OPERATION MANUAL

RK-2006LPGNF

Temperature controller for pellets air heaters

Version C606

Table of Contents.

1. Application.
Controller RK-2006LPGNF is designed for temperature control of solid fuel fired air heaters equipped with:

- Auger and feeding stoker working with the stoker,
- Blow-in fan,
- Ignition glow plug for automatic start,
- External fan,
- Alarm indicator
- Ash removal system
- Room thermostat (option)
- Internet module (option).

2. Connection.
Before turning on the controller, connect: power cables of: controller, blow-in fan, heater 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 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 devices that are connected to the controller must not exceed 400W.

CAUTION! Output that controls the lighter is 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.

Not used outputs can remain unplugged.

3. Operation.
After power-up the controller displays the name and version of the software, then goes to the state it was in before shutting down or lose power.

On the front panel of the controller (Figure) there is:

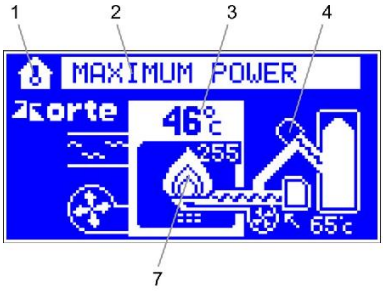
1 – display,
2 – STOP button, reset the alarm and cancel the changes,
3 – START button and choose the parameter,
4 – the heater thermostat knob and set the parameters and click OK,
5 – MENU button and choose the parameter,
6 – ESC / output.

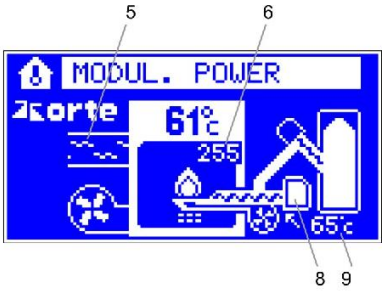
Figure 1. Front panel of RK-2006LPGNF controller.

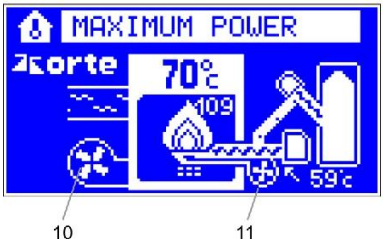
Basic operation of the device is to set the preset heater temperature. To do this You need to turn the heater thermostat knob (4) to set the correct value and confirm it with the OK button (or press the knob).

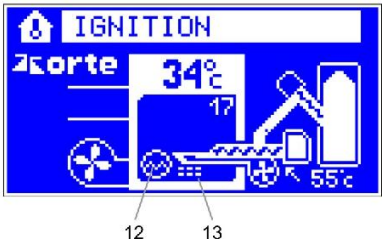
CAUTION! If you enter the room thermostat works in adaptive mode, you try to change the set temperature of the heater may end in failure, ie. After approval of the new value of the controller can automatically change the heater temperature to a value that results from the operation of the adaptive algorithm.

4. Overview of display symbols.









1 – Thermostat work indicator,
2 – Controller work indicator,
3 – Heater temperature,
4 – Feeder work indicator,
5 – Air output,
6 – Brightness of the flame,
7 – Burner capacity indicator (the higher the capacity, the brighter the flame),
8 – Stocker work indicator,
9 – Feeder temperaturę,
10 – Heaters fan,
11 – Bureners fan,
12 – Lighter/Ignitor work indicator,
13 – Cleaning device work indicator.

5. . Device operation modes.

Table 1. Operation mode list.

Operation mode.	Description
STOP	Heater control stopped. Controller maintains heater operation, but automatic ignition does not follow.
STAND-BY	Controller maintains heater operation. In case of heat demand automatic ignition of heater follows.
IGNITION	Controller carries out automatic ignition of heater.
STABILIZATION OF THE FIREING	Fan control and feeder so as to stabilize the burner.
MAX. POWER	Fan and fuel feeder operates to reach heater max. power.
MODUL. POWER	Controller reduces fuel feeding as much as heated air corresponds to the desired setting.
MINIMUM POWER	Fan and fuel feeder operation is minimize to maintain fire.
SCAVENGE (AIR PURGING)	Controller activates blower/burners fan to ensure removal of accumulated gases.
AFTER BURNING	No demand for heat or furnace needs cleaning. The controller turns off the tray and burnout of fuel until the flame failure.
EXTINCTION (SHUT DOWN).	The controller suppresses the heater furnace.
CLEANING	Burner cleaning.
AUGER (MANUAL) REFILLING	Manual operation of fuel auger. Heater control stopped. Controller maintains heater operation, but automatic ignition does not follow.
AUGER EXTINCT (EMERGENCY SHUT DOWN)	Fuel ignition in auger channel. The controller empties ignited fuel from the auger channel until temperature drops.
ALARMS	Safety and temperatures sensors failure alarms.

