



Electra Steam, Inc.

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MODEL:

SERIAL #:

RVX60 - 210 Series Steam Boiler Series Instructions Manual



RV60 – RV210 Electric Steam Boiler Series



Features

- Vertical boiler design; very low floor space requirements
- Miniature boiler max. vessel volume 5ft³
- Maximum safety valve setting 100psi
- 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 “M”.
- Operating pressure range 0 – 85psig
- Heavy duty carbon steel pressure vessel. Vessel jacket and electrical enclosure powder coated (all 304 stainless steel optional)
- Large selection of optional equipment

Standard Equipment of Each Boiler Includes:

- A.S.M.E. pressure relief valve
- High pressure cutoff control with manual reset
- One (1) operating pressure control for all models equipped with two heating elements or two (2) staged operating pressure controls for all models equipped with three or four heating elements
- Low water level cutoff control with manual reset
- High water level cutoff control with automatic or manual reset.
- Magnetic contactors
- Internal branch circuit fusing
- Enable/Disable switch for each heating element
- Main supply power distribution block
- Indicator lights for POWER, REFILLING, HEATING and ALARMS

Applications

- Laboratories
- Breweries
- Process Heating
- Shrink Wrap Labels
- Dry Cleaning
- Food Service (*)

HEATING POWER kW	STEAM CAPACITY lbs/hr (kg/hr) (3)	BHP	VOLTAGE ⁽¹⁾	PHASE	SHIP WT. ⁽²⁾ Lbs (kg)	OP. PRESS. RANGE psig (bar)	Steam Outlet (in NPT)	
							LP < 15psig	HP > 15psig
60 KW	205.0 (92.9)	6	208/240/380/415/480/600	3	790 (358)	0-85 (0 – 5.9)	1 – 1/4	1
75 KW	256.3 (116.1)	7.5	208/240/380/415/480/600	3	790 (358)	0-85 (0 – 5.9)	1 – 1/4	1
80 KW	273.4 (123.8)	8	208/240/380/415/480/600	3	820 (371)	0-85 (0 – 5.9)	1 – 1/4	1
90 KW	307.5 (139.3)	9	208/240/380/415/480/600	3	820 (371)	0-85 (0 – 5.9)	1 – 1/4	1
105 KW	358.8 (162.5)	10.5	208/240/380/415/480/600	3	850 (385)	0-85 (0 – 5.9)	2	1 – 1/4
120 KW	410.0 (185.7)	12	208/240/380/415/480/600	3	850 (385)	0-85 (0 – 5.9)	2	1 – 1/4
135 KW	461.3 (209.0)	13.5	208/240/380/415/480/600	3	950 (430)	0-85 (0 – 5.9)	2	1 – 1/4
150 KW	512.6 (232.2)	15	208/240/380/415/480/600	3	1000 (453)	0-85 (0 – 5.9)	2	1 – 1/2
165kW	563.8 (255.4)	16.5	208/240/380/415/480/600	3	1050 (476)	0-85 (0 – 5.9)	2	1 – 1/2
180kW	615.1 (278.6)	18	208/240/380/415/480/600	3	1050 (476)	0-85 (0 – 5.9)	2 – 1/2	2
195kW	666.3 (301.8)	19.5	208/240/380/415/480/600	3	1100 (498)	0-85 (0 – 5.9)	2 – 1/2	2
210kW	717.6 (325.1)	21	208/240/380/415/480/600	3	1100 (498)	0-85 (0 – 5.9)	2 – 1/2	2

Please note that all information provided within this brochure is subject to change without notice.

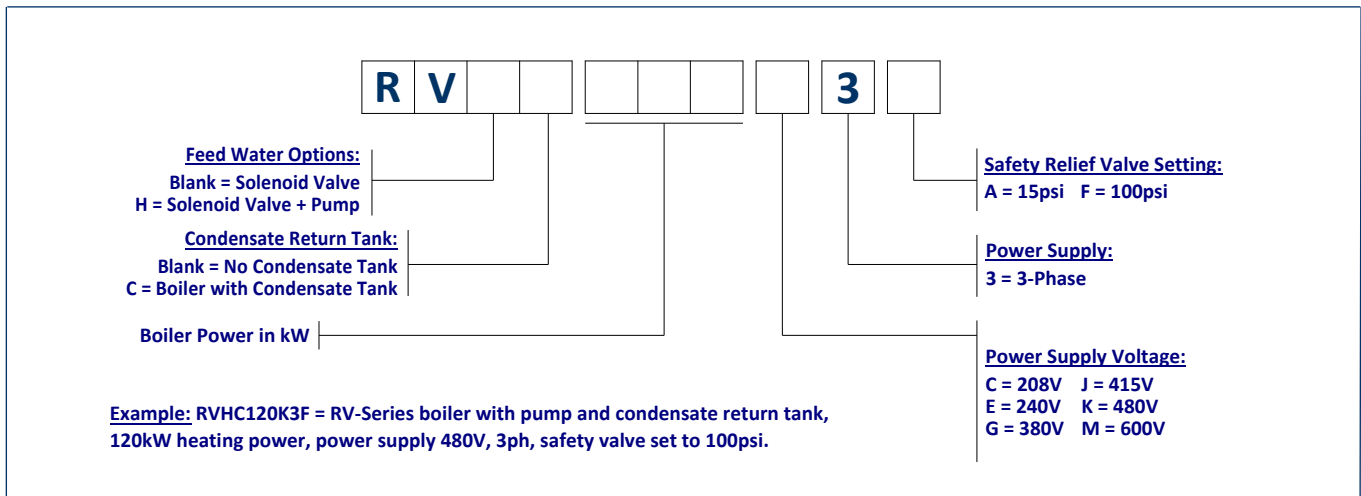
Please contact Reimers Electra Steam, Inc. with any questions regarding the specifications or dimensions detailed within.

⁽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 to provide single point power supply.

⁽²⁾ On boilers equipped with condensate return tank, add 200lbs (91.0kg) to shipping weight

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

Model Number Key



LIMITED WARRANTY - STEAM BOILERS

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, electrical and 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 and 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) and returning 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.

Important Safety Information








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

⚠️ WARNING		⚠️ ADVERTENCIA		⚠️ WARNING		⚠️ AVERTISSEMENT	
	Risk of electric shock. This boiler is connected to more than one branch circuits. Disconnect all power and control circuits before servicing.		Riesgo the electrochoque. Esta caldera está conectado a mas de un circuito de alimentación. Desconecte los todos circuitos antes de realizar el mantenimiento.		Risk of electric shock. This boiler is connected to more than one branch circuits. Disconnect all power and control circuits before servicing.		Risque de choc électrique. Cette chaudière est reliée à plusieurs circuits d'alimentation. Débrancher tous les circuits d'alimentation avant l'entretien.
	Read and understand the operator's manual before using this boiler.		Lea y comprenda el manual de instrucciones antes de utilizar esta		Read and understand the operator's manual before using this boiler.		Lire et comprendre les instructions avant d'utiliser cette chaudière.

Located on or near removable covers

⚠️ WARNING		⚠️ ADVERTENCIA		⚠️ WARNING		⚠️ AVERTISSEMENT	
	Risk of electric shock. Disconnect all branch circuits before removing this cover.		Riesgo de electrochoque. Desconecte los todos circuitos antes de remover esta cubierta.		Risk of electric shock. Disconnect all branch circuits before removing this cover.		Risque de choc électrique. Débrancher tous les circuits avant de retirer le couvert.

Located on end caps of cylindrical boiler pressure vessel jacket and near external water columns

⚠️ CAUTION		⚠️ ATENCIÓN		⚠️ CAUTION		⚠️ PRUDENCE	
	All exposed pipes and valves may be hot. Do not touch.		Las tuberías y valvulas expuestas pueden estar calientes. No toque.		All exposed pipes and valves may be hot. Do not touch.		Tous les tuyaux et valves exposées peuvent être chauds Ne pas toucher

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

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.

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 at least 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 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. Ensure that the boiler is cold, not pressurized and electrically disconnected.

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 “slapping” 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.

12. WATER:

Ensure that all electrical components are in a dry location, free from any possibility of water soaking. Electric foot switches must not be placed on a wet floor. They must be placed on dry surface not subject to steam or water.

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 ASME I 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.

NOTICE The ASME data plate is located in the upper portion of the pressure vessel near the external water column, behind the label stamped with the NATIONAL BOARD NUMBER of the 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. Review the overall dimensions of your boiler model on page 7 and 8 and the NFPA-70 requirements below to select proper boiler location.

a.) Working space:

Working space for electric boilers must meet the requirements of NFPA-70, Table 110.26.

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:

RV-, RVH- and RVHC- Models	Dimension In.						
	A	B	D	EL	ER	F	G
	3	A18	3	3	3	NC	-

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

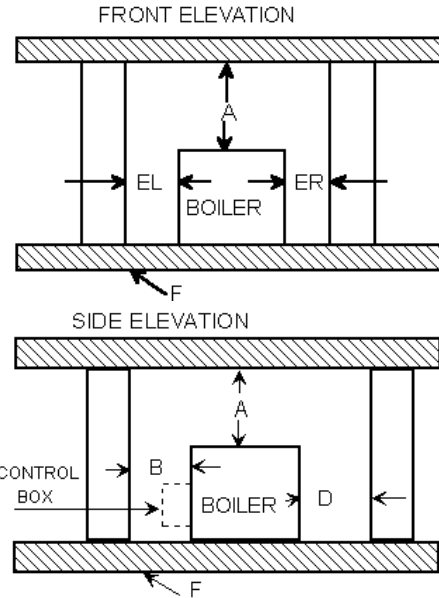
D – Clearance from back of boiler

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 solenoid valve, connect incoming water supply to strainer on intake side of solenoid valve. On models with high pressure feed pump, connect incoming water supply to the inlet side of the pump. On models furnished with condensate return tank, connect water line to makeup valve located at tank end (See Instruction Supplement 1 in this manual). RV, RVH and RVHC 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 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

CAUTION 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.

Closed Condensate Return System without Tank: If the condensate is to be returned by gravity in a closed system (no tank and no steam trap), the load discharge should be at least 2 feet above the boiler water level. When applicable, install steam return lines at sufficient height to allow a pitch of 2 inches to 10 feet of pipe length. To make the return connection to the boiler, follow the steps below:

- Remove the boiler blow down valve from the shell and replace through a female 3/4" NPT tee with female ports
- Connect the return line with a swing check valve to one of the side ports of the tee, with flow towards the boiler
- Connect the blowdown valve to the other side port of the tee

This system is not recommended where a significant amount of intermittent live steam is being taken from a line over 25 to 30 ft. in length.

Condensate Return System (with Tank): See Instruction Supplement #1.

1.4 Electrical

Ensure that a fused disconnect switch is installed as close as possible to the boiler. To hookup power and control voltage, please proceed as indicated in FIGURE 1. To ensure proper connections, please refer also to the attached wiring diagrams and labels next to the field wiring terminals for proper conductor size, temperature ratings and maximum torques that can be applied to the terminal contacts. Use copper conductors only. As an option, all boiler models can be equipped with control voltage transformers to provide single point power supply.

WARNING All wiring must be installed in accordance with the National Electric Code and any local Codes that may apply. Wiring must be done by a competent, certified electrician. For this service, the N.E.C. requires supply wires rated at 125% of full load. Use only copper wire. Install a fused disconnect switch within sight of the boiler. Connect power supply to the terminals in control panel.

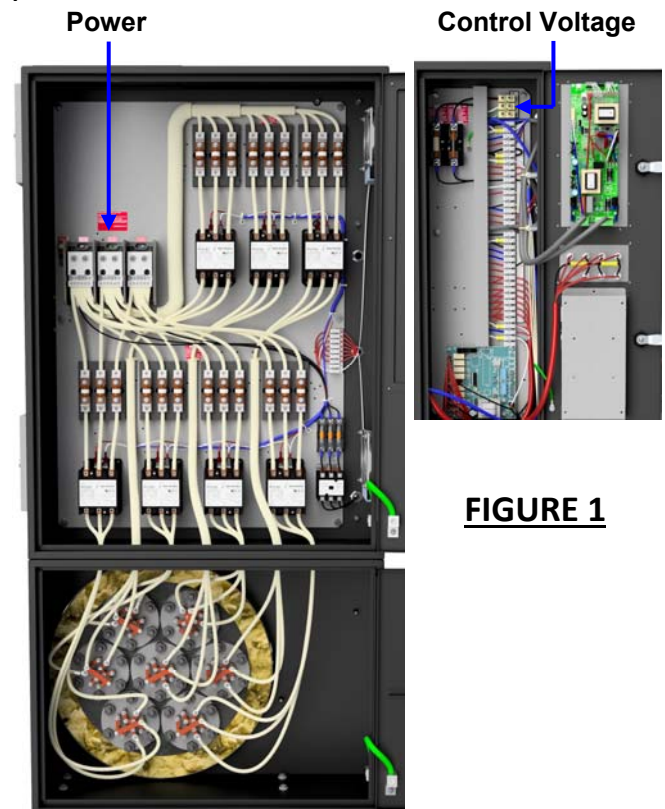


FIGURE 1

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 isles. If it is required that discharge piping be installed from the safety valve, the pipe must never be smaller than the valve outlet and must be rigidly supported, placing no weight on the valve itself.

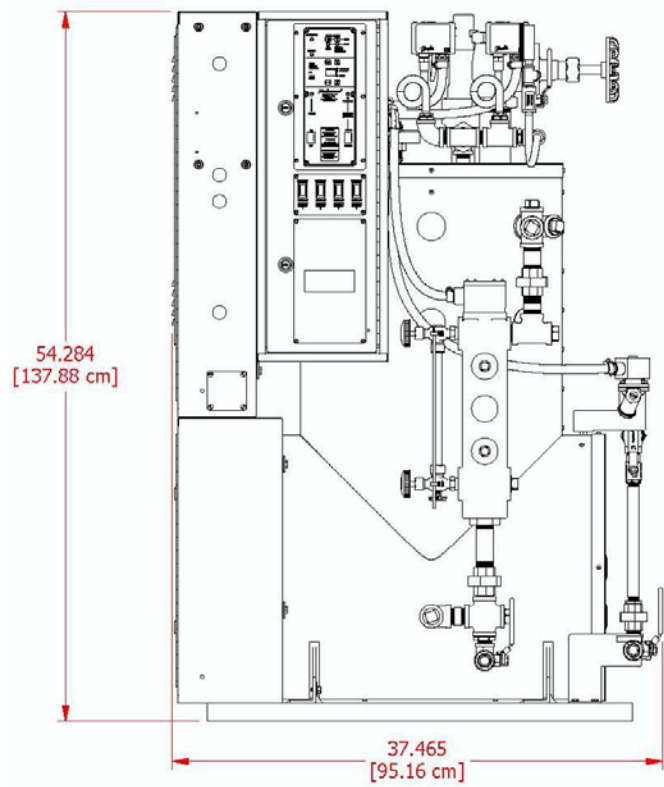
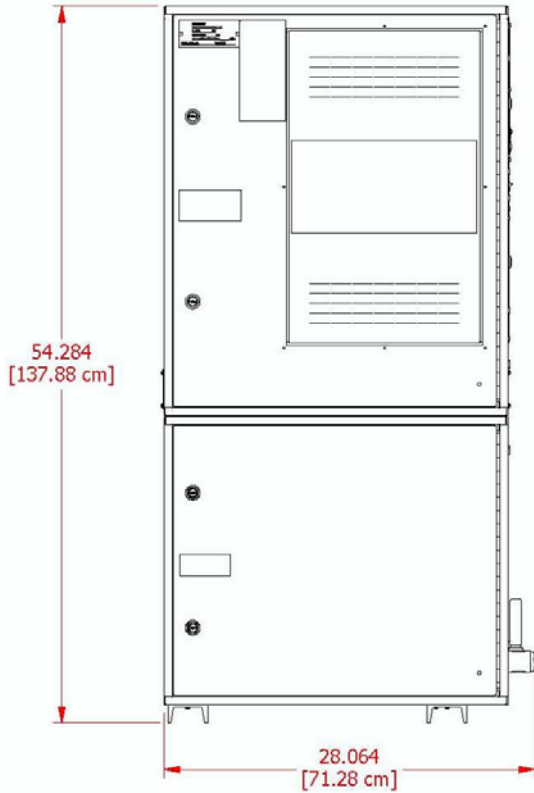
1.6 Blowdown Valve

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.

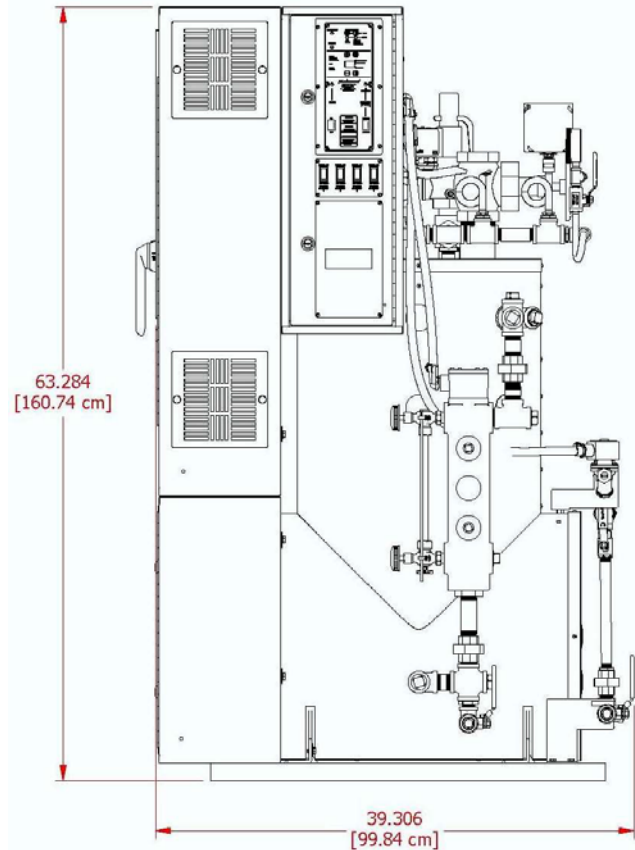
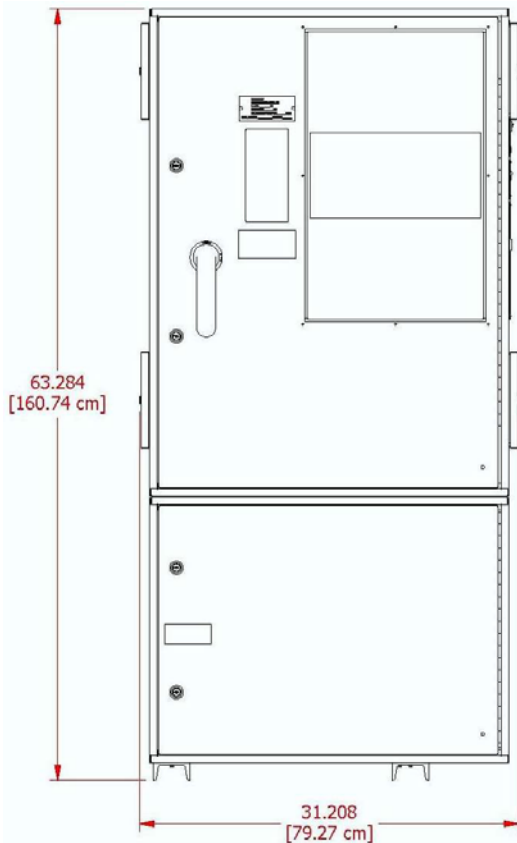
Reimers Electra Steam, Inc. offers vented and un-vented blowdown tanks that can be piped to this boiler model series. Please refer to the separate Boiler Blowoff Tank Instruction Manual that is provided with each Reimers blowdown tank.

Overall Dimensions

60kW – 80kW all Voltages; 90kW – 120kW, 380V - 600V, 3ph



135kW – 210kW all Voltages; 90kW – 120kW, 208V – 240V, 3ph



Regardless of required clearances provided in chapter 1.1, allow 3ft clearance in front of the boiler for heating element removal.

2. Operation

2.1 Boiler Startup

STEP 1: Open the steam line valve (1) slightly. This will allow the boiler to be filled without producing back pressure.

Open the Feed Water Shutoff Valve (2) and ensure that the Blowoff valve (3) and External Water Column Drain Valve (4) is closed.

STEP 2: Throw the fused disconnect switch (not provided by factory) to the ON-position and turn ON the boiler control voltage.

STEP 3: Turn the power switch on the boiler controller panel (5) to the ON-position. If no water is visible, or if the water level in the gage glass is lower than approximately 1/3 height, then the refilling device (pump (6) and/or solenoid valve (7)) should become energized.

NOTICE

Do not let the pump run dry for an extended time as it will get damaged.

STEP 4: Observe the rise of the water level in the gage glass and ensure that the refilling device shuts down before the water level reaches half height of the gage glass. If there are no alarms (LOW WATER or HIGH PRESSURE) indicated on the boiler controller front panel, the heaters should become energized before the refilling device stops.

STEP 5: Close the steam line valve

STEP 6: Each RV-model electric steam boiler ships with the operating steam pressure set according to the customer's specification. Observe the rise of the steam pressure on the gage. The maximum steam pressure setting on models with high pressure trim is 85psig, whereas on models with low pressure trim is 13.5psig. If any HEATING indicator lights are still on while the steam pressure reaches the above values, turn the POWER switch on the panel of the boiler controller immediately OFF and proceed with re-adjusting the steam pressure as follows:

- Models equipped with operating pressure PID – Controller: Follow the instructions in the Honeywell T775U controller manual, which is provided as part of the boiler documentation.
- Models that are not equipped with operating pressure PID – Controller:

WARNING

Stand clear of scalding water, steam and hot pipes.

Disconnect the boiler from all power supplies.

- Disconnect all power supplies from the boiler
- Close the steam outlet valve
- Remove the front covers from all pressure controls (8) that are not labeled with "LIMIT CONTROL DO NOT ADJUST"



FIGURE 2

- Turn the pressure control knob counterclockwise to increase the pressure and counterclockwise to decrease the pressure
- Install the pressure control front covers,
- Connect all power supplies to the boiler, open the steam outlet valve and operate the boiler.

2.2 Control Functions

The electronic boiler controller provides the following functions:

- Low water level cutoff with lockout and manual reset function
- Boiler high pressure cutoff indication
- High water level cutoff
- Automatic boiler refill
- Automatic boiler blowoff (this feature is only available when the motorized boiler blowoff valve is installed)

2.2.1. Low Water Cutoff Function

The low water cutoff function of the boiler controller de-energizes the heating elements when the water level in the pressure vessel falls below the minimum acceptable operating level. The controller senses the water level with a solid-state probe. 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 pressing the "LOW WATER" reset button the alarm light "LOW WATER" turns off, the lockout is reset and the heating elements are energized.

The Low Water Cutoff short cycling timer can be adjusted. See the boiler control manual.

2.2.2. High Pressure Cutoff Indication

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 on the controller panel "HIGH PRESSURE" turns on. After the pressure control is replaced the HIGH PRESSURE alarm light turns only off after pressing the reset button of the high limit pressure control.

2.2.3. High Water Level Shutoff

When the high water level cut-off probe comes in contact with boiler water, the boiler controller turns off the automatic refilling device (feed pump and/or solenoid valve). At the same time the boiler controller de-energizes the heating elements and displays an alarm (refer to the boiler controller instruction manual for details).

2.2.4. Automatic Boiler Refill

When the POWER switch of the boiler controller is turned on and the refilling water level probe(s) are in contact with the boiler water, the boiler controller keeps the automatic refilling device (feed pump and/or solenoid valve) de-energized. As soon as the upper or both refilling level probes (depending on the selected automatic refill function, refer to the electronic boiler controller instruction manual for details), the boiler controller energizes the refilling device after a set ON-delay time. As soon as the water level probe makes contact with the boiler water, the boiler controller de-energizes the refilling device after a set refill OFF-delay time. The ON and OFF delay times can be adjusted (refer to the boiler controller manual for instructions).

