

Heat Miser Heat Exchanger System

Installation

Operations &

Maintenance

Manual



Principle of Operation

The Heat Miser is designed to efficiently harness the energy from steam to heat water for domestic or industrial use. The unit is designed to provide hot water on demand and eliminate the need for larger hot water storage tanks.

Steam Loop

Steam is supplied to the unit from the installation facility and sent through a strainer to remove any potential debris from entering the system. An electro-pneumatic (typical) control valve regulates the incoming steam based on the temperature requirements of the system. As the steam transfers heat to the water side it cools and condenses. Condensate is discharged from the bottom of the unit through a steam trap or condensate pump.

Water Loop

The hot water outlet has a temperature sensor, RTD, which allows the Controller to respond to the demand for hot water by throttling the steam control valve. A recirculation pump loop feeds hot water down to the inlet of the cold water. This acts as a primer and allows the system to recover quickly after reduced demand for hot water. A high limit switch is located at the hot water discharge as well. If the temperature is above the set point then a valve will open allowing cold water from the inlet to mix with the hot water.

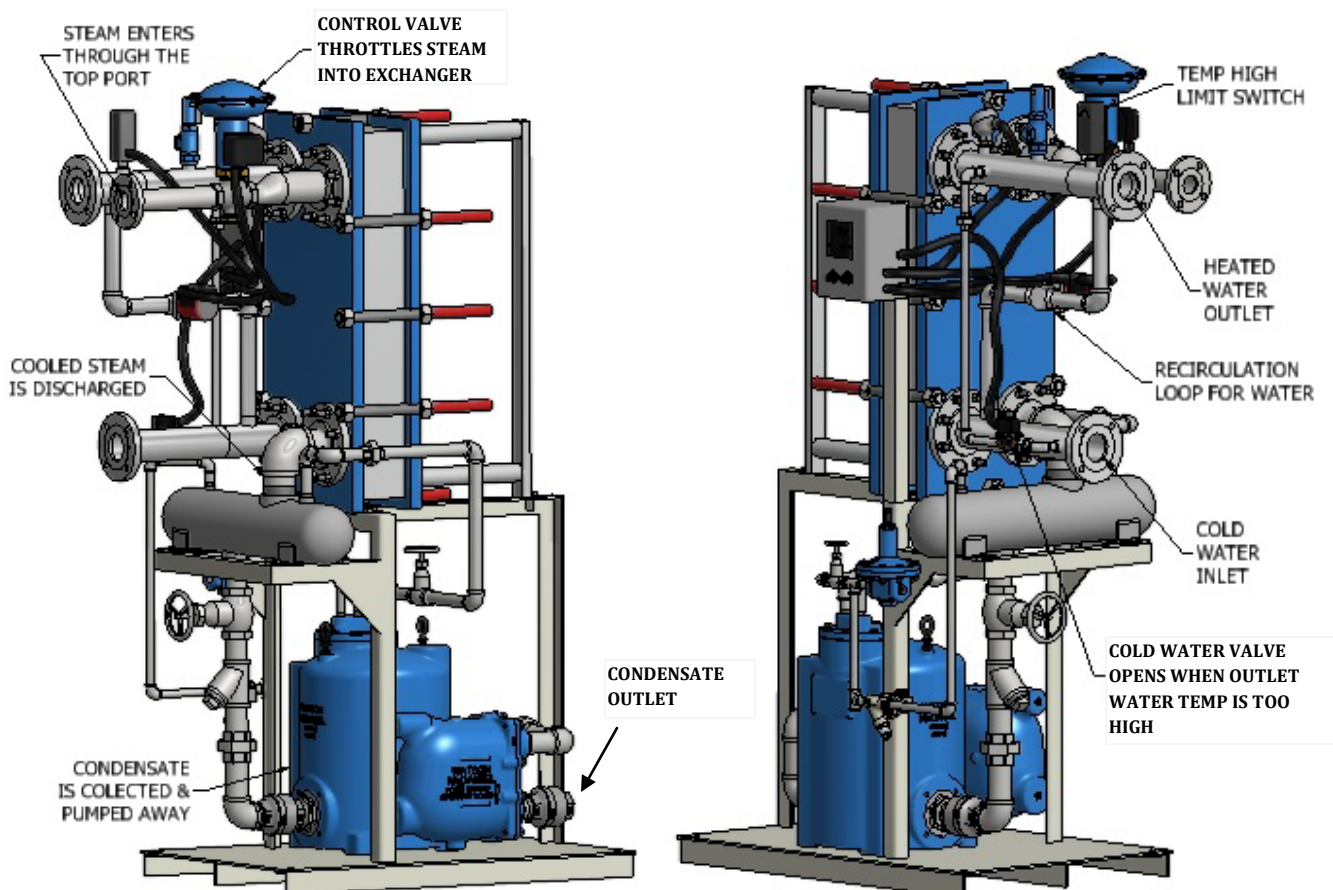


Figure 1: Typical Layout

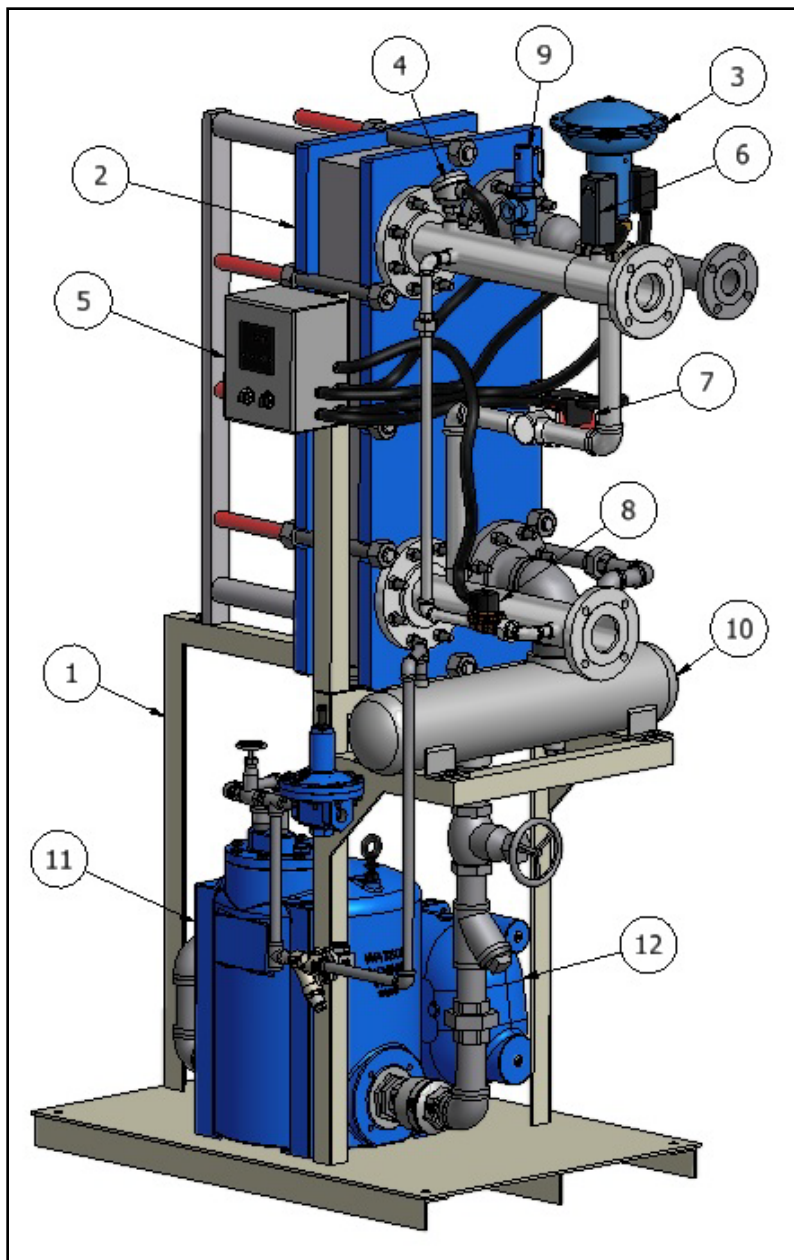


Figure 2: Typical Component Callout

HEAT MISER ASSEMBLY		
ITEM	DESCRIPTION	MATERIAL
1	Base Frame	Carbon Steel
2	Heat Exchanger	Stainless Steel
3	Steam Control Valve	Br, CI, CS, or SS
4	Temperature Sensor	Stainless Steel
5	Control Enclosure	
6	Temperature High Limit Switch	Bronze
7	Recirculation Pump	Stainless Steel
8	Cold Water Solenoid Valve	Bronze / SS
9	Temperature & Pressure Relief Valve	Bronze
10	Condensate Receiver	Carbon Steel
11	Pressure Motive Pump	Ductile Iron
12	Steam Trap	Ductile Iron

