



SERVICE BULLETIN

MODEL NO'S. SG-9, SG-14, SG-18, SG-23, SG-27, SG-36 BULLETIN NO. 95-3
 SUBJECT: TROUBLE SHOOTING FOR WATER

The purpose of the water level sensing system is to replenish the water in the unit as it is boiled away to make steam for the room.

PROBLEM:

1. Boiler does not fill with water when turned on for steam operation.
2. Water runs through boiler, constantly filling (with power on/off)

POSSIBLE CAUSES

Control power supply defective, time clock switch does not close (unit will not turn on), P.C. Board "clock/remote" switch on remote setting, water supply turned off, water level sensor defective, fill valve defective, P.C. Board defective.

TROUBLE SHOOTING AND REPAIRS:

To make diagnostic trouble shooting easier check the following red-"LED" lights on the P.C. Board:

"DRAIN" LED-LIGHT: illuminated only when drain valve is in open position, indicated by red marking on valve stem plate, (can be illuminated momentarily in steam cycle if drain valve is in rotation to close).

"HIGH TEMP" LED-LIGHT: illuminated only when air switch button is depressed (and sometimes when power supply to steam generator switched off and on).

"FULL" LED-LIGHT: illuminated only when the water level sensor is in contact with the water (delluminate when sensing low water, may flash from wave action in boiler).

"FLUSH" LED-LIGHT: illuminated only when unit is in FLUSH cycle (not illuminated in steam cycle).

"FILL" LED-LIGHT: illuminated only when water FILL valve is energized (unit taking a drink).

"H1 to H4" LED-LIGHTS: illuminated only when the "FULL" LED-LIGHT is satisfied and the steam room thermostats are calling for the contactor to close and the unit to make steam.

IF LIGHTS ARE ILLUMINATED OTHER THAN ABOVE SERVICE IS REQUIRED

1. Quick check - remove cover from the low voltage control side of main electrical box, and identify the red LEDS.
2. Quick check - symptom water valve closed water does not enter boiler - full light on - remove JB-1 plug and LED light goes out on P.C. Board - repair / replace probe - LED light stays on - repair / replace P.C. Board
3. Quick check - symptom water valve closed water runs through boiler - full light on - fill light out - turn off power supply to steam generator - water does not stop - replace / repair fill valve
4. Quick check - symptom water valve closed no water enters - full light off - repair / replace P.C. Board
5. Quick check - symptom water valve closed water runs through boiler - full light on - check flush valve is not defective and water passing through valve
6. Quick Check - symptom water valve stays energized water runs through boiler - check full light off - remove JB-1 plug and jump together the 2 terminal pins on P.C. Board - full light on, water stops - repair / replace probe
7. Quick check - symptom water valve stays energized water runs through boiler - full light on - repair / replace P.C. Board

IF THE ABOVE SCENARIOS AND CONDITIONS DO NOT DESCRIBE YOUR PROBLEM, FURTHER TESTING AS LISTED BELOW MAY BE REQUIRED.

1. Check the 2 glass 3AMP fuses protecting the primary side of the transformer. If the fuses are good, the voltage across them agrees with the voltage on the product label and the transformer appears to be in good condition, then carry on and check the output (secondary side) of the transformer.

If the fuses are blown, check for visual deterioration and/or the fuses continually blowing. If this is the case, the transformer or the wiring on the primary side may need replacing.

2. Check the voltages on the secondary side of the transformer. There are 5 wires connected to a white plug JB-4 on the top right of the circuit board (the secondary side of the transformer power supply). Starting from the top, the wire colors are: blue pin #1, yellow pin #2, blue pin #3, brown pin #4, brown pin #5. The voltages should be approximately as follows:

- i) Across the 2 brown wires 24VAC
- ii) Across the 2 blue wires 24VAC
- iii) Across the yellow and either blue wires 11 VAC/16 VAC

Depending on the voltage supplied to the steam generator, the voltages listed above may vary 1 or 2 volts higher than shown.

If the transformer's secondary output does not meet the above standards and the primary input has the correct voltage, the transformer is faulty and should be replaced.

Once it has been determined that the transformer output is correct check the 3 glass fuses on the top right of the circuit board to make sure they are not burnt or damaged. Check their voltage as follows:

Right fuse	lower end to ground	24VAC
Middle fuse	lower end to ground	16VAC
Left fuse	upper end to ground	24VAC

Should any of these voltages not be the same as or very close to the above, the fuse/s must be replaced.

**CAUTION: CONTINUALLY BURNING OF ABOVE FUSE/S
CHECK YOUR FIELD WIRING CONNECTIONS**

Make sure the switch on the time clock, (located on the right of the clock hands) is in the "clock" position (the "clock" automatic position is: white knob in the center of its sliding path). This will turn the unit on to the steam cycle if the trippers (on the outside ring) are set to the outside and the time is properly adjusted. The other 2 positions on the switch are: top of its sliding path MANUAL ON (steam cycle only), and bottom of its sliding path MANUAL OFF (flush cycle only).

Check the "clock/remote" switch on the P.C. Board. It should be set on CLOCK (button to left side) unless your unit is being controlled by a remote device (computer, or manual remote switch). Switching the "clock/remote" switch to remote (button to right side) with no field controls connected will energize the flush cycle and it will not return to steam cycle. To energize steam cycle jump across the 2 field connection terminals marked remote (located above time clock). CAUTION: DO NOT CYCLE CLOCK REMOTE SWITCH CIRCUIT.

Remove the plug in JB-1 (it has a blue wire pin #1 on top and a white wire pin #2 on the bottom) and the full light should deilluminate. At the same time, the fill light will illuminate and the fill valve will energize (open) to allow water to enter the boiler.

If it does not open, both the time clock and the circuit board should be checked as outlined below:

If the valve did not open, before replacing the plugin JB-1 on to the circuit board, open the manual drain valve to lower the water level (if there is any water) and check to make sure that there is no continuity Not less than 250k from the blue probe wire on JB-1 to ground (no water in boiler). If there is any continuity at all, replace the probe and wire assembly. Close the manual drain valve.

The 3 wires from the time clock are connected to the plugin on JB-3. The wire colors are from left to right as follows: white-(pin 5), brown-(pin 4), brown-(pin 3), yellow-(pin 2), white/red-stripe-(pin 1). Turn off the power supply to the steam generator, remove the 2 screws (top right and lower left) and the upper and lower external cover of the time clock. Check for the following voltages as follows:

clock terminal - 1 -	24VAC to ground	white red striped wire
clock terminal - 2 -	0VAC to ground	yellow wire
clock terminal - 3 -	24VAC to ground	brown wire
clock terminal - 4 -	24VAC to ground	brown wire
clock terminal - 5 -	0VAC to ground	white wire

Should any of these voltages not be the same as or very close to the above, turn off the power supply to the steam generator, remove the check for continuity between the plugin (JB-3) and the time clock terminals as follows:

clock terminal - 1 -	to plugin terminal pin - 3 - brown wire
clock terminal - 1 -	to clock terminal - 3 -
clock terminal - 2 -	to plugin terminal pin - 5 - white wire
clock terminal - 4 -	to plugin terminal pin - 2 - yellow wire

Check for continuity between remote switch field connection terminals and the plug in JB-3.

remote switch terminal - SW -	to plugin terminal pin - 1 - white red striped wire
remote switch terminal - 24VAC-	to plugin terminal pin - 4 - brown wire

If no continuity is found, carefully try to insert the wire deeper into the plug socket. This may be done (after removing the black wire retainer) with a very small ended screw driver (CAUTION: DO NOT PUSH AGAINST THE P.C. BOARD). If continuity is found to be OK and there is still not the correct voltage present on all wires the time clock circuit may be defective and the P.C. Board should be removed for repair.

To check the operation of the valve itself, determine that the water supply to the fill valve is turned on.

Loosen the flare nut on the "inlet" side of the fill valve to determine there is in fact water pressure there. No water pressure or volume check and repair water supply.

Remove the 2 wire nuts from the fill valve (the fill valve has 1/2" copper pipe on the inlet and 3/8" copper pipe on the outlet) and check the voltage between the 2 orange wires at the valve. It should be 24VAC. If no voltage is found on the orange wires turn off the power supply to the steam generator and remove the plug at JB-2. Test for continuity between the plug and the end of each orange wire. If no continuity is found carefully try to insert the wire deeper into the plug socket.

This may be done (after removing the black plastic wire retainer) with a very small ended screw driver (CAUTION DO NOT PUSH AGAINST THE P.C. BOARD). If continuity is OK and there is still not the correct voltage at the fill valve the fill circuit is defective and the P.C. Board must be removed for repair. If the correct voltage is found and the valve does not open remove the 2 orange wires from the valve and test as follows:

From 1 orange wire to ground there should be 24VAC

From 2 orange wires to ground there should be 0 VAC

Loosen the flare nut on the outlet side of the valve (for visual inspection of water flow). Reconnect the 1 orange wire that has the 24 VAC to the valve. Touch the other wire from the valve to ground (not the orange wire). This should activate the valve (open it to allow water through). If this does not open the valve, then it is defective and should be replaced. If the above tests OK and water still does not enter the boiler, there must be a blockage between the valve and the outlet end of the pipe inside the boiler. The end of the pipe may be blocked with mineral deposits.