom filter retainer on unit return opening for filter installation. Filter retainers have 2 top tabs that must be bent out at 10° to 15° angle.

Step 3 — Make Piping Connections

CHECK WATER SUPPLY QUALITY AND QUANTITY before beginning. Whether the 50HQ, VQ units are being applied in a well source or closed loop application, the quality and quantity of the water circulated through the heat exchanger must fall within the ranges listed in the following table.

	COPPER COIL	CUPRO-NICKEL COIL
Filtration (Microns)	≤ 25	> 25
Uninhibited Chloride (PPM)	≤ 200	> 200
Alkalinity (as CaCO ₃)	80-100	> 100
pH	7.2-7.6	< 7.2, > 7.6
Free Residual Chlorine Level (PPM)	1.0-1.7	> 1.7
Sulfides (PPM)	N.A.	≤ 0.1
Max. Water Quantities (GPM)		
014	< 5.5	< 6.0
018	< 6.5	< 7.5
022	< 8.0	< 9.0
027	< 10.0	< 10.5
033	< 13.0	< 14.0
042	< 15.5	< 16.5
048	< 17.0	< 18.0
060	< 22.0	< 23.0
080	< 29.5	< 31.0

LEGEND

GPM — Gallons Per Minute < — Less Than
N.A. — Not Acceptable > — Greater Than
PPM — Parts Per Million ≤ — Less Than or Equal To

NOTE The term pH refers to the acidity, basicity or neutrality of the water supply. Below 7.0, the water is considered to be acid. Above 7.0, the water is considered to be basic. Neutral water contains a pH of 7.0.

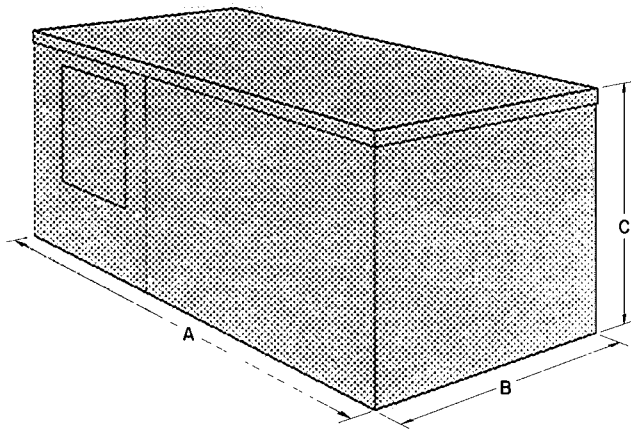
CONNECT WATER SUPPLY AND RETURN LINES to water inlet and outlet pipe connections shown in Fig. 4 and 5. Use flexible hose for water line to reduce possible vibration and improve unit serviceability. Make sure hoses or pipes are suitable for system water pressure and sized for proper flow rate.

CAUTION: Improper heat exchanger water flow due to piping, valving or improper pump operation is hazardous to units. If water flow through heat exchanger stops due to freezing, cracking of heat exchanger may occur.

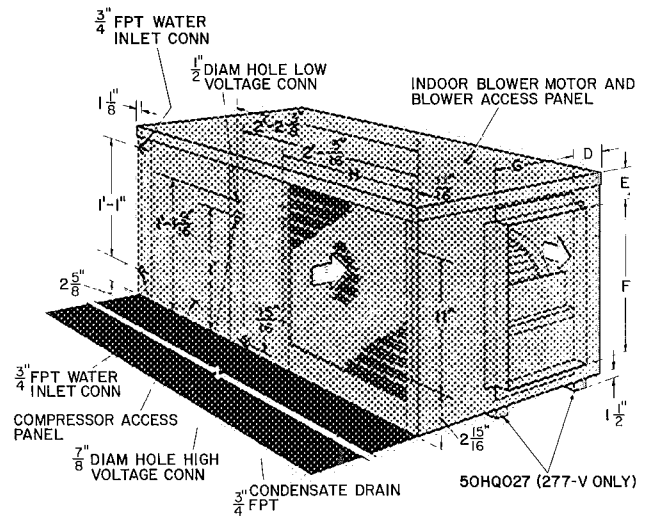
(Text continued on page 6)

Table 1 — Installation Data — 50HQ (See Fig. 2.)

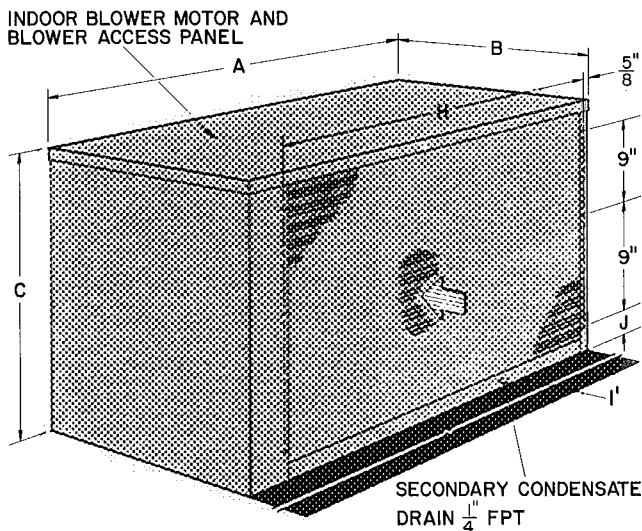
MODEL 50HQ	014	018	022	027	033	042	048	060	080
OPER WT (lb)	185	195	210	220	230	250	300	325	360
DIMENSIONS (ft.-in.)									
A			3-10-9/16					4- 0	
B			1- 9-3/8					1-10	
C			1-6					2- 0	
D			0- 3-1/2				0- 3-7/8	0-2-9/16	0-3-1/16
E			0- 2-5/8					0-3-1/8	
SUPPLY DUCT CONN. (ft.-in.)									
F			1- 1-7/16					1-7-7/8	
G			0- 9-1/2				0-10-1/2	1-1-1/8	1-0
RETURN DUCT PILOT HOLES (ft.-in.)									
H		1-6-1/4			1-10-1/2		2- 1-1/8	2-7-11/16	3-1-11/16
J							0- 3-1/8	0-3-3/8	0-3-7/8
ACCESSORY FILTER (1) Size (in.)			17 x 23		Replaceable Media			23 x 37	



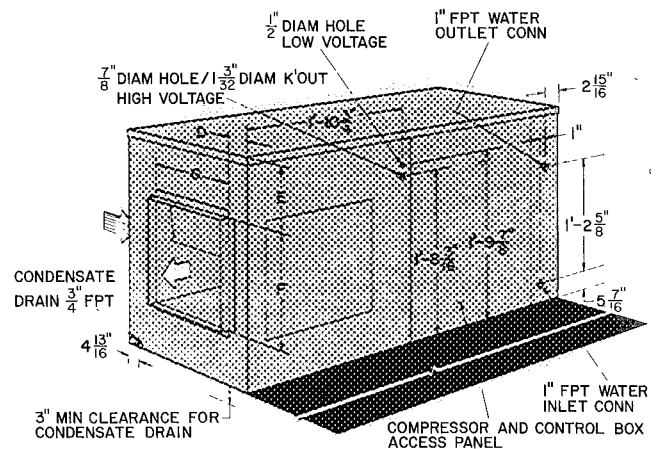
**50HQ014-042
REAR VIEW**



**→ 50HQ014-042
FRONT VIEW**



**50HQ048,060,080
FRONT VIEW**



**50HQ048,060,080
REAR VIEW**

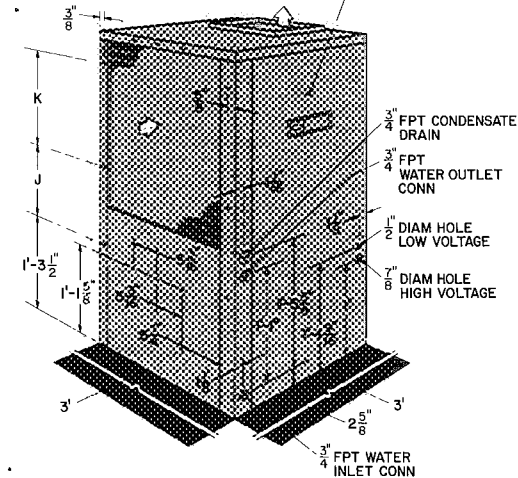


Fig. 2 — Dimensions and Connections — 50HQ

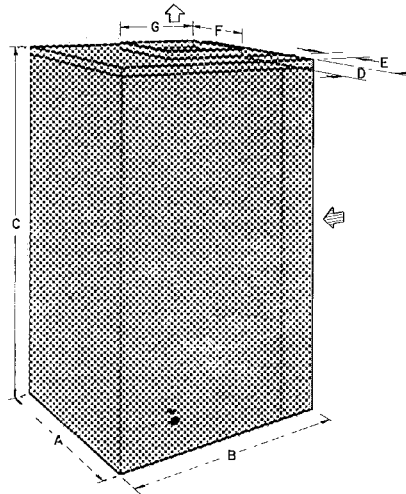
→ Table 2 — Installation Data — 50VQ (See Fig. 3.)