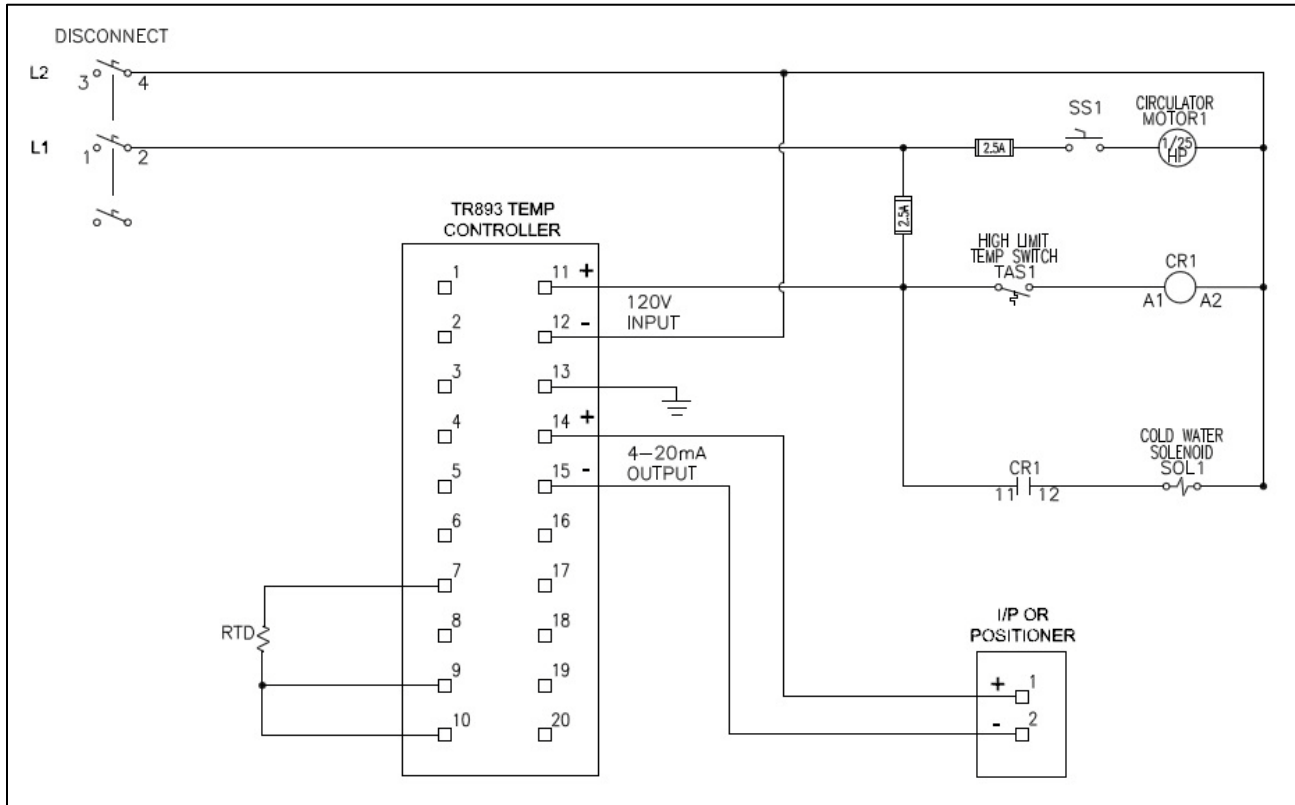
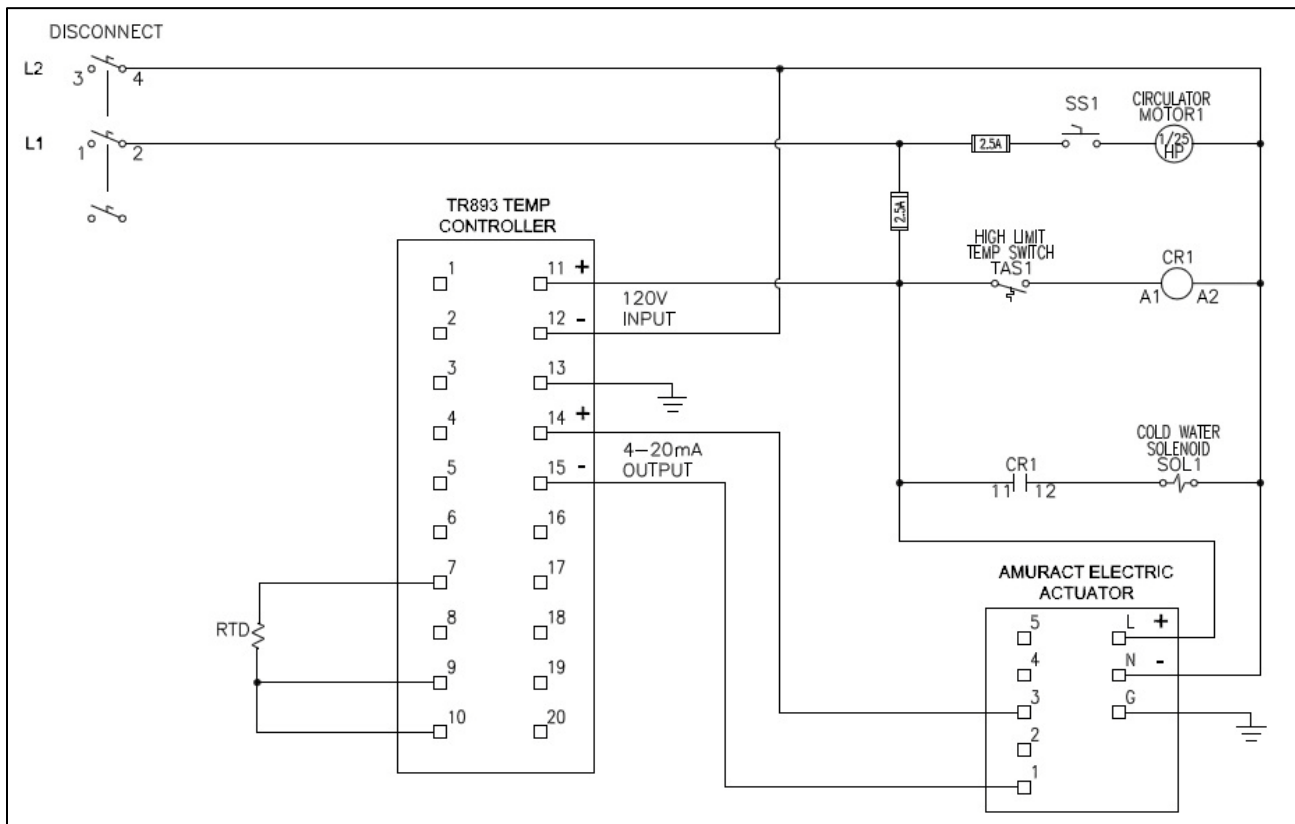
Installation

