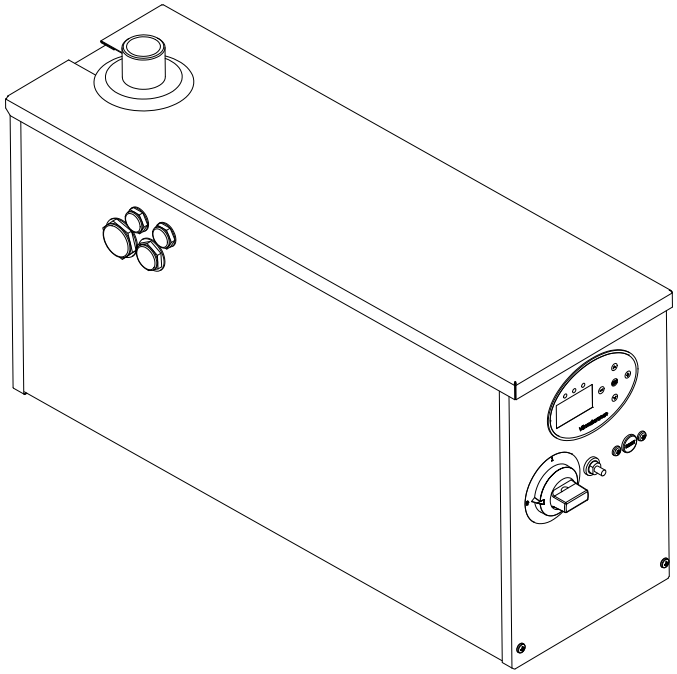
1212_EK15E_191017_en
pwr:1.14 / 1.15
dsp:1.05
p-typ: 4

Installation and maintenance
EK 15 E
Electric flow heater - 7-stage
14.7 kW



VÄRMEBARONEN

Contents

Notes

Filled in when EK 15E is installed

Manufacturing number: _____

Installation date: _____

Installation engineer: _____

_____

Tel: _____

Other: _____

_____

_____

Safety and handling

Read these instructions carefully before installation and operation!

Keep these instructions at the electric flow heater!

Check that the electric flow heater has not been damaged during transport. Report any transport damage to the carrier.

Check that the delivery is complete.

All installation must be performed by an authorised person in accordance with the existing regulations.

Never disable the safety equipment!

The electric flow heater must never be switched off electrically unless the heating system is full and the flow heater vented.

Correct installation in combination with correct adjustment and continuous service will produce high operational reliability and good heating economy.

The electric flow heater must not be modified, changed or converted in any way.

Only authorised persons may carry out work on the electric flow heater.

Ensure the power to the electric flow heater is switched off before service / repair.

Never carry out maintenance work / service on pressure-bearing parts when they are pressurised.

The electric flow heater may not be used by children or people with physical or mental impairments. Nor by children / people who lack knowledge about the electric flow heater.

Children may not play with the electric flow heater and connect accessories.

Always contact your installation engineer for service.

The type and manufacturer's number of the electric flow heater must always be specified when contacting Värmebaronen. See the rating plate

Värmebaronen AB reserves the right to change the specification, in accordance with its policy of continuous improvement and development, without prior notice.

The following icons are used in these instructions to indicate important information:

Information that is important for optimum operation.

Tells you what you should or should not do to avoid personal injury.

Tells you what you should or should not do to prevent a component, the electric flow heater, a process or the environment from being damaged or destroyed.

Electrical hazard!

Function

Electric flow heater EK 15

Output 14.7 kW, divided into seven 2.1 kW stages, which are controlled via an electronic temperature control, 20-95°C.

Can easily be climate controlled.

Load guard with current transformers included.

All-pole switch.

Operation / status indication.

Stainless electric flow heater.

Connection for external blocking connection or output control 0-10V.

Output signal for external display of connected output.

Overheating protection with alarm indication.

A low water volume and well-insulated tank mean low heat loss.

Brackets for wall mounting included.

Compact format.

Simple connection

Mounted on the wall with included brackets.

Has connection for front / safety line on top, return line is on the bottom.

Temperature control

The temperature control regulates output connection in seven stages.

Available accessories include an outdoor temperature sensor, which allows the temperature of the electric flow heater to be determined by the outdoor temperature and the selected heat curve, UTK. A room unit is also available that, when used with the UTK function, increases heating comfort at the lowest possible energy consumption by utilising passive heat from, e.g., solar radiation. The unit also reduces variations in room temperature caused by wind.

The electronic controls contain an over temperature function, which switches off selected output if the boiler temperature exceeds the setpoint with an adjustable value. When the over temperature ceases, the output is automatically reconnected.

When any of these functions take effect, the status indicator blinks to indicate this.

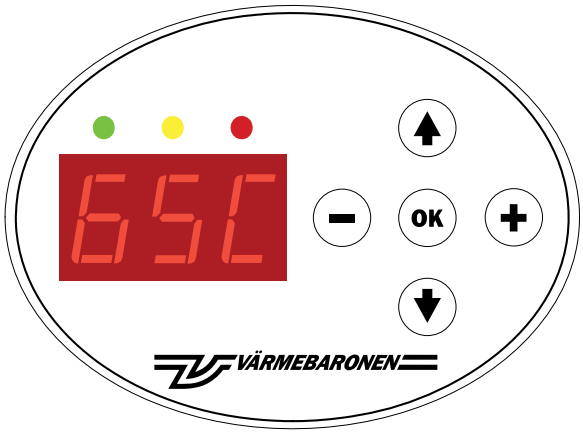
Accessories

Outdoor temperature sensor

Room device.

Menu - handling

Handling



Indicators and buttons

Green	Permanently on	The electric flow heater has voltage.
	Flashing	Output connection is restricted.
Yellow	Permanently on	Displays a modifiable parameter. In row 0, solid yellow means that a warning is acknowledged but the cause remains.
	Fast flashing	Parameter has been changed but not acknowledged (ok).
	Flashing	Warning
Red	Flashing	Alarm, which has not been acknowledged.
	Permanently on	Acknowledged alarm as long as the cause has not been corrected.

The buttons are used to navigate the menus:

(▲) moves up in the menu list.

(▼) moves down in the menu list.

(−) decreases the value.

(+) increases the value.

(ok) acknowledges the changed value.

Menus

The menu system consists of three levels: the User level, Service level and Advanced service level.

Menu row

Each menu contains a number of rows. The menu bar number appears on the display, followed by a decimal point and a value. At larger values, the display switches between displaying the row number and its value.

Editable value

An editable menu row is indicated by the yellow indicator light. When the value is changed, the indicator flashes.

The new value is only applied after confirming by pressing (ok). The old value is removed if the row is left with (▼) or (▲).

User level

Reading and modification of the most common parameters.

Menu row 0 is the row that normally appears, and the menu automatically returns here from other menus if no button is selected for a certain period of time.

Service level

This is where the parameters are found that are usually adjusted when commissioning the electric flow heater.

Access to "Service level" is obtained by simultaneously pressing (▼) in any menu row in "User level" and (▲).

The same action is used to return to "User Level".

Advanced Service Level

Settings used less frequently and manual run output stepping and circulation pump.

Access to the "Advanced Service level" is obtained by setting the value "21" in the last menu bar, 12, in "Service level".

Return to the menu item "Service level" is done by going back with (▲).

Return to "User level" is done by simultaneously pressing (▼) and (▲).

Screen saver

The screen saver will be activated 15 minutes after the last button press.

The menu returns to display of the current boiler temperature.

"21-lock" for "Advanced service level" is reset.

If there are no unacknowledged alarms, the display will turn off and only the indicators will be lit.

Menu - handling

Alarm

If several simultaneous alarms / warnings / restrictions are active, only the first code is shown in the list. Scroll using ⏫ to see other alarms.

A red indicator flashes when one or more alarms are active. The display switches to display the menu bar (row-1) where the current alarm codes are displayed. If more than one alarm is active at the same time, the alarm row will switch content and display all current alarm codes according to a rolling schedule.

Once the cause of the alarm is resolved and is acknowledged with OK, the red indicator stops flashing. The display will return to its normal display.

Acknowledgement of alarms

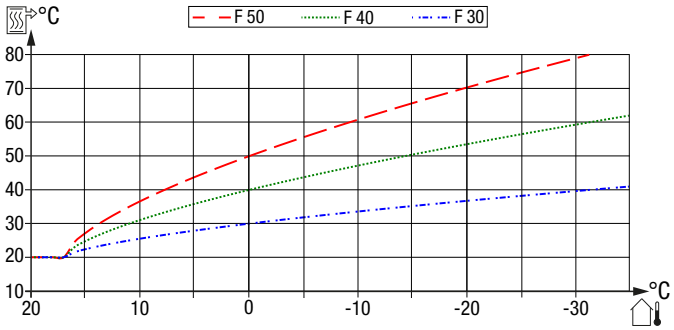
Acknowledge active alarms by pressing the OK button when the alarm row is displayed. All active alarms are acknowledged at the same time. The red indicator will stop flashing and return to solid. The display remains on the alarm row and displays the alarm code(s). Once all active alarms are resolved, the red indicator turns off.

The user can use the menu system as usual even during an active alarm.

Menu - User Level

		Delivery setting
50C	**Current boiler temperature**, display.	
1.20	**Desired boiler temperature**, setpoint, 20-95°C, adjustment For electric flow heaters with UTK, a calculated boiler temperature setpoint is displayed.	20
2. 0	**Current number of connected output stages**, 0-7, display Step 1 2 3 4 5 6 7 Power output 2.1 4.2 6.3 8.4 10.5 12.6 14.7 kW	
3. 100	**Current level for external 0-10V control signal**, 0-100%, display	
4. 0	**Current electrical current**, amps, in the highest load phase, 0-50 A, display Requires that the current transformers are connected.	
5.- -	UTK function switched off, see Advanced Service Level row 15.	
5.17	**Current outdoor temperature**, °C, requires outdoor temperature sensor -50-50°C, display	
6.- -	UTK function switched off, see Advanced Service Level row 15.	
6. 0	**UTK, alternative temperature input status**, display. 0: Not active. 1: The function is active, see "User level" row 9.	0
7.- -	UTK function switched off, see Advanced Service Level row 15.	
7.20	**Level curve**, parallel displacement, 5-30, adjustment	20
8.- -	UTK function switched off, see Advanced Service Level row 15.	
8.38	**Curve**, higher value provides warmer temperatures for cold outdoor temperatures, 20-60, adjustment	38

The flow temperature is calculated according to the current outdoor temperature, settings for the curve and level and room temperature. The supply line temperature can be min / max limited.



The diagram shows the curves F30, F40 and F50 at Level = 20.

Curve F30 aims for a supply temperature of 30°C at an outdoor temperature of ±0°C. The corresponding temperatures for curves F40 and F50 are 40°C and 50°C respectively.

The vertical axis shows the supply line temperature and the horizontal axis shows the outdoor temperature.

Heating curve

The heating system's dimensioned supply line temperature is used as the initial value. If the value is not known, general values are used. If the room is not at the desired temperature, additional adjustment is needed. Wait at least one day between adjustments so that temperatures have time to stabilize.

Menu - User Level

Initial values

Dimensioned values, select a curve that provides the desired supply line temperature.

Unknown values - floor heating systems, Select a curve that provides a temp. of 40°C for wooden joists and 30°C for concrete slab in the supply line temperature on the coldest day.

Unknown values - Radiator system, select a curve that provides a 55°C supply temperature for a low temperature system on the "coldest day" and a 70°C supply temperature for a high temperate system.

The 'coldest day' is the lowest temperature that normally occurs in the location.

Adjustment of basic setting

For low temperatures, select a higher level. An increase in the room temperature can be limited by the thermostats for the radiators or underfloor heating.

For high temperatures, select a lower level.

If the room is not at the desired temperature, additional adjustment is needed. Wait at least one day between adjustments so that temperatures have time to stabilize.

		Delivery setting
9.- -	UTK function switched off, see Advanced Service Level row 15.	
9.-5	**Alternative temperature** - -15-+15°C Adjustment	-5
	See "Outdoor temperature sensor and alternative heating" in "Electrical installation".	
	Closed input activates the function. Can be used for night-time reduction, holiday mode or similar, see "Electrical installation"; "Alternative temperature".	
	Function without installed room unit: Shifts, parallel displacement, UTK curve level with a configurable number of stages. This corresponds to a change in the room temperature by the approximate corresponding number of degrees.	
10.-	Room unit not installed.	
10. 18.	**Room unit, current room temperature** in whole degrees. 15-25°C, display	
11.-	Room unit not installed.	
11. 20.	**Room unit, set temperature** in whole degrees 15-25°C, display.	
	Adjustments are made using the room unit.	
12. 0	**ECO-mode**, adjustment	0
	Standby mode, the electric flow heater holds at a temperature of 7°C.	
	The pump is turned off but is run every other day.	
	0: Off	
	1: On, the electric flow heater holds at a standby temperature of 7°C. The circulation pump is run every other day for two minutes. Output is allowed to step in if external restriction and load guard allow.	

Menu item - Service level

		Delivery setting
1. 0	**Quick increase** - Service mode, setting. 0: Off 1: On, speeds up step in / step out rate for 15 minutes.	0
2. 0	**Temporary disconnection of connection delay** after power on, service mode, adjustment. See also "Advanced Service" level row 14. 0: Normal 1: Temporary disconnection	0
3.25	**Load guard, the size of the main fuse** in amps. Adjustment 0-50	25
4.50	**Load guard, stage size current value** expressed as one tenth ampere. ***DO NOT CHANGE!***	31
5. 7	**Stage limitation**, number of output stages, installed output, that the electric flow heater can work with - settings 1-7	7
6.- -	UTK function switched off, see Advanced Service Level row 15.	
6. 10	**UTK min-Limitation** of the supply line temperature. Adjustment 10-50°C.	10
7.- -	UTK function switched off, see Advanced Service Level row 15.	
7.70	**UTK Max-Limiting** the supply line temperature. Adjustment 20-80°C.	70
8.- -	UTK function switched off, see Advanced Service Level row 15.	
8. 0	**Room unit,** activate / deactivate adjustment 0: No room unit or switched off 1: Room unit connected	0
9.- -	UTK function switched off, see Advanced Service Level row 15.	
9.30	UTK room unit P-factor, 1 / 10th°C / °C. Adjustment 0-100	30
10. - -	UTK function switched off.	
10. 10	UTK room unit I-factor, 1 / 10th°C / °C / h. Adjustment 0-100	10
11. 0	Program Version power board, display	
12. 0	Enter 21, for access to "Advanced service level".	0

Step	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
Power output	2.1	4.2	6.3	8.4	10.5	12.6	14.7	kW
Current	3	6.05	9.1	12.1	15.1	18.1	21.2	A

Menu - Advanced Service level

		Delivery setting
13. 0	**External control with 0-10V signal**, adjustment. 0: Output limiting. The electric flow heater's temperature control is superior; the setpoint must be set slightly higher than the required temperature. 1: Output control, only the overtemperature limit restricts. See "Advanced Service level" rows 16 and 17.	0
14. 2	**Maximum output** upon restart after power failure, 6 kW directly exceeding connection delay, adjustment. 1: No connection delay. 2: One hour. 3: Two hours.	2
15. 0	Select, **fixed setpoint or UTK** - function, adjustment 0: Fixed setpoint 1: UTK	0
16. 95	**Maximum boiler temperature, method**, adjustment. 0: Absolute temperature. 1: Temperature relative to setpoint.	0
17. 0	**Maximum boiler temperature - adjustment** 6-95°C This setting is used by both methods according to row 16 above. At "Absolute temperature", the selected temperature should not exceed 10°C.	10
18. 1	**Manual activation** of rows 19 and 20. Adjustment 0: Off 1: Limited to 15 minutes	0
19. 0	**Manual activation / test run of output stage** - 0-7, adjustment, see row 18 +/- to step in / out output stage. Manual output connection is subordinate to all protective functions, i.e., if the load guard function or overtemperature protection alarm is activated, the electric flow heater will step down in the same way as for automatic operation.	0
20. 0	**Manual circulation pump**, adjustment, see row 18. 0: Circulation pump off 1: Circulation pump on	0
21. 0	-	
22. 25	-	
23. 0	**Control of circulation pump** - operation mode, adjustment. 0: Circulation pump follows output stage The pump only starts when the first output stage is connected. The pump stops 30 minutes after the electric flow heater becomes inactive. The circulation pump is run for two minutes every other day. 1: Circulation pump always on	1
24. 32	Current **temperature of power circuit board**, display.	

Operation and maintenance

Before starting, check that the installation is in a fully satisfactory condition.
Ask the installation engineer to demonstrate the control and functions so that you know how the system works and must be maintained.

Check:

- ***Boiler and heating system are filled with water, vented and that the pressure is correct.***
- ***That all necessary valves are open.***
- ***That any safety valves are working.***
- ***That any external safety equipment is working as intended.***
- ***That the circulation pump is working and the flow direction is correct.***

Start

Energised electric flow heater, the display illuminates along with a green indicator.

A number of parameters are shown below that should be considered when starting:

For installation / configuration, see "Menu - Management"!

- Stage restriction; "Service level" row 5.
- Load guard; "Service level" row 3.
- Circulation pump; "Advanced Service level" rows 20 and 23.
- External control / Output control; "Advanced Service level" row 13.
- ECO-mode; "User level" row 12.

Depending on whether the electric flow heater will be controlled by a fixed or outdoor-compensated, UTK, setpoint. For the UTK function, the electric flow heater must be supplemented with an outdoor temperature sensor, optional.

- Desired boiler temperature; "User level" row 1.
- UTK; "Advanced service level" rows 5, 6, 7, 8 and 9 and "Service level" rows 6, 7 and 8.

- Room unit; "User level" rows 10 and 11 and "Service level" row 8.
  The room unit is an option and requires that the UTK function is activated.

Depending on the selected connection delay upon restart after power failure, a connection delay can be applied for output connection over 6 kW, see "Advanced Service Level" line 14.

For testing and service, the connection delay and output connect / disconnect can be temporarily sped up, see "Service level" rows 1 and 2.

The electric flow heater should now step in the number of output stages needed until the temperature conforms to the set value.

Connection delay

According to the recommendations, a maximum of 6 kW of the output should be connected immediately after a voltage loss.
See "Advanced Service level" row 14.

Circulation pump

Operating modes for circulation pump, see "Advanced Service level" rows 20 and 23.

Load guard

The load guard protects the main fuses against overload by reducing the electric flow heater's output. When the overload ceases, the output is reconnected stage by stage.
See "Service level" row 3.

Stage restriction

The flow heater can be stage restricted in 1-7 stages. The number of stages selected corresponds to the installed output. See "Service level" row 5.

Output limitation / Output control, 0-10V

Output restriction; the electric flow heater's temperature control is superior; the setpoint must be set slightly higher than the required temperature.

Output control, only the overtemperature limit restricts. Used together with another unit with its own temperature control.

See "Advanced Service level" row 13.

Desired boiler temperature

Desired boiler temperature, setpoint, see "User level" row 1.

Outdoor temperature compensator setpoints, UTK

The Elomax electric flow heater must be supplemented with an outdoor temperature sensor-option. This function must be activated in the menu system.
See "Advanced level" rows 5, 6, 7, 8 and 9 and "Service level" rows 6, 7 and 8.

Alternative temperature

This function requires that the UTK function is activated and an external contact. Can be used for night-time reduction, holiday mode or similar, see "User level" rows 6 and 9.

Operation and maintenance

Alternative temperature with room unit

Upon activation, the centre point of the setpoint adjuster is moved by the set number of stages.
For example, the centre position of the handwheel is 20-6 = 14°C if the alternative temperature parameter is set to -6.

Optional Room Unit

The control can be equipped with a room unit with a setpoint adjuster, handwheel and an alarm indicator, which has the same function as the red indicator on the front panel.

The room unit increases heating comfort with the lowest possible energy consumption. Additional information is included with the device.
Further information is provided with the room unit.
The room unit requires that the UTK function is activated.

Room unit; "User level" rows 10 and 11 and "Service level" row 8.

Over temperature protection

The overtemperature protection supplements the overheating protection. The aim is to prevent the overheating protection from triggering as far as possible.

The temperature at which over-temperature protection is tripped can be set as a fixed value or in relation to the setpoint. See "Advanced Service level" rows 16 and 17.

Safety valve

To maintain the safety function, safety valves in the heating system must be operated regularly, about 4 times a year.

Venting - water pressure

Regularly check that the water pressure is correct.
Air may be left in the system for a while after installation, for which reason it should be vented a few more times.

The pressure in a heating system varies with the temperature. Do not add water unnecessarily!

Draining

If the heating system needs to be drained of water, the electric flow heater must first be switched off so that the immersion heater is not damaged.

Overheating protection

The electric flow heater's overheating protection is triggered if the temperature exceeds approximately 100°C. Protection is reset when the "reset plug" on the front panel is removed. Reset can only be done when the temperature has fallen below 80°C.

Always check the cause of a guard being triggered! If the protection is triggered repeatedly, the cause must be fixed!

Action in the event of a risk of freezing

When it is extremely cold, no part of the heating system must be switched off as there is a risk of bursting.

If you suspect that any part of the heating system is frozen, contact an installation engineer.

If the heating system is to be switched off for an extended period of time, the system should be drained or it can be filled with water mixed with glycol.

The electric flow heater must not be operated if you suspect that any part of the heating system is frozen.
Call an installation engineer!

Frost protection - heating systems

If the heating system's water is mixed with glycol, it is important to check that the glycol contains a suitable quantity of corrosion-protection additive. When glycol breaks down, one of the by-products is carbonic acid, which increases the risk of corrosion.

Frost protection

The ECO function activates the frost protection automatically when the boiler temperature is below 10°C. See "User level" row 12.

General

Installation must take place according to existing rules and standards.
Heating systems can differ from one country to the next due to climate, traditions and national regulations. In cases where standards violate national regulations, the latter must be followed. National and individual requirements must be taken into account.
The electric flow heater must be located indoors in a suitable location equipped with a floor drain.
The electric flow heater is mounted horizontally so that the air that is released can circulate.
An system equipped with a closed expansion tank must undergo an installation inspection prior to first operation. The inspection must be carried out by a person who is qualified for the task. The boiler or expansion tank may not be replaced without another inspection.
Valves must be fitted between the flow heater and the heating system.
Cables and pipes must be laid so that it is possible to open the front and remove the roof plate for service.
For installation and accessibility for service, there must be at least 60 cm space above and in front of the cartridge.
The electric flow heater is designed for non-oxygenated water.

Water quality

Tap water is usually classified from the point of view of hygiene. Good water classified on this basis is not automatically suitable for a heating system. To avoid problems a technical water analysis should take place. Any nonconformities with standard values should be corrected.

If the volume of the heating system is low, the boiler and heating system may be filled with water that is not classified as good boiler water. When the water is heated, some oxygen and carbonic acid are emitted to the expansion tank or vent valves. The remainder will react with the metals in the system. This corrosion is often insignificant as the same volume of water circulates and it soon becomes oxygen-free. What is important is that the system is leak-proof so that the water is not replaced with new oxygen rich water and the water is not oxygenated during installation.

In large systems, it is impossible, in practice, to protect against leaks and oxygen admission. In such cases, an oxygen-consuming agent can be added so that there is always a slight surplus in the system. These agents often contain corrosion-limiting additives.

Suitable water line quality:

Alkalinity ≥ 60 mg / l to avoid corrosion.
Carbonic acid content > 25 mg / l increase the risk of corrosion.
Sulphate contents > 100 mg / l may accelerate corrosion.
If the sulphate content is higher than the alkalinity, there is a risk of copper corrosion.
Hard water causes boiler scale and is not suitable in a heating system.
Very soft water may cause corrosion damage.

Chloride levels above 100 mg / l make the water aggressive, especially together with lime deposits.
Low pH values may cause corrosion damage. The pH value should be between 7.5 and 8.5.
The presence of carbonic acid in combination with low pH and hardness values makes the water aggressive.

Flow requirements

The electric flow heater requires a constant adequate flow to function properly. If the heating system's valves are able to throttle circulation, an overflow valve must be installed.

The circulation pump must press the water through the cartridge with the flow direction shown in the system diagram.

Flow that is too low increases the difference between the desired and the actual temperature, increases the risk of that the overheating protection will be triggered and the risk of irregular control resulting in increased wear on the electromechanical components.

Excessive flow can result in vibrations in the immersion heaters with noise and reduced service life as well as unnecessary wear on system components.

Flow direction

The circulation pump must press the water through the boiler with the flow direction shown in the System principles.

Expansion system

EK 15E must be connected to an expansion system. Expansion vessels are dimensioned to accommodate changes in water volume due to heating and cooling. Expansion vessels, safety pipes, aeration and overflow pipes must be installed in a manner that protects against freezing.

If the electric flow heater's safety pipe is not connected to an open expansion vessel, it must always be equipped with automatic venting.

Open system

The electric flow heater's flow / safety line must be connected in an uninterrupted, uninterruptible pitch to an expansion tank installed at the highest point of the heating system. In order to avoid oxygenation of the heating system, the distance between the top of the highest radiator and expansion tank may not be less than 2.5 metres. To avoid damage in the event of any blockage in the expansion system, the electric flow heater should be fitted with a safety valve.

Pipe installation

Closed system

The electric flow heater is connected to a closed expansion tank in an unbroken, uninterruptible connection to a type-approved safety valve, DN15, with maximum 3 bar opening pressure.
The flow / safety lines must always be equipped with automatic venting. Otherwise, air can accumulate in the boiler tank, which may cause damage to the immersion heaters.

The discharge pipe from a safety valve must meet the requirements under EN 12828.

Steam or liquid that flows out of the safety valve when it opens must be drained safely.

The discharge pipe from the safety valve is dimensioned so that the blow-off capacity is not impeded.

The discharge pipe must be laid so it cannot freeze, must be cleaned well and must be laid so that water pockets cannot form.

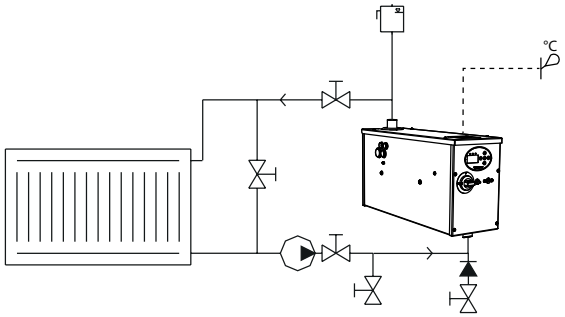
The opening pressure of the safety valve is determined by the component in the system that tolerates the lowest pressure.

System principles

The figures shown are system principles. The actual system must be installed according to existing standards. Any additional equipment must be installed as indicated by the manufacturer for its product.

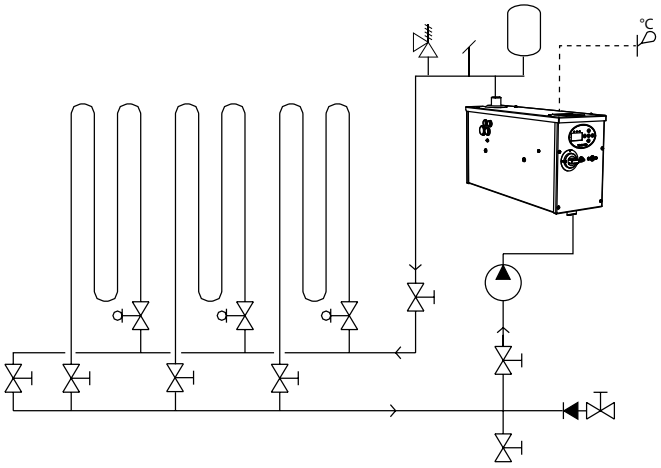
Radiator system

By supplementing the EK 15E with an outdoor temperature sensor, an outdoor temperature compensated supply temperature is obtained in a shunt-free system.

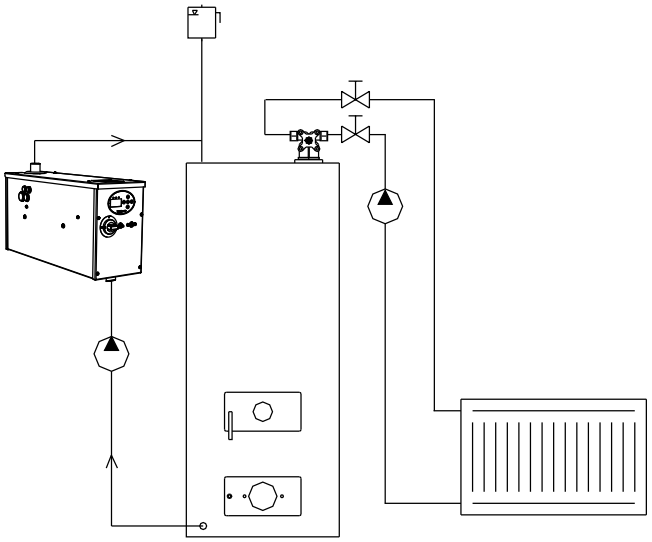


Underfloor heating system

By supplementing the EK 15E with an outdoor temperature sensor, an outdoor temperature compensated supply temperature is obtained in a shunt-free system.



With boiler



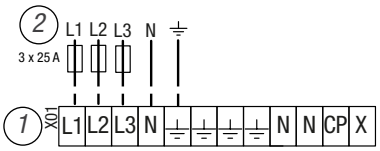
As a complement to an existing boiler, the EK 15E can be installed either between hot water outlets if applicable, on the electric flow heater, or between the electric flow heater's expansion pipe and drain valve.

Electrical installation

Electrical installation shall be carried out in accordance with the applicable regulations, by an authorized electrical installer or by someone who is covered by the company's self-inspection programme!
The electric flow heater and heating system must be filled with water and vented before the flow heater is connected to the power supply.
Low-voltage cables may not be laid parallel to high-voltage cables.
Cables and pipes must be laid so that it is possible to remove the front plate and open the top plate.
Do not drill into the electric flow heater's cover plates. Cuttings can damage the electric flow heater's electrical equipment!

Connection power supply 400V 3N~

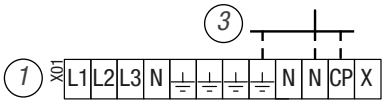
Cable area 5 x 6 mm² Cu, fuse 25 A



Circulation pump 230V~

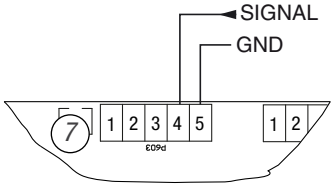
See "Advanced Service level" row 23.

Control for circulation pump, max load 2A.



Output limitation / Output control, 0-10V

See "Advanced service level" row 13 and "Service level"I row 5!



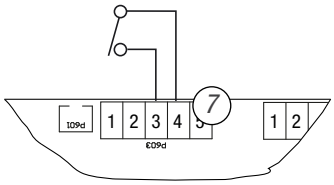
Controlled by an external voltage signal, 0-10Vdc. The control signal controls the output stages 0-100% of installed output. Installed output is the number of stages the electric flow heater is allowed to use.

The existing jumpers 3-4 are removed.
The control signal is connected to terminals 4-5.

Blockage

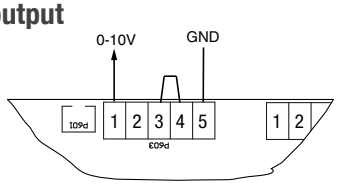
A potential-free contact is connected to clamps 3-4.

The existing jumper 3-4 is removed.



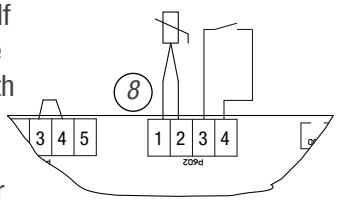
0-10V signal of connected output

The connected output of the electric flow heater can be obtained as a 0-10Vdc signal, which corresponds to 0-100% of the installed output.



Outdoor temperature sensor and alternative heating, option

See "User level" rows 7, 8 and 9 and "Advanced service level" rows 6, 7 and 15.



The outdoor temperature sensor is fitted to an outside wall, at half the height of the façade, close to a corner, facing north / north west. The sensor must not be placed where it will be exposed to the morning sun or close to valves, windows or doors. The sensor is connected in clamps 1-2, with at least 0.4 mm² cable up to 30 meters.

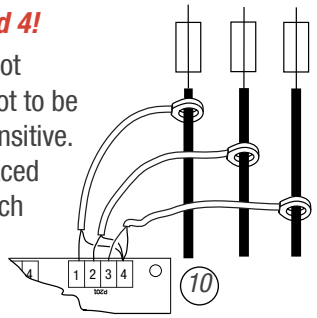
The temperature can be changed with an external potential-free contact function; alternative temperature. Connection to clamps 3-4.

Optional Room Unit

Further information is provided with the room unit.

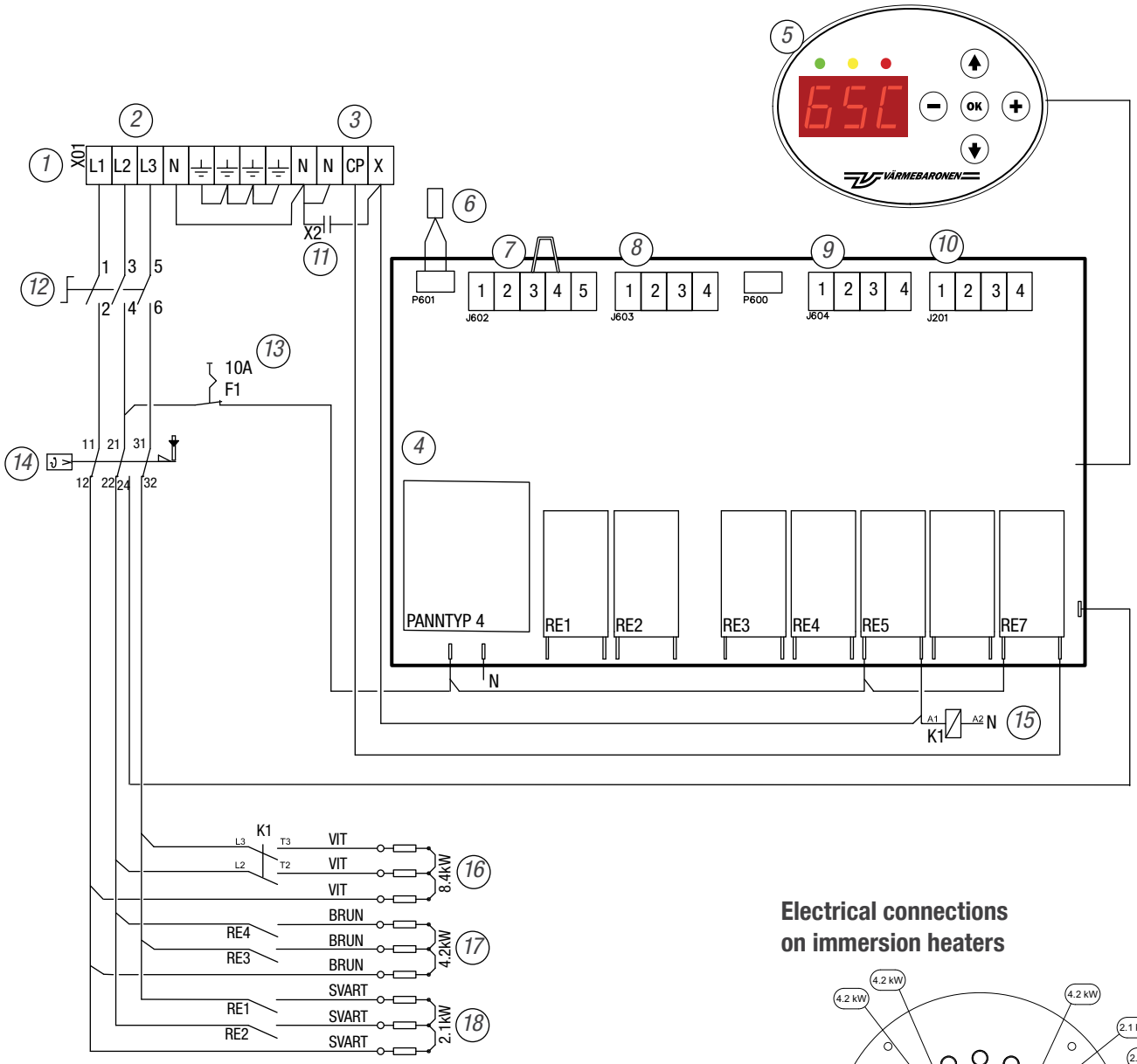
Current Transformers - Load Guard

See "Service level" rows 3 and 4!

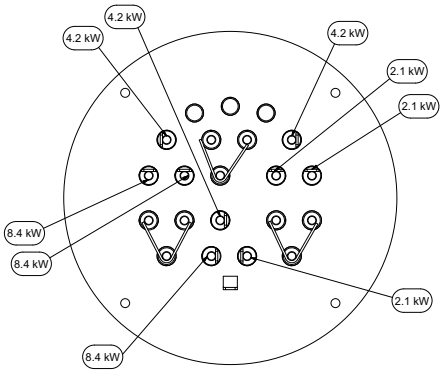


The current transformers need not be connected if the function is not to be used. The guard is not phase-sensitive. The current transformers are placed on the wires from the fuses, which must be protected. Connection must be made with a high-voltage insulated cable, with a minimum area of 0.75 mm². A joint conductor is connected in terminal 4.

Wiring diagram



Electrical connections on immersion heaters



Before work is performed, the electric flow heater must be de-energised!

1. Terminal block.
2. Connection 400V3N~.
3. Circulation pump connection, 230V~.
4. Circuit board, power.
5. Overlay and panel circuit board.
6. Boiler temperature sensor.
7. Connection for Blocking or voltage control.
8. Connection, outdoor temperature sensor and alternative temperature, option.
9. Room unit connection, option.
10. Connection, current transformers for load guard.
11. Capacitor.
12. All-pole switch.
13. Miniature circuit breaker.
14. Overheating protection.
15. Contactor, power group three.
16. Heating element output group three, 8.4 kW.
17. Heating element for output group two, 4.2 kW.
18. Heating element for output group one, 2.1 kW.

Troubleshooting - Warning, limitation and alarms

Limit

b01	Connection delay	Delayed output connection after restart after power failure. Upon restart after power loss, up to 6 kW is connected immediately if necessary. In service mode, the delay can be accelerated, see "Service level" row 2. The delay can be permanently removed, see "Advanced Service level", row 14.
b02	The load guard limits	Green indicator flashes. The load guard limits. See "Service level" rows 3 and 4.
b03	External restriction / blocking	Green indicator flashes. External limit. Blocking or restriction via external 0-10V signal, see "User level" row 3.
b04	Manual operation	Manual connection of output stages and circulation pump, see "Advanced Service level" rows 18-20.
ECO	ECO mode	Green indicator flashes. ECO function is active, see "User level" row 12.

Warning - yellow indicator flashing

The display shows current warnings if no stop alarms occur. The information remains until OK is pressed and the cause has been resolved.

ot.1	High temperature around power circuit board	Temperature > 45°C. Yellow indicator goes off at temperature below 42°C, the warning is acknowledged with OK. All connected output steps out at temperatures > 55°C, output can be stepped back in at temperatures < 45°C, see "Advanced service level" row 24.
ot.2	High boiler temperature	Over Temperature. Yellow indicator goes off when temperature has fallen below the limit and the warning is acknowledged with OK. All connected output steps out and steps in again only when the temperature has dropped below the limit. Selectable in "Advanced Service level" rows 16 and 7.
ot.3	Low boiler temperature	Boiler temperature lower than 7°C. The electric flow heater's temperature must be no lower than 7°C during operation, regardless of the selected setpoint. If external blocking / external control is active, the electric flow heater is ***NOT*** allowed to step in output. If the load guard restricts, the electric flow heater is ***NOT*** allowed to step in output.
ot.4	Outdoor sensor	Incorrect value, interruption, disconnected sensor or short-circuit. Control assumes 0°C outdoor temperature.
ot.5	Room device	Incorrect value, interruption / short circuit of the sensor and / or disconnected room unit. The unit is disconnected from the control until the alarm is acknowledged and the room unit is repaired.
ot.6	Room unit, adjustment	Incorrect value, interruption / short circuit or disconnection of the room unit. The unit is disconnected from the control until the alarm is acknowledged and the room unit is repaired.

Alarm - red indicator flashes: the electric flow heater is blocked

Display window shows current alarms. The information remains until the cause is corrected and OK is pressed

F.01	Boiler temperature sensor	Incorrect value or interruption / short circuit on sensor.
F.02	Temperature sensor on circuit board	Incorrect value or interruption / short circuit on sensor.
F.03	Low boiler temperature	Boiler blocked due to a boiler temperature lower than 3°C.
F.05	Overheating protection triggered	All output disconnected, the circulation pump is still in operation.
F.06	Low supply voltage	Low supply voltage to electronic components, all output disconnected, the circulation pump is switched off.

Troubleshooting

Intervention that requires tools must be performed by a qualified electrician!

Fault	Possible cause of fault	Action
Indicators and display off.	The electric flow heater has no power.	Check the main fuses.
	Switch off.	Set switch to position. Connection delay can restrict output staging.
	Control fuse triggered.	Check where the short circuit is, take remedial action and then reset the fuse.
	Malfunction of the control electronics.	Change the circuit board.
Group fuse is triggered.	Immersion heater faulty.	Check the insulation of the immersion heaters, which are accessible when the electric flow heater's lower front plate and insulation are removed. Change the defective container with immersion heater. Check that the power cables are not against the electrical connections.
The electric flow heater does not step up power even though the temperature in the electric flow heater is lower than the set value.	The boiler electric flow heater has been restricted.	Check the "Number of output stages" adjustment.
	The electric flow heater is controlled by external signal.	Check the voltage of the signal.
	Outside temperature compensator connected.	Check the settings for the UTK function.
	Temperature sensor defective.	Take control measurements of the temperature sensor. The sensor must not be connected to the circuit board during resistance measurement. When the boiler is energized, voltage is measured in the sensor's connection points at the PCB.

Boiler temperature

°C	kΩ	V	°C	kΩ	V	°C	kΩ	V
5	141.9	4.7	**40**	30	3.7	**75**	8.2	2.3
10	111.6	4.6	**45**	24.6	3.6	**80**	6.9	2
15	88.3	4.5	**50**	20.2	3.3	**85**	5.8	1.8
20	70.3	4.4	**55**	16.7	3.1	**90**	5	1.7
25	56.3	4.2	**60**	13.9	2.9	**95**	4.2	1.5
30	45.4	4.1	**65**	11.6	2.7	**100**	3.7	1.3
35	36.8	3.9	**70**	9.7	2.5			

Outdoor temperature

°C	kΩ	V	°C	kΩ	V
-40	88.7	4.5	**0**	8.8	2.3
-35	64.2	4.3	**5**	6.8	2.0
-30	47.0	4.1	**10**	5.4	1.7
-25	34.7	3.9	**15**	4.2	1.5
-20	25.9	3.6	**20**	3.4	1.3
-15	19.5	3.3	**25**	2.7	1.1
-10	14.8	3.0	**30**	2.2	0.9
-5	11.4	2.7			

Uneven regulation, the electric flow heater steps up a few stages and is then immediately stepped down, etc.

Water flow through the electric flow heater is too low.
Check that circulation pumps and valves are working.

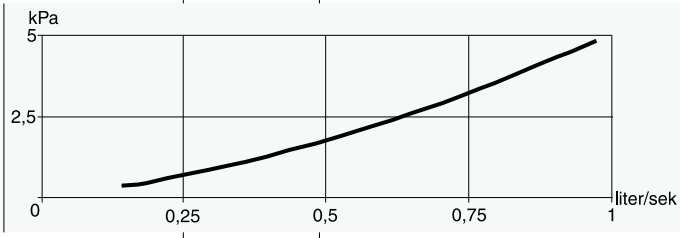
This is an easy way to get an idea of the level of flow through the electric flow heater:

1. Limit the output stages of the electric flow heater so that the output is constant, e.g., to four output stages.
2. Allow the electric flow heater's temperature to stabilise.
3. Measure the temperature increase between the return and flow lines of the electric flow heater.
4. Calculate the flow through the electric flow heater using the formula below.
5. Check against the flow details whether the flow is adequate.

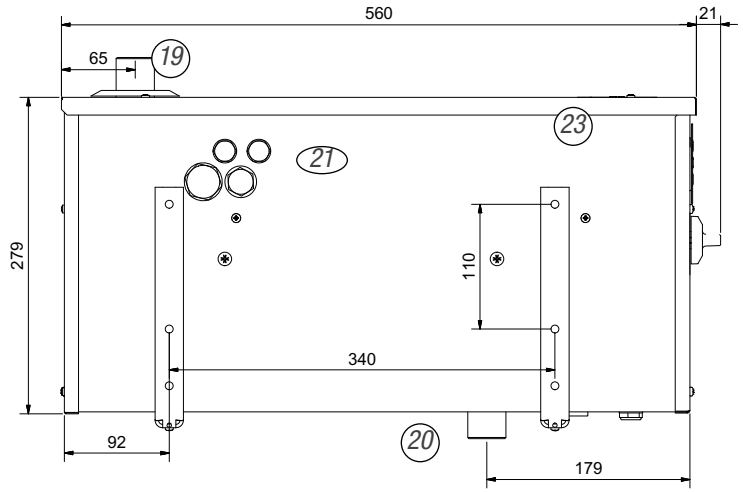
$q = P / (\Delta t \times 1.16)$

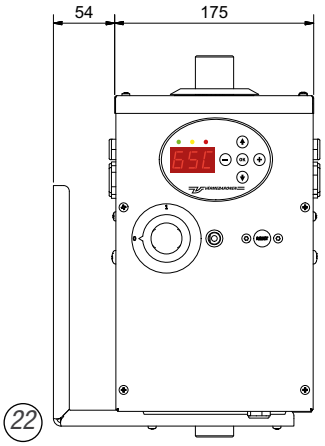
Q = water flow in m3 / h. (m3 / h x 1000 / 3600 = litre / second)
P = electric flow heater's delivered output in kW
Δ t = temperature difference between the electric flow heater's return and flow lines in °C.
1.16 = water's thermal absorption coefficient.

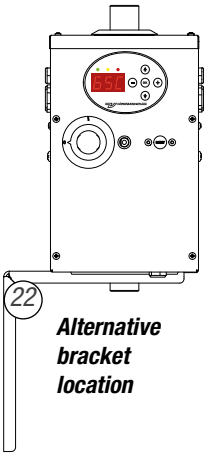
Technical data

Type	EK 15 E	
Article number	1212	
RSK number	621 10 11	
Power output	14.7	kW
Voltage	400V 3N~	
Voltage tolerance	≤ ±10	%
Frequency	50	Hz
Current	21.2	A
Highest fuse	25	A
Number of power stages	7	
Output / stage, stage size	2.1	kW
Current / stage	3	A
Ingress protection rating	IP x1	
Flow requirements		
recommended, Δt=10°C	0.35	litres / sec
min / max Δt= 25 / 5°C	0.2-0.7	litres / sec
Pressure drop		
Volume	3.6	litres
Design pressure	3	bar
Test pressure	4.3	bar
Design temperature	110	°C
Operating temperature	20-95	°C
Ambient temperature	≤ 30	°C
Connection, flow / return	R 25 ext.	
Weight empty	13	kg
Weight filled with water	16.6	kg
Manufactured to	PED 2014 / 68 / EU article 4.3	

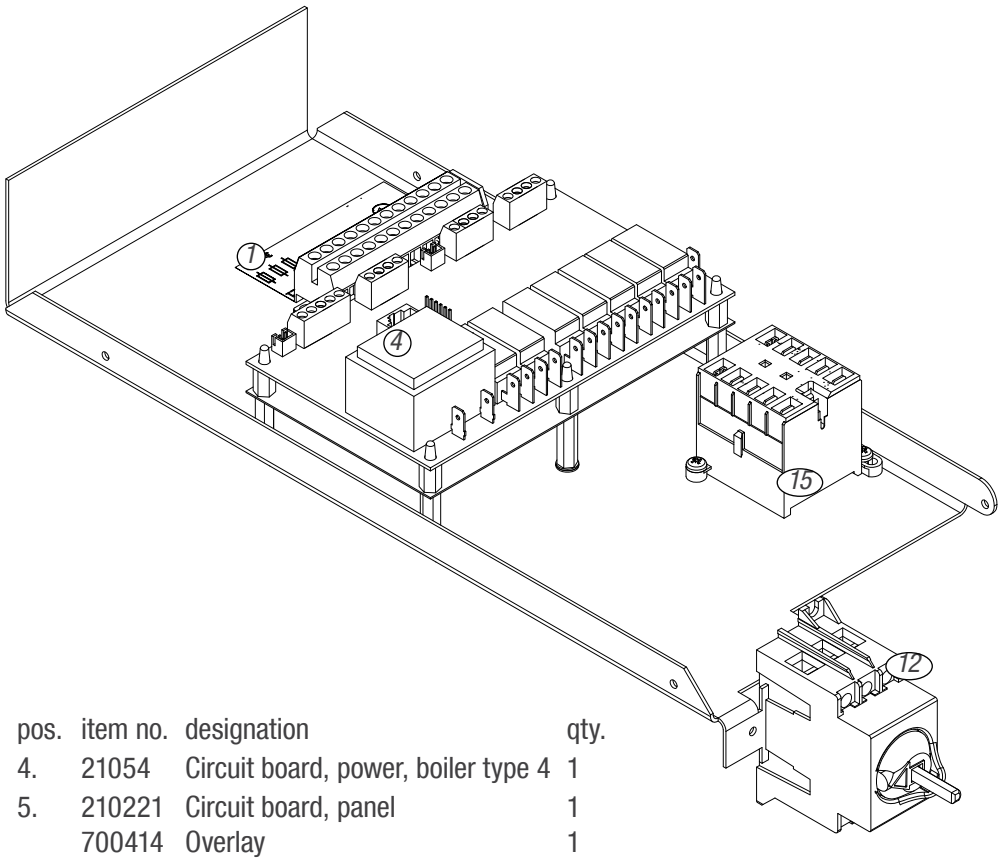
Technical data



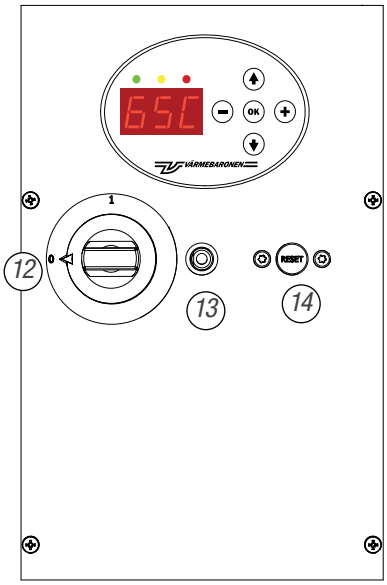




Alternative bracket location



pos.	item no.	designation	qty.
4.	21054	Circuit board, power, boiler type 4	1
5.	210221	Circuit board, panel	1
	700414	Overlay	1
6.	210206	Temperature sensor	1
11.	440090	Capacitor	1
12.	130010	Switch	1
	120009	Knob for switch	1
	700223	Shaft for switch	1
13.	180023	Miniature circuit breaker	1
14.	120025	Overheating protection	1
	370092	Reset plug	1
15.	170046	Contactor	1
	360020	Current transformer	3
	90047	Container with immersion heater	1
19.		Flow / safety line, R25 ext.	
20.		Return R25 ext.	
21.		Cable openings	
22.		Wall bracket	
23.		Cover over coupling opening	



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