

STORAGE UNIT

AST-40, AST-50, AST-80, AST-120

A Spanish language version of these instructions is available by contacting the manufacturer listed on the rating plate.
La version espanola de estas instrucciones se puede obtener al escribirle a la fábrica cuyo nombre aparece in la placa de especificaciones.

INSTALLATION & OPERATING INSTRUCTION MANUAL

THE WARRANTY ON THIS STORAGE UNIT IS IN EFFECT ONLY WHEN THE STORAGE UNIT IS INSTALLED AND OPERATED IN ACCORDANCE WITH LOCAL CODES AND THESE INSTRUCTIONS. THE MANUFACTURER OF THIS STORAGE UNIT WILL NOT BE LIABLE FOR ANY DAMAGE RESULTING FROM FAILURE TO COMPLY WITH THESE INSTRUCTIONS. READ THESE INSTRUCTIONS THOROUGHLY BEFORE STARTING.

For your family's comfort, safety and convenience, it is recommended this storage unit be installed and serviced by a plumbing professional.



As required by the state of California Proposition 65.

TABLE OF CONTENTS

General Information	3
Installation.....	4
Locating The Storage Unit	4
Water Connections.....	5
Electrical Connections.....	9
General Operation.....	12
Thermostat Adjustment	12
Maintenance	14
Parts List	16
Storage Unit	16
Optional Service Parts.....	17
Typical Installations	18
Notes.....	20

CONGRATULATIONS!

You have just purchased one of the finest storage units on the market today!

This handy installation and operating instruction manual will explain, in detail, the installation and maintenance of your new Storage Unit. It is strongly recommended that you contact a plumbing professional for the installation of this storage unit.

You should carefully read this manual, as well as the enclosed warranty, and refer to it when questions arise. If you have any specific questions concerning your warranty, please consult the plumbing professional from whom your storage unit was purchased. For your records we recommend that you write the model number, serial number, and installation date of your storage unit in the maintenance section in the back of this manual.

This manual should be kept with the storage unit.

GENERAL INFORMATION

This storage unit must be installed in accordance with local codes. In the absence of local codes, install this storage unit in accordance with the N.E.C. Reference Book (latest edition).

The warranty for this storage unit is in effect only when the storage unit is installed, adjusted, and operated in accordance with these Installation and Operating Instructions. The manufacturer will not be held liable for damage resulting from alteration and/or failure to comply with these instructions.

These instructions apply only to this storage unit. Other components of the system should be installed in accordance with the instructions provided by the manufacturer of that component.

State and local codes may supersede suggestions made in this Installation and Operating Instruction manual.

This storage unit shall be used in conjunction with an existing water heater or hot water boiler.

CAUTION

Incorrect operation of this appliance may create a hazard to life and property and will nullify the warranty.

DANGER

Do not store or use gasoline or other flammable, combustible, or corrosive vapors or liquids in the vicinity of this or any other appliance.

A sacrificial anode(s) is used to extend tank life. Removal of any anode, except for inspection and/or replacement, will nullify the warranty. In areas where water is unusually active, an odor may occur at the hot water faucet due to a reaction between the sacrificial anode and impurities in the water. If this should happen, an alternative anode(s) may be purchased from the supplier that installed this water heater. This will minimize the odor while protecting the tank. Additionally, the water heater should be flushed with appropriate dissolvers to eliminate any bacteria.

IMPORTANT

Before proceeding, please inspect the storage unit and its components for possible damage. DO NOT install any damaged components. If damage is evident, please contact the supplier where the storage unit was purchased or the manufacturer listed on the rating plate for replacement parts.

WARNING

Product contains one or more chemicals known to the State of California to cause cancer, birth defects, or reproductive harm.

INSTALLATION

Locating The Storage Unit

WARNING

To avoid damage or injury, there shall be no materials stored against the storage unit and proper care shall be taken to avoid unnecessary contact (especially by children) with the storage unit. **UNDER NO CIRCUMSTANCES SHALL FLAMMABLE MATERIALS, SUCH AS GASOLINE OR PAINT THINNER BE USED OR STORED IN THE VICINITY OF THIS STORAGE UNIT OR ANY LOCATION FROM WHICH FUMES COULD REACH THE STORAGE UNIT.**

This water heater **MUST** be installed indoors out of the wind and weather.

This storage unit must **NOT** be installed in any location where gasoline or flammable vapors are likely to be present, unless the installation is such to eliminate the probable ignition of gasoline or flammable vapors.