2.2.5. Automatic Boiler Blowoff

See Boiler Controller Manual for instructions.

3. Maintenance



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 blow-offs 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 recommended 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 RV-series steam boilers is to install a Reimers Electra Steam, Inc. properly sized and fully trimmed blowdown tank. 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 (Refer to the Boiler Blowdown Tank Supplement for details).

3.2. Safety Relief Valve Test



Stand clear of safety valve and scalding steam. In addition to the instructions given below, follow all instructions provided on the yellow tag, attached to the valve

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

3.3 High Limit Pressure Control Test

⚠WARNING Before commencing this test, ensure that the boiler is disconnected from all electrical supplies. This test must be performed by qualified boiler service and maintenance personnel only. This test must be performed monthly.

Step 1: Remove the cover of all operating pressure controls.

Step 2: In addition to the wires that are already connected to the operating pressure control terminals, use #18 insulated, 600V rated wire and jump the “C” and “NC” terminals as shown in FIGURE 3.

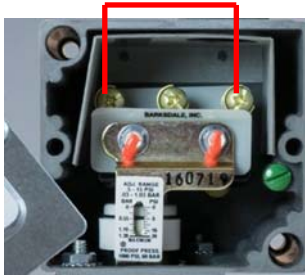


FIGURE 3

Step 3: Turn ON the boiler control voltage and heating power supplies. Ensure that the steam outlet valve is closed.

Step 4: Flip the POWER switch on the boiler controller panel to the ON-position. Ensure that the boiler refills to nominal water level (approximately 1/3 height in the gauge glass).

Step 5: Read the pressure gage and observe the steam pressure rising. If the boiler is stamped with 15psig maximum allowable working pressure (MAWP), then the high limit pressure control should cut off the heating at 13.5psig. If the steam pressure rises to 15psig, turn the POWER rocker switch OFF immediately. If the boiler is stamped with 100psig MAWP, then the high limit pressure control should cut off the heating at 90psig. If the steam pressure rises to 100psig, turn the POWER rocker switch OFF immediately.

Step 6: As soon as the high limit pressure control trips, the HIGH PRESSURE alarm light on the boiler controller panel turns ON and the HEATING light turns OFF.

Step 7: Open slowly the steam outlet valve and discharge steam until the boiler pressure drops approximately 4psig on 15psig MAWP models and 10psig on 100psig MAWP models below their cutoff thresholds.

Step 8: Turn OFF all power supplies to the boiler. Remove the wire jumper from the operating pressure controls and install the pressure control enclosure cover.

Step 9: Turn ON all boiler power supplies. After 2 seconds, the HIGH PRESSURE alarm light should turn ON.

Step 10: Press the alarm reset switch of the high limit pressure control. The HIGH PRESSURE alarm light in the controller panel should turn OFF.

If all above steps can be completed as described, then the high limit pressure control works properly.

⚠WARNING DO NOT forget to remove the jumper wire before attempting to resume boiler operation.

3.4 Element Replacement and Cleaning

⚠WARNING Before servicing elements, 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 element terminal cover from the front of the boiler.
- Disconnect and label the terminal wires
- Remove all six (6) 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 Low Water Cutoff Test

⚠WARNING Before commencing this test, ensure that the boiler is disconnected from all electrical supplies. This test must be performed by qualified boiler service and maintenance personnel only. Before commencing this test, ensure that the boiler blowoff valve is piped to a blowdown tank. This test shall be performed weekly.

Step 1: Ensure that the boiler is disconnected from all power supplies.

Step 2: Open the control circuit electrical enclosure and disconnect the blue wire from terminal strip TB2, contact # 3 as shown in FIGURE 4. Cover the end of the blue wire with a suitable sized wire nut.



FIGURE 4

Step 3: Close the control circuit electrical enclosure.

Step 4: Flip the POWER switch on the boiler controller panel to the ON-position, and ensure that the steam outlet valve is closed; the water level is

at nominal level (approximately 1/3 height of the gage glass) and the boiler at set operating pressure.

Step 5: Open slowly the boiler blowoff valve until the water level in the gage glass begins dropping. The REFILLING light on the boiler controller panel should turn ON after dropping the water level about 1/4in.

Step 6: Keep lowering the water level to the bottom of the gage glass. Depending on the setting of the low water cut off controller, the LOW WATER alarm light may be already

lit. If not, wait for a maximum of 1 minute. After the elapse of this time the LOW WATER light should be lit.

Step 7: Continue blowing down the boiler until empty.

Step 8: Turn OFF all boiler power supplies, open the control circuit electrical enclosure and re-connect the blue wire to terminal TB2, contact #3.

Step 9: Close the control circuit electrical enclosure

Step 10: Turn ON all power supplies to the boiler. If the controller displays indicates a flashing "0", press the <E> button to clear. The boiler should start refilling to nominal water level.

Step 11: Wait until the water level reaches nominal level in the boiler. The LOW WATER alarm light should be still lit.

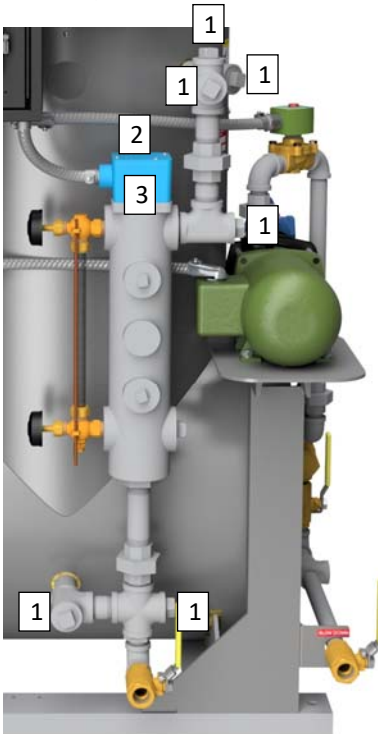
Step 12: Press the LOW WATER reset switch on the controller panel. The LOW WATER alarm light should turn OFF and the HEATING light should turn ON.

If all above steps can be completed as described, then the low water cutoff controller works properly.