MODEL 50VQ	014	018	022	027	033	042	048	060	080
OPER WT (lb)	220	240	260	270	290	320	320	355	390
DIMENSIONS (ft-in.)									
A	1-9-1/4						2-3		
B	1-9-1/4						2-5-3/8		
C	3-2-5/16						4-0		
D	0-6-11/16						0-5-1/2		
E	0-5-15/16						0- 6-13/16	0- 5-1/2	0- 6-1/16
SUPPLY DUCT CONN. (ft-in.)									
F	0-9-1/2						0-10-1/2	1- 1-1/8	1-0
G	1-1-7/16						1-3-15/16		
CONDENSATE DRAIN CONN. (ft-in.)							1-10-1/4	0- 8-1/4	0- 8-1/4
RETURN DUCT PILOT HOLES (ft-in.)									
J	0-4-7/8						2- 1-3/8	0-11-3/8	0-11-3/8
K	1-4						1	3	3
L	—						1-7	0-11	0-11
M	—						1-7	2- 9	2- 9
FILTER (1) Size (in.)	21 x 21						Replaceable Media		
							24 x 40		

COMPRESSOR, HEAT EXCHANGER, FAN MOTOR/BLOWER ASSEMBLY
AND CONTROL BOX ACCESS PANEL

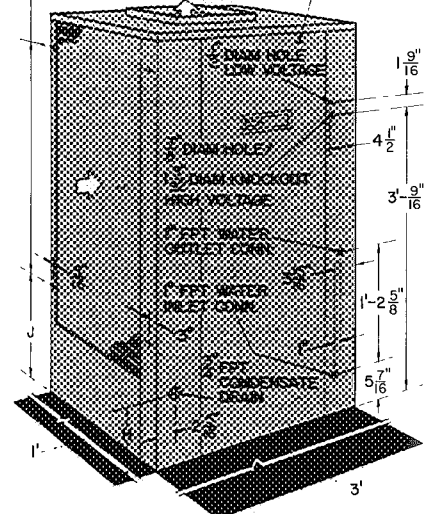


→ 50VQ014-042
FRONT VIEW



50VQ014-080
REAR VIEW

COMPRESSOR, CONTROL BOX, HEAT EXCHANGER,
BLOWER MOTOR ACCESS PANEL
PILOT HOLES: NO. SPACES K AT
DISTANCE L = TOTAL DIMENSION M



50VQ048,060,080
FRONT VIEW

Space required for service and/or airflow.

