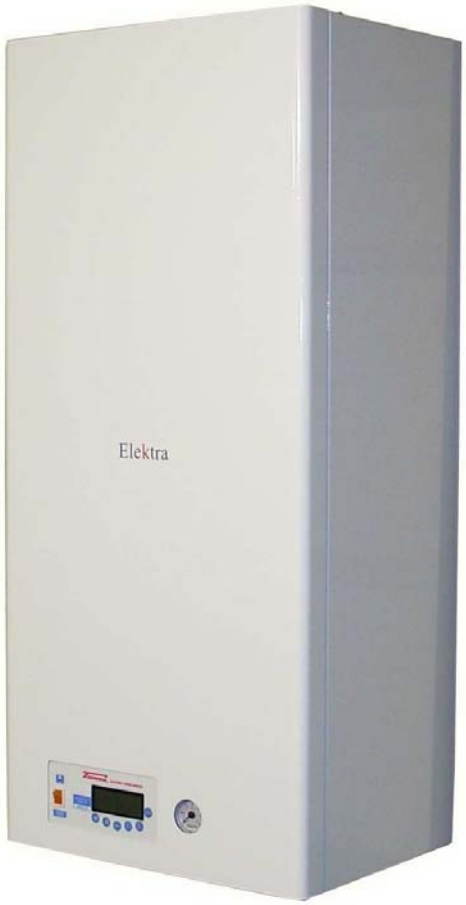
ELECTRIC WALL BOILER
ONLY HEATING
***Elektra. .. N HE** series*



USE AND MAINTENANCE MANUAL

EQUIPMENT COMPLIANT CE DIRECTIVE 2006/42 - IEC 60335-2-21:2012 with IEC 60335-1:2010 with EN 60335-2-21:2003+A1:2005+A2:2008 - EN 60335-1:2012 - EN 62233:2008.

ELECTRIC WALL BOILER

Series ELEKTRA. … N HE

Presentation

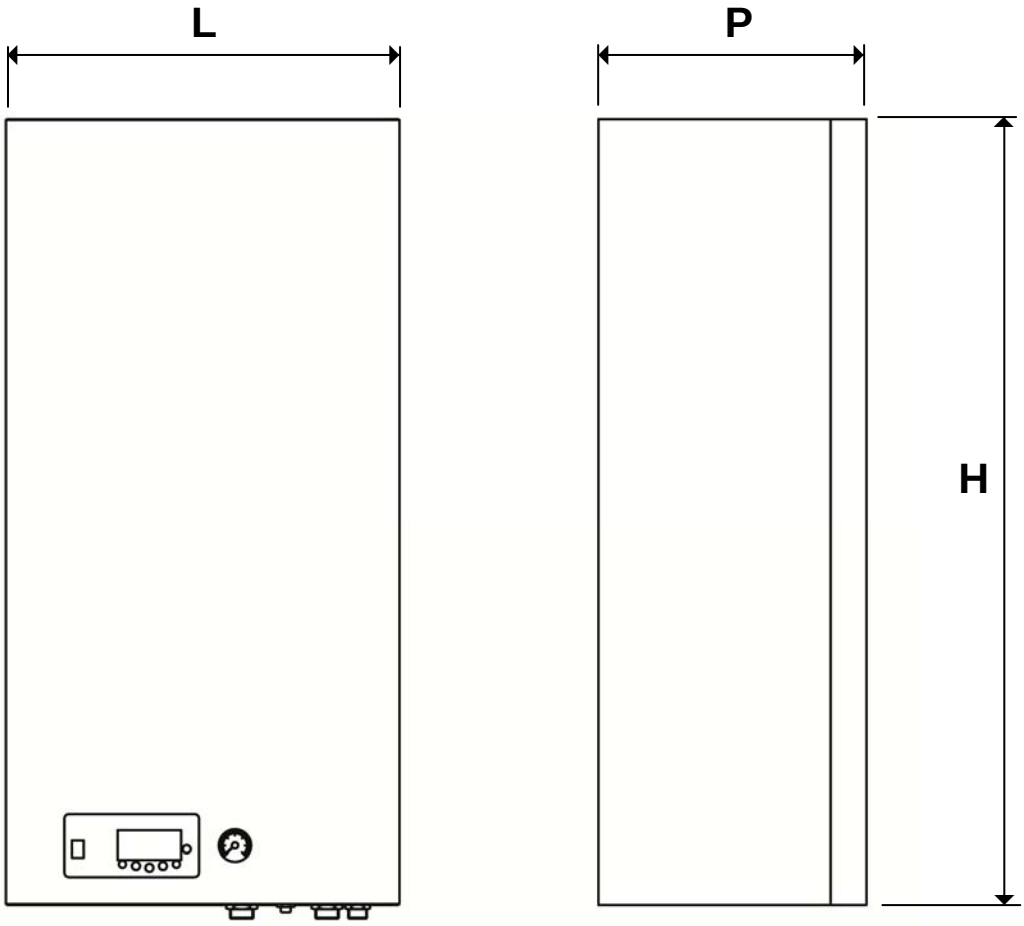
Thank you for choosing an electric wall boiler FIAMMA, built with the most modern technologies, safe and tough materials, so as to ensure maximum efficiency of use, total quality of the device and extreme safety for the user.
The series Elektra .. is built according to European standards dir. machines 2006/42 - IEC 60335-2-21:2012 IEC 60335-1:2010 and EN 60335-2-21:2003 + A1 : 2005 + A2 : 2008 - EN 60335-1:2012 - EN 62233:2008 .
The obtained results can be summarized in the following key points:
- Noiseless functioning, thanks to maximum insulation of the device by means of innovative special materials that ensures minimum heat loss.
- High degree of reliability, thanks to a careful choice of materials and to sever tests carried out during production for each unit built.
- High performance with maximum efficiency, thanks to a modulation of electrical power to the heating elements, according to the actual need of energy by the system. The system D.E.S. manages the device with temperature probes positioned in each sensitive point of the boiler, in order to reduce power consumption when the device is not used at the maximum capacity or demand.
- The appliance is fully adjustable both in water temperature of the heating system (with the possibility to choice of system at high and low temperature for underfloor systems).
- The assembly of the components has been realized in order to allow an easy access to them, all from the front of the unit, for ordinary and extraordinary maintenance.
We recommend you to follow our instructions, and we suggest to contact the area authorized service FIAMMA in order to prepare a planned maintenance contract which can ensure suitable operation at maximum efficiency and safety, so that your machine use can go a long way.
In renewing our thanks, our technical department and our sales network, are at your disposal for any further information

FIAMMA GIRO s.r.l.
Company group

Dimensions

The series ***Elektra. .. N*** *has four power levels, but the same overall dimensions:*

Elektra.6 N HE	*6 kW maximum electrical output*
Elektra.12 N HE	*12 kW maximum electrical output*
Elektra.18 N HE	*18 kW maximum electrical output*
Elektra.24 N HE	*24 kW maximum electrical output*



Appliance dimension

L *(Width) :*	*400*	*mm*
H *(Height) :*	*875*	*mm*
P *(Depth) :*	*300*	*mm*
Weight :	*39*	*kg*

Packaging dimension

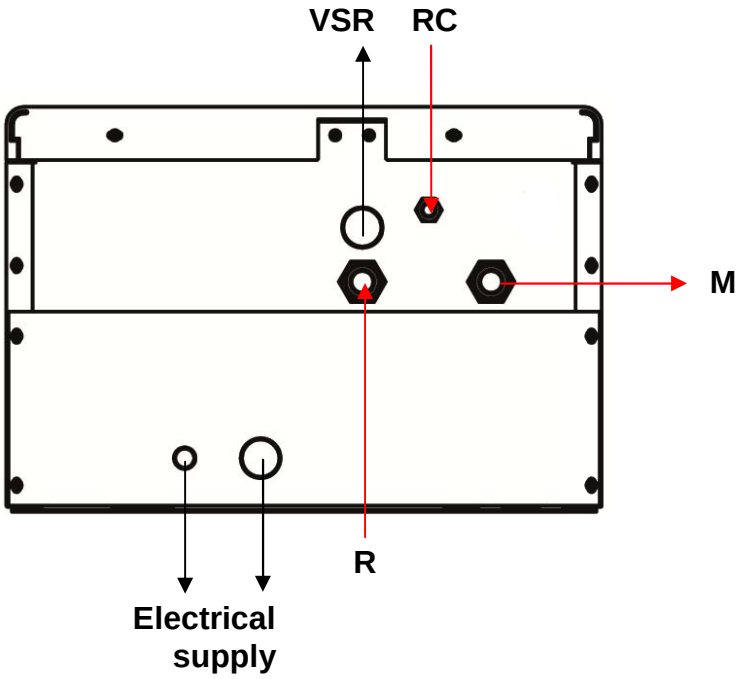
Width:	*440*	*mm*
Height :	*940*	*mm*
Depth :	*390*	*mm*
Weight :	*41*	*kg*

