

# OPERATION MANUAL



## UMS-4PS

UNIVERSAL WEATHER-COMPENSATING CONTROLLER

Version 1.930



## 1. Application.

The UMS-4PS weather compensating controller is a microprocessor device designed for weather compensating central heating temperature control in the installations powered by a central heating system. The temperature in the central heating circulation is maintained by controlling the servomotor of the mixing valve.

The controller is equipped with the output designed for controlling the central heating pump, the temperature of installation water decrease input and the heating turn-off input. The construction of the device makes it possible to connect parallelly any given number of UMS-4PS controllers which means that one boiler or central unit may be connected independently to many central heating systems.

## 2. Connection.

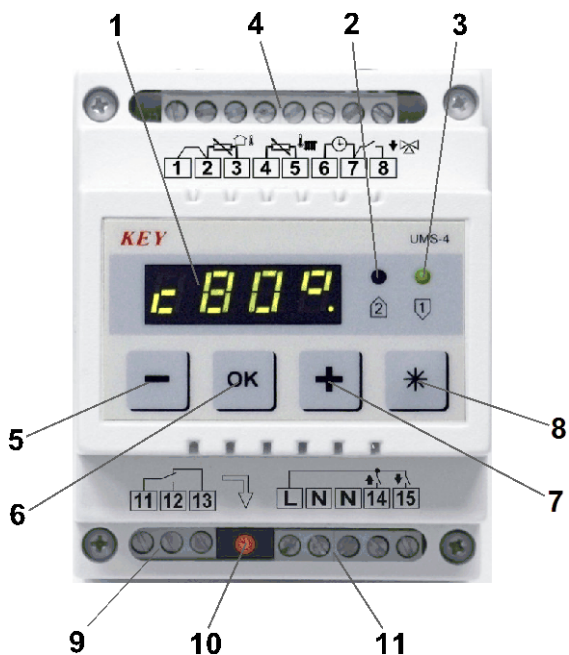
Before turning the power on, the cables powering the controller, the servomotor of the mixing valve and the cables powering the central heating pump should be connected to the appropriate sockets. The outside temperature sensor may be connected parallelly to any given number of UMS/UMP controllers, bearing in mind that appropriate contacts should be connected to the suitable contacts of the controller. Each UMS-4PS controller requires a separate central heating temperature sensor. Detailed connection scheme is presented in the picture 3.

**CAUTION!** Before plugging in the controller make sure that the wiring system is properly grounded.

## 3. Operation.

The front panel of the controller (picture 1) contains:

- 1 – Display.
- 2 – Servomotor of the mixing valve indicator (opening).
- 3 – Servomotor of the mixing valve indicator (closing).
- 4 – temperature sensors and additional features control inputs connector
- 5 – (-) button used for selecting and changing parameters.
- 6 – OK button used for changing and accepting parameters.
- 7 – (+) button used for selecting and changing parameters.
- 8 – (\*) button.
- 9 – central heating pump control connector.
- 10 – central heating pump control input indicator.
- 11 – power and the mixing valve servomotor control connector.



Picture 1. Front panel of UMS-4PS.

The operation of the controller boils down to setting threshold temperatures WINTER/SUMMER and the value of the decrease in temperature. Controlling the servomotor of the mixing valve and the central heating pump is obtained automatically on the basis of the temperatures and service parameters set by a fitter.

During regular work when one of the two measured temperatures is displayed, the indicator on the extreme right shows the regulation mode of the controller:

- when the light is on, the controller is in the WINTER mode. In this mode the task of the controller is to maintain an appropriate temperature in the central heating system. The temperature depends on the outside temperature or the mean outside temperature as well as the programmed weather characteristics,

- when the light is off, the controller is in the SUMMER mode. In this mode the controller closes the mixing valve and turns off the central heating pump. To avoid jamming, the pump is turned on once a day for a minute.

Access to all parameters that can be changed by the user is available thanks to + and – buttons. The list of all parameters is included in Table 1. The way of changing particular values can be found in the description of the parameters.

Table 1 contains the list of all parameters of the user. The first column includes examples of display indications, the next columns: description of a given parameter, minimum and maximum set value, jump of the value while being set and the last column contains the default values set by the producer. They can be restored by selecting the service function [Prod].

Table 1. List of parameters of the user.