Tryb STOP.
Controller maintains heater operation only to protect the heater against overheating and auger channel ignition. Room thermostat contacts closing do not result in any action. Pressing START button will result in switching the controller to STAND-BY mode.

STAND-BY.
In this mode controller does not carry out any additional operation, until room thermostat contacts close (call for heat). Room thermostat contacts close (call for heat) means that c heater operation will focus on maintenance of temperature according to thermostat setting programmed with the knob. Or to the temperature value that results from the operation of the adaptive algorithm. Pressing the STOP button () will result in switching to STOP mode.

IGNITION.
Heater burner 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 during operation in IGNITION mode will result in switching of the controller into AFTER-BURNING MODE.

STABILIZATION OF THE FIREING.
Heater burner is switched to the stabilization of the detected flame ignition. While stabilizing the fan runs at a speed the same as when operating in maximum power. Tray gives fuel quantity such as the minimum power. In addition, depending on the service settings fuel dose may be increased gradually. Stabilization of the firing continues for the time programmed in the settings of the service or until the heater temperature. Pressing the STOP button, exceeding the working time without cleaning, opening the contacts of the thermostat during operation stabilization ignition, the controller will switch to AFTER-BURNING MODE.

CAUTION! Stabilization of ignition can be turned off by a service technician. In this case, after the fire the controller switches to work with maximum power.

MAX. POWER OPERATION MODE.
When in this mode the controller operates fuel auger and fan to ensure max. power of the heater. Fuel and air feeding rate is adjusted by the technician. Pressing STOP button, exceeding time limit for cleaning, thermostat contacts opening during will result in switching of the controller into AFTER-BURNING 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 heater water temperature corresponds to the programmed setting. Pressing STOP button, exceeding time limit for cleaning, thermostat contacts opening will result in switching of the controller into AFTER-BURNING MODE. 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 heater minimum power, increase temperature follows of air temperature in relation to the top hysteresis parameter setting, the controller will be switched into EXTINCTION(SHUT DOWN) mode. When the heater air temperature drops below the desired setting it will result in switching of the controller into „max power operation mode". Pressing STOP button, exceeding time limit for cleaning, thermostat contacts opening will result in switching of the controller into AFTER-BURNING 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.

AFTER-BURNING.
In this mode the controller turns off the fuel feeder/auger. Speed of the fan of the burner remains the same (the same as before starting AFTER-BURNING). AFTER-BURNING remains until the flame failure, after that controller starts EXTINCTION.

EXTINCTION (SHUT DOWN).
In this mode the controller changes the speed of the fan which is determined by the technician due to ensure complete fuel combustion and the burner cool down. When this mode is finished the controller switches into CLEANING, STAND-BY or STOP mode, depending on what was the reason of starting this mode EXTINCTION or AFTER-BURNING.

CLEANING.
Automatic burner cleaning occurs after time set limit by technician (the length of EXTINCTION) or after proper length of burners work. In this mode controller starts cleaning system for preset time 9set by technician). If during this procedure button STOP is pressed, after this procedure controller resets back to STANDBY mode or STOP.

AUGER EXTINCTION (EMERGENCY SHUT DOWN).
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 SHUT DOWN) 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.

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.

ALARMS.
RK-2006LPGNF 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 heater 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 STAND-BY 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 SHUT DOWN 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:

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 STAND-BY mode.

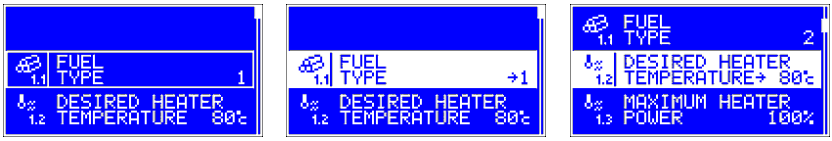
Protection against overheating and overheating of the heater.
RK-2006LPGNF is protected against overheating of the heater. If the air temperature reaches a preset value in service parameter TEMP. MAXIMUM OF THE HEATER, the controller activates the ventilator of the heater. The increase temperature of the heater to the value programmed in parameter service TEMPERATURE HEATER OVERHEAT will turn off the fan of the burner, turn on the heater fan, switch the controller to STOP mode without starting the process of extinction and trigger the alarm:

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

Heater temperature sensor damage.
In case of heater water temperature sensor damage the controller turns off the fan, engages central heating pump, controller switches into STOP mode and activates alarm:

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

6. Preview and set user parameters.
Pressing the MENU button we can view the following user parameters.



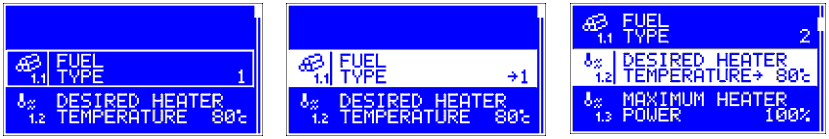
The user can switch between different parameters by turning the knob (4). By pressing the knob you enter the mode of change of the selected parameter – the parameter will be backlit. You can change the value of the selected parameter by turning the knob. To confirm the change press the knob again, and the controller will return to the list of parameters. To leave the mode of change and restore the previous value of a parameter, press the MENU or ESC button. If the device is left either in the changing or viewing the parameters mode for 60 seconds, removal of the modification introduced recently and switching in the mode of displaying the device status will occur automatically.

Table 2. User settings list.

L.p	Parameter	Min	Max
1.1	Fuel type.	1	4
1.2	Desired heater temperature.	40°C	90°C
1.3	Heater max. power.	60%	100%
1.13	Current furnace brightness (FD–1).		
1.14	Ignition turn-off depending on the illuminance value.	0	255
1.10	Temperature of the burner (PT–1000, CT–1/2).		
1.11	Ignition turn-off depending on the temperature.	200°C	500°C
1.15	Burner running time.		
1.16	Number of inflammationof burner.		
1.17	Heater is turned off.	NO	YES
1.19	Alarms cancellation.		
1.20	Burners working mode.		

1.1 Fuel type selection.
RK-2006LPGNF 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.

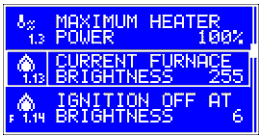
CAUTION! Fuel type may be changed, if the controller is in STOP mode only.



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

1.3 Heater operation max. power – Heater operation max. power – this parameter enables to limit heater operation max power. Power limitation is possible thanks to fuel reduction during operation at maximum power.

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.



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

1.14 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.

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.

1.10 Burner measured temperature – this parameter displays the current measured burner temperature.

1.12 Lighter turning off due to temperature – if temperature of the burner is equal or higher than this desired setting, the controller will switch off the lighter and assume that ignition was provided.

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.

1.15 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.

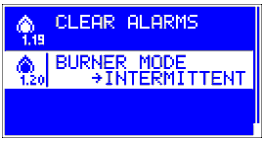
1.16 Burner start up counter – reading of this counter defines start number of the ignition attempts.

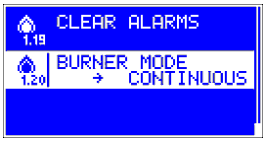
1.17 Heater is turned off – this parameter informs whether heater is turned off. It enables turning on and turning off the heater.

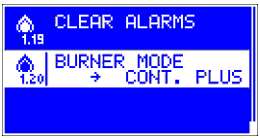
1.19 Alarms cancellation – this parameter enables to clear all the alarms written in controllers memory.

1.20 Burners working mode

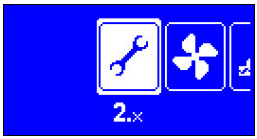
INTERMITTENT – turning off the room controller turns controller into AFTER-BURNING MODE
CONTINUOUS – turning off the room controller turns controller into MIN POWER instead AFTER-BURNING MODE (mode that saves the lighter).
CONTINUOUS PLUS – working mode in which burner is always on (excluding emergency situations) and lighters by itself even when room controller is open (other than in CONTINUOUS MODE where for turning on there is needed closing of the room controller).







7. Setting the parameters – service mode.
Service parameters are divided into groups. For each group are assigned service parameters possible to change. Entry into service mode after press and hold for about 3 seconds the MENU button. regulator displays a list of service parameters possible to edit and change. Viewing the list of parameters is possible by turning the multifunction knob - possible to edit the parameter is highlighted. After selecting the desired parameter press the OK button (knob), and enter the subgroups of a given parameter. Select the parameter you want to change and press the knob - a parameter is highlighted. Turning the knob set the desired value and then press the knob.



Giving up mode changes and restore the previous value of the parameter by pressing the STOP button or ESC. If the unit is left in a mode change or view the parameters for 60 seconds, the controller will automatically withdraw the recently introduced modification and switch to display the status of the device. A list of all service parameters presented in the table. The table columns contain the following order: group number, name of the parameter and the value of the minimum and maximum possible settings.

Table 3. Table service parameter.

