OPERATING MANUAL

RK-2006LP

AUGER FITTED SOLID FUEL
BOILER TEMPERATURE CONTROLLER

Version DC19

1. Application.

Controller RK-2006LP is designed for temperature control of solid fuel fired water boilers equipped with:

- Auger and feeding stoker working with the stoker,
- Blow-in fan,,
- Ignition glow plug for automatic start,
- Central heating pump,
- Hot tap water pump or mixing pump (option),
- Alarm indicator or ash removal system (option),
- Room termostat (option).

2. Connection.

Before turning on the controller, connect: power cables of: controller, blow-in fan, central heating and hot tap water pumps and auger to appropriate sockets in the rear of the controller. The temperature sensor should be placed in metering locations that shall be dry. Figure 2 presents the electrical connection diagram. For connection of stoker, alarm indicator and ash removal system the additional module UM-1 shall be applied.

CAUTION! Before plugging in the controller first check if the wiring system is properly grounded, and if the terminal screws of the output connector are tightened.

CAUTION! Total power of the fan, central heating and hot water pump which are connected to the controller must not exceed 900W. Outputs of the controller that are not used may remain disconnected.

CAUTION!!! Control outputs of the feeder and lighter are not protected and MUST BE protected with adequate fuses.

CAUTION! The controller is equipped with properly protected semiconductor temperature sensors, yet metering locations with installed sensors must be dry.

3. Operation.

After turning the controller on, the name and software version is displayed and all signal lamps are on to enable checking of functionalities. When the controller is turn on it will return to its last state before turning off or power failure.

On the front panel of the controller (picture 1) there is:
1 - Display,
2 - Fan indicator,
3 - Auger indicator,
4 - Ignition glow plug indicator,
5 - Central heating circuit pump indicator,
6 - Hot tap water pump or mixing pump indicator,
7 - Room thermostat operation and boiler desired setting indicator,
8 - Previous parameter selection button,
9 - STOP button for alarm and settings change cancellation,
10- START button,
11- Next parameter selection button,
12- Boiler thermostat and parameters setting knob with OK confirmation button.

Picture 1. Front panel of RK-2006LP controller.

3.1. Main window, adjustment mode and devices mode.
Following turning on of the controller the main window is displayed. On the top of the display (1) boiler water temperature is shown, and on the bottom operation mode is displayed. Symbol „*" displayed in the right bottom corner indicates burner flame detection. Lights below the display indicate particular outputs and when switched on they indicate their operation.

Basic operation of the controller is carried out by setting the desired temperature of the boiler. To do this turn the boiler thermostat knob (12) according to the desired setting and confirm with OK button (Press the knob).

CAUTION! When the household thermostat input works in the mode of adaptation, any attempts to change the boiler programmed temperature may end with failure, i.e. when the new value is confirmed, the change in the boiler programmed temperature to the value resulting from the algorithm of adaptation is automatic.

CAUTION! If the heating system is fitted with the domestic water tank, boiler water temperature controlled and maintained by the controller during tank preheating may be higher than desired temperature setting programmed with thermostat knob.

3.2. Device operation modes.

Table 1. Operation mode list.

Operation mode	Description
STOP	Boiler control stopped. Controller maintains central heating and domestic water pump operation, but automatic ignition does not follow.
STANDBY	Controller maintains central heating and domestic water pump operation. In case of heat demand automatic ignition of boiler follows.
IGNITION	Controller carries out automatic ignition of boiler.
KINDLE FIRE STABILIZE	Controlling the fan and auger to support the burner operation.
MAXIMUM POWER	Fan and fuel feeder operate to reach boiler maximum power.
MODUL. POWER	Controller reduces fuel feeding as much as boiler water temperature corresponds to the desired setting.
MINIMUM POWER	Fan and fuel feeder is minimized to maintain fire.
SCAVENGE (AIR PURGING)	Controller activates blower to ensure removal of accumulated gases.
POSTCOMBUSTION	No demand for heat or cleaning the furnace is needed. The feeder is turned off and the fuel is reheated until the flame dies down.
EXTINCTION (SHUTDOWN)	Controller shuts down boiler operation.
CLEANING	Burner cleaning.
AUGER (MANUAL) REFILLING	Manual operation of fuel auger. Boiler control stopped. Controller maintains central heating and domestic water pumps operation, but automatic ignition does not follow.
AUGER EXTINCT (EMERGENCY SHUTDOWN)	Fuel ignition in auger channel. The controller empties ignited fuel from the auger channel until temperature drops.
ALARMS	Safety and temperatures sensors failure alarms.

STOP.
Controller maintains central heating and domestic water pumps operation only to protect the boiler against overheating and auger channel ignition. Room thermostat contacts closing(call for heat) and domestic water temperature drop do not result in any action. Pressing START button (10) will result in switching the controller to STANDBY mode.

STANDBY.
In this mode controller does not carry out any additional operation, until room thermostat contacts close (call for heat) or domestic water temperature drop, the boiler operation will focus on maintenance of temperature according to thermostat setting programmed with the knob. If preheating of domestic water tank is necessary and the desired boiler temperature setting is higher from domestic water temperature setting the controller will follow higher setting. Pressing the STOP button (9) will result in switching to STOP mode.

IGNITION.
Boiler controller is switched into IGNITION mode if demand for heat follows, and if the controller did not detect the flame. During ignition the controller activates fan, auger and igniter. Fuel and air feeding rate is adjusted by the technician. IGNITION

mode follows till flame is detected. If the flame is not detected within the specified time, the controller activates „Out of fuel alarm". Pressing STOP button, exceeding time limit for cleaning, thermostat contacts opening or if water temperature in domestic water tank is obtained during operation in IGNITION mode will result in switching of the controller into the POSTCOMBUSTION mode.

KINDLE FIRE STABILIZE.
After the flame has been detected the boiler burner is switched into the KINDLE FIRE STABILIZE mode. While in the mode the fan operates with the maximum power. The fuel dose given by the auger is the same as while at work with the minimum power. Additionally, depending on the service settings, the fuel dose may be increased gradually. KINDLE FIRE STABILIZE option is being carried out for the period of time set in the service settings or till the moment the boiler reaches the programmed temperature. Pressing STOP button, exceeding time limit for cleaning, thermostat contacts opening or if water temperature in domestic water tank is obtained during operation in the KINDLE FIRE STABILIZE mode will result in switching of the controller into the POSTCOMBUSTION mode.

CAUTION! The KINDLE FIRE STABILIZE mode can be turned off by the technical staff. In such case the controller is switched into the work with the maximum power after the ignition cycle has been finished.

