ELECTRA STEAM, INC.
4407 Martinsburg Pike
Clear Brook, VA 22624
USA
Phone: 540-662-3811
Fax: 540-665-8101
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MODEL:

SERIAL#:

RHP- RHPH- and RHPHC-120-300 Steam Boiler Models

Instructions Manual

TABLE OF CONTENTS

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RHP120 - RHP300 STEAM BOILERS

Applications

- Process Steam
- Industrial Autoclaves
- Air Humidification
- Dry Cleaning
- Food Service
- Laboratories
- Automotive Industry

Features

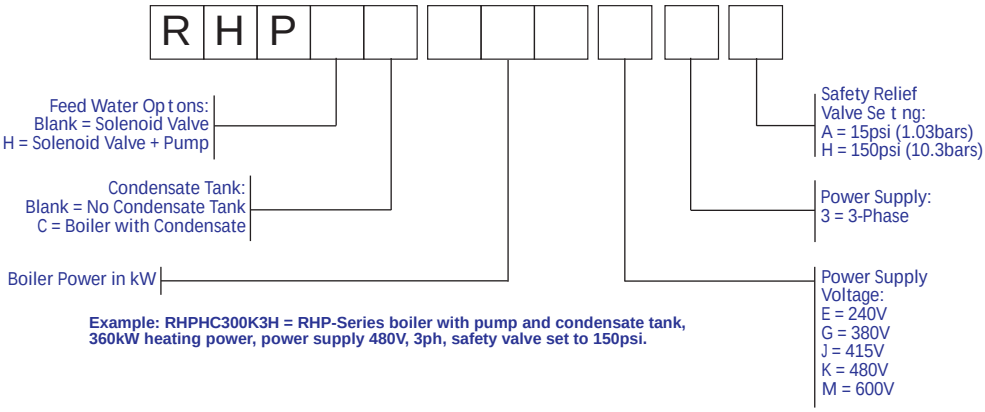
- Maximum safety valve setting 150psi
- All boilers are manufactured in accordance with the requirements of the A.S.M.E. Boiler and Pressure Vessel Code and A.S.M.E. CSD-1. Each boiler bears the National Board Stamp "S".
- High quality saturated steam, operating pressure range 0 – 135psig
- Heavy duty carbon steel pressure vessel. Vessel jacket and electrical enclosure made from painted carbon steel
- Large selection of optional equipment

Standard Equipment of Each Boiler Includes:

- A.S.M.E. pressure relief valve
- Two (2) boiler bottom blowoff valves (one quick-opening and one slow opening) as per A.S.M.E. Code B31.1
- High pressure feed pump in RHPH- and RHPHC-models
- One (1) primary high pressure cutout control with automatic reset and one (1) secondary high pressure cutout control with manual reset
- One (1) primary low water cutout control with automatic reset and one (1) secondary low water cutout with manual reset
- PID-step controller with number of heating stages depending on boiler model
- Digital readout of the operating pressure
- Magnetic contactors
- Internal branch circuit fusing
- Main supply power distribution block
- Indicator lights for POWER, REFILLING, HEATING, ALARMS and Automatic Boiler Blowoff Status
- Pressure and water level gauge

HEATING POWER	STEAM CAPACITY	BHP	VOLTAGE[1]	PHASE	NUMBER OF HEATING STAGES	SHIP WT. [2]	PRESSURE VESSEL CAPACITY	OP. PRESS. RANGE	Steam Outlet Size (NPT) Steam Pressure	
kW	lbs/hr (kg/hr)[3]					lbs (kg)	GAL. (L)	psig (bar)	LP <15psig	HP >15psig
120 KW	409.0 (185.3)	12	240/380/415/480/600	3	4	1,300 (589)	78.5 (297)	0-135 (0 – 9.3)	2"	1-1/4"
150 KW	512.0 (232.0)	15	240/380/415/480/600	3	5	1,400 (634)	78.5 (297)	0-135 (0 – 9.3)	2"	1-1/4"
180 KW	614.0 (278.0)	18	240/380/415/480/600	3	6	1,500 (680)	78.5 (297)	0-135 (0 – 9.3)	3"	1-1/2"
200 KW	683.0 (309.0)	20	240/380/415/480/600	3	6	1,600 (725)	78.5 (297)	0-135(0 – 9.3)	3"	1-1/2"
210 KW	717.0 (324.8)	21	240/380/415/480/600	3	6	1,600 (725)	78.5 (297)	0-135(0 – 9.3)	3"	1-1/2"
240 KW	819.0 (370.6)	24	380/415/480/600	3	6	1,650 (748)	78.5 (297)	0-135(0 – 9.3)	3"	2"
300 KW	1,024.0 (464.0)	30	380/415/480/600	3	6	1,700 (770)	78.5 (297)	0-135 (0 – 9.3)	3"	2"

Model Number Key



Example: RHPHC300K3H = RHP-Series boiler with pump and condensate tank, 360kW heating power, power supply 480V, 3ph, safety valve set to 150psi.

[1] Each boiler model requires two (2) power supplies: Primary heating power and secondary control voltage. Nominal control voltage is 120V, 50/60Hz. Boiler models rated for 380V and 415V are equipped with control voltage transformers that require 220/240V applied to their primary side in order to provide the 120V AC control voltage to the boiler. As an option, all boiler models can be equipped with control voltage transformers so that only the heating power supply needs to be connected to the boiler.

[2] On boiler equipped with condensate tank, add 180lbs (82kg)

[3] The STEAM CAPACITY listed above is based on the evaporation rate from and at 212°F, at 0psig. If the boiler feed water temperature is 50°F, then the STEAM CAPACITY for each model listed above is approximately 15% lower.

Please note that all information provided within this brochure is approximate and subject to change without notice.
Please contact Reimers Electra Steam, Inc. with any questions regarding the specifications or dimensions detailed within.

LIMITED WARRANTY – STEAM GENERATORS

Reimers Electra Steam, Inc. warrants the following products of its own manufacture against defects in materials and workmanship under normal use and service. This warranty is in lieu and excludes all other expressed or implied warranties or merchantability of fitness for any particular use. No person is authorized to extend the terms of this warranty or assume any other liability except by written statement signed by an officer of Reimers Electra Steam, Inc. Clear Brook, Virginia 22624.

WARRANTY PERIOD

The pressure vessel and electrical & mechanical components are warranted for one year from date of shipment from Reimers Electra Steam, Inc. in Clear Brook, VA 22624.

LIMITATIONS

Products must be installed, used and maintained in accordance with our instructions, including reasonable & necessary maintenance by the user. Users are responsible for the suitability of the products to their application. There is no warranty for damage resulting from improper installation, abuse, power failure, fire, flood, lightening, improper water, misuse, improper specification, misapplication or other operating conditions beyond our control or parts that are normally expendable in usual course of operation.

Claims against carriers for damage in transit must be filed by the buyer. Reimers liability, if any, will not exceed the price of Reimers products claimed to be defective.

Components manufactured by any supplier other than Reimers shall bear only that warranty made by the manufacturer of that product and service for that warranty shall be the responsibility of that manufacturer and not Reimers.

