

STEAM MASTER®



1 UNIT FOR 2 ROOMS

 **steam**sauna

**COMMERCIAL STEAM GENERATORS
INSTALLATION, OPERATION AND MAINTENANCE MANUAL**

WARRANTY

The manufacturer warrants each part to be free from defects in material and workmanship, in the course of normal use and agrees to repair or exchange any part thereof in which such defects appear, to the satisfaction of the manufacturer. This warranty is applied within the boundaries of the United States or Canada.

The manufacturer's obligation under this warranty is limited to the repair or exchange of any defective part, if that part is returned to the manufacturer. Postage and handling charges to and from Steam Sauna Inc. for warranty repairs is to be prepaid by the purchaser. A return authorization number assigned by Steam Sauna Inc. is required prior to returning any product for repair. Components returned without a return authorization number will not be repaired or replaced. Any missing parts claim must be made within 48 hours of receiving this product.

This warranty does not cover any related charges for the installation/removal of these products. Warranty service can be obtained by sending your product to Steam Sauna Inc. Proof of purchase and a serial number of the product will be required before any services are performed. This warranty applies only to the original purchaser.

For all Commercial steam units, the boiling tank is protected by a three-year warranty against corrosion and leakage, and a one-year warranty on all other components from date of purchase (return freight and all "on site" work are purchaser's obligation).

The warranty is void if a certified plumber, electrician or authorized qualified service representative do not perform the installation and wiring.

This warranty does not apply to any product, which has been repaired or altered in any way, so as in the judgment of the manufacturer to injure the product's stability or reliability or which has been subjected to misuse, neglect, accident or any use other than steam bath. Neither does this warranty apply to any product connected, installed or adjusted other than in accordance with the manufacturer's instructions, or if the steam line(s) are restricted in any manner.

The manufacturer will not be liable to you or anyone else for any damages, loss of profits, loss of earnings, loss of business opportunities, personal injury or other loss resulting directly or indirectly from using the equipment or services.

This warranty is in lieu of any other warranties expressed or implied and no representative is authorized to assume for the manufacturer any liability in conjunction with the sale of the manufacturer's products.

STEAM SAUNA INC.

This manual is a comprehensive guide to proper installation, troubleshooting, operation and general care of your **STEAM MASTER® ES Series**.

Please familiarize yourself with these contents. This will guide you through the necessary steps to install and operate your Steam Sauna commercial steam generator as easily and conveniently as possible.

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INSTALLATION MANUAL

COMMERCIAL STEAM GENERATOR EXECUTIVE SERIES (ES)

INTRODUCTION

Steam Sauna manufactures steam generators for any steam bath need. They are the result of many years of continued research. Our large commercial units are manufactured to rigid quality standard. We also custom build for specialized applications e.g. yachts, Recreational Vehicles (RV's), executive fitness rooms etc.

Your **Steam Sauna** Commercial generator has been factory tested for a minimum of 8 hours and is both C.S.A. approved and U.L. listed. This assures consistent quality and safety control. The ES series steam generators are custom built to your particular requirements, therefore your unit may not be equipped with all the features described in this manual. Especially 2Rooms units are slightly different from 1ROOM units. Contact your manufacturer for additional information or troubleshooting instructions.

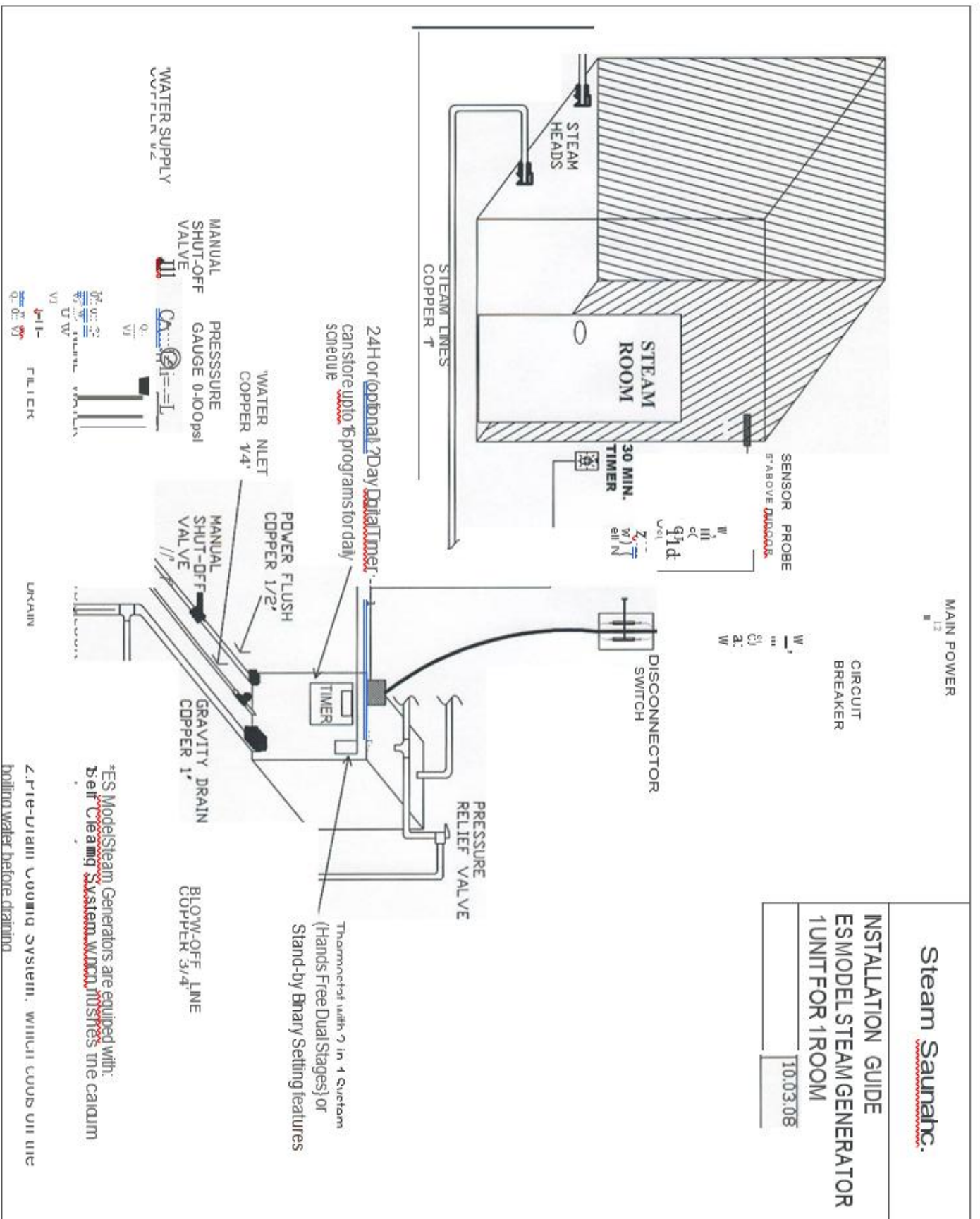
SAFETY TIPS

- (1) Read all instructions in this guide prior to installing your steam generator.
- (2) Always ground the unit properly.
- (3) Make sure there are no restrictions in the steam line(s) (existing lines).
- (4) Never install valves or have other obstructions in the steam lines (e.g. kinks).
(new installation)
- (5) Always turn off the electrical supply and the water before doing any work on the unit.
- (6) Install the steam heads approximately 6"-12" from the floor. If possible, under the benches or in another location away from peoples feet and legs as they are extremely hot and could cause injury.
- (7) Always ask qualified trade people to install or service your unit.

Steam Sauna.

INSTALLATION GUIDE ESMODEL STEAM GENERATOR 1 UNIT FOR 1 ROOM

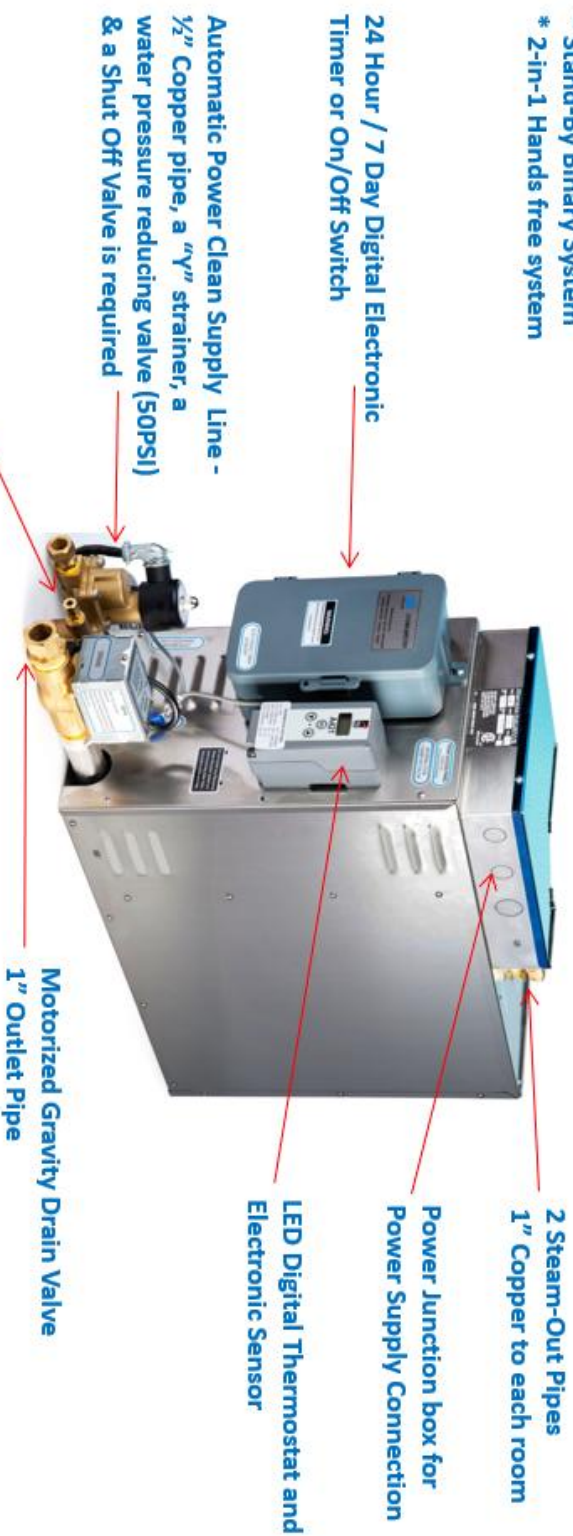
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ES Series- "Steam Master" Heavy Duty Commercial Steam Generator's Shop Drawing

Brand Name : Steam Master
Model : Executive Series – ES7.5-60
Dimensions : 27" L x 9" W x 19" H
Enclosure : Stainless Steel
Exclusive Features:
 * A Self-Cleaning System
 * Stand-By Binary System
 * 2-in-1 Hands free system

Output : 7.5-60 KW
Electrical : 240V/208V/480V/600V;
 Single or 3 Phase



Operational Water Supply Line: 1/2" Copper tube. This line must have a sediment filter and a Shut Off Valve

 **steam sauna**
 manufacturing

Our range of products are CSA Certified since 1974 and UL Listed since 1987



 ISO9001 since 2005

INSTALLATION INSTRUCTIONS

- **All units operate at atmospheric pressure. NEVER install valves or other obstructions in the steam lines (other than factory installed). To do so may cause damage to the unit, malfunction or personal injury.**
- Always use copper pipe with copper or brass fittings. The use of black or galvanized pipe will cause staining in the steam room.
- Always use qualified trades people for the installation of this unit.
- Observe and follow all instruction tags on the machine.

