

K043 / K043-S / K043-D / K043-V

Multi-Tariff Boiler Thermostat

Revision 2009

Programmable boiler thermostat with tariff-aware switching, ten memory registers plus weekend register, single or dual heater relays.

Manufactured in-house at our SMT line.

DDM Novastar SPR-45 + LS60 + GF-120HT, AOI on every joint, per-unit calibration to NVRAM.

[Energetika-VDS](#) · [Strumica, Macedonia](#) · [energetika-vds.com](#)

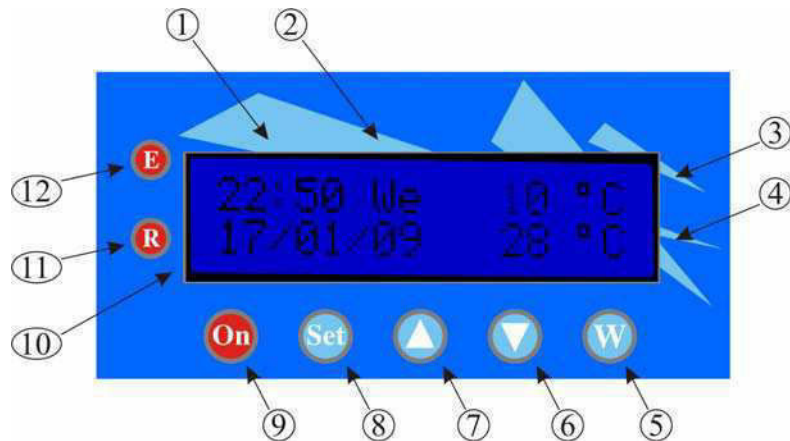
Catalog detail on the following pages.

Model Description
(Model K043, K043-S, K043-D, K043-V)

Model K043, K043-S



Model K043-D, K043-V



The thermostat K043 and K043-S was manufactured with a purpose of boiler management and reduction of electrical energy consumption. It contains ten built-in memories and one weekend memory. The different memory settings regulate the working conditions of the boiler heaters. They can be pre-set according to the settings of the local electrical energy supplier and the legal tariff system. The thermostat has two independent relays to operate two boiler heaters of 1.5 kW for model K043 and 2kW for model K043-S and achieve economy mode operation.

The thermostat K043-D and K043-V has one relay to operate boiler heater of 1.5 kW for model K043-D and 2kW for model K043-V

By attaching the thermostat to the power source the display is turned on without any content, signaling the unit has been powered. Pressing the "On" button the main menu appears and the thermostat is ready for operational.

Key and Display Functions

1. Current time – hour:minute
2. Current day
3. The current water temperature in the boiler
4. Pre-set temperature. This temperature can be set in the range from +10°C to +80°C.
5. Pressing the **W** key displays the consumed electricity in kWh. The rest of the features of this key are described later.
6. Pressing the **▼** key reduces the pre-set temperature.
7. Pressing the **▲** key increases the pre-set temperature.
8. The **Set** key has multiple functions that are going to be described later.
9. The **On** key has the function of turning on and turning off the temperature regulator.
10. Current date – day/month/year
11. Signaling LED **R** used for relay state indication:
 - a. The LED lights in case any of the two relays is on.
 - b. The LED is off in case both of the relays are off.
12. Signaling LED **E** used for economy mode operation indication.

Changing the Current Time

Pressing the **Set** key the display shows the following content:



with the indicator of the current hour blinking. Using the keys **▲** and **▼** the hour is adjusted.

In case there is no activity within 30 seconds the unit automatically returns to basic display content.

Pressing the **Set** key again the display shows the following content:



with the minute indication of the current time blinking. Using the keys **▲** and **▼** the minutes of the current time are adjusted.

In case there is no activity within 30 seconds the unit automatically returns to basic display content.

Pressing the **Set** key again the display shows the following content:



with the day of the week indication blinking. Using the keys **▲** and **▼** the day of the week is adjusted.

In case there is no activity within 30 seconds the unit automatically returns to basic display content.

Pressing the **Set** key again the display shows the following content:





with the day indication of the current date blinking. Using the keys **▲** and **▼** the day of the current date is adjusted.

In case there is no activity within 30 seconds the unit automatically returns to basic display content.



Pressing the  key again the display shows the following content:



with the month indication of the current date blinking. Using the keys  and  the month of the current date is adjusted. In case there is no activity within 30 seconds the unit automatically returns to basic display content.


Pressing the  key again the display shows the following content:



with the year indication of the current date blinking. Using the keys  and  the year of the current date is adjusted. In case there is no activity within 30 seconds the unit automatically returns to basic display content.

Memory Programming

The model K043 has ten built-in memories available and additional memory for weekend programming. Depending on the requirements these can be programmed in the following way.

Pressing and holding the  key (for about 5 seconds) the display shows the following content:



Now, the unit is in programming mode and waits for selection weather the weekday memories or weekend memory shall be accessed.










Pressing the  key weekday memory programming is selected.


Pressing the  key weekend memory programming is selected.

In case there is no activity within 30 seconds the unit automatically returns to basic display content.

Depending on the selection, memory programming proceeds in the following way. If weekday programming had been selected the display shows the following content:



where the indication M-1 marks the memory location number. The user is expected to set the hour using the  key and the  key. Pressing the  key confirms the hour setting and the minute indication starts blinking. Again, the minutes are set using the  key and the  key. Pressing the  key confirms the minute setting and the temperature indication starts blinking. This temperature is the desired temperature to be reached at the set time. The temperature is set repeating the procedure for the time adjustment. Pressing the  key again, the “Off” indication starts blinking. In order to activate the current memory settings, the  key should be pressed, in which case the display show “On” indication. In case the current memory should be deactivated, the  key should be pressed.

While in programming mode, pressing the  key the next memory location is accessed and the display shows the following content:



The same procedure described above is applied for programming any of the ten memory locations.

In case the last memory location has been reached, after it has been set, the unit returns to the basic display content. In case there is no activity within 30

seconds the unit automatically returns to basic display content regardless of menu position.

Weekend Programming

When the unit is not in a programming or setting mode, pressing and holding the **Set** key (for about 5 seconds) the display shows the following content:



Now, the unit is in programming mode and pressing the **Down Arrow** key weekend memory programming is selected. The display shows the following content:



The procedure for setting the start of weekend memory is the same as for the weekday. After setting the desired time and temperature, the display shows the following content:



Using the previously described procedure the time and day of weekend end are set and the weekend memory setting is completed.

Memory Activation and Deactivation

When the unit is not in a programming or setting mode, pressing and holding the **Set** key (for about 5 seconds) the display shows the following content:



Now, the unit is in programming mode. Pressing the **Set** key again, the display shows the following content:



The indication “On” is blinking. Pressing the **Down Arrow** key changes this indication to “Off”. Pressing the **Set** key confirms the selection and exists to basic display mode. This option is used for quick activation or deactivation of all the memories. In case there is no activity within 30 seconds the unit automatically returns to basic display content.

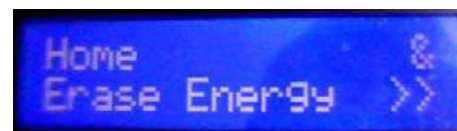
Displaying The Consumed electricity in kWh

Pressing the **W** key the display shows the following content:




where the consumed electricity can be read out in kWh. The consumed electricity is accumulated when one or both of the boiler heaters are active.

Pressing the **W** key again, the display shows the following content:



The operator is expected to make a selection. If at this point the **W** key is pressed, the unit returns to basic display mode. In case there is no activity within 30 seconds the unit automatically returns to basic display content.

If there is a need to erase accumulated consumed electricity and reset the counter, this is done by pressing the  key. If so, then the display shows the following message:





Now, the unit waits for an access code (a password) in order to proceed and execute counter reset.

NOTE: THE ACCESS CODE IS KNOWN ONLY TO THE MANUFACTURER AND CAN NOT BE DISCLOSED TO THE FINAL USER.


In case there is no activity within 30 seconds the unit automatically returns to basic display content.

Economy Mode Operation for model K043 and K043-S




Connecting the thermostat to a 220VAC power supply the basic content is displayed and the signaling diode  gets turned on. The indication of this signaling diode means that the thermostat operates in economy mode and the two boiler heaters are set to a water temperature of 52°C. As soon as this temperature is reached one of the boiler heaters gets turned off and the heating of the water continues with one heater up to the pre-set temperature. The pre-set temperature is maintained by a single boiler heater. In case the water temperature drops below 52°C the two boiler heaters are turned on, again.

Pressing the  key and holding it pressed for 5 seconds, while in the main menu, the display shows the following content:



The blinking “On” indication means that the thermostat is operating in economy mode. Pressing the  key, the display shows the following content:

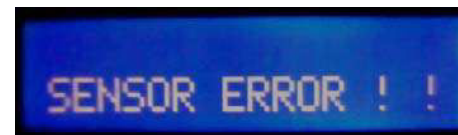


The blinking “Off” indication means that the thermostat is no longer operating in economy mode. At the same time, the  indication gets turned off. If the  key gets pressed again, the “On” indication starts blinking and the signaling LED  is turned on, meaning the unit operates in economy mode, now. In case there is no activity within 30 seconds the unit automatically returns to basic display content.

Error Messages

Sensor Error

In case of whatever reason the measuring sensor gets damaged the display shows the following message:



The message blinks continuously indicating sensor malfunction. In this situation, the boiler heaters are turned off immediately and any unit manipulation is not possible. This requires thermostat servicing.

Overheating

In case of whatever reason the water temperature reaches over 92°C, the display shows the following message:



The message blinks continuously indicating there is an error in the system, showing at the same time the water temperature. In this situation, the boiler heaters are turned off immediately and any unit manipulation is not possible. If water temperature drops below 92°C, the unit returns to the main menu and

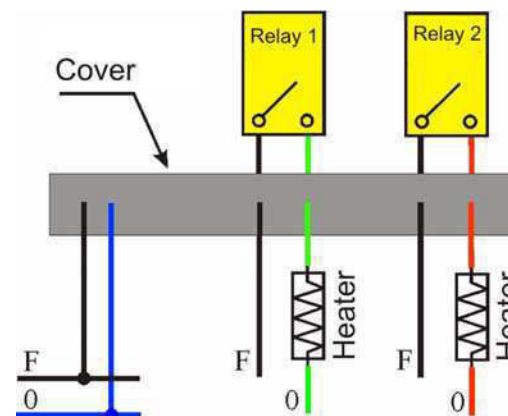
Water Freezing Protection

In order to prevent water freezing in the boiler, the thermostat does not allow water temperature to drop below 10°C. If this temperature is reached, both of the boiler heaters turn on and maintain it at this value. Understandable, in order to activate this function, the unit has to be plugged in and turned on.

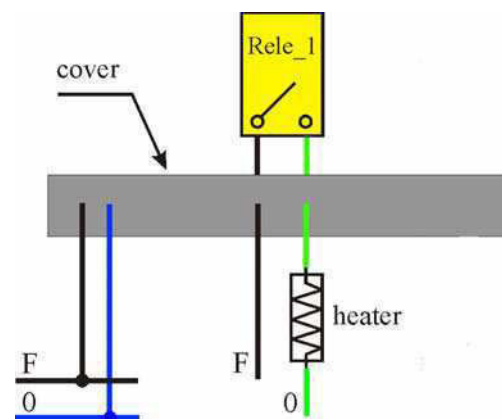
Thermostat Reset

In case of whatever reason there is a malfunctioning in the normal operation of the unit, such as if the display does not show the menus or access to some parts of the program is impossible or pressing the **On** key does not show the main menu, the thermostat needs to be reset. This is done by pressing and holding the **On** key for 8 seconds. After releasing it, the display shows the contents of the main menu. It should be noted that after reset, the unit loads the factory settings. Any previous user settings should be re-entered following the previously described procedure.

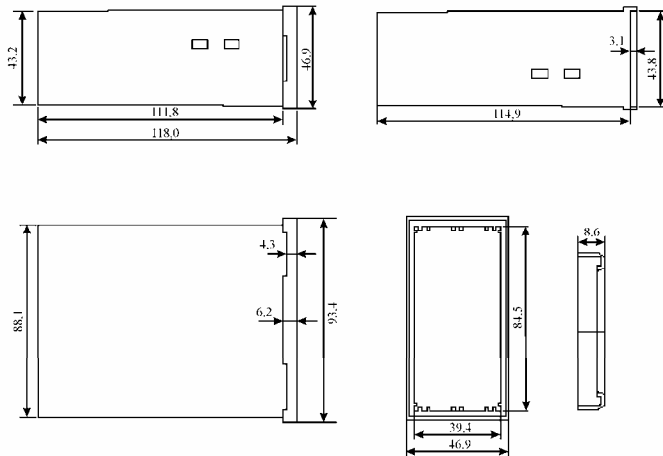
Connection Scheme for model K043, K043-S



Connection Scheme for model K043-D, K043-V



Thermostat Model K043, K043-S, K043-D, K043-V
External Dimensions



Technical Specification

Product: Temperature Regulator for boiler

Model: K043, K043-S, K043-D, K043-V

Supply voltage: 220V AC, 50 Hz

Temperature control range: (+10°C ~ +80°C)

Maximum relay output power for model K043 :

Relay 1: 10A, 220V AC, 50 Hz

Relay 2: 10A, 220V AC, 50 Hz

Maximum relay output power for model K043-S :

Relay 1: 20A, 220V AC, 50 Hz

Relay 2: 20A, 220V AC, 50 Hz

Maximum relay output power for model K043-D :

Relay 1: 10A, 220V AC, 50 Hz

Maximum relay output power for model K043-V :

Relay 1: 20A, 220V AC, 50 Hz

Backup power for the real-time clock and the calendar:

NiMh 3V6 battery capable of supporting the real-time clock for four years without any external power supply. There is also a built-in regulation for battery charging and discharging, thus obtained up to fifteen years of flawless operation.

Sensor measurement accuracy: ± 0,5°C

Real-time clock accuracy: ± 1 sec./den