REMEDY

Claims under this Limited Warranty must be made by obtaining a Return Authorization Number from our office (PHONE: 540-662-3811, FAX: 540-665-8101) & returning the defective part, freight prepaid to: Reimers Electra Steam, Inc., 4407 Martinsburg Pike, Clear Brook, Virginia 22624

Defective items will be repaired or replaced as necessary within a reasonable time without charge, other than incidental charges such as freight prepayment. Such repair or replacement within a reasonable time is the exclusive remedy available from Reimers Electra Steam, Inc., under this Limited Warranty.

CONSEQUENTIAL DAMAGES

Reimers Electra Steam, Inc., is not liable for labor costs incurred in the removal, reinstallation, or unauthorized repair of product, or for damages of any type whatsoever, including incidental and/or consequential damages.

THIS WARRANTY SUPERSEDES ALL PREVIOUS WARRANTIES.

Read this manual before installing and using this product. Failure to do so can result in serious injury or death.

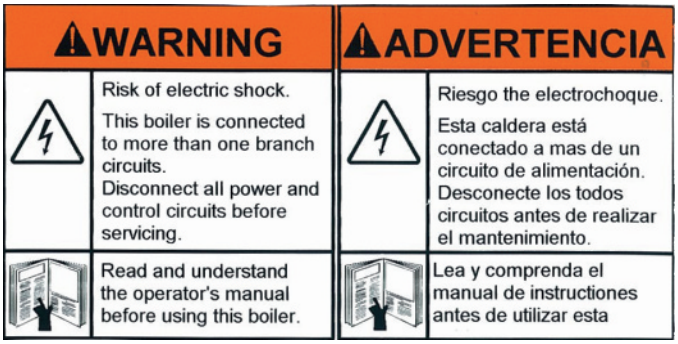
You have just purchased a quality steam boiler designed to the ASME Boiler Code and registered with the National Board of Boiler Inspectors. Treat this industrial equipment with care and respect. It is safe when installed, maintained, and used properly. Read the instruction carefully and contact the factory if you have any questions.

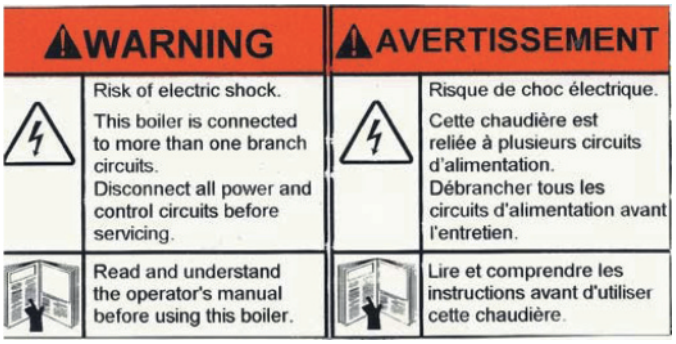
WARNING Read this manual before installing and using this product.
Failure to do so can result in serious injury or death.

Your boiler should be marked with a complete set of WARNING/CAUTION labels shown below. If one of these labels is missing, please contact our factory immediately.

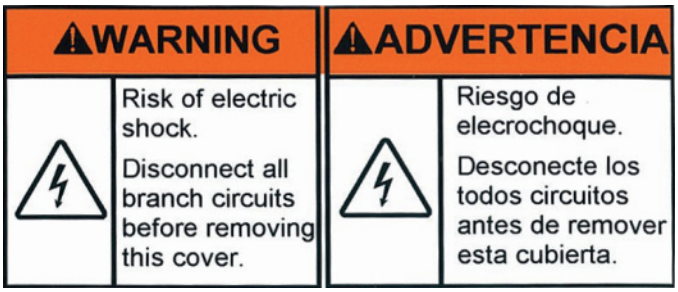
US and All Other Non-Francophone Countries — Canada and All Other Francophone Countries

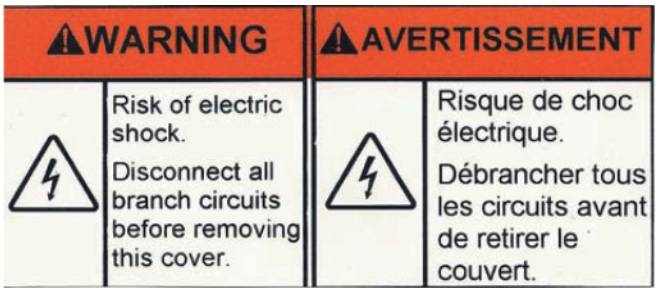
Located on electrical enclosure door





Located on end caps of cylindrical boiler pressure vessel jacket





Located on end caps of cylindrical boiler pressure vessel jacket

This manual contains safety messages. Each of the safety messages are preceded by one of the following signal word panels:

DANGER Safety messages preceded by this label contain information, that if not followed will result in death or serious injury.

WARNING Safety messages preceded by this label contain information, that if not followed could result in death or serious injury.

CAUTION Safety messages preceded by this label contain information, that if not followed could result in minor or moderate injury.

NOTICE Messages preceded by this label contain important information, but are not hazard-related.

Ensure that this manual is available to the boiler operator at any time.

Read carefully all safety labels attached to the boiler. If any safety label was damaged during shipment, contact the factory immediately:
Ph. 540-662-3811; e-mail: sales@reimersinc.com

Important Safety Information

⚠WARNING

1. BLOWDOWN VALVE: This valve is utilized to blow impurities from the boiler chamber. When opened, a large volume of hot water and steam is discharged. Ensure that this valve is properly piped for such discharge. State and local codes must be met as applicable.

2. ELECTRICAL: All field wiring to the boiler must be in accordance with the National Electric Code and any local codes that may apply. Wiring must be made by a competent certified electrician. Use copper wire only.
Ensure that all electrical components are in a dry location, free from any possibility of water soaking. Electric foot switches when supplied must not be placed on a wet floor. They must be placed on dry surface, not subject to steam or water.

3. GAUGE GLASS: The gauge glass protector guards must be on at all times. When replacing the glass, be sure that the unit is not under pressure and is cool to touch. The gauge glass should be replaced once per year. If cracks or wear is evident, replace the gauge glass immediately.

4. MODIFICATION/MISUSE: This boiler has been designed and constructed in accordance with the ASME Boiler and Pressure Vessel Code. Any modification or misuse can result in a dangerous situation. Reimers Electra Steam, Inc. is not liable for any product that has been modified or improperly used.

5. PRESSURE GAUGE: The pressure gauge indicates the internal pressure of the boiler. It can fail. Periodically have your boiler inspector compare the gauge with a known gauge utilizing the test valve arrangement provided

6. REGISTRATION: Most states and cities require boiler registration and inspection. Check with your government authorities.

7. INSTALLATION AND REPAIR:
Installation and repair work of this unit must be performed only by experienced personnel. Before commencing a repair, ensure that the boiler is cold, not pressurized and electrically disconnected. All standard electrical and steam safety precautions must be taken during testing.

8. SAFETY VALVE: The safety valve is designed to discharge hot steam when the set pressure is exceeded. Ensure that the discharge port is pointing toward the back of the unit away from the operator or any aisles. Test the safety valve periodically to ensure that it is operating properly. Test carefully at full pressure by lifting lever using pliers and let it “slap” shut. Steam discharge can scald. Ensure no one is exposed.

9. STEAM INSTALLATION:
Steam piping must be of black pipe, not galvanized. Work must be done by an experienced steam fitter. All state and local codes must be met as applicable.

10. WATER: Ensure that all electrical components are in a dry location, free from any possibility of water soaking.

1. Installation

REIMERS ELECTRA STEAM, INC. boilers are heated by one or more immersion type heating elements. Automatic controls are provided to maintain pre-set operating pressure and proper water supply. Safety features include automatic low water cutoff, automatic pressure control, safety valve and visible water level gauge. Each boiler is manufactured in accordance with the ASME Power Boiler Code Standards and is individually inspected and stamped by an authorized National Board Insurance Inspector. All boilers are registered with the National Board of Boiler and Pressure Vessel Inspectors. When boiler is received, make sure it has not been damaged in shipment.

NOTE:
ASME DATA PLATE IS LOCATED ON BOILER SADDLE AND/OR END OF PRESSURE VESSEL BEHIND LABEL STAMPED WITH NATIONAL BOARD NUMBER OF UNIT.

1.1 Location

Place the boiler in a level position, close to the equipment which it is to supply. This will insure minimum heat losses and allow more economical piping arrangements. All steam lines should be insulated.

Regardless of the NFPA-70 working space requirements shown below, provide a minimum of 3ft clearance on both sides of the boiler for element servicing, 3ft of clearance to the front of the boiler and 1.5ft to the rear of the boiler.

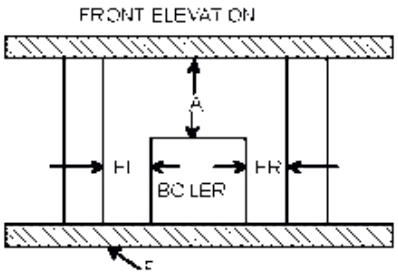
a.) Working space:
Electric boiler spacing is dictated by NFPA-70, Table 110.26 as follows:

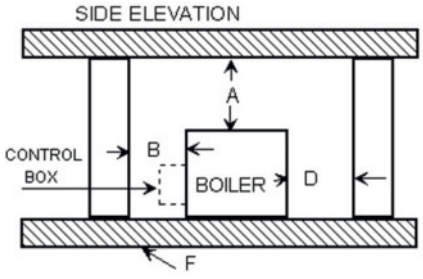
Nominal Voltage To Ground (Volts)	Minimum Clear Distance		
	Condition 1	Condition 2	Condition 3
0 – 150	3ft (914mm)	3ft (914mm)	3ft (914mm)
151 – 600	3ft (914mm)	3.5ft (1.07m)	4ft (1.22m)

Note: Where the conditions are as follows:
Condition 1 — Exposed live parts on one side of the working space and no live or grounded parts on the other side of the working space, or exposed live parts on both sides of the working space that are effectively guarded by insulating materials.
Condition 2 — Exposed live parts on one side of the working space and grounded parts on the other side of the working space. Concrete, brick, or tile walls shall be considered as grounded.
Condition 3 — Exposed live parts on both sides of the working space.
(a) *Dead-Front Assemblies*. Working space shall not be required in the back or sides of assemblies, such as dead-front switchboards or motor control centers, where all connections and all renewable or adjustable parts, such as fuses or switches, are accessible from
locations other than the back or sides. Where rear access is required to work on non-electrical parts on the back of enclosed equipment, a minimum horizontal working space of 762 mm (30 in.) shall be provided.
b.) Alcove or closet installation per UL834: Proper location of this boiler model with regard to combustible and noncombustible surfaces and materials is coded on the boiler name plate. The following decoding sketch and description is provided for the user information:

RHP-, RHPH- and RHPHC- Models	Dimension In.						
	A	B	D	E_L	E_R	F	G
	24	A6	6	6	6	C	-

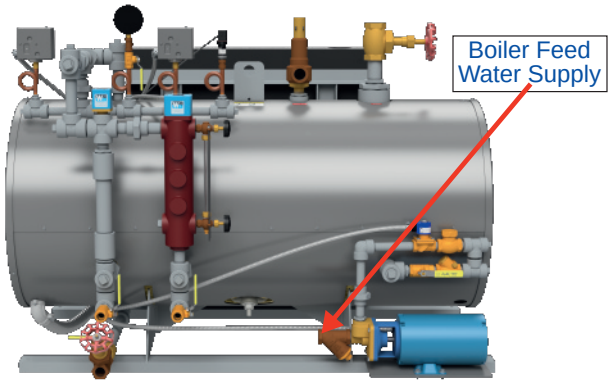
Description of dimensions and symbols
A – Clearance above top of boiler
B – Clearance from front of boiler
Prefix C to numeral indicates suitability for closet or alcove installation
Prefix A indicates suitability for alcove but not for closet installation
D – Clearance from back of boiler
EL – Clearance from left side of boiler
ER – Clearance from right side of boiler
F – Indicates type of flooring: "**NC**" for noncombustible floor / "**C**" for combustible floor. Numeral indicates minimum clearance below suspended units to combustible floor





1.2 Water Supply

On models with pump and/or solenoid valve, connect incoming water supply to strainer on intake side of solenoid valve.



On models furnished with condensate return tank, connect water line to makeup valve located at tank end. (See Instruction Supplement 1 in this manual) R, RH and RHC steam boiler models require four (4) gallons of feed water per hour for each 10 kW of electric heating capacity of the boiler. Lines should be of adequate size and meet local plumbing codes.

In order to ensure long term trouble-free boiler operation, we recommend that the water used as boiler feed water to be tested for hardness. If the water in your area is harder than 1grain (17mg/L), use a water softener. The main cause for premature heating element failure in electric steam boilers is water hardness. If severe corrosion during inspection of the pressure vessel as indicated in chapter 3.4 of this manual becomes evident, additional tests of your boiler feed water must be performed. A water analysis should be performed by a qualified and recognized water treatment company located in your area.

Recommended levels for boiler feed water:

WATER PROPERTY	MAX. LIMIT
Total hardness	17 mg/L
Dissolved Oxygen	0.04 mg/L
Total Iron	0.1 mg/L
Total Copper	0.05 mg/L
pH	> 8.5
Specific Resistivity	25kΩ * cm

Recommended levels for boiler water (water inside pressure vessel when boiler is operating)

PROPERTIES	MAX. LIMIT
Total Alkalinity	350 mg/L
Total Dissolved Solids	3500 mg/L
Total Suspended Solids	300 mg/L
pH	10.5 - 12

NOTICE **Do not add any chemicals to the boiler feed water unless specifically recommended by a qualified and recognized water treatment company.**

1.3 Steam Outlet

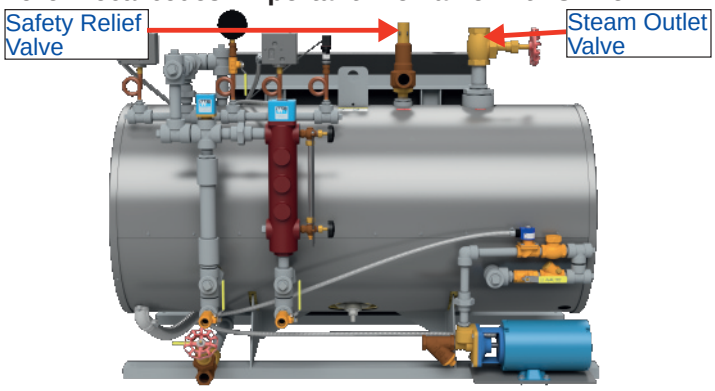
All piping from and to the boiler must comply with the A.S.M.E. B31.1 Power Piping Code. All State and local codes must be met. All piping must be done by a qualified steam fitter.
Connect steam line of sufficient size from steam line valve to the equipment. Steam piping must be black steel pipe, not galvanized. Work must be done by an experienced steamfitter. All state and local codes must be met.

1.4 Condensate Return

If the condensate is to be returned by gravity (no tank) in a closed system, the load discharge should be at least 2 feet above the boiler level so that the weight of the condensate will actuate the check valve. When applicable, install steam return lines at sufficient height to allow a pitch of 2 inches for every 10 feet of pipe length.
Note: For condensate return systems (with tank), see special sheet.

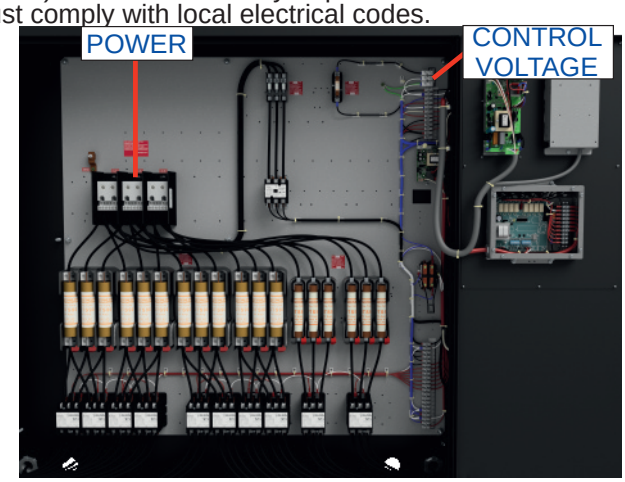
1.5 Safety Relief Valve

The safety valve is designed to discharge hot steam when the set pressure is exceeded. Ensure that the discharge port is pointing toward the back of the unit away from the operator and any aisles. If it is required that discharge piping be installed from the safety valve, the pipe should not be smaller than the valve outlet and should be rigidly supported so as not to place weight on the valve itself. Follow local codes. **Important: No valve in this line!**



1.6 Electrical

Install a fused disconnect switch near the boiler. It should be fused as marked on the boiler name plate. Connect the power supply from the disconnect switch to the terminals in the boiler control panel. A copy of the wiring diagram is in the control panel.
Important: Electrical connections to the boiler control panel (below) should be made by a qualified Electrician. All wiring must comply with local electrical codes.



Boiler models that are equipped with a transformer option (OPT1010 or OPT1011) do not require a separate external control voltage power supply.

1.7 Blowdown Valve

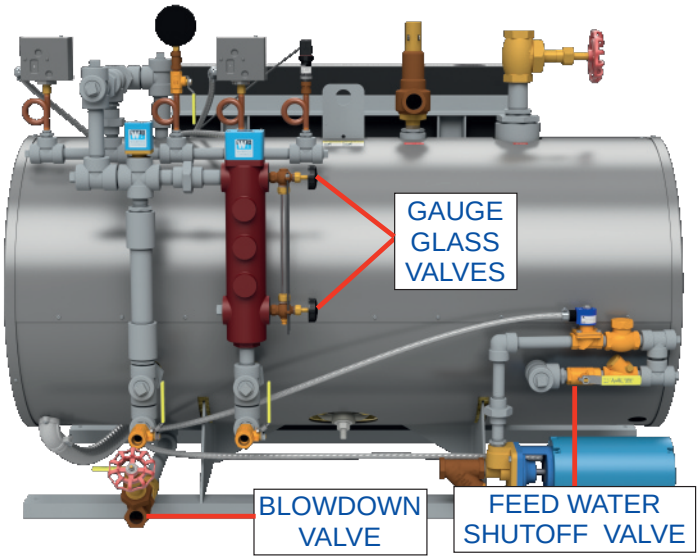
⚠ CAUTION

When the blowdown valve is utilized, a large volume of hot water and steam is discharged. Ensure that this valve is properly piped for this discharge. State and local codes must be met as applicable.

2. Operation

2.1 Boiler Startup

a. Open steam line valve slightly. This will allow the boiler to be filled without producing back pressure.

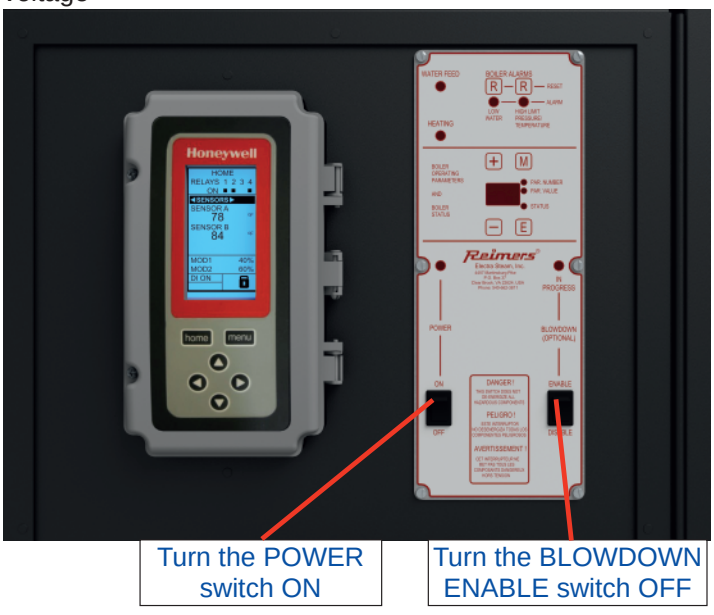


b. Open upper and lower gauge glass fixture valve

c. Ensure that the feed water shutoff valve is in the OPEN-position

d. Close the boiler blowdown valve

e. Throw the fused disconnect switch (not provided by factory) to the ON-position and turn on the boiler control voltage



f. After approximately 2 seconds, the WATER FEED light turns on and water enters the boiler. As soon as the water level reaches approximately half height in the gauge glass, the automatic water feed turns off.

NOTICE **Do not let the pump to run dry for an extended time as this will cause damage to the pump.**

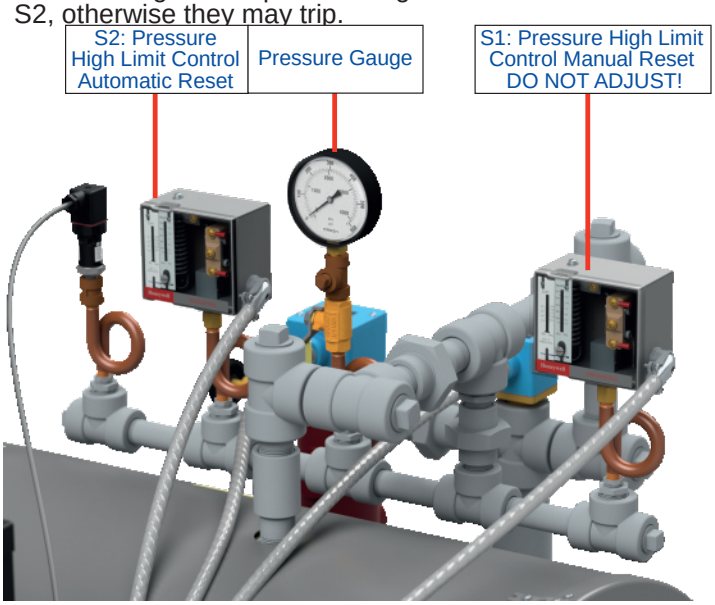
g. If the boiler controller indicates any alarms, then press the corresponding RESET button(s).

