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Wireless remote control ready
boiler controller for stoker, blower,
central heating and domestic hot water pumps and the mixing valve
version with the return water sensor

JOKER DS2PM-RC

Instruction and installation manual

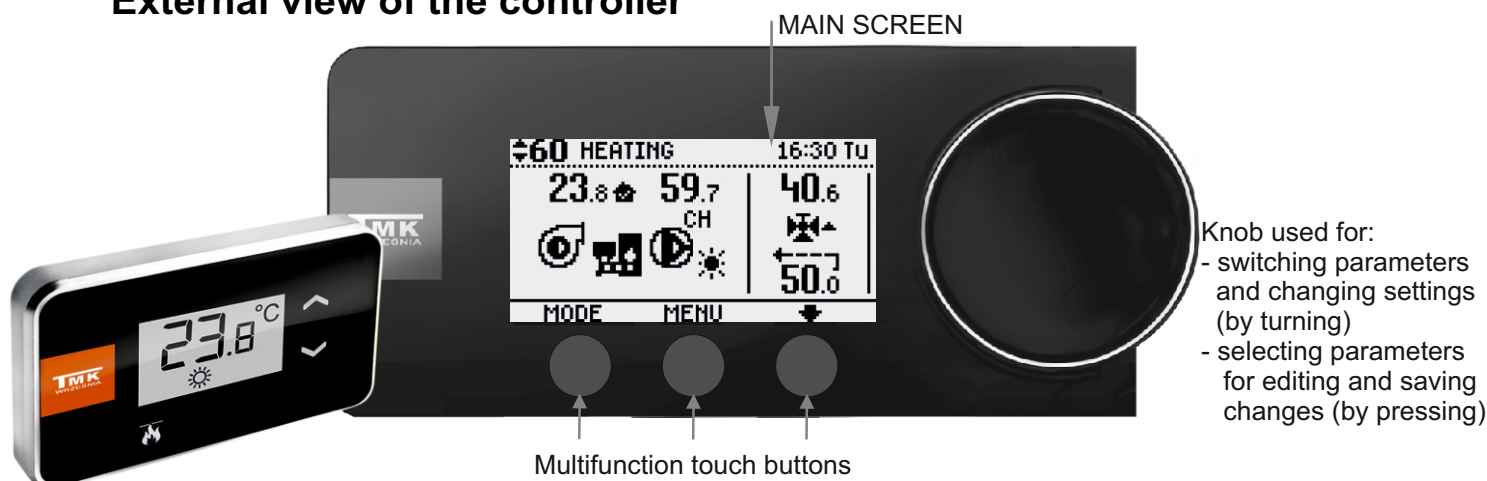
Application

Fully automatic controller JOKER DS2PM-RC is designed to dynamically control the stoker, blower, central heating circulation pump, feeding pump of the domestic hot water tank and the four-way valve. Controller maintains the set temperature in rooms with a wireless room panel according to the time programming. Controller controls dynamically the amount of delivered fuel and the blower power. It features a thermal switch-off function to protect the boiler against overheating, and is equipped with an "anti-stop" and antibacterial protection functions. The controller may prioritize domestic hot water and additionally prevent the tank and radiators from excessive cooling resulting from insufficient boiler temperature. It distributes boiler capacity among central heating and domestic hot water circuits in a dynamic way, in conformity with user's settings and preferences. The user can also select timed programmes ensuring optimisation of energy consumption. The return water sensor protects the boiler from temperature dropping too low.

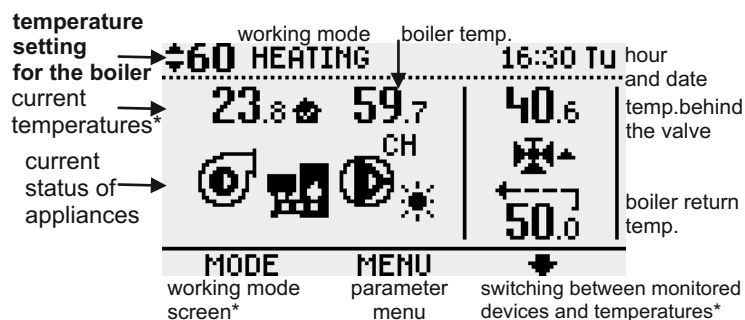
Thanks to advanced control procedures, the temperature of domestic water and heated spaces is maintained at desired levels, while the boiler operates in optimal conditions ensuring increased life expectancy.

The user can limit the number of controlled appliances thanks to flexible configuration of the menu and the main control screen.

External view of the controller



MAIN SCREEN - status of the appliances and boiler temperature setting.



Examples of appliance status

- stoker helix animation means that the stoker is feeding coal
- blower active
- C.H. pump switched on
- C.H. timed programme "day temperature" active
- the valve is being opened (closed)
- C.H. timed programme "day temperature" active
- C.H. pump manual mode

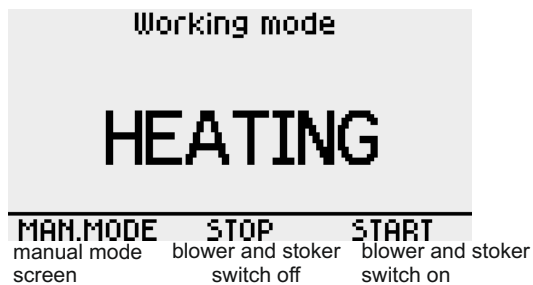
*CAUTION - Temperature of the stoker is displayed on the "manual mode" screen of the stoker and blower - press [MODE], and then [MANUAL MODE].

MONITORING OF ALL ACTIVE DEVICES AND TEMPERATURES (SENSORS) IS AVAILABLE IN THE MENU - parameter J

In order to change settings of the boiler on the MAIN SCREEN press the knob (arrows flash) and turn it to select the desired temperature. To validate, press the [SAVE] button or press the knob.

To exit without saving, press the [EXIT] button.

WORKING MODE SCREEN- press [MODE] on the MAIN SCREEN



CAUTION - pressing [START] or [STOP] buttons will be confirmed on the display. Current working status is visible only after re-entering the WORKING MODE screen.

CAUTION - if no button is pressed, after five seconds the display returns automatically to MAIN SCREEN.

MONITORING OF DEVICES AND TEMPERATURES (SENSORS) SCREEN - press [MENU] to open-par. J

Boiler	59.7	30%
Stoker	35.3	
P.CH	M ●	☀
P.DHW	35.5	☾
Valve	40.6	
Return	50.0	
EXIT		

30% current blower speed

● device is switched on

○ device is switched off

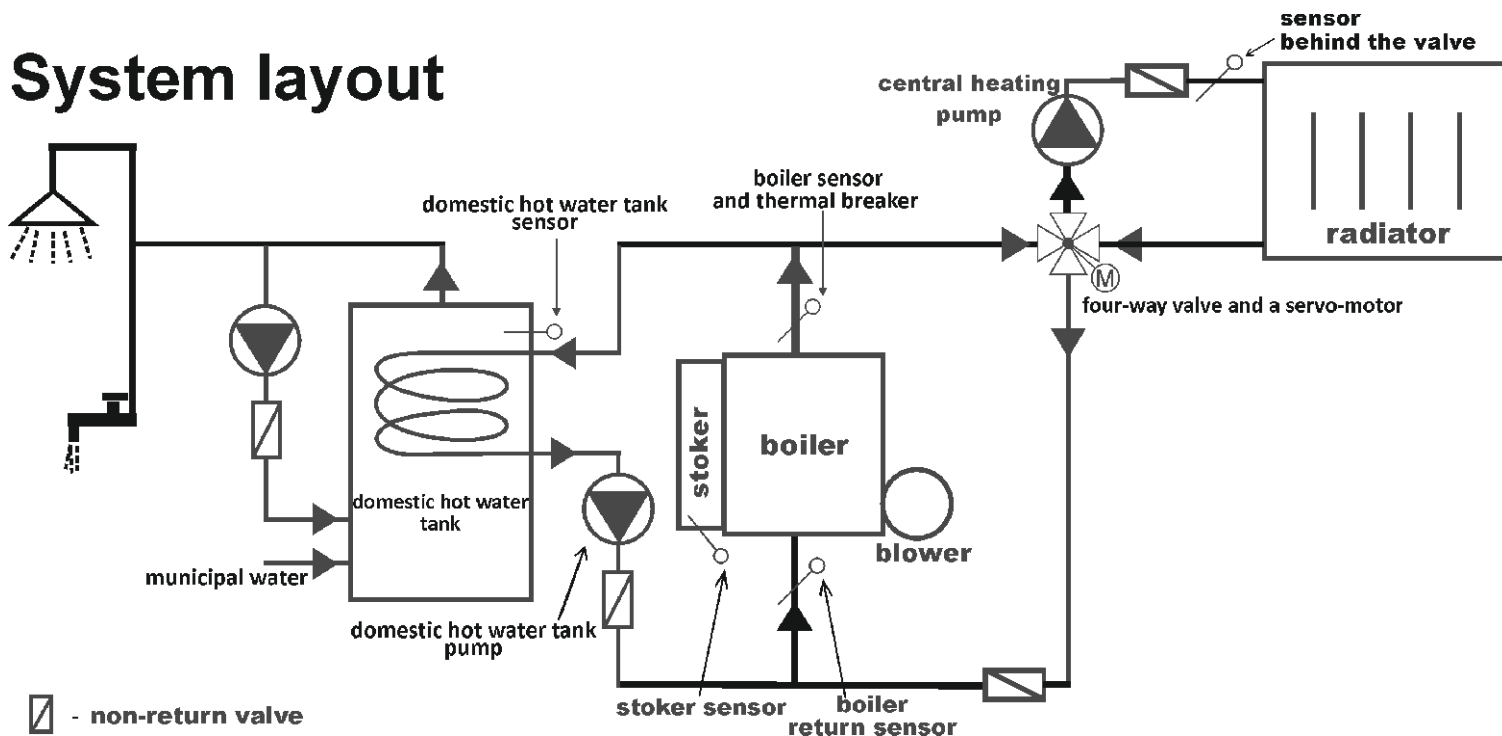
☀ C.H. timed programme "day temperature" active

☾ D.H.W. tank timed programme "night temperature" active

„M” - manual mode

CAUTION - the "Monitoring of devices and sensors" screen does not return automatically to the MAIN SCREEN.

System layout



Installation instructions

The controller can be mounted on a wall mount (included in the kit as a standard option) or on a vertical support (available as an extra option). The mount is fixed to a wall with rawl plugs (included in the kit), following which the controller can be easily snapped onto the mount.

When the vertical support is used, first it needs to be fixed to the surface, and then the rails at the back of the controller can be used to snap it securely on the support.

Controller connection

Connect the supply cable to a 230 V, 50 Hz power outlet with an earth contact.

The ambient temperature in the controller mounting location may not exceed 40°C.

CAUTION: The connection cable of the regulator may only be replaced by the manufacturer.

CAUTION: JOKER controller is only able to operate when the system is filled with water. If the system is empty, the controller must be disconnected from the power supply. Otherwise the pump may become damaged.

General technical data:

- Supply voltage 230V/50Hz
- Maximum pump output 3x100VA, 1x250VA(stoker), 1x5VA(valve)
- "Anti-stop" function (pump protection against "jam") – activated for 30 sec. every 14 days
- Antibacterial protection of tank water against Legionella bacteria _____ SWITCHED OFF

Default settings

C.H. HEATING BOILER CONTROL (OF THE BLOWER AND STOKER)

Installation

1. Installation of the boiler temperature sensor and thermal breaker switch

Fix the sensor and thermal breaker switch to an uninsulated exit pipe of the C.H. boiler with two provided strips so that they adhere well.

It is recommended to additionally wrap the sensor and thermal breaker switch with some thermal insulation material.

2. Installation of the stoker temperature sensor

The stoker sensor must be fixed to the feeding pipe where designated by the boiler producer.

If the boiler producer provided no instructions, for best results install the sensor on the feeding pipe 50 cm from where coal enters the furnace.

Attach the sensor to the pipe with the provided metal strap so that it adheres well.

CAUTION: Incorrect installation may damage the sensor.

CAUTION: The sensor and thermal breaker switch are not made for direct use in water.

3. Connecting the power cord to the blower and the stoker

- Connect the yellow-green wire (zero protection) to the marked terminal of the blower/stoker.
- Connect brown and blue wires to L and N terminals of the blower/stoker.
- in case of the version with IEC connector, plug in the controller and the blower/stoker

CAUTION: The regulator must be installed by a qualified electrician only.

MANUAL MODE OF THE STOKER AND BLOWER

The user can flexibly switch on and off the stoker as well as the blower. It may useful for instance when the boiler is ignited with empty stoker.

The screen "Manual mode of the stoker and blower" is available on pressing [MODE], and then within five seconds [MANUAL MODE]. The manual mode screen is available alternatively under parameters B4 and C8.

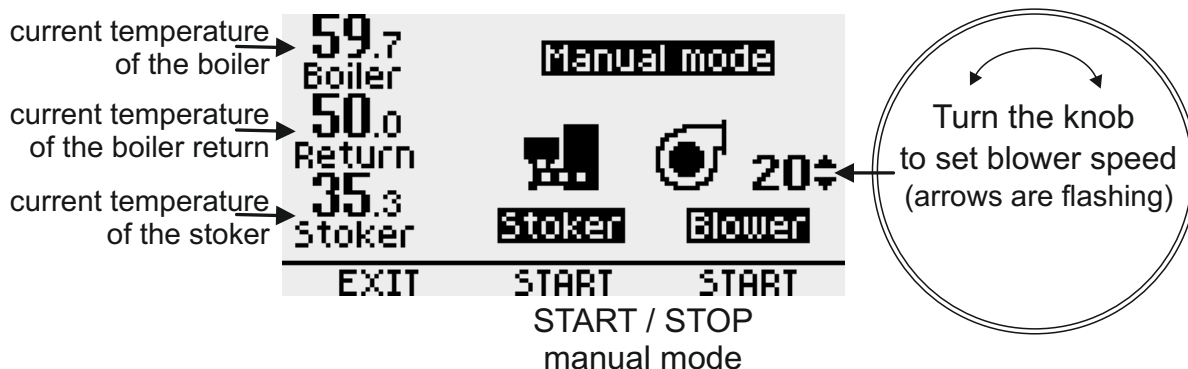
FIRING UP OF THE BOILER WITH EMPTY STOKER

After the coal container is filled, switch on the stoker by pressing [START stoker] until coal appears in the retort.

Then switch off the stoker by pressing [STOP stoker], and ignite coal in the retort. Next, switch on the blower [START blower] and set its optimal speed by turning the knob (current blower speed is displayed on the screen in per cent).

When coal in the retort has been ignited switch to automatic mode - press [EXIT] and then [START] on the main screen. Automatic mode is described on page 4.

Screen of the MANUAL MODE OF THE STOKER AND BLOWER:



Animated movement of the helix means that the stoker is feeding coal.

CAUTION - the controller does not automatically return from "Manual mode of the stoker and blower" menus to the MAIN SCREEN. .

BOILER AUTOMATIC MODE (BLOWER AND STOKER)

Use **MANUAL MODE OF THE STOKER AND BLOWER** to fire up the boiler (page 3). When coal in the retort has been ignited switch to automatic mode by pressing [EXIT], then pressing [MODE], and then within five seconds [START]. The controller starts automatic FIRE UP of the boiler - the blower works at its maximal speed setting, while the stoker regularly feeds new portions of coal. FIRE UP mode will start only if the temperature at the boiler sensor is lower than the extinguish temperature setting (parameter A3). Over the first 6 hours after the FIRE UP procedure has been started the controller does not take into account the minimal temperature at the return to the boiler (parameter E3).

When the boiler temperature exceeds current extinguish temperature setting (parameter A3), the controller enters HEATING mode.

If the parameter A8 is set to YES (default: NO), as the temperature of the boiler approaches the temperature set by the user (parameter A1) displayed on the MAIN SCREEN, the amount of coal and air is automatically reduced. When the temperature selected by the user is achieved, the controller enters into STANDBY mode. In this mode the stoker and blower switch on at regular intervals to prevent furnace from extinguishing.

The controller enters HEATING mode again when the temperature drops by the hysteresis value (parameter A2) below boiler temperature.

CAUTION: If the temperature at the return to the boiler falls below the setting of the parameter E3, the controller will increase boiler temperature to 65°C.

CAUTION: While the D.H.W. tank is heated up, the controller raises the boiler temperature by 5°C above the current temperature setting for the D.H.W. tank (F1).

During heating up of the D.H.W. tank automatic reduction of boiler power is not performed.

When the blower and stoker need to be stopped press [MODE], and then within five seconds press [STOP]. Pressing [START] restarts the blower and the stoker.

In HEATING mode, when boiler temperature drops below the current extinguish temperature setting (parameter A3), the controller enters EXTINGUISH mode - the blower and stoker are switched off.

EXTINGUISH will not start unless FIRE UP has been completed (parameter A4 - default setting: 6 hours).


If during FIRE UP boiler temperature does not exceed EXTINGUISH temperature, once FIRE UP time has passed, the controller enters into NOT FIRED UP mode.