STEP 1. LOCATING AND INSTALLING THE UNIT

1. The steam generator should be located within maximum 50 ft. of the steam room.
2. It must be located in a clean, dry location (e.g. mechanical room). It is not designed to operate in a location that is wet, damp or may get splashed with water or chemicals which could cause a shock hazard and will cause serious damage to the unit voiding all warranties.
3. Before installing the unit, have in mind that you need water line and drain close to the unit, also you will need to run power line to the unit.
4. **All areas that may be exposed to frost or high temperature must be avoided e.g. attics or unventilated rooms where temperature can reach 120 °F (50 °C) or more.**
5. The steam unit should be shelf or bench top mounted in an area that allows easy service access. We recommend a shelf height of 36" – 45". Installation inside the wall or under the ceiling is not recommended.
6. The unit must always be installed on a flat and level surface, and do not set the unit into a sealed frame.
7. Face the front (access panel) out so that it may be easily removed to access the fuses and other components of the unit for maintenance purposes. Allow a minimum of 4" to 8" clearance from the wall on each side of the unit for easy access and ventilation. **NEVER** mount the unit with one (1) side against a wall.

STEP 2. INSTALLING THE STEAM VALVES

Two steam valves with necessary fitting and connectors are provided inside the package. They must be installed on the steam outlets on top of the unit.

1. Remove the bubble wrap from two steam valves.
2. Connect them on the top of the machine using the labels on the machine as your guide; e.g.: Connect steam valve-1 to steam out-1, and connect steam valve-2 to steam out-2.
3. The pressure relief valve sticker is located under the pressure relief valve.
4. Tighten down the compression fittings on top of the tank.
5. Install the coils on the valves (if they are not installed). Remove the snap ring on top of the valve stem and place the solenoid coil(s) on the stem(s). Coils and valves are labeled.
6. Replace the snap rings.

Note: Always have these solenoid coils properly installed before applying power to the machine; otherwise it will burn the coils immediately.

STEP 3. PLUMBING

All units come factory equipped with compression connections and unions. Always use these connectors. Use the following table to select proper copper pipe sizes for different lines, and then follow the instructions on each line connection:

	Steam Lines	Drain Line	Water Inlet Line	Power Flush Line	Blow-off Line
Pipe size	1" (Also see page 30)	1"	1/4"	1/2"	3/4"

3-1. INSTALLING THE STEAM LINES

The steam outlets are two 3/4" copper pipe compression fittings on top of the unit, which you will immediately expand into a 1" line. Run the steam lines from the steam outlets (or steam valve outlets in 2 Rooms units) to steam rooms. Always install the steam lines so they drain back to the machine and/or to the steam heads. Never have a low spot that will accumulate condensation. Insulate exposed steam lines with fiberglass insulation to prevent steam heat loss.

Note: In some models it is required to install a different pipe size. Check specification sheet on page 24 for more details. However, the minimum size 1" is recommended for models up to ES-24.

Exception:

If 2 rooms are of different sizes or if 1 room is closer to the steam unit and the other more distant, use a higher diameter steam pipe to the larger or farther room. This is to distribute the steam flow between the rooms proportionately.

For more information please contact the manufacturer.

Notes:

1. ½" steam lines are not recommended for any of the units.
2. Do not install any restrictions on the steam lines.
3. For steam line runs of 50 ft or more, contact the manufacturer
4. Never use foam type insulation.

3-2. INSTALLING THE DRAIN LINE

The drain valve is located on the front of the unit and has a ¾" fitting. Using an adapter connect a 1" copper pipe to the drain valve. Run this pipe with a down slope to the floor drain, because the drain system is a gravity drain.

3-3. WATER INLET LINE

A sediment filter is installed on the ¼" water inlet line. Install a manual shut-off valve on the 1/2" copper pipe next to power flush valve and connect it to the ½" water supply line. If you are connecting to a softener or R.O. system, use the instructions included with this equipment to connect into the water supply. Set up the softener according to specific instructions included with it.

Note: Flush the 1/4" feed line to the floor drain or a bucket prior to connecting it to the unit; otherwise the copper debris will clog the Water Inlet Valve

3-4. POWER FLUSH LINE

The Power Flush solenoid is installed on the ½" line on the front of the unit. Use a ½" copper pipe to connect it to the water supply, considering the instructions in step 4-5.

Note: Flush the ½" feed line to floor drain or a bucket prior to connecting it to the unit, otherwise the copper debris will clog the Power flush Valve.

3-5. WATER SUPPLY LINE

On a ½" copper line install a pressure reducer (35-40 PSI) and a manual shut-off valve and connect it to the water supply line.

3-6. STEAM BLOW-OFF LINE

Install a safety pressure relief valve (5 to 10 PSI) on one of the steam lines and run a ¾" copper pipe from its outlet to the floor drain. The 2 ROOMS units come with a factory installed pressure relief valve and you just need to run the pipe to floor drain.

3-7. STEAM HEADS

The steam head(s) should be located in a safe area away from people's feet and legs. They should be as close to the floor drain as possible.

The steam head(s) should be placed between 6" to 12" up from the floor with the slotted side facing down. They may be grouped together or spread throughout the room. Never place the steam head(s) high on a wall.

STEP 4. ELECTRICAL INSTALLATIONS

Have a qualified electrician to connect the unit to power source. The wattage and voltage are listed on the serial plate on top of the unit. Make sure that your power source voltage and amperage capacities match the unit.

4-1. POWER CONNECTION

You will need a circuit breaker and a disconnect switch and sufficient length of cable to install the power line. Select the appropriate parts according to the electrical specifications of the steam generator and local electrical codes.

Install a circuit breaker in power distribution panel and connect it to main power. Run a cable from circuit breaker to a disconnect switch that will be installed on the wall beside the steam generator. Connect L1 (red), L2 (black) and/or L3 (blue) wires in the power junction box to the disconnect switch. Connect the ground terminal in the power junction box to the ground. This machine has no neutral connection.

The power to the unit must be uninterrupted on a day-to-day basis. This allows the control board and timer to function properly.

4-2. INSTALLING THE TEMPRATURE SENSOR PROBE IN THE STEAM ROOM

The **Sensor Probe** should be installed into the wall approx. 3-5" above the door and in **opposite** corner of the room from the steam heads. The sensor head must be exposed into the room from the wall approx. 1" out, and sealed with rubber or silicon gel. It must always have free air flow around it to sense the current temperature and also to prevent sensing radiant wall heat (Above the door is a good location). A guard that allows free airflow may be placed over the probe.

4-3. CONNECTING THE SENSOR PROBE TO THE THERMOSTAT

The sensor probe is supplied with a 6 ft wire. If the distance between the steam room(s) and the thermostat(s) (which is/are installed on the steam generator) is more than that, run a cable from the thermostat to the sensor probe and connect it to the sensor wires. Use the following table to select the proper wire size:

Wire Gauge	Maximum Sensor Cable Length feet (meters)
16 AWG	500 (150)
18 AWG	300 (100)
20 AWG	200 (60)
22 AWG	125 (40)

4.4. STEAM CONTROL OPTIONS

BASED ON THE USER'S REQUIREMENTS THE UNITS ARE DESIGNED WITH DIFFERENT CONTROL OPTIONS. Check your unit Work Order Sheet and the parts that are supplied with unit, and then use the proper instruction in this section. Your unit may not have some or all of the options that are described below.

➤ **4-4-1. AUTO SHUT OFF TIMER (30 OR 60 MINUTES)**

Install the 30 or 60 minutes timer outside the steam room beside the door. Run a cable (2x14 AWG) from this timer to the power junction box on top of the steam generator and connect it to the labeled wires accordingly.

➤ **4-4-2. IN ROOM TOUCH TIMER**

Install the touch button inside the steam room into the wall, away from steam and water dripping and accessible for users to use as a Start/ Stop button. Seal the flat side on the wall with silicon sealing. Connect the female end of the connector cable to the rear end of the button and run the cable to the black box (touch timer), which is attached to the steam generator by a flexible conduit. Connect the male end of the connector cable to female connector on the box.

➤ **4-4-3. AIR SWITCH**

Install the air switch cylinder inside the steam room into the wall, away from steam and water dripping and accessible for users to use as a Start/ Stop button. Seal the front side on the wall with silicon sealing. Insert one end of the plastic tube provided with the switch into the back of the cylinder and run it to the steam generator. Insert the other end of the tube to the air switch, which is in the power junction box on top of the steam generator.

STEP 5. SCENT DISPENSER (OPTION)

Read the dispenser Instruction manual that is provided with this document separately before installing.

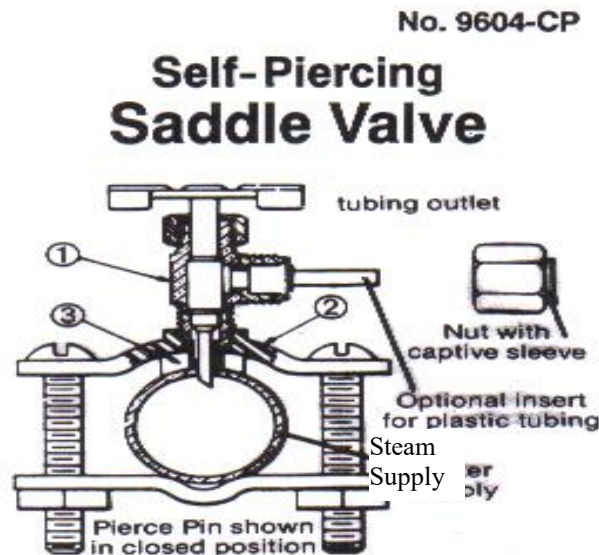
Scent dispenser pumps the fragrance (wintergreen, eucalyptus...) from the bottle into the steam line. Install the scent pump beside the steam generator and connect its adaptor to the power source.

The scent tubing starts from the Fragrance Bottle and its white portion will be mounted on the scent pump wheel. Then it ends to the saddle valve, which will tap into the steam line.

5-1. INSTALLATION INSTRUCTION FOR SELF-PIERCING SADDLE VALVE

The saddle valve taps into the steam line, between the steam valve and steam room.

- Assemble valve body as shown in the following sketch, with piercing pin retracted to the top clamp (2) by rotating valve handle counter-clockwise.
Caution: Be sure the piercing pin does not protrude down beyond the top clamp.
- With rubber gasket (3) in fixed position, clamp the entire assembly firmly to the steam pipe outlet using the bolts, nuts and base clamp provided.
- Turn the handle clockwise to pierce the steam pipe and close the valve.
- To open valve, turn handle counter-clockwise to desired steam flow.

