

**COPY**

# 38QE/40QE Advanced Technology Heat Pump System

## Installation Instructions

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### SAFETY CONSIDERATIONS

Installing and servicing air conditioning equipment can be hazardous due to system refrigerant pressures and electrical components. This is especially true with variable speed type equipment, since **HIGH VOLTAGE COMPONENTS REMAIN ENERGIZED AFTER THE UNIT MAIN DISCONNECT IS OPENED!**

### **▲ DANGER**

A high-voltage (300-VDC) circuit remains energized after the main disconnect is opened. The normal capacitive discharge time is 10 minutes, but this period may be extended indefinitely by component failure. Before servicing components within the compressor section power box, always check with a DC voltmeter across the D.C. Capacitor. Electrical shock can cause personal injury or death.

For the above reasons, installation and servicing **MUST BE** conducted only by a Carrier installer/dealer specifically trained to service variable speed equipment. Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency or your distributor or branch for information or assistance. The qualified installer or agency must use factory authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

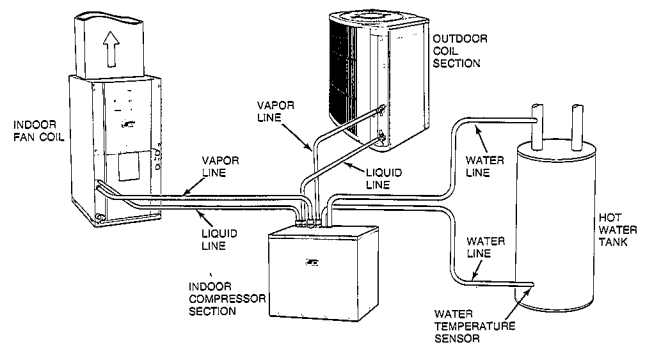
Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and NEC (National Electrical Code) for special installation requirements.

### **▲ WARNING**

Before installing or servicing, turn off main power to indoor and outdoor units. There may be more than one disconnect switch. Turn off accessory heater power if applicable. Electric shock can cause personal injury or death.

### GENERAL OPERATION AND USAGE

The HydroTech 2000 advanced variable speed heat pump system is designed to provide heating and cooling, as well as provide a majority of the year round domestic hot water requirements. The system is composed of three main sections, indoor compressor section, outdoor fan coil section and the indoor fan coil section (see Fig. 1). Additionally a



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Fig. 1—38QE/40QE Advanced Heat Pump System

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

domestic water heating control box and domestic water heating tank temperature sensor are supplied to control the electric domestic water heating tank. The water heating is accomplished by pumping cold water from the cold water inlet pipe at the top of the domestic water tank, through the 38QE refrigerant-to-water heat exchanger, and back into the bottom of the tank.

The variable speed compressor operation allows the 38QE system to control its output capacity to match the required load through a wide range of outdoor temperatures and operating modes.

Specially designed mating 40QE indoor units provide variable airflow control which is increased and decreased along with the compressor speed. This feature, along with an electronic expansion device, provide a level of comfort previously unavailable for the home. It also enhances system efficiency and provides much quieter operation than conventional systems during most periods of operation.

The 38QE/40QE system has many other designed in comfort and efficiency features including:

Carrier/Parker Home-Zone® thermostat and damper options—to provide separate temperature control in up to four areas.

Humidity control—add the optional humidistat to activate special compressor and fan control which improves moisture removal as needed. Humidistat plus humidifier also controls moisture addition in the heat mode.

Air cleaning—connections provided for automatic control of optional electronic air cleaner.

Utility demand limit interface—allows owner participation in incentive programs offered by utilities for peak load control, where available.

Unique defrost—the high temperature of the water in the home's hot water tank is used as the heat source for the defrost cycle, rather than cooling the indoor air as with traditional units. In addition, demand type defrost control provides defrost when, and only when, it is required.

The 38QE/40QE system is available in capacity sizes shown in Table 1. Accessories supplied with the system and other available accessories are shown in Table 2.

#### APPLICATION LIMITATIONS

The 38QE system software and safety devices are designed to prevent equipment operation under conditions that do not comply with the application limitations.

The 38QE product has certain application limitations which are listed below:

1. The 38QE compressor section and outdoor section are to be matched to the specifically designed 40QE indoor fan coil section. Permitted system configurations are shown in Table 1.

**Table 1—Carrier Approved 38QE Systems**

SYSTEM CAPACITY	2 TON	3 TON
INDOOR COMPRESSOR SECTION	38QE024300	38QE036300
OUTDOOR FAN-COIL SECTION	38QE924300	38QE936300
INDOOR FAN-COIL SECTION	40QE024300	40QE036300

25 ft maximum vertical rise allowable

2. The 38QE can only be used with Carrier/Parker Home-Zone® thermostats. Monitor thermostat and slave thermostat model requirements are given in Table 2. All thermostats must be properly configured and programmed in order to obtain normal system operation.
3. The 38QE should not be used with systems containing more than four (4) independently dampered zones. Use

of the bypass controller accessory is required for all zone applications.

4. The system will not operate in the cool mode at outdoor temperatures below 45 F, and is not compatible with the Carrier Motormaster low-ambient control accessory.
5. The system will not operate in the heat mode at outdoor temperatures above 75 F.
6. The compressor section must be located in a non-freezing area because of water containing components. Maximum air temperature surrounding the compressor section must not exceed 105 F because of cooling required for electronic controls.
7. The compressor section is designed to be installed on a solid mounting pad such as concrete. Do not install compressor section in an attic, on a wall, or suspended from a ceiling.
8. Refrigerant line lengths are limited to 50 ft total maximum, with 25 ft maximum vertical rise between indoor and outdoor units.
9. For improved domestic water heating, locating the compressor section within 15 ft of the domestic water tank is desirable.

→ **Table 2—Accessory Parts List**

ACCESSORIES SUPPLIED WITH COMPRESSOR SECTION			
ORDERING NUMBER	DESCRIPTION		
313204-701	Water Heater Control Box		
313288-710	Water Temperature Sensor Assembly		
313243-201	Comp. Section Base Pad		
ACCESSORIES REQUIRED OR RECOMMENDED			
ORDERING NUMBER	DESCRIPTION	Zones	
		Singl	Mult
HT2000	Homezone Monitor Stat w/ clock	RQ	RQ
HZS (Version 2.7 or higher)	Homezone Slave Stat		RQ
ZD-06,08,10,12,14,16	Round Dampers 6" thru 16"		RQ
RD0810,0814,0818,0824	Rectangular Damper 8x10 thru 24		RQ
BCE	Bypass Controller		RQ
TSR01	Relay Pack-Power Supply	RQ	
PS02/PS01	Duct Pressure Sensor		RQ
PSP00	Static Pressure Pick-up		RQ
RDS	Remote Duct Sensor	OP	OP
RRS	Remote Room Sensor	OP	OP
PCA-223	Plenum Cable—22 AWG, 3 conduc	RC	RC
PCA-225	Plenum Cable—22 AWG, 5 conduc	RC	RC
HL38MG026	Humidistat	RC	RC
—	Humidifier (49BF/FH/WS)	RC	RC
—	Electronic Air Cleaner (31MP/SX)	RC	RC
38TH900011	Outdoor Support Foot Kit, 4 in.	OP	OP
38YH900011	Outdoor Snow Rack, 18 in. (024)	OP	OP
38YH900021	Outdoor Snow Rack, 18 in. (036)	OP	OP
P504-8163S	Bi-flow Filter-Drier	RQ	RQ
HT01AX220	Transformer 40va	—	RQ

RQ—Required for installations. OP—Optional for installations.  
RC—Recommended for installations.

10. System is designed to work with conventional residential sized electric water heating tanks only. **NOTE:** The 38QE should be installed with electric water heater tanks that have two connections leading to the bottom of the tank, as shown in Fig. 7a (cold water in, drain). If only one connection to bottom of tank, install a preheat tank, as for gas water heaters, Fig. 7b. For installation with a gas water heater, a water preheat tank must be installed.

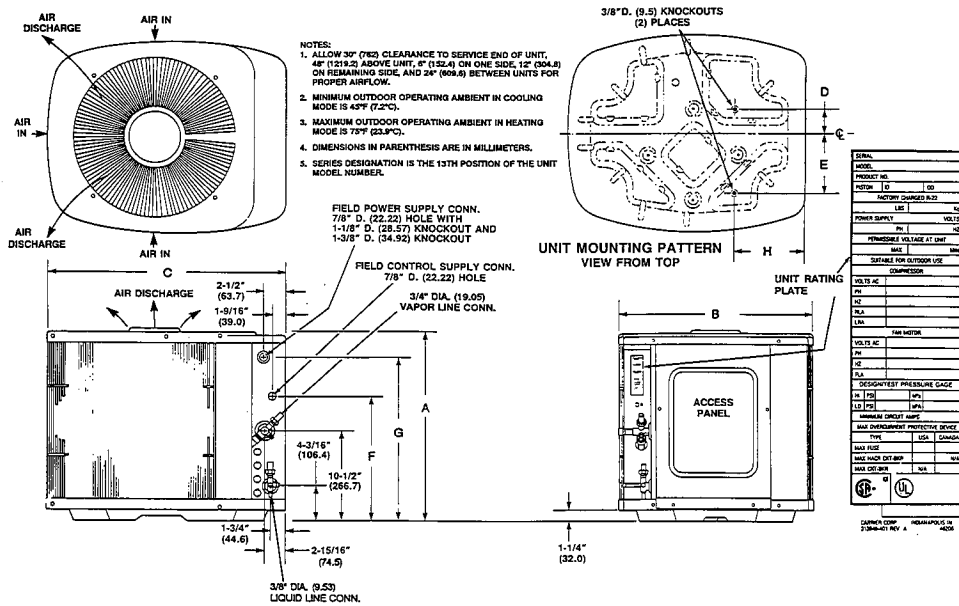


Fig. 2—Outdoor Section Dimensions

Dimensions

UNIT SIZE*	A		B		C		D		E		F		G		H	
	(IN.)	(mm)	(IN.)	(mm)	(IN.)	(mm)	(IN.)	(mm)	(IN.)	(mm)	(IN.)	(mm)	(IN.)	(mm)	(IN.)	(mm)
38QE924	31-7/8"	809.6	30"	762.0	34-15/16"	887.4	4"	101.6	9-3/4"	247.6	21-1/2"	546.1	27-7/8"	708.0	8-3/16"	207.9
38QE936	31-7/8"	809.6	38-5/8"	391.0	45"	1143.0	5-15/16"	150.8	11-13/16"	300.0	21-1/2"	546.1	27-7/8"	708.0	8-9/16"	217.4

ORIENTATION AND LOCATION OF EQUIPMENT

Step 1—Inspect Equipment and Job Site.

A complete single zone system will consist of the following:

1. Compressor Section
2. Outdoor Section
3. Indoor Section
4. Domestic Water Heater Control Box
5. Domestic Water Heater Tank Sensor
6. Homezone Monitor Thermostat
7. Homezone Power Supply Relay Pack

Unpackage and inspect units for any damage. File claims with shipper if necessary.

The compressor section package will include an installation packet, domestic water heater control box and tank temperature sensor.

The outdoor fan coil section will include an installation packet. The indoor fan coil section will include an installation packet.

Consult local building codes and the National Electrical Code (NEC) for special requirements.

When installing, allow sufficient space for airflow clearance (outdoor fan-coil section), wiring, refrigerant and water piping and servicing unit. Position the outdoor section so water or ice from roof cannot drop directly on top of unit. Position the compressor section indoors and adjacent to the domestic water heating tank.

Step 2—Install Outdoor Fan-Coil Section (38QE924 or 38QE936).

The installation data, dimensions, and connection for the 38QE924,936 outdoor section are shown in Fig. 2.

Install on a solid, level mounting pad—If conditions or local codes require the unit be attached to pad, tiedown bolts should be used and fastened thru knockouts provided in unit base pan. Refer to unit mounting pattern in Fig. 2. Position so snow or ice from roof or eaves cannot fall directly on unit. Position to minimize direct sunlight on air temperature sensor above service valves.

On rooftop applications, locate unit at least 6 ins. above roof surface. Place unit above a load-bearing wall and isolate unit and tubing set from structure.

Arrange supporting members to adequately support unit and minimize transmission of vibration to building. Consult local codes governing rooftop applications.

For proper drainage the outdoor section must be raised off the mounting surface. Fig. 3 shows unit with accessory support feet installed. Use accessory snow rack in areas where prolonged subfreezing temperatures or heavy snow occur. Refer to separate installation instructions packaged with the accessories.

Step 3—Install Indoor Compressor Section (38QE024 or 38QE036).

The installation data, dimensions, and connection for the 38QE024, 036 compressor sections are shown in Fig. 4.

Locate unit in non-freezing area such as a basement, garage or utility room. Indoor locations within the living space are not recommended. Basement installations also require careful planning to avoid areas directly under or adjacent to bedrooms, living rooms, etc. Locate unit near the domestic water heater. Allow space for refrigerant and water piping,

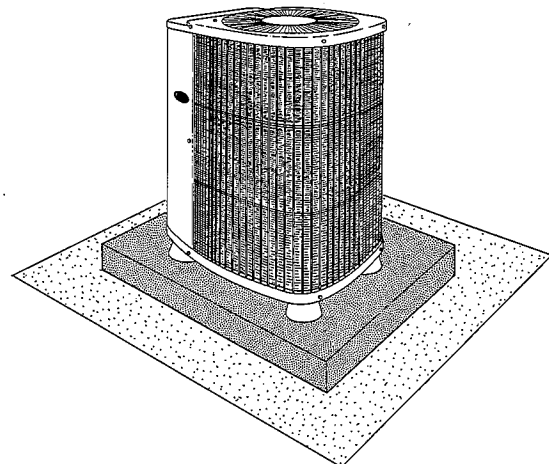


Fig. 3—Outdoor Accessory Support Feet

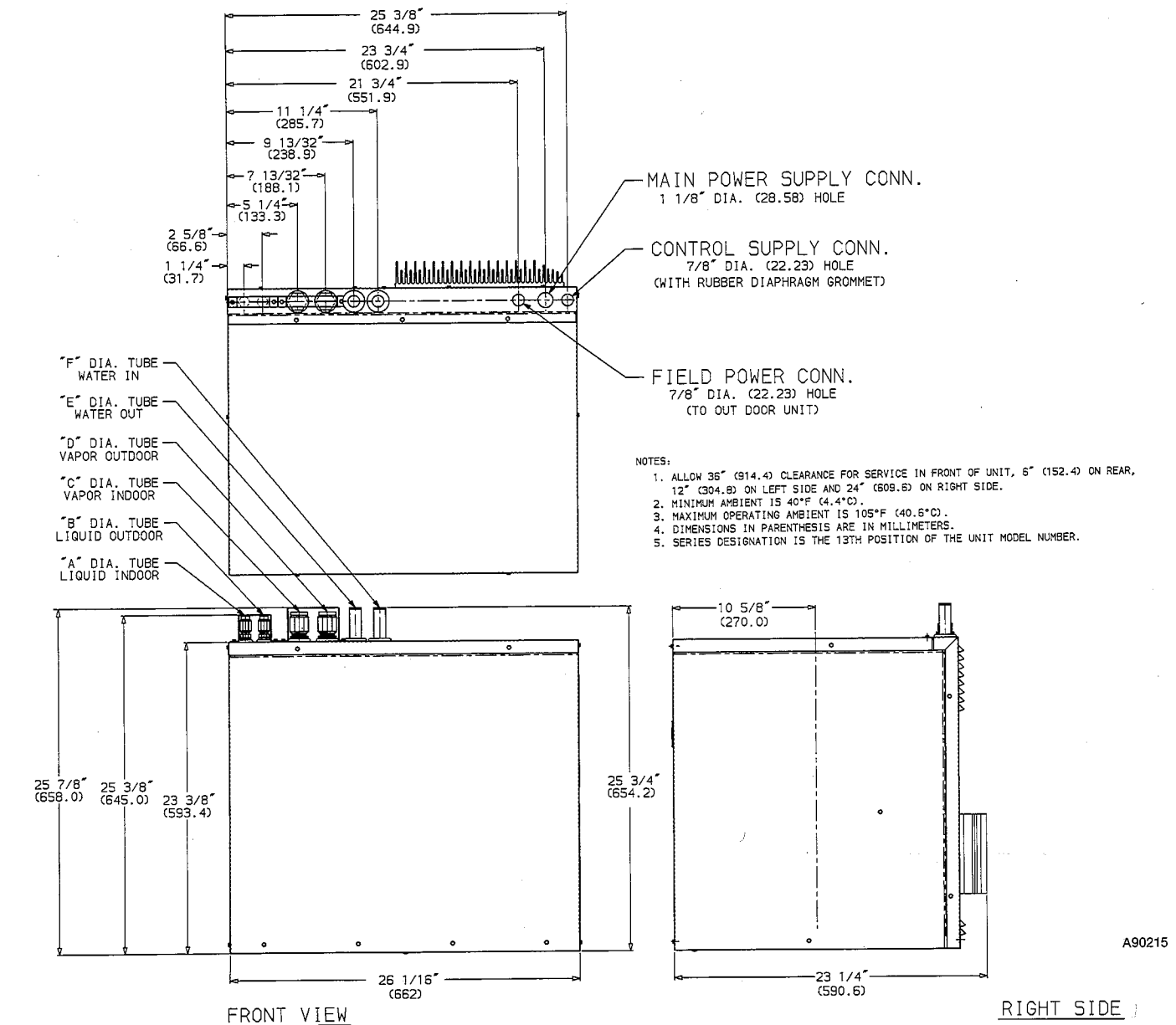


Fig. 4—Indoor Compressor Section

wiring and for servicing the unit (see Fig. 4). Do not exceed maximum total pipe lengths.