MAXIMUM POWER OPERATION MODE.
When in this mode the controller operates fuel auger and fan to ensure max. power of the boiler. Fuel and air feeding rate is adjusted by the technician. Pressing STOP button, exceeding time limit for cleaning, thermostat contacts opening or if water temperature in domestic water tank is obtained during operation in MAXIMUM POWER mode will result in switching of the controller into EXTINCTION (SHUTDOWN) mode.

MODULATED POWER OPERATION MODE.
Depending on desired parameters the controller may gradually reduce fuel and air rate feeding to reduce burner power, as much as boiler water temperature corresponds to the programmed setting. Pressing STOP button, exceeding time limit for cleaning, thermostat contacts opening or if water temperature in domestic water tank is obtained during operation in MODULATED POWER mode will result in switching of the controller into POSTCOMBUSTION mode.

MINIMUM POWER OPERATION MODE.
When in this mode the controller operates fuel feeding and fan operation to maintain firing to ensure the minimum fuel consumption. Fuel and air feeding rate is adjusted by the technician. If in spite of boiler minimum power, increase temperature follows of water temperature in relation to the top hysteresis parameter setting, the controller will be switched into EXTINCTION (SHUTDOWN) mode. When the boiler water temperature drops below the desired setting it will result in switching of the controller into „Maximum power operation mode". Pressing STOP button, exceeding time limit for cleaning, thermostat contacts opening or if water temperature in domestic water

tank is obtained during operation in MINIMUM POWER mode will result in switching of the controller into POSTCOMBUSTION mode.

SCAVENGE (AIR PURGING).
During the operation with minimum power output, the controller will activate flue scavenge (purging) to ensure removal of accumulated gases. Scavenge (purging) is provided with temporary fan operation in higher speed.

POSTCOMBUSTION.
In the mode the auger is turned off by the regulator. The fan power is not altered (it works with same speed as when the POSTCOMBUSTION mode was turned off). The POSTCOMBUSTION prolongs till the moment the flame dies down, after which the regulator is switched into the EXTINCTION mode.

EXTINCTION (SHUTDOWN).
In this mode the fan power is changed to the value programmed by the technical staff to ensure complete fuel combustion and the burner cool down. When EXTINCTION (SHUTDOWN) is finished the controller is switched into CLEANING, STANDBY or STOP mode, provided POSTCOMBUSTION, EXTINCTION (SHUTDOWN) followed as a result of STOP button pressing.

CLEANING.
The automatic furnace cleaning is carried out if the extinction time has been determined by the technician or the burner has been operating long enough. In the mode, the cleaning mechanism is activated for the period preprogrammed by the technician. If the STOP button has been pressed during the cleaning, the controller will enter either the STANDBY or STOP mode.

AUGER (MANUAL) REFILLING.
User may activate auger manual refilling function. When device is in STOP mode, press START and hold button for 5 seconds to start refilling. Refilling follows according to the time programmed by the technician or until it is manually turned off with STOP button.

AUGER EXTINCTION (EMERGENCY SHUTDOWN).
If the auger is equipped with a temperature sensor, a temperature increase above the range programmed by the technician, it will result in activation of auger ignition alarm. The controller turns off the fan and auger. If the burner is equipped with the stoker, the device is switched additionally into AUGER EXTINCTION (EMERGENCY SHUTDOWN) mode. During shut down the stoker is engaged for the time needed to remove the ignited fuel from the stoker. In addition if the burner has cleaning mechanism, the controller will activate the cleaning cycle and remove fuel from the burner.

3.3. ALARMS.

RK-2006LP controller continually checks operations of installed devices as well as alarm sensors. In case of failure, the device activates alarm and proper operations are carried out. Information on the problem is also shown on the display. In addition depending on nature of damage the inner sound alarm system may be activated. To cancel alarm, first identify the cause and repair it and then STOP button shall be pressed. If alarm is cancelled and required repairs did not follow, sound alarm system will be turned off only. In case more than one alarm has been activated, information on each alarm will be displayed alternately.

OUT OF FUEL ALARM.

If in IGNITION mode the controller fails to detect a flame within the time specified by the technician, „Out of fuel alarm" will be activated. To turn on the controller again first refill fuel, cancel the alarm with STOP button and begin setting-up process by pressing START button.

EMERGENCY ALARM.

Depending on construction type, the boiler may be equipped with emergency sensor (e.g. hopper cover sensor). Activation of the alarm will result in fan and auger turning off, and switching the controller into STANDBY mode.

CAUTION! This alarm does not result in engagement of inner sound system and does not require cancelling. Once the hopper cover is closed, the programmed process will be carried out from the moment when it was interrupted (it returns to the mode that was before alarm activation).

AUGER IGNITION ALARM.

If the auger has been equipped with a temperature sensor, and the programmed setting of „Auger ignition temperature" was exceeded, it will result in activation of auger ignition alarm. The controller will go to SHUTDOWN mode.

CAUTION! This alarm may be cancelled only if the auger temperature drops below set point. If the alarm was cancelled before extinction completion, only sound alarm will be turned off.

AUGER SENSOR DAMAGE.
In case of auger temperature sensor damage, as in case of overheating, the controller will go to shut down mode and will activate the appropriate alarm:

A L A R M : A U G E R
T E M P . S E N S O R

CAUTION! This alarm may be cancelled only after repairs.

BURNER TEMPERATURE SENSOR DAMAGE.
If flame temperature detector (CT-1/2 or PT-1000) has been connected to the controller, its damage will result in activation of the alarm and switching into STANDBY mode.

A L A R M : B U R N E R
T E M P . S E N S O R

PROTECTION AGAINST BOILER OVERHEATING.
RK-2006LP controller is provided with triple protection against boiler overheating. If boiler water temperature set point is equal to the programmed „Boiler max. temperature" service setting, the controller will engage central heating pump.

If water boiler temperature increases above 93°C, it will activate STB system which will automatically engage power for central heating pump and will shut off blower. Operation of STB will result in switching the controller to STANDBY mode. Normal operation of STB will be resumed, if boiler temperature drops below 90°C.

Boiler water temperature increases up to the programmed „Boiler overheating temperature" service setting will result in fan turning off, engagement of central heating pump and switching the controller in STOP mode, but EXTINCTION (SHUTDOWN) mode and alarm will not be activated:

A L A R M : B O I L E R
O V E R H E A T

CAUTION! This alarm may be cancelled, if boiler water temperature drops below the overheating temperature setting.

BOILER TEMPERATURE SENSOR DAMAGE.
In case of boiler water temperature sensor damage the controller turns off the fan, engages central heating pump, controller switches into STOP mode and activates alarm:

A L A R M : B O I L E R
T E M P . S E N S O R

CAUTION! This alarm may be cancelled only if repairs are made.

