

# Rooftop Water Heater Model SRT80 120NE

## COMMERCIAL GAS WATER HEATER

### GAS-FIRED POWER BURNER FOR DOMESTIC HOT WATER

- INSTALLATION • OPERATION • SERVICE • MAINTENANCE • LIMITED WARRANTY

Thank you for buying this energy efficient water heater from State Industries. We appreciate your confidence in our products.

**⚠️ WARNING:** If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **WHAT TO DO IF YOU SMELL GAS:**
  - Do not try to light any appliance.
  - Do not touch any electrical switch; do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.



**GAS-FIRED**



**LISTED**

**⚠️ CAUTION**

**TEXT PRINTED OR OUTLINED IN RED CONTAINS INFORMATION RELATIVE TO YOUR SAFETY. PLEASE READ THOROUGHLY BEFORE INSTALLING AND USING THIS APPLIANCE.**

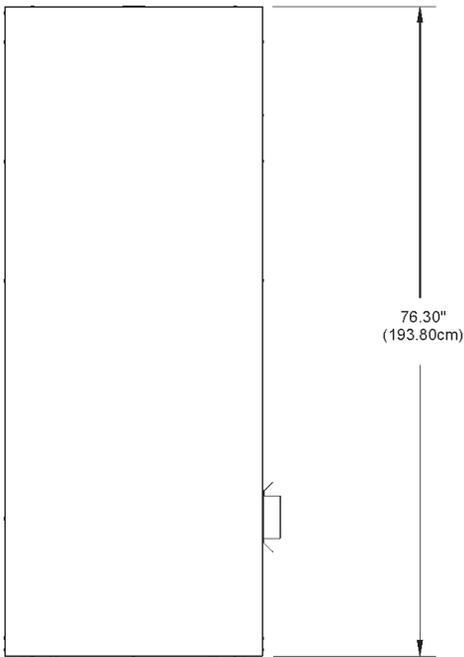


500 Tennessee Waltz Parkway  
Ashland City, TN 37015  
[www.statewaterheaters.com](http://www.statewaterheaters.com)

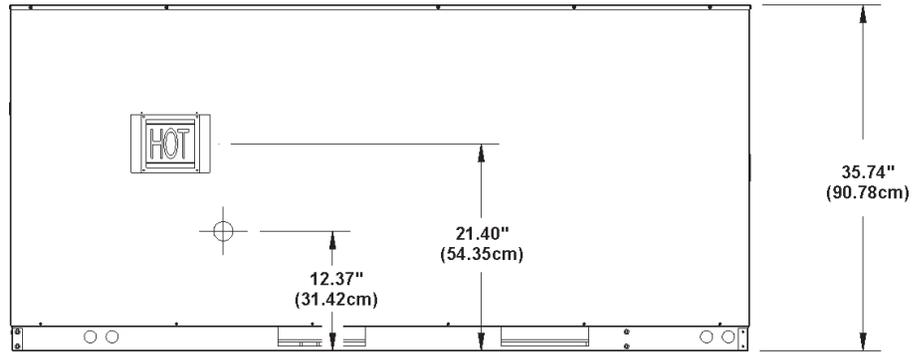
PLACE THESE INSTRUCTIONS ADJACENT TO HEATER AND  
NOTIFY OWNER TO KEEP FOR FUTURE REFERENCE.

# ROOFTOP SRT80-120NE ROUGH-IN-DIMENSIONS

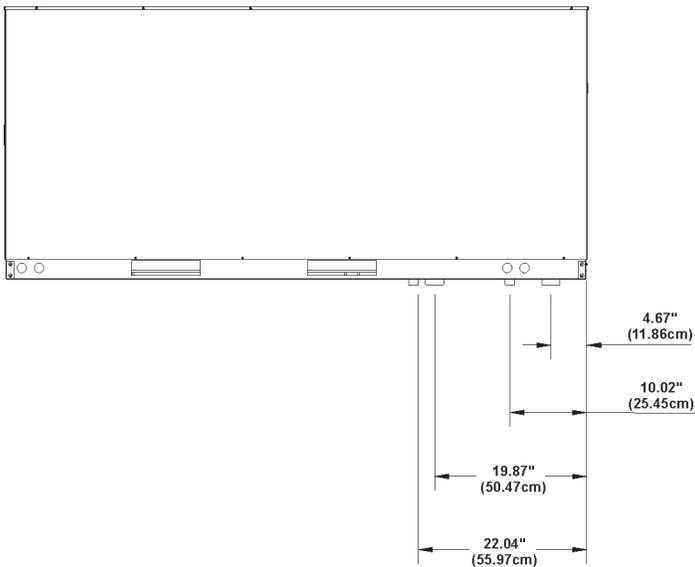
TOP VIEW



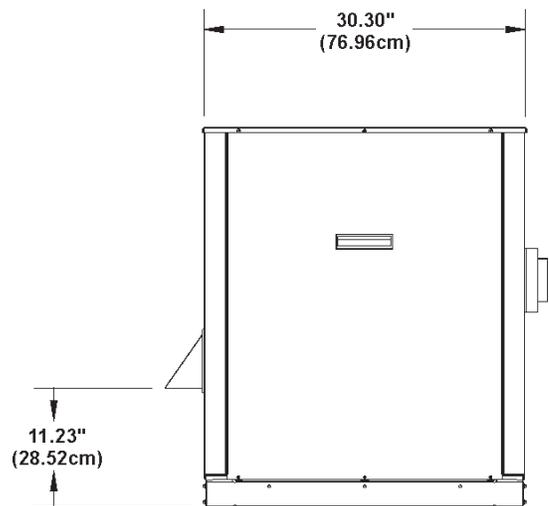
RIGHT SIDE VIEW



LEFT SIDE VIEW



FRONT VIEW



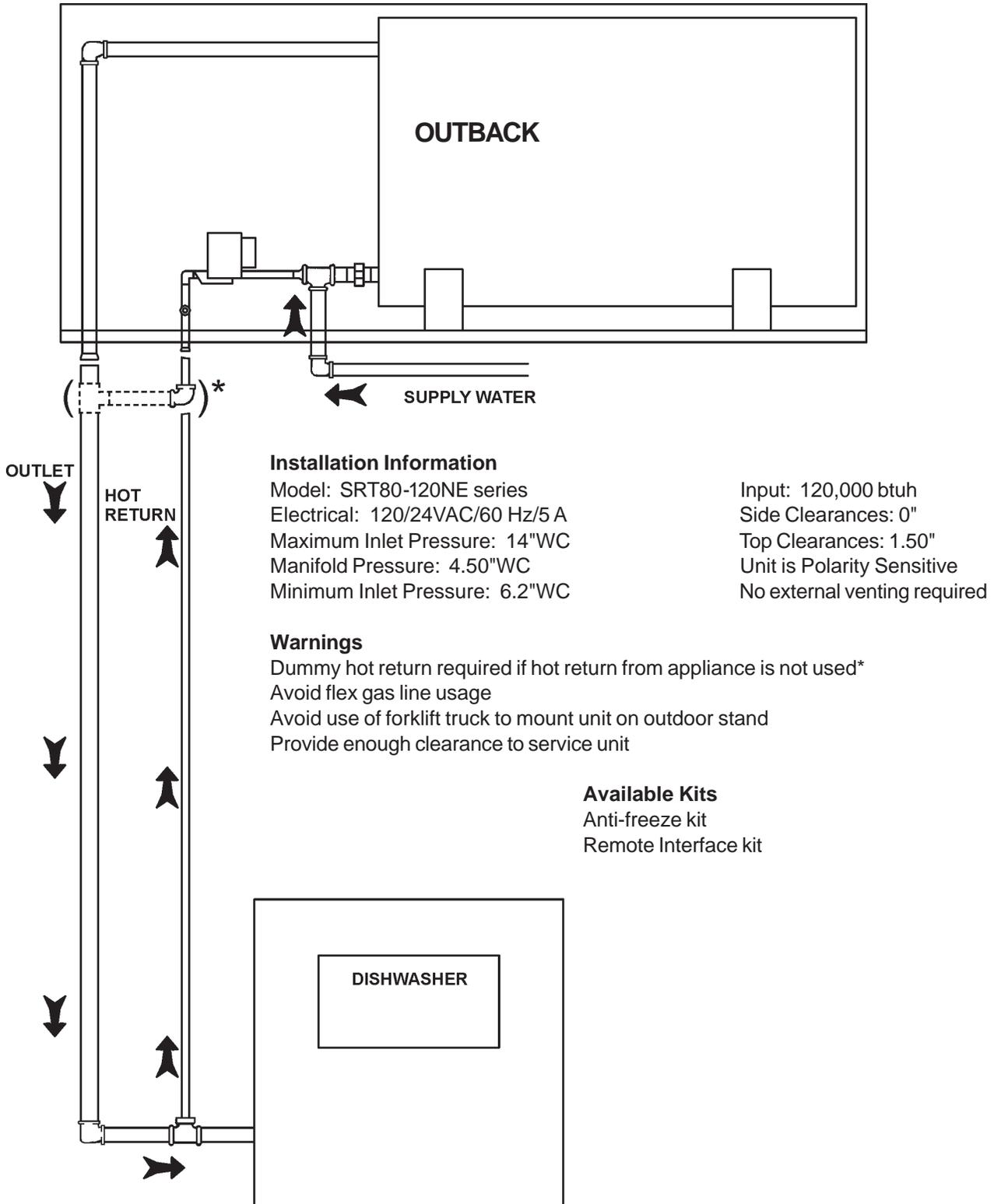
GAS VALVE PIPING	
SRT80-120	1/2" NPT

Table 1. RECOVERY CAPACITIES - NATURAL GAS / L.P.

Model	BTU Input	Approx. Gallon Capacity	TEMPERATURE RISE - DEGREES °F - GALLONS PER HOUR (LPH)											
			30	40	50	60	70	80	90	100	110	120	130	140
SRT80-120	120,000 35.17 kwh	80 303L	388 (1469)	291 (1102)	233 (882)	194 (734)	166 (628)	145 (549)	129 (488)	116 (439)	106 (401)	97 (367)	90 (341)	83 (314)

Recovery capacities are based on heater performance at 80% thermal efficiency.

# INSTALLATION INFORMATION



### Installation Information

Model: SRT80-120NE series  
Electrical: 120/24VAC/60 Hz/5 A  
Maximum Inlet Pressure: 14"WC  
Manifold Pressure: 4.50"WC  
Minimum Inlet Pressure: 6.2"WC

Input: 120,000 btuh  
Side Clearances: 0"  
Top Clearances: 1.50"  
Unit is Polarity Sensitive  
No external venting required

### Warnings

Dummy hot return required if hot return from appliance is not used\*  
Avoid flex gas line usage  
Avoid use of forklift truck to mount unit on outdoor stand  
Provide enough clearance to service unit

### Available Kits

Anti-freeze kit  
Remote Interface kit

## FOREWORD

This design complies with the current edition of ANSI Z21.10.3 as an automatic circulating tank type water heater and automatic storage water heater.

Detailed installation diagrams are found in this manual. These diagrams will serve to provide the installer with a reference for the materials and methods of piping necessary. It is highly essential that all water, gas piping and wiring be installed as shown on the diagrams.

Particular attention should be given to the installation of thermometers at the locations indicated on the diagrams as these are necessary for checking the proper functioning of the heater.

In addition to these instructions, the equipment shall be installed in accordance with all local codes. The authority having jurisdiction should be consulted before installing.

In the absence of local codes, the installation must comply with the current editions of the National Fuel Gas Code, ANSI Z223.1/NFPA 54 and the National Electric Code, NFPA 70. The former is available from the Canadian Standards Association, 8501 East Pleasant Valley Road, Cleveland, OH 44131, and both documents are available from the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.

## TABLE OF CONTENTS

	PAGE		PAGE
ROUGH-IN DIMENSIONS .....	2	Chemical Vapor Corrosion .....	14
INSTALLATION INFORMATION .....	3	VENTING .....	15
FOREWORD .....	4	Vent Terminals .....	15
FEATURES .....	5	Pressure Switches .....	15
Water Temperature Control .....	5	Gas Piping .....	15-16
High Limit Switch (E.C.O.) .....	6	Connection of Gas Pipe .....	16
Dishwashing Machine Requirement .....	5	Purging .....	16
Circulating Pump .....	6	Gas Meter Size - City Gases Only .....	16
PLUMBING MANIFOLD ASSEMBLY .....	6	Gas Pressure Regulation .....	16
Flow Diagram .....	5	Gas Valves .....	17
Automatic Air Bleed Valve .....	5	SYSTEM CONNECTIONS .....	17
Hot Return Recirculation Pump .....	7	Thermometers .....	17
Drain Valve .....	7	Relief Valve .....	17
AIR SYSTEM ASSEMBLY .....	7	Water Line Connections .....	17
Blower Assembly .....	7	Closed System .....	17
Blower Plenum .....	7	Water (Potable) Heating and Space Heating .....	17
Air Hose .....	8	Water Heater Wiring .....	17-18
Flue Adapter .....	8	OPERATION .....	19-20
Exhaust Vent .....	8	Sequence of Operation .....	21
CONTROL SYSTEM .....	8	Error Codes .....	21
Blocked Outlet Switch .....	8	Fault Conditions .....	21-22
Blocked Inlet/Prover Switch .....	8	PRIOR TO START-UP .....	22
Low Gas Pressure Switch .....	9	Required Ability .....	22
On/Off Switch .....	9	OPERATING INSTRUCTIONS .....	23
Hot Surface Igniter .....	9	Adjustment Procedure (Initial Start-Up) .....	23-24
OIM - Outdoor Interface Module .....	9	Cathodic Protection .....	24
WR Ignition Control Board .....	9	Precautions .....	24
Low Water Cutoff Board and Probe .....	10	Lighting & Operating Label .....	25
Thermostat/E.C.O. Probes .....	10	GENERAL INFORMATION .....	26
Transformer .....	10	Power Burner .....	26
Junction Box .....	10	High Limit .....	26
TANK ASSEMBLY SYSTEM .....	10	High Altitude Installations .....	26
Tank Insulation .....	10	MAINTENANCE .....	26
CABINET ASSEMBLY .....	11	General .....	26
Cabinet Panels .....	11	Maintenance Schedule .....	26
ADDITIONAL CONTROLS .....	11	Flushing .....	26
Gas Valve .....	11	Draining .....	26
Flame Sensor .....	11	Sediment Removal .....	26
INSTALLATION INSTRUCTIONS .....	11	Lime Scale Removal .....	26-27
Required Ability .....	11	Anode Inspection and Replacement .....	27
Insulation Blankets .....	11	Drain Valve and Access Panels .....	27
Locating The Heater .....	11-12	Relief Valve .....	27
Provide Unit Support .....	12	Circulating Pump .....	27
Roof Curb .....	12-13	Vent System .....	27
Rig and Place Unit .....	13	INSTALLATION DIAGRAMS .....	28-32
Outdoor Stand .....	14	CHECKLIST AND SERVICE INFORMATION .....	33
Clearances .....	14	TROUBLE-SHOOTING .....	33-34
Hard Water .....	14	REPLACEMENT PARTS .....	34
Air Requirements .....	14	LIMITED WARRANTY .....	35

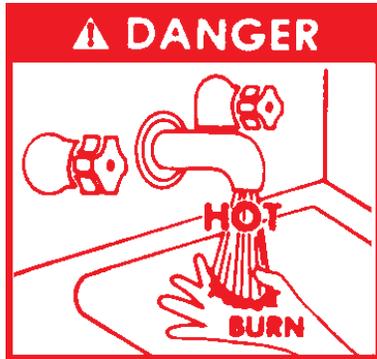
## FEATURES

### IMPORTANT

IT IS REQUIRED THAT A QUALIFIED SERVICE TECHNICIAN PERFORM THE INITIAL FIRING OF THE HEATER.

A CHECKLIST AND SERVICE INFORMATION section are included at the rear of this manual. By using this checklist the user may be able to make minor operational adjustments and save himself unnecessary service calls. However, the user should not attempt repairs which are not listed in this section.

### WATER TEMPERATURE CONTROL



THIS WATER HEATER IS EQUIPPED WITH AN ADJUSTABLE THERMOSTAT TO CONTROL WATER TEMPERATURE. HOT WATER TEMPERATURES REQUIRED FOR AUTOMATIC DISHWASHER AND LAUNDRY USE CAN CAUSE SCALD BURNS RESULTING IN SERIOUS PERSONAL INJURY AND/OR DEATH. THE TEMPERATURE AT WHICH INJURY OCCURS VARIES WITH THE PERSON'S AGE AND TIME OF EXPOSURE. THE SLOWER RESPONSE TIME OF CHILDREN, THE ELDERLY OR DISABLED PERSONS INCREASES THE HAZARDS TO THEM. NEVER ALLOW SMALL CHILDREN TO USE A HOT WATER TAP, OR TO DRAW THEIR OWN BATH WATER. NEVER LEAVE A CHILD OR DISABLED PERSON UNATTENDED IN A BATHTUB OR SHOWER.

THE WATER HEATER SHOULD BE LOCATED IN AN AREA WHERE THE GENERAL PUBLIC DOES NOT HAVE ACCESS TO SET TEMPERATURES.

The water temperature is controlled using the Touch Pad Buttons on the Display at the front of the unit (See Figure 1). This control utilizes two temperature probes to determine the tank temperature. The upper temperature probe is located on top of the unit in the back and the lower probe is located on the front center axis of the tank.

The temperature may be adjusted from 70°F/21°C to 180°F/82°C. The thermostat was adjusted to 70°F/21°C before the heater was shipped from the factory. It is recommended that lower water temperatures be used to avoid the risk of scalding. It is further recommended, in all cases, that the water temperature be set for the lowest temperature which satisfies your hot water needs. This will also provide the most energy efficient operation of the water heater and minimize scale formation.

SETTING THE WATER HEATER TEMPERATURE AT 120°F/49°C WILL REDUCE THE RISK OF SCALDS. Some states require settings at specific lower temperatures.

Figure 1 shows the approximate time-to-burn relationship for normal adult skin. Short repeated heating cycles caused by small hot water uses can cause temperatures at the point of use to exceed the thermostat setting by up to 20°F/-11°C. If you experience this type of use, you should consider using lower temperature settings to reduce scald hazards.

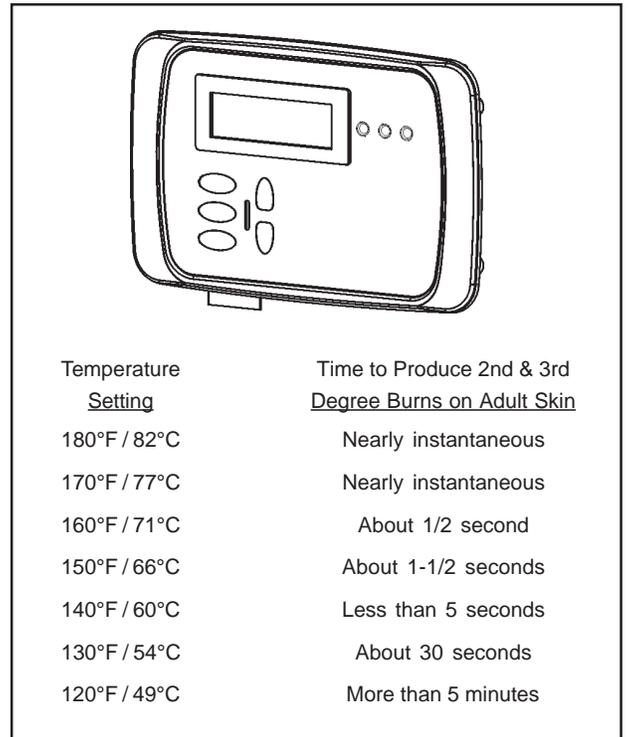


FIGURE 1

Valves for reducing point-of-use temperature by mixing cold and hot water are available (see Figure 2). Also available are inexpensive devices that attach to faucets to limit hot water temperatures. Contact a licensed plumber or the local plumbing authority.

