LUMEL

SCREEN RECORDER

CE



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1 Name and designation of the product

The KD6 recorder is an advanced multi-channel device that allows to measure and display parameters in many channels simultaneously. It is an ideal solution for applications where several different physical quantities represent the state of the monitored object. This device can work autonomously or cooperate with external measuring and executive modules.

2 Recorder set

The set includes:

- 1. KD6 recorder
- 2. seal
- 3. holder for mounting in a board
- 4. screw set

1 pc. 1 pc. 1 set. (4 pcs.) 1 set (quantity depends on the version)



3 Basic requirements, user safety

In terms of operational safety, the recorder meets the requirements of the PN-EN 61010-1 standard.

Safety Notes:

- The recorder should be installed and connected by qualified personnel. All available protection requirements must be considered.
- All pins should be inserted into the appropriate connectors on the device, even if they are not used for any connections.
- Before switching the recorder on, the correctness of connections shall be verified.
- Before removing the recorder housing, supply must be switched off and measuring circuits disconnected.
- Removal of the recorder housing during the warranty period voids its warranty.
- The recorder meets the requirements for electromagnetic compatibility in an industrial environment.

• There should be a switch or a circuit breaker in the building's installation, located near the device, easily accessible for the operator and appropriately marked.

4 Installation

The recorder is designed to be mounted in the board with the use of holders as shown in Fig. 1. The recorder housing is made of a self-extinguishing plastic.

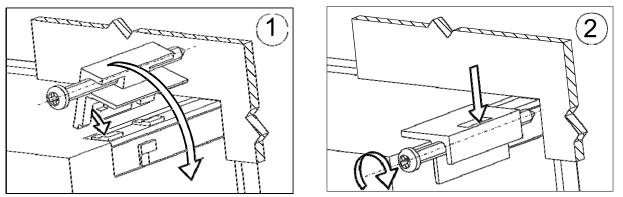
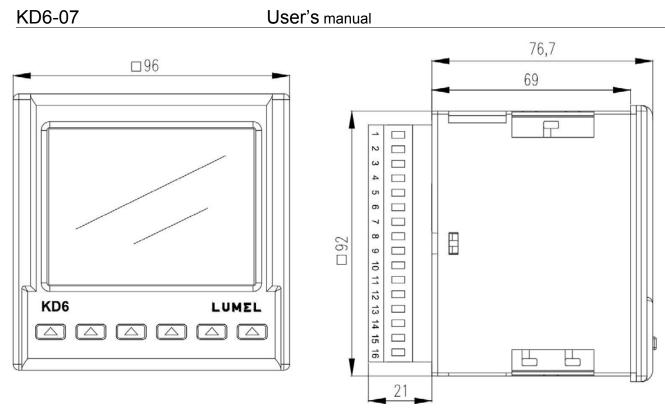


Fig.2 Recorder mounting

Housing dimensions 96 x 96 x 77 mm, mounting hole dimensions 92.5 x 92.5 mm. Outside the recorder, there are screw strips and self-locking ones which enable the connection of external wires with a cross-section of 2.5 mm².



5

Fig.3 Overall dimensions figure of the KD6 recorder

5 Device description

KD6 has been designed as a modular device consisting of a power module (Z slot),

communication module and optional input and output I / O modules (X and Y slot).

The standard (basic) version of the recorder includes a power module, a display with buttons and a communication module.

The power module also includes an RS485 slave interface, 24 V / 30 mA object power supply, 2 x digital (voltage) inputs and 2 x relay outputs.

The communication module includes Ethernet, USB Host and RS485 master.

Functional features of the KD6 recorder:

- 3.5 "TFT colour graphic screen with a resolution of 320 x 240 pixels
- Ethernet 10/100 BASE-T,
- RJ45 socket, web server, ftp server, Modbus TCP / IP server, DHCP client
- USB Host

Recorder features:

- 60 logical channels,
- -10 logical groups being a combination of up to 6 logical channels,
- independent recording for each group (interval, recording trigger mode),
- alarm functions,
- mathematical functions,
- scaling functions,
- Modbus Master: 10 devices with 10 registers.

Data sources for logical channels:

- from internal measuring modules (binary inputs / outputs, analogue inputs / outputs),
- from remote devices connected to the recorder via the RS-485 Modbus Master interface,
- from mathematical, alarm and rescaling functions.