DOMESTIC WATER TEMPERATURE SENSOR DAMAGE.
If the heating system is fitted with domestic water circuit, in case of sensor damage the controller turns off the domestic water pump and activates alarm:

A L A R M : H O T W A T E R
T E M P. S E N S O R

CAUTION! This alarm does not require cancellation. The alarm is deactivated automatically, if repairs are made.

RETURN WATER TEMPERATURE SENSOR DAMAGE.
If the heating system is provided with the mixing pump, in case of return water temperature sensor damage, the pump is switched off and the controller activates alarm:

A L A R M : R E T U R N
T E M P. S E N S O R

CAUTION! This alarm does not require cancellation. The alarm is deactivated automatically, if repairs are made.

4. Review of user settings.

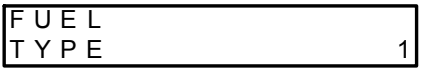
Pressing parameter buttons (8 and 11) allows reviewing user's parameters while their activation is indicated with fast flashing of proper light. Following selection of the desired parameter you can switch to the change mode by pressing OK button (12) (indicated with the displayed symbol „→" on the left of the desired parameter). You can confirm new settings by pressing OK button. Press the STOP button to exit the change mode and resume the previous setting of the parameter. If the device was left in the change or parameters previewing mode for 60 seconds and no button was pressed, the controller will automatically cancel the last modification and will be switched into display mode. Table 2 presents user's settings. Columns of the table represent: fast flashing light, parameter name and available minimum and maximum setting.

Table 2. User settings list.

Light	Parameter	Min.	Max.
Auger	Fuel type.	1	4
Thermostat	Desired boiler temperature.	40°C	90°C
	Boiler maximum power.	60%	100%
CH pump	Central heating pump operation mode.	WINTER	SUMMER
HTW pump	Domestic water desired temperature.	30°C	60°C
	Domestic water heating priority.	NO	YES
	Domestic water tank bacterial flora liquidation program.	NO	YES
	Measured domestic water temperature.		
	Measured return water temperature.		
Igniter	Current furnace brightness (FD-1).		
	Brightness when fuel ignition has occurred (FD-1).	0	255
	Temperature of the burner (PT-1000, CT-1/2).		
	Burner temperature with fuel ignited (PT-1000, CT-1/2).	20°C 20°C	500°C 100°C
	Burner work time.		
	Burner start up counter.		

4.1. Fuel type selection.

RK-2006LP controller enables programming ignition settings for four different fuel types. „Fuel type" parameter enables switching between particular settings. Fan, auger and igniter operation are saved for the selected fuel type.



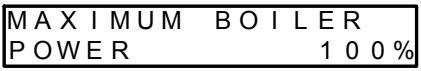
CAUTION! Fuel type may be changed, if the controller is in STOP mode only.

4.2. Boiler temperature setting.

Desired boiler temperature - it is the temperature setting that will be obtained by the controller, if room thermostat input contacts are closed.

4.3. Boiler operation maximum power.

Boiler operation maximum power - this parameter enables to limit boiler operation max power. Power limitation is possible thanks to fuel reduction during operation at maximum power.



4.4. Domestic water circuit operation parameters.
These parameters specify how the controller ensures domestic water temperature. In case of the system without domestic water circuit, it is not possible for the user to view and change these parameters.

Domestic water desired temperature - parameter that specifies temperature of water in domestic water tank that will be obtained by the controller.

Domestic water heating priority - this parameter specifies operation of central heating and domestic water pumps during hot water preheating. When priority is selected during operation and hot water preheating, the controller engages domestic water pump and switches off central heating pump. This operation results in quick heating of water in the tank. During preparation of hot water without priority option, central heating and domestic water pumps operation follow at the same time.

Bacterial flora liquidation in domestic water tank - the controller enables manual activation of program for bacterial flora liquidation in domestic water tank. When „YES" is selected, it activates the process of heating the domestic water tank above 75°C. When the required temperature is obtained the controller switches off the bacterial flora liquidation program automatically.

CAUTION! Bacterial flora liquidation option shall be switched on in the night or if water intake does not follow from the domestic water tank, to protect the user against burning.

Domestic water measured temperature – the controller enables to view the temperature measured in domestic water tank.

4.5. Return water temperature.
If the heating circuit is equipped with the mixing pump and return temperature sensor, this option enables view of the return water temperature. Otherwise, this option in unavailable.

4.6. Flame optical detection parameters.
These parameters specify operation of burner flame optical detector. If the system is fitted with flame temperature detector, parameters change and viewing is unavailable.

The current furnace brightness determined by an optical detector - this parameter displays the current flame brightness measured by the optical detector.

Brightness when fuel ignition has occurred - if the optical detector reading will be equal or higher than this desired setting, the controller will switch off the igniter and assume that ignition has occurred.

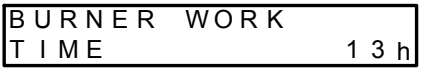
4.7. Flame detection temperature parameters.
These parameters specify operation of the temperature detector of burner fuel ignition. If the system is fitted with optical fire burner detector, parameters change and viewing is unavailable.

Burner measured temperature - this parameter displays the current measured burner temperature.

Burner temperature with fuel ignited - if ignition temperature is equal or higher than this desired setting, the controller will switch off the lighter and assume that ignition was provided.

4.8. Information on burner work.
Parameters described below refer to counters that accumulate information on operation of the burner since its first start. It is not possible to cancel counter readings.

Burner work time.
Reading of this counter defines burner work time. The counter updating follows after total working hour of the device at maximum or minimum power.



Burner start up counter.
Reading of this counter defines start number of the ignition attempts.

5. Settings – service mode.

Holding OK button for 3 seconds enters the service mode where you can review and change the parameters by pressing the selection buttons (8 and 11). After selection of the given parameter you can enter into the change mode with OK button that is indicated by the displayed symbol „→" on the left of the desired parameter. Pressing OK button will confirm the change. If you press STOP button changes will not be saved and old settings will be resumed. If the device is in change mode or parameters reviewing for 60 seconds, the controller will automatically go back to the display mode. Table 3 presents the list of all service settings. Columns of the table represent: flashing light, parameter name and available minimum and maximum setting.

Table 3. Service settings.

Light	Parameter	Min.	Max.
No	Language selection (See description).		
Fan	Fan modulation during boiler start.	NO	YES
	Min. fan speed during heating up.	1%	100%
	Max. fan speed during heating up.	1%	100%
	Ignition modulation start delay.	0s	250s
	Fan speed during ignition.	1%	100%
	Fan speed at max. power.	1%	100%
	Fan speed at min. power.	1%	100%
	Fan speed at extinction.	1%	100%
	Fan speed during cleaning mode.	0%	100%
	Fan scavenge (air purging).	NO	YES
	Fan scavenge (air purging) blow time.	5s	60s
	Fan scavenge (air purging) pause time.	1min	99min
	Fan speed during scavenge.	1%	100%
Auger	Auger filling time.	1min	99min
	Initial fuel feed.	0s	250s
	Fuel feed cycle.	1s	250s
	Fuel feed during ignition.	0%	100%
	Fuel feed for max burner power.	1%	100%
	Fuel feed for min. burner power.	1%	100%
	Stoker work mode (See description).		
	Stoker work time.	1s	99s
	Stoker pause time.	1s	99s
	Stoker extra work time.	1s	99s
	Stoker emptying time.	1s	99s
	Auger ignition test.	NO	YES
	Auger ignition temperature.	20°C	99°C
Igniter	Flame detector type (See description).		
	Correction FD-1.	0	99
	Hysteresis loss of flame (optical sensor).	1	255

	Hysteresis loss of flame (temperature sensor).	1°C	250°C
	Flame failure detection delay.	1s	500s
	Fuel ignition time.	1min	15min
	Kindle fire stabilize.	NO	YES
	Kindle fire stabilize time.	1min	99min
	Smooth kindle fire stabilize.	NO	YES
	Ignition try count.	1	10
	Furnace extinction time.	1min	30min
	Furnace cleaning mode (See description).		
	Cleaning mechanism work time.	1s	900s
	Cleaning mechanism retraction time.	1s	900s
	Cleaning mechanism pause time.	1s	900s
	Cleaning mechanism opening time.	1s	900s
	Cleaning mechanism closing time.	1s	900s
	Number shut downs before cleaning.	1	99
	Minimum operating time without cleaning.	0h	max-1h
	Maximum working time without cleaning.	min+1h	99h
CH pump	Central heating pump work mode (See description).		
	Central heating pump periodic work.	NO	YES
	Central heating pump periodic work time.	1min	99min
HTW pump	Domestic water path (See description).		
	Domestic water heating hysteresis.	1°C	20°C
	Boiler increase temperature during hot tap water heating.	2°C	20°C
	Domestic pump work extension.	NO	YES
	Domestic pump work extension time.	1min	10min
	Stabilization time after heating up DHW.	1min	99min
	Mixing pump engaging temperature.	30°C	60°C
	Mixing pump work hysteresis.	1°C	9°C
Thermostat	Boiler minimum temperature.	30°C	69°C
	Boiler maximum temperature.	70°C	90°C
	Boiler upper hysteresis.	1°C	20°C
	Boiler power switching hysteresis.	1°C	9°C
	Boiler protection hysteresis.	1°C	5°C
	Boiler overheating temperature.	90°C	99°C
	Burner power modulation.	NO	YES
	Modulation factor.	1	20
	Thermostat working mode (see description).		
	Time constant of adaptation.	1min	99min
	Delay in burner turn-off.	0min	99min
No	Resume service settings.		
	Outputs test.		
	Service mode end.		

5.1. Language selection.

RK-2006LP controller interface offer the function of language selection. Number of available languages depend on software version being used.

5.2. Fan operation parameters.

Fan modulation during boiler start - selection of „YES" setting means that fan speed modulation will be provided during boiler start.

Min. fan speed during heating up - this parameter is available, if the function of fan modulation during boiler start is selected. This parameter specifies power of the fan during boiler start.

Max. fan speed during heating up - this parameter is available, if the function of fan modulation during boiler start is selected. This parameter specifies power of the fan at end of boiler start.

Ignition modulation start delay - this parameter is available, if the function of fan modulation during boiler start is selected and it describes operation time of the fan with speed according to the selected „Min. fan speed during boiler start" setting. After time expire the controller will increase fan speed up to the selected „Max. fan speed during boiler start" setting.

Fan speed during ignition - this parameter describes power of the fan speed during ignition. This parameter is unavailable if „Fan speed modulation during ignition" was selected.

Fan speed at max. power - means the fan power when burner of the boiler works with maximum power.

Fan speed at min. power - means the fan power when burner of the boiler works with minimum power.

Fan speed during extinction (shut down) - means fan power during burner extinction (shut down).

Fan speed during cleaning mode – the parameter is available only when the cleaning mechanism is in AUTO or COMBI mode. It defines the capacity at which the fan is operating when cleaning the furnace.

Fan scavenge (air purging) - the controller offers the function of scavenge (air purging), which simply includes periodical switching on of the fan during burner operation for the purpose of removal of accumulated gases.

Fan scavenge (air purging) blow time - this parameter specifies blow time. This setting is unavailable if „Fan scavenge" (air purging) setting was not selected.

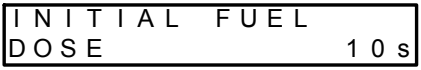
Fan scavenge (air purging) pause time - this parameter specifies pause time during scavenge. This setting is unavailable if „Fan scavenge" (air purging) setting was not selected.

Fan speed during scavenge (air purging) - this parameter specifies fan power during scavenge (air purging). This setting is unavailable if „Fan scavenge" (air purging) setting was not selected.

5.3. Fuel auger operation parameters.

Auger filling time - this parameter specifies time required for refilling the main auger with fuel.

Initial fuel feed - this parameter specifies time, when fuel will be fed before igniter start. Selection of „0s" setting will switch off initial fuel dose feeding. In this case „Fuel dose during ignition" setting shall be programmed as the value over „0%".



Fuel feed cycle - auger operation cycle includes fuel feeding and feeding pause. This parameter specifies the time of the whole cycle. The desired value specifies all burner work modes which require fuel feeding (ignition, maximum and minimum power).

Fuel feed during ignition - this parameter specifies fuel dose that is fed to the burner during lighter operation. The programmed setting specifies feeding time in percent in relation to the time of whole work cycle. Selection of „0s" setting will switch fuel feeding during operation of the lighter. In this case „Initial Fuel Dose" setting be shall be programmed as the value over „0s".

Fuel feed for max. burner power - this parameter specifies fuel dose fed to the burner during operation with maximum power. The programmed setting specifies feeding time in percent in relation to the time of whole work cycle.

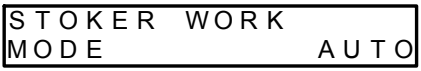
Fuel feed for min. burner power - this parameter specifies fuel dose fed to the burner during operation with minimum power. The programmed setting specifies feeding time in percent in relation to the time of whole work cycle.

Stoker work mode - this parameter specifies work mode of the stoker:

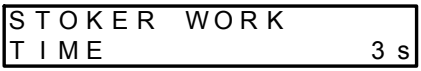
„OFF" - the burner without the stoker.