Lp.	Parameter	Min	Max
2.x Overall	2.1 Language. (see description)).		
	2.2 Brightness of the display.		
	2.3Saturation.		
	2.4 Contrast.		
	2.5 Service settings.	NO	YES
	2.7 Output testing.	NO	YES
3.x Fan of the burner	3.1 Fan modulation during heater start.	NO	YES
	3.2 Min. fan speed during heating up.	1%	100%
	3.3 Max. fan speed during heating up.	1%	100%
	3.4 Ignition modulation start delay.	0s	250s
	3.5 Fan speed during ignition.	1%	100%
	3.6 Fan speed at max. power.	1%	100%
	3.7 Fan speed at min. power.	1%	100%
	3.8 Fan speed at extinction.V	1%	100%
	3.9 Fan speed during cleaning mode.	0%	100%
	3.10 Fan scavenge (air purging).	NO	YES
	3.11 Fan scavenge (air purging) blow time.	5s	60s
	3.12 Fan scavenge (air purging) pause time.	1min	99min
	3.13 Fan speed during scavenge.	1%	100%
4.x Auger	4.1 Auger filling tim.	1min	99min
	4.2 Initial fuel feed.	0s	250s
	4.3 Fuel feed cycle.	1s	250s
	4.4 Fuel feed during ignition.	0%	100%
	4.5 Fuel feed for max burner power.	1%	100%
	4.6 Fuel feed for min. burner power.	1%	100%
	4.7 Stoker work mode (See description).		
	4.8 Stoker work time.	1s	99s
	4.9 Stoker pause time.	1s	99s
	4.10 Stoker extra work time.	1s	99s
	4.11 Stoker emptying time.	1s	99s
	4.12 Auger ignition test.	NO	YES
	4.13 Auger ignition temperature.	20°C	99°C
5.x Igniter	5.1 Flame detector type: FD–1, PT–1000, CT–1/2.		
	5.2 CorrectionFD–1.	0	99
	5.3 Hysteresis loss of flame (temperature sensor).	1°C	250°C
	5.4 Hysteresis loss of flame (optical sensor).	1	255
	5.5 Flame failure detection delay.	1s	500s
	5.6 Fuel ignition timea.	1min	15min
	5.7 Ignition try count.	1	10
	5.10 Firing stabilization.	NO	YES
	5.11 Stabilization time firing up.	1min	99min
	5.12 Smooth stabilization Firing.	NO	TAK
	5.13 The blanking time the furnace.	1min	30min
	5.14 Lighter with starting amount of fuel.	NO	YES
6.x Cleaning mechanism	6.1 Mode of operation of the cleaning mechanism: CYCLE, ROTO, AUTO, COMBI.		
	6.2 Cleaning mechanism work time.	1s	900s
	6.3 Cleaning mechanism retraction time.	1s	900s
	6.4 Cleaning mechanism pause time.	1s	900s
	6.5 Opening time cleaning mechanism.	1s	900s
	6.6 Closing time cleaning mechanism.	1s	900s
	6.7 Number shut downs before cleaning.	1	99
	6.8 Minimum operating time without cleaning.	0h	max–1h

	6.9 Maximum working time without cleaning.	min+1h	99h
	6.10 Reversal of the cleaning mechanism.	NO	YES
7.x Heater fan	7.1 Blow starting mode.	AUTO	TERM
	7.2 Periodical starting of the blow.	NIE	YES
	7.4 Working time of the blow.	1s	100min
	7.3 Time of the break in blow.	1min	99min
	7.5 Minimum blowing power.	1%	60%
	7.6 Maximum blowing at temperature.	60°C	200°C
9.x Heater	9.1 Heater minimum temperature.	30°C	89°C
	9.1 Heater minimum temperature.	31°C	90°C
	9.3 Heater upper hysteresis.	1°C	20°C
	9.4 Heater power switching hysteresis.	1°C	9°C
	9.5 Heater protection hysteresis.	1°C	5°C
	9.6 Heater overheating temperature.	91°C	99°C
	9.7 Burner power modulation.	NO	YES
	9.8 Modulation factor.	1	20
	9.9 The operating mode of the thermostat: NORM, ADAP.		
	9.10 The time constant adaptation.	1min	99min
	9.11 Burner off delay.	0min	99min
10.x Data transmission	10.1 Data link: (see description). OFF, MODBUS RTU.		
	10.2 MODBUS device number.	1	247
	10.3 MODBUS channel capacity: 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800,38400, 56000, 57600, 76800, 115200.		
	10.4 MODBUS frame format: 8N1,8E1, 801, 8N2.		
	10.5 MODBUS access level: NONE, READOUT, USER's, SERVICE.		
	10.6 Terminal access level: NONE, READOUT, USER's, SERVICE.		
	10.7 Additional delay.	0ms	10ms

2.x Overall.