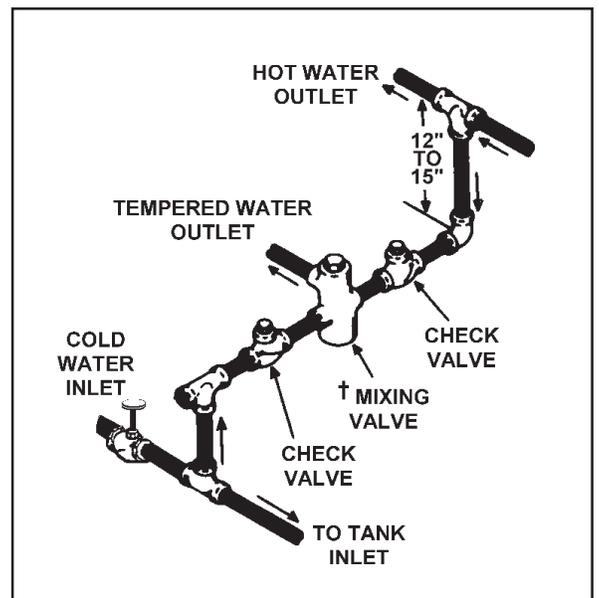


FIGURE 2

## HIGH LIMIT SWITCH (E.C.O.)

The top immersion well of the upper probe also contains the high limit (energy cutoff) sensor. The high limit switch interrupts the main burner gas flow should the water temperature reach approximately 199°F/93°C.

Should the high limit switch activate, it must be reset by cycling power to the unit. The water temperature must drop below 180°F/82°C before the controller can be reset.

Continued manual resetting of the high limit control, preceded by higher than usual water temperature is evidence of high limit switch operation. For example, a malfunction of the control system allowing the gas valve to stay open could cause water temperature to rise until the high limit switch opens. Contact your dealer or servicer if continued high limit switch operation occurs.

## DISHWASHING MACHINE REQUIREMENT

All dishwashing machines meeting the National Sanitation Foundation requirements are designed to operate with water flow pressures between 15 and 25 pounds per square inch (103 kPa and 173 kPa). Flow pressures above 25 pounds per square inch (173 kPa), or below 15 pounds per square inch (103 kPa), will result in improperly sanitized dishes. Where pressures are high, a water pressure reducing or flow regulating control valve should be used in the 180°F (82°C) line to the dishwashing machine, and should be adjusted to deliver water between these limits.

The National Sanitation Foundation also recommends circulation of 180°F (82°C) water. Where this is done, the circulation should be very gentle so that it does not cause any unnecessary turbulence inside the water heater. The circulation should be just enough to provide 180°F (82°C) water at the point of take-off to the dishwashing machine. Adjust flow by means of the plug cock in the circulating line. (See INSTALLATION DIAGRAMS section.)

## CIRCULATING PUMP

A circulating pump is used when a system requires a circulating loop or there is a storage tank used in conjunction with the heater. Refer to the piping diagrams at rear of manual for electrical hookup information and install in accordance with the current version of the National Electric Code NFPA No. 70.

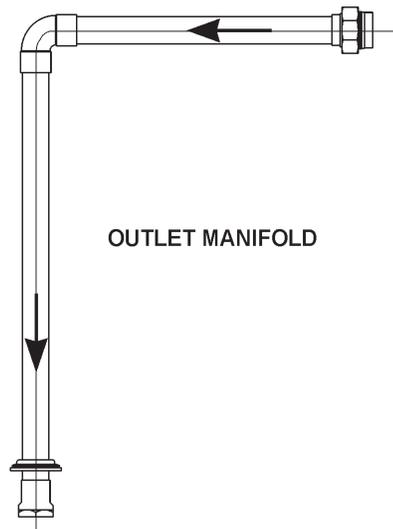
All bronze circulators are recommended for use with commercial water heaters.

Although circulators are oiled and operated by the manufacturer some circulators must be oiled again before being operated. Please refer to manufacturer's instructions.

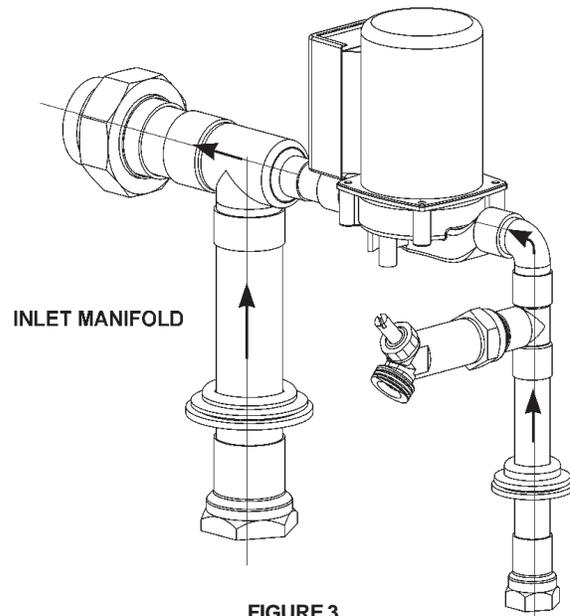
## PLUMBING MANIFOLD ASSEMBLY

### FLOW DIAGRAM

The plumbing manifold assembly is composed of several components with each having a unique function. Please see Figures 3, 5, and 6 to observe the water flow to the plumbing manifold assembly and the components that make it up.



OUTLET MANIFOLD



INLET MANIFOLD

FIGURE 3

## AUTOMATIC AIR BLEED VALVE

The tank assembly utilizes an automatic air bleed valve. The purpose for this automatic air bleed valve is to allow air to escape the tank when the unit is filled with water. When the unit is drained, the opposite occurs with the valve allowing air to replace the drained water. It removes the pressure vacuum that occurs in the system causing incomplete drainage. This valve is automatic which allows it to sense when the tank assembly is filled with water, see Figure 4.

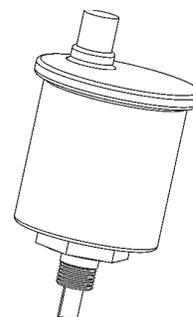


FIGURE 4

## HOT RETURN RECIRCULATION PUMP

The hot return recirculation pump circulates the hot water through the hot water line to eliminate delays at plumbing fixtures, see Figure 5.

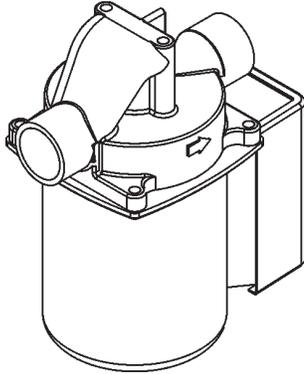


FIGURE 5

## DRAIN VALVE

The drain valve is used to drain the water from the tank assembly and plumbing manifold assembly, see Figure 6.

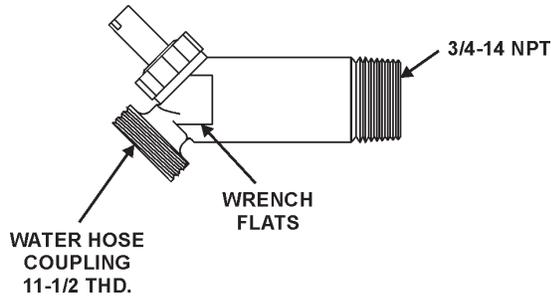


FIGURE 6

## AIR SYSTEM ASSEMBLY

The air system assembly is comprised of the blower assembly, blower plenum, air hose, and inlet vent terminal. This is where combustion air is acquired for combustion, see Figure 7.

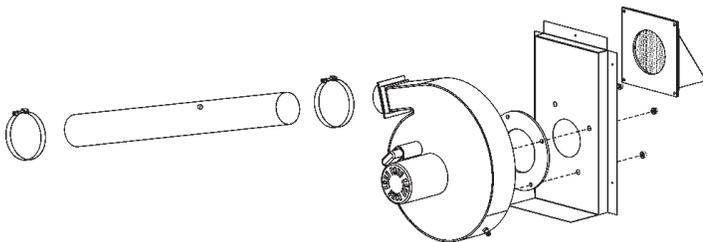


FIGURE 7

## BLOWER ASSEMBLY

The blower assembly functions by pulling in air from outside the unit to supply to the burner assembly for proper combustion. The blower pushes the air through the burner assembly and heat exchanger where the flue gases then exit the exhaust system assembly, see Figure 8.

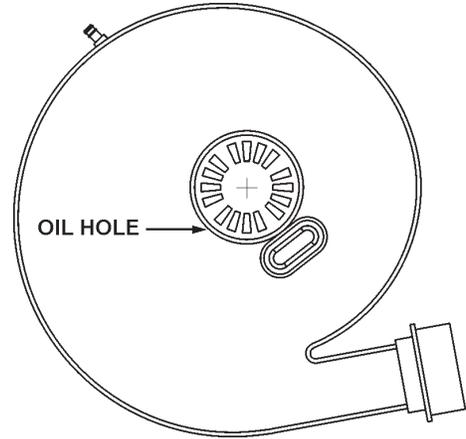


FIGURE 8

## BLOWER PLENUM

The blower plenum is used to draw air into the blower inlet. The inlet of the air system must maintain enough height from the ground to take into account yearly snow levels to prevent possible inlet vent blockage. The air plenum allows the blower to pull air into the unit from a higher inlet location to provide protection required, see Figure 9.

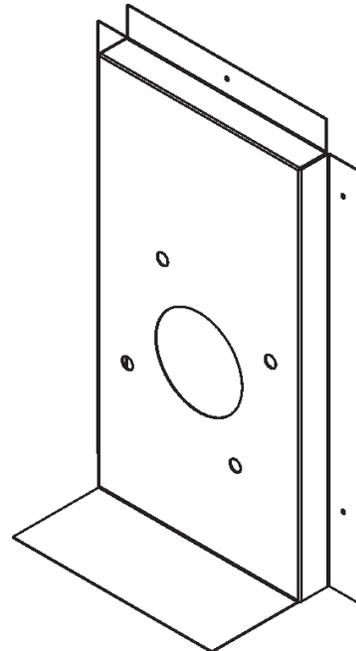


FIGURE 9

## AIR HOSE

The air hose is used to provide a flexible air path from the blower to the burner assembly. It is held in place with two standard hose clamps, see Figure 10.

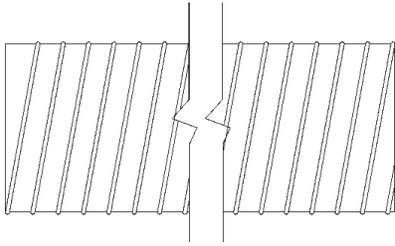


FIGURE 10

## FLUE ADAPTER

The flue adapter is made of a flat metal plate with an exhaust adapter to mate with the exhaust elbow. This is where the flue gases exit the heat exchanger. This is a very hot region and is covered with a layer of high temperature fiberglass insulation, see Figure 11.

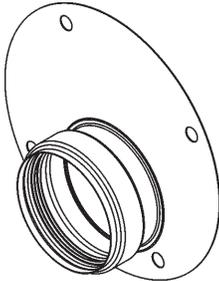


FIGURE 11

## EXHAUST VENT

The exhaust vent elbow mates with the flue adapter. The elbow mates with the exhaust terminal to dispose the flue gases to the outdoors. This venting section is covered with a fiberglass insulated wrap to protect from heat and condensation. These pipes are sealed with a high temperature gasket integral to the vent pipe fittings, see Figure 12.

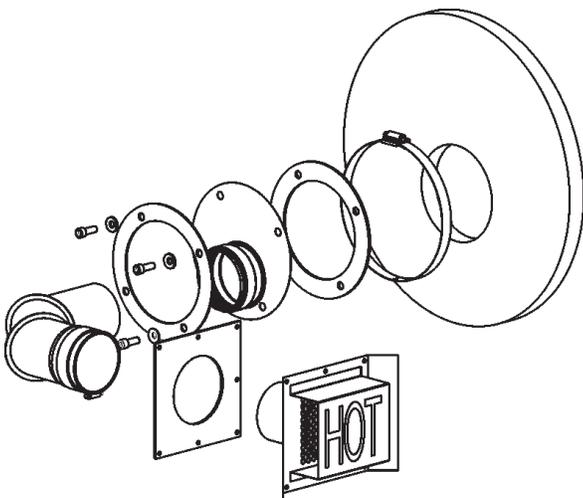


FIGURE 12

## CONTROL SYSTEM

The control system is comprised of an Outdoor Interface Module that monitors the functions of the WR ignition system, pressure switches, low water cutoff and temperatures in the tank.

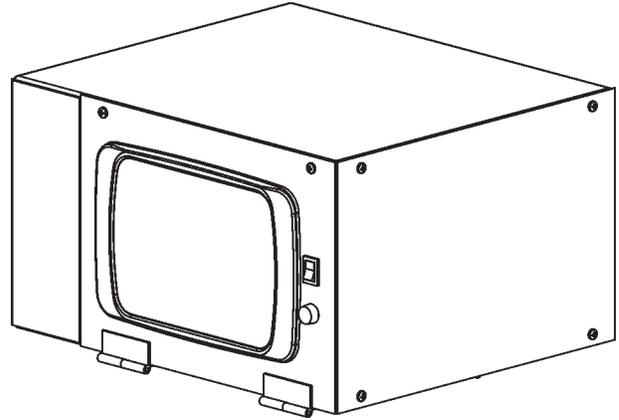


FIGURE 13

## BLOCKED OUTLET SWITCH

The Blocked Outlet Switch is set up to shut the unit off when a pressure buildup in the exhaust vent pipe occurs. This switch is a positive pressure switch that requires an increase in pressure to change the electrical contacts from normally closed to open. When this switch prevents the unit from igniting, most likely the exhaust is blocked. Check for obstructions in the exhaust venting and exhaust vent terminal, see Figure 14.

## BLOCKED INLET/PROVER SWITCH

The Blocked Inlet/Prover Switch is set up to shut the unit off when a reduction in pressure in the intake vent occurs. This switch is a negative pressure switch that requires an increase in negative pressure to change the electrical contacts from normally open to closed. The switch is connected to the pressure tap connected to the housing of the blower. When this switch prevents the unit from ignition, most likely the intake is blocked. Check for obstructions in the inlet vent terminal, see Figure 14.

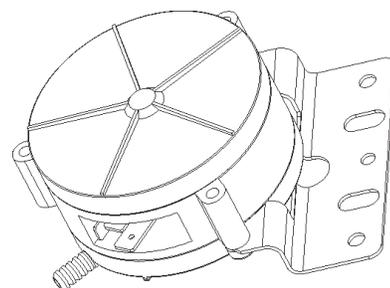


FIGURE 14

The blocked Inlet/Prover Switch has a second function. It is provided on the heater to verify that the fan is operating. When the fan increases in negative pressure, the electrical contacts close signaling that the blower is operational and is at peak performance. The controller requires that the electrical contacts on the switch close before it will allow the blower to come on.

## LOW GAS PRESSURE SWITCH

The Low Gas Pressure Switch is a single pole, normally open pressure switch that will close its contacts when a rising pressure of 6.2 inches (1.53 kPa) w.c. is encountered. The contacts will open when the pressure falls below the fixed set point of 6.2 inches of w.c. The Low Gas Pressure Switch monitors the gas supply pressure to the heater. If the gas supply falls below the 6.2 inches of w.c., the main burner is extinguished (if heater is running) or the heater will not start up, see Figure 15.

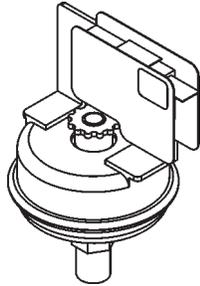


FIGURE 15

## ON/OFF SWITCH

The ON/OFF Switch is a single pole, single throw rocker switch. This switch provides 120V from the electrical source to the heater, see Figure 16.



FIGURE 16

## HOT SURFACE IGNITER

The Hot Surface Igniter is a device that ignites the main burner by high temperature (1800°F). When the 120 VAC is applied to the igniter, sufficient heat is generated to ignite the main burner. Although improvements have been made to strengthen the igniter, it is still fragile and care must be taken when handling the igniter to prevent breakage, see Figure 17.

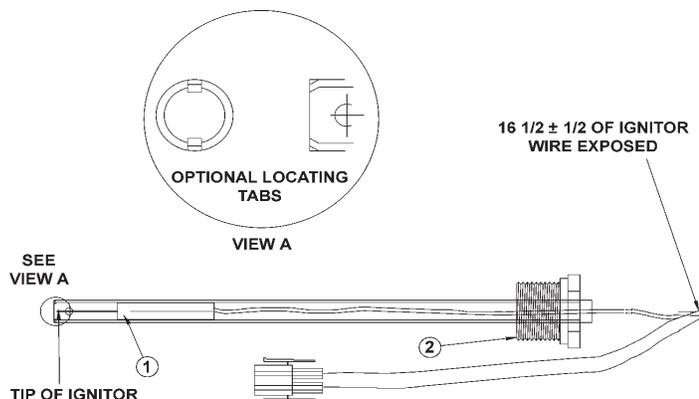


FIGURE 17

## OIM - OUTDOOR INTERFACE MODULE

The OIM is a device that monitors the control system. It monitors the ignition control assembly, the tank and outlet temperatures, the low water cutoff device, and the pressure switches. The display board provides operating information. It records and logs error messages for diagnostics. The module is equipped with a touch pad for easy access to observe menus and current status of control, see Figure 18.

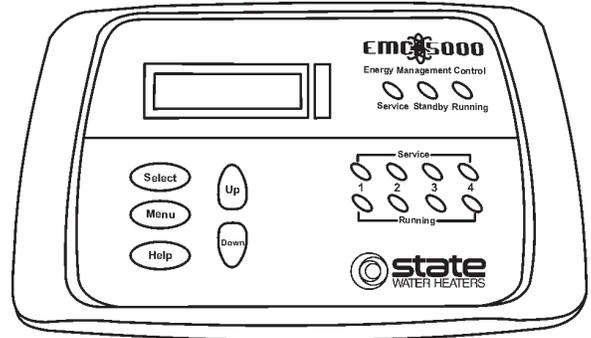


FIGURE 18

## WR IGNITION CONTROL BOARD

The WR Ignition Control Board performs the ignition sequence for the water heater. It controls the diagnostics of the system and monitors all the pressure switches, the flame sensing device, the thermostats, the E.C.O., and components that make up the control system. The difference between the WR Ignition Control Board is that the OIM board monitors all the controls and provides that information through the LCD display where the WR Ignition Control Board provides the means to control the complete sequence of operation and switches, see Figure 19.

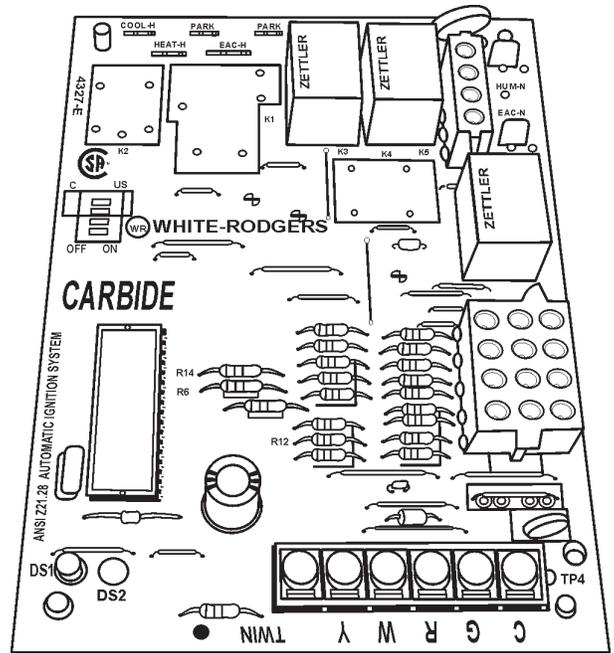


FIGURE 19

## LOW WATER CUTOFF BOARD AND PROBE

The Low Water Cutoff Board and Probe monitors the water level to confirm the tank is completely full. This function is very important when the unit is first filled with water and when complete loss of power is encountered during freezing temperatures (in case the unit drains while using the anti-freeze kit), see Figure 20.

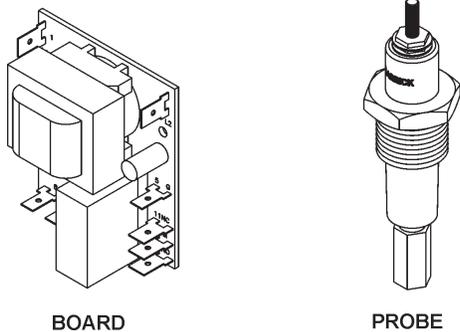


FIGURE 20

## THERMOSTAT/E.C.O. PROBES

The Outback utilizes a two probe system. The upper probe located on top of the unit toward the back of the cabinet consists of a thermostat and E.C.O. The thermostat monitors the top temperature in the tank. The E.C.O. high limit switch interrupts the main burner gas flow should the water temperature reach approximately 205°F. The lower probe measures the water temperature in the lower half of the tank assembly.

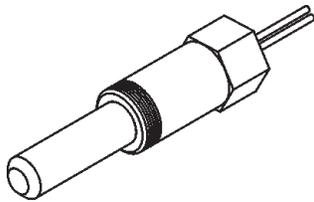


FIGURE 21

## TRANSFORMER

The control system utilizes a 120/24 VAC step down transformer. Most of the control system utilizes 24 VAC for operation. See wiring diagram for those components utilizing 24 VAC and 120 VAC, see Figure 22.