Display	Parameter	Min	Max	Jump	Default settings
c50°	Temperature of water in central heating circulation				
-15°	Outside temperature				
d-10	Value of installation water temperature decrease	-30	0	1°C	-10
co C	Manual switching between working modes (WINTER/SUMMER) of the unit	C	-		C
LL10	Threshold temperature WINTER	0	30	1°C	10
LH18	Threshold temperature SUMMER	0	30	1°C	18
E ??	Temperature sensors alarms damage				

### 3.1 Temperature of water in central heating circulation [c50°].

The parameter enables the user to view the measured water temperature of the central heating system. In order to display the programmed temperature of the central heating system (the temperature that the regulator is aiming at), press and hold the OK button. This is signaled by flashing of the first LED on the display e.g. [c.50°]. The regulator returns to this basic parameter automatically after 60 seconds. This means the regulator will switch to displaying water temperature of the central heating circulation when e.g. the user switches to viewing the outside temperature and during the period of 60 seconds will press no button at all. The exception to the rule are emergency situations. In such cases, the default alarm is displayed.

### 3.2 Outside temperature [-15°].

This parameter shows the outside temperature. If the desired temperature of installation water is counted on the basis of the average outside temperature, press and hold the OK button to find out the current average outside temperature, e.g. [A.-10].

### 3.3 The rate of installation water temperature decrease [d-10].

The value set in this parameter determines by how many degrees the temperature of the installation water in the central heating system will be decreased in the case of opening contacts of nighttime temperature decrease input. This is calculated on the weather characteristics.

In order to change the parameter you need to press the OK button, while it is being displayed. The regulator will switch into the edition mode, signaled by flashing digits of the parameter being changed. By pressing (+,-) buttons, you need to set the desired level of temperature and confirm your choice with the OK button. Pressing the (\*) button will cause cancellation of the introduced change and exiting the edition mode. Also, the cancellation of changes will occur, if the parameter will not be confirmed during 60 seconds since the last change

### 3.4 Switching (WINTER/SUMMER) working modes of the unit manually [co C].

The parameter enables the user to switch the regulator manually between the WINTER/SUMMER working modes. The switching occurs after pressing the OK button. The notice [co C] means WINTER mode, whereas [co -] – SUMMER mode.

**CAUTION!** Any attempts of switching controller's working modes manually might result in failure if it is the outside temperature that forces the switching automatically (e.g. an attempt of turning on the SUMMER mode at the outside temperature below zero).

### 3.5 Temperature threshold [LL10] / [LH18].

In order to eliminate the influence of the frequent changes in outside temperature on the work of the UMS-4PS controller, a possibility of programming the threshold temperatures for changing to WINTER mode ([LL10]) and SUMMER mode ([LH18]) has been implemented. Changing between these mode is automatic after the outside temperature exceeds one of the threshold temperatures. The changes of threshold temperatures are made in the same way as programming night inside temperature decrease.

**CAUTION!** When the outside temperature sensor is out of order, the controller does not switch the WINTER/SUMMER modes automatically. However, the switch between the modes can be made manually.

### 3.6 Temperature sensors damage.

The regulator tests functioning of measuring channels continually. In case of detecting a damage, the coded alarm is displayed, and the regulator starts to operate. The list of alarm codes and the description of regulator reaction is shown in table 2. In an emergency, one has to turn off the regulator, connect power to central heating pump permanently, open the mixing valve manually and contact technical staff.

Table 2. The list of alarm codes and responses from the control unit.

Code	Description	Controller's response
E 2	Central heating sensor failure	The mixing valve is open after selecting the WINTER mode. Temperature decreasing and central heating installation turn-off option are not available.
E 4	Outside temperature sensor failure	No automatic switching between WINTER/SUMMER working modes. 0°C outside temperature is taken into account when programming the central heating temperature.

**CAUTION!** When damaging the outside temperature sensor and the central heating temperature sensor occurs at the same time, the regulator will display the [E 6] alarm.

## 4. Default settings.

To restore service mode, press and hold the (\*) button for about 3 sec. It is possible to check the parameters using the (+, -) buttons. After selecting a desired parameter, press the OK button to enter the operation mode signalled by blinking of the selected parameter. To make a selection, use the (+, -) buttons. In order to confirm new settings

you should use the OK button; then the regulator enables the user to select the next parameter. Pressing the (\*) button during edition will cancel the introduced change. Exiting the default settings follows automatically 60 seconds after the recent use of the button or selecting and confirming [End] option.

