KOSPEL

ELECTRIC CENTRAL HEATING FLOW BOILER

Operating and installation instruction

EKCO.MSF - 4 ☐
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Control panel programming

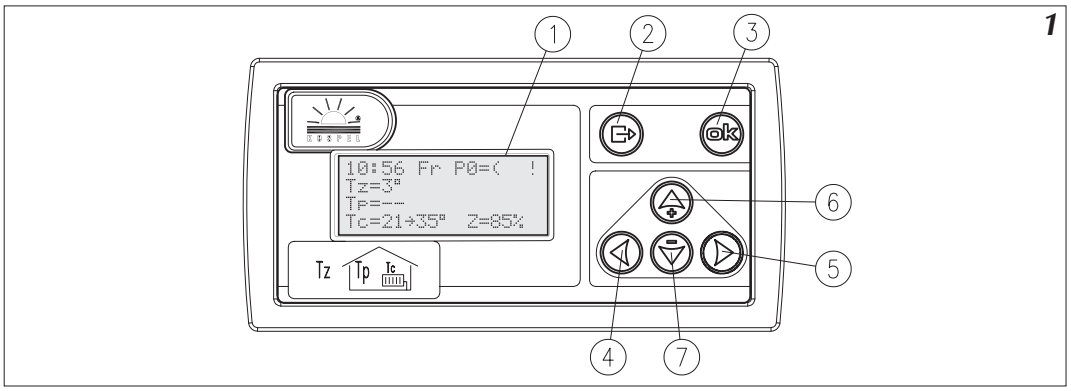
Microprocessor control panel is an element, which controls boiler functioning. It selects optimum working parameters on the basis of heating characteristics, outdoor temperature and information gathered from the heating system. The control panel has been pre-programmed, thanks to which the boiler is ready to work in a central heating system.

After boiler installation and the start-up you should perform the following:

1. In order to switch the boiler into working configuration (System on - shown on the display), press (⊡) and hold until you hear the sound.
2. Check and possibly correct time setting according to "Current time setting" (page 5). Current time stays the same even if there is lack of power supply (thanks to batteries applied).
3. Set appropriate 24-hour programmes for an each day of the week, according to "Weekly time setting" (page 7). If necessary, you should modify 24-hour programmes rightly to your own needs, according to "24-hour programmes setting" (page 7).
4. Set maximum room temperature, according to "Maximum room temperature setting" (page 8) (on condition that there is a room temperature sensor installed).
5. In case there is too cold or too hot in a room, you should correct (adjust) heating parameters according to "Heating parameters setting" (page 6).

In the further sub-sections of this chapter you will find a description of all possible functions as for the panel operating.

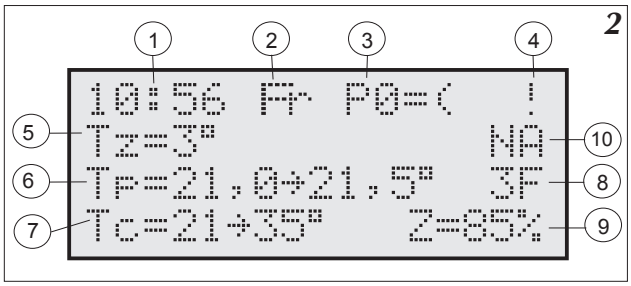
Fig.1 Operating panel
[1] - LCD alphanumeric display
[2] - escape key
[3] - enter key
[4] - left key
[5] - right key
[6] - plus (+) key (up)
[7] - minus (-) key (down)



General view

When the appliance is connected to power supply, the control panel (PSK.M2) starts its work by showing current time and a day of the week. To switch on the boiler and go to "General view" mode, you should press (⊡) and hold for some time.