Mount indoor compressor section on a rigid, solid platform or concrete floor. Insert the asphalt impregnated felt pad (factory supplied in container) between the unit basepan and mounting surface to provide full unit support and for vibration attenuation. Do not use vibration isolators under corners of basepan.

Install unit to permit adequate clearance for service on all sides of the unit. A heat sink which is used to provide electronic component cooling is located at the lower right side of the rear panel. This heat sink protrudes from the rear panel. This area should always remain clear of obstructions. Do not enclose this area in any manner. Failure to provide proper ventilation can cause equipment to malfunction.

### ▲ CAUTION

To prevent freezing of water piping, do not expose the 38QE indoor compressor section to ambient temperatures below freezing.

#### Step 4—Install Domestic Water Heater Control Box.

The domestic water heater control box allows the 38QE heat pump to control the domestic water heating function. The tank elements are controlled by the 38QE such that the water heating is performed by the heat pump when possible and the tank elements are disabled.

Locate the control box adjacent to the Domestic water heating tank. The box will be wired in the branch circuit that

supplies the power for the Electric Water Heater Tank. Control and sensor wiring will also be connected to the control box. Refer to wiring section of this manual for description of the wiring required.

**Step 5—Install Domestic Water Heating Tank Temperature Sensor Fitting.**

The tank temperature sensor is used to provide the 38QE with the tank water temperature. This temperature is used to control and terminate the water heating mode.

The water temperature sensor fitting is installed into the tank drain-out fitting. Details describing the piping are contained within the piping section of this manual.

**Step 6—Install the Thermostat(s).**

The system is designed to operate with Carrier/Parker Home-Zone® model thermostats and zoning dampers. Refer to the installation instructions shipped with the Carrier/Parker Home-Zone® accessories.

**Step 7—Install Indoor Fan-Coil Section (40QE024, 40QE036 or 40QEH036).**

Refer to the installation instruction shipped with the 40QE unit.

**Step 8—Install Other Electrical Accessories, if any.**

Refer to the individual instructions packaged with optional accessories (humidistat, humidifier, air cleaner, zone thermostats and dampers).

Also refer to the installation instructions supplied with the 40QE indoor unit.

**PIPING CONNECTIONS**

A system piping schematic is shown in Fig. 5 which illustrates both the refrigerant and domestic water heating connections that are required.

**Isolate interconnecting tubing from the framing and ductwork or where tubing runs through stud spaces, enclosed ceiling or pipe chases. Use isolation type hangers, since rigid fastening transmits pulsation to structure, creating objectionable sound.**

**Step 9—Install Refrigerant Pipes**

**NOTE:** Before making the 3/8" O.D. refrigerant line connections at the indoor coil verify that the fittings *do not* contain an AccuRater piston.

The 38QE system employs a unique electronic bi-directional expansion valve, located within the compressor section, and does not require AccuRaters in either the indoor or outdoor section.

Refrigerant piping between sections may be made using accessory tubing packages or field-supplied tubing of refrigerant grade, correct size and condition.

If either refrigerant tubing or unit piping is exposed to atmospheric conditions for longer than 5 minutes, it must be evacuated to 1000 microns to eliminate contamination and moisture in the system.

All refrigerant tubes *must* be insulated with closed-cell foam type insulation with a minimum wall thickness of 3/8". Failure to properly insulate refrigerant tubes adequately will degrade system performance and efficiency, as well as permitting moisture or frost to form on the tubing surfaces during some operating modes. Insulation on the refrigerant lines at the compatible fittings should extend over the compatible fitting to prevent moisture from collecting on the fitting surface and freezing during low outdoor temperature operation. Freezing of the moisture on the compatible fitting may cause damage to the fitting and refrigerant leakage.

Run refrigerant tubes as directly as possible, avoiding unnecessary turns and bends. Suspend refrigerant tubes so they do not damage insulation on liquid and vapor tubes and do not transmit vibration to structure. Also, when passing refrigerant tubes through walls, seal opening so vibration is not transmitted to structure. Leave some slack in refrigerant tubes between structure and units to absorb vibration.

**▲ CAUTION**

**DO NOT BURY MORE THAN 3 FT OF REFRIGERANT TUBING IN GROUND.** If any section of tubing is buried, there must be a 6-in. vertical rise to valve connections on outdoor unit. If more than the recommended length is buried, refrigerant may migrate to the cooler buried section during extended periods of shut-down. This causes refrigerant slugging and possibly compressor damage at start-up.

*Compressor Section*

Refrigerant piping on the 38QE differs from other Carrier triple split type systems. The refrigerant piping requires the installation of two (one 3/4-in. O.D. copper tube and one 3/8-in. O.D. copper tube) tubes between the compressor section and each of the indoor and outdoor sections. A filter-drier, specified in Table 2 or supplied with unit, must be installed in the 3/8-in. indoor liquid line within 12 ins. of the compressor section for noise control. *Fig. 5 illustrates* the various refrigerant tube connections on the compressor section.

- 3/4-in. O.D. refrigerant vapor tube to indoor coil
- 3/4-in. O.D. refrigerant vapor tube to outdoor coil
- 3/8-in. O.D. refrigerant liquid tube to indoor coil
- 3/8-in. O.D. refrigerant liquid tube to outdoor coil

→ The total refrigerant line distance from the indoor fan coil to the outdoor unit shall not exceed 50 equivalent ft (see Fig. 6).

Both the liquid and vapor connections have compatible fittings. Compatible fittings permit mechanical (quick-connect), or sweat connections.

A. Mechanical connection (mate one set of connections at a time.)

1. Loosen nut on compatible fitting one turn. Do not remove.
2. Remove plug and be sure O-ring is in groove inside compatible fitting.
3. Cut tubing to correct length. Deburr and size as necessary.
4. Insert tube into compatible fitting until it bottoms. **TIGHTEN NUT UNTIL IT BOTTOMS ON SHOULDER OF FITTING OR VALVE.** Keep tube bottomed in compatible fitting while tightening nut. Do not over-tighten.

**▲ CAUTION**

If undersized, damaged or elliptically-shaped tubing is used when making Compatible Fitting, leaks may result.

B. Sweat connection—Use refrigerant grade tubing.

1. Remove locknut, and rubber O-ring from inside of compatible fitting.
2. Cut tubing to correct length.
3. Insert tube into compatible fitting until it bottoms.

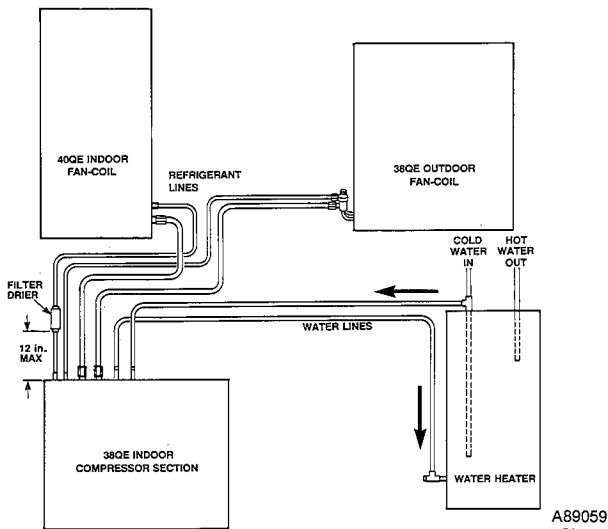


Fig. 5—38QE/40QE System Piping Schematic

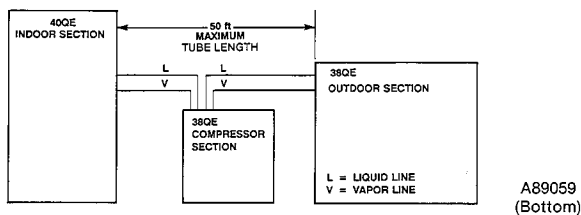


Fig. 6—Maximum Refrigerant Line Length

- After wrapping the service valve with a wet cloth, the tubing set can be brazed to the service valve using either silver bearing or non-silver bearing brazing material. Consult local code requirements.

