

**HARVIA**

Dealer logo:



**EN** Owner's/Operator's Manual

Sauna heater installation, wiring,  
operating instructions, troubleshooting,  
maintenance and guarantee.

**IMPORTANT!** This manual must  
be left with owner, manager, or  
operator of Sauna after it is used by  
electrician!

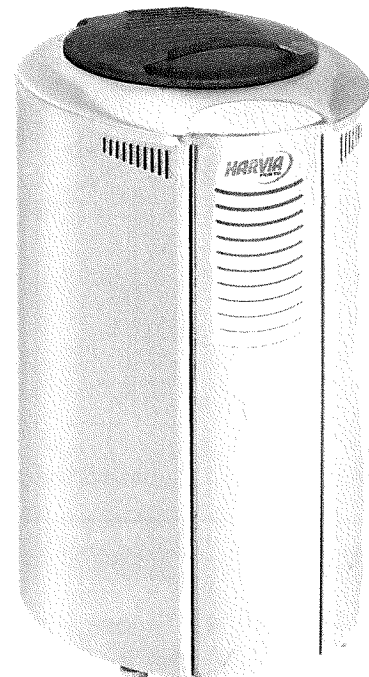
**MODEL**

HAFU4502401 4,4 kW  
HAFU6502401 6,5 kW  
HAFU1002401 9,8 kW



3159549

ETL LISTED  
CONFORMS TO  
UL STD 875  
CERTIFIED TO  
CAN/CSA STD  
E60335-2-53-05



**Dealer contact info:**

Finlandia Sauna Products, Inc.  
14010-B S.W. 72nd Ave., Portland, OR 97224-0088  
Phone 1-800-354-3342 / 1-503-684-8289 Fax: 1-503-684-1120  
Email [info@finlandiasauna.com](mailto:info@finlandiasauna.com) [www.finlandiasauna.com](http://www.finlandiasauna.com)



**CONTENTS**

**WARNINGS** ..... 3

**1. INSTRUCTIONS FOR USE** ..... 4

- 1.1. General ..... 4
- 1.2. Operation Switches and Parts ..... 4
- 1.3. Thermostat and Overheat Protector ..... 5
  - 1.3.1. Thermostat ..... 5
  - 1.3.2. Overheat Protector ..... 5
- 1.4. Piling of the Sauna Stones ..... 5
  - 1.4.1. Repositioning and Replacing of Stones ..... 6
- 1.5. Setting the Heater in Standby Mode and Heating It for the First Time ..... 6
  - 1.5.1. Standby Mode ..... 6
  - 1.5.2. Full Capacity ..... 6
- 1.6 Heating the Sauna Room for a Bath ..... 6
- 1.7. Throwing Water on Heated Stones ..... 7
  - 1.7.1. Sauna Water ..... 7
  - 1.7.2. Temperature and Humidity of the Sauna Room ..... 7
- 1.8. After Bathing ..... 7
- 1.9. Steam Bath ..... 7
- 1.10. Instructions for Bathing ..... 7
- 1.11. Troubleshooting ..... 8

**2. THE SAUNA ROOM** ..... 9

- 2.2. Sauna Room Floor ..... 9
- 2.3. Heater Output ..... 9
- 2.4. Ventilation of the Sauna Room ..... 9
- 2.5. Hygienic Conditions of the Sauna Room ..... 10

**3. INSTRUCTIONS FOR INSTALLATION** ..... 11

- 3.1. Prior to Installation ..... 11
- 3.2. Installation Place and Floor-Attachment of Heater ..... 11
- 3.4. Safety Railing ..... 12
- 3.5. Electrical Connections ..... 12
  - 3.5.1. Installation of the Control Panel ..... 12
- 3.6. Electric heater insulation resistance ..... 12

**4. SPARE PARTS** ..... 14

## WARNINGS

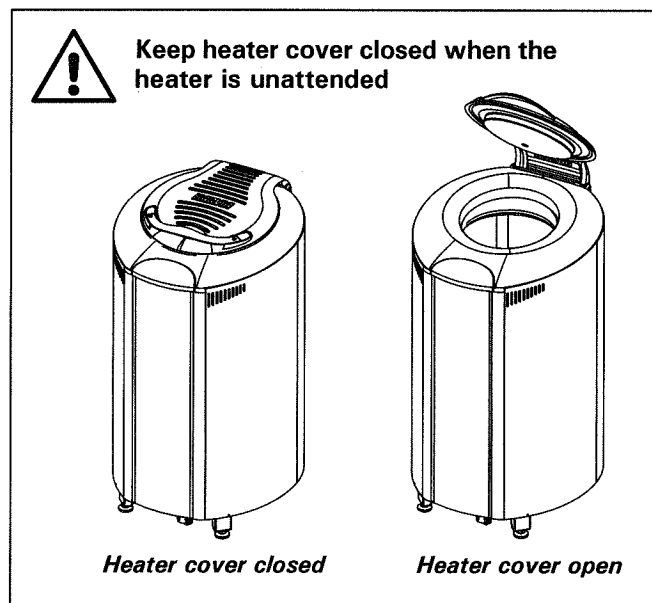
- Keep away from the heater when it is hot. The stones and outer surface of the heater may burn your skin.
- Do not throw too much water on the stones. The evaporating water is boiling hot.
- Do not let young, handicapped or ill people bathe in the sauna on their own.
- Consult your doctor about any 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.
- Do not smoke, use alcohol, or exercise in the sauna.
- 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.
- Persons with poor health should consult their physicians before using the sauna.
- Do not place any combustible material over the sauna heater (towels, bathing suits, wooden bucket or dipper)!
- Hyperthermia occurs when the internal temperature of the body reaches a level several degrees above the normal body temperature of 98,6 °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:

- Failure to perceive heat
- Failure to recognize the need to exit the room
- Unawareness of impending hazard
- Fetal damage in pregnant women
- Physical inability to exit the room
- Unconsciousness

**WARNING** – the use of alcohol, drugs, or medication is capable of greatly increasing the risk of fatal hyperthermia.

- Use only clean tap water on the stones – do not use pool or spa water, as chlorine gas can be produced and the heating elements can be damaged!
- Sea air and a humid climate may corrode the metal surfaces of the heater.



**Purpose of the electric heater:**

The AF 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 an AF 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.

# 1. INSTRUCTIONS FOR USE

## 1.1. General

The Harvia Forte electric heater is the right choice for bathers who use the sauna several times a week but not necessarily at fixed times. The heater is always ready for use as long as standby heat is maintained in it. Users need not wait long as the sauna room can be quickly (5–15 minutes) heated to a pleasant bathing temperature (+50... +60 °C). The room heats up quickly when the heater cover is opened and the heater power is turned up.

The thermal insulation of the heater is very efficient, to ensure that a bathing temperature can be maintained in the stone space using as little thermal energy as possible. The daily energy consumption of the heater in standby state is only 4–6 kWh. The thermal power released by the heater does not go to waste as it can be used to keep a sauna room with good insulation both warm and dry. The required amount of thermal energy can be adjusted by decreasing the power of the sauna heating equipment. If the sauna room gets too hot, the temperature of the stone space can be lowered.

### Technical data

- Heating/standby power (HI/LO): 4,35 kW, 6,5 kW, 9,8 kW
- Heating power electronically controlled
- Digital temperature control
- Sauna stone temperature can be adjusted in the range from 428 °F to 500 °F (220 to 260 °C) at the control panel
- Input power indicated by indicator lamp 8
- Heater dimensions: width 500 mm, depth 530 mm, height 880 mm
- Amount of stones approximately 100 kg

## 1.2. Operation Switches and Parts

1. Cover with silicone rubber gasket used to control the heat emitted.
2. Handle to safely open and close the cover (fig. 1).
3. The cover hinge is equipped with a spring-loaded latching device that keeps the cover either open or closed.
4. Control and display panel.
5. Electric switch.

### Display screen (1)

The screen displays either the HI or LO operation state. In the LO state, the stone space is heated up using standby heat. The heater's three heating elements are connected in series to one phase. The HI state uses all of the heating power of the heater: the heating elements of the three-phase electric system are star-connected between phases. The display screen indicates the temperature of the stone space in bars (I–IIIIII) unless the operating button (3) has been recently pressed.

When the decimal point of the rightmost digit (8) on the display is lit, it indicates the power input (0 to 100 %) taken by the heater from the mains. For example, if during an hour on LO setting the decimal point is lit for 30 minutes altogether, the power used by the heater equals to  $(30 \text{ min}/60 \text{ min}) = 0,5 \times 660 \text{ W} = 330 \text{ W}$ . The example is from a 6 kW

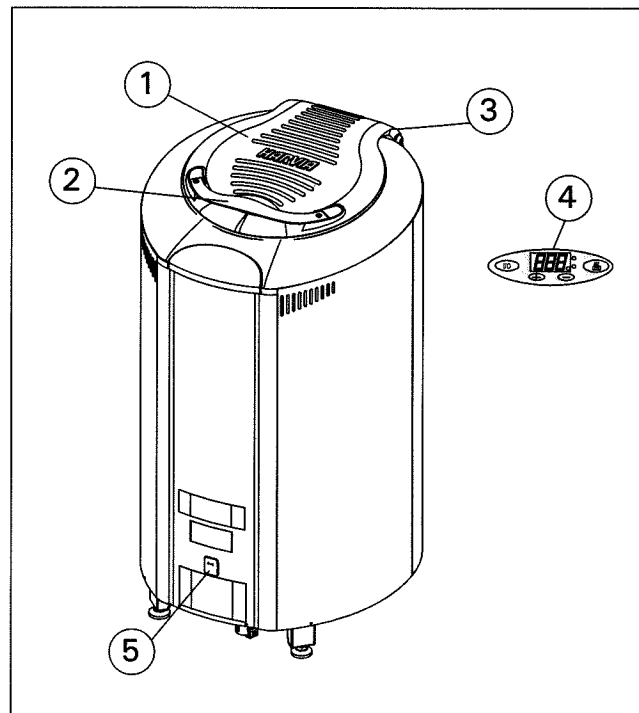


Figure 1. Heater parts

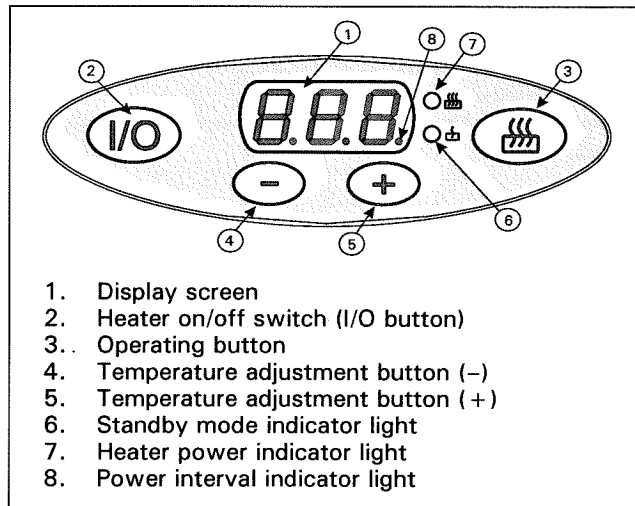


Figure 2. Control panel

heater. The shorter the time the decimal point is lit, the more economical the heater is. The power intervals can also be monitored while the heater capacity setting is HI, because the thermostat switches the heating power on and off once the set value of 500 °F (260 °C) has been reached.

### I/O button (2)

The I/O button is used to switch the heater heating elements on and off. For this to happen, the electric switch must be switched on (see figure 1). The indicator light burns under the I/O button to indicate standby mode.

### Operating button (3)

In the initial state, the heater is at the lower state (LO). When the HI state is selected, the heater is switched on to full capacity (4,35 kW, 6,5 kW or 9,8 kW) for one hour to ensure that the stone space stays warm during the bath. The maximum heater

capacity may raise the temperature of the sauna room from the ideal 140 degrees Fahrenheit (60 degrees Celsius) to a higher temperature, depending on the size, wall materials and insulation of the room. In this case, the heater cover must be left fully open for long enough. If the temperature of the room rises too high, the operating button should be used to switch back to LO state.

The heater automatically returns from HI to LO state in one hour.

#### Temperature adjustment buttons (4 and 5)

The temperature adjustment buttons 4 (-) and 5 (+) are used to set the stone space to the required temperature (I = min. 428 °F/220 °C, IIIII = max. 500 °F/260 °C). Holding the button down speeds up the setting process.

#### Indicator lights (6 and 7)

Indicator lights 6 (LO) and 7 (HI) are used to show which state is in use. The lower light indicates standby heat and the upper light represents heater power.

### 1.3. Thermostat and Overheat Protector

#### 1.3.1. Thermostat

Heating of the stone space is monitored by a thermostat. The temperature is measured using a thermocouple sensor that follows the temperature very closely and an electronic, processor-controlled measuring device. Because the thermocouple sensor is fixed to the casing of the stone space, the sensor is at the same temperature as the stones. Thanks to the short, pre-set connection time, the thermostat maintains the temperature of the stone space very close to the selected value. Even if the heater were closed and the heater turned on to full capacity, the thermostat would not let the temperature of the heater rise high enough to damage the rubber gasket. If, however, the gasket is damaged for some reason, it can be replaced.

Continuous use of standby heat ensures that the stone space can provide heat as soon as the heater cover is opened.

When the operating button is used to set full heater capacity (HI), the heater temperature is set to 500 °F (260 °C). This temperature cannot be set using the temperature adjustment buttons 4 and 5 (fig. 2). If the heater cover is closed while the heater operates at full capacity, the pre-set temperature of the stone space 500 °F (260 °C) can be achieved more quickly.

#### 1.3.2. Overheat Protector

If, for some reason, the temperature of the heater rises too high (over 644 °F/340 °C), the overheat protector protects the heater by permanently switching off the current in the heating elements. To signify this, the error message Er3 flashes on the display. Since the sensor of the overheat protector is closely connected to the upper part of the stone space, it reacts quickly to changes in the temperature of the chamber.

The overheat protector cannot be reset to allow current to flow to the heating elements until the heater has cooled down and the temperature has fallen below the switch-off value. The error message

Er3 must also disappear from the display. The mechanical reset button (see figure 3) is used to reset the overheat protector. To reset the protector, press the button until you hear a click.

The reason for the malfunction must be determined before the button is pressed:

- Are there enough stones?
- Have the stones started to crumble and pile up more compactly in the stone space?
- Has the heater been on for a long time at full capacity with the cover closed?

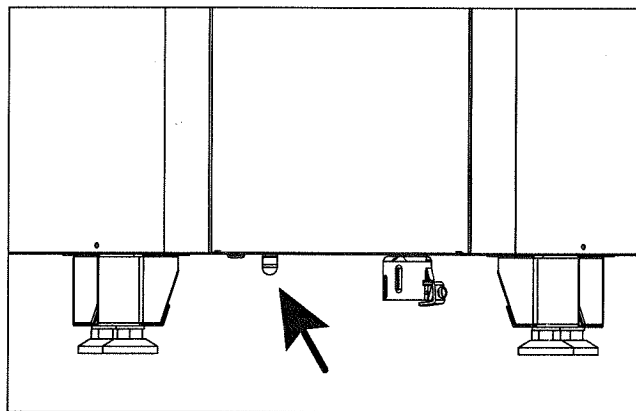


Figure 3. Overheat protector

#### 1.4. Piling of the Sauna Stones

The sauna stones for a heat-storing electric heater should be 5 to 10 cm in diameter. The sauna stones must be solid blocks of stone specially intended for use in the heater. **Ceramic, light or porous stones, stones with a small number of edges and stones of equal size must not be used. They may hinder the air circulation in the stone space and cause the heating elements to overheat and become damaged. Also using of soft soapstones as sauna stones is forbidden.**

Stone dust should be washed off before piling the stones. The stones are piled on the bottom of the heater's stone space and the grate in between the heating elements (resistors) so that the stones support one another. The stones should not be piled too tightly to allow the air to freely flow through the stone space. The weight of the stones should not lie on the heating elements. The stones should not be piled too tightly, so that air can flow through the heater. See Figure 4. The stones should be not wedged between the heating elements. The heating elements should neither be in contact with the walls of the stone space nor touch one another. The entire stone space should be filled with stones, but there should be enough space for the lid to close properly.

**Note! When the stones have been placed inside the heater, the heater should be warmed up to remove moisture from the stones. See item 1.5. "Setting the heater in standby mode and heating it for the first time".**

**The heater should not be used without stones!**

**The guarantee does not cover any faults caused**

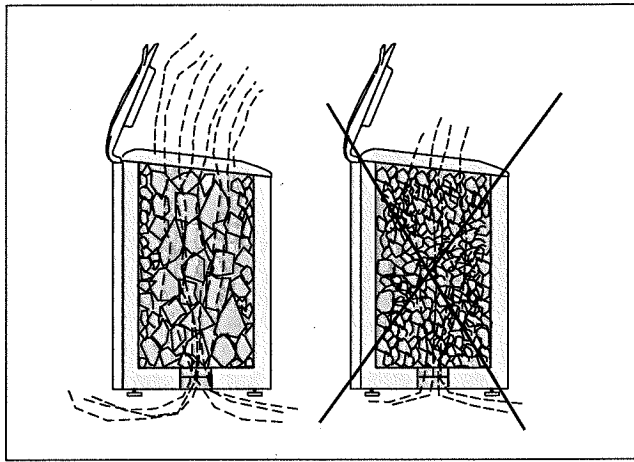


Figure 4. Piling of the sauna stones

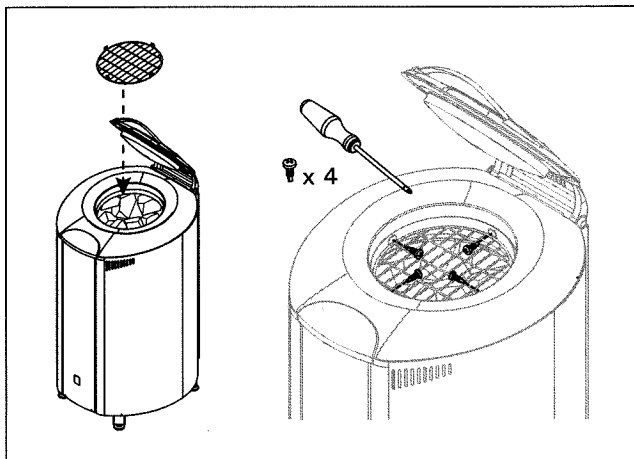


Figure 5. Installing the safety grid

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

No such objects or devices should be placed inside the heater stone 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 Stones

It is recommended that the stones be repositioned every time the stone level has stopped descending or no less than once a year. Depending on the frequency of use, the stones should be replaced with new ones at intervals of every 2–3 years. When repositioning or replacing the stones, the small pieces of stone should be removed from the bottom of the heater and the stones that have become “soft” should be replaced. The heater should be warmed up to remove moisture from the new stones. See Point 1.5. “Setting the heater in standby mode and heating it for the first time”.

### 1.5. Setting the Heater in Standby Mode and Heating It for the First Time

The electronics of the heater are switched on and off using the small electric switch with a swing mechanism I in front of the heater (fig. 1). When

the switch is in the **ON** position, the indicator light under the **I/O** button burns as an indication of the standby mode. In standby mode, the heater heating elements do not carry current. The person installing the heater sets it in standby mode when making the electrical connections.

When the heater is switched on for the first time after the stones have been put in place, it should be run at full capacity (see chapters 1.5.1. and 1.5.2.) the cover 1 open (fig. 1). The big stone space needs at least two hour-long heating periods at full capacity to ensure that the temperature of the chamber rises high enough. When the heater is switched on for the first time, both the heater and the stones emit odour. To remove this, the sauna room needs to be efficiently ventilated. These actions should also be taken when stones are rearranged or added to the heater.

#### 1.5.1. Standby Mode

To switch the heater on, press the **I/O** button. To indicate that current has been connected to the heating elements, the display shows the message **LO** (standby power). In addition, indicator light 6 (fig. 2) is lit up. The temperature of the stone space can be set to a maximum of 500 degrees Fahrenheit (260 degrees Celsius) by pressing the **+** button 5 (fig. 2). The minus button 4 (fig. 2) is used to lower the temperature if it has been set too high.

The electric power consumption of the heater can be monitored using indicator lamp 8 (fig. 2). See the section “Display screen.”

#### 1.5.2. Full Capacity

To switch on to full capacity, press the operating button 3 (fig. 2) once. The display screen 1 (fig. 2) indicates that the **HI** state (= full heater capacity) is in use. In the **HI** state, the stone space temperature increases towards the set value of 500 °F (260 °C). Full capacity is switched on for only one hour at a time, after which the heater automatically switches to the **LO** state with indicator light 6 burning (fig 2). After initial heating, the heater cover must be closed. If the stone chamber seems to emit odours, the cover can be left open for a while as the heater operates at full capacity (**HI**).

To get a really good bath, wait for one full day to allow the heat to distribute itself evenly in the closed stone space.

### 1.6 Heating the Sauna Room for a Bath

After the heater has been properly pre-heated, the stones are ready for a bath at any time. However, a certain amount of time is needed to raise the temperature of the sauna room to a pleasant level. The size, wall materials and thermal insulation of the sauna room play a significant part in this respect.

When the heater cover 1 (fig. 1) is opened, the air flowing through the hot stones and the heating elements begins to heat up the room. To ensure that the thermal energy stored in standby mode remains in the heater stones despite the cooling effect of air currents and the water thrown on the stones, the heater power should be switched on during bathing using the operating button 3 (fig. 2). “**HI**” will be displayed on the screen for a while as an indication of the higher power and the indicator lamp 7 glows (fig. 2).

A well-insulated sauna room (see chapter 2.1. "Insulation and wall materials of the sauna room") warms up to a proper bathing temperature in 5–15 minutes. Bathing requires no special preparations; just wait until the temperature reaches approximately 131 degrees Fahrenheit (55 degrees Celsius). The best bathing temperature when using this heater model is +131...+140 °F (+55 ...+ 60 °C). At this temperature, enough water can be used to produce a pleasant humidity in the sauna room. The same humidity conditions cannot be reached at higher temperatures.

### 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 stones.

When the sauna room's basic temperature is +131...+140 °F (+55 ...+ 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 stones with a small ladle (approx. 0,2 l). The frequency will depend on the effect of the increasing humidity on the bather's skin. Humid air is easy to breath 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 0,2 litres. The amount of water thrown on the stones at a time should not exceed 0,2 l, because if an excessive amount of water is poured on the stones, only part of it will evaporate and the rest may splash as boiling hot water on the bathers.**

**Never throw water on the stones 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 stones should meet the requirements of clean household water.** The factors essentially affecting the quality of water include the following:

- humuos 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/l calcium less than 100 mg/litre.

Calcareous water leaves a white, sticky layer on the stones and metal surfaces of the heater. Calcification of the stones 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 sea-water 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 stones are dry and the timer is turned to zero before closing the heater lid. If the stones are still wet, the lid 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 stones to a level suitable for bathing (+428–500°F/+220–260 °C).

### 1.9. Steam Bath

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

- go into the sauna room
- turn on the heater power (HI)
- open the lid
- throw a lot of water on the stones with the ladle (0,2 l)

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 open for as long as it is necessary. The sauna room should also be well ventilated to remove humidity!**

Finally, set the heater power to the LO position, close the heater cover.

### 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 stones.
- 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. Troubleshooting

If the heater loses its heat, check that

- the standby heat is in the LO position and the indicator light 6 is burning (fig 2).
- the thermostat overheat protector has permanently switched off the current in the heating elements. This is the case if the heater cools down completely and the only way to solve the malfunction is to reset the heater using the overheat protector reset button. See fig. 3.
- the electric switch is turned on.
- the fuses in the fuse box are in good condition.

**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 stone space has descended, ie, the stones have disintegrated and become tighter and, therefore, the air flow through the stone space is partly obstructed. Reposition the stones if necessary and replace the "soft" ones.

| Error messages |   |
|----------------|---|
| ER1:           | Temperature sensor measuring circuit broken             |
| ER3:           | Overheat protector's measuring circuit broken           |
| ER4:           | Connection between upper and lower card interrupted     |
| ER5:           | Temperature of the control panel's environment too high |



## 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 6'7" (2010 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).**

### 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. 0,1m<sup>2</sup>) of said wall surface causes the cubic volume of the sauna to increase by 1,2 Cu.Ft. (ca. 0,12 m<sup>3</sup>). 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. 5.

Sauna shall be provided with intended ventilation as required per the local code authorities.

## 2.5. Hygienic Conditions of the Sauna Room

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

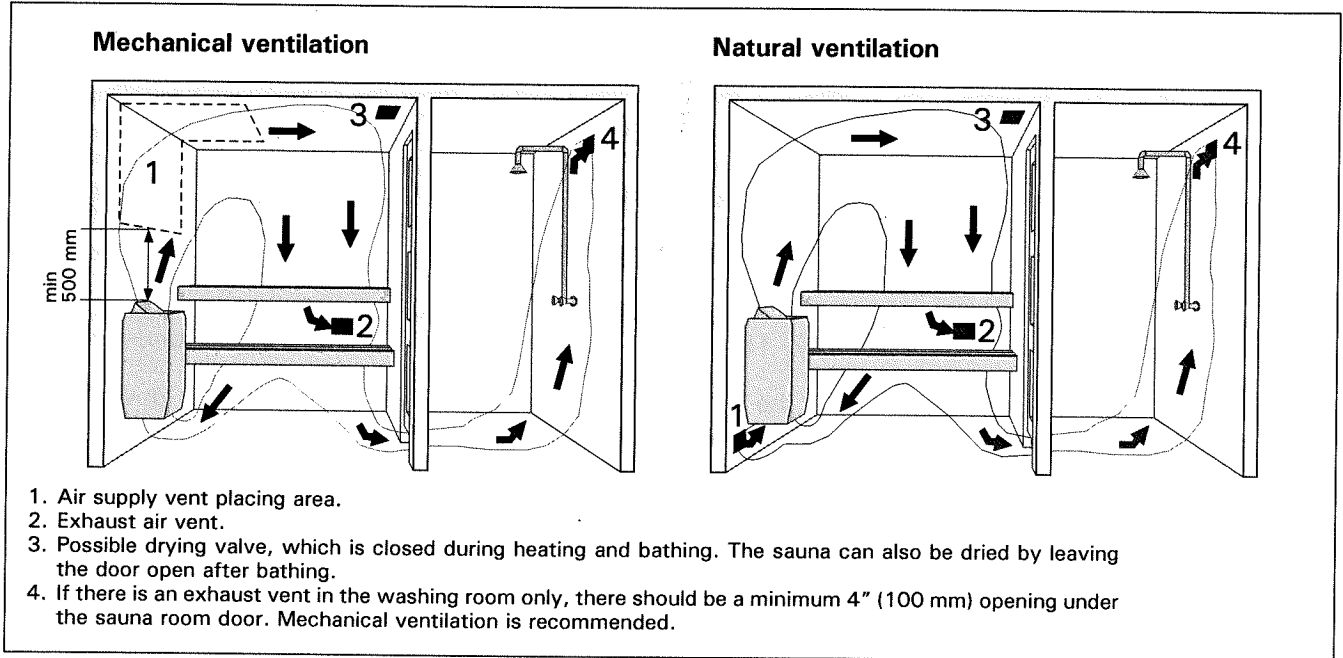
The use of sauna seat towels is recommended to prevent sweat from flowing onto the platforms. The towels should be washed after each use. Separate towels should be provided for guests.

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.



**Figure 6.** *Ventilation of the sauna room*

### 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 stones?
- 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 1.
- If the house is heated by electricity, does the pilot circuit (contactor) require a supplementary relay to make the pilot function potentialfree, because voltage control is transmitted from the heater when it is switched on?
- The location of the heater fulfils the minimum

requirements concerning safety distances given in fig. 7.

**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! Only one electrical heater may be installed in the sauna room.**

#### 3.2. Installation Place and Floor-Attachment of Heater

The AF 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. 130 kg on the substructure is taken into consideration. Place the heater on its platform in a straight orientation on its adjustable feet, and fasten it to the platform at opposite corners using the fasteners supplied with the heater.

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

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.

| Heater Model and dimensions  | Output | Standby power | Sauna room         |                    |            |          |          |          |
|--|--------|---------------|--------------------|--------------------|------------|----------|----------|----------|
|  |        |               | Cubic vol.         |                    | Floor Area |          | Height   |          |
| Width 500 mm<br>Depth 530 mm<br>Height 880 mm<br>Weight 30 kg<br>Stones 100 kg | kW     | W             | See item 2.3.      |                    |            |          |          |          |
|  |        |               | min m <sup>3</sup> | max m <sup>3</sup> | min sqft   | max sqft | min inch | max inch |
| HAFU4502401  | 4,4    | 480           | 5                  | 8                  | 27         | 43       | 6'7"     | 7'6"     |
| HAFU6502401  | 6,5    | 720           | 7                  | 12                 | 38         | 64       | 6'7"     | 7'6"     |
| HAFU1002401  | 9,8    | 1080          | 10                 | 15                 | 54         | 80       | 6'7"     | 7'6"     |

Table 1. Installation details of a AF-heater

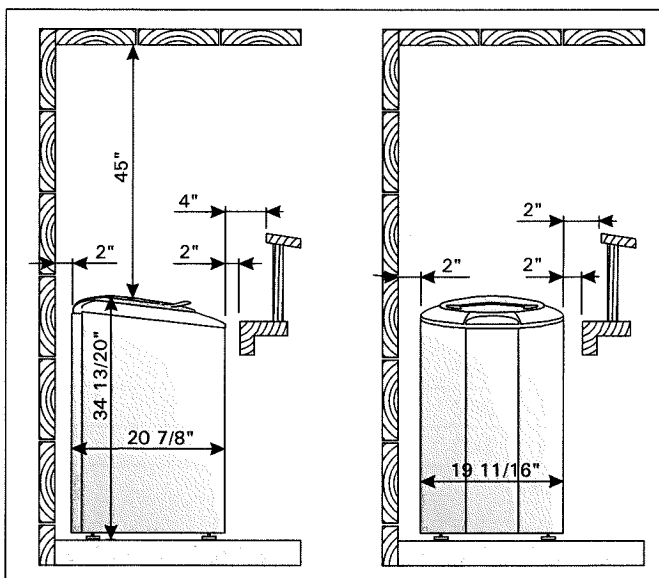


Figure 7. Minimum safety distances from the heater (inches)

### 3.4. Safety Railing

A safety railing must be built around the heater. The minimum distances given in figure 7 must be observed.

### 3.5. Electrical Connections

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

The wiring diagrams are included in the control unit's installation instruction.

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

1. Remove heater from carton and place in proper location in sauna room. Observe proper clearances as per figures 7 and table 1. After final hookup, electrical contractor should secure heater to floor with at least two screws or bolts.
2. See applicable wiring diagram for heater model (figures 8–9, see control unit manual for detailed instructions how to connect the heater and the control unit). Heater must be permanently installed (no pigtails or plugs allowed) and wiring must be done by a licensed electrician, who must follow wiring diagram provided and adhere to local codes. Use proper A.W.G. rated wire size and use copper wire suitable for 90 °C within sauna walls. Use grounding terminals provided in sauna heater and control unit to properly ground the equipment as per NEC and local codes.
3. Inside the heater box there are two signs. Please place the metal "CAUTION" sign on the

interior wall of the sauna room directly above the heater in a visible place. Place the metal "WARNING" sign outside, on the door of the sauna room. "MAINTENANCE INSTRUCTIONS" are at the end of this manual.

#### 3.5.1. Installation of the Control Panel

The control panel is splashproof and has a small operating voltage. The panel can be installed in the washing or dressing room, or in the living quarters. If the panel is installed in the sauna room, it must be at the minimum safety distance from the heater and at a maximum height of one metre from the floor.

The control panel is delivered with an installation flange, two fixing screws and a 3 metre data cable which can be shortened if necessary. 5 and 10 metre cables are also available.

Conductor tubing inside the wall structure allows you to thread the data cable hidden within the wall – otherwise the installation will have to be on the wall surface.

Fasten the control panel as follows:

1. Thread the data cable through the flange. Fasten the flange with fixing screws.
2. Place the control panel in the flange. The panel locks in the flange by means of spring clamps.
3. Connect the free end of the data cable to the connector in the heater on a colour-to-colour principle (figure 9).

#### 3.6. 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 RCD (residual current device)!**

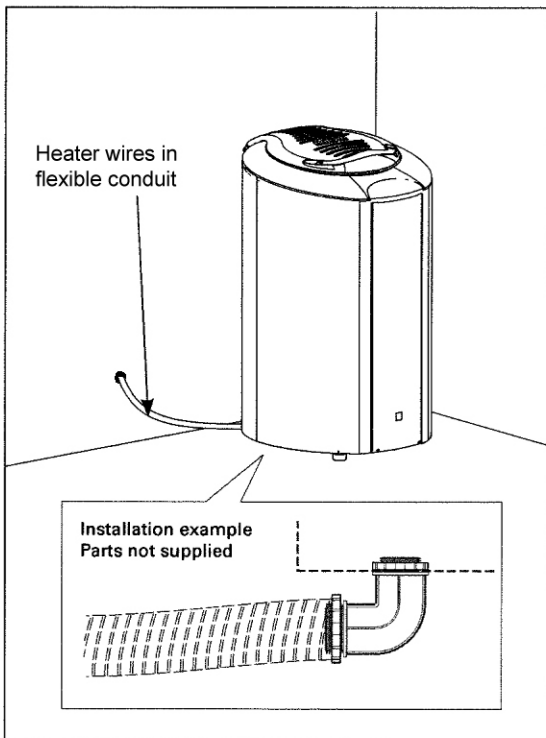


Figure 8. Connections of the heater

| 240 V 1-PHASE SAUNA HEATER WITH BUILT IN CONTROLS |          |         |       |          |  |
|---|----------|---------|-------|----------|--|
| Heater model                                      | Input kW | Voltage | Phase | Amperage | Min. 90 °C Copper supply wire A.W.G. No. |
| HAFU4502401                                       | 4,4      | 240     | 1     | 18,3     | 10                                       |
| HAFU6502401                                       | 6,5      | 240     | 1     | 27,0     | 8  |
| HAFU1002401                                       | 9,8      | 240     | 1     | 40,8     | 6  |

Table 2. Supply wires

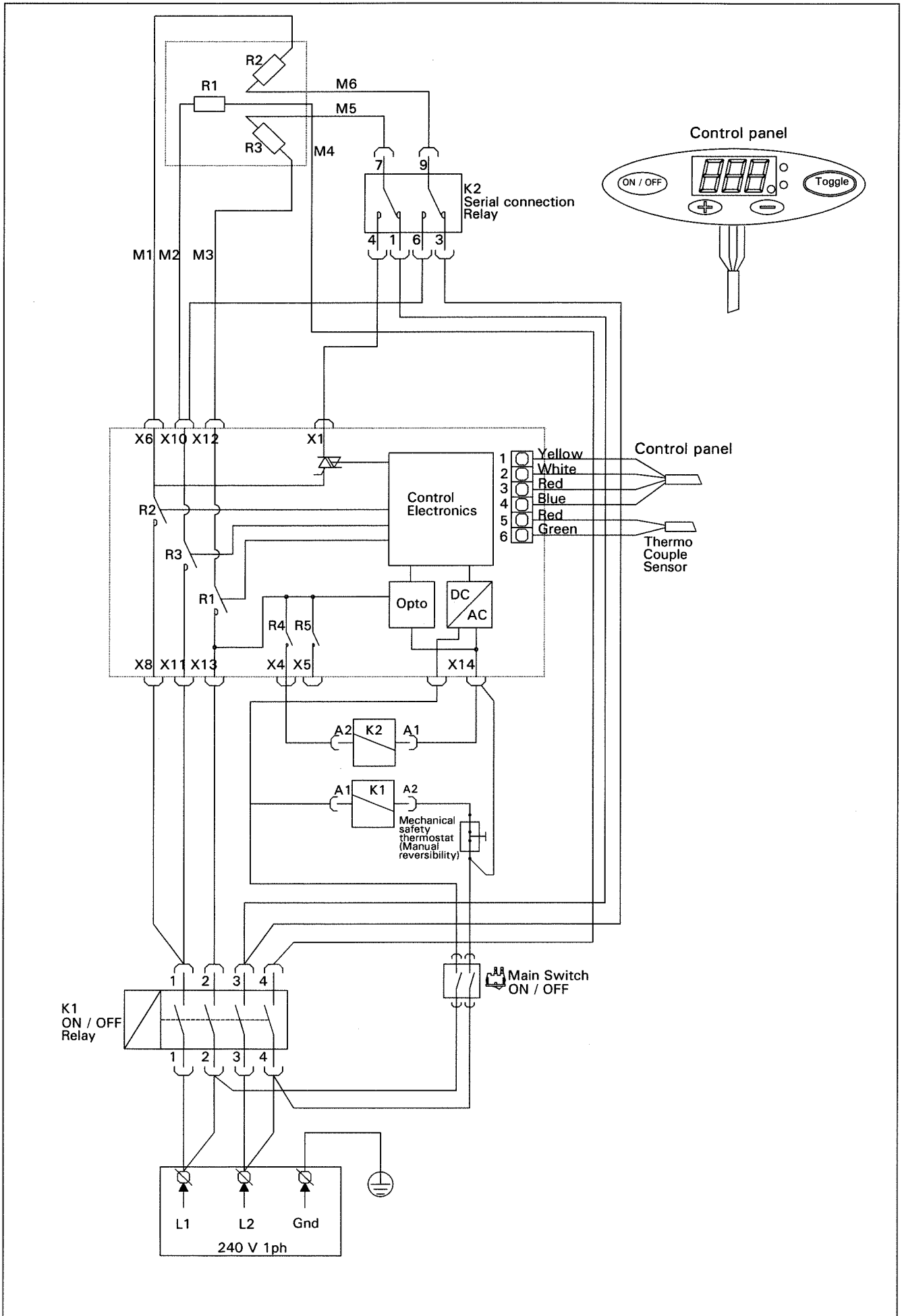
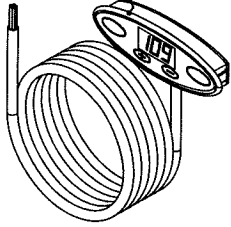


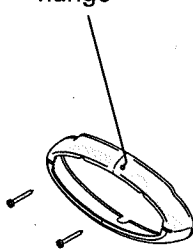
Figure 9. Electrical connections of heater

## 4. SPARE PARTS

ZSF-940  
Control panel  
with cable



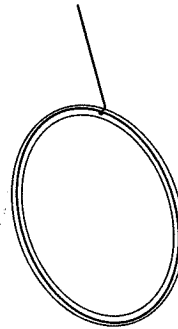
ZSME-80  
Wall installation  
flange



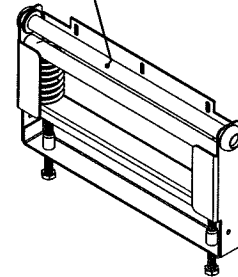
WX272  
Cover



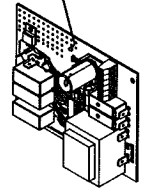
ZSF-230  
Gasket



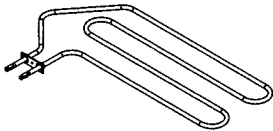
WX260  
Cover hinge  
mechanism



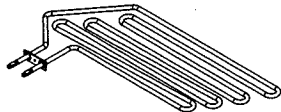
ZSF-945  
Electric control  
board



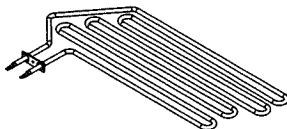
### HEATING ELEMENTS



ZSF-20 (for HAFU4502401)  
1450 W / 240 V



ZSF-30 (for HAFU6502401)  
2170 W / 240 V



ZSF-50 (for HAFU1002401)  
3260 W / 240 V

ZSF-905  
Electric operating unit