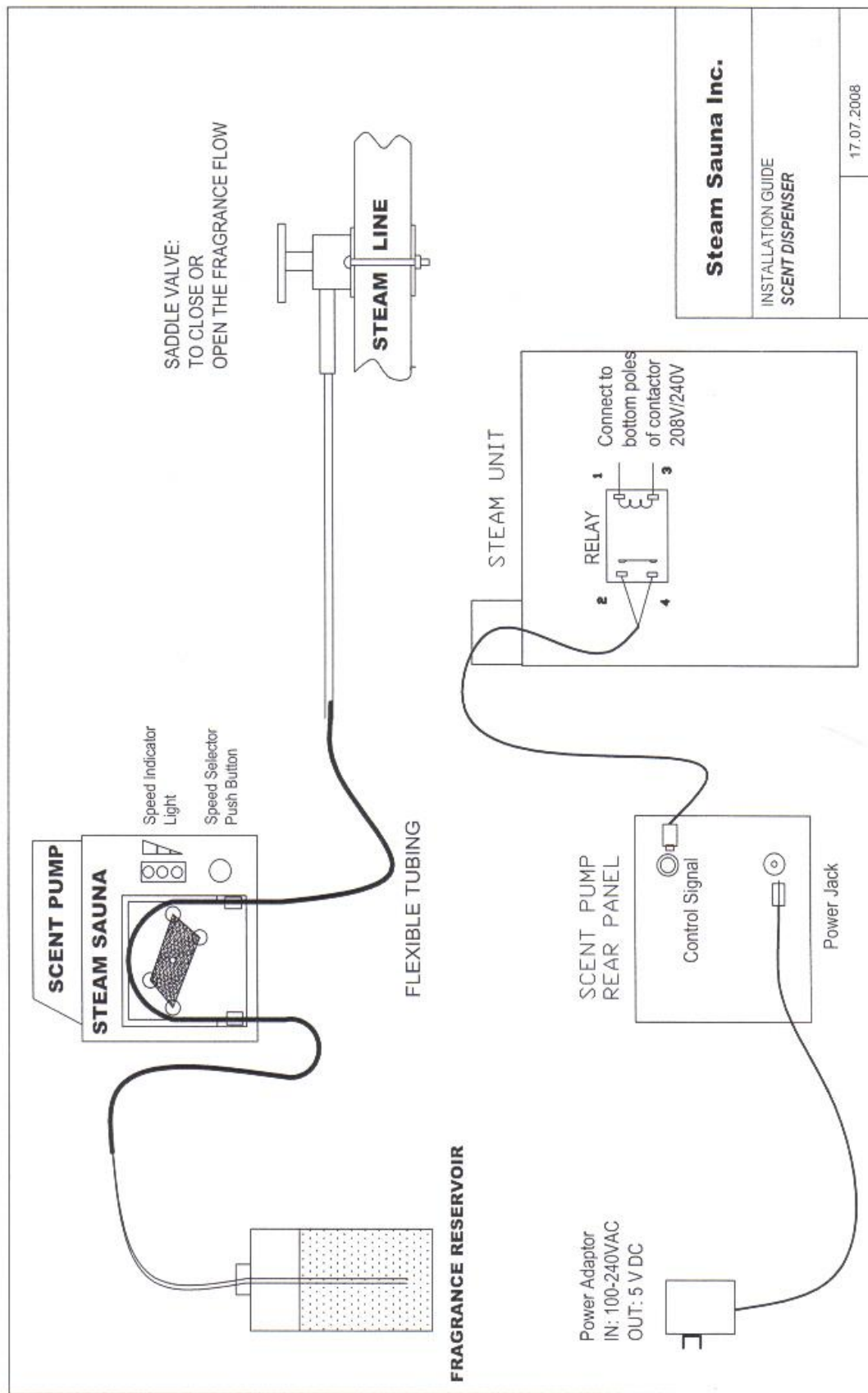


Valve pierces its own hole in copper steam line when turned CW. At the end turn CCW to open the hole made.

6. WATER SOFTNER (OPTION)

Read the water softener manual that is provided with this document separately before installing.

The water softener will purify the water for the boiling cycle, therefore it will be installed only on ¼" water inlet line. Connect the water softener between the manual shut-off valve and the sediment filter -which is factory installed- on ¼" line. This way you can close the valve and remove the water softener for service, without interrupting the steam generator by using a bypass line.



START UP PROCEDURE

There is a boiler tank inside the steam generator that is equipped with several heating elements. In the boiling (steaming) cycle, first the tank fills up with water, then the heating elements will power up, and boils the water. Therefore it is crucial to monitor the start up procedure as follows in this section to make sure the heating elements do not energize before filling the tank. After the boiling cycle finished (at the time which is set by timer) the unit will go to cleaning cycle. In this cycle the unit will be filled with pressured water and drained repeatedly for ½ hour.

1. Boiling (steaming) Cycle

Note: Make sure all solenoid coils are properly installed on all external valves before proceeding with start up.

1. Turn on water supply and check for leaks on all plumbing connections.
2. Turn the timer that is mounted on the front of the unit to the **OFF** position.
 - For mechanical timer: Push the manual **ON/OFF** lever to **OFF** position.
 - For digital timer: Press the **ENTER** (OVERRIDE) button and verify the **OFF** sign shows up on the display.
3. Hook a clamp AMP Meter to L1 (red) and turn it on to monitor the amperage during the start up cycle. Turn the breaker and the fuse disconnect switch to the **ON** position.
4. The amperage is less than 1 Amp. steam valves will open. Check all steam valves for magnetic energy by using a non-magnetized wrench, screwdriver etc. and touching the top of each steam valve (where the clip holds the solenoid coil in place). If you feel a magnetic pull, the valves are open.
5. The thermostat display will start flashing.
6. Turn the unit “**ON**” at the Timer.
 - For mechanical timer: Push the manual ON/OFF lever to ON position.
 - For digital timer: Press the ENTER (OVERRIDE) button and verify the ON sign shows up on the display.
7. The amperage is less than 1 Amp.

8. You will hear a “click” sound inside the unit, which shows that water inlet solenoid is energized. Water will immediately flow into the tank through 1/4" inlet line. You can verify it by touching the 1/4" line to feel the water flow. Depending on the water pressure and unit's model, tank will fill within 2-5 minutes. You will hear another “click” and the water will stop.
9. **Caution:** Up to this point the amperage must always stay less than 1 Amp. If you noticed amperage higher than 1 Amp, turn off the breaker immediately and call the manufacturer for further assistance.
10. After 10 seconds, you will hear a bigger “click” sound that indicates the contactors are engaged. The amperage will jump to the 1st stage or 2nd stage value, depending on your control options. Read your work order sheet to find the nominal current for your unit.
11. If you have optional controls such as 30-minute timer or in-room-touch-timer, turn them ON to elevate to the 2nd stage. You will notice that the amperage is even higher than the 1st stage.
12. Unit produces steam in 2 to 8 minutes depending on the kW of your unit and the distance between the unit & steam room. Allow the unit to produce steam for ½ hour and observe the temperature in the steam room and compare it with your thermostat settings. See the operating manual for further information.
13. **TIMER CHECK**
To verify that the 30-minute timer or in-room-touch timer controls the same room that is installed in, turn the timer in each room ON and OFF separately and make sure it controls the steam in the same room, not the other room.

2. Cleaning (Flush) Cycle

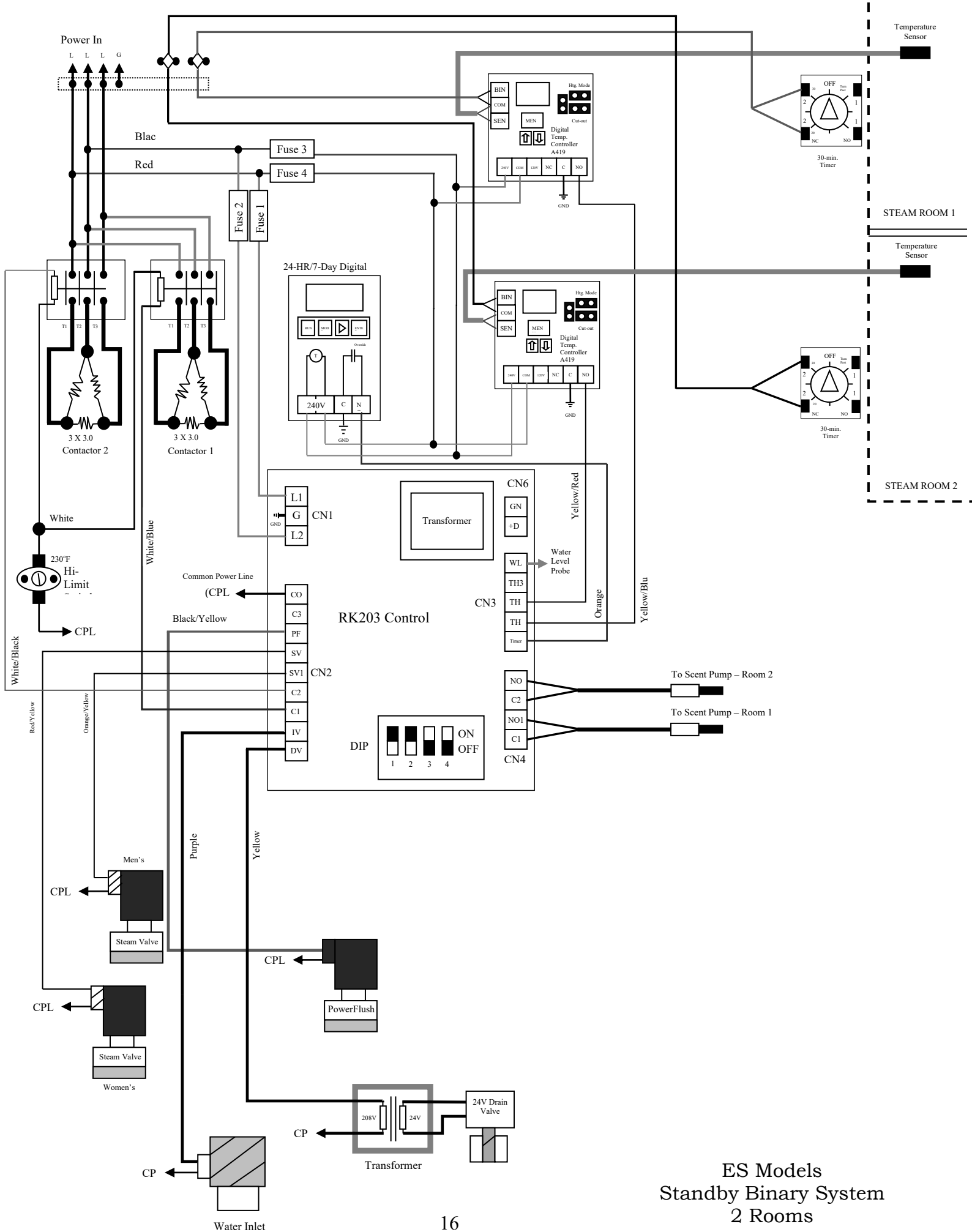
The cleaning cycle will start 10 minutes after the boiling cycle is finished according to the daily schedule that is set to the 24h/7day timer. In this cycle the hot water will be drained from the boiler through the drain valve. Then the boiler will be flushed by the water inlet and the power flush valves and drained through the drain valve several times within ½ hour. To start this cycle manually turn the 24h/7day timer OFF and observe this cycle for a ½ hour period and make sure that during this cycle you will see the change (from open to close or vice versa) of the following solenoid valves at least once:

1. The drain valve: Drains water from the tank. The first drain is hot water and the other drains are cold water. You can check its function by touching the 1" drain line to feel the water flow.