*Outdoor Fan Coil Section*

**CAUTION**

A brazing shield **MUST** be used when tubing sets are being brazed to the service valves to prevent damage to the painted unit surface.

**CAUTION**

To avoid damage while brazing, service valves must be wrapped with a heat-sinking material such as a wet cloth.

Both the liquid and vapor lines require sweat connections. Use proper equipment and safety precautions when making the sweat connection. The service valves on this unit are both front and backseating. The service port does not contain a schrader fitting. Do not attempt to connect manifold until valve is fully backseated.

Service valves are closed from factory and ready for brazing. After wrapping the service valve with a wet cloth, the tubing set can be brazed to the service valve using either silver bearing or non-silver bearing brazing material. Consult local code requirements.

Outdoor units contain correct system refrigerant charge for operation with indoor unit of the same size when connected by 25 ft of field-supplied or factory accessory tubing. Check refrigerant charge for maximum efficiency (see Refrigerant charging).

*Indoor Fan Coil Section*

The liquid and vapor tube fittings are flare and compatible, respectively on the 40QE units. Use proper equipment and safety precautions when making the flare connections. Refer to the 40QE Installation Instructions.

**Step 10—Install Domestic Hot Water Piping**

**CAUTION**

Use only water piping, fittings and brazing material that are suitable for *Potable Water* systems when connecting the heat pump to the household water system. Consult local codes.

The compressor section and domestic water heater should be located as near as possible to each other. Total length of interconnecting water piping between the compressor section and water heater should not exceed the lengths shown in Table 3. The number of bends and pipe fittings should be kept to a minimum. The use of shut-off valves in the water lines between the domestic water tank and the compressor section are not recommended as they may adversely affect the system performance. (If valves are used, use only Ball or Gate type). However compliance with local codes should be followed. Failure to insulate pipes will result in performance degradation.

*Domestic Water Heating Tank*

The 38QE can be installed with a conventional electric water heater or with a gas water heater system. The basic installation procedures are the same. However in the installation with the gas water heater an insulated preheat tank

**Table 3—Recommended Water Piping Size**

PIPE SIZE	ALLOWABLE TOTAL PLUS	
	PIPING LENGTH (Ft)†	PIPING ELBOWS
1/2" nom (5/8" OD)	20	6*
3/4" nom (7/8" OD)	50	6**

\*Length can increase by 1.6 ft for each elbow less than 6.  
 \*\*Length can increase by 2.0 ft for each elbow less than 6.  
 †Total length of cold and hot water pipes.

must be used. The preheat tank is essentially an electric water tank without the electric heating elements.

Installation of the 38QE with a conventional electric water heater is shown in Fig. 7a. Installation with a gas water heater and preheat tank is shown in Fig. 7b.

*Tank Water Temperature Sensor*

The connection of the water heating lines to the tank includes the installation of the tank water temperature sensor. The tank water temperature sensor is located within the drain fitting of the tank. The fitting location is shown in Fig. 7a,b. The detail for installing the sensor is shown in Fig. 8.

Water connection tubes on the 38QE compressor section are identified in Fig. 4. The two tubing stubs require field-supplied sweat couplings or reducing couplings for connection to water lines.

**CAUTION**

A brazing shield must be used when tubing and fittings are being brazed to the water stub tubes to prevent damage to the painted unit surface.

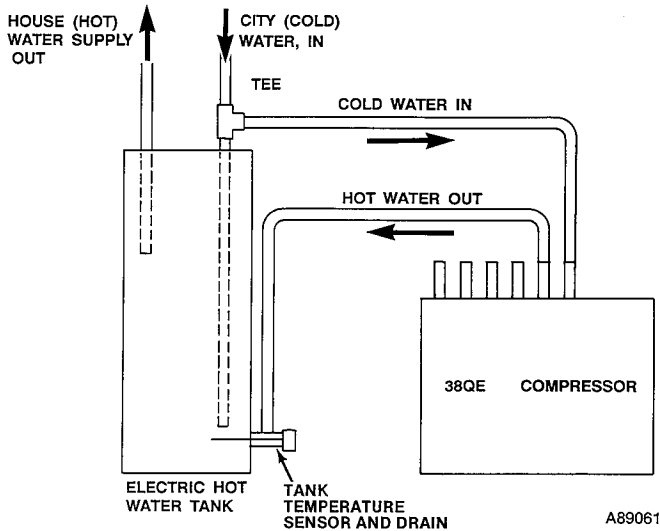


Fig. 7a—Installation with Conventional Electric Water Heater

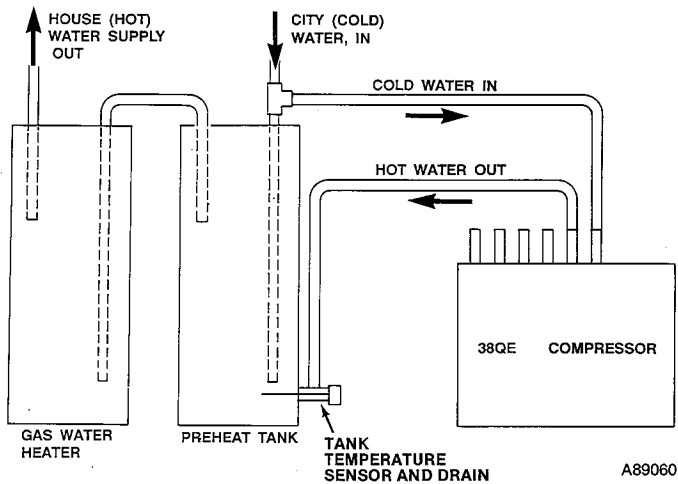


Fig. 7b—Installation with Gas Water Heater and Preheat Tank

#### Tank Water Temperature Thermostat

Adjust the lower electric heater thermostat to the minimum setting.

#### Water Piping Installation

1. Shut off all electrical power to domestic water heater.
2. Shut off water supply to domestic water heater and drain tank.
- 3. Remove drain valve from bottom of tank which requires sensor (Fig. 7a or 7b). Install pipe nipples and tee and install tank water temperature sensor as shown in Fig. 8. Bend sensor up to avoid hitting water tanks that have dome shaped bottoms.
4. Install second tee into tank sensor tee as shown in Fig. 8. Install drain valve and connect water piping between second pipe tee and hot water outlet connection on the compressor section.
5. Install a tee fitting on the cold city water supply as shown in Fig. 7. Install the water piping between the tee fitting and the cold water inlet connection on the compressor section.
6. Refill the hot water pipes and tank, purge air, and check all water connections for leaks.

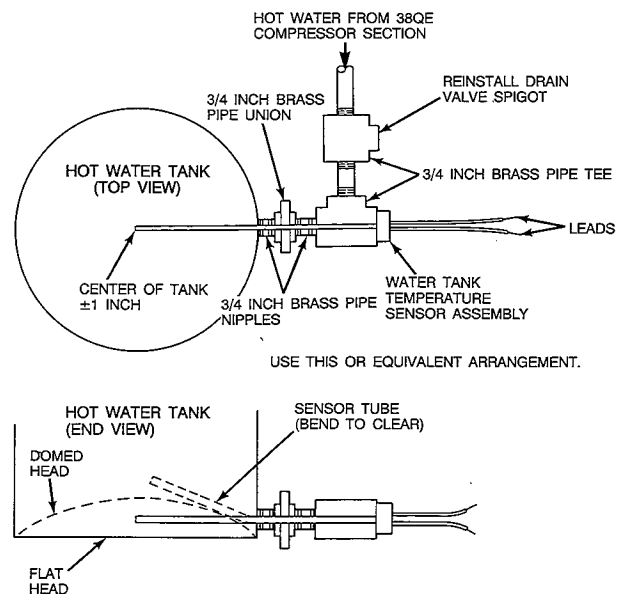
7. Insulate all water pipes with closed-cell foam type insulation with a minimum wall thickness of 3/8 in.
8. If shut off valves have been installed in the water lines between the tank and compressor section, slowly open all valves. Bleed air from the heat pump water circuit and circulating pump. First loosen the threaded union on the pump outlet until water flows out and no air is present. Retighten union. Repeat process with union on pump inlet. Then loosen air bleed screw in the center of the circulating pump. The air bleed screw should only be loosened, not totally removed, enough to allow air to bleed. Retighten screw after system has been bled.

### CAUTION

Failure to bleed air from the water pump before energizing will cause *immediate pump failure*. The pump employs water-cooled and lubricated bearings; and if air is left in the vicinity of the bearing, insufficient cooling and lubrication will be available and bearing failure will result.

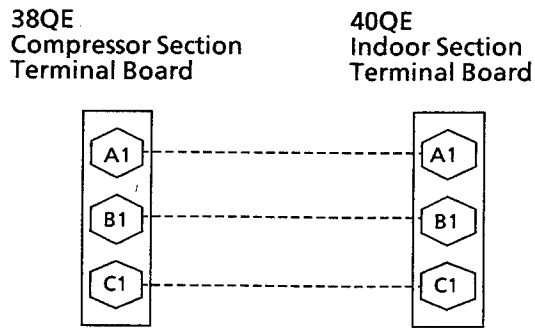
#### ELECTRICAL CONNECTIONS

**NOTE:** This equipment generates and uses radio frequency energy. If not installed properly in strict accordance with these installation instructions, it may cause interference with televisions and/or radio reception. It has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules (which are designed to provide protection against such interference in a residential installation). However, there is no guarantee that there will not be interference in a particular installation. If this equipment does cause interference to television and/or radio reception, which can be determined by turning the equipment off and on, the installer or serviceman should refer to "38QE Start-up, Troubleshooting and Service Guide."

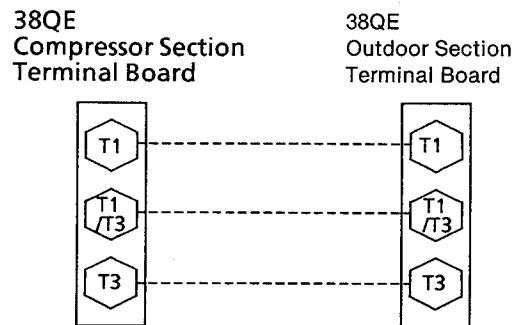


→ Fig. 8—Hot Water Inlet Connection to Hot Water Tank

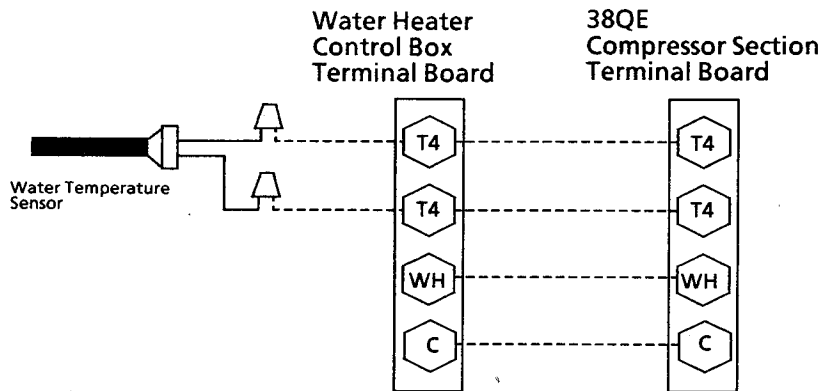
Compressor section to indoor fan coil section:



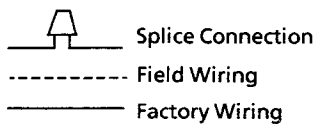
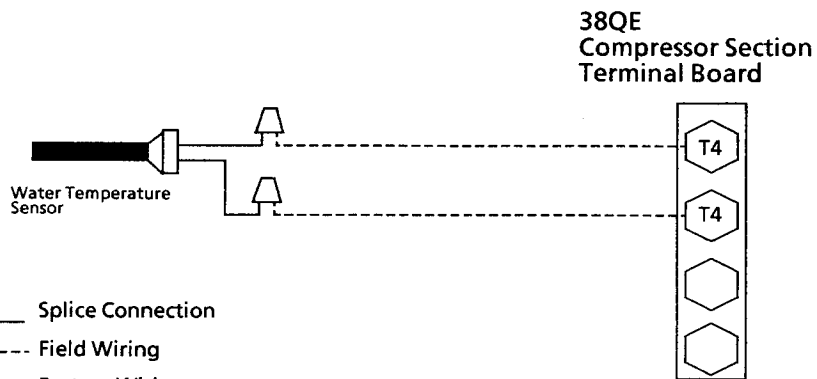
Compressor section to outdoor fan coil section:



Domestic water heater control box and temperature sensor (Electric water heater)



Water Temperature Sensor (Gas water heater and preheat tank)



A89008

Fig. 9—System Control and Sensor Connections



### ▲ CAUTION

Avoid running control and sensor wiring in parallel bundles, conduit or pipe chases with the power wiring. Power wiring can cause interference with the control and sensor wiring. Maintain a minimum of 6 ins. of separation between the control and sensor and power wiring. Control wiring should be secured to the refrigerant piping between the compressor, indoor and outdoor units.

### ▲ CAUTION

To prevent interference avoid running control and sensor wires in parallel with antenna and telephone cables.

**IMPORTANT:** The use of aluminum wire for any power or control wiring is not allowed, all electrical wiring must be copper; and all wiring specifications pertaining to the 38QE system are specified as copper wire using American Wire Gauge (AWG) sizing system

### ▲ WARNING

Make ground connection before connecting power wiring or personal injury may occur due to electrical shock.

### ▲ CAUTION

Care should be taken not to interconnect control and sensor wiring. Immediate damage to electronics will result.

### ▲ WARNING

To prevent electrical shock or equipment damage, make sure all disconnects and circuit breakers are open before electrical connections are attempted; if this action is not taken personal injury or death can occur.

#### Step 11—Install Control and Sensor Wiring

The control wiring consists of connections between the compressor section, water heater control box, indoor fan coil and the thermostat. Sensor wiring is connected between the outdoor fan coil and the compressor section. Sensor wiring is also connected between the water heater tank and the domestic water heating control box.

Control and sensor wiring requires standard thermostat type and gauge of wire. The plenum cable listed in Table 2 is recommended.

##### *Compressor Section to Indoor Fan Coil Section*

Run one length of 3 conductor wire. See Fig. 9 for connection schematic. These three wires are used to control communications. To reduce the possibility of electrical interference, route this cable along the refrigerant tubes and attach with wire ties.

##### *Compressor Section to Outdoor Fan Coil Section*

Run one length of 3 conductor wire. See Fig. 9 for connection schematic. These wires are used for outdoor unit temperature sensors. To reduce the possibility of electrical interference, route this cable along the refrigerant tubes and attach with ties.

##### *Domestic Water Heater Control Box to Compressor Section*

Run one length of 4 conductor wire. See Fig. 9 for connection schematic. Two wires will be used to power the water heater contactor. The other two wires will be used for the tank sensor connections. Do not interconnect the contactor and sensor wires as immediate damage will result.

##### *Domestic Water Tank Temperature Sensor to Water Heater Control Box*

See Fig. 9 for connection schematic. Use 2 conductor wire, if extra length is required to make the connection.

**NOTE:** For installations with a gas hot water heater and a preheat tank, the water heater control box may be omitted. Wire tank water temperature sensor directly to compressor section as shown in Fig. 9.

#### Step 12—Install Thermostat Wiring

The thermostat connections are described below for both single and multiple zone installations.

The single zone installation requires a Parker relay pack power supply accessory to provide power for the single zone thermostat.

##### *Single Zone—Fig. 10*

Connect 3 wires from indoor fan coil section to monitor thermostat. Connect 5 wires from thermostat to power supply module. Connect 2 wires from the power supply module to the indoor fan coil section terminals R and C or an auxiliary transformer that is capable of supplying 24 VAC. These connections are shown schematically in Fig. 10. All connections within the indoor fan coil are described in the 40QE Installation Instructions.

##### *Multiple Zone (option)—Fig. 11*

Connect 3 wires from indoor fan coil section to Monitor Thermostat. All additional zones are to be connected as shown in Fig. 11 in parallel. All connections within the indoor fan coil and for each additional zone are described in the 40QE Installation Instructions.

##### *Other Accessories*

Refer to the individual instructions packaged with optional accessories for their control wiring. Also refer to the installation instructions supplied with the 40QE indoor unit.

#### Step 13—Install Power Wiring

The 38QE system requires three branch circuits for power. These include the compressor section, domestic water heater and the indoor fan coil. The outdoor fan coil section receives power from the indoor compressor section. The electrical data for the 38QE system is shown in Table 4.