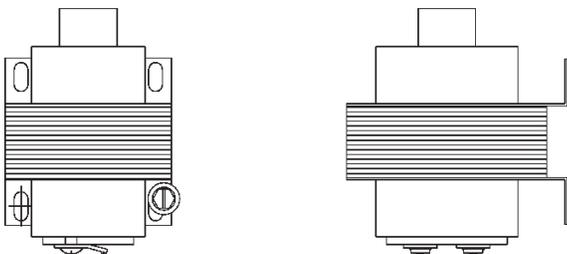


FIGURE 22

## JUNCTION BOX

The junction box is where the 120 VAC is supplied to the unit and tied into the rest of the controls. The junction box provides a

grounding screw to tie into the metal panel to assure the unit is grounded, see Figure 23.

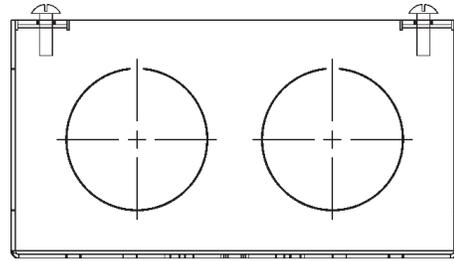


FIGURE 23

## TANK ASSEMBLY SYSTEM

The Tank Assembly is an 80 gallon unit with a U-shaped heat exchanger. It incorporates two inlet tubes to control flow inside the tank. The heat exchanger is equipped with a stainless steel baffle which is non-removable. The working pressure is 150 psi, see Figure 24.

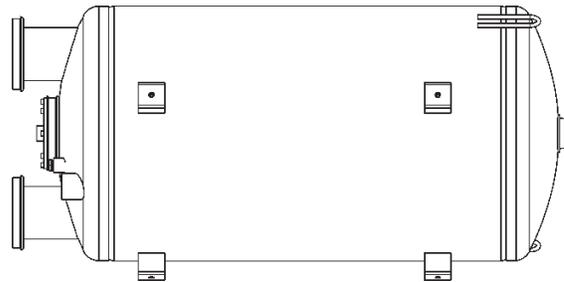


FIGURE 24

## TANK INSULATION

The tank assembly is wrapped in foam insulation sealed inside a round jacket. The ends of the tank consist of high temperature fiberglass insulation and foam dams to prevent foam leakage, see Figure 25.

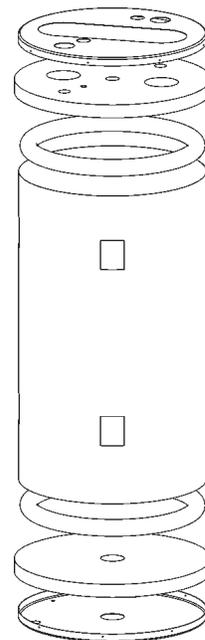


FIGURE 25

## CABINET ASSEMBLY

### CABINET PANELS

There are five panels that comprise the cabinet assembly. The ends of the cabinet allow access to all controls and plumbing. Please confirm all joints are attached correctly and sealed to prevent water leakage inside the cabinet, see Figure 26.

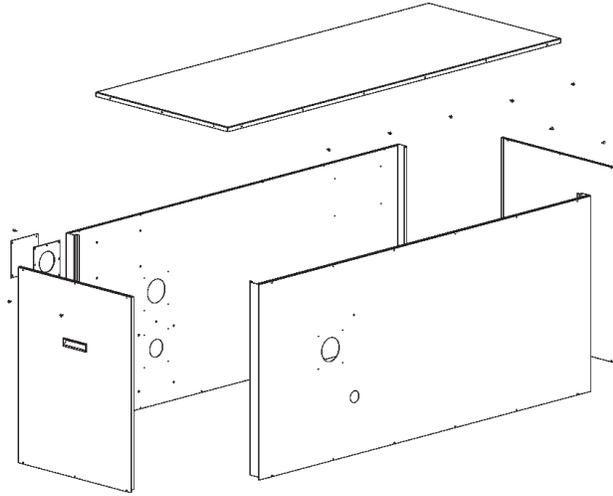


FIGURE 26

## ADDITIONAL CONTROLS

### GAS VALVE

The gas valve is used to supply the gas to the unit during heat up periods. The ignition control board monitors the thermostat's call for heat and sends a signal to the gas valve when to open to allow gas flow, see Figure 27.

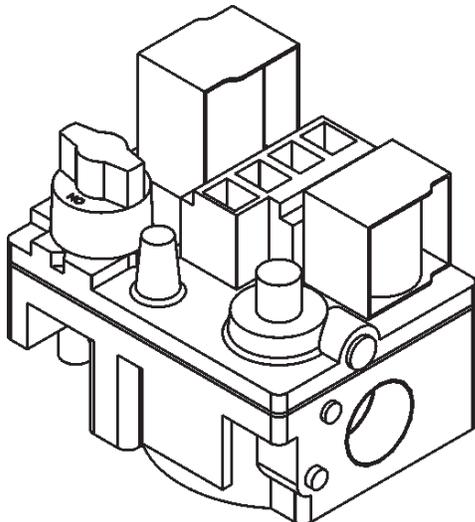


FIGURE 27

## FLAME SENSOR

The flame sensor is used to sense the burner flame. When there is sufficient flame, and the burner is properly grounded, the flame sensor signals back to the ignition board that the burner is operating properly and to maintain the operation of the gas valve until the thermostat is satisfied.

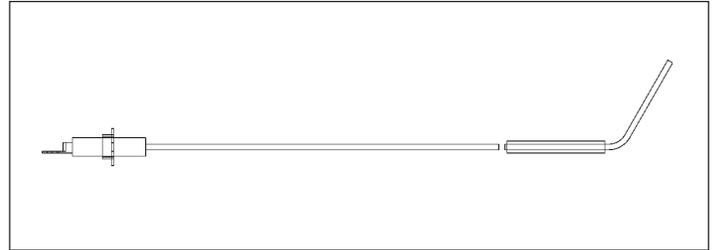


FIGURE 28

## INSTALLATION INSTRUCTIONS

### REQUIRED ABILITY

INSTALLATION OR SERVICE OF THIS WATER HEATER REQUIRES ABILITY EQUIVALENT TO THAT OF A LICENSED TRADESMAN IN THE FIELD INVOLVED. PLUMBING, AIR SUPPLY, VENTING, GAS SUPPLY AND ELECTRICAL WORK ARE REQUIRED.

### INSULATION BLANKETS

Insulation blankets available to the general public for external use on gas water heaters are not approved for use on your State water heater. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank water heaters. Your State water heater meets or exceeds the ASHRAE/IES 90.1b 1999 standards with respect to insulation and standby loss requirements, making an insulation blanket unnecessary.

### LOCATING THE HEATER

#### **WARNING**

THERE IS A RISK IN USING FUEL BURNING APPLIANCES SUCH AS GAS WATER HEATERS IN ROOMS, GARAGES OR OTHER AREAS WHERE GASOLINE, OTHER FLAMMABLE LIQUIDS OR ENGINE DRIVEN EQUIPMENT OR VEHICLES ARE STORED, OPERATED OR REPAIRED. FLAMMABLE VAPORS ARE HEAVY AND TRAVEL ALONG THE FLOOR AND MAY BE IGNITED BY THE HEATER'S IGNITER OR MAIN BURNER FLAMES CAUSING FIRE OR EXPLOSION. SOME LOCAL CODES PERMIT OPERATION OF GAS APPLIANCES IF INSTALLED 18 INCHES (46 cm) OR MORE ABOVE THE FLOOR. THIS MAY REDUCE THE RISK IF LOCATION IN SUCH AN AREA CANNOT BE AVOIDED.

THE HEATER SHALL BE LOCATED OR PROTECTED SO IT IS NOT SUBJECT TO PHYSICAL DAMAGE BY A MOVING VEHICLE.

DO NOT LOCATE THE HEATER WHERE NOISE FROM THE EXHAUST OR INTAKE WILL BE OBJECTIONABLE. THIS INCLUDES LOCATIONS CLOSE TO OR ACROSS FROM WINDOWS AND DOORS.

## CURB DIMENSIONS:

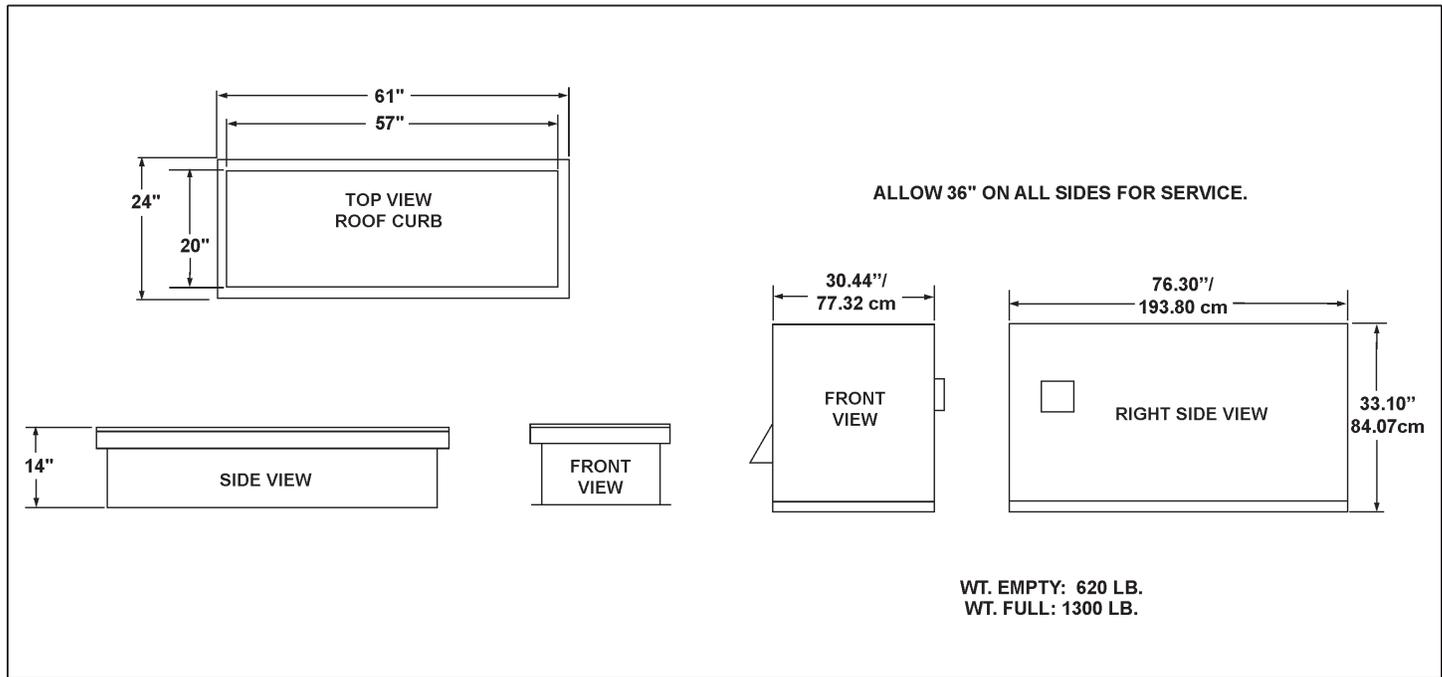


FIGURE 29

### WARNING

**FLAMMABLE ITEMS, PRESSURIZED CONTAINERS OR ANY OTHER POTENTIAL FIRE HAZARDOUS ARTICLES MUST NEVER BE PLACED ON OR ADJACENT TO THE HEATER. OPEN CONTAINERS OF FLAMMABLE MATERIAL SHOULD NOT BE STORED OR USED IN THE SAME ROOM WITH THE HEATER.**

Water heater life depends upon water quality, water pressure and the environment in which the water heater is installed. Water heaters are sometimes installed in locations where leakage may result in property damage, even with the use of a drain pan piped to a drain. However, unanticipated damage can be reduced or prevented by a leak detector or water shutoff device used in conjunction with a piped drain pan. These devices are available from some plumbing supply wholesalers and retailers, and detect and react to leakage in various ways:

- Sensors mounted in the drain pan that trigger an alarm or turn off the incoming water to the water heater when leakage is detected.
- Sensors mounted in the drain pan that turn off the water supply to the entire home when water is detected in the drain pan.
- Water supply shutoff devices that activate based on the water pressure differential between the cold water and hot water pipes connected to the water heater.
- Devices that will turn off the gas supply to a gas water heater while at the same time shutting off its water supply.

### PROVIDE UNIT SUPPORT

Before locating the unit on the roof, make sure the strength of the roof and beams are adequate at that point to support the weight of

the unit full of water. (Full weight of approximately 1300 lbs. Add extra load and safety factors.) This is very important and the user's responsibility, see Figure 29. If you are uncertain as to the load bearing capability of the roof, consult a licensed structural engineering expert.

The unit should be placed on a solid level roof curb of adequate strength. A properly designed roof curb is provided through State Order Entry.

**IMPORTANT: THE WATER HEATER SHOULD BE EMPTY OF WATER DURING LIFTING. MAKE SURE ALL FASTENERS ON THE BASE OF THE UNIT ARE IN PLACE DURING LIFTING.**

The location of the unit on the roof should be such that exhaust gas is not located near any air intakes or ventilation ducts.

Provide a minimum of 36" on each side of the unit for servicing.

Plumbing connections for water are made from inside the building. Gas and electric connections are made from the rooftop. Remote control wiring passes through the leak-tight fitting in the base of the unit.

### ROOF CURB

Assemble and install accessory roof curb in accordance with instructions shipped with curb.

**IMPORTANT: THE GASKETING OF THE UNIT TO THE ROOF CURB IS CRITICAL FOR A WATER TIGHT SEAL. INSTALL GASKET SUPPLIED WITH THE ROOF CURB AS SHOWN IN FIGURE 30.**

Curb should be level. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

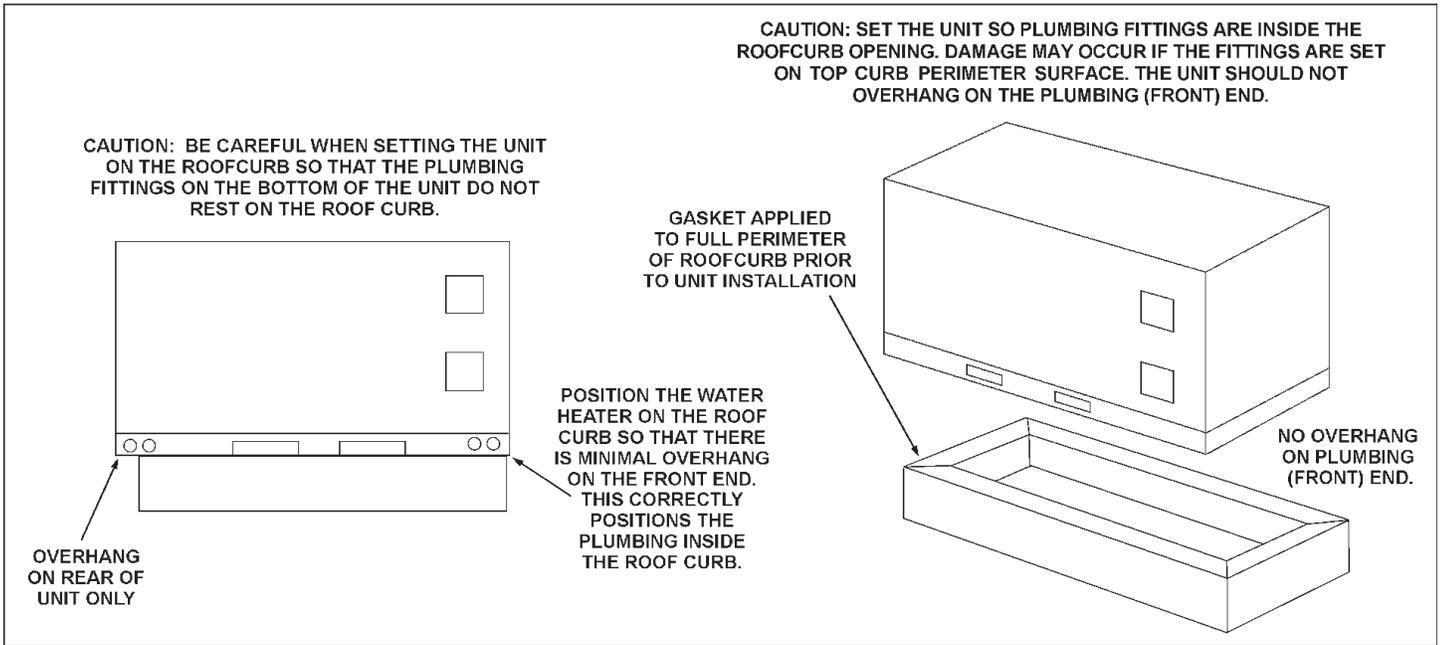


FIGURE 30

### RIG AND PLACE UNIT

Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across the roof. Level the unit by using unit frame.

Lifting holes are provided in base rails as shown in Figure 31. All panels must be in place when rigging.

The unit cannot be placed on the curb with a fork lift or other lifting device through the fork lift openings. Doing so would interfere with placement on the roof curb.

Maintain clearance around and above the unit to provide minimum distance from combustible materials, proper air flow, and service access.

Do not install unit in an indoor location. Do not locate unit air inlets near exhaust vents or other sources of contaminated air.

Be sure that unit is installed such that snow will not block the combustion intake or flue outlet.

Unit may be installed directly on wood flooring or on Class A, B, or C roof covering material when roof curb is used.

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

Exhaust vent terminal must have a minimum horizontal clearance of 4 ft. from electric and gas meters, gas regulators, and gas relief equipment. Minimum distance between unit and other electrically live parts is 48 inches.

Flue gases can deteriorate building materials. Orient unit such that flue gas will not affect building materials.

Adequate combustion and ventilation air space must be provided for proper operation of this equipment.

After unit is in position, remove rigging skids and shipping materials.

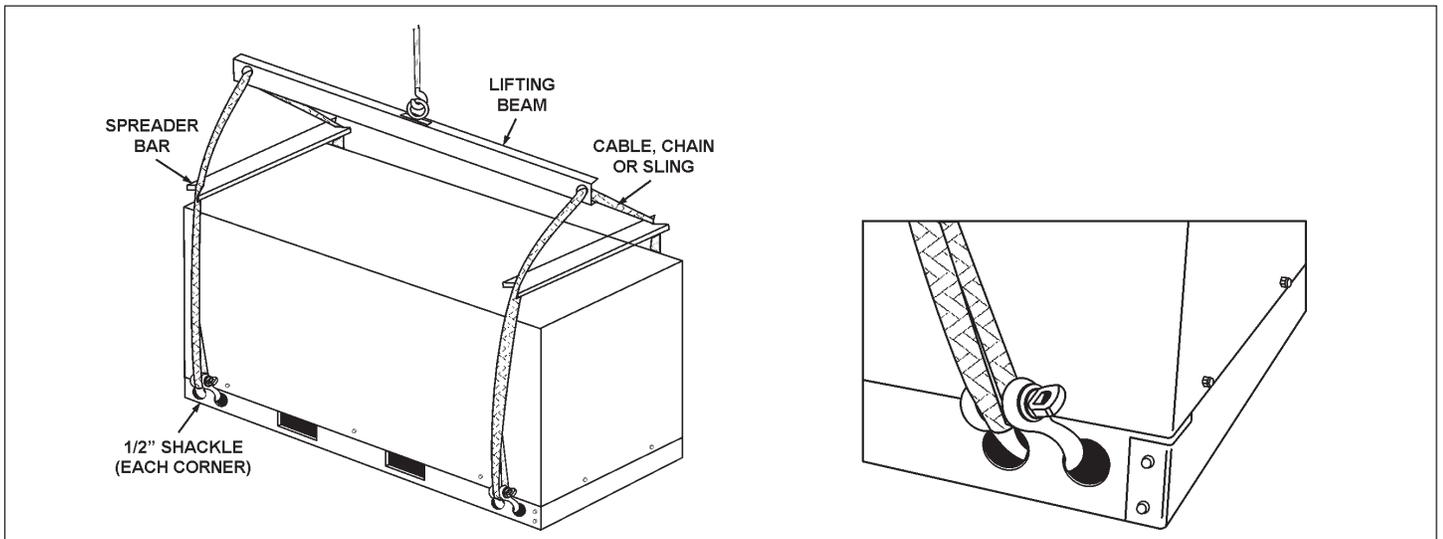


FIGURE 31

## OUTDOOR STAND

This rooftop water heater is approved for an outdoor installation with an optional stand. Contact State Order Entry to acquire optional stand kit.