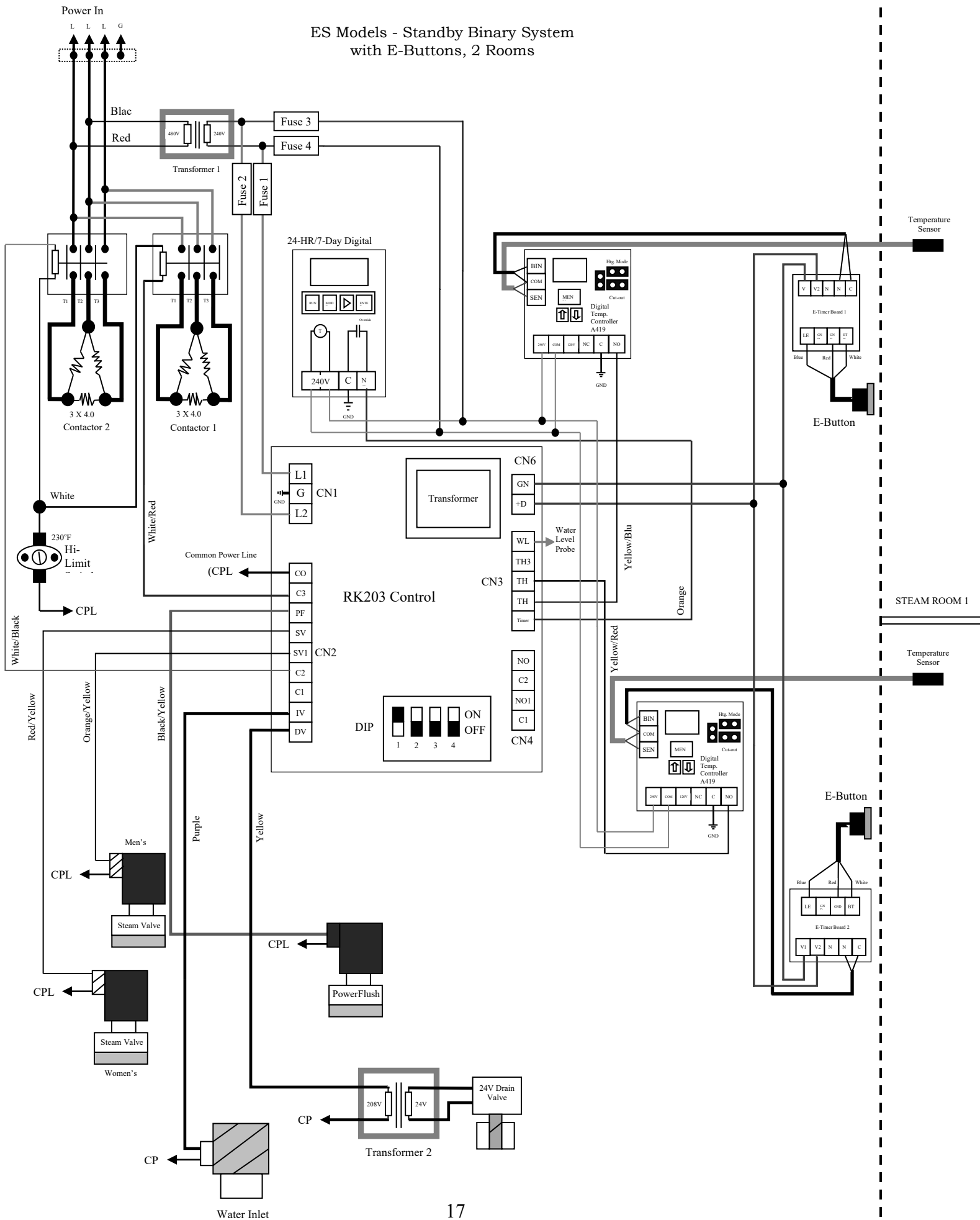
2. The water inlet valve: On $\frac{1}{4}$ " line is filled up the tank. You can check its function by touching the $\frac{1}{4}$ " line to feel the water flow.
3. The power flush valve: On $\frac{1}{2}$ " line is filled up the tank. You can check its function by touching the $\frac{1}{2}$ " line to feel the water flow or use a screwdriver to check the magnetic pull.
4. The steam valves on top of the unit get engaged and disengaged to build up pressure in the tank during flush cycle. Use a non-magnetized wrench, screwdriver etc. and touch the top of each steam valve (where the clip holds the solenoid coil in place). If you feel a magnetic pull, the valves are open.

BASIC TROUBLESHOOTING GUIDE

Unit does not produce steam after it is connected	- Water supply valve is closed	- Turn on water supply
	- Electrical Power is off	- Turn on power. Check circuit breaker
	- Timer On/Off turned off	- Turn it on
	- Thermostat not set properly	- Adjust thermostat to desired temperature
	- Not Connected properly	- Check wiring and plumbing
	- Damage in shipping	- Contact manufacturer-
Water constantly flows out of the steam head	- Water Inlet Valve on ¼" line is stuck open by copper debris	- Turn the power off, if water didn't stop, open the valve and clean it up
	- Power flush valve is stuck open by copper debris	- Open the valve and clean it up
	- No water level signal to control board	- See maintenance manual
Thumping noise on water line when unit is running	- Water pressure higher than the maximum allowed pressure on water supply valve	- Install pressure reducer valve (35-40) PSI on water supply line
The unit does not drain	- The timer is not set properly	-See Timer setting instructions
The Circuit Breaker trips or blows the fuse on disconnect switch	- The Breaker or Fuse rating is low	-Check the AMP. Rating on the nameplate or your order sheet and change the breaker
	- Short circuit caused by wrong wiring	- Check your wiring with the electrical diagram provided with your documents
	- Short circuit caused by water leakage	- Check for water leaks, find the source and tighten the fittings
	- Heating elements burnt	- Check the resistance on heating elements (see maintenance manual)
Unit heats up but does not produce sufficient steam, steam room not hot enough	- Drain valve is leaking, causing frequent flow of cold water into the tank	- Open drain valve (see maintenance manual) and check for pieces of calcium, clean it up
	- Water inlet valve stuck open	- Open water inlet valve (see maintenance manual) and check for small pieces, clean it up
	- Power flush valve stuck open	- Open water inlet valve (see maintenance manual) and check for small pieces, clean it up
	- Standby timer is off. Only one stage is engaged	- Turn the timer ON. Also check for proper connection.
Steam room is too hot	- Sensor location is wrong	- Displace the sensor to correct location (see installation manual)
	- Thermostat is not set properly	- Check the thermostat set points and program it properly (see operation manual)
	- Sensor wiring is wrong or sensor failed	- Check the sensor wiring (see installation manual)



ES Models - Standby Binary System with E-Buttons, 2 Rooms



OPERATION MANUAL

COMMERCIAL STEAM GENERATOR EXECUTIVE SERIES (ES)

INTRODUCTION TO STEAM GENERATOR FUNCTIONS

This unit is designed and manufactured based on your specific requirements. Each steam generator has its own function, which may operate differently from another steam generator. This section explains different functions on steam generators. Your unit may have some of these functions. Read your order sheet to find out which functions your unit has.

REGULAR 2-in-1 SYSTEM

The unit has two heating stages. When the thermostat is calling for heat, both stages get engaged and produce strong steam until the temperature SETPOINT is reached in the steam room. Then one stage, which is controlled by thermostat, goes off and the other stage keeps on producing steam (steady but slow).

SPECIAL 2-in-1 SYSTEM

This system also has two stages, but the thermostat controls each stage individually. The SETPOINT for the top thermostat is slightly higher than the bottom thermostat. When the lower SETPOINT in bottom thermostat is reached, one stage goes off, but the other stage keeps on steaming until the higher SETPOINT in top thermostat is reached.

STAND BY SYSTEM

The unit only produces steam on demand. When the user turns on the 30 minute mechanical or Electronic TOUCH timer the unit starts producing strong steam until one of the following happens:

- Timer times out (turns off)
- Temperature SETPOINT is reached

Then the unit stops producing steam and stands by for the next request. Only the first heating cycle in the daily schedule will take about 5 minutes longer than the consequent next cycles to produce steam.

BINARY SETTING

The thermostat implements two different sets of SETPOINTS to control the temperature in the steam room. The regular SETPOINT is about 117°F (47°C) and the secondary SETPOINT is less than by OFFSET value, 25°F (15°C):

$$\begin{aligned}\text{Secondary SETPOINT} &= \text{Regular SETPOINT} - \text{OFFSET Value} \\ &= 117^{\circ}\text{F} - 25^{\circ}\text{F} = 92^{\circ}\text{F}\end{aligned}$$

A 30 minutes dial timer or Electronic Touch timer activates the transition from Regular SETPOINT to Secondary SETPOINT and vice versa.

INTRODUCTION TO PROGRAMMING

The steam generator operates based on the thermostat and the 24h/7day timer setting. The thermostat controls and maintains the desired temperature in the steam room (which can be set by user) and the timer controls the daily operation schedule for the unit (e.g. start time and shut down time). Users according to their desired application can set these controls. The thermostat and timer programming instructions is explained below.

THERMOSTAT FUNCTIONS AND SET UP

Depending on the model and features, the steam generator might be equipped with one or both of the following thermostats, which are fully programmable:

- A419 Johnson Controls digital thermostat
- RANCO ETC digital thermostat

The programming instructions for both thermostats will be explained in the following sections.

The A419 Control Functions

Setpoint (SP) establishes the temperature value at which the steam is switched on or off. Setpoint range is -30 to 212°F or -34 to 100°C (in 1-degree increments).

Differential (DIF) establishes the difference in temperature between the ON and OFF cycle. For example if the SP=117°F and the DIF=3 steam stops at 117°F and comes back ON at 113 which is (117-3-1=113). The differential is set relative to Setpoint and may be set from 1 to 30 °F or °C (in 1-degree increments).

Anti-Short Cycle Delay (ASD) establishes the minimum time that the unit stays in OFF cycle before the next ON-cycle. The ASD does not allow the unit to re-energize until the programmed time delay has elapsed. The delay is activated when the control is first turned on and every time an ON-cycle ends. When the delay is activated, the LCD alternately flashes the sensor current temperature reading and ASD. The anti-short Cycle Delay range is 0 to 12 minutes (in 1-minute increments).

Temperature Offset (OFS) establishes a secondary Setpoint value that may be invoked to control the steam or temperature in the room when a 30-minute timer or in-room-touch timer is activated in the steam room. Offset range is 0 to 50 °F or °C (in 1-degree increments). For example, if OFS=25F and SP=117F, with the timer in ON position, the unit operates at normal setpoint which is 117; but when the timer turns off, the unit operates at 92F which is (117-25) and the display shows a BIN sign as long as the timer stays “OFF”.

Sensor Failure Operation (SF) establishes how the A419 control’s output-relay operates the unit in the event of a sensor or sensor wiring failure. The user may select to keep the unit running (SF=1) or to shut it down (SF=0) after the sensor failed. When the control detects a sensor circuit failure, the LCD flashes SF alternately with OP (if the sensor circuit is open), or SH (if the sensor circuit is shorted). Before indicating a failure, the control implements a 1-minute delay, which allows verification of failure condition and avoids nuisance failure indications.

Setpoint (sp)	Differential (dif)	Anti-short Cycle Delay (Asd)	Temperature Offset (OFS)	Sensor Failure Operation (SF)
117°F/47°C	1	0	25°F/15°C	0

Changing the A419 Control Temperature Units

The A419 control is factory set to display Fahrenheit or Celsius according to the region standards. To change to Celsius, press Up and Down (arrows) simultaneously. Press them again to display Fahrenheit units. Verify that the control is displaying the desired temperature units before setting the Setpoint.

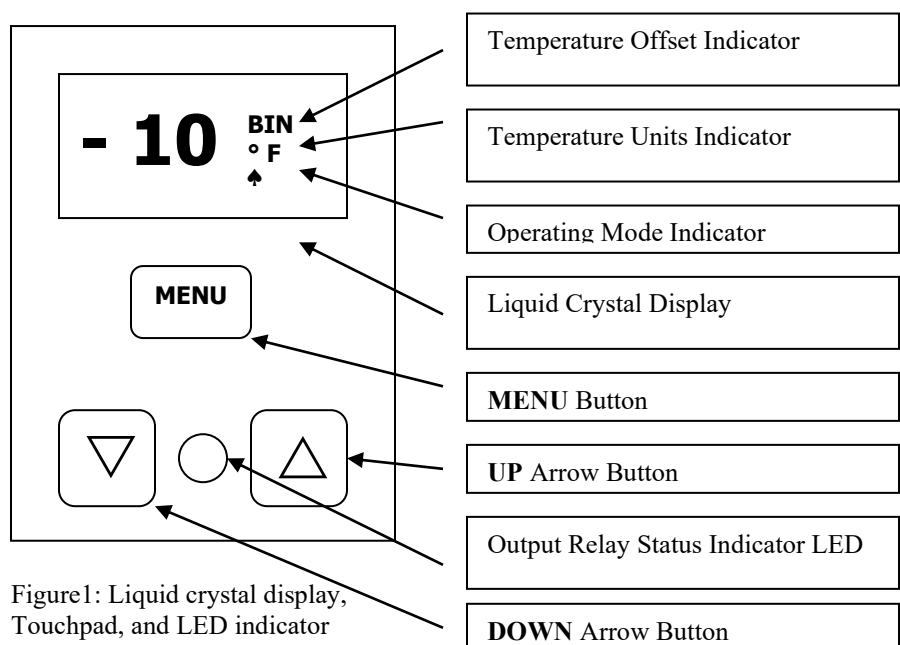
Setting the A419 Control Setpoint Value

To view and adjust Setpoint, follow these steps:

1. Press and hold MENU (about 2 seconds) until the display flashes SP.
2. Press MENU again to display the existing setpoint value.
3. Press Up or Down (arrows) to change the setpoint value.
4. Press MENU again to save the new value. The display returns to the current sensor temperature.