The location where this storage unit is to be installed is of the utmost importance. Before installing this storage unit, consult the installation section of these instructions. After reading these installation and operating instructions, select a location for the storage unit where the floor is level and is easily accessible to a power supply and water connections. It is recommended that the storage unit be located near the center of greatest hot water usage to prevent heat loss through the pipes. **DO NOT locate the storage unit where water lines could be subjected to freezing temperatures. Locate the storage unit so that access panels and drain valves are accessible.**

Storage unit corrosion and component failure can be caused by the heating and breakdown of airborne chemical vapors. Examples of some typical compounds that are potentially corrosive are: spray can propellants, cleaning solvents, refrigerator and air conditioning refrigerants, swimming pool chemicals, calcium or sodium chloride, waxes and process chemicals. These materials are corrosive at very low concentration levels with little or no odor to reveal their presence.

NOTE: DAMAGE TO THE STORAGE UNIT CAUSED BY EXPOSURE TO CORROSIVE VAPORS IS NOT COVERED BY THE WARRANTY. DO NOT OPERATE THE STORAGE UNIT IF EXPOSURE HAS OR WILL OCCUR. DO NOT STORE ANY POTENTIALLY CORROSIVE COMPOUNDS IN THE VICINITY OF THE STORAGE UNIT.

Locating The Storage Unit continued-

This storage unit must be located in an area where leakage of the tank or water line connections and the combination temperature and pressure relief valve will not result in damage to the area adjacent to the storage unit or to lower floors of the structure. When such locations cannot be avoided, a suitable drain pan must be installed under the storage unit. The drain pan must have a minimum length and width of at least 4 in. (10.2 cm) greater than the diameter of the water heater. The drain pan, as described above, can be purchased from your plumbing professional. The drain pan must be piped to an adequate drain. The piping must be at least 3/4 in (1.9 cm) in diameter and pitched for proper drainage.

To comply with NSF requirements this water heater is to be:

- a) Sealed to the floor with sealant, in a smooth and easily cleanable way, or
- b) Installed with an optional leg kit that includes legs and/or extensions that provide a minimum clearance of 6" beneath the water heater.

This water heater MUST be installed indoors out of the wind and weather.

Note: For California installation this water heater must be braced, anchored, or strapped to avoid falling or moving during an earthquake. See instructions for correct installation procedures. Instructions may be obtained from DSA Headquarters Office, 1102 Q Street, Suite 5100, Sacramento, California 95811.

Water Connections

NOTE: BEFORE PROCEEDING WITH THE INSTALLATION, CLOSE THE MAIN WATER SUPPLY VALVE.

After shutting the main water supply valve, open a faucet to relieve the water line pressure to prevent any water from leaking out of the pipes while making the water connections to the storage unit. After the pressure has been relieved, close the faucet. The fittings at the circulating connections and the hot water outlet are dielectric waterway fittings with tapered male pipe threads. Make the proper plumbing connections between the storage unit and the plumbing system in the structure. Install a shut-off valve in the cold water supply line.

⚠ CAUTION

If sweat fittings are to be used, **DO NOT** apply heat to the nipples. Sweat the tubing to the adapter before fitting the adapter to the water connections. It is imperative that heat is not applied to the nipples containing a plastic liner.

IMPORTANT

FAILURE TO INSTALL AND MAINTAIN A NEW, LISTED 3/4" X 3/4" TEMPERATURE-PRESSURE RELIEF VALVE WILL RELEASE THE MANUFACTURER FROM ANY CLAIM WHICH MIGHT RESULT FROM EXCESSIVE TEMPERATURE AND PRESSURES.

⚠ CAUTION

This storage unit does not contain a heat exchanger. Only potable water may be allowed to enter the tank.

If this storage unit is installed in a closed water supply system, such as one having a back-flow preventer in the cold water supply, provisions shall be made to control thermal expansion. **DO NOT** operate this storage unit in a closed system without provisions for controlling thermal expansion. Your water supplier or local plumbing inspector should be contacted on how to control this situation.