The rooftop stand is constructed of a tubular steel frame along with tubular steel legs. See Figure 32. The legs are three feet in length and slide into the corners of the tubular steel frame. The legs may be cut to length to reduce the overall height of the stand if necessary.

The rooftop unit is located on the stand the same way as located on the roof curb. Please locate panels at one end of the stand. This area is used to run the water lines into the rooftop unit. It provides added protection to the water lines. For additional information see Optional Stand Kit Instructions.

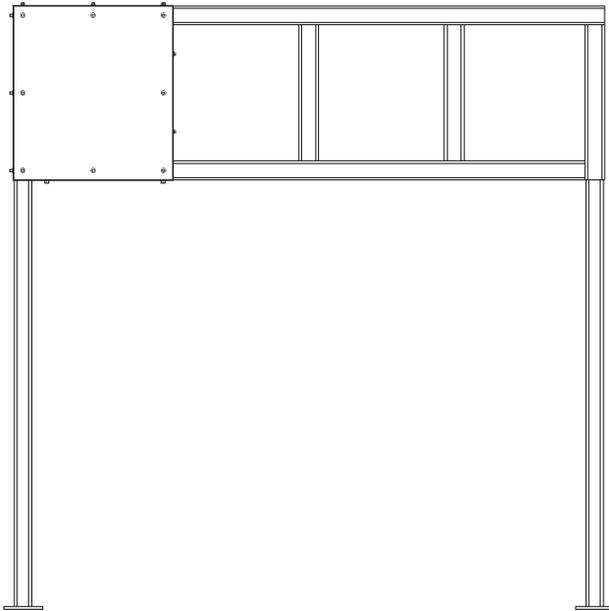


FIGURE 32

When installing the heater, consideration must be given to proper location. Location selected should be as close to the intake and exhaust termination points as practicable, with adequate air supply and as centralized with the piping system as possible.

**LOCATE IT NEAR A DRAIN. THE HEATER SHOULD BE LOCATED IN AN AREA WHERE LEAKAGE FROM THE HEATER OR CONNECTIONS WILL NOT RESULT IN DAMAGE TO THE ADJACENT AREA OR TO LOWER FLOORS OF THE STRUCTURE.**

When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the appliance.

State Water Heater provides an after market anti-freeze kit for use when there is a loss of power. This kit provides drainage to the tank and plumbing manifold to prevent freeze-up. When power is restored, the system is equipped with automatic air bleed and a low-water cut-off device to prove the tank is full of water prior to startup. See kit instructions for complete details.

## WARNING

**DO NOT USE THIS APPLIANCE IF ANY PART HAS BEEN UNDER WATER. IMMEDIATELY CONTACT A QUALIFIED INSTALLER OR SERVICE AGENCY TO REPLACE A FLOODED WATER HEATER. DO NOT ATTEMPT TO REPAIR THE UNIT! IT MUST BE REPLACED!**

## CLEARANCES

These heaters are approved for outdoor installations on combustible flooring (roof) with the minimum clearances of 0" for sides and 1.50" for top.

Always disconnect electrical power before servicing the unit.

## HARD WATER

Where hard water conditions exist, water softening or the threshold type of water treatment is recommended. This will protect the dishwashers, coffee urns, water heaters, water piping and other equipment.

See MAINTENANCE section for details of tank cleanout procedure.

## AIR REQUIREMENTS

**KEEP APPLIANCE AREA CLEAR AND FREE OF COMBUSTIBLE MATERIALS, GASOLINE AND OTHER FLAMMABLE VAPORS AND LIQUIDS.**

**DO NOT OBSTRUCT THE FLOW OF COMBUSTION AND VENTILATING AIR.**

## WARNING

**FOR SAFE OPERATION PROVIDE ADEQUATE AIR FOR COMBUSTION AND VENTILATION. AN INSUFFICIENT SUPPLY OF AIR WILL CAUSE RECIRCULATION OF COMBUSTION PRODUCTS RESULTING IN CONTAMINATION THAT MAY BE HAZARDOUS TO LIFE. SUCH A CONDITION OFTEN WILL RESULT IN A YELLOW, LUMINOUS BURNER FLAME, CAUSING CARBONING OR SOOTING OF THE COMBUSTION CHAMBER, BURNERS AND FLUE TUBES AND CREATES A RISK OF ASPHYXIATION.**

## CHEMICAL VAPOR CORROSION

## WARNING

**CORROSION OF THE FLUE WAYS AND VENT SYSTEM MAY OCCUR IF AIR FOR COMBUSTION CONTAINS CERTAIN CHEMICAL VAPORS. SUCH CORROSION MAY RESULT IN FAILURE AND RISK OF ASPHYXIATION.**

Spray can propellants, cleaning solvents, refrigerator and air conditioning refrigerants, swimming pool chemicals, calcium and sodium chloride, waxes, and process chemicals are typical compounds which are potentially corrosive.

**PRODUCTS OF THIS SORT SHOULD NOT BE STORED NEAR THE HEATER. ALSO, AIR WHICH IS BROUGHT IN CONTACT WITH THE HEATER SHOULD NOT CONTAIN ANY OF THESE CHEMICALS. IF NECESSARY, UNCONTAMINATED AIR SHOULD BE OBTAINED FROM REMOTE OR OUTSIDE SOURCES.**

## VENTING

### **! WARNING**

THE INSTRUCTIONS IN THIS SECTION ON VENTING MUST BE FOLLOWED TO AVOID CHOKED COMBUSTION OR RECIRCULATION OF FLUE GASES. SUCH CONDITIONS CAUSE SOOTING OR RISKS OF FIRE AND ASPHYXIATION.

### **! WARNING**

NEVER OPERATE THE HEATER UNLESS IT IS VENTED TO THE OUTDOORS AND HAS ADEQUATE AIR SUPPLY TO AVOID RISKS OF IMPROPER OPERATION, FIRE, EXPLOSION OR ASPHYXIATION.

### **! CAUTION**

DO NOT TERMINATE THE VENTING WHERE NOISE FROM THE EXHAUST OR INTAKE WILL BE OBJECTIONABLE. THIS INCLUDES LOCATIONS CLOSE TO OR ACROSS FROM WINDOWS AND DOORS.

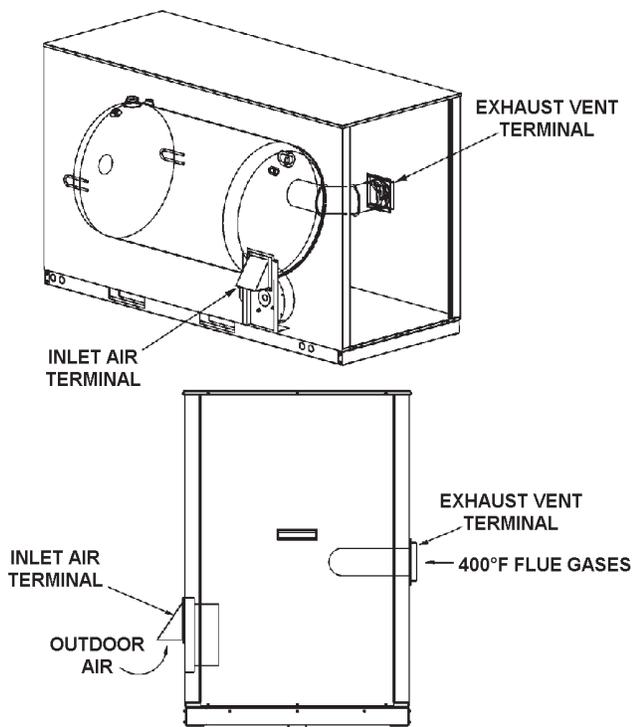


FIGURE 33

## VENT TERMINALS

The vent system must terminate so that proper clearances are maintained as cited in local codes or the current edition of the National Fuel Gas Code, ANSI Z223.1/NFPA 54.

The SRT80-120NE series is designed with an internal vent construction. The exhaust vent terminal and the inlet air terminal are located on the sides of the appliance. Do not add vent pipe to the appliance, see Figure 33.

Assure the exhaust vent terminal is not in a public area where the hoods are exposed. The exhaust vent terminal gets very **HOT** during operation and can cause burns. Please use caution when working around the exhaust vent terminal.

It is imperative that the area around the vent terminal hoods are kept clear from obstructions so plenty of fresh air is available for combustion.

The vent shall terminate a minimum of 12" (30.5 cm) above expected snowfall level to prevent blockage of vent termination.

### **! WARNING**

USE ONLY THE VENT TERMINALS SUPPLIED WITH THIS UNIT. TERMINATION OF A VENT SYSTEM WITH A DEVICE OTHER THAN THE SUPPLIED VENT TERMINATIONS WILL AFFECT SYSTEM PERFORMANCE AND RESULT IN A SAFETY HAZARD.

## PRESSURE SWITCHES

The SRT80-120NE is provided with three pressure switches. These switches are essential to the safe and proper operation of the unit. All switches are wired in series. The controller is set up to shut the unit down whenever there is a failure of any of the switches.

### **! CAUTION**

THE WATER HEATER IS POLARITY SENSITIVE. BEFORE APPLYING ELECTRICITY TO THIS HEATER BE CERTAIN THAT SUPPLY NEUTRAL WIRE TO GROUND CHECK INDICATES ZERO VOLTAGE.

## GAS PIPING

Contact your local gas service company to ensure that adequate gas service is available and to review applicable installation codes for your area.

TABLE 3  
MAXIMUM CAPACITY OF PIPE IN CUBIC FEET OF GAS PER HOUR  
(Based upon a Pressure Drop of 0.5 inch Water Column  
and 0.6 Specific Gravity Gas)

LENGTH IN FEET	NORMAL IRON PIPE SIZES (INCHES) INPUT IN THOUSANDS BTU/HR								
	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
10	175	360	680	1400	2100	3960	6300	11000	23000
20	120	250	485	950	1460	2750	4360	7700	15800
30	—	200	375	770	1180	2200	3520	6250	12800
40	—	170	320	660	990	1900	3000	5300	10900
50	—	151	285	580	900	1680	2650	4750	9700
60	—	138	260	530	810	1520	2400	4300	8800
70	—	125	240	490	750	1400	2250	3900	8100
80	—	—	220	460	690	1300	2050	3700	7500
90	—	—	205	430	650	1220	1950	3450	7200
100	—	—	195	400	620	1150	1850	3250	6700
125	—	—	175	360	550	1020	1650	2950	6000
150	—	—	160	325	500	950	1500	2650	5500
175	—	—	145	300	460	850	1370	2450	5000
200	—	—	135	280	430	800	1280	2280	4600

LENGTH IN METERS	NORMAL IRON PIPE SIZES (INCHES) INPUT IN KW								
	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3.0	51	105	199	410	615	1160	1845	3221	6735
6.1	35	73	142	278	428	805	1277	2255	4626
9.1	—	59	110	225	346	644	1031	1830	3748
12.2	—	50	94	193	290	556	878	1552	3192
15.2	—	44	83	170	264	492	776	1391	2840
18.3	—	40	76	155	237	445	703	1259	2577
21.3	—	37	70	143	220	410	659	1142	2372
24.4	—	—	64	135	202	381	600	1083	2196
27.4	—	—	60	126	190	357	571	1010	2108
30.5	—	—	57	117	182	337	542	952	1962
38.1	—	—	51	105	161	299	483	864	1757
45.7	—	—	47	95	146	278	439	776	1610
53.3	—	—	42	88	135	249	401	717	1464
61.0	—	—	40	82	126	234	375	688	1347

Size the main gas line in accordance with Table 3. The figures shown are for straight lengths of pipe at 0.5 in. (125 kPa) W.C. pressure drop, which is considered normal for low pressure systems. Note that fittings such as elbows and tees will add to the pipe pressure drop.

### **! CAUTION**

DO NOT USE FLEXIBLE GAS PIPING.

## **! WARNING**

THE HEATER IS NOT INTENDED FOR OPERATION AT HIGHER THAN 14.0" WATER COLUMN (1/2 POUND OR 3.45 kPa PER SQUARE INCH) SUPPLY GAS PRESSURE. HIGHER GAS SUPPLY PRESSURES REQUIRE SUPPLEMENTAL REDUCING SERVICE REGULATION. EXPOSURE TO HIGHER GAS SUPPLY PRESSURE MAY CAUSE DAMAGE TO THE GAS CONTROLS WHICH COULD RESULT IN FIRE OR EXPLOSION. IF OVERPRESSURE HAS OCCURRED SUCH AS THROUGH IMPROPER TESTING OF GAS LINES OR EMERGENCY MALFUNCTION OF THE SUPPLY SYSTEM THE GAS VALVE MUST BE CHECKED FOR SAFE OPERATION. MAKE SURE THAT THE OUTSIDE VENTS ON THE SUPPLY REGULATORS AND THE SAFETY VENT VALVES ARE PROTECTED AGAINST BLOCKAGE. THESE ARE PARTS OF THE GAS SUPPLY SYSTEM, NOT THE HEATER. VENT BLOCKAGE MAY OCCUR DURING ICE STORMS.

IT IS IMPORTANT TO GUARD AGAINST GAS VALVE FOULING FROM CONTAMINANTS IN THE GAS WAYS. SUCH FOULING MAY CAUSE IMPROPER OPERATION, FIRE OR EXPLOSION.

IF COPPER SUPPLY LINES ARE USED THEY MUST BE INTERNALLY TINNED AND CERTIFIED FOR GAS SERVICE.

BEFORE ATTACHING THE GAS LINE BE SURE THAT ALL GAS PIPE IS CLEAN ON THE INSIDE.

TO TRAP ANY DIRT OR FOREIGN MATERIAL IN THE GAS SUPPLY LINE, A DIRT LEG (SOMETIMES CALLED A SEDIMENT TRAP OR DRIP LEG) MUST BE INCORPORATED IN THE PIPING. THE DIRT LEG MUST BE READILY ACCESSIBLE AND NOT SUBJECT TO FREEZING CONDITIONS. INSTALL IN ACCORDANCE WITH RECOMMENDATIONS OF SERVING GAS SUPPLIERS. REFER TO THE [NATIONAL FUEL GAS CODE](#).

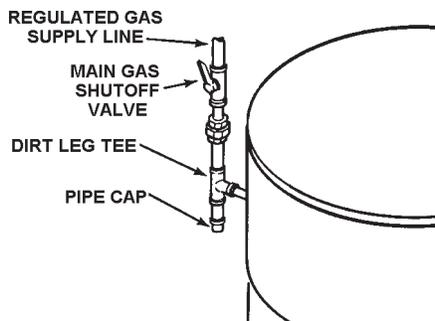


FIGURE 34

### CONNECTION OF GAS PIPE

## **! WARNING**

PERFORM THE GAS LEAK TEST ANY TIME WORK IS DONE ON A GAS SYSTEM TO AVOID THE POSSIBILITY OF FIRE OR EXPLOSION WITH PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

The gas leak test is performed as follows: Paint pipe connections upstream of gas control with a rich soap and water solution to test for leaks before operating main burner. Bubbles indicate gas leak. To stop leak, tighten pipe connections. After piping connections are checked, turn on main burner. With main burner in operation, paint pipe joints (including flanges), pilot gas tubing connections and control inlet and outlet with rich soap and water solution. Bubbles indicate gas leak. To stop leak, tighten flange screws, joints and pipe connections. Replace part if leak can't be stopped. To prevent damage, care must be taken not to apply too much torque when attaching gas supply pipe to gas valve inlet.

Apply joint compounds (pipe dope) sparingly and only to the male threads of pipe joints. Do not apply compound to the first two threads. Use compounds resistant to the action of liquefied petroleum gases.

DISCONNECT THE APPLIANCE AND ITS MANUAL GAS SHUTOFF VALVE FROM THE GAS SUPPLY PIPING SYSTEM DURING ANY SUPPLY PRESSURE TESTING EXCEEDING 1/2 PSIG (3.45 kPa). GAS SUPPLY LINE MUST BE CAPPED WHEN DISCONNECTED FROM THE HEATER. FOR TEST PRESSURES OF 1/2 PSIG (3.45 kPa) OR LESS, THE APPLIANCE NEED NOT BE DISCONNECTED, BUT MUST BE ISOLATED FROM THE SUPPLY PRESSURE TEST BY CLOSING THE MANUAL GAS SHUTOFF VALVE.

BEFORE PLACING THE HEATER IN OPERATION, CHECK FOR GAS LEAKAGE. USE SOAP AND WATER SOLUTION OR OTHER MATERIAL ACCEPTABLE FOR THE PURPOSE OF LOCATING GAS LEAKS. DO NOT USE MATCHES, CANDLES, FLAME OR OTHER SOURCES OF IGNITION FOR THIS PURPOSE.

### PURGING

Gas line purging is required with new piping or systems in which air has entered.

## **! CAUTION**

PURGING SHOULD BE PERFORMED BY PERSONS EXPERIENCED IN THIS TYPE OF GAS SERVICE. TO AVOID RISK OF FIRE OR EXPLOSION, PURGE DISCHARGE MUST NOT ENTER CONFINED AREAS OR SPACES WHERE IGNITION CAN OCCUR. THE AREA MUST BE WELL VENTILATED AND ALL SOURCES OF IGNITION MUST BE INACTIVATED OR REMOVED.

### GAS METER SIZE - CITY GASES ONLY

Be sure that the gas meter has sufficient capacity to supply the full rated gas input of the water heater as well as the requirements of all other gas fired equipment supplied by the meter. If the gas meter is too small, ask the gas company to install a larger meter having adequate capacity.

### GAS PRESSURE REGULATION

Main line gas pressure to the water heater should be between a maximum 14.0" (3.45 kPa) W.C. and a minimum of 6.2 W.C. (1.53 kPa).

The inlet gas pressure must not exceed the maximum value. A service regulator must be installed within 10' (305 cm) of unit.

### GAS VALVES

## **! WARNING**

SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, TURN OFF THE MANUAL GAS CONTROL VALVE TO THE APPLIANCE.

### SYSTEM CONNECTIONS

The system installation must conform to these instructions and to the local code authority having jurisdiction. Good practice requires that all heavy piping be supported.

### THERMOMETERS (Not Supplied)

Thermometers should be obtained and field installed as shown in the installation diagrams.

Thermometers are installed in the system as a means of detecting the temperature of the outlet water supply.

## RELIEF VALVE

This heater is equipped with an approved temperature and pressure relief valve. ASME ratings cover pressure relief. CSA ratings cover release rate with temperature actuation.

**FOR SAFE OPERATION OF THE WATER HEATER, THE RELIEF VALVE(S) MUST NOT BE REMOVED OR PLUGGED.**

In addition to the appliance relief valve, each remote storage tank which may be used in conjunction with this appliance shall also be installed with a properly sized, rated and approved temperature (ANSI) and pressure (ASME) relief valve(s). This relief valve shall comply with the standard for relief valves and automatic gas shutoff devices for hot water supply systems, ANSI Z21.22.

Your local code authority may have other specific relief valve requirements.



### WARNING

**THE PURPOSE OF A RELIEF VALVE IS TO AVOID EXCESSIVE PRESSURE OR TEMPERATURE INTO THE STEAM RANGE, WHICH MAY CAUSE SCALDING AT FIXTURES, TANK EXPLOSION, SYSTEM OR HEATER DAMAGE. NO VALVE IS TO BE PLACED BETWEEN THE RELIEF VALVE AND THE TANK.**

A DRAIN LINE MUST BE CONNECTED TO THE RELIEF VALVE TO DIRECT DISCHARGE TO A SAFE LOCATION TO AVOID SCALDING OR WATER DAMAGE. THIS LINE MUST NOT BE REDUCED FROM THE SIZE OF THE VALVE OUTLET AND MUST NOT CONTAIN VALVES OR RESTRICTIONS, NOR SHOULD IT BE LOCATED IN FREEZING AREAS. DO NOT THREAD OR CAP THE END OF THIS LINE. RESTRICTED OR BLOCKED DISCHARGE WILL DEFEAT THE PURPOSE OF THE VALVE AND IS UNSAFE. THE DISCHARGE LINE SHALL BE INSTALLED TO ALLOW COMPLETE DRAINAGE OF BOTH THE VALVE AND LINE.

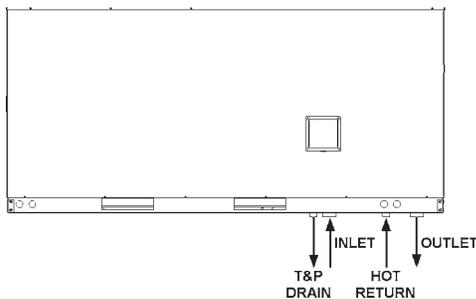


FIGURE 35

## WATER LINE CONNECTIONS

This manual provides detailed installation diagrams (see back section of this manual) for typical methods of application for the water heaters.