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

2.2–2.4 Brightness, saturation, contrast of the display – the parameters enable the user to adjust the display to his/her own needs.

2.5 Service settings – setting and confirm with the OK button to display the value YES when this option will delete all the parameters and assign them to the pre-programmed by the installer or service technician.

2.7 Testing out – in order to verify the correctness of the controller, it is possible to test various output devices. This feature is available in service mode only if the adjustment process is stopped, ie. The regulator before entering the service mode was in STOP mode. Selecting output testing allows the control knob to select the outputs on the display. Pressing OK allows you to temporarily attach the selected output. In order to complete the testing procedures exit, press the STOP button.

3.x Fan of the burner operation parameters.

3.1 Fan modulation during heater start – selection of „YES" setting means that fan speed modulation will be provided during heater start.

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

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

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

3.5 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.

3.6 Fan speed at max. power – means the fan power when burner of the heater works with maximum power.

3.7 Fan speed at min. power – means the fan power when burner of the heater works with minimum power.

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

3.9 The fan speed for cleaning – this parameter is available only when the cleaning mechanism operates in AUTO mode or COMBI. It specifies that the power of the fan while cleaning the hearth.

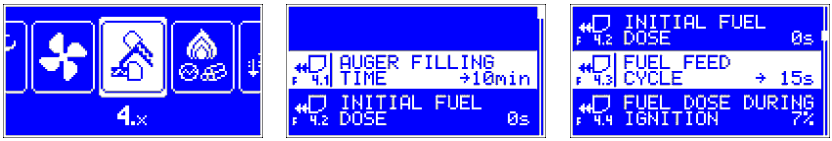
3.10 Fan scavenge (air purging) – the controller offers the function of scavenge (air purging), which simply includes periodical switching on of the fan during burner operation for the purpose of removal of accumulated gases.

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

3.12 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.

3.13 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.

4.x Fuel auger operation parameters.



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

4.2 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%".

4.3 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).

4.4 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".

4.5 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.

4.6 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.

4.7 Stoker work mode – this parameter defines the operation of the internal tray (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.

4.8 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.

4.9 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.

4.10 Time to extend the work stoker – this parameter is only available when stker is in automatic mode and determines how long after you turn off the main tray will work stoker.

4.11 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.

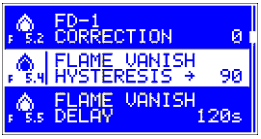
4.12 Auger ignition test – this parameter provides functionalities of „X" emergency input. If „NO" setting was selected then „X" input will be used for connection of e.g. auger flap opening contact sensor or the contact informing on operation of auger motor overload switch. If „YES" setting was selected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

4.13 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.x Ignitor working parameters.

5.1 Flame detector type – FD–1/ CT–1/2/ PT–1000 – 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.



5.2 Indication correction of flame optical detector – only when flame optical detector (FD-1) is on. Describes light intensity detected by optical detector when burner is off. The correction value is deducted from the value light intensity during the flame detection. Correction allows calibration of FD-1 sensor the way that during burner shut down value (no flame) of the light equals zero.

5.3–5.4 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".

5.5 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.

5.6 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.

5.7 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.

5.10 Firing stabilization – This parameter determines whether the fuel kindling Stabilization mode is enabled firing.

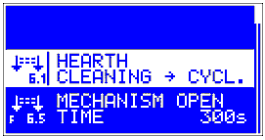
5.11 Firing stabilization time – this parameter determines the maximum operating time of stabilization firing. This parameter is not available if the parameter STABILIZATION OF FIRING is set to NO.

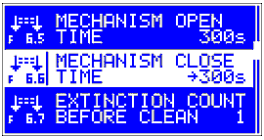
5.12 Smooth stabilization of ignition – setting the parameter to YES will cause the stabilization of firing up the controller gradually increases the amount of fuel fed. This parameter is not available if the parameter STABILIZATION OF FIRING is set to NO.

5.13 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. After burner extinction (flame loss), the fan operation follows according to time programmed in this setting. This function ensures combustion of all fuel remains and burner cool down.

5.14 Lighter with starting amount of fuel – this parameter informs whether in the moment of fuel delivery the lighter should be on.

6x Cleaning mechanism.





6.1 Furnace cleaning mode – this parameter specifies the way the cleaning mechanism works:

NONE – means that the burner does not have a cleaning mechanism. In this case, the output DATA is working as an external alarm.