→ Supply Air

⇐ Return Air

Fig. 3 — Dimensions and Connections — 50VQ

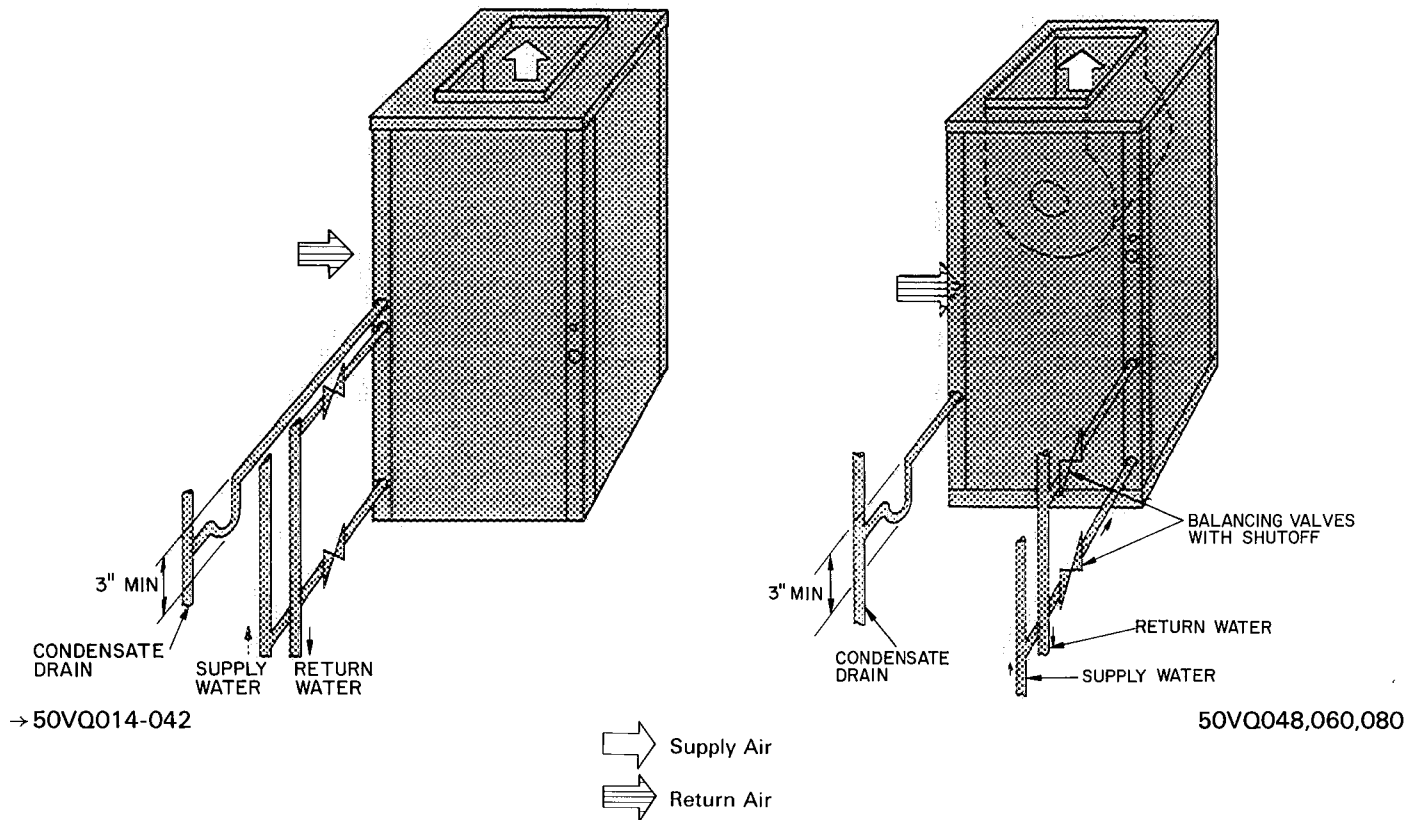


Fig. 4 — Water Piping — 50VQ

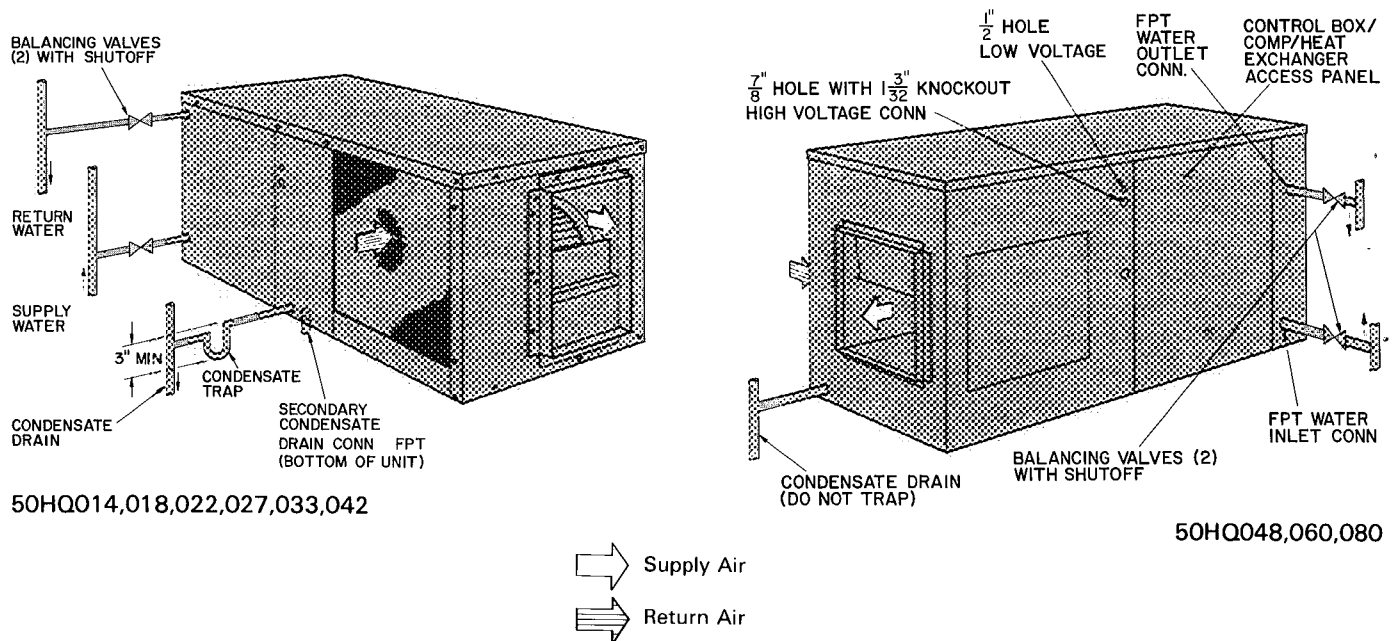


Fig. 5 — Water Piping — 50HQ

→ Table 3 — Electrical Data

UNIT MODEL 50HQ,VQ	V-PH-HZ	OPERATING VOLTAGE		COMPRESSOR		FAN FLA	MINIMUM CIRCUIT AMPS	MAXIMUM FUSE AMPS
		Max	Min	LRA	RLA			
014	208/230-1-60	253	197	37.5	9.6	9	12.7	20
018				53.0	13.4	9	17.7	30
022				65.0	13.3	1.5	18.1	30
027				66.0	16.2	1.7	22.0	35
033				88.0	23.3	2.5	31.6	50
042				100.0	27.7	3.2	37.8	60
048				94.0	23.9	3.4	33.3	50
060				150.0	35.3	4.5	48.6	60
033	208/230-3-60	253	187	87.0	13.8	2.5	19.8	30
042				100.0	18.5	3.2	26.3	40
048				80.0	16.8	3.9	24.9	40
060				136.0	20.6	4.5	30.3	50
080				137.0	20.7	6.2	32.1	50
014	277-1-60*	305	249	33.0	6.4	1.5	9.5	15
018				46.0	11.6	1.5	16.0	25
022				54.0	10.5	1.5	14.7	25
027				61.0	11.3	1.5	15.7	25
033				76.0	16.3	2.1	22.5	35
033	460-3-60	506	414	30.0	6.0	1.1	8.9	15
042				36.5	6.9	1.6	10.2	15
048				35.0	8.2	2.0	12.3	15
060				49.0	10.4	2.3	15.3	25
080				69.0	11.4	3.1	17.4	25
048	575-3-60*	632	518	27.0	6.8	1.4	9.9	15
060				41.0	8.3	1.8	12.2	20
080				55.0	9.6	2.5	14.5	20

FLA — Full Load Amps
LRA — Locked Rotor Amps
RLA — Rated Load Amps

*These voltages only available in units designed for water temperature range of 60 F to 90 F

For water flow and temperature data refer to Start-Up section, page 8.

CAUTION: Galvanized pipe or fittings are not recommended for use with these units due to possible electrolysis.

INSTALL BALANCING VALVES (with shutoff) in water supply and return lines for water flow adjustment and a means of water shutoff, if necessary, when servicing unit. When multiple units are connected in parallel, valves permit removal of one unit without interrupting water flow to other units.

Modified Units Only — Install Model 265 water regulator valve and shutoff valves.

MAKE CONDENSATE DRAIN LINE CONNECTION to female pipe connection provided on unit, Fig. 4 and 5. Install a trap in condensate line as close as possible to unit. NOTE: Do not trap 50HQ048,060,080 units. Trap must be at least 3 in. deep and not higher than the bottom of unit condensate drain opening. Pitch condensate line to open drain or sump. Insulate a condensate drain line located above a living area.

50HQ Units Only — When unit is installed above an occupied area, a secondary drain is required. Remove plastic cap from secondary drain connec-

tion, located in bottom of unit, and connect drain so that discharge is obvious to maintenance personnel.

Step 4 — Make Electrical Connections — Field wiring must comply with local and national fire, safety and electrical codes. Voltage to unit must be within the operating voltage range indicated on nameplate or in Table 3. On 3-phase units, phases must be balanced within 2%.

VOLTAGE TO COMPRESSOR — Operating voltage to compressor must be within voltage range indicated on unit nameplate.

If the difference between the highest phase voltage and the lowest phase voltage is greater than 10 volts (208 or 230) or 20 volts (460), contact your local power company for correction of improper voltage or phase imbalance.

Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause

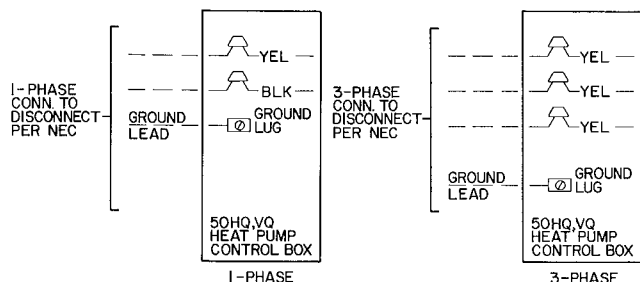
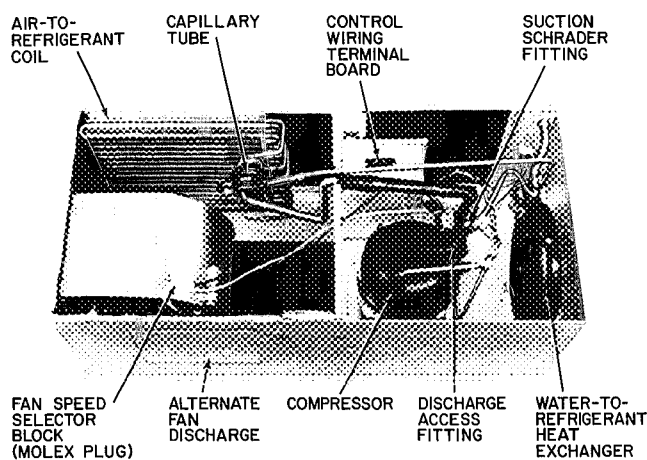
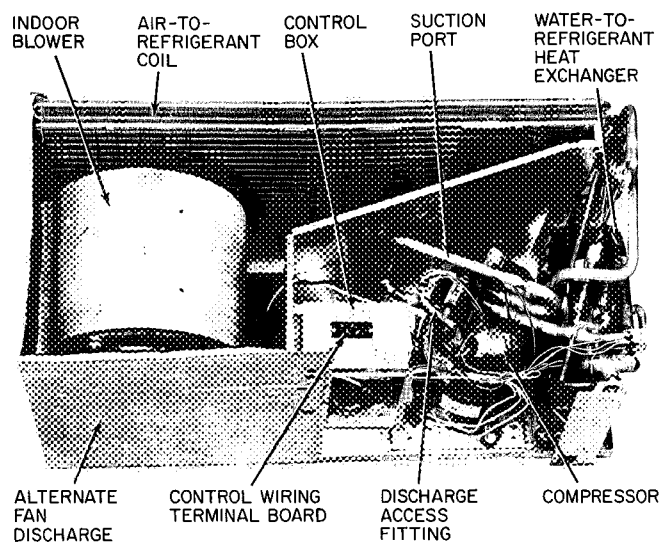