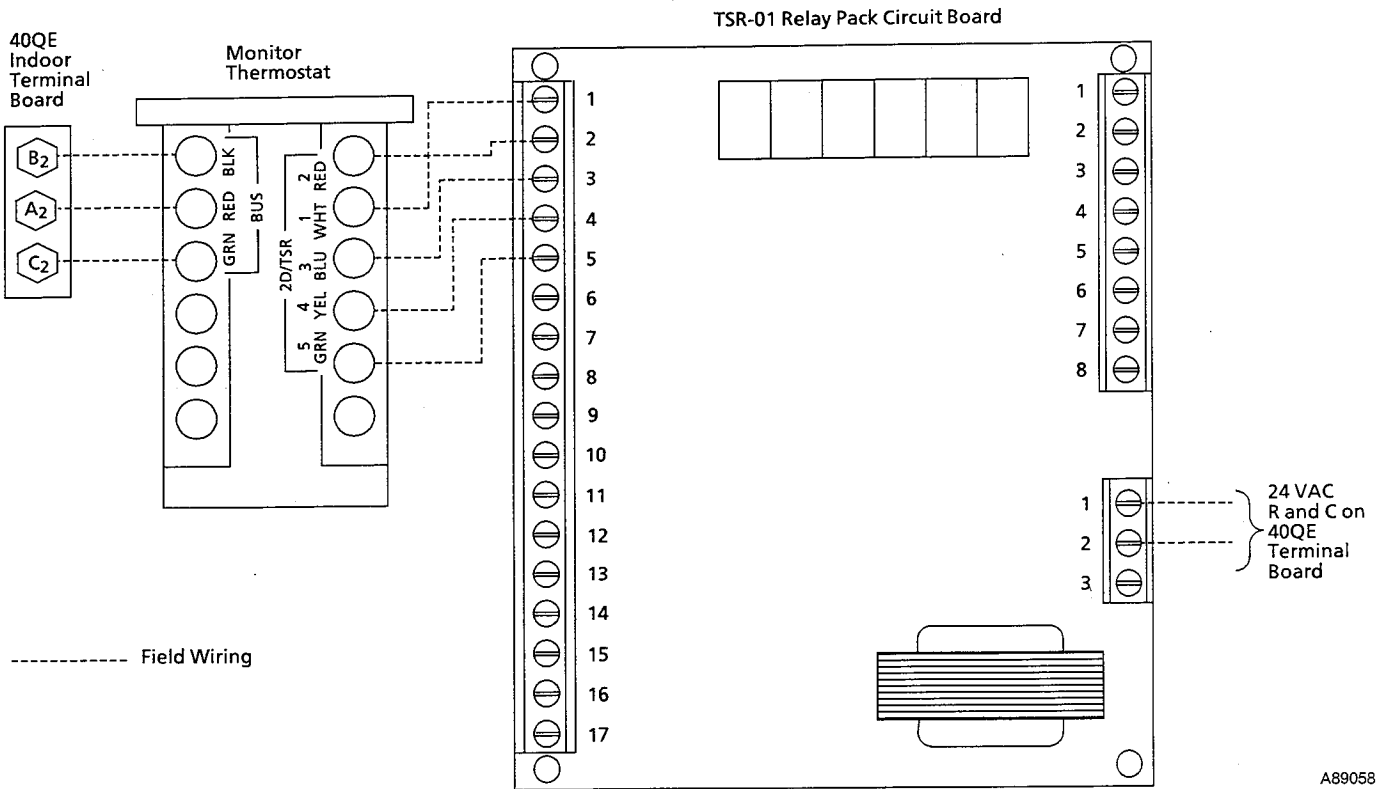
**NOTE:** Be sure field wiring complies with local and national fire, safety and electrical codes, and voltage to system is within limits shown in Table 4 or on unit rating plate. Contact local power company for correction of improper voltage. See Table 4 for recommended circuit protection device.

**NOTE:** Operation of unit on improper line voltage constitutes abuse and could affect unit reliability. Do not install unit in system where voltage may fluctuate above or below permissible limits.

Install all branch circuits and disconnect switches in accordance with National Electric Codes (NEC) and applicable local codes. Locate disconnect(s) within sight from and readily accessible from the unit, per section 440-14 of the National Electric Code (NEC).

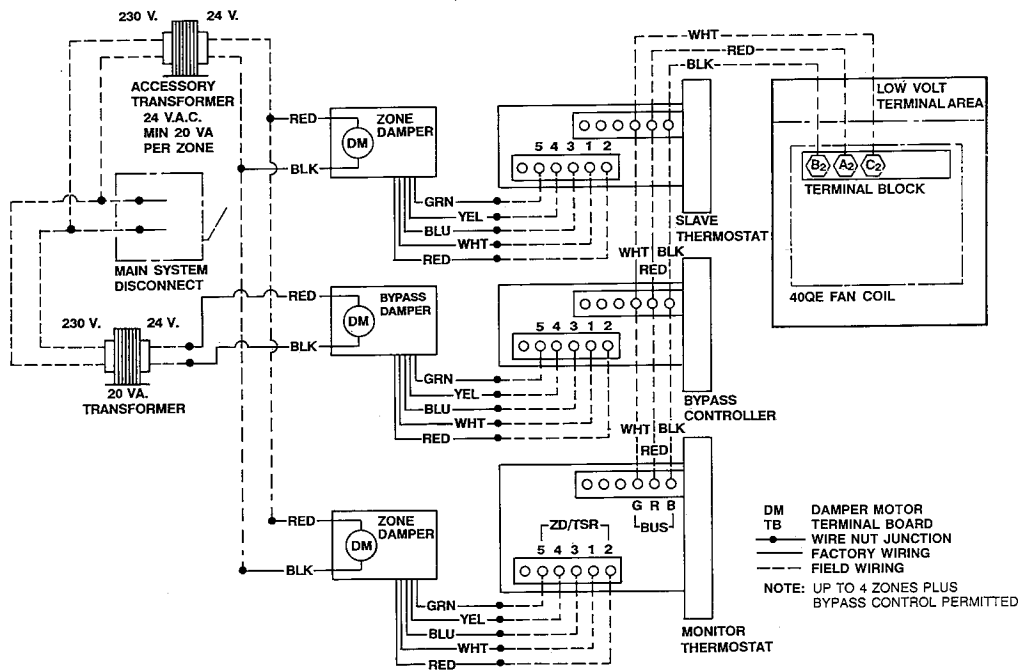
##### *208 Volt Operation*

Model 38QE and 40QE units are factory wired for nominal



A89058

**Fig. 10—Thermostat Wiring Diagram (Single Zone)**



A89057

**Fig. 11—Thermostat Wiring Diagram (Multiple-Zone)**

Table 4—Electrical Data

	VOLT/PHASE	OPERATING VOLTAGE*		COMPRESSOR		FAN	MAX FUSE or HACR TYPE CIRCUIT BKR AMPS	MCA
		MIN	MAX	LRA	RLA	FLA		
<b>INDOOR COMPRESSOR SECTION</b>								
38QE024300	208/230/1	187	254	35.0	20.3		40	25.9
38QE036300	208/230/1	187	254	35.0	25.3		50	32.4
<b>OUTDOOR FAN-COIL SECTION</b>								
38QE924300	208/230/1	187	254			.5		**
38QE936300	208/230/1	187	254			.7		
<b>WATER HEATER CONTROL BOX</b>								
38QE9XX300	208/230/1	187	254		20		20	

FLA —Full Load Amps  
 HACR—Heating, Air Conditioning and Refrigeration  
 MCA —Minimum Circuit Amps  
 RLA —Rated Load Amps  
 LRA —Locked Rotor Amps

\*Permissible limits of the voltage range at which the unit will operate satisfactorily.

\*\*Outdoor Coil Wiring—For 25-ft wire run or less, use minimum 14 AWG wire size. For longer wire run, use same size wire as supply to compressor section.

230 V operation. The primary connection on control transformers must be rewired to the 208 volt wires for line voltage between 187 and 218 Volts. Refer to the 38QE Compressor Section label wiring diagram for location and wire identification to rewire the two (2) transformers in the main control box. Refer to the 40QE label wiring diagram for location and wire identification to rewire the transformer in the accessory heater or cooling-only control package. Cap each unused transformer wire with a wire nut and tape or, if the unused lead has a push-on terminal, tape and protect any exposed metal on the terminal.

*Compressor Section*

Install branch circuit disconnect of adequate size to handle compressor section. Route line power leads from disconnect through hole provided in compressor section top rear panel and into the main control box. Connect ground wire to ground lug. Connect main power to the terminal block located within the main control box. The compressor section wire label illustrates the terminal block location.

Rear panel wiring holes are shown in Fig. 4. See Fig. 12 for connection schematic.

*Outdoor Fan Coil Section*

The outdoor fan coil section receives power from the compressor section. Provide a separate disconnect switch for the outdoor fan coil section. Fig. 12 illustrates the connections from the compressor section to the disconnect switch and then to the outdoor fan coil section.

Connect ground wire to ground lug. Route power wires for the outdoor fan coil section through the 7/8-in. hole provided in the top rear panel of the compressor section. Splice wires to pigtailed with wire nuts.

Connect the power wires to the outdoor disconnect switch. From the disconnect switch, extend wires through hole provided in outdoor fan coil section and into line voltage section of control box. Splice leads to black and yellow pigtailed with wire nuts. Connect ground wire to ground lug inside control box.