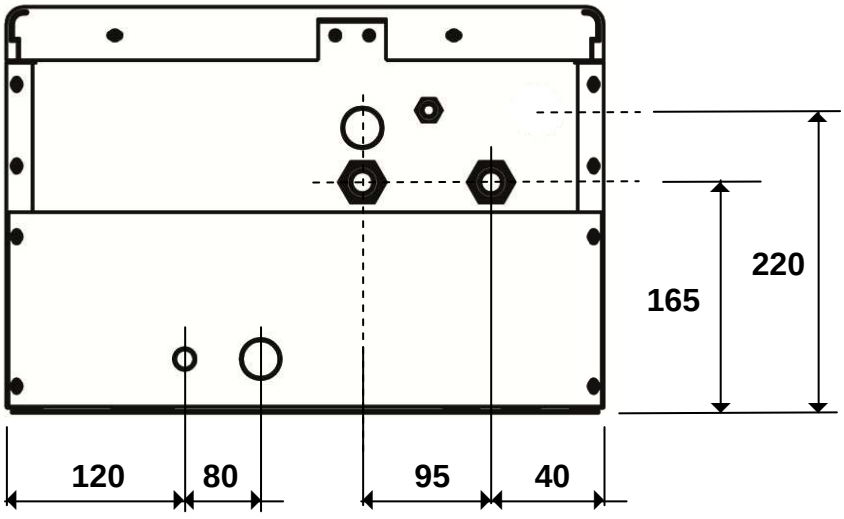
Hydraulic connections – Dimensional of connection arrangement.

Hydraulic connections

M	*Heating delivery :*	*¾"*	*M*
R	*Heating return :*	*¾"*	*M*
VSR	*Heating safety valve (3 bar) :*	*½"*	*F*
RC	*Manual Filling tap (restoring water pressure)*		

Bottom view (under the boiler)





Main technical features Elektra 6.. - Elektra 12.. - Elektra 18..

Elektra.6 N HE *6 kW maximum electrical output*
Single-phase electrical supply 230 V - 50 Hz.
Weight : 39 kg.
Electrical / heat power available at heating: 6 kW obtained by n°.1 resistance group (n°.1 3x2 kW).
Maximum head available at the pump 5 m H_2O
Expansion vessel capacity of 8 lt.
Safety valve of heating circuit: 3 bar.
Maximum heating operating pressure: 2.5 bar.
Minimum operating pressure in the heating circuit: 0.6 bar.
Maximum limit of thermal safety heating circuit - boiler body: 100 °C.

Elektra.12 N HE *12 kW maximum electrical output*
Single-phase electrical supply 230 V - 50 Hz.
Weight : 40 kg.
Electrical / heat power available at heating: 12 kW obtained by n°.2 resistance groups (n°.2 3x2 kW).
Maximum head available to the pump 5 m H_2O
Expansion vessel capacity of 10 lt.
Safety valve of heating circuit: 3 bar.
Maximum heating operating pressure: 2.5 bar.
Minimum operating pressure in the heating circuit: 0.6 bar.
Maximum limit of thermal safety heating circuit - boiler body: 100 °C.

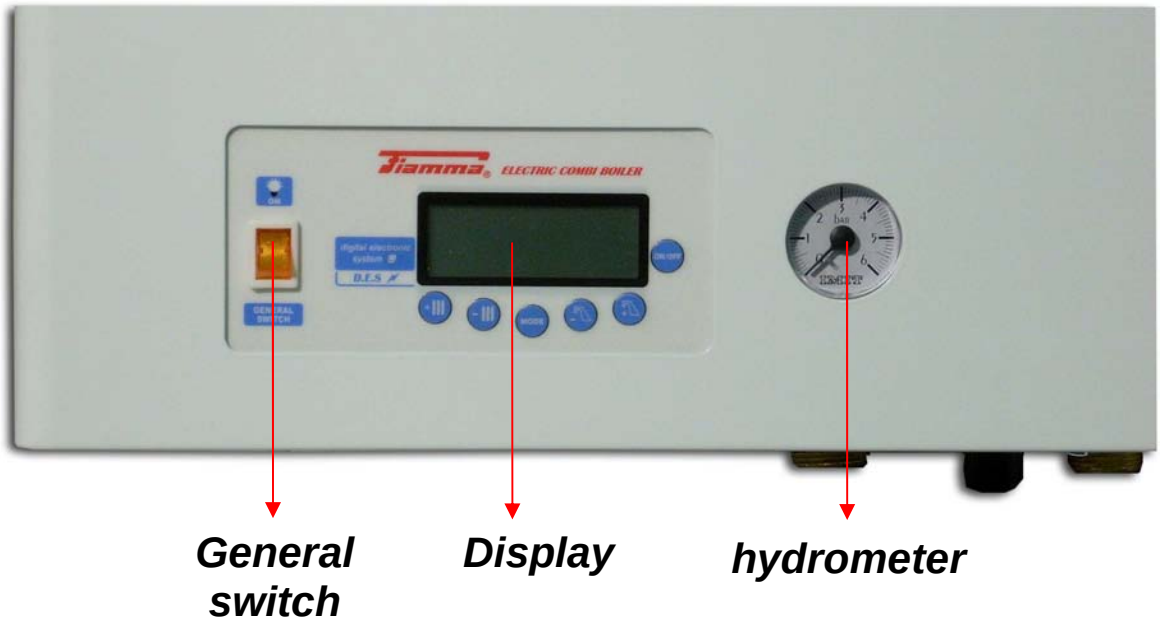
Elektra.18 N HE *18 kW maximum electrical output*
Single-phase electrical supply 230 V - 50 Hz.
Weight : 41 kg.
Electrical / heat power available at heating: 18 kW obtained by n°.3 resistance groups (n°.3 3x2 kW).
Maximum head available at the pump 5 m H_2O
Expansion vessel capacity of 10 lt.
Safety valve of heating circuit: 3 bar.
Maximum heating operating pressure: 2.5 bar.
Minimum operating pressure in the heating circuit: 0.6 bar.
Maximum limit of thermal safety heating circuit - boiler body: 100 °C.

Main technical features Elektra 24..

Elektra.24 N HE *24 kW maximum electrical output*
Single-phase electrical supply 230 V - 50 Hz.
Weight : 42 kg.
Electrical / heat power available at heating: 24 kW obtained by n°.4 resistance groups (n°.4 3x2 kW).
Maximum head available to the pump 6 m H_2O.
Expansion vessel capacity of 10 lt.
Safety valve of heating circuit: 3 bar.
Maximum heating operating pressure: 2.5 bar.
Minimum operating pressure in the heating circuit: 0.6 bar.
Maximum limit of thermal safety heating circuit - boiler body: 100 °C.