A Recommended Notes

1. Read all instructions carefully and follow to avoid injury or damage to the system.
2. Installer should be trained and experienced with all necessary mechanical, plumbing and electrical responsibilities required for the tasks.
3. The system is recommended to be handled with a fork lift in the pockets at the base of the frame. Avoid adding stresses to piping during transport.
4. Piping will need to be adequately sized to handle the flow, velocity, and pressure requirements for the heat exchangers application.
5. The unit should be installed indoors in a location that will allow complete access for maintenance.
6. Shutoff valves are strongly recommended near all connection points to the unit to allow isolation for maintenance.
7. To prevent condensate from possibly damaging the unit or pipe, an adequately sized drip leg with steam trap should be installed prior to the system.

B Installation

1. Main electrical power must be disconnected prior to installation to prevent electrical shock or equipment damage. Unit is recommended to be installed on a dedicated circuit.
2. Verify the steam supply is safely shut off.
3. After the unit is positioned properly and leveled, it shall be secured to the floor using the four anchor bolt holes located on the frame skid.
4. Clean out existing pipe with steam or compressed air to remove mill scale and debris buildup. Buildup in the lines could cause damage to the heat exchanger system.
5. Additional components such as a High Limit shut-off valve and/or steam inlet strainer may ship loose. HL Valve shall be installed just upstream of the control valve. The strainer should be installed upstream but before the incoming steam isolation valve.
6. Verify the direction of flow is correct for each of the 4 connections. See Figure 1 for proper installation points for steam supply, condensate return, cold water inlet, and hot water outlet.
7. If a pressure motive pump is included in the system, a secondary steam connection, ½" to 1" typical, will need installed at the inlet piping to the pump motive line.
8. A pressure and temperature relief valve is mounted on the outlet hot water line. Install a properly sized relief valve discharge line in case of release.
9. When installing the flange bolts, tighten evenly and in a star pattern. This will reduce stresses and prevent the flanges from fracturing.
10. 120VAC (typical) should be connected to the main enclosure. Additional connections may need to be made if the control valve or HL valve ship loose. See the Common Electrical Schematics (Fig. 3-6) or consult the factory.
11. If the system has a pneumatic actuator for the controls, connect air pressure to the positioner, I/P, or regulator mounted on the control valve assembly. The supply should be clean, dry air and regulated down to approximately 30 psig.
12. Inspect all connections to confirm everything has been installed correctly and all bolts are tight.