Note: If no setup entry is made for 30 seconds, the control reverts to the (normal) temperature display.

IMPORTANT: If MENU is not pressed after changing the setpoint value, the control reverts to the previously programmed setpoint value.



Setting the other A419 Control Functions

To set the Differential, Anti-short Cycle Delay, Temperature Offset, or Sensor Failure operation, use the following method.

1. Press and hold MENU until the display changes to flashing SP. (This takes about 2 seconds.)
2. Press Up or Down (arrows) repeatedly until the desired function is displayed. (See Table 3.)
3. Press MENU to display the function's current value.
4. Press Up or Down (arrows) until the desired value is reached.
5. Press MENU to save the new value. The display returns to the current sensor temperature.

IMPORTANT: If MENU is not pressed after changing the settings, the new settings are not saved and the control reverts to the previously programmed setting values.

Notes:

- If no setup entry is made for 30 seconds, the control reverts to the (normal) temperature display.
- Any saved A419 control setting is non-volatile and remains in the control's memory during power interruptions.
- The sum of the Setpoint and Differential values must be within the Setpoint range, or the control may not function properly.

IMPORTANT: Do not set Setpoint and Differential values which (when totaled) fall out of A419 control's Setpoint range (-30 to 212°F [-34 to 100°C]). The control will not function properly if these values are outside of the control's Setpoint range.

Table 1: Display Symbols, Control Function, Ranges, Units, Values, and Factory Settings

Display Symbols	Control Function	Range – Units/Value	Factory Settings
SP	Setpoint*	-30 to 212 – °F (-34 to 100 – °C)	117F 47C
DIF	Differential*	1 to 30 – (°F or °C in 1-degree increments)	1
ASD	Anti-short Cycle Delay	0 to 12 – (in 1-minute increments)	0
OFS	Temperature Offset	0 to 50 (°F or °C in 1-degree increments)	25F 15C
SF	Sensor Failure Operation	0 = unit will shut down after sensor failure 1 = unit keeps running after sensor failure	0
F or C	Temperature Units	°F (Fahrenheit) or °C (Celsius)	F for USA C for Canada

RANCO ELECTRONIC TEMPERATURE CONTROL

A steam generator with 2-in-1 system has 2 separate stages of heaters. Initially, both stages are energized to raise the temperature in steam room up to the setpoint (S2), then the second stage disengages and only first stage stays on to keep the room full of steam by producing continuous flow of steam (S1). The operator can control the function of both stages by programming ETC thermostat dual setpoints (S1 and S2). In order to keep the room full of steam, S1 (which controls the first stage) should be set higher than S2; for example if S2 is set at 117°F(47°C), then S1 should be set at 125°F(52°C) or higher.

ETC has seven values that has to be programmed:

	Display Symbols	Description	Range	Factory Default
1	F/C	Fahrenheit or Celsius reading selection on the display		F for US C for Canada
2	S1	First stage temperature setpoint. The first stage turns off after reaching to S1.	-30°F to 220°F 1°C to 105°C	125°F 52°C
3	DIF1	First stage differential; e.g. the temperature drop by which the first stage turns back to ON state, after reaching to the setpoint(OFF state)	1 to 30	1
4	C1/H1	First stage Cooling or Heating mode		Must be set as H1
5	S2	Second stage temperature setpoint. The second stage turns off after reaching to S2.	-30°F to 220°F 1°C to 105°C	117°F 47°C
6	DIF2	Second stage differential; e.g. the temperature drop by which the second stage switches back to ON state, after reaching to the setpoint(OFF state).	1 to 30	1
7	C2/H2	Second stage Cooling or Heating mode		Must be set as H2

Programming Steps

1. Press the SET key once to start programming. The display will show current selection for F (Fahrenheit) or C (Celsius). Press **▲** or **▼** key to toggle between F or C designation.
2. Press the SET key again to access the stage 1 setpoint (S1). The display will show the current value of S1. Press **▲** or **▼** key to increase or decrease the value of S1. Should be set at 125°F (52°C).
3. Press the SET key again to access the stage 1 differential (DIF1). The display will show the current value of DIF1. Press **▲** or **▼** key to increase or decrease the value of DIF1. Should be set at 1.
4. Press the SET key again to access the stage 1 cooling or heating mode selection. The display will show the current mode, either C1 for cooling or H1 for heating. Press **▲** or **▼** key to select H1 for heating mode.
5. Press the SET key again to access the stage 2 setpoint (S2). The display will show the current value of S2. Press **▲** or **▼** key to increase or decrease the value of S2. It should be set at 117°F (47°C).
6. Press the SET key again to access the stage 2 differential (DIF2). The display will show the current value of DIF2. Press **▲** or **▼** key to increase or decrease the value of DIF2. It should be set at 1.
7. Press the SET key again to access the stage 2 cooling or heating mode selection. The display will show the current mode, either C2 for cooling or H2 for heating. Press **▲** or **▼** key to select H2 for heating mode.
8. Press the SET key once more and programming is complete. The display will show the current steam room temperature, and the stages that are energized, i.e. S1 or S2 or both or none.

Lockout Switch

The ETC is provided with a lockout switch to prevent tampering by unauthorized personnel. When placed in the LOCK position, the keypad is disabled and no changes to the settings can be made.

To access the lockout switch, disconnect the power supply and open the ETC front panel, the lockout switch is located on the inside cover.

TROUBLESHOOTING ERROR MESSAGES

Display Messages

- E1-** Appears when either the up or down key is pressed when not in the programming mode.
To correct: If the E1 message appears even when no keys are being pressed, replace the control.
- E2-** Appears if the control settings are not properly stored in memory.
To correct: Check all settings, and correct if necessary.
- EP-** Appears when the probe is open, shorted, or sensing a temperature that is out of range.
To correct: Check to see if the sensed temperature is out of range. If not, check for probe damage by comparing it to a known ambient temperature between -30°F and 220°F. Replace the probe, if necessary.
- EE-** Appears if the EEPROM data has been corrupted.
To correct: This condition cannot be field repaired. Replace the control.
- CL-** Appears if the calibration mode has been entered.
To correct: Remove power to the control for at least five seconds. Reapply power. If the **CL** message still appears, replace the control.

PROGRAMMING DAILY SCHEDULE FOR THE UNIT

EC7000 TIMER

INTRODUCTION

The EC7000 is a single-channel, electronic timer that controls the unit with a time-of-day schedule. The control may be utilized as a 24-hour or 7-day control. As a 24-hour control the same ON/OFF program is utilized each day of the week (Saturday and/or Sunday, or any other day may be skipped). When schedules vary from day to day, the 7-day programming capability allows a different schedule for each day of the week. With 16 setpoints available, these time controls provide programming versatility.

SPECIFICATIONS – PROGRAMMING CAPABILITIES

16 Setpoints – A setpoint defines the type of event (ON or OFF) as well as the time and day(s) on which the event will occur.

24-Hour or 7-Day programming – Allows the same schedule or a different schedule for each day of the week.

Selectable Clock Format – 12-hour (AM/PM) or 24-hour format.

Manual Override – Reverses current output state; begins immediately when initiated and remains until overridden again or until next setpoint is reached.

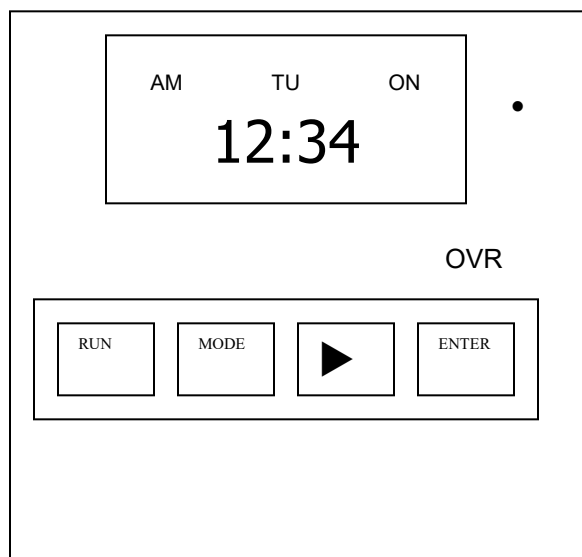
POWER OUTAGE CARRY-OVER

The program and time-of-day are maintained during a power outage for a minimum of seven (7) days. A built-in special capacitor eliminates the inconvenience of battery replacement.

ENVIRONMENTAL

EC7000 should be mounted indoors in an environment that is free from excessive contaminants such as oil, moisture and dirt. EC7000 is suitable for both indoor and outdoor use.

KEYPAD DESCRIPTION



RUN – Returns timer to the RUN mode. The timer will only control the load when in the RUN mode.

MODE – Advances from one programming mode to the next. The order of programming modes is as follows: Clock Format select, Run, Set Time and Setpoint Programming. After the last mode, the control will loop back to the Run mode.

▶ - Changes the parameter value that currently being programmed.

ENTER – In all programming modes, what is shown in the display is what exists in memory. Pressing the Enter key simply advance to the next parameter to be programmed. (i.e. hours to minutes).

Before you begin programming, make sure you understand setpoints. A setpoint defines the type of event – ON or OFF – as well as the time of the event and the day(s) on which the event will occur. For example, to turn the unit ON at 5:00 AM each day of the week, a setpoint like this would be required: ON, 5:00 AM, Mon-Tue-Wed-Thur-Fri-Sat-Sun. Setpoint programming provides built-in skip-a-day capability; to skip any day(s), simply do not add the day(s) to the setpoint. You must set the timer as it shuts down the boiling cycle for at least 1 hour in any 24 hours period.

As a simple example, consider the following schedule for turning the unit ON and OFF:

SUN: Unit is OFF.

MON through FRI: Unit is ON at 5:30 AM, OFF at 10:30 PM

SAT: ON at 5:30 AM, OFF at 12:30 PM

Note: When programming, “NO” on the display means no event is required at that setpoint on that particular day. “YES” means an event is required (either On or OFF) at that setpoint on that day. The sample schedule would be arranged as follows:

1st setpoint: SUN: **NO**, MON through SAT: **YES; ON**; at **5:30 AM**

2nd setpoint: SUN: **NO**, MON through FRI: **YES**, SAT: **NO; OFF**; at **10:30 PM**

3rd setpoint: SUN through FRI: **NO**, SAT: **YES; OFF**; at **12:30 PM**

Mark your setpoint work sheet as following table and proceed to program the unit using the programming instruction.

Program No.	Day of Week							Type of Event	Time
1	S	(M)	(T)	(W)	(T)	(F)	(S)	ON OFF	5:30 AM
2	S	(M)	(T)	(W)	(T)	(F)	S	ON OFF	10:30 PM
3	S	M	T	W	T	F	(S)	ON OFF	12:30 PM

YOUR SETPOINT WORK SHEET (Mark with your schedule)									
	Day of Week							Type of Event	Time
1	S	M	T	W	T	F	S	ON OFF	
2	S	M	T	W	T	F	S	ON OFF	
3	S	M	T	W	T	F	S	ON OFF	
4	S	M	T	W	T	F	S	ON OFF	
5	S	M	T	W	T	F	S	ON OFF	
6	S	M	T	W	T	F	S	ON OFF	
7	S	M	T	W	T	F	S	ON OFF	
8	S	M	T	W	T	F	S	ON OFF	
9	S	M	T	W	T	F	S	ON OFF	
10	S	M	T	W	T	F	S	ON OFF	
11	S	M	T	W	T	F	S	ON OFF	
12	S	M	T	W	T	F	S	ON OFF	
13	S	M	T	W	T	F	S	ON OFF	
14	S	M	T	W	T	F	S	ON OFF	
15	S	M	T	W	T	F	S	ON OFF	
16	S	M	T	W	T	F	S	ON OFF	

PROGRAMMING INSTRUCTIONS

SET TIME mode

STEP KEY

DESCRIPTION

1. MODE Advances to SET TIME mode. Control displays time with hours flashing. TOD is also displayed to indicate that Time-of-Day is being set.
2. ► Advance to current hour.
3. ENTER Minutes begin flashing.
4. ► Advance to current minute.
5. ENTER Day of week begins flashing.
6. ► Advance to current day of week. Then go directly to Setpoint Programming mode below.
7. ENTER Save day of week.
8. RUN Advances to RUN mode.