Switching-on the boiler

CONTROL PANEL

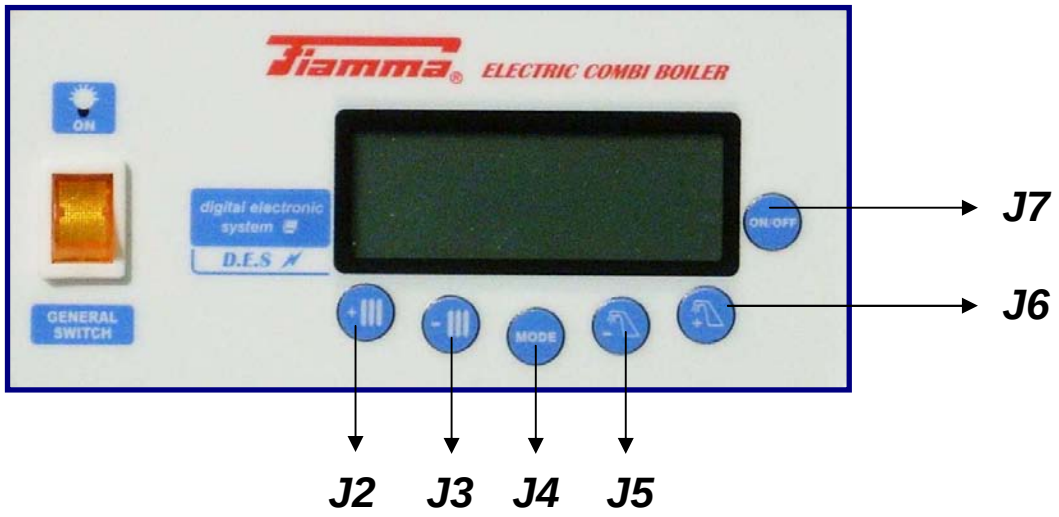


The control panel is composed of : display, function selection keys, general switch and the hydrometer it is placed in the lower left corner in front of the unit (see image above).

Using analogical hydrometer.

The analogical hydrometer control panel has a dial with unit of measure in a bar, from 0 to 6 bar. The water pressure in the heating system is indicated by the index of the black arrow.
The optimum pressure for the system is between 1 and 1.5 bar.
More than 1.5 bar you can have a maximum pressure of 2 bar (maximum expansion of the system during the rise in temperature). More than 2 bar pressure the system is not in the range of operation, and mechanical safety valve (preset to 3 bar) can start to lose water.
The minimum operating pressure is 0.8 bar (+/- 0.2 bar). The differential positive or negative tolerance is due to the operation of the water pressure switch with fixed setting.

KEYBOARD PANEL (Control panel)



MEANING OF THE KEYS IN USER MODE

KEY	***FUNCTION***
J5	*Change and set parameters.*
J6	*Change and set parameters.*
J7	*ON - OFF Switching* *Display temperature output / Display setpoint output* *Unlock error of safety thermostat*
J4	*Summer – Winter switching*
J2	*Display / Increase of heating setpoint (or room temperature)*
J3	*Display / Decrease of heating setpoint (or room temperature)*
J4 + J7	*Start function degassing*

TURNING ON THE BOILER

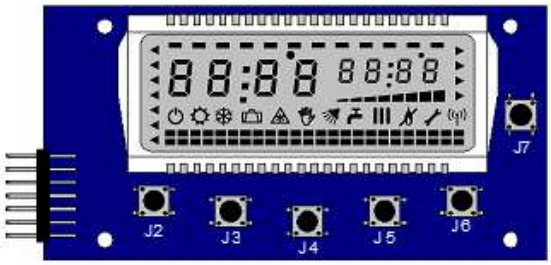
*The boiler is switched-on by means of the light General switch located on the left of the display in the instrument panel of the boiler. Pressing the switch upward to the ON position, it will light in the presence of single-phase supply (230V-50 Hz). Then, it shall be pressed the ON-OFF (**J7**) on the keypad to switch the power from stand-by to the operating position; the display will light up of blue and will appear various symbols signaling function /faults etc.*
At this point it shall be chosen the mode of operation, summer or winter operation.

TEMPERATURE VARIATION OF THE HEATING CIRCUIT

*When the apparatus has been set with the snow symbol (❄) for the wintry functioning, you can change the maximum temperature of heating circuit pressing one of the two keys with the radiator symbol located on the left of the display (**J2** and **J3** keys).*

*The key with the symbol of the **III +** (**J2**), increases the temperature, and the key with the symbol of the **III -** (**J3**), decreases the temperature.*

ON-OFF KEY
Display Simbols

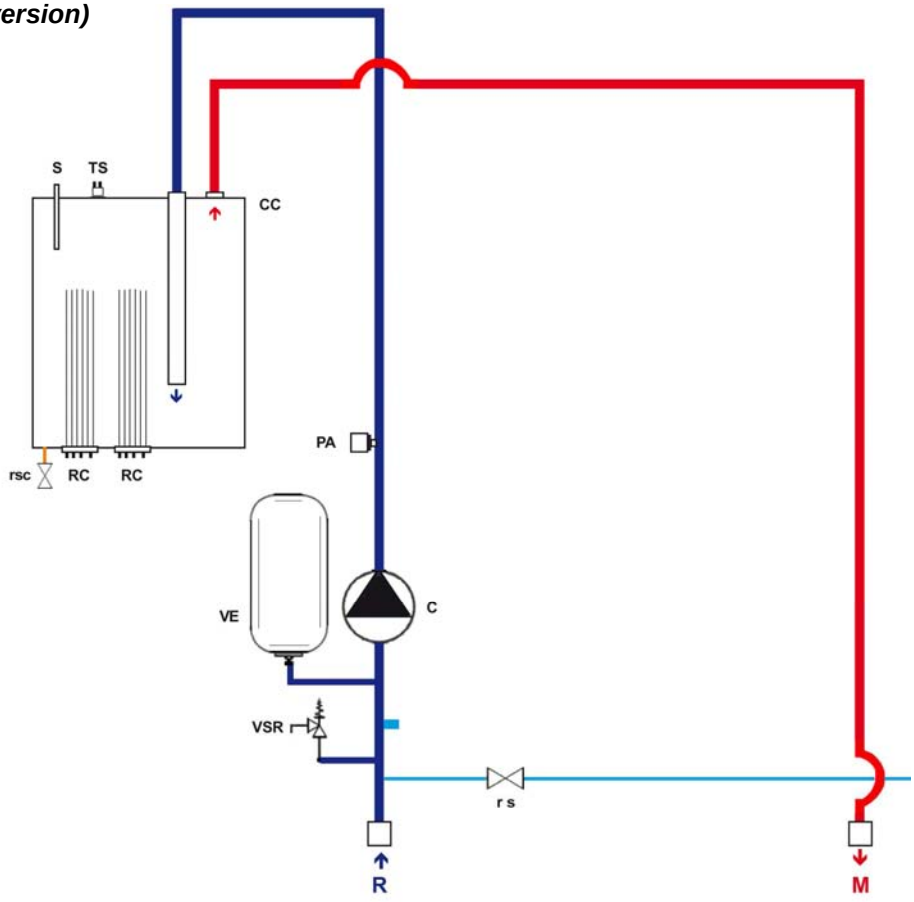


*The ON/OFF key (**J7**), in addition to put the boiler in stand-by mode, allows to reset (unlock) the apparatus in case of high temperature lock.*
If the lock would be caused by lack of water pressure alarm, the recovery will be automatic after that the hydric pressure will be restored at the minimum operating level (0,8 bar) by means of the opening and the closure of the charging tap placed under the boiler (black handle).
The display has several symbols, signaling in addition to operation modes, also the various alarm or system displays:

SYMBOL	MEANING
	Malfunction
	Request of burner switch-on
	Heating request
	Parameter menu activated
	Anti-freeze request activated
	Winter mode
	Summer mode
	OFF mode
Level of modulation	*Indicates the instantaneous power of the boiler from 0 to 100%*

INSTALLATION
TECHNICAL NOTE FOR INSTALLER AND TECHNICAL MAINTENANCE

HYDRAULIC SCHEME
(Elektra 12 N 015 HE version)

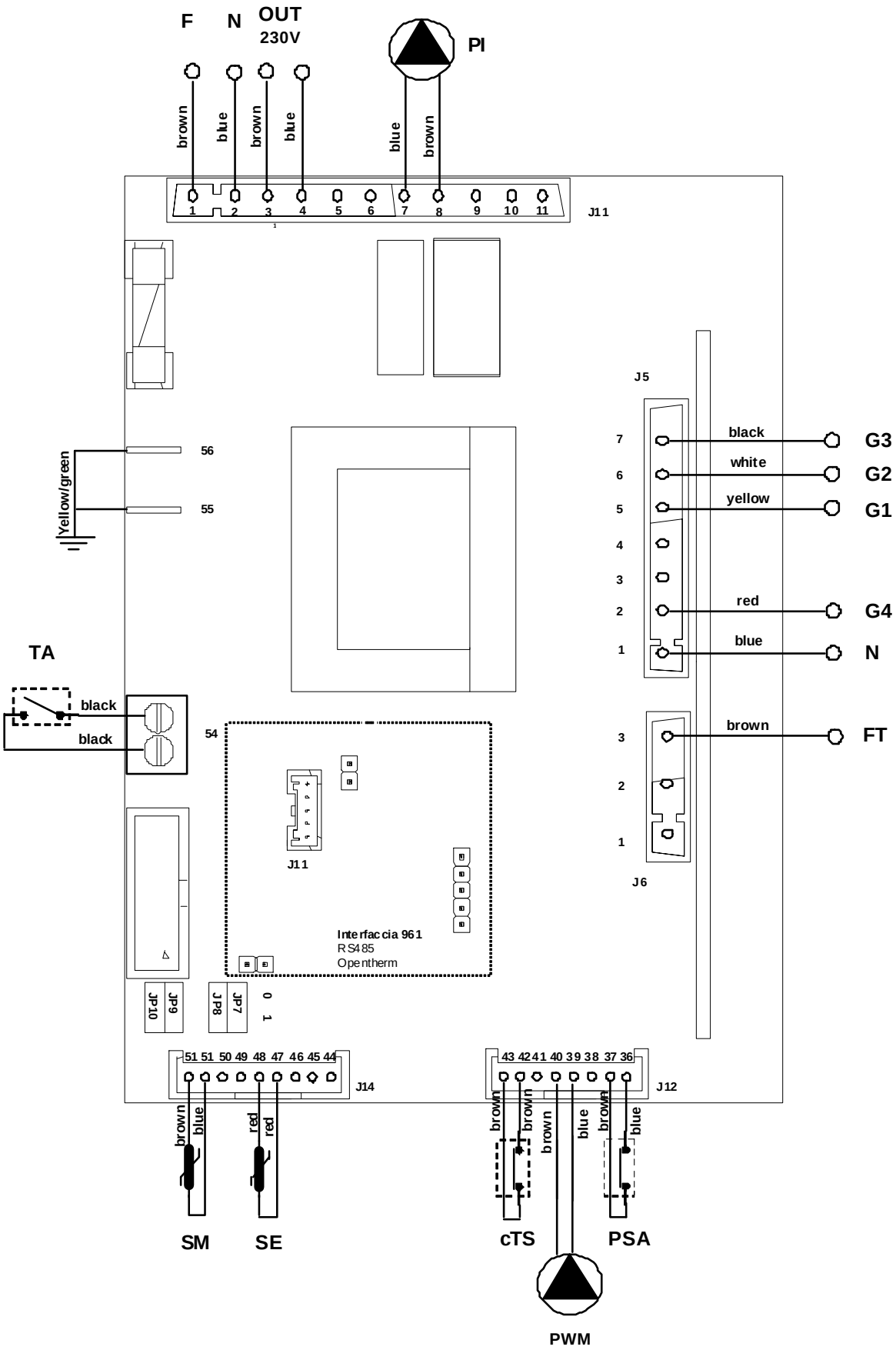


Legend

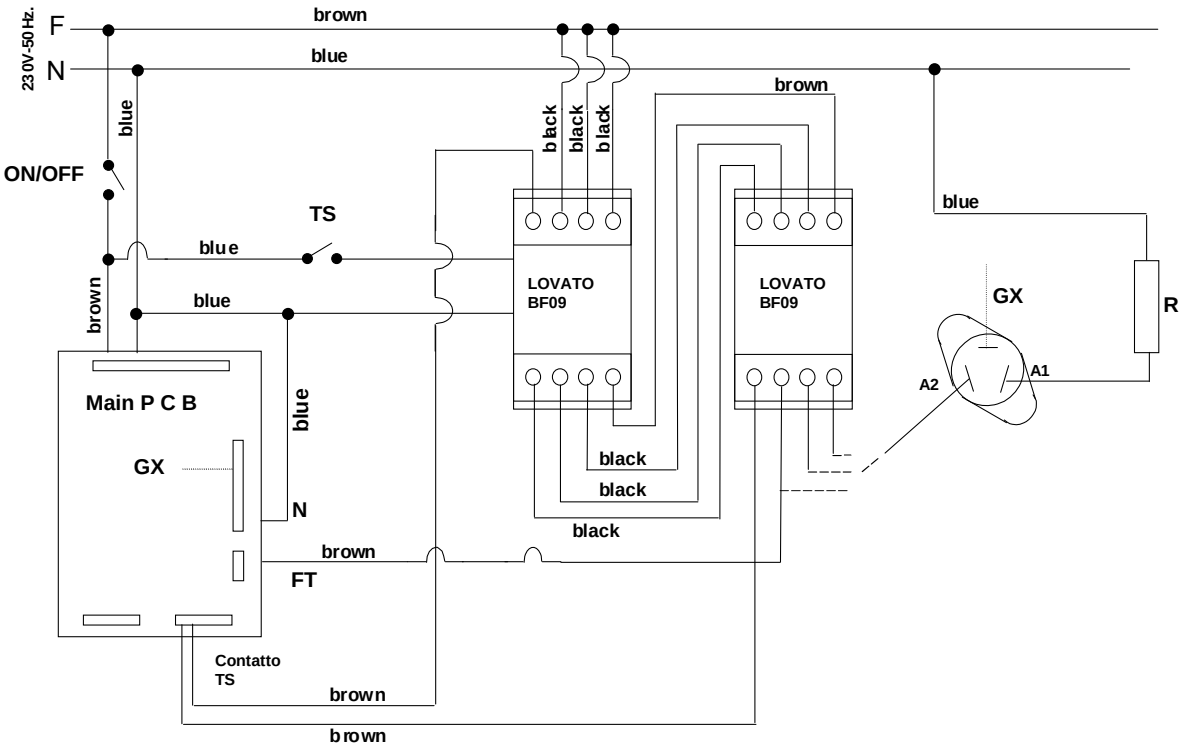
- ***TS*** *Safety thermostat.*
- ***PA*** *Water pressure switch.*
- ***S*** *Thermowell for immersion sensor.*
- ***R*** *Hydraulic connection in-let heating circuit.*
- ***M*** *Hydraulic connection out-let heating circuit.*
- ***VSR*** *Safety valve heating circuit 1/2”x3 bar*
- ***rc*** *Drain valve.*
- ***CC*** *Boiler body.*
- ***rsc*** *Drain valve of boiler body.*
- ***RC*** *Boiler resistance of 6 kW.*
- ***VE*** *Expansion vessel heating circuit.*
- ***rs*** *Filling tap*

For the other models, the only changes refer to the number of electric resistances; the 6 kW version has only one 6 kW resistance (detail RC), the 18 kW version has three 6 kW resistances, and the 24 kW version has four 6 kW resistances.

CONNECTING SCHEME



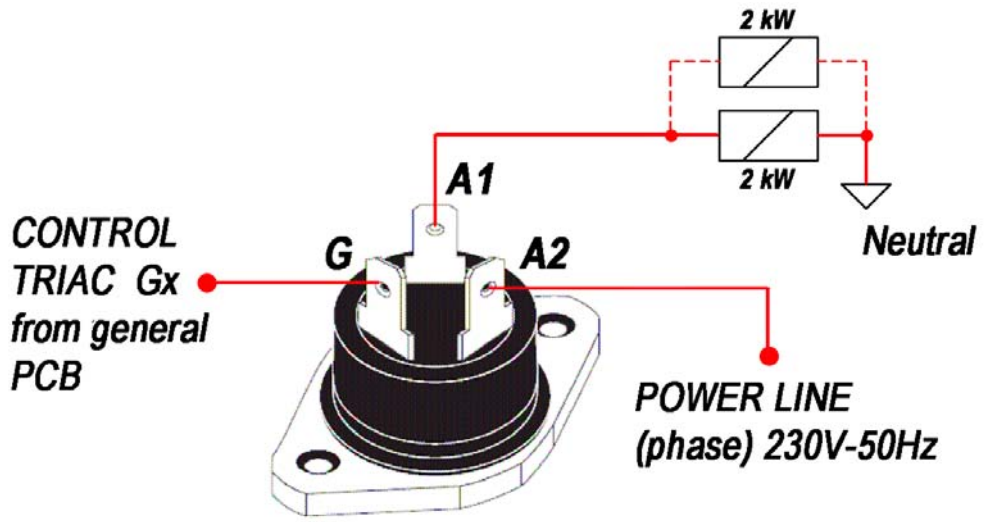
MAIN ELECTRIC SCHEME

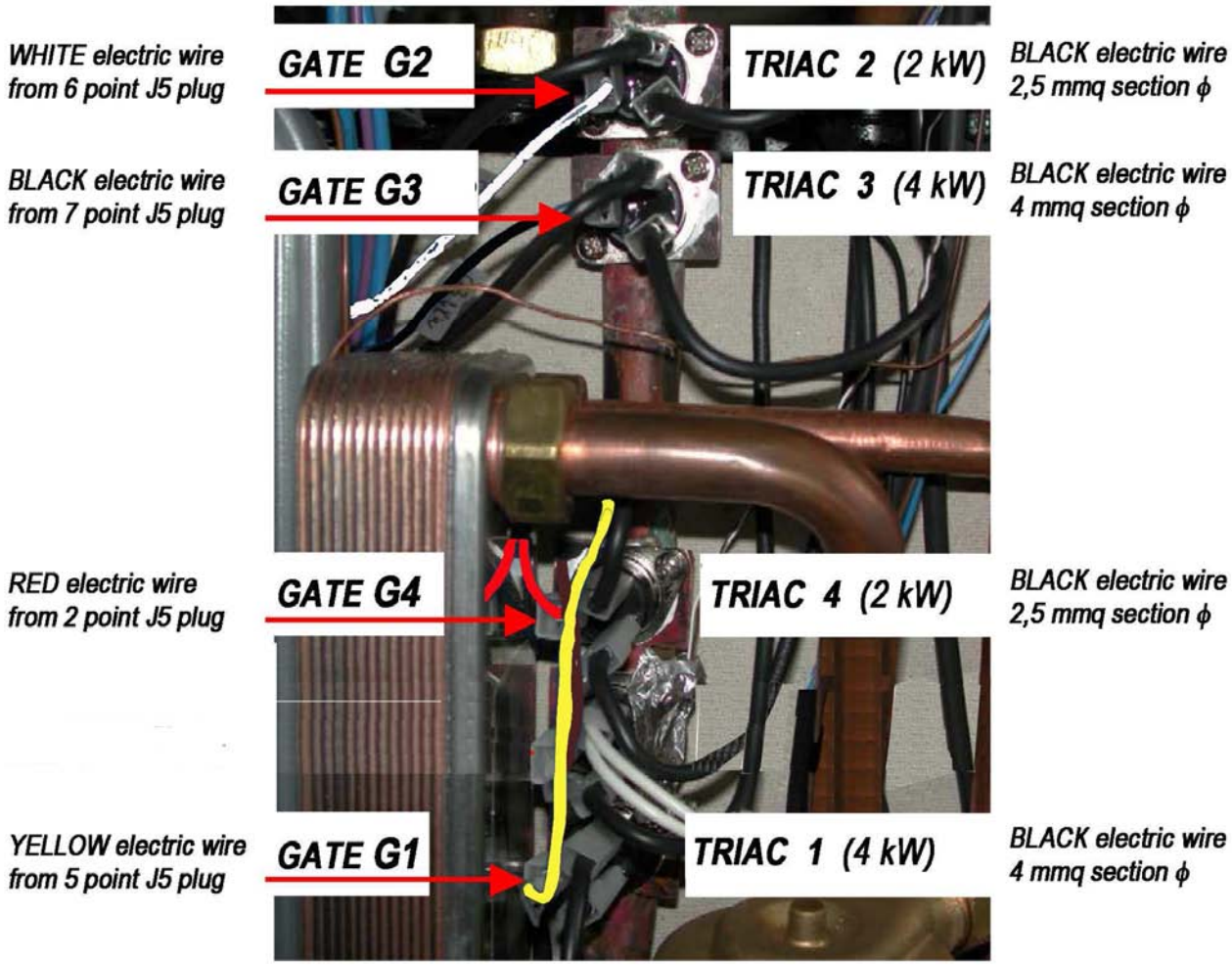


Legend electric scheme

Single phase	***F***
Neutral	***N***
Selected Phase from Contactor	***FT***
Electronic Pump	***PI***
Control of contact TS on Contactor of power (C-NO)	***cTS***
Control gate triac n°1 (4KW power)	***G1***
Control gate triac n°2 (2KW power)	***G2***
Control gate triac n°3 (4KW power)	***G3***
Control gate triac n°4 (2KW power)	***G4***
Delivery heating probe (ntc sensor)	***SM***
External probe (sensor)	***SE***
Water pressure switch	***PSA***
Safety thermostat	***TS***
Room thermostat (terminal provided)	***TA***
General switch	***ON/OFF***

TRIAC – Connection scheme





MANUFACTURE CONSTANTS

FUNCTION	***Value***
MAX TEMPERATURE PRIMARY	*80°C*
TIME OF PUMP FUNCTIONING IN ANTI-LOCK	*10 sec*
INTERVENTION TIME ANTI-LOCK PUMP	*24H*
TEMPERATURE ANTIFREEZE ON (only circulator)	*7°C*
TEMPERATURE ANTIFREEZE ON (heat exchanger ignition)	*4°C*
TEMPERATURE ANTIFREEZE OFF	*20°C*

SETPOINT AND PARAMETERS

FUNCTION	***Default***	***RANGE***
HEATING SETPOINT	***60°C***	*30 – 75 °C*
FLOOR HEATING SETPOINT	***30°C***	*10 – 40 °C*
ROOM SETPOINT (with external probe present)	***20°C***	*10 – 30 °C*

PARAMETERS

FUNCTION	***N°***	***Default***	***RANGE***
EXTERNAL PROBE START UP	*1*	***0***	***0 – 1***
BUILDING COEFFICIENT OF DISPERSION	*2*	***35***	***5 – 35 °C***
HEATING POST CIRCULATION	*4*	***30***	***1 – 180 sec***
HEATING EXCHANGER CIRCULATION STARTING	*5*	***0***	***0 – 240 sec***
MIN. IGNITION TEMPERATURE CIRCULATOR	*6*	***30***	***0 – 50 °C***
SPEED PUMP PWM OPERATION	*10*	***4***	*1=400 l/h - 2=800 l/h - 3=1000 l/h - 4=1200 l/h*

TEMPERATURES

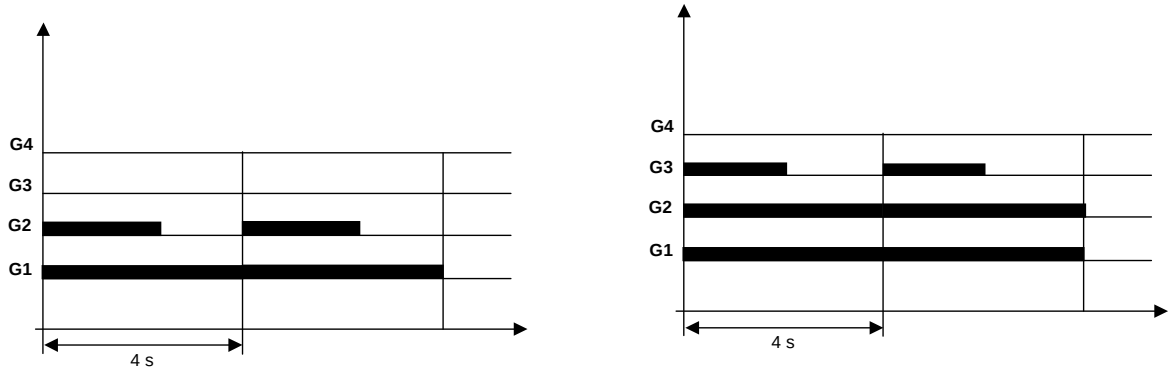
FUNCTION	***N°***
DELIVERY TEMPERATURE	***t: “Ch”***
EXTERNAL TEMPERATURE	***t: “Ep”***
OFFSET SETPOINT OF EXTERNAL PROBE	***t: “Se”***

SELECTION JUMPERS enable

Jumper	***0 / 1***
JP7	*High temperature / Low temperature plant*
JP8	*Combi / Only Heating*

CONTROL OF MAIN HEAT EXCHANGER

According to the required power during the heat request, the controls G1-G4 related to the main exchanger are turned on all or partially.
The actuation of each control is reduced to a lapse of 4 seconds. Higher is the required power, more the control will remain operative in this lapse.
The power in heating or during a sanitary request is calculated by PID algorithm.
Please see in the pictures below two examples related to 40% and 60% of total power.



In case of simultaneous request of heating and tank, the controls G1-G4 related to the main heat exchanger will be directed in the following way:

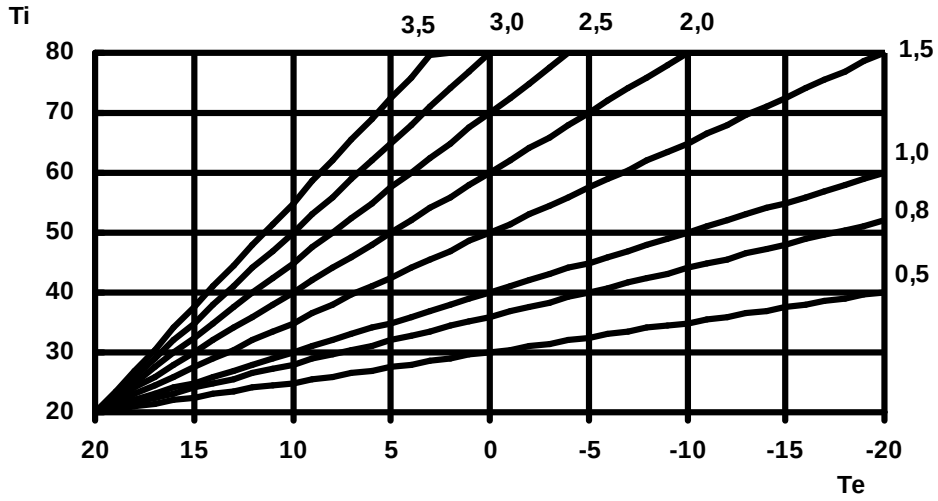
Boiler status	***Primary G1 ÷ G4***
Only heating request	G1 ÷ G4 = modulation

<u>Controls rotation:</u>
Every hour the o*rder of ignition of triac G1÷ G4 controls is rotated in such a way to partition evenly in time the use of all heating elements.*

CONTROL OF EXERNAL PROBE
Installation and functioning at sliding temperature

For the connection of the external probe, it shall be used the Original Kit FIAMMA code F.532 provided in the accessories of the electric boilers Elektra.
The electrical connection shall be done in the external terminal at the general electric panel already prearranged in the standard cabling of the boiler. The connection must be carried out with junction cables and wires having a minimum section of 1,5 mm and, if possible, avoiding the insertion along with electric lines, digital lines of inverter or other not compatible.
After the connection the external probe must be enabled by means of the introduction of a variation of ***N°1*** *parameter, changed from 0 to 1.*
Then the setpoint chased by the heating delivery probe will be calculated as follows:

Ti = [(Troom – T e) * K e / 10] + Troom



Example of calculation for several values of Ke

The coefficient ***Ke*** *is the leakage of the building and it can be set by* ***N°2*** *parameter.*

Te*, is the temperature measured by the external probe.*

Troom *is the setpoint related to the desired room temperature*.

ANTIFREEZE FUNCTION

In case the delivery probe measures a temperature lower than 7°C, the circulator is activated.

If the temperature goes down the value of 4°C the m ain heat exchanger is ignited until the delivery temperature has reached 20°C. The antifree ze function is active also with the boiler turned OFF (function in standby mode but with bright switch on).

HEATING REQUEST

As the contact of room thermostat closes, if the mainboard is in winter mode, the system pump is only activated if the temperature of the primary heat exchanger is higher than the temperature set by parameter ***N°6****.*

If the value of temperature measured by the primary heat exchanger probe is lower than the programmed delivery setpoint, the triac are ignited in sequence as per the required power. This occurs only after a settable time by parameter ***N°5****.*

The instant power of the boiler and the related control of triac G1-G4 takes place by means of PID regulator.

At the end of the request the pump remains supplied for a time equal to the value programmed by ***N°4*** *parameter.*

MEANING OF THE KEYS OF TEMPERATURE MENU

To log in temperature menu, press simultaneously ***J3 and J5*** *keys. The symbol* ☝ *will appear on the display.*

KEY	***FUNCTION***
J7	*Exit by temperature menu*
J2	*Temperature index increase*
J3	*Temperature index decrease*

MEANING OF KEYS OF PARAMETERS MENU

To log in parameters menu, press simultaneously the keys ***J2 and J6*** *for* ***4*** *seconds.*
The symbol ☝ *will appear on the display.*

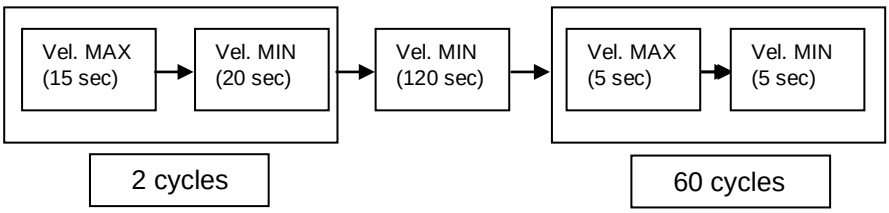
KEY	***FUNCTION***
J5	*Parameter value decrease*
J6	*Parameter value increase*
J7	*Exit by parameters menu*
J2	*Parameter index increase*
J3	*Parameter index decrease*

DEGASSING FUNCTION

*The degassing function is activated by simultaneously pressing the keys **J4** and **J7**.*

During this function are altered states of operation to maximum and minimum speed of the circulating pump PWM in order to facilitate the escape of air bubbles from the hydraulic circuit.

The sequence is illustrated below.

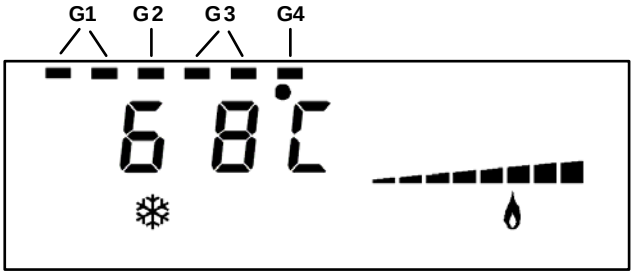


When this function is on the display shows a timer indicating the time at the end of the function.

INSTRUCTION GRUNDFOS PUMP

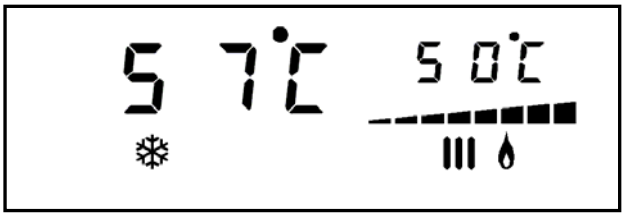
"Heating elements status"

The dashes located in the upper part indicate the heating elements status. Each dash corresponds to a 2 kW element. The first 6 dashes refer to heating modules of primary heat exchanger.



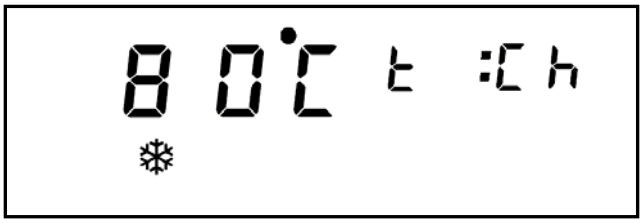
"Heating request"

When an heating request occurs, the temperature measured by the delivery probe is displayed and the symbol ||| *starts to flash. On the small digit is displayed the tank temperature. The instantaneous power of the boiler is indicated by the level of modulation. In any moment it is possible to observe which triac are turned on.*



"Temperature display"

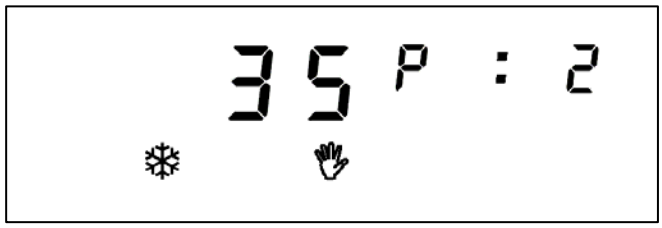
On the small digit will appear the writing ***t :*** *followed by the description of the selected temperature, while the big digit will show the temperature value.*



FUNCTION	***N°***
DELIVERY TEMPERATURE	***t: "Ch"***
EXTERNAL TEMPERATURE	***t: "Ep"***
EXTERNAL PROBE OFFSET SETPOINT	***t: "Se"***

"Parameters display"

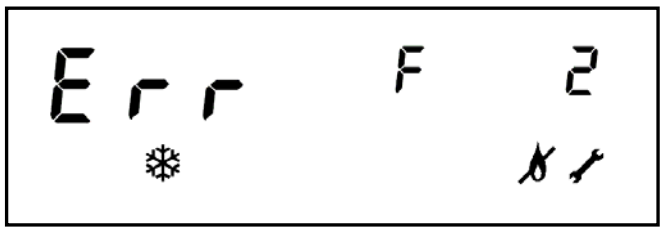
On the small digit will appear the writing ***P :*** *followed by the index of the selected parameter, while the big digit will show the parameter value.*



MALFUNCTIONING CODE

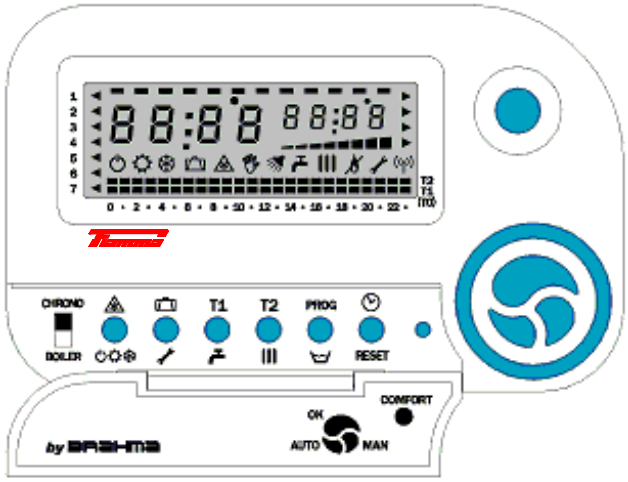
When a malfunction occurs, the writing "Err F X" appears, where X indicates the related error code

CODE "Err"	***MEANING***
9	*Hardware eeprom failure*
1	*Insufficient system water pressure*
3	*Err boiler delivery probe*
8	*Safety thermostat block*



FUNCTIONING WITH REMOTE CONTROL ENCRONO OT1, OT2 or KRONOS OT11

LOOK OF THE REMOTE CONTROL ENCRONO OT1, OT2 and KRONOS OT11



Elektra … N, *can be connected by means of its card and an additional module to install on a prearranged part, to a compatible remote control device Opentherm®, like Encrono OT1, OT2 or OT11.*
This can be obtained by means of the interface card (additional module).
When the card finds the connection with the remote control, on the LCD display appears the symbol .
The compatible remote control OpenTherm becomes the master of the entire system, therefore almost all the functionalities, as the setting of heating and hot sanitary water setpoint or the control of system status, are directly executable by it, in relation with the kind of application on which the card is used.
By means of the remote control it is possible to restore the system from the non-volatile lock status.
The communication between the remote control and the electronic card fitted with D.E.S. system can be interrupted in the following ways:

- Interruption of the connection between remote control and card:
In this case, after 1 minute, the card starts to work in local mode.

- Noise on communication cable between remote control and card:
In this case it is possible that remote control and card do not manage to communicate (wrong data interpretation), therefore, after a certain lapse appears the related error signal. If the noise on the communication cable ends, the dialog between remote control and the card is automatically restored and the malfunction disappears.

TRANSPARENT PARAMETERS

This function is available only with the use of remote control OT2 or OT11. The digital electronic PCB is equipped with 5 parameters adjustable by the installer, in order to set the functioning of the system in conformity to the final application. The parameters have the same meaning of the ones described in the table “parameters”.

Parameters Table

FUNCTION	***N°***	***def.***	***RANGE***
EXTERNAL PROBE ENABLING	*1*	***0***	***0 – 1***
BUILDING LEAKAGE COEFFICIENT	*2*	***35***	***5 – 35 °C***
HEATING POST CIRCULATION	*4*	***30***	***1 – 180 sec***
HEATING EXCHANGER CIRCULATION STARTING	*5*	***0***	***0 – 240 sec***
MIN. IGNITION TEMPER. CIRCULATOR	*6*	***30***	***0 – 50 °C***

RANGE OF SETPOINT ADJUSTABLE BY MEANS OF REMOTE CONTROL

Interval of temperature setting with high temperature system (JP7 = 0)	*30 °C ÷ 75 °C - step 1°C* *Pre-set value: 60 °C*
Interval of temperature setting with low temperature system (JP7 = 1)	*15 °C ÷ 40 °C - step 1°C* *Pre-set value: 30 °C*

FUNCTIONING OF BOILER ELEKTRA WITH REMOTE CONTROL

The actuation of heating mode takes place after an heating request from remote control (value of heating setpoint calculated by remote control higher than heating setpoint set by the user on remote control divided by two) and in the winter mode status.
It also enabled the relay which controls the valve opening area managed by Enchrono/Kronos.

CONTROL PANEL IN USER MODE

The pressure of one key/two keys activates the backlighting of LCD display.

KEY	***FUNCTION***
J5	*Disabled in Opentherm mode*
J6	*Disabled in Opentherm mode*
J7	*Unlock error of safety thermostat*
J4	*Disabled in Opentherm mode*
J2	*Disabled in Opentherm mode*
J3	*Disabled in Opentherm mode*

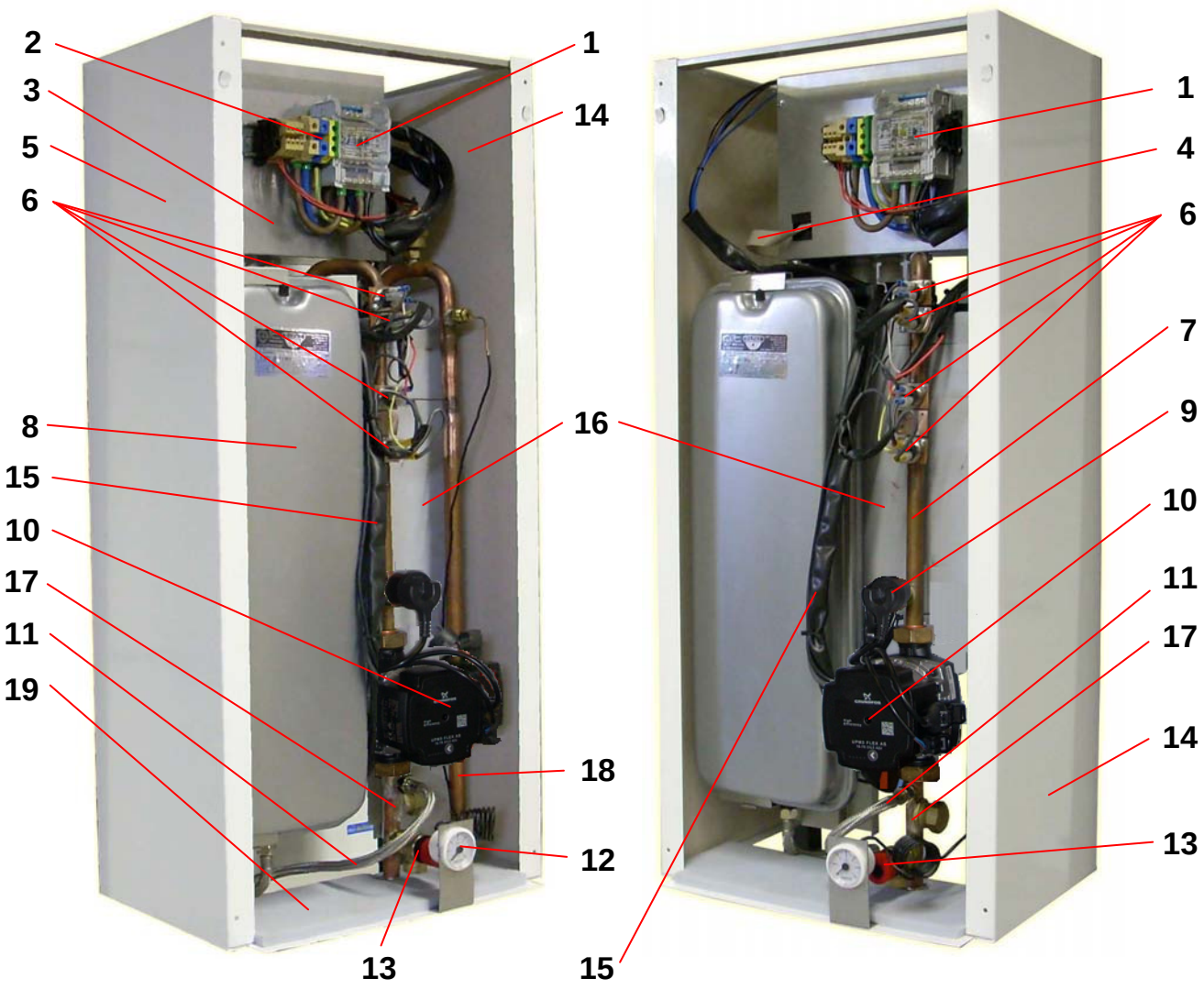
CONTROL PANEL IN INSTALLER MODE

The keys have the same functioning described on par. “Control panel in user mode”.

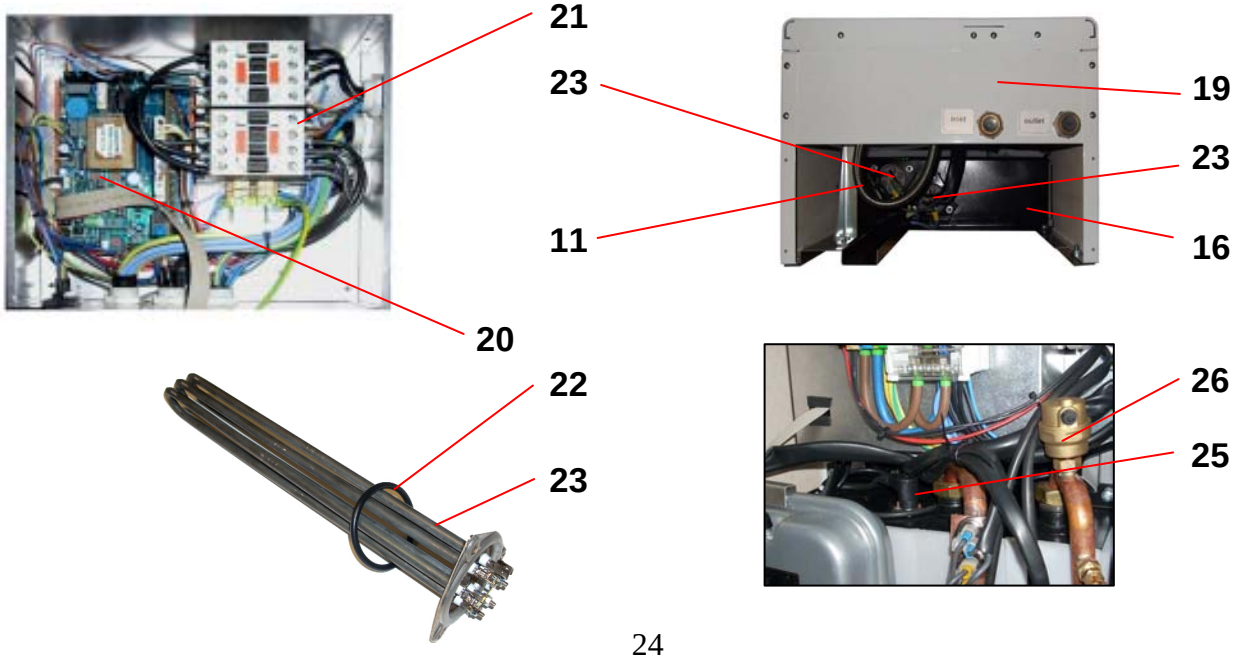
DISPLAY OF MALFUNCTIONS

CODE "Err"	***MEANING***
F 009	*Hardware eeprom fault*
F 001	*Insufficient water pressure in the system*
F 003	*Boiler delivery probe error*
F 008	*Safety thermostat lock*

For further details related to remote controls series OT1 / OT2 / OT11, please see the related technical specifications.



3 *Particular - Upper particular / resistance / Boiler body / resistances*



Front unit

Spare parts – Legend

1	*Tetrapolar Terminal block for Elektra 6/12/18 … .*	*Cod.P.2054*
	Tetrapolar Terminal block for Elektra 24 … .	
2	*Terminal of the electric supply line 230V (Ph).*	*Cod.P.2073*
	Terminal of the electric supply line 230V (blue - N).	*Cod.P.2072*
	Terminal line of electrical ground (green/yellow)…	*Cod.P.2074*
3	*General electric box (panel circuit board / contactor).*	
4	*Flat cable connection LCD display.*	*Cod.P.2095*
5	*Left side panel of casing.*	*Cod.P.2030*
6	*Triac of electric power (40A-600V).*	*Cod.P.2293*
7	*Return tube pump-boiler body.*	*Cod.P.2037*
8	*Expansion vessel 8 lt. N 6 kW version.*	*Cod.P.289*
	Expansion vessel 10 lt. N 12/18/24 kW version.	*Cod.P.1846*
9	*Water pressure switch (minimum pressure).*	*Cod.P.1082*
10	*Circulator at variable prevalence (electric pump).*	*Cod.P.7326*
11	*Flexible tube for expansion vessel.*	*Cod.P.1531*
12	*Hydrometer.*	*Cod.P.141*

13	*Heating Safety valve - 3 bar.. ……*	*Cod.P.158*
14	*Right side panel of casing. ……*	*Cod.P.2029*
15	*Elektra .. N. electrical wiring. ……*	*Cod.P.7500*
16	*Body boiler Elektra 6 N/C/B/BP-L. ……*	*Cod.F.1953*
	Body boiler Elektra 12 N/C/B/BP-L. ……	*Cod.F.1955*
	Body boiler Elektra 18 N/C/B/BP-L. ……	*Cod.F.1956*
	Body boiler Elektra 24 N/C/B/BP-L. ……	*Cod.F.1957*
17	*Return tube (heating plant-dima). ……*	*Cod.P.2042*
18	*Outlet tube hot water heating plant-boiler body). ……*	*Cod.P.2079*
19	*Lower panel (lower grid). ……*	*Cod.P.2139*
20	*PCB of operating (Elektra N/C/B/BP..). ……*	*Cod.P.2057*
21	*Contactor of power for Elektra 6 .. . ……*	*Cod.P.2103*
	Contactor of power for Elektra 12 .. . ……	*Cod.P.2067*
	Contactor of power for Elektra 18 .. ……	*Cod.P.2104*
	Contactor of power for Elektra Elektra 24 .. . ……	*Cod.P.2101*
22	*O-Ring gasket for 3x2 kW electrical resistance for Elektra 6÷24. …..*	*Cod.P.2078*
23	*Electrical resistance. 3x2 kW for Elektra 6÷24 .. . ……*	*Cod.P.2710*
24	*Drain tap ¼" for Elektra .. .……*	*Cod.P.2190*
25	*Contact safety thermostat 100℃. Elektra .. . ……*	*Cod.P.1195*
26	*Automatic bleed valve (Jolly). ……*	*Cod.P.174*
27	*Front panel Elektra .. N-C . ……*	*Cod.P.2126*
28	*Display Lcd (Lcd pcb). ……*	*Cod.P.1763*
29	*Instrument panel of Elektra (profil+lexan keyboard P.2099). ……*	*Cod.P.2164*
30	*Lighting general switch (On-Off switch). ……*	*Cod.P.1099*

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