C Common Electrical Schematics**Figure 3: Standard Enclosure with Pneumatic Actuator****Figure 4: Standard Enclosure with Electric Actuator**

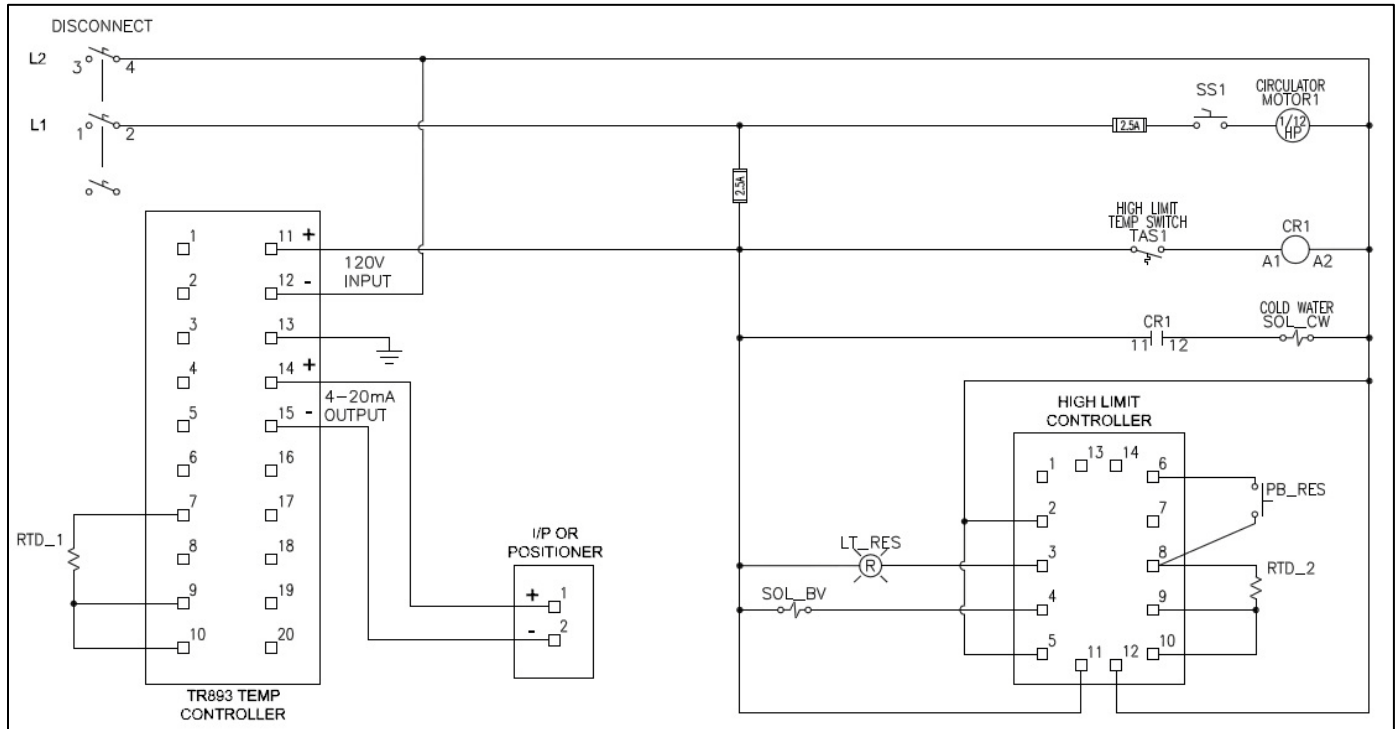


Figure 5: High Limit Option with Pneumatic Actuator

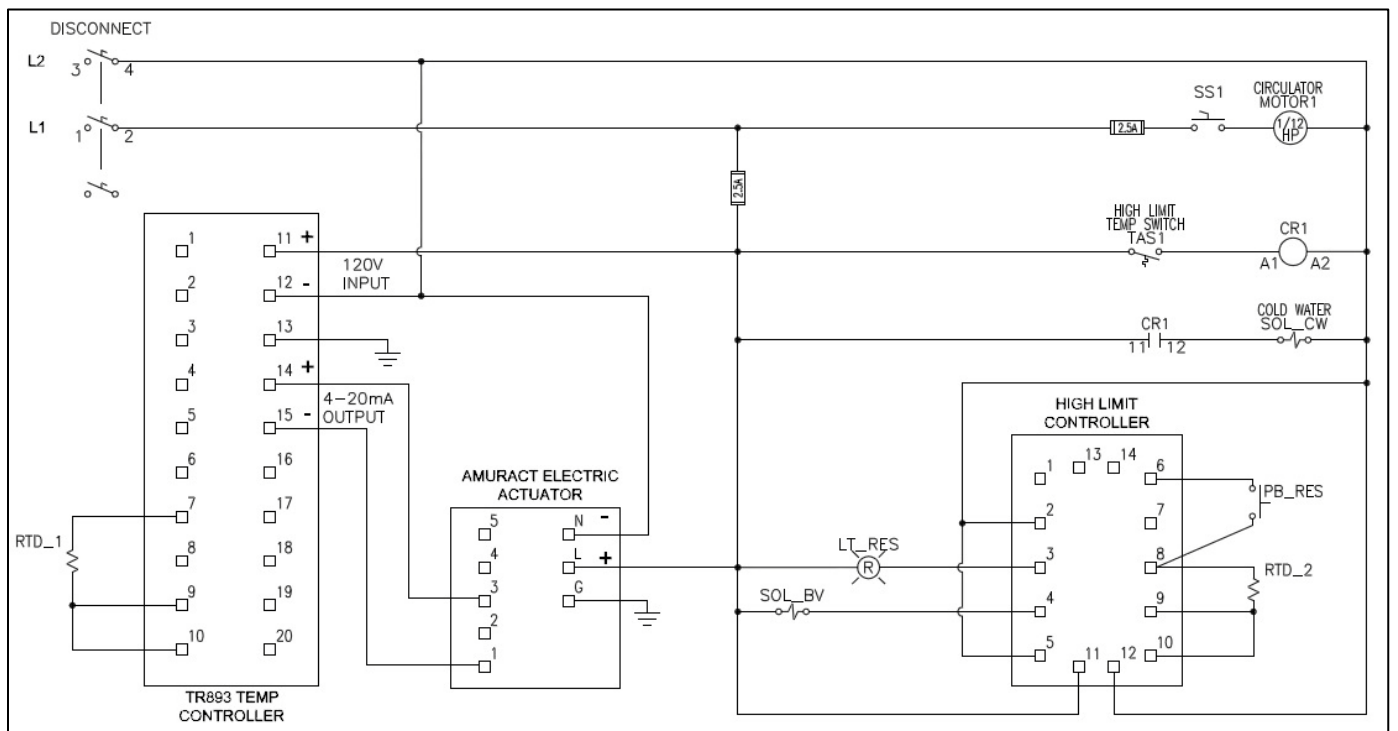


Figure 6: High Limit Option with Electric Actuator

Start up

1. All valves in the installation need to be closed.
2. Slowly open the cold and hot water isolation valves.
3. Allow time for the unit to fill with water and check the water loop system for leaks. Shut down and repair as required.
4. Set the temperature for the Aqua stat high limit switch by adjusting the dial with a small screwdriver.

Note: This temperature should be set at or just above/below the actual desired water temperature to help prevent outlet water from overheating.

5. Open the gate valve before the steam trap or pump to allow condensate to drain from the inlet piping.
6. Open the isolation valve to the condensate return line downstream of the unit.
7. Slowly open the steam inlet valve, this includes the motive line if applicable, and verify there aren't any water hammer conditions.

Note: Do not allow condensate to collect while system is operational. Serious damage to the system can occur from water hammer.