SETPOINT PROMGRAMMING mode

STEP	KEY	DESCRIPTION
1.	MODE	Advances to SET TIME mode.
2.	MODE	Advances from the SET TIME mode to the SETPOINT PROGRAMMING mode. The timer displays “1” at bottom of display and “_ _: _ _”. The “1” indicates that the first of 16 setpoints is being programmed. The dashes indicate that this setpoint is clear.
3.	ENTER	Display shows “SU” (Sunday) and “no”. This indicates that Sunday is not included in the setpoint.
4.	►	Displays toggles between “YES” and “no”. If the event is desired for the particular day select “YES”, if not select “no”.
5.	ENTER	Display shows “MO” (Monday) and “no”. Repeat steps 3 and 4 to select which day(s) to include in the setpoint. After programming Saturday, the display will show the setpoint with the hours flashing. Dashes in the hour location indicate that the setpoint is still clear.
6.	►	Advance to desired hour for this event.
7.	ENTER	Minutes begin flashing.
8.	►	Advance to desired minute for this event.
9.	ENTER	Event type begins flashing.
10.	►	Display toggles between ON and OFF event types. Choose the event desired.
11.	ENTER	Advances to the next setpoint. Repeat steps 3 through 10 to program additional setpoints. When all setpoints required are programmed, advance to step 12.
12.	RUN	Return to the RUN mode when programming is complete.

NOTE: Once programming has been completed through step 12, the display should show correct Time-of-Day, Day-of-Week and Setpoint status (ON/OFF). If present load status should be an ON event, but shows as an OFF event, press ENTER/OVR to turn load ON and to initiate programmed schedule.

TO REVIEW SETPOINTS

STEP	KEY	DESCRIPTION
1.	MODE	Advances from RUN mode to SET TIME mode (TOD displays)
2.	MODE	Advances from SET TIME mode to SETPOINT PROGRAMMING mode. The control will display the first setpoint (1 displays at bottom). To modify the setpoint, go to step 3 of the SETPOINT PROGRAMMING mode instructions.
3.	►	Advances through the remaining setpoints.
4.	RUN	Returns to RUN mode when done reviewing setpoints.

OVERRIDE

Manual override reverses the current output state. Loads that are ON turn immediately OFF; loads that are OFF turn immediately ON. The timer displays OVR to indicate that the current load state is the result of an override. The override remains in effect until overridden again or until the next setpoint is reached. To initiate override, press OVR (ENTER) key while in the RUN mode.

NOTE: After an override has been initiated, the OVR will display until the next programmed setpoint is reached, even if the timer is overridden again. Display will show if the load is on or off.

CLOCK FORMAT SELECT mode

These timers initially power up in the Clock Format Select mode. This mode is only accessible once. If the clock format needs to be changed, the timer will have to be reset. To reset the timer, insert a pointed object into the reset hole to the right of the display.

STEP	KEY	DESCRIPTION
1.		Apply power to timer. Control displays 12 Hr, indicating 12-hour clock format.
2.	▶	Toggles between 12 hour (AM/PM) and 24 hour (17:00 = 5:00 PM) clock formats. Choose the format desired.
3.	ENTER	Advances to RUN mode.

SPECIFICATION SHEET

STEAMASTER® COMMERCIAL STEAM GENERATOR

MODEL NO.	CU FT RANGE	KW MAX	STEAM OUTLET	VOLTS PHASE	3 PHASE AMPS	1 PHASE AMPS	MAX. DIM L X W X H	OPERATING WEIGHT
ES - 7.5	375	7.5	¾"	208/240	21 / 18	36 / 32	27"X 9"X 24"	90 to 105 lb
				480/600	9 / 7	16 / 13		100 to 115 lb
ES - 9	500	9	1"	208/240	25 / 22	44 / 36	27"X 9"X 24"	90 to 105 lb
				480/600	11 / 9	19 / 15		100 to 115 lb
ES - 12	750	12	1"	208/240	33 / 29	58 / 50	27"X 9"X 24"	95 to 110 lb
				480/600	14 / 12	25 / 20		100 to 115 lb
ES - 15	1000	15	1"	208/240	42 / 35	72 / 63	27"X 9"X 24"	95 to 110 lb
				480/600	18 / 15	32 / 25		100 to 115 lb
ES - 18	1250	18	1"	208/240	50 / 43	87 / 75	27"X 9"X 24"	95 to 110 lb
				480/600	22 / 18	38 / 30		100 to 120 lb
ES - 21	1500	21	1"	208/240	58 / 51	101 / 88	27"X 9"X 24"	95 to 110 lb
				480/600	25 / 21	44 / 35		100 to 120 lb
ES - 24	1750	24	1"	208/240	67 / 58	116 / 100	27"X 9"X 24"	95 to 110 lb
				480/600	29 / 24	50 / 40		105 to 120 lb
ES - 30	2000	30	1 - ¼"	208/240	83 / 72	145 / 125	27"X 9"X 24"	100 to 115 lb
				480/600	36 / 30	63 / 50		110 to 125 lb
ES - 36	2250	36	1 - ¼"	208/240	100 / 87	173 / 150	27"X 9"X 24"	100 to 115 lb
				480/600	43 / 36	75 / 60		110 to 125 lb
For room size over the above range, contact manufacturer Toll free: 1 800 354 8462								

MAINTENANCE MANUAL

DRAIN VALVE

INSTRUCTION FOR CLEANING THE DRAIN VALVE V8043

Removing the Power head

1. Turn off the main power supply to the steam generator to prevent electrical shock or equipment damage.
2. Push the manual opening lever to the “MAN. OPEN” position (see Fig.4-A).
3. Remove the front screw securing the cover to the power head and lift the power head off (see Fig.4-B).
4. Use a flat screwdriver to loosen the 2 screws securing the power head to the valve body and lift power head off the valve body (see Fig.6).
5. Use a 5/16 wrench or ratchet to remove the 4 hex-nut screws securing the adapter plate to the valve body and lift off the adapter plate using a flat screwdriver (see Fig.5).

Cleaning the Boiler and the Valve Body

Now that the valve is open, you can flush the tank in order to remove any other sediment or calcium pieces inside the boiler. Follow these instructions:

1. Insert the O-ring back on the valve body, and then replace the adapter plate upside-down, so the ball will stick out of the valve body. This is to open the valve passage, so the sediment will pass through easily.
2. Remove the power head and place it on a location where it is secure from water.
3. Turn on the main power breaker and turn off the front timer after 5 seconds. After 10 minutes the unit will start cleaning cycle, which will continue for 30 minutes.
4. To repeat the cleaning cycle turn on the timer, then turn it off after 5 seconds.
5. After the cleaning cycle finished, turn off the main power to the unit.
6. Remove the adapter plate and clean the valve body of any piece of sediment that is left inside the valve.

Installing the Power Head

1. Insert the O-ring on the valve body, only if you have removed it (see Fig.5).
2. Place the metal plate with the rubber plug on top of valve body. Make sure the 3 guide pins on the underside of the metal plate fit into the recesses on the valve body.
3. Secure the metal plate to the valve body with the 4 hex-nut screws (see Fig.5). 2 of the screws have heads with recessed threads to insert screws for mounting the power head, insert them in the larger screw openings.
4. Make sure that the manual opening lever is locked in the “MAN. OPEN” position. Fit the power head onto the valve body, ensuring that the shaft seats correctly (see Fig.6). The power head should be aligned so that the manual opening lever is at the port “A” end of the valve body. Secure the power head to the valve body with the 2 screws.
5. Replace power head cover and secure it with 1 screw.
6. Turn on the main power and test the unit in both boiling cycle and cleaning cycles.