Logical channels as a data source for:

KD6-07

User's manual

- mathematical, alarm and rescaling functions,
- logical groups
- outputs (hardware relays),
- analogue outputs.

Presentation of data from logical channels on the display:

- as numerical values,
- horizontal or vertical line and bar charts,
- analogue indicators.

Data recording

- 8GB internal memory,
- as CSV or binary files.

Downloading Recorded Data:

- USB HOST 2.0
- FTP

5.1 Mechanical design.

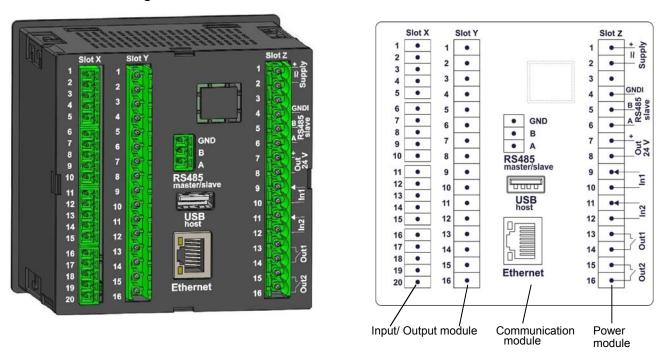


Fig.4 View of the recorder's rear plate

Input / output (I / O) modules are mounted in two slots X and Y.

Depending on the recorder execution code, the appearance of the X and Y slots of the rear panel in Fig. 4 may be different.

5.2 Basic modules.

Input / output (I / O) modules mounted in X / Y slots:

a) 6 x relay ouput module (Out1..Out6),

b) 4 x relay ouput module (Out1..Out4) + 4 x binary inputs separated from each Rother (In1..In4),

c) 4 x analog output module (Out1..Out4) + 4 x binary inputs with common ground (In1..In4),

d) 4 x programmable measuring inputs module (In1..In4),

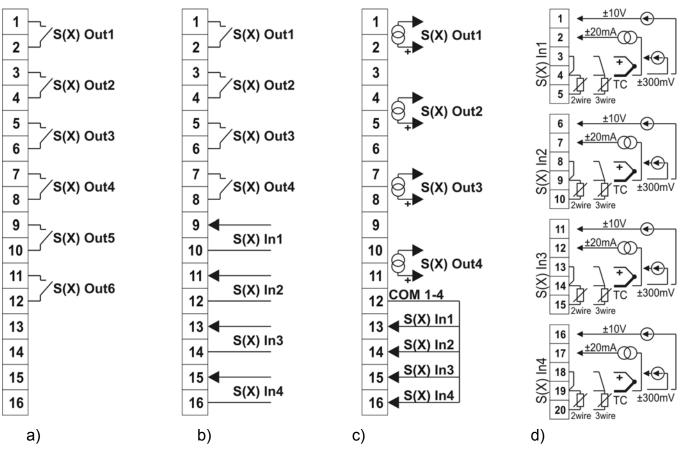
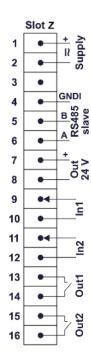
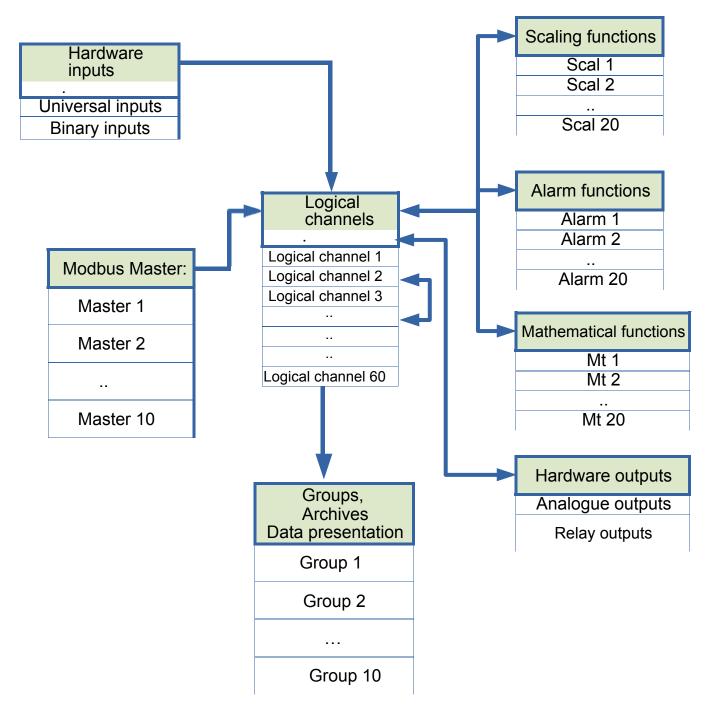