**CAUTION!** If the regulator is in the service mode, the work of control devices is stopped until the time of exiting the mode.

In table 1 the list of all available parameters has been presented. The first column contains examples of display unit indications, the next columns – description of a parameter, the minimum and maximum values possible to set, as well as a change of the value while setting; the values preprogrammed by the producer are included in the last column. One may return to the values by selecting the [Prod] option.

Table 3. The list of service parameters.

Display	Parameter	Min	Max	Jump	Default settings
to 1	Module operating mode and the type of the outdoor temperature sensor.	0	1	1	1
cF40	The ratio of the weather characteristics inclination.	20	80	1	40
cr 0	Changing the weather characteristics.	-9	9	1°C	0
cL20	The minimum temperature of heating circuit water.	5	60	1°C	20
ch75	The maximum temperature of central heating circulation.	40	90	1°C	75
ch 2	Mixing valve servomotor work hysteresis.	1	9	1°C	2
cP 2	Duration of pulse controlling the mixing valve actuator.	1	99	1s	2
t 20	Pause between impulses controlling the servomotor.	---,1	240	1s	20
cn--	Mixing valve shift duration.	--,1	99	1min	--
n---	Quantity of measurements used to calculate the average outside temperature.	---, 1	144	1	---
- 0	Temperature sensor correction coefficient the outside.	-30	30	1	0
= 0	Central heating temperature sensor correction factor.	-30	30	1	0
Prod	Restoring producer's settings.				
outc	The mixing valve output testing – closing.	outc	out1		
outo	The mixing valve output testing – opening.	outo	out2		
outP	Central heating pump output testing.	outP	out3		
End	Exiting the default settings.				

#### 4.1 Module operating mode and type of the temperature sensor.

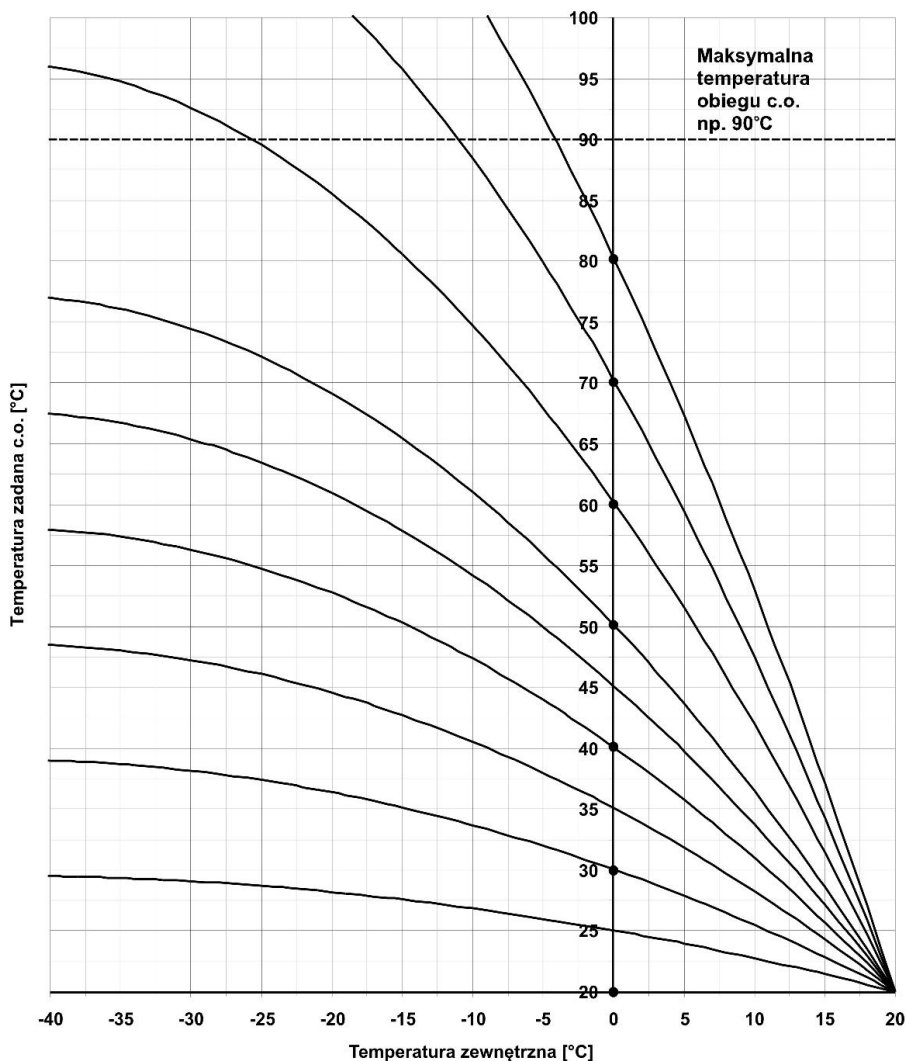
Depending on the setting of the service parameter [to 1] the module can work in one of the two modes.