CYCL – means the mode in which the cleaning procedure is run after the firing and repeated at regular intervals until burner shut down is completed. Cleaning procedure is attached to the time set in parameter „Cleaning mechanism work time". After turning off the regulator, output deducts the time set in parameter „Cleaning mechanism retraction time" and the time set in parameter „Cleaning mechanism pause time".

ROTO – working mechanism ROTO mode is similar to mode CYCLE. The difference is that the control output cleaning mechanism is attached for the duration of the mode blanked.

AUTO – means the cleaning procedure is started automatically after a specified number shut downs or after a sufficient burner operation time. Automatic cleaning means: burner shut down and start cleaning mechanism for the time set in parameter „Cleaning mechanism work time". After turning off the regulator, output deducts the time set in parameter "Cleaning mechanism retraction time" and then goes to normal working cycle.

COMBI – This mode is a combination of modes AUTO CYCLE. Working mechanism starts at the end of the firing and stabilization is cyclical switching mechanism for the time set in the parameter TIME WORK MECHANISM. After switching off the cleaning mechanism controller counts down the time set in parameter RETURN TIME MECHANISM, and the time set in parameter TIME PARKING MECHANISM. During operation the output EXTINCTION cleaning mechanism is disabled. After a certain number of extinctions or sufficient time, the burner is started automatically cleaning involving extinguished hearth, start cleaning mechanism at the time set in the parameter TIME OPENING THE MECHANISM and run the fan with the power specified in the parameter SPEED FAN. THE CLEANING. After switching off the engine output controller also disables the fan and counts time set in the parameter TIME CLOSING MECHANISM, then take a normal job.

COMBI 2 – mode similar to COMBI but it differs that when cleaning mechanism is on, fan works always with power that is set in the parameter SPEED FAN. THE CLEANING, independently than current mode (excluding emergency mode).

6.2 Cleaning mechanism work time – this parameter is available only when the cleaning mechanism is activated (CYCLE, ROTO or COMBI. mode). It defines the time needed to complete the full mechanism to open or move to end position.

6.3 Cleaning mechanism retraction time – this parameter is available only when the cleaning mechanism is activated (CYCLE, ROTO or COMBI. mode). It specifies the time required for the mechanism retraction to the rest position after turning off the control output.

6.4 Cleaning mechanism pause time – this parameter is available only when the cleaning mechanism is activated (CYCLE, ROTO or COMBI. mode). It specifies the time interval between successive repetition of the cleaning cycle.

6.5 Opening time cleaning mechanism – this parameter is only available when cleaning mechanism operates in AUTO mode or ESTATE and determines the time required to complete the opening mechanism during cleaning automatic.

6.6 Closing time cleaning mechanism – this parameter is available only when the cleaning mechanism operates in AUTO mode or COMBI and determines the time it takes to return the mechanism to its rest position after the full opening of the automatic cleaning mechanism.

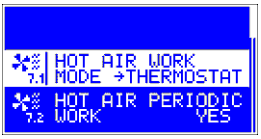
6.7 Number of extinctions before cleaning – this parameter is available only when the cleaning mechanism operates in AUTO mode or COMBI and determines which in turn goes off to start the procedure of cleaning.

6.8 Minimum operating time without cleaning – this parameter is available only when the cleaning mechanism operates in AUTO or COMBI mode. Specifies the minimum number of hours the burner must in order to start cleaning. If the minimum time is not reached, the cleaning will not run even if there was a required number of shut downs. Setting the parameter to „0h" control the minimum time off work without cleaning.

6.9 The maximum working time without cleaning – this parameter is available only when the cleaning mechanism operates in AUTO or COMBI mode. Specifies how many hours the burner can work without cleaning. If the maximum time is reached, the cleaning will run even if there was no required number of shut downs.

6.10 Reversal of the cleaning mechanism – (implicitly NO) – setting this parameter on YES does reversal of the output of the cleaning mechanism. Due to this setting voltage is set on the output of the mechanism continuously and is turned on when the mechanism is working. In systems with actuator this parameter enables changing the way of work of the mechanism.

7.x Heater fan working parameters.



7.1 Starting of the blow mode – this parameter specifies the method of heater fan switching on. Selection of „THERMOSTAT" setting means that fan will be switched on only if room thermostat contacts are closed and in case of emergency (e.g. heater overheating). Selection of „AUTO" setting means that fan operation will follow regardless of room thermostat.

7.2 Periodic switching blow – this parameter allows you to run the function periodic of the fan to move air in the heating circuit. The fan is activated for 30 seconds at intervals set in the parameter Time of the break in blow. This function is available when the fan is set to the value of TERM.

7.4 Working time of the blow – set value referes to a period of time that fan will be turned on with open room thermostat. This parameter is valid only when fan is working in TERM mode and function of periodic switching blow is on.

7.3 Time of the break in blow – 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.

7.5 Minimum airflow power – after reaching the minimum temperature of the heater, the blow-in fan will be turned on and will operate with the power set in this parameter.

7.6 Maximum airflow at temperature – after reaching the heater temperature set in this parameter, the fan will operate at maximum power.

9.x Heater work parameters.

9.1 Minimum heater temperature – this parameter specifies minimal temperature of heated air when the controller can switch on the fan. It is the lowest temperature setting of the heater that can be programmed with thermostat's knob.

9.2 Maximum heater temperature – this parameter specifies max. programmed temperature of the heated air when central fan is always engaged to provide protection for the heater against overheating.It is also max setted temperature which can be programmed with thermostat's knob.

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

9.4 Burner power switching hysteresis – when the programmed heater air temperature is obtained the controller is switched to minimum power work mode. This parameter specifies required air 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.

9.5 Heater protection hysteresis – the controller provides for heater minimum and maximum temperature by providing control over operation of fan. This parameter specifies hysteresis parameter of heater limit temperatures switching off.

9.6 Heater overheating temperature – this parameter specifies heated air temperature when the controller switches off control and activates heater overheating alarm.

9.7 Burner power modulation – when modulation is switched on it will result in gradual reduction of fan speed and fuel dose to obtain heated air temperature corresponding to the programmed setting.

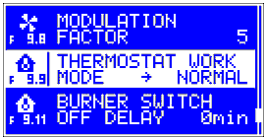
9.8 Burner power modulation factor – this parameter specifies degree setting when the controller will reduce burner power before heated air temperature is obtained according to the programmed setting. Burner power is reduced by gradual reduction of fed fuel dose and fan speed reduction. This parameter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

The room thermostat.
RK-2006LPGN was equipped with an input for connecting any room thermostat with contact output. Contacts of the thermostat is signaled by the appearance of the thermometer symbol in the index of the thermostat.

9.9 Mode of operation of the room thermostat – this parameter determines the impact of the entry of the room thermostat to the operation of the controller:

NORM. – in this mode, the thermostat contacts are closed when the controller starts firing up the burner and the heater strives to maintain the set temperature of the heater thermostat knob. After reaching the desired temperature in the room and the thermostat regulator contacts open burner extinguishes and goes STANDBY.

ADAP. – in this mode, the controller analyzes the changes in the thermostat input and based on automatically determines the setpoint temperature of the heater.

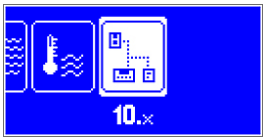


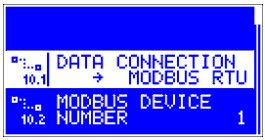
Caution! In the case of not using the room thermostat input should remain closed, and the operation of the thermostat set to the NORM .. In this case, the heater will operate continuously maintaining the set temperature of the heater thermostat knob.

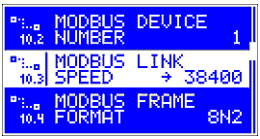
9.10 The time constant of adaptation – this parameter is available when the thermostat is working in adaptive mode. It determines the rate of "seeking" appropriate adaptive algorithm preset heater temperature. Value should be selected empirically according to the characteristics of the controlled object. If during working adaptive algorithm and frequently changing external conditions we observe frequent overheating of the rooms, increase the time constant. If temperature is too low this value should be reduced.

9.11 Burner off delay – this parameter determines the time of the burner work in minimum power after opening of the thermostat contacts. If, after the programmed time the thermostat input will not be closed again, the torch will be lit, and the controller switches to STANDBY. Setting this parameter to 0 minutes will immediately extinguish the torch after opening the thermostat contacts.

10.x Data transmission.







10.1 Data link – the parameter allows the user to select the operation performed by the data connector.

NONE – connector inactive (default value).

MODBUS RTU – Communication by RS-485 bus with using the ModBus standard RTU protocol.

10.2 MODBUS device number – 1..247 – allows the user to determine the number of the device attributed to your controller, and to avoid errors when a number of devices are switched to the bus. Default value -1.

10.3 MODBUS channel capacity – selection of the RS-485 transmission speed. Default value – 38400.

10.4 MODBUS frame format – allows you to determine the data frame format used in the RS- 485 transmission.

8N1 – 8 bits of data, no parity bits, 1 bit of silence.
8E1 – 8 bits of data, even parity bit, 1 bit of silence.
8O1 – 8 bits of data, odd parity bit, 1 bit of silence.
8N2 – 8 bits of data, no parity bits, 2 bits of silence (default setting).

10.5 MODBUS access level – defines to what extent the configuration of parameters is available to the ModBus protocol.

NONE – no parameters are provided by the controller.

READ-OUT – the controller allows you to view its parameters only.

USER – changing the user's parameters only is available (default setting).

SERVICE – changing all of the parameters is possible.

10.6 Terminal access level – defines to what extent access can be obtained through the remote terminal.

NONE – no access through the remote terminal.

READ-OUT – terminal allows you to view the parameters and controller work only.

USER – it is possible to change the parameters user's settings (default settings).

SERVICE – full access to the controller and viewing all of the parameters can be obtained through the terminal.

10.7 Additional delay – delay of answering of the device.

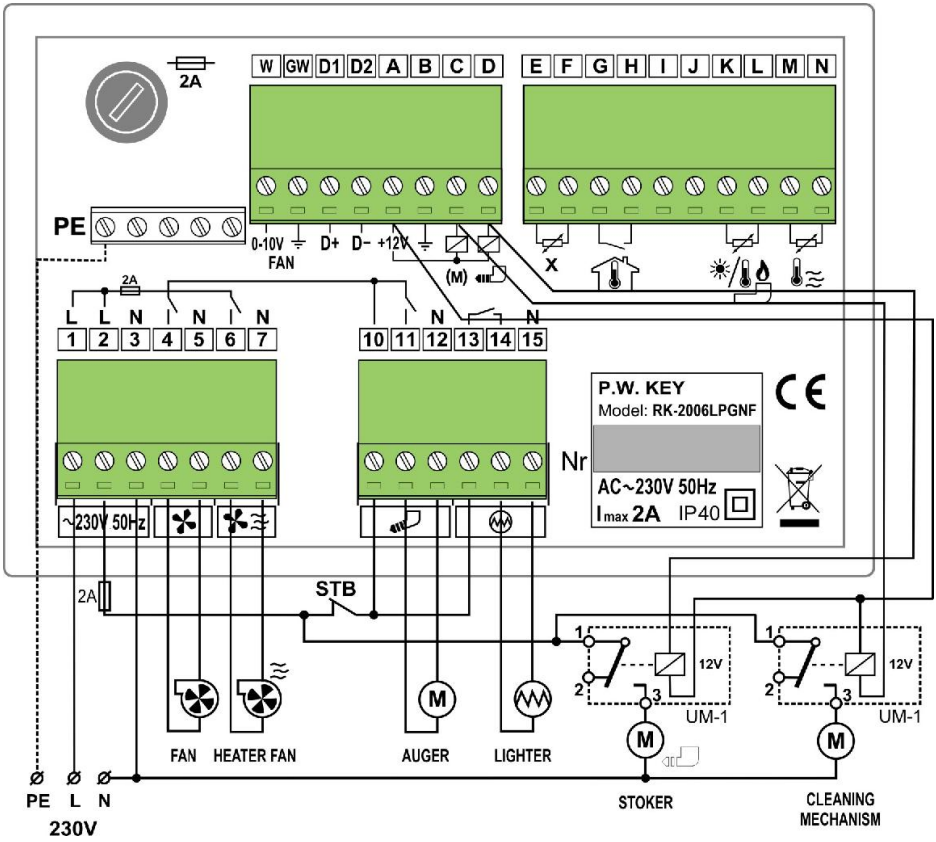
8.Controller disassembly.

If controller disassembly is necessary follow the following procedure:

– Disconnect the heater and controller from power supply,
– Remove the controller from the heater,
– Disconnect terminals and wires from the controller.

9. Technical Data.

Power Supply	230 V ± 10%, 50 Hz
Power consumption (without fan and pump)	< 4 VA
Burner temperature measurement range (KTY 81-210)	-39–109°C ±1°C
Temperature measurement range (KTY 81-210)	-39–109°C ±1°C
Burner temperature measurement range (PT-1000)	-30–500°C ±3°C
Heater temperature adjustment range	30–90°C ±1°C
Heater programmed overheating protection	91–99°C ±1°C
Total outputs rating	max 2 A / 230 V
Dimensions (H x W x D)	96 x 144 x 94



Picture 2. RK-2006 LPGNF electrical scheme.

DECLARATION OF CONFORMITY

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

hereby declares that the product:

Controller RK-2006LPGNF

the essential requirements of

EC directive on electrical equipment for use within certain voltage limits 2014/35 / UE (LDV) from 02/26/2014 and the

EC Electromagnetic Compatibility Directive 2014/30 / UE equivalent (EMC) from 26.02.2014.

mgr inż. Zdzisław Kluczek
właściciel

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.