„CYCL." - stoker is switched on periodically, regardless of the auger. Work and pause time of the stoker is determined with particular settings.

„AUTO" - operation mode when the stoke is switched on along with the auger and is switched off with a delay defined with „Stoker extra work time" setting.



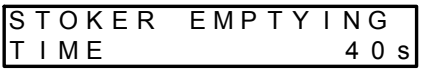
Stoker work time - this parameter specifies operation time of the stoker in whole work cycle. This setting is unavailable if the stoker is switched off or in automatic mode.



Stoker pause time - this parameter specifies pause time during stoker operation when in work cycle. This setting is unavailable if the stoker is switched off or in automatic mode.

Stoker extra work time - this parameter is available only, when the stoker works in automatic mode and it specifies stoker work time after auger switching off.

Stoker emptying time – this parameter specifies time needed for removal of the whole fuel from the stoker. Stoker emptying during extinguishing of feeder, feeding initial fuel dose (portion), and during burner shut down. This setting is unavailable if the stoker is switched off.



Auger ignition test - this parameter provides functionalities of „X" emergency input. If „NO" setting was selected then „X" input will be used for connection of e.g. auger flap opening contact sensor or the contact informing on operation of auger motor overload switch. If „YES" setting was selected then „X" input will be used for connection of auger temperature sensor used for ignition detection.

CAUTION! In case emergency input is not used, „NO" parameter shall be selected in „Auger ignition test" setting and contacts of „X" input shall be closed.

Auger ignition temperature - this parameter specifies auger temperature, when the controller activates auger ignition alarm. This parameter is unavailable when „NO" was selected in „Auger ignition test" setting.

5.4. Fuel ignition, extinction (shut down) and cleaning combustion chamber.

Flame detector - flame detection may follow with two methods: burner temperature measurement or brightness measurement. In case when temperature sensor is used, depending on its location, temperature measurement range may be from several degrees to several hundred degrees. If measured temperatures do not exceed 100°C it is recommended to use CT-1 or CT-2 sensor. In case of higher temperatures, PT-1000 sensor shall be used. For flame brightness measurement, FD-1 optical detector shall be used.

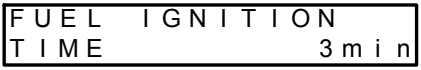
Correction of the photodetector indications – the parameter is available only when an optical flame detector (FD-1) has been selected. It determines the quantity of light „seen" by the sensor after the burner has been extinguished. The value of correction is deducted from the measured quantity of light during the flame detection stage. The correction enables the user to calibrate the FD-1 sensor so that the result of illuminance measurement while the burner is extinguished could equal „0".

Hysteresis loss of flame - depending on the type of flame detector, this parameter specifies how many degrees or units in relation to the threshold set by the user must cut off the lighter or the brightness of the flame temperature to the controller began to flame failure detection procedure.

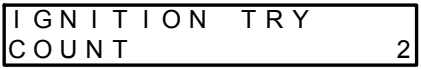
WARNING! If the hysteresis is larger than the threshold of igniter shut down, flame failure detection procedure is started when the temperature drops or the brightness of the flame to the value of „0".

Flame failure detection delay - this parameter specifies how long after the launch procedures for the detection of flame failure or brightness temperature must remain below the hysteresis for the regulator to decide that the furnace was extinguished.

Fuel ignition time - after igniter and fan are switched on, the controller tests temperature increase or brightness in the selected location of the burner. If flame is not detected within the time programmed in this parameter, the controller will repeat ignition cycle.



Ignition try count - this parameter specifies how many times ignition may fail until the controller activates „Out of fuel alarm" and switches into STOP mode. The alarm is indicated with adequate message displayed on the display. To start the controller first refill the fuel, then cancel by pressing STOP button and start setting mode by pressing START button.



Kindle fire stabilize – the parameter determines if the mode of kindle fire stabilize is switched on after the fuel has been ignited.

Kindle fire stabilize time – the parameter defines the maximum working time while the regulator is in the mode of stabilizing the ignition. The parameter is not available if the „Kindle fire stabilize" parameter has been set to „NO".

Smooth kindle fire stabilize – set the parameter to the "YES" value to allow the regulator to increase the amount of fuel gradually while it is in the „Kindle fire stabilize" mode. The parameter is not available if the „Kindle fire stabilize" parameter has been set to „NO".

Furnace extinction (shut down) time - if the controller switches to extinction (shut down) mode, the induction fan is activated according to power selected in „Fan speed at extinction (shut down)" setting. The parameter defines the duration of extinction. This function ensures combustion of all fuel remains and burner cool down.

Furnace cleaning mode - the parameter defines the way the cleaning mechanism works.

„NONE" - means the burner is not equipped with a cleaning mechanism. In such case, the DATA output works as an external alarm signalling device.

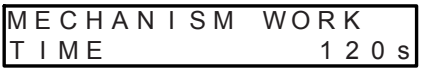
„CYCLE" - means the cleaning procedure is activated after the flame has occurred and is repeated in cycles until the burner is extinguished (end of the POSTCOMBUSTION mode). The cleaning depends on activating the mechanism for the period set in the „Cleaning mechanism work time" parameter. Once the cleaning mechanism has been turned off, the time set in the „Cleaning mechanism retraction time" and „Cleaning mechanism pause time" parameters is counted down.

„ROTO" - the cleaning mechanism operation in the ROTO mode is similar to its work in the CYCLE mode. The difference is the output controlling the cleaning mechanism is activated for the whole period of the EXTINCTION mode.

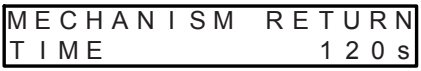
„AUTO" - means the cleaning procedure is automatic and is activated when the determined number of shutdowns or long burner working time occurs. The automatic cleaning depends on the furnace extinction, starting the cleaning mechanism for the period set in the „Cleaning mechanism opening time" parameter and activating the fan with capacity defined in the „Fan speed when cleaning" parameter. When the mechanism output and the fan are turned off, the time set in the „Cleaning mechanism closing time" parameter will be counted down and the controller standard work will be resumed.

„COMBI" - the mode is a combination of the „CYCLE" and „AUTO" modes. The mechanism starts its operation after the KINDLE FIRE STABILIZE has finished – its work is turned on and off in cycles whose duration is defined in the „Mechanism working time" parameter. When the cleaning mechanism is turned off, the time set in the „Mechanism retraction time" and „Mechanism pause time" parameters is counted down. When the cleaning mechanism is in the EXTINCTION mode, its output is turned off. Once the determined number of SHUTDOWNS occur or the burner operates long enough, the automatic cleaning will be activated (furnace extinction, activation of the cleaning mechanism for the time set in the „Mechanism opening time" parameter and starting the fan with the capacity determined in the „Fan speed during cleaning" parameter). When the output of the mechanism is turned off, the fan is not active, the time set in the „Mechanism closing time" parameter is counted down and then the regular work is resumed.