Fig.5 I / O module pin-outs description (for slot X)

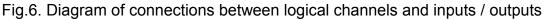
Power module mounted in the Z slot:

- supply of the recorder supply (terminals 1,2)
- RS-485 slave communication interface (terminals 4-6)
- object power supply Out 24V (terminals 7,8)
- two binary inputs In1, In2 (terminals 9-12)
- two relay outputs Out1, Out2 (terminals 13-16)





5.3 Diagram of connections between logical channels and inputs / outputs



6 Recorder programming

6.1 Recorder start-up

After switching the power on, the recorder displays the manufacturer's logo, recorder name, input / output (I / O) modules mounted in the X / Y slots, the current software version, MAC address and recorder number. Then, the data visualization screen which was displayed at the last disconnection of the recorder from the network appears.



6.2 Language selection

The factory setting is English. To select a different language, press the Menu button and hold it for about 10 seconds. The language selection menu will then appear.

Use the buttons or to select the language, and then confirm by pressing the OK button.

6.3 Recorder front panel



Fig.8 KD 6 recorder front panel

The recorder has 6 buttons and a colour graphic screen.

Values of measured parameters are displayed in measuring groups selected by consecutive pressing of the buttons **Group** (subsequent group) or **Group** (previous group).

A maximum of any 6 values / logical channels / displayed simultaneously on the screen constitute a group. Defining of group is described in the **Groups** mode.

At the top of the screen there is an information bar (see section 6.3.1) informing the user about his work state on an ongoing basis.

The recorder buttons can be used for various functions. A description of the button functions can be found in the navigation bar at the bottom of the screen (see section 6.3.2). No description means that the button is inactive at the moment.

6.3.1 Information bar

The information bar at the top of the screen shows the state of the file archive memory, the archiving state, the symbol of connecting an external memory to the USB Host port, the symbol of transferring files from the file archive memory to an external memory connected to the USB Host port, symbol of Ethernet connection, indicators of receiving and transmitting data with the use of the RS485 link, date and real time clock.

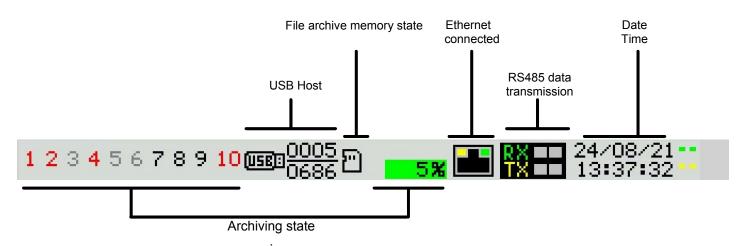


Fig. 9 Information bar

Symbol	Icon colour	Notes
2	Black - archive memory installed correctly	
1	Black - out of archive memory Red - Invalid file system on the card	
]*	Copying from internal memory to file archive memory. The percentage of use of the file archive memory is blinking blue and the percentage of copying progress is displayed.	
4567	Current archiving state: Black - archiving in the group enabled, waiting for the archiving condition to be met. Red - the archiving condition has been met and records are being saved. Grey - group archiving disabled.	Numbers indicate the archiving group
104	Filling up the file archive memory in percentage	
1/6	Green background	Value in the range 0 70%
	Orange background	File archive over 70% full. It is recommended to delete unnecessary files via FTP or upload them to an external memory connected to the USB Host port.
	Red background	Less than 7% of free space in the file archive memory is left. Time until the file archive is completely full - approx. 14 days at 1 sec. interval. Delete unnecessary files via FTP immediately.

		When the file archive is full to 95%, the overwrite mode starts and the oldest archive files are deleted during further archiving and new archive files are created.
11%	Percentage of progress when copying the archive	
	Blue pulsating background	Copying from internal memory to file archive is in progress
<u>0005</u> 0686	File transfer to an external memory connected to the USB Host port	• 5 files were transferred • total number of files to be transferred
(USB):	Symbol indicating the connecting of an external memory to the USB Host port	

6.3.2 Navigation bar

At the bottom of the screen, there is a navigation bar describing the functions of the buttons that allow the user to configure the recorder parameters, change the display mode, and change the displayed group.

Button functions:

Group Group	Switching between the presented groups of logical channels.							
Mode Mode	Switching between different presentations of displayed data values in the current group							
Menu	Pressing the Menu button brings up the main menu selection window.							
	This window allows to enter the Device Configuration, File Management menu and display the Device Info window							
	Navigation buttons in the option selection menu							
	Displacement buttons. They allow to move the cursor in the edited text							
Exit	Exit the main menu							
Select	Confirming the selection, introducing changes and exiting the edition window							
Back	Leaving the current submenu							
Cancel	Cancellation, no changes made							
ŤŁ	Switching between graphs in data presentation mode as line graphs							

6.4 Data panels

The displayed data can be presented in several modes:

- numerical values,
- horizontal / vertical bar charts,
- horizontal / vertical line charts,
- in the form of an indicating meter,

Additionally, binary values 0/1 can be presented in two ways - as numerical values or as text.

All channels of a given group are presented simultaneously in the same way.

It is possible to switch between individual views and groups. Figure 10 shows the different presentation modes of logical channel groups called from the navigation bar with buttons.



Fig.10 Examples of the measurement data presentation mode

6.5 Configuration of KD6 parameters

To enter the configuration of recorder parameters, press the button Menu. Use the buttons to select the appropriate configuration window and confirm by pressing the button

Select . Return to the measurement and recording mode is carried out by means of Back buttons

Configuration menu:

- General settings of the recorder, see section 6.5.1
- Inputs, see section 6.5.2
- Outputs, see section 6.5.3
- Logical channels, see section 6.5.4
- Groups, see section 6.5.5
- Functions, see section 6.5.6
- Modbus Slave, see section 6.5.7

- Modbus Master / Slave, see section 6.5.8
- Ethernet, see section 6.5.9
- Safety, see section 6.5.10
- Information, see section 6.5.11

6.5.1 General settings of the recorder

General settings menu allows you to change the display language of the user interface, set the current date and time, restore factory parameters and set the time to the minimum brightness (LCD backlight) and the time of group switching (option enabling cyclical changes of the displayed group).

Menu			
General	settings	s	
Inputs			
Outputs	;		
Logical	channe	s	
Groups	i.		
Functio	ns		
Exit	V 1		Select

Language	Polish		
Date	22/10/2021		
Time	10:15:45		
Display type	Type 1		
Syncronise time	No		

Fig.11 General settings

Menu parameters include as General settings:

Table 1.

No	Parameter name	Feature/value	Description	Factory set
1	Language	English, Polish, Deutsch		English
2	Date	dd / mm / yyyy	Day /month /year	01/06/2020
3	Time	hh:mm:ss	hours: minutes: seconds	
4	Display type	Туре 1, Туре 2	Type of display used	Depending on equipment
5	Synchronise time	No Yes	Synchronization with the time server	No
6	Factory parameter settings	No Yes	Restore manufacturer settings	No

6.5.2 Inputs

The device has 2 binary inputs In1, In2 in slot Z and inputs related to the installed input modules in slots X, Y (according to the customer's order) as standard. The configured input can be used by any logical channel to visualize the result or to further process the input data.

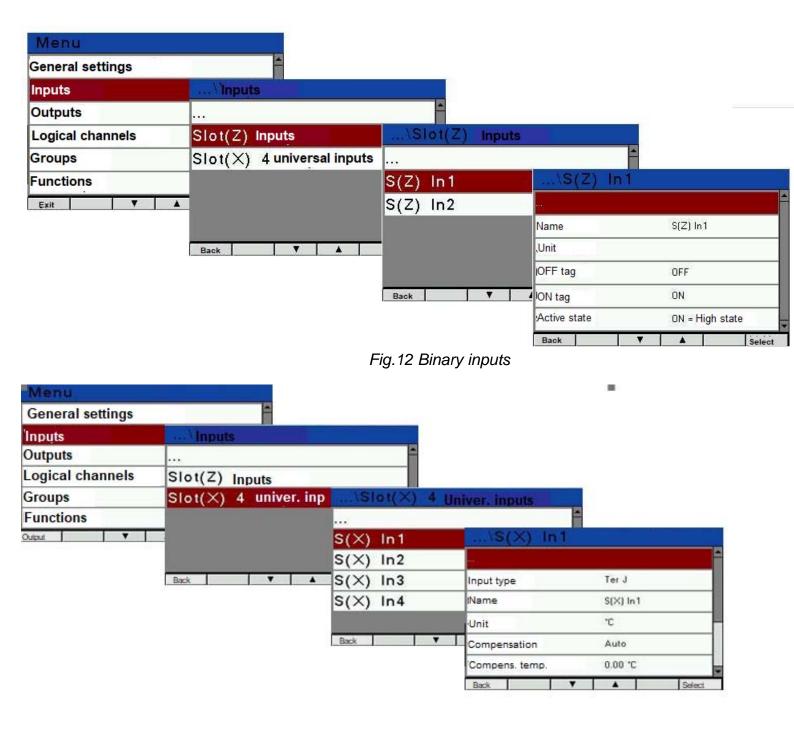


Fig.13 Universal inputs

16

No				Parameter name	Range	Notes/ description	Factory
					. talige		set
1				Name		Name edition	
2				Unit		N/A	
3			t	OFF tag		Tag edition	OFF
4			ndı	ON tag		Tag edition	ON
5			Binary input	Active state		ON = high state of input active ON = low state input active.	ON = high state
6			Universal input, voltage, current, resistance	Input type	-1010, 010 V -300300 mV, 0300 mV -7575 mV, 075 mV -4040 mA, 040 mA 04000 Ω		-1010 V
7			, vo ce	Name	S(X) In1 S(Y) In4		S(X) In14
8			iput tan	Unit	V, mV, mA, Ω		V
9		72	sal input, v resistance	Filter	0.560.0 s		0,5 s
10	(Z)	S(Z) In1,In2	nivers:	Min	-12 V, -360 mV, -90 mV, -48 mA, 0 Ω	Depending on the input range	-12.0 V
11	Slot (t, S(Z)	Ū	Max.	12 V, 360 mV, 90 mV, 48 mA, 405 Ω		12.0 V
12	(λ),	S(Y) In1In4,		Input type	Pt100, Pt500, Pt1000		
13	slot	In1.		Name	S(X) In1 S(Y) In4		S(X) In14
14	(), S	Ξ	00	Unit	°C, °F		°C
15	Slot (X), Slot (Y), Slot (Z)		100/ 100/ 1000 1000	The way of connecting the sensor		3 wire 2 wire	2 wire
16		S(X) In1In4,	100/	Wires resistance	0.0060.00 Ω,		0 Ω
17		S()	ıt P	Correction	-20.020.0 °C		0°C
18			Inpu	Filter	0.560.0 s		0,5 s
19				Min			-200.0°C
20 21				Max.	Ter J, K, N, E, T, S, R, B		850.0°C
				Input type			$\mathcal{S}(\mathbf{X})$ lp1 4
22			R, B	Name	S(X) In1 S(Y) In4 °C, °F		S(X) In14 °C
23 24			S, F	Unit Compensation	Auto, Manual		Manual
25			Τ,	Comp. temp.	0.0060.00 °C		0.0°C
26			I, Е,	Correction	-20.0020.00 °C		0.0°C
27			K, N,	Filter	0.560.0 s		0.5 s
28			Input Ter J, Þ	Min	-55°C	Depending on the choice of the thermocouple	0,00
29			lnpu	Max.	1765°C	Depending on the choice of the thermocouple.	

6.5.3 Outputs:

Depending on the customer's needs, additional relay or analogue output modules can be installed in the appropriate X, Y slots in the device.

As standard, there are 2 relay outputs Out1, Out2 in the Z slot. The configured output can be used by any logical channel to visualize the result or to further process it.

Menu				
General settings	-			
Inputs				
Outputs	Outputs		-2001 	
Logical channels			-	
Groups	Slot(Z) Outputs			
Functions	Slot(Y) 6 relays	\Slot(Y)	6 relays	
Exit				2
		S(Y) Out1	\S(Y)	Out1
		S(Y) Out2		
	Back 🛛	S(Y) Out3	Source	Logical channel 1
		S(Y) Out4	Name	S(Y) Out1
		S(Y) Out5	Unit	
		Back	▼OFF tag	OFF
			ON tag	ON
			Back	Y A Selec



Table 3.

No				Parameter name	Range	Notes/ description	Factory set
1				Source:	Logical channel 1 Logical channel 60	Selection of logical channel (160)	Logical channel 1
2			~	Name		Output name	S(Y) Out1
3		Out1,Out2	Relay outputs	Unit		Unit name (only reading)	
4		t1,C	out	OFF tag		Description edition	OFF
5		no	elay	ON tag		Description edition	ON
6	ot (Z)	, S(Z)	Re	Active state		On Off	On
7	Slot (Y), Slot	Out1Out4,		Source:	Logical channel 1 Logical channel 60		Logical channel 1
8	Slot (X),	S(Y)		Name		Output name	S(X) Out1
9	Slot		put	Unit	mA	Unit name (only reading)	mA
10	0,	S(X) Out1Out4,	Analogue output	Value when ERR	0/420 mA		0.00
11		ut1.	gue	Lower input value	+/- 21474000.00		-99999.99
12		Ō (alo	upper input value	+/- 21474000.00		99999.99
13		S(X	Ar	Lower output value	020 mA		4.00 mA
14				upper output value	020 mA		20.00 mA
15				Output range	020 /420 mA		020 mA

6.5.4 Logical channels

Logical channels are a bridge between physical inputs and outputs and the control and visualization process.

This mode allows the user to configure the device to read data from the input / output modules installed in it, to display it on the screen, use it in calculations in other logical channels, or use it as a data source for the control output of any object.

The data source for the logical channel can be:

- measurement values from analogue inputs, binary inputs, and other devices read via the Modbus master interface,

- functions: mathematical, scaling, alarm,
- states on hardware outputs (analogue outputs, binary outputs),
- values from other logical channels.

Logical chan	nels			
		<u>^</u>		
ettings		Settinas		
ogical channel	1			
ogical channel	2	Active channels	16 / 60	
ogical channel	3		Settings	
	4	-		Logical channel 1 Logical channel 2
			Active channels	Logical channel 3
				Logical channel 4
		Back	7	Logical channel 5
		Dack	-	Logical channel 6
				Logical channel 7
				Logical channel (8
			Cancel Delete	Select OK
	MLogical cham ettings ogical channel ogical channel ogical channel ogical channel	ogical channel 1 ogical channel 2 ogical channel 3 ogical channel 4	ettings\Settings ogical channel 1 ogical channel 2 Active channels ogical channel 3 ogical channel 4	ettings ogical channel 1 ogical channel 2 ogical channel 3 ogical channel 4 * • • • • • • • • • • • • • • • • • • •

Fig. 15 Logical channels - settings

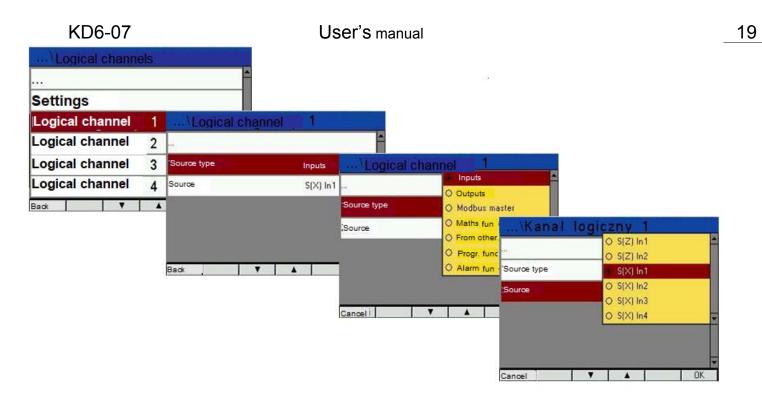


Fig. 16 Logical channels - source

No		Parameter name	Range	Notes/ description	Factory set
1	Settings	Active channels	1.60	Channels selection	Channels 1. 16
2	-ogical channel 160	Source type	Inputs, Outputs, Modbus master Mathematical function From other channel Scaling function Alarm function		Inputs
3	Logical	Source:	Inputs S(Z) In1, S(Z) In2, S(X) In1 S(X) In4, S(Y) In1 S(Y) In4 Outputs: S(Z) Out1, S(Z) Out2, S(X) Out1 S(X) Out4 / 6, S(Y) Out1 S(Y) Out4 / 6 Modbus master: Master 1 Master 10 Mathematical function Mt1 Mt 20 From other channel Logical channel 1. Logical channel 10		S(Z) In1

Table 4.

	Scaling function Scal 1 Scal 20	
	Alarm function Alarm 1 Alarm 20	

6.5.5 Groups

A group is a set of up to six logical channels. The device can only display channels assigned to the given Group on the same screen. Each logical channel can belong to one or more groups simultaneously or belong to no group.

Menu			
General settings		*	
Inputs			
Outputs	Groups		
Logical channels		-	
Groups	Settings		
Functions	CSV settings		
Exit 📃 🔻	Actions	\lSettings	
	Group 1		-
	Group 2	Number of group displayed 10 / 1	0
		\Settings	
	Back		Group 1
		No of group displayed	Group 2 Group 3
			Group 4
			Group 5
		Back	Group 6
			Group 7
			Group 8
		Cancel Delete	V A Select OK

Fig.17 Groups - settings

Table 5.

No		Parameter name	Range	Notes/ description	Factory set
1	Settings	Number of displayed groups	1. 10		10
2	CSV settings	Field separator	Comma, Semicolon, Tab		Comma
3	_	Decimal separator	Dot Comma		Dot
4	Actions	Auto export / files export	Off. On	It means transfer of completed files and automatic transfer of new created archives files to external memory	Off
5		Copy archives to CSV file	No Yes	Transfer of recorded values to new files in internal memory	No

<u> </u>			Delete erekivee	No Yes		Na
6			Delete archives	ino yes	Deleting internal memory of recorder	No
7			Quantity of displayed groups	1.6		6
8			Type of bar diagrams	Off Horizontal Vertical		Horizontal
9			Type of linear diagrams	off Horizontal Vertical		Horizontal
10			Time base	30 sec. 7 days		2 min.
11			Colour of background	Black White	Selection	Black
12		Settings	Archive type	Manually off Manually on Below Above Intern. Extern.		Manually Off
13			Triggering	Logical channel 1 Logical channel 60		Logical channel 1
14			Interval	1 3600 s		1
15			Lower threshold	-214740000 214740000		-999999.9
16			Upper threshold	-214740000 214740000		999999.9
17			Signal source	Logical channel 1 Logical channel 60		Logical channel 1
18			Decimal point	Auto, None, 0.0; 0.00; 0.000		Auto
19	Group 110		Binary values displayed as	Value Text	0, 1 are displayed for the values. For the text displayed there are inscriptions: OFF, ON. In the case of the maths functions 4 6, 18 28 subtitles TRUE, FALSE are displayed	Value
20		9	Number of sectors	16		1
21		Display field 1	Colour of sector 1	Green, Red, Yellow, White, Blue, Purple, Bright blue, Olive, Black, Bright green, Orange, Dark red, Grey	When choosing the colour of the sector you should have in mind chosen background colour to have information displayed on screen clearly visible.	Green
22			Value 1	+/- 214740000.0		0.0
23			Colour of sector 2	As for sector 1		Red
24			Value 2	+/- 214740000.0		100.0
25			Colour of sector 3	As for sector 1		Yellow
26			Value 3	+/- 214740000.0		200.0
27			Colour of sector 4	As for sector 1		White
28			Value 4	+/- 214740000.0		300.0
29			Colour of sector 5	As for sector 1		blue
30			Value 5	+/- 214740000.0		400.0
31			Colour of sector 6	As for sector 1		Purple

6.5.6 Functions

In the Functions mode, the user can define a mathematical, scaling and alarm function, the result of which can be displayed on the device screen. The user can use the output value in the conversion in other logical channels or use this data as a data source for the output to control any object.

Mathematical functions

In addition to the basic mathematical functions: addition, subtraction, multiplication and division, