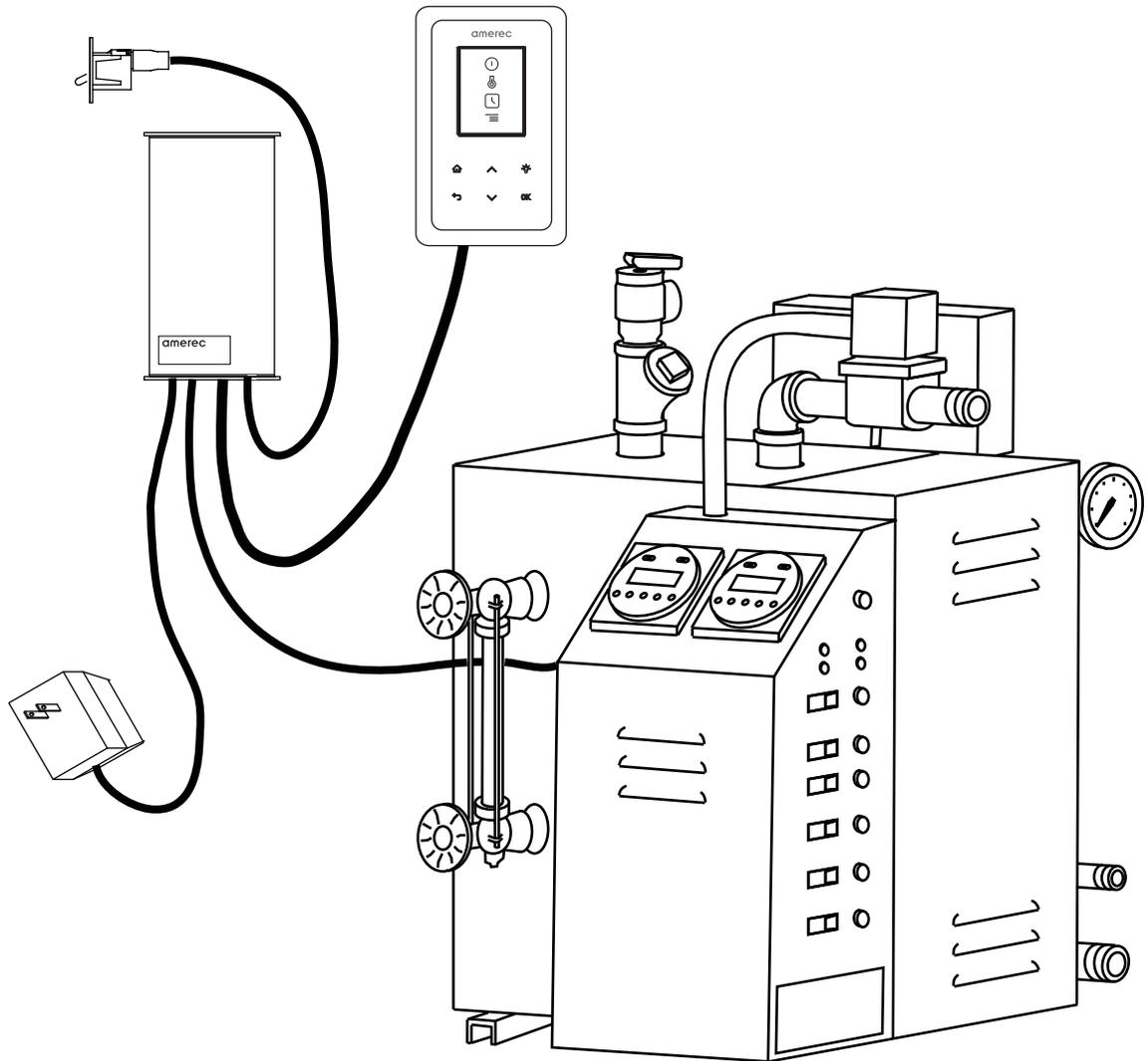


amerec

INSTALLATION INSTRUCTIONS FOR THE AI SERIES STEAM BOILER WITH T100-B TOUCH CONTROL



MODELS AI12, AI18 & AI24 and
MODELS AI30, AI36, AI42 & AI48

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IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS.

WARNING - To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.

WARNING - To reduce the risk of injury:

- a. The wet surfaces of steam enclosures may be slippery. Use care when entering or leaving.
- b. The steam head is hot. Do not touch the steam head and avoid the steam near the steam head.
- c. Prolonged use of the steam system can excessively raise the internal human body temperature and impair the body's ability to regulate its internal temperature (hyperthermia). Limit your use of steam to 10 - 15 minutes until you are certain of your body's reaction.
- d. Excessive temperatures have a high potential for causing fetal damage during the early months of pregnancy. Pregnant or possibly pregnant women should consult a physician regarding correct exposure.
- e. Obese persons and persons with a history of heart disease, low or high blood pressure, circulatory system problems, or diabetes should consult a physician before using a steambath.
- f. Persons using medication should consult a physician before using a steambath since some medication may induce drowsiness while other medications may affect heart rate, blood pressure and circulation.

WARNING - Hyperthermia occurs when the internal temperature of the body reaches a level several degrees above the normal body temperature of 98.6°F (37°C). The symptoms of hyperthermia include an increase in the internal temperature of the body, dizziness, lethargy, drowsiness and fainting. The effects of hyperthermia include:

- a. Failure to perceive heat
- b. Failure to recognize the need to exit the steambath
- c. Unawareness of impending risk
- d. Fetal damage in pregnant women
- e. Physical inability to exit the steambath
- f. Unconsciousness

WARNING - The use of alcohol, drugs or medication can greatly increase the risk of hyperthermia.

SAVE THESE INSTRUCTIONS

SAVE THIS MANUAL

Thank you for purchasing your new Amerec steam boiler.
If we can be of any assistance do not hesitate to call our Technical Support department at 1-800-363-0251.

FOR THE SAFETY OF YOU AND YOUR FAMILY OR CUSTOMERS, PLEASE READ FOLLOWING WARNINGS AND ALL INSTRUCTIONS BEFORE USING YOUR STEAMBATH. POST "STEAMBATH INSTRUCTIONS" LABEL OUTSIDE STEAMBATH FOR SAFETY WARNINGS.

**WARNING**

Electric Shock Hazard - High voltage exists within this equipment. Disconnect all electrical power before servicing the boiler. All installation and service to this equipment should be performed by qualified license personnel in accordance with local and national codes. There are no user serviceable parts in this equipment.

Electrical grounding is required on all Amerec steambath boilers.

The boiler is designed for hookup with copper wire only, 75°C or better.

Wire the controls exactly as described. Do not connect any additional wiring or power supplies to the controls or their terminals in the boiler.

All plumbing must be installed by a licensed plumber in accordance with all applicable local and national codes.

Install indoors only. Protect from freezing. Boiler must be level side to side and end to end.

The pressure relief valve and generator drain must be installed in such a fashion that the risk of scalding is reduced to a minimum. Draining these outlets into the steam room may present a scald hazard and may damage materials used to construct the room.

Be certain that steambath enclosures are properly sealed to avoid water damage from escaping steam. It is recommended that 100% silicone caulk be used to seal all pipes and fittings. Steam must be prevented from escaping into the wall cavity.

Avoid traps and valleys in the steam line where water could collect and cause a steam blockage. The hot steam line must be insulated against accidental user contact.

Centering the steam pipe is critical in rooms made of plastic, acrylic, resin, fiberglass or similar materials. Allowing the steam pipe to touch materials not rated 240°F (115°C) or higher will result in damage to these materials.

Do not install the steam head near bench(es) or where steam may spray or where condensation will drip on the user as this will present a scald hazard.

Be careful when entering a steambath. Escaping steam from an overheated steam room may cause injury.

Scald Hazard: Do Not Touch the steam head or trim during operation as they are HOT. Stay at least 12 inches (305 mm) away from the hot steam escaping from the steam head.

Children should only use the steambath under close adult supervision.

Do not exceed 30 minutes in a steambath. Excessive exposure can be harmful to your health. Excessive exposure can produce a rapid pulse, light-headedness, weakness or fainting. If you become uncomfortable or experience any of the above conditions exit the steambath immediately.

Steambaths can put undue stress on the body. Therefore a steambath should be used only under a doctor's direction if you:

Are in generally poor health
Are under the care of a physician
Have circulatory problems
Have diabetes

Are pregnant
Have a heart condition
Have high blood pressure
Are using medication

DO NOT use the steam bath if you:

Are under the influence of drugs

Are under the influence of alcohol



CAUTION

BEFORE INSTALLING YOUR AI BOILER AND T100 CONTROL

VERIFY YOUR BOILER AND CONTROL ARE DESIGNED FOR YOUR VOLTAGE

Boilers designed for North American power are available in 208 and 240VAC for single phase and in 208, 240 and 480VAC for three phase line voltage. Any boiler may be used on a lower voltage (which results in a lower wattage) but use on a voltage higher than about 10VAC above the rating may result in damage to the heating elements.

All controls for these boilers (including the T100's interface box) will operate on 120VAC 60Hz.

Boilers designed typical international voltages of 220/380V~, 230/400V~ or 240/415V~ operate at 240V~ N for single phase mains and 415V~ for three phase mains. These boilers may be used safely at the common lower voltages.

All controls for these boilers (including the T100's interface box) will operate on 230V~ N 50Hz.

These instructions include information for all models with both North American and (metric/international) values. Be careful to use the correct values for you installation.

For further assistance, contact Technical Support:

amerec

Technical Support
17683 128th Place NE, Bldg C
Woodinville, WA 98072
USA

email: support@amerec.com
phone 425.951.1120
fax: 425.951.1130

GENERAL INFORMATION: The AI Commercial Steam Boiler is a low pressure boiler, UL/CUL Listed, built to NEC requirements and using an ASME certified H stamped pressure vessel.

The boiler has all steel construction with powder coated finish on visible surfaces and stainless steel mounting feet to minimize the risk of corrosion. The mounting feet hold the boiler one inch (25 mm) above the floor to allow cleaning the floor below it and to further prevent corrosion. This also allows the boiler to sit directly on a combustible surface without additional protection. The feet extend beyond the sides of the boiler chassis and have clearance holes to allow securing the boiler in place using ¼" (6.4 mm) bolts.

AI Commercial Steam Boilers are factory assembled and tested and ready to install. All boilers are plumbed for a ½" potable water feed inlet, a ¾" drain discharge and a ¾" pressure relief valve discharge. Boilers are available for connection to 208VAC or 240VAC single or three phase, or 415V~ or 480VAC in three phase only. All models require the appropriate full power electrical service plus ground. Models in 208V, 240V and 415V also require a 14 gage minimum Neutral for the control circuit and 480V models require a separate 120VAC+N service for the control circuit. Use 75° minimum copper wire for all service connections. A ¾"-1"-1½"-2" combination knockout is provided in the boiler's electrical box for the main service conduit and an additional ½"-¾" knockout is provided for the control service if needed.

The boiler's control circuit is protected by a 250VAC 3A non-time-delay fuse installed in the front panel of the boiler's electrical box. A 100mA time-delay fuse mounted on the boiler's circuit board protects the board's low voltage circuitry. No other fusing is installed in the steam boiler.