Fig.2 General view



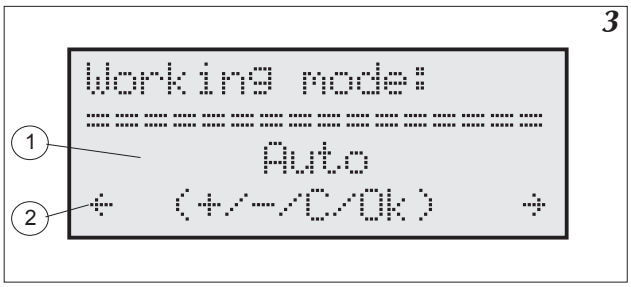
Description of details displayed on the screen:

1. Current time (hours:minutes).
2. Current day of the week (**Mo** – Monday, **Tu** – Tuesday etc.).
3. Number of programme currently implemented (e.g. P3 – programme no.3); after an equality sign (**=**) there is a symbol of temperature currently kept in a heated room: ***** - comfortable, **+** - comfortable raised, **-** - comfortable reduced, **(** - economical. See Table 1 (page 5).
4. Exclamation mark (!) signals that the flow is too low (the pump is working although there is lack of sufficient water flow in the installation).
5. **Tz** stands for 'outdoor temperature'; if two exclamation marks (**!!**) appear instead of temperature, it means that there is a failure of an outdoor temperature sensor; in case of two question marks (**??**) – it means that there is a data transmission error or reading of extremely low or extremely high temperatures. If an outdoor temperature sensor is broken, the control panel will keep an average temperature in a central heating installation (initial temp. equals 40°C and may be changed by an authorised service).
6. **Tp** stands for current temperature in a room; after an arrow you can see a room temperature set by a user (see "Maximum room temperature setting"). A room temperature sensor is optional. If it is not connected to the system, there are two minuses (**--**) displayed.
7. **Tc** informs about temperature of a central heating installation. The first value shows current temperature, the second one, just after an arrow, indicates the temperature, which the boiler has to achieve and keep in the installation.
8. **3F** symbol appears when there is lack of power supply symmetry; which means that in case of 3-phase installation one or two phases disappear (it applies only to 3-phase boilers).
9. Mixing valve open access given in percentage.
10. **NA** symbol appears, when there is a master appliance turned on (fig.17).

Working mode

Working mode" enables you to set an appropriate working mode of the boiler.

Fig.3 Working mode
[1] - current working mode
[2] - line presenting keys (push buttons) available (active) in this particular mode; C – stands for 'cancel key'



1. In order to select "Working mode" you should press ◁ or ▷ several times going through different sides of the display.
2. Pressing △ and ▽ keys you can select an appropriate working mode of the boiler (see Table 1. "Working mode").
3. The selected programme you should accept by pressing ok key.
4. After 30 seconds (or after pressing ⊏▷ key) the display goes back to "General view".

Table 1. Boiler working modes

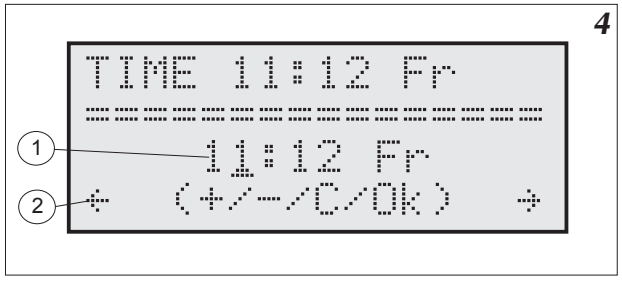
Mode	Function	Way of display in general view
Automatic	Boiler works according to a weekly time programme (see "Weekly time setting")	Currently set 24-hour programme with temp., e.g. P1=+
Always P5	Permanent setting (7 days a week) of P5 programme – programme which keeps required water temperature in the central heating installation (see "24-hour programmes setting")	manP5
a.fre.	Permanent setting of temperature of a heat-carrying agent (e.g. water) at 25˚C – it is anti freeze temperature (boiler will keep the heat-carrying agent temperature in the installation at a level of Tc=25˚C on condition that outdoor temperature drops below +2˚C; if outdoor temperature is higher than +2˚C, heating process in the system will be switched off)	a.fre.
Always -	comfortable-reduced temperature	man-
Always +	comfortable-raised temperature	man+
Always *	comfortable temperature	man*
Always (	economical temperature	man(

a.fre. – anti freeze

man - manual

Current time setting

Fig.4 Time
[1] - line showing the time
[2] - line presenting keys (push buttons) available (active) in this particular mode

