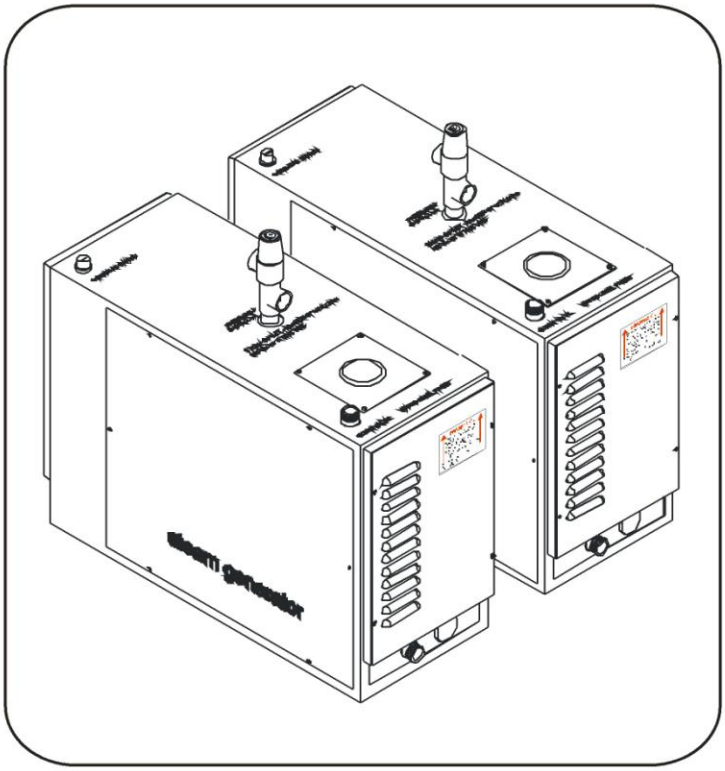
SCANDIA MANUFACTURING

STEAM GENERATOR USER MANUAL



MADE IN USA!

Certified Products

PO Box 636 Eagle Idaho USA. 83616
T: 877.467.2862 F: 208.286.0290 info@scandiamfg.com www.scandiamfg.com

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FOREWARD

Thank you for choosing the Scandia Ultra SK Series steam generator. Please take the time to read these instructions before you begin as they contain important information about the installation, operation and maintenance requirements for the Scandia Ultra steam generator.
SK Series steam generators are available in specifications from 4kW to 42kW and are equipped with the OC-B intelligent controller, automatic drain valve and automatic descaler. The 100% solid stainless steel design is consistent with Scandia Manufacturing's Ultra Sauna gas and electric sauna heaters that have been used in fine establishments since 1962. Experience the innovation and quality you have come to expect from Scandia with the Ultra Steam SK Series steam generator.

WARNING

★Read the manual before installation and operation.
★All Scandia Ultra Steam Generators must be electrically grounded.
★All plumbing must be installed by a licensed plumber in accordance with local and national codes.
★All wiring must be installed by a licensed electrician in accordance with local and national codes.
★Disconnect all electrical power from the generator prior to servicing.
★Never shut off the water to a steam generator that is in use.
★SK series generators are for indoor use only.
★Electric Shock Hazard – High voltage exists within this equipment. There are no user serviceable parts in this equipment.

SAFETY PRECAUTIONS

★Elderly persons, pregnant women, or these suffering heart disease, high blood pressure, diabetes or not in good health are advised to seek medical opinion before using a steam room.
★Do not smoke in the steam room.
★Avoid using the steam room immediately after strenuous exercise.
★Do not use the steam room when under the influence of alcohol.
★Leave the steam room at once if you feel sleepy, sick or uncomfortable.
★People using medication should consult a physician before using a steam bath since some medication may induce drowsiness while other medications may affect hear rate, blood pressure and circulation.
★Children under the age of 16 should be accompanied by an adult.
★Wet surfaces of the steam enclosure may be slippery. Use care when entering or leaving the steam bath.
★The steam head is hot. Do not touch the steam head and avoid the steam near the steam head.
★WARNING – Hyperthermia occurs when the internal temperature of the body reaches a level several degrees above the normal body temperature of 98.6 degrees F. 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
f. Unconsciousness

WARNING – The use of alcohol, drugs or medication can greatly increase the risk of hyperthermia.
★Commercial operators should post a notice of these precautions in a prominent location.

SPECIFICATIONS AND DIMENSIONS

SPECIFICATIONS

The specifications of the Ultra steam are given below. Note that all the models might not be available at the dealer.

Single Unit 240V / Single & 3-Phase Generators

Model	Power (KW)	Max Cubic Footage	Voltage (V)	Phase (N~)	Current (A)	Breaker Size	Dimensions (LxWxH)
SK-240-40	4	140	240	1	16.7	20	20 7/8" x 7" x 13"
SK-240-50	5	190	240	1	20.8	25	20 7/8" x 7" x 13"
SK-240-60	6	215	240	1	25	30	20 7/8" x 7" x 13"
SK-240-70	7	250	240	1	29.2	35	20 7/8" x 8 1/4" x 14 1/2"
SK-240-80	8	320	240	1	33.33	40	20 7/8" x 8 1/4" x 14 1/2"
SK-240-80-3	8	320	240	3	19.24	25	20 7/8" x 8 1/4" x 14 1/2"
SK-240-10	10	388	240	1	41.7	50	20 7/8" x 8 1/4" x 14 1/2"
SK-240-10-3	10	388	240	3	24.05	30	20 7/8" x 8 1/4" x 14 1/2"
SK-240-12	12	425	240	1	50	60	20 7/8" x 8 1/4" x 14 1/2"
SK-240-12-3	12	425	240	3	28.86	35	20 7/8" x 8 1/4" x 14 1/2"
SK-240-15	15	565	240	1	62.5	80	20 7/8" x 9" x 18 1/8"
SK-240-15-3	15	565	240	3	36.08	45	20 7/8" x 9" x 18 1/8"
SK-240-18	18	670	240	1	75	90	20 7/8" x 9" x 18 1/8"
SK-240-18-3	18	670	240	3	43.30	60	20 7/8" x 9" x 18 1/8"

Model	Power (KW)	Max Cubic Footage	Voltage (V)	Phase (N~)	Current (A)	Breaker Size	Dimensions (LxWxH)
SK-240-20	20	775	240	1	Please call for electrical specs and dimensions		
SK-240-20-3	20	775	240	3	Please call for electrical specs and dimensions		
SK-240-30	30	1130	240	1	Please call for electrical specs and dimensions		
SK-240-30-3	30	1130	240	3	Please call for electrical specs and dimensions		
SK-240-36	36	1340	240	1	Please call for electrical specs and dimensions		
SK-240-36-3	36	1340	240	3	Please call for electrical specs and dimensions		

Single Unit 208V / Single & 3-Phase Generators

Model	Power (KW)	Max Cubic Footage	Voltage (V)	Phase (N~)	Current (A)	Breaker Size	Dimensions (LxWxH)
SK-208-40	4	140	208	1	18.02	25	20 7/8" x 7" x 13"
SK-208-50	5	165	208	1	21.63	30	20 7/8" x 7" x 13"
SK-208-60	6	225	208	1	28.85	35	20 7/8" x 8 1/4" x 14 1/2"
SK-208-60-3	6	225	208	3	16.65	20	20 7/8" x 8 1/4" x 14 1/2"
SK-208-80	8	275	208	1	36.06	45	20 7/8" x 8 1/4" x 14 1/2"
SK-208-80-3	8	275	208	3	20.82	25	20 7/8" x 8 1/4" x 14 1/2"
SK-208-90	9	335	208	1	43.27	60	20 7/8" x 8 1/4" x 14 1/2"

SK-208-90-3	9	335	208	3	24.99	30	20 7/8" x 8 1/4" x 14 1/2"
SK-208-12	12	415	208	1	54.08	70	20 7/8" x 9" x 18 1/8"
SK-208-12-3	12	415	208	3	31.23	40	20 7/8" x 9" x 18 1/8"
SK-208-14	14	500	208	1	64.90	80	20 7/8" x 9" x 18 1/8"
SK-208-14-3	14	500	208	3	37.47	45	20 7/8" x 9" x 18 1/8"
Model	Power (KW)	Max Cubic Footage	Voltage (V)	Phase (N~)	Current (A)	Breaker Size	Dimensions (LxWxH)
SK-208-18	18	670	208	1	Please call for electrical specs and dimensions		
SK-208-18-3	18	670	208	3	Please call for electrical specs and dimensions		
SK-208-28	28	1245	208	1	Please call for electrical specs and dimensions		
SK-208-28-3	28	1245	208	3	Please call for electrical specs and dimensions		
SK-208-42	42	1500	208	1	Please call for electrical specs and dimensions		
SK-208-42-3	42	1500	208	3	Please call for electrical specs and dimensions		