After installation of the water lines, open the main water supply valve and fill the storage unit. While the storage unit is filling, open several hot water faucets to allow air to escape from the water system. When steady streams of water flow through the faucets, close them, and check all water connections for possible leaks. **NEVER OPERATE THE STORAGE UNIT WITHOUT FIRST BEING CERTAIN IT IS FILLED WITH WATER.**

▲ WARNING

For protection against excessive temperatures and pressure, install temperature and pressure protective equipment required by local codes, but not less than a combination temperature and pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment or materials, as meeting the Requirements for *Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22*, and the Standard *CAN1-4.4 Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves*. The combination temperature and pressure relief valve shall be marked with a maximum set pressure, not to exceed the maximum working pressure of the storage unit. The combination temperature and pressure relief valve shall also have an hourly rated temperature steam BTU discharge capacity not less than the hourly input rating of the water heater or boiler used in conjunction with this storage unit.

Install the combination temperature and pressure relief valve into the opening provided and marked for this purpose on the storage unit.

Note: Some models may already be equipped or supplied with a combination temperature and pressure relief valve. Verify that the combination temperature and pressure relief valve complies with local codes. If the combination temperature and pressure relief valve does not comply with local codes, replace it with one that does. Follow the installation instructions above on this page.

Install a discharge line so that water discharged from the combination temperature and pressure relief valve will exit within six (6) inches (15.3 cm) above, or any distance below the structural floor and cannot contact any live electrical part. The discharge line is to be installed to allow for complete drainage of both the temperature and pressure relief valve and the discharge line. The discharge opening must not be subjected to blockage or freezing. **DO NOT** thread, plug or cap the discharge line. It is recommended that a minimum of four (4) inches (10.2 cm) be provided on the side of the storage unit for servicing and maintenance of the combination temperature and pressure relief valve.

Do not place a valve between the combination temperature and pressure relief valve and the tank.

▲ WARNING

Hydrogen gas can be produced in a hot water system served by this storage unit that has not been used for a long period of time (generally two weeks or more). Hydrogen gas is extremely flammable. To reduce the risk of injury under these conditions, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow. There should be no smoking or open flame near the faucet at the time it is open.

This storage unit can deliver scalding water temperatures at any faucet in the system. Be careful whenever using hot water to avoid scalding injury. Certain appliances, such as dishwashers and automatic clothes washers, may require increased water temperature. By setting the thermostat in the water heating system to obtain increased water temperature required by these appliances, you might create the potential for scald injury. To protect against injury, you should install a mixing valve in the water system. This valve will reduce point of discharge temperature by mixing cold and hot water in branch supply lines. Such valves are available from your local plumbing supplier. Please consult with a plumbing professional.

▲ CAUTION

INCREASING THE THERMOSTAT SETTING ABOVE THE PRESET TEMPERATURE MAY CAUSE SEVERE BURNS AND CONSUME EXCESSIVE ENERGY. HOTTER WATER INCREASES THE RISK OF SCALD INJURY.

Electrical Connections

Before any electrical connections are made, be sure that the storage unit is full of water and that the manual shut-off valve in the cold water supply line is open. Check the wiring diagram before proceeding. All wiring shall be done in accordance with all applicable local and state codes.

The thermostat incorporates a manual adjustable temperature indicator to change the potable water temperature. Please refer to the adjusting thermostat temperature section for proper instruction for adjusting water temperature. Turn off all power related to the boiler and heating system before proceeding with the electrical connections. It is recommended that a disconnect switch be installed between the boiler or water heater and the storage unit. This will enable safe operation and access for service, thermostat adjustment or over temperature reset.

The thermostat switch is a single pole, double throw device. The field connections shall be used as a control for one leg of the electrical circuit. The thermostat switch can be used in the range of 24 to 480 volts with a maximum current load of 15 amps. Any and all wiring shall be sized and installed to satisfy the voltage and amperage used. All wiring shall be done in accordance with all applicable local and state codes. If you should have any questions, please contact the Service Department of the manufacturer listed on the rating plate.

Electrical Connections For General Installations:

If a circulating pump is used to control the heating fluid flow from the storage unit to the boiler, a zone relay is required between the storage unit thermostat and the boiler. Connect one of the black wires on storage unit to one leg of the circulating pump. The second leg of the circulating pump is to be connected to "L2" (120V neutral). Connect the same black wire on the storage unit to one leg of the zone relay. The second leg of the zone relay is to be connected to "L2" (120V neutral). The contact side of the zone relay is to be connected to the boiler operating control (see figure 1). Connect the other black wire on the storage unit to "L1" (120V hot). These connections enable the storage unit thermostat to control the circulator, the zone relay, and the boiler operating control.

If a zone valve to used to control the heating fluid flow from the storage unit to the boiler, a zone step-down transformer is required between the storage unit thermostat and the zone valve. Connect one of the black wires on the storage unit to one leg of the transformer primary side.