In all modes of the controller pumps are run depending on selected settings.

OPERATION WITH THE WIRELESS REMOTE CONTROL ROOM PANEL

Operation of the JOKER DS2PM-RC controller with the wireless room control panel is described on pages 12 and 13.

SUMMER MODE (parameter K1 in Controller settings)

When SUMMER mode is selected, automatic reduction of boiler power is not performed. The boiler heats up only the D.H.W. tank. SUMMER mode is indicated on the MAIN SCREEN by the  and  icons.

Over the first 6 hours from switching from the SUMMER mode to the WINTER mode the controller does not take into account the minimal temperature at the return to the boiler (parameter E3).

ALERTS

The controller features several boiler alerts: regulated alerts for low or high boiler temperature (parameters A5 and A6) and permanent (not regulated) alerts: low temperature at 8°C and high temperature at 92°C. The 92°C alert stops the blower and the stoker and fully opens the mixing valve. Even when boiler temperature drops, the "92°C alert" remains active until [START] button is pressed. Once the temperature exceeds the alert threshold set by the user, both an audible and visual (red diode) alerts are triggered. When boiler reaches the permanent alert temperature only a visual alert is activated.

When temperature of the stoker exceeds the alert temperature setting (parameter C6), the stoker is activated in order to shove burning coal from the stoker into the boiler (preventing fire from moving into the coal container). A special screen appears to display temperature and duration of coal shoving (parameter C7). Audible and visual (red diode) alerts are activated and the mixing valve is fully opened.

Pressing [STOP] on the screen "Shoving fire from the stoker into the boiler" stops the shoving off procedure regardless of the temperature of the stoker. When shoving off is discontinued, "STOKER FIRE" symbol appears on the main screen.

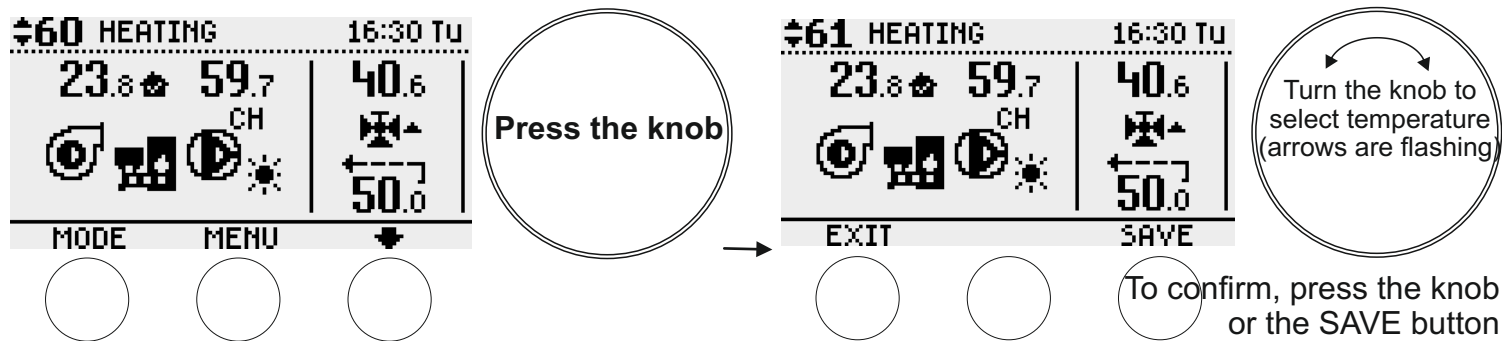
CAUTION: Shoving off of coal from the stoker into the boiler is activated only once in a given working cycle of the controller. In order to activate the stoker alert again press [START] - then the "STOKER FIRE" message will disappear from the screen.

The 92°C alert has a priority over stoker alert.

The emergency cooling of the boiler in the SUMMER mode (parameter A7) will activate the CH pump and the DHW tank feeding pump, in such a case the valve is fully opened. An audible alert and a visual alert (red diode) are activated.

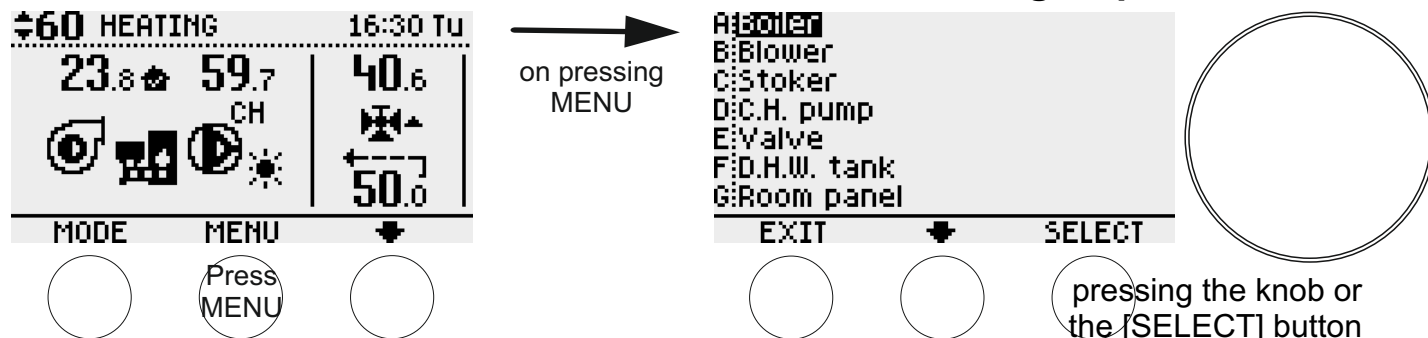
CAUTION: During the emergency cooling of the boiler there is a risk of increased domestic hot water temperature above user settings. The careful use of hot water is recommended.

C.H. BOILER - QUICK BOILER TEMPERATURE SETTINGS



Pressing [EXIT] will bring back the MAIN SCREEN without saving any changes.

C.H. BOILER PARAMETER MENU - group A

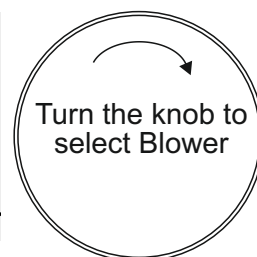
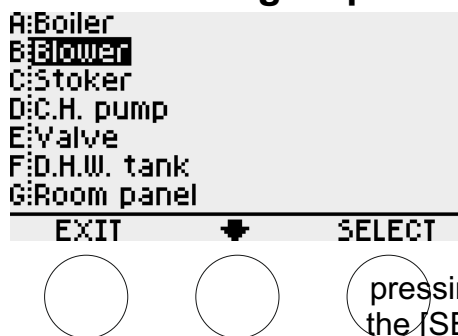
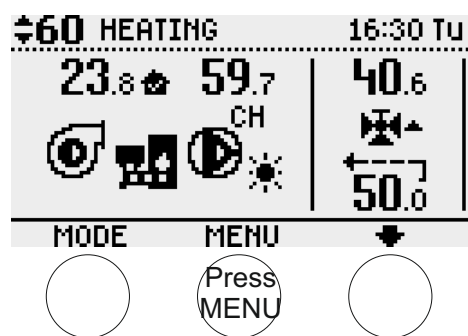


Press [MENU] to change parameters of the C.H. boiler. List of groups of parameters will appear on the screen. Select the top parameter group "A - C.H. boiler". by pressing the knob or the [SELECT] button. "A1", the first from the group of C.H. boiler parameters will appear on the screen. Turn the knob right to go to the following parameters, and then press [EDIT/SELECT] or the knob to change. At this point, you can change the value of a parameter either by turning the knob or using the dynamically appearing buttons. Some parameters need to be selected for editing; use the [SELECT] button and the knob - a flashing dot will highlight the parameter selected for editing. Editing is confirmed by pressing the knob or the [SAVE] button. Pressing [EXIT] will bring back the previous screen without saving any changes.

LIST OF PARAMETER OF THE C.H. BOILER (moving between parameters and change of setting - turn the knob):

- A1 Boiler temperature setting (55-90°C, default: 60°C)
Boiler temperature cannot be lower than the sum of parameters: A2+A3 +5°C.
CAUTION: If the temperature at the return to the boiler falls below the setting of the parameter E3, the controller will increase boiler temperature to 65°C.
While the D.H.W. tank is heated up, the controller raises the boiler temperature by 5°C above the current temperature setting for the D.H.W. tank (F1).
- A2 Boiler hysteresis (0-10°C, default: 1°C)
Boiler hysteresis can't be higher than the difference of parameters: A1 minus A3 minus 5°C.
- A3 Boiler extinguish temperature (40-50°C, default: 45°C)
Boiler extinguish temperature cannot be higher than the difference of parameters: A1 minus A2 minus 5°C.
- A4 Fire up duration (10-480 min, default: 6 hours)
- A5 low boiler temperature alert (0-50°C, default setting: 8°C).
- A6 high boiler temperature alert (60-120°C, default setting: 92°C)
The controller features also two permanent (non-configurable) alerts: of low boiler temperature (8°C) and of high boiler temperature (92°C). The 92°C alert stops the blower and the stoker and fully opens the mixing valve. Even when boiler temperature drops, the "92°C alert" remains active until [START] button is pressed.
- A7 The emergency cooling of the boiler in the SUMMER mode (60-99°C, default setting: 80°C - CAUTION: SETTING THE TEMPERATURE ABOVE 90°C IS ONLY PERMITTED WHEN THE BOILER IS ADDITIONALLY PROTECTED FROM COMING TO BOIL !)
CAUTION: During the emergency cooling of the boiler there is a risk of increased domestic hot water temperature above user settings. The careful use of hot water is recommended.
- A8 Automatic reduction of boiler power as the temperature of the boiler approaches the temperature set by the user (NO, YES, default: NO)
When this parameter is set to "NO", parameters B1 and C1 are inactive.
Automatic reduction of boiler power is not performed during heating up of the D.H.W. tank, in the SUMMER mode and during the antibacterial protection procedure.

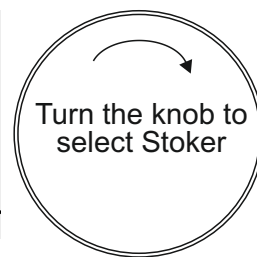
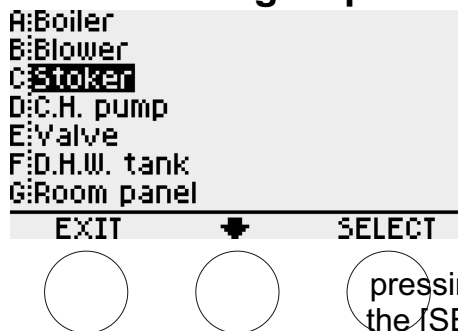
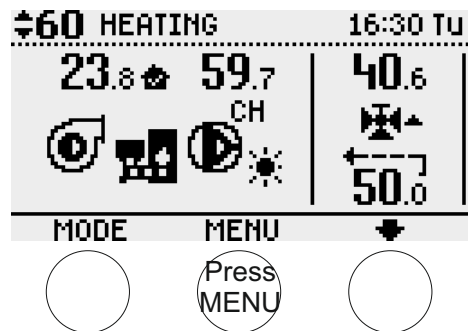
BLOWER PARAMETER MENU - group B



Press [MENU] to change parameters of the blower. List of groups of parameters will appear on the screen. Turn the knob right (clockwise) to select group "B - Blower", and then to select press the knob or the [SELECT] button. "B1", the first in the group of blower parameters will appear on the screen. Turn the knob right (clockwise) to go to the following parameters. Press the knob or the [EDIT] button to change settings. At this point, you can change the value of a parameter either by turning the knob or using the dynamically appearing buttons. Editing is confirmed by pressing the knob or the [SAVE] button. Pressing [EXIT] will bring back the previous screen without saving any changes.

LIST OF PARAMETERS OF THE BLOWER (moving between parameters and change of setting - turn the knob):
 B1 Minimal blower speed (default: 30%)- this parameter is active if parameter A8 has been set to "YES".
 B2 Maximal blower speed (20-100%, by default adjusted to the boiler power - see the table at the bottom of the page)
 B3 Blower STANDBY duration (0-4 x parameter C4, default setting: 2 x C4 = 20 sec.)
 B4 Manual mode of the stoker and blower - description on page 3.

STOKER PARAMETER MENU - group C



Press [MENU] to change parameters of the stoker. List of groups of parameters will appear on the screen. Turn the knob right (clockwise) to select group "C - Stoker", and then to select press the knob or the [SELECT] button. "C1", the first in the group of stoker parameters will appear on the screen. Turn the knob right (clockwise) to go to the following parameters. Press the knob or the [EDIT] button to change settings. At this point, you can change the value of a parameter either by turning the knob or using the dynamically appearing buttons. Editing is confirmed by pressing the knob or the [SAVE] button. Pressing [EXIT] will bring back the previous screen without saving any changes.

LIST OF PARAMETERS OF THE STOKER (moving between parameters and change of setting - turn the knob):
 C1 Minimal duration of stoker operation in HEATING mode (default: 5 sec.)-this parameter is active if parameter A8 has been set to "YES".
 C2 Maximal duration of coal feeding in HEATING mode (1- 250 sec, by default adjusted to the boiler power - see the table at the bottom of the page)
 C3 Pausing of coal feeding in HEATING mode (0-250 sec, by default adjusted to the boiler power - see the table at the bottom of the page)
 C4 Coal feeding duration in STANDBY mode (1-250 sec, default: 10 sec.)
 C5 Pausing of coal feeding in STANDBY mode (1-250 min., default: 30 min)
 C6 Stoker alert temperature (70-90°C, default setting: 85°C)
 When temperature of the stoker exceeds the alert temperature setting, the stoker is activated in order to shove burning coal from the stoker into the boiler (preventing fire from moving into the coal container). Audible and visual (red diode) alerts are activated.
 C7 Duration of coal shoving once stoker alert temperature has been reached (0-20 min., default setting: 5 min) to prevent coal in the container from catching fire
CAUTION: Setting to "0" leaves the boiler without protection and is not allowed for most boiler types!
 C8 Manual mode of the stoker and blower - description on page 3.

BOILER POWER	10kW	20kW	30kW	40kW	50kW
Blower speed [%](par.B2)	42	46	48	52	54
Stoker-feeding [sec.](par.C2)	5	6	7	8	10
Stoker-pausing [sec.](par.C3)	19	19	21	25	28

CONTROL OF THE CENTRAL HEATING PUMP

Installation

1. Installation of the boiler sensor

- Attach the sensor to an uninsulated pipe going out of the CH boiler with two provided strips so that it adheres well.
- It is recommended to additionally wrap the sensor with some thermal insulation material.

CAUTION: The sensor is not made for direct use in water.

2. Connecting the power cord to the CH pump

- Connect the yellow-green wire (zero protection) to the marked terminal of the pump.
- Connect brown and blue wires to L and N terminals of the pump.
- for the version with IEC connector, plug the controller and the pump

CAUTION: The regulator must be installed by a qualified electrician only

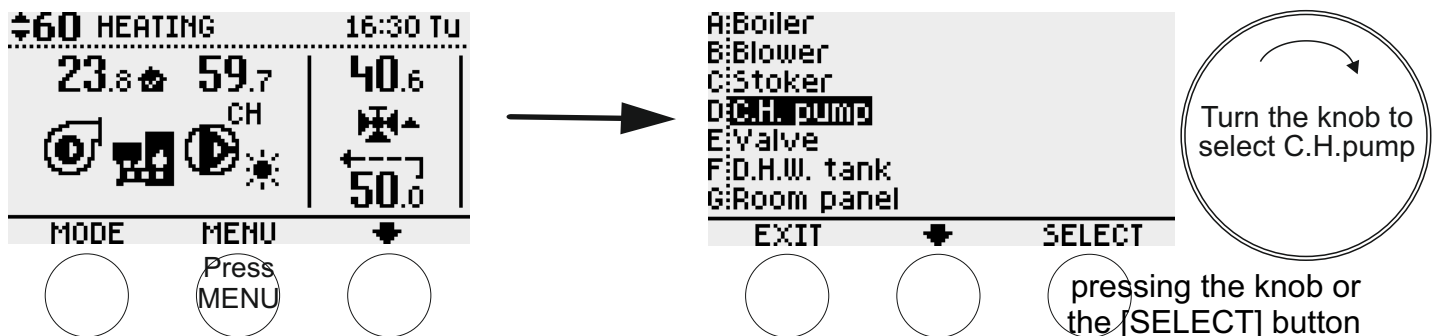
C.H. PUMP OPERATION

The controller switches on the C.H. pump when the temperature in the boiler reaches 50°C, and switches it off when it drops to 45°C.

When domestic hot water priority has been selected (parameter F3 is set to YES), the C.H. pump will be switched off while the hot water tank is heated up.

C.H. pump switches on below 8°C - (ANTIFREEZE PROTECTION). A visual alert (red diode) is activated.

C.H. PUMP PARAMETER MENU - group D



Press [MENU] to change parameters of the C.H. pump. List of groups of parameters will appear on the screen. Turn the knob right (clockwise) to select group "D - C.H. pump", and then to select press the knob or the [SELECT] button. "D1", the first in the group of C.H. pump parameters will appear on the screen. Turn the knob right (clockwise) to go to the following parameters. Press the knob or the [EDIT] button to change settings. At this point, you can change the value of a parameter either by turning the knob or using the dynamically appearing buttons. Editing is confirmed by pressing the knob or the [SAVE] button.

Pressing [EXIT] will bring back the previous screen without saving any changes.

LIST OF CH PUMP PARAMETERS (to switch between parameters and to change setting – turn the knob)

D1 CH pump switch-on temperature 50°C - read only

D2 CH pump switch-off temperature 45°C - read only

D3 Manual CH pump mode ([START] button – the pump is working regardless of the settings, [STOP] button- the pump is switched off regardless of the settings)

CAUTION: the manual mode prevails over the "anti-stop" function and the frost protection. When the controller is powered on the pump always switches to automated mode.

CONTROL OF THE MIXING VALVE

Installation

1. Installation of the temperature sensor behind the valve

- Attach the sensor to an uninsulated pipe behind the valve with two provided strips so that it adheres well (for best results install the sensor on the pipe minimum 1 meter from the valve).

2. Installation of the boiler return temperature sensor

- Fix the sensor to an uninsulated section of the return pipe of the boiler with two provided strips so that it adheres well. It is recommended to additionally wrap the sensor with some thermal insulation material.

CAUTION: The sensors are not made for direct use in water.

3. Connecting the power cable to the valve (230V, max. 5VA, 3-pin)

CAUTION: CONNECTING ANOTHER DEVICE MAY DAMAGE THE CONTROLLER

Valve actuator cable at the controller



the three-wire cable of the mixing valve actuator should be connected as follows:

- fix the **N** marked wire to the common (neutral) terminal of the valve
- fix the remaining two wires to L1 and L2 screw terminals of the IEC connector, as described in the mixing valve user manual.

Next, plug the IEC connector of the valve actuator cable into the dedicated socket of the JOKER controller.

It is recommended to check the connection by opening and closing the valve manually (parameter E5).

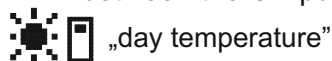
It is possible to reverse direction of turning of the mixing valve - parameter E6.

CAUTION: The regulator must be installed by a qualified electrician only.

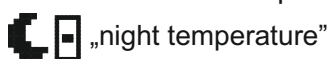
MIXING VALVE OPERATION

The role of the controller is to stabilise water temperature in the central heating system. This is accomplished by opening and closing of the mixing valve. The controller switches the valve on and off in order to achieve the minimal temperature setting behind the valve when room temperature has been achieved, or the maximal temperature setting behind the valve if room temperature has not been achieved. When remote control from a room panel is deactivated (parameter G4 set to "NO"), the controller is working to achieve maximal temperature setting behind the valve (parameter E1), and parameter E2 (minimal temperature behind the valve) becomes inactive.

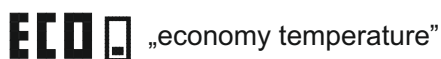
The user can select three different maximal and minimal temperatures behind valve - "day", "night" and "economy" (parameters E1 and E2). Temperature behind valve is programmable, different temperatures can be set for every day and hour of the week (parameter H1). The central heating timed programme in use is displayed on the MAIN SCREEN between the CH pump icon and the boiler return temperature:



„day temperature”



„night temperature”



„economy temperature”

The mixing valve may operate only when C.H. pump is working.

When boiler temperature at the return is lower than parameter E3 (minimal temperature at the return), the valve is closed. When temperature at the return is equal to the E3 setting, the valve remains closed. The controller allows to open the valve only when temperature at the return is higher than the E3 setting.

CAUTION: If return temperature sensor has not been installed or is damaged, the controller will not activate the blower and stoker in the automatic mode - replace the sensor.

Over the first 6 hours after the FIRE UP procedure has been started the controller does not take into account the minimal temperature at the return to the boiler (parameter E3).

When hot water tank priority has been selected (parameter F3 set to "YES"), over the first 3 hours from switching on the C.H. pump the controller does not take into account the minimal temperature at the return to the boiler (parameter E3). At the time when the temperature setting is switched from "day" to "night", from "night" to "economy" or from "day" to "economy" the valve is continuously closed for 4 minutes. The closing of the valve is overridden when a need to open the valve arises.

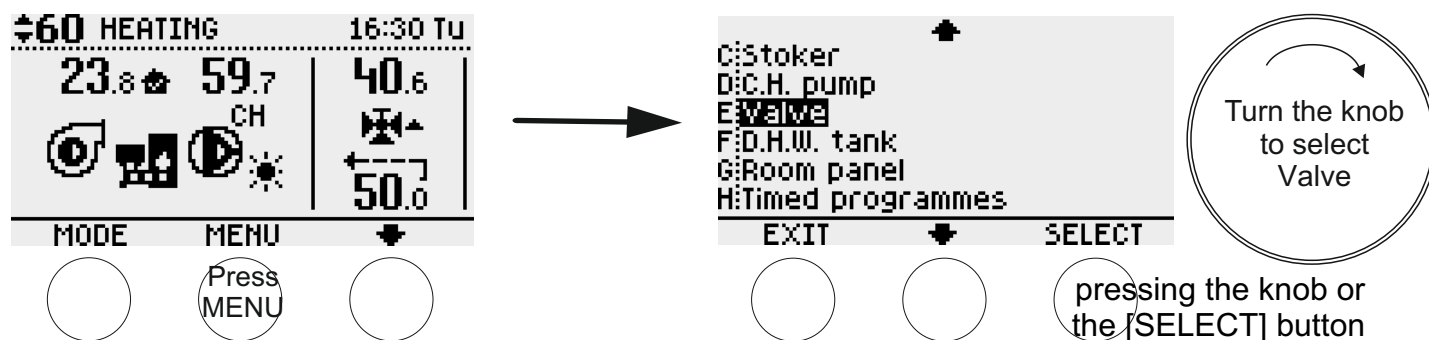
The valve is continuously closed for 4 minutes when the SUMMER mode is activated.

When the SUMMER mode has been selected, the CH pump is switched on only in an emergency (a visual and sound alert are triggered). In such a case the valve is fully opened while the CH pump is working. The valve is continuously closed for 4 minutes after the alert has been switched off.

The valve is fully, continuously open when temperature in the boiler reaches 92°C and during shoving fire from the stoker into the boiler. Audible and visual alerts are activated.

The user can manually open and close the valve, e.g. in order to check if it has been properly connected (parameter E5). Press [OPEN] to open the valve, press [CLOSE] to shut off the valve. It is possible to reverse direction of turning of the mixing valve - parameter E6.

MENU OF VALVE PARAMETERS – group E



In order to modify valve parameters, press the [MENU] button. A list of groups of parameters will appear on screen. Turn the knob right (clockwise) to select the E group - "Valve". Press [SELECT] or the knob. "E1", the first parameter from the valve group will be displayed. To go to different parameters, turn the knob right, and then press the [EDIT] / [SELECT] button or the knob to change a desired parameter. Now you can change the value of the parameter using the knob or the dynamically alternating buttons. Some parameters need to be selected for editing: use the SELECT button and the knob. To save changes, press the [SAVE] button or press the knob. The [EXIT] button restores the previous menu level without saving changes.

LIST OF VALVE PARAMETERS (to switch parameters and change setting – turn the knob):

E1 Maximal temperature behind the valve (setting maximal temperature behind valve E1a, E1b or E1c below corresponding E2a, E2b or E2c [minimal temp. behind valve] results in both settings becoming equal)
 E1a day (1-99°C, default: 45°C)
 E1b night (1-99°C, default 30°C)
 E1c economy (1-99°C, default: 25°C)

E2 Minimal temperature behind the valve (setting minimal temperature behind valve E2a, E2b or E2c above the corresponding E1a, E1b or E1c [max temp. behind valve] results in both settings becoming equal)
 E2a day (1-99°C, default: 35°C)
 E2b night (1-99°C, default 20°C)
 E2c economy (1-99°C, default: 15°C)

E3 Minimal temperature of the boiler return pipe regulated by the valve (40-55°C, default: 50°C)
 When boiler temperature at the return is lower than parameter E3, the valve is closed. When temperature at the return is equal to the E3 setting, the valve remains closed. The controller allows to open the valve only when temperature at the return is higher than the E3 setting.
 Over the first 6 hours after the FIRE UP procedure has been started the controller does not take into account the minimal temperature at the return to the boiler.
 When hot water tank priority has been selected (parameter F3 set to "YES"), over the first 3 hours from switching on the C.H. pump the controller does not take into account the minimal temperature at the return to the boiler.

E4 Valve downtime (valve action time is constant - 1 sec.) (0-200 sec., default setting: 10 sec.)

E5 Manual valve mode (the [STOP] button switches off the manual mode)

E6 Direction of valve turning (press [EDIT] and confirm to reverse direction of turning of the valve)
 CAUTION: return to default settings will not change direction of valve turning.

CONTROL OF THE DOMESTIC HOT WATER TANK FEEDING PUMP

Installation

1. Installation of tank temperature sensor

Mount the sensor in a location recommended by the tank's manufacturer.

CAUTION: *The sensor is not made for direct use in water.*

2. Connecting the power cord to the pump


- Connect the yellow-green wire (zero protection) to the marked terminal of the pump.
- Connect brown and blue wires to L and N terminals of the pump.
- **for the version with IEC connector, plug the controller and the pump**


CAUTION: *The regulator must be installed by a qualified electrician only.*


HOT WATER TANK FEEDING PUMP OPERATION

The controller switches off the pump of the hot water tank when the temperature inside of the tank reaches the set value (parameter F1 a,b or c). The pump is switched on when the temperature drops by the set value of hysteresis (parameter F2 - either a, b or c).

The user can select three different temperatures of domestic hot water - "day", "night" and "economy" (parameter F1). Temperature is set through timed programmes, different temperatures can be set for every day of the week and every hour (parameter H2). The timed programme in use is displayed on the MAIN SCREEN to the right of the D.H.W. pump icon:

 „day” temperature
of the D.H.W. tank

 „night” temperature
of the D.H.W. tank

 „economy” temperature
of the D.H.W. tank

The user can select or unselect the priority of the hot water tank over central heating pump (parameter F3). With this parameter unselected (the default setting is "NO") the hot water and central heating pumps work independently from one another. If this priority is selected ("YES" setting), the central heating pump and the valve are switched off when the hot water tank is heated up.

The feeding pump of the hot water tank is switched on if: 1. the set temperature of domestic hot water has not been achieved and 2. when the temperature at the C.H. boiler is higher than that inside of the hot water tank by the parameter F4 "protection of the hot water tank against cooling down". Another condition is having achieved the value of parameter F5 -minimal temperature of the C.H. boiler at which the D.H.W. tank feeding pump is switched on.

If SUMMER mode has been selected (parameter K1), the central heating boiler only feeds the hot water tank.

The user may deactivate control of the domestic hot water tank pump (parameter F8 is set to "NO"). Once it's been selected, the D.H.W. tank pump icon and reading of the D.H.W. tank temperature disappear from the main screen.

ANTIBACTERIAL PROTECTION FUNCTION

The user can select **protection against Legionella bacteria in the DHW tank** (parameter F6).


CAUTION: temperature of the active weekly antibacterial protection is 60°C.

In addition to selecting automatic antibacterial protection, it is possible to override settings manually to carry out immediately a single antibacterial protection procedure.

CAUTION: For antibacterial protection procedure to be carried out the temperature of the CH boiler must achieve at least 65°C (if that requirement has not been fulfilled, the controller will display an alert).

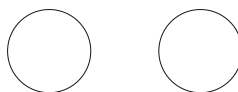
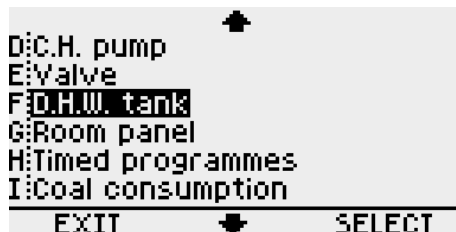
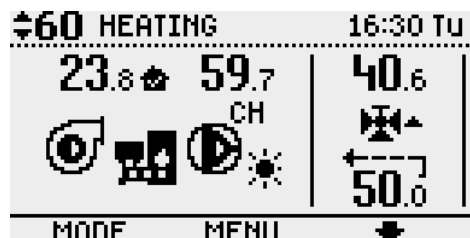
The maximal time of the antibacterial protection procedure is 2 hours.

If the temperature in the DHW tank reaches 60°C in a given weekly cycle the next scheduled antibacterial protection procedure will not be carried out.

 icon on the main screen means a completed antibacterial protection procedure.

In order to increase efficiency of the procedure, it is recommended to open all water discharge points (taps and others).

HOT WATER TANK PARAMETER MENU - group F



Press [MENU] to change parameters of the hot water tank. List of groups of parameters will appear on the screen. Turn the knob right (clockwise) to select group "F - D.H.W. tank", and then to select press the knob or the [SELECT] button. "F1"- the first in the group of parameters of the D.H.W. tank will appear on the screen. Turn the knob right to go to the following parameters, and then press [EDIT/SELECT] or the knob to change. At this point, you can change the value of a parameter either by turning the knob or using the dynamically appearing buttons. Some parameters need to be selected for editing; use the [SELECT] button and the knob. Editing is confirmed by pressing the knob or the [SAVE] button. Pressing [EXIT] will bring back the previous screen without saving any changes.

LIST OF PARAMETER OF THE DHW TANK (moving between parameters and changing of settings - turn the knob):

F1 DHW tank temperature

F1a day (10-85°C, default setting: 45°C)

F1b night (10-85°C, default setting: 35°C)

F1c economy (10-85°C, default setting: 25°C)

F2 DHW tank hysteresis

F2a day (1-15°C, default setting: 3°C)

F2b night (1-15°C, default setting: 3°C)

F2c economy (1-15°C, default setting: 3°C)

F3 DHW tank priority, YES, NO (default setting is NO)

When hot water tank priority has been selected, over the first 3 hours from switching on the C.H. pump the controller does not take into account the minimal temperature at the return to the boiler (parameter E3).

F4 DHW tank protection from cooling down (0-15°C, default setting: 5°C)

F5 Minimal temperature of the CH boiler at which the DHW tank feeding pump is switched on (20-70°C, default setting: 45°C)

F6 Protection of DHW against Legionella (YES, NO; default setting: NO) - **CAUTION: minimal temperature of active antibacterial protection is 60°C.** The [WHEN] button opens a screen to edit the time when the weekly protection procedure is started (default setting: Sunday, 0h.00m); the [NOW] button immediately starts a single antibacterial protection procedure.

CAUTION: For antibacterial protection procedure to be carried out the temperature of the CH boiler must achieve at least 65°C (if that requirement has not been fulfilled the controller will display an alert). If in a given weekly cycle the temperature in the DHW tank reaches 60°C, the next scheduled antibacterial protection procedure will be skipped.

F7 Manual mode of the DHW tank feeding pump. [START] button - the pump is switched on regardless of the settings; [STOP] button - the pump is switched off regardless of the settings.

CAUTION: The manual mode overrides the "anti-stop" function and the holiday mode. When the controller is powered on the pump always switches to automated mode.


F8 Operation with D.H.W. tank pump

If "NO" has been selected, D.H.W. tank pump control is deactivated. D.H.W. tank pump icon and reading of the D.H.W. tank temperature disappear from the main screen.

OPERATION WITH WIRELESS REMOTE CONTROL PANEL

Detailed information about the wireless remote control panel can be found in the remote control panel manual.

PAIRING OF THE PANEL WITH THE MAIN CONTROLLER (parameter G3)




When the room panel is switched on, it waits for 30 seconds to be paired with the Joker main controller. If pairing is not started within 30 seconds (parameter G3 in the menu of the Joker - press [START]), the room panel begins displaying measured room temperature and the "no radio communication" alert icon  (continuously).




To repeat pairing procedure, remove batteries from the room panel, reinsert them and (within 30 seconds) enter the "room control panel" menu of the Joker main controller, select the parameter G3 and press [START]. A "successful" or "failed" pairing message will appear on the main screen of the Joker controller. Additionally, before pairing procedure is repeated, it may be useful to change radio communication channel - parameter G3 (to select channel - turn the knob).



When the room control panel and the main controller are not paired, the JOKER controller works like a version without a room panel.

JOKER CONTROLLER OPERATION WITH THE ROOM CONTROL PANEL

SETTING TEMPERATURE BEHIND VALVE ON THE ROOM CONTROL PANEL

In order to set temperature behind valve on the room panel for the timed programme in use (indicated by one of three icons: , , ) - first, unblock touch buttons and then

- press the button  - current boiler temperature will be displayed for 15 seconds;
- press the button within 15 seconds  or  - current setting of temperature behind valve begins flashing and simultaneously one of two symbols will be displayed:
 - „L” ("low") - means that room temperature has been reached and that minimal temperature behind valve is edited.
 - „H” ("high") - means that room temperature has not been reached and maximal temperature behind valve is edited.

Pressing the  or  button again will further increase or decrease setting. When setting has been changed, after 15 seconds it will be registered and sent to the JOKER main controller.




The most important function of the room panel is to measure room temperature and to send it to the JOKER main controller. When room temperature setting for a given time and day has been reached, the controller is working to achieve the minimal temperature behind valve as set by the user. If room temperature has not been reached, the controller will be working to achieve the maximal temperature setting behind valve.



Three different room temperatures may be selected: "day", "night" and "economy"(parameter G1). Additionally, room temperature may be controlled through programmed time settings, different temperatures can be set for every day of the week and every hour (parameter H1). The timed programme currently in use is displayed on the MAIN SCREEN between the CH pump icon and the boiler return temperature.

When room control panel is switched off, the JOKER controller works like a version without a room panel.

„LOW COAL LEVEL" ALERT ON THE ROOM PANEL

The room panel informs the user about low coal level (as set by the user) by displaying the  icon in the right bottom corner. In addition a short audible signal is repeated every minute. The audible signal is switched off when the user has checked coal level in the hopper (expressed in %). In order to check coal level, press and hold the  button. Parental control does not need to be deactivated. The  icon will be displayed. The audible alert is triggered only if the timed programme "day" is in use. The audible alert can be switched off - set the I5 parameter to "NO". Description of how coal consumption is estimated is found on page 15.

ROOM CONTROL PANEL PARAMETER MENU - group G

Current room temperature measured by the room control panel is displayed in the top left corner of the main screen of the JOKER controller (see drawing below). Four symbols can appear together with temperature:



- room temperature setting not reached;



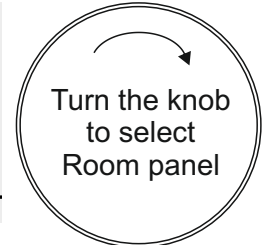
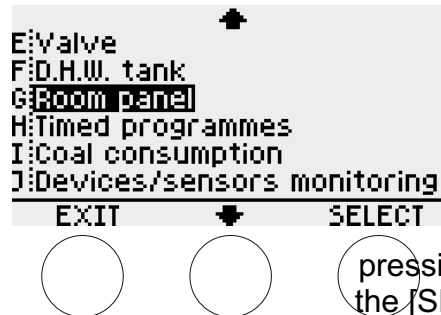
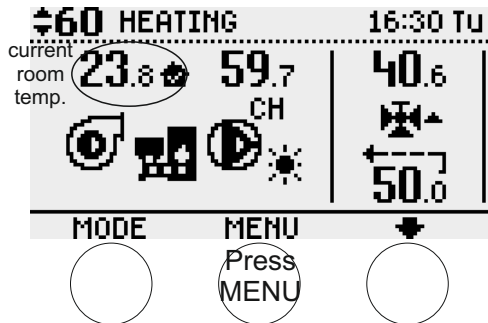
- room temperature setting reached;



- no room panel/failure of the room panel/communication failure in the room panel - the main controller works like a version without remote control;



- communication failure in the Joker controller - the main controller works like a version without remote control.



Press [MENU] to change parameters of the room panel. List of groups of parameters will appear on the screen. Turn the knob right (clockwise) to select group "G - Room panel", and then to select press the knob or the [SELECT] button. "G1"- the first in the group of parameters of the room panel will appear on the screen. Turn the knob right to go to the following parameters, and then press [EDIT/SELECT] or the knob to change. At this point, you can change the value of a parameter either by turning the knob or using the dynamically appearing buttons. Some parameters need to be selected for editing; use the [SELECT] button and the knob.

Editing is confirmed by pressing the knob or the [SAVE] button.

Pressing [EXIT] will bring back the previous screen without saving any changes.

LIST OF ROOM PANEL PARAMETERS (moving between parameters and changing of settings - turn the knob):

G1 Room temperatures

G1a day (10,0-35,0°C, default: 21,0°C)

G1b night (10,0-35,0°C, default: 18,0°C)

G1c economy (10,0-35,0°C, default: 17,0°C)

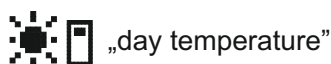
G2 Precision of room temperature control - hysteresis (0,1-0,5°C, default setting: 0,2°C)

G3 Pairing of the room control panel with the Joker controller (press [START] to begin pairing) and selection of radio communication channel

G4 Operation with room control panel

If "NO" has been selected, Joker controller operation with the room panel is deactivated. Room panel icon and reading of the room temperature disappear from the main screen.

TIMED PROGRAMMES - group H



„day temperature“



„night temperature“



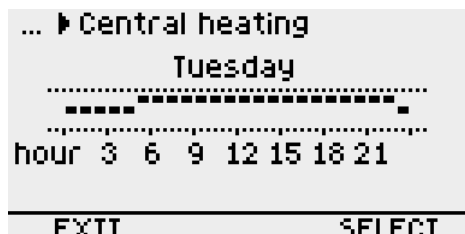
„economy temperature“

Central heating timed programmes - parameter H1.

CAUTION - Central heating timed programmes are common for temperature behind valve and room temperature settings.

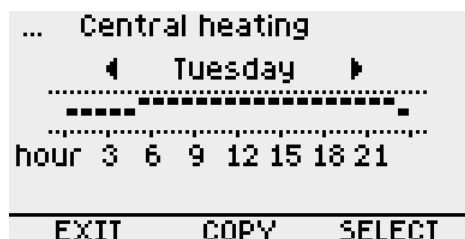
Timed programmes of the domestic hot water tank - parameter H2.

Timed programmes are managed like parameters in MENU groups A to G.



This screen shows a chart of timed programmes (temperatures) for the current day of the week.

Press SELECT or the knob

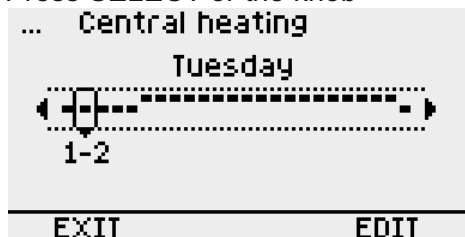


In this screen turn the knob to select a day of the week. You can see the timed programmes chart (temperature) for the selected day.

Possible operations:

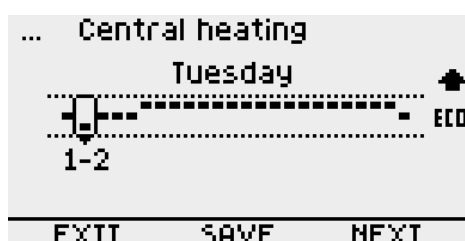
- press [SELECT] to edit the selected day
- press [COPY] to copy the settings for the selected day to another day of the week which you select with the knob

Press SELECT or the knob



In this screen, turn the knob to select time interval to be edited.

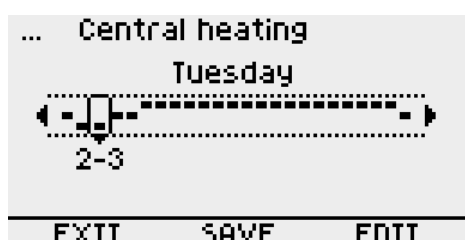
Press EDIT or the knob



In this screen, turn the knob to select the suitable programme - "day", "night" and "economy".

On pressing the [SAVE] button the screen returns to selection of the day of the week (see the second screen).

Press NEXT or the knob



Once you press [NEXT], the symbol of timed programmes moves to the following hour. Possible operations:

- press [EDIT] to change timed programme for selected hour (see the screen above)
- turn the knob to select any hour for editing
- press [SAVE] to save changes and return to the screen of selection of the day of the week (see the second screen).

Pressing [EXIT] will bring back the previous screen without saving any changes.

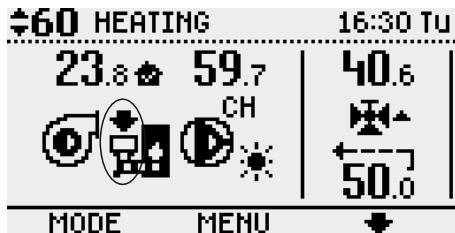
COAL CONSUMPTION - group I

Application

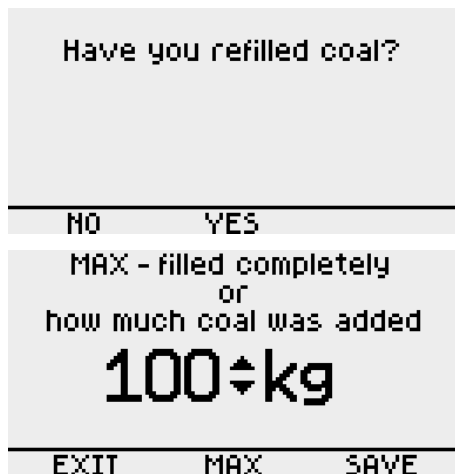
COAL CONSUMPTION function helps the user to monitor coal level in the coal hopper. Current coal consumption is calculated based on volume of the hopper and efficiency of the stoker. Information about current coal level in the hopper is provided as well. Alerts of the controller and of the room panel inform the user that coal needs to be refilled. Additionally the user can monitor average coal consumption over time.

COAL CONSUMPTION SETTINGS

In order that coal level be calculated correctly, fill the hopper completely with coal and then correct the parameter I3 - Coal hopper volume (default setting: 120 kg)
When coal level calculated by the controller drops below the value of the parameter I4 (default setting 10%) a red diode will start flashing and the following icon will be displayed on the control screen (arrow flashing):



While adding coal into the hopper press [MODE] and then press [STOP] on the [WORKING MODE] screen.



On pressing [STOP] a question will be displayed: "Have you refilled coal?"

If [YES] is selected, provide on the following screen how much coal was added and confirm by pressing [SAVE] or press [MAX] if the hopper was filled completely. The controller will update coal level in the hopper (parameter I1).

CAUTION:

It is advisable to verify the estimation of coal consumption performed by the controller from time to time - parameter I1. If it is evidently different from real consumption, it can be corrected.

If real coal consumption is lower than calculated by the controller, decrease parameter I2 (stoker efficiency). If is higher than calculated, increase the value of I2.

COAL CONSUMPTION PARAMETER MENU - group I

LIST OF PARAMETERS (moving between parameters and changing of settings - turn the knob):

I1 Current estimated amount of coal in the hopper (0 - 100%, default setting 100%)

I2 Actual stoker efficiency required to estimate coal consumption (1.0-20.0 g/sec, default setting: 6.5 g/sec)

I3 Coal hopper volume (5-300 kg, default setting: 120 kg)

I4 Low coal level alert (1 - 50%, default setting 10%)

I5 Audible alert of low coal level on the room panel (YES, NO, default: YES)

Detailed description of how coal consumption is monitored is available on page 12.

I6 Estimation of coal consumption (YES, NO, default: YES)

CONTROLLER SETTINGS - group K

Controller settings are managed like parameters in MENU groups A to I.

CONTROLLER SETTINGS (moving between parameters and change of setting - turn the knob):

K1 Season of the year: SUMMER, WINTER (factory setting: WINTER).

S and  appear on the MAIN SCREEN when SUMMER has been selected.

K2 Holiday mode (1-28 days, default setting: 0 days = switched off) - over the selected period of time all economic settings are active. "The text string **"HOLIDAY"** will appear on the MAIN SCREEN.

Press the [START] button to switch on the holiday mode for the number of days selected with the knob, press the [STOP] button to switch off.

K3 Day of the week/hour (press the NEXT button or the knob to select day of the week, hour and minutes for edition)

K4 Time until the main screen is returned (10-240 secs, default setting: 60 secs) CAUTION - the controller does not return automatically to the MAIN SCREEN from "manual mode" menus and the „Monitoring of devices and sensors”(par. J).

K5 Brightness after the main screen is returned (0-100%, default setting: 20%)

K6 Return to default settings (the controller will ask to confirm)

CAUTION: Return to default settings does not concern screen contrast (parameter K9), radio communication channel (parameter G3), direction of valve turning (parameter E6), language (parameter K7) and inactive devices (parameters F8 and G4).

K7 Change language: Polish / Russian / English / Lithuanian / Czech

CAUTION: Return to default settings does not concern language.

K8 Information about the controller (model, software version 5.1 - 6.0) - read only

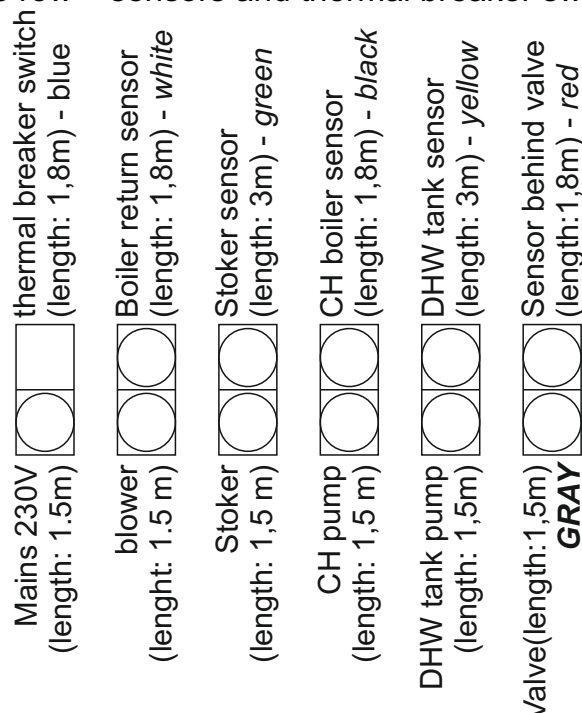
K9 Contrast of the display (1-31, default setting: 12 - CAUTION: return to default settings does not concern display contrast)

KIT COMPOSITION

- controller
- plastic tie straps - 4 pcs.
- metal tie strap (for stoker sensor) - 1 pc.
- wall mount - 1 pc.
- rawplug 6mm - 2 pcs.
- IEC connector with screw terminals for valve actuator cable - 1 pc.
- vertical support - 1 pc. (available as an option at an extra charge)

SEQUENCE OF CABLE CONNECTIONS seen in the bottom view of the controller

top row – sensors and thermal breaker switch



Bottom row - power supply cables

EXTENDING SENSOR CABLES

In case you require a longer temperature sensor cable please contact TMK at +48 503 141 201.



OPERATION WITHOUT HOT WATER TANK SENSOR

In case one of the sensors is disconnected (e.g. if domestic hot water tank is switched off - parameter F8), tape up the unused connector to protect it from dust and humidity. In addition, wind and tie up unused cables with a tie strap.

CAUTION: If return temperature sensor has not been installed or is damaged, the controller will not activate the blower and stoker in the automatic mode - replace the sensor.

PROTECTION

Pumps, blower, valve, stoker and the controller are protected by a 5A fuse which blows in case of malfunction (such as a short circuit in one of the pumps, the blower, the valve, the stoker or the controller). Another protection provided by the controller is a thermal breaker which switches off the blower (regardless of the controller setting) when boiler temperature exceeds 90 °C, which may occur in case of malfunction of a pump or the controller itself. The thermal breaker returns to the initial position after temperature of the boiler has fallen by some 30°C).

A flashing  icon on the MAIN SCREEN replacing temperature reading means that the temperature sensor is not working properly. Additionally, a visual alert is activated - a flashing yellow diode. Failure of the stoker temperature sensor is also displayed on the MAIN SCREEN -  stoker. If sensor failure occurs, the controller enters into emergency mode.

CAUTION: Manual mode overrides the emergency mode.

CHANGE LANGUAGE - parameter K7

The controller menu features a choice of five languages: Polish, Russian, English, Lithuanian and Czech. To select language, press [MENU]. List of groups of parameters will appear on the screen. Turn the knob right (clockwise) to select group "K - Controller settings", and then press the right button or the knob. Turn the knob right (clockwise) to select parameter K7, and then press the right button [SELECT] or the knob to choose language.

Editing is confirmed by pressing the knob or the [SAVE] button.

Pressing [EXIT] will bring back the previous screen without saving any changes.

WARRANTY

TMK sp.j. grants the user a warranty for the JOKER DS2PM-RC controller. The warranty period is 3 years from the date of purchase of the device, however not longer than 4 years from the date of manufacture.

WARRANTY TERMS AND CONDITIONS

Warranty claims shall be accepted provided that the terms and conditions of warranty, and general rules of operation of electronic devices, are complied with as required. TMK sp.j. guarantees appropriate workmanship, high quality and reliable operation of the controller. In the event of any faults in the controller's operation, or defects which can be attributed to the manufacturer, TMK sp.j. shall repair or replace the faulty controller with a defect-free device within 14 working days from the date of returning the controller (in person or through post). The warranty scheme explicitly excludes all defects arising due to the user's fault and, particularly, defects caused by mechanical damage, faulty mounting, water ingress or operation of the device contrary to the general rules of operation of electronic devices.

The warranty is only valid with a proof of purchase.

DATE OF SALE:
day, month, year

.....
Seller's stamp and signature

MANUFACTURER:

Firma TMK sp.j.
62-300 Września
Szosa Witkowska 105
tel./fax +48 61 437 97 60
www.tmk.com.pl

.....
DATE OF MANUFACTURE