The water heater may be installed by itself, or with a separate storage tank. When used with a separate storage tank, the circulation may be either by gravity or by means of circulating pump. When a circulating pump is used, it is important to note that the flow rate should be slow so that there will be a minimum of turbulence inside the heater.

## CLOSED SYSTEM



### CAUTION

A closed system will exist if a check valve (without bypass), pressure reducing valve (without bypass), or a water meter (without

bypass) is installed in the cold water line between the water heater and street main (or well).

Excessive pressure may develop causing premature tank failure or intermittent relief valve operation. This type of failure is not covered by the limited warranty. An expansion tank or a similar device may be required in the inlet supply line between the appliance and the meter or valve to compensate for the thermal expansion of water under supply pressure.

Water heater damage due to installation in a closed system is not covered by the limited warranty. The solution is to install a thermal expansion tank between the check valve and the water heater.

## WATER (POTABLE) HEATING AND SPACE HEATING

1. All piping components connected to this unit for space heating applications shall be suitable for use with potable water.
2. Toxic chemicals, such as those used for boiler treatment, shall **NEVER** be introduced into this system.
3. This unit may never be connected to any existing heating system or component(s) previously used with non-potable water heating appliance.
4. When the system requires water for space heating at temperatures higher than required for domestic water purposes, a tempering valve must be installed. Please refer to installation diagrams on pages 29 through 33 in back of manual for suggested piping arrangements.

## WATER HEATER WIRING

IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH 105C WIRE OR ITS EQUIVALENT, EXCEPT IN THE BURNER HOUSING. IN THIS CASE USE 200°C WIRE.

THE COMPUTER CONTROL REQUIRES A SOURCE OF STABLE CLEAN ELECTRICITY FOR PROPER OPERATION. INSTALLING THE HEATER ON A BRANCH CIRCUIT THAT HAS ELECTRONIC NOISE, IS SUBJECT TO FLUCTUATIONS IN VOLTAGE LEVEL OR HAS AN APPLIANCE WHICH GENERATES EMF OF RFI INTERFERENCE CAN CAUSE THE CONTROLLER TO MALFUNCTION. A HIGH QUALITY POWER CONDITIONER MUST BE INSTALLED IF THE ABOVE CONDITIONS EXIST. MALFUNCTIONS CAUSED BY A POOR ELECTRICAL SUPPLY ARE NOT COVERED UNDER YOUR WARRANTY.



### CAUTION

**LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION.**



### CAUTION

**VERIFY PROPER OPERATION AFTER SERVICING UNIT.**

The controller is wired to the heater. The model and rating plate provides the electrical information needed to size the complete heater branch supply.

All electrical work must be installed in accordance with the National Electrical Code and local requirements.

When installed, the appliance must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, NFPA 70.

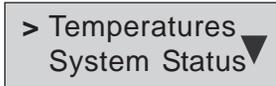
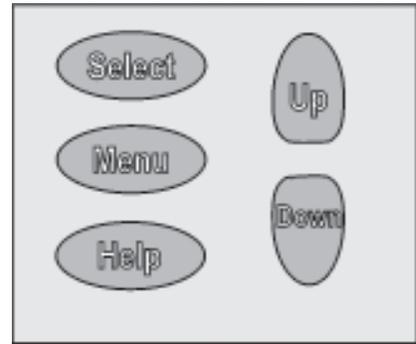
**NOTE: This controller is polarity sensitive. If the hot and neutral supply voltage is reversed, the controller will not sense flame. Verify polarity before connecting the unit.**



## OPERATION

### MENU NAVIGATION

The EMC-5000 Interface has 5 buttons on the touch panel of the interface. The EMC-5000's menus are navigated through the touch panel, as shown to the right, which can be found on the outdoor and remote interface box. Basic navigation through the menus begins with the *Main Menu*. With the exception of changing a user set point, touching {menu} will bring you to the *Main Menu*, as is illustrated here:



From the *Main Menu*, you can use the [up] and [down] arrow keys to navigate through the *Main Menu*. The arrow > on the left displays the current item that you have selected. Touching [select] will select the item from the menu and navigate to its appropriate sub menu. Navigation through the sub menus is the same as navigation through the *Main Menu*.

Note: Some sub menus do not have the > visible, navigation through the screen operates through touching [up] and [down].

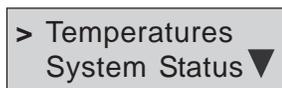
The up and down arrows, ▼ and ▲, found on the right of the screen are an indication that there are more items available on the current screen. As described above, touching [up] and [down] will allow you to display these items.

The *User Settings* sub menu contains items that are adjustable by the user. These items can be adjusted by following these steps:

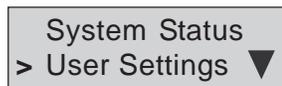
1. Move the > to the items you wish to adjust by touching [up] and [down].
2. Touch [select] to adjust the parameter.
3. Touch [up] and [down] to adjust the value.
4. Touch [select] to accept the new value, or touch [menu] to cancel any changes made.  
**Changes will not be made until the [select] key is pressed again to accept the changed value.**

The following example steps through the process of adjusting the operating set point:

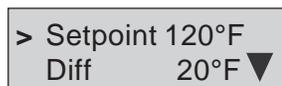
1. Touch [menu] to display the *Main Menu*:



2. Touch [down] until *User Settings* is selected:



3. Touch [select] to enter the *User Settings* sub menu:



4. To adjust the operating set point, touch [select] once. The > should now be blinking indicating that you are adjusting this parameter.
5. Touch [up] and [down] to adjust the parameter.
6. Touch [select] again to accept the new parameter (or touch [menu] to return to cancel any changes and return to the previous setting).

## Menu Tree

Main Menu	Description
<i>Temperatures</i>	
Outlet	Displays the temperature of the outlet tank probe.
Tank	Displays the temperature of the probe located in the tank.
<i>System Status</i>	
LWCO	Low Water Cut-Off status. The status can be either <i>Closed</i> or <i>Open</i> . A <i>Closed</i> status indicates that there is not a low water condition in the tank. An <i>Open</i> status indicates that there is a low water condition in the tank.
ECO	Emergency Cut-Off status. The status can be either <i>Closed</i> or <i>Open</i> . A <i>Closed</i> status indicates safe operation. An <i>Open</i> status indicates that the system is locked out due to the water temperature reaching an unsafe temperature value.
BlwPrv	Blower prover status. The status can be either <i>Closed</i> or <i>Open</i> . A <i>Closed</i> status indicates that combustion air is adequate. An <i>Open</i> status indicates that combustion air is inadequate.
Blk Out	Blocked outlet status. The status can be either <i>Closed</i> or <i>Open</i> . A <i>Closed</i> status indicates normal operation. An <i>Open</i> status indicates that the exhaust outlet is blocked.
Low Gas	Low gas status. The status can be either <i>Closed</i> or <i>Open</i> . A <i>Closed</i> status indicates normal operation. An <i>Open</i> status indicates low supply gas pressure.
Freeze State	(Anti-Freeze kit only) This indicates the status of the freeze condition aquastat. The status can either be <i>OK</i> or <i>Freeze</i> . An <i>OK</i> status indicates normal operation. A <i>Freeze</i> condition indicates that freezing conditions exist and the system is responding.
Tank Drain	(Anti-Freeze kit only) Tank drain status. This status can either be <i>Closed</i> or <i>Open</i> . A <i>Closed</i> status indicates that the system is in normal operation and the tank drain valve is closed. An <i>Open</i> status indicates that the system is draining the tank to deter freezing.
Tank Pump	Status of the tank pump. This indicates if the tank pump is enabled by the control. The status is either <i>On</i> or <i>Off</i> . An <i>On</i> status indicates the control is asking for the tank pump to be turned on. An <i>Off</i> status indicates that the control is asking for the tank pump to be turned off.
Loop Pumps	Status of the loop pumps. This indicates if the loop pumps are enabled by the control. The status is either <i>Enabled</i> or <i>Disabled</i> . An <i>Enabled</i> status indicates the control is asking for the loop pumps to be turned on. A <i>Disabled</i> status indicates that the control is asking for the loop pumps to be turned off.
<i>User Settings</i>	
Setpoint	The setpoint is the temperature to which water will be heated and stored. Allowable range is 100°F to 180°F.
Diff	Temperature difference below the operating set point before the system will call for heat. Allowable range of 0°F to 50°F.
Temp Units	Temperature unit of the system for display. This can either be °F or °C.
Netwrt Addr	(PC Networking only)  Network address of the heater on State Industries Networking network. This number must be unique to all devices on the network. Allowable range of 1 to 32 on the network, or 0 to place the device off the network.
<i>Log Info</i>	
Run Min	The total number of minutes of heating.
Cycles	The total number of cycles the heater achieved. A cycle is defined as a transition from an idle state to a heat state.
kBTU	(for reference only) This is a factory setting for reference only.
Prop Rev	This will display the current software revision.
<i>Current Error</i>	The current error screen displays the current error, if the system is in an error state.
<i>Error History</i>	The error history screen will display the previous nine recorded errors by the system along with the running minutes of when the error occurred.
<i>Reload Defaults</i>	Allows for re-setting the system to its factory defaults.

## SEQUENCE OF OPERATION

1. When the control is powered up the outdoor interface and the remote interface should display a blank line and copyright on the 2-line display.
2. After one second, the display should switch to indicate that the touch switches are calibrating. During this process, the *Running* LED will flash once per second until all of the switches have been calibrated. This is an automatic process and can take several seconds. Placing hands or fingers near the switches can delay this process.
3. The control is now initialized and the display will change to display the temperatures screen if no error is detected.
4. The system is checked for faults and, if detected, the *Service* light will flash. If the fault is a temperature probe fault, the *Service* LED will remain on without flashing. Whenever a fault is detected, the display will switch to display the *Current Error* screen.
5. If the control determines that the actual water temperature inside the tank is below the programmed temperature setpoint less the differential, a call for heat is activated. This call for heat is generated even if the ignition module has detected an error, however, if the ignition module has detected a fault, the ignition sequence will not advance. Provided that no fault has been detected, the *Running* LED will turn on.
6. If the Low-Water Cut-Off is satisfied, the ignition module will then perform selected system diagnostic checks. This includes confirming the proper state of the air switches and the ECO limit device.
7. If all checks are successfully passed, the combustion blower is energized for the pre-purge cycle.
8. When the pre-purge cycle is complete, power is applied to the igniter element for the igniter warm-up period.
9. At the conclusion of the igniter warm-up period, the gas valve will open, allowing gas to enter the burner chamber.
10. The igniter will remain on for a short predetermined time period, then it will be turned off.
11. The control will monitor the flame sense probe to confirm a flame is present. If a flame is not verified within the predetermined flame prove time, the gas valve will immediately be closed and the blower will continue to run for approximately 10 seconds. The control will then return to step 6.
12. If a flame is confirmed, the control will enter the heating mode where it will continue heating the tank until the setpoint temperature is reached. At this point, the gas valve is closed and the control enters the post-purge cycle.
13. The combustion blower will run for the duration of the postpurge cycle to purge the system of all combustion gasses. When the post purge cycle is complete, the blower is deenergized and will coast to a stop.
14. The control will now enter the standby state as indicated by the *Standby* LED. The control will continue to monitor the tank water temperature and the state of the other system devices. If the temperature drops below the setpoint value less differential,

the control will automatically return to step 5 and repeat the entire operating cycle. During this entire process, if the control detects an improper operating state for external devices such as the ECO switch, blower prover switch, etc., the appropriate indication will be given on the interface modules.

## ERROR CODES

These error codes will be displayed if there is a problem with ignition or operation of the heater. They will be displayed on the LCD screen on the outdoor interface module and the remote interface module.

The following error codes are codes related to the temperature probes:

Outlet Probe  
Tank Probe

The following error codes are related directly to the Ignition Module:

I.M. Lock Out  
I.M. PS Closed  
I.M. PS Open  
I.M. ECO  
I.M. 115V Reversed  
I.M. Low Flame  
I.M. Igniter  
I.M. Flame Fault

Note: The ignition module faults are only reset after a one hour delay period after the fault, or by cycling the power.

## FAULT CONDITIONS

### Fault: OUTLET PROBE

There is a problem with the outlet temperature probe

Possible Cause	Remedy
1. Outlet temperature probe is not connected (Wiring disconnect)	1. Check that the temperature probe is connected properly
2. Outlet temperature probe wiring is open or closed	2. Repair wiring
3. Defective outlet temperature probe	3. Replace probe

### Fault: TANK PROBE

There is a problem with the tank temperature probe

Possible Cause	Remedy
1. Tank temperature probe is not connected (Wiring disconnect)	1. Check that the temperature probe is connected properly
2. Tank temperature probe wiring is open or closed	2. Repair wiring
3. Defective tank temperature probe	3. Replace probe

The following are fault conditions related to the ignition module:

**Fault: I.M. LOCK OUT**

I.M Failed an internal hardware or software check

Possible Cause	Remedy
1. Ignition Module Failure	1. Replace Ignition Module

**Fault: I.M. PS CLOSED**

The pressure switch is stuck closed

Possible Cause	Remedy
1. Pressure switch is shorted or not wired properly	1. Check and replace wiring
2. Defective pressure switch	2. Replace pressure switch

**Fault: I.M. PS OPEN**

The pressure switch is stuck open

Possible Cause	Remedy
1. Pressure switch is not connected	1. Check that the pressure switched is wired properly
2. Pressure switch is open or not wired properly	2. Check and repair wiring
3. Defective pressure switch	3. Replace pressure switch
4. Insufficient pressure developed by combustion blower	4. Verify blower operation to the ignition module

**Fault: I.M. ECO**

Emergency cut-off, water temperature has reached an unsafe temperature

Possible Cause	Remedy
1. Temperature probe is damaged	1. Check that the temperature probe is not damaged and replace probe if necessary
2. Temperature probe wiring is damaged	2. Check and repair wiring
3. Water in tank too hot	3. Normal condition when water temperature exceeds safety limit. Allow water to cool or admit water into tank and manually reset the control. Determine cause for over temp condition

**Fault: I.M. 115V REVERSED**

The line hot and the neutral line are reversed wired

Possible Cause	Remedy
1. Line hot and neutral reversed	1. Check wiring and reverse line hot and neutral

**Fault: I.M. LOW FLAME**

Low flame has been sensed

Possible Cause	Remedy
1. Weak or insufficient flame detected	1. Check flame rod

**Fault: I.M. IGNITER**

There is a problem with the ignition module

Possible Cause	Remedy
1. Igniter is not wired in or the wiring is damaged	1. Check that the igniter is wired in properly or that the wiring is not damaged
2. Igniter is damaged	2. Replace igniter
3. The ignition module is damaged	3. Replace ignition module

**Fault: I.M. FLAME FAULT**

A flame was detected when there is not supposed to be a flame (no call for heat).

Possible Cause	Remedy
1. Flame sense wiring is damaged	1. Check and repair wiring
2. Ignition module is damaged	2. Replace ignition module

**PRIOR TO START UP**

**REQUIRED ABILITY**

INSTALLATION OR SERVICE OF THIS WATER HEATER REQUIRES ABILITY EQUIVALENT TO THAT OF A LICENSED TRADESMAN IN THE FIELD INVOLVED. PLUMBING, AIR SUPPLY, VENTING, GAS SUPPLY AND ELECTRICAL WORK ARE REQUIRED.

Before attempting start-up, thoroughly study and familiarize yourself with the exact sequence of operation and all other details on the specific heater being used.

The power burner is equipped with an ignition system which automatically sequences prepurge and ignition, senses and ignites main burner flame and sequences burner operation. Heater is equipped with an ignition control which locks out after three unsuccessful ignition attempts. Familiarize yourself with the sequence of operation of this unit prior to start-up.

Be certain that the water heater is full of water, that air is purged from all lines, there are no leaks (gas and water), and all inlet water lines are open.

The following test equipment should be on hand (all test equipment must be acclimated to ambient temperature before calibration and use.)

- Two U-tube manometers or calibration 0-10" (0-2.5 kPa) and 0-35" (0-2.5 kPa) W.C. pressure gauges.

- Attach a gas pressure gauge or manometer to the upstream side of main gas cock and a gas pressure gauge or manometer to the manifold pressure tap.

- You are now ready to begin the burner start-up procedure.

# OPERATING INSTRUCTIONS

## IMPORTANT

IT IS RECOMMENDED THAT A QUALIFIED SERVICE TECHNICIAN PERFORM THE INITIAL FIRING OF THE HEATER. AT THIS TIME THE USER SHOULD ASK THE TECHNICIAN ANY QUESTIONS IN REGARD TO THE OPERATION AND MAINTENANCE OF THE UNIT.



## CAUTION

BEFORE PROCEEDING WITH THE OPERATION OF THE UNIT, MAKE SURE HEATER AND SYSTEM ARE FILLED WITH WATER AND ALL AIR IS EXPELLED FROM HEATER AND PIPING.

NEVER OPERATE THE HEATER WITHOUT FIRST BEING CERTAIN IT IS FILLED WITH WATER AND A TEMPERATURE AND A PRESSURE RELIEF VALVE IS INSTALLED IN THE RELIEF VALVE OPENING OF THE HEATER. DO NOT ATTEMPT TO OPERATE HEATER WITH COLD WATER INLET VALVE CLOSED.

## FILLING:

1. Close the heater drain valve.
2. Open a nearby hot water faucet to permit the air in the system to escape.
3. Fully open the cold water inlet pipe valve allowing the heater and piping to be filled.
4. Close the hot water faucet as water starts to flow.
5. The heater is ready to be operated.

THE MAIN MANUAL GAS SHUTOFF VALVE MUST HAVE BEEN CLOSED FOR AT LEAST FIVE (5) MINUTES. THIS WAITING PERIOD IS AN IMPORTANT SAFETY STEP. ITS PURPOSE IS TO PERMIT GAS THAT MIGHT HAVE ACCUMULATED IN THE COMBUSTION CHAMBER TO CLEAR. IF YOU DETECT GAS AT THE END OF THIS PERIOD, DO NOT PROCEED WITH LIGHTING. RECOGNIZE THAT GAS ODOR, EVEN IF IT SEEMS WEAK, MAY INDICATE THE PRESENCE OF ACCUMULATED GAS SOMEPLACE IN THE AREA WITH A RISK OF FIRE OR EXPLOSION. SEE THE FRONT PAGE FOR STEPS TO BE TAKEN.

DO NOT USE THIS HEATER IF ANY PART HAS BEEN UNDER WATER. IMMEDIATELY CALL A QUALIFIED SERVICE TECHNICIAN TO INSPECT THE HEATER AND TO REPLACE ANY PART OF THE CONTROL SYSTEM AND ANY GAS CONTROL WHICH HAS BEEN UNDER WATER.

LIGHT THE UNIT IN ACCORDANCE WITH THE OPERATING INSTRUCTIONS LABEL ATTACHED TO THE HEATER.

THESE INSTRUCTIONS ARE REPEATED IN THE LIGHTING AND OPERATING LABEL ILLUSTRATION IN THIS MANUAL.

## INITIAL START-UP

A minimum gas supply pressure of 6.2" W.C. for natural gas is required before making any adjustment to the gas control pressure regulator. Attempts to adjust the regulator during periods of low gas supply pressure could result in overfiring of the heater when the gas supply pressure returns to normal.

1. Check gas line pressure with a manometer.

2. Check manifold pressure (see Table 4) using a pressure gauge (manometer) connected to the manifold pressure tap on the gas control valve.

If full rate adjustment is required, remove cover screw from top of the gas control valve.

Using a small screwdriver, turn adjusting screw clockwise  to increase or counterclockwise  to decrease gas pressure to obtain 4.5" (1 kPa) for natural gas Water Column.

3. Cycle the burner on and off several times to check its operation.
4. Check the operation of the limit and operating controls.
5. Check the input rate:

For appliance installation locations with elevations above 2000 feet (610 m) refer to HIGH ALTITUDE INSTALLATIONS section of this manual.

- a. Attach a pressure gauge (manometer) to the manifold pressure tap and refer to Table 4, page 26 for correct pressure.
- b. Use this formula to "clock" the meter. Be sure other gas consuming appliances are not operating during this interval.

$$\frac{3600}{T} \times H = \text{Btuh}$$

Should it be necessary to adjust the gas pressure to the burner, to obtain the full input rate, the steps below should be followed:

T = Time in seconds to burn 1 cubic foot of gas. (With a stopwatch read the gas meter and measure the amount of time required for the heater to consume 1 cubic foot of gas.)

H = Heating value of gas (in Btu's per cubic foot of gas).