3.6 Clean the External Water Column Piping and Level Probes

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

Cleaning the external water column piping:



Step 1: Remove all 1" – steel pipe plugs (1) as shown in FIGURE 5. This will give access to the straight runs of the external water column piping.

Step 2: Use a soft brush to clean the inner walls of the external water column piping.

Step 3: Use a flashlight to ensure that all straight runs are clear from deposits.

Step 4: Re-install the 1" – steel pipe plugs, using PTFE-tape and/or pipe dope.

FIGURE 5

Cleaning the level probes:

Step 1: Remove the blue cover (2) from the top of the level probe terminal box (FIGURE 5).

Step 2: Remove the level probe terminal box body (3) from the top of the external water column.

Step 3: Disconnect one wire from one level probe, and unscrew the probe.

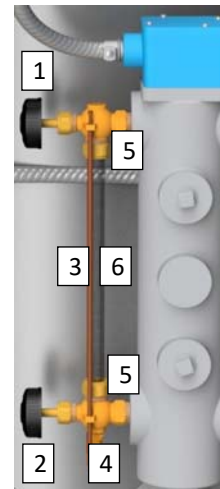
Step 4: If the level probe rod is contaminated with deposits, use a stiff wire brush for cleaning. To clean the PTFE insulator sleeve, use a wet cloth.

Step 5: Repeat Step 3 and Step 4 for all other remaining level probes.

Step 6: Re-install the level probe terminal body and cover.

3.7 Gauge Glass Replacement

⚠CAUTION Before replacing the gage glass, ensure that the boiler is cold and drained.



Step 1: Close top- (1) and bottom - gage glass valve (2).

Step 2: Remove the gage glass protector rods (3).

Step 3: Open drain valve (4) on bottom fixture to drain glass.

Step 4: Loosen nuts (5) at top and bottom of glass.

Step 5: Slide glass (6) up, pull out from bottom fixture and remove.

Step 6: Install new glass by performing the above procedure in reverse order. Always install new rubber washers.

FIGURE 6

4. Trouble Shooting

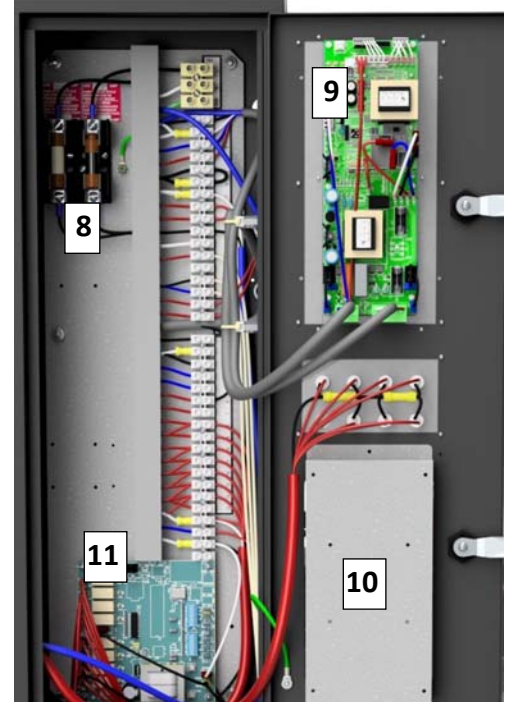
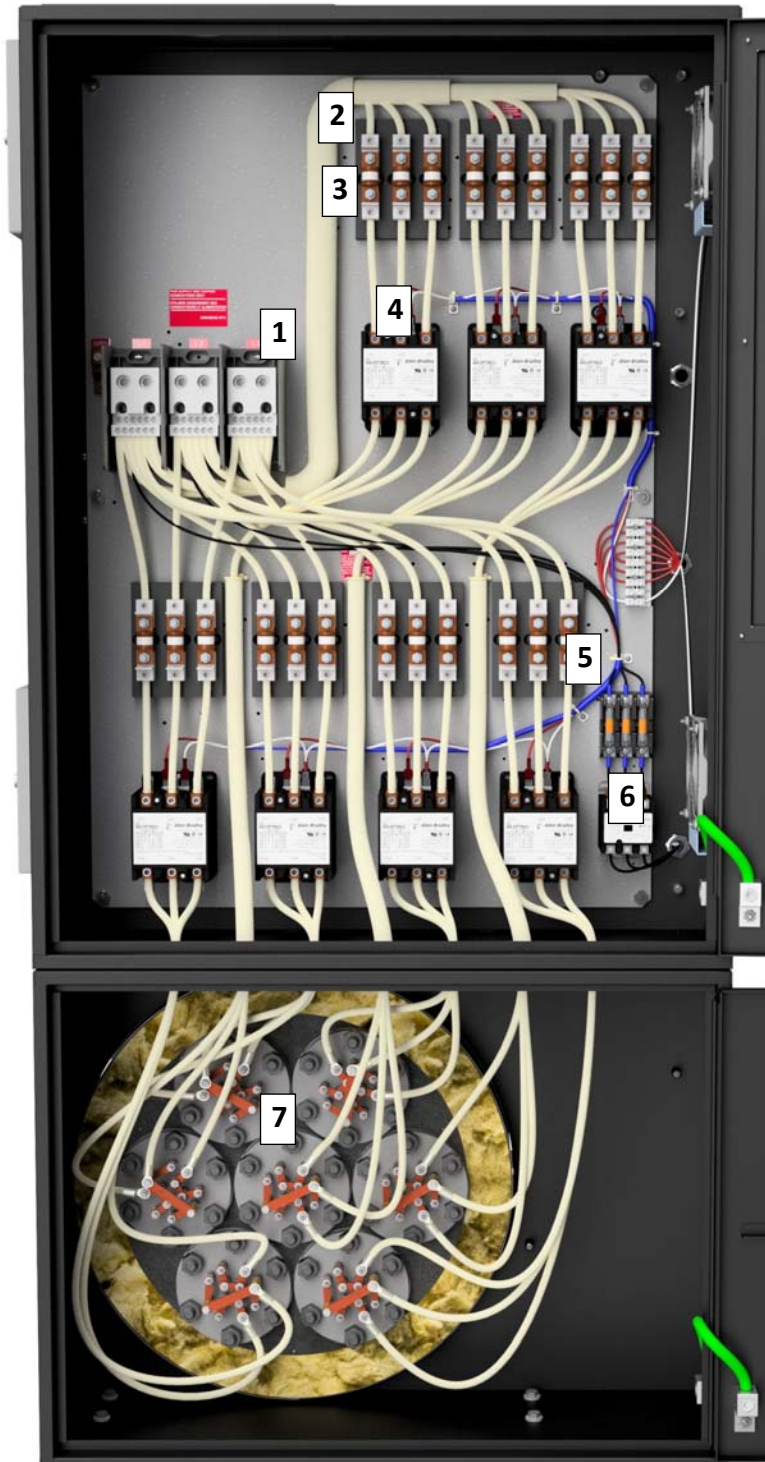
Boiler Status	Quick Fix
POWER switch on boiler controller turned on, but no lights lit on the front panel of the boiler controller	<ul style="list-style-type: none"> - Check circuit breaker or fuse of the wall outlet where the boiler control voltage circuit is hooked up to. If the circuit breaker is 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:	<ul style="list-style-type: none"> - Press the LOW WATER reset switch - Check Water Level. Water level must be visible in gauge glass. - Check the probe wires for continuity - Check if feed water is available - Check feed water pump and/or solenoid valve for proper operation
HIGH PRESSURE alarm light on boiler controller panel lit:	<ul style="list-style-type: none"> - 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.	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Check water inlet strainer - Check whether the water feed shutoff valve is open
Boiler overfills or floods	<ul style="list-style-type: none"> - Check water feed solenoid valve for sticking - Check the float control wires to the boiler controller for continuity - Check feed water. Boiler won't operate with distilled or de-mineralized water -
Fuse blown	<ul style="list-style-type: none"> - Short circuit or overload has occurred. Before replacing fuse, locate the short circuit or overload. - Poor contact between fuse and fuse clips can also 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Check for pump and solenoid valve wiring circuits