As soon as no boiler alarms are indicated, the HEATING light turns on and the boiler starts to build up pressure. Observe the pressure gauge while pressure builds up, until working pressure is reached. The working pressure should have been factory set to your specification. However, if you wish to change the working pressure setting, proceed as follows.

⚠ WARNING **Stand clear of scalding water or steam. Disconnect the boiler from all power supplies.**

All pressure controls are factory preset and require no adjustment. However, if a change of the operating steam pressure is required, then proceed as follows:

- Press the <MENU> key on the PID-Controller for about one second
- Select PROGRAM
- Select MOD1
- With the UP and DOWN keys, set new boiler working pressure. Do not set the boiler working pressure too close to the settings of the pressure high limit controls S1 and S2, otherwise they may trip.



h.) To shut off the boiler, turn the POWER switch on the boiler controller OFF.

The control provides four basic functions and two optional functions. The following overview describes the functions.

Low water cutoff
High pressure cutoff
Automatic boiler refill
Automatic boiler blowoff (Optional)

The Honeywell controller T775P2003 was set at the factory with its parameters as shown below and to the operating steam pressure as ordered:

- Press & hold the MENU button for 5 seconds to display the Setup Menu
- # of Sensors = 1
- Sensor A
- TYPE = 4-20 MA
- UNITS = PSI
- MIN VALUE = 0
- MAX VALUE = (Set same as Transducer max pressure)
- CALIBRATE = 0.0
- LABEL = BOILER A
- OUTPUTS
  - MOD 1
    - TYPE = 0-10V
    - MIN OUT = 0
    - INTEGRAL = 0
    - DERIVATIVE = 0
    - HIDE = NO
- Skip MOD 2, #RELAYS, OPTIONS RELAY 1, RELAY 2
- EXIT
- MENU (Press Once)
- PROGRAM ►
- MOD 1 ►
- SETPOINT = ? (Set to desired operating pressure)
- THROT. RANGE = 2 PER STEP
- ACTION HEAT

Skip MOD 2, RELAY 1, RELAY 2

2.2 Control Functions

2.2.1 Low Water Cut-Off Function

The low water cutoff function of the boiler control de-energizes the heating elements when the water level in the boiler pressure vessel falls below the minimum acceptable operating level. The control senses the water level in the boiler pressure vessel through a probe type control as primary low water cut-off function with automatic reset & a secondarey low water cutoff probe, "Probe 3". When the tip of the probe is in contact with water in the boiler, the boiler operates normally. When the water level in the boiler falls below the tip of the probe the control senses that water level is low. The control will not de-energize the heating elements when the probe loses contact with the boiler water for short periods of time. But, when the probe loses contact with the probe for a set time, the control de-energizes the heating elements and turns on the “LOW WATER” boiler alarm light. Boiler operation can only be resumed after determining why water level is low, restoring normal water level in the boiler and pressing the “LOW WATER” reset button [R]. After presseing the “LOW WATER” reset button the alarm light “LOW WATER” turns off, the lockout is reset and the heating elements are energized.

2.2.2 High Pressure Cutoff Function

If the operating pressure control fails, the steam pressure in the boiler can reach the value set on the high limit pressure control. In that case, the high limit pressure control de-energizes the heating elements and locks them out. The boiler alarm light “HIGH PRESSURE” comes on. Reduce the boiler pressure to a point below the normal operating pressure and press the high pressure reset button [R]. Heating elements should turn on. If pressure rises above the set operating pressure then check the pressure transducer.

2.2.3 Automatic Boiler Refill

The probe type boiler control provides automatic boiler refill and primary low water cutoff function with automatic reset. When the water level drops below the water level probe, the boiler controller energizes the feed water pump/solenoid valve. When water comes back into contact with the water level probe the controller turns off the feed water pump/solenoid valve after a preset time delay. If the water does not reach normal level within a preset time, the controller de-energizes the feed water valve/pump and displays a flashing “0” on the LED display. Pressing the “E” key will start another feed water cycle.

The ON and OFF delay time can be adjusted. See the boiler control manual for instructions.

2.3 Boiler Monitor Definitions

The following are definitions for all boiler monitor indications.

Flashing “0”: Boiler feed pump and/or solenoid remained energized longer than the set time. Boiler feed pump and/or solenoid are de-energized. Press “E” key to re-set alarm and start a new re-filling cycle.

Flashing “1”: Following a blowdown cycle, the automatic re-fill device did not stay on for the set time. Press”E” key to re-set the alarm.

Flashing "2": Boiler is flooded. Heating and water feed are disabled. Lower water level to resumer operation.

3. Boiler Maintenance

WARNING Boiler repairs must be performed by experienced personnel only. Ensure boiler water is cold and drained and that there is no pressure and all electricity to the boiler is shut-off.

3.1 Boiler Blowoff

All boilers must be blown off periodically to remove minerals, scale and other foreign matter, which accumulate inside the pressure vessel. The concentration of this deposit depends in part upon the condition of the water in the area. When water is naturally soft, or has been softened chemically, boiler blowoffs are required less often than in areas where hard water is found. Water softeners are suggested in hard water areas to minimize the formation of hard scale on heating elements. Another factor affecting water condition is the amount of condensate, if any, that is being returned to the boiler. Since condensate is essentially clean distilled water, it contains very few impurities. If a large part of the condensate is being returned and little make-up water is used, the boiler need not be blown down as often as when little or no condensate is returned to the boiler. We recommend blowoff of newly installed steam boilers once per day until the first heating element and pressure vessel inspection is performed (refer to chapter 3.4). If no significant amount of sediment is found on the bottom of the pressure vessel and on the heating element sheaths, then the boiler blowoff frequency can be reduced accordingly. The safest method to blowoff R-series steam boilers is to install a Reimers Electra Steam, Inc. properly sized and fully trimmed blowdown tank, model BTANK-16. Reimers blowdown tanks are designed and constructed to Section VIII of the A.S.M.E. Code and inspected by a commissioned National Board Boiler inspector.

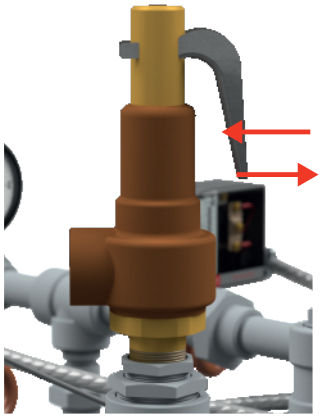
3.1.1 Boiler Blowoff Frequency

Perform a blowdown of the boiler daily and allow the boiler to refill. Never leave a boiler sit empty.

WARNING **Stand clear of scalding water or steam. Ensure that the Boiler Bottom Blowoff Valve is properly piped.**

3.3 Safety Valve Test

This test should be performed once per month. Proceed as follows:



- Increase the steam pressure as shown in chapter 2.1. to maximum operating pressure.
- Keep the steam outlet valve closed
- Pull the trip lever and hold open for five (5) seconds in order to flush off the valve seat.
- Permit the valve to “slap” shut. If a leak occurs, repeat this test and if necessary, replace the valve.