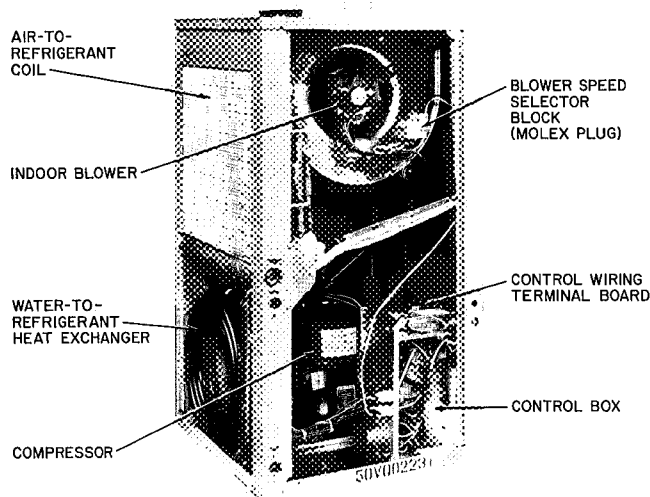
Fig. 6 — Line Power Connections



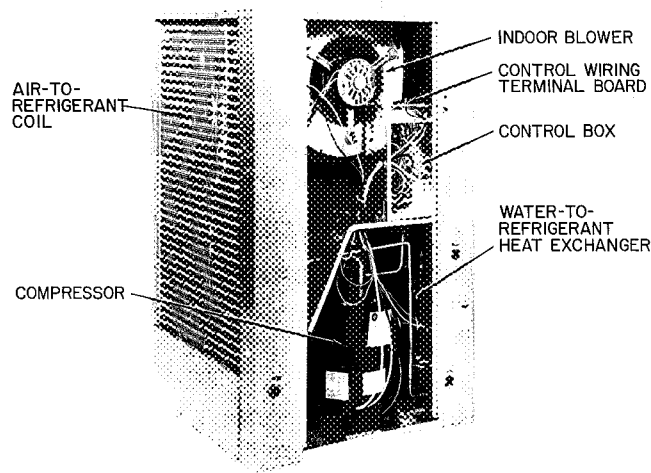
A) 50HQ014-042



B) 50HQ048,060,080



→ C.) 50VQ014-042



D) 50VQ048,060,080

Fig. 7 — Component Arrangements

damage to electrical components. Such operation would invalidate any applicable warranty.

INSTALL A BRANCH CIRCUIT DISCONNECT PER NEC of adequate size to handle unit starting current. Locate disconnect within sight from and readily accessible from the unit, per Section 440-14 of National Electrical Code (NEC).

BRING POWER LEADS INTO UNIT — Extend leads from disconnect per NEC through hole provided (Fig. 2 and 3) into line wiring splice box, Fig. 6.

CONNECT GROUND LEAD TO GROUND LUG IN SPLICE BOX for safety. Connect power wiring. See Fig. 6. Splice line power leads to yellow and black pigtailed on single-phase units or yellow pigtailed on 3-phase units. Use wire nuts. Tape each connection.

Unit transformer on 208-230-volt units is factory wired for 230/24-volt operation. For 208/24-volt operation, remove black (230-v) transformer lead from unit contactor and connect red (208-v) lead to contactor. Cap unused transformer lead.

SET FAN MOTOR SPEED

208/230-, 575-Volt Units — Set fan motor for high-, medium- or low-speed operation as follows:

1. Remove unit fan section access panel.
2. Locate Molex fan speed selector block on fan housing, Fig. 7. Selector block receptacle No. 1 is high fan speed, receptacle No. 2 is medium fan speed and receptacle No. 3 is low fan speed. Yellow and black fan motor power leads from control box are connected to selector block receptacle C and No. 1. Yellow lead is common, black lead is speed-change lead.
3. To change fan motor speed, remove black lead from selector block receptacle and plug it into desired receptacle. Receptacle No. 4 is not used.

CAUTION: For proper unit operation, set unit fan motor speed for air quantity within range shown in Table 4.

277-Volt Units — Fan motor is single speed. No adjustment is needed.

460-Volt Units — Two-speed fan motor is factory wired for high-speed operation. (Yellow and black power leads from control box are connected to the yellow and black fan motor leads.) Change fan motor to low speed by wiring as follows:

1. Splice the violet and black fan motor leads together.
2. Splice yellow and black power leads from control box to yellow and red motor leads. (Yellow-to-yellow and black-to-red.)

CONNECT CONTROL POWER WIRING (24 v) — Power leads are brought through 1/2-in. hole provided in unit, Fig. 2 and 3. Extend leads to control wiring terminal board located on top of control box, Fig. 7. Connect leads to terminal board as shown in Fig. 6.

Use Carrier-specified room thermostat and subbase for proper unit operation. Be sure that field-installed jumper wire is connected between subbase terminals W and Y. Set thermostat heat anticipator at 1.0 amp.

START-UP

Water Flow and Temperature Data

1. Consider design water flow rates for efficient operation. See Table 4 for permissible water flow range.
2. Ensure that water temperatures entering unit are between 60 F minimum and 90 F maximum for standard unit. For modified units, ensure temperature range is between 45 and 60 F. For water temperatures below 60 F, insulate supply line and ensure that secondary drain pan is installed under unit.

CAUTION: Water temperature outside specified temperature range may cause damage to unit. Do not jumper low temperature switch in order to use ethylene glycol.

3. Ensure that supply water is clean and air is purged from system. Air in supply water causes scaling in heat exchanger. Foreign material in water and/or excessive velocity of water can cause damage to tubing.
4. Ensure that field-supplied water regulating and shutoff valves are installed on systems utilizing entering water temperatures between 45 to 60 F.

To Start Unit — Ensure that air filter is in place on unit filter flanges provided. *Do not operate unit without filter in place.* Adjust the thermostat as follows:

1. Set selector switch at OFF.
2. Turn on main disconnect switch to unit.
3. Set fan switch as desired (ON or AUTO.).
4. Set thermostat dial at desired temperature.

5. Set selector switch at HEAT or COOL.

Check system refrigerant charge. See Service, Refrigerant Charging.

Unit Single-Phase Compressors Equipped With a Compressor Start Thermistor (PTC Device) — When supply voltage is within limits indicated on nameplate and compressor will not start, check the thermistor with an ohmmeter.

If the PTC is good, and the compressor does not start, disconnect the PTC from the starting circuit and give unit a temporary capacitance boost. Refer to Carrier Standard Service Techniques Manual, Chapter 2, for details on capacitance boost procedure. If unit does not start with capacitance boost, compressor may be defective. If unit does start, check starting capability with PTC assistance. If questionable, remove PTC, add start capacitor and start relay per start kit installation instructions.

WARNING: Capacitance boost or installation of start capacitor and start relay should be performed by trained personnel. Improper procedure could cause personal injury or equipment damage.

Unit Controls and Safety Devices

HIGH-PRESSURE RELIEF VALVE (except 50HQ,VQ014) is located in compressor. Relief valve opens at a pressure differential of approximately 550 psi between suction (low side) and discharge (high side) to allow pressure equalization.

CURRENT AND TEMPERATURE SENSITIVE OVERLOAD (linebreak) — Internal on all compressors except on 50HQ,VQ014 which has external shell mounted overload. Overload resets automatically when internal compressor motor temperature drops to a safe level (overloads may require up to 45 minutes to reset). When an internal overload is suspected of being open, check by using an ohmmeter or continuity tester. If necessary, refer to Carrier Standard Service Techniques Manual, Chapter 2, for complete instructions.

Lockout Circuit

HIGH-PRESSURE SWITCH closes on a pressure rise above 395 psig and energizes lockout relay. Switch opens at 295 psig. To restore unit to normal operation move the thermostat system switch to OFF and then back to either HEAT or COOL.

FREEZE-UP PROTECTION — Low water temperature cutout (LWTC) shuts unit off if water temperature reaches 37 F and energizes lockout relay. Low water temperature cutout resets at 42 F. To restore unit to normal operation move the thermostat system switch to OFF and then back to either HEAT or COOL.