8. Inspect for leaks throughout the system. Shut down and repair as required.
9. Open valve for the compressed air if applicable. Check the air pressure regulator for the control valve and confirm it is around 30 psig.
10. Activate the electrical power to the main control enclosure and switch the circulator pump on.
11. If the High Limit Option is available then adjust the alarm set point on the high limit controller (See Figure 8)

12. Verify that the High Limit Isolation Valve opens. The reset button may need to be pressed if alarm is on.
13. Apply a demand for hot water. This can be accomplished by adjusting the set point temperature at the controller. See the Controller Reference for details.
14. Confirm the displayed temperature has increased and that steam is flowing through the valve. The pressure gauge on the steam side should be reading a positive value.
15. Inspect the piping system for any leaks. Shut down and repair as required.
16. Auto Tune the controller by first applying a typical or full heat load demand to the system. See Controller Manual for instructions for complete setup.
17. Apply various heat loads to the hot water system to confirm that the system functioning properly.
18. Test the high limit switch: Adjust the high limit switch down to a lower setting to confirm that the cold water solenoid activates. Return the limit switch setting back to the correct value and confirm that the solenoid valve closes.
19. If applicable, test the High Limit Option: Adjust the alarm set point down below the current water temp. Verify the High Limit valve closes and verify that the reset button won't open the valve. Return the alarm set point to the correct value and verify that the High Limit Valve remains closed until the Reset Button is pressed.
20. Perform a final check of all piping and components to verify the system is tight and there are no leaks or other potential issues.
21. Upon completion of all checks the system may be released for operation.

Maintenance

Proper maintenance is significant for proper operation of the heat exchanger system. Frequency of cleaning and maintenance performed are dependent on the conditions of the steam system.

1. Inspect all connections for leaks and tighten as required.
2. Blow down or clean all line strainers in the system.
3. Blow down or drain the heat exchanger to remove any debris or build up.
4. Verify the temperature is properly set and that the measured temperature is correct.
5. Inspect that the circulation pump is running properly.
6. Adjust the high limit switch down to a lower setting to confirm that the cold water solenoid activates. Return the high limit value after inspection.
7. If High Limit Option is included, then check to verify the High Limit Valve closes when the water temp is too high. (See Start up and Controller Manual for help) Also verify that the Reset Button latches and the system cannot be reset until the hot water temperature is below the alarm set point.
8. If applicable, check the air pressure regulator for the control valve and confirm it is around 30 psig.

Note: These maintenance operations should be performed a few days after the system has been initially installed and at least on an annual cycle, timing will depend on use and water quality. Customer is responsible for setting a timeframe based on conditions.

Controller Quick Reference

Main Temperature Controller

This is only intended to be a quick start reference. Please consult the official TA893 Instruction Manual for a complete guide to the operation of the Controller.

Start at the main screen of the display. This will display the Measured Value on top and the Target Set Value on the bottom.

