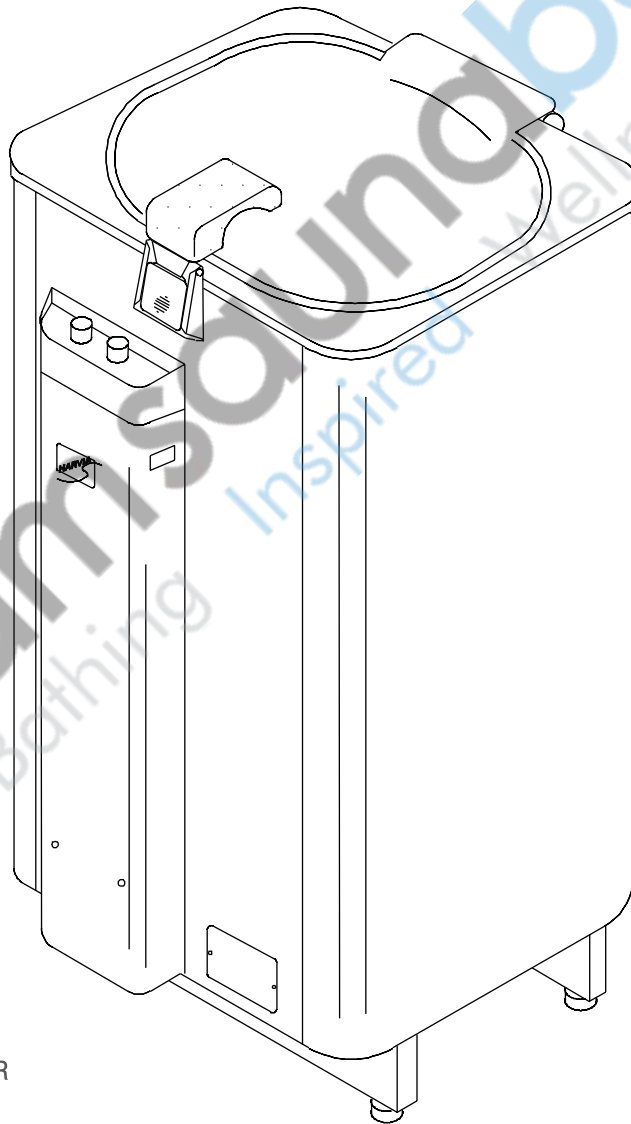




FINLANDIA
SAUNA

AV-4, AV-6

Instructions for installation and use of Electric Sauna Heater



LISTED 6J21
SAUNA HEATER

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Purpose of the electric heater:

The AV electric heater is intended for use in a well heat-insulated family sauna. It is forbidden to use the heater for any other purposes.

The guarantee period of a AV electric heater in family use is one year and in communal use, 3 months.

Please read the user's instructions carefully before using the heater.

NOTE! These instructions for installation and use are intended for the owner or the person in charge of the sauna, as well as for the electrician in charge of the electrical installation of the heater.

After completing the installation, the person in charge of the installation should give these instructions to the owner of the sauna or to the person in charge of its operation and provide them with the necessary user training.

Congratulations on your choice!

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1. INSTRUCTIONS FOR USE

This heater shall not be operated unless the rock compartment is filled with the rocks.

1.1. General

The AV electric heater is the right choice for those who like to bathe several times a week whenever they feel like it, because the heater is always ready for bathing. It only takes a few minutes (5–15) to raise the sauna room temperature to a pleasant bathing level (50–60 °C) provided that both the lid of the heater and the air circulation valve are open and the heater power is switched on.

The heater is effectively heat-insulated to maintain the bathing temperature of the rock space (at approx. 310 °C) using a very low electric power level, ie a standby power of 250 W.

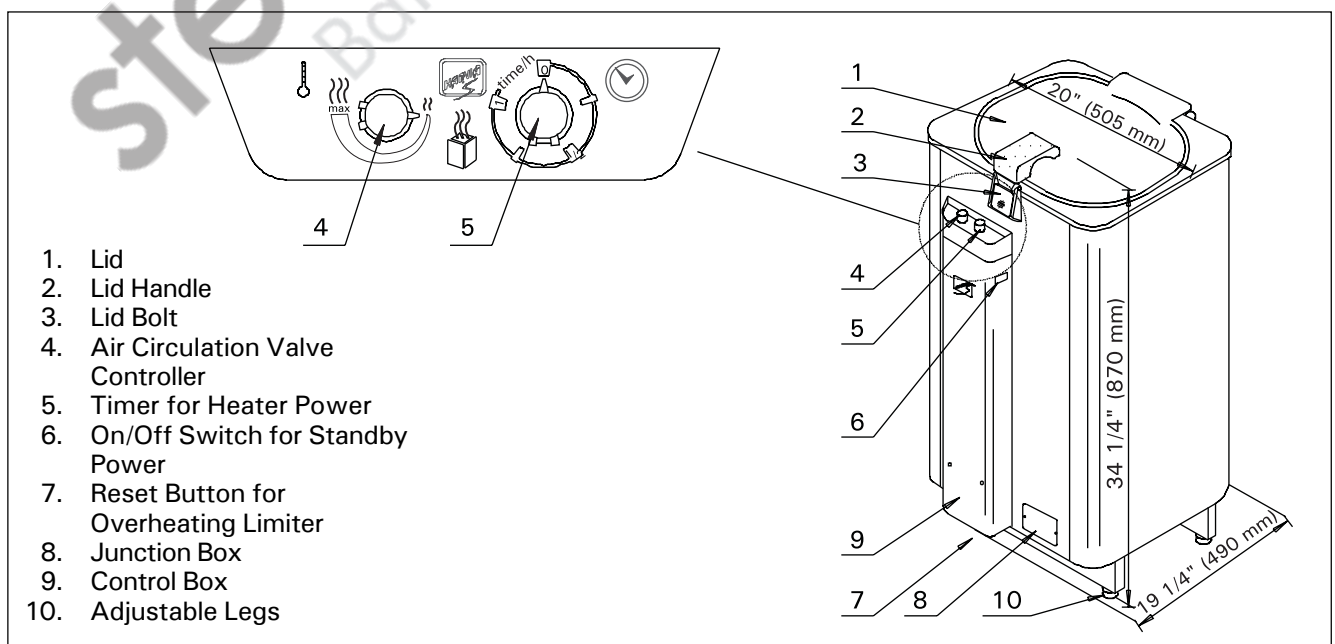
On standby, the heater's daily energy requirement from the electric network is only (24 hours x 0.250 kW) 6 kWh. This is turned into heat energy used for the sauna premises, ie, **the heater acts as a 250 W electric radiator.**

The heat power released by the heater is not wasted because it is normally sufficient to keep the well heat-insulated sauna room warm and dry. The amount of heat energy required for the sauna can be balanced by reducing the power produced by other heating devices on the sauna premises.

1.2. Operating Switches and Components

1. The lid, with a silicon rubber packing, directs the course of the steam coming from the hot rocks.
2. The wooden part of the lid handle allows the lid to be safely closed by pressing the lid against the locking bolt, whereupon the lid is locked.
3. By pressing the lid bolt, the lid springs open assisted by the spring in the hinge. **Slow down the opening movement of the lid with your hand!**
4. Use the air circulation valve regulator to open and close the air valve on the bottom of the heater. The air flowing through the heater enables the heater to warm up. If the sauna room temperature rises too high, close the valve slightly. **Always remember to close the valve after bathing!**
5. The timer allows you to switch on the heater power to the maximum for one hour to speed up the warming of the sauna room. The turning of the timer knob extends the time if one hour is not enough. **NOTE! When the heater power is switched on, the lid must be open.** If the lid is closed and the heater power is on, the temperature inside the heater will quickly reach the switch-off temperature, controlled by the thermostat, and the heater will be switched off completely for several hours. **The heater's maximum output is required to ensure that the rocks, warmed up by standby heat, will remain hot.** The timer will return from the set time to zero; switch off the heater power and leave the heater on standby. **Make sure that the timer has returned to zero before you close the lid!**
6. The heater's standby power can be switched off by the standby on/off switch if the heater is not going to be used for a long time
7. The reset button of the overheating limiter is in connection with the thermostat, located under the cover of the heater's control box. If the overheating limiter has permanently switched off the currents to the heater, the regulator is reset in accordance with Point 1.3.2.
8. Under the connection box cover, there is a terminal block where to the heater's supply cable has to be connected. The cables are brought to the terminal block through the bottom of the heater.
9. The control box cover can be opened by unscrewing the two screws on the cover. Under the splashproof cover are the heater's electrical components.

Figure 1. Operating Switches and Components



1.2.1 Scale Lights of Control Box

DIM LIGHT:

- standby power of 250 W is switched on

BRIGHT LIGHT:

- standby power + heater power are switched on

NO LIGHT:

- neither the standby power nor the heater power are switched on, or the thermostat has switched off the currents to the resistors

1.3. Thermostat and Overheating Limiter

1.3.1. Thermostat

The thermostat controlling the warming up of the heater's rock space is located under the control box cover at the foot of the heater. The thermostat switches off the currents to the heat resistors for a while if the control value set on the thermostat is exceeded. When the rock space has cooled enough, the currents to the resistors are switched on again.

The thermostat is adjusted to the correct temperature at the factory. The heater's thermostat prevents the temperature of the rocks from exceeding approx. +350°C. On standby, the temperature of the stones does not reach the thermostat's switch-off temperature and, therefore, the heater is continuously on when the standby power is switched on. By keeping the heater on standby, you can make sure that **the heater's stones are ready for bathing immediately after you open the lid.**

The heater power, switched on by the timer, may gradually raise the temperature of the heater to the level of the thermostat's switch-off temperature even though the lid is open. As a result, the currents to the resistors will be switched off. If the lid is closed, the currents to the resistors will be switched off very quickly. The currents will be switched off unnoticeably, because a timer-indicator light will stay on on the display panel. By turning the timer to zero, you can make sure that there is no light on the display panel; ie, no currents flow to the resistors through the thermostat.

1.3.2. Overheating Limiter

If the temperature of the heater rises too high for some reason, the overheating limiter, connected to the thermostat, will permanently switch off the currents to the resistors.

The overheating limiter can be reset to the position which allows currents to flow through the thermostat only after the heater has cooled. The thermostat has a reset button to reset the overheating limiter. **To reset the overheating limiter, the reset button is pressed hard enough so that you can hear a click. The pressing may require a force corresponding to 7 kilograms.** See figure 2.

Prior to pressing the button, the cause of the fault must be found:

- are the stones crumbled and pressed together?
- has the heater been on for a long time while unused?
- has the heater been banged or shaken?

1.4. Piling of the Sauna Rocks

The sauna rocks for an electric heater should be 1^{9/16}" – 3^{1/8}" (4–8 cm) in diameter. The heater rocks should be solid blocks of rock specially intended for use in the heater. **Neither light, porous ceramic "rocks" of the same size nor soft potstones should be used in the heater, because they may cause the resistance temperature to rise too high as a result of which the resistance may be broken.**

Rock dust should be washed off before piling the rocks. The rocks are piled on the bottom of the heater's rock space and the grate in between the heating elements (resistors) so that the rocks support one another. The rocks should not be piled too tightly to allow the air to freely flow through the rock space. The weight of the rocks should not lie on the heating elements. The rocks should not be piled too tightly, so that air can flow through the heater. See Figure 3. The rocks should be not wedged between the heating elements. The resistors should neither be in contact with the walls of the rock space nor touch

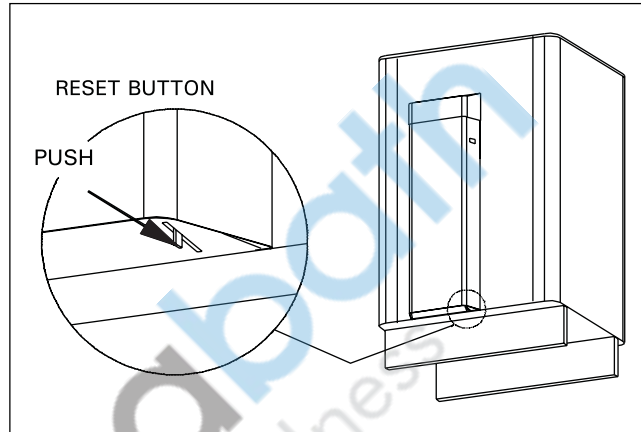


Figure 2. Resetting the overheating limiter

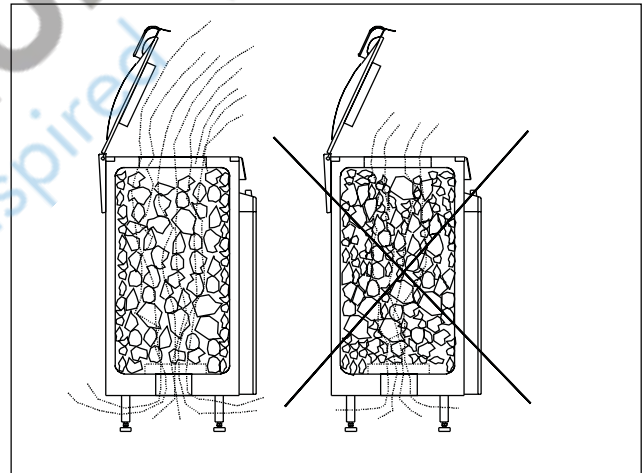


Figure 3. Piling of the sauna rocks

one another. The rocks should completely cover the heating elements. The entire rock space should be filled with rocks, but there should be enough space for the lid to close properly.

Note! When the rocks have been placed inside the heater, the heater should be warmed up to remove moisture from the rocks. See Point 1.5 "First Heating Time".

The guarantee does not cover any faults caused by the use of rocks not recommended by the plant. Neither does the guarantee cover any faults caused by disintegrated or too small rocks blocking the heater ventilation.

No such objects or devices should be placed inside the heater rock space or near the heater that could change the amount or direction of the air flowing through the heater, thus causing the resistance temperature to rise too high, which may set the wall surfaces on fire!

1.4.1. Repositioning and Replacing of Rocks

It is recommended that the rocks be repositioned every time the rock level has stopped descending or no less than once a year. Depending on the frequency of use, the rocks should be replaced with new ones at intervals of every 2–3 years. When repositioning or replacing the rocks, the small pieces of rock should be removed from the bottom of the heater and the rocks that have become 'soft' should be replaced. The heater should be warmed up to remove moisture from the new rocks. See Point 1.5 "First Heating Time".

1.5. First Heating Time

The heater should be warmed up for the first time at full capacity (heater power + standby power) with the lid and the air circulation valve fully open. When the heater is warmed up for the first time, both the heater and the rocks will emit odours. To remove the odours, the sauna room should be fully ventilated.

The same procedure should be performed every time rocks are added to the heater or they are replaced.

The heater is warmed up at full capacity for 2–3 hours depending on the heater power (approx. 2 h AV6, approx. 3 h AV4). When warming up the heater for the first time, it should be noted that the timer only keeps the heater power on for about one hour at a time. By turning the timer, the number of hours can be increased so that the time required for the first heating period, recommended by the manufacturer, is reached. The heater should not cool too much during the first heating period. The heater lid should be closed about fifteen minutes after the timer has returned to zero after the termination of the heating period.

After this, the standby power (250 W) will remain switched on permanently.

The heater produces ideal bathing conditions only after about 24 hours, when the temperature of the stone space has evened out.

1.6. Warming Up of Sauna Room for Bathing

After the first heating time, the stones will continuously be ready for bathing. However, it takes about ten minutes to raise the temperature of a well heatinsulated sauna room (see Point 2.1 "Sauna Room Insulation and Wall Materials") to the level suitable for bathing, depending on the heating characteristics of the sauna room. You can start bathing without any major preparations when the temperature has risen to about +55 °C.

When both the lid (1) and the air circulation valve (4) are open, the hot air that has circulated between the hot stones (approx. +310 °C) and the heating resistors begins to warm up the sauna room. **To ensure that the heat energy stored by the standby power remains in the stones despite the cooling effect of the air flow and the water thrown on the stones, the heater power should be switched on by the timer (5) and it should be kept on while bathing.** The heater power can be kept switched on by the timer up to one hour. See Figure 1.

While bathing, the air flow is controlled by means of the air circulation valve regulator (4). The regulator adjusts the position of the valve located underneath the stone space. In the beginning, the regulator should be kept fully open. If the temperature tends to rise unnecessarily high, the rising of the temperature can be slowed down by turning the air circulation valve counter-clockwise. By experimenting, you will find a valve position which keeps the sauna room temperature reasonably stable.

1.7. Throwing Water on Heated Stones

When the sauna room air warms up, it becomes dry and, therefore, it is necessary to throw water on the hot rocks.

When the sauna room's basic temperature is +50–60 °C, you can start bathing. If the basic temperature is very low, the cold, solid wall surfaces become wet.

The bather should throw water on the rocks with a small ladle (approx. 2 dl). The frequency will depend on the effect of the increasing humidity on the bather's skin. Humid air is easy to breathe and the skin begins to sweat. Both too high a temperature and air humidity will give an unpleasant feeling.

The maximum volume of the ladle is 2 decilitres. The amount of water thrown on the rocks at a time should not exceed 2 dl, because if an excessive amount of water is poured on the rocks, only part of it will evaporate and the rest may splash as boiling hot water on the bathers.

Never throw water on the rocks when there are people near the heater, because hot steam may burn their skin.

Staying in the hot sauna for long periods of time makes the body temperature rise, which may be dangerous.

1.7.1. Sauna Water

The water to be thrown on the heated rocks should meet the requirements of clean household water. The factors essentially affecting the quality of water include the following:

- humous content (colour, taste, precipitates); recommended content less than 12 mg/litre.
- iron content (colour, smell, taste, precipitates); recommended content less than 0,2 mg/litre.
- hardness – the most important substances are manganese (Mn) and calcium (Ca);
- recommended content of manganese 0,05 mg/litre, calcium less than 100 mg/litre.

Calcareous water leaves a white, sticky layer on the rocks and metal surfaces of the heater. Calcification of the rocks deteriorates the heating properties.

Ferrous water leaves a rusty layer on the surface of the heater and elements, and causes corrosion.

The use of humous, chlorinated water and seawater is forbidden.

Only special perfumes designed for sauna water may be used. Follow the instructions given on the package.

1.7.2. Temperature and Humidity of the Sauna Room

Both thermometers and hygrometers suitable for use in a sauna are available. As the effect of steam on people varies, it is impossible to give an exact, universally applicable bathing temperature or percentage of moisture. The bather's own comfort is the best guide.

The sauna room should be equipped with proper ventilation to guarantee that the air is rich in oxygen and easy to breathe. See item 2.4. "Ventilation of the Sauna Room".

Bathing in a sauna is considered a refreshing experience and good for the health. Bathing cleans and warms your body, relaxes the muscles, soothes and alleviates oppression. As a quiet place, the sauna offers the opportunity to meditate.

1.8. After Bathing

When you have stopped bathing, make sure that the rocks are dry and the timer is turned to zero before closing the heater lid. If the rocks are still wet, the lid and the air circulation valve should be left open until the stones are dry.

Due to the large number of stones in the heater, it is economical to keep the standby power switched on continuously even if the sauna is not used on a daily basis. The reason for this is that it is rather slow to raise the temperature of the nearly 100 kilograms of rocks to a level suitable for bathing (+ 310 °C).

1.9. Steam Bath

The AV heater also allows you to enjoy low-temperature steam bathing in the following manner:

- go into the sauna room
- switch on the heater power
- leave the air circulation valve closed
- open the lid
- throw a lot of water on the stones with the ladle (2 dl)

In this way, the temperature will remain extremely low, the sauna room will be filled with steam and it is as if you were in a Turkish bath.

After steam bathing, the sauna room structures should be carefully dried by keeping the heater lid and the air circulation valve open for as long as it is necessary. The sauna room should also be well ventilated to remove humidity!

Finally, turn the timer to zero and close both the air circulation valve and the heater lid.

1.10. Instructions for Bathing

- Begin by washing yourself; for example, by taking a shower.
- Stay in the sauna for as long as you feel comfortable.
- According to established sauna conventions, you must not disturb other bathers by speaking in a loud voice.
- Do not force other bathers from the sauna by throwing excessive amounts of water on the rocks.
- Forget all your troubles and relax.
- Cool your skin down as necessary.
- If you are in good health, you can have a swim if a swimming place or pool is available.
- Wash yourself properly after bathing. Have a drink of fresh water or a soft drink to bring your fluid balance back to normal.
- Rest for a while and let your pulse go back to normal before dressing.

1.11. Warnings

- **Sea air and a humid climate may corrode the metal surfaces of the heater.**
- **Do not hang clothes to dry in the sauna, as this may cause a risk of fire. Excessive moisture content may also cause damage to the electrical equipment.**
- **Do not place any combustible material over the sauna heater (towels, bathing suits, wooden bucket or dipper)!**
- **Keep away from the heater when it is hot. The rocks and outer surface of the heater may burn your skin.**
- **Do not throw too much water on the rocks. The evaporating water is boiling hot.**

- **Use only clean tap water on the rocks - Do not use pool or spa water, as chlorine gas can be produced and the heating elements can be damaged!**
- **Do not let young, handicapped or ill people bathe in the sauna on their own.**
- **Consult your doctor about any health-related limitations to bathing.**
- **Parents should keep children away from the hot heater.**
- **Consult your child welfare clinic about taking little babies to the sauna.**
 - age?
 - temperature of the sauna?
 - time spent in the warm sauna?
- **Be very careful when moving in the sauna, as the platform and floors may be slippery.**
- **Never go to a hot sauna if you have taken alcohol, strong medicines or narcotics.**
- **Do not exceed 30 min. in the sauna at one time, as excessive exposure can be harmful to health. The sauna should not be used as an endurance test!**
- **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 room
 - c) Unawareness of impending hazard
 - d) Fetal damage in pregnant women
 - e) physical inability to exit the room
 - f) Unconsciousness

1.12. Warning signs

Warning signs – are furnished with Sauna heater. The metal "CAUTION" sign should be fastened to wall, close to heater, in a visible place. The metal "WARNING" sign should be fastened outside, to the Sauna room door.

1.13. Malfunctions

If the heater's warmth disappears, check that:

- the standby power switch is in the ON position and the dim scale light is on
- the timer has been turned to the 0–1 h range and the scale light has become brighter
- the thermostat has not switched off the currents to the resistors

This is the case if there are no the scale lights on when the timer is turned to zero. When the stone space has been allowed to cool for a while with the lid open, the thermostat will switch on the currents to the resistors.

- the overheating limiter of the thermostat has not permanently switched off the currents to the resistors.
- This is the case if the heater becomes cold and the fault does not disappear until the heater is return to operation by pressing the reset button of the Overheating Limiter. See Point 1.3. "Thermostat and overheating limiter".
- the heater's fuses on the panel are intact

Note! The pin of rotatable fuses does not always fly off when the fuse blows. The only way to make sure that the fuses used for the heater have not blown is to replace them.

If the rising of the sauna room temperature has slowed down, check whether:

- the level of the rock space has descended, ie, the stones have disintegrated and become tighter and, therefore, the air flow through the rock space is partly obstructed. Reposition the rocks if necessary and replace the 'soft' ones.

2. THE SAUNA ROOM

2.1. Insulation and Wall Materials of the Sauna Room

In an electrically heated sauna, all the massive wall surfaces which store plenty of heat (such as bricks, glass blocks, plaster etc.), must be sufficiently insulated in order to keep the heater output at a reasonably low level.

A wall and ceiling construction can be considered to have efficient thermal insulation if:

- the thickness of carefully fitted insulating wool inside the house is 4" (100 mm) minimum 2" (50 mm).
- the moisture protection consists of e.g. aluminium paper with tightly taped edges. The paper must be fitted so that the glossy side is towards the inside of the sauna.
- there is a 3/8" (10 mm) vent gap between the moisture protection and panel boards (recommendation).
- the inside is covered by 1/2" – 5/8" (12–16 mm) thick panelling.
- there is a vent gap of a few millimetres at the top of the wall covering at the edge of the ceiling panelling.

When aiming at a reasonable heater output, it may be advisable to lower the ceiling of the sauna, (minimum height 74^{13/16}" (1900 mm)). As a result, the volume of the sauna is decreased, and a smaller heater output may be sufficient. The ceiling can be lowered so that the ceiling joists are fixed at a suitable height. The spaces between the joists are insulated (minimum insulation 4" (100 mm)) and surfaced as described above.

Because heat goes upwards, a maximum distance of 47" (1200 mm) is recommended between the bench and ceiling.

NOTE! Consult fireextinguishing authorities to find out which part of the fireproof wall may be insulated.

NOTE! The protection of the walls or ceiling with heat protection, such as mineral board fitted directly on the wall or ceiling, may cause the temperature of the wall and ceiling materials to rise dangerously high.

2.1.1. Room construction – general information

FRAMING	2" x 4" dry Douglas Fir, 16" o.c.
CEILING HEIGHT	No higher than 7' 0".
INSULATION	R11 Fiberglas with foil back in walls and ceiling, foil facing into room.
DRYWALL	See local codes. Is not required in most residences. See local codes for commercial. If drywall is used, apply 1" x 2" nailers so that wall and ceiling boards can be attached to solid wood.
PANELING	Use kiln-dried, clear, T & G softwood such as California Redwood, Western Red Cedar, Alaska yellow Cedar, with moisture content not exceeding 11%.
BENCHES	Use matching wood of vertical grain with 2"x 2" tops – 1/2" spacing – and 2"x 4" facing, fastening from bottom to prevent burning of bathers.
HEATER GUARDRAIL	Use matching softwood of 1" x 2" or 2" x 2".
DOOR	Must open out and should not have a lock. Size – 2' 0"x 6'8" with fir rails and double sealed tempered glass.
ROOM LIGHT	Should be a vapor proof, wall mounted type, with rough-in box munted flush with inside paneling. It should mount 6" (150 mm) from ceiling, not directly over the Sauna heater, and not over upper benches; light bulb should not exceed 75 watts.

Note! Receptacles OR PLUGS are not allowed in a Sauna room. If a speaker is installed in a Sauna room, it should not be installed higher than 3' from floor, away from the Sauna heater (consult manufacturer for ratings).

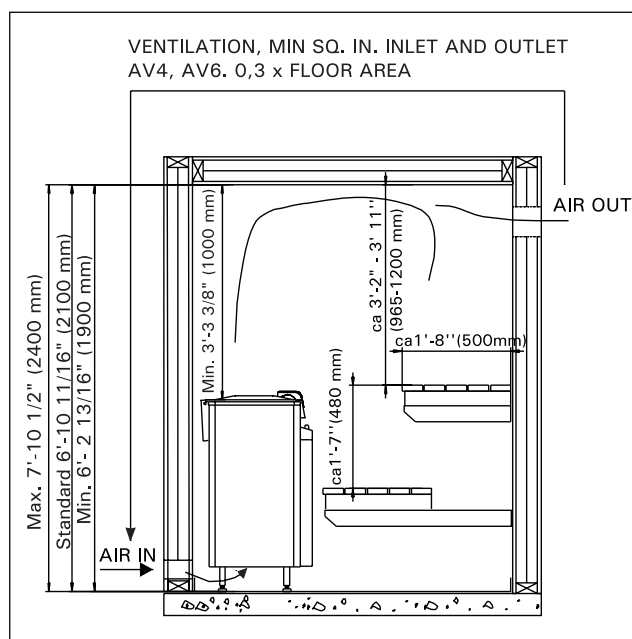


Figure 4. Sauna room

2.2. Sauna Room Floor

Due to a large variation in temperature, the sauna stones disintegrate in use.

Small pieces of stone are washed down on the sauna room floor along with the water thrown on the rocks. Hot pieces of stone may damage plastic floor coverings installed underneath and near the heater.

A light-cocoured joint grout, used for a tiled floor, may absorb impurities from the rocks and water (e.g iron content).

To prevent aesthetic damage (due to the reasons presented above) only dark joint grouts and floor coverings made of rock materials should be used underneath and near the heater.

2.3. Heater Output

When the walls and ceiling are covered with panels, and the insulation behind the panels is sufficient to prevent thermal flow into the wall materials, the heater output is defined according to the cubic volume of the sauna. See table 1.

If the sauna has visible uninsulated wall surfaces, such as walls covered with brick, glass block, concrete or tile, each 10 square feet (ca. 0,1m²) of said wall surface causes the cubic volume of the sauna to increase by 1,2 Cu.Ft. (ca. 0,12 m³). The heater output is then selected according to the values given in the table.

Because log walls are heated slowly, the cubic volume of a log sauna should be multiplied by 1.5, and the heater output should then be selected on the basis of this information.

2.4. Ventilation of the Sauna Room

Sufficient ventilation is extremely important for the sauna. The air in the sauna room should be changed six times per hour. The fresh air pipe should come directly from outside.

Inlet ventilation openings shall be located at the bottom of the wall, as close to the floor level as possible.

Outlet ventilation openings shall be located at the top of the wall, as close to the ceiling as possible, and shall comply with the minimum size requirements for inlet ventilations openings. See fig. 4.

2.5. Hygienic Conditions of the Sauna Room

Good hygienic standards of the sauna room will make bathing a pleasant experience.

The use of sauna seat towels is recommended to prevent sweat from flowing onto the platforms. The towels should be washed after each use. Separate towels should be provided for guests.

It is advisable to vacuum or sweep the floor of the sauna room in connection with cleaning. In addition, the floor may be wiped with a damp cloth.

The sauna room should be thoroughly washed at least every six months. Brush the walls, platforms and floor by using a scrubbing-brush and sauna cleanser.

Wipe dust and dirt from the heater with a damp cloth.

3. INSTRUCTIONS FOR INSTALLATION

3.1. Prior to Installation

Prior to installing the heater, study the instructions for installation, as well as checking the following points:

- The heater power should be suitable for the sauna room volume. **Table 1** shows the directive minimum and maximum volumes for each heater output. A precondition for the given values is that the sauna room has well heatinsulated walls and a ceiling with timber cladding.
- Are there a sufficient number of high quality sauna rocks?
- Is the supply voltage suitable for the heater?
- The fuses and the connection cables conform with valid regulations and their dimensions are in accordance with **table 2**.
- The location of the heater fulfils the minimum requirements concerning safety distances given in figure 5.
- **It is absolutely necessary to ensure that the installation is carried out according to these values. Neglecting them can cause a risk of fire.**
- **Note!** We do not recommend that the AV heater be used in saunas having walls made from solid timber, brick or stone. Cold surfaces without cladding will 'sweat' and leak water when bathing. In addition, the slow warming up of solid wall surfaces will prolong the time needed to raise the sauna room temperature.
- Only one electrical heater may be installed in the sauna room.

HEATER		SAUNA ROOM				
inch	mm	Min. height	Floor area		Volume	
Width	Depth	inch	Sq.Ft.	Cu.Ft.		
Height		mm	m ²	m ³		
20"	505					
19 ¹ / ₄ "	490					
34 ¹ / ₄ "	870					
MODEL			Min.	Max.	Min.	Max.
AV4	74	13/16	28	45	175	280
		1900	2,6	4,2	5	8
AV6	74	13/16	40	67	245	420
		1900	3,7	6,3	7	12

Table 1. Installation details of a AV heater. See fig. 4 and item 2.3. "Heater output"

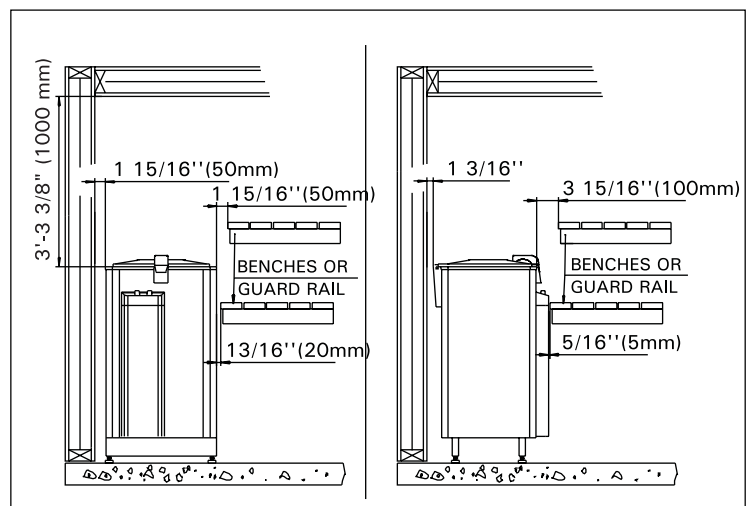


Figure 5. Min. distances to combustible materials

3.2. Installation Place and Floor-Attachment of Heater

The AV heater is fixed to the floor. It can be directly placed on a wooden floor provided that the effect of the heater's weight of approx. 150 kg on the substructure is taken into consideration. Position the heater directly on the base with the help of its adjustable legs. Attach the heater to its base with screws through the holes in the opposite corners of the base.

Install the heater so that the operating switches are easy to use and it is easy to throw water on the rocks.

The heater should be positioned so that the heater lid directs the steam from the hot stones to one side and not directly towards the bathers.

3.3. Safety Railing

If a safety railing is built around the heater, the minimum distances given in figure 5 must be observed.

3.4. Electrical Connections

The heater may only be connected to the electrical network in accordance with the current regulations by an authorised, professional electrician.

Refer to the chart in table 2 to determine the wire size and circuit protection required. The complete sauna system should be properly grounded as per NEC or as required by local codes. A grounding terminal is provided in the wiring compartment of each heater, complete the wiring according to the appropriate wiring figure 6.

See table 1 for required clearances. Any wiring within internal Sauna walls must be rated for 90°C (194°F) and copper wire must be used. Run wire through seal tight flex conduit from wall to heater and connect to junction box.

Note! If connection to heater will be made at a later time, bring flex into Sauna room 4–6" (100–150 mm) from floor, and leave 3' (900 mm) of flex for hookup (can be cut to right length later).

Further instructions concerning exceptional installations can be obtained from local electrical authorities.

3.5. Electric heater insulation resistance

When performing the final inspection of the electrical installations, a "leakage" may be detected when measuring the heater's insulation resistance. The reason for this is that the insulating material of the heating resistors has absorbed moisture from the air (storage transport). **After operating the heater for a few times, the moisture will be removed from the resistors.**

Do not connect the power feed for the heater through the fault current switch!

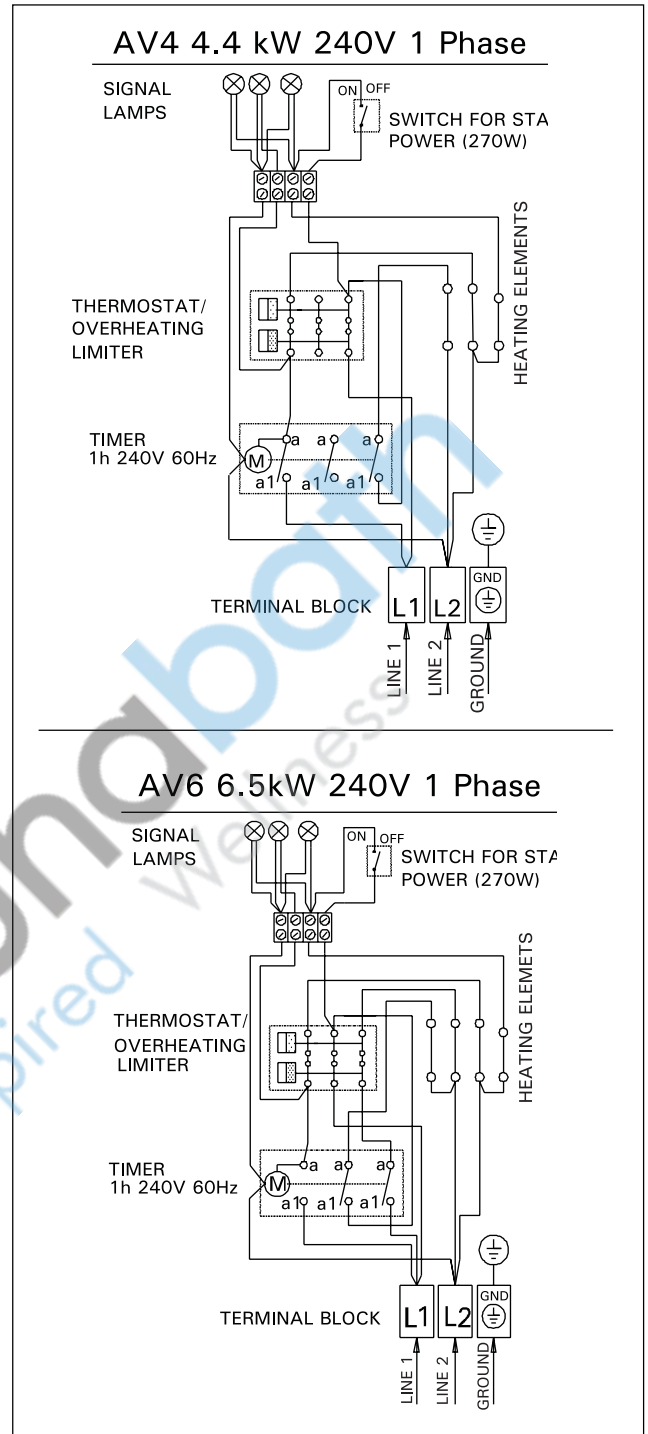


Figure 6. Electrical connections of the heaters

240 PHASE AV- SAUNA HEATER WITH BUILT IN CONTROLS					
Heater Model	Input kW	Voltage	Phase	Amperage	Min. 90°C Copper supply wire A.W.G. No.
AV-4-1	4,4	240	1	18,3	12
AV-6-1	6,5	240	1	27,0	8

Table 2. Supply wires

3.6. Testing of Sauna heater

Before testing heater, fill rock cavity with igneous stones provided with heater. See item 1.4. "Piling of the Sauna rocks".

1. After Sauna heater has been properly wired, according to appropriate wiring diagram and local codes, turn Sauna breaker on in the main breaker panel. (Note! Electrician must label "Sauna" breaker.)
2. Set timer to 10 or 15 minutes.
3. Within 5 minutes, you should be able to feel heat from heater elements when holding your hand over heater.
4. If Sauna does not heat, refer to troubleshooting information.
5. It is normal for smoke to appear during the first heating, as protective element coating needs to burn off.

3.7. Troubleshooting

A. If sauna does not operate after initial installation and wiring:

1. Check breaker to be sure that it is on. Also, breaker should be correct size.
2. Make sure that supplies are correct
3. Check circuit breaker in contactor to be sure that it has not been shorted out.
4. Be sure that timer is in on position.
5. Be sure that timer winds down. If timer has been shorted out, heater will operate only by standby element.

B. If sauna has been in operation, but heater ceases to operate:

1. Check breaker to make sure it is on.
2. Check timer to see if it winds down.
3. Check high limit reset button in heater (reset is under the heater to see if it has been released).
4. Call your electrician or service person for further help.

C. If Sauna heater operates, but room does not come up to Sauna temperature (160–185°F (70–85°C)) normal Sauna temperature):

1. You must allow at least 30 minutes for Sauna heat-up time.
2. Is Sauna thermometer located 6" (150 mm) from ceiling, and is it above or close to Sauna heater? (This is proper location for Sauna temperature reading.) Thermometer readings vary with room heights and location. Eg. 180°F (82°C) above Sauna heater = 165°F (74°C) on opposite wall = 140°F (60°C) on upper bench level = 120°F (49°C) on lower bench level = 100°F (38°C) at floor level.
3. Check for proper wire size, amp size and proper wiring (according to diagrams and information) also necessary copper wiring.
4. Check for placement of stones to make sure they are loosely spaced around elements, to insure good air flow. Stones packed too tightly will restrict air flow and reduce heating capacity.
5. Check for heat loss (around or under door, around ceiling light or fan – we do not recommend ceiling light and a fan does not belong in the Sauna.

6. Is room properly insulated?
7. Is ceiling higher than in figure 4?
8. After checking all of the above, remove rocks and check heater elements for holes or burned areas. (Only if heater has been in use for some time.)

3.8. Caution! Electrician or service person!

1. Before servicing heater, control, or contactor, turn power off at breaker!
2. Open junction box to make sure wires are tightly secured with no loose connections. Heater wire and all connecting wires should be copper.
3. Check for burned spots or short in wiring of timer or thermostat.

3.9. Maintenance instructions

1. Use only clean water on Sauna stones. **Do not** use spa or pool water as it will destroy your heater.
2. Clean water should always be used in Sauna buckets and water should be dumped out after every use. Scour buckets and dippers occasionally when film collects from usage. Use plastic bucket liner in bucket to prevent water leakage.
3. Scrub benches with a soft brush, using soap and water or a mild disinfectant, when needed - about once a week in commercial Saunas, or depending upon sauna usage. For sanitation, each bather should sit or lie on a towel (this will prolong bench life).
4. Remove Super Dek and wash waterproof floor with disinfectant (e.g. Pine Sol) about once a week or as often as needed. Hose off Super Dek to clean.
5. To maintain beautiful appearance of Sauna heater, remove water stains by wiping a damp cloth occasionally.
6. Harvia Sauna Heaters require no special maintenance when properly installed by a qualified electrical contractor. After 1 years of usage, the rocks may need replacing if they have crumbled or powered.
7. Harvia Sauna strongly recommends a floor that can be easily cleaned (concrete, ceramic tile, or a poured type of flooring). When this is provided, the Sauna can be easily cleaned and kept in a sanitary condition with little effort. A carpet is NOT recommended for a Sauna! A carpet becomes a perfect breeding ground for bacteria in the moist conditions of a Sauna; and a carpet promotes the spread of foot diseases such as athlete's foot. For same reasons, wooden duckboard should not be used for flooring.
8. In new construction, a floor drain should also be provided, especially in commercial Saunas for sanitary cleaning and maintenance.
9. Seal wood around glass in door – inside and outside - with *Thompson's Water Seal* to prevent warpage.
10. When Sauna wood becomes stained from perspiration, the wood may lightly sanded with fine sandpaper to restore beautiful appearance. We do not recommend stains or sealers as toxic vapors may appear when heated. However, 2 coats of *Thompson's Water Seal* may be used on the wood benches in a commercial Sauna, so that the wood may be more easily cleaned and kept sanitary – the wood will not absorb perspiration.
11. The Sauna room will heat faster if the higher vent is kept in a closed position when heating. The lower vent may always be kept in an open position.
12. Required warning signs should be posted according to the instructions.

3.10. Guarantee

This HARVIA SAUNA heater is guaranteed for one year date of purchase, and includes all heater parts such as heating elements, controls, contactors, etc.

This guarantee covers faults in manufacture and material only, and includes the exchange of new parts supplied by the manufacturer or manufacturer's agent, after the faulty parts have been returned to same. The replacement of parts under warranty does not extend the warranty period beyond the original one year.

The guarantee does not cover defects caused by normal wear and tear, defects caused by improper installation, poor maintenance, or failure to follow the manufacturer's instructions for installation, use and care, or alterations made to the Sauna product.

This guarantee is void if the heater is used improperly. Pool or spa water should not be poured over the Sauna stones, as chemicals are harmful to the heater. Only one or two dippers full of water should

be poured over the hot stones at one time. This guarantee will be void if a shower has been installed in the Sauna room.

The guarantee does not cover delivery costs of the faulty part or costs of the person carrying out the repair in the field. If the Sauna heater is returned to the manufacturer or manufacturer's agent within five years after date of purchase, the agent will provide free labor for repair, but will charge for parts if date of purchase is past one year.

This guarantee will be void if installation and wiring is not carried out by a certified electrician or authorized and qualified service representative, who must sign below.

This guarantee will be void if information below is not filled out and returned within 15 days of purchase, and it applies only to original installation of product and to original purchaser.

HARVIA SAUNA HEATER _____

MODEL NUMBER _____

DATE OF PURCHASE _____

ORIGINAL OWNER _____

ADDRESS _____

PURCHASED FROM _____

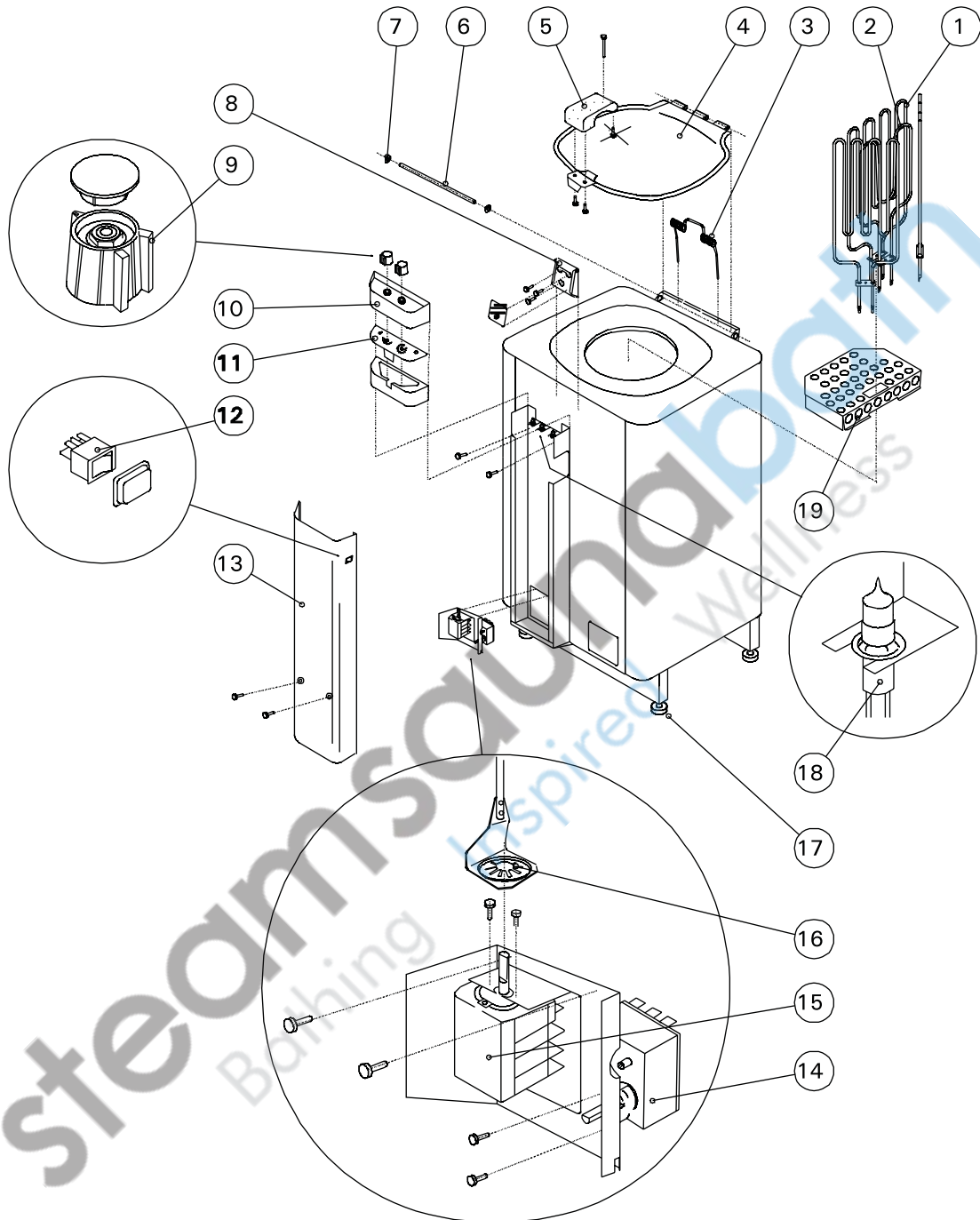
ELECTRICAL CONTRACTOR _____

MUST SIGN HERE _____

DATE OF ELECTRICAL _____

WIRING & HOOKUP _____

4. SPARE PARTS



1. Heating element 240V	ZSA-430	11. Lexan plate	ZSA-670
2. Standby heating element 240V	ZSA-420	12. On/Off switch for standby power	ZSK-684
3. Lid spring	ZSA-460	13. Control box cover	ZSA-220S
4. Lid		14. Thermostat/overheating limiter	ZSK-520
5. Handle	ZSA-500	15. Timer 230V 60 Hz	ZSA-720
6. Hinge pin	ZSA-380	16. Axlelock Ø 6	ZSA-580
7. Axlelock Ø 12	ZSA-590	17. Adjuster	ZSA-440S
8. Lock		18. AV-lamp	ZSA-530
9. Knob, nut, cap	ZSA-660	19. Ventilation plate	ZSA-20S
10. Plastic parts of Control box	ZSA-480		