Heat Pump Circuits, shown in Fig. 8 are refrigerant and water flow diagrams for heating and cooling cycles.

Table 4 — Service Data

UNIT 50HQ.VQ	014	018	022	027	033	042	048	060	080
R-22 CHG (lb-oz)* Standard Unit (Water Temp Range 60-90 F)	1-8	1-13	2-2	2-6	2-6	2-14	4-3	5-3	6-8
MODIFIED UNIT (Water Temp Range 45-60 F)	1-0	1-5	1-10	1-14	1-14	2-6	3-11	4-11	6-0
REFRIG CONTROL	Capillary Tube								
FAN	Centrifugal — Direct Drive								
Diameter (in. Nom)	9	9	9	9	9	10	10	10	12
Width (in. Nom)	7	7	7	7	7	7	8	10	9
Range Cfm	400-600	500-700	600-800	750-900	900-1050	1150-1300	1400-1700	1800-2100	2200-2500
Motor Hp	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Motor Rpm (3-speed)†	1075 Nominal								1000
HEAT EXCHANGER WATER FLOW RATE (Gpm)	2 5-5	3 5-6 5	4-8	5-10	6-12	7 5-14	8-16	11-21	14-28

Values apply to 277-volt units only

*Factory refrigerant charge

†277 is single speed.

SERVICE

Refrigerant Charging — Unit refrigerant system is factory charged. When recharging is necessary during heating or cooling season, weigh in total charge indicated in Table 4. Remove any refrigerant remaining in system before recharging. If system has lost complete charge, evacuate system to 500 microns (29.7 in. vacuum) before recharging. Service port connections are provided on high and low sides of refrigerant system for evacuation and charging. (See Fig. 8 for service port location.)

Dial-a-charge charging cylinder is an accurate device used to recharge systems by weight. These cylinders are available at refrigeration supply firms.

To check and/or adjust refrigerant charge during cooling season, use correct Cooling Cycle Charging Chart (Fig. 9, 10, 11, 12, 13, 14, 15, 16, 17) or Carrier Chargemaster® charging device. Charging charts or Chargemaster may also be used as alternate methods of recharging system. Refer to Table 4 for low temperature models.

COOLING CYCLE CHARGING CHART METHOD

1. Operate unit a minimum of 10 minutes before checking charge, and after each charge adjustment.
2. Measure suction pressure by attaching a gage to unit suction service port (Schrader Fitting).
3. Measure discharge pressure by attaching a gage to unit discharge service port (Schrader Fitting).
4. Using a sling psychrometer, measure wet-bulb temperature of air entering unit.
5. Refer to correct Charging Chart. Locate on curves where unit discharge pressure line and indoor air wet-bulb temperature line intersect.

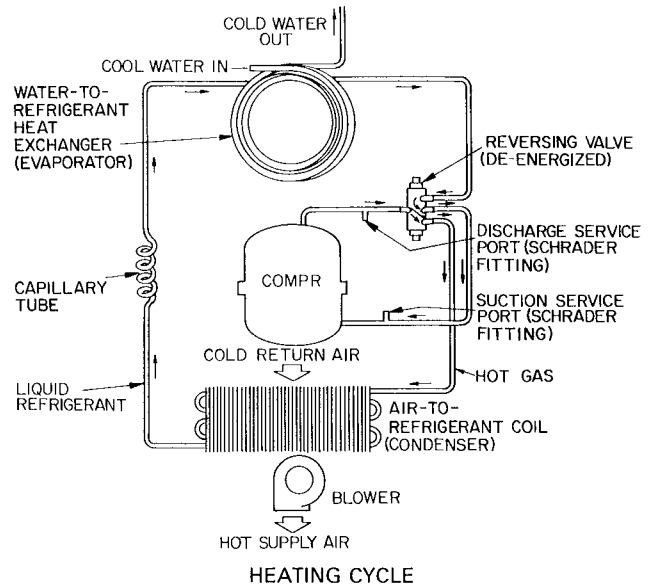
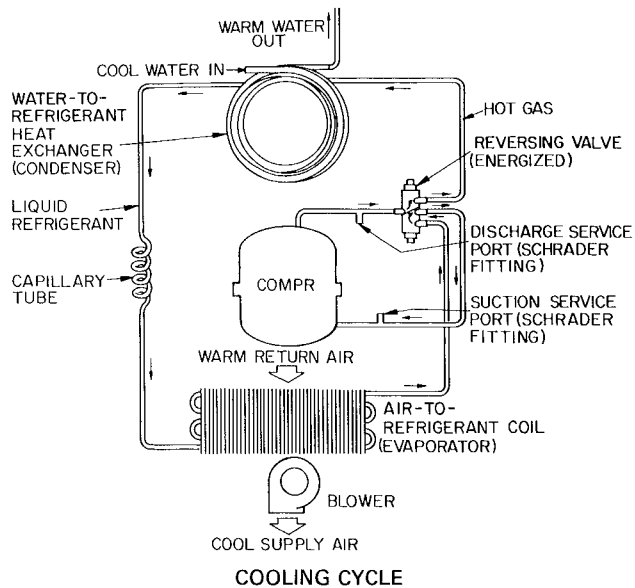
6. From intersect point, project horizontally left to chart suction pressure line. Compare chart suction pressure to unit suction pressure (step 2).
7. If unit suction pressure is lower than chart pressure, add refrigerant to unit until chart pressure is reached. If unit suction pressure is higher than chart pressure, remove refrigerant until chart pressure is reached.

CHARGEMASTER DEVICE OPERATION — Operate unit 10 minutes before using Chargemaster. Ensure unit indoor fan section access panel is in place for proper Chargemaster operation.

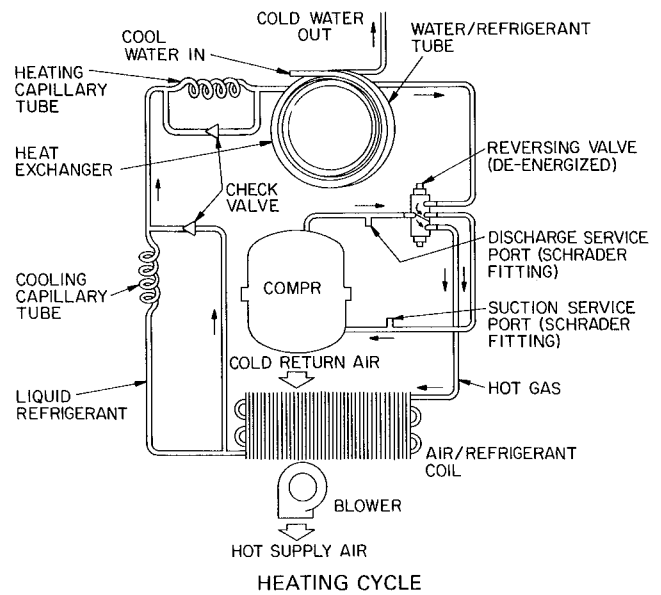
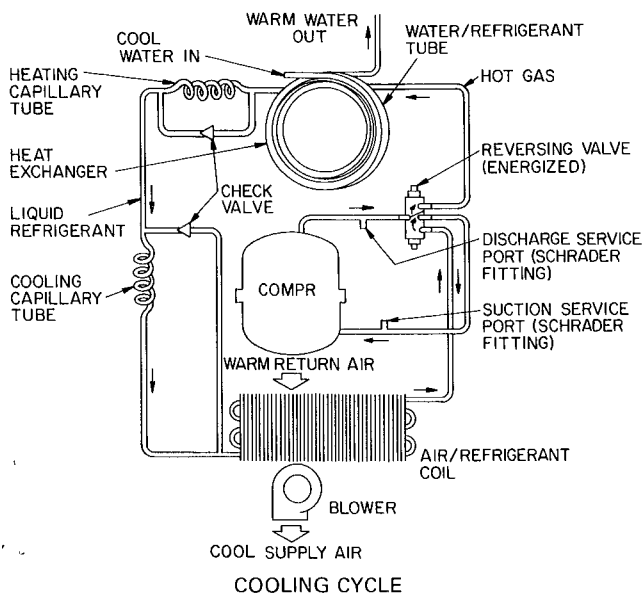
1. Tape Chargemaster feeler bulb to unit suction line. Insulate bulb. Ensure suction line is clean for good contact with bulb.
2. Connect refrigerant drum to Chargemaster inlet port with drum in position for vapor charging.
3. Connect Chargemaster outlet port (loosely) to unit suction line Schrader valve.
4. Crack valves on refrigerant drum and Chargemaster to purge lines from drum to suction line Schrader valve. After purging lines, close valve on Chargemaster only. Tighten Chargemaster connection at suction line Schrader valve.
5. Measure unit leaving water temperature.
6. Read *evaporator temperature at red needle position* on Chargemaster temperature gage and *suction line temperature at black needle position*.