Electrical Connections continued-

The second leg of the primary side is to be connected to "L2" (120V neutral). The secondary side of the transformer is to be connected to the zone valve coil. The contact side of the zone valve is to be connected to the boiler operating control. Connect the other black wire on the storage unit to "L1" (120V hot) (see figure 2). These connections enable the storage unit thermostat to control the zone valve and the boiler operating control.

If a water heater is used to heat the fluid of the storage unit, a circulating pump is required between the storage unit and the water heater. Connect one of the black wires on storage unit to one leg of the circulating pump. The second leg of the circulating pump is to be connected to "L2" (120V neutral). Connect the other black wire on the storage unit to "L1" (120V hot) (see figure 3). These connections enable the storage unit thermostat to control the circulating pump.

Other installations may require slightly different wiring arrangements. Remember, the thermostat on the storage unit only controls one leg of the system.

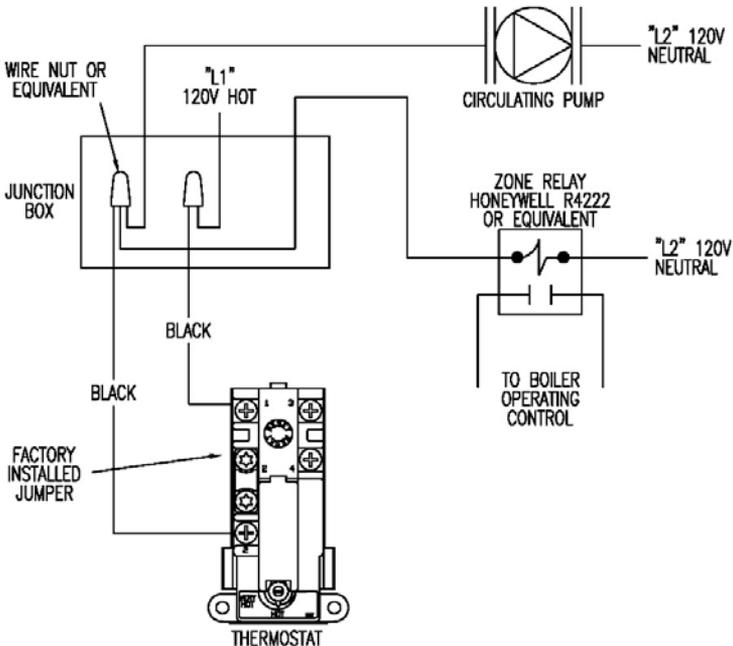


Figure 1

Electrical Connections continued-

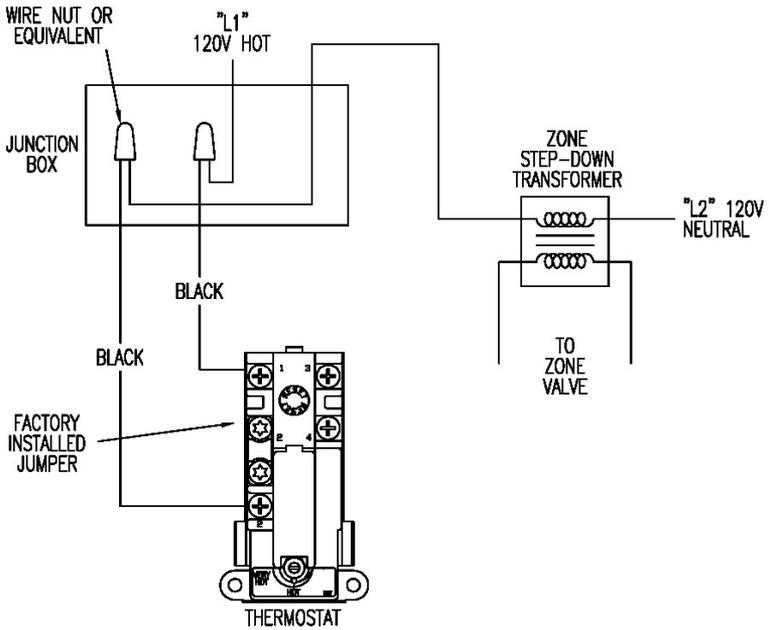


Figure 2

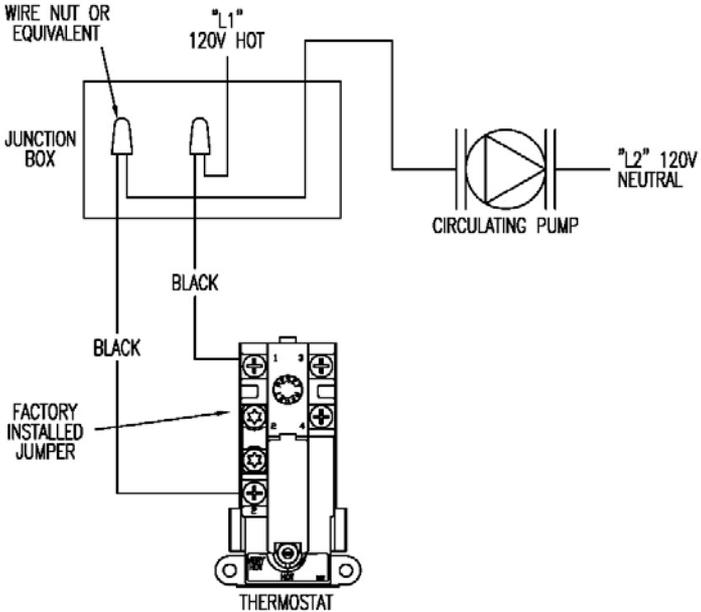


Figure 3

GENERAL OPERATION

CAUTION

Scalding may occur within five (5) seconds at a temperature setting of 140° F (60° C).

TO FILL THE STORAGE UNIT

1. Close the storage unit drain valve by turning the knob clockwise.
2. Open the cold water supply shut-off valve.
3. Open several hot water faucets to allow air to escape from the system.
4. When a steady stream of water flows from the faucets, the storage unit is filled. Close the faucets and check for water leaks at the storage unit drain valve, combination temperature and pressure relief valve and the hot and cold water connections.

TO DRAIN THE STORAGE UNIT

Should it become necessary to completely drain the storage unit, make sure you follow the steps below:

1. Disconnect the power supply to the storage unit. Consult the plumbing professional or electric company in your area for service.
2. Close the cold water supply shut-off valve.
3. Open the drain valve on the storage unit by turning the knob counter-clockwise. The drain valve has threads on the end that will allow connection of a standard hose coupling.

WARNING! THIS WATER MAY BE HOT.

4. Open a hot water faucet to allow air to enter the system.

To refill the storage unit, refer to “TO FILL THE STORAGE UNIT.”

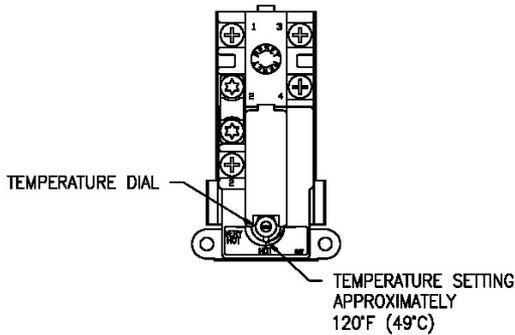
THERMOSTAT ADJUSTMENT

CAUTION

Before adjusting thermostat, turn off power supply to the storage unit.

The temperature of the water can be changed by adjusting the thermostat. Before any work is done on the storage unit, disconnect all power to the storage unit by opening the switch at the main electrical circuit breaker or fuse box. Remove the access panel. Fold the insulation outward away from the control. Adjust the thermostat dial using a screw driver until the minimum acceptable temperature is achieved. The thermostat has been factory preset to approximately 120° F (49° C). **Remember that lower temperature settings are more energy efficient.** Rotate the temperature dial **clockwise**  to increase water temperature. Rotate the thermostat dial **counter-clockwise**  to decrease the temperature setting. Replace the insulation making sure that the control is well covered and that the plastic terminal shield has not been displaced; replace the access panel. The storage unit is now ready for operation and the main switch can be closed.

Thermostat Adjustment continued-

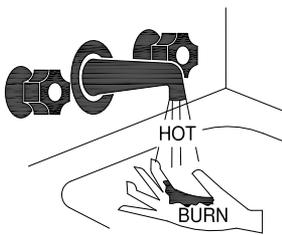


⚠ DANGER

Hotter water increases the risk of scald injury. Scalding may occur within five (5) seconds at a temperature setting of 140° F (60° C). To protect against hot water injury, install an anti-scald tempering valve in the water system. This valve will reduce point of discharge water temperatures by mixing cold and hot water in branch water lines. A licensed plumbing professional or local plumbing authority should be consulted.