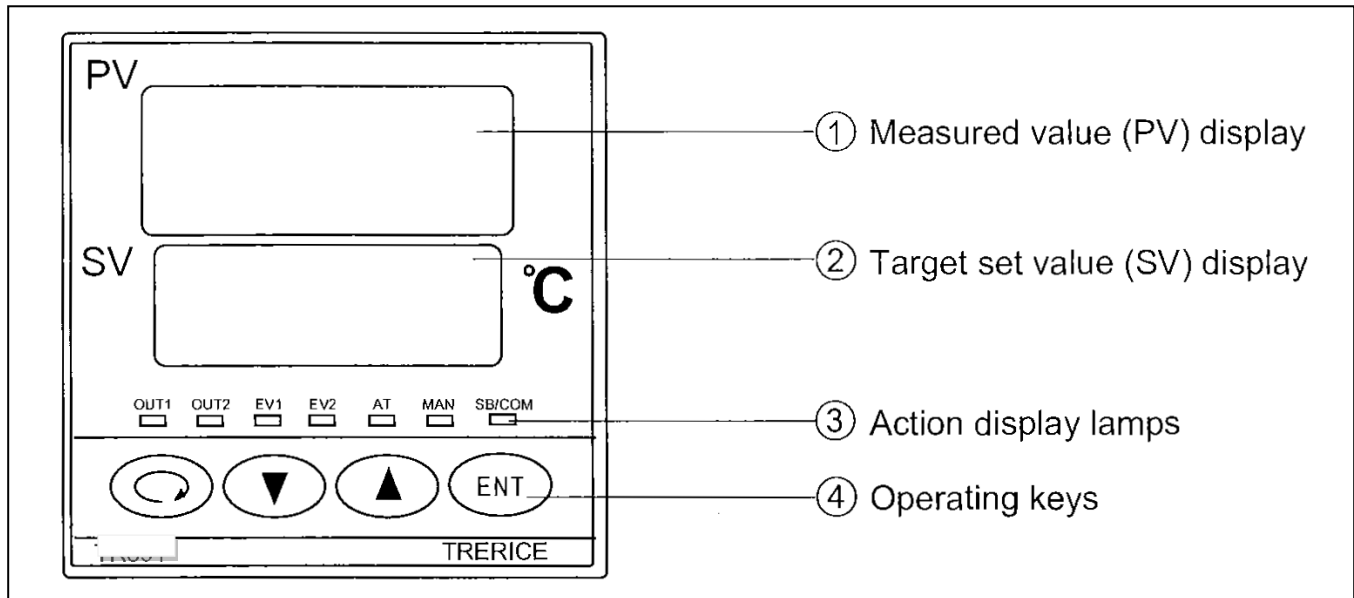


Figure 7: Temperature Controller Display

Setting the Target Value

To set the Target Value, press the Up  and Down Arrow  keys, then confirm the value by pressing the Enter key .

Auto Tuning - AT

Auto Tuning is the method of automatically setting the P.I.D. control parameters.

Press the Parameter, , key at the main screen to cycle through the different screens. After 3 screens the AT screen should appear. Press the up or down arrow until ON is displayed and press Enter to start the process. The AT light and decimal point next to ON at the display will begin flashing. The system will adjust to the measured valve several times and when complete store the new PID values. When complete the AT light decimal will stop flashing.

High Limit Controller

This is only intended to be a quick start reference. Please consult the official CN63500 Instruction Manual for a complete guide to the operation of the Controller.

Start at the main screen of the display. This will display the Measured Value on top and the Target Set Value on the bottom.

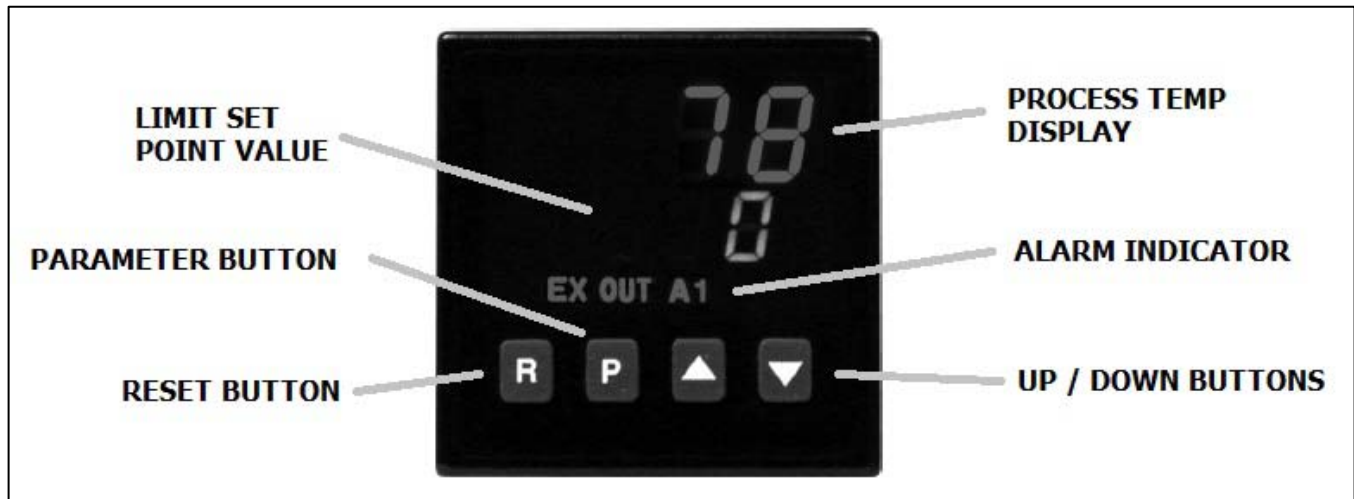


Figure 8: High Limit Controller Display

Setting the Target Value

To set the Target Value, press the Parameter Button to begin. The Top display will show "PASS". Press the Up  and Down Arrow  keys to enter the password, default is 10. Parameters cannot be accessed until the correct password has been entered. Press the Parameter button again to confirm and access the set point, the top display will show "SP". Adjust the setting with the up and down arrows then confirm the value by pressing the Parameter Button again. The main screen will return after the unit sits idle for a short time.