Btuh = Actual heater input rate, in Btuh.

EXAMPLE: (Using RTF-120 heater)

$$T = 18.9 \text{ seconds} \quad \frac{3600}{18.9} \times 1050 = 199,900 \text{ Btuh (59 kW)}$$

$$H = 1050 \text{ Btu/ft.}^3$$

For high altitude installations, compare result to the derated input required for the elevation at the installation location.

- c. Remove the pressure regulator cover screw and adjust the pressure by turning the adjusting screw with a small screwdriver. Do not exceed 4.5" (1 kPa) Water Column.

 Clockwise to increase gas pressure and input rate.

 Counterclockwise to decrease gas pressure and input rate.

- d. "Clock" the meter as in step (b) above.

- e. Repeat steps (c) and (d) until the specified input rate is achieved.
- f. Turn the manual gas valve to "OFF". Replace the pressure regulator cover screw. Remove the pressure gauge or manometer from the manifold pressure tap. Replace the set screw in the manifold pressure tap. If the gas pressure regulator cannot be adjusted to give the full input rating with sufficient gas pressure at the valve, check to ensure the unit is equipped with the correct orifice.

 **WARNING**

**UNDER NO CIRCUMSTANCES SHOULD THE INPUT EXCEED THE RATE SHOWN ON THE HEATER RATING PLATE. OVERFIRING COULD RESULT IN DAMAGE OR SOOTING OF THE HEATER.**

**CATHODIC PROTECTION**

 **CAUTION**

**HYDROGEN GAS CAN BE PRODUCED IN A HOT WATER SYSTEM SERVED BY THIS HEATER 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 a hot water faucet be opened for several minutes 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.

**PRECAUTIONS**

**IF THE UNIT IS EXPOSED TO THE FOLLOWING, DO NOT OPERATE HEATER UNTIL ALL CORRECTIVE STEPS HAVE BEEN MADE BY A QUALIFIED SERVICEMAN.**

1. FLOODING TO OR ABOVE THE LEVEL OF THE BURNER OR CONTROLS
2. EXTERNAL FIRING
3. DAMAGE
4. FIRING WITHOUT WATER
5. SOOTING

**NEVER OPERATE THE HEATER WITHOUT FIRST BEING CERTAIN IT IS FILLED WITH WATER AND A TEMPERATURE AND PRESSURE RELIEF VALVE IS INSTALLED IN THE RELIEF VALVE OPENING OF THE HEATER.**

**SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, TURN OFF THE MANUAL GAS CONTROL VALVE TO THE APPLIANCE.**

## FOR YOUR SAFETY READ BEFORE OPERATING



**WARNING: IF YOU DO NOT FOLLOW THESE INSTRUCTIONS EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.**



**BEFORE OPERATING: ENTIRE SYSTEM MUST BE FILLED WITH WATER AND AIR PURGED FROM ALL LINES.**

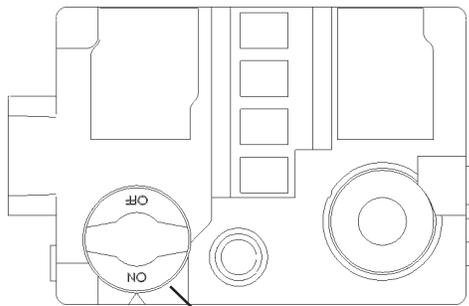
- A. This appliance does not have a pilot. It is equipped with an ignitor device which automatically lights the burner. Do **not** try to light the burner by hand.
- B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- C. Use only your hand to push in or turn the gas control knob. **Never use tools.** If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately contact a qualified installer or service agency to replace a flooded water heater. Do not attempt to repair the unit! It must be replaced!

### WHAT TO DO IF YOU SMELL GAS:

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

## OPERATING INSTRUCTIONS

1.  STOP! READ THE SAFETY INFORMATION ABOVE ON THIS LABEL.
2. Set the thermostat to lowest setting.
2. Turn off all electrical power to the appliance.
4. This appliance is equipped with a device which automatically lights the burner. Do **not** try to light the burner by hand.
5. Push in control knob slightly and turn clockwise  to "OFF".
6. Wait five (5) minutes to clear out any gas. If you smell gas,  STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go on to the next step.
7. Turn gas control knob counterclockwise  to "ON".
8. Turn on all electric power to the appliance.
9. Set thermostat to desired setting.
10. If the Appliance will not operate, follow the instructions "To Turn Off gas to Appliance" and call your service technician or gas supplier.



GAS CONTROL KNOB

## TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. TURN OFF ALL ELECTRICAL POWER TO THE APPLIANCE IF SERVICE IS TO BE PERFORMED.
3. Push in gas control knob slightly and turn clockwise  to "OFF", do not force.

## GENERAL INFORMATION

### POWER BURNER

The SEQUENCE OF OPERATION is provided on page 21 and the INITIAL START-UP procedure of the unit on page 23.

### HIGH LIMIT

The high limit switch (not adjustable) is factory set to cutout at 199°F (93°C). The controller must be manually reset by cycling the power to the unit and the water temperature must be below 180°F (82°C).

TABLE 4

GAS SUPPLY SPECIFICATIONS	RTF-120 Natural Gas
Max. Gas Supply Pressure W.C.	14.0 (3 kPa)
Nominal Gas Supply Press. W.C.	7.0 (1.74 kPa)
Minimal Gas Supply Press. W.C.	6.2 (1.53 kPa)
Manifold Press. W.C.	4.5 (1 kPa)

### HIGH ALTITUDE INSTALLATIONS



#### WARNING

THE SRT80-120E IS CERTIFIED FOR USE WITHOUT MODIFICATION FOR ALTITUDES UP TO 2000 FEET. INSTALLATIONS ABOVE 2000 FEET MAY REQUIRE REPLACEMENT OF THE BURNER ORIFICE IN ACCORDANCE WITH THE NATIONAL FUEL GAS CODE (ANSI Z223.1/ NFPA 54). FAILURE TO REPLACE THE ORIFICE WILL RESULT IN IMPROPER AND INEFFICIENT OPERATION OF THE APPLIANCE, PRODUCING CARBON MONOXIDE GAS IN EXCESS OF SAFE LIMITS, WHICH COULD RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

Some gas utility companies derate their gas for altitude, making it unnecessary to install high altitude orifices. Call the local gas or utility company to verify BTU content.

Due to the input rating reduction at high altitudes, the output rating of the appliance is also reduced and should be compensated for in the sizing of the equipment for applications.

## MAINTENANCE

### GENERAL

KEEP APPLIANCE AREA CLEAR AND FREE FROM COMBUSTIBLE MATERIALS, GASOLINE AND OTHER FLAMMABLE VAPORS AND LIQUIDS. (SEE WARNING ON PAGE 11, LOCATING THE HEATER).

Water heater maintenance includes periodic tank flushing and cleaning, and removal of lime scale. The unit should be inspected and adjusted to maintain proper combustion. Refer to the following table. A periodic inspection of the venting system should be made. Where used, the water circulating pump should be oiled.

COMPONENT	OPERATION	INTERVAL	REQUIRED
Tank	Sediment Removal	Monthly	Flushing
Tank	Lime Scale Removal	Semi-Annually	UN-LIME® Delimer
Anode Rods	Inspect	Semi-Annually	Replace as Required
Relief Valve	Inspect	Semi-Annually	
Circulating Pump (1)	Oiling	Four Months	SAE No. 20 non-detergent motor oil
Blower	Clean Inlet Screen and Blower Wheel	As Required	Soft Brush
Vent System	Inspect	Every 3 Months	Joints should be sealed

(1) If furnished with oiling provision.

## MAINTENANCE SCHEDULE

Following are the instructions for performing some of the recommended maintenance. Unit inspection and adjustment should be performed by a competent technician.

### FLUSHING

1. Turn off the heater electrical disconnect switch.
2. Open the drain valve and allow water to flow until it runs clean.
3. Close the drain valve when finished flushing.
4. Turn on the heater electrical disconnect switch.

### DRAINING

Maintenance and service procedures may also require draining the heater.

1. Turn off the heater electrical disconnect switch.
2. Close the cold water inlet valve to heater.
3. Open a nearby hot water faucet to vent the system.
4. Open the gate valve on plumbing manifold.
5. If the heater is being drained for an extended shutdown, it is suggested the drain valve be left open during this period.
  - Follow FILLING instructions when restoring hot water service.

### SEDIMENT REMOVAL

Waterborne impurities consist of the particles of soil and sand which settle out and form a layer of sediment on the bottom of the tank.

For convenience, sediment removal and lime scale removal should be performed at the same time.

### LIME SCALE REMOVAL

The amount of calcium carbonate (lime) released from water is in direct proportion to water temperature and usage. The higher the water temperature or water usage, the more lime deposits are dropped out of the water. This is the lime scale which forms in pipes, heaters and on cooking utensils.

Lime accumulation not only reduces the life of the equipment but also reduces efficiency of the heater and increases fuel consumption.

The usage of water softening equipment greatly reduces the hardness of the water. However, this equipment does not always remove all of the hardness (lime). For this reason it is recommended that a regular schedule for deliming be maintained.

The depth of lime buildup should be measured periodically. Heaters will have about 3" (7.6cm) of lime buildup when the level of lime has reached the bottom of the cleanout opening or about 1" (2.5cm) of lime buildup if it has reached the drain valve opening. A schedule for deliming should be set up, based on the amount of time it would take for a 1" (2.5cm) buildup of lime.

Example 1:

Initial six-month inspection shows 1/2" (1.3cm) of lime accumulation. Therefore, the heater can be delimed once a year.

Example 2 :

Initial six-month inspection shows 2" (5cm) of lime accumulation. Therefore, the heater should be delimed every 3 months.

Sediment and lime scale removal may be accomplished through the cleanout opening furnished on the heater. The heater must be drained, see DRAINING, before removing cleanout cover on tank.

To dissolve and remove the more stubborn mineral deposits, SRT80-120NE UN•LIME® Professional Delimer should be used.

SRT80-120NE UN•LIME® Professional Delimer is an easy to handle patented food grade acid formulated specifically for lime scale removal from all types of water using equipment. Available in 1 gallon (3.8L) (part no. 4763) and 5 gallon (19L) (part no. 4813) sizes. Hydrochloric base acids are not recommended for use on glass-lined tanks.

SRT80-120NE Form No. 4800, entitled "Why, When and How", describes tank cleaning methods and materials. UN•LIME and the booklet may be obtained through your State dealer or distributor.

To clean heater through cleanout opening, proceed as follow:

1. Turn off water inlet valve, the heater electrical disconnect switch and open gate valve.
2. Drain the tank.
3. Remove cover from cleanout opening on front of tank assembly.
4. Remove lime, scale or sediment using care not to damage the glass-lining.
5. Inspect cleanout plate gasket.
6. Install cleanout plate. Be sure to draw plate up tight by tightening screws securely.
7. Close gate valve, open water inlet line and turn on the power burner electrical disconnect switch.
8. Check for water leakage.

## ANODE INSPECTION AND REPLACEMENT

This water heater is equipped with a sacrificial anode. Anodes protect the glass-lined tank from corrosion by sacrificing themselves through electrolysis. When the anode material is consumed, there is no more protection and corrosion of the tank accelerates

Inspection of the anode every 6 to 12 months allows you to identify a spent anode and replace it. Replace the anode when its diameter is 3/8" (1cm) of an inch, or annually which ever is first. Aggressive, very hot and softened water causes rapid consumption of the anode requiring frequent inspections. Anodes are available from your distributor or State Industries.

### To inspect or replace an anode:

The anodes on this heater are easily accessible from the front of the heater making replacement simple and quick.

1. Turn the heater off per the lighting instructions.
2. Open the drain valve to flush any sediment out of the bottom of the heater.
3. Shut off the cold water supply. Make sure all hot water fixtures and circulating pumps are turned off.
4. Make sure tank is drained. Remove the anode using a socket of the appropriate size. Do not use an impact wrench.
5. Inspect and replace the anode as required. Use a pipe tape or sealant when reinstalling the anode.
6. Close the drain valve. Open a hot water fixture to allow air to escape. Open the cold water supply to heater and allow the tank to fill. Follow the lighting instructions.
7. Check your anode and drain valve for leaks.

## DRAIN VALVE AND ACCESS PANELS

The heater is equipped with a 3/4" drain valve.

An access panel covers the front of the tank.

## RELIEF VALVE

At least twice a year, the temperature and pressure relief valve should be checked to ensure that it is in operating condition. To check the relief valve, lift the lever at the end of the valve several times. The valve should seat properly and operate freely.

If water does not flow, remove and inspect for obstructions or corrosion. Replace with a new valve of the recommended size as necessary. Inspection of the valve should be performed at least every three years. Do not attempt to repair the valve, as this could result in improper operation and a tank explosion. In areas with poor water conditions, it may be necessary to inspect the T&P valve more often than every three years.



**BEFORE MANUALLY OPERATING THE VALVE, MAKE SURE THAT A DRAIN LINE HAS BEEN ATTACHED TO THE VALVE TO DIRECT THE DISCHARGE TO AN OPEN DRAIN. FAILURE TO TAKE THIS PRECAUTION COULD MEAN CONTACT WITH EXTREMELY HOT WATER PASSING OUT THE VALVE DURING THIS CHECKING OPERATION.**

If the temperature and pressure relief valve on the heater discharges periodically or continuously, it may be due to thermal expansion of water in a closed water supply system, or, it may be due to a faulty relief valve.

Thermal expansion is the normal response of water when it is heated. In a closed system, thermal expansion will cause the system pressure to build until the relief valve actuation pressure is equaled. Then, the relief valve will open, allowing some water to escape, slightly lowering the pressure.

Water heater damage due to installation in a closed system is not covered by the limited warranty. The solution is to install a thermal expansion tank between the check valve and the water heater.

**ABOVE ALL, DO NOT PLUG THE TEMPERATURE AND PRESSURE RELIEF VALVE. THIS IS NOT A SOLUTION AND CAN CREATE A HAZARDOUS SITUATION.**

## CIRCULATING PUMP

The water heating system includes several circulating pumps. It should be lubricated as directed by the circulator manufacturer.

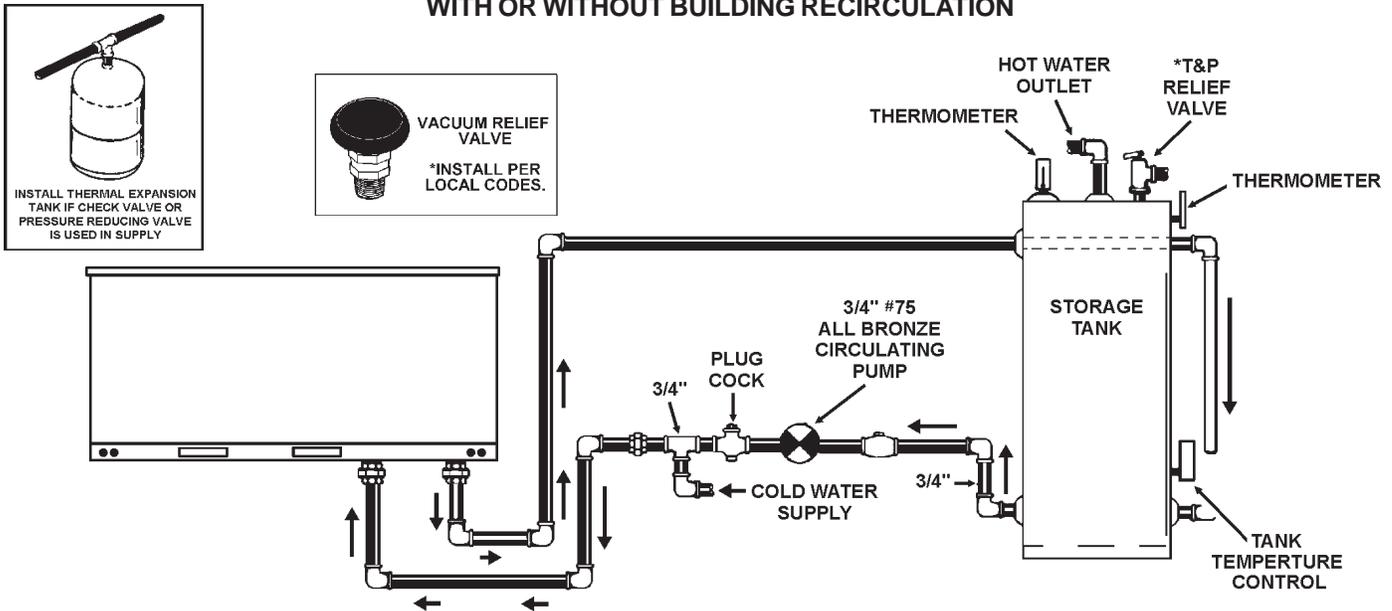
## VENT SYSTEM

Examine the vent system every 3 months. Points of inspection are as follows:

1. Check for obstructions and/or deterioration of vent terminals.
2. Vent from screen should be cleaned of foreign material and soot. The screen is located inside the vent outlet and is accessible from the outside of the hood. Do not reach inside the vent terminal when the heater is in operation.
3. Check all vent system connections for leakage and reseal as required using Hi Temp Silicone sealer or equivalent (inside cabinet).

# INSTALLATION DIAGRAMS

## ONE TEMPERATURE - ONE HEATER VERTICAL STORAGE TANK FORCED CIRCULATION WITH OR WITHOUT BUILDING RECIRCULATION



**CAUTION:** IF BUILDING COLD WATER SUPPLY HAS A BACK-FLOW PREVENTER, CHECK VALVE OR WATER METER WITH CHECK VALVE PROVISIONS FOR THERMAL EXPANSION OF WATER IN THE HOT WATER SYSTEM MUST BE PROVIDED

**NOTE:** CONNECT RETURN LINE FROM HOT WATER CIRCULATING LOOP (IF USED) TO COLD WATER INLET LINE.

\* PIPE TO OPEN DRAIN

INSTALL IN ACCORDANCE WITH LOCAL CODES

## ONE TEMPERATURE - ONE HEATER HORIZONTAL STORAGE TANK FORCED CIRCULATION WITH OR WITHOUT BUILDING RECIRCULATION

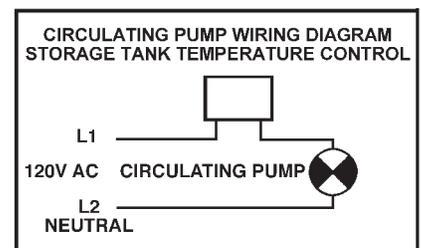
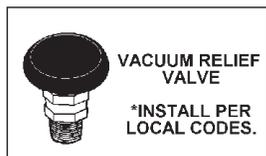
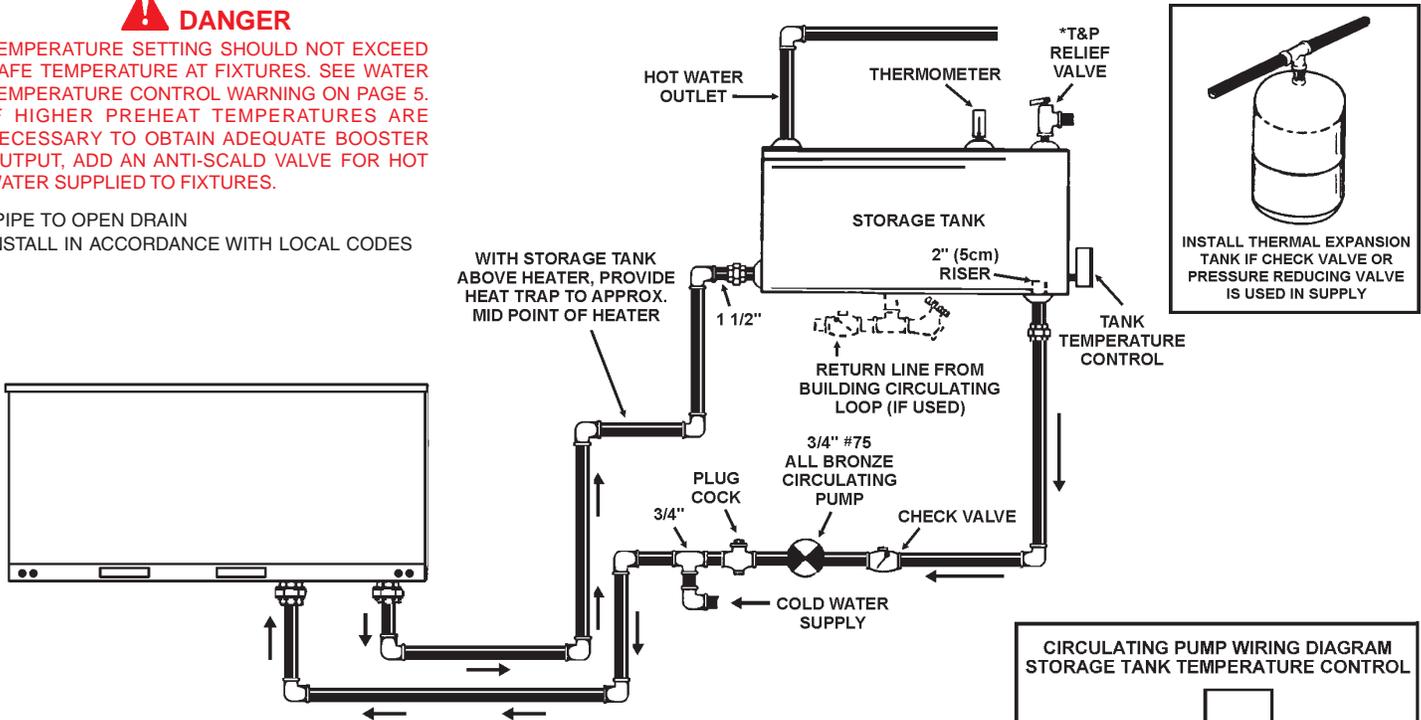


**DANGER**

TEMPERATURE SETTING SHOULD NOT EXCEED SAFE TEMPERATURE AT FIXTURES. SEE WATER TEMPERATURE CONTROL WARNING ON PAGE 5. IF HIGHER PREHEAT TEMPERATURES ARE NECESSARY TO OBTAIN ADEQUATE BOOSTER OUTPUT, ADD AN ANTI-SCALD VALVE FOR HOT WATER SUPPLIED TO FIXTURES.