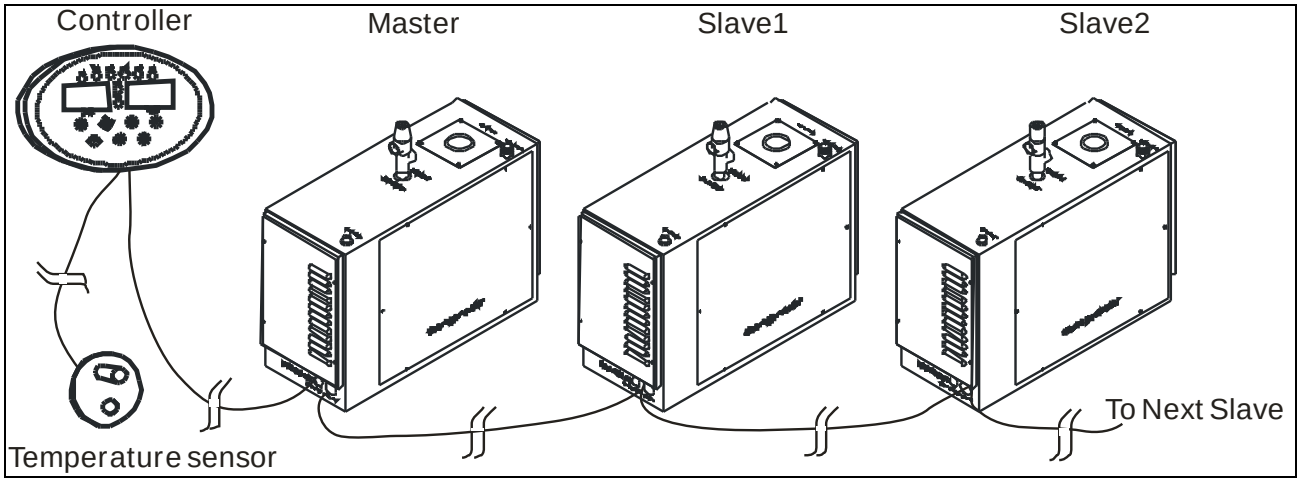


Figure 1

*If greater power is required one **OC-B** controller may be used to control two or more steam generators, e.g. if you need a 30kW steam generator you can use one OC-B controller to control two 15kw steam generators or three 10kW steam generators. The Master Slave configuration is given in Figure 1 ,2, and 3.*

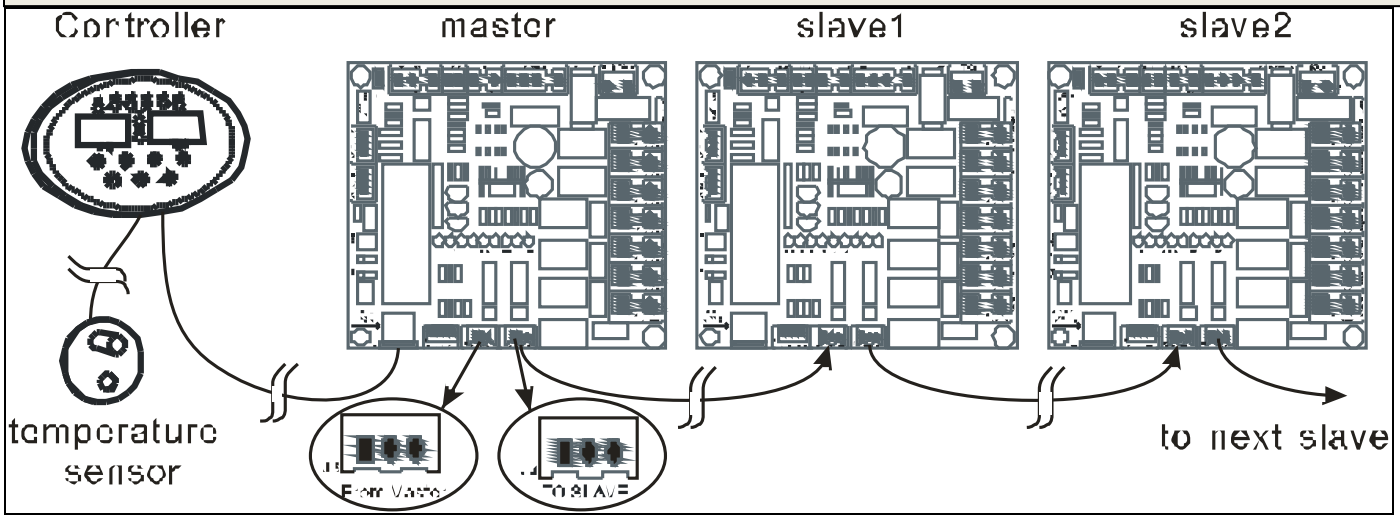


Figure 2

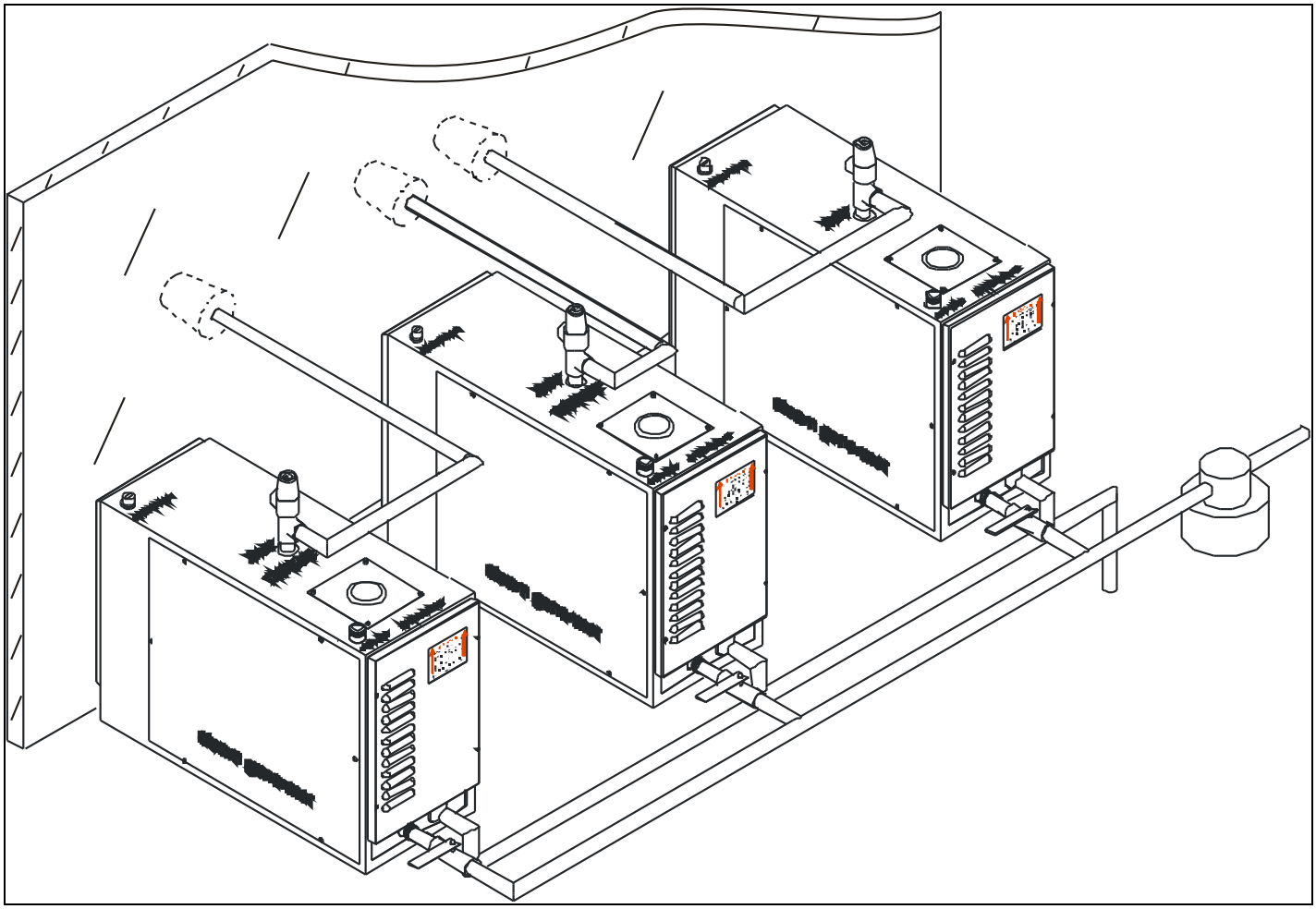
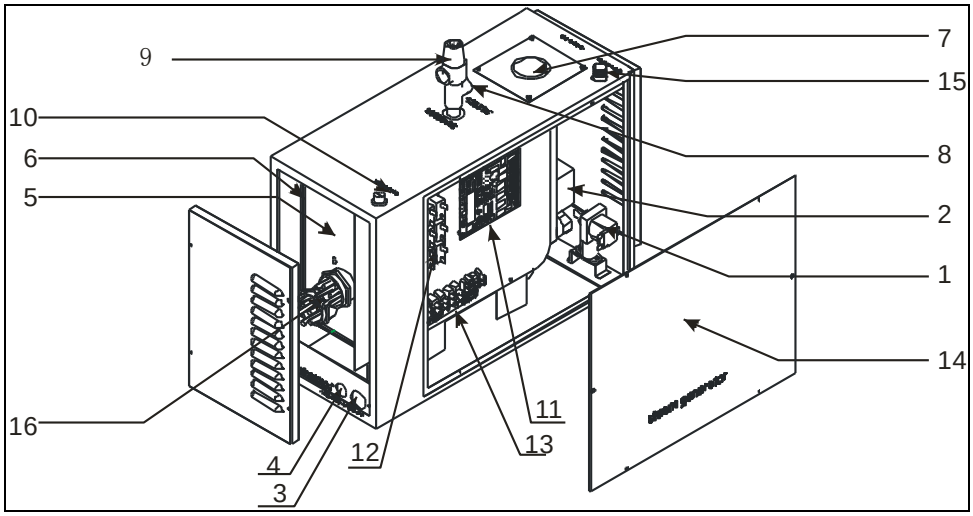