Note: This storage unit is equipped with an energy cut out device to prevent overheating. Should overheating occur, turn off the electrical supply to the storage unit and contact a qualified service technician.

⚠ DANGER



Water temperature over 125°F can cause severe burns instantly or death from scalds.

Children, disabled and elderly are at highest risk of being scalded.

Review this instruction manual before setting temperature at water heater.

Feel water before bathing or showering.

Temperature limiting valves are available.

APPROXIMATE TIME/TEMPERATURE RELATIONSHIPS IN SCALDS

120° F (49° C)	More than 5 minutes
125° F (52° C)	1½ to 2 minutes
130° F (54° C)	About 30 seconds
135° F (57° C)	About 10 seconds
140° F (60° C)	Less than 5 seconds
145° F (63° C)	Less than 3 seconds
150° F (66° C)	About 1½ seconds
155° F (68° C)	About 1 second

MAINTENANCE

IMPORTANT

The storage unit should be inspected at a minimum of annually by a qualified service technician for damaged components. **DO NOT** operate this storage unit if any part is found damaged.

Shut off the electric power whenever the water supply to the storage unit is off. Shut off the electric power and water supply, drain the heater completely to prevent freezing whenever the building is left unoccupied during the cold weather months.

The following maintenance should be performed by a qualified service technician at the minimum periodic intervals suggested below. In some installations, the maintenance interval may be more frequent depending on the amount of use and the operating conditions of the storage unit. Regular inspection and maintenance of the storage unit will help to insure safe and reliable operation.

1. Annually, check the operation of the thermostat.
2. At least once a year, check the combination temperature and pressure relief valve to insure that the valve has not become encrusted with lime. Lift the lever at the top of the temperature-pressure relief valve several times until the valve seats properly without leaking and operates freely.

WARNING

When lifting lever of temperature-pressure relief valve, hot water will be released under pressure. Be certain that any released water does not result in bodily injury or property damage.

3. If the combination temperature and pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. Do not plug the combination temperature and pressure relief valve outlet for any reason.
4. Monthly, drain off a gallon of water from the storage unit to remove silt and sediment.

 **WARNING! THIS WATER MAY BE HOT.**

Maintenance continued-

5. A combination sacrificial anode rod/hot water outlet nipple has been installed to extend tank life. The anode rod should be inspected periodically (every 2 years) and replaced when necessary to prolong tank life. Water conditions in your area will influence the time interval for inspection and replacement of the anode rod. Contact the plumbing professional who installed the storage unit or the manufacturer listed on the rating plate for anode replacement information. The use of a water softener may increase the speed of anode consumption. More frequent inspection of the anode is needed when using softened (or phosphate treated) water.

▲ CAUTION

FOR YOUR SAFETY, **DO NOT** ATTEMPT TO REPAIR THERMOSTAT, OR ELECTRICAL WIRING. REFER SUCH REPAIRS TO A QUALIFIED SERVICE TECHNICIAN.

Contact your local plumbing supplier or plumbing professional for replacement parts or contact the company at the address displayed on the rating plate of the storage unit.

For faster and better service, please provide the part name, model, and serial number(s) of the storage unit(s) when ordering parts.

READ THE WARRANTY FOR A FULL EXPLANATION OF THE LENGTH OF TIME THAT PARTS AND THE STORAGE UNIT ARE WARRANTED.

Manufactured under one or more of the following U.S. Patents: RE.34,534; B1 5,341,770; 4,416,222; 4,628,184; 4,669,448; 4,672,919; 4,808,356; 4,829,983; 4,861,968; 4,904,428; 5,000,893; 5,023,031; 5,052,346; 5,081,696; 5,092,519; 5,115,767; 5,199,385; 5,277,171; 5,372,185; 5,485,879; 5,574,822; 5,596,952; 5,660,165; 5,682,666; 5,761,379; 5,943,984; 5,954,492; 5,988,117; 6,142,216; 6,395,280; 6,684,821; 7,063,132; 7,007,748

Other U.S. and Foreign patent applications pending. Current Canadian Patents: 1,272,914; 1,280,043; 1,289,832; 2,045,862; 2,092,105; 2,107,012; 2,108,186; 2,112,515

Complete the following information and retain for future reference:

Model No: _____

Serial No: _____

Service Phone

Days: _____ Nights: _____

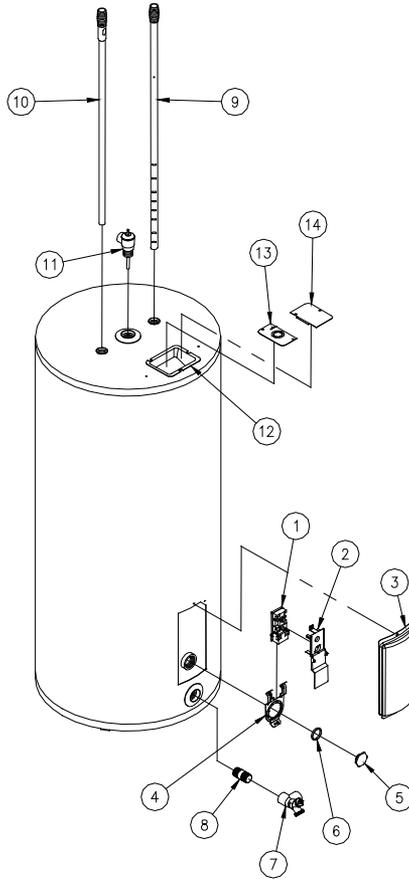
Address: _____

Supplier: _____

Supplier Phone No: _____

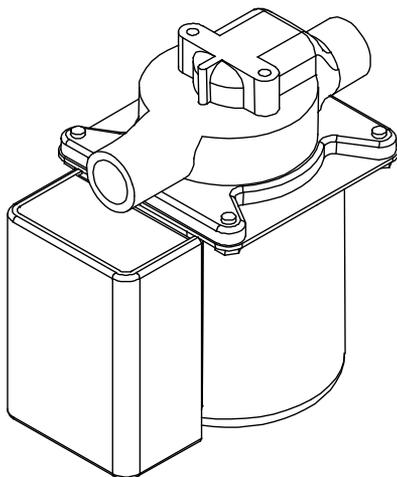
PARTS LIST

STORAGE UNIT

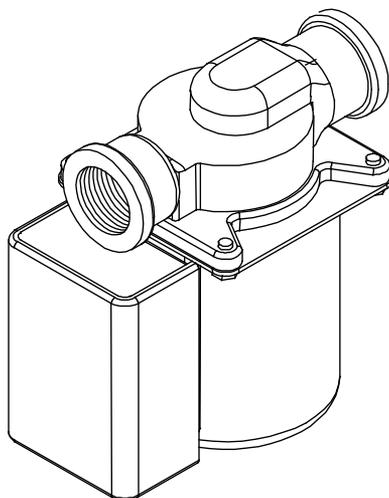


ITEM	DESCRIPTION
1	THERMOSTAT
2	THERMOSTAT COVER
3	THERMOSTAT ACCESS COVER
4	THERMOSTAT MOUNTING BRACKET
5	PLUG
6	PLUG GASKET
7	DRAIN/RETURN VALVE
8	NIPPLE
9	DIPTUBE (COLD INLET)
10	ANODE (HOT OUTLET)
11	TEMPERATURE & PRESSURE VALVE (NOT PROVIDED)
12	ELECTRICAL JUNCTION BOX
13	ELECTRICAL JUNCTION BOX COVER/CONDUIT CONNECTION
14	ELECTRICAL JUNCTION BOX COVER