\*PIPE TO OPEN DRAIN

INSTALL IN ACCORDANCE WITH LOCAL CODES



WIRING DIAGRAM FOR BOILER TO TANK LOOP AND/OR HOT WATER LOOP (IF USED).

## TWO TEMPERATURE - ONE HEATER HIGH TEMPERATURE WITH OR WITHOUT BUILDING RECIRCULATION



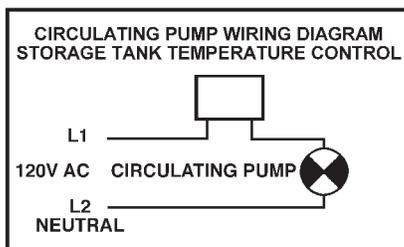
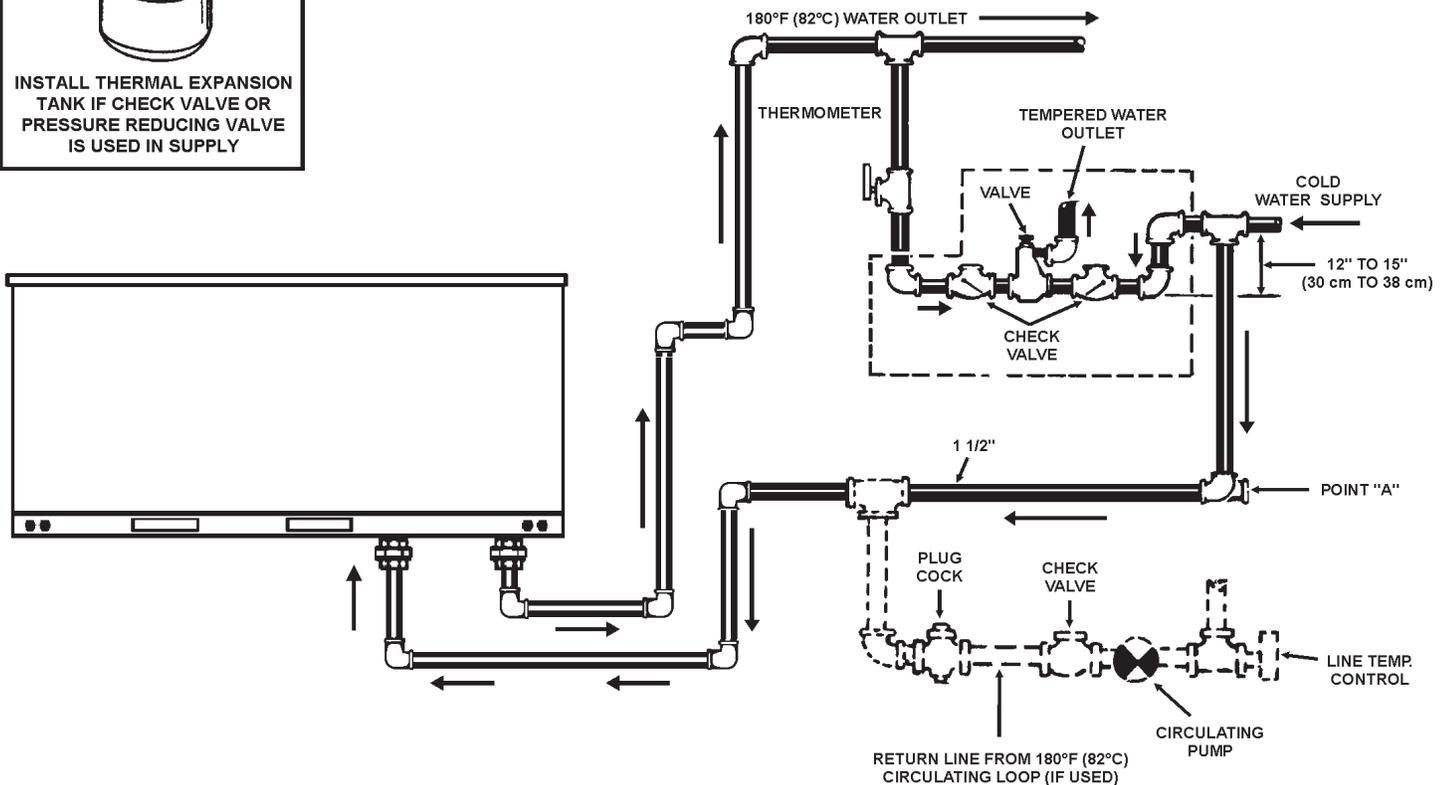
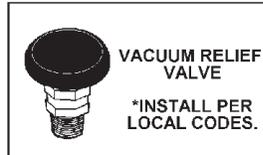
TEMPERATURE SETTING SHOULD NOT EXCEED SAFE TEMPERATURE AT FIXTURES. SEE WATER TEMPERATURE CONTROL WARNING ON PAGE 5. IF HIGHER PREHEAT TEMPERATURES ARE NECESSARY TO OBTAIN ADEQUATE BOOSTER OUTPUT, ADD AN ANTI-SCALD VALVE FOR HOT WATER SUPPLIED TO FIXTURES.

CAUTION: IF BUILDING COLD WATER SUPPLY HAS A BACK-FLOW PREVENTER, CHECK VALVE OR WATER METER WITH CHECK VALVE PROVISIONS FOR THERMAL EXPANSION OF WATER IN THE HOT WATER SYSTEM MUST BE PROVIDED.

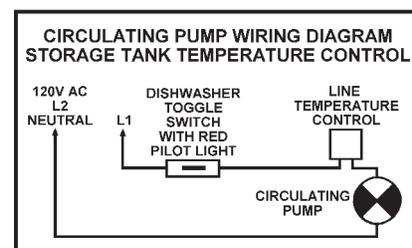
\*PIPE RELIEF VALVE TO OPEN DRAIN.

**NOTE:** IF TEMPERED WATER IS RECIRCULATED, RETURN LINE SHOULD BE CONNECTED AT POINT "A".

INSTALL IN ACCORDANCE WITH LOCAL CODES.

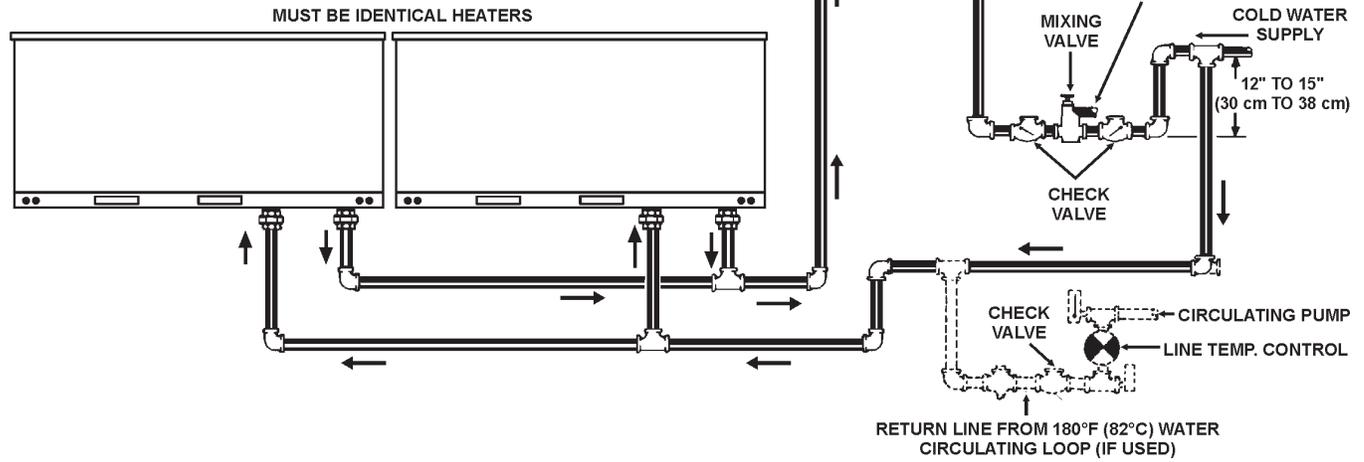
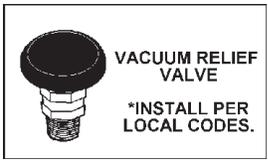


**WIRING DIAGRAM FOR BOILER TO TANK LOOP  
AND/OR HOT WATER LOOP (IF USED).**

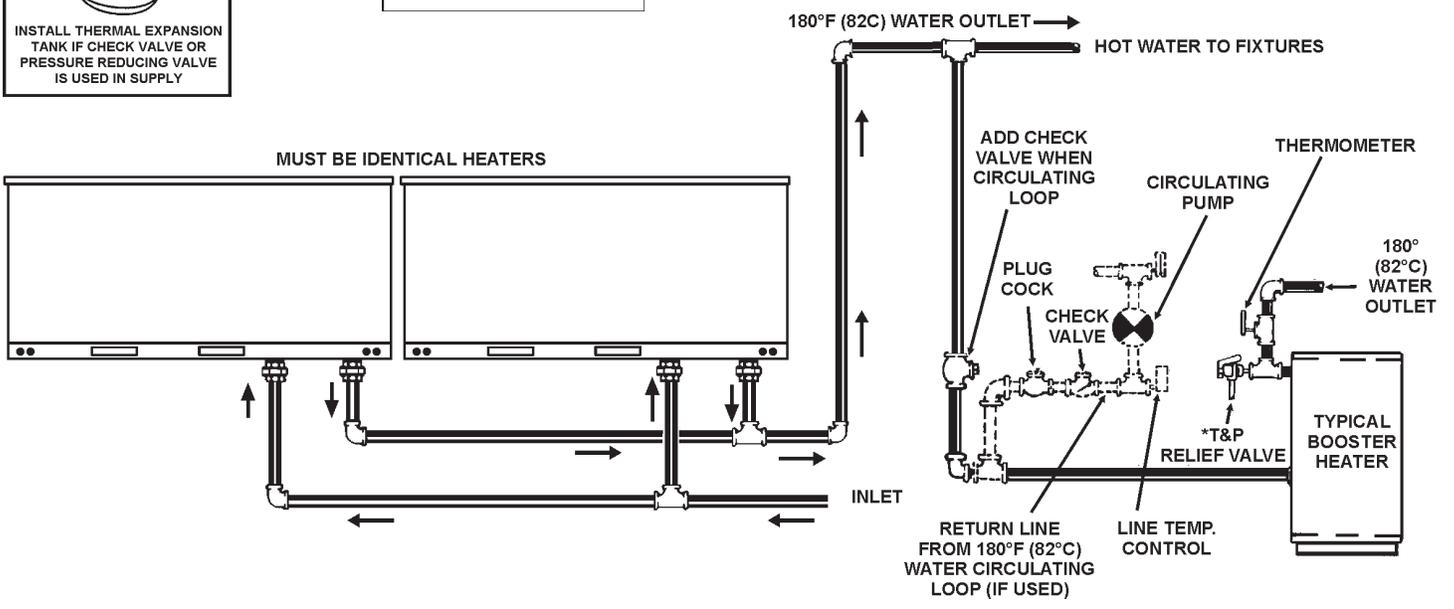
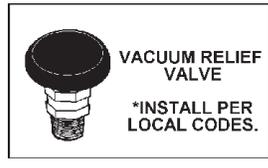
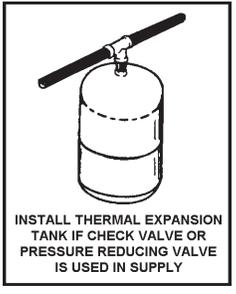


**WIRING DIAGRAM FOR  
180°F (82°C) LOOP (IF USED).**

**TWO TEMPERATURE - TWO HEATERS HIGH TEMPERATURE WITH OR WITHOUT BUILDING RECIRCULATION**



**TWO TEMPERATURE - THREE HEATERS (TWO PRE-HEATERS/ONE BOOSTER HEATER) WITH OR WITHOUT BUILDING RECIRCULATION**



FOR MULTIPLE HEATER INSTALLATION SEE MANIFOLD KIT SPECIFICATIONS.

**CAUTION: IF BUILDING COLD WATER SUPPLY HAS A BACK-FLOW PREVENTER, CHECK VALVE OR WATER METER WITH CHECK VALVE PROVISIONS FOR THERMAL EXPANSION OF WATER IN THE HOT WATER SYSTEM MUST BE PROVIDED.**



TEMPERATURE SETTING SHOULD NOT EXCEED SAFE TEMPERATURE AT FIXTURES. SEE WATER TEMPERATURE CONTROL WARNING ON PAGE 5. IF HIGHER PREHEAT TEMPERATURES ARE NECESSARY TO OBTAIN ADEQUATE BOOSTER OUTPUT, ADD AN ANTI-SCALD VALVE FOR HOT WATER SUPPLIED TO FIXTURES.

## TWO TEMPERATURE - TWO HEATERS (ONE PRE-HEATER/ONE BOOSTER HEATER) WITH OR WITHOUT BUILDING RECIRCULATION



TEMPERATURE SETTING SHOULD NOT EXCEED SAFE TEMPERATURE AT FIXTURES. SEE WATER TEMPERATURE CONTROL WARNING ON PAGE 5. IF HIGHER PREHEAT TEMPERATURES ARE NECESSARY TO OBTAIN ADEQUATE BOOSTER OUTPUT, ADD AN ANTI-SCALD VALVE FOR HOT WATER SUPPLIED TO FIXTURES.

\* PIPE RELIEF VALVE TO OPEN DRAIN

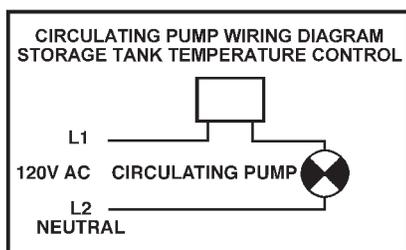
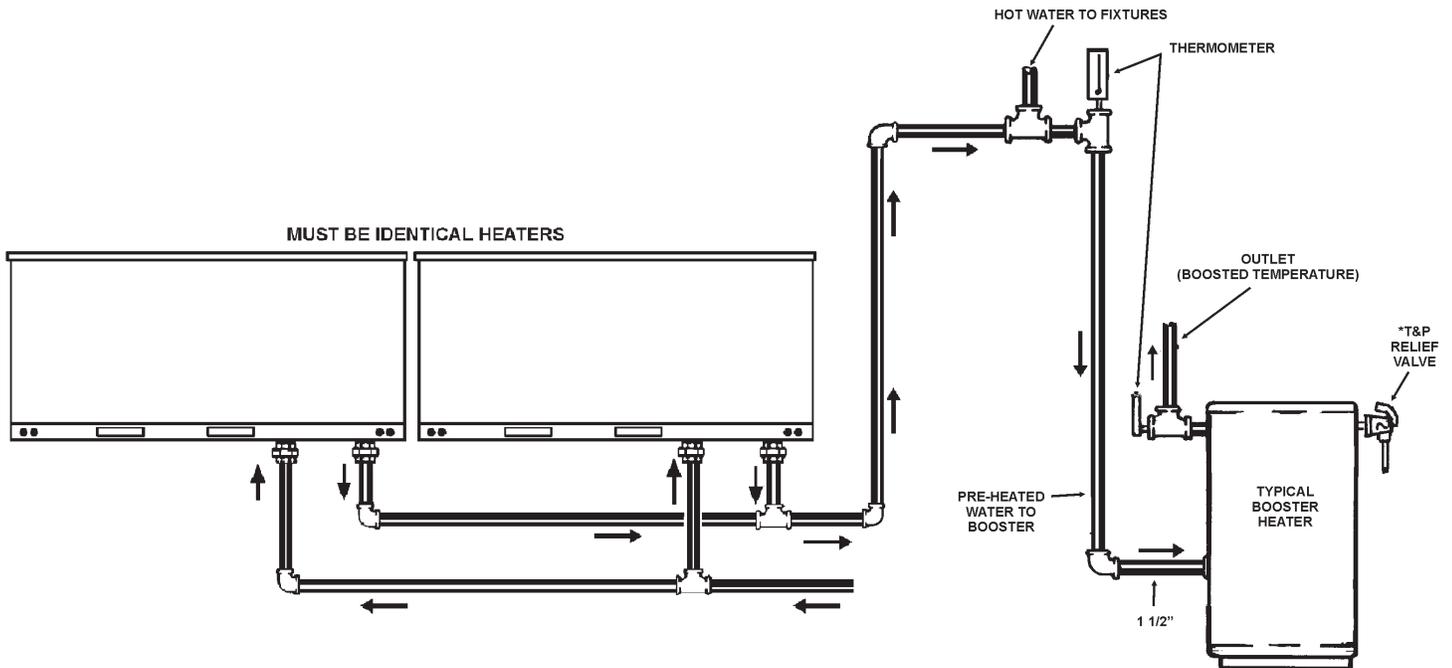
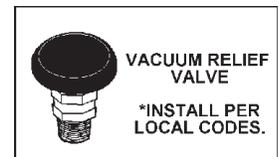
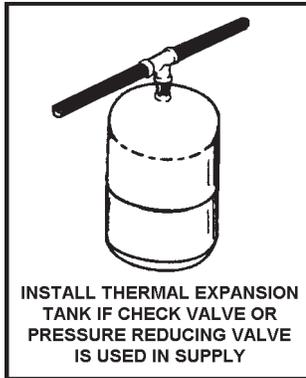
\*\* 140°F (60°C) TO 150°F (66°C) SHOULD BE MAXIMUM WATER TEMPERATURE MAINTAINED IN THE PRE-HEATERS.

120°F (49°C) SHOULD BE THE MINIMUM TEMPERATURE OF WATER IN THE PRE-HEATERS.

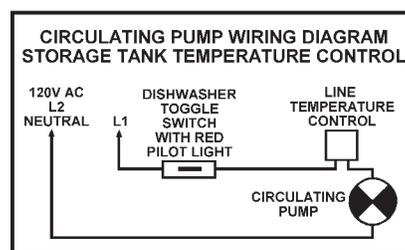
CONNECT CIRCULATING LINE FROM FIXTURES, IF USED, TO COLD WATER SUPPLY LINE OF PRE-HEATER.

CONNECT CIRCULATING LINE OF 180°F (82°C) OR BOOSTED WATER, IF USED, TO INLET WATER LINE TO BOOSTER.

INSTALL IN ACCORDANCE WITH LOCAL CODES.

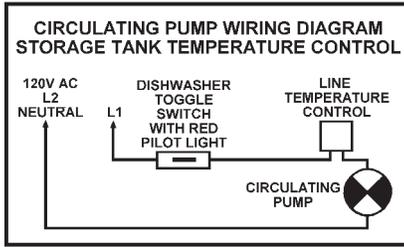


WIRING DIAGRAM FOR BOILER TO TANK LOOP AND/OR HOT WATER LOOP (IF USED).

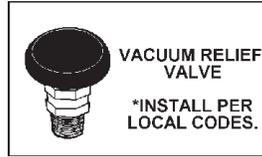


WIRING DIAGRAM FOR 180°F (82°C) LOOP (IF USED).

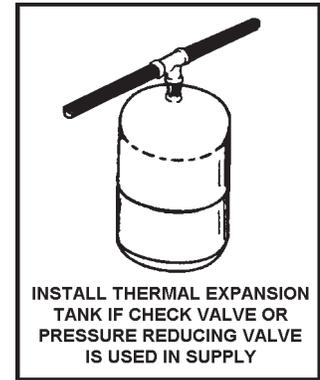
**TWO TEMPERATURE - ONE HEATER HIGH TEMPERATURE WITH RECIRCULATION OF SANITIZING LOOP**



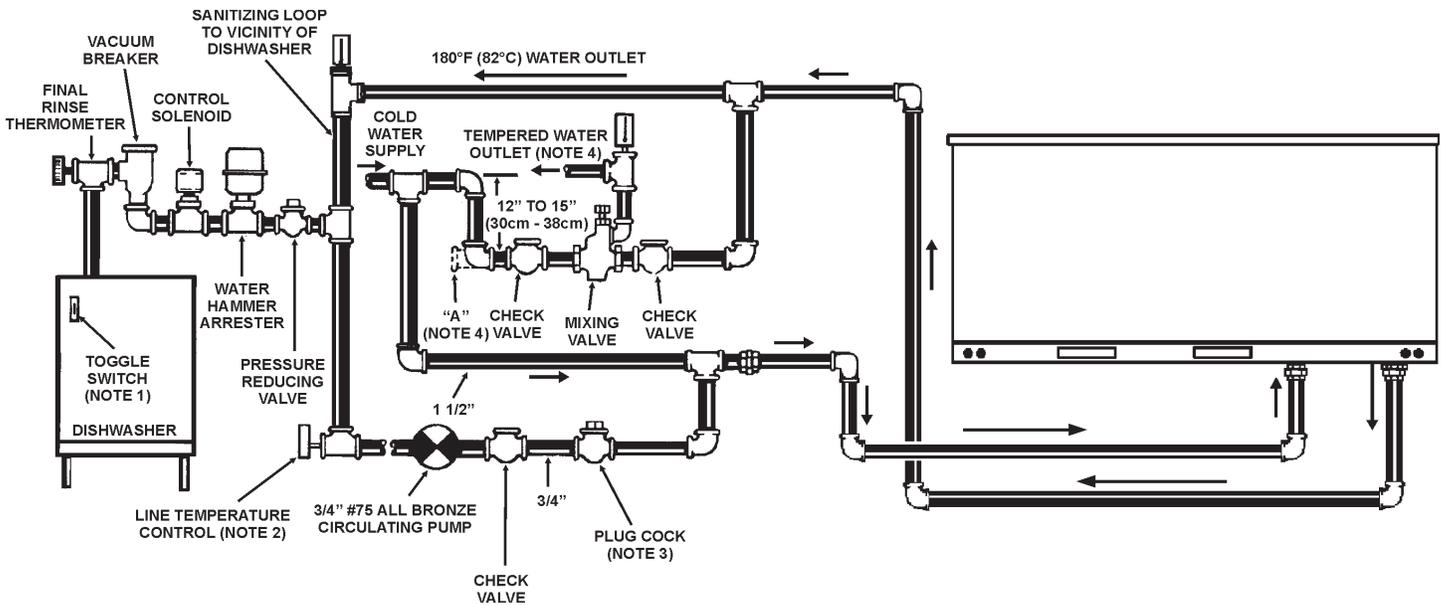
**WIRING DIAGRAM FOR 180°F (82°C) LOOP (IF USED).**



**VACUUM RELIEF VALVE**  
\*INSTALL PER LOCAL CODES.



**INSTALL THERMAL EXPANSION TANK IF CHECK VALVE OR PRESSURE REDUCING VALVE IS USED IN SUPPLY**



**⚠ DANGER**

TEMPERATURE SETTING SHOULD NOT EXCEED SAFE TEMPERATURE AT FIXTURES. SEE WATER TEMPERATURE CONTROL WARNING ON PAGE 5. IF HIGHER PREHEAT TEMPERATURES ARE NECESSARY TO OBTAIN ADEQUATE BOOSTER OUTPUT, ADD AN ANTI-SCALD VALVE FOR HOT WATER SUPPLIED TO FIXTURES.

**CAUTION:** IF BUILDING COLD WATER SUPPLY HAS A BACK-FLOW PREVENTER, CHECK VALVE OR WATER METER WITH CHECK VALVE PROVISIONS FOR THERMAL EXPANSION OF WATER IN THE HOT WATER SYSTEM MUST BE PROVIDED.

\*PIPE RELIEF VALVE TO OPEN DRAIN.

INSTALL IN ACCORDANCE WITH LOCAL CODES.

**NOTE 1:** TOGGLE SWITCH CONTROLS 180°F (82°C) WATER CIRCULATION. INSTALL ON OR CLOSE TO DISHWASHER. TOGGLE SWITCH MUST BE CLOSED (ON) DURING THE RINSE OPERATION AND OPEN (OFF) WHEN DISHWASHER IS NOT OPERATING OR WHEN ON LONG STANDBY.

**NOTE 2:** INSTALL LINE TEMPERATURE CONTROL IN AN UNINSULATED TEE BEYOND THE DISHWASHER TAKEOFF IN THE SANITIZING LOOP. CONTROL SHOULD BE SET AT 185°F (85°C).

**NOTE 3:** ADJUST PLUG COCK SO THE SANITIZING LOOP FLOW RATE DOES NOT CAUSE UNNECESSARY TURBULENCE IN THE TANK.

**NOTE 4:** IF TEMPERED WATER IS RECIRCULATED, RETURN LINE SHOULD BE CONNECTED AT POINT A.

## CHECKLIST AND SERVICE INFORMATION

### IMPORTANT

The installer may be able to observe and correct certain problems which might arise when the unit is put into operation or when it is re-fired after a prolonged shutdown. HOWEVER, it is recommended that only qualified servicemen, using appropriate test equipment, be allowed to service the heater.

BE SURE TO TURN OFF THE ELECTRICITY WHENEVER POSSIBLE OR APPROPRIATE WHILE CHECKING EQUIPMENT.



### WARNING

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

**CAUTION:** LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION.

VERIFY PROPER OPERATION AFTER SERVICING.

### BURNER OPERATIONAL PROBLEMS

1. Refer to TROUBLESHOOTING.

### NOT ENOUGH OR NO HOT WATER

1. Be certain the electrical disconnect switch serving the water heater is in the ON position.
2. Check the fuses.
  - The electrical disconnect switch usually contains fuses.
3. The capacity of the heater may have been exceeded by a large demand for hot water.
  - Large demands require a recovery period to restore water temperature.
4. Colder incoming water temperature will lengthen the time required to heat water to the desired temperature.
  - If the heater was installed when incoming water temperature was warm, colder water creates the effect of less hot water.
5. Look for hot water wastage and leaking or open hot water faucets.
6. Sediment or lime scale may be affecting water heater operation. Refer to MAINTENANCE for details.
7. The heater's temperature high limit sensor has activated. Reset high limit.
8. Burner may not be firing at proper rate.
  - Check gas pressure. Adjust to obtain required manifold pressure.
9. Burner fan wheel may be dirty.
  - Clean fan wheel with a stiff brush.

### WATER IS TOO HOT

1. Refer to WATER TEMPERATURE CONTROL.

## WATER HEATER MAKES SOUNDS

1. Sediment or lime scale accumulations cause rumbling and pounding noises when the heater is operating.
  - The sounds are normal, however, the tank bottom should be cleaned. Refer to MAINTENANCE for details.
2. Some of the electrical components of the water heater make sounds which are normal.
  - Contacts click or snap as the heater starts and stops.
  - Transformers often hum.

## WATER LEAKAGE IS SUSPECTED

1. Check to see if the water heater gate valve is tightly closed. Also check the cleanout opening for leakage.
2. The apparent leakage may be condensation which forms on cool surfaces of the heater and piping.
3. If the outlet of the relief valve is leaking it may represent:
  - Excessive water pressure.
  - Excessive water temperature.
  - Faulty relief valve.

Excessive water pressure is the most common cause of relief valve leakage. It is often caused by a "closed system". If a check valve is in the inlet system it will not permit the expanded hot water volume to equalize pressure with the main. The relief valve must release this water or the water heater or plumbing system will be damaged. Refer to MAINTENANCE-RELIEF VALVE section in this manual.

Water heater damage due to installation in a closed system is not covered by the limited warranty. The solution is to install a thermal expansion tank between the check valve and the water heater.

## TROUBLE-SHOOTING

1. Verify that all vent terminals are free of debris.
2. Check supply wire polarity - hot to hot and neutral to neutral and no "stray" current in neutral.
3. Heater is properly grounded.

Checking these four (4) items first will often result in a timely solution to the service call.



### WARNING

JUMPING OUT COMPONENTS AND/OR CIRCUITS DURING TROUBLESHOOTING CAN CAUSE SERIOUS PROBLEMS WITH THE UNIT'S OPERATING SEQUENCE AND IGNITION SAFETY. IF YOU DO NOT HAVE THE PROPER TEST EQUIPMENT, I.E. A VOLT-OHM METER AND A MICROAMMETER, DO NOT ATTEMPT TO TROUBLESHOOT OR REPAIR.

ALTERING THE CONTROLLER AND/OR CONTROLLER WIRING IN ANY WAY COULD RESULT IN INTERNAL DAMAGE TO THE MODULE CIRCUITS, POSSIBLY ALTERING THE IGNITION SEQUENCE ALLOWING GAS VALVES TO OPEN BEFORE THE HOT SURFACE IGNITER IS UP TO IGNITION TEMPERATURE.

**NOTE: ANY BYPASS OR ALTERATION OF THE UNITS SAFETIES WILL RESULT IN VOIDING THE APPLIANCE WARRANTY.**

Before performing any troubleshooting familiarize yourself with the particular appliance.

Refer to the SEQUENCE OF OPERATION on page 21 before continuing.

Make sure the appliance is connected to a 120V AC power supply, manual gas valve is in the ON position, and all electrical connections are secure before continuing to troubleshoot this appliance.



**THE WATER HEATER IS POLARITY SENSITIVE. BEFORE APPLYING ELECTRICITY TO THIS HEATER BE CERTAIN THAT SUPPLY NEUTRAL WIRE TO GROUND CHECK INDICATES ZERO VOLTAGE.**

**BLOWER MOTOR WILL NOT RUN**

1. Confirm 120V AC to the controller. Also, to verify correct polarity, check for 120 V AC between hot supply and ground.

If there is no voltage, check for a loose connection where it connects to the controller.

2. If there is 120 volts to the controller, check for loose connections or a locked rotor. If the rotor cannot be freed the motor and blower assembly must be replaced.

**MOTOR RUNS, PREPURGE TIME ELAPSES BUT MAIN FLAME NOT ESTABLISHED.**

1. Check to see if main manual gas valve is open.
2. Check for a loose connection at the transformer, or a defective transformer.
3. Check for a loose connection at the gas valve.
4. Check for open pressure switches or open E.C.O. Check for blockage in the intake and exhaust vent hoods. If no blockage is found, check vinyl tubing for cuts or crimps. If this tubing is damaged it must be replaced. If these steps do not eliminate the problem, replace the pressure switches.
5. Check to see if there is resistance across the igniter terminal with an ohmmeter. If there is no continuity, the igniter is broken and should be replaced.

If the igniter appears to function properly, then verify that the inlet pressure is 14" Natural Gas (3 kPa) maximum. The gas valve supplied on this appliance is not designed to open against a higher pressure. At this time also check that the inlet pressure is not lower than the minimal gas supply pressure, as shown in Table 4: that is, for Natural Gas, 6.2" W.C. If the inlet pressure is not within these limits then adjust the supply pressure accordingly.

If the inlet pressure falls within the allowable limits, then verify that the manifold pressure, when the gas is fully open, with the heater running, is as called out in Table 4: that is, 4.5" (1 kPa) W.C. for Natural Gas. If the manifold pressure is not correct then adjust accordingly. See ADJUSTMENT PROCEDURE in OPERATING INSTRUCTIONS selection, page 21, for the manifold pressure adjustment procedure.

6. If the inlet and manifold pressures are within the limits specified in step 5, then reset the appliance. Verify 24V AC at the gas valve during the three (3) second ignition trial, after the igniter reaches operating temperature. If 24V AC at the gas valve is not seen during this period, the controller must be replaced.

If there is 24V AC at the gas valve during the four second ignition trial and the manifold pressure does not increase above 0" W.C. then verify that the manual gas control valve is in the "ON" position. If the valve is in the "ON" position and the previous voltage and gas pressure conditions are met, then the gas valve is defective and must be replaced.

Note that a positive manifold pressure reading of approximately 1.5" (.38 kPa) W.C. is normal during the prepurge portion of the ignition cycle due to the location of the gas orifice.

**MOTOR RUNS, BURNER LIGHTS MOMENTARILY, THEN LOCKS OUT**

1. Reset the appliance two more times to ensure that all of the air has been purged from the gas line.
2. If the burner lights momentarily but does not sustain ignition, verify that the inlet pressure is not greater than 14.0" (3.5 kPa) W.C. or lower than the minimal gas supply pressure, as shown in Table 4: that is, 6.0" for Natural Gas. Also, the manifold pressure should rise during the three (3) second trial for ignition. If the manifold pressure is not correct then adjust accordingly. See ADJUSTMENT PROCEDURE in OPERATING INSTRUCTIONS section, page 18, for the manifold pressure adjustment procedure.
3. Check for the reversed polarity in the supply wiring. This controller is polarity sensitive. If the hot and neutral supply wires are reversed, the controller will not sense flame. Reverse the supply wires and try to fire the unit.

**NOTE:** Always turn off and disconnect main supply wiring before servicing the unit.

4. Check connecting wire to the flame sensor. Verify that the flame sensor has not been damaged in any way.
5. Verify that the air supply is adequate. The air inlet screen or blower wheel may be restricted. Also, check the installation for proper ventilation. See AIR REQUIREMENTS.
6. Check the venting hoods for obstructions. See VENTING.
7. Check for a maximum inlet pressure of 14" Natural Gas (3 kPa), and the manifold pressure as listed in Table 4: that is, for Natural Gas, 4.5". Please note that the manifold pressure listed is the maximum value for the manifold pressure. Do not set the manifold pressure higher than the value shown for your heater in Table 4. Overfiring the heater will result in rough ignition and/or noisy operation.
8. Confirm that the air inlet screen is free of obstructions.



**Do not reach into the burner housing or combustion chamber if the heater is still hot. Allow the heater to cool and always use gloves as the combustion chamber and the burner sleeve and housing can become very hot after operation. Overfiring is a dangerous condition that must be corrected immediately.**

**GAS FAILS TO SHUT OFF**

Check for defective gas valve or thermostat. If operation is incorrect, replace.

**REPLACEMENT PARTS**

Replacement parts may be ordered through State dealers, authorized servicers or distributors. Refer to the Yellow Pages for where to call or contact the State Water Heaters, 500 Tennessee Waltz Parkway, Ashland City, TN 37015, 1-800-821-2017. When ordering parts be sure to state the quantity, part number and description of the items including the complete model and serial number as it appears on the product. Refer to the parts list for more information.

# MODEL SRT80 120NE LIMITED WARRANTY

State Water Heaters, the warrantor, extends the following LIMITED WARRANTY to the owner of this water heater.

## 1. THE TANK

If the glass-lined tank in this water heater shall prove upon examination by the warrantor to have leaked due to natural corrosion from potable water therein, during the first THREE years after initial installation, the warrantor will supply a replacement tank less burner and controls or a complete new State water heater of equivalent size and current model at the warrantor's option. Some government agencies are requiring energy efficient standards for water heaters. In the event regulations prohibit sale of a model of equivalent size and construction, State will provide a model which complies with the regulations of your area., in which case the consumer will be charged the difference in price between the like replacement and the energy efficient model required. The warranty on the replacement water heater will be limited to the unexpired term of the original warranty.

## 2. ALL OTHER PARTS

If within ONE year after initial installation of this water heater, any part or portion shall prove upon examination by the warrantor to be defective in material or workmanship, the warrantor will repair or replace such part or portion at its option.

## 3. CONDITIONS AND EXCEPTIONS

This warranty shall apply only when the water heater is installed in accordance with local plumbing and building codes, ordinances and regulations, the printed instructions provided with it and good industry practices. In addition, a temperature and pressure relief valve, certified by A.G.A. and approved by the American Society of Mechanical Engineers, must have been installed.

a. This warranty shall apply only when the heater is used:

- (1) at temperatures not exceeding the maximum setting of its thermostat;
- (2) at water pressure not exceeding the working pressure shown on the heater;
- (3) when operated free of the damaging effects of uncontrolled water hammer;
- (4) when filled with potable water, free to circulate at all times;
- (5) in a non-corrosive and non-contaminated atmosphere;
- (6) with factory approved anode(s) installed;
- (7) in the United States, its territories or possessions, and Canada;
- (8) sized in accordance with proper sizing techniques for commercial and/or residential water heaters;
- (9) bearing a rating plate which has not been altered, defaced or removed, except as required by the warrantor;
- (10) operated with properly installed dirt leg;
- (11) fired with the fuel for which it was factory built;
- (12) fired at the factory rated input;

b. Any accident to the boiler, any misuse, abuse (including freezing) or alteration of it, any operation of it in a modified form, or any attempt to repair tank leaks will void this warranty.

c. This warranty is void if a device acting as a backflow prevention device (check valves etc.) is installed in the cold water supply the heater is connected to, unless an effective method of controlling thermal expansion is also installed at the heater(s) and operational at all times. The relief valve installed on the heater is not an acceptable method.

d. This warranty shall be void and shall have no effect if the design or structure of the water heater is, or is attempted to be modified or altered in any way, including, but not limited to, by attaching non-company approved appliances or equipment.

## 4. SERVICE AND REPAIR EXPENSES

Under the limited warranty the warrantor will provide only a replacement water heater or part thereof. The owner is responsible for all other costs. Such costs may include but are not limited to:

- a. Labor charges for service removal, repair or reinstallation of the water heater or any component part;
- b. Shipping, delivery, handling, and administrative charges for forwarding the new heater or replacement part from the nearest distributor and returning the claimed defective heater or part to such distributor.
- c. All cost necessary or incidental for any material and/or permits required for installation of the replacement.

## 5. LIMITATIONS ON IMPLIED WARRANTIES

Implied warranties, including the warranty of merchantability imposed on the sale of this heater under state law are limited to one (1) year duration for the heater or any of its parts. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

## 6. CLAIM PROCEDURE

Any claim under the warranty should be initiated with the dealer who sold the boiler, or with any other dealer handling the warrantor's products. If this is not practicable, the owner should contact:

State Water Heaters  
500 Tennessee Waltz Parkway  
Ashland City, TN 37015

a. The warrantor will only honor replacement with identical or similar water heater or parts thereof which are manufactured or distributed by the warrantor.

b. Dealer replacements are made subject to in-warranty validation by warrantor.

## 7. DISCLAIMERS

NO OTHER EXPRESS WARRANTY HAS BEEN OR WILL BE MADE IN BEHALF OF THE WARRANTOR WITH RESPECT TO THE MERCHANTABILITY OF THE HEATER OR THE INSTALLATION, OPERATION, REPAIR OR REPLACEMENT OF THE BOILER. THE WARRANTOR SHALL NOT BE RESPONSIBLE FOR WATER DAMAGE, LOSS OF USE OF THE UNIT, INCONVENIENCE, LOSS OR DAMAGE TO PERSONAL PROPERTY OR OTHER CONSEQUENTIAL DAMAGE. THE WARRANTOR SHALL NOT BE LIABLE BY VIRTUE OF THIS WARRANTY OR OTHERWISE FOR DAMAGE TO ANY PERSONS OR PROPERTY, WHETHER DIRECT OR INDIRECT, AND WHETHER ARISING IN CONTRACT OR TORT.

a. Some states do not allow the exclusion or limitation of the incidental or consequential damage, so the above limitations or exclusions may not apply to you.

b. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Fill in the following for your own reference. Keep it. Registration is not a condition of warranty. The model and serial number are found on the heater's rating plate.

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_ Date Installed \_\_\_\_\_

Dealer's Name \_\_\_\_\_

Dealer's Address \_\_\_\_\_ Phone No. \_\_\_\_\_

City and State \_\_\_\_\_ Zip Code \_\_\_\_\_

**KEEP THIS WARRANTY POSTED ADJACENT TO THE HEATER FOR FUTURE REFERENCE**



500 TENNESSEE WALTZ PARKWAY  
ASHLAND CITY, TN 37015  
Phone: 800-821-2017 Fax: 800-644-9306  
[www.statewaterheaters.com](http://www.statewaterheaters.com)