The **[to 0]** mode means that the module controls the mixing valve maintaining a constant, preset by the user, temperature of the heating circuit. In this mode, the outside temperature sensor input may be left unconnected.

The **[to 1]** mode indicates that the module is working in a weather-based mode, which means that the water temperature in the heating circuit depends on the outdoor temperature. In this mode it is necessary to connect the outdoor temperature sensor.

#### 4.2 Weather characteristics.

The temperature of the installation water needed for maintaining constant room temperature depends mainly on the outside temperature and thermal characteristics of the given building. The UMS-4PS unit enables the user to set the adequate inclination and change the weather characteristics. The relation between the outside temperature (or averaged outside temperature), the set parameters and the programmed water temperature of central heating system is shown in picture 2.



Picture 2. Weather characteristics. (Programmed temperature of the central heating system, Maximum temperature in central heating circulation, e.g. 90°C, Outside temperature [°C].)



**The ratio of the weather characteristics inclination [cF40]** – the parameter determines the temperature of water in the central heating system when it is 0°C outside. In the graph (picture 2) the relation between the outside temperature and the temperature of water in the central heating system for ten examples of parameter settings [cF ] has been shown.

**Adjusting the weather characteristics of central heating circulation [cr 0]** – the parameter determines by how many degrees the programmed temperature of central heating water, calculating on the weather characteristics, will be revalued.

**The minimum temperature of central heating circuit [cL20]** – this parameter defines the minimum temperature of water in the central heating circuit. If the temperature calculated from the weather curve, after shifting the curve by the heating curve offset [cr 0], will be lower than this minimum temperature, then the target heating circuit temperature will be raised to the minimum temperature set by this parameter.

**The maximum temperature of central heating circulation [cH75]** – the parameter defines the maximum programmed temperature of water in central heating circulation. If temperature calculated on the weather characteristics, after considering the heating curve change by value [cr 0], exceeds the maximum temperature, then the programmed temperature of the central heating circulation will be limited to the value set in this parameter. Protection from excessive increase of central heating circulation temperature is of considerable significance in case of underfloor heating where the temperature should not exceed 50°C.

**CAUTION!** Additional guard protecting installation from excessive rise of temperature should be used in underfloor heating systems regardless of the maximum programmed temperature.

#### **4.3 Mixing valve servomotor working parameters.**

**Hysteresis of mixing valve servomotor working [ch 2]** – the mixing valve servomotor is stopped after achieving the programmed, calculated on the weather characteristics, temperature of water in central heating circulation. When the rise in temperature of water in central heating circulation is continued, the regulator closes the mixing valve. The parameter determines the value by which the temperature of central heating circulation needs to fall below the programmed one, so that the regulator could proceed to open the valve.

**Duration of pulse controlling the mixing valve actuator [cP 2]** – the parameter defines the period of time during which the mixing valve is turned on when being opened or closed. When fast actuators are applied, setting the short time control pulse is recommended.

**Interval between impulses transmitted to control the servomotor [t 20]** – the parameter determines the pause between impulses controlling the mixing valve servomotor. The duration of the steering pulse is constant and equals 2 seconds. In case of using fast servomotors, a longer break is recommended. Changing the parameter to [t---] allows the servomotor to work continually.

**Mixing valve shift duration [cn--]** – the parameter defines the time necessary for moving the mixing valve between the side positions when the continuous control pulse is on. When the value of the parameter is different from "--", the controller starts to count the control pulses duration. When the actuator is activated long enough into one of the directions, the controller will recognize that the mixing valve has achieved full (depending on the operation direction) opening or closing. Then, the valve control is stopped until the need of change of the work direction occurs. The function aims to reduce the quantity of unnecessary activations of relays controlling the mixing valve actuator operation. Setting the parameter to the value "--" disables the function.