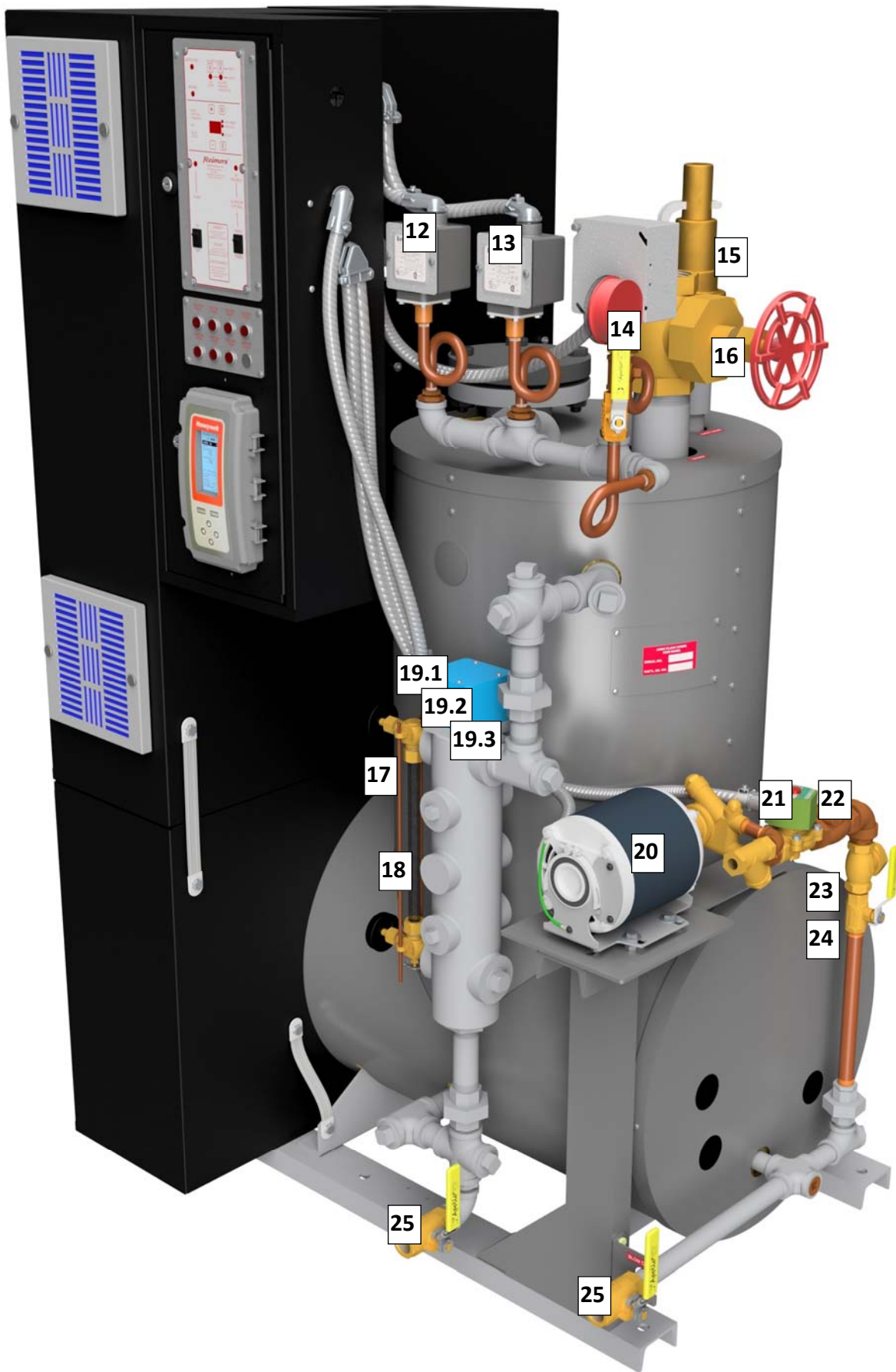
If trouble shooting did not resolve problem, please contact our service technicians at:
Phone: 540-662-3811

5. Replacement Parts

⚠ WARNING Use Reimers Electra Steam, Inc. 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.

NOTICE The FIGURES below are not representative for the entire RV-series boiler model range. When ordering power fuses, contactors, heating elements and control circuit components, always provide the Reimers Electra Steam, Inc. representative with the serial number of your boiler.