The T100 control's interface box is connected to the boiler's low voltage Class 2 control circuit during installation using a factory supplied cable. An access hole and knockouts, ½" trade size, are provided for room control wiring. The T100 may be mounted inside or outside the steam room and its temperature sensor must be mounted inside the steam room. Temperature sensors require factory supplied 25 foot (4.6 m) long cables for connection to the T100's adapter box and a 25 foot (4.6 m) long shielded cable is supplied for connecting the T100 to it's adapter box..

Standard equipment:

- Manual operation (boiler mounted RUN switch and manual ball valve drain) and single steam room (one steam valve, one temperature sensor, one T100, two steam heads). Switches allowing manual heat and water control during routine service, lights indicating heat and valve operating status and self-check fault codes.

Optional equipment:

- Second steam room (second steam valve, T100 and temperature sensor, two steam heads) *factory installed only*.
- RUN CLOCK (7-day or 24 hour clock for boiler ON/OFF scheduling).
- AUTODRAIN (24 hour clock plus electronic drain valve).

Water Quality Requirements:

The nature of a boiler or steambath steam generator requires testing of the feedwater to avoid potential high concentrations of impurities which can cause a deposit or scale to form on the internal surfaces. This deposit or scale can interfere with the equipment's proper operation and even cause premature steam generator failure. Concentration of impurities is generally controlled by treating the feedwater and/or "blowing down" the steam generator when it is not heating. The steam generator "blow down" process involves draining and rinsing the tank and refilling replacing it with makeup water.

To insure proper operation, the water supply should be tested prior to operating the equipment. There are several treatment processes which can be used if you have a problem with hard water. A local reliable water treatment company can recommend the appropriate treatment if required. The recommended feedwater minimum quality is listed below.

Feedwater Quality

Hardness	5.5 – 85 ppm	(0.3 – 5.0 gpg)
T-Alkalinity	20 – 200 ppm	(1.2 – 11.7 gpg)
TDS	<100 ppm	
Silica	<12 ppm	
PH (strength of alkalinity)	7.0 – 9.0	
Chlorine	<0.1 ppm	
Conductivity	min 20 µS/cm	



AI SERIES STEAM BOILER WITH T100 CONTROL INSTALLATION INSTRUCTIONS

For service or assistance contact Amerec Technical Support between 7:00 am and 5:00 pm Pacific time at

1-800-363-0251

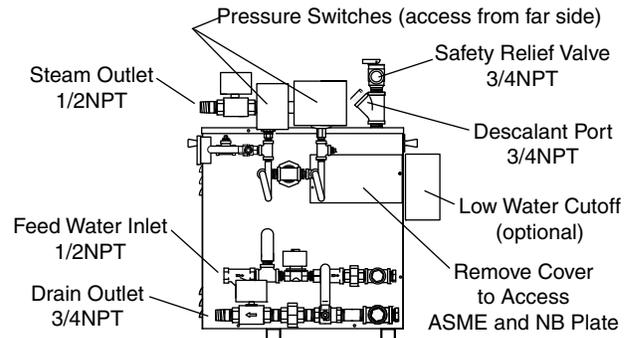
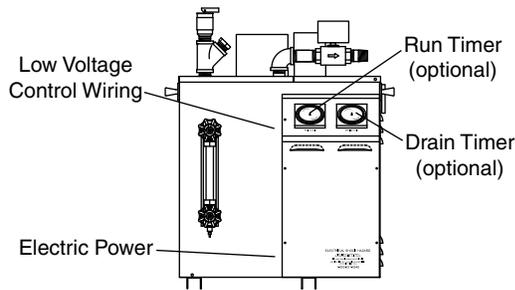
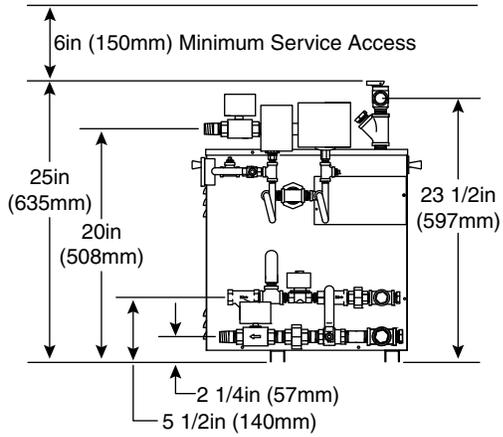
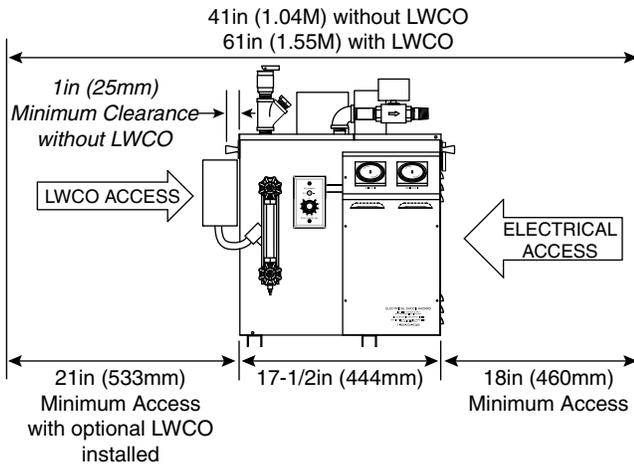
AMEREC AI BOILER RATINGS

CATALOG #	UL-MODEL #	WATTS	VOLTS	PHASE		AMPS	MAX ROOM SIZE CU FT [CU M]	STEAM LB-HOUR	DIMENSIONS		
				L	W				H		
AI12	12-208	12 000	208	1	59	500 [14]	36	17 1/2 x 20 3/4 x 23 1/4 [444.5 x 527.0 x 590.6]			
				3	34						
	12-240		1	51							
			3	30							
12-415	415	3	18								
12-480	480	3	15								
AI18	18-208	18 000	208	1	88	750 [21]	54				
				3	51						
	18-240		1	76							
			3	44							
18-415	415	3	26								
18-480	480	3	22								
AI24	24-208	24 000	208	1	116	1000 [28]	73				
				3	68						
	24-240		1	101							
			3	59							
24-415	415	3	34								
24-480	480	3	29								
AI30	30-208	30 000	208	3	84	1250 [35]	91				
	30-240		240		73						
	30-415		415		43						
	30-480		480		36						
AI36	36-208	36 000	208	3	101	1500 [43]	109				
	36-240		240		88						
			415		51						
	36-480		480		43						
AI42	42-208	42 000	208	3	118	1750 [50]	127				
	42-240		240		102						
			415		59						
	42-480		480		51						
AI48	48-240	48 000	240	3	117	2000 [57]	145				
			415		68						
	48-480		480		58						

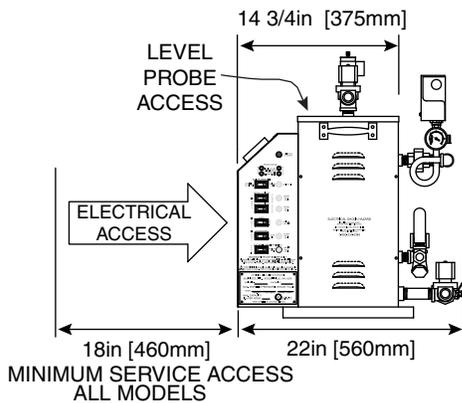
Notes:

- All models use 120VAC 60 Hz or 240V~ 50 Hz control circuits.
- 208V, 240V and 400V models supply 120V (OR 240V to control circuit internally, 480V models require a separate 120V service.
 - o For 208V, 240V and 415V models, run power wires + Ground and a 14AWG Neutral for controls.
 - o For 480VAC units, run 3 power wires + Ground and run a 120V service for the control circuit.
- All models: no internal heating circuit fuses are needed; a panel mounted 3A fuse provided for the control circuit
- Use only copper wire, rated 75°C or better.
- Install all wiring per local and national codes.

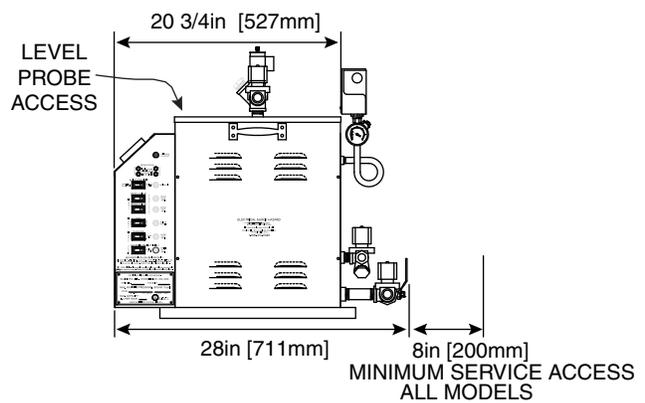
ALL MODELS



12, 18 and 24 kW MODELS



30, 36, 42 and 48kW MODELS



INSTALLATION

BOILER

AI Steam Generators must be installed by a licensed plumber and electrician to local and national codes.



AI Steam Boilers are intended for indoor use only.
Install upright and level side to side and front to back.
Not for space heating purposes.
Protect from freezing.

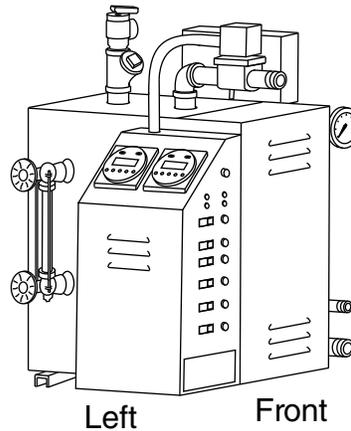
The steam generator is designed to sit directly on a hard level surface. The mounting location must be suitable to safely support over 125lb.s (57 kg) for models AI12-AI24 and over 150lb.s (68 kg) for AI30-AI48. The boiler must be mounted upright and level and prevented from moving. Ensure that the boiler is mounted high enough above the drain receptacle to allow proper drain flow. The weight of the boiler is generally sufficient to prevent movement. Use ¼" bolts through the holes provided in the boiler's feet to secure it in place floor if necessary.

The boiler's back end (nearest the water gage) may be installed 1" (25 mm) or further from a wall or combustible surface. Use the lift handle to set the minimum clearance by placing the boiler so the handle just touches the adjacent surface. Keep combustibles at least 1" (25 mm) away from left side, 8" (200 mm) from right side plumbing and 6" (150 mm) from top of switches and steam valve. Do not store solvents, paints or other flammables near the boiler.

All electrical access is from the left side and front end (as viewed at right). Up to 480VAC may be exposed during servicing. Leave space for service access: at least 18" (460 mm) to front and left side, 6" (150 mm) above the pressure switches and valves.

Refer to drawings on page 7 for clearances and connections.

Install per code: *your local codes may require even greater clearances.*



Leave sufficient space between the right (plumbing) side and adjacent surfaces to allow servicing the plumbing when needed. Provide at least 8" clearance from the piping for access.

CAUTION: Exposed plumbing may be over 200°F (93°C) during normal operation and can present a severe burn hazard. Be sure to protect people from accidental contact!

PLUMBING All valves are factory equipped with a short pipe nipple in their outlet. When attaching plumbing, hold these nipples while tightening. Do not tighten plumbing by using a wrench on the brass valve bodies as this can damage the valve! Brass or copper lines are recommended for all plumbing; a dielectric coupling may be necessary.

1. INSTALL WATER LINE

Run a ½" potable water feed line between the nearest cold water line and the WATER INLET fitting on the boiler. Install a shut-off valve near the boiler. When tightening this fitting always use two wrenches so there will be no strain on the water inlet valve. The shut off valve must remain open during boiler operation! Feedwater pressure may be between 20 and 100 psi (1.4 to 7 bar). Feedwater pressure should be limited to approximately 20 psi (1.4 bar) for best performance. A water hammer prevention device is factory installed on all steam boiler boilers. *Excessive water hammer can damage a water valve, preventing it from shutting off the water supply to the boiler!* Special water treatment may be required in your area – see AUTODRAIN section on page 16 for further details.

Flush water supply line thoroughly before final hookup. Debris such as flux residue can prevent the inlet valve from fully closing. A grit filter is factory installed on the boiler to trap large debris such as sand. Shut the water supply off and remove and clean the filter periodically as dictated by local water conditions.

A customer supplied back-flow prevention device may be required in your area. Check local codes. To prevent water level sensing errors, backflow prevention is necessary in installations where the steam boiler's water supply is shared with another boiler or other nearby high usage connection.

2. INSTALL STEAM LINE

AI boilers come equipped with ¾"NPT steam outlets. *Do not place a shutoff device in the steam line!* Locate steam heads so bathers do not come into contact with a steam head and so steam may not exhaust directly on any part of a bather's body. Steam and steam heads are very hot and can cause severe burns!

Run a ¾" copper steam line from the boiler to the steam room. The steam line should enter the steam room low on the wall, 15" to 18" (380 to 450 mm) above the floor.

IMPORTANT: The steam line should be pitched away from the boiler so any condensate will drain from the steam line. For best results, the boiler should be installed as close to the steam room as possible, with its steam outlet valve higher than the steam heads in the steam room and the steam line run straight to the steam heads with a pitch of at least $\frac{1}{4}$ " per foot (6.4 mm per 305 mm) to drain into the room. Do not allow sags, dips or other low sections in the steam line: these may block the steam flow or cause spitting of very hot water into the steam room.

As with any steam bath steam boiler, spitting, reduced steam and other problems can occur if too many elbows or tees are placed in the steam line, if the line is too long, if the line has large rises or if there are low area or traps in the line. The effects depend on the number and size of these practices in a particular installation.

To reduce noise or improve the distribution of steam in larger rooms, additional steam heads may be installed. Two steam heads are supplied with each boiler. Space steam heads at 6" (150 mm) intervals, minimum. The steam heads should be located to ensure they do not discharge steam or drip condensate where the user may come in contact with the hot moisture – *contact may cause injuries from scalding to severe burns!*

AT THE STEAM ROOM: Drill/prepare a $1\frac{3}{8}$ " (35 mm) hole at each steam head location for steam line entry 15" to 18" (380 to 460 mm) above the floor. Terminate the steam line from the boiler with a tee at the steam room then plumb each side of the tee to a steam head location and through the wall. Center the $\frac{3}{4}$ " copper steam pipe in the $1\frac{3}{8}$ " (35 mm) hole. Terminate the steam line with a $\frac{3}{4}$ " NPT male adapter. Stub the line out into the room $\frac{3}{8}$ " (9.5 mm) from the finished surface. Secure the steam lines to structural members.

INSTALL STEAM HEAD INSULATOR(S): Fill in gaps using 100% Silicone caulk between steam pipe and finished wall surface at point of entry (see drawing). Apply silicone caulk to the finished wall side of the steam head insulator and screw on hand tight until flush with the wall with the opening pointing down. If a hand tight fit does not align with the opening pointing down, use teflon tape on the steam line threads to adjust the fit. Protect the steam head finish from damage while handling and tightening.

INSTALL STEAM HEAD: Slide the steam head on until it rests firmly against the finished wall. Tighten the hex head screw underneath the steam head to secure it in place with the Allen wrench provided. The steam head should be level with its fragrance reservoir at the top.

IMPORTANT Check all of the standard fixtures in the steam room. All fixture penetrations and steam head insulators must be sealed with 100% silicone caulk to avoid moisture damage within walls.

When the steam line is in an area where the temperature will be below 40°F (4.4°C) or if the line is more than 20 feet (6 m) long, best results can be obtained by insulating the steam pipe. Any insulation must be suitable for temperatures of at least 250°F (120°C).

3. INSTALL SAFETY VALVE LINE All AI boilers are equipped with a factory installed 15 psi (1.1 bar) pressure relief safety valve. This must be plumbed to a $\frac{3}{4}$ " indirect waste line. Do not install a shut off device in this line. Do not reduce this line. Do not form a trap in this line! Discharge from the safety valve may be at over 240°F (120°C). Do not plumb this line into the steam room! Plumb this waste line per local plumbing codes.

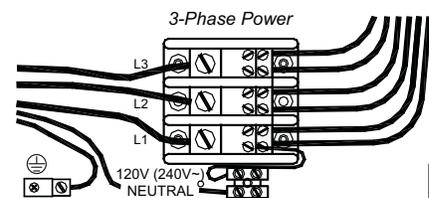
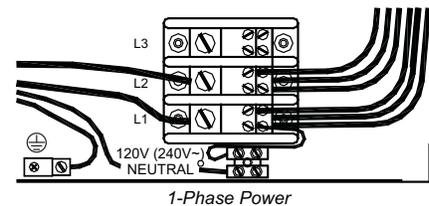
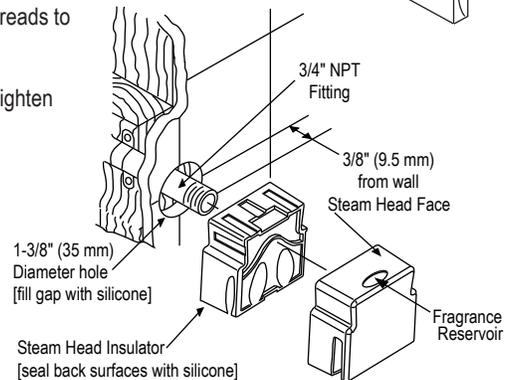
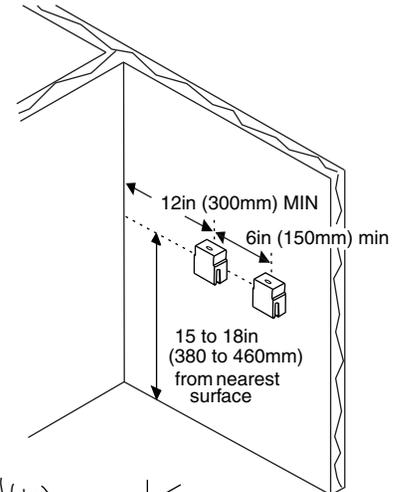
4. INSTALL DRAIN All AI boilers are equipped with a factory installed manual ball valve to allow draining the tank. An optional electronic drain may be installed after the manual valve. Plumb the drain to a $\frac{3}{4}$ " indirect waste line. If the drain is opened while the boiler is under pressure, discharge from the drain may be at over 240°F (120°C) and near 15 psi (1.1 bar). Do not plumb this line into the steam room! Plumb this waste line per local plumbing codes. A (customer supplied) expansion tank or blowdown cooling tank may be required by local code.

ELECTRICAL

Refer to the ID plate on the boiler's switch panel to determine voltage and current requirements.

Electrical service for all models requires two (single phase) or three (3 phase) hot leads plus a suitable ground connection. Models operating on 208V, 240V, 415V or 480V also require a 14 AWG Neutral for the boiler controls circuit. Models operating on 480V require a separate 120V (14AWG) service for the controls circuit. Route the copper supply wire with appropriate strain relief through the hole marked POWER ENTRIES. A multiple knockout is provided at this point for electrical service using up to 2" conduit. A second knockout, $\frac{1}{2}$ " to $\frac{3}{4}$ ", is provided for the 120V controls circuit, if needed.

CAUTION: Loose wire connections can cause heat damage to wires, terminal blocks and other components and may void the warranty.



ELECTRICAL (continued)

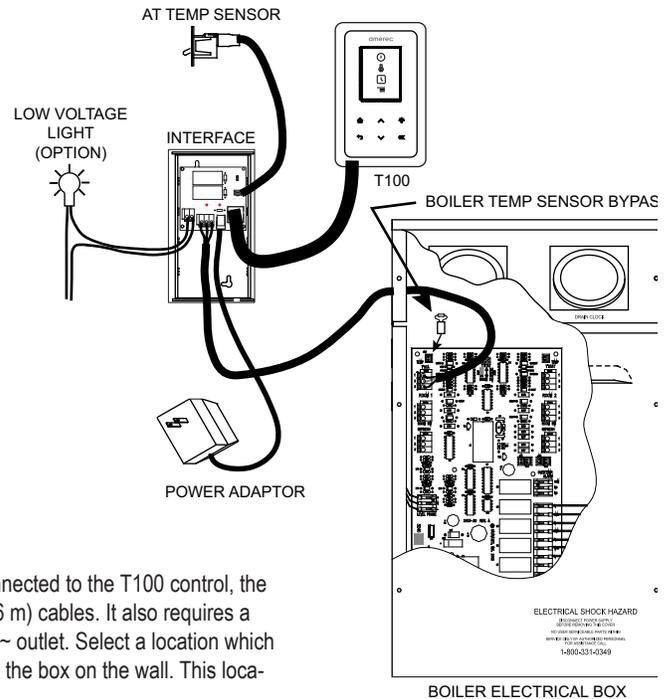
Connect the control circuit's Neutral (208/240/415V models) or 120V+N (480V models) to the left side of the small terminal block provided in the generator's electrical enclosure. Connect the power service to the boiler's large terminal block and the ground to the boiler's ground lug, located near the front edge of the electrical enclosure (a copper wire clamping lug). Ensure all wires are tightly clamped at their respective terminals.

NOTE: A GFI device is not required by UL. A GFI may be installed if required by local codes or the owner. A GFI device will tend to nuisance trip due to heater element aging.

ROOM CONTROLS

Each steam valve outlet is to be used for a single steam room. Each room requires one temperature sensor mounted in the room and one T100 room control mounted inside or outside the steam room. The T100 and temperature sensor connect to a wall mounted interface box. The interface connects to the circuit board in the boiler's electrical enclosure. *To reduce the risk of electrical interference between circuits, do not run the low voltage control cables inside the same conduit as high voltage circuits. Avoid running control cables closely alongside high voltage wiring in cable troughs and raceways.*

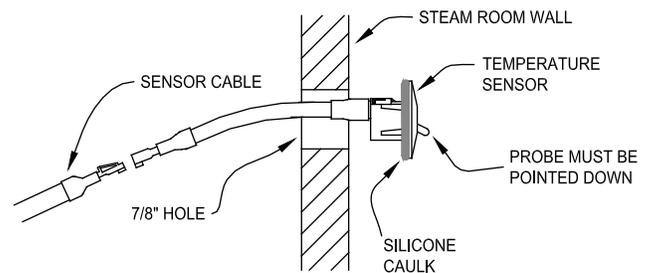
Two independent control circuits are available for two steam outlets to supply two separate steam rooms. If only one valve is installed on the steam boiler, it will be controlled by the ROOM 1 circuit with the T100's interface box connected to the T-STAT terminal block at the upper left edge of the printed circuit board (PCA) located in the boiler's electrical enclosure. When the (optional) second steam outlet is provided, the second room's control interface connects to the T-STAT terminal block at the upper right edge of the PCA in the same manner as the ROOM 1 circuit described here. *Follow all wiring and PCA jumper setting instructions closely for proper operation.*



1. **INSTALL THE T100 INTERFACE BOX** The T100's interface box will be connected to the T100 control, the room temperature sensor, and the steam boiler using the supplied 25 foot (7.6 m) cables. It also requires a 9VDC power adapter (provided) which connects to a nearby 120VAC or 230V~ outlet. Select a location which is convenient to the boiler, power, control and temperature sensor then mount the box on the wall. This location should be dry and keep the box safe from damage.

- Remove the box's cover before mounting by gently pulling out on the sides of the box cover until it slides off.
- Locate the two mounting holes inside the box then use screws or other appropriate mounting methods to secure the box to the wall.
- Leave the cover off until all cables and power are connected and the installation has been shown to be working correctly.

2. **TEMPERATURE SENSOR INSTALLATION** *Before installing the sensor, make sure it has a yellow band on the tubing on the back of the assembly. If not, contact technical support at 1-800-363-0251 for assistance. The temperature sensor must be mounted in the steam room. Cut a 7/8" (22 mm) diameter hole in the steam room wall to mount the sensor. It is recommended that the sensor be mounted 6" (152 mm) down from the ceiling, but not directly over the steam dispersion head and not more than 7 feet (2.1 m) above the floor. Do not cover or enclose the sensor: if the airflow across the sensor is blocked or reduced, the room may overheat or suffer large temperature variations.*



String the sensor cable from the sensor location through 1/2" (12 mm) holes in the wall studs or ceiling joists to the adapter box location. Leave 12" (300mm) of slack at the sensor location. Note: *Do not staple through or otherwise damage the cable. Use a factory supplied sensor cable only.*

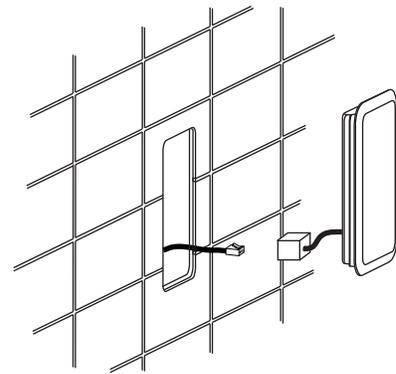
In the steam room: Plug the temperature sensor into the sensor cable. The cable and the sensor connectors are designed to lock together when properly aligned. Run a bead of 100% silicone caulk around the underside of the sensor head then carefully feed the cable and sensor through the hole and attach the sensor in place.

At the interface box: Connect the sensor cable's end plug into its socket on the box's circuit board. The socket is directly above the board's T100 jack. Orient the cable end to match its socket and insert it until the end locks in place. Use a cable strain relief (provided) to secure the cable to the interface box.

ROOM CONTROLS (continued)

3. **T100 CONTROL INSTALLATION** The low voltage control T100s can be mounted directly to a finished wall. Connect the control to the interface using the 25 foot (7.6 m) shielded 8 conductor cable (provided). String the cable from the control location through $\frac{1}{2}$ " (13 mm) holes in the wall studs or ceiling joists to the interface. Note: *Do not staple through or damage cable. Use factory supplied cables only.*

In the steam room: A mounting template is included at the end of this document. Using the supplied template, cut a hole in the finished wall where the control is to be mounted and pull the cable end out through the mounting hole. Plug the control cable into the cable on the back of the T100 control housing. Run a bead of 100% silicone caulk around the perimeter on the back of the control housing and insert the T100 into the finished wall, center the control and tape the control against the finished wall while the silicone hardens.



At the interface box: Connect the control cable's plug into the T100 jack on the box's circuit board. Orient the cable end to match its socket and insert it until the end locks in place. Use a cable strain relief (provided) to secure the cable to the interface box.

4. **CONNECT BOILER** A 25 foot (7.6 m) three conductor cable is provided to connect the interface box to the AI boiler steam boiler. String the cable from the control location through $\frac{1}{2}$ " (13 mm) holes in the wall studs or ceiling joists to the interface. Note: *Do not staple through or damage cable.* Install the cable in the interface's BOILER T*STAT terminal block by pressing the orange tab, inserting the stripped end of one cable conductor, then releasing the tab. Repeat until all three wires are secured. Repeat the process to connect the other end of the cable to the boiler circuit board's T*STAT terminal block. **Be sure the position 1 at the interface connects to position 1 at the boiler, 2 to 2 and 3 to 3!** Use a cable strain relief (provided) to secure the cable to the interface box.

5. **INSTALL BYPASS** The T100 connects to its own temperature sensor through the interface so the normal boiler temperature sensor is not connected. Instead, a sensor bypass (supplied) must be plugged into the TEMP SENS jack on the boiler's circuit board as shown at right. Orient the bypass plug to match the jack and insert it until the end locks in place.

6. **CONNECT INTERFACE POWER** A power converter provides low voltage to the interface for normal operation. Connect the power converter into an outlet near the interface box then run its cord through a hole in the interface box and connect it to the power jack on the interface circuit board (between the T-STAT terminal block and the T100 jack). When power is connected, the PWR light (*above the T*STAT terminal block*) should light bright and steady. Use a cable strain relief (provided) to secure the cable to the interface box.

7. **LIGHT (OPTION)** The interface circuit board includes a terminal block for use with a low voltage room light, such as Amerec's Chormatherapy kit (*contact Support for more information*). Connect the interface in line with one of the light's power leads as shown at right and connect those leads to the LOW VOLTAGE RM LIGHT terminal block by pressing an orange tab, inserting the stripped end of a conductor, then releasing the tab. After connecting both wires, use a cable strain relief (provided) to secure the light wires to the interface box.

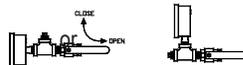
8. **BOILER SET UP** Place or remove jumpers on the boiler's circuit board as shown in the drawing on the next page.

STARTING THE BOILER FOR THE FIRST TIME

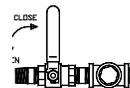
Before applying power to the boiler for the first time: On the electrical box's front panel, set all rocker switches to the left, their normal operating position. If installed, set the optional Run Clock so the boiler is off and make sure the water supply is connected to the boiler and turned on.

- Open the valves on the glass water gage all the way (counterclockwise).

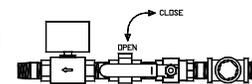
- Open the pressure gage valve (handle horizontal).



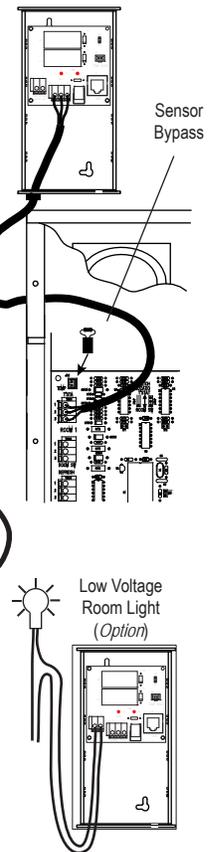
- If the Autodrain option is not installed, close the manual drain ball (handle up).



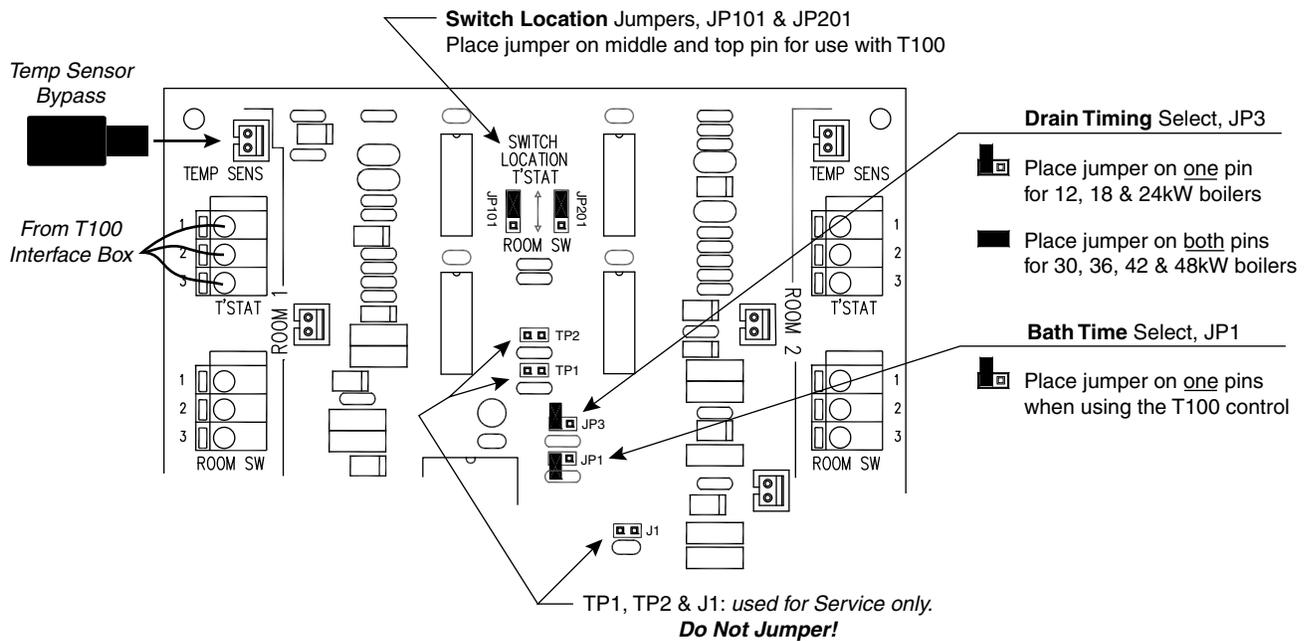
- If the optional electronic Autodrain is installed, open the manual drain ball valve as shown (handle pointing towards electronic valve). Set the Drain Clock to an off position (no orange showing in area above pointer).



- Turn on the electrical service to the boiler. All lights and valves should be off at this point.



BOILER CIRCUIT BOARD SET-UP



STARTING THE BOILER FOR THE FIRST TIME (continued)

NOTE: When the boiler is started with an empty tank, the room steam valves will open to release the air pressure created during water fill. Once the tank has filled, the valves will operate normally, opening only when steam needs to be released to a room to increase its temperature. Also, whenever a steam valve opens to release steam to a room, the boiler heating is disabled for a few seconds. This is designed to increase the elements' working life.

Set the BOILER OPERATION switch to the right (red showing) or set the optional run clock to a "RUN" position. The BOILER ON light, both room STEAM VALVE OPEN lights and the WATER VALVE OPEN light should turn on, one heat contactor will close and the boiler will start filling with water. The water will become visible in the water gage a few seconds later. In a short time, the feedwater valve and its light will turn off, the steam valve lights will turn off, the BOILER HEATING light will turn on and second heating element contactor will close. The boiler will continue heating until it reaches its operating pressure of approximately 4 to 6 psi, then the BOILER HEATING light and one contactor will turn off. *During normal operation, the water level should always be visible in the lower half of the gage glass.*

Check for steam and water leaks. Repair any leaks before continuing.

VERIFY T100 INSTALLATION

After all connections have been made, and the boiler operation verified (per previous section), make sure the interface box is turned on (PWR light on) and power is turned on to the room light (if installed) and the boiler is set to RUN.

- On the boiler: the room steam valve should be closed and the ROOM STATUS lights should be off.
- At the Control: touch the bottom of the T100 screen to light the display. With the  icon lit brightly on the display, press the OK switch. A small  should light below the T100 display, the interface board's two lights should be lit (left light shows power is on, right light indicates room should be heating), the room steam valve should open and the boiler's ROOM STATUS lights should light steadily.
- (Optional) Room Light (if installed): With the T100 display lit, press the T100's  switch. There should be a small  icon lit below the display and the room light should turn on.

If there are any blinking lights or other failures, recheck all connections. Contact Technical Support for assistance.

OPERATING INSTRUCTIONS

The AI boiler steam generation is based on two operating systems. The first is the boiler itself, maintaining water levels and boiling the water to create steam for use in a steam bath. The second is the steam room control circuit, maintaining a comfortable steam bath by releasing steam from the boiler only when needed to raise the temperature in the steam room. The boiler's control circuit board is used for both systems so the boiler must be running before starting a steam bath. And the boiler may run continuously without affecting the steam room temperature. In this way the boiler can be left running so it is ready to produce steam immediately when the T100 is used to start a steam bath.

OPERATING INSTRUCTIONS (continued)

BOILER START The boiler operation may be started in one of two ways.

1. To start the boiler manually, place the BOILER OPERATION switch (located on the boiler's switch panel) to its MANUAL RUN position. The switch will show a red color at its left side to indicate that it has been turned on and the BOILER ON light will turn on to show the boiler is running. If an optional Run Clock is installed, this manual switch will start the boiler regardless of the clock setting and the boiler will continue to run until the switch is returned to the CLOCK RUN position.
2. To start the boiler using the optional Run Clock, leave the BOILER OPERATION switch in its CLOCK RUN position. Program the Run Clock to the desired on (RUN) and off periods. To determine if the clock is switching properly, rotate the dial to the right: when an on period is reached the BOILER ON light will turn on and the boiler will fill and heat as necessary. Continue rotating the clock dial until the clock is reset to the current time. Check the Run Clock dial later in the day to ensure it is maintaining time correctly. *For digital clocks, refer to the Clock Operating instructions.*

Normal boiler operation controls water fill and heating using three water levels. The lowest level serves as an automatically resetting low water cut-off safety level: if the water level drops too far the heating elements are turned off to prevent damage. When the water level is near the bottom of the water gage glass, there is enough water in the tank to allow heating it safely. When the water level reaches near mid-glass, the water level has reached its maximum depth and the water valve will close until the level drops to about 1/4 of the glass again.

Water heating is controlled by the operating pressure switch. While there is enough water in the tank to allow heating, the elements will be energized if the pressure in the tank is below the switch setting (about 3 psi) and the water will be heated until enough steam pressure is generated to build up pressure in the tank to about 5 psi. At this point the elements are turned off until the pressure drops again.

If the steam bath is not turned on, no steam will be released to the room and the boiler will need to boil the water only to make up for temperature loss from the boiler itself. During a steam bath, particularly during initial heating, the boiler may need to heat continuously to compensate for the steam being released to the steam room. The boiler might not build up any pressure during this period.

When the boiler is started with an empty tank, the steam outlet valve(s) will open to release air pressure created by adding water. If not released, this air pressure could be sensed by the pressure switch, preventing heating. When the water reaches the safe heating level, the heat will turn on and, if the steam bath is not turned on, the steam valve(s) will close when the water reaches its maximum depth.

STEAM ROOM OPERATION The steam room begins heating when the thermostat or room switch is used to "turn on" the steam bath. While the steam bath is on, steam is released to the room as needed to bring the temperature up to the thermostat setting. When the boiler supplies two rooms, the rooms operate identically but independently. Only one room will be described here.

The T100 is the thermostat, controlling the steam bath temperature. *Refer to Amerec doc. 4209-53 for the detailed T100 operating instructions.*

The T100 lets the user start and stop the steam bath, adjusts the bath temperature, and controls how long the bath runs before automatically stopping. When the bath is turned off, the boiler's steam valve will remain closed and the corresponding ROOM STATUS LEDs on the boiler will remain turned off.

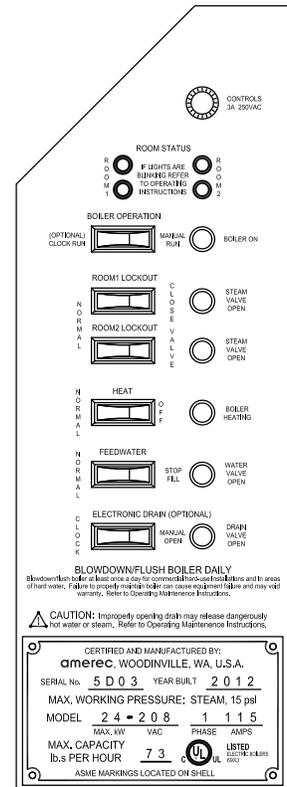
LIGHTS AND SWITCHES are provided to show boiler operating status, to indicate fault conditions and to allow manual control of boiler functions for routine maintenance and troubleshooting. During normal steam bath operation, the ROOM STATUS LEDs on the boiler will light steadily. These LEDs will blink in specific patterns to indicate problems with the steam bath temperature control or boiler water level control.

When the boiler is operating normally, the BOILER ON light will be lit. All switches will be set to the left except the BOILER OPERATION switch will be set to MANUAL RUN (unless an optional Run Clock is installed).

The boiler's STEAM VALVE OPEN lights will turn on when steam is released to heat the corresponding steam room. Set a room's ROOM LOCKOUT switch to the CLOSE VALVE position to prevent steam being released to that room during servicing, room cleaning, etc.

Whenever the boiler is operating, the heat contactors will close as needed to turn on the heating elements, heating the boiler's water and creating steam. The BOILER HEATING light turns on when the elements are turned on. Place the HEAT switch in the OFF position to prevent heating, such as during manual drain/blowdown. **NOTE: when a steam valve opens to release steam to a room, the boiler heating is disabled for a few seconds. This is designed to increase the elements' working life.**

When the feedwater valve opens to refill the boiler, the WATER VALVE OPEN light will turn on. Set the FEED-WATER switch to STOP FILL to prevent water fill, such as during manual drain/blowdown.



OPERATING INSTRUCTIONS (continued)

The optional electronic Autodrain valve is normally closed, opening only when power is supplied by a Drain Clock or by the ELECTRONIC DRAIN switch to start drain/blowdown. When the Autodrain valve is opened, the DRAIN VALVE OPEN light will turn on. Normal operation is controlled by a clock: use the ELECTRONIC DRAIN switch to open the drain without resetting the clock. This switch has no effect when the electronic drain valve is not installed. The manual drain ball valve must be left in the open position for the electronic Autodrain to function. There is a delay between seeing the DRAIN light turn on and the drain valve opening. This delay could be a minute or more, depending on the valve installed.

ROUTINE MAINTENANCE

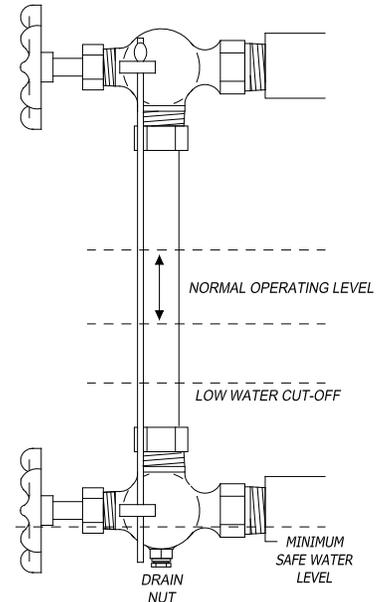
The boiler and controls should require very little maintenance. We recommend checking water level control periodically and frequent draining of the tank to ensure continued safe operation. Check for smooth, rapid flow when filling or draining the boiler. Also look at the boiler frequently to check for leaks and periodically check for loose or overheated wires and for indications of corrosion.

WATER LEVEL CONTROL

Your local code may require a low water cut-off test at certain intervals. This is a good idea whether or not it is required. We recommend checking water level controls at least monthly. CAUTION A hot boiler can result in very hot water and steam being released to the drain and the operator may be exposed to dangerously high temperatures on fittings, valves and pipes. This test may be done while the boiler is cold.

To check the water level control circuit, first start the boiler using the BOILER OPERATION switch.

- Set the HEAT switch OFF. Turn on the steam bath and verify the room's steam valve is open (this will help the boiler drain more quickly in the following steps). Adjust the thermostat as needed to open the steam valve.
- Check the water level showing in the gauge glass: when the level rises above the middle of the glass, the water valve should close and stop filling the boiler.
- Open the boiler's drain and reset the HEAT switch to its NORMAL position: the BOILER HEATING light will turn on and the heating contactors will close.
- Watch the water level in the gauge glass: as the level reaches a depth of about 1/3 of the glass, the water valve will turn on again.
- Set the FEEDWATER switch to STOP FILL and the water valve will close.
- Allow the water to continue to drain and watch the level in the glass. When the water level drops to about 1/2" depth in the glass, the BOILER HEATING light will turn off and the heat contactor will open. This is the low water cut-off level.
- Set the BOILER OPERATION switch to off, close the drain and reset all switches to their NORMAL position. Reset the thermostat to its original position. The boiler is now ready for normal operation again.



BOILER BLOWDOWN/AUTODRAIN

The boiler is supplied with a manual drain valve and may be equipped with an (optional) electronic Autodrain valve. An Autodrain valve is always a good idea to easily schedule frequent draining. Rinsing or other cleaning of the tank is a manual operation. Draining the tank, particularly while under pressure, is often referred to as "blowdown." To avoid confusion, we will refer to emptying the boiler's tank as "draining" here.

When water is changed to steam, solids may be left behind, eventually interfering with the water level sensing and possibly causing premature element failure. Frequent draining and periodic cleaning of the tank is necessary to help reduce the build-up of these solids (scale and sludge). Every installation is unique in its water quality and maintenance requirements. Symptoms of excessive build up include faulty water level sensing, gauge glass stained or water level not changing, plugged/slow running drains and early element failure. Draining the boiler tank at least once a day is recommended even with good water, much more often could be necessary as water quality drops. For reliable operation, your site may require water treatment.

CAUTION: *Draining a hot boiler may release dangerously hot water or steam, risking personal injury and damage to plumbing! Your local code may require that boiler pressure be limited to under 5 psi and require a special drain system to drain a hot boiler while under pressure!*

Local water conditions and the amount of time per day that the boiler operates will determine the necessary draining and cleaning intervals. We recommend draining daily or after every use and inspecting for properly flowing drain at least monthly. If you drain it shortly before starting the boiler you will start your bath with clean, fresh water, too. A slow running drain or mineral build up in the gauge glass may indicate excessive build up in the tank and a more thorough cleaning should be done immediately.

We recommend inspecting for a clear water gauge glass at least monthly. Also, the gauge glass should be drained at least monthly, more often with poor water quality: while the boiler is pressured, use a wrench to open the drain cock on the bottom gauge valve for a couple seconds. A safety device is included in each gauge valve to prevent loss of steam and water should the gauge glass be broken. The gauge glass drain procedure will reduce the risk of plugging up the valve or its pressure stop. Use CAUTION when performing this routine to protect yourself from the hot water and steam released from the gauge drain!

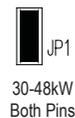
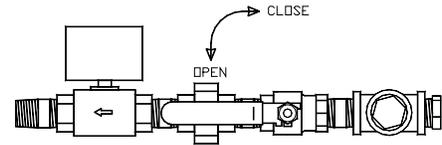
BLOWDOWN/AUTODRAIN (continued)

Failure to properly maintain the boiler can cause equipment failure and may void the warranty.

Using the Autodrain requires setting its clock or using the manual ELECTRONIC DRAIN switch on the boiler's switch panel. Set the Drain Clock's tabs inward (so orange is showing) for the time of day you wish the boiler to drain. If the boiler also uses a Run Clock, a good time to drain the boiler is shortly before the Run Clock is scheduled to start the generator for the day. **CAUTION** *If draining a hot boiler, care must be taken to ensure it may drain safely while unattended.*

Note: The manual drain valve must be left open for the electronic drain to work properly and the tank select jumper on the boiler's circuit board must be positioned correctly to provide proper drain cycle timing for the Autodrain™ system. If the jumper is mis-set, a 12-24kW boiler may overflow and water may run out the steam head during the drain cycle or a 30-48kW boiler may drain hot water.

The Autodrain's™ system uses a computer controlled drain cycle to add and drain water in steps, rinsing the tank and draining water at or below 140°F (60°C). This will also eliminate the need for special drain systems or blowdown tanks in most jurisdictions. The drain cycle begins when started by the Drain Clock, first releasing any stored steam to the steam room then adding, mixing and draining water a few times. Once the cycle is complete, the boiler returns to its normal operation. If the steam bath operation when the Cooldrain™ cycle is started, the computer will wait until the room is up to temperature before beginning the drain cycle in order to reduce the effects felt by the bathers. If the room does not come up to temperature within 20 minutes, the drain cycle will begin anyway.



During the drain cycle, the upper Room Status LEDs will remain lit on the boiler. The lower Room Status LEDs and the Refresh switch LEDs will be off. These LEDs will also blink to indicate slow draining and possible scale build up. This indicates that the boiler requires maintenance. The blinking will continue until power to the boiler is reset.

Note: If the water drains too slowly, the upper Room Status LEDs will blink off once then light 5 seconds to indicate that the tank and drain may need cleaning. The drain cycle will continue to operate normally. If the drain is nearly plugged, the upper Room Status LEDs will blink off twice then light 5 seconds to indicate that the drain is not functioning and servicing is necessary. The drain cycle will not operate again until power has been reset.

To manually drain the generator (with an electronic Autodrain installed) set the ELECTRONIC DRAIN switch to the MANUAL OPEN position.

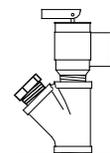
When an electronic drain is installed, make sure that the manual drain ball valve is always left in the open position. **Do not touch the safety valve when the boiler is hot: the valve will be dangerously hot!** Open a steam valve or the safety valve to relieve the vacuum caused by draining. A more effective drain and rinse procedure is to:

- First set the HEAT switch to OFF then set the BOILER OPERATION switch to MANUAL RUN to start the boiler.
- Turn on the steam bath and verify the room's steam valve is open (this will help the generator drain more quickly in the following steps). Adjust the thermostat if needed to open the steam valve.
- Check the water level showing in the gauge glass: when the level rises above the middle of the gauge, the water valve should close.
- Set the ELECTRONIC DRAIN switch to the MANUAL OPEN position and set the FEEDWATER switch to STOP FILL to keep the water valve closed.
- Watch the water level in the gauge glass: allow the boiler to drain for at least 30 seconds after the level drops below the gauge glass for the boiler to drain completely when clean. The water level should drop quickly and smoothly in a clean boiler.
- Toggle the ELECTRONIC DRAIN and FEEDWATER switches on and off as needed to add and drain water until it drains smoothly and quickly and the water in the gauge glass is clear. A drain is provided on the bottom water gauge valve to allow draining the gauge glass assembly if needed.
- Reset all switches and the thermostat to their normal positions when done.

*To manually drain the boiler (without an electrical Autodrain), simply open the manual drain valve. The water draining from the boiler may cause a vacuum, increasing the time needed to empty the boiler. To speed up the drain time, a room steam valve should be opened or the lever on the pop-off safety valve may be raised to allow air into the boiler to eliminate the vacuum. **Do not touch the safety valve when the boiler is hot: the valve will be dangerously hot!** When the boiler has finished draining, close the valves.*

To rinse and drain the boiler, follow the autodrain procedure above, opening and closing the manual valve as needed.

CLEANINGA plugged port is provided next to the safety relief valve. This port is used to add cleaning solution to the boiler without affecting other plumbing. The safety valve must be installed in the upright position as shown.



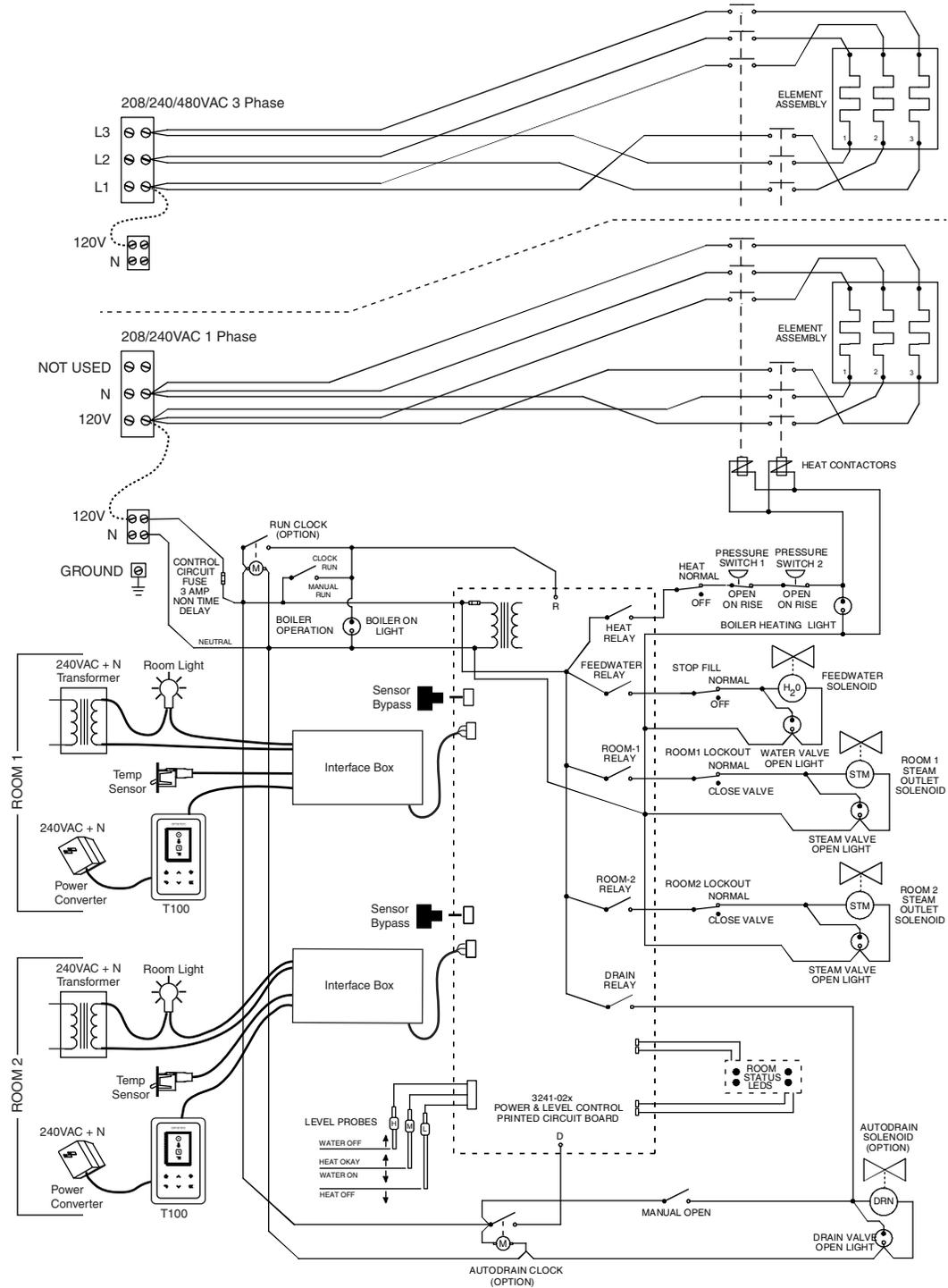
If the water drains slowly or sporadically, it may be necessary to remove the element assembly and clean the tank by hand. If this condition is seen, stop using the boiler and call Technical Support for assistance.

WIRING: AI12, AI18 and AI24, 208/240/480V 60Hz Models



All wiring must be installed by a licensed electrical contractor in accordance with all applicable local and national codes!
 Electrical ground required on all steamers.
 Electrical Shock Hazard -- High voltage exists within this equipment.
 There are no user serviceable parts within this equipment.
 Disconnect all electrical supplies when servicing this equipment.

Note: Jumper factory installed between field wiring terminal blocks to pick off 120VAC for control circuit. Jumper is not installed on 480V models.
 A separate 120V+N service required for control circuit on 480V models.

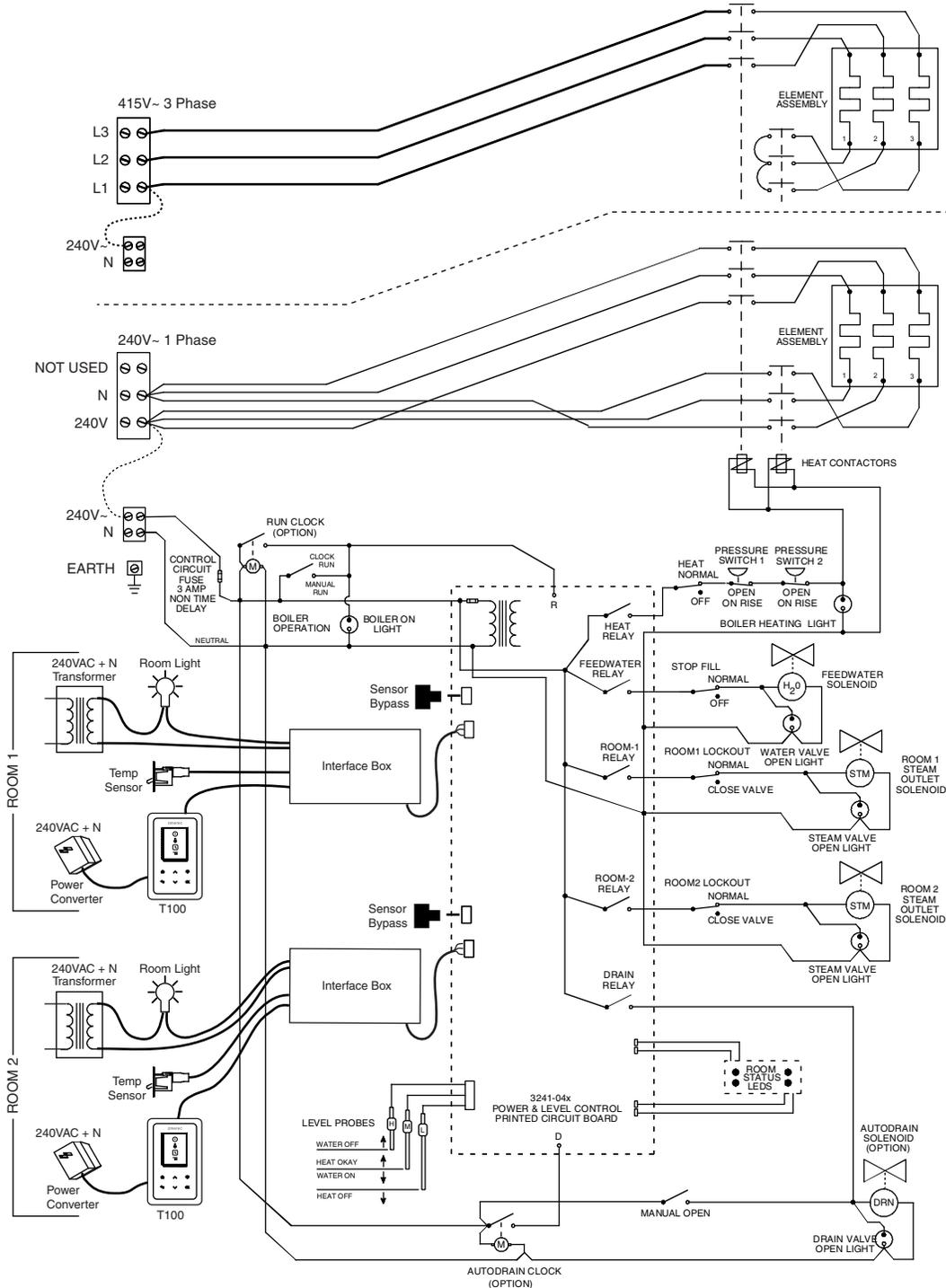


WIRING: AI12, AI18 and AI24, 240/415V~ 50Hz Models



All wiring must be installed by a licensed electrical contractor in accordance with all applicable local and national codes!
 Electrical ground required on all steamers.
 Electrical Shock Hazard -- High voltage exists within this equipment.
 There are no user serviceable parts within this equipment.
 Disconnect all electrical supplies when servicing this equipment.

Note: Jumper factory installed between field wiring terminal blocks to pick off 240V- for control circuit.

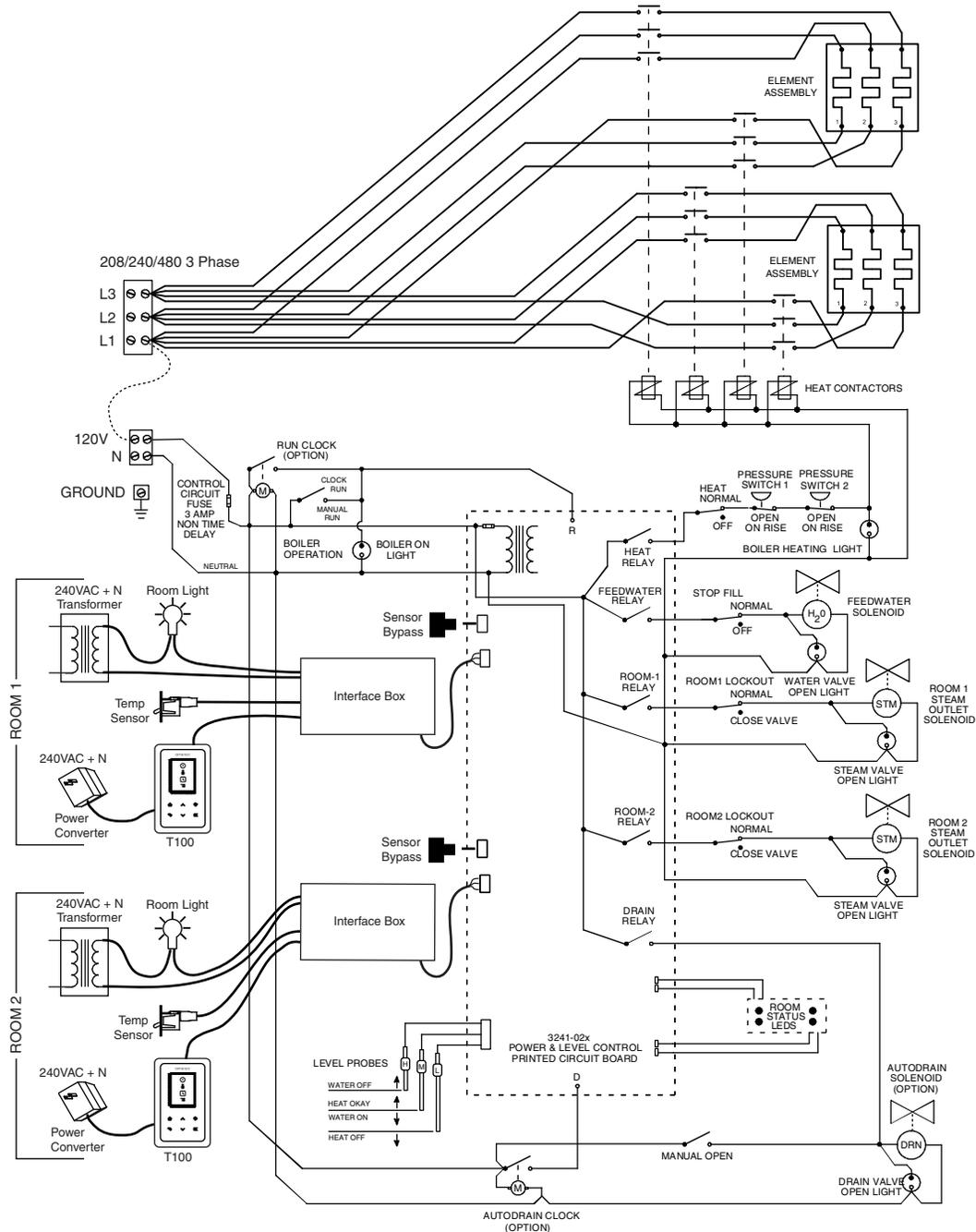


WIRING: AI30, AI36, and AI48, 208/240V/480V 60Hz Models



All wiring must be installed by a licensed electrical contractor in accordance with all applicable local and national codes!
 Electrical ground required on all steamers.
 Electrical Shock Hazard -- High voltage exists within this equipment.
 There are no user serviceable parts within this equipment.
 Disconnect all electrical supplies when servicing this equipment.

Note: Jumper factory installed between field wiring terminal blocks to pick off 120VAC for control circuit. Jumper is not installed on 480V models.
 A separate 120V+N service required for control circuit on 480V models.

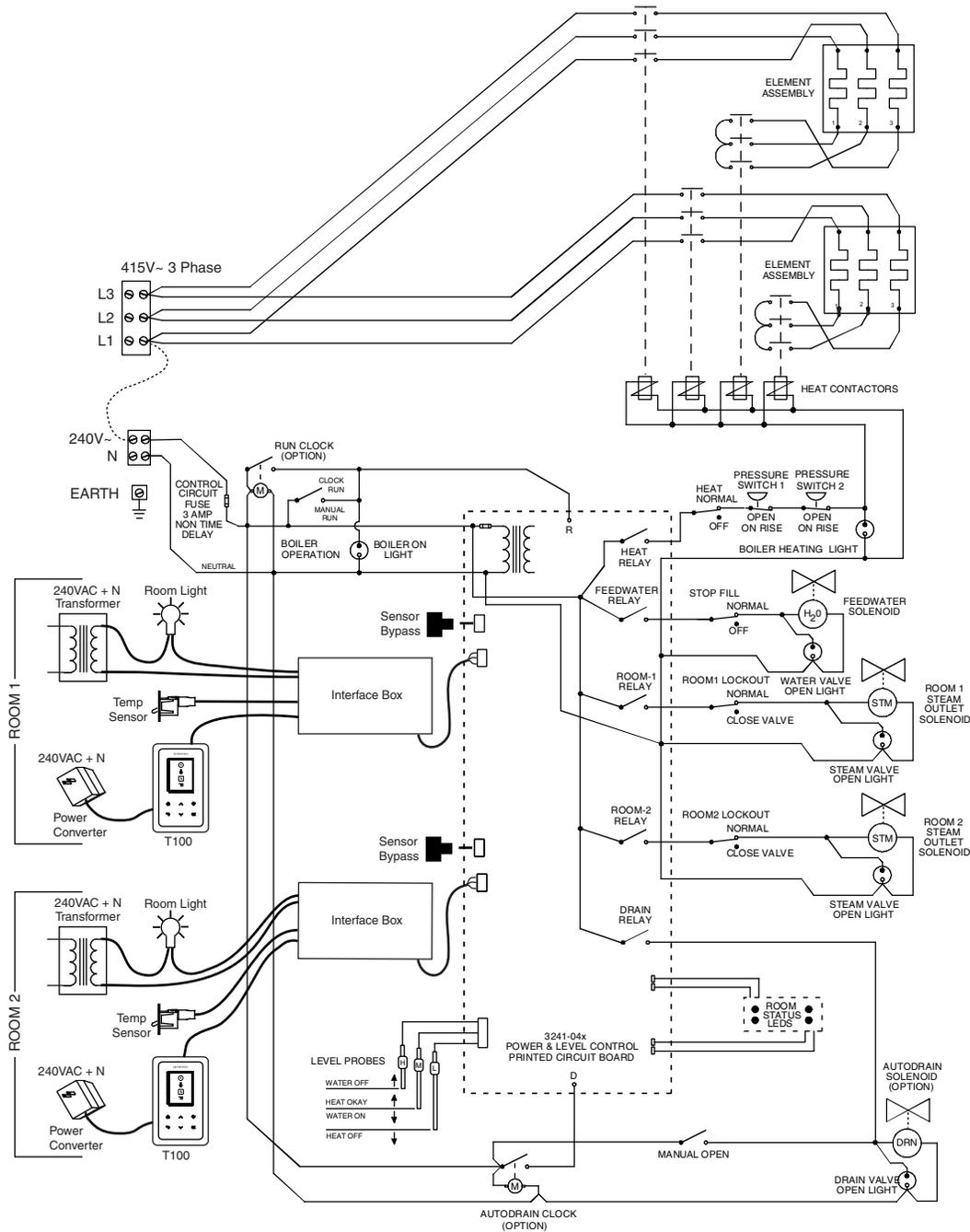


WIRING: AI30, AI36, and AI48, 415V~ 50Hz Models



All wiring must be installed by a licensed electrical contractor in accordance with all applicable local and national codes!
 Electrical ground required on all steamers.
 Electrical Shock Hazard -- High voltage exists within this equipment.
 There are no user serviceable parts within this equipment.
 Disconnect all electrical supplies when servicing this equipment.

Note: Jumper factory installed between field wiring terminal blocks to pick off 240V~ for control circuit.



APPENDIX 1: RUN CLOCK AND AUTODRAIN BLOWDOWN CLOCK

The AI series boilers may be factory equipped with an optional Run Clock (Boiler ON/OFF control) and/or a Drain Clock (operating an electronic Auto-drain blowdown valve). Two clocks are available: a 7-day clock typically used for Boiler ON/OFF operation and a 24 hour clock typically used for daily blowdown (or optionally for Boiler ON/OFF operation). Both clocks connect and function in the same manner. The 7-day clock is adjustable in two hour intervals, the 24 hour clock is adjustable in 15 minute intervals.

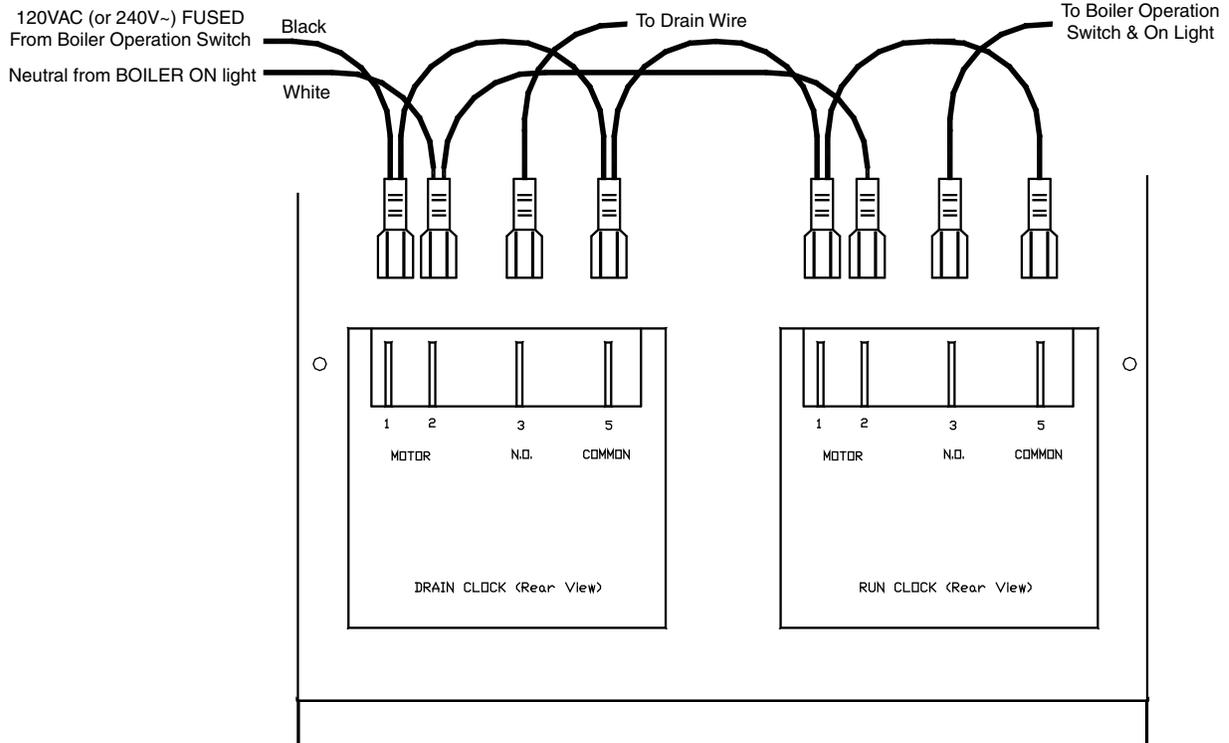
TO SET: Turn the clock dial to the right (clockwise) until the pointer matches the current time (and day) on the clock dial. Move set-tabs towards the clock center for the periods the boiler should be ON (or the drain should be open) and away from the center for OFF (or drain closed) periods. When the clock's pointer is in an area with orange showing, its switch will close and turn the boiler ON or open the Autodrain for blowdown.



NOTE: The clocks operate on 120VAC supplied by the boiler's control circuit. If this circuit loses power, the clocks must be reset to the correct time.

CONNECTIONS: Always turn off all power to the boiler before working on the electrical circuits! Remove the top (angled) cover from the electrical box by removing the two mounting screws. Insert the clock in its mounting cut-out (RUN in the left hole, DRAIN in the right hole) and connect the clock's wires as shown below. Wires are marked with their locations.

Note: The drain valve's wires are connected to the power wire from the DRAIN CLOCK and a Neutral lead in the boiler's contactor compartment.



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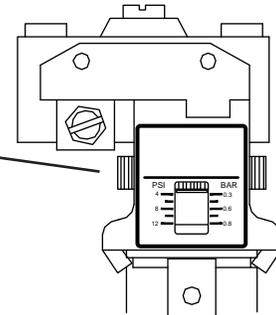
APPENDIX 2: PRESSURE CONTROL ASSEMBLY

The AI boiler comes equipped with two pressure switches, wired in series, to control boiler heating. The primary switch automatically closes when the boiler's internal pressure is low and opens when the pressure is high, turning the heating elements on and off as needed to create steam and maintain boiler pressure. The second switch is a safety control: it remains closed during normal operation but, should the primary switch fail and the boiler pressure increase too much, the safety switch will open, turning off the heating elements. The safety switch will remain open until the pressure has dropped and its reset button is manually pushed.

If the safety switch opens, there may be a problem with the primary switch. Check the primary switch operation by creating pressure in the boiler. Also verify that the pressure gauge shows a smooth and steady pressure increase. If the primary switch does not open at the correct pressure or the gauge shows rapid pressure increases, release all pressure and remove line voltage from the boiler and clean or repair the pressure control assembly as needed.

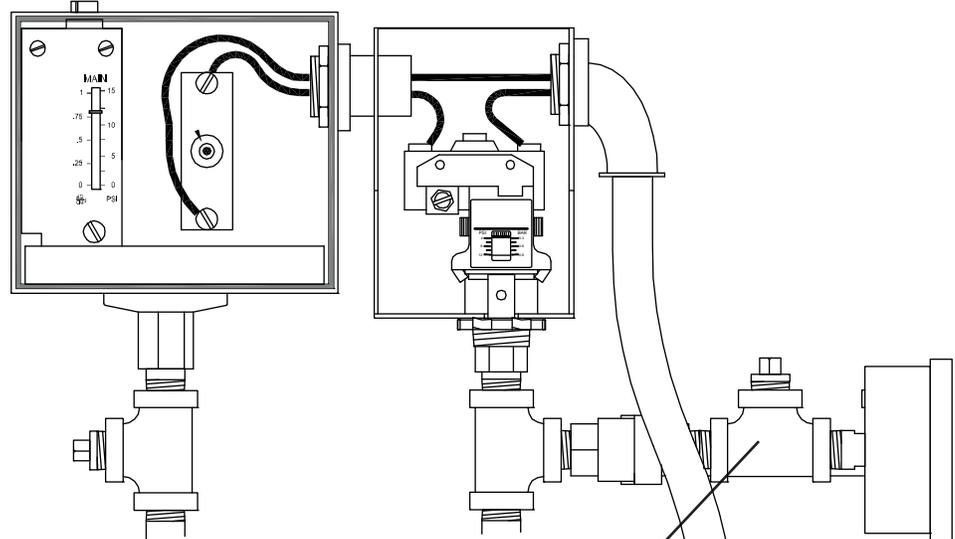
Adjust the pressure switches as shown below.

Turn the thumbwheel on the primary switch and set the bar to about 4 psi



Turn the screw on top of the safety switch to set the switch to a point higher than the primary switch setting and lower than the safety relief valve setting.

We recomend setting it to 10 psi.



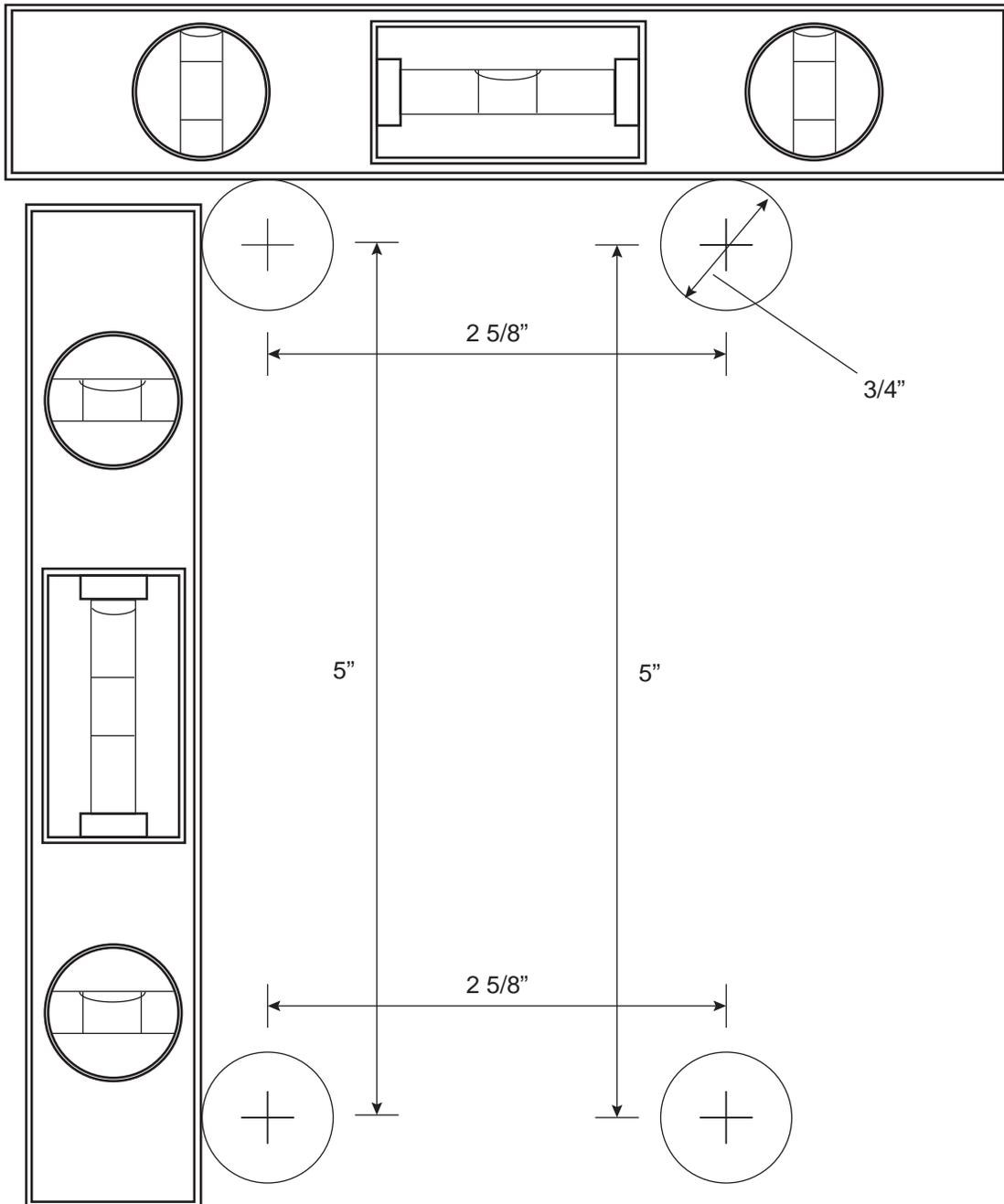
A fitting is supplied to allow connecting a second pressure gauge to easily replace the supplied gauge or to connect a second gauge for inspection. A ball valve is supplied assist with gauge changes; the valve should be left open during normal operation.

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APPENDIX 2: T100 ROUGH-IN

Step 1: Drill four 3/4" holes, level and plumb as shown below

*Always confirm pattern as printed is to scale before using as a template.
Some printers will change pattern size during printing.*



APPENDIX 2: T100 ROUGH-IN (continued)

Step 2: Cut straight edges from hole to hole as shown.

Note: dashed line shows outside edge of T100 control for reference

*Always confirm pattern as printed is to scale before using as a template.
Some printers will change pattern size during printing.*