*Domestic Water Heater Control Box (Electric Heater Only)*

Install branch circuit disconnect of adequate size to handle domestic water heater. Fig. 13 illustrates the required wiring connection between the branch disconnect and the 38QE

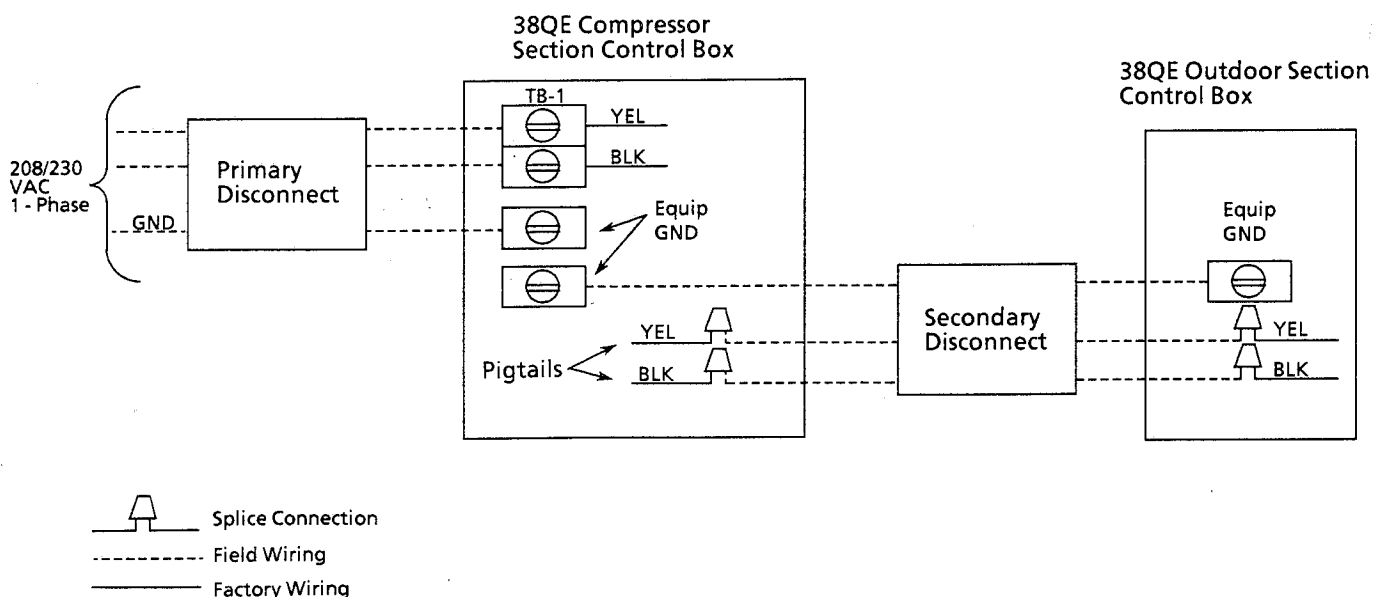
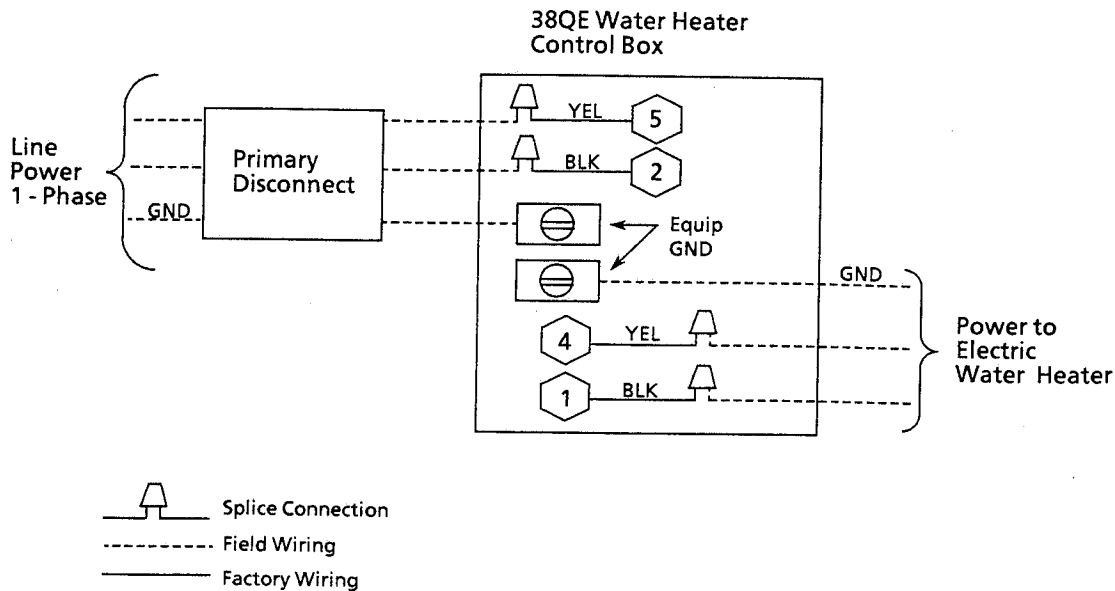


Fig. 12—Compressor Section and Outdoor Section Power Connections



**Fig. 13—Water Heater Control Box Power Connections  
(Electric Water Heater Only)**

A89056

water heater control box and the domestic water heater splice box.

**⚠ CAUTION**

The water heater control box is designed for a maximum of 20 Amps. Make certain that the water heater does not exceed this 20 Amp limit. This system is not designed to be installed with commercial grade electric water heaters that may have greater than 20 Amp requirements.

*Indoor Fan Coil Section*

Install branch circuit disconnect of adequate size to handle indoor fan coil section. The proper wire sizing and lengths, circuit breaker or fuse amp requirements are included in the 40QE installation instructions. Indoor power connection diagrams are also included in the 40QE installation instructions.

**SYSTEM SET-UP ADJUSTMENTS**

**Step 14—Inspect Indoor Blower Speed Limits**

40QE fan coils are supplied with maximum and minimum speeds preset at the factory. Maximum and minimum blower speeds are determined by an 11-pin torque selection connector located on the blower controller. (See indoor unit installation instructions for component location.)

To Inspect Blower Speed Settings—

1. Remove indoor unit access doors.
2. Refer to indoor unit installation instructions to locate 11-pin speed selection connector on controller.
3. Check for proper factory speed pin settings on controller and adjust as shown below, if necessary.

Minimum and maximum settings may require adjustment later. Refer to the 38QE and 40QE Start-Up and Service Instructions.

**Step 15—Adjust Domestic Water Heating Tank Thermostats (Electric Heater Only)**

Adjust the lower element thermostat setting to the mini-

INDOOR UNIT	NOMINAL SPEED SETTINGS (MAX.-MIN.)
40QE024	5-2
40QE036	7-3

Refer to 40QE Installation Instructions for proper Indoor Fan Coil Blower setup.

imum value possible. This maximizes the heat pump water heating capability. If this element is set above 100 F the heat pump will not provide water heating. When the temperature setting of the lower element is above 100 F the tank will operate as a conventional electric water heater.

(NOTE: If the 38QE has been installed with a conventional gas water heater the above steps are not required.)

**Step 16—Configure Thermostats**

In order for the 38QE system to work properly the thermostat must be correctly configured.

This procedure contains basic instructions for thermostat operation. For detailed information on adjusting setpoints or setup, refer to the instructions inside the thermostat cover and the HydroTech 2000 Start-up and Service Manual.

If the thermostat appears to malfunction during this procedure, refer to the appropriate Parker Thermostat Operation Manual, HydroTech 2000 Start-up and Service Manual or the Parker Homezone Troubleshooting Guide.

Make sure thermostat mode switches are set to OFF, and FAN is set to AUTO.

Turn the indoor unit main disconnect switch ON (Note: Transformers supplying power to multi-zone dampers and thermostats may be on separate circuit from indoor unit.). When the thermostat is powered up, the display will show cooling and heating set points. If the display is blinking on and off, it is indicating incorrect wiring connections or that the thermostat is not receiving adequate power. Check wiring connections and supply voltage from the transformer. The voltage must be 22 volts minimum. Make certain that the thermostat ribbon cable has been inserted into the connector board correctly.

If the thermostat displays a hardware, software, heat pump, or fan coil error code (HF,SF,HP or FC followed by a two digit number), refer to the HydroTech 2000 Start-up and Service Manual for further instruction on how to isolate and clear system problems.

