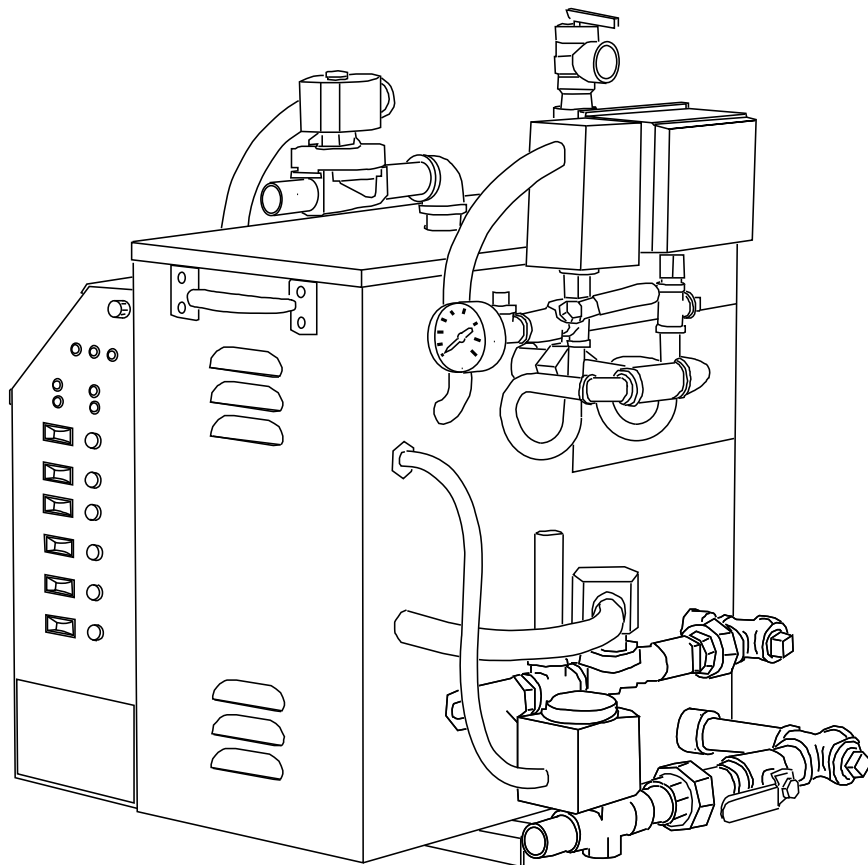




COMMERCIAL STEAM GENERATOR WITH COOLFLUSH™ AUTO DRAIN OPTION AND INTEGRAL LOW WATER CUT-OFF

BOILERS FOR LARGE STEAM ROOMS



INSTALLATION INSTRUCTIONS
MODELS AI 12, AI 18 AI 24, AI 30, AI 36, AI 42 & AI 48
208 and 240V 1 & 3 phase, and 480V 3 phase

INDEX

SECTION	PAGE
WARNINGS	3-6
GENERAL INFORMATION	7
WATER QUALITY REQUIREMENTS	7
BOILER RATINGS	8
INSPECTION INFORMATION	9
DIMENSIONS	10
INSTALLATION	11
GENERATOR	11
PLUMBING	11
WATER LINE	11
STEAM LINE	12
SAFETY VALVE	13
DRAIN	13
ELECTRICAL SERVICE	12
ROOM CONTROLS	14
TEMPERATURE SENSOR	14
THERMOSTAT	15
ROOM SWITCH (<i>I60 or other</i> <i>and Bath Time Settings</i>)	15
REFRESH CONTROL	16
WIRING DIAGRAM – CONTROL CIRCUITS	17
WIRING DIAGRAM – POWER AND CONTACTOR	18
STARTING THE GENERATOR	19
OPERATING INSTRUCTIONS	20
BOILER START	20
STEAM ROOM OPERATION	20
THE THERMOSTAT	21
THE I60 SWITCH	21
THE REFRESH™ CONTROL	21
LIGHTS AND SWITCHES	21
ROUTINE MAINTENANCE	22
WATER LEVEL CONTROL	22
LOW WATER CUT-OFF (LWCO)	22
BLOWDOWN - CoolFlush™ AUTO DRAIN OPTION	23
BLOWDOWN - MANUAL DRAIN	24
APPENDIX 1: RUN CLOCK AND AUTOBLOWDOWN TIMERS	25
APPENDIX 2: RUN AND AUTOBLOWDOWN DIGITAL CLOCKS	27
APPENDIX 3: PRESSURE CONTROL ASSEMBLY	29

SAVE THIS MANUAL

A **MANUFACTURER'S REPORT: CONTROLS AND SAFETY DEVICES** is supplied with each generator.
You may be required to present this form to a state, provincial or other inspection agency.
Secure this document in a safe location.

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

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

POST "STEAMBATH INSTRUCTIONS" LABEL OUTSIDE STEAMBATH FOR SAFETY WARNINGS.

FOR THE SAFETY OF YOU AND YOUR FAMILY OR CUSTOMERS, PLEASE READ THE 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 generator. All installation and service to this equipment should be performed by qualified licensed 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 generators. The generator 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 generator.

Service only by authorized personnel!

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

Install indoors only. Protect from freezing. Generator 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.



Danger To reduce the risk of explosions, do not interconnect steam lines!!

Caution The steam outlet carries hot vapor! A separate steam line is required for each steam outlet. Do not connect a valve or shut-off in the steam line! 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 user contact.

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

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. 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.

Merci pour l'achat de votre nouveau AMEREC AK générateur de vapeur.
Si nous pouvons vous être utiles n'hésitez pas à appeler notre assistance technique au 1-800-363-0251.

**POUR LE SÉCURITÉ DE VOTRE FAMILLE ET VOUS OU CLIENTS, VEUILLEZ
LIRE LES AVERTISSEMENTS SUIVANTS ET TOUTES LES INSTRUCTIONS AVANT
D'UTILISER VOTRE BAIN DE VAPEUR.**

**POST "BAIN DE VAPEUR" LABEL HORS D UN BAIN DE d'INSTRUCTIONS
POUR DES AVERTISSEMENTS EN MATIÈRE DE SÉCURITÉ.**

ENREISTREZ CE MANUEL

**POUR LA SÉCURITÉ DE VOTRE FAMILLE ET VOUS OU VOS CLIENTS, VEUILLEZ LIRE
APRÈS AVERTISSEMENTS ET TOUTES LES INSTRUCTIONS AVANT D'UTILISER VOTRE BAIN DE
VAPEUR. POST "BAIN DE VAPEUR" LABEL HORS D UN BAIN DE VAPEUR D'INSTRUCTIONS POUR DES
AVERTISSEMENTS EN MATIÈRE DE SÉCURITÉ.**



AVERTISSEMENT



Risque de choc électrique - Haute tension existe au sein de ce matériel. Débranchez toute source d'alimentation avant de procéder à l'entretien du générateur. Toutes les instructions d'installation et service à cet équipement doit être effectuée par du personnel autorisé qualifié conformément aux codes locaux et nationaux. Il n'y a pas de pièce réparable par l'utilisateur à cet équipement.

Mise à la terre électrique est requis sur tous les générateurs bain de vapeur AMEREC. Le générateur est conçu pour connecter un fil de cuivre uniquement, 75 °C ou mieux.

Câbler le contrôle très exactement comme indiqué. Ne connectez aucun câblage supplémentaire ou blocs d'alimentation pour les commandes ou leurs terminaux dans le générateur.

Service uniquement par le personnel autorisé!

Toute la tuyauterie doit être installé par un plombier sous licence conformément à tous les codes locaux et nationaux applicables.

Installer à l'intérieur uniquement. Protéger du gel. Générateur doit être mise à niveau latérale et l'extrémité à l'autre.

La valve de limitation de pression et purge du générateur doit être installé de telle façon que le risque de brûlure est réduit à un minimum. Vidange de ces prises dans la salle de vapeur peut présenter un risque de brûlure et peut endommager les matériaux utilisés pour construire la salle.



Danger Pour réduire les risques d'explosion, ne pas connecter les conduites de vapeur t!!

Attention La sortie vapeur transporte vapeur chaude ! Une conduite de vapeur distincte est requise pour chaque sortie vapeur. Ne connectez pas une valve ou l'arrêt dans la conduite de vapeur! Éviter les pièges et les vallées dans la conduite de vapeur où l'eau pourrait recueillir et provoquer un blocage de vapeur. La vapeur chaude ligne doit être isolée par rapport au contact de l'utilisateur.

Ne pas installer la tête de vapeur près d'un banc ou où la vapeur peut pulvériser ou où la condensation s'égoutte sur l'utilisateur comme cela présentera un risque de brûlure.

Etre certain que le bain de vapeur boîtiers sont étanches afin d'éviter les dégâts d'eau de s'échapper la vapeur. Il est recommandé que 100% mastic au silicone utilisée pour obturer tous les raccords et tuyaux. La vapeur doit être empêché de s'échapper dans la cavité du mur. Centrage du tube à vapeur est critique dans les chambres faites de plastique, de l'acrylique, résine, la fibre de verre ou des matériaux similaires. Permettant le tube à vapeur pour toucher les matériaux non coté 115°C ou plus aura pour effet d'endommager ces matériaux.

POST "WARNING LABEL OUTSIDE STEAMBATH FOR SAFETY WARNINGS. REQUIRED POSTING ON DOOR OF STEAM ROOM OR ADJACENT TO DOOR FOR ALL COMMERCIAL INSTALLATIONS.

**WARNING**

**REDUCE THE RISK OF
OVERHEATING AND SCALDING**

1. Exit immediately if uncomfortable, dizzy or sleepy. Staying too long in a heated area is capable of causing overheating.
2. Supervise children at all times.
3. Check with a doctor before use if pregnant, diabetic, in poor health or under medical care.
4. Breathing heated air in conjunction with consumption of alcohol, drugs or medication is capable of causing unconsciousness.

CAUTION! Do not contact steam head. Stay at least 12" away from hot steam escaping from the steam outlet.

**REDUCE THE RISK OF
SLIPPING AND FALL INJURY**

Use care when entering or exiting the steam room, floor may be slippery.

05-21-07
4110-79 **NOTE:** *For additional safety instructions, see owner's manual.*

Étiquette d'avertissement "Extérieur poste bain de vapeur pour les avertissements relatifs à la sécurité

**AVERTISSEMENT**

**Réduire le risque de
surchauffe et de brûlures**

Quitter immédiatement si mal à l'aise, étourdi ou somnolent. De rester trop longtemps dans une zone chauffée est capable de causer une surchauffe. Supervisez les enfants en tout temps.

Vérifier avec un médecin avant d'utiliser en cas de grossesse, diabétique, en mauvaise santé ou nécessitent des soins médicaux.

Respirer de l'air chaud en conjonction avec la consommation d'alcool, de drogues ou de médicaments peuvent causer la perte de conscience.

PRUDENCE! Ne contactez pas tête de vapeur. Séjour d'au moins 305 mm de vapeur s'échappant de la tête de vapeur.

Réduire le risque de dérapage et de chute

Utiliser les soins en entrant ou en sortant de la salle de vapeur, le sol peut être glissant.

05-03-16
4110-791 **Remarque :** Pour d'autres consignes de sécurité, voir le manuel du propriétaire.

IMPORTANT USER SAFETY INSTRUCTIONS

1. **READ AND FOLLOW ALL INSTRUCTIONS.—SAVE THESE INSTRUCTIONS!**
 2. The steam bath is not intended for use by anyone (including children) with reduced physical, sensory or mental capabilities or who lack experience or knowledge, unless they have supervision or training on the use of the steam bath by a person responsible for their safety.
 3. **WARNING** - To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times. Ensure they do not play in the steam bath.
 4. **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 raise excessively the internal human body temperature and impair the body's ability to regulate its internal temperature (hyperthermia). Limit your use of steam to 10 to 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 steam bath.
 - f. Persons using medication should consult a physician before using a steam bath since some medication may induce drowsiness while other medications may affect heart rate, blood pressure and circulation.
 5. **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 steam bath:
 - c. Unawareness of impending risk:
 - d. Fetal damage in pregnant women:
 - e. Physical inability to exit the steam bath: and
 - f. Unconsciousness.
 6. **WARNING** - The use of alcohol, drugs or medication can greatly increase the risk of hyperthermia
-

1. **Lire et suivre toutes les instructions. -- Conservez ces instructions !**
2. Le bain de vapeur n'est pas destiné à être utilisé par toute personne (y compris les enfants) avec toutes leurs capacités physiques, sensorielles ou mentales ou qui manquent d'expérience ou de connaissances, à moins qu'ils aient la supervision ou de la formation sur l'utilisation du bain de vapeur par une personne responsable de leur sécurité.
3. **Avertissement** : Pour réduire les risques de blessures, ne pas permettre aux enfants d'utiliser ce produit, sauf s'ils sont étroitement surveillés en tout temps. S'assurer qu'ils ne jouent pas dans le bain de vapeur.
4. **Avertissement** : pour limiter les risques de blessure :
 - a. Les surfaces mouillées de boîtiers de vapeur peut être glissant. Soyez prudent lorsque vous entrant ou sortant.
 - b. La tête de vapeur est chaud. Ne pas toucher la tête de vapeur et éviter la vapeur près de la tête de vapeur.
 - c. Une utilisation prolongée de la chaudière à vapeur peut augmenter excessivement la température du corps humain et d interne nuisent à la capacité du corps de régler sa température interne (hyperthermie). Limitez votre consommation de vapeur pour 10 à 15 minutes jusqu'à ce que vous soyez certain de la réaction de votre corps.
 - d. Des températures excessives ont un haut potentiel de causer de dommages foetaux pendant les premiers mois de la grossesse. Enceinte ou peut-être les femmes enceintes devraient consulter un médecin au sujet de l'exposition correcte.
 - e. Les personnes obèses et les personnes ayant des antécédents de maladie du coeur, tension artérielle basse ou élevée, des problèmes du système circulatoire ou de diabète devraient consulter un médecin avant d'utiliser un bain de vapeur.
 - f. Les personnes qui utilisent ces médicaments devraient consulter un médecin avant d'utiliser un bain à vapeur depuis quelques médicaments peut induire une somnolence tandis que d'autres médicaments peuvent affecter la fréquence cardiaque, la tension artérielle et de la circulation.
5. **Avertissement** - L'hyperthermie survient lorsque la température interne du corps atteint un niveau à plusieurs degrés au-dessus de la normale de la température corporelle de 37 °C. Les symptômes de l'hyperthermie comprennent une augmentation de la température interne du corps, sensation vertigineuse, léthargie, somnolence et d'évanouissement. Les effets de l'hyperthermie comprennent :
 - a. L'incapacité de percevoir la chaleur
 - b. L'incapacité à reconnaître la nécessité de quitter le bain de vapeur :
 - c. La méconnaissance de l'imminence d'un risque :
 - d. Dommages au fœtus chez les femmes enceintes :
 - e. Incapacité physique pour quitter le bain de vapeur : et
 - f. L'inconscience.

Avertissement - La consommation d'alcool, de drogues ou de médicaments peut augmenter considérablement le risque d'une hyperthermie



GENERAL INFORMATION: The AI Commercial Steam Generator is a low pressure heating boiler, UL/CUL Listed, built to NEC requirements and with an ASME “H” stamped certified and National Board registered pressure vessel.



The generator 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 generator one inch above the floor to allow cleaning the floor below it and to further prevent corrosion. This also allows the generator to sit directly on a combustible surface without additional protection. The feet extend beyond the sides of the generator chassis and have clearance holes to allow securing the generator in place using 1/4” bolts.

AI Commercial Steam Generators are factory assembled and tested and ready to install. All generators are plumbed for a 1/2” potable water feed inlet, a 3/4” drain discharge and a 3/4” pressure relief valve discharge. Generators are available for connection to 208VAC or 240VAC single or three phase, or 480VAC in three phase only. All models require the appropriate full power electrical service plus ground. Models in 208V and 240V also require a 14 gauge minimum Neutral for the control circuit; 480V models require a separate 120VAC+N service for the control circuit. **Use 75° minimum copper wire for all service connections.** A 3/4”-1”-1 1/2”-2” combination knockout is provided in the generator’s electrical box for the main service conduit and an additional 1/2”-3/4” knockout is provided for the 480V models’ 120V control service.

The generator’s control circuit is protected by a 250VAC 3A non-time-delay fuse installed in the front panel of the generator’s electrical box. No other fusing is installed in the steam generator.

Room controls (ON/OFF, thermostat, temperature sensing and steam Refresh™) are connected during generator installation using factory supplied wire or cables. Room controls operate on a low voltage Class 2 circuit. An access hole and 1/2” trade size knockouts are provided for room control wiring. The thermostat must be mounted outside the steam room, the temperature sensor must be mounted inside the steam room, the optional Refresh™ control mounts inside the steam room, and the optional I60 Bath On/Off switch must mount outside the steam room. Temperature sensors require factory supplied cables for connection to the generator. All controls require 4 conductors (3 for thermostat), 18 to 24 AWG copper, 75° 300V minimum (50 foot long cables are provided, longer cable may be available: contact Technical support for assistance).

Standard equipment:

- Manual operation (generator mounted RUN switch and manual ball valve drain) and single steam room (one steam valve, one temperature sensor, one thermostat with integral steam bath ON/OFF switch and bath-on indicator light, 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.
- A built in automatically resetting Low Water Cut Off and a built in manual reset LWCO.

Optional equipment:

- Second steam room (second steam valve, thermostat and temperature sensor) **factory installed only!**
- RUN CLOCK (7-day or 24 hour programmable time clock or 7-day programmable digital clock for generator ON/OFF scheduling).
- CoolFlush™ Auto Drain consisting of a 3/4 inch electronically operated ball valve and a time clock. (7-day or 24 hour programmable time clock or 7-day programmable digital clock for generator are available).
- I60 Steam bath on/off switch: (mounts to single gang switch box in a dry location only). Bath time is switch selectable for automatic bath time out of 15, 30 or 60 minutes using a switch on the boiler’s circuit board.
- Steam Refresh™ (control for mounting inside steam room, status indicator light).

Water Quality Requirements:

The nature of a steambath 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 generator failure. Concentration of impurities is generally controlled by treating the feedwater and/or “blowing down” the generator when it is not heating. The “blow down” process involves removing a portion of the tank water with high solid concentration and replacing it with makeup water.

To reduce corrosion and element damage risks, always flush new feedwater lines thoroughly to eliminate flux residue and avoid sodium based water softeners. The ASX-200 filter system available from Amerrec provides very good protection in most installations and should be connected to a cold water supply. *Feedwater temperature must be no hotter than 100°F if the ASX-200 is installed! Contact Technical support for more information.*

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 quality is listed below.

Feedwater Quality

Hardness, ppm	10 – 30 (.5 – 1.75 gpg)
T-Alkalinity, ppm	150 – 700 (8.75 – 40.8 gpg)
Silica, ppm	15 – 25 (.875 – 1.45 gpg)
PH (strength of alkalinity)	10.5 – 11.5

IMPORTANT! Regular maintenance will help your steamer work properly for a long time. Check for leaks, loose or damaged wires, signs of corrosion and calcium build up in the tank and on the level probe.

This is particularly important in areas with high calcium levels and other water quality problems. Calcium buildup can cause poor steamer performance and damage the heating elements!

AMEREC AI BOILER RATINGS

CATALOG#	UL MODEL#	WATTS	VOLTS	PHASE	AMPS	MAX ROOM SIZE (CU FT)	STEAM LB-HR	DIMENSIONS (INCHES)
								L W H
AI 12	12-208	12,000	208	1	59	550	36	20 x 22 x 24 ½
	12-208		208	3	34			
	12-240		240	1	51			
	12-480		480	3	15			
AI 18	18-208	18,000	208	1	88	900	54	20 x 22 x 24 ½
	18-208		208	3	51			
	18-240		240	1	76			
	18-480		480	3	22			
AI 24	24-208	24,000	208	1	116	1200	73	20 x 22 x 24 ½
	24-208		208	3	68			
	24-240		240	1	101			
	24-480		480	3	29			
AI 30	30-208	30,000	208	3	85	1500	91	20 x 28 x 24 ½
	30-240		240	3	73			
	30-480		480	3	36			
AI 36	36-208	36,000	208	3	101	1800	109	20 x 28 x 24 ½
	36-240		240	3	88			
	36-480		480	3	43			
AI 42	42-208	42,000	208	3	118	2100	127	20 x 28 x 24 ½
	42-240		240	3	102			
	42-480		480	3	51			
AI 48	48-240	48,000	240	3	117	2400	145	20 x 28 x 24 ½
	48-480		480	3	58			

Notes:

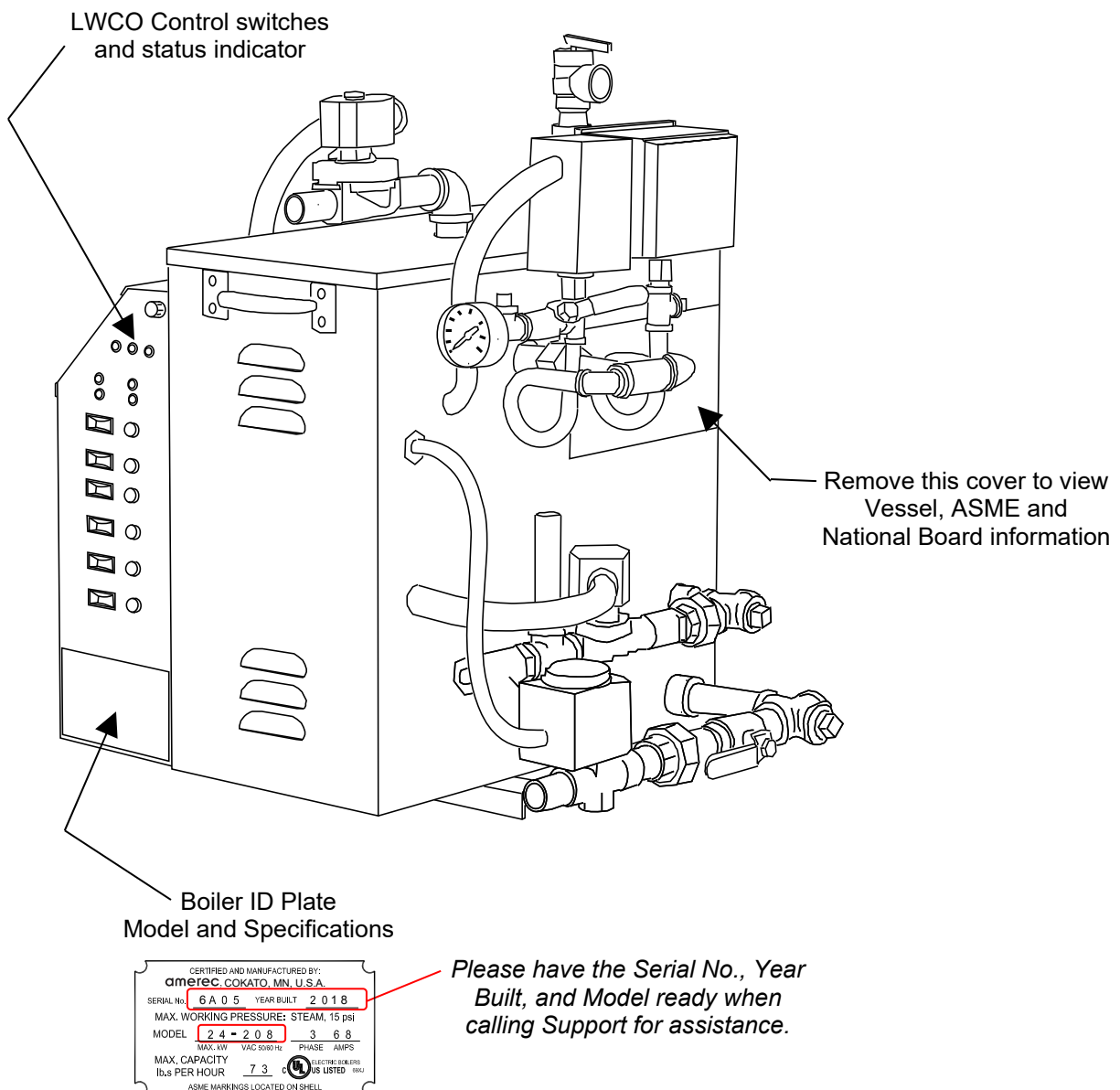
- All models: no internal heating circuit fuses are needed, panel mounted 3A fuse provided for 120V control circuit
- 208V and 240V models supply 120V to control circuit internally, *480V models require a separate 120V service.*
 - For **208V** and **240V** models, run power wires + Neutral and ground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

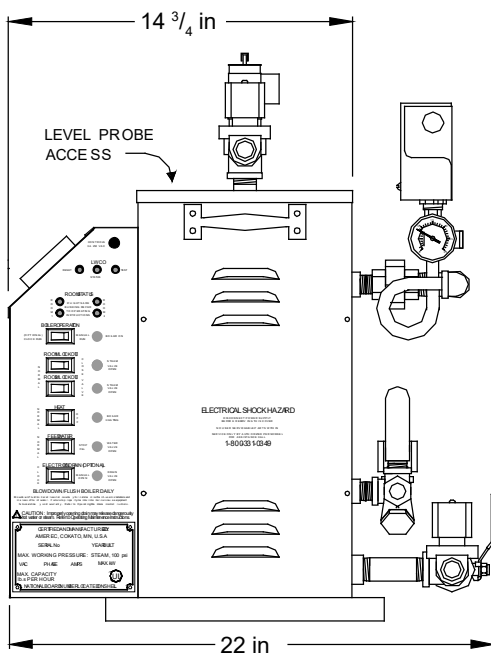
INSPECTION INFORMATION

Pressure vessel: ASME "H" stamped
National Board Registered
MAWP 15 psig
LWCO, Auto and Manual Reset

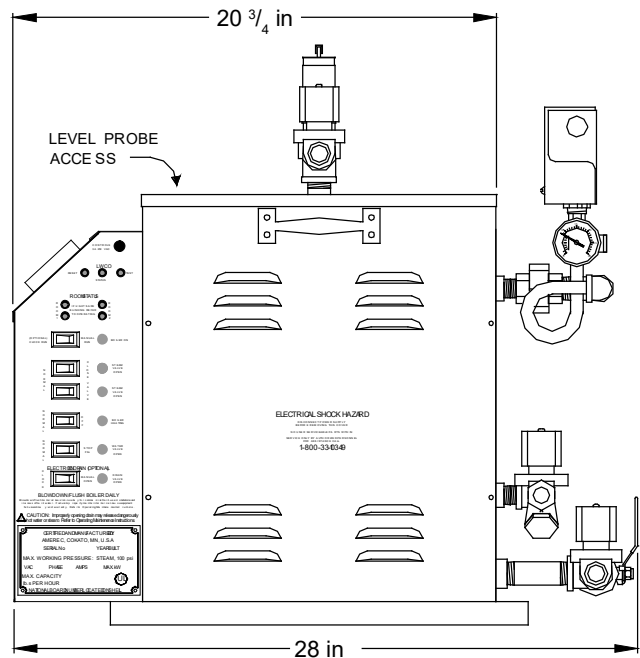
UL Listed for US and Canada to UL834

All boilers ship with an H2 report and a CSD-1 form
Replacement forms can be obtained by contacting Technical Support

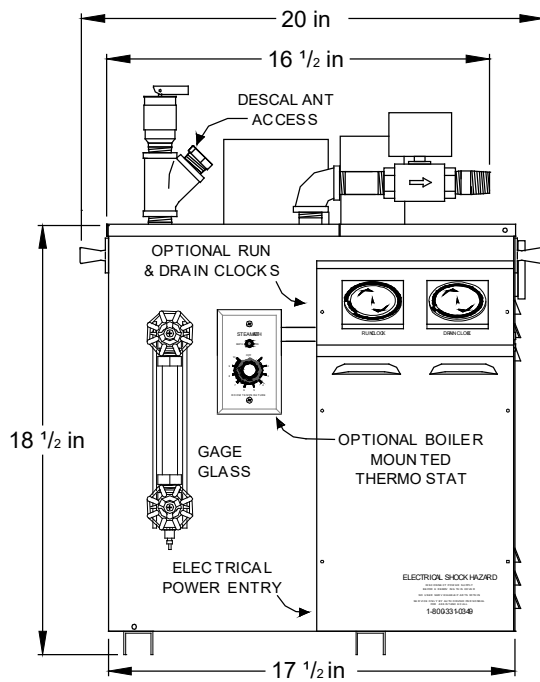




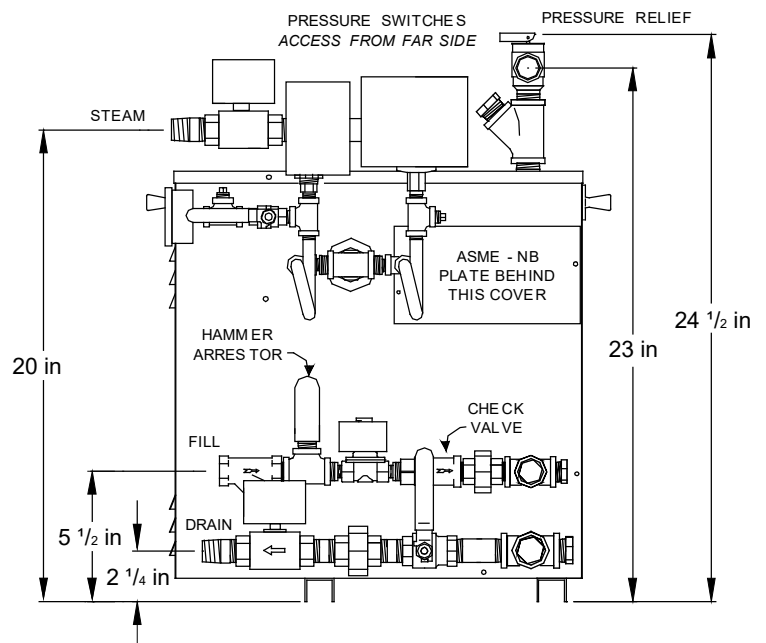
AI12, AI18, AI24



AI30, AI36, AI42, AI48



ALL MODELS



ALL MODELS

Shown with optional boiler mounted thermostat.

All dimensions in inches.

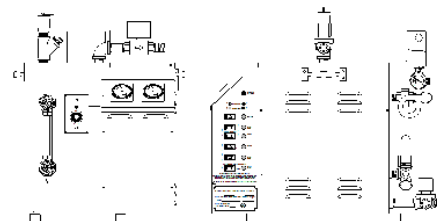
INSTALLATION

GENERATOR

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



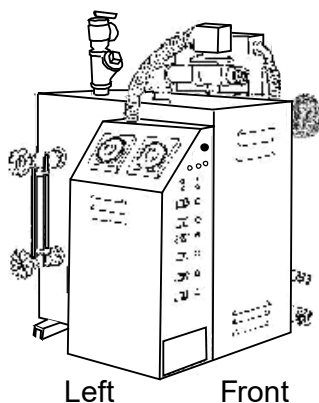
**AI Steam Generators are intended for indoor use only.
Install upright and level side and front to back.
Not for space heating purposes.
Protect from freezing.**



The steam generator is designed to sit directly on a hard level surface. The mounting location must be suitable to safely support your boiler. Models AI12–AI24 may weigh more than 165lb and models AI30–AI48 may weigh more than 220lb. The generator must be mounted upright and level and prevented from moving. *Ensure that the generator is mounted high enough above the drain receptacle to allow proper drain flow.* The weight of the generator is generally sufficient to prevent movement. Use 1/4" bolts through the holes provided in the generator's feet to secure it in place on the floor if necessary.

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

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" to front and left side, 6" above the pressure switches and valves.



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 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 required for all plumbing.

1. INSTALL WATER LINE

Run a 1/2" potable water feed line between the nearest cold water line and the WATER INLET fitting on the generator. Cold feedwater is required for proper operation of the CoolFlush™ Auto Drain system. *Special water treatment may be required in your area – see Water Quality section on pages 7 and 8 for further details.* Install a shut-off valve near the generator. When tightening the water fittings, always use two wrenches so there will be no strain on the water inlet valve. The water shut off valve must remain open during generator operation! We recommend feedwater pressure between 20 and 50 psi. A water hammer prevention device is installed on your boiler. *Excessive water hammer can damage a water valve, preventing it from shutting off the water supply to the generator!*

Flush water supply line thoroughly before final hookup. *Debris such as flux residue can prevent the inlet valve from fully closing and may cause corrosion damage to the water valve or heating elements.* A grit filter is factory installed at the water inlet 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 check valve is installed in the boiler's feedwater line. An additional 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 generator's water supply is shared with another generator or other nearby high usage connection.

2. INSTALL STEAM LINE

AI generators come equipped with $\frac{3}{4}$ " 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 $\frac{3}{4}$ " copper steam line from the generator to the steam room. The steam line should enter the steam room 18" above the floor.

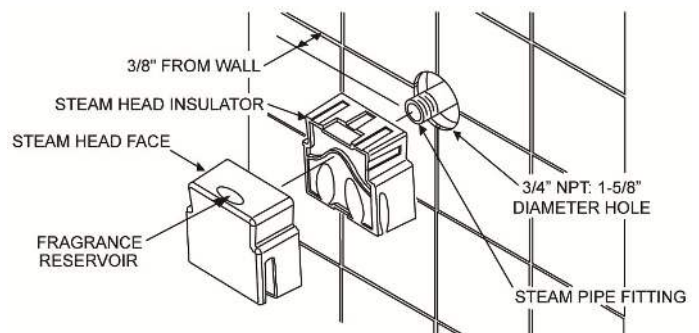
IMPORTANT: The steam line should be pitched away from the generator so any condensate will drain from the steam line. For best results, the generator should be installed as close to the steam room as possible, with its steam outlet valve higher than the steam heads in the steam room and the steam line run straight to the steam heads with a pitch of at least $\frac{1}{4}$ " per foot 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 generator, 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.

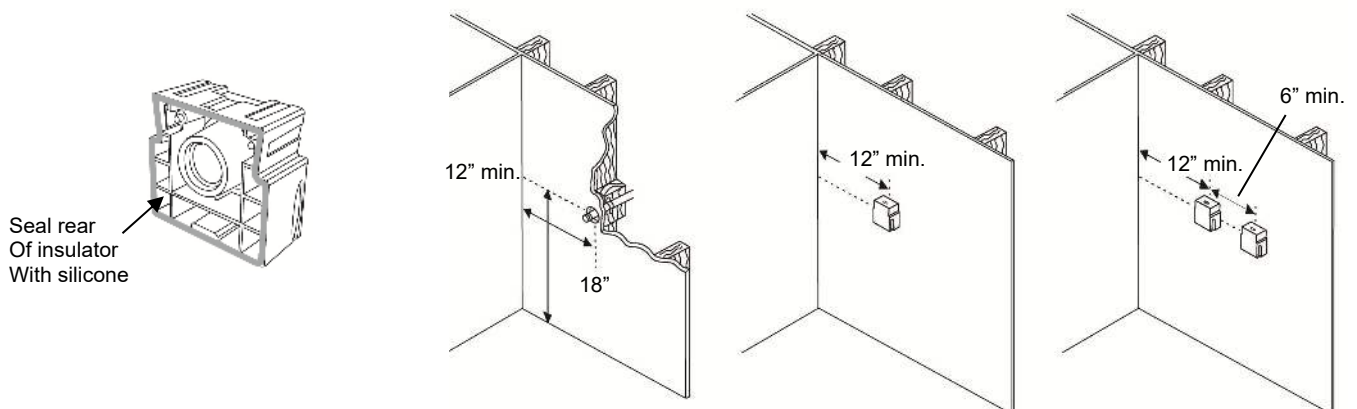
Two steam heads are supplied with each generator. Additional steam heads are required for 30kw models and above. Three steam heads required for 30-36kw models. Four steam heads required for 42-48kw model. This will prevent back pressure causing premature heat contactor failure, reduce noise level and provide better steam distribution in larger rooms. Space steam heads at 6" 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 $1\frac{5}{8}$ " hole at each steam head location for steam line entry 15 to 18" above the floor. Terminate the steam line from the generator 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 $1\frac{5}{8}$ " hole. Terminate the steam line with a $\frac{3}{4}$ " NPT male adapter. Stub the line out into the room $\frac{3}{8}$ " from the finished surface. Secure the steam lines to structural members.

Install steam heads so vent opening is pointed towards the floor. Use Teflon thread tape to help aim the steam head correctly if necessary. Protect the steam head finish from damage while handling and tightening. Seal the wall around the steam pipes and all fixtures in the steam room with 100% silicone caulk to avoid moisture damage within the walls.



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

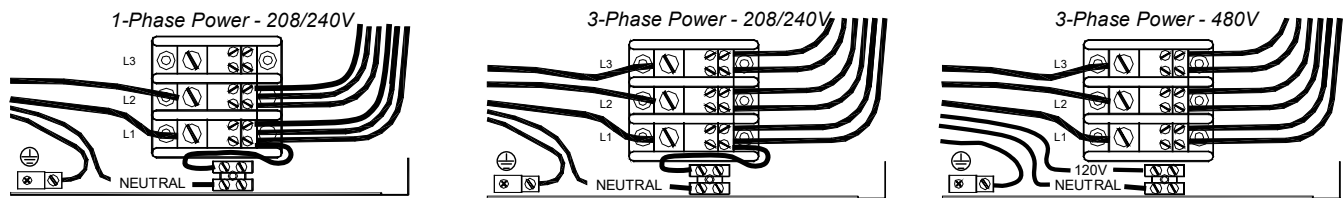


3. INSTALL SAFETY VALVE LINE All AI generators are equipped with a factory installed 15 psi pressure relief safety valve. This must be plumbed to a $\frac{3}{4}$ " indirect waste line. *Do not install a shut off device in this line. Do not reduce this line. Do not form a trap in this line! Discharge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

4. INSTALL DRAIN All AI generators 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 generator is under pressure, discharge from the drain may be at over 240°F. Always plumb the drain with piping suitable for 240°F minimum. Do not plumb this line into the steam room! Plumb this waste line per local plumbing codes.* When equipped with an Autodrain system and with the pressure control properly set to 4 to 5psi, drain water will be at or below 140°F during the CoolFlush™ Auto Drain cycle. *Local codes may require a (customer supplied) expansion tank or blowdown cooling tank if draining water in excess of 140°F or 5 psi.*

ELECTRICAL

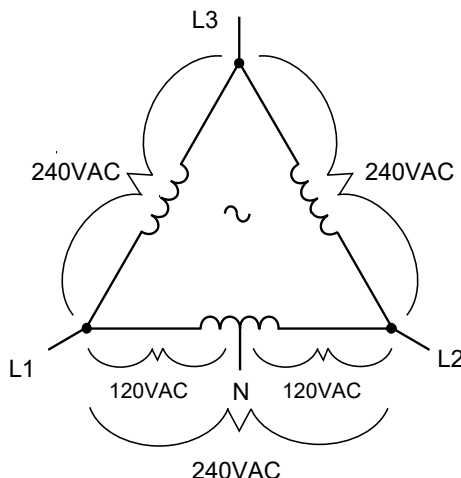
Refer to the ID plate on the generator's switch panel to determine voltage and current requirements. Electrical service for all models requires two (single phase) or three (3 phase) hot leads plus a suitable ground connection. Models operating on 208V or 240V also require a 14 AWG Neutral for the generator 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.



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

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

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

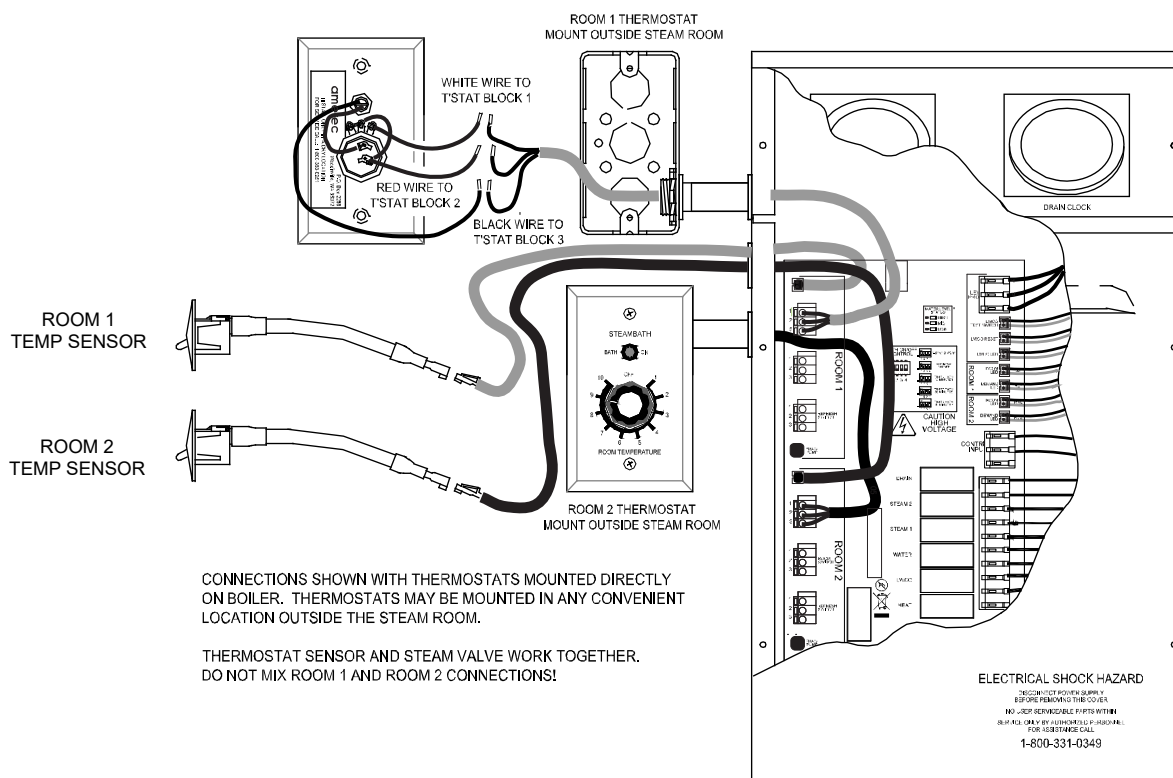


CAUTION when connecting to 3-phase: Your 3 phase 208/240VAC may be supplied with one side center tapped and connected to Neutral in order to provide 120VAC circuits. Check your voltage before connecting to the boiler and make sure to use one of the lines referenced to N (L1 or L2 at left) so the boiler's L1 connection will have a 120V supply for the control circuit. *Connecting to the 240V High leg (L3 at left) will supply too high a voltage and cause the boiler's 3A fuse to blow and it could damage parts and valves in the control circuit!*

Also remember, 480V 3 phase requires bringing in a separate 120V line for the control circuit!

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 thermostat control mounted outside the room. The thermostat mounts to a standard single switch/outlet electrical box. The thermostat may be mounted directly on the generator's electrical enclosure using a common 1/2" conduit z-bracket between the box and a knockout provided in the generator'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.*

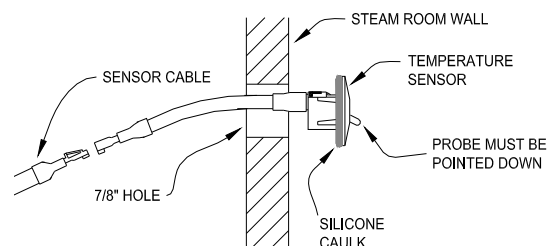


Two independent control circuits are available for two steam outlets to supply two separate steam rooms. If only one valve is installed on the steam generator, it will be controlled by the ROOM 1 circuit with controls connected to the terminal blocks alongside the upper left edge of the printed circuit board (PCA) located in the generator's electrical enclosure. When the (optional) second outlet is provided, the second room's controls connect along the lower left side of the circuit board in the same manner as the ROOM 1's circuit's described here..

1. TEMPERATURE SENSOR INSTALLATION The temperature sensor must be mounted in the steam room. Cut a 7/8" diameter hole in the steam room wall to mount the sensor. It is recommended that the sensor be mounted 6" down from the ceiling, but not directly over the steam dispersion head and not more than 7 feet 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" holes in the wall studs or ceiling joists to the generator location. Leave 12" of slack at the sensor location. Route the generator end of the sensor cable through the generator hole marked CONTROL WIRING ENTRY using the strain relief provided.

Note: *Do not staple through or otherwise damage the cable. Use a factory supplied sensor cable only.*



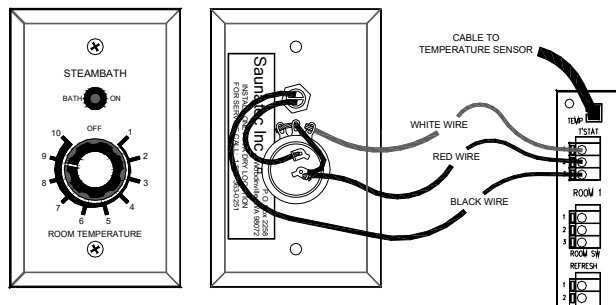
In the steam room: Plug the temperature sensor into the sensor cable. The cable and the sensor connectors are designed to lock together when properly aligned. Run a bead of 100% silicone caulk around the underside of the sensor head then carefully feed the cable and sensor through the hole and attach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

At the generator: Connect the sensor cable's end plug into its socket on the generator's control circuit board. The socket is directly above the room's T'STAT terminal block. Orient the cable end to match its socket and insert it until the end locks in place. Make sure the thermostat and temperature sensor cables are connected at the same side of the circuit board: either along the left edge (ROOM 1) or the right (ROOM2). *When only one steam outlet valve is available, always connect to ROOM 1.*

2. THERMOSTAT INSTALLATION The low voltage thermostat control can be mounted up to 50 feet from the generator and must be located outside the steam room. A 50 foot cable is provided. String the 50' cable from the control location through 1/2" holes in the wall studs or ceiling joists to the generator and the switch box installed at the desired control mounting location. *An IT1 is always required for each room.*

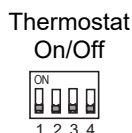
At the control: Connect the control cable to the thermostat control using wire nuts (provided). Match the provided cable's red and black wires to the thermostat's red and black wires, respectively. Match the cable's third wire (white or green) to the thermostat's white wire.

At the generator: Route the generator end of the control cable through the generator hole marked CONTROL WIRING ENTRIES using the strain relief provided. Strip the control cable wire ends 1/2" and place the bare copper into the ROOM 1 (or ROOM 2) T'STAT terminal block, putting the black wire in the bottom hole ("3"), red in the center ("2") and white (or green) in the top ("1"). Use a small screwdriver to carefully press the terminal block's tabs down to insert or remove the wire ends. *When only one steam outlet valve is installed, always connect to ROOM 1.*



The thermostat has an integral switch to start and stop the heating of the steam room: *see operating instructions*. If an (optional) I60 switch or other switch is to be used, it will connect to the ROOM SWITCH terminal block as described in the following section. When using the thermostat as the Bath on/off switch, all positions of the boiler circuit board's switch must be set down (*the switch is located near the upper the center of the PCA*).

3. ROOM SWITCH INSTALLATION The (optional) I60 switch is a momentary switch (closed only while pressed) intended for installations with occasional use. When an I60 switch or equivalent is connected, the circuit board's switch must be correctly set as shown below. The steam bath will start when the switch is pressed and stop when the switch is pressed again or stop automatically at the bath time selected using the switch.



See OPTIONAL below



When using the I60

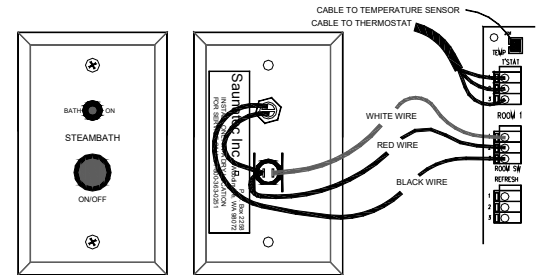
The I60 may be mounted up to 50 feet from the generator and must be located outside the steam room. A 50 foot cable is provided. String the 50' cable from the control location through 1/2" holes in the wall studs or ceiling joists to the generator and the switch box installed at the desired control mounting location.

If the optional second steam room is installed, both rooms must use the same type of on/off switch, either the thermostat or the I60!

OPTIONAL To use a timer control on/off switch as a Room Switch (supplied by user), be sure it is capable of switching a 3VDC circuit. Connect the switch contacts to positions 1 and 2 of the Room Switch terminal block and set the circuit board's switch to position 1 up (room switch control, no time out). *This will not work with a momentary switch.*

At the I60: Connect the control cable to the switch using wire nuts (provided). Match the provided cable's red and black wires to the switch's red and black wires, respectively. Match the cable's third wire (white or green) to the switch's white wire.

At the generator: Route the generator end of the switch cable through the generator hole marked CONTROL WIRING ENTRY. Strip the control cable wire ends ½" and place the bare copper into the ROOM 1 (or ROOM 2) ROOM SWITCH terminal block, putting the black wire in the bottom hole ("3"), red in the center ("2") and white (or green) in the top ("1"). Use a small screwdriver to carefully press the terminal block's tabs down to insert or remove the wire ends. *When only one steam outlet valve is installed, always connect to ROOM 1.*

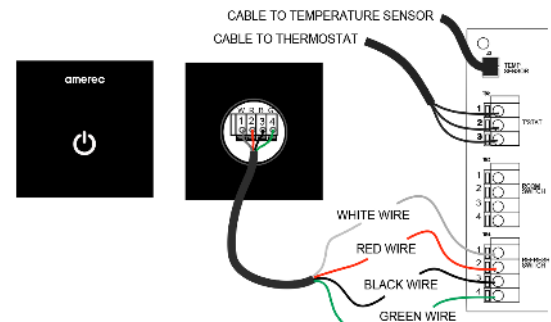


4. REFRESH CONTROL INSTALLATION The (optional) Refresh™ control uses a low voltage control to provide a short burst of steam into the steam room when the power icon is pressed. The control may be mounted up to 50 feet from the generator and must be located inside the steam room. A 50 foot cable is provided. String the 50' cable from the control location through ½" holes in the wall studs or ceiling joists to the generator and the desired control mounting location in the steam room.

At the control: Connect the control cable to the terminal block on the Refresh™ control. While connecting the control cable to the control, note which wire is connected to which terminal block position (ex. white to 1, red to 2, black to 3, green to 4). An instruction plate is provided and should be attached to the wall alongside the Refresh™ control in the steam room to help bathers understand the Refresh™ operation. The instruction plate is adhesive backed for easy mounting to a clean dry surface.

USE THIS CONTROL TO REFRESH THE STEAM AFTER SUDDEN COOLING
WHEN THE CONTROL'S POWER ICON IS LIT, PRESS AND RELEASE THE POWER ICON. THE LIGHT WILL TURN OFF AND STEAM WILL BE ADDED TO THE ROOM FOR 10 TO 15 SEC. TWO MINUTES AFTER PRESSING THE ICON, THE LIGHT WILL TURN ON AGAIN AND THE CONTROL WILL BE READY FOR ANOTHER BURST OF STEAM WHEN NEEDED.

At the generator: route the generator end of the control cable through the generator hole marked CONTROL WIRING ENTRIES using the strain relief provided. Strip the control cable wire ends ½" and place the bare copper into the ROOM 1 (or ROOM 2) REFRESH SWITCH terminal block, matching the colors to the terminal block positions identically to the control's connections. When finished, the control's block position 1 should be connected to the PCA's position 1, 2 to 2, 3 to 3 and 4 to 4. Use a small screwdriver to carefully press the terminal block's tabs down while inserting or removing the wire ends. *When only one steam outlet valve is installed, always connect to ROOM 1.*



Note: In areas with high humidity or a high chlorine or chemical environment, such as around pool treatment equipment, we recommend adding some dielectric grease to low voltage wire connections to reduce the risk of corrosion.

WIRING: Control Circuit, All Models

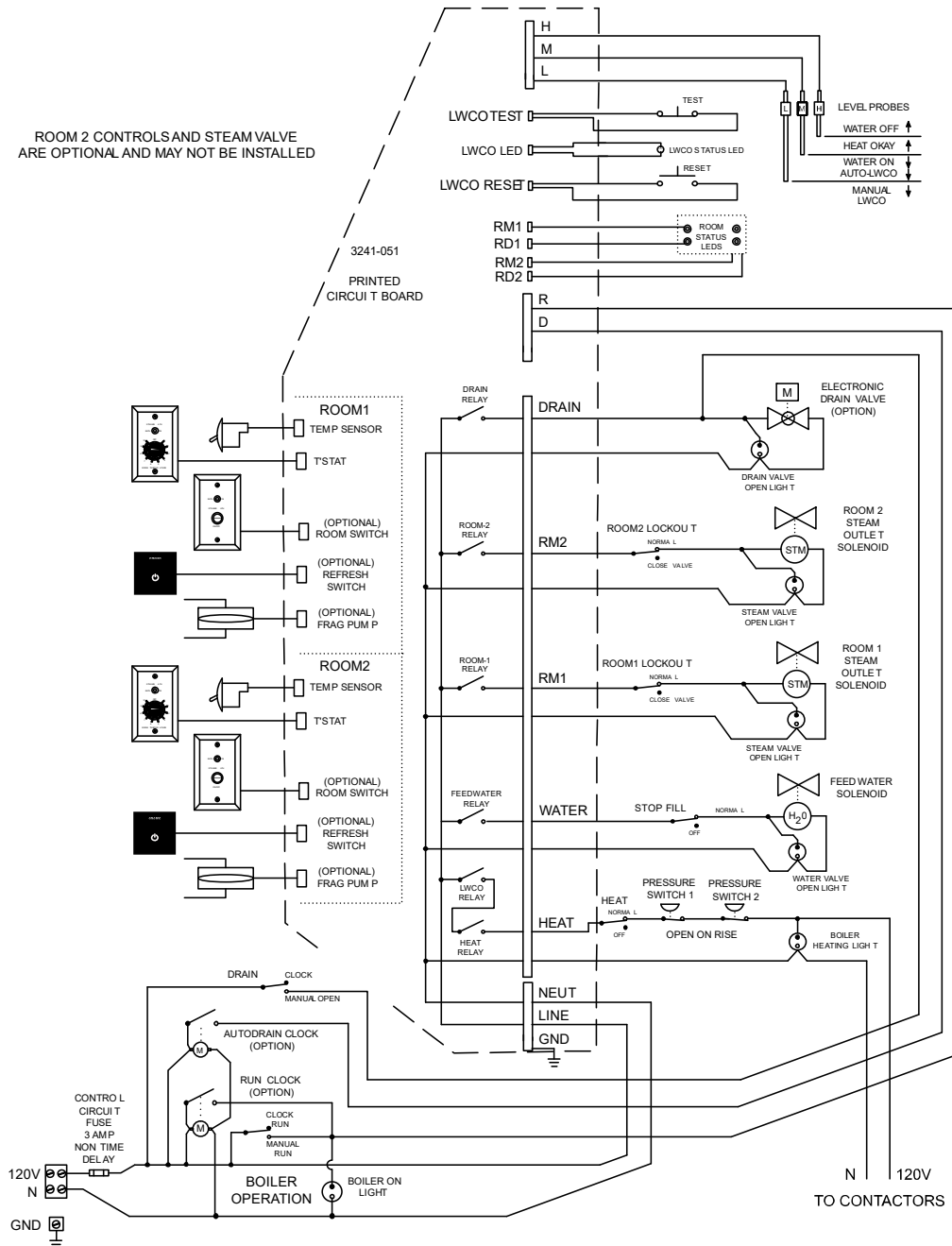


ALL WIRING MUST BE INSTALLED BY A LICENSED ELECTRICAL CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

ELECTRIC SHOCK HAZARD – HIGH VOLTAGE EXISTS WITHIN THIS EQUIPMENT. THERE ARE NO USER SERVICEABLE PARTS IN THIS EQUIPMENT.

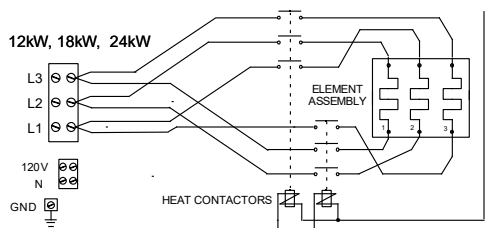
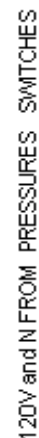
ELECTRICAL GROUND REQUIRED ON ALL STEAMERS.

DISCONNECT ALL ELECTRICAL SUPPLIES WHEN SERVICING THIS EQUIPMENT; 480V GENERATORS HAVE TWO SEPARATE SUPPLIES.



ELECTRICAL GROUND REQUIRED ON ALL STEAMERS.

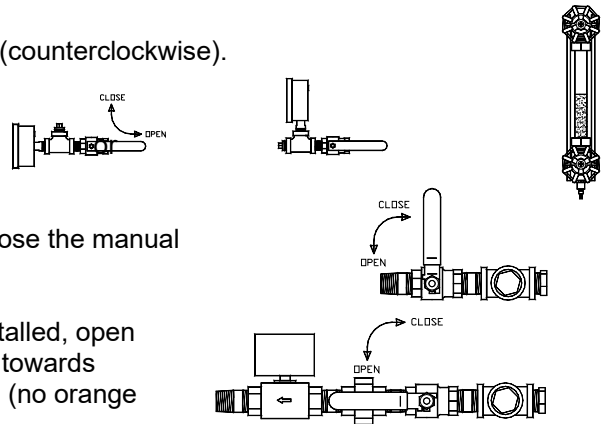
**DISCONNECT ALL ELECTRICAL SUPPLIES WHEN SERVICING THIS EQUIPMENT;
480V GENERATORS HAVE TWO SEPARATE SUPPLIES.**



STARTING THE GENERATOR FOR THE FIRST TIME

Before applying power to the generator 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 generator is off (no orange showing in area above pointer) and make sure the water supply is connected to the generator and turned on.

- Open the valves on the glass water gauge all the way (counterclockwise).
- Open the pressure gauge valve (handle horizontal).
- If the CoolFlush™ Auto Drain option is not installed, close the manual drain (handle up).
- If the optional electronic CoolFlush™ Auto Drain 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).
- Set the room thermostat(s) to the **OFF** position.
- Turn on the electrical service to the boiler. *All lights and valves should be off at this point.*



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 and the boiler will start filling with water. The water will become visible in the water gauge a short time later.

The LWCO LED should be yellow or amber then change to green once the mid water level is reached. When the maximum water level is reached, the feedwater valve and its light will turn off and the steam valve lights will turn off, the **BOILER HEATING** light will turn on and the heating element contactors will close. The boiler will continue heating until it reaches its operating pressure of approx. 4 to 5 psi then the **BOILER HEATING** light and the contactors will turn off. During normal operation, the water level should always be visible in the lower half of the gauge glass. If it drops to less than 1 inch of water, the manual reset LWCO may alarm and shut the boiler down until serviced.

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

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.*

Turn the thermostat(s) on to begin heating the steam room(s). If an (optional) I60 room switch is installed, set the thermostat to the desired temperature and press the I60 switch to start the steam bath and begin heating the room. The status LEDs on the thermostat(s), switches and boiler will light and remain on continuously when the steam bath is on and operating normally.

OPERATING INSTRUCTIONS The AI model steam generators are based on two operating systems. The first is the generator 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 generator only when needed to raise the temperature in the steam room. The generator's control circuit board is used for both systems so the generator must be running before starting a steam bath. And the generator may run continuously without affecting the steam room temperature when the bath is off. In this way the generator can be left running so it is ready to provide steam immediately when the thermostat (or optional I60 room switch) is used to start a steam bath.

BOILER START (RUN) The generator operation may be started in one of two ways.

1. **MANUAL RUN** To start the generator manually, place the **BOILER OPERATION** switch (located on the generator'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 generator is running. If an optional Run Clock is installed, this manual switch will start the generator regardless of the clock setting and the generator will continue to run until the switch is returned to the **CLOCK RUN** position.
2. **CLOCK RUN** To start the generator 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. If the clock is switching properly, when an on period is reached the **BOILER ON** light will turn on and the generator will fill and heat as necessary. Check the Run Clock later in the day to ensure it is maintaining time correctly. *See clock attachments for further details.*

Normal RUN operation controls water fill and heating using three water levels. The lowest level serves as a 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 at the mid level, there is enough water in the tank to allow heating it safely. When the water level reaches top level (just above mid-glass) the water level has reached its maximum depth and the water valve will close until the level drops to the mid level again. If the water takes too long to fill, the mid level may turn off heating using its automatic resetting LWCO. If the level continues to drop during normal operation, the boiler will go into a LWCO error and shut down completely about 10 seconds after the low level becomes dry. *Also see page 22 for more LWCO information.*

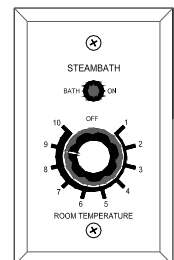
Water heating is controlled by the operating pressure switch. While there is enough water in the tank to allow heating, the elements will be energized if the pressure in the tank is below the switch setting (about 4 psi) and the water will be heated until enough steam pressure is generated to build up pressure in the tank to about 7 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 generator will need to heat the water only to make up for temperature loss from the generator itself. During a steam bath, particularly during initial heating, the generator may need to heat continuously to compensate for the steam being released to the steam room. The generator might not build up any pressure during this period.

When the generator 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 its maximum depth, the heat will turn on, the water valve will close and, if the steam bath is not turned on, the steam room valve(s) will close.

STEAM ROOM OPERATION (BATH) 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 generator supplies two rooms, the room operations are identical but independent. Only the use of one room will be described here.*

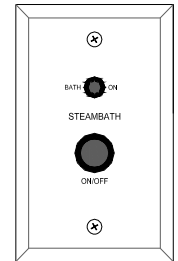
The thermostat sets the room temperature using a 1 to 10 scale, with 1 being the coolest at about 90°F and 10 the hottest at about 124°F. These are the steam room temperatures sensed by the temperature sensor near the ceiling. ***For bather safety and to prevent damage to the steam room, never attempt to force these temperatures higher!***



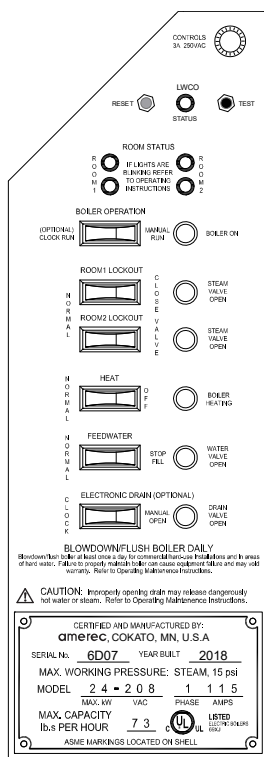
THE THERMOSTAT has an OFF position to turn the steam bath off (prevent heating) if an I60 switch option is not installed. When the bath is turned off, the generator's steam valve will remain closed and the thermostat's LED, the Refresh™ control power icon and their corresponding **ROOM STATUS** LEDs on the generator will remain turned off. When the thermostat is turned to the temperature setting part of the dial, the steam bath is turned on and all of the corresponding LEDs will light.

For the steam bath to be on whenever the generator is running, leave the thermostat set to the desired temperature setting. Soon after the generator is started, the room's LEDs will light and it will begin heating as soon as steam is available. *Do not install an I60 option when using continuous operation.*

THE I60 SWITCH option is intended for steam rooms with only intermittent use. When the I60 is installed, the thermostat's off position is the same as the lowest temperature setting and has no effect on the generator operation. The generator runs, holding steam under pressure until the user is ready to start a steam bath. The thermostat should be left preset to the desired room temperature. Press the I60 to start the steam bath. The room's LEDs will light once the bath is started. To stop the steam bath, press the I60 switch again or wait and it will turn off automatically at its pre-set time (15, 30 or 60 minutes – See page 15). If the generator supplies two rooms, both must use the same type of switch: if one uses an I60 switch the other must as well.



THE REFRESH™ CONTROL option gives the bather a more immediate control over the steam bath conditions. By pressing the Refresh™ control power icon during a steam bath, an extra burst of steam is added to the room regardless of the steam room temperature. This may be used to compensate for sudden cooling caused by someone opening the steam room door, for instance. The power icon on the Refresh™ control lights to indicate that the steam bath is turned on and an extra burst of steam is available. Once the power icon is pressed, the control's icon turns off and steam is released to the room for about 10 seconds. The extra steam released to the room adds a little heat and steam to "refresh" the steam cloud and stir the room's air, helping to reduce cold spots. There is a 2 minute delay after the Refresh™ control is pressed before the power icon turns on again and another steam burst is available. This wait period is designed to prevent a bather from accidentally overheating the room. Generally, if the room has cooled enough to need a second Refresh™ burst it will have cooled enough to require normal heating, too.



LIGHTS AND SWITCHES are provided to show generator operating status, to indicate fault conditions and to allow manual control of generator functions for routine maintenance and troubleshooting. During normal steam bath operation, the **ROOM STATUS** LEDs on the generator will light steadily. When the optional Refresh™ control is installed, the bottom room status LED will turn off for two minutes while Refresh™ is in use. These LEDs will blink in specific patterns to indicate problems with the steam bath temperature control, generator water level control or drain flow (with the Autodrain installed).

When the generator 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 generator'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 generator is operating, the contactors will close as needed to turn on the heating elements, heating the generator'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: 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.*

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

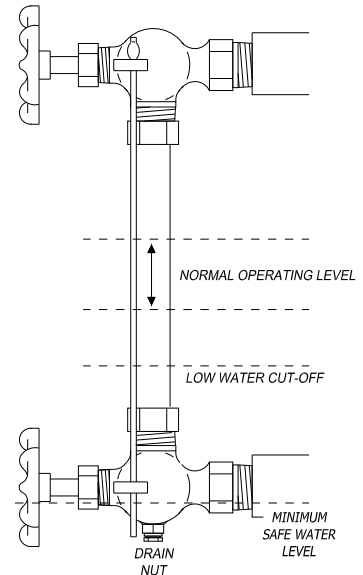
The optional electronic Auto Drain valve is normally closed, opening only when power is supplied by a Drain Clock or by the **ELECTRONIC DRAIN** switch to start drain/blowdown. When the Auto Drain valve is opened, the **DRAIN VALVE OPEN** light will turn on. Normal operation is controlled by a clock: 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 Auto Drain to function. If Autodrain is not installed, make sure the manual valve is left closed during normal operation.* There is a delay between seeing the DRAIN light turn on and the drain valve opening. This delay could be a minute or more.

ROUTINE MAINTENANCE The generator 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 generator. Also look at the generator 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 generator 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 generator is cold.*

To check the water level control circuit, first start the generator using the **BOILER OPERATION** switch (with the RUN clock set to off, if installed).

- Set the **HEAT** switch OFF. 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 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 generator.
- Open the generator'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. About 30 seconds after the mid probe is dry (water turns on) the **BOILER HEATING** light will turn off and the heat contactor will open. This is the automatic LWCO.
- When the water level drops to about 3/4" depth in the glass. About 10 seconds later, the LWCO LED should turn yellow or amber and the red ROOM STATUS LEDs should start blinking to show a water error. The boiler should stop all operations.
- Set the **BOILER OPERATION** switch to CLOCK RUN, close the drain and reset all switches to their NORMAL position. Reset the thermostat to its original position. Press the LWCO RESET switch or shut of power to the boiler to clear the error. The generator is now ready for normal operation again. Note: *the LWCO LED will turn green again once water fill has reached the mid level again.*



To check only the manual reset LWCO: With water in the tank (at least past the mid level) and the boiler in RUN mode, press and hold the LWCO TEST switch (on the switch panel). The boiler will start flashing a level error then, about 10 seconds after pressing the switch, the LWCO LED will change from green to yellow or amber, the room status LEDs will continue to blink in a level error pattern, and the boiler heating and its water valve will be off. Release the TEST switch.

After testing, press the LWCO reset switch and the error should stop, the boiler will return to normal operation, and, if the middle level is wet, the LWCO LED will change back to green.

BLOWDOWN/CoolFlush™ Auto Drain The generator is supplied with a manual drain valve and may be equipped with an (optional) electronic Auto Drain valve. An Auto Drain 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 generator’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!

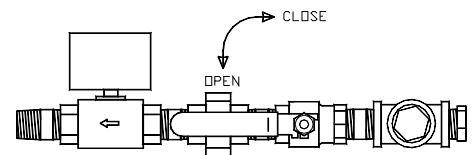
Local water conditions and the amount of time per day that the generator operates will determine the necessary draining and cleaning intervals. We recommend draining daily or after every use and inspecting for properly flowing drain at least monthly. If you drain it shortly before starting the generator, 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 generator 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!**

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

Using the CoolFlush™ Auto Drain requires setting its clock or using the manual **ELECTRONIC DRAIN** switch on the generator’s switch panel. Set the Drain Clock’s for the time you wish the generator to drain (see attached clock instructions). If the generator also uses a Run Clock, a good time to drain the generator is shortly before the Run Clock is scheduled to start the generator for the day. **CAUTION** *If draining a hot generator, 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 generator’s circuit board must be positioned correctly to provide proper drain cycle timing for the CoolFlush™ system.



The **CoolFlush™ Auto Drain** 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. This may also eliminate the need for special drain systems or blowdown tanks in most jurisdictions. **For safety and reliability always plumb the drain with piping suitable for 240°F minimum.**

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 generator returns to its normal operation. If the steam bath is operating when the CoolFlush™ 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 generator and, if the steam bath is in use, the thermostat and I60 LEDs will remain lit. The lower Room Status LEDs and the Refresh control power icon will be off.

These LEDs will also blink to indicate slow draining and possible scale build up. This indicates that the generator requires maintenance. ***The blinking will continue until power to the boiler is reset.***

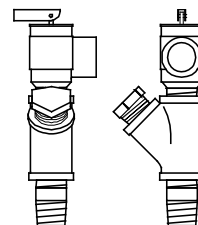
Note: If the water drains too slowly, the upper Room Status LEDs and the thermostat and I60 LEDs will blink off once then light 3 seconds to indicate that the tank and drain may need cleaning. The drain cycle will continue to operate normally. If the drain is nearly plugged, the upper Room Status LEDs and the thermostat and I60 LEDs will blink off/on/off then light 3 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. *If the water level is below maximum, the drain cycle will stop and the boiler will return to normal operation. If the water level cannot drain below the high water level, the boiler operation will be shut down until power is cycled. This is to prevent steam from starting with an overfilled tank.*

To manually drain the generator (with a CoolFlush™ Auto Drain 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 generator 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:

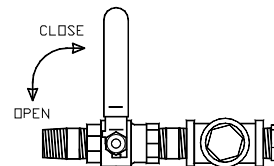
- First set the **HEAT** switch to OFF then set the **BOILER OPERATION** switch to MANUAL RUN to start the generator.
- Turn on the steam bath and verify the room's steam valve is open (this will help the generator drain more quickly in the following steps). Adjust the thermostat if needed to open the 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 generator to drain for at least 30 seconds after the level drops below the gauge glass for the generator to drain completely when clean. The water level should drop quickly and smoothly in a clean generator.
- 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.

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 generator and call Amerec Technical Support for assistance.

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



To manually drain the generator (without a CoolFlush™ Auto Drain installed), simply use the switches to turn off the heating and the water valve then open the manual drain valve. The water draining from the generator may cause a vacuum, increasing the time needed to empty the generator. 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 generator to eliminate the vacuum. *Do not touch the safety valve when the generator is hot: the valve will be dangerously hot!* When the generator has finished draining, close the valves.



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

APPENDIX 1: RUN CLOCK AND AUTO DRAIN BLOWDOWN CLOCK TIMER

The AI series generators may be factory equipped with an optional Run Clock (Generator ON/OFF control) and/or a Drain Clock (operating an electronic Auto Drain blowdown valve). Three clocks are available: a 24/7 clock (shown below) typically used for Generator ON/OFF operation, a 24 hour clock typically used for daily blowdown (or optionally for Generator ON/OFF operation) and a 7-day/24 hour programmable digital clock. All clocks connect in the same manner. The 24/7 hour clock is adjustable in two hour intervals, the 24 hour clock is adjustable in 15 minute intervals and the digital clock allows up to 8 ON/OFF operations per day.

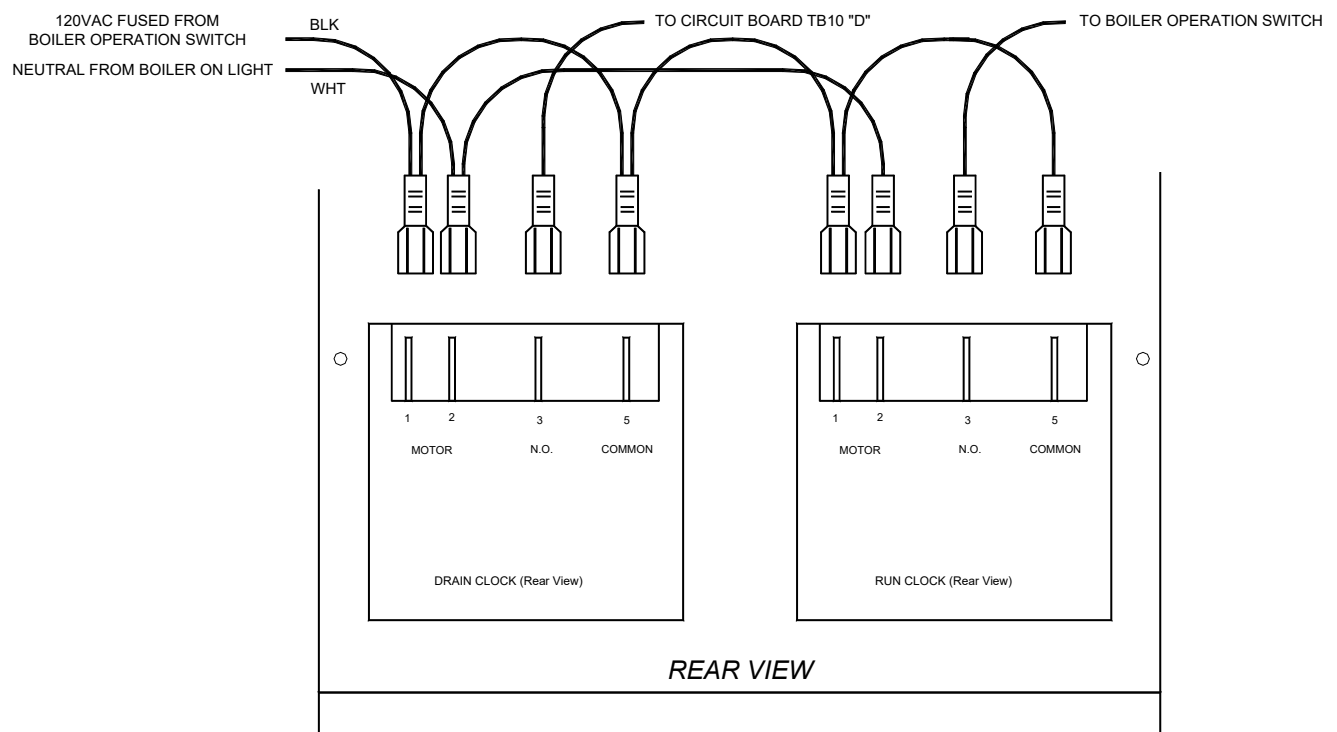
To Set the 24/7 and 24 hour clocks : Turn the clock dial to the right (clockwise) until the pointer matches the current time (and day) on the clock dial. Move set-tabs towards the clock center for the periods the generator should be ON (or the drain should be open) and away from the center for OFF (or drain closed) periods. *When the clock's pointer is in an area with orange showing, its switch will close and turn the generator ON or start the CoolFlush™ Auto Drain blowdown.*



To set the Digital clock: refer to the Digital Timer instructions.

NOTE: *In most boilers, the clocks operate on 120V supplied by the generator's control circuit. If this circuit loses power, the clocks must be reset to the correct time. The digital clocks have an internal battery and are not affected by a loss of power.*

CONNECTIONS: *Always turn off all power to the generator 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.



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

This page intentionally left blank

APPENDIX 2: DIGITAL RUN/AUTO DRAIN CLOCK

This time clock provides flexible timing for daily and/or weekly programming. Setting the clock is simple and fast by means of push buttons and display prompts. This timer provides 24 hour/7 day timing.

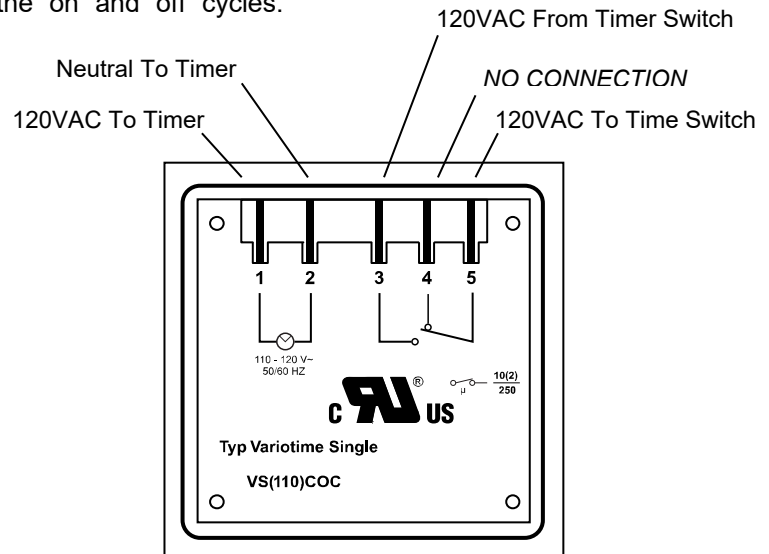
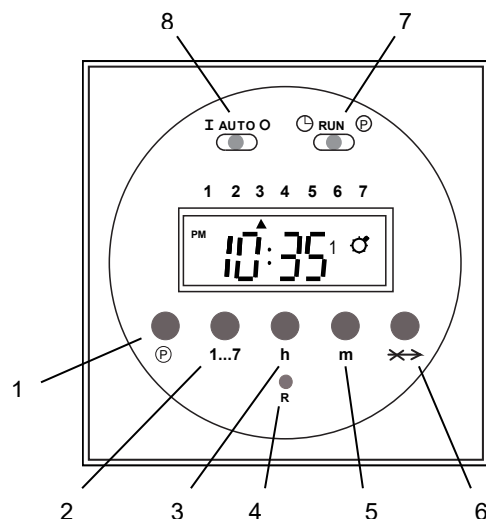
Up to 8 on/off operations are allowed for each day and a total of up to 112 switching cycles per week when using repeat timings. Minimum time setting is 1 minute.

An internal backup keeps the time of day clock running for up to about 2 hours after losing line voltage. Once the time of day displays turns off, you may need to be reset the clock once power is restored. All programmed on and off events will be restored once the power returns.

Note: to save programming, time you can set up each on/off cycle;

- A) to be unique for each individual day, or
- B) to repeat Monday through Friday, or
- C) to repeat Saturdays and Sunday only, or
- D) to repeat Monday through Saturday, or
- E) to repeat every day for the entire week

This can save a lot of time when programming the “on” and “off” cycles.



Item	Description	Item	Description
1	P Switch Point: press to select the switching point while in programming mode	7	Timer Mode Select: = set time of day and day of week RUN = clock and automatic program on = program mode
2	1...7 Days: press to select the weekday		
3	h Hours: press to set the hours and AM/PM		
4	R Reset: press to delete all settings	8	Operating Mode Select: I = continuous on AUTO = programmed On/Off 0 = Continuous off
5	m Minutes: press to set the minutes		
6	><> Skip: press to immediately reverse the present operating mode		

APPENDIX 2: DIGITAL RUN/AUTO DRAIN CLOCK

Directions:

Setting the Time of Day: Slide the **RUN** switch to ☰

1) Setting the current day:

- Press 1...7 and notice a single arrow will move in steps below the numbers 1 to 7, where
1 = Monday 3 = Wednesday 5 = Friday 7 = Sunday
2 = Tuesday 4 = Thursday 6 = Saturday
Keep the button pressed for more than 2 seconds to use the fast setting mode.
- Set the current day of the week.

2) Setting the current time:

- Press the **h** button to set the current hours and the ⌚ button to set the current minutes. The time will display in a 12 hour format with AM and PM.
- Slide the **RUN** switch back to **RUN**. The clock colon will blink between the hours and minutes when showing the time of day.

Programming an ON/OFF cycle: Slide the **RUN** switch to ☰ Note: days may be selected individually or in groups. When the 1...7 button is pressed while programming a ON/OFF cycle, it first selects individual days 1 to 7, then repeat for days 1 to 5 (Mon-Fri), then repeat for days 6 & 7 (Sat & Sun only), the days 1 to 6 (Mon-Sat) then all days 1 to 7 (Mon-Sun)

1) Setting each cycle to “switch on”

- A “1” to the right of the time display indicates this is the first switch cycle and the ⚙ icon indicates the cycle starts with a switch-on condition (circuit closes). (Hint: odd numbers always indicate a “switch-on” cycle.)
- Press **h** and **m** buttons to set the switch-on time, noting the AM/PM indicator.
- Press the 1...7 button until the day arrow points to the selected day or days you want this ON cycle to occur. (see “Note” above instructing how to choose days of the week)
- When done, press the ⌚ (left of 1...7) to save the on cycle setting and go to the off cycle setting.

2) Setting each cycle to “switch off”

- A “2” to the right of the time display indicates this is the first switch off cycle and the ⚙ icon will not appear. The cycle starts with a switch-off condition (circuit opens). (Hint: even numbers always indicate a “switch-off” cycle.)
- Press **h** and **m** buttons to set the switch-off time, noting the AM/PM indicator.
- Press the 1...7 button until the day arrow points to the selected day or days you want this OFF cycle to occur. (see “Note” above instructing how to choose days of the week)
- When done, press the ⌚ (left of 1...7) to save the off cycle setting and go to the next on cycle setting. If done with settings, slide the **RUN** switch back to **RUN** to resume normal operation.

3) To modify or review a switch point, while in programming mode, press the ⌚ (left of 1...7) until the switch point you want to change is displayed then repeat step 1 or 2 above.

- We recommend setting a switch off point immediately after setting the switch on point to avoid errors and the same when deleting switch points.
- You may repeat the above steps to program up to 8 on/off cycles (16 switch points) in any 24 hour period. By using blocks of days, you may have up to 112 switch points per week.
- Slide the **RUN** switch back to **RUN**. The clock colon will blink between the hours and minutes when showing the time of day.

Automatic Operation: With the slide switches set switch to **RUN** and **AUTO** the time of day will be displayed and the load will be turned on or off according to the programmed switch times.

Manual Operation:

- Slide the **AUTO** switch to **I** and the load will be turned on. This switch over-rides and programmed switchings.
- Slide the **AUTO** switch to **O** and the load will be turned off. This switch over-rides and programmed switchings.

Skip cycle: While in **AUTO** and **RUN** mode, a programmed on or off point can be temporarily overridden using the skip button. Pressing the ⏏ button while the a program has turned the load on will immediately turn the load off until the next programmed on time. Pressing the ⏏ button while the load is off will turn the load on until the next programmed off time.

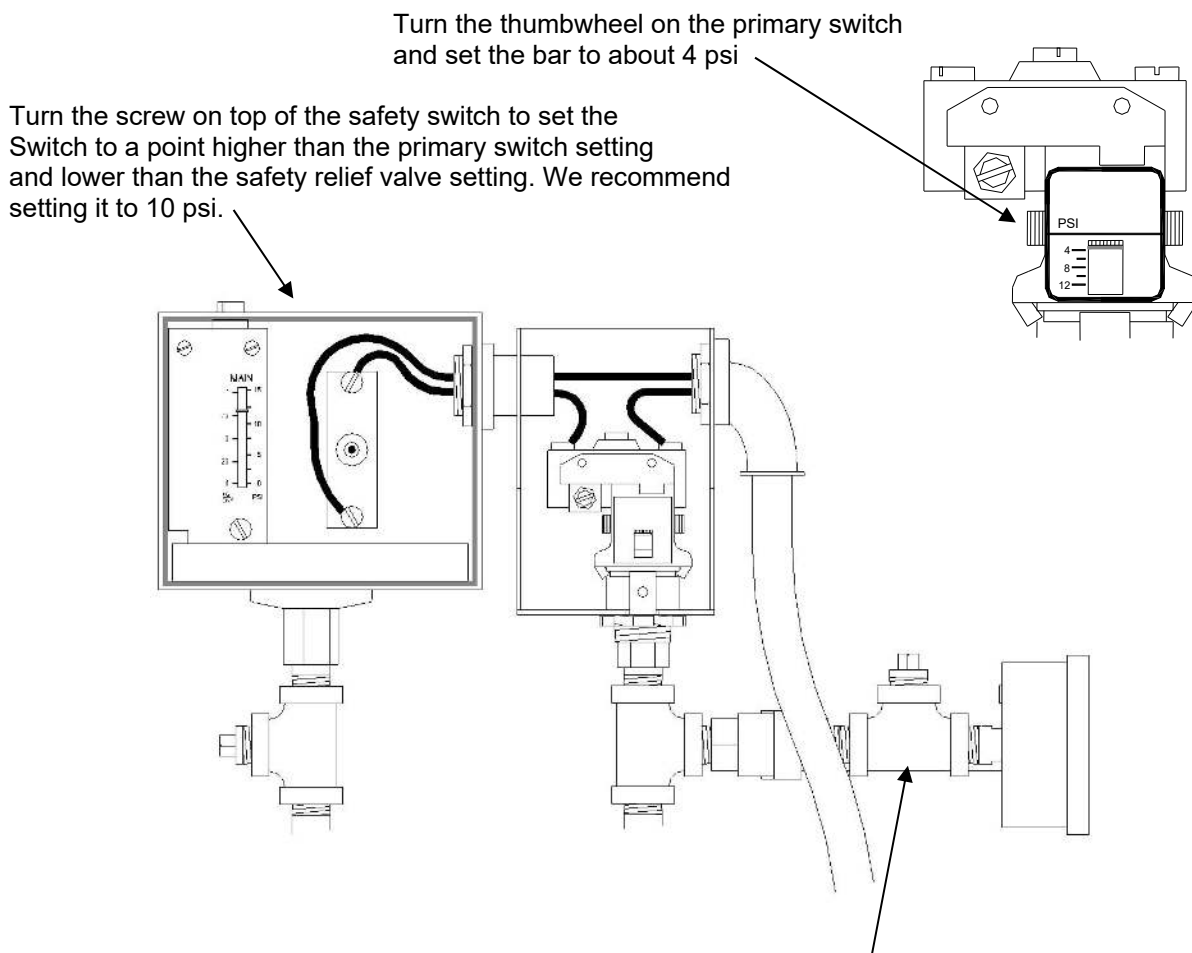
Clear/Reset All: Pressing the **R** button will clear all programmed switch settings and the time and day. A pen is required to press this button so it cannot be pressed by accident.

APPENDIX 3: 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 generator'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 generator pressure. The second switch is a safety control: it remains closed during normal operation but, should the primary switch fail and the generator 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 generator. 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 generator and clean or repair the pressure control assembly as needed.

Adjust the pressure switches as shown below.



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 to assist with gauge changes; the valve should be left open during normal operation.