3.4 Element Replacement and Element Cleaning

WARNING **Ensure that the boiler is cold, drained and all power supplies are disconnected**

Clean the element rods every six (6) months. To clean the element rods, or if an element must be replaced, proceed as follows:

- Remove the round endcaps from the ends of the boiler.
- Disconnect and label the terminal wires
- Remove all four (4) nuts from each element flange and pull out the heating element
- Use a stiff wire brush to remove all scale and foreign matter from the element rods.
- Clean the element flange surfaces before installing new elements and gaskets

3.5 Water Level Probe and External Water Column Piping

WARNING **Ensure that the boiler is cold, drained and all power supplies are disconnected.**

In order to provide reliable automatic water level control, the water level probes are located inside external water columns, piped on the rear exterior of the boiler. The water columns have connection to the top and side of the pressure vessel so that the probes can read the water level, protected from foam and bursting steam bubbles that form on the surface of the boiler water.

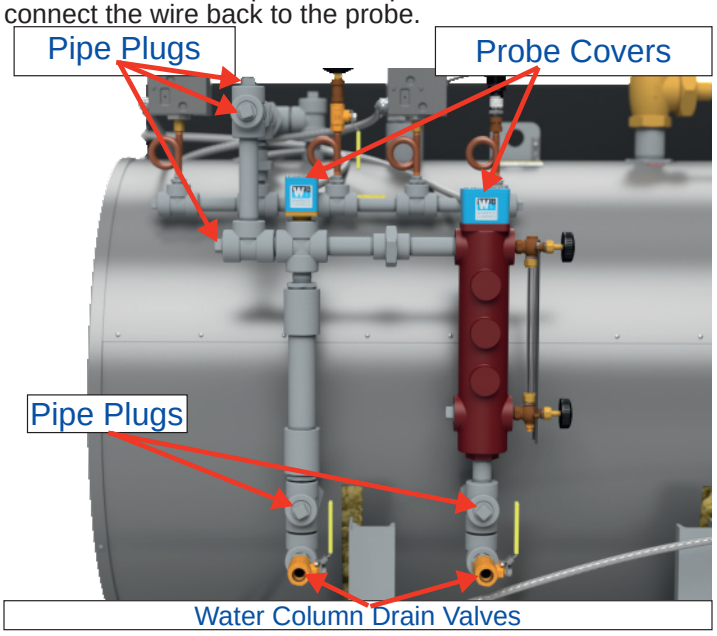
The probe columns must be cleaned every six (6) months of sediments and other debris that accumulates at the bottom of the column. To accomplish this, proceed as follows:

Step 1:
Remove the pipe plugs from the external water column piping

Step 2:
Insert a rotary cleaner, wire brush, or similar tool into the upper and lower horizontal portions of the external column piping and remove deposits.

Step 3:
After cleaning, re-install the pipe plugs. Use proper pipe thread sealing material.

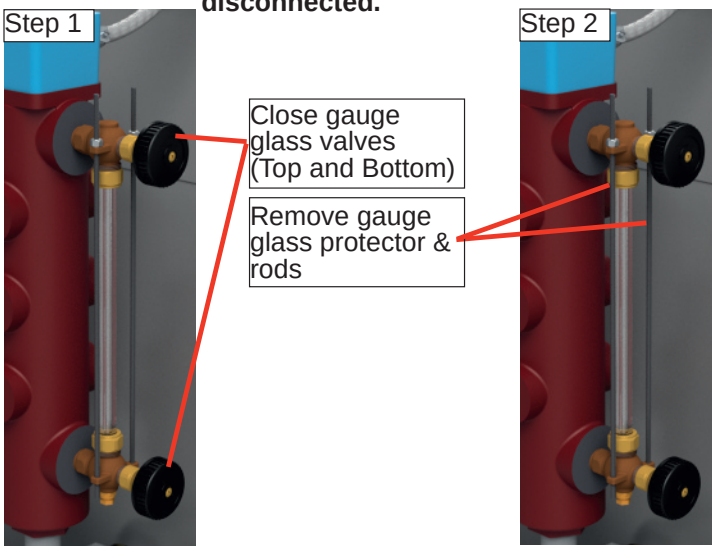
Step 4:
Remove the water level probe cover, disconnect the wire from the probe. Remove probe and inspect the probe rod. If sediment has accumulated, use a stiff wire brush to remove it. Install the probe in its place in the column and connect the wire back to the probe.



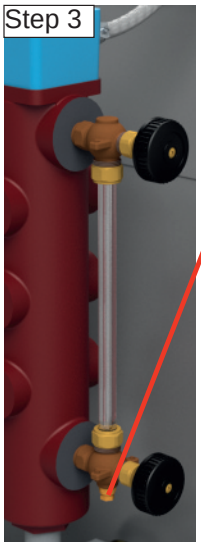
Repeat this procedure every 6 months. Pipe the external water column drain valve to a safe point of discharge. Open this valve for approximately 5 seconds every 3 days to remove sediments from the horizontal portion of the lower external water column piping.

3.6 Gauge Glass Replacement

WARNING **Ensure that the boiler is cold, drained and all power supplies are disconnected.**



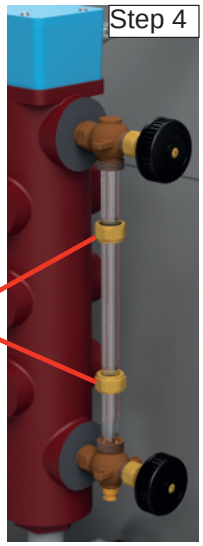
Step 3



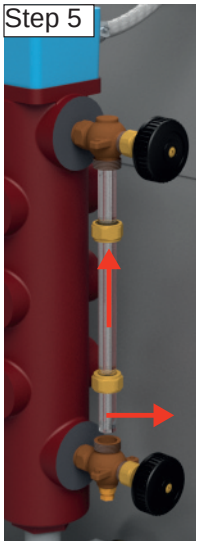
Open drain valve on bottom fixture to drain glass

Loosen nuts at top and bottom of glass

Step 4



Step 5



Slide glass up, pull out on bottom of glass and remove

Step 6

Install new glass by performing the above procedure in reverse order. Always install new rubber washers.

4. Troubleshooting

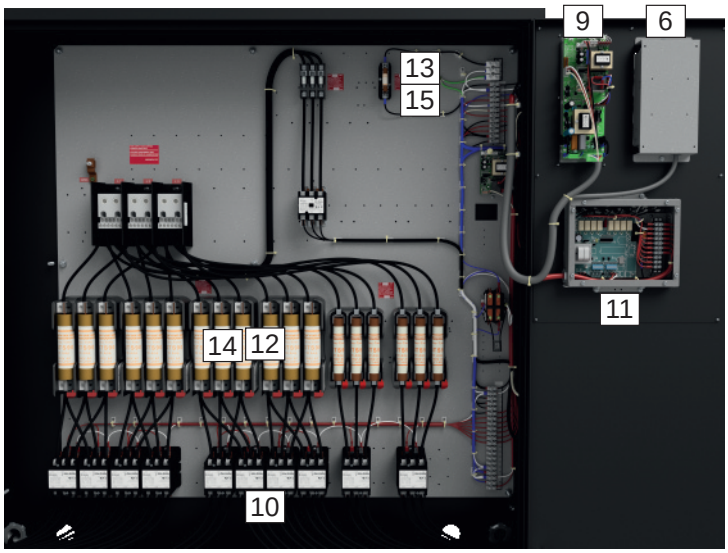
WARNING **Ensure that the boiler is cold and has no pressure.**
Electrical trouble shooting must be performed by a qualified electrician.