At initial start-up, thermostat(s) and bypass controller functions must be manually configured. This may be accomplished per the instructions located under the thermostat cover with addressing exceptions as listed below:

**NOTE:** Be sure to correctly configure system for a variable speed system and single- or multiple-zone application as detailed in the instructions for rotary switch position F8, F9 and F13.

The proper configuration, programming and setup for single- and multiple-zone installations are described here:

1. Address numbers 1 thru 2 are reserved for the 38QE controls. No other devices can use address 1 thru 2. Be sure the 38QE compressor section control module is set to address 1 and the 40QE fan section control module is set to address 2.
2. The monitor thermostat used for single-zone applications should use address 3.
3. For multiple-zone applications the monitor thermostat **MUST BE** addressed to the highest number followed by the bypass controller (required) and then the slave thermostats in any order (example: monitor thermostat is address 6, bypass controller is address 5, zone 2

slave thermostat is address 4, zone 3 slave thermostat is address 3.)

4. Power to indoor unit must be cycled after any change to monitor thermostat address.

After all device features have been set or checked, return all rotary switches to position 0 then, start-up and check the operation of the 38QE variable speed system. Refer to HydroTech 2000 Start-up and Service Manual.

To check the configuration:

1. Power up the thermostat.
2. Remove the thermostat cover.
3. Turn the rotary switch to the position indicated in Table 5.
4. Check that the configuration settings are correct.

After the configuration values are correctly set:

1. Turn the rotary switch to position "0".
2. Replace the thermostat cover.

These configuration items are the minimum required to get the system running. There are many other options and features available through the remaining configuration settings. Refer to the Parker Reference Manuals for a complete description and correct use of these additional features.

#### Step 17—Adjust Refrigerant Charge

38QE refrigerant charge adjustment or recharge must be made by weighing-in the proper amount of refrigerant. Serv-

**Table 5—Carrier/Parker HT2000 Home-Zone® Thermostat Configuration**

ROTARY SWITCH POSITION	ROTARY SWITCH SETTING	DISPLAY		
		FACTORY SET.	SINGLE ZONE	MULTIPLE-ZONE
0	COMFORT SETPOINTS	74 74	74 74	74 74
1	DEVICE ADDRESS	3	3	m*
2	SETBACK OVERRIDE TIME LIMIT	60	60	60
3	SETBACK SETPOINTS	85 65	85 65	85 65
4	DAMPER MAXIMUM OPEN POSITION	15	15	15
4	DAMPER VENTILATION POSITION	05	05	05
5	ZONE TEMP. SENSOR CALIBRATION	*	*	*
6	SUPPLY AIR TEMP. SENSOR CALIBRATION	*	*	*
7	COMMUNICATION CHECK	OFF	OFF	OFF
8	PRESSURE SENSOR ERROR CORRECTION	*	*	*
9	MAXIMUM PRESSURE SETPOINT	100*	100*	100*
A	HUMIDITY SETPOINT	50	50	50
B	SYSTEM MODE DEMAND/LARGE DEMAND	1	1 4	1 4
C	VARIABLE SPEED EQUIPMENT CONFIG.	*	*	*
D	NOT USED	BLANK	BLANK	BLANK
E	NOT USED	BLANK	BLANK	BLANK
F1	HTG./CLG. TIMEGUARD OVERRIDE	OFF	OFF	OFF
F2	CELSIUS TEMPERATURE DISPLAY	OFF	OFF	OFF
F3	ERROR CODE DISPLAY	ON	ON	ON
F4	2400 BAUD RATE	ON	ON	ON
F5	HEAT PUMP SYSTEM	ON	ON	ON
F6	LOCAL OUTSIDE AIR TEMP. SENSOR**	OFF	OFF	OFF
F7	DX COIL TEMPERATURE SENSOR	OFF	OFF	OFF
F8	MULTIPLE ZONE SYSTEM	OFF	OFF	ON
F9	VARIABLE SPEED EQUIPMENT	ON	ON	ON
F10	LOCAL HUMIDITY SENSOR	OFF	OFF	OFF
F11	EFFICIENCY OPERATING MODE	OFF*	OFF*	OFF*
F12	ALTERNATE INFORMATION DISPLAY	OFF	OFF	OFF
F13	HIGH/LOW TEMPERATURE LIMITS	OFF	OFF	OFF
F14	AUTO FAN OFF FOR HEAT	ON	ON	ON
F15	TEMPERATURE TREND STAGING	ON	OFF	OFF
F16	SETBACK LOCKOUT	OFF	OFF	OFF
F17	BYPASS CONTROLLER	OFF	OFF	ON

\*VSE PARAMETERS ARE USED TO CONFIGURE OR TROUBLESHOOT THE VARIABLE SPEED SYSTEM. FOR DETAILS, REFER TO THE START-UP AND SERVICE MANUAL FOR THE COMPRESSOR BEARING SYSTEM.

**NOTE:** ADDRESS THERMOSTAT FOR MULTIPLE-ZONE OPERATION AS FOLLOWS: SLAVE 2 ADDRESS = m-3  
 MONITOR ADDRESS = m  
 BYPASS CONTROL ADDRESS = m-1  
 SLAVE 1 ADDRESS = m-2

SLAVE x ADDRESS = 3  
 x = NO. OF ZONES-1  
 4 ZONES MAX. (MONITOR + SLAVES)  
 (REFER TO COMPRESSOR UNIT INSTRUCTIONS FOR OTHER ZONING LIMITATIONS)

ice ports are provided on the liquid and vapor service valves. Schrader fittings are also provided on the suction and discharge tubes within the compressor section. Dial-A-Charge charging cylinder is an accurate device for recharging systems by weight.

### ▲ WARNING

Outdoor section service valve gauge ports are not equipped with schrader valves. To prevent personal injury, make sure gauge manifold or port caps are connected to the valve gauge ports before moving valves off fully backseated position. Wear safety glasses and gloves when handling refrigerant.

### ▲ CAUTION

Evacuate and purge BOTH suction and discharge schraders of COMPRESSOR SECTION. Purging only from one or from only the outdoor service valves may result in refrigerant being isolated in indoor section due to system refrigerant control valving.

### ▲ CAUTION

Compressor damage may occur if system is overcharged. Weigh-in all refrigerant.

#### *Initial system charging*

The outdoor units are shipped with the base system refrigerant charge for correct operation with a total piping length from indoor section to outdoor section of 25 ft. The remaining components of the system should be leak-checked and evacuated or purged before opening the service valves at the outdoor coil. The procedure described here should be followed for the initial charge:

1. Pressurize the remaining system with R-22 vapor to 100 psig.

### ▲ WARNING

Never use oxygen or other flammable gases in a refrigeration system for leak checking or any other purpose. Personal injury or death can result from doing so.

2. After refrigeration system has been pressurized, with the appropriate gas, to 100 psig, inspect all components, solder joints, mechanical connections, etc., for leakage.

3. If a leak is found, do not attempt to repair until all pressure has been relieved from the system. After the pressure has been relieved, make repairs to leaking component, repressurize system to 100 psig and continue leak checking.
4. After all components, solder joints, mechanical connections, etc. have been leak-checked, relieve all system pressure and evacuate or purge system.

**NOTE:** If either refrigerant tubing or unit piping is exposed to atmospheric conditions for longer than 5 minutes, it must be evacuated to 1000 microns to eliminate contamination and moisture in the system.

5. Slowly open (turn clockwise) both service valves on the outdoor fan coil section allowing the bare system refrigerant charge to be released throughout the system. Service valves should be fully opened and back seated. Port caps installed tightly.
6. Unit is shipped with valve stem(s) frontseated, and caps installed. Replace stem caps after system is opened to refrigerant flow (backseated). Replace caps finger tight and tighten additional 1/12 turn (20-ft lbs torque) using a backup wrench on valve body flats to prevent distortion of sheet metal.
7. See refrigerant charging instructions or charging label of outdoor or compressor section for field charge adjustment for piping lengths used.

#### *Full charge replacement*

If refrigerant escapes from the system, leak test and evacuate entire system. Follow precautions listed in initial system charging. Weigh-in system base charge plus adjustment for field piping. Refer to charging label on outdoor or compressor section.

#### *System Startup*

### ▲ WARNING

DO NOT attempt to manually operate the contactor for any reason. Personal injury can result.

**NOTE:** The 38QE system compressor section is equipped with a crankcase heater. It is recommended that the heater be energized 24 hours prior to starting the unit. To energize crankcase heater set thermostat mode switches to "off," turn on power to compressor section to the indoor fan coil and thermostat.

Refer to the HydroTech 2000 Start-up and Service Manual for further instructions before operating system. Leave the thermostat mode switches to 'OFF' position until the start-up instructions have been thoroughly and completely read and proper system operation has been confirmed.

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