OPTIONAL SERVICE PARTS
ALL BRONZE CIRCULATORS

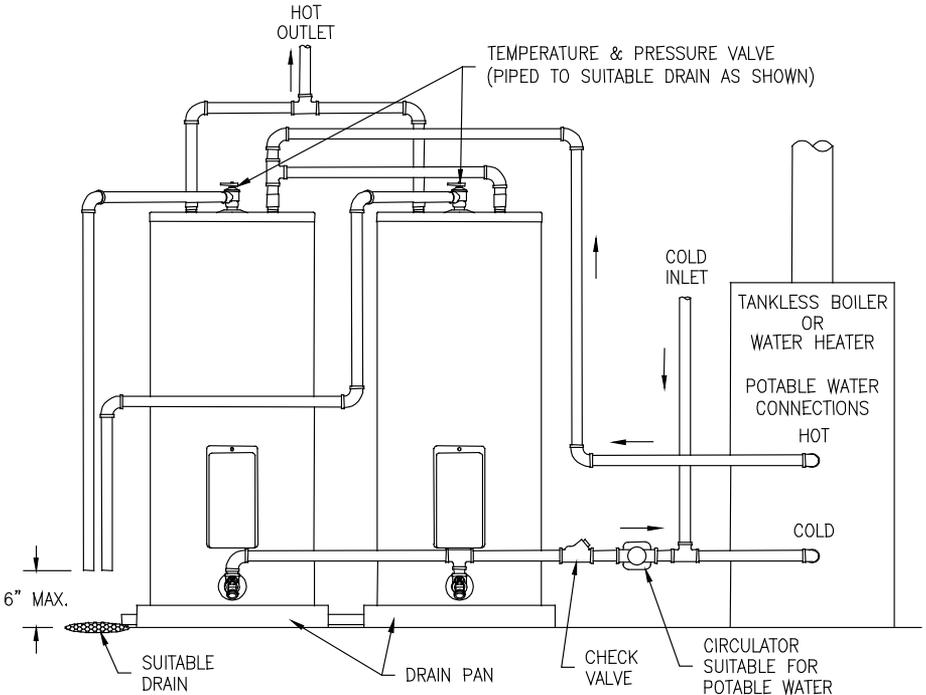
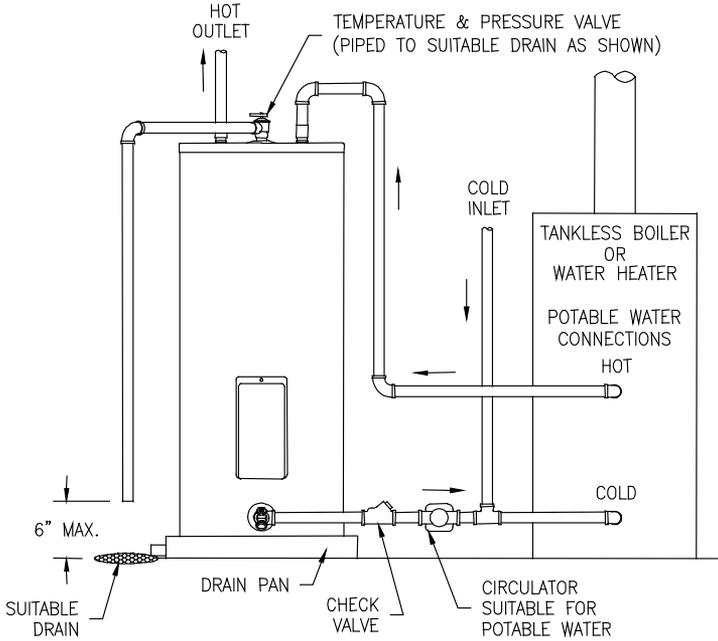


006-BC4
120V, 1/40 HP
1/2" Sweat Fittings

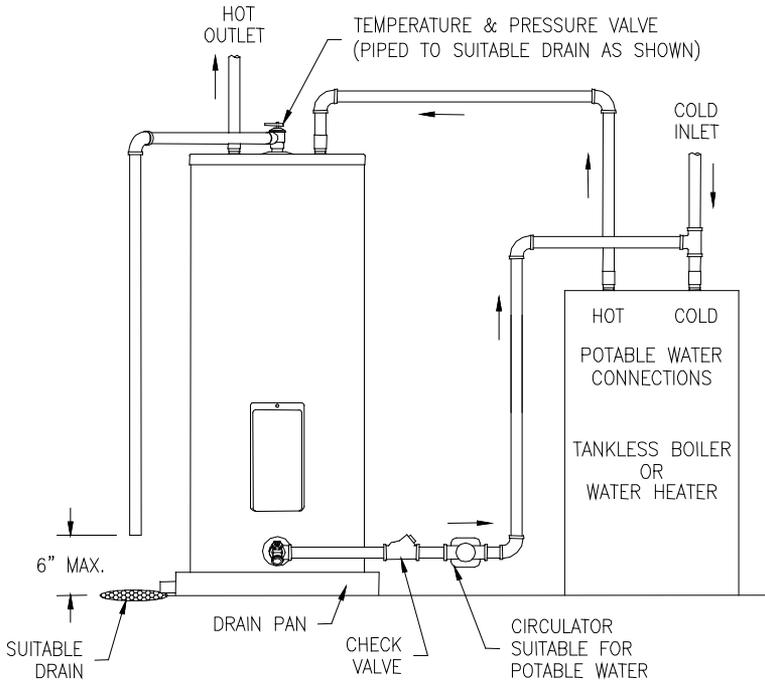


006-HBT4
120V, 1/40 HP
3/4" NPT Fittings

TYPICAL INSTALLATIONS



Typical Installations continued-



NOTES