#### **4.4 Averaged measurement of the outside temperature.**

The unit UMP-4PS records a change in the outside temperature every ten minutes. Each measurement is stored in the unit memory for 24 hours. The saved measurements might be used when calculating the average outside temperature.

**Quantity of measurements used to calculate the average outside temperature [n--]** the parameter determines on how many recent measurements the average outside temperature will be calculated. The value received this way helps to determine the level of the programmed installation water temperature based upon the weather characteristics. Changing the parameter to [n--] results in the current outside temperature which is used to calculate the programmed installation water temperature.

**CAUTION!** The memory containing the outside temperature measurements is erased when turning off the power. If the device has been working for less than 24 hours, then the average outside temperature will be calculated on the basis of the available data.

#### **4.5 Correction of the outside temperature sensor indications.**

**The correction ratio of the outside temperature sensor [ \_ 0]** – long connecting wires as well as overload by units connected parallelly might be a cause of faulty results when measuring the outside temperature. The parameter enables to correct an error. Transition of correction rate by 1 corresponds to a change of indication by circa 0.3°C.

**\_ 0** - this parameter enables calibration of the external temperature sensor.

**= 0** - this parameter enables the calibration of the central heating circuit temperature sensor.

#### **4.6 Producer's default settings.**

The regulator enables the user to restore the default settings programmed by the producer by selecting [Prod] on display unit and pressing the OK button. After activating the option, the regulator enters the values of respective parameters given in tables 1 and 3.

#### **4.7 Output testing.**

In order to verify the accurate functioning of the regulator, it is possible to test output setup controlling the central heating pump and mixing valve servomotor. Selecting [outc] on the display allows, using the OK button, to turn on closing the mixing valve, choosing [outo] with OK button turns on opening the mixing valve, choosing [outP] by pressing OK, turns on the central heating pump.

#### **4.8 Exiting default settings.**

Selecting [End] on the display and pressing the OK button results in exiting the parameter setting mode. Also, when during 60 seconds no buttons will be pressed at all, exiting the mode occurs.

### **5. Additional features.**

#### **5.1 Installation water temperature decrease input.**

The unit UMS-4PS has been equipped with input of decreasing the temperature of installation water. Opening the contacts of this input makes the temperature of water in central heating circulation fall by the value programmed by the user (see 3.3). The solution enables the decrease of room nighttime temperature by connecting it to the outside unit – a programmed clock. Decreasing the temperature of water in central heating installation can be as well controlled by any room thermostat equipped with a contact output.

**CAUTION!** If the option of nighttime decrease is not used, then the contacts 6-7 of the regulator should be closed or value of the parameter [d-10] should be changed to “0”.

**CAUTION!** Installation water temperature decrease input shall not be connected to any other UMP/UMS inputs directly.

#### **5.2 Central heating turn-off input.**

Closing 7-8 contacts of UMS-4PS unit will turn off the central heating system. The unit will close the mixing valve (as in SUMMER mode), however it will not turn off the central heating pump (as in WINTER mode). Additionally, the safety system will be turned on to protect the central heating installation from freezing. Connecting the programmed clock to the input will automatically turn off the heating at preferred times.

**CAUTION!** If the heating turn-off option is not in use, contacts 7-8 of the unit should be left open.

**CAUTION!** The central heating turn-off option has a priority over the installation water temperature decrease option. This means that if both options are turned on – the heating turn-off option will be carried out.

**CAUTION!** The heating turn-off inputs must not be connected with any other UMP/UMS inputs directly.

### **6. Controller disassembly.**

If controller disassembly is necessary, follow the procedure:

- Disconnect it from power supply
- Disconnect and place the controlling wires in safety
- Disconnect sensor wire
- Remove the controller.