Figure 3

COMPETE DIAGRAM

The diagram of the parts is given in figure 4 and the description is given below.

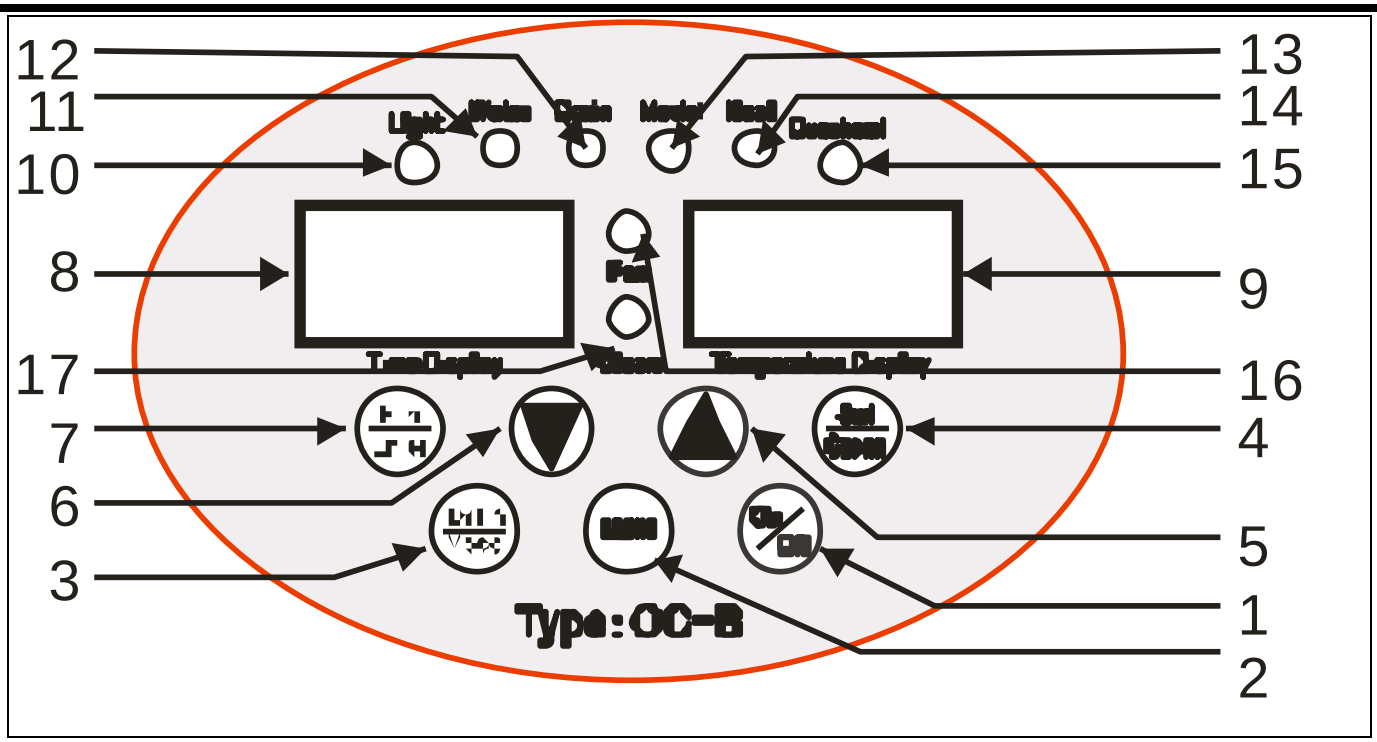


No.	Part	Description
1	Water inlet valve	Automatically controls the water flow (29 psi maximum)
2	Drain valve	Automatic flush
3	Power entry	The route of power wire
4	Control cable entry	The route of control cable
5	Stainless steel tank	Boiler
6	Insulation material	Reduce the loss of the boiler heat
7	Water lever probe	Detects the water level inside the tank
8	Steam outlet	Steam outlet
9	Pressure relief valve	Operates if the pressure in the boiler exceeds 17.4 psi
10	Overheat switch	Boil dry protector operates at 230 F
11	Main circuit board	Control center
12	Accessorial circuit board	Connect and control the heat element
13	Terminal	Connection for power supply
14	Lug	Ground
15	Descaling liquid inlet	Descaling liquid inlet (1/2 inch)
16	Heat element	Heat element

CONTROLLER DIAGRAM

The controller diagram is given in figure 5 and the description below

No.	Part	Description
1		Push to operate
2		Push to operate
3		Dual function button push to select steam on demand mode or to drain the generator manually when not steaming.
4		Dual function button used when steaming to set the time/temperature and when not steaming to begin the automatic descaling.
5		Increase button
6		Decrease button
7		Dual function button switches a fan on and off, also used to confirm changes in temperature settings.
8	Time display window	Display the resting and operating time of the steam generator
9	Temp display window	Display the detected temperature of steam room
10	Light LED	Indicator LED for the light in the steam room.
11	Water LED	Indicator LED for water level. Red means water is filling. Green means water level filled to control point. (Note: if the LED remains red for more than 5 minutes, check water supply.)
12	Drain LED	Indicator LED for draining – shows red for manual draining and green for automatic draining at the end of the cycle.
13	Mode LED	Red indicates steam on demand mode; green indicates the unit is operating using conventional timing.
14	Heating LED	Green indicates elements are heating, red indicates the required temperature has been reached and the elements have turned off.
15	Overheat LED	Indicator LED for overheat, red indicates the steam generator was shut off because the internal tank temperature is too high. (Caused by dry firing elements)
16	Fan LED	Indicator LED for fan in steam room (if required).
17	Clean LED	Indicator LED shows descaling in operation.



Please note for the generator to operate in steam on demand mode the steam on demand button must be connected.

INSTALLATION

★ Disconnect the power supply before installation.
★ Confirm the model you have selected is suitable for your steam room, please refer to chart 5.
★ Mount the steam head at least 18" above the floor.
★ If the steam generator is installed in an inaccessible place ensure that both the electrical power and water supply can be isolated in an emergency.
★ The minimum water inlet pressure is 3.6 psi and the maximum is 11.6 psi, advise the water pressure not exceed 7.25 psi.
★ The steam line from the steam generator to the steam room should be kept to a minimum, lines longer than **20** feet should be insulated to prevent heat loss. Steam lines will be hot during use and must be protected against accidental contact.
★ Keep the number of right angle bends to a minimum and ensure that the run does not create a trap into which condensation would gather and cause a blockage. I.e. the pipe must not go down and then up. It is highly recommended to run the steam line in a downward slope to the steam room to prevent blockage in the steam line.
★ There must be no valve or other blockage in the steam pipe.
★ The steam pipe should be metal of other material which can endure temperatures up to 300° F copper pipe is recommended. The use of black pipe or galvanized steel will result in rust coming out of the steam head.

★ It is not recommended to install the Steam generator outdoors or where it might be susceptible to freezing. Allow for a minimum space of 18" around the generator to install and maintain the generator.
★ Steam generator should be level side to side and front to back and should be installed so that the arrows on the case point up.
★ Do not install the steam generator in close proximity to hazardous substances.

WATER QUALITY REQUIREMENTS

The nature of steam generators 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 of 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 flushing the generator when it is not heating. The "auto-flush" process involves removing a portion of the tank water comprised of high solid concentration and replacing it with makeup water.

To ensure 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 Range, ppm 15-25 (1.28-1.45 gpg)
PH (strength of alkalinity) 10.5-11.5

MOUNTING THE GENERATOR

The steam generator should be installed in a dry, well ventilated place in close proximity to the steam room. It can be placed on the floor or hung on the wall. Refer to Figure 6b for required clearances.

Wall Mounting:
Note the location of the mounting holes on the back of the generator. The screws must set directly into studs or equivalent supports. Drill pilot holes and install two #10 1 ½" screws. Hang the generator by the two keyhole mounts in the back plate. Then, with the front cover removed, install the third screw to secure the unit in place.

Floor Mounting:

In general the width of the unit allows it to sit on a shelf, across the ceiling joists or on a floor. The generator must be restrained from moving. Normally the plumbing will provide adequate support. If not, additional support must be provided.
*All floor installed generators must have provision for routine draining of the tank.

WATER AND STEAM CONNECTION

★The water supply line and steam line should comply with local standards. Copper piping is required.
★Connect the water inlet valve of the generator to the ½" main water supply using a flexible hose with ½" fittings.
★Connect a ½" copper steam line to the steam outlet. If the steam line is longer than 20 feet it should be insulated. ***Warning – Steam line will be very hot during use and must be protected against accidental contact.*** Note that according to the location it may be necessary to attach an additional length of pipe to the pressure relief valve in order to divert the steam flow to a safe direction should the valve operate.
★Connect the drain outlet to a suitable drain using a copper drain line. Water draining from the generator may reach temperatures up to 220 F.
★Make a secure connection between steam head & steam line inside the steam room.
★Use a non-corrosive hose with ½ inch unions to connect between the descaling liquid container and the inlet valve; note the descaling liquid container must be mounted at least 20 inches above the steam generator.

INSTALLATION FOR CONTROLLER AND TEMPERATURE PROBE

The OC-B controller is water proof and can be installed inside or outside the steam room according to customer preference.
★ Ideally the control panel should be installed at a height of approximately 60 inches for ease of use.
★ Drill a 1 ½" hole in the desired control location. Feed the control cable through the wall to the generator. Remove the cover on the control to expose the mounting holes. Screw the control to the wall and replace the control cover. It is highly recommended to silicone the back of the control to ensure moisture does not penetrate behind the control.
★Temperature probe installation: the temperature probe is installed inside the steam room approximately 10" from the ceiling and away from the door. Use included mounting screw to secure the probe to the wall. It is recommended to silicone the back of the probe to ensure moisture does not penetrate behind the probe. Attached the thermostat sensor to the generator circuit board.

Shown in figure 9 and 10.

INSTALLATION FOR POWER SUPPLY AND CONTROL CABLE

★ Confirm the line feeds to the generator are the correct voltage and phase.
★ Remove the knock out for the power cable entry and use a rubber grommet to protect the cable.connect to the conductors to the correct terminals for single phase power supply use the copper bridge connectors, for 3 phase supply remove them.
Remove the knock out for the control cable entry and use a rubber grommet to protect the cable, connect the cable to the relevant port on circuit board.
Ensure the power supply wire and control cable remain separated to prevent magnetic field of power supply wire from disturbing control cable signal.
Shown in figure 11, 12, and 13.

STEAM ON DEMAND FUNCTION

Commercial operators may wish to take advantage of the steam on demand function which will allow customers to press the steam on demand button located inside the steam room after which the generator will operate for 30 minutes then stop until activated again.

To operate the steam on demand function install the controller inside the plant room alongside the generator then fit the push button supplied in a convenient location inside the steam room and connect to the controller with the cable provided.

Shown in figure 14.

TESTING AND OPERATION

(1) Once the installation has been completed and checked turn on power and water supplies carry out the following test.

(2) On the control panel press the " On/Off " key, (the key has a time-lapse function, press it for 1 second), the time and temp windows display the data.

(3) The water inlet valve turns on & water enters the boiler, the indicator LED is red. When the water level rises to the low water sensor level the elements switch on and the heating indicator LED is on, several seconds later when the high water sensor is reached the water inlet indicator LED changes to green and the water inlet valve will turn off.

(4) After a few minutes of operation it will begin steaming, for small steam generator 2-3 minutes, for larger generators 3-5 minutes.

(5) Press the " On/Off " key again the controller turns off, there will be no data on display and the generator will stop - no more steam.

(6) Press the " On/Off " key once more (temp and time display again) after a few seconds the generator will begin steaming again, let the generator operate for a short while - the water level will fall to the low water level, check that the water inlet valve opens automatically (the water inlet indicator LED becomes red) During the cold water enters boiler , the steam generator still produce steam once the high water level is reached again the water inlet valve will close the and the LED will go back to green .

(7) The time display counts down to show the remaining time, when it reaches 0 the steam generator will stop heating.

(8) Once the steam generator has operated for 10 minutes or more when it is turned off (manually or automatically) it will enter the automatic drain down cycle; this means once the temperature of the water in the boiler falls below 80 ℃ it will and drain and then flush before it can start steaming again.

Note when the steam generator is off you can drain it manually (flush boiler and drain) by pressing the "drain" button – drain LED starts flashing - note that if the water will only start draining once the temperature has fallen below 80 ℃.

(9) " Drain Model " This button has 2 functions if the generator is off this button can be used to drain the generator manually. If the generator is switched on it is used to select the steam on demand operating mode.

(10)When the preset temperature for the steam room is reached 2 of the 3 element banks will switch off allowing just the 1 bank to continue heating to maintain the temperature. Elements will cycle on and

off to maintain the temperature to within approximately 2.5 degrees above or below the preset requirement.
(11) Boil dry protection – if the water supply fails, the water level indicator LED will change to red and the steam generator stop.

(12)The"Light" can output 208V or 240V (depending on power supply) to power the transformer for a 120V lamp. Press on/off.

(13) "Fan Enter " This button has 2 functions it can be used to power a fan if fitted and is also used during the temperature or time setting procedure to confirm the settings (see further details below)

(14) "Set Clean " This button has 2 functions it is used to set the time and temperature settings and to start the descaling operation (see further details below).
(15) To change the display temperature from Celsius (default) to Fahrenheit alter the settings of the JP1 pins on the circuit board, please refer last chapter circuit diagram.

SETTING TIME AND TEMPERATURE

When the steam generator leaves the factory the default settings are 40℃ and 1 hour of operation these can be adjusted as follows;

(1) Time setting: press "Set Clean " key the time display window will flash - press " ▲ "" ▼ " to adjust the time, every time the arrow button is pressed the time will increase or reduce 5 minutes, once the desired setting is reached press "Fan Enter" the window will stop flashing. You can adjust the runtime duration from **10 to 240 minutes**, exceed 240 minutes it will display "Long" meaning no time limit. *Note the controller has a memory function, if the power supply is not cut off the previous settings will be displayed.

(2) Temperature setting: Press "Set Clean" once after you finish setting the time or twice if time was not adjusted and the temperature window will flash. Enter the required temperature by pressing "▲" " ▼ " to adjust - every press will increase or reduce 1 ℃. You can adjust from 30℃-60℃ (85-140℉, if Fahrenheit is displayed). Once the required temperature has been set press " Fan Enter " the window will stop flashing.
(3) Auto-descaling can only operate when the steam generator is in the OFF mode (i.e. the boiler has finished steaming, the water has drained and flushed, the drain LED is off).
Before auto-descaling can commence, a supply of liquid descaler must be connected from storage reservoir positioned at least 20" above the steam generator. For the dilution ratio please refer to the information supplied with the descaling agent.

IMPORTANT do not use strong acids or high concentrations as these my attack and destroy the element or other metal parts of the boiler.

To start the process press the "Set Clean" key for 5 seconds, "Clean" LED is on, time window displays last setting time (default setting is 8 hours), press " ▲ "or" ▼ " 5 seconds, the time window will display hours, increase or decrease to set the required time, each button press will increase or decrease 1 hour, maximum is 24 hours, minimum is 1 hour. Once the setting has finished the flashing will stop and the

process will begin automatically by opening the inlet valve for the generator to fill with the descaling solution, the inlet valve will then close and the solution will remain inside the boiler for the preset time. At the end of the sequence the drain valve will open and the boiler will drain and then flush with clean water; when the cycle is complete the drain LED will turn off.

1. *Ensure there is sufficient descaling solution in the container to completely fill the generator - when generator tank is full of descaling solution the D4 LED on the circuit board will be turn on.*
2. *If during the descaling the power supply is interrupted, do not operate the steam generator until either the descaling process has been reset or the descaling solution has been drained and the generator has been flushed with clean water – minimum 3 flushes.*

MAINTENANCE

★The single biggest problem with steam generation is the build-up of scale resulting from dissolved solids within the water. Scaling can cause the elements to fail, the water level sensors not to function and premature failure of the O-rings resulting in leaks from around the elements. The extent of the problem will vary according to the degree of hardness in the local water supply.
★For all commercial operators we recommend you consult a local water expert to assess your local water quality. Please note that in some cases a water softener may be required.
★All users commercial and domestic must ensure a regular maintenance routine to descale the generator. The frequency of this will vary according to the degree of hardness in the local water supply and the amount of time the generator is used. Check your facility's water for hardness and arrange the descaling routine accordingly.
★High levels of hardness descale once every 50 to 100 hours of operation
★Medium levels of hardness descale once every 100 to 250 hours operation
★Low levels of hardness descale once every 250 to 1000 hours of operation.
★Parts that fail because of a lack of descaling are not covered under warranty.
★Because heating and cooling cause expansion and contraction it is important to inspect all the water and steam inlets and outlets as well as their pipes and connectors on a regular basis to ensure there are no leaks.
★Clean the filter net in the magnetic valve according to the water quality in the location.
The condition of the wiring and electrical integrity of the generator should be checked regularly - for commercial operators this should be at least once a year.

All generators are guaranteed for 12 months from the date of purchase. This guarantee excludes consumable items such as the electrical elements and failures resulting from misuse or abuse such as a failure to descale as above.

TROUBLESHOOTING

We recommend that trained professionals carry out all repairs.

Trouble description	Cause	solution
When the generator is turned on there is no display on control panel.	Something is wrong with: 1. power supply 2. transformer 3. main circuit board 4. controller 5. control cable or port	1. Check power supply voltage. 2. Indicator LED of power supply on circuit board isn't on in red. Check transformer. 3. If the LED is red remove controller, use circuit board to manually turn on steam generator. If steam generator doesn't work the circuit board is faulty. Change circuit board 4. If the generator works in manual start, check control cable for loose connections.
Turn on steam generator, press "on/off". The controller is on but the elements are not heating.	Cause: 1. water supply valve isn't turned on. 2. water inlet magnetic valve 3. water level probe 4. main board 5. Ground wire of generator and circuit board 6. circuit board 7. heat element	Solution: 1. Indicator LED for water level is red. check water supply ,water inlet valve 2. Check the connection of water level probe. 3. Check ground wire connection for circuit board and generator. 4. Indicator LED for water level is green. Check circuit board 5. Check if overheat switch is disconnected 6. Check heat elements
Steam generator is turned on .control panel is normal. indicator LED for heating is on .but	Cause: 1. main circuit board	Solution: 1. Change main circuit board

there is no steam spout out	2. relay circuit board 3. heat elements	2. Change relay circuit board 3. Change heat elements
Temp. window display “LC”	Something is wrong with the water level probe connection	Check connection or change temperature sensor probe.
Temp. window display “HC”	Water level probe is short circuiting	1. Check temperature sensor connection 2. Check controller if it is short circuited inside
When generator is turned off water flows out of the steam head	Something is wrong with water inlet valve	Check water inlet valve. Clean it or change it
Cut off power supply, water flow out from steam nozzle	Something wrong with: 1.water inlet valve 2.circuit board	Change circuit board or water inlet valve
The controller is turned off but the generator continues to run	Something wrong with: 1. circuit board 2. controller 3. relays on accessorial circuit board 4. water level probe	Cut power supply at once and contact a service technician.

FIGURES

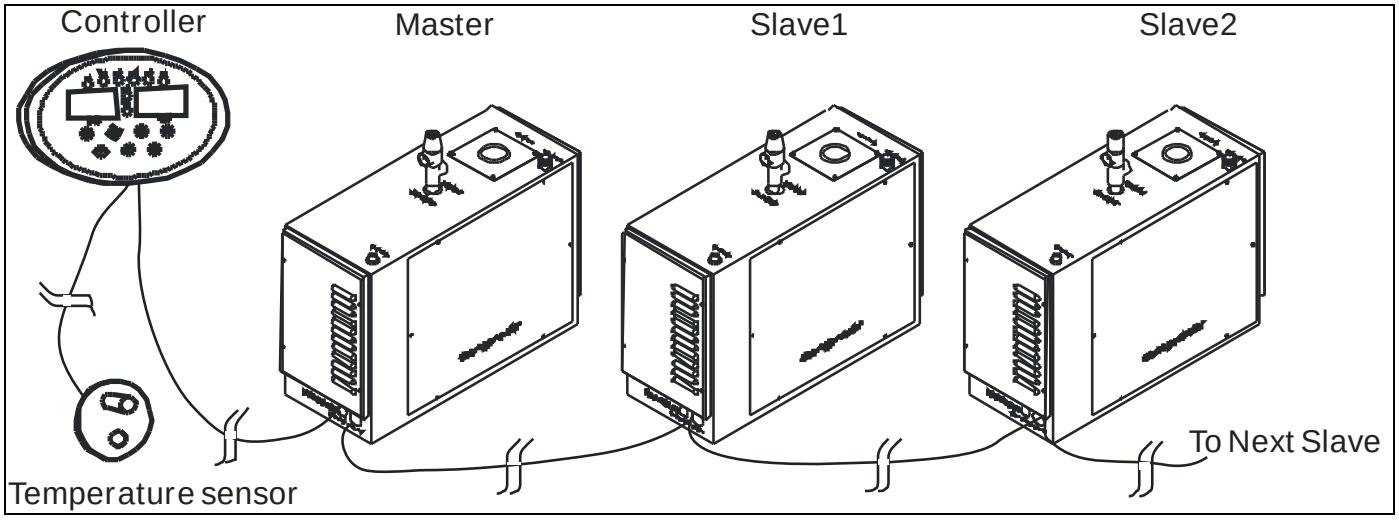


Fig 1

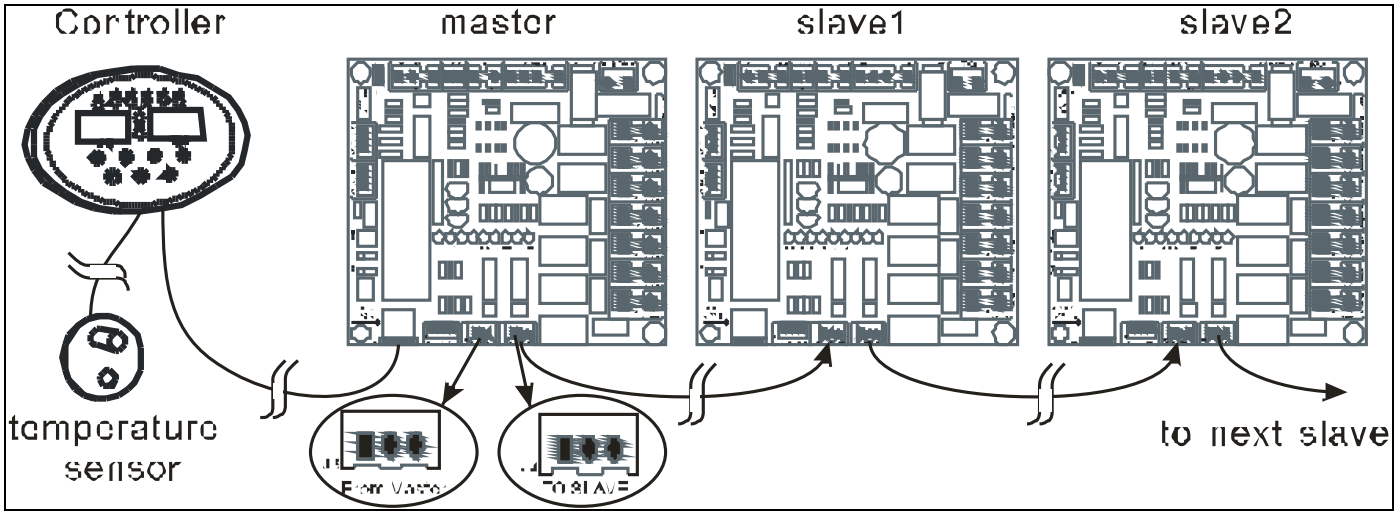


Fig 2

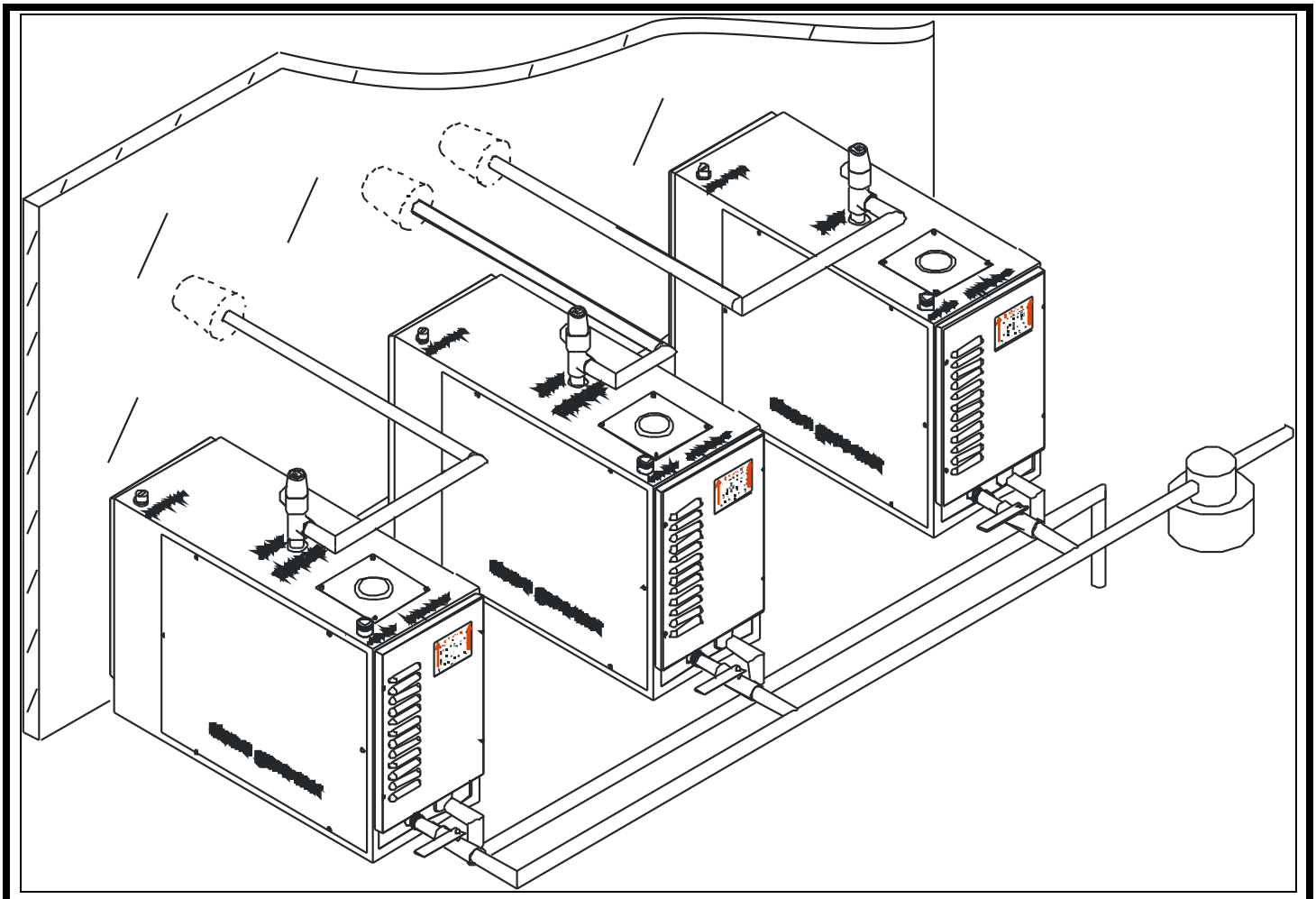


Fig 3

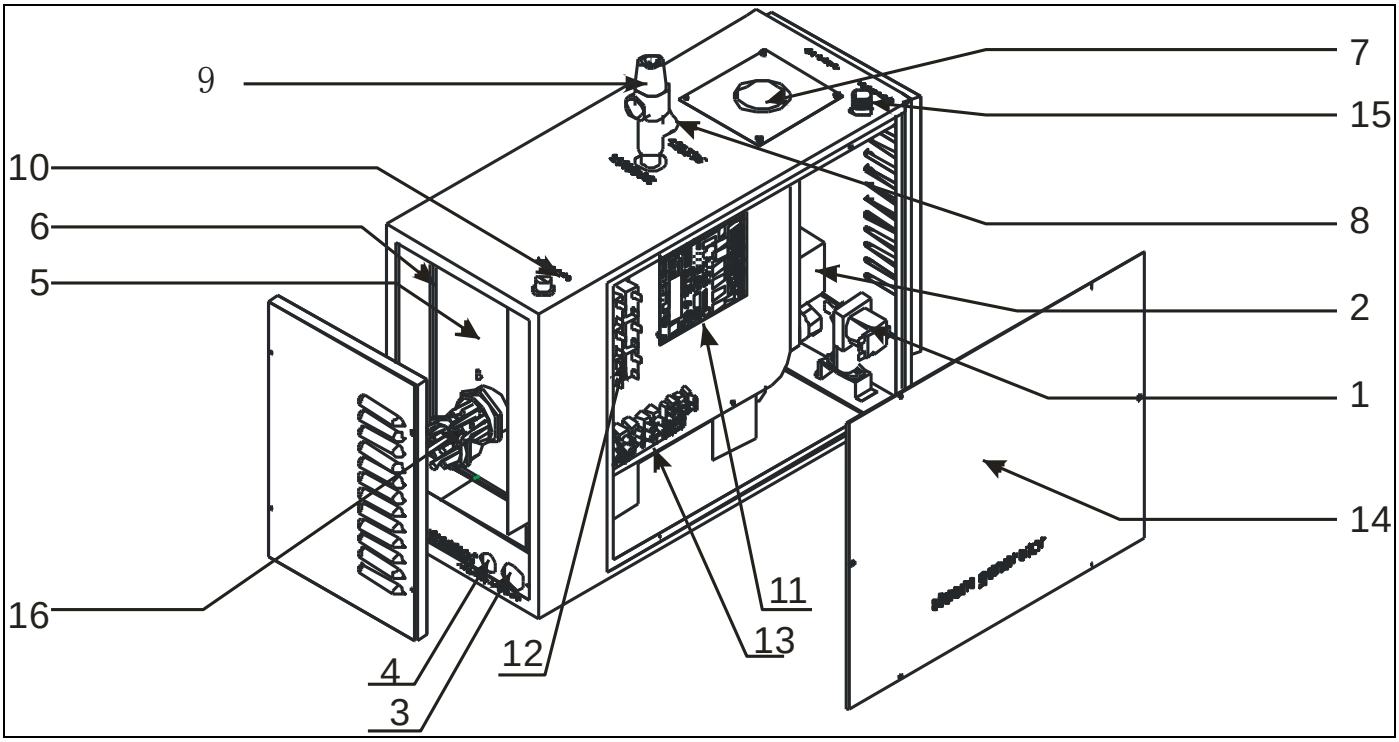


Fig 4

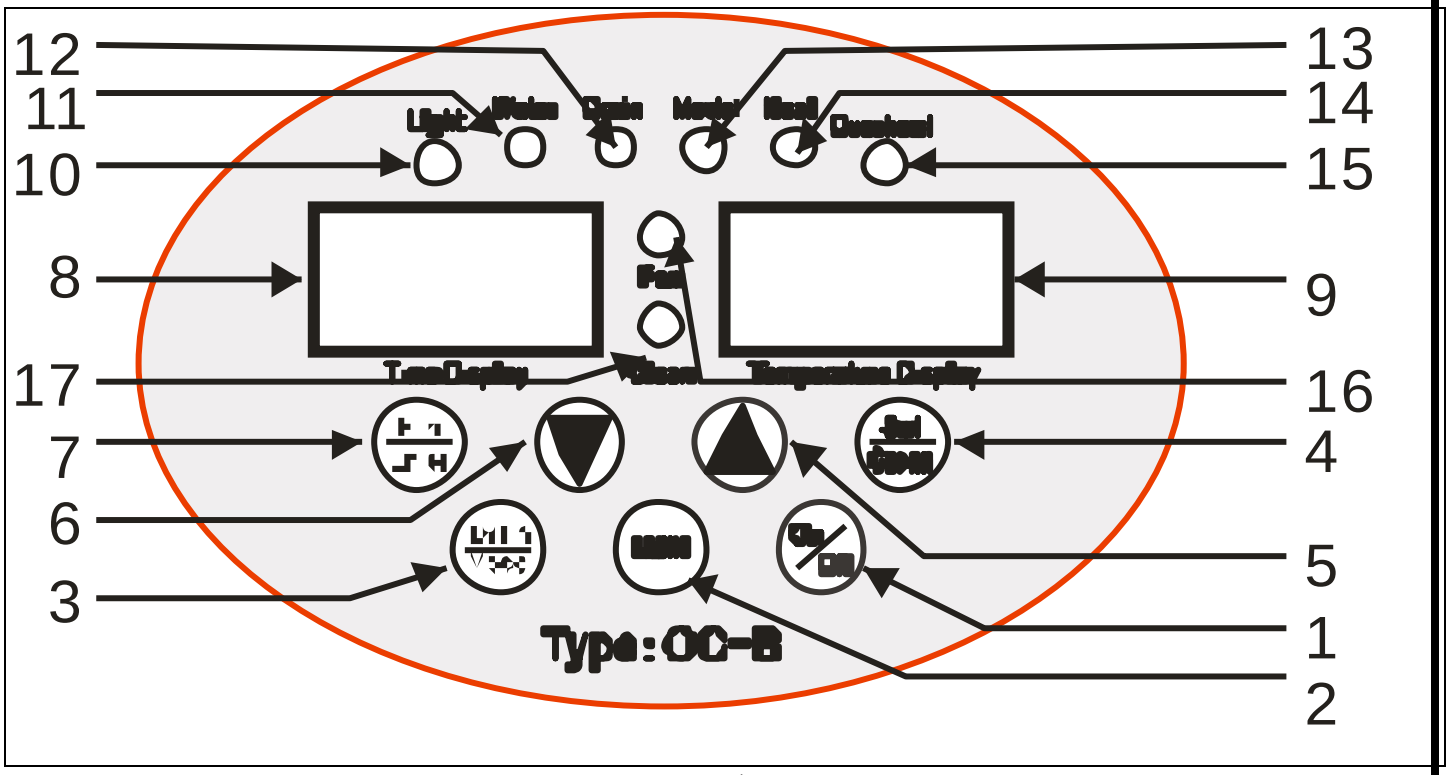
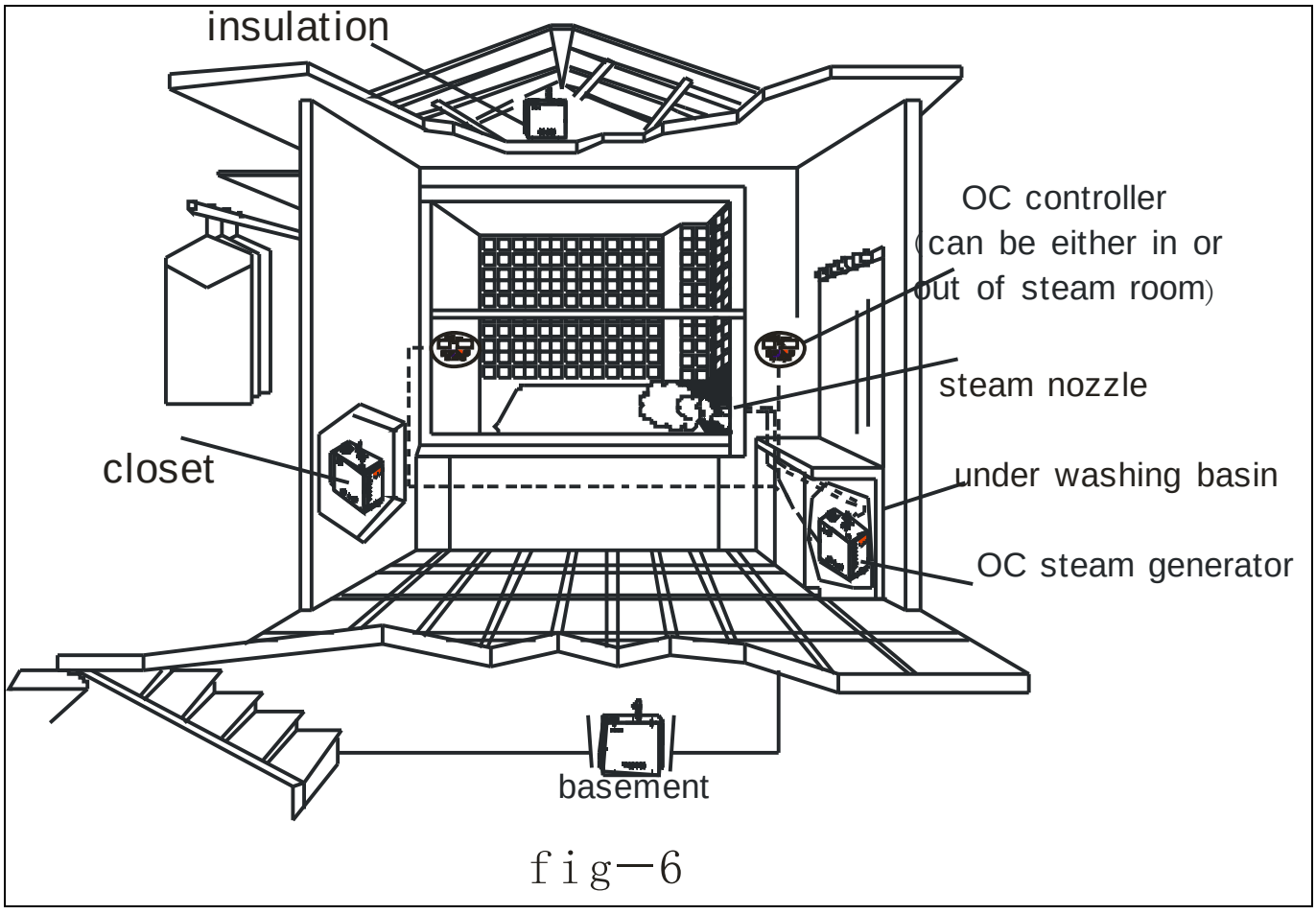

12
11
10
8
17
7
6
3
13
14
15
9
16
4
5
1
2
Type:OC-B

Fig 5


insulation
OC controller
(can be either in or
out of steam room)
steam nozzle
closet
under washing basin
OC steam generator
basement

fig—6

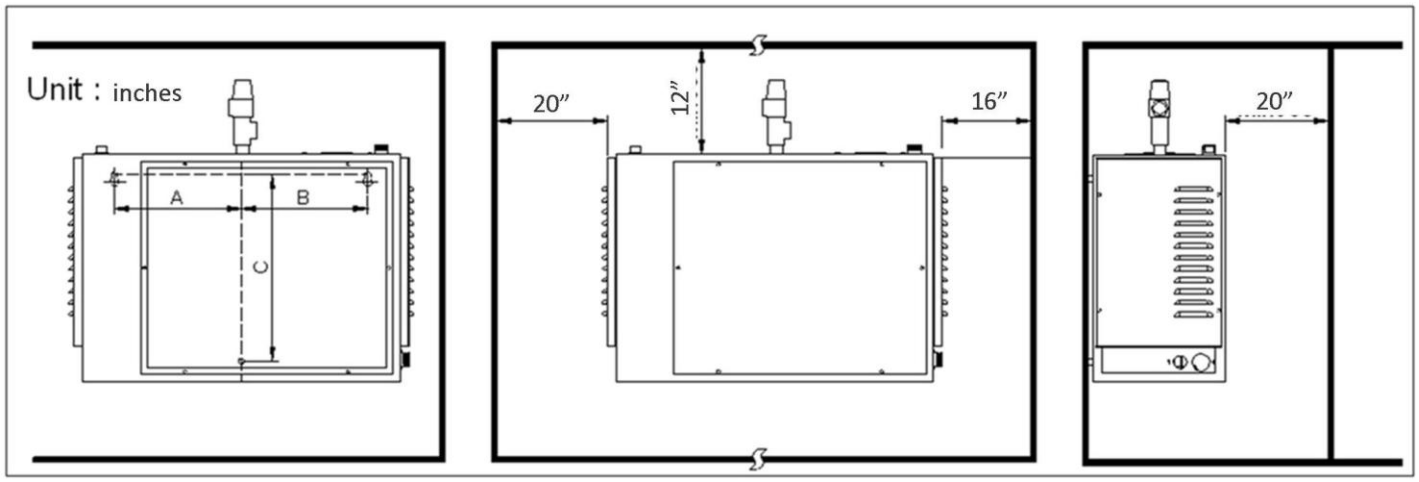


Fig 6b

chart-6

Generator Sizes	A	B	C
4kW-6kW	8.5"	8.5"	11"
7kW-12kW	8.5"	8.5"	13"
15kW-18kW	8.5"	8.5"	16"

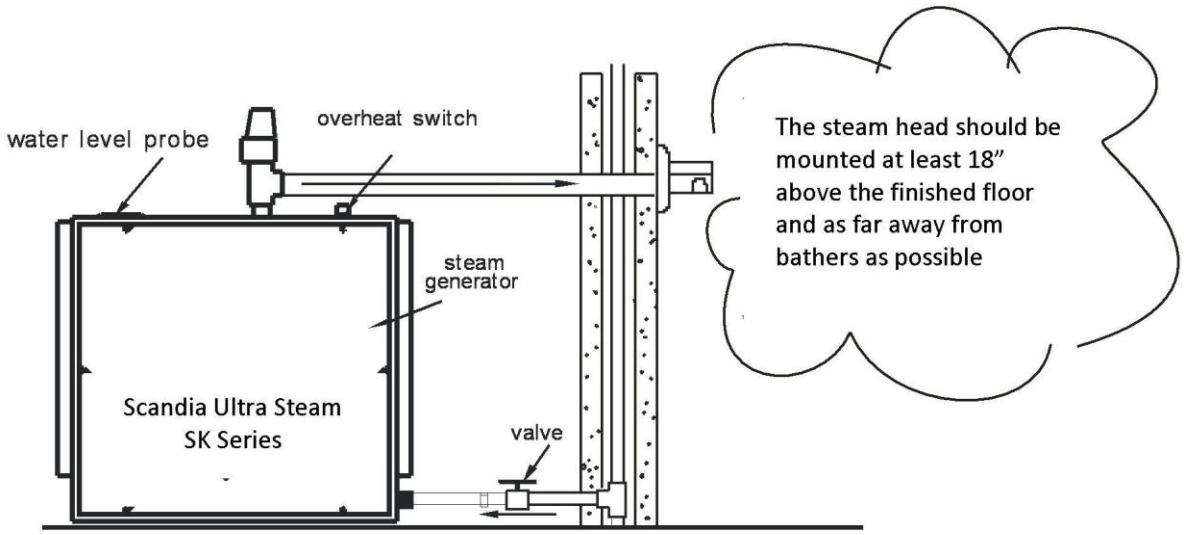


Fig 8

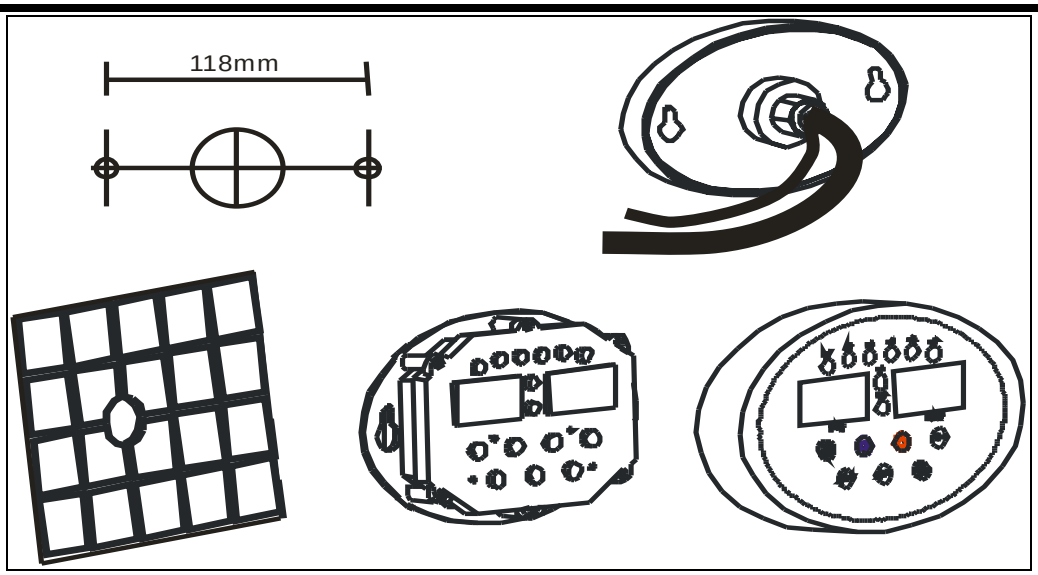


Fig 9

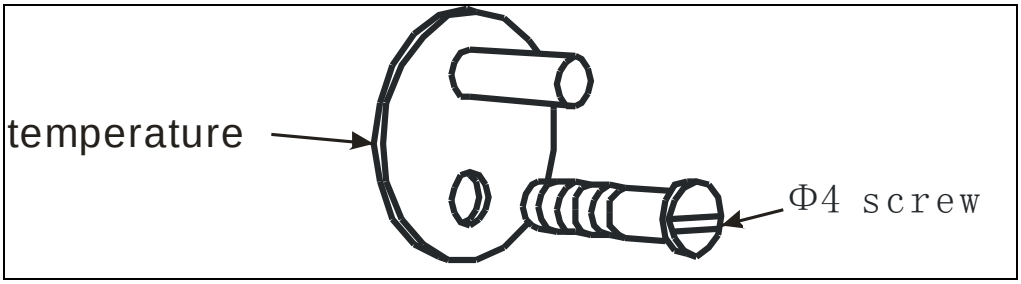


Fig 10

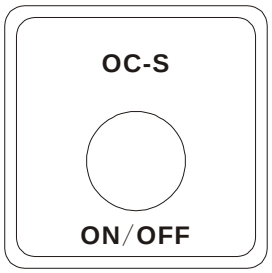


Fig 14