CAUTION Do not read evaporator temperature with Chargemaster valve open

(Text continued on page 12.)



50HQ,VQ014-042



50HQ,VQ048-080

NOTE: These diagrams are typical and do not show actual component locations

Fig. 8 — Refrigerant and Water Flow Diagrams

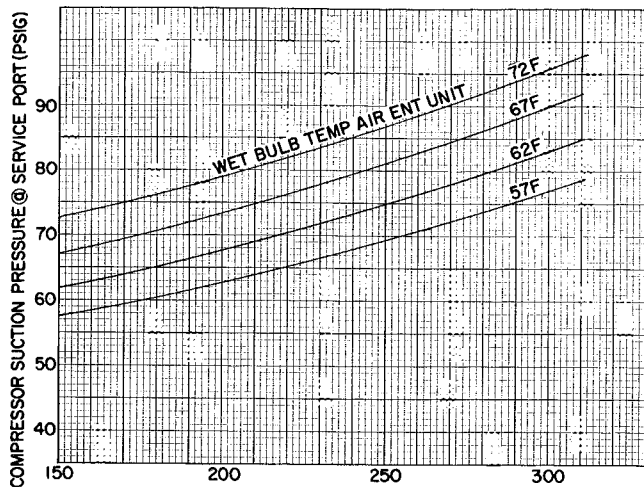


**Fig. 9 — Cooling Cycle Charging Chart
(R-22) — 50HQ,VQ014**

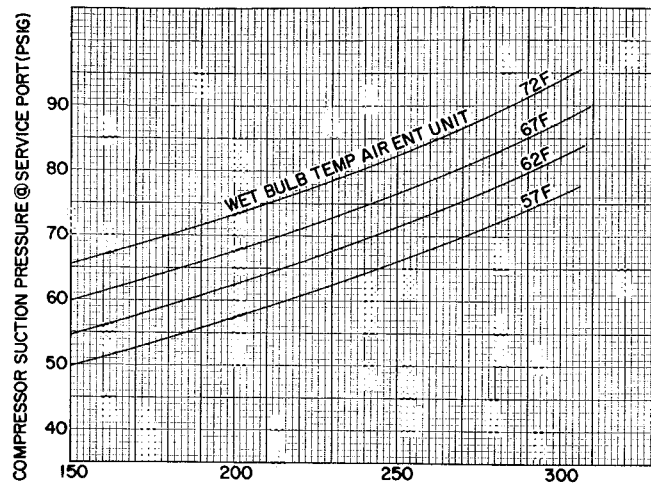


**Fig. 12 — Cooling Cycle Charging Chart
(R-22) — 50HQ,VQ027**

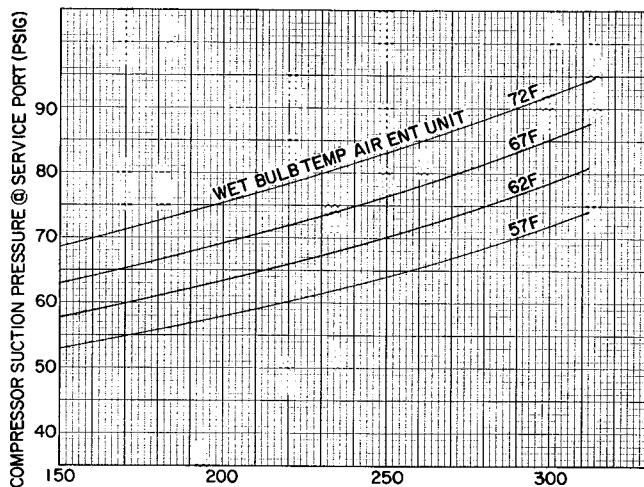


**Fig. 10 — Cooling Cycle Charging Chart
(R-22) — 50HQ,VQ018**

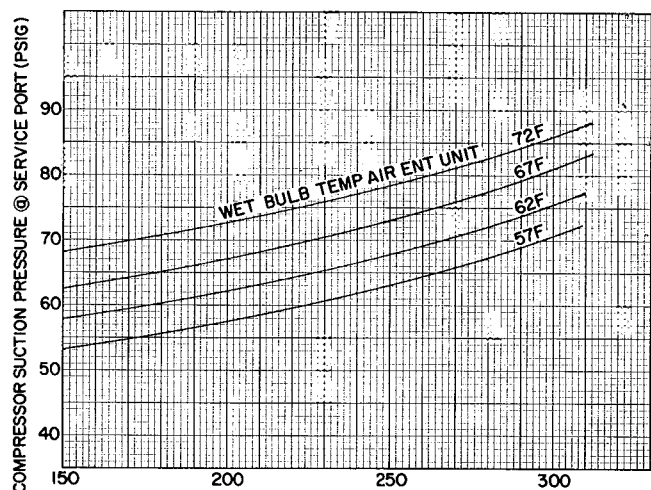


**Fig. 13 — Cooling Cycle Charging Chart
(R-22) — 50HQ,VQ033**

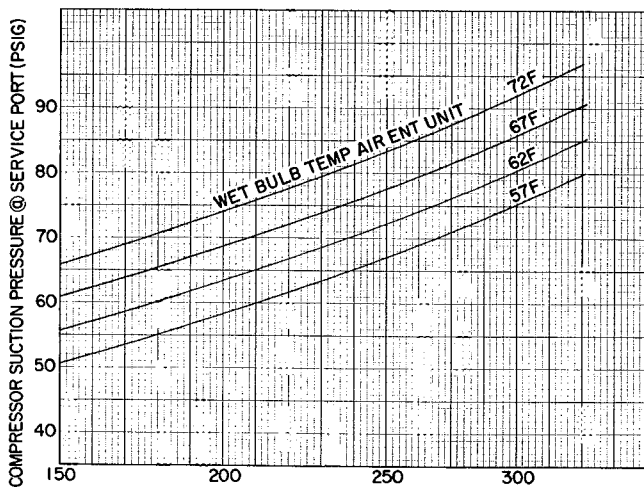


**Fig. 11 — Cooling Cycle Charging Chart
(R-22) — 50HQ,VQ022**

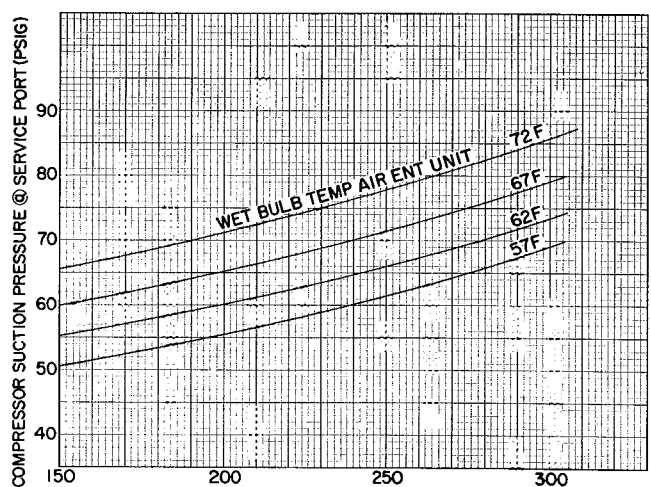


**Fig. 14 — Cooling Cycle Charging Chart
(R-22) — 50HQ,VQ042**

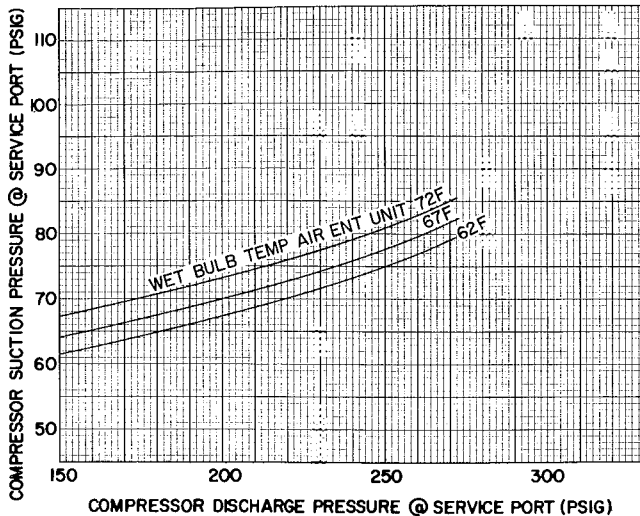


**Fig. 15 — Cooling Cycle Charging Chart
(R-22) — 50HQ,VQ048**

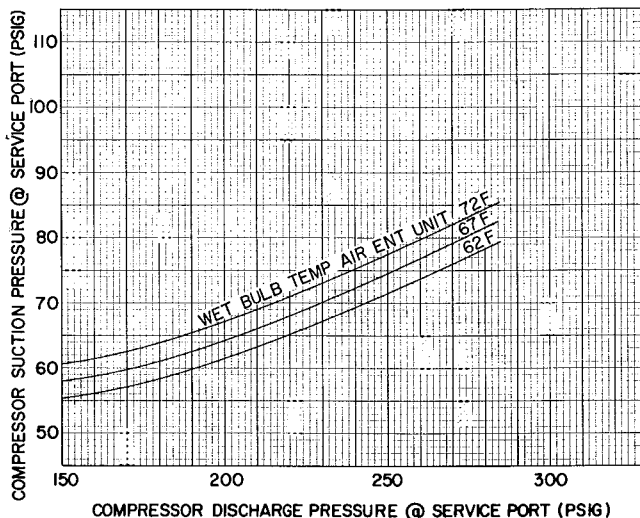


**Fig. 16 — Cooling Cycle Charging Chart
(R-22) — 50HQ,VQ060**

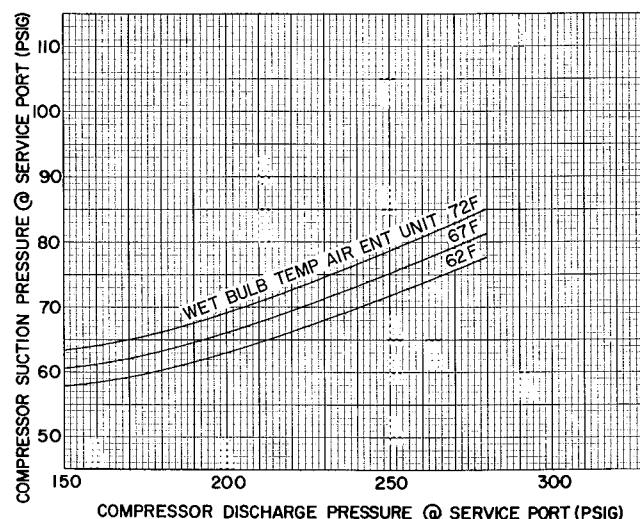


**Fig. 17 — Cooling Cycle Charging Chart
(R-22) — 50HQ,VQ080**

7. Enter 50HQ,VQ Chargemaster® Charging Chart, Table 5, at unit leaving water temperature (step 5) and evaporator temperature (step 6). (Do not use standard charging chart on cover of Chargemaster.) Find the suction line temperature required for correct system charge. If actual suction line temperature (step 6) is higher than table value, the system is undercharged. If suction line temperature is lower than table value, the system is overcharged.

Example: At leaving water temperature of 93 F and evaporator temperature of 41 F, the system is correctly charged at 50 F (± 2 F) suction line temperature.

8. Add charge by slowly opening Chargemaster valve. If necessary, reduce charge by bleeding at liquid line Schrader valve. Check outdoor air and evaporator temperature during procedure. If they change, refer back to Chargemaster Charging Chart for new value.

Correct use of Chargemaster ensures that an optimum refrigerant charge is in system when conditions and system components are normal. However, the Chargemaster does not solve or fix system abnormalities. It indicates correct charge for condition of system. It does not make corrections for dirty filters, slow fans, or other abnormal conditions. This charging device ensures that a correct relationship exists between leaving water temperature, evaporator temperature, and suction line temperature on a specific system.

Table 5 — Chargemaster Charging Chart

UNIT LEAVING WATER TEMP (F)	EVAPORATOR TEMP (F)*									
	30	33	36	39	41	44	47	50	53	56
	Suction Line Temp (F)									
69	46	49	51	54	57	59	61			
75	45	47	50	53	55	58	60	64		
81		46	49	51	54	56	57	63		
87			48	50	52	54	56	62	65	
93			46	48	50	53	55	57	61	
99				47	49	51	54	56	61	64
105				45	47	50	53	56	60	63
112					46	49	53	55	59	62
117					45	47	52	55	57	61
123						46	50	53	55	56

*Saturated evaporator temperature which is the equivalent temperature of pressure taken at unit suction service valve

MODE	CONDITION	OPTION
HEATING	40 F LWT	8 F S H. at Comp
COOLING	45-60 F EWT	225-296 Psig

EWT — Entering Water Temperature (F)
LWT — Leaving Water Temperature (F)
SH — Specific Heat (F)

Compressor Removal

NOTE: If units have been installed with insufficient clearances, it may be necessary to remove them from the installed space for servicing. See Fig. 2 and 3 for specified service clearances.

See Table 6 for compressor information and Fig. 7 for component location. Follow safety codes, and wear safety glasses and work gloves. Have quenching cloth available (step 7).

CAUTION: Copper tubing and aluminum fins are used in unit coils. Do not overheat or place excessive strain on tubing or damage may result.

1. Shut off power to unit. Failure to do so may result in electrical shock. Remove unit compressor section access panels, Fig. 2 and 3.
2. Remove refrigerant from unit using refrigerant removal methods described in Carrier Standard Service Techniques Manual, Chapter 1.
3. Remove core from suction and discharge line Schrader valves.
4. Disconnect compressor wiring at compressor terminal box.
5. Using a tubing cutter, cut suction and discharge lines at convenient place near compressor for easy reassembly to new compressor with copper slip couplings.

CAUTION: Excessive movement of copper lines at compressor may cause a break where lines connect to coil.

6. Remove compressor holddown bolts and lift compressor out.

Table 6 — Compressor Data

UNIT 50HQ,VQ	V-PH	PRODUCTION COMPRESSOR	OIL RECHARGE (oz)
014	208/230-1	AJ5513F	24
018		AB5519F	32
022		MD2023FE	42
027		MD2423FE	42
033		MD3423FE	42
042		MD4023FE	42
048		PC4616AD	76
060		PC6416AG	76
033	208/230-3	MF3423FE	42
042		MF4023FE	42
048		PY4616AD	76
060		PY6416AF	76
080		PY7716AF	76
014	277-1	AK8515E	17
018		AB5519F	32
022		AB5520G	32
027		AB5524G	32
033		AH8543E	45
033	460-3	MH3423FE	42
042		MH4023FE	42
048		PH4616AD	76
060		PH6416AF	76
080		PH7716AF	76

7. Carefully unbrazed suction and discharge line piping stubs from compressor. If oil vapor in piping stubs ignites, use quenching cloth.
8. Braze piping stubs (removed in step 7) on new compressor.
9. Clean system.
10. Install new compressor in unit. Braze suction and discharge lines to compressor piping stubs (at points where cut, step 5) using field-supplied copper couplings. Ensure compressor holddown bolts are in place. Connect wiring.
11. Evacuate and recharge unit.



ELECTRIC SHOCK HAZARD

Open all remote disconnects before servicing this equipment.

Lubrication

COMPRESSOR contains factory oil charge. Replace oil when lost. See Table 6 for oil recharge. If necessary, refer to Carrier Standard Service Techniques Manual, Chapter 1, page 1-21, for oil recharging procedure. Use Carrier PP33-1, Texaco Capella B or Suniso 3G oil.

FAN MOTOR BEARINGS are prelubricated for 3 years heavy-duty or 5 years normal-duty service.

Cleaning Coil and Condensate Pan — Clean and inspect coil, condensate pan and drain before each cooling season.

1. **50VQ UNITS** — Remove coil section access panels.
50HQ UNITS — Remove top cover.
2. Slide air filters out of filter flanges.
3. Disconnect condensate drain line at pan drain connection.
4. Use vacuum cleaner nozzle to clean the face of coil.
5. Clean condensate drain trap with a bottle brush. Clean condensate pan.
6. Hold pail under condensate pan drain connection and flush pan out with clean water. Ensure water flows freely through condensate drain. Do not overflow pan.
7. Reconnect condensate drain line.
8. Install access panel on 50VQ or top cover on 50HQ models and replace air filters.

Indoor Blower Assembly, Motor and Blower Removal

NOTE: If units have been installed with insufficient clearances, it may be necessary to remove them from the installed space for servicing. See Fig. 2 and 3 for specified service clearances.

50VQ

1. Remove blower section access panel.
2. Remove power wires from Molex plug.
3. Place a spacer beneath blower housing for support.
4. Remove blower assembly mounting bracket. (Rear flange on top of blower housing and screws now hold blower assembly in place.)
5. Support blower housing at bottom and remove spacer. Tilt blower assembly downward and lift out of unit.
6. Loosen setscrew holding fan to motor shaft.
7. Loosen motor mounting band and remove motor.
8. Remove blower cutoff plate from blower housing outlet.
9. Remove blower wheel from blower housing outlet.

50HQ

1. Remove top cover (Fig. 2).
2. Remove power wires from Molex connector (Fig. 7).
3. Remove blower assembly mounting screws from base unit (Fig. 2).

4. Lift blower assembly out of unit.
5. Loosen setscrew holding fan to motor shaft.
6. Loosen motor mounting band and remove motor.
7. Remove blower cutoff plate from blower housing outlet.
8. Remove blower wheel from blower housing outlet.

Clean Indoor Blower Wheel — When coil is cleaned, remove caked-on dirt from blower wheel and housing with brush; remove grease with mild solvent. When replacing blower assembly, make sure blower wheel is centered in housing.

Return Air Filter — Replace filter media 4 times a year. For other types of filters, refer to filter manufacturer's instructions as required.

CAUTION: Never operate unit without a filter. Coil will become plugged with dirt and damage to fan motor may result.

Heat Exchanger — If excessive discharge pressure is experienced with normal water flow, the heat exchanger tubes may be fouled and require cleaning. Contact a local water treatment firm for details on chemical cleaning.

TROUBLESHOOTING CHART

PROBLEM	CAUSE	CORRECTION
ENTIRE UNIT DOES NOT RUN	Blown fuse	Replace fuse or reset circuit breaker.
	Broken or loose wires	Replace or tighten the wires.
	Voltage supply low	If voltage is below minimum voltage specified on nameplate, contact local power company.
	Transformer	Check 24-volt transformer for burnout or voltage less than 18 volts.
	Thermostat	Set thermostat on COOL and lowest temperature setting; unit should run. Set thermostat on HEAT and highest temperature setting; unit should run. Set fan to ON; fan should run. If unit does not run in all 3 cases, the thermostat could be wired incorrectly, or faulty. To ensure faulty or miswired thermostat, disconnect thermostat wires at unit and jumper between R, Y, G and W terminals and unit should run.
BLOWER OPERATES BUT COMPRESSOR DOES NOT	Voltage supply low	If voltage is below minimum voltage specified on the nameplate, contact local power company.
	Thermostat	Check setting, calibration and wiring
	Loose or broken wires at compressor, capacitor or contactor	Replace or tighten wires.
	High-pressure controls	The unit could be off on the high-pressure cutout control. Reset the thermostat to OFF. After a few minutes, turn to COOL. If the compressor runs, unit was off on high pressure. Check for inadequate water flow. Check for dirty filter. If the unit still fails to run, check for faulty pressure switch.
	Defective capacitor	Check capacitor or start thermistor (PTC). If defective, remove, replace and revise correctly
	Seized compressor	Try a start capacitor in parallel with the run capacitor momentarily. If the compressor starts but the problem re-occurs on starting, install an auxiliary start kit. The hard start kit is comprised of a recommended start relay and correctly sized capacitor. If the compressor still does not start, replace the compressor.
	Compressor overload open	In all cases, an external or internal temperature sensitive compressor overload is used. If the compressor dome is too hot to touch, the overload will not reset until the compressor cools down. If the compressor is cool and the overload does not reset, there may be a defective or open overload. If the overload is external, replace the overload; otherwise, replace the compressor.
	Compressor motor grounded	Internal winding grounded to the compressor shell. Replace the compressor.
	Compressor windings open	Check continuity of the compressor windings with an ohm-meter. If the windings are open, replace the compressor.
UNIT OFF ON LOW WATER TEMPERATURE CONTROL	Low water temperature cutout (LWTC) open	The unit could be off on the LWTC. Reset the thermostat to OFF. After a few minutes, turn to HEAT. If the compressor runs, unit was off on LWTC. (See Problems for possible causes.)
	Lack of or inadequate water flow	Increase water flow.
	Entering water too cold	Increase entering water temperature.
	Scaled or plugged heat exchanger	Clean, or replace heat exchanger
	Low water temperature switch defective or improperly calibrated	Check for low water temperature switch. Recalibrate or replace
UNIT SHORT CYCLES	Wiring and controls	Loose connections in the wiring or the control contactors defective
	Defective compressor overload	Check and replace if necessary. If the compressor runs too hot, it may be due to the deficient refrigerant charge

TROUBLESHOOTING CHART (cont)

PROBLEM	CAUSE	CORRECTION
INSUFFICIENT COOLING OR HEATING	Unit undersized	Recalculate heat gains or losses for space to be conditioned. If excessive, rectify by adding insulation, shading, etc.
	Loss of conditioned air by leaks	Check for leaks in ductwork or introduction of ambient air through doors and windows.
	Thermostat improperly located (e.g., near kitchen)	Relocate thermostat where it can accurately sense the comfort level in living areas.
	Inadequate airflow	Maintain adequate airflow and proper distribution of air
	Low refrigerant charge	Recharge system
	Defective compressor	Check compressor. If discharge pressure is too low and suction pressure is too high, compressor is not pumping properly. Replace compressor
	Defective reversing valve creating bypass of refrigerant from discharge to suction side of compressor	Replace reversing valve.
	Incorrect operating pressure	Adjust refrigerant charge (See Refrigerant Charging, page 9.)
	Restricted refrigerant flow	Check strainer and capillary tubes for possible restrictions to flow of refrigerant If refrigerant system is contaminated with moisture, non-condensables, and particles, dehydrate, evacuate and recharge the system
NOISY OPERATION	Compressor	Make sure the compressor is not in direct contact with the base or sides of the cabinet. The holddown bolts used for shipping should be loosened so that the compressor is floating free on its isolator mounts. Excessive noise will occur if the compressor has a broken valve or loose discharge tube. Replace the compressor.
	Blower and blower motor	Check blower wheel. If wheel is hitting casing, adjust for clearance and alignment. If blower is bent or damaged, replace. If blower is loose on shaft, tighten. Check bearings. If defective, replace.
	Contactors	A clattering or humming noise in the contactor could be due to control voltage less than 18 volts. Check for low supply voltage, low transformer output or excessively long runs of thermostat wires. If the contactor contacts or coil is defective, repair or replace.
	Rattles and vibrations	Check for loose screws, panels or internal components. Tighten and secure. Copper piping could be hitting the metal surfaces. Carefully readjust by bending slightly.
	Undersized ductwork	Resize ductwork
	Excessive water through the heat exchange	Throttle back on the water flow ensuring adequate flow for good operation but eliminating the noise

For replacement items use Carrier Specified Parts

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

Book	1	4
Tab	5a	5a

Form 50HQ,VQ-5SI Supersedes 50HQ,VQ-3SI

Printed in U S A

10-84

PC 111

Catalog No. 535-029