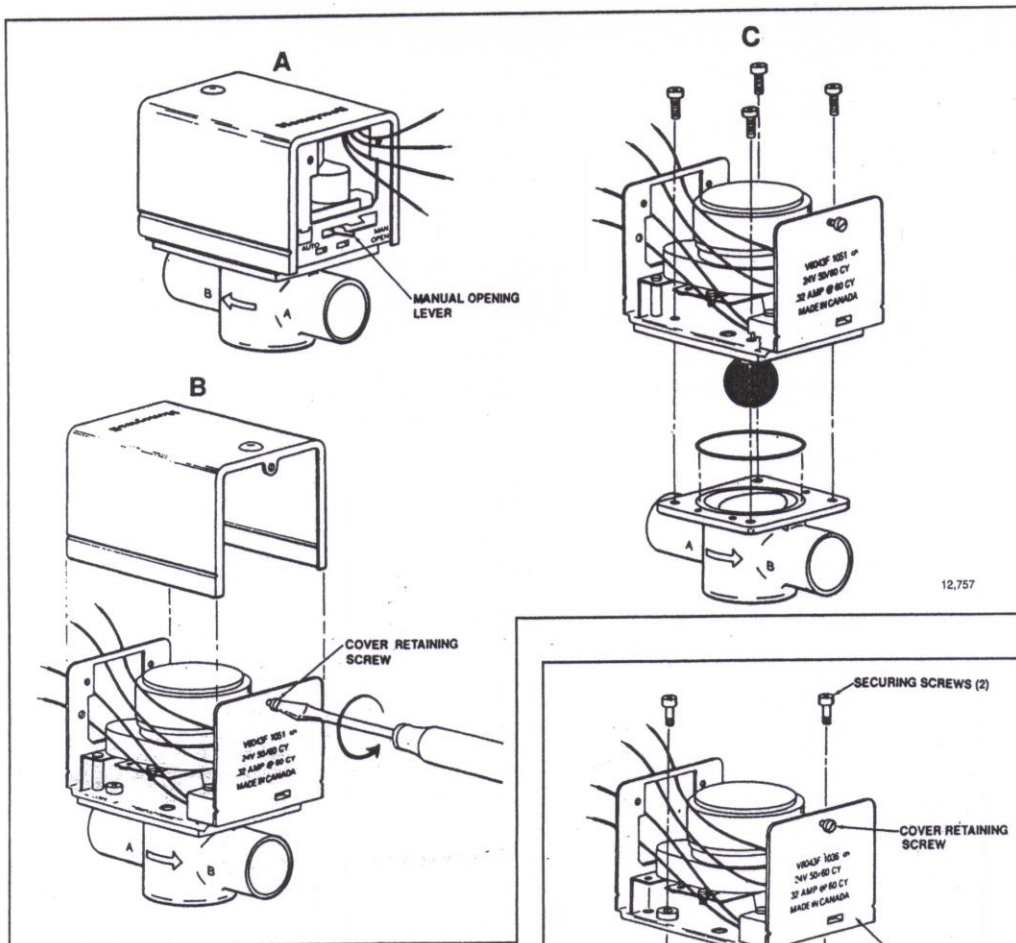


Fig. 4

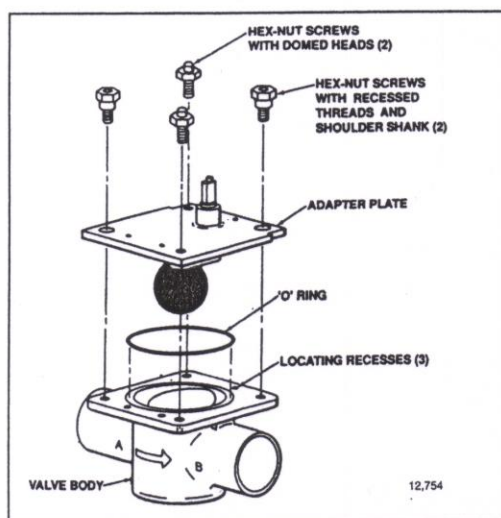


Fig. 5

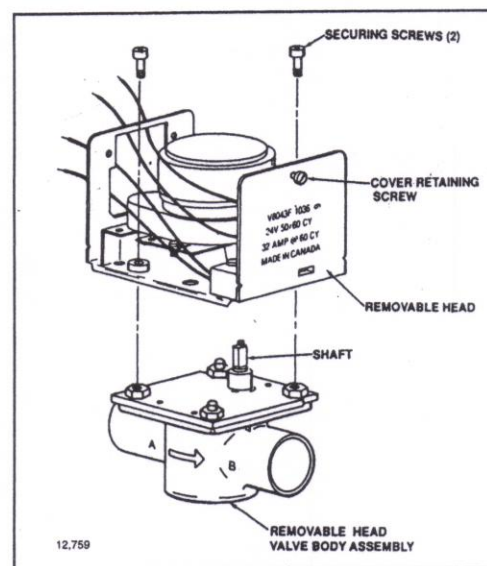


Fig. 6

Instruction For Replacing The Cartridge Crystals For Water Scale Inhibitor



Figure – 1



Figure – 2



Figure – 3



Figure – 4

1. Close the manual shut-off valve on water supply line. Place a bucket or pale under the water scale inhibitor to collect any water residue that remained in the canister.
2. Turn the canister with both hands or with a strap tool counter clockwise to remove the canister as shown in Figure-1.
3. Use a channel-lock tool to loosen and lift up the top cap, as shown in Figure-2 & Figure-3. There is an O-ring washer on the cap and another one in the canister.
4. Dispose all the sediment from the canister and wash it. Then refill the canister with new crystal balls as shown in Figure-4.
5. Replace the top cap and the O-rings. Shake the canister to accommodate all the crystals if there is empty space between them.
6. Reinstall the canister by turning it clockwise on the body. Open the manual valve to make sure there is no leak from the canister.

WATER INLET VALVE 3121 Parker / 32L8DGM Peter Paul

MAINTENANCE

Note: Depending on water conditions and filtration, it may be required to periodically clean and/or replace worn components.

CAUTION: *Do not expose plastic or rubber components to any type of commercial cleaning fluid. Parts should be cleaned with a mild soap and water solution.*

DISASSEMBLY INSTRUCTIONS

(See Figure 1 & Figure 2)

WARNING: *Depressurize system and turn off electrical power to the valve before attempting repair. / The valves need to be removed from the line for disassembly or repair.*

To remove the coil: Unscrew the nut on top of the sleeve. The enclosure, coil and flux plate or integrated coil may now be removed.

To disassemble the pressure vessel:

Disassembly is best done as follows:

Hold the valve body installed in the system with a channel lock to prevent bending the existing piping. Placing pliers on the sleeve of the valve in the location shown in Figure 1 turn the sleeve counterclockwise to unscrew the sleeve from the body of the valve. The pliers should be positioned 90° from the centerline of the sleeve to avoid sleeve damage. Extract the plunger & spring

from the sleeve. Wash the sleeve cavity and valve body and remove any sediment or rust.

Replacement parts: When ordering replacement parts, specify valve complete number and voltage as noted on the valve nameplate or label.

CAUTION: Rectified coils:

The 3121 Parker solenoid coil contains solid state components that prevents from reading the actual resistance of the coil. But the 32L8DGM Peter Paul resistance should read about 780 Ohms.

REASSEMBLY INSTRUCTIONS (See Figure 2)

Insert the O-ring seal onto the body and make certain that it seats completely flat inside the body.

Assemble plunger spring to plunger assembly if necessary and insert the plunger into the sleeve assembly with the lower end exposed.

Carefully thread the sleeve assembly with the plunger inside into the body, and tighten the sleeve assembly with a torque of 30 – 40 inch pounds.

Place the flux plate, coil, and enclosure onto the sleeve, and tighten the sleeve assembly with the top nut using a torque of 15 – 30 inch pounds.

TROUBLE SHOOTING	
PROBLEM	PROCEDURE
Valve fails to operate	1. Check electrical supply with voltmeter. Voltage should agree with nameplate or label rating at the valve. 2. Check coil with ohmmeter for shorted or open coil. 3. Verify supply pressure is equal to or less than nameplate rating.
Valve is sluggish or inoperative – electrical supply and pressure check out.	1. Disassemble valve operator (see disassembly instructions). Clean extraneous matter from inside valve – the plunger must be free to move without binding.
External leakage at sleeve to body joint.	1. Check that sleeve is torqued to the body with 30 – 40 inch pounds and that O-ring seal inside the body is not damaged.
Internal leakage at sleeve port or body port, energized or de-energized.	1. Remove sleeve. Examine surface of rubber seals in the bottom and top of the plunger. Clean or replace plunger as required. 2. Inspect orifices in the body and sleeve for nicks. Damage may require installing a new valve if problem not solved by replacing the plunger. 3. The return spring must not be broken.

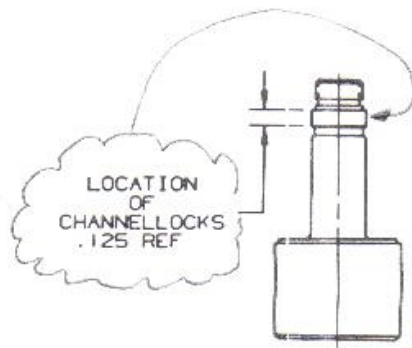


Figure 1

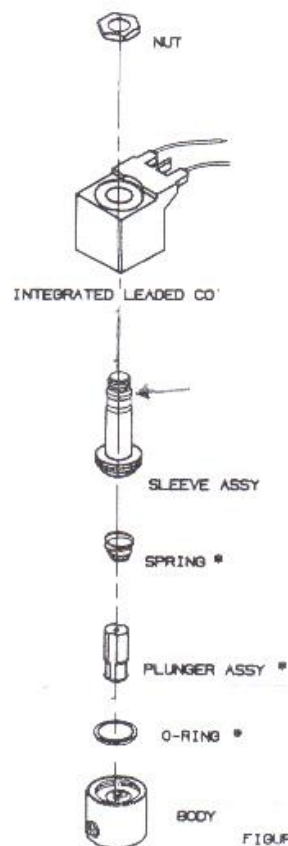


FIGURE 2

POWER FLUSH VALVE

Depending on service conditions, fluid being used, filtration, and lubrication, it may be required to periodically clean and/or replace worn components. See Disassembly Instructions.

Caution:

Do not expose plastic or elastomeric materials to any type of commercial cleaning fluid. Parts should be cleaned with a mild soap and water solution.

DISASSEMBLY INSTRUCTIONS

Warning:

Depressurize system and turn off electrical power to the valve before attempting repair. The valve body need not be removed from the line.

To remove the coil assembly

For both ordinary and hazardous location constructions, unscrew the nut on the top of the coil assembly. The wave washer and coil assembly can now be removed.

To disassemble the pressure vessel

Caution: Do not use a pipe wrench directly on the sleeve tube.

For general cleaning and internal component replacement, there is no reason to remove the sleeve from the valve cover. Unscrew the four (4) cover screws. The diaphragm retainer/plunger assembly, return spring, diaphragm and O-ring can now be removed. On anti water hammer valves the speed control feature can also be removed at this time.

Replacement Parts

When ordering replacement parts kits, specify valve number and voltage from nameplate. Parts kits are available for each valve. Parts included in each kit are marked with an asterisk (*). See exploded views.

Reassembly Instructions

Warning:

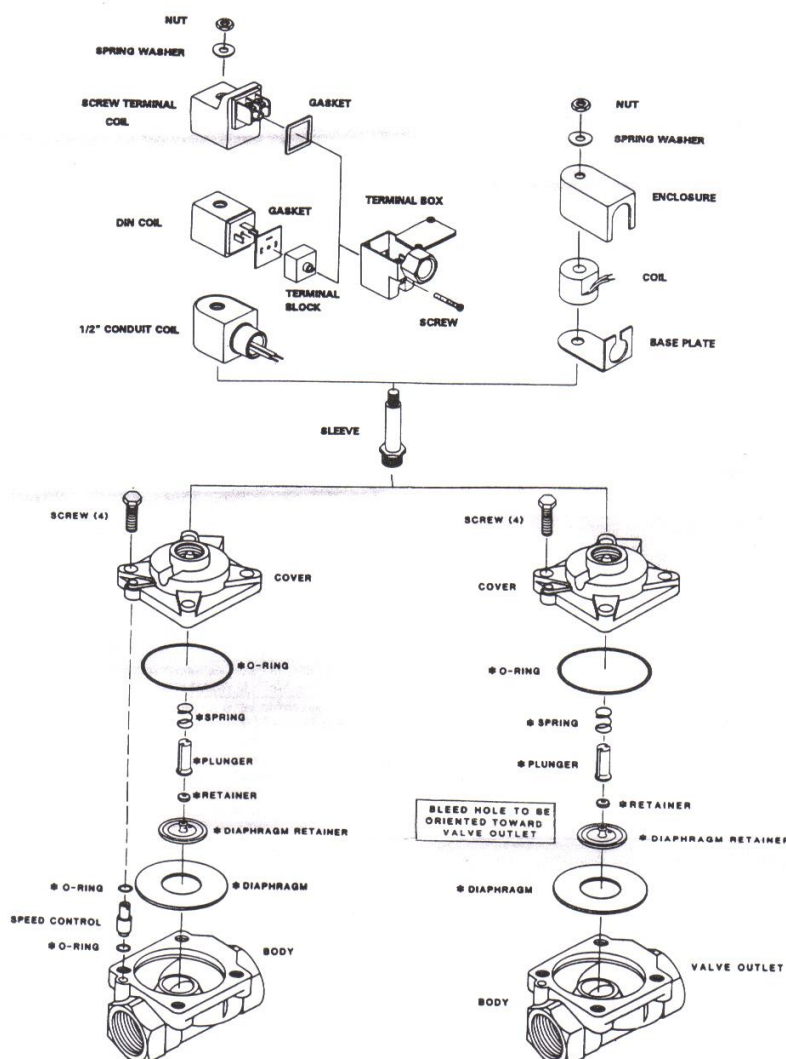
Valves equipped with Hazardous Location coils must use Hazardous Location replacement coils only. Verify nameplate data and coil part number before installing the replacement coil.

To reassemble the pressure vessel

Refer to exploded view drawings. Assemble the O-ring into the body groove. For valves with the anti-water hammer feature, replace the O-rings and reassemble the speed control device at this time. Place return spring over plunger and install plunger diaphragm with the diaphragm installed into sleeve cover assembly. Parts must be replaced in the order shown. Tighten screw with a torque of 70-80 in-lbs. Avoid damaging the main orifice when placing the diaphragm assembly in the valve.

If the sleeve was removed from the cover, tighten the sleeve assembly with an input torque of 260-270 in-lbs.

With the coil assembly repositioned on the sleeve, slide the wave washer over the sleeve and tighten coil assembly nut with an input torque of 43-53 in-lbs.



POWER FLUSH VALVE TROUBLE SHOOTING	
PROBLEM	PROCEDURE
Valve fails to operate	1. Check electrical supply with voltmeter. Voltage must agree with nameplate rating. 2. Check coil with ohmmeter for shorted or open coil. 3. Make sure that pressure complied with nameplate rating.
Valve is sluggish or inoperative – electrical supply and pressure check out.	1. Disassemble valve as per the Disassembly Instructions. Clean out extraneous matter. The plunger must be free to move without binding. 2. Check the diaphragm for tears and for clogged or obstructed bleed hole or pilot orifice. Torn diaphragm must be replaced. 3. Check all springs, if broken, replace. 4. Check that the plunger is attached to the diaphragm assembly.
External leakage at sleeve flange to cover joint.	1. Check that sleeve is torqued to 260 - 270 in-lbs.
External leakage at flange joint between body and cover.	1. Check that cover screws are torqued with an input torque of 70-80 in-lbs. If leakage persists replacement of diaphragm assembly or flange O-ring may be required and/or bodies or covers with damaged sealing surfaces may have to be replaced.
External leakage at speed control device.	1. Check O-rings for damage. Replace if necessary.
Internal Leakage	1. Disassemble valve as per the Disassembly Instructions. Remove extraneous matter. Clean parts in a mild soap and water solution. 2. Examine diaphragm sealing surface for dirt. Remove all foreign particles. Examine orifice for nicks. Damaged parts must be repaired or replaced. 3. Check plunger return spring. Replace if broken.

THERMOSTAT

How to test the Temperature sensor probe on A419 and A319 Johnson Control Thermostat

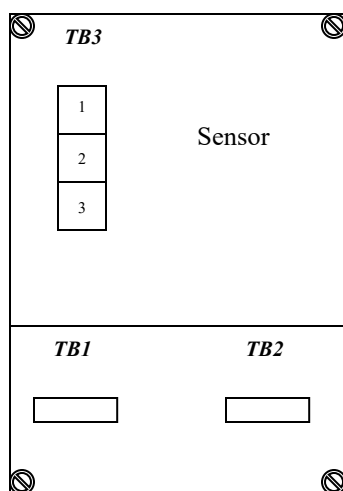
1. Using a thermometer take an independent temperature reading at the steam room, where the sensor probe is installed. Find the corresponding resistance value from table.1. Each resistance value corresponds to a temperature value, which is the temperature at the tip of the sensor in the steam room.
2. Using a philips screwdriver remove 4 screws from the front panel of the thermostat.
3. Using a fine flat screwdriver take off the sensor wires:
On A319: from TB3.
On A419: from TB3-2 and TB3-3 pins.
4. Using your Ohmmeter measure the resistance between the sensor wires and compare the reading with the resistance value that you found in step 1 above.
5. If there is a big difference between these values, the sensor is defective and has to be replaced.
6. As a secondary measure, check the continuity on the extension cable from thermostat to sensor, while the sensor is disconnected from the cable. Make sure the cable wires are not short (circuit).
7. As a secondary measure, check the continuity on the extension cable from thermostat to sensor, while the sensor is disconnected from the cable. Make sure the cable wires are not short (circuit).

How to test the sensor probe on ETCDD211000 RANCO Thermostat

1. Follow Step 1. above.
2. Disconnect the sensor wire from the thermostat
3. Follow Step 4, 5 and 6 above.

<u>Resistance</u> A319	<u>Temperature</u>		<u>Resistance</u> A419	<u>Resistance</u> ETC. RANCO
	Fahrenheit	Celsius		
52571	-30	-34	650	682800
37116	-20	-29	670	498900
26539	-10	-23	700	347400
19208	0	-18	750	259470
14062	10	-12	780	185190
10408	20	-7	810	141180
7784	30	-1	850	103110
5880	40	4	890	80040
4484	50	10	930	59700
3450	60	16	960	45000
2678	70	21	1000	35820
2095	80	27	1050	27495
1652	90	32	1080	22209
1313	100	38	1120	17325
1051	110	43	1180	14178
847	120	49	1210	11226
687	130	54	1270	9297
561	140	60	1320	7464
461	150	66	1380	6033
380	160	71	1420	5079
316	170	77	1460	4155
264	180	82	1520	3531
221	190	88	1600	2921
187	200	93	1650	2506
158	210	99	1690	2096
135	220	104	1750	1814

Table.1



A419
Johnson Control

Example:

If the sensor temperature in the steam room is 90°F/32°C and you have an A419 thermostat, you should read 1080 Ohms on your meter.

If you have an A319 thermostat, you should read 1652 Ohms on your meter.

And if you have ETC RANCO, you should read 22209 Ohms on your meter.

Maintenance instructions for 7321BBN Steam Valve

MAINTENANCE

Note: Depending on service conditions, it may be required to periodically clean and/or replace worn components. See disassembly instructions.

CAUTION

Do not expose plastic or elastomeric materials to any type of commercial cleaning fluid. Parts should be cleaned with a mild soap and water solution.

DISASSEMBLY INSTRUCTIONS

1. Depressurize system, and turn off electrical power to the valve before attempting repair.
2. Do not remove the coil with power on; otherwise, it burns out instantly.

To remove the coil assembly:

Unscrew the nut on the top of the coil assembly. The wave washer and coil assembly can now be removed.

To disassemble the pressure vessel:

CAUTION: Do not use a pipe wrench directly on the sleeve tube.

Use a 7/8" (22mm) wrench or an adjustable wrench to remove the sleeve tube. The plunger, return spring, and flange seal may be removed.

Unscrew the 4 or 6 cover screws. The diaphragm assembly, return spring, and O-Ring can now be removed. If the cover can not be easily lifted off the body, laterally tap the cover or gently pry the cover from the body. Care must be taken not to damage the diaphragm, cover or body.

Replacement Parts: When ordering replacement parts, specify valve number and voltage from nameplate.

REASSEMBLY INSTRUCTIONS

WARNING: Verify nameplate data and coil part number before installing the replacement coil.

To reassemble the pressure vessel:

Refer to exploded view drawings. Assemble the O-ring into the body groove. Install the diaphragm assembly into the body. Making sure the diaphragm tab is located over the outlet port of the body. Line up the diaphragm bolt holes with the appropriate bolt and flow holes in the body. Install and tighten the screws with a torque of 70-80 in-lbs. for the 3/8" and 1/2" sizes, and 125-150 in-lbs. for the larger port size valves. Avoid damaging the main orifice when placing the diaphragm assembly in the valve.

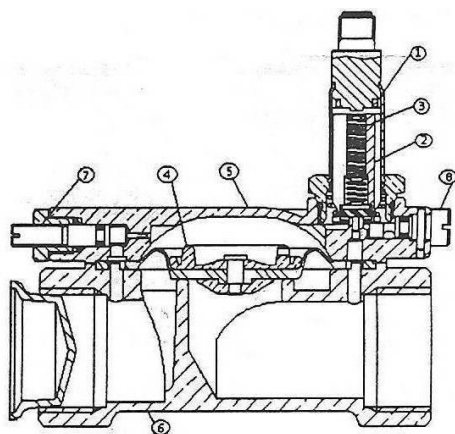
If the sleeve was removed from the cover, install the plunger and spring into the sleeve. Tighten the sleeve assembly with an input torque of 230-250 in-lbs.

With the coil assembly repositioned on the sleeve, slide the wave washer over the sleeve and tighten the coil assembly nut with an input torque of 43-53 in-lbs.

After re-assembly, it is advisable to thoroughly check for leakage and correct operation of the valve.

TROUBLESHOOTING

PROBLEM	PROCEDURE
Valve fails to operate.	1. Check electrical supply with voltmeter. Voltage must agree with nameplate rating. 2. Check coil with ohmmeter for shorted or open coil.
Valve is sluggish or inoperative – electrical supply and pressure check out.	1. Disassemble valve as per the Disassembly Instructions. Clean out any extraneous matter. The plunger must be free to move without binding. 2. Check the diaphragm for tears and clogged or obstructed bleed hole or pilot orifice. Torn diaphragm must be replaced. 3. Check all springs. If broken, replace.
External leakage at sleeve flange to cover joint.	1. Check that the sleeve is torque to 260-270 in-lbs. 2. Check flange seal for damage. Replace if defective.
External leakage at flange joint between body and cover.	1. Check that the cover screws are torqued with an input torque per reassembly instructions. If leakage persists, replacement of diaphragm assembly or flange O-ring may be required and/or bodies or covers with damaged sealing surfaces may have to be replaced.
Internal leakage.	1. Disassemble valve as per the Disassembly Instructions. Remove extraneous matter. Clean parts in a mild soap and water solution. 2. Examine diaphragm sealing surface for dirt. Remove all foreign particles. Examine orifice for nicks. Damaged parts must be repaired or replaced. 3. Check plunger return spring. Replace if broken



Normally Closed Valve (typical)

Part	Description
1	Sleeve Assembly
2	Plunger Assembly
3	Plunger Spring
4	Diaphragm Assembly
5	Cover
6	Body
7	Metering Stem (optional)
8	Manual Override Stem (optional)

* Parts included in repair kit. Contact Parker Skinner Valve for repair kit number based on selected valve.

ELEMENTS – FIELD INSTALLATION

What you will need:

- Basic Toolkit.
- Sharp knife.
- High-temperature silicone seal.
- Anti-seize compound.

1. Manually drain the tank by opening the drain valve lever, and allow it to drain.
2. Shut off the water and power.
3. Disconnect the water and steam lines.
4. Disconnect the blue wire from the sensor probe.
5. Remove the steam valve, and the pressure relief valve (if equipped).
6. If you can do the repair without removing the unit, the electrical connection can be left in place. Remove the front back and top from the external blue box. The top will rotate far enough out of the way.
7. Remove the ground wire from the tank, and the leads from the high-temperature limiter(s).
8. Remove the insulation.
9. Remove the 14 screws that hold the lid down on the tank. Remove the lid. You may have to tap it up at the corners, use a hammer and piece of wood as medium.
10. Remove the wires from the elements.
Note: The tank can slide backward in the box for more working space.
11. Remove the elements.
Note: You may need to remove the contactors and transformers from the outer case to allow your socket in. Do not unwire these components.
12. Clear all debris from inside the tank.
13. Open and clean the drain valve and pipe.
14. Be certain that the inner surface of the tank is clean and dry where the element seals are going to seat.
15. Install the new elements starting at the bottom corner furthest from the drain. The fiber washer goes inside the tank, and the metal washer outside the tank.
16. Tighten each element as you place it in the tank. Hold the inside element nut with a wrench to prevent the element from twisting as you tighten the external nut.
17. Place a light bead of high-temperature silicone seal around the top of the tank (just enough to seat the gasket), then set the new gasket in place.
18. Be sure that the water probe shield is clear of all deposits, and that the water level probe is clean and centered in it.
19. Place the lid on the tank (the water level probe goes to the front of the tank).
20. Replace the seal washers on the stainless steel tank screws. Use a light coating of anti-seize compound on the screw threads.

21. Start 1 screw on each of the 4 sides to align the lid. Do not tighten them down then start all the remaining screws. Tighten the screws down using a clockwise direction around the tank. Do this rotation around the tank approximately 3 times to assure an even torque and moisture-proof seal.
22. Put the drain valve together.
23. Rewire the elements.
24. Replace the components to their original position on the external box.
25. Return the tank to its original position.
26. ALWAYS re-attach the ground wire to the tank, and tighten down securely.
27. Replace the insulation.
28. Replace the back of the box.
29. Replace the top of the box.
30. Reconnect the blue wire to the water probe, and tighten nut.
31. Check and be sure that all wires are properly connected, and that no connections are bent or broken. Reconnect the wires to the high-temperature limiter(s).
32. Replace the steam valve(s) and pressure relief valve.
33. Connect your water line(s) (if you have removed it).
34. Leave the front open temporarily.
35. Check the wire connections in the electrical connection box on top of the unit to be sure that all connections are tight.
36. Turn on the water, check for leaks. Repair as necessary.
37. Turn on the power and monitor it as it begins to function. It must first fill up with water then the contactors engage to energize elements. Allow it to fully steam while you visually check for any leaks (around elements). Tighten anything that is leaking until it stops.
38. Shut down the unit, and replace the front.
39. Restart and operate as normal.

STEAM SAUNA INC.

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