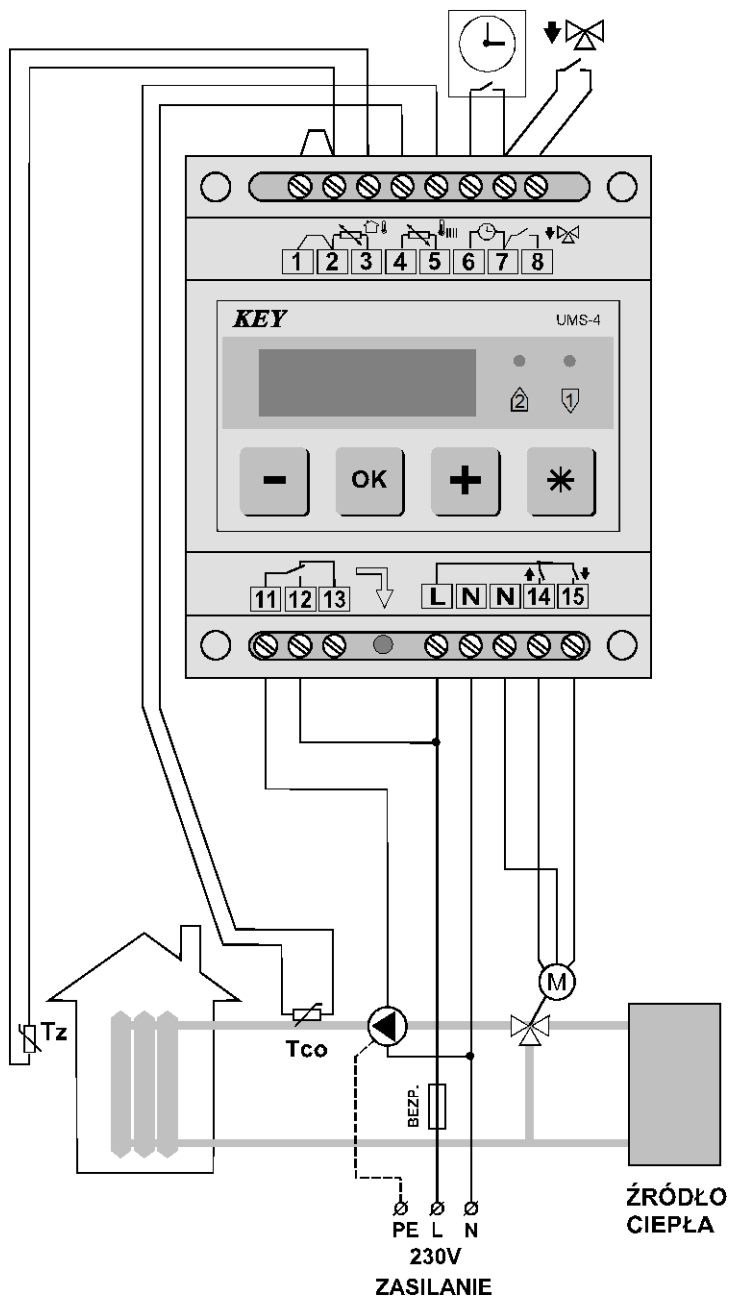
When several units of a system are connected parallelly, you need to take care of proper supply of power to the sensors while disconnecting the UMS-4PS equipped with jumpers at sensor inputs. This can be obtained by placing jumpers at one of the remaining units.

## 7. Technical specification

Power supply	230 V ± 10%, 50 Hz
Power consumption (without control devices)	<2 VA
Temperature measurement range	- 40°C ÷ 109°C ± 1°C
Outputs rating	1 A / 230 V
Dimensions (HxWxL)	89 × 67 × 65 mm

## 8. Notes.

Display	Parameter	User's settings
to 1	Module operating mode and the type of the outdoor temperature sensor.	
d-10	Value of decrease in installation water temperature.	
LL10	Threshold temperature WINTER.	
LH18	Threshold temperature SUMMER.	
cF40	The ratio of the weather characteristics inclination.	
cr 0	Changing the weather characteristics.	
cL20	The minimum temperature of heating circuit water.	
cH75	The maximum temperature of central heating circulation.	
ch 2	Mixing valve servomotor work hysteresis.	
cP 2	Duration of pulse controlling the mixing valve actuator.	
t 20	Pause between impulses controlling the mixing valve servomotor.	
cn--	Mixing valve shift duration.	
n---	Number of measurements used to calculate the average outside temperature used to calculate the average outside temperature.	
_ 0	Temperature sensor correction coefficient the outside.	
= 0	Central heating temperature sensor correction factor.	



Picture 3. UMS-4PS controller and boiler configuration scheme.



# DECLARATION OF CONFORMITY

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

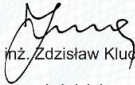
hereby declares that the product:

**UMS-4PS**

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 26.02.2016.

  
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 this 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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