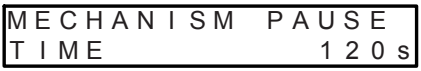
Cleaning mechanism work time - the parameter is available only when the cleaning mechanism operates in the CYCLE, ROTO or COMBI mode. It defines the duration the cleaning mechanism is activated when the burner is turned on.



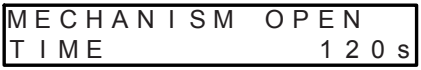
Cleaning mechanism retraction time - the parameter is available only when the cleaning mechanism operates in the CYCLE, ROTO or COMBI mode. It defines the time required for the mechanism retraction to the resting position after the control output has been turned off.



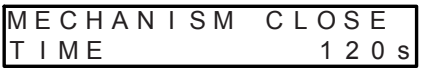
Cleaning mechanism pause time - the parameter is available only when the cleaning mechanism operates in the CYCLE, ROTO or COMBI mode. It defines the period between the mechanism successive turn-ons.



Cleaning mechanism opening time – the parameter is available only when the cleaning mechanism operates in the AUTO or COMBI modes. It defines the time needed to fully open the mechanism when the automatic cleaning is on.



Cleaning mechanism closing time – the parameter is available only when the cleaning mechanism operates in the AUTO or COMBI modes. It defines the time required for the mechanism retraction to the resting position after it fully opened while the automatic cleaning.



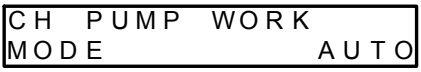
The number of shutdowns before cleaning - the parameter is available only when the cleaning mechanism operates in the AUTO or COMBI modes. It determines the moment following a shutdown after which the cleaning procedure will be activated.

Minimum operating time without cleaning - the parameter is available only when the cleaning mechanism operates in the AUTO or COMBI mode. It specifies the minimum number of hours the burner must operate so that the cleaning could be activated. If the minimum operation time is not reached, the cleaning will not be started even if the required number of shutdowns has occurred. To turn off the „Minimum operating time without cleaning' option, set the parameter to „0h'.

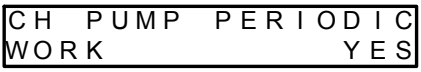
Maximum operating time without cleaning - the parameter is available only when the cleaning mechanism operates in the AUTO or COMBI mode. It specifies the maximum number of hours the burner can work without cleaning. If the maximum time is reached, the cleaning will be started even if the required number of shutdowns has not occurred.

5.5. Central heating pump work parameters.

Central heating pump switching on parameters - this parameter specifies the method of central heating pump switching on. Selection of „THERMOSTAT" setting means that central heating pump will be switched on only if room thermostat contacts are closed and in case of emergency (e.g. boiler overheating). Selection of „AUTO" setting means that central heating pump operation will follow regardless of room thermostat.



Central heating (CH) pump periodic switching on - this parameter enables periodic operation of central heating pump and water transfer in the heating circuit. The pump is activated periodically every 30 seconds according to selected time in „CH pump periodic work" setting. This function in available, if „THERMOSTAT" was selected in CH pump work mode



CH pump periodic work time - this parameter is available, if CH pump works in „THERMOSTAT" mode and the function of CH pump periodic work is active. The programmed setting will specify the time lapse between CH pump work, in case of opened contacts of the room thermostat.

5.6. Setting domestic water pump parameters.
The controller offers an additional function for heating of domestic water. Not every heating system is provided with domestic water tank and charge pump, this circuit may be switched off or used for control of the pump that mixes the return water in the boiler.

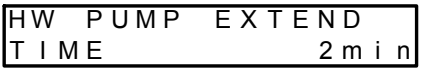
Domestic water path - if „NONE" is selected the domestic water pump is off. In this case temperature sensor input and pump control output may remain disconnected. Selection of „EXISTS" setting provides for interlock release of all parameters and functions related to domestic water path handling. Election of „MIXING PUMP" setting will switch domestic water in the circuit purposed for control of the mixing pump. In this case return water temperature sensor shall be connected instead of domestic water sensor, and the mixing pump instead of charge pump of domestic water tank.

Domestic water heating hysteresis - this parameter indicates water temperature drop in the tank in relation to the programmed setting (so that charge pump was switched on). This setting is available, if domestic water path „EXISTS" setting was selected.

Increase temperature during domestic water heating - Closing thermostat contacts means that boiler operation will follow according to the temperature programmed with the thermostat knob. If domestic water tank heating is necessary, the desired boiler temperature is higher in relation to the desired domestic water by the selected value in this setting. In case of simultaneous operation of the room thermostat and domestic water tank heating, the controller operation will follow to maintain the higher boiler temperature. This setting is available, if domestic water path „EXISTS" setting was selected.

Domestic water pump work extension - quick switching off of the pump refilling domestic water tank may result in excessive rise of boiler temperature. This parameter enables switching on of domestic water pump extension. This setting is available, if domestic water path „EXISTS" setting was selected.

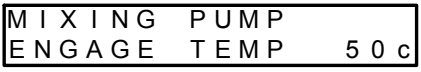
Domestic water pump extension time - this parameter specifies the time lapse when domestic water is switched off since the moment when the programmed temperature of domestic water tank was obtained. This setting is available, if domestic water path „EXISTS" setting was selected and pump extension was selected.



Sabilization time after heating up DHW – while preparing the domestic hot water with priority on, the whole boiler capacity is used to heat up DHW. The boiler programmed temperature when it works for the DHW is often higher than the required temperature in the CH circulation. Additionally, when the CH pump is turned off while it works with DHW priority, the cooldown of the heated rooms and activation of the household thermostat input may occur. In such case, when the work with DHW priority has finished, the temperature of the boiler water might be higher than the temperature required for heating up the rooms – the fact may be the reason for the burner extinction because the boiler upper hysteresis would be exceeded. The parameter defines the time required to stabilize the circulation after heating the DHW with priority on has finished. During the stabilizing, the upper hysteresis check is stopped and the adaptive algorithm of the household thermostat is suspended. The parameter is available only when the DHW duct is turned on.

CAUTION! The option will not be active if preparing the DHW is carried out without priority or the controller is in the SUMMER mode.

Mixing pump engaging temperature - this parameter specifies required return water temperature so that the mixing pump engagement follows the controller. This parameter is available if domestic water path „MIXING PUMP" setting was selected.



Mixing pump work hysteresis - this parameter specifies required return water temperature increase in relation to the mixing pump engagement temperature so that the controller switches off the mixing pump. This parameter is available if domestic water path „MIXING PUMP" setting was selected.

5.7. Boiler work parameters.

Minimum boiler temperature - this parameter specifies boiler temperature when the controller shall switch off central heating and domestic water pumps. It is the lowest temperature setting of the boiler that can be programmed with thermostat's knob.

Maximum boiler temperature - this parameter specifies boiler max. programmed temperature setting which can be programmed with thermostat's knob. It is also boiler temperature when central heating pump is engaged to provide protection for the boiler against overheating.

Boiler upper hysteresis - if the controller works in burner minimum power mode, and boiler temperature increase follows by this programmed setting, the controller will start burner extinction(shut down).

Burner power switching hysteresis - when the programmed boiler water temperature is obtained the controller is switched to minimum power work mode. This parameter specifies required water temperature drop so that maximum power work mode was activated. After switching to maximum power the fuel and air feeding dose is determined according to burner power modulation.

Boiler protection hysteresis - the controller provides for boiler minimum and maximum temperature by providing control over operation of central heating and domestic water pumps. This parameter specifies hysteresis parameter of boiler limit temperatures switching off.

Boiler overheating temperature - this parameter specifies boiler water temperature when the controller switches off control and activates boiler overheating alarm.

Burner power modulation - when modulation is switched on it will results in gradual reduction of fan speed and fuel dose to obtain boiler water temperature corresponding to the programmed setting.

BURNER POWER MODULATION YES

Burner power modulation factor - this parameter specifies degree setting when the controller will reduce burner power before boiler water temperature is obtained according to the programmed setting. Burner power is reduced by gradual reduction of fed fuel dose and fan speed reduction. This parameter is unavailable, if burner modulation power is off.

MODULATION FACTOR 5

5.8. Room thermostat.

RK-2006LP controller has been equipped with the input enabling connection of any room thermostat provided with contact output. Closing the thermostat contacts is signalized with blinking its lamp. When the contacts are opened, the lamp will be off.

CAUTION! The room thermostat input is active during work in the WINTER mode only. The indicator signalizing the status of the input is independent of the entered mode.

Room thermostat working mode - the parameter determines the influence of the room thermostat input on the controller operation:

„NORMAL” - in the mode, once the thermostat contacts are closed, the burner is ignited, and the boiler is going to maintain the temperature set with the boiler thermostat knob. When the desired temperature is reached and the thermostat contacts are opened, the burner extinction occurs and the controller enters the STANDBY mode.

„ADAPTIVE” - in the mode, the changes in the thermostat input status are analysed - on their basis the boiler programmed temperature is defined automatically.

THERMOSTAT WORK MODE NORMAL

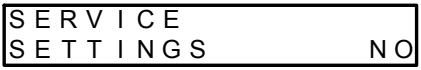
CAUTION! When the room thermostat is unused, its input should remain closed and the thermostat working mode should be set to „NORMAL” In such case, the temperature programmed with the boiler thermostat knob will be maintained continuously.

Time constant of adaptation – the parameter is available when the thermostat is in the mode of adaptation. It defines the rate of „searching' the appropriate boiler programmed temperature by the algorithm of adaptation. The value of parameter should be selected experimentally depending on the properties of the heated object. When frequent room overheating occurs during the work of the algorithm of adaptation and frequent changes in the outside conditions – the value of the time constant should be decreased.

Delay in burner switch off – the parameter determines the working time of the burner at the minimum power and when the thermostat contacts are opened. Once the programmed time is finished and the thermostat contacts are not closed again, the burner will be extinguished and the controller will enter the STANDBY mode. When the parameter is set to the „0min" value, the burner will be extinguished immediately after the thermostat contacts have been opened.

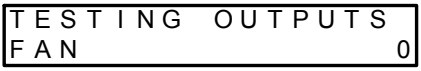
CAUTION! The burner may be turned off after the thermostat contacts have been opened with a delay different from the programmed one if the DHW circulation is also controlled.

5.9. Service settings.
If „YES" selection followed and was confirmed with OK button when this option is displayed will result in cancelling of all parameters and restoration of default parameters programmed before by the fitter or technician.



CAUTION! Activation of this function will result in restoration of service parameters for current fuel type only.

5.10. Output testing.
It is possible to test particular preset functions. This is available, only, if the controller is in STOP mode before switching to service mode. To select outputs testing option use the knob (12) choosing particular outputs which are indicated by flashing of the proper light and output name displayed. By pressing OK button you can turn on the selected output temporarily. To finish output testing press STOP button.



5.11. Service mode exit.
By choosing this option and confirmation with OK button you can exit service mode. The controller also exits the service mode, if no button is pressed after 60 seconds.

– – E X I T – –

6. DATA emergency output - audible alarm or cleaning mechanism.

The regulator has output DATA allows you to connect via the UM-1 module siren alarm or additional cleaning mechanism. If you exit this mode, the siren is in alarm, it is activated in the event of: sensor failure of the boiler, burner sensor, the sensor or mixing pump hot water, boiler overheating or lack of fuel.

7. Controller disassembly.

If controller disassembly is necessary follow the following procedure:
- Disconnect the boiler and controller from power supply,
- Remove the controller from the boiler,
- Disconnect terminals and wires from the controller.

8. Technical Data.

Power Supply	230V ± 10%, 50Hz	
Power consumption (without fan and pump)	< 4VA	
Burner temperature measurement range (KTY 81-210)	-9–109°C	±1°C
Temperature measurement range (KTY 81-210)	-9–109°C	±1°C
Burner temperature measurement range (PT-1000)	-30–500°C	±3°C
Boiler temperature adjustment range	30–90°C	±1°C
Boiler programmed overheating protection	90–99°C	±1°C
Boiler equipment overheating protection	>95°C	±1°C
Total outputs rating	max 4A/230V	
Dimensions (H x W x D)	96x144x94	

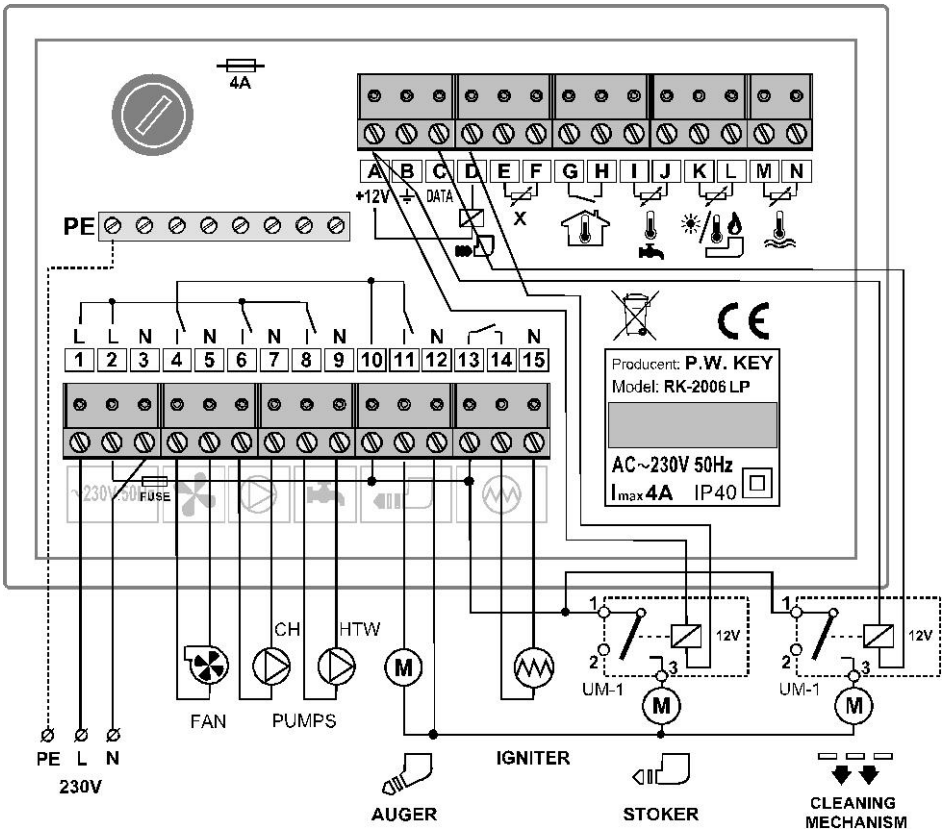


Figure 2. RK-2006LP Controller connection diagram.

9. Notes.

Light	Parameter	Settings.			
		1	2	3	4
Thermostat	Boiler max. power.				
HTW pump	Domestic water desired temperature.				
	Domestic water heating priority.				
Igniter	Brightness when fuel ignition has occurred (FD-1).				
	Burner temperature with fuel ignited (PT-1000, CT-1/2).				

Light	Parameter	Settings			
		1	2	3	4
Fan	Fan modulation during boiler start.				
	Min. fan speed during heating up.				
	Max. fan speed during heating up.				
	Ignition modulation start delay.				
	Fan speed during ignition.				
	Fan speed at max. power.				
	Fan speed at min. power.				
	Fan speed at extinction.				
	Fan speed during cleaning mode.				
	Fan scavenge(air purging).				
	Fan scavenge (air purging) blow time.				
	Fan scavenge(air purging) pause time.				
	Fan speed during scavenge.				
Auger	Auger filling time.				
	Initial fuel feed.				
	Fuel feed cycle.				
	Fuel feed during ignition.				
	Fuel feed for max burner power.				
	Fuel feed for min. burner power.				
	Stoker work mode.				
	Stoker work time.				
	Stoker pause time.				
	Stoker extra work time.				
	Stoker emptying time.				
	Auger ignition test.				
	Auger ignition temperature.				
Igniter	Flame detector type.				
	Correction FD-1.				
	Hysteresis loss of flame (optical sensor).				
	Hysteresis loss of flame (temperature sensor).				
	Flame failure detection delay.				
	Fuel ignition time.				
	Ignition try count.				
	Kindle fire stabilize.				

Light	Parameter	Settings			
		1	2	3	4
Igniter	Kindle fire stabilize time.				
	Smooth kindle fire stabilize.				
	Furnace extinction time.				
	Furnace cleaning mode.				
	Cleaning mechanism work time.				
	Cleaning mechanism retraction time.				
	Cleaning mechanism pause time.				
	Cleaning mechanism opening time.				
	Cleaning mechanism closing time.				
	Number shut downs before cleaning.				
	Minimum operating time without cleaning.				
	Maximum working time without cleaning.				
CH pump	Central heating pump work mode.				
	Central heating pump periodic work.				
	Central heating pump periodic work time.				
HTW pump	Domestic water path.				
	Domestic water heating hysteresis.				
	Boiler increase temperature during hot tap water heating.				
	Domestic pump work extension.				
	Domestic pump work extension time.				
	Stabilization time after heating up DHW.				
	Mixing pump engaging temperature.				
	Mixing pump work hysteresis.				
Thermostat	Boiler minimum temperature.				
	Boiler maximum temperature.				
	Boiler upper hysteresis.				
	Boiler power switching hysteresis.				
	Boiler protection hysteresis.				
	Boiler overheating temperature.				
	Burner power modulation.				
	Modulation factor.				
	Thermostat working mode (see description).				
	Time constant of adaptation.				
	Delay in burner turn-off.				

DECLARATION OF CONFORMITY

Manufacturer: Przedsiębiorstwo Wielobranżowe KEY
11-200 Bartoszyce, ul. Bohaterów Warszawy 67

hereby declares that the product:

RK-2006 Controller

is in conformity with provisions of the following directives:
73/23/EWG i 93/68/EWG (LVD 73/23/EEC + 93/68/EEC),
as superseded by Directive 2006/95/WE (EC Directive 2006/95/EEC);
89/336/EWG (Elektromagnetic Compatibility Directive 89/336/EEC),
as amended by Directive 93/68/EWG (EMC Directive 93/68/EEC)

on basis of compliance with the following harmonised directives:

PN-EN 55022:2006(U)
PN-EN 61000-4-2:1999+A2:2003
PN-EN 61000-4-3:2006(U)
PN-EN 61000-4-6:1999+A1:2003+IS1:2006
PN-EN 61000-4-4:2005(U)
PN-EN 61000-4-5:2006(U)
PN-EN 61000-4-11:2005(U)

PN-EN 60730-1:2002+A1:2006(U)A12:2004+A13:2005
PN-EN 60730-1:2005+A14:2006
PN-EN 60730-2-9:2006
PN-EN 61000-3-2:2006(U)
PN-EN 61000-3-3:1997+A1:2005+A2:2006+IS1:2006

Information on disposal

This appliance is marked according to the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

The symbol on the product, or the documents accompanying the product, indicates that his appliance may not be treated as household waste.
The appliance shall be handed over to the applicable collection point for used up electrical and electronic equipment for recycling purpose.

Ultimate disposal of the appliance shall follow according to applicable local regulations on waste utilization. For more information about disposal, utilization and recycling please contact your local authorities, household waste disposal service or the shop where you purchased the product.

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