microsyst

COMPETENCE IN
MEASUREMENT

CE

ON/OFF controller
with user adjustable analog input
three/five independent discrete outputs
and an analog transmitter output
MS8104k5 & MS8104k3

v2.01

USER MANUAL

PLOVDIV 2015

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1. DESIGNATION

MS8104k5 and **MS8104k3** are designed for process control in ON / OFF control mode. The difference between the two controllers is only in the number of discrete outputs - 5 for MS8104k5 and 3 MS8104k3.

One of discrete outputs is alarm with switch-on delay and the rest are ON / OFF controlled with programmable hysteresis All outputs have independent set points, and user selectable positive or negative logic of control / type "heating" or "cooling" /.

The large number of digital outputs with independent set points, provide the opportunity controllers to be used for stage control. Stage control allows to switch on and off heavy loads at different times to protect the power supply network of shock loads.

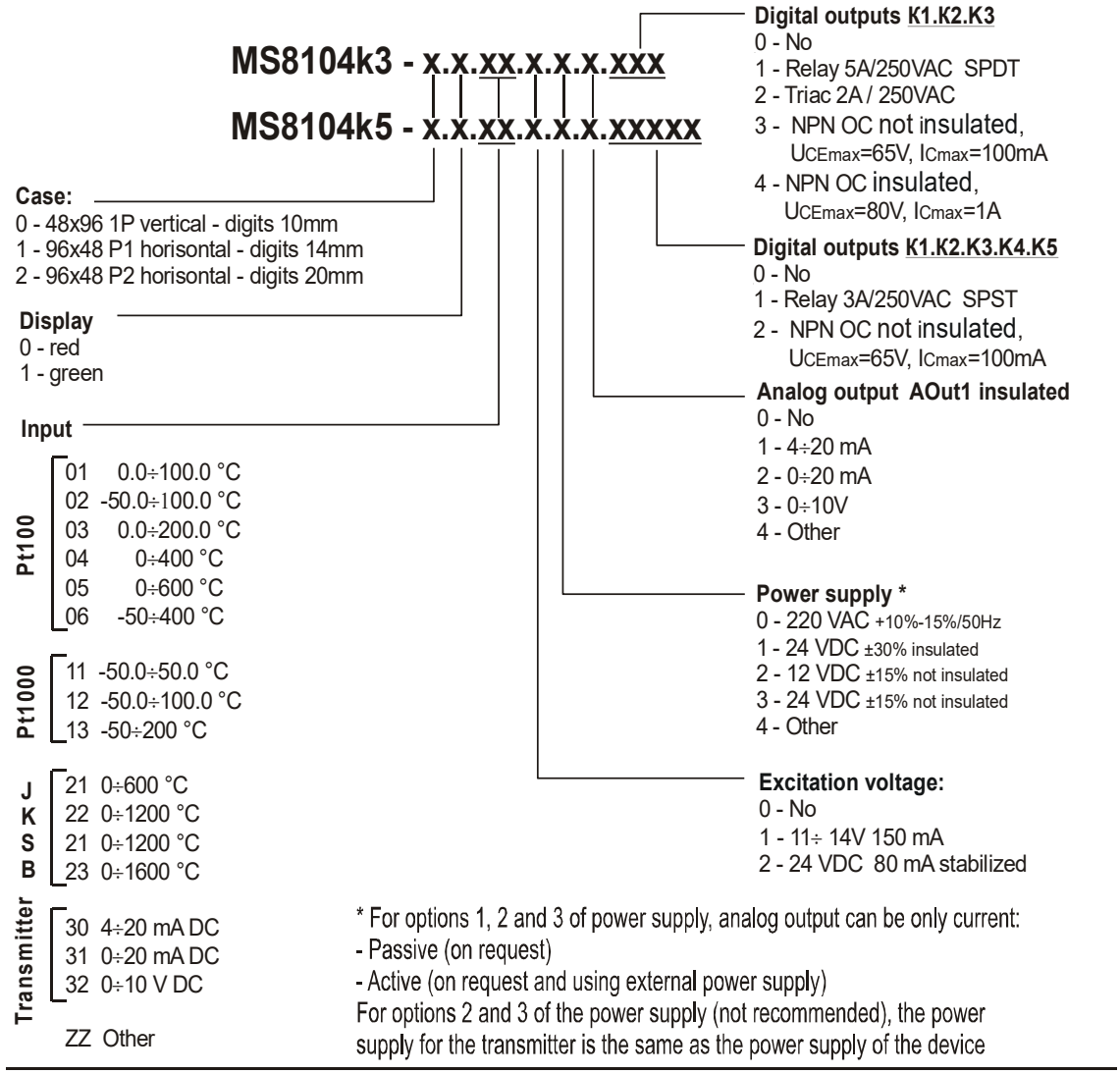
Parameters hysteresis, alarm levels and others are user programmable.

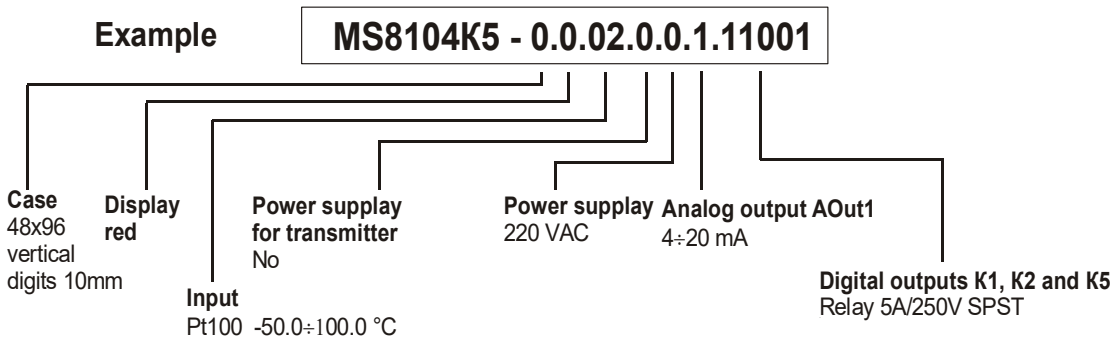
The controller has an analog output, which transmit the input value in unified output current or voltage signal.

- *The range of the displayed parameter is user adjustable only when the input parameter is a linear / as unified current or voltage signal /.*
- *Sets up the known values of the input signal by a reference / signal calibrator / or direct signal from the transmitter corresponding to the lower and upper level of the site / As a reservoir, a current transformer, etc. /*

2. ORDER CODE

The difference between two models are the number and type of the digital outputs only

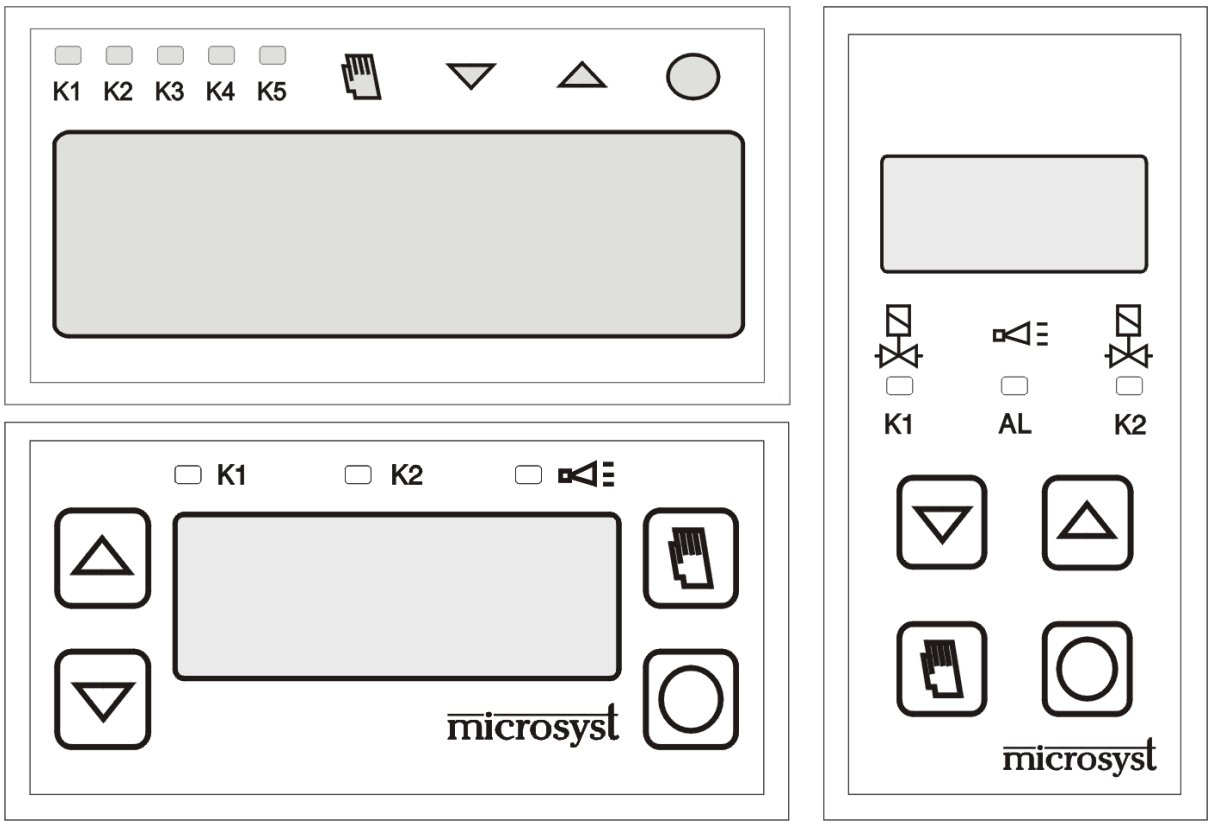


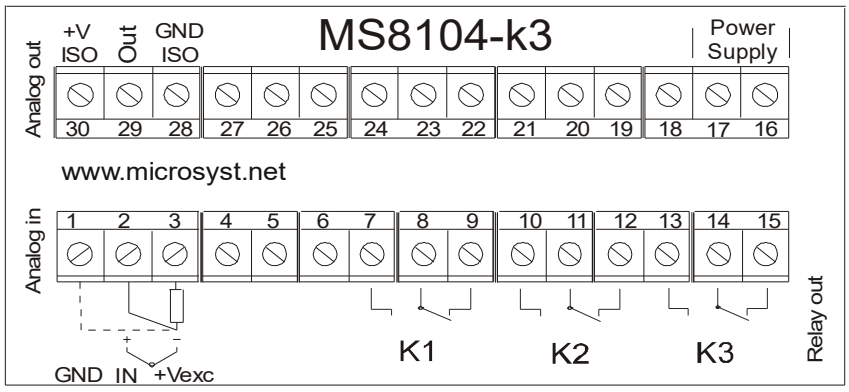


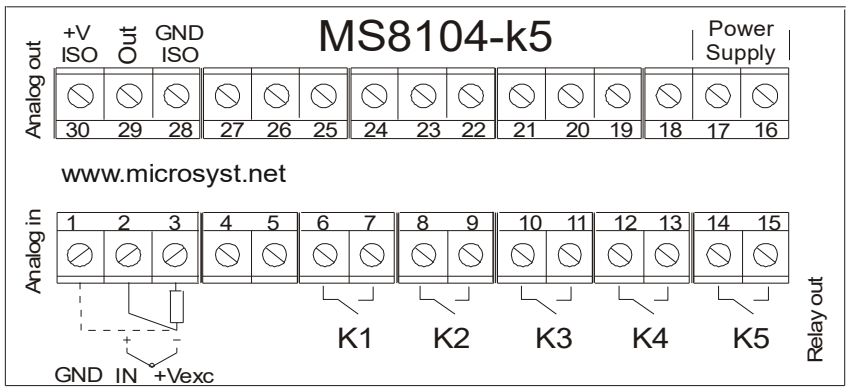
3. TECHNICAL DATA

Inputs			
Linear current or voltage		current - 0 (4) ÷ 20 mA DC, voltage - 0 ÷ 1 (10) V DC	
RTD		Pt 100, P1000	EN 60751
Thermocouple		J, K, S, B, R, E	EN 60584
Other		by order	
Measurement accuracy		± 0.15% от обхвата	
Outputs - digital			
MS8104-K3	K1, K2, K3	Relay 250 VAC / 5 or 10 A **- SPDT** - NO & NC * for current over 6 A are selected other terminal	
MS8104-K5	K1, K2, K3, K4, K5	Реле 250 VAC / 3 A - **SPST** - NO	
Options	- Triac 250V/ 2 A – *only for* MS8104-k3; - NPN OC uniso 100 mA – not insulated it is used the main internal power supply, example for SSR ; -NPN OC iso 500mA70V–insulated, for loads with external power supply- *for* MS8104-k3		
Outputs - analog		0 (4) ÷ 20 mA DC, 0 ÷ 1 (10) V DC	± 0.15% of FS
		Transmitter function – optically isolated	
Auxiliary voltage outputs			
for analog output – VAOut		+ (11 ÷ 14) V DC / 150 mA non stabilized, isolated	
for transmitter – V excitation		+ (11 ÷ 14) V DC 150 mA - non stabilized + 24 V DC 80 mA stabilized	
Display and keyboard			
Display		* for vertical case : 4 digits LED 10 mm	
		* for horizontal case : 4 digits LED 20 mm or 14 mm	
Display range/format		-1999 ¸ 9999 / XXXX, X.XXX, XX.XX, XXX.X	
Keyboard		foil	
Power supply			
voltage; frequency		220V / max 20mA; 50 Hz (± 1 Hz)	
Other		by order code	
Ambient conditions			
Operating temperature / humidity		0 ÷ 50 °C / 0 ÷ 80 % rh	
Storage temperature / humidity		-10 ÷ 70 °C - 0 ÷ 95 % rh	
Dimensions			
Overall dimensions (WxHxL)		Vertical - 96 x 48 x 128 mm Horizontal - 48 x 96 x 128 mm	
Panel cat off		Vertical - 90 x 44 mm	
		Horizontal - 44 x 90 mm	
Weight		max 400 g	
Protection class		IP40	
Software version:			

4. FRONT AND BACK PANEL. DISPLAY AND KAYBOARD

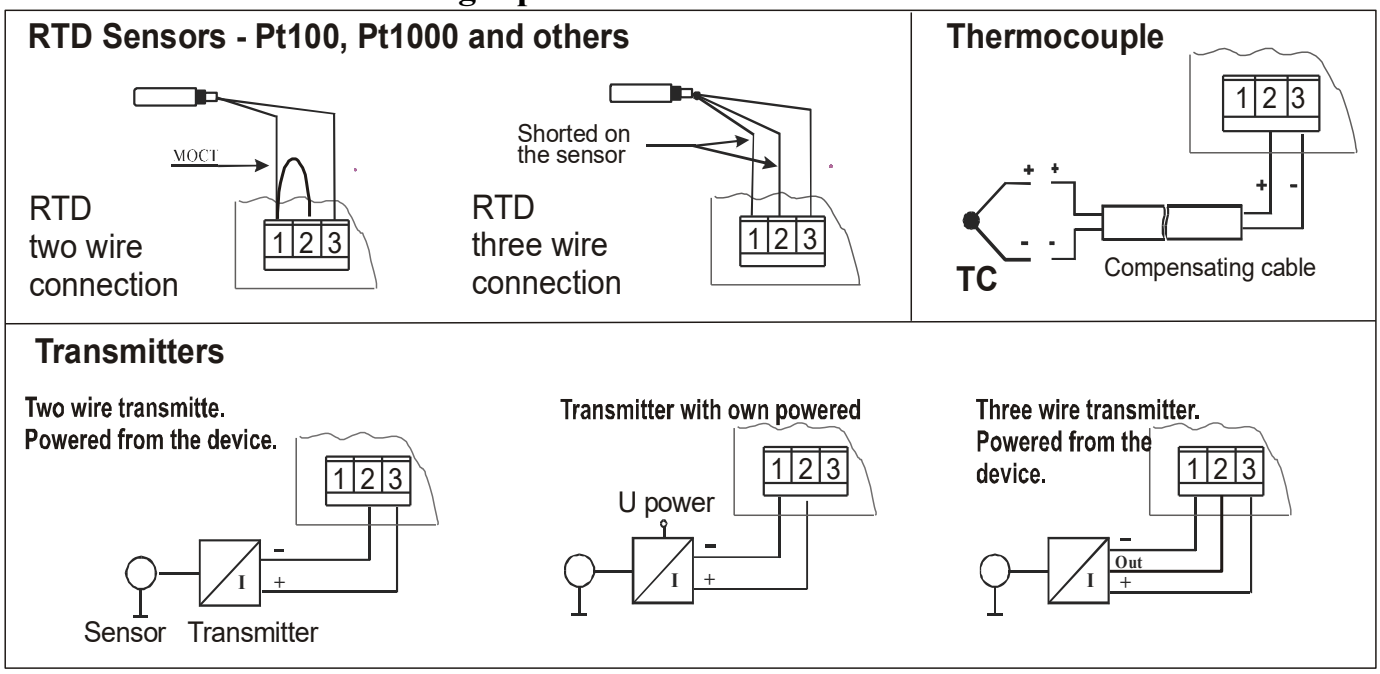




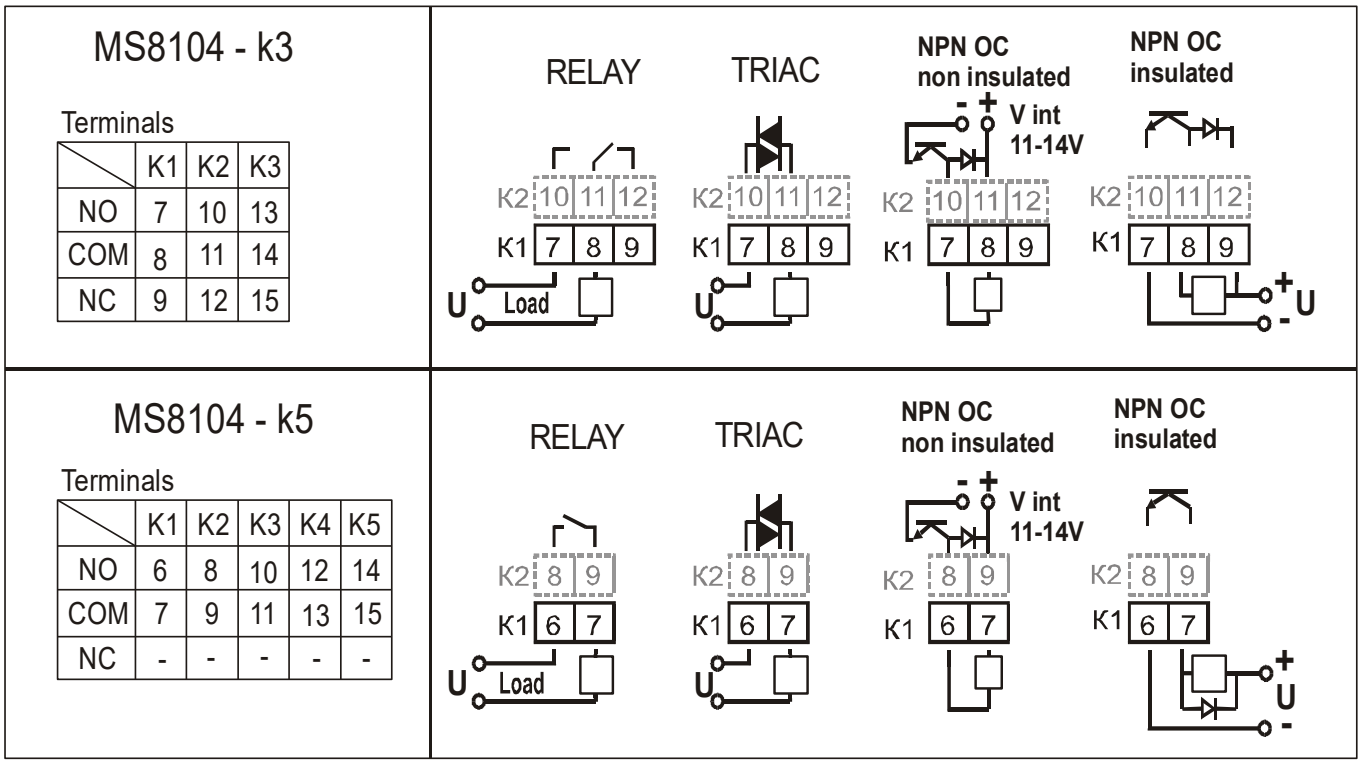


5. CONNECTIONS

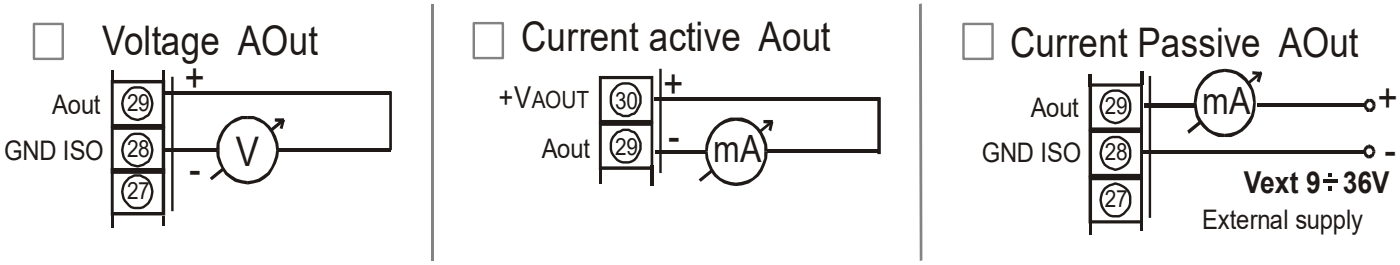
- **Connection of an analog input**



- **Connection of a digital output**

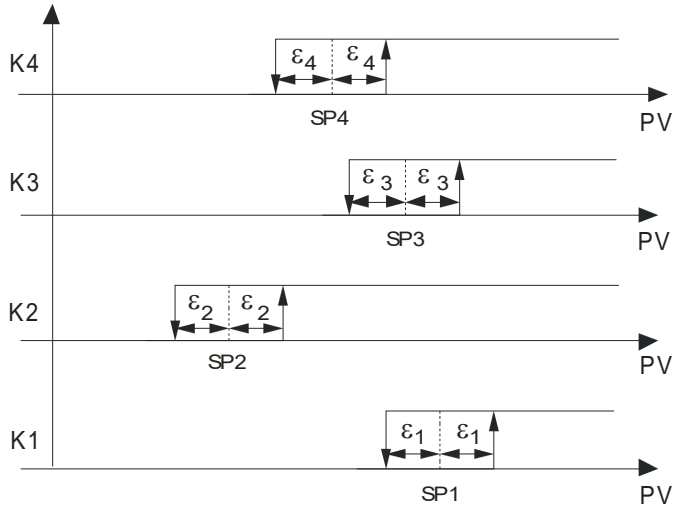


- **Connection of a digital output**



6. OPERATION

Four independent Set points with hysteresis for



Denote :

PV – process variable

SP1 – set point Channel 1 (**К1**)

SP2 - set point Channel 2 (**К2**)

SP3 - set point Channel 3 (**К3**)

SP4 - set point Channel 3 (**К4**)

ε_1 - hysteresis for **SP1** (HST1)

ε_2 - hysteresis for **SP2** (HST2)

ε_3 - hysteresis for **SP3** (HST3)

ε_4 - hysteresis for **SP4** (HST4)

7. USER MANUAL

When the power supply is turned on, the process variable is appears on the display.
K1 LED is illuminated when the output K1 is turn on, K2 LED is illuminated when the output K2 is turn on.
AL LED is illuminated when the alarm output is turn on.
Outputs K3 and K4 is indicated on the front panel only for MS8104k5 with 20mm digits.

In this mode, the action of the buttons is as follows:

BUTTONS	PERFORMANCE
mode	By consecutive pressing of this button can realize browsing and editing of the separate set-points - **SP1**, **SP2**, **SP3** and **SP4**. When press the button, **SP1** appears on the display. When release the button the value of the set-point **SP1** appears on the display. The next pressing of the button switches to **SP2** and so on to **SP4.** After the value of set-point **SP4** has appeared the pressing of the button realizes appearing of **PU** and after the releasing of the button, the controller returns to normal operating mode. *The controller return to normal operating mode also by non-pressing of a button for more than 5 seconds.*
up или down	They realize editing of the values of the set-points **SP1**, **2, 3 and 4**. By the button **MODE** can select the value of the set-point, desired for change, as it is described above. After its value has appeared, by the pressing of the buttons **UP** or **DOWN** can increase or decrease the value. *By the pressing of a button, different from the buttons **UP** and **DOWN**, and also if don't press any button for more than 5 seconds, the controller will exit from he mode for editing and memorizing of the value.*
auto	By pressing and holding of this button for more than 3 seconds you will enter operating mode "**TUNING OF PARAMETERS**"(see below)

 и 	The single entering of this combination (pressing of the button **UP**, holding and pressing of the button **AUTO**) when the input variable is on the display will realize locking of the keyboard. By the second entering of this combination will unlock the keyboard. The new status is indicated by **"Loc"** or **"UnLc"**. The locking of the keyboard is a prohibition to the access to mode "**TUNING OF PARAMETERS**" and prohibition of the editing of the values of the set-points **SP1**, **SP2, SP3 and SP4**. *The status of the keyboard is memorized in non - volative memory and it is valid after reset of power supply .*

7.1. Lock / UnLock the Keyboard

** see the last row of the table above*

7.2 Parameters Setting

	Press and hold to enter mode setting parameters to appear on the display **"tune"**, which stands next to the button is released.
	Select the parameter.
 , 	Change the value of the selected parameter.
◆ *After displaying the last parameter, the controller returns to normal mode*	

	◆ ***In mode "PARAMETER SETTING" all outputs are switched off and not controlled.***
	◆ ***The logic of the ON/OFF control output is determined by the sign of the hysteresis: type "heating" in a positive and "cooling" in negative hysteresis.***

Parameter	Description	Value	Factory value
HSt1	Hysteresis (ε_1) for **SP1**.	-1999÷9999 decimal point according to the measured value	
HSt2	Hysteresis (ε_2) for **SP2**.		
HSt3	Hysteresis (ε_3) for **SP3**.		
HSt4	Hysteresis (ε_4) for **SP4**.		
AL	Lower limit of the alarm	on the limit of the range	
AH	Higher limit of the alarm		
tAL	Time delay for activation of the output alarm	0 ÷ 80 s	5
Filt	Filter coefficient for process variable Less value - more "heavy" filter.	0.01 ÷ 1.00	0.13

7.3. System parameter setting

- Parameters accessible at pressed button 

at switch on of the power supply.
- The System Parameters apear after basic parameters.
- Access is possible by holding the button 

up to power supply turn off

	***Change with extreme caution, because their change can result in incorrect operation of the appliance!*** ***Changing the P1 and P0 required standard device connected to the output.***

SYSTEM PARAMETERS			
Parameter	**Description**	**Value**	**Factory value**
P1	Multiply coefficient for analog output	-1999 ÷ 9999	
P0	Offset for analog output		
dPnt	Decimal point 128 – **x.xxx** 64 – **xx.xx**; 32 – **xxx.x**; **0 – xxxx**		
A db	Zone of operation of the filter **FiLt**	0 ÷ 255 **	10% of the range
Adbt	Waiting time after leaving the zone filter to adopt the new value.	0 ÷ 255 x 0.5 s	4
dSPL	Consistently lower and upper limits of change of the displayed parameter. **When change is automatically recalculated settings display input value corresponding to the input and output signals.**	-1999 ÷ 9999 **	
End	Exit after last parameter		
** ***Dimension and decimal point according to the measured value.***			

	*Input and output signals **<u>are factory set</u>** according to the order code. To change the format of the displayed parameter is enough to change only **dSPL** and **dPnt**.*

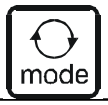
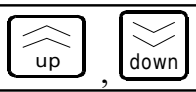
	*Recalibration of the Process Variable is possible only if the controller is factory set for <u>analog input signal</u>.* *There is an option in production programmable linearization for a specific sensor, in which case the change affects only the range of the analog output.*

7.4. Analog output

- The analog output is with digital range **Aout = 0 ÷1023**.
- The analog output is calculated with:

$$Aout = \left(P1 \cdot \frac{(PV - dSPL\ low\ limit)}{(dSPH\ high\ limit - dSPL\ low\ limit)} + P0 \right) / 1024$$

7.5 Offet seting of the analog output

	◆ Press and hold the button before turn on the power supply if the keyboard in unlock.
	◆ In the display input value, press and hold the right of these buttons, press the left. On the display appears "OFS" until the buttons release. ◆ The offset is with one order greater resolution than that of the measured parameter.
	◆ Change the value of the offset.
	◆ Confirmation of the change, the new value is added to the old value of the offset and exit from the menu.

- ***The access to the offset is possible until turning off the device from the power supply.***

8. RECOMMENDATION AGAINST INTERFERENCE

8.1. Recommendations for use of connecting wires

- Wires that carry a similar type of signals can be packed together, but if the signals are different, the wires must be separated to prevent electromagnetic interaction.
- When there have to be crossed wires with different signal types this must be done at an angle of 90 degrees and a long distance.
- Wires, which carry weak signals and wires connecting the sensors to the controller must not be near contactors, motors, generators, radios and wires, which carry large currents.

8.2. Noise suppression using the built-in in the controller filter

- If the input parameter fluctuates and is not stable it is necessary to reduce the filter coefficient **FILt.** As less value, as heavier filter and slowly change the input parameter.
- If the process variable on the display jumps periodically for short intervals, it is necessary to increase the parameter **A db**. When increase this parameter, the device reacts slowly at a unexpected variation in input, but ignores the short interference
- If the jump have a longer duration it is necessary to increase **Adtd**, but not more than 8 / max 10 /. The optimal value is 4.

9. SERVICE FUNCTIONS OF THE CONTROLLER *(only in SERVICE DESCRIPTION)*

	***THEY CAN BE USED FROM SERVICE SPECIALIST ONLY! INCORRECT USAGE OF THIS FUNCTIONS CAUSE DISABILITY OF THE DEVICE!***

WARRANTY CARD

Warranty Card № : .....

Warranty : ..... months

Serial number : .....

The product is bought by : .....

with invoice № : ...../..... ..... 20.....

WARRANTY CONDITIONS

The warranty consists of free repair of all manufacturing defects that can occur during the warranty period. **The repair is done by presenting of this warranty card in the service base with which is bought the product.** The warranty does not cover damage caused by poor transport, poor storage, incorrect usage, forces of nature, failure to follow instructions and when others made an attempt to remove the defects. In these cases the defect can only be removed for a fee.

Service during the warranty period and settlement of claims is done under the current legislation.

REPAIRS MADE IN THE SERVICE BASE

Service	Data of entry	Order number	Type of the repair	Date of delivery	Performer of the repair

Seller: ..... Buyer: .....

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