Pos.	Part Number	Part Description
1		POWER DISTRIBUTION BLOCK
2		Power Fuse
3		POWER FUSE BLOCK
4		HEATER CIRCUIT CONTACTOR
5		3-PHASE FEED PUMP FUSE
6	02350	3-PHASE FEED PUMP CONTACTOR
7		HEATING ELEMENT
8	02125 & 02655	CONTROL VOLTAGE FUSES
9	20838	BOILER CONTROLLER
10	05048	PID-CONTROLLER
11	05291	STEP-CONTROLLER
12	05664	OPERATING PRESSURE LIMIT CONTROL
13	05665	OPERATING PRESSURE HIGH LIMIT CONTROL W/MANUAL RESET
14		PRESSURE GAUGE
15		SAFETY RELIEF VALVE
16		STEAM OUTLET VALVE
17	02396	WATER GAUGE FIXTURE SET
18	05596	GAUGE GLASS
19.1	21227	LEVEL PROBE LOW WATER CUTOFF
19.2	21228	LEVEL PROBE AUTOMATIC REFILL
19.3	21229	LEVEL PROBE HIGH LEVEL CUTOFF
20	05008	FEED PUMP
21	02301	FEED SOLENIID VALVE
22	02462	SWING CHECK VALVE
23	02692	SPING LOADED CHECK VALVE
24	03802	FEED WATER SHUTOFF VALVE

Related Supplemental Documents to this Instruction Manual

Document Name

Document No.

Condensate Return Tank Installation and Instruction Manual
Blowdown Tank Instruction Manual

PRESHIPMENT PARTS QUALITY VERIFICATION

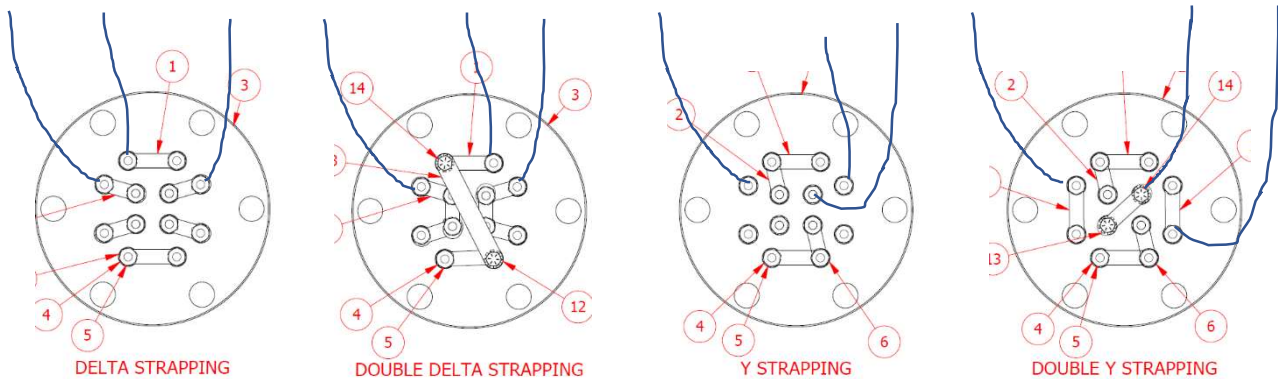
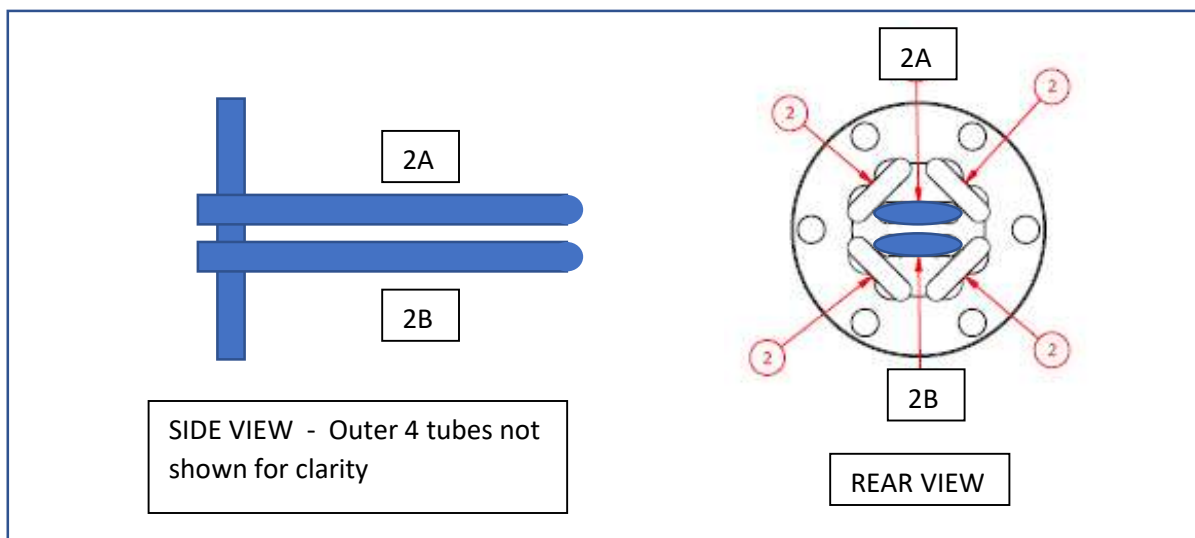
Component: RV Heating Elements

Part Numbers: 21095

Objective: Assure strapping is applied in proper orientation. If not aligned proper it will alter KW of element and imbalance KW loads on power feeds.

Instruments and Tools Required: Nut driver, 30 in-lb torque driver, washers, star washers, nuts, straps.

Method: Lay element on work bench or secure in fixture. Flange must be oriented as shown with center rods 2A and 2B laying horizontal. Strapping is to be applied or removed per one of the arrangements on dwg 21095 to meet boiler voltage and KW requirements. In some cases a jumper wire may be used in place of a strap.



15 KW	30 KW	15 KW	30 KW
208/240/480 V 3φ	208/240/480 V 3φ	600 V 3φ	600 V 3φ
FRONT VIEWS Reference Dwg 21095			