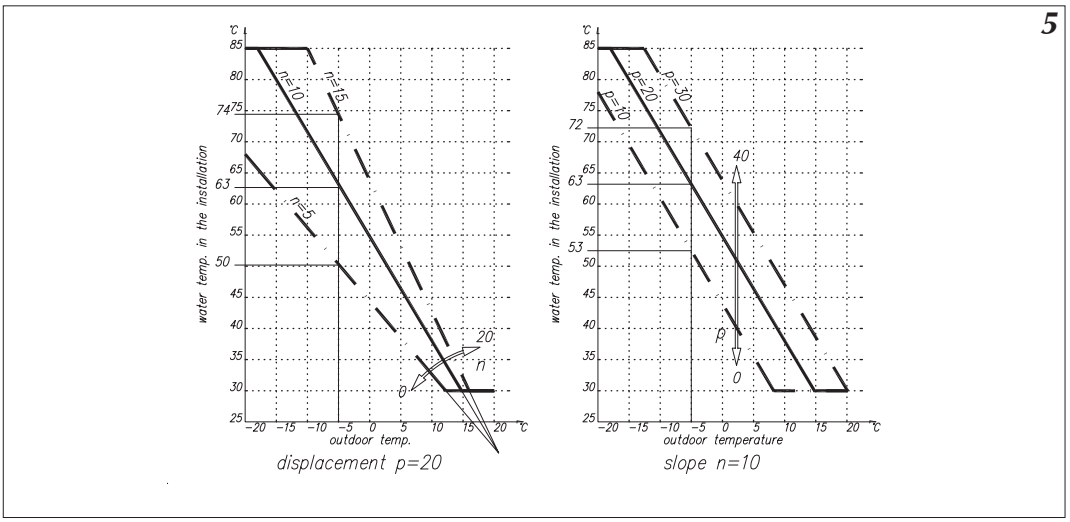


1. In order to select "Time" press ◁ or ▷ key several times going through different sides of the display.
2. To set an appropriate current time, you should press △ and ▽ keys. These push-buttons change currently underlined element.
3. After setting an appropriate value, you should accept it by pressing ok key. Then it will automatically go to editing next value.
4. After 30 seconds (or after pressing ⊏▷ key) the display goes back to "General view".

Heating parameters setting

The main task of PSK.M2 control panel is to ensure ideal thermal comfort in heated rooms, as well as, to minimise working costs. PSK.M2 maintains certain temperature in the central heating system depending on outdoor temperature. When the outdoor temperature is low, there is a greater demand for heat (higher temperature in a central heating installation) and vice versa, when outdoor temperature is higher, water temperature in the installation may be lower.

Fig.5 Sample heating curves



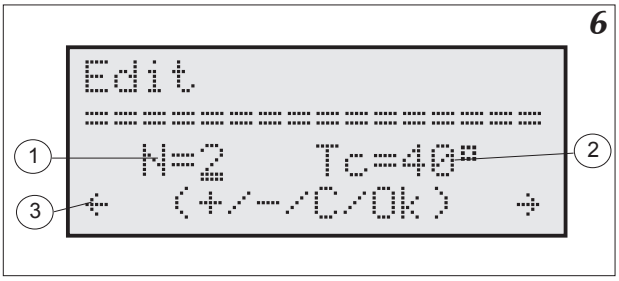
The relationship between outdoor temperature and temperature inside the central heating system is called a heating curve – characterised by two parameters: P – displacement and N – slope. Those parameters depend on individual features of a heated room and initially are set at the following values: P=20, N=10 (they are sufficient to ensure an appropriate thermal comfort in the majority of heated rooms). However, if the panel does not provide thermal comfort (too hot or too warm in a room), there is a need to alter and adjust heating curves.

Fig.6 Parameter N / parameter P – edition

[1] - current value of parameter N ("Edit N" mode) / current value of parameter P ("Edit P" mode)

[2] - water temperature in a central heating installation calculated on the basis of a heating curve and current outdoor temperature

[3] - line presenting keys (push buttons) available (active) in this particular mode



1. In order to alter heating curves you should go from "General view" to "Edit N" (press ▷ ; if you press the same key one more time, you will enter "Edit P" mode).
2. In order to improve thermal comfort of heated rooms, you should press △ and ▽ keys to alter the value of parameter N / parameter P. Parameter N may be modified between 0 – 20 and parameter P – between 0 – 40.
3. If temperature in heated rooms is not sufficient, you should slightly change the value of parameters (gradually!) – please, follow instructions given in Table 2.
4. After setting an appropriate value of parameters, you should accept it by pressing ok key.
5. After 30 seconds (or after pressing ⊏▷ key) the display goes back to "General view".

Table 2 Heating curve changes

Way of coping with lack of thermal comfort dependent on outdoor temperature	Parameter N	Parameter P
temp. conditions: - close to 0°C - insufficient warm-up - heavy frost - insufficient warm-up	no changes	set next higher value
temp. conditions: - close to 0°C - overheat - heavy frost - overheat	no changes	set next lower value
temp. conditions: - close to 0°C – sufficient temperature - heavy frost - insufficient warm-up	set next higher value	no changes
temp. conditions: - close to 0°C – sufficient temperature - heavy frost - overheat	set next lower value	no changes
temp. conditions: - close to 0°C – insufficient warm-up - heavy frost - sufficient temperature	set next lower value	set next higher value
temp. conditions: - close to 0°C – overheat - heavy frost - sufficient temperature	set next higher value	set next lower value

24-hour programmes setting

To ensure an ideal thermal comfort you should adjust an appropriate 24-hour programme to your individual needs by selecting the most appropriate temperature at certain time of the day. PSK.M2 panel offers 8 different programmes.

	Comfortable temp. *	Comfortable-raised temp. +	Comfortable-reduced temp. -	Economical temp. (
Programme 0	5.00 - 8.00 15.00 - 23.00	-	-	8.00 - 15.00 23.00 - 5.00
Programme 1	7.00 - 24.00	-	-	0.00 - 7.00
Programme 2	5.00 - 11.00 13.00 - 23.00	-	-	11.00 - 13.00 23.00 - 5.00
Programme 3	0.00- 24.00	-	-	-
Programme 4	-	-	-	0.00 - 24.00
Programme 5	Water temp. in the installation between 10°C - 60°C (set by the user)			
Programme 6	This programme is individually set by the user – there is a possibility to set an appropriate temp. for your own needs (every 30 minutes)			
Programme 7	This programme is individually set by the user - there is a possibility to set an appropriate temp. for your own needs (every 30 minutes)			

Fig.7, 8 24-hour programmes
[1] - programme number
[2] - currently editing time digits indicated by cursor
[3] - lines presenting type of temperature selected for a certain time during the day

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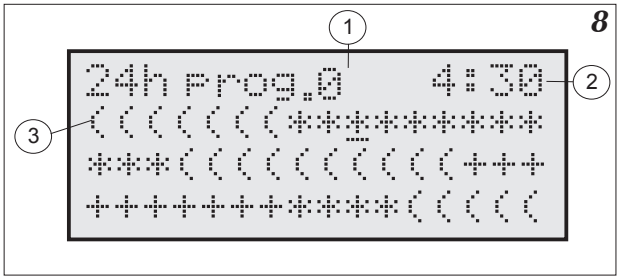

Temperature types:
* Comfortable temp.
\+ Comfortable-raised temp.
\- Comfortable-reduced temp.
(Economical temp.

1. In order to go from "General view" to "24-hour programmes", press (△) You find a currently working programme on a display.
2. Pressing (△) and (▽) keys you switch to next programmes (cursor under programme number)
3. Programmes from 0 – 4 can not be altered in any way – they are set by the factory.
4. Programme 5 – you can alter temperature in the installation (Tc) - between 10°C - 60°C. In order to do that, enter Programme 5 and with the use of (◁) or (▷) key enter edition of temperature (cursor under temperature value). To set temperature, use (△) or (▽) key. Do not forget to press (ok) key to accept the changes.
5. Programmes 6 and 7 – enter programme 6 or 7; cursor shows time (certain hour) to which you can attribute a certain type of temp. - use of (◁) or (▷) key to change the time. The underline hour is shown one a display. To change temperature, press (△) or (▽) key. Do not forget to press (ok) key to accept the changes.
6. After 30 seconds (or after pressing (⊡) key) the display goes back to "General view".

Weekly time setting

Fig.9 Week programme
[1] - line presenting days of the week (1 – Monday, 2 – Tuesday etc.)
[2] - line for attributing a certain programme to a certain day of the week
[3] - line presenting keys (push buttons) available (active) in this particular mode

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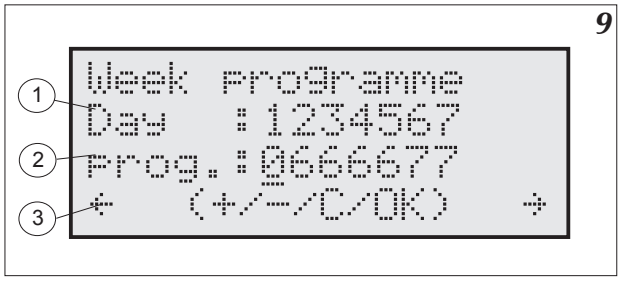


1. To enter "Week" mode from "General view" mode, press (◁) key.
2. You can choose a certain type of 24-hour programme (from 0 to 7; see above) for an each day. To choose a 24-hour programme, press (△) or (▽) key. After this, press (ok) key to accept it and to go automatically to next day of the week.
3. After 30 seconds (or after pressing (⊡) key) the display goes back to "General view".

Maximum room temperature setting

If you want to set maximum room temp., enter "Room thermostat" mode. The temperature should be set at about 0,5˚C - 1˚C higher than the expected comfortable temp. When the maximum temp. is reached, heating process stops (room is not over-heated). Such a situation may happen e.g., during sunny days.

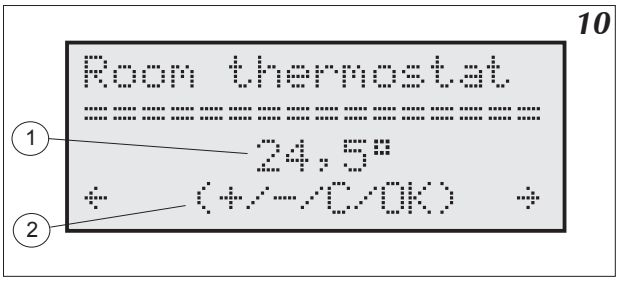


Fig.10 Room thermostat
[1] - value of room temp. set
[2] - line presenting keys (push buttons) available (active) in this particular mode

1. In order to select "Room thermostat" press ◁ or ▷ key several times going through different sides of the display.
2. To set room temp. use △ or ▽ key.
3. Do not forget to press ok key to accept the changes.
4. After 30 seconds (or after pressing ⇨ key) the display goes back to "General view".

Outdoor temperature setting

This mode enables the user to set maximum outdoor temp. at which the panel will turns off the heating process in the central heating system.

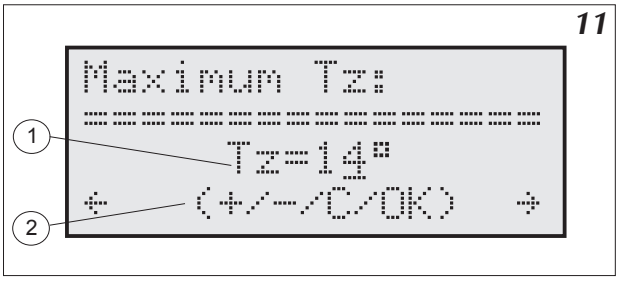


Fig.11 Maximum Tz
[1] - value of outdoor temp. set
[2] - line presenting keys (push buttons) available (active) in this particular mode

1. In order to select "Maximum Tz" press ◁ or ▷ key several times going through different sides of the display.
2. To set outdoor temp. use △ or ▽ key.
3. Do not forget to press ok key to accept the changes.
4. After 30 seconds (or after pressing ⇨ key) the display goes back to "General view".

Pump working mode

This mode enables the user to select from 2 options: "Auto mode" (automatic) and "Always run" (this mode will change into "Auto mode" every time you switch the boiler off and on again).

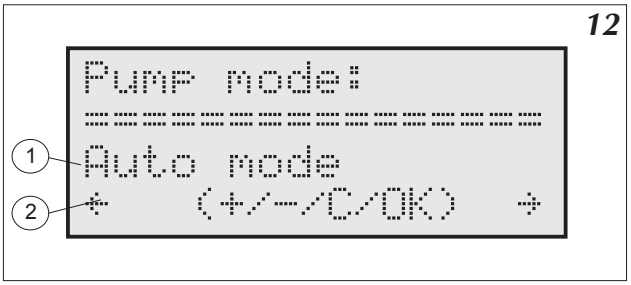


Fig.12 Pump mode
[1] - current working mode
[2] - line presenting keys (push buttons) available (active) in this particular mode

1. In order to select "Pump mode" press ◁ or ▷ key several times going through different sides of the display.
2. To set working mode use △ or ▽ key.
3. Do not forget to press ok key to accept the changes.
4. After 30 seconds (or after pressing ⇨ key) the display goes back to "General view".

Tco set

Constant inlet temperature setting

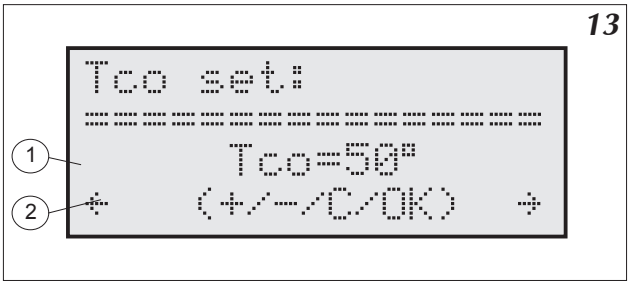


Fig.13 Tco set
[1] - value of inlet temp. set

Errors view

Mode "Errors" – here you can find more precise information about current faults in the system.

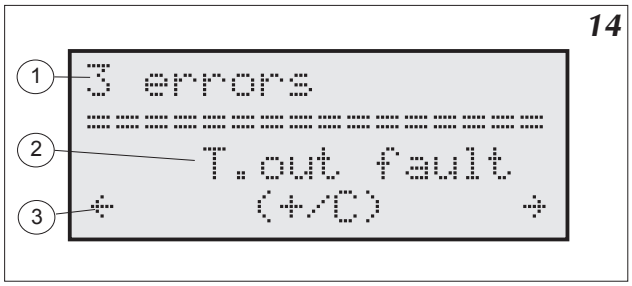


Fig.14 Errors
[1] - number of errors
[2] - error indication
[3] - line presenting keys (push buttons) available (active) in this particular mode

1. In order to select "Errors" press ◁ or ▷ key several times going through different sides of the display.
2. If there is more than one error (which is signalled in the first line), you can view them using △ key.
3. After 30 seconds (or after pressing ⊡ key) the display goes back to "General view".

The control panel recognises the following errors:

Errors indication	Description
Flow 0.0	lack of flow; if the value shown equals 0, it indicates that there is no flow whatsoever and if it is above 0 (l/min) – it means that the flow is too small to switch on the boiler;
Tz fault	outdoor temp.sensor does not answer; line between the sensor and the boiler is unrouted (lack of connection)
Tz short.	short-circuit on the outdoor sensor line
Tz trans.	sensor transmission error (disturbances possible)
Tp fault	lack of room temperature sensor; lack of connection
Tp short.	short-circuit on the room temperature sensor (room thermostat)
Tp trans.	room temp.sensor transmission error
T.ch-in fault	lack of inlet temp. sensor, lack of connection
T.ch-in short.	short-circuit on the inlet temp. line
T.ch-out fault	lack of outlet temp. sensor, lack of connection
T.ch-out short.	short-circuit on the outlet temp. line
Tc fault	lack of mixing valve outlet temp. sensor
Tc short.	short-circuit on the mixing valve outlet temp. sensor
power error	Assymetrical power supplies (refers to three phase boilers only)

To view errors from "General view", you should press ok key.

Service mode

In order to select "Extended menu" press ◁ or ▷ key several times going through different sides of the display.

"Extended menu" is available only to an authorised serviceman (after entering a 3-digit code).

This mode is for altering boiler heating data (parameters) – at a service level.

Heating data view

To view more precise details about current parameters (as for the boiler and installation system), enter "Heasting data" mode.

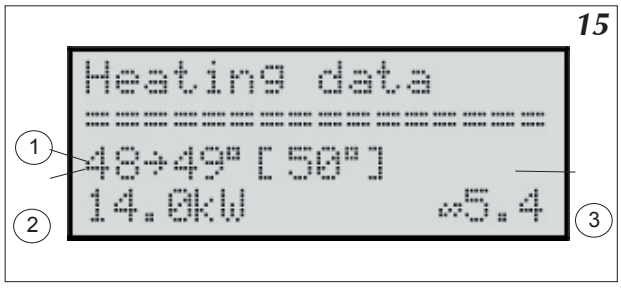


Fig.15 Heating data
[1] - first value - inlet temp. of heat-carrying agent in the boiler; after the arrow – outlet temp. of heat-carrying agent in the boiler; in brackets – temp. the control panel works for
[2] - current power
[3] - flow of water (number of liters per minute)

1. In order to select "Heating data" (from "General view" site), press ▽ key.
2. After 30 seconds (or after pressing ⊡ key) the display goes back to "General view".

Valve delay set:

This mode enables the user to set a delay with which the valve works.

0 – no delay; 10 – the biggest possible delay

Fig.16 Valve delay set

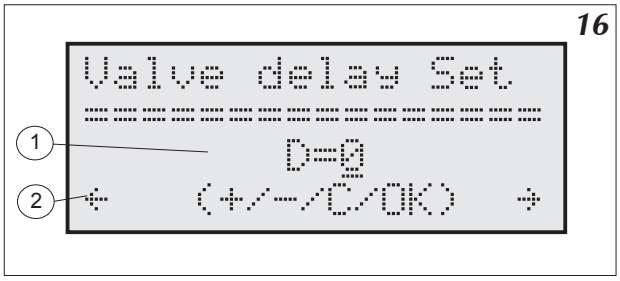
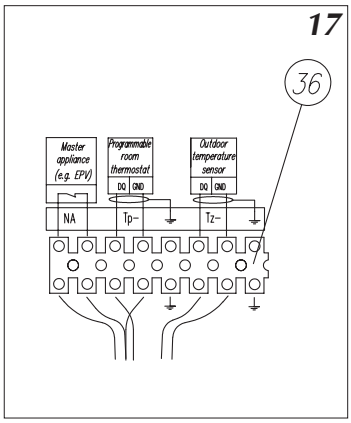


Fig.17 Diagram. Connection - temperature sensors and a master appliance



In order to avoid peak powe absorption, the boiler can be subordinated to other high power appliances (e.g. electric instantaneous water heaters) without any loss in comfort of its usage. A master appliance should be connected to NA contacts (see fig.18) according to its instruction manual. When NA opens, the boiler stops heating. Once the master appliance is off, the boiler starts working again.

If there is not any master appliance, the user should close NA permanently to ensure faultless boiler working.