Boiler Status	Quick Fix
POWER switch on boiler controller turned on, but no lights lit on the front panel of the boiler controller	- Check circuit breaker or fuse of the wall outlet where the boiler control voltage circuit is hooked up to. If the circuit breaker is tripped or the fuse blown, check whether other appliances are plugged into outlets that are fed by the same circuit breaker/fuse. If that is the case, then plug those other appliances into outlets that are protected by other circuit breakers or fuses.
LOW WATER alarm light on boiler controller panel lit:	- Press the LOW WATER reset button - Check Water Level. Water level must be visible in gauge glass. - Ensure that the boiler is filled with Tap water and not distilled or de-mineralized water. - Check the probe wires for continuity - Check feed water pump and/or solenoid valve for proper operation
HIGH PRESSURE alarm light on boiler controller panel lit:	- Press the HIGH PRESSURE reset switch - If the pressure gauge indicates steam pressure above the preset value, reduce pressure and press the HIGH PRESSURE reset switch again. - Check operating pressure switch for proper operation
Unit won't build up pressure when POWER switch is on, boiler filled to nominal water level with water and HEATING light on the boiler controller is lit.	- Voltage Test: Read voltage across each element. If no voltage reading, check the voltage before and after the element contactor. If no voltage before the contactor, check fuses in fused disconnect switch. If no voltage reading after the contactor and contactor pulled in, replace contactor. If voltage reading after the contactor, go to Amperage Test. - Amperage Test: Read amperage on each element wire. If no amperage reading on one or more element wires, replace heating elements.
Pump and/or solenoid valve energized, but no water enters the boiler	- Check water inlet strainer - Check whether the water feed shutoff valve is open
Boiler overfills or floods	- Check water feed solenoid valve for sticking - Check the water level probes for continuity to circuit boards or mineral buildup - Check feed water. Boiler won't operate with distilled or de- mineralized water
Fuse blown	- Short circuit or overload has occurred. Before replacing fuse, locate the short circuit or overload. - Poor contact between fuse and fuse clips can cause fuse to blow. If surface that makes contact with the fuse clips is discolored, fuse has been making poor contact with the clips. Installing a larger fuse will not help. Replace the fuse holder.
Contactor(s) don't pull in	- Ensure that the contactor coil is receiving proper voltage - If contactor pulls in but chatters, clean magnetic core of contactor - Further problems would indicate mechanical difficulties within the contactor. - Complete contactor replacement is usually the least expensive solution
"REFILLING" light on the boiler controller is lit, but feed water pump or solenoid valve not energized	- Check for proper voltage to pump

If trouble shooting did not resolve problem, please contact our service technicians at:
Phone: 540-662-3811
Email: techsupport@reimersinc.com

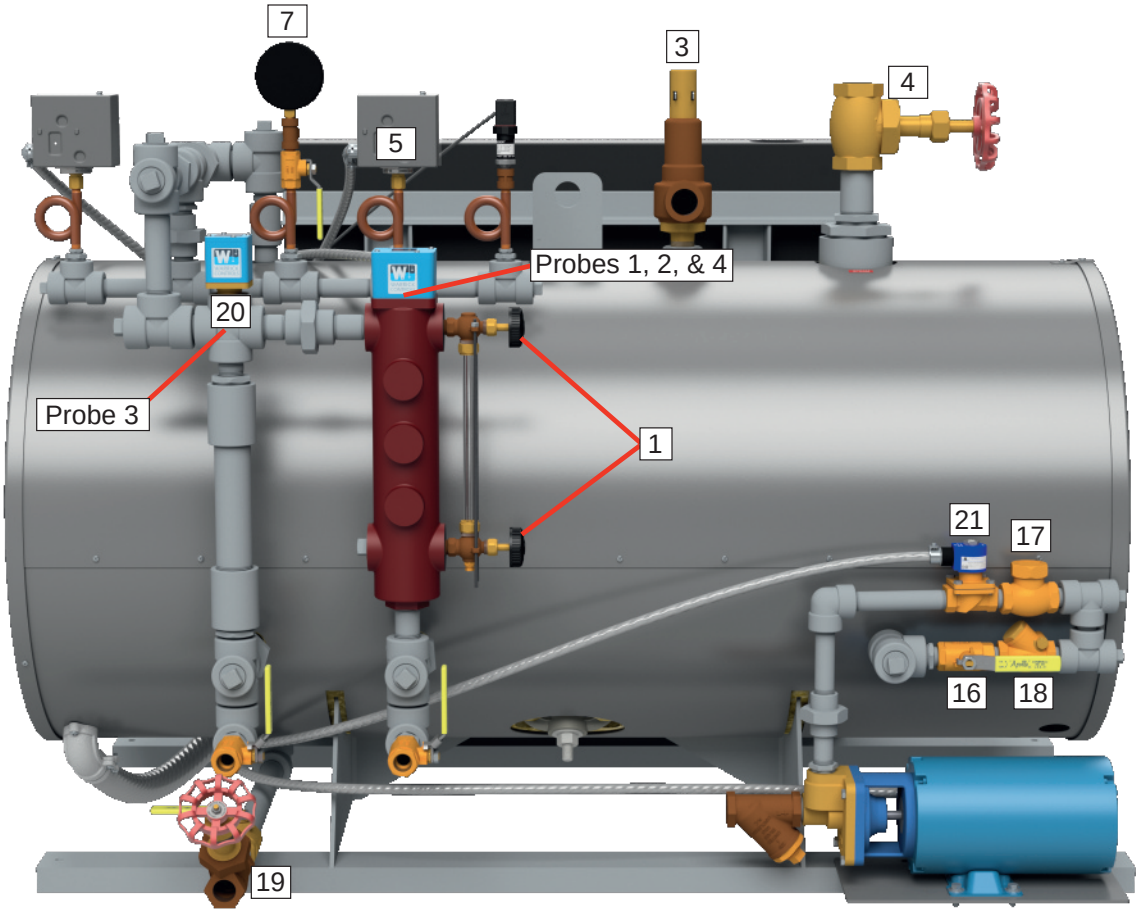
5. Parts list for RHP, RHPH and RHPHC Boiler Models (RHP-Series)

WARNING **Use Reimers replacement parts. All components are designed and approved to be used in this Underwriters Laboratories listed and ASME National Board Stamped boiler. Failure to do so may cause serious injury or death.**



Boiler Probe Lengths Measured From End to End:

Probe 01 (Refill Probe) - 21399 - 11.00" - Port B
Probe 02 (High Water Cutoff Probe) - 21229 - 5.875" - Port C
Probe 03 (Manual Low Water Cutoff Probe) - 21400 - 14" - By Itself
Probe 04 (Automatic Reset Low Water Cutoff Probe) - 21401 - 12.5" - Port A



NOTE: When ordering parts, provide boiler model, serial number and detail shipping instructions.

ITEM NO.	PART NO.	DESCRIPTION	BOILER MODEL
1	02396	GAUGE SET STANDARD SHANK	ALL MODELS
	02003	GAUGE GLASS 10" X .625" PYREX	ALL MODELS
	02006	GAUGE RUBBER WASHER FOR .625" GAUGE GLASS	ALL MODELS
	02448	GAUGE BRASS WASHER FOR .625" GAUGE GLASS	ALL MODELS
3	02337	VALVE SAFETY 0.75" 100 P.S.I. SWP	NOTE 2
	02392	VALVE SAFETY 1" 100 P.S.I. SWP	NOTE 2
	02028	VALVE SAFETY 1" 150 P.S.I. SWP	NOTE 2
	02408	VALVE SAFETY 1.25" 15 P.S.I. SWP	NOTE 2
	04814	VALVE SAFETY 1.5" NPT BRZ 15 P.S.I. SWP	NOTE 2
4	02463	VALVE GLOBE 1.25" NPT BRZ	NOTE 2
	02464	VALVE GLOBE 1.5" NPT BRZ	NOTE 2
	02713	VALVE GLOBE 2" NPT BRZ	NOTE 2
	04697	VALVE GLOBE 3" NPT BRZ	NOTE 2
5	02297	PRESSURE CONTROL 150 P.S.I. AUTO RESET	HIGH PRESSURE MODELS
	04696	PRESSURE CONTROL 15 P.S.I. AUTO RESET	LOW PRESSURE MODELS
6	05048	PID-CONTROLLER HW	ALL MODELS
7	02048	PRESSURE GAUGE 3.5" 300 P.S.I.	HIGH PRESSURE MODELS
	02467	PRESSURE GAUGE 3.5" 30 P.S.I.	LOW PRESSURE MODELS
8	02608	ELEMENT 30KW, 240V 3Ph	NOTE 1
	03267	ELEMENT 30KW, 380V 3Ph	NOTE 1
	02609	ELEMENT 30KW, 480V 3Ph	NOTE 1
	02610	ELEMENT 30KW, 600V 3Ph	NOTE 1
9	20838	ELECTRONIC BOILER CONTROL	ALL MODELS
10	02530	HEATING ELEMENT CONTACTOR 50A 120V 3PH	NOTE 2
	02539	HEATING ELEMENT CONTACTOR 75A 120V 3PH	NOTE 2
	02597	HEATING ELEMENT CONTACTOR 93A 120V 3PH	NOTE 2
11	21025	STEP CONTROL WITH 8 HEATING STAGES	ALL MODELS
12	02656	HEATING ELEMENT FUSE 250V 90A UL/CSA	NOTE 2
	02135	HEATING ELEMENT FUSE 600V 40A UL/CSA	NOTE 2
	02518	HEATING ELEMENT FUSE 600V 50A UL/CSA	NOTE 2
	02136	HEATING ELEMENT FUSE 600V 60A UL/CSA	NOTE 2
13	02125	CONTROL CIRCUIT FUSE 250V 15A UL/CSA	ALL MODELS
14	02144	HEATING ELEMENT FUSE BLOCKS 250V 100A	NOTE 2
	02614	HEATING ELEMENT FUSE BLOCKS 600V 60A	NOTE 2
15	02140	CONTROL CIRCUIT FUSE BLOCK	ALL MODELS
16	02514	VALVE BALL .75" 200 P.S.I. SWP	NOTE 2
	02515	VALVE BALL 1" 200 P.S.I. SWP	
17	02371	VALVE CHECK .75" 200 P.S.I. SWP SPRING LOADED	NOTE 2
		VALVE CHECK 1" 200 P.S.I. SWP SPRING LOADED	NOTE 2
18	02067	VALVE CHECK .75" 200 P.S.I. SWP SWING	NOTE 2
	03307	VALVE CHECK 1" 200 P.S.I. SWP SWING	NOTE 2
19	02513	VALVE 1" Y 200 P.S.I. SWP	NOTE 2
	02642	VALVE 1.25" Y 200 P.S.I. SWP	NOTE 2
20	02630	ELECTRODE PROBE FITTING	ALL MODELS
21	02301A	SOLENOID VALVE .75" NPT 120V AC	NOTE 2
	02723	SOLENOID VALVE 1" NPT 120V AC	NOTE 2

NOTE 1 – When ordering, specify voltage (V) and power (kW) of element.
NOTE 2 – When ordering, specify model number of part and boiler serial number.

Instruction Supplement 1

Condensate Return System

I1. Installation

Step 1: Connect water supply to water intake on tank (1). If the city water line pressure exceeds 40psi, install a pressure reducing valve.

WARNING Water supply should be turned off when the boiler is not in operation.

Step 2: Connect the condensate return line from the equipment to the condensate return intake (2). Pipe from the vent (3) is to be installed to outside of the building, if desired. If this method is used, the pipe should be the same size as the vent opening.

WARNING Under no condition should the vent be plugged.

Step 3: Install piping from the overflow (4) to a drain.

I2. Startup

Step 1: Turn all boiler power supplies on.
Step 2: Open the water supply valve to begin filling the condensate tank with water. Observe the water level in the tank gauge glass. When the float valve inside the tank closes, the water level should be still visible in the upper portion of the gauge glass.
Step 3: Open the boiler steam outlet valve (9).
Step 4: Ensure that the feed water shutoff valve (5) and the condensate pump supply valve (6) are in the open position.
Step 5: Flip the POWER-switch (not shown) to the ON position. The pump should turn on.
Step 6: Open the pump primer valve (8) slightly and wait until water discharges. Close this valve.
Step 7: Wait until the pump stops. After the pump has stopped, the water level in the boiler gauge glass should be at approximately half height of the glass.
Step 8: Close the steam outlet valve (9) and wait until the boiler builds up pressure to its preset value.
Step 9: Open slowly the steam outlet valve (9) to supply steam to the process.

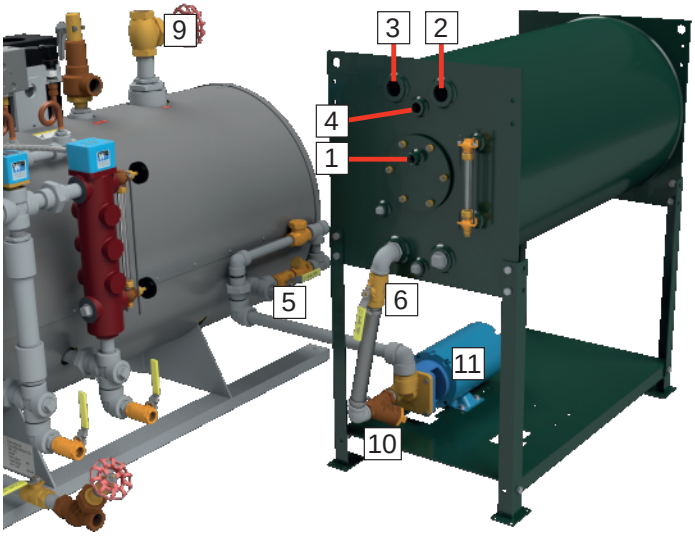
I3. Maintenance

a. Strainer – The strainer (10) should be removed and cleaned shortly after boiler has been in operation to clear away sediment, which may have accumulated during start-up. This strainer should be periodically inspected and cleaned when necessary.
b. Gauge Glass - See Boiler Instructions.
c. Pump Motor - Maintenance is normally not required on the pump or motor (11).

I4. Condensate Return System Parts List

Part# Description
05592 Gauge Glass 5/8" X 5.75"
02001 Gauge Glass Fixture Set
05846 Strainer 1"
Part number for pump depends on boiler model

Horizontal Condensate Return Tank:



Vertical Condensate Return Tank: