

# Technical Training Handbook

And

## Reference Guide

Boiler Base 3

# Boiler Base

## Table of Contents

• Gas Boiler Base	1
• Water Level Board (23198)	11
• Electric Boiler Base	16
• Clamp Style Block Off Plate	25
• Clamp Style SWLCO Plate	26
• Clamp Style Elements	28
• SWLCO Delay	29
• Steam Coil Boiler Base	30
• Drain Cooling Kit	42
• Descaling Procedure	44
• Pump Kit for Descaling	51

## CLASSIC CONVECTION STEAMERS 15 PSI BOILER BASE STYLE

Project \_\_\_\_\_  
Item \_\_\_\_\_  
Quantity \_\_\_\_\_  
FCSI Section \_\_\_\_\_  
Approval \_\_\_\_\_  
Date \_\_\_\_\_

### **Cleveland Classic Series** CONVECTION STEAMERS

TWO COMPARTMENT, PRESSURELESS  
GAS FIRED STEAM GENERATOR, with NICKELGUARD™  
200, 250, 300M BTU, 36" WIDE CABINET BASE DESIGN

**MODELS:**  36-CGM-300

#### **Cleveland Standard Features**

- Cooking Capacity for up to six 12" x 20" x 2½" deep Cafeteria Pans.
- Pressureless cooking with forced convection steam, permitting doors to be opened while cooking continues.
- Solid State Controls operate water level and safety functions.
- Each compartment is equipped with a 60 minute mechanical timer, separate bypass switch for constant steaming and a cold water condenser for superior cooking results.
- **Instant Steam Standby Mode:** Holds generator at steaming temperature. Allows unit to start cooking instantly.
- **Durable 14 Gauge Stainless Steel Construction:** For Compartment Door and Steam Cooking Cavity.
- **Separate Main Power Switch for "On/Off"**
- **Exclusive Steam Cooking Distribution System:** The exclusive Convection Jets produce a high velocity convection steam without fans. Coved Corner design in cooking compartment distributes heat evenly and is easy to keep clean. Creased top & bottom enhance drainage. Cold Water Condenser for each compartment maintains a dry steam. Fully insulated cooking compartment for thermal efficiency. Removable Stainless Steel Slide Racks for easy cleaning.
- **Exclusive "Cool to the Touch" Compartment Door Design:** Free floating inner door with reversible door gasket provides an air tight seal. Stainless Steel Slam/Latch Door Latch mechanism provides greater reliability.
- **Left Hand Door Hinging:** Compartment Doors hinged left, controls on the right.
- Modular Cabinet Base with Hinged Door.
- **High Efficiency Gas Steam Generator with NickelGuard,** Electronic Spark Ignition and Automatic Water Fill on start up.
- **Automatic Generator Drain at shutdown:** Contains a "Water Jet" Spray Rinse Cleaning Cycle to keep drain clear.
- **Automatic Water Level Control System** with Low Water Power Cut-off Circuit.
- Steam generator equipped with High Limit Pressure Safety Switch, 15 psi Safety Valve, and Steam Generator Pressure Gauge.
- **NSF Certified 6" Stainless Steel Legs** with adjustable flanged feet for a one inch level adjustment.
- Gas Pressure Regulator and Control Valve.
- Standard Voltage for Controls: 115 volts, 60 Hz, single phase.
- All Controls are serviceable from the front.
- **Secondary Low Water Cut-Off, factory installed (CALG)**  
(Required for AZ, AR, CA, CO, CT, DE, FL, GA, HI, IL, IA, KS, MD, MA, MI, MN, MT, NE, NV, NM, NC, OK, OR, PR, RI, TN, UT, VA, WA, WV., Buffalo, NY, Wash. DC)



Shown with optional  
Electronic Timer

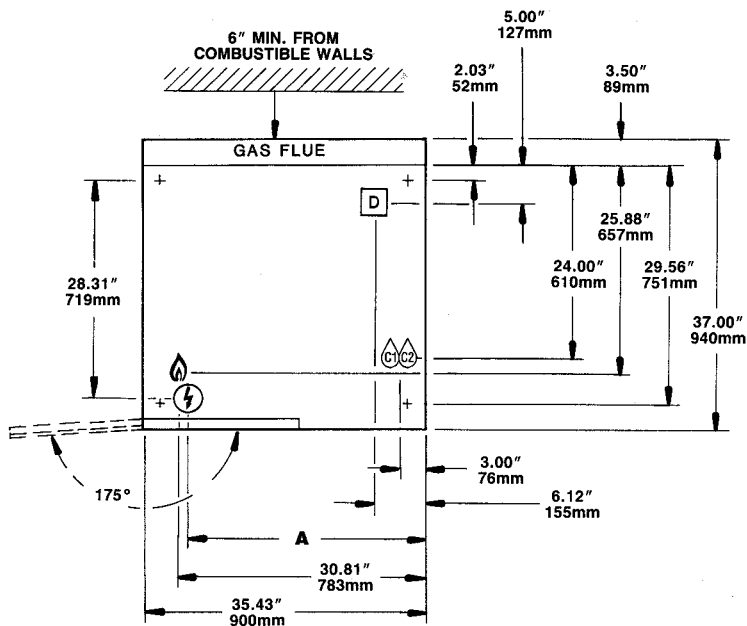
#### **Short Form Specifications**

Shall be Two Compartments, CLEVELAND Convection Steamer, Model 36-CGM-\_\_\_\_, Gas-fired Steam Generator, NickelGuard, \_\_\_\_ M BTU. Solid State Controls operate timing, water level and safety functions. Steam Generator with Automatic Water Fill on start-up, Automatic Blowdown with additional Manual Drain Valve and Electronic Spark Ignition. For each cooking compartment: 60 minute Mechanical Timer, Manual Operation Mode and Cold Water Condenser. Type 304 Stainless Steel cooking compartment.

#### **Options & Accessories**

- Right Hand Door Hinging, Controls on the Left (DHR)
- Electronic Timer with Compensating Load Feature (ETC)
- ON/OFF Steam Switch only for compartment controls (MC)
- Cafeteria pans in depths of 1", 2½", 4" and 6"
- Compartment Door Steam Shut Off Switch (SCS)
- Power Take Off Kit (GPTO), Kettle Interconnecting Kit (IMK)
- Stainless Steel Base Frame (FSS)
- Stainless Steel Insulated Flue Cover (SSF)
- Quick Disconnect for gas line (QDC)
- Correctional Packages
- Boiler Descaling Pump Kit (107142)
- Water Filters
- Rear Gas Connection (RGT)

SECT. III PAGE 11  
0609



Each compartment has capacity for:

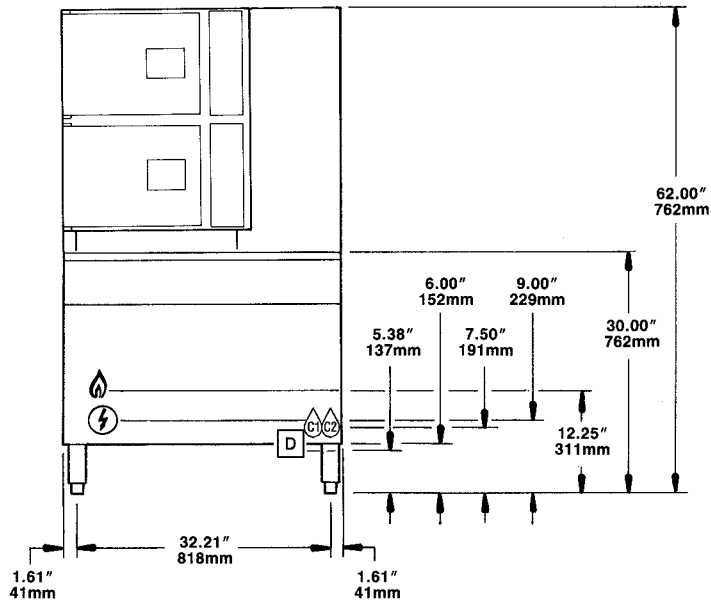
- Three, 12" x 20" x 2½" or six, 12" x 20" x 1" deep Cafeteria Pans.

**WATER QUALITY REQUIREMENT**

The recommended minimum water quality standards whether untreated or pre-treated, based upon 10 hours of use per day, and a Daily Blowdown, are as follows:

TOTAL DISSOLVED SOLIDS less than 60 parts per million  
 TOTAL ALKALINITY less than 20 parts per million  
 SILICA less than 13 parts per million  
 pH FACTOR greater than 7.5  
 CHLORINE less than 30 parts per million

Consult a local water treatment specialist for an on site water analysis for recommendations concerning steam generator feed water treatment (if required), in order to remove or reduce harmful concentrations of minerals. The use of highly mineralized water will mean that more frequent servicing of the steam generator will be necessary. The fact that a water supply is potable is not proof that it will be suitable for the generator.



**NOTE:** When ordering optional reverse door openings: Control Panel, door openings, and cooking compartments are located opposite that shown above and positioned on right hand side of base.

	BTU RATING	INCHES	mm
<b>A</b>	200	29.65	753
	300	25.03	636

GAS 🔥		ELECTRIC ⚡	WATER 💧	DRAINAGE [D]	CLEARANCE
NATURAL	PROPANE	25 watts per compartment. 50 watts for Steam Generator Control. ** Do not connect to GFI outlet. See note below.	¼" NPT Cold Water Inlet 35 psi minimum 60 psi maximum Ⓢ Condenser feed Ⓣ Boiler feed	<b>The Floor Drain must be located outside the confines of the equipment base.</b> 1 1/2" IPS common drain. Do not connect other units to this drain. Do not use PVC pipe for drain.	Right - 6", Left - 6", Rear - 6" (12" on control side if adjoining wall or equipment is over 30" high for service access) <b>For use in non-combustible locations.</b> <b>Contact factory for variances to clearances</b>
¾" IPS for 200,000 BTU or less. 1.00" IPS for 250,000 BTU or more. Supply pressure: 4.00" W.C. minimum 14.00" W.C. maximum	¾" IPS for 200,000 BTU or less. 1.00" IPS for 250,000 BTU or more. Supply pressure: 12.00" W.C. minimum 14.00" W.C. maximum				
Manufacturer must be notified if unit will be used above 2,000 ft. altitude.					

**NOTES:**

\*\*DO NOT CONNECT TO GFI OUTLET. CLEVELAND RANGE RECOMMENDS GAS FIRED 120 VOLT STEAMERS BE HARD WIRED DIRECTLY TO ELECTRICAL SYSTEM. Cleveland Range reserves right of design improvement or modification, as warranted. Many regional, state and local codes exist and it is the responsibility of the owner and installer to comply with the codes. Cleveland Range equipment is built to comply with applicable standards for manufacturers. Included among those approval agencies are ASME/N. Bd, UL, NSF and CSA (AGA, CGA).

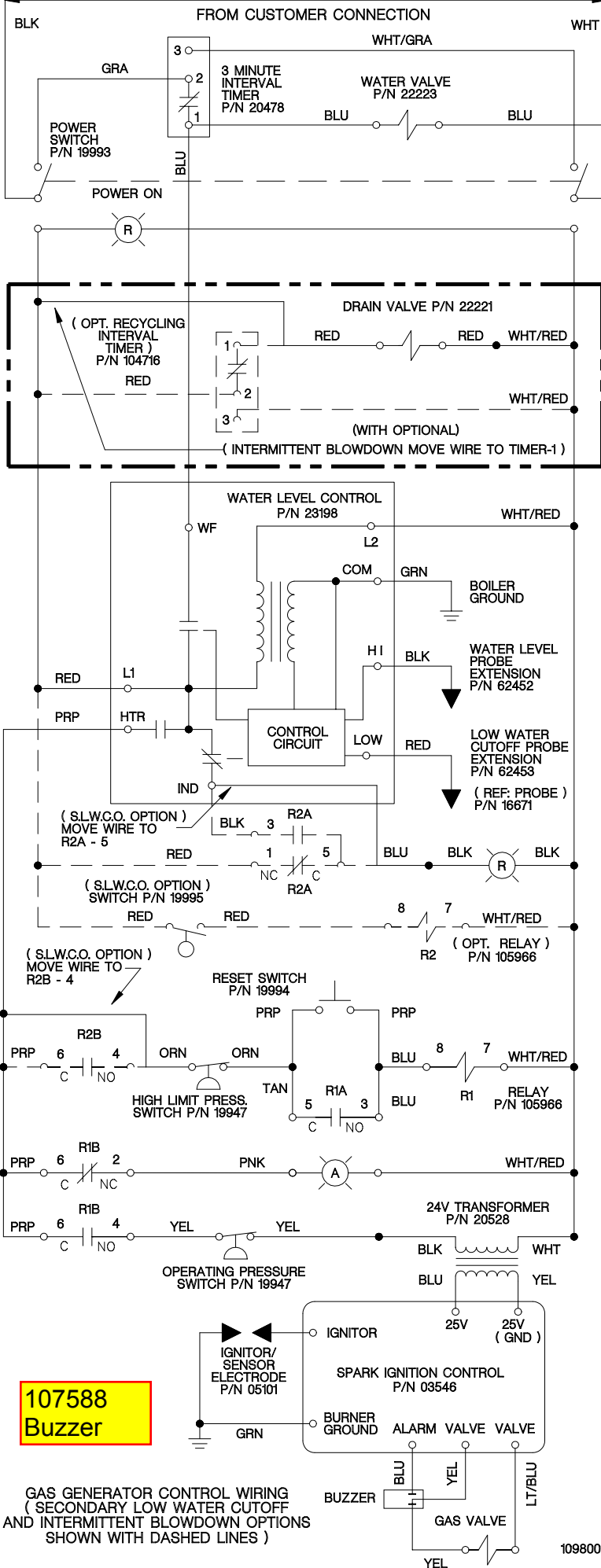
(NOT TO SCALE)  
 SECT. III PAGE 12  
 6069  
 Litho in U.S.A.

CLEVELAND RANGE  
SEQUENCE OF OPERATIONS  
Gas Boiler Base  
With Secondary Low Water Cut Off Switch

1. To turn the unit on, depress the red on/off rocker switch.
  - 115 VAC is sent to the terminal block in control box.
  - 115 VAC is sent to normally open blowdown valve closing it.
  - 115 VAC is sent to L1 and L2 of the water level board.
  - 115 VAC is sent to the open contacts of the low water cut-off switch.
  - 115 VAC is sent through the normally closed contacts of the R2 relay to the low water indicator light.
  
2. With the water level board energized and no water in the boiler
  - 115 VAC is sent from the IND terminal to the normally open contacts of R2A.
  - 115 VAC is sent from the WF terminal to the fill solenoid.
  - The fill solenoid opens and the boiler fills.
  - The rising water raises the float on the low water cut-off switch closing it.
    - R2 relay is energized.
    - The normally closed contacts R2A open de-energizing the low water indicator light.
    - The normally open contacts of R2A close energizing the low water indicator light.
  - The water fills to the low probe shorting it to ground
    - 115 VAC is removed from the IND terminal and the low water indicator light is de-energized.
      - If the low water cut off float switch opens the low water indicator light re-energizes.
    - 115 VAC is sent from the HTR terminal to the normally open contacts of R2B.
    - With water in the unit and the R2 relay energized, 115 VAC is sent through the normally closed contact of the high-pressure switch to the amber reset switch,
    - 115 VAC is sent through the normally closed R1B contact to energize the amber light.
  
3. When the momentary amber switch is depressed 115 VAC is sent to the R1 relay closing it.
  - The normally closed R1B contacts open de-energizing the amber light.
  - The relay latches itself through contacts 3 and 5 with a jumper to the coil.
    - If either the high-pressure switch opens, the secondary low water cut off switch opens, or the low probe circuit on the water level board opens, then the latch circuit opens.
    - When the water level or pressure returns to a safe condition the amber light will energize and the process may begin again.
  - The R1B relay contacts close sending power through the normally closed operating pressure switch to the 24 VAC transformer.
    - 24 VAC is sent to the ignition module.

4. With 24 VAC to the ignition module, 24 VAC is sent to the gas valve.
  - The gas valve is energized.
  - The gas valve opens to the initial stage sending gas to the burner.
    - The initial stage Natural gas pressure for the 200 BTU boiler base is 1.2" W.C.
    - The initial stage Natural gas pressure for the 300 BTU boiler base is .75"W.C.
    - The initial stage LP gas pressure is 2.5" W.C. for both boiler bases.
  - A spark is generated at the igniter.
  - The gas is ignited and the flame rectifies the AC current.
  - The ignition module reads 1.5 micro amps DC current through the ground wire.
    - If the module does not read 1.5 micro amps DC in 4 seconds it will lock out.
    - When the ignition module locks out 24 VAC is sent to the buzzer from the alarm terminal on the module.
  - The gas valve continues to open to the second stage in 6-8 seconds.
    - The second stage natural gas pressure is 3.5" W.C.
    - The second stage LP gas pressure is 11" W.C.
5. The water in the boiler is heated to steam.
  - As steam is generated and pressure builds the air is pushed out through the steamtrap.
  - When steam goes through the steam trap and heats it to 192 degrees it closes.
6. Pressure builds in the boiler to the set point.
  - The operating pressure switch opens and the heat circuit is de-energized.
  - When the pressure drops below the set point the heat circuit is energized and the heat process begins again.
7. Water continues to fill until the high probe is grounded.
  - When the high probe is grounded the WF terminal on the water level board is de-energized.
  - The fill solenoid closes until the high probe is ungrounded for 05 seconds.
  - If the water level drops below the high probe for more than 05 seconds the WF terminal is energized and the water fill circuit begins again.
8. When the unit is turned off, by depressing the red rocker switch, 115 VAC is sent to the 3-minute timer.
  - The three-minute timer will energize the fill solenoid for 3 minutes while the steamer drains.
  - 115 VAC is removed from all other circuits.
  - The red light in the power switch is de-energized.

115 VAC



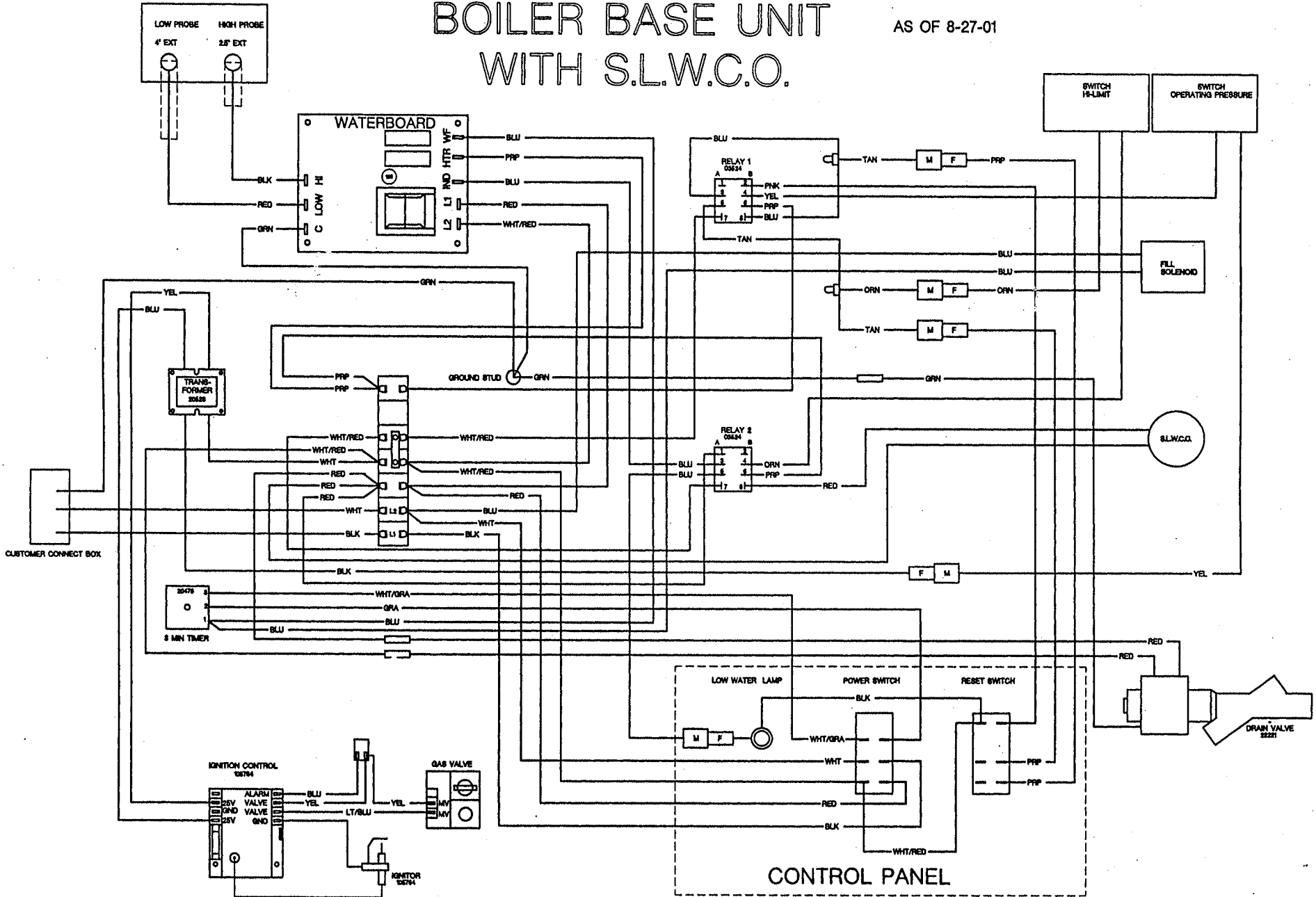
109765-1  
111971-1  
12159

LABEL, LOW WATER  
LABEL, CONSOLE SWITCH  
LIGHT;INDICATOR;NEON;RED

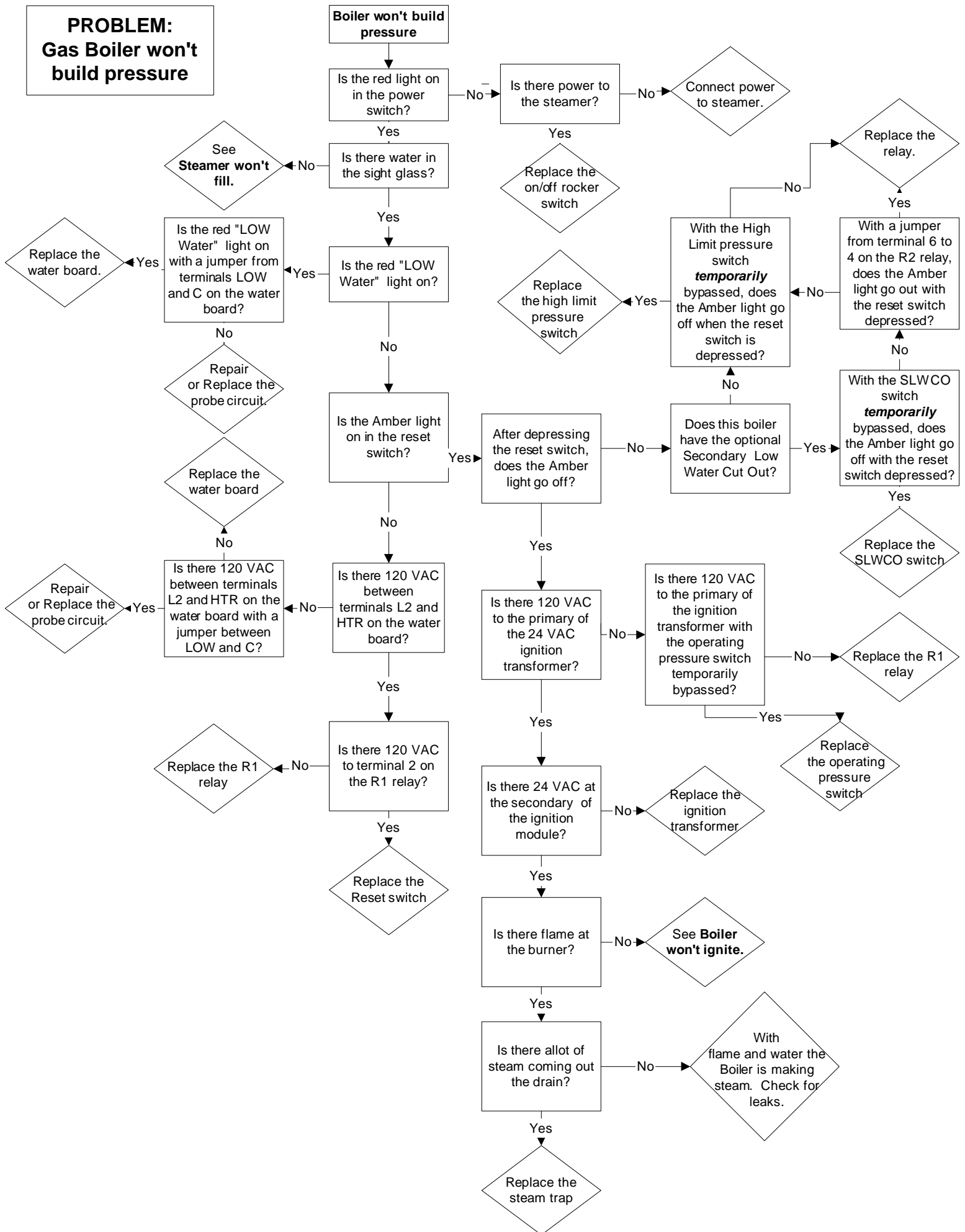
S16546 Plate, Block Off, 3.125"

# BOILER BASE UNIT WITH S.L.W.C.O.

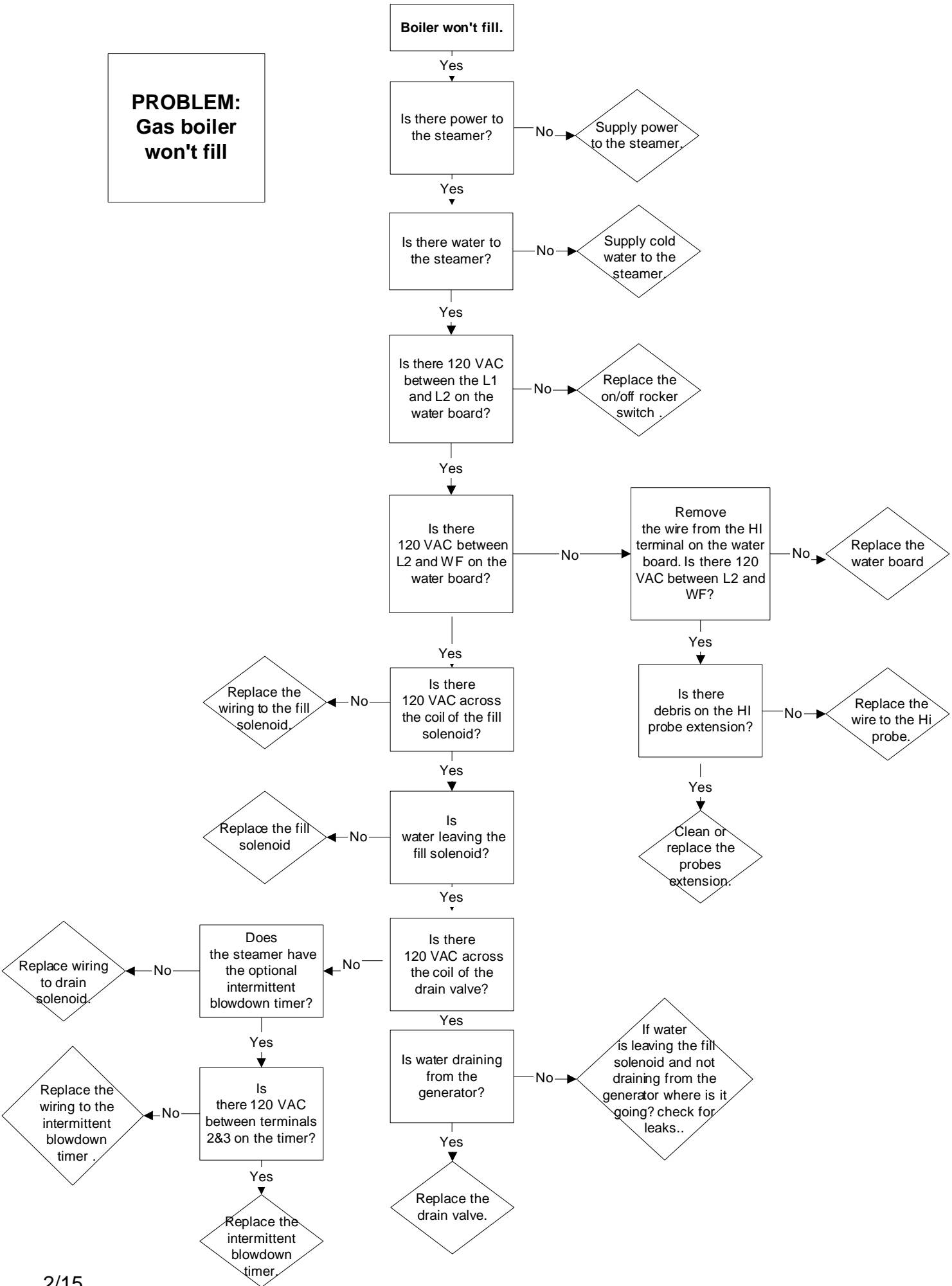
AS OF 8-27-01



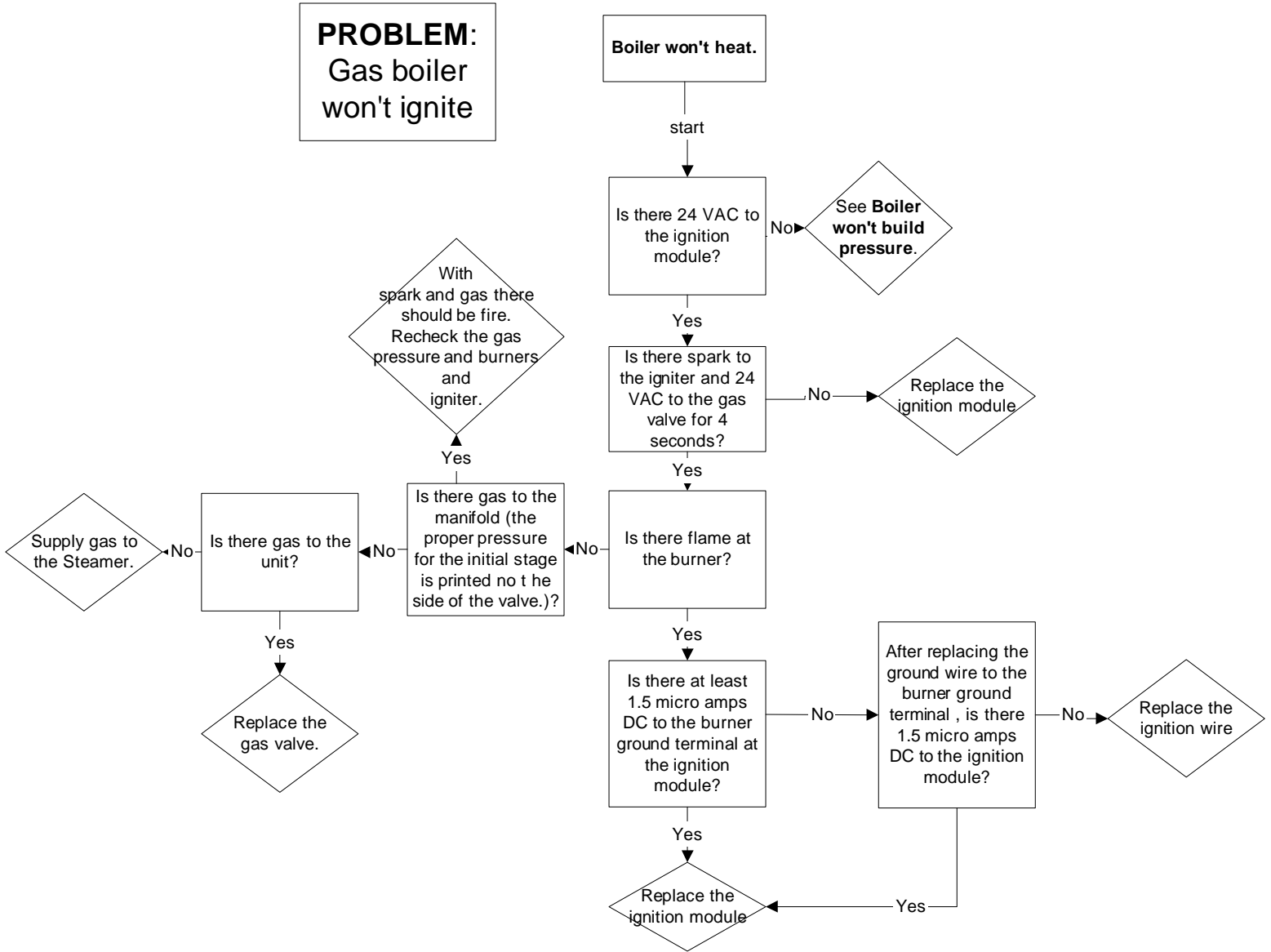
**PROBLEM:  
Gas Boiler won't  
build pressure**



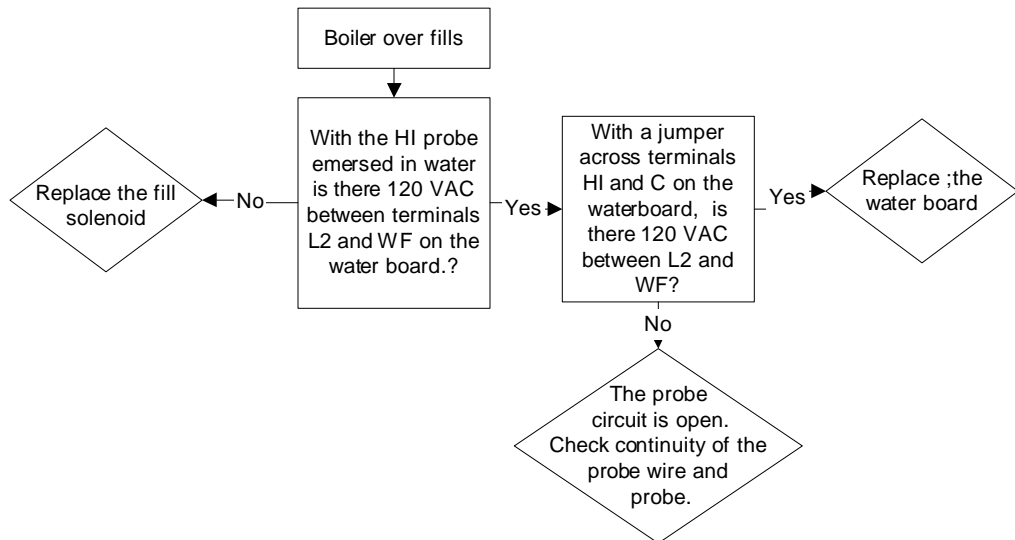
**PROBLEM:  
Gas boiler  
won't fill**



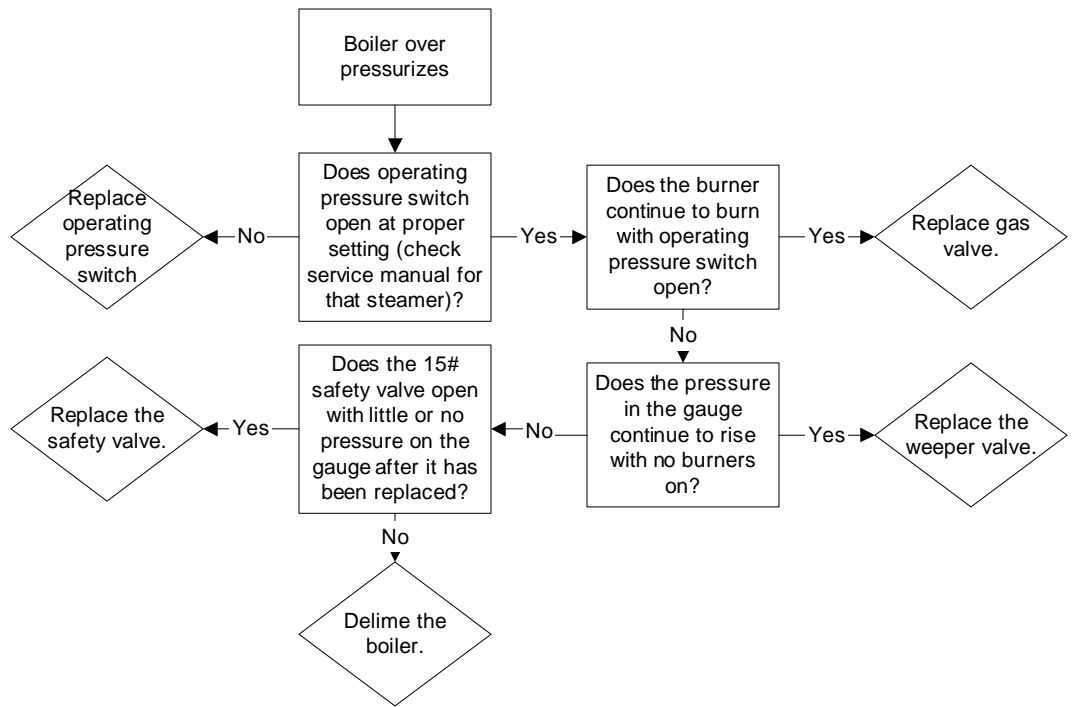
**PROBLEM:**  
Gas boiler  
won't ignite



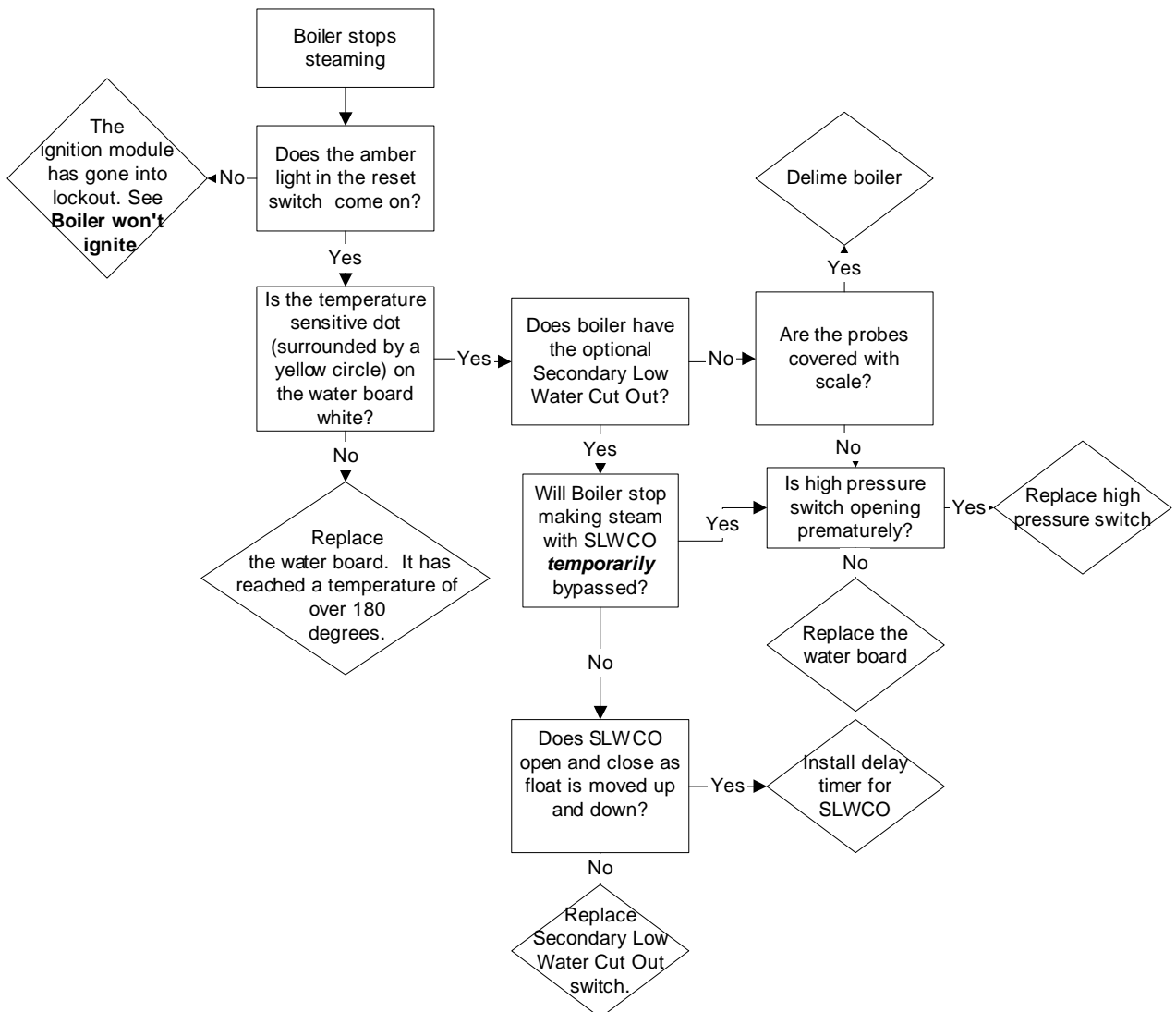
**PROBLEM: Gas Boiler Overfills**



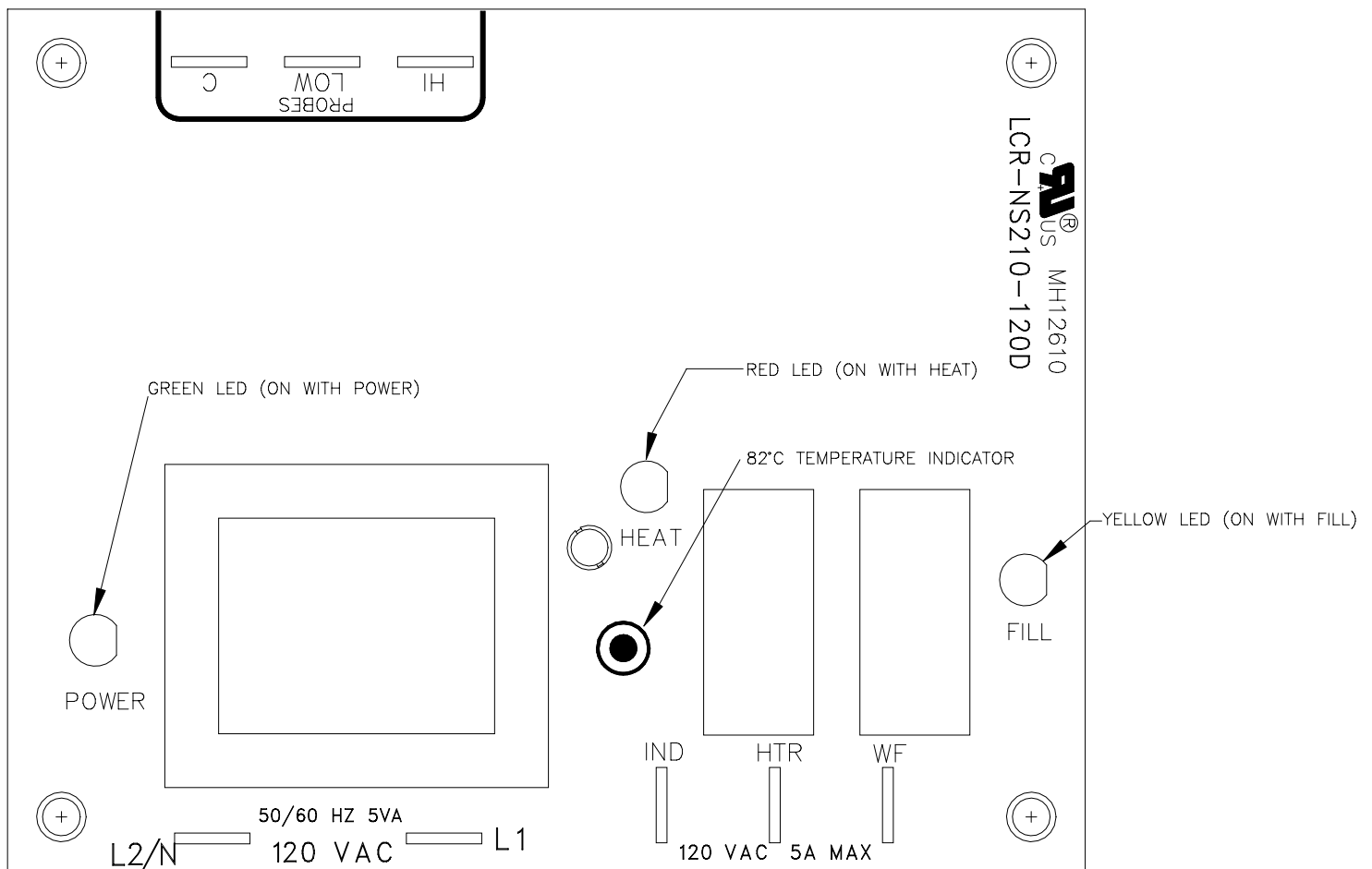
**PROBLEM:**  
**Gas Boiler Over**  
**Pressurizes**  
**(15# Safety**  
**valve opens)**



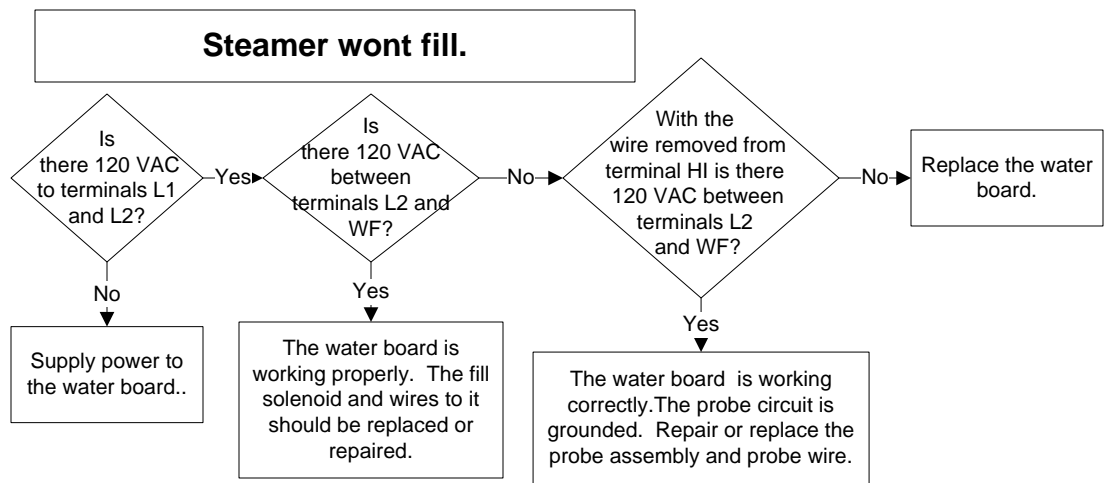
**PROBLEM: Gas Boiler Stops Producing Steam**



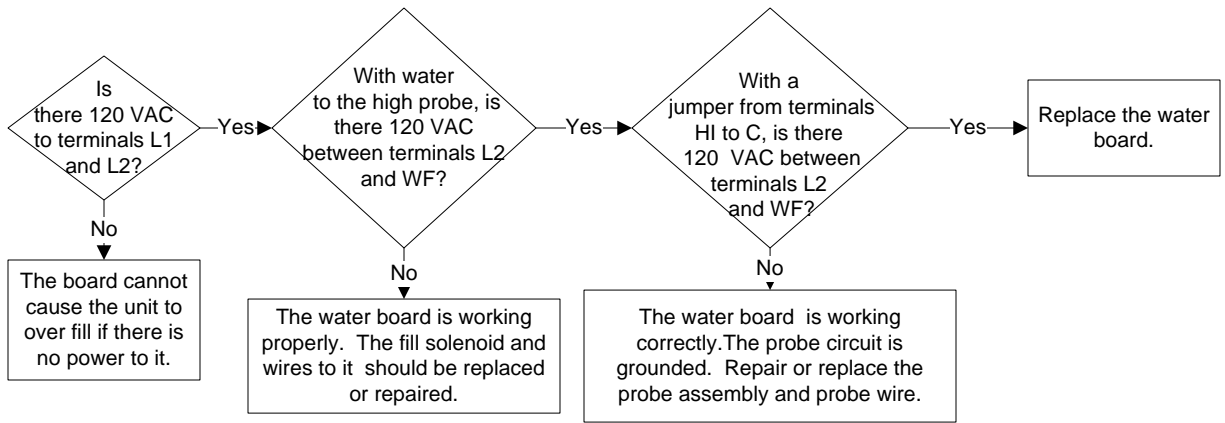
# 23198 Water Level Control Board Pressure Boilers



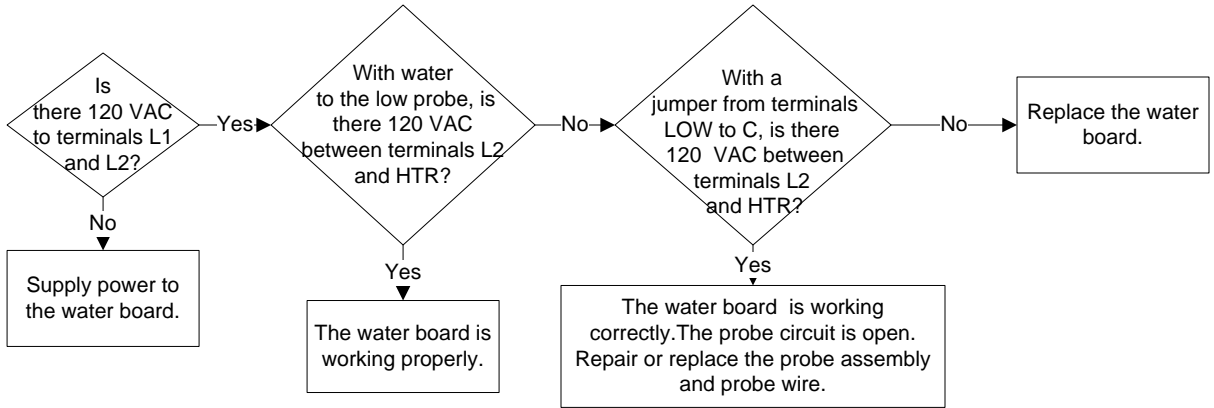
**PROBLEM:  
Water board (23198)  
for Atmospheric  
Generators**



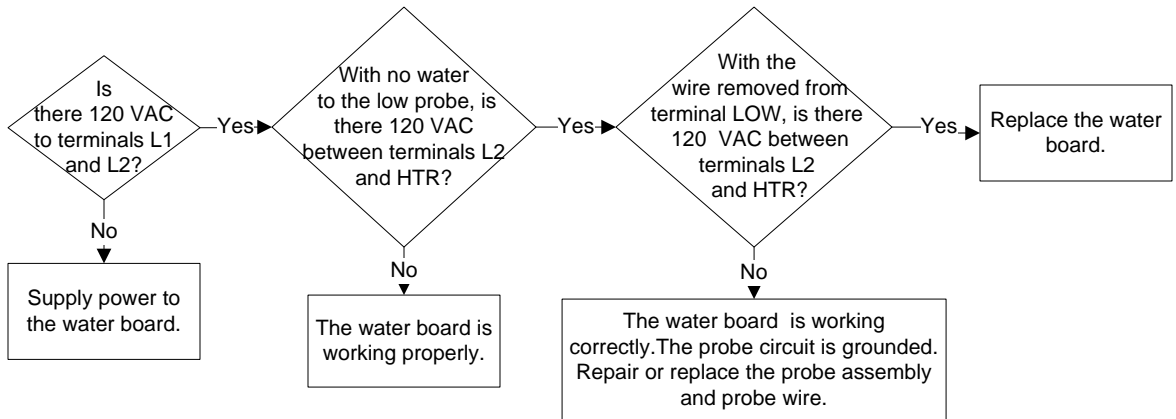
**Steamer over fills**



**Steamer Won't Heat**



**Steamer Dry Fires**



# Installation Instructions

## Water Board Replacement for P/N 23198 Using Field Kit Part Number FK23198

The Installation of Cleveland Range Water Board Field Kit should only be performed by Cleveland Range authorized technicians. Read entire installation procedure before beginning. This kit is intended for the replacement of Water Board P/N 23198 with P/N 300821 Water Board Assembly.

### 23198 Field Kit (P/N FK23198) PARTS LIST

ITEM	QUANTITY	PART NUMBER	DESCRIPTION
1	1	300821	WATER BOARD ASSEMBLY
2	1	300822	LABEL W/D SUPPLEMENTAL
3	1	260BFK	INSTRUCTIONS, INSTALLATION
4	4	20351*	TERMINAL FEM. 0.250" X 0.032"

\*NOTE: THESE TERMINALS ARE ONLY TO BE USED IN THE EVENT THAT THE TERMINALS ON THE MACHINE DO NOT FIT THE TERMINALS ON THE WATER BOARD ASSEMBLY'S WIRES.



1333 East 179<sup>th</sup> Street  
Cleveland, Ohio 44110

Phone: 216-481-4900  
Fax: 216-481-3782  
[www.clevelandrange.com](http://www.clevelandrange.com)

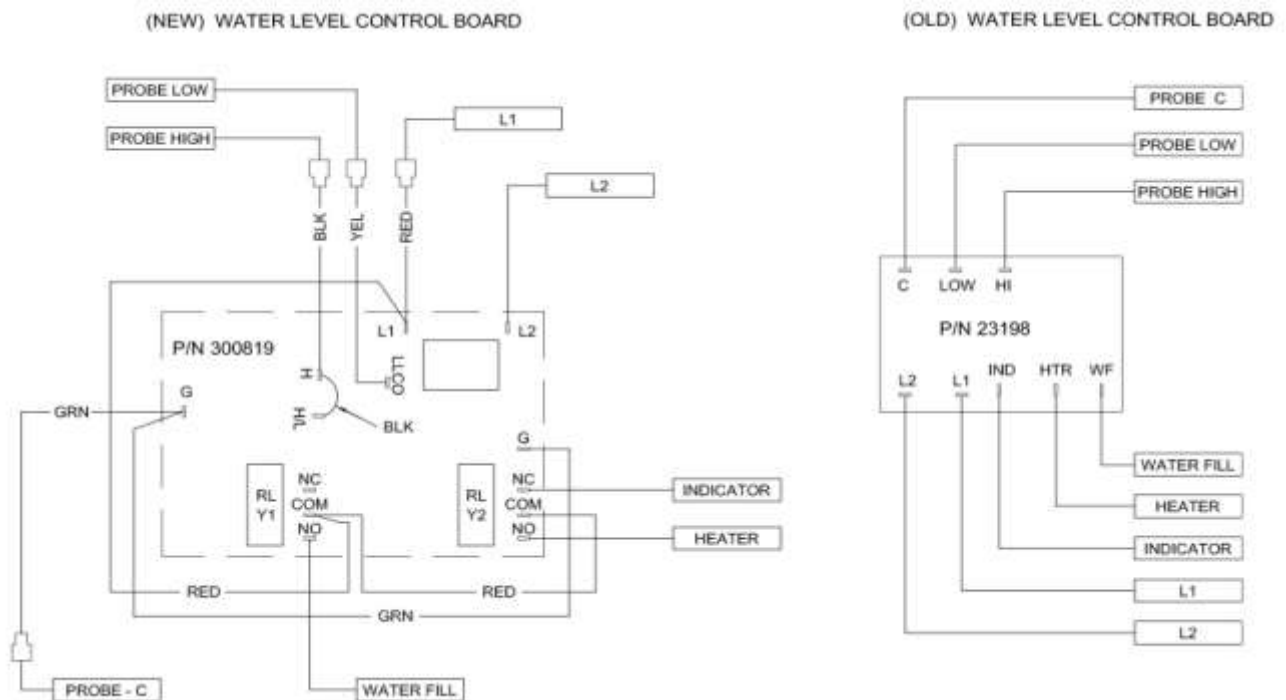


21 JANUARY 11

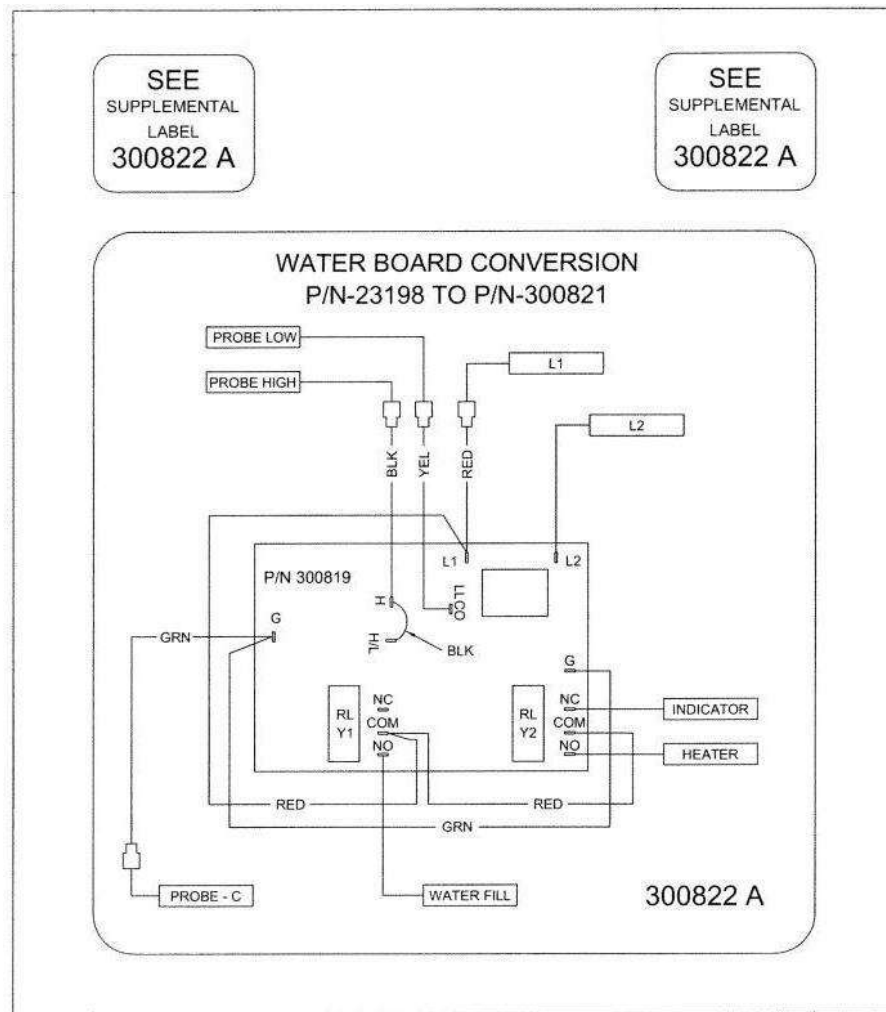
Part No. 260BFK Rev. A

## 300821 Water-Board Assembly Installation

1. REMOVE THE 23198 WATER BOARD. RETAIN THE FOUR MOUNTING SCREWS.
2. MOUNT THE 300821 WATER BOARD ASSEMBLY USING THE ORIGINAL FOUR MOUNTING SCREWS.
3. TRANSFER WIRES FROM 23198 WATER BOARD TO 300821 WATER BOARD ASSEMBLY AS FOLLOWS:
4. FROM (PROBE-C) ON BOARD 23198 TO (GRN) WIRE SUPPLIED ON BOARD ASSEMBLY 300821.
5. FROM (PROBE-LOW) ON BOARD 23198 TO (YEL) WIRE SUPPLIED ON BOARD ASSEMBLY 300821.
6. FROM (PROBE-HIGH) ON BOARD 23198 TO (BLK) WIRE SUPPLIED ON BOARD ASSEMBLY 300821.
7. FROM (WATER FILL) ON BOARD 23198, CONNECT EXISTING WIRE TO RELAY Y1 N.O. ON BOARD ASSEMBLY 300821.
8. FROM (HEATER) ON BOARD 23198, CONNECT EXISTING WIRE TO RELAY Y2 N.O. ON BOARD ASSEMBLY 300821.
9. FROM (INDICATOR) ON BOARD 23198, CONNECT EXISTING WIRE TO RELAY Y2 N.C. ON BOARD ASSEMBLY 300821.
10. FROM (L1) ON BOARD 23198 TO (RED) WIRE SUPPLIED ON BOARD ASSEMBLY 300821.
11. FROM (L2) ON BOARD 23198, CONNECT EXISTING WIRE TO L2 ON BOARD ASSEMBLY 300821.



**Figure 1**  
**WIRING COMPARISON OF NEW BOARD AND ORIGINAL BOARD**



**Figure 2**  
**LABELS TO APPLY TO THE MACHINE**

12. APPLY THE LARGER LABEL, P/N 300822A MARKED "WATER BOARD CONVERSION" NEAR TO THE MACHINE'S EXISTING WIRING DIAGRAMS.
13. APPLY SMALLER LABELS MARKED "SEE SUPPLEMENTAL LABEL" OVER THE WATER BOARD GRAPHIC ON THE MACHINE'S ORIGINAL LADDER DIAGRAM AND/OR POINT TO POINT WIRING DIAGRAM.

## CLASSIC CONVECTION STEAMERS 15 PSI BOILER BASE STYLE

Project \_\_\_\_\_  
Item \_\_\_\_\_  
Quantity \_\_\_\_\_  
FCSI Section \_\_\_\_\_  
Approval \_\_\_\_\_  
Date \_\_\_\_\_

### **Cleveland Classic Series** CONVECTION STEAMERS

TWO COMPARTMENT, PRESSURELESS  
ELECTRIC STEAM GENERATOR  
24, 36 OR 48 KW, 24" WIDE CABINET BASE DESIGN

**MODELS:**  24-CEM-24  24-CEM-48  
 24-CEM-36

#### **Cleveland Standard Features**

- Cooking Capacity for up to six 12" x 20" x 2½" deep Cafeteria Pans.
- Pressureless cooking with forced convection steam, permitting doors to be opened while cooking continues.
- Solid State Controls operate water level and safety functions.
- Each compartment is equipped with a 60 minute mechanical timer, separate bypass switch for constant steaming and a cold water condenser for superior cooking results.
- **Instant Steam Standby Mode:** Holds generator at steaming temperature. Allows unit to start cooking instantly.
- **Durable 14 Gauge Stainless Steel Construction:** For Compartment Door and Steam Cooking Cavity.
- **Separate Main Power Switch for "On/Off"**
- **Exclusive Steam Cooking Distribution System:** The exclusive Convection Jets produce a high velocity convection steam without fans. Coved Corner design in cooking compartment distributes heat evenly and is easy to keep clean. Creased top & bottom enhance drainage. Cold Water Condenser for each compartment maintains a dry steam. Fully insulated cooking compartment for thermal efficiency. Removable Stainless Steel Slide Racks for easy cleaning.
- **Exclusive "Cool to the Touch" Compartment Door Design:** Free floating inner door with reversible door gasket provides an air tight seal. Stainless Steel Slam/Latch Door Latch mechanism provides greater reliability.
- **Left Hand Door Hinging:** Compartment Doors hinged left, controls on the right.
- Modular Cabinet Base with Hinged Door.
- **Electric Steam Generator:** Automatic Water Fill on start up.
- **Automatic Generator Drain at shutdown:** Contains a "Water Jet" Spray Rinse Cleaning Cycle to keep drain clear.
- **Automatic Water Level Control System** with Low Water Power Cut-off Circuit.
- Steam generator equipped with High Limit Pressure Safety Switch, 15 psi Safety Valve, and Steam Generator Pressure Gauge.
- Secondary Low Water Cut-Off, factory installed (CALE)  
(Required for AZ. AR. CA. CO. CT. DE. FL. GA. HI. IL. IA. KS. MD. MA. MI. MN. MT. NE. NV. NM. NC. OK. OR. PR. RI. TN. UT. VA. WA. WV., Buffalo, NY, Wash. DC)
- **NSF Certified 6" Stainless Steel Legs** with adjustable flanged feet for a one inch level adjustment.
- Standard voltage 208 or 240 volts, 60 Hz, 3 phase.
- All Controls are serviceable from the front.



#### **Short Form Specifications**

Shall be Two Compartments, CLEVELAND Convection Steamer, Model 24-CEM-\_\_\_\_, Electric Steam Generator, \_\_\_\_KW, \_\_\_\_ volts, \_\_\_\_ phase, 3 wire. Solid State Controls operate timing, water level and safety functions. Electric Steam Generator with Automatic Water Fill on start-up and Automatic Blowdown with additional Manual Drain Valve. For each cooking compartment: 60 minute Mechanical Timer, Manual Operation Mode and Cold Water Condenser. Type 304 Stainless Steel cooking compartment.

#### **Options & Accessories**

- Right Hand Door Hinging, Controls on the Left (DHR)
- Electronic Timer with Compensating Load Feature (ETC)
- ON/OFF Steam Switch only for compartment controls (MC)
- Cafeteria pans in depths of 1", 2½", 4" and 6"
- Voltages other than standard
- Power Take Off Kit (EPTO), Kettle Interconnecting Kit (IMK)
- Correctional Packages
- Stainless Steel Base Frame (FSS)
- Compartment Door Steam Shut Off Switch (SCS)
- Boiler Descaling Pump Kit (107142)
- Water Filters

SECT. III PAGE 1  
0609

Each compartment has capacity for:

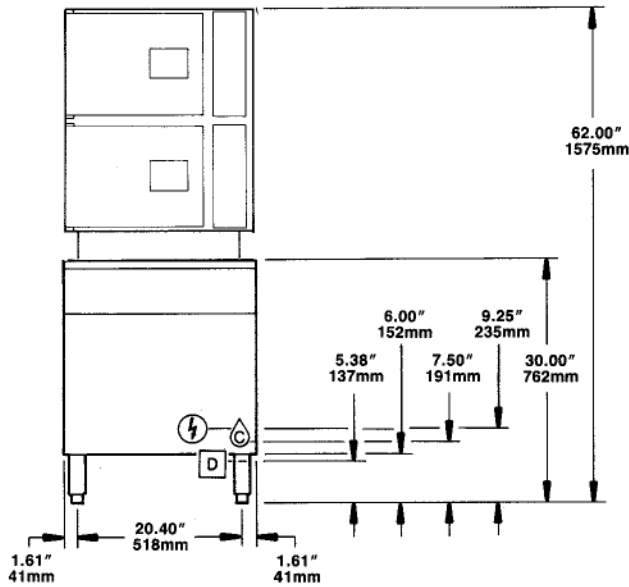
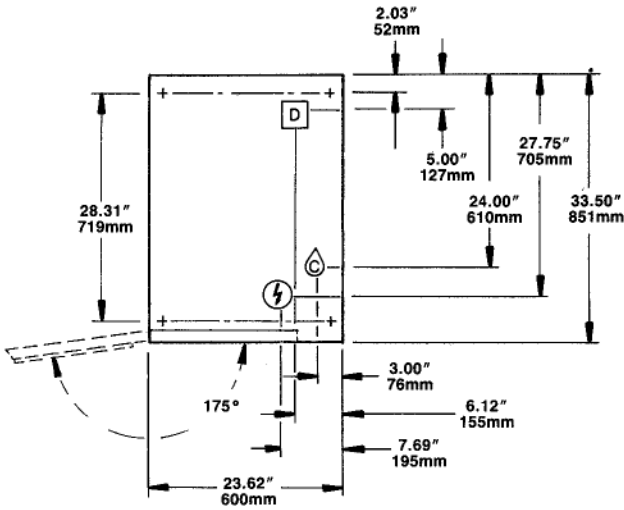
- Three, 12" x 20" x 2½" or six, 12" x 20" x 1" deep Cafeteria Pans.

### WATER QUALITY REQUIREMENT

The recommended minimum water quality standards whether untreated or pre-treated, based upon 10 hours of use per day, and a Daily Blowdown, are as follows:

TOTAL DISSOLVED SOLIDS	less than 60 parts per million
TOTAL ALKALINITY	less than 20 parts per million
SILICA	less than 13 parts per million
pH FACTOR	greater than 7.5
CHLORINE	less than 30 parts per million

Consult a local water treatment specialist for an on site water analysis for recommendations concerning steam generator feed water treatment (if required), in order to remove or reduce harmful concentrations of minerals. The use of highly mineralized water will mean that more frequent servicing of the steam generator will be necessary. The fact that a water supply is potable is not proof that it will be suitable for the generator.



**NOTE:** When ordering optional reverse door openings: Control Panel, door openings and cooking compartments are opposite that shown.

### ELECTRIC ⚡

KW	Volts	Watts	Ph	Amps	Wire
24	208	21,500	1	103.4	2
	220	24,000	1	109.1	2
	240	24,000	1	100.0	2
	440	20,200	1	45.9	2
	480	24,000	1	50.0	2
208	21,500	3	59.7	3	
220	24,000	3	63.1	3	
240	24,000	3	57.8	3	
440	20,200	3	26.5	3	
480	24,000	3	28.9	3	
600	24,000	3	23.1	3	
360	21,500	3	34.5	4	
380	24,000	3	36.5	4	
415	24,000	3	33.4	4	
36	208	32,200	3	89.5	3
	220	36,000	3	94.6	3
	240	36,000	3	86.7	3
	440	30,200	3	39.7	3
	480	36,000	3	43.4	3
	600	36,000	3	34.7	3
	360	32,200	3	51.7	4
	380	36,000	3	54.8	4
	415	36,000	3	50.1	4
48	208	42,900	3	119.2	3
	220	48,000	3	126.1	3
	240	48,000	3	115.6	3
	440	40,300	3	52.9	3
	480	48,000	3	57.8	3
	600	48,000	3	46.2	3
	360	42,900	3	68.9	4
	380	48,000	3	73.0	4
	415	48,000	3	66.9	4

WATER Ⓒ	DRAINAGE Ⓓ	CLEARANCE
1/4" NPT Cold Water Inlet 35 psi minimum 60 psi maximum	<b>The Floor Drain must be located outside the confines of the equipment base.</b>  1 1/2" I.P.S. common drain. Do not connect other units to this drain. Do not use PVC pipe for drain.	Right - 3", Left - 3", Rear - 3" (12" on control side if adjoining wall or equipment is over 30" high for service access) <b>Contact factory for variances to clearances.</b>

**NOTES:**

Cleveland Range reserves right of design improvement or modification, as warranted. Many regional, state and local codes exist and it is the responsibility of the owner and installer to comply with the codes. Cleveland Range equipment is built to comply with applicable standards for manufacturers. Included among those approval agencies are ASME/N. Bd, UL, NSF and CSA.

(NOT TO SCALE)  
SECT. III PAGE 2  
6069  
Litho in U.S.A.

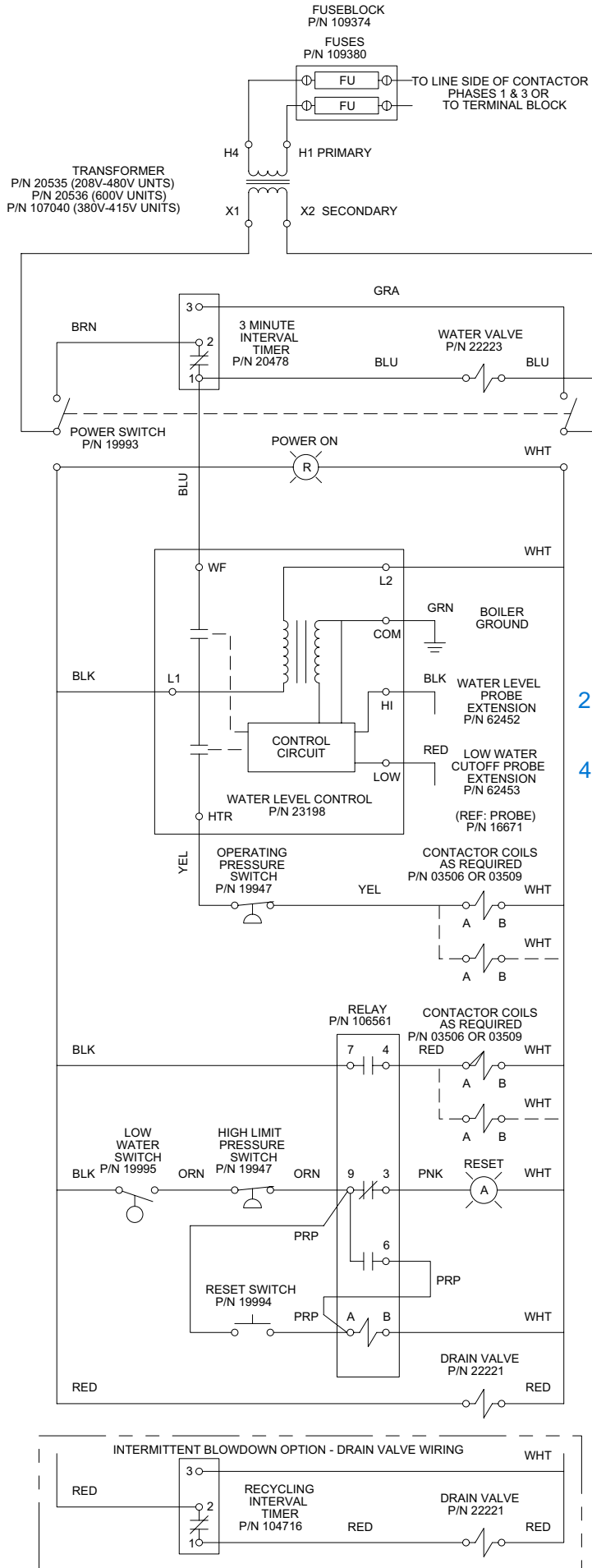
CLEVELAND RANGE  
SEQUENCE OF OPERATIONS  
Electric Boiler Base  
With Secondary Low Water Cut Off Switch

1. Supply voltage is sent to the primary of the Control Transformer.
  - 115 VAC is sent from the secondary of the Control Transformer to the on/off rocker switch.
2. To turn the unit on, depress the red on/off rocker switch.
  - 115 VAC is sent to the upper cabinets and terminal block in control box.
  - 115 VAC is sent to normally open drain valve closing it.
  - 115 VAC is sent to L1 and L2 of the water level board.
  - 115 VAC is sent to the open contacts of the low water cut-off switch.
3. With the water level board energized and no water in the boiler
  - 115 VAC is sent from the WF terminal to the fill solenoid.
  - The fill solenoid opens and the boiler fills through the drain valve.
  - The water fills to the low probe shorting it to ground
  - 115 VAC is sent from the HTR terminal through the normally closed contacts of the operating pressure switch to coil of the contactor(s).
  - The rising water also raises the float on the low water cut-off switch closing it.
  - 115 VAC is sent through the normally closed contact of the high-pressure switch to the amber reset switch, energizing the amber light.
4. When the momentary amber switch is depressed 115 VAC is sent to the ice cube relay closing it.
  - The relay latches itself through a jumper to the coil.
    - If either the high-pressure switch or the low water cut of switch opens, the latch circuit opens.
    - When the contact close the amber light will energize and the process may begin again.
  - The relay contacts close sending 115 VAC to the coil of the contactor.
5. With 115 VAC to the coil of the contactor(s).
  - The contactor closes.
  - Supply voltage is sent to the elements.
6. The water in the boiler is heated to steam.
  - As steam is generated and pressure builds the air is pushed out through the steamtrap.
  - When steam goes through the steam trap and heats it to 192 degrees it closes.
7. Pressure builds in the boiler to the set point of 8-10 PSI (except 36CEM16 or pressure steamers that are set at 5PSI).

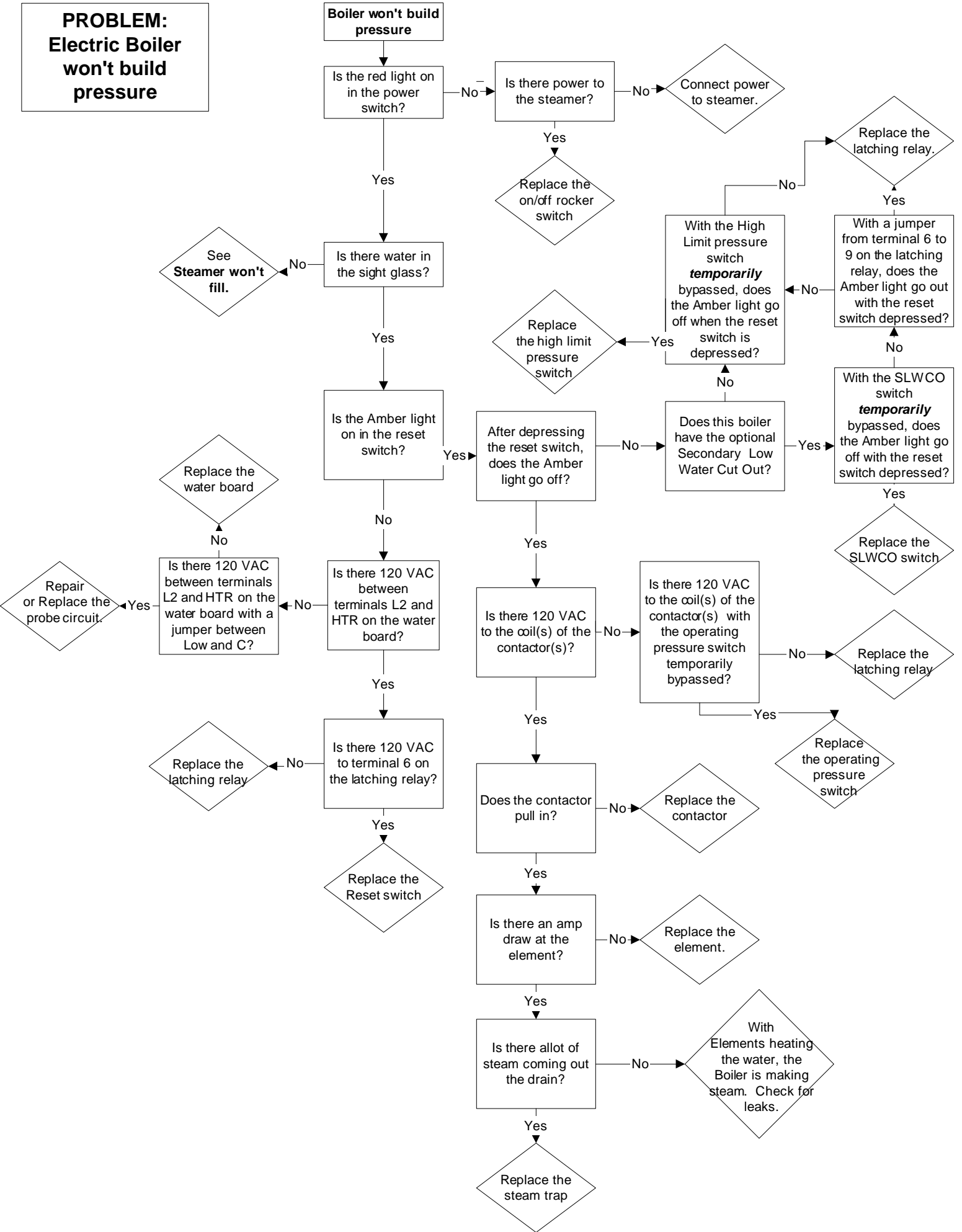
- The operating pressure switch opens and the heat circuit is de-energized.
  - When the pressure drops below the set point the heat circuit is energized and the heat process begins again.
8. Water continues to fill until the high probe is grounded.
- When the high probe is grounded the WF terminal on the water level board is de-energized.
  - The fill solenoid closes until the high probe is ungrounded for 05 seconds.
  - If the water level drops below the high probe for more than 20 seconds the WF terminal is energized and the water fill circuit begins again.
9. When the unit is turned off, by depressing the red rocker switch,
- 115 VAC is removed from the heat circuit.
  - 115 VAC is removed from the drain circuit and the normally open drain valve opens allowing the unit to drain.
  - 115 VAC is sent to the 3-minute timer.
  - The three-minute timer will energize the fill solenoid for 3 minutes while the steamer drains.

ELECTRIC GENERATOR CONTROL WIRING  
CALIFORNIA CODE (ASME CSD-1)  
(INTERMITTENT BLOWDOWN OPTION)

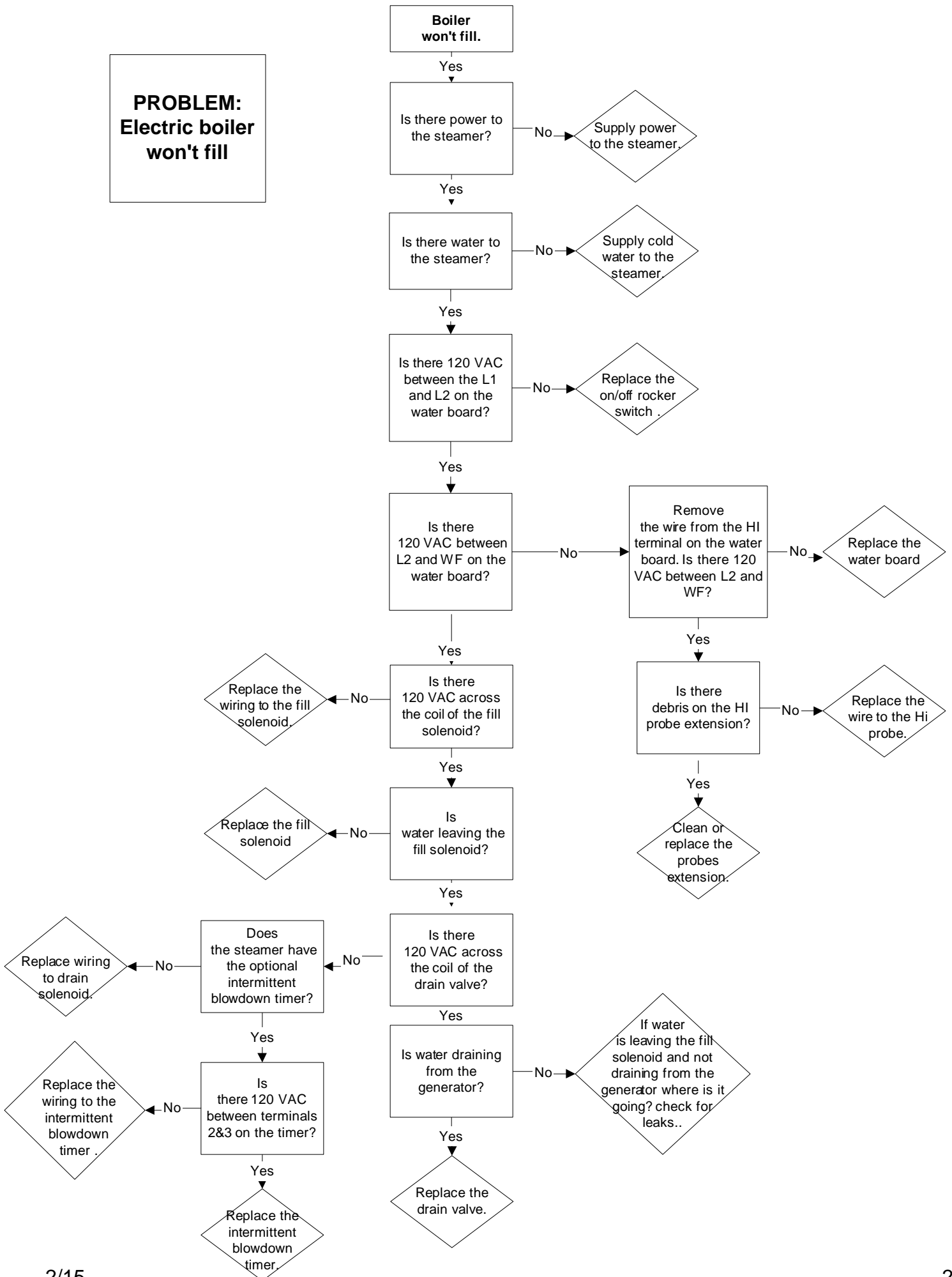
02196 t block  
or 02193



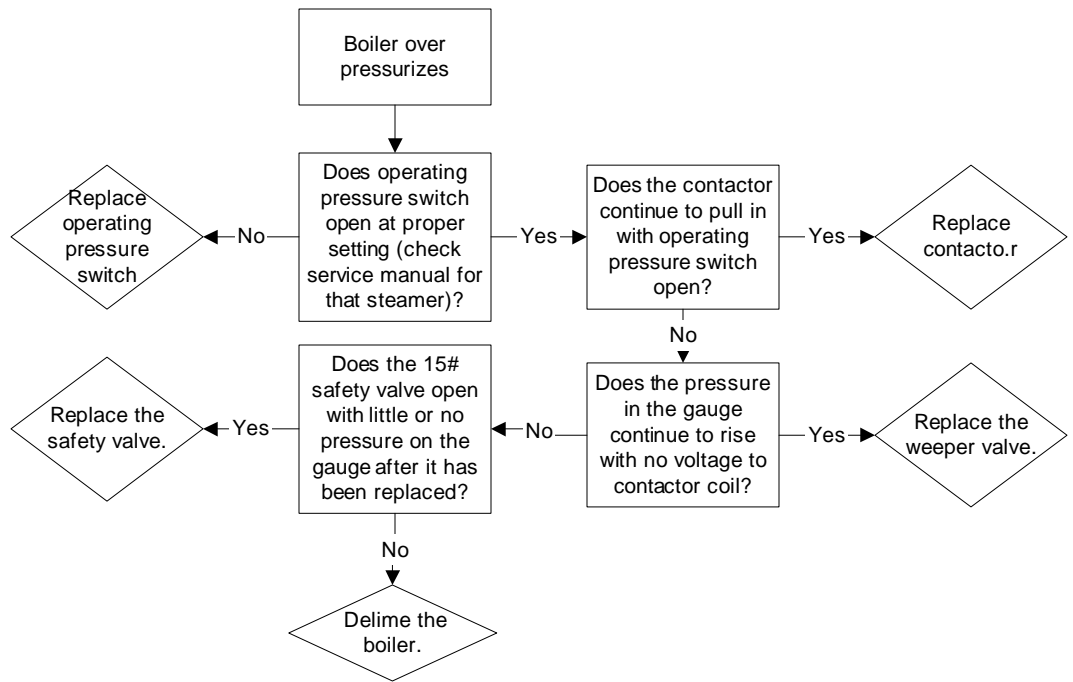
**PROBLEM:  
Electric Boiler  
won't build  
pressure**



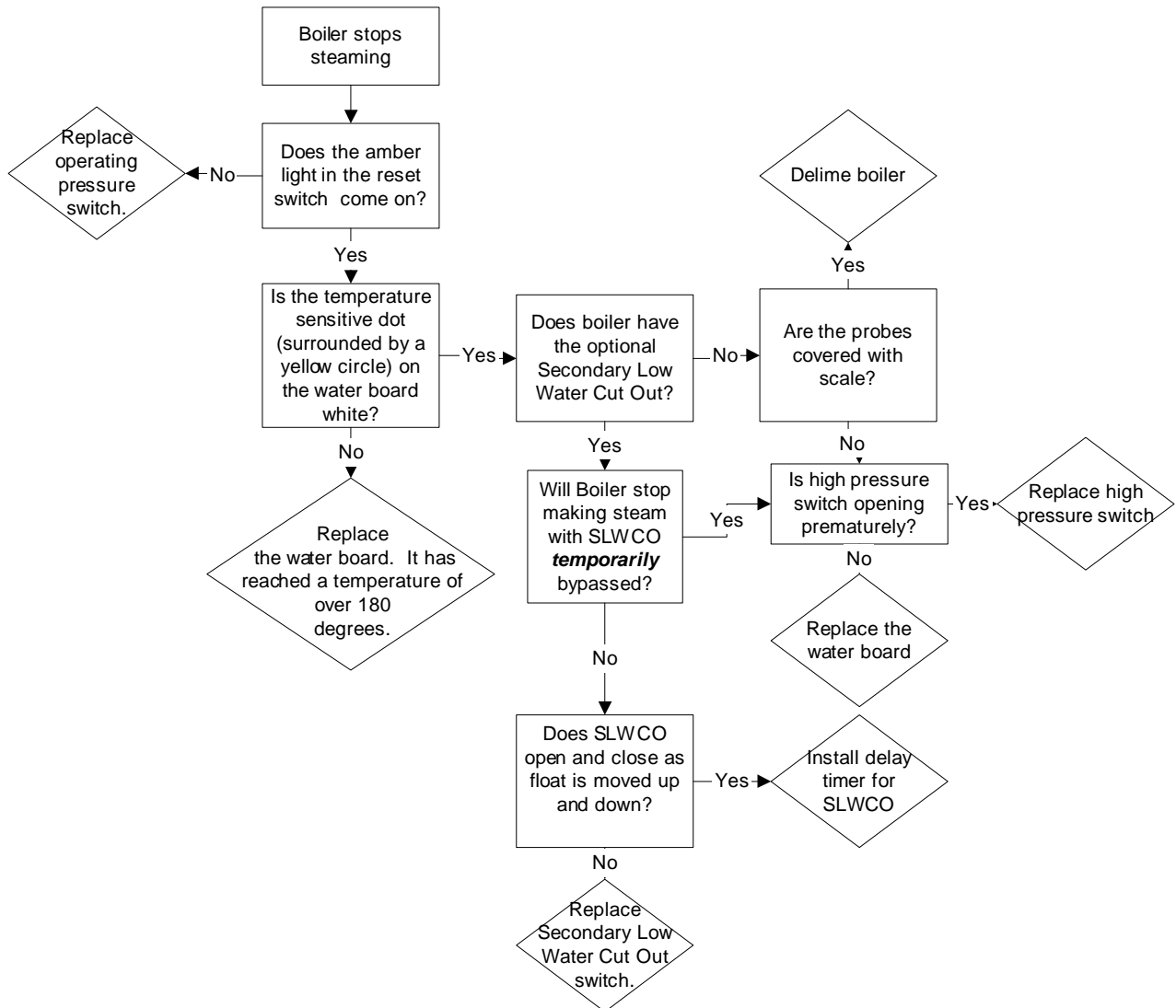
**PROBLEM:  
Electric boiler  
won't fill**



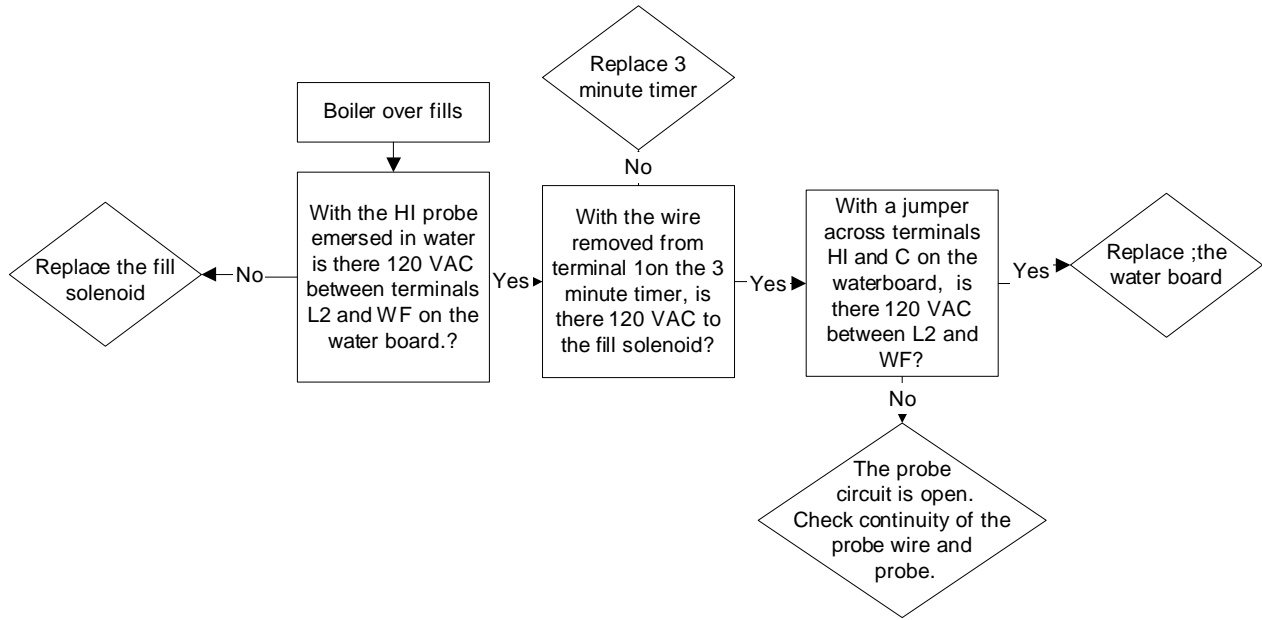
**PROBLEM:  
Electric Boiler  
Over  
Pressurizes  
(15# Safety  
valve opens)**



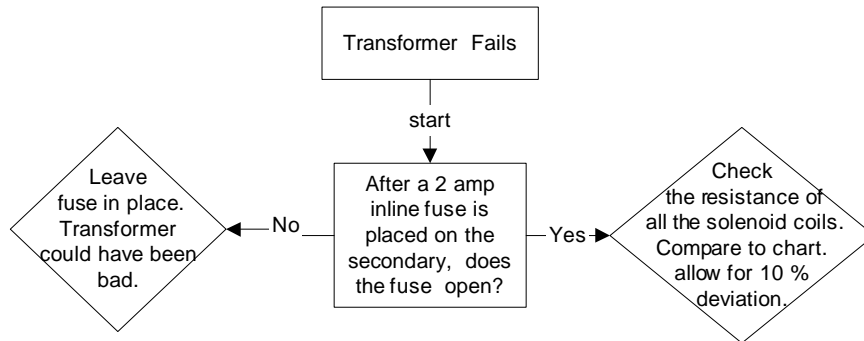
**PROBLEM:  
Electric Boiler Stops Producing Steam**



PROBLEM: Electric Boiler Overfills

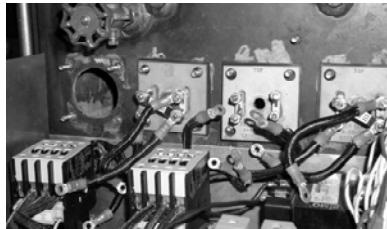


PROBLEM: Transformer continues to fail.



LET.	REVISIONS	DATE	BY
A	PRODUCTION RELEASE PER ED# C-6258	4-24-02	DRL

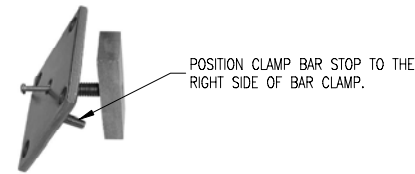
# FK110758 Block-Off Plate Assembly



STEP 1  
CLEAN GASKET AREA WITH A WIRE BRUSH.



STEP 2  
INSTALL GASKET OVER REMAINING HEATER MOUNTING STUDS.



POSITION CLAMP BAR STOP TO THE RIGHT SIDE OF BAR CLAMP.

STEP 3  
WITH #6-32 SCREW SCREWED INTO CLAMP BAR STUD, PULL #6-32 SCREW THROUGH THE HOLE IN BLOCK-OFF PLATE.

WARNING:  
DISCONNECT POWER AND DRAIN BOILER BEFORE REMOVING EXISTING BLOCK-OFF PLATE AND INSTALLING REPLACEMENT BLOCK-OFF PLATE.

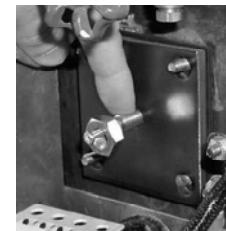


POSITION CLAMP BAR STOP TO THE RIGHT SIDE OF CLAMP BAR.

STEP 4  
INSERT CLAMP BAR INTO BOILER HEATER HOLE WHILE RESTING BLOCK-OFF PLATE ON #6-32 SCREW.



STEP 5  
PULL CLAMP BAR STUD THROUGH BLOCK-OFF WHILE POSITIONING BLOCK-OFF PLATE OVER REMAINING STUDS.



SEALING SIDE OF NUT

SEALING NUT

STEP 6  
HOLD STUD WHILE PLACING SEALING NUT OVER #6-32 SCREW WITH SEALING SIDE OF NUT FACING BLOCK-OFF PLATE SURFACE.



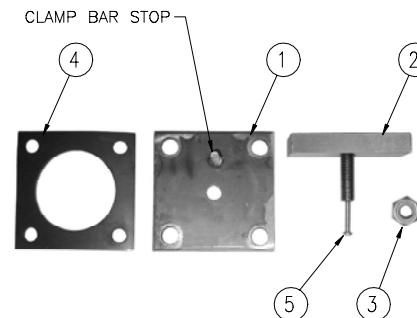
STEP 7  
THREAD NUT ONTO CLAMP BAR STUD WHILE HOLDING #6-32 SCREW.



STEP 8  
REMOVE #6-32 SCREW FROM CLAMP BAR AND TIGHTEN NUT (25-40 IN.-LBS.) WHILE POSITIONING PLATE OVER HEATER MOUNTING STUD BASES.



STEP 9  
INSTALLATION COMPLETE. RECONNECT POWER AND CHECK FOR LEAKS.  
CAUTION:  
DISCONNECT POWER BEFORE TIGHTENING NUT IF LEAKS ARE PRESENT.



ITEM	QTY	PART NO.	DESCRIPTION
5	1	106128	SCREW, 6-32 X 1, TORX/SLOT HD, SELF TAP
4	1	07128	GASKET
3	1	110764	SEALING NUT
2	1	110761	WELDMENT, CLAMP BAR
1	1	110758	WELDMENT, BLOCK-OFF PLATE

ITEM	QTY	PART NO.	DESCRIPTION
<b>CLEVELAND RANGE INC.</b> 1333 East 179th St. Cleveland, Ohio 44110-2574			
TOLERANCES (EXCEPT AS NOTED)	SCALE	DRAWN BY	APPROVED BY
DECIMAL ± .005	N/A	DRL	
ANGULAR ± 1°	TITLE	INSTRUCTION, KIT, BLOCK-OFF PLATE HEATER HOLE, FIELD REPLACEMENT	
AC	DATE	DRAWING NO.	REV
	4-24-02	D-110759	A

THIS DESIGN DESCRIBES A PROPRIETARY ITEM AND IS THE PROPERTY OF CLEVELAND RANGE. THIS DRAWING IS NOT TO BE COPIED OR USED WITHOUT THE APPROVAL OF CLEVELAND RANGE.

# FK110857 SLWCO Plate Replacement



**STEP 1**  
CLEAN GASKET AREA WITH A WIRE BRUSH AND INSTALL GASKET OVER REMAINING MOUNTING STUDS.



**STEP 2**  
WITH #6-32 SCREW (ITEM 11) SCREWED INTO CLAMP BAR STUDS (ITEM 4), PULL #6-32 SCREW THROUGH THE HOLES IN BLOCK-OFF PLATE OF ITEM 3.



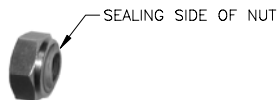
**STEP 3**  
INSERT FLOAT SWITCH INTO BOILER HOLE UNTIL ELBOW AND BOTTOM HALF OF CLAMP BARS ARE INSIDE HOLE.



**STEP 4**  
INSERT TOP OF CLAMP BARS INTO BOILER HOLE BY OVERLAPPING BARS AND INSERTING THEM SEPARATELY (ONE FOLLOWED BY THE OTHER) INTO THE HOLE.



**STEP 5**  
PULL CLAMP BAR STUDS THROUGH BLOCK-OFF WHILE POSITIONING BLOCK-OFF PLATE OVER REMAINING STUDS. HOLD STUDS WHILE PLACING SEALING NUTS (ITEM 6) OVER #6-32 SCREWS WITH SEALING SIDE OF NUTS FACING BLOCK-OFF PLATE SURFACE.



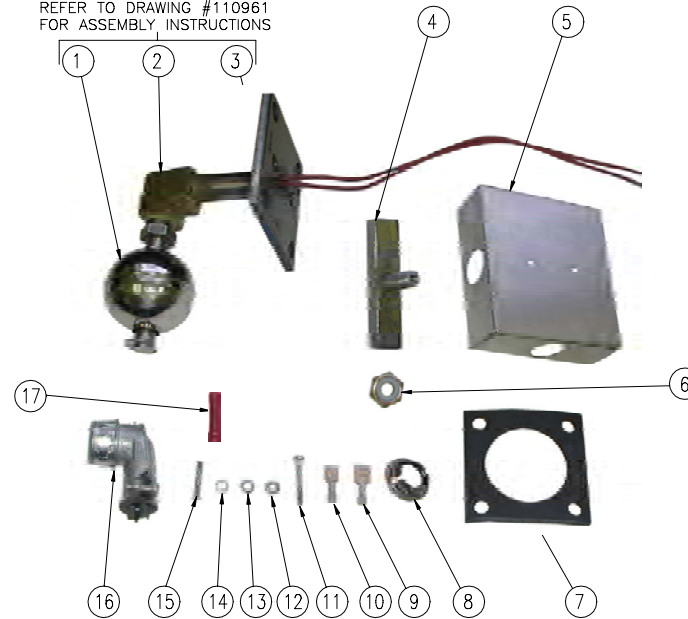
SEALING NUT

**WARNING:**

DISCONNECT POWER AND DRAIN BOILER BEFORE REMOVING EXISTING S.L.W.C.O. ASSEMBLY AND INSTALLING REPLACEMENT S.L.W.C.O. ASSEMBLY.

GAS BOILER ASSEMBLY SHOWN. THE SAME PROCEDURE CAN BE USED FOR ELECTRIC BOILER ASSEMBLIES.

REFER TO DRAWING #110961 FOR ASSEMBLY INSTRUCTIONS



PARTS

ALTERNATE INSTALLATION  
SKIP STEPS 2, 3 & 4.  
INSTALL CLAMPS THROUGH BOILER HAND HOLE. CONTINUE WITH REMAINING INSTALLATION STEPS.

ITEM	QTY	PART NO.	DESCRIPTION
17	2	20330	TERMINAL, BUTT CONN., 22-18 AWG, FULL INSUL.
16	1	105245	CONNECTOR, GREENFIELD, 3/8" X 90 DEGREES, SNAP-IN
15	2	110962	ROD, THREADED, 6-32 X 1"
14	4	23111	WASHER, LOCK, INTERNAL TOOTH, #6
13	2	110493	WASHER, FLAT, 6-32
12	4	14674	NUT, 6-32, ZINC PLATED
11	2	106128	SCREW, 6-32 X 1, TORX/SLOT HD, SELF TAP
10	1	20352	TERMINAL, 22-18 AWG, 3/16" TAB, FEMALE
9	1	20351	TERMINAL, 22-18 AWG, 1/4" TAB, FEMALE
8	1	19329	PLUG, SNAP-IN
7	1	07128	GASKET
6	2	110764	SEALING NUT
5	1	110855	COVER, SLWCO, CLAMP MOUNTED
4	2	110869	WELDMENT, CLAMP BAR
3	1	110857	WELDMENT, SLWCO MOUNTING/BLOCK-OFF
2	1	05244	ELBOW, 90°, 3/8
1	1	19995	FLOAT SWITCH

ITEM	QTY	PART NO.	DESCRIPTION
<b>CLEVELAND RANGE, LLC</b>			
1533 East 17th St. Cleveland, Ohio 44110-2014			
<small>THE DRAWING IS THE PROPERTY OF CLEVELAND RANGE, LLC. IT IS TO BE USED ONLY FOR THE PURPOSES OF CLEVELAND RANGE.</small>			
DESIGNED BY	± 0.030	DESIGNED BY	APPROVED BY
ANALYZED	± 1"	DATE	REV
DATE	9-6-02	ISSUE NO.	110960
			SHEET 1 OF 2
			REV A



**STEP 6**  
 THREAD SEALING NUT ONTO CLAMP BAR STUDS WHILE HOLDING #6-32 SCREWS.



**STEP 7**  
 REMOVE #6-32 SCREW FROM CLAMP BARS AND TIGHTEN NUTS (25-40 IN.-LBS.) WHILE POSITIONING PLATE OVER MOUNTING STUD BASES.



**STEP 9**  
 DISCONNECT POWER TO UNIT. THREAD NUTS (ITEM 12) ONTO #6-32 RODS (ITEM 15) APPROXIMATELY 1/4". INSERT LOCK WASHER (ITEM 14) OVER RODS AS SHOWN ABOVE.



**STEP 10**  
 INSERT #6-32 RODS INTO CLAMP BAR STUD HOLES. TIGHTEN #6-32 RODS TO CLAMP BAR STUDS.



**STEP 11**  
 MOUNT COVER TO CLAMP BAR STUDS BY ALIGNING COVER HOLES TO #6-32 RODS. USE ITEMS 12,13 & 14 TO SECURE COVER TO BOILER.

**CAUTION:**

MAKE SURE FLOAT SWITCH WIRES ARE NOT PINCHED BETWEEN COVER AND BOILER BEFORE TIGHTENING COVER TO CLAMP BAR STUDS.

RECONNECT POWER TO UNIT AND VERIFY OPERATION. INSTALLATION COMPLETED.



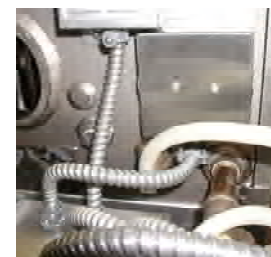
**STEP 8**  
 REPLACE 45° CONDUIT FITTING WITH 90° FITTING (ITEM 16). REFER TO CONDUIT "A" AND "B" ROUTING EXAMPLES AND CHOOSE COVER HOLE TO USE FOR WIRE ROUTING. ROUTE FLOAT SWITCH WIRES THROUGH COVER HOLE, FITTING AND CONDUIT. INSERT 90° FITTING INTO COVER HOLE AND PLUG UNUSED HOLE WITH ITEM 8. REFER TO THE LADDER DIAGRAM ON THE DOOR OF THE UNIT, CHOOSE FROM ITEMS 9, 10 & 17 FOR WIRE END TERMINATIONS AND MAKE ELECTRICAL CONNECTIONS. RECONNECT POWER, RUN UNIT UNTIL STEAM IS GENERATED, AND CHECK FOR LEAKS.

DISCONNECT POWER TO UNIT AND DRAIN BOILER BEFORE MAKING ANY AJUSTMENTS IF LEAKS ARE PRESENT.

CONDUIT ROUTING EXAMPLES  
 EXAMPLES SHOWN BELOW ARE 2 OF MANY WAYS TO ROUTE CONDUIT DEPENDING ON THE BOILER ASSEMBLY VERSION. THE COVER MAY BE ROTATED 180° TO ALLOW THE CONDUIT TO BE CONNECTED TO ANY SIDE OF THE COVER.



CONDUIT ROUTING "A"



CONDUIT ROUTING "B"

ITEM	QTY	PART NO.	DESCRIPTION
<b>CLEVELAND RANGE, LLC</b>			
<small>1333 East 179th St. Cleveland, Ohio 44110-2514</small>			
<small>PLEASE RETURN TO THE SOURCE OF PURCHASE FOR ALL INFORMATION ON CLEVELAND RANGE. THE SOURCE IS NOT TO BE HELD RESPONSIBLE FOR THE ACCURACY OF CLEVELAND RANGE.</small>			
TOLERANCES			
FRACTIONS			
DECIMAL	±.030	NO HOLE SIZE	DRAWN BY DRL APPROVED BY
ANGULAR	±1°		
DATE	9-6-02	SIZE D	DRAWING NO. 110960 SHEET 2 OF 2 REV A

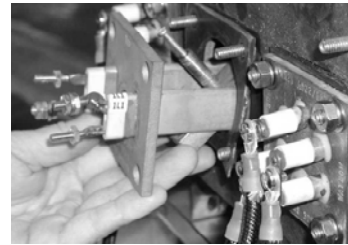
REV.	REVISIONS	DATE	BY
A	PRODUCTION RELEASE PER E.O. # C-6429	1-13-03	DRL

**WARNING:**  
DISCONNECT POWER AND DRAIN BOILER BEFORE REMOVING EXISTING HEATER AND INSTALLING REPLACEMENT HEATER ASSEMBLY.



**STEP 1**

CLEAN GASKET AREA WITH A WIRE BRUSH AND INSTALL GASKET OVER REMAINING MOUNTING STUDS.



**STEP 2**

INSERT HEATER (REMOVE HEATER JUMPER FOR 3 Ø DELTA HEATERS) AND INSERT CLAMP BAR INTO HEATER HOLE WITH 6-32 SCREW SCREWED INTO CLAMP BAR STUD.



**STEP 3**

PUSH CLAMP BAR STUD TOWARDS HEATER CENTER HOLE UNTIL 6-32 SCREW IS THROUGH CENTER HOLE.



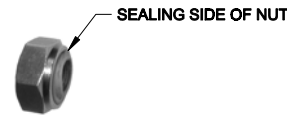
**STEP 4**

PULL CLAMP BAR THROUGH HEATER CENTER HOLE WHILE POSITIONING HEATER OVER REMAINING MOUNTING STUDS.



**STEP 5**

HOLD CLAMP BAR STUD WHILE PLACING SEALING NUT OVER #6-32 SCREW WITH SEALING SIDE OF NUT FACING HEATER PLATE SURFACE.



SEALING NUT



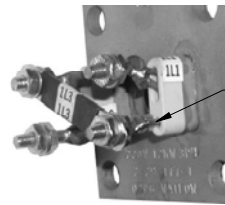
**STEP 6**

THREAD NUT ONTO CLAMP BAR STUD WHILE HOLDING #6-32 SCREW.



**STEP 7**

REMOVE #6-32 SCREW FROM CLAMP BAR STUD AND TIGHTEN NUT (25-40 IN.-LBS.) WHILE POSITIONING HEATER PLATE OVER HEATER STUD BASES.



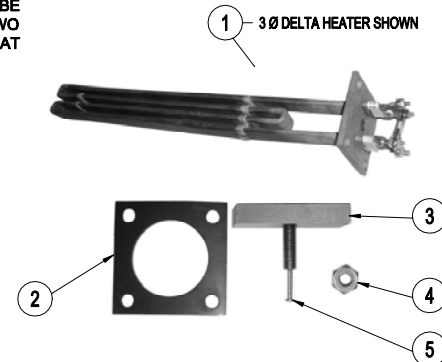
**STEP 8**

MAKE ELECTRICAL CONNECTIONS TO HEATER (RE-INSTALL HEATER JUMPER FOR 3Ø DELTA HEATERS), AND RUN UNIT UNTIL STEAM IS GENERATED. CHECK FOR LEAKS.

HEATER JUMPER IS TO BE CONNECTED TO THE TWO HEATER TERMINALS THAT HAVE ONE ELEMENT CONNECTION.

**WARNING:**

DISCONNECT POWER TO UNIT AND DRAIN BOILER BEFORE MAKING ANY ADJUSTMENTS IF LEAKS ARE PRESENT.



PARTS

FK300196--208  
FK300197--240  
FK300198--480

5	1	106120	SCREW, 6-32 X 1.000, TORX/PAN
4	1	110764	SEALING NUT, 3/8-16
3	1	110761	CLAMP BAR
2	1	07128	GASKET
-	-	300206	HEATER, 220/380, 12KW, 3Ø, WYE, CLAMP MOUNTED
-	-	300205	HEATER, 240/415, 12KW, 3Ø, WYE, CLAMP MOUNTED
-	-	300201	HEATER, 208/220, 12KW, 1Ø, CLAMP MOUNTED
-	-	300200	HEATER, 440/480, 12KW, 1Ø, CLAMP MOUNTED
-	-	300199	HEATER, 250V, 12KW, 1Ø, CLAMP MOUNTED
-	-	300198	HEATER, 440/480, 12KW, 3Ø, DELTA, CLAMP MOUNTED
-	-	300197	HEATER, 230/240, 12KW, 3Ø, DELTA, CLAMP MOUNTED
1	1	300196	HEATER, 208/220, 12KW, 3Ø, DELTA, CLAMP MOUNTED
ITEM	QTY	PART NO.	DESCRIPTION
<b>CLEVELAND RANGE, LLC</b> 1333 East 179th St., Cleveland, Ohio 44110-3074			
<small>NO DIMENSIONS SHOWN UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.</small>			
TOLERANCES UNLESS OTHERWISE SPECIFIED	DO NOT SCALE	DRAWN BY	DATE
NA	PRINTED/DRAWN	DRL	1-13-03
TITLE INSTRUCTIONS, KIT, REPLACEMENT HEATER, CLAMP MOUNTED			
ANGULAR	SIZE	DRAWING NO.	SHEET 1 OF 1
NA	D	110869	REV A



## CLASSIC CONVECTION STEAMERS 15 PSI BOILER BASE STYLE

Project \_\_\_\_\_  
Item \_\_\_\_\_  
Quantity \_\_\_\_\_  
FCSI Section \_\_\_\_\_  
Approval \_\_\_\_\_  
Date \_\_\_\_\_

### **Cleveland Classic Series** CONVECTION STEAMERS

TWO COMPARTMENT, PRESSURELESS  
STEAM COIL GENERATOR  
24" WIDE CABINET BASE DESIGN

**MODEL:**  24-CSM

#### **Cleveland Standard Features**

- Cooking Capacity for up to six 12" x 20" x 2½" deep Cafeteria Pans.
- Pressureless cooking with forced convection steam, permitting doors to be opened while cooking continues.
- Solid State Controls operate water level and safety functions.
- Each compartment is equipped with a 60 minute mechanical timer, separate bypass switch for constant steaming and a cold water condenser for superior cooking results.
- **Instant Steam Standby Mode:** Holds generator at steaming temperature. Allows unit to start cooking instantly.
- **Durable 14 Gauge Stainless Steel Construction:** For Compartment Door and Steam Cooking Cavity.
- **Separate Main Power Switch for "On/Off"**
- **Exclusive Steam Cooking Distribution System:** The exclusive Convection Jets produce a high velocity convection steam without fans. Coved Corner design in cooking compartment distributes heat evenly and is easy to keep clean. Creased top & bottom enhance drainage. Cold Water Condenser for each compartment maintains a dry steam. Fully insulated cooking compartment for thermal efficiency. Removable Stainless Steel Slide Racks for easy cleaning.
- **Exclusive "Cool to the Touch" Compartment Door Design:** Free floating inner door with reversible door gasket provides an air tight seal. Stainless Steel Slam/Latch mechanism provides greater reliability.
- **Left Hand Door Hinging:** Compartment Doors hinged left, controls on the right.
- Modular Cabinet Base with Hinged Door.
- **Steam Coil Generator:** Automatic Water Fill on start up. Minimum 35 psi incoming steam pressure required with a ¾" steam line.
- **Automatic Generator Drain at shutdown:** Contains a "Water Jet" Spray Rinse Cleaning Cycle to keep drain clear.
- **Automatic Water Level Control System** with Low Water Power Cut-off Circuit.
- Steam generator equipped with High Limit Pressure Safety Switch, 15 psi Safety Valve, and Steam Generator Pressure Gauge.
- Secondary Low Water Cut-Off, factory installed (CALs) (Required for AZ. AR. CA. CO. CT. DE. FL. GA. HI. IL. IA. KS. MD. MA. MI. MN. MT. NE. NV. NM. NC. OK. OR. PR. RI. TN. UT. VA. WA. WV., Buffalo, NY, Wash. DC)
- **NSF Certified 6" Stainless Steel Legs** with adjustable flanged feet for a one inch level adjustment.
- Standard Voltage for Controls: 115 volts, 60 Hz, single phase.
- All Controls are serviceable from the front.



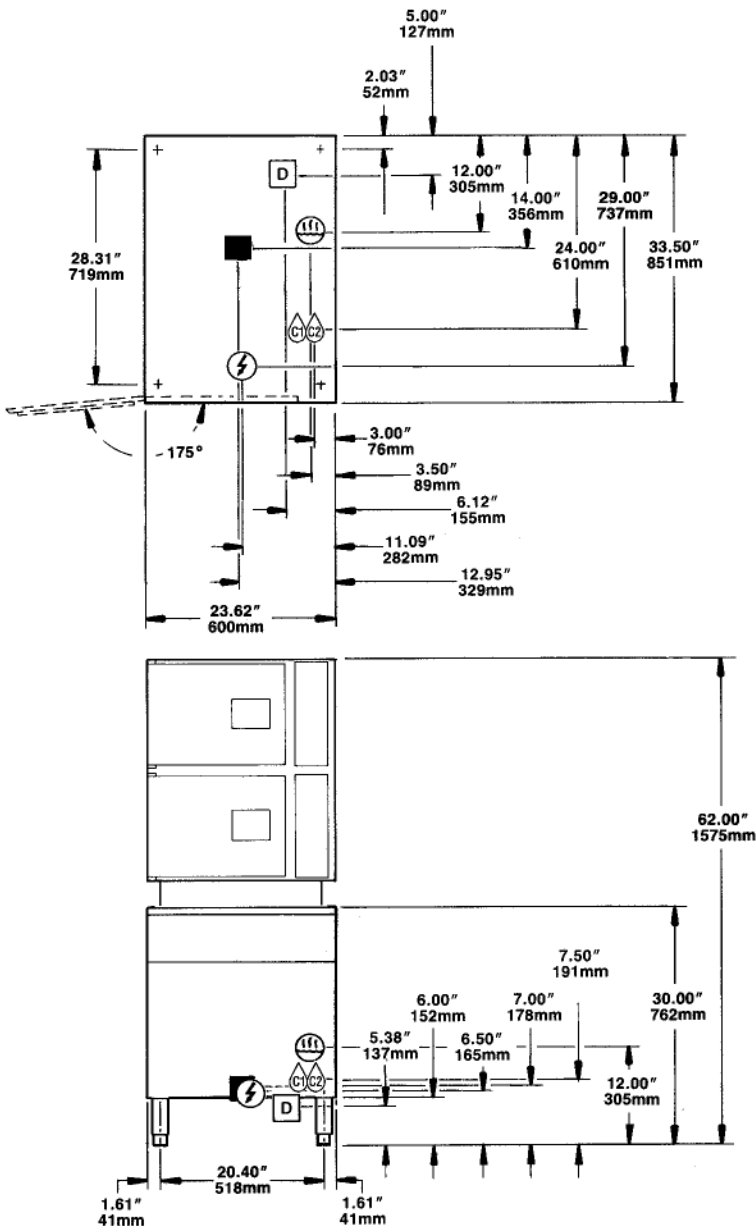
#### **Short Form Specifications**

Shall be Two Compartments, CLEVELAND Convection Steamer, Model 24-CSM, Steam Coil Steam Generator, 115 volts, single phase. Solid State Controls operate timing, water level and safety functions. Steam Generator with Automatic Water Fill on start-up and Automatic Blowdown with additional Manual Drain Valve. For each cooking compartment: 60 minute Mechanical Timer, Manual Operation Mode and Cold Water Condenser. Type 304 Stainless Steel cooking compartment.

#### **Options & Accessories**

- Right Hand Door Hinging, Controls on the Left (DHR)
- Electronic Timer with Compensating Load Feature (ETC)
- ON/OFF Steam Switch only for compartment controls (MC)
- Cafeteria pans in depths of 1", 2½", 4" and 6"
- Additional Power Reducing Valve (PRV)
- Moisture Separator Trap (MS)
- Stainless Steel Base Frame (FSS)
- Compartment Door Steam Shut Off Switch (SCS)
- Correctional Packages
- Boiler Descaling Pump Kit (107142)
- Water Filters

SECT. III PAGE 5  
0609



- Each compartment has capacity for:  
Three, 12" x 20" x 2½" or six, 12" x 20" x 1" deep Cafeteria Pans.

### WATER QUALITY REQUIREMENT

The recommended minimum water quality standards whether untreated or pre-treated, based upon 10 hours of use per day, and a Daily Blowdown, are as follows:

TOTAL DISSOLVED SOLIDS	less than 60 parts per million
TOTAL ALKALINITY	less than 20 parts per million
SILICA	less than 13 parts per million
pH FACTOR	greater than 7.5
CHLORINE	less than 30 parts per million

Consult a local water treatment specialist for an on site water analysis for recommendations concerning steam generator feed water treatment (if required), in order to remove or reduce harmful concentrations of minerals. The use of highly mineralized water will mean that more frequent servicing of the steam generator will be necessary. The fact that a water supply is potable is not proof that it will be suitable for the generator.

**NOTE:** When ordering optional reverse door openings: Control Panel, door openings, cooking compartments and clearances are opposite that shown.

STEAM COIL (SC)	WATER (C1/C2)	DRAINAGE (D)	ELECTRIC (E)	CLEARANCE
<b>Steam Supply Piping:</b> <ul style="list-style-type: none"> <li>• ¾" IPS minimum for 35-50 psi</li> <li>• For pressures above 50 psi, a Pressure Reducing Valve must be specified.</li> </ul>	¼" NPT Cold Water Inlet 35 psi minimum 60 psi maximum (C1) Condenser feed (C2) Boiler feed	<b>The Floor Drain must be located outside the confines of the equipment base.</b>  1 1/2" IPS common drain. Do not connect other units to this drain. Do not use PVC pipe for drain.  Condensate Return Drain Line ■ ¾" IPS. Do not connect to common drain.	115V-1 PH 25 watts per compartment. 25 watt Steam Generator Control.	Right - 3", Left - 3", Rear - 3" (12" on control side if adjoining wall or equipment is over 30" high for service access) <b>Contact factory for variances to clearances.</b>

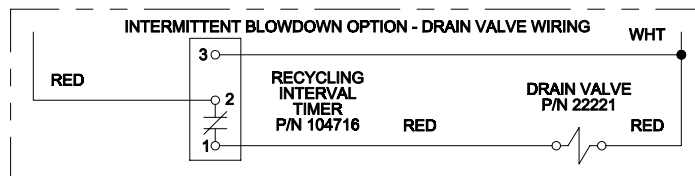
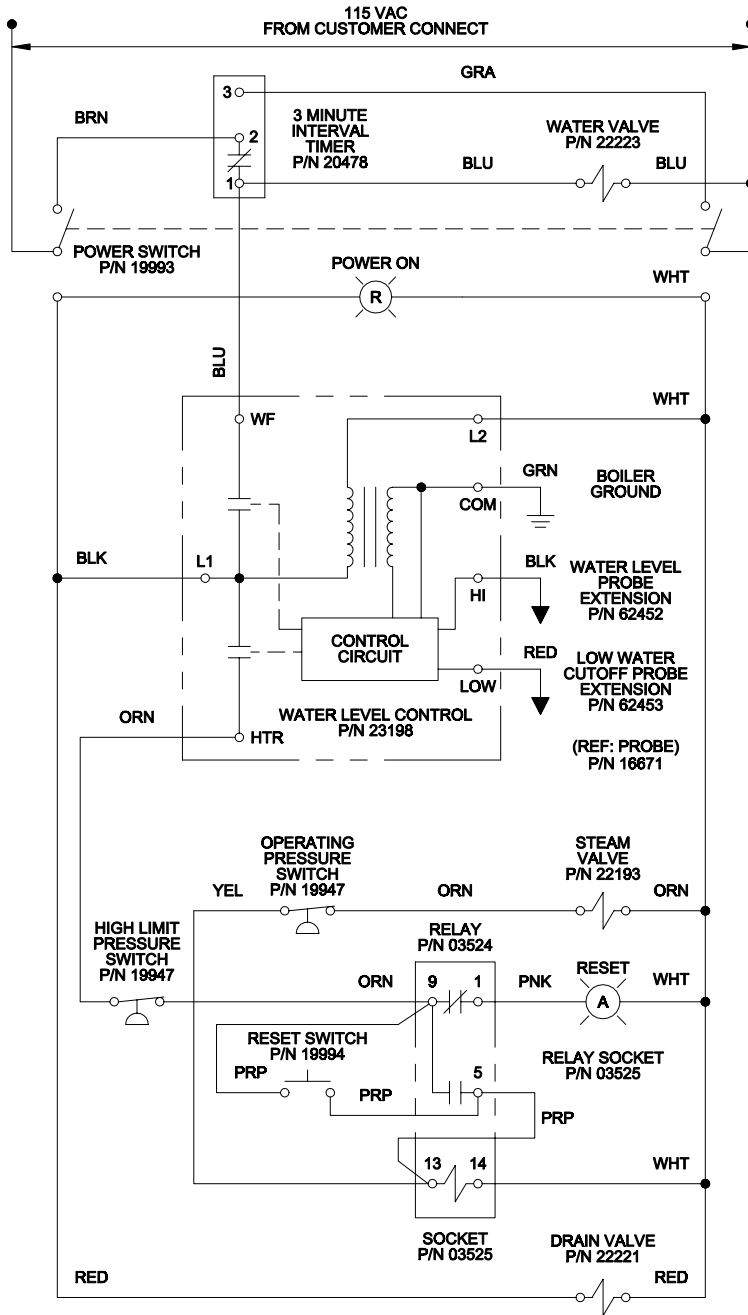
**NOTES:**  
 Cleveland Range reserves right of design improvement or modification, as warranted.  
 Many regional, state and local codes exist and it is the responsibility of the owner and installer to comply with the codes.  
 Cleveland Range equipment is built to comply with applicable standards for manufacturers. Included among those approval agencies are ASME/N. Bd, UL, NSF and CSA.

CLEVELAND RANGE  
SEQUENCE OF OPERATIONS  
Steam Coil Boiler Base

1. To turn the unit on, depress the red on/off rocker switch.
  - 115 VAC is sent to the upper cabinets and terminal block in control box.
  - 115 VAC is sent to normally open drain valve closing it.
  - 115 VAC is sent to L1 and L2 of the water level board.
  
2. With the water level board energized and no water in the boiler
  - 115 VAC is sent from the WF terminal to the fill solenoid.
  - The fill solenoid opens and the boiler fills through the drain valve.
  - The water fills to the low probe shorting it to ground
  - 115 VAC is sent from the HTR terminal through the normally closed contacts of the highlimit pressure switch to contacts of the ice cube relay and the amber reset switch, energizing the amber light.
  
3. When the momentary amber switch is depressed 115 VAC is sent to the coil of the ice cube relay closing it.
  - The relay latches itself through a jumper to the coil.
    - If either the high-pressure switch or the low water cut off float switch opens, the latch circuit opens.
    - When the contacts close the amber light will energize and the process may begin again.
  - The relay contacts close sending 115 VAC through the normally closed contacts of the operating pressure switch to the coil of the supply steam solenoid. .
  
4. With 115 VAC to the coil of the supply steam solenoid.
  - The solenoid opens.
  - Steam is sent to the coil in the boiler.
  
5. The water in the boiler is heated to steam.
  - As steam is generated and pressure builds the air is pushed out through the steamtrap.
  - When steam goes through the steam trap and heats it to 192 degrees it closes.
  
6. Pressure builds in the boiler to the set point .
  - The operating pressure switch opens and the heat circuit is de-energized.
  - When the pressure drops below the set point the heat circuit is energized and the heat process begins again.
  
7. Water continues to fill until the high probe is grounded.
  - When the high probe is grounded the WF terminal on the water level board is de-energized.
  - The fill solenoid closes until the high probe is ungrounded for 05 seconds.

- If the water level drops below the high probe for more than 20 seconds the WF terminal is energized and the water fill circuit begins again.
8. When the unit is turned off, by depressing the red rocker switch,
- 115 VAC is removed from the heat circuit.
  - 115 VAC is removed from the drain circuit and the normally open drain valve opens allowing the unit to drain.
  - 115 VAC is sent to the 3-minute timer.
  - The three-minute timer will energize the fill solenoid for 3 minutes while the steamer drains.

# STEAM COIL GENERATOR CONTROL WIRING (INTERMITTENT BLOWDOWN OPTION)



104827 D

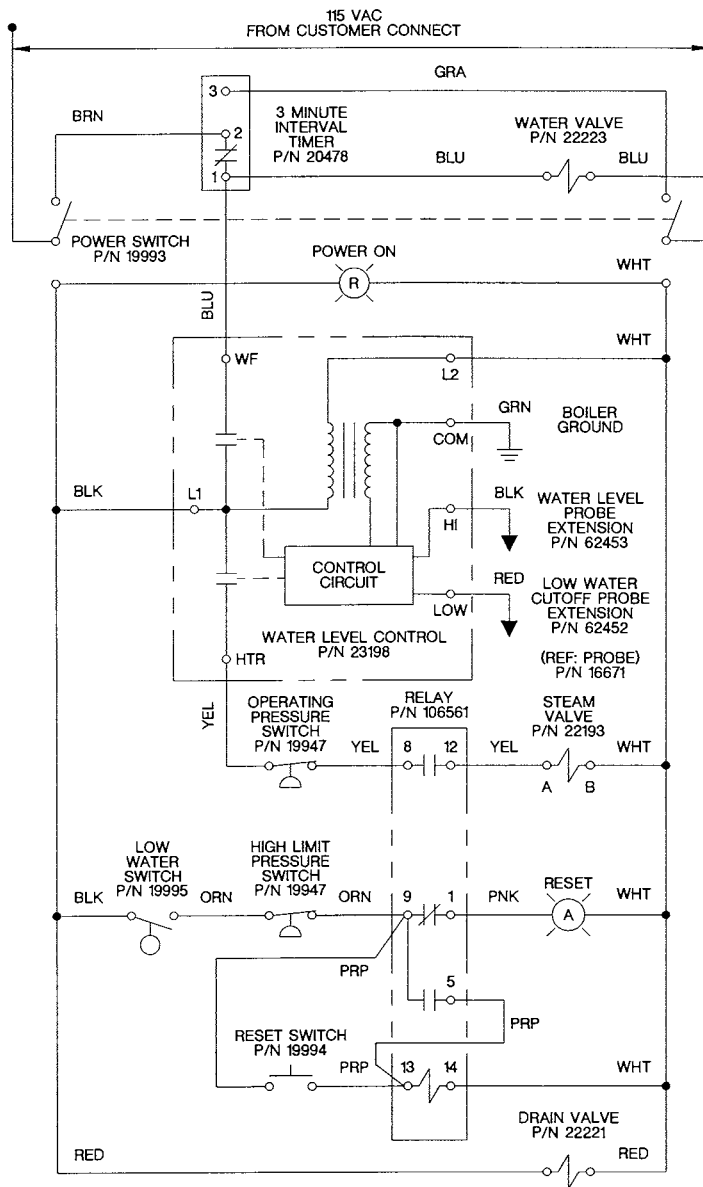
CLEVELAND RANGE  
SEQUENCE OF OPERATIONS  
Steam Coil Boiler Base  
With Secondary Low Water Cut Off Switch

1. To turn the unit on, depress the red on/off rocker switch.
  - 115 VAC is sent to the upper cabinets and terminal block in control box.
  - 115 VAC is sent to normally open drain valve closing it.
  - 115 VAC is sent to L1 and L2 of the water level board.
  - 115 VAC is sent to the open contacts of the low water cut-off float switch.
2. With the water level board energized and no water in the boiler
  - 115 VAC is sent from the WF terminal to the fill solenoid.
  - The fill solenoid opens and the boiler fills through the drain valve.
  - The water fills to the low probe shorting it to ground
  - 115 VAC is sent from the HTR terminal through the normally closed contacts of the operating pressure switch to coil of the contactor(s).
  - The rising water also raises the float on the low water cut-off switch closing it.
  - 115 VAC is sent through the normally closed contact of the high-pressure switch to the amber reset switch, energizing the amber light.
3. When the momentary amber switch is depressed 115 VAC is sent to the ice cube relay closing it.
  - The relay latches itself through a jumper to the coil.
    - If either the high-pressure switch or the low water cut off switch opens, the latch circuit opens.
    - When the contact close the amber light will energize and the process may begin again.
  - The relay contacts close sending 115 VAC to the coil of the supply steam solenoid.
4. With 115 VAC to the coil of the supply steam solenoid
  - The steam solenoid opens.
  - Supply steam is sent through the steam coil.
5. The water in the boiler is heated to steam.
  - As steam is generated and pressure builds the air is pushed out through the steamtrap.
  - When steam goes through the steam trap and heats it to 192 degrees it closes.
6. Pressure builds in the boiler to the set point .
  - The operating pressure switch opens and the heat circuit is de-energized.
  - When the pressure drops below the set point the heat circuit is energized and the heat process begins again.
7. Water continues to fill until the high probe is grounded.

- When the high probe is grounded the WF terminal on the water level board is de-energized.
  - The fill solenoid closes until the high probe is ungrounded for 05 seconds.
  - If the water level drops below the high probe for more than 20 seconds the WF terminal is energized and the water fill circuit begins again.
8. When the unit is turned off, by depressing the red rocker switch,
- 115 VAC is removed from the heat circuit.
  - 115 VAC is removed from the drain circuit and the normally open drain valve opens allowing the unit to drain.
  - 115 VAC is sent to the 3-minute timer.
  - The three-minute timer will energize the fill solenoid for 3 minutes while the steamer drains.

B1 B4

### STEAM COIL GENERATOR CONTROL WIRING SECONDARY LOW WATER CUTOFF (INTERMITTENT BLOWDOWN OPTION)

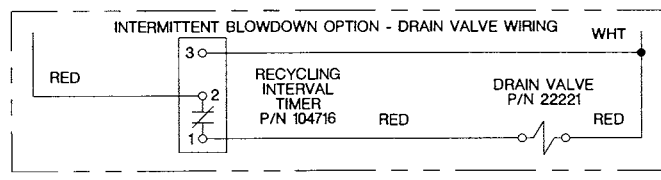


10.500



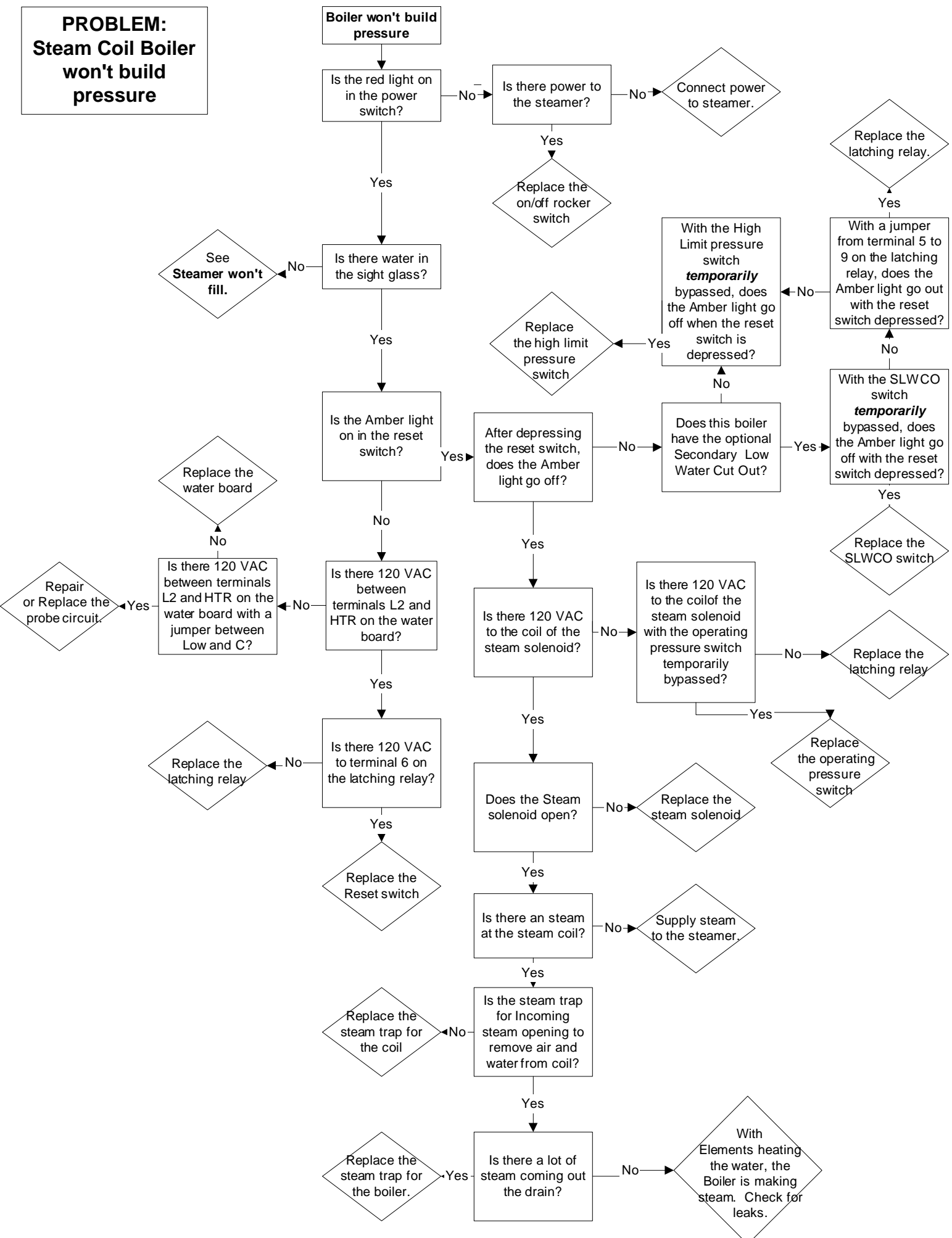
B3 B2

B3 B2

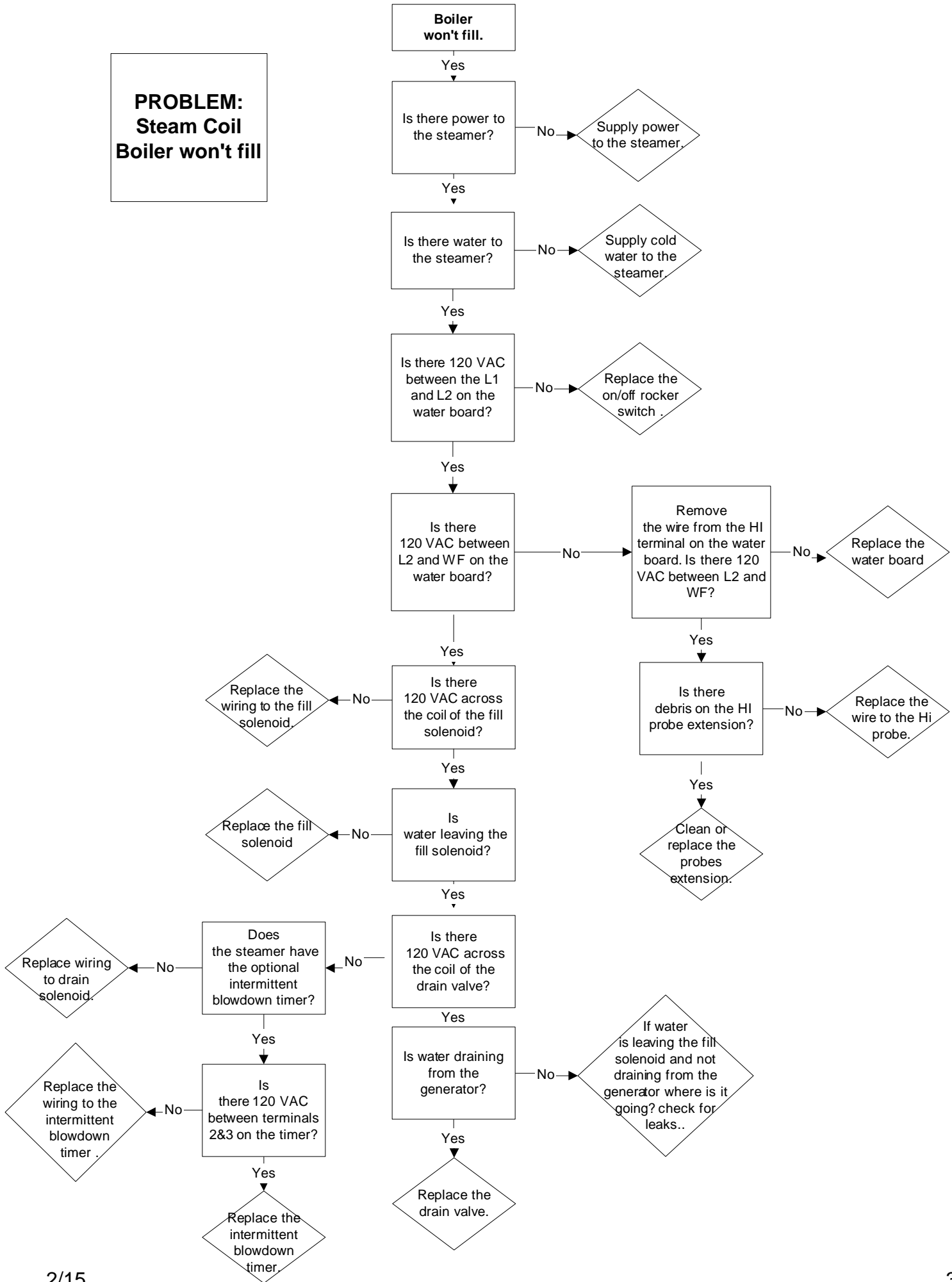


104828 B

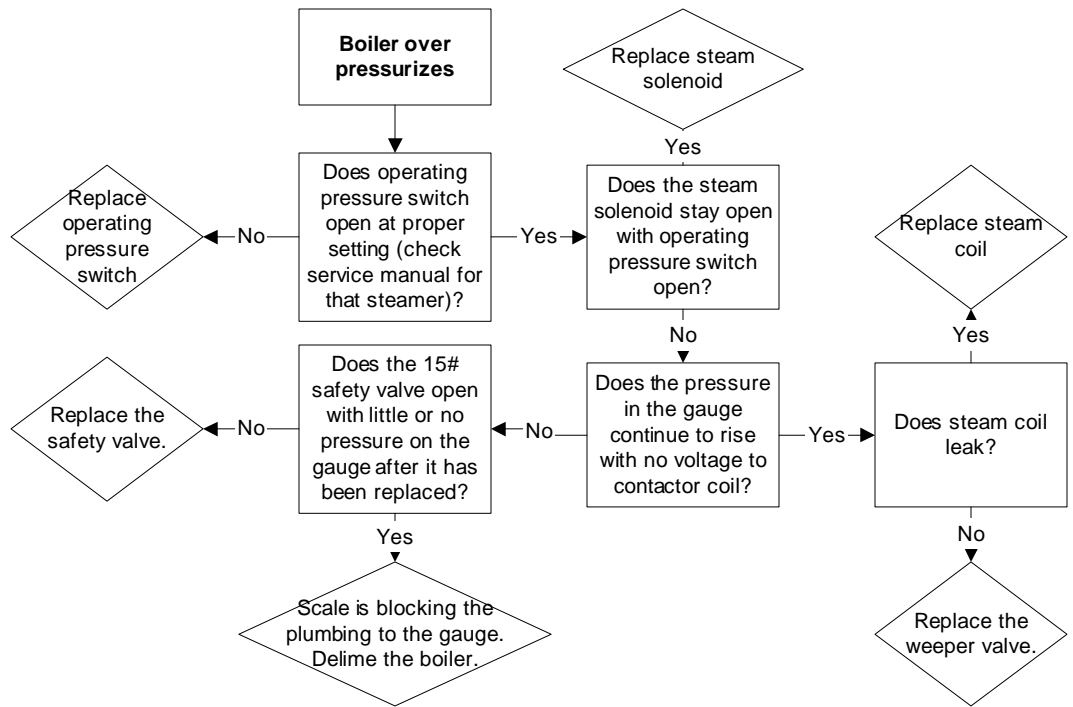
**PROBLEM:  
Steam Coil Boiler  
won't build  
pressure**



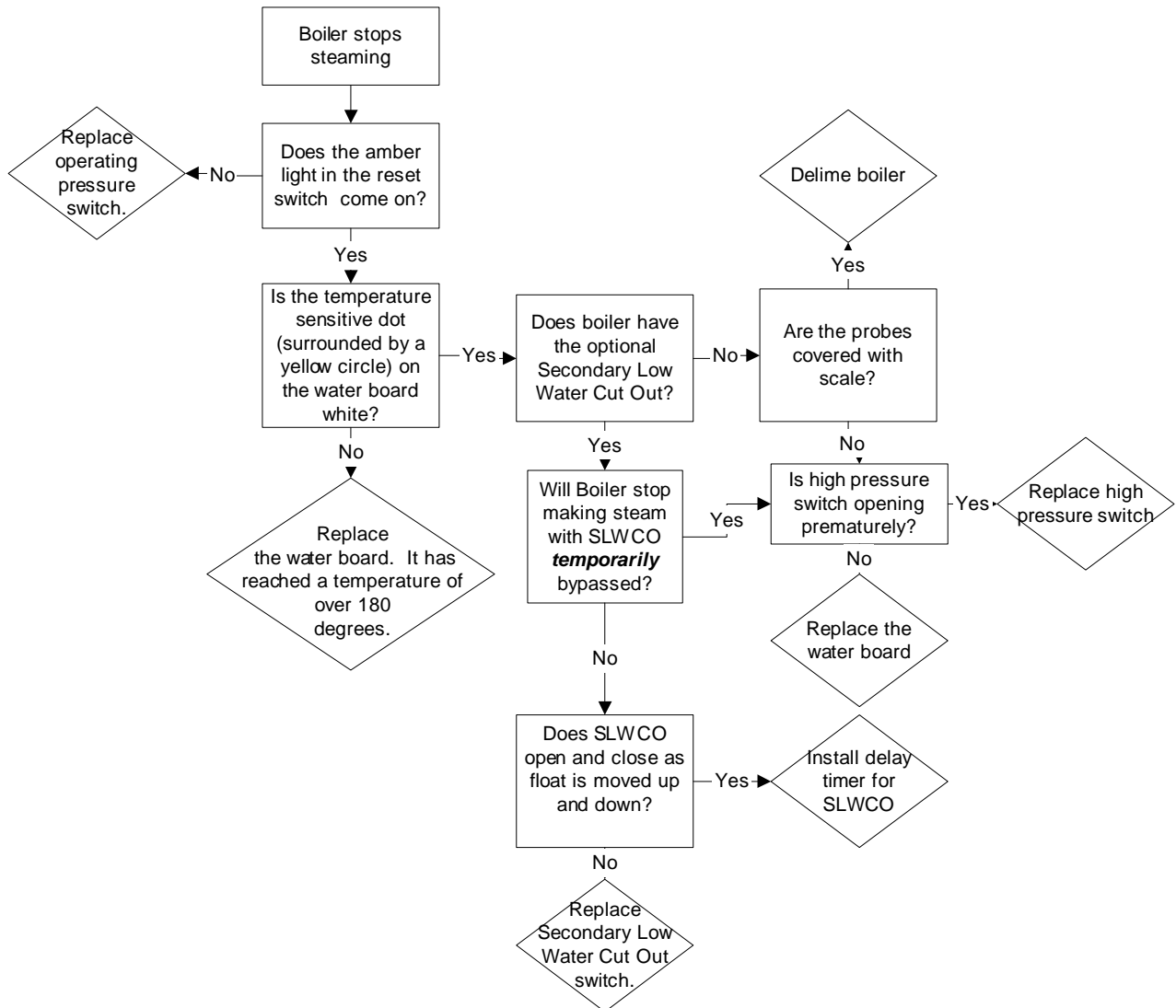
**PROBLEM:  
Steam Coil  
Boiler won't fill**



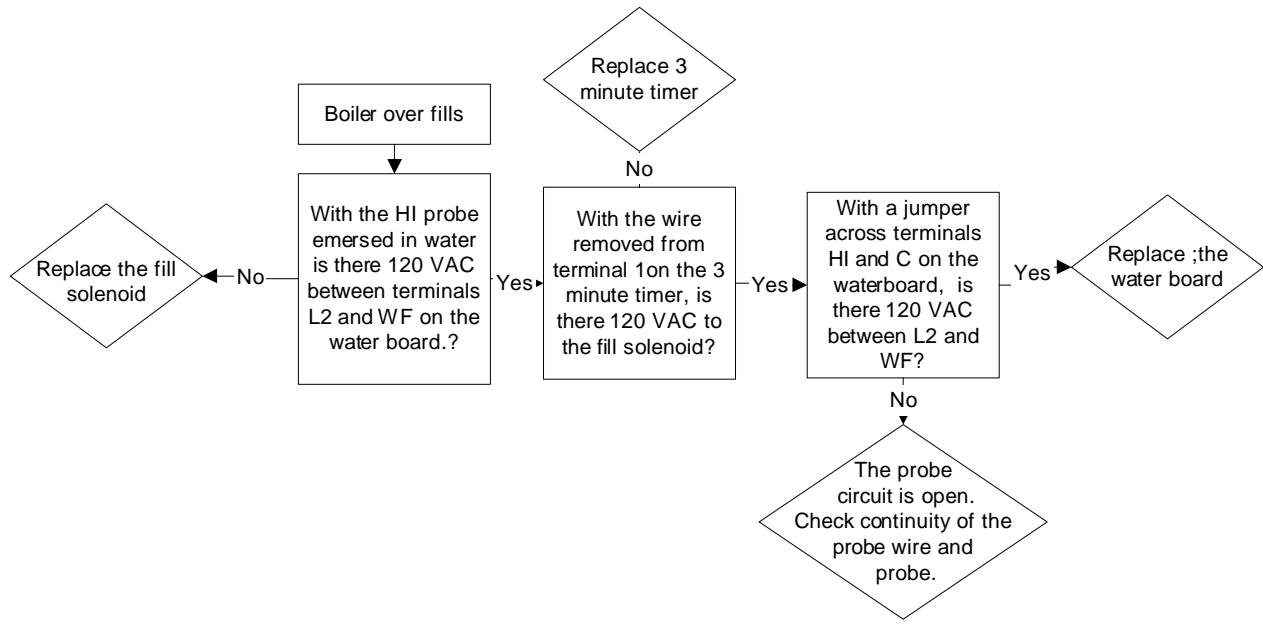
**PROBLEM:**  
Steam Coil  
Boiler Over  
Pressurizes  
(15# Safety  
valve opens)



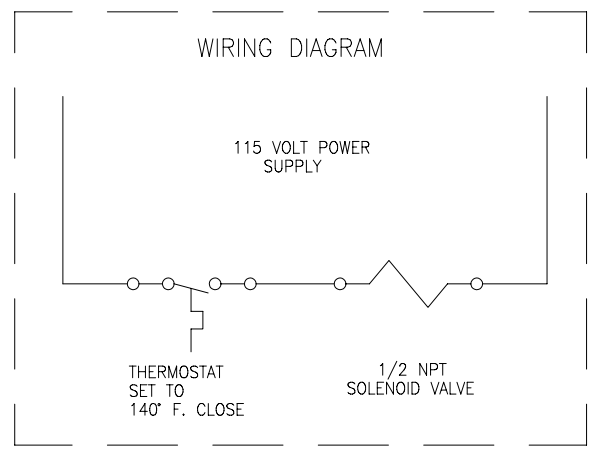
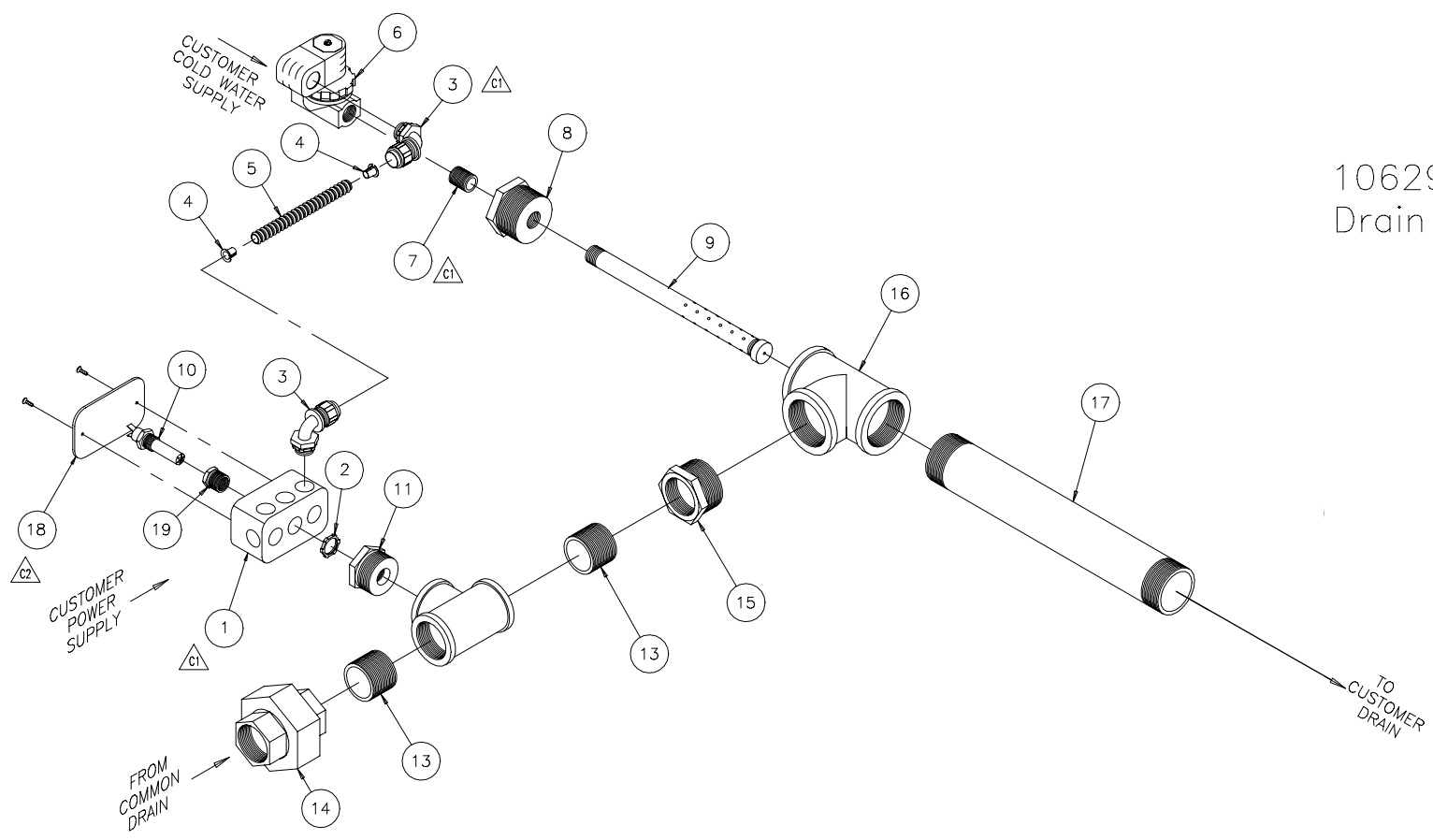
**PROBLEM:**  
Steam Coil Boiler Stops Producing Steam



# PROBLEM: Steam Coil Boiler Overfills



# 106290 Drain Cooling Kit



20	1	106292	COUPLING, REDUCER, BELL, 1/2" X 1 1/2"
19	1	02558	BUSHING, REDUCER 1/2" X 3/8"
18	1	02368	COVER, HANDI BOX
17	1	106293	NIPPLE, 2" X 15" LG., BLACK
16	1	106294	TEE, 2", BLACK
15	1	106295	BUSHING, REDUCER, 2" X 1-1/2", BLACK
14	1	21308	UNION, 1-1/2", BLACK
13	2	14382	NIPPLE, CLOSE, 1-1/2", BLACK
12	1	20221	TEE, 1-1/2", BLACK
11	1	106296	BUSHING, REDUCER, 1-1/2" X 1/2", BLACK
10	1	106288	SWITCH, THERMOSTAT, 130 degree
9	1	106291	TUBE, SPRAY, AFTER DRAIN COOLER
8	1	106297	BUSHING, REDUCER, 2" X 1/2", BLACK
7	1	14323	NIPPLE, CLOSE, 1/2", BLACK
6	1	22115	VALVE, SOLENOID, 1/2"
5	1	1052490600	CONDUIT, GREENFIELD, 1/2" X 6" LG.
4	2	105560	BUSHING, ANTI-SHORT, 1/2", SIZE 3
3	2	105247	CONNECTOR, GREENFIELD, 1/2", 90°
2	1	14614	NUT, LOCK, 1/2", ELECTRICAL
1	1	02361	HANDI-BOX, ELECTRICAL

TOLERANCES (EXCEPT AS NOTED)		<b>CLEVELAND RANGE INC.</b> 1333 East 179th St. Cleveland, Ohio 44110-2574	
DECIMAL ± .005	SCALE 1=4	DRAWN BY DUTCHMAN	APPROVED BY
ANGULAR ± 1°	TITLE INSTRUCTION AFTER DRAIN COOLER ASSEMBLY		
DATE AC	01-18-93	DRAWING NO. C- 1062901	REV D

THIS DESIGN DESCRIBES A PROPRIETARY ITEM AND IS THE PROPERTY OF CLEVELAND RANGE. THIS DRAWING IS NOT TO BE COPIED OR USED WITHOUT THE APPROVAL OF CLEVELAND RANGE.

**AFTER DRAIN COOLER KIT**  
**FIELD APPLICATION**

- 1) AFTER DRAIN COOLER KIT is to be installed as close as possible to the equipment common drain termination (ref. dwg. P/N 1062901)
- 2) Use 1 ½ NPT piping and fittings as required to connect the AFTER DRAIN COOLER KIT to common drain.
- 3) Connect a ½” cold water supply to the “AFTER DRAIN COOLER KIT” solenoid valve. A separate water supply of cold cooling water. Install a ½” shut-off valve in this supply line for use when and if service to the kit is required.
- 4) Open the 2 x 4 electrical handy box. Install a separate 115 volt power supply to box per code, as shown in ref. drawing P/N 1062901.
- 5) Should the drain piping from the AFTER DRAIN COOLER KIT need to be extended to a floor drain use 2” NPT or larger piping and fittings.

NOTE: Do not hard plumb directly into a floor drain.

Allow a minimum of 2” air gap at end of drain piping. Keep the number of fittings and length of piping to minimum.

# DESCALING PROCEDURE

for

## 200/300KBTU BOILER BASES

---

### PRELIMINARY PROCEDURE

- 1) Start with the unit turned off & completely cool.  
The boiler will drain in approximately 3 minutes.
- 2) Open the door at the base of the unit.
- 3) Remove the handhole plate & gasket. Discard old gasket.
- 4) Inspect the boiler for scale build-up. Remove any loose scale within reach of the handhole plate area.
- 5) Proceed to correct boiler instructions listed below.
- 6) For descale piping parts list, see P/N 107142 Rev "F".

---

1333 East 179<sup>th</sup> Street  
Cleveland, Ohio 44110

Phone: (216) 481- 4900  
Fax: (216) 481- 3782



Part No. 260ALK - F 4/03

## GAS BOILER, ORIGINAL VERSION

- 1) For piping setup, see P/N 260ALK Sht 4 of 7.
- 2) Install handhole plate with descaler ports (Item 1) & new gasket (Item 12).
- 3) After descaler handhole plate has been installed, attach the 2.500 inch nipples with attached unions to the inlet & outlet ports.
- 4) Remove cal code switch (p/n 19995) from the boiler base & clean the shaft under the float.
- 5) Connect the 1/2 inch hose with the attached union to the bottom 2.500 inch nipple.
- 6) Connect the 3/4 inch hose with the attached union to the top 2.500 inch nipple.

## GAS BOILER, FIELD REPLACEMENT VERSION

- 1) For piping setup, see P/N 260ALK Sht 5 of 7.
- 2) Install handhole plate with new gasket.
- 3) Remove Cal Code plate (p/n 19995) from the boiler base.
- 4) Install plate (Item 18) in place of Cal Code switch for descaling procedure.
- 5) When the boiler is descaling, clean Cal Code switch (p/n 19995, if applicable) once removed. Also, clean the shaft under the float.
- 6) Remove plug from tee & install descale plumbing assembly (Items 2, 3, 4, 5, 14, 15, & 18) on discharge side in male run tee located underneath the safety valve.
- 7) Install descale plumbing assembly (pump side) in Cal Code plate. Connect plumbing assembly to item 19.

## GAS BOILER, CURRENT PRODUCTION RELEASE

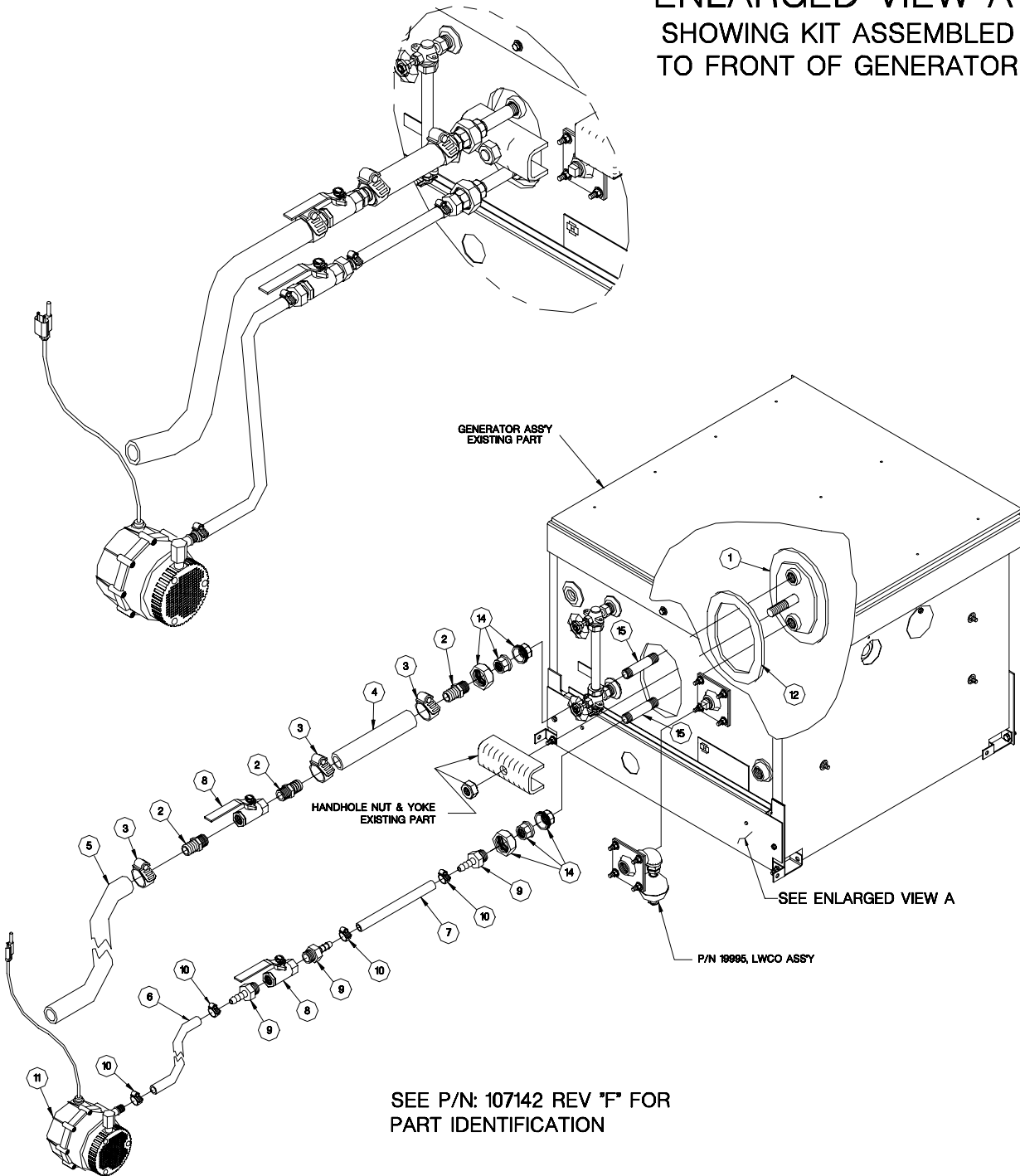
- 1) For piping setup, see P/N 260ALK Sht 6 of 7. Install handhole plate with new gasket.
- 2) Remove plug from LWCO plate (if so equipped) & from the male run tee underneath the safety valve.
- 3) Install descale plumbing assembly (on left side) in male run tee, connected to the safety valve.
- 4) Install descale plumbing assembly (with pump) in drain port.
- 5) If applicable, remove LWCO switch (p/n 19995) from boiler base.
- 6) If applicable when the boiler is descaling, clean LWCO switch (p/n 19995) once removed. Also, clean the shaft under the float.

## DESCALING INSTRUCTIONS

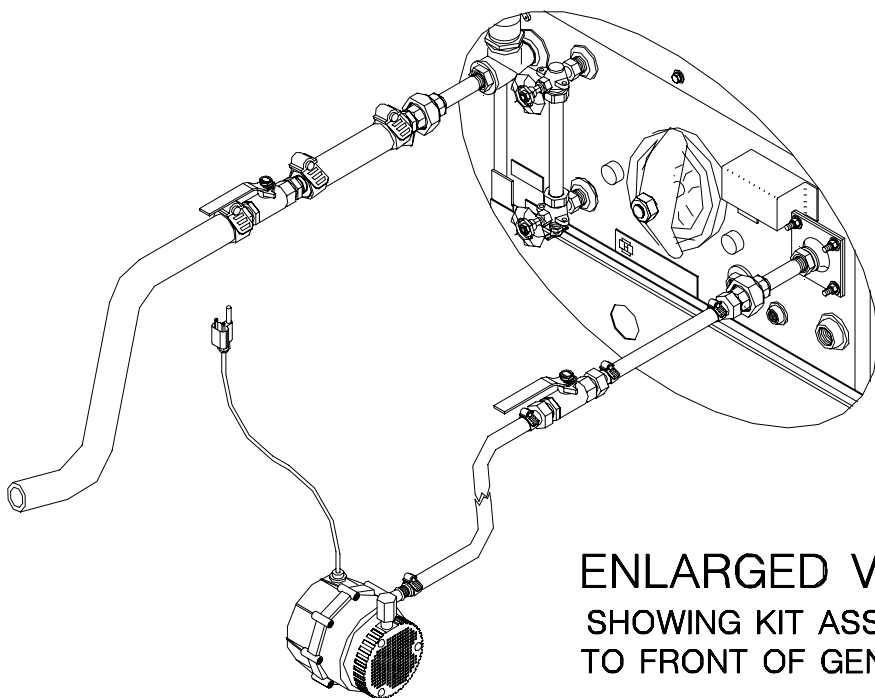
- 1) The manual blowdown drain valve must be closed.  
(if so equipped), the manual 3/4 inch ball valve is located at the lower right front of the boiler face.
- 2) The valve handle should be perpendicular to the valve.
- 3) Fill the 5-gallon bucket with 2 gallons of descaler & 3 gallons of water.
- 4) Turn the unit on.
- 5) Turn on the pump for the descaler & open the inlet valve (Item 8) to the boiler. Let the boiler fill with descaler to just above the top of the sight glass. Before opening the exit valve, make sure the exit line is in the bucket with the pump.  
Note: The amber light reset switch on the console will turn on.  
**DO NOT PRESS THIS SWITCH**
- 6) It is recommended that the descaler level in the boiler be at the top of the boiler. This can be accomplished by controlling the flow with the ball valves.
- 7) Let the pump operate for 1 hour. Once the dissolve becomes neutral, the PH indicator will turn purple. The dissolve becomes ineffective.  
Note: Liquid level in the descaler bucket should not drop below the pump. Add water if necessary.
- 8) After 1 hour, turn off the pump & close the inlet ball valve. Open the manual drain and then turn the main switch to off & let drain.
- 9) Flush the boiler with water once all of the descaler has been drained.
- 10) Close the manual blowdown drain valve (if so equipped).
- 11) Turn the unit on to fill with water.
  - a) Fill the 5-gallon bucket with water,
  - b) 2 cups of baking soda may be added to the waterWhen the water level reaches the middle of the sight glass, open the inlet valve & turn on the pump. Make sure that the outlet valve from the handhole plate is closed.
- 12) Let the water level rise above the top of the sight glass. After 10 minutes, open the manual drain valve (if so equipped) & turn the unit off.  
Note: If the unit does not have a manual drain valve, then turn the main switch to off.
- 13) Continue flushing with water for 3 minutes. Once flushing is complete, the unit is descaled. Remove the descaling handhole plate and replace with the original where necessary.
- 14) Remove the pump assembly and install plugs where necessary.

# GAS BOILER/ELECTRIC BOILER ORIGINAL VERSION (GAS SHOWN)

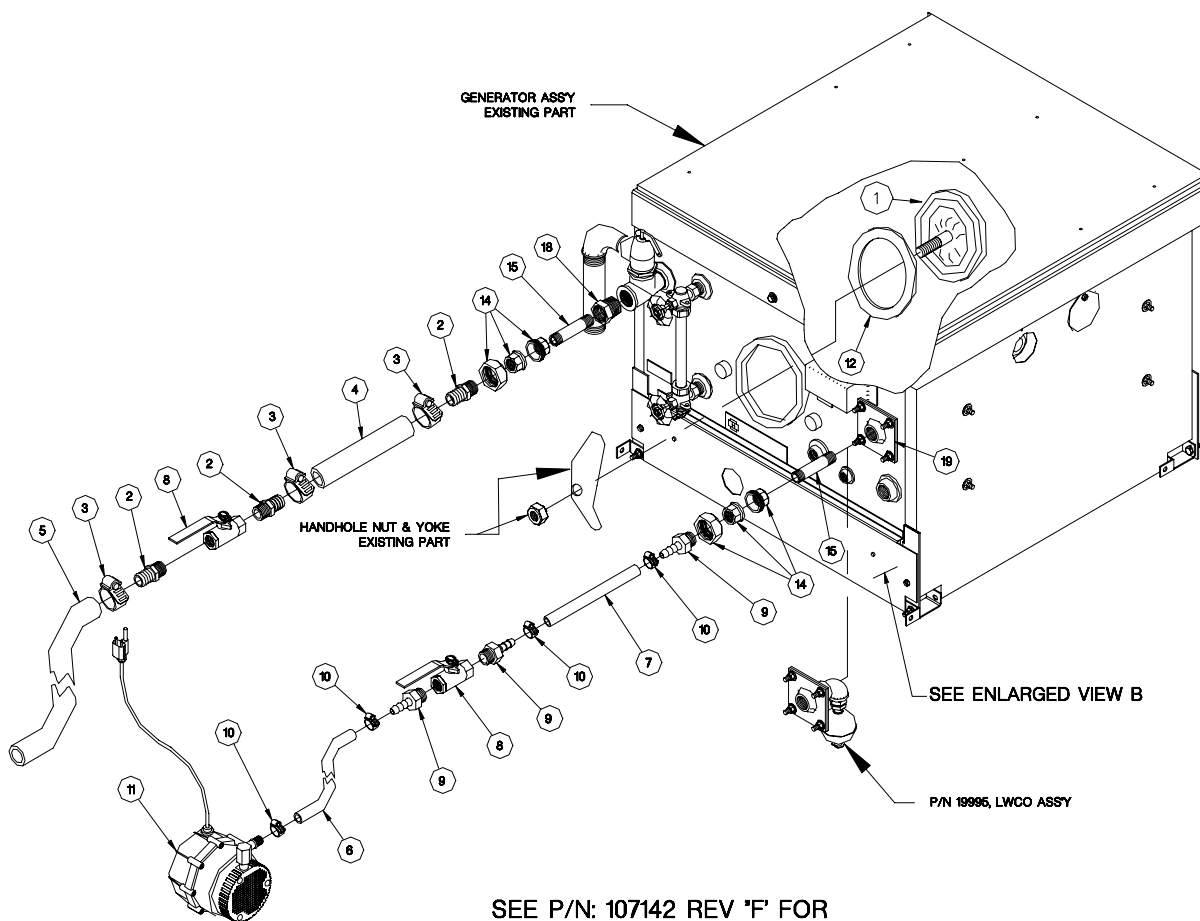
ENLARGED VIEW A  
SHOWING KIT ASSEMBLED  
TO FRONT OF GENERATOR



# GAS BOILER/ELECTRIC BOILER FIELD REPLACEMENT VERSION (GAS SHOWN)

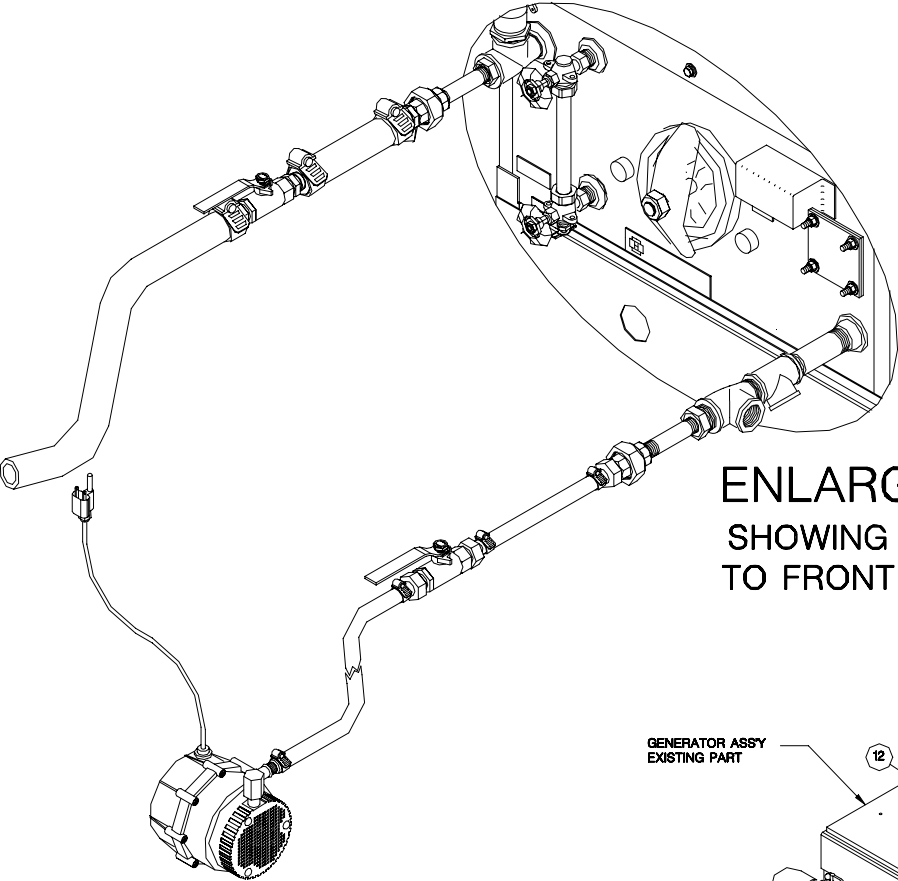


ENLARGED VIEW C  
SHOWING KIT ASSEMBLED  
TO FRONT OF GENERATOR

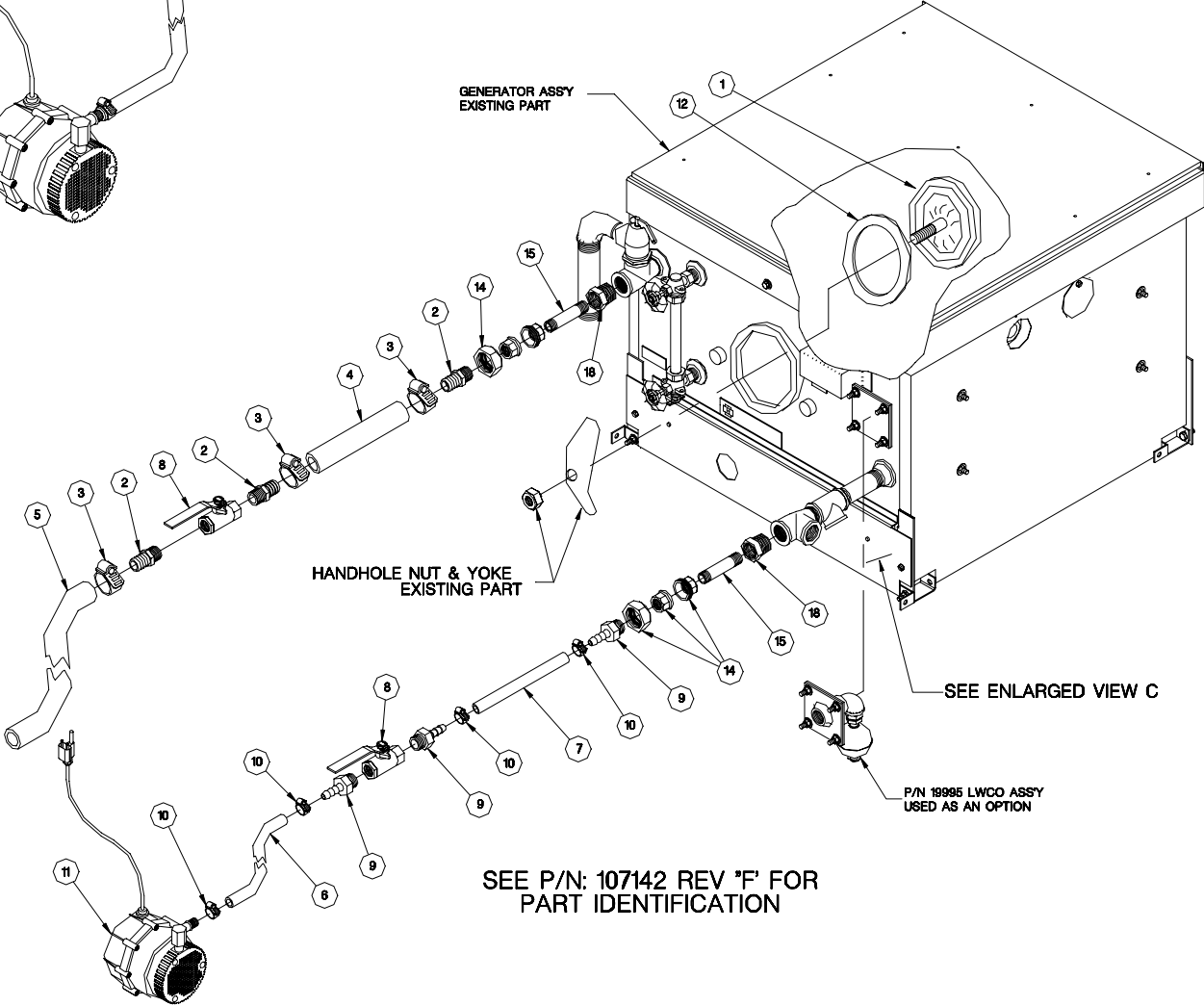


SEE P/N: 107142 REV 'F' FOR  
PART IDENTIFICATION

# GAS BOILER/ELECTRIC BOILER CURRENT PRODUCTION RELEASE (GAS SHOWN)



**ENLARGED VIEW C  
SHOWING KIT ASSEMBLED  
TO FRONT OF GENERATOR**



# 200/300KBTU DESCALING KIT PART LIST

(P/N: 107142)

ITEM	PART #	DESCRIPTION	QTY
1	437481	Plate Ass'y, Handhole w/Descaler Port	1
2	06241	Fitting, Hose Barb, 3/4 H x 1/2 MPT	3
3	03204	Clamp, Hose, Worm Drive	3
4	1088190600	3/4 Hose For Descaling Syst, 6.000" Lg	1
5	1088193600	3/4 Hose For Descaling Syst, 36.000" Lg	1
6	1088203600	1/2 Hose For Descaling Syst, 36.000" Lg	1
7	1088200600	1/2 Hose For Descaling Syst, 6.000" Lg	1
8	22212	Valve, Ball, 1/2 Female	2
9	06237	Fitting, Hose, Barb, 1/2H X 1/2 MPT	3
10	106219	Clamp, Hose Worm Drive	4
11	107131	Pump, Submersible, Boiler Descaler Kit	1
12	07106	Gasket, Handhole	1
13	107199	Bucket W/Lid, 5 Gallon	1
14	23103	Union, 0.500, Brass	2
15	14331	Nipple, 0.500 NPT x 2.500 Lg, Sch 40	2
16	108815	Label, Descaling System	1
17	108845	Envelope, Vinyl, 10" x 13", Short Side Opening	1
18	02566	Bushing, Reducing, 3/4 x 1/2	2
19	41943	Plate Ass'y, Mounting, Weldment	1
20	260 ALK	Instructions, Descaling Installation	1
21	260 ALP	Instructions, Piping Conversion	1



DESCALE PROCEDURE FOR  
TWO & THREE PROBE GENERATOR BASE STEAMERS

STEP BY STEP PROCEDURE

**IMPORTANT WARNING: BEFORE REMOVING THE HAND HOLE PLATE TO DESCALE ANY STEAM GENERATOR, MAKE SURE THERE IS NO WATER OR PRESSURE BUILT UP IN THE GENERATOR. CHECK THE OUTER SURFACE OF THE GENERATOR TO MAKE SURE IT IS COLD. TURN THE YELLOW HANDLE ON THE MANUAL FILL VALVE 90 DEGREES TO THE BODY TO PREVENT ANY WATER FROM ENTERING THE UNIT. THIS LIQUID DESCALER IS DESIGNED TO BE USED WITH NO HEAT APPLIED TO THE GENERATOR.**

STEP #1

Before opening the hand hole plate in the generator make sure the red power switch is in the off position. Open the electric circuit box in front of the generator and look for two black square solid state timers mounted on the side. If there are two solid state timers in the box, this unit has a TDS blowdown. The timer mounted on top is a one-second timer. Remove the white wire from the terminal marked number 3 on the TDS timer to prevent the purge from coming on.

To open the hand hole plate, loosen and remove the nut and bar across the generator opening. Place the end of a two x four on the hand hole plate. Rap the end of the wood with a hammer in various places until the plate and gasket fall inside the generator.

Remove any scale build-up that can be taken out by hand or with a small vacuum cleaner. **IF THE GENERATOR HAS PREVIOUSLY BEEN REPLACED WITH A NICKEL PLATED ONE, DO NOT SCRAPE OR SCRATCH THE SURFACE.** Assess the scale build-up above the water level on the tubes and the top to determine the number of descalings that will be needed.

Use 2 gallons of liquid cleaner regardless of the size of the boiler. If there is a heavy build-up of scale (1/4" or more) on the upper tubes (above the water level) and across the top of the generator, it will have to be descaled twice.

After removing the scale and determining the number of descalings needed, replace the hand hole plate with the old gasket still on the plate.

STEP #2

Remove the safety relief valve from the front of the generator. This will be the port of entry for the liquid

descaling agent. **REMEMBER TO MOVE THE YELLOW HANDLE ON THE WATER FILL VALVE TO ALIGN WITH THE VALVE BODY.** Before applying the descaler, turn on the power switch to close the drain valve. This will also energize the fill valve.

### STEP #3

Using a funnel and tubing, pour the liquid descaler into the generator through the port the safety relief valve was removed from.

### STEP #4

After the descaling agent has been introduced into the generator, replace the safety relief valve.

1. Place the upper compartment timer switch in the manual position. As the generator is filling with water, this will allow any air in the top to escape.
2. To completely fill the generator with water, bypass the water level probe:
  - a. Remove the black wire at the terminal marked HI on the water level control board that connects to the water level probe.
  - b. When the water begins to enter the upper cooking compartment, CAREFULLY replace the black wire on the water level control. This will turn the water off.

### STEP #5

**DO NOT PRESS THE AMBER STEAM SWITCH. THIS CHEMICAL WORKS BEST WHEN COLD.**

### STEP #6

Wait 1-2 hours to allow for descaling of the generator. Drain the generator by turning off the red POWER switch. The drain and fresh water solenoid valves will open for three minutes allowing the generator to flush out. After draining, fill the generator with fresh water and repeat the flush process by turning off the power switch.

### STEP #7

After the generator has been rinsed out, remove the hand hole plate and gasket as explained in STEP #1. Observe the edges and surfaces of the hand hole and the plate for excessive wear-and corrosion. Replace the used hand hole plate gasket with a new one and install new anodes.

For the anodes to work properly, the hanger must be firmly connected to the support rod. Make sure no scale or debris is between the support and the hanger. It must be a metal to metal connection.

Do not use a gasket sealing material on the hand hole plate gasket. When tightening the nut on the bar, make sure that at least 1/16" of gasket material is showing all of the way around the inside of the hand hole plate.

Reinstall the wire removed from the purge timer in the electric box.

### STEP #8

Bring the steamer up to pressure by pressing the red power switch to fill the generator and then the amber switch when the light comes on. After twenty (20) minutes the generator should have steam in it. Check for steam leaks around the hand hole. If any leaks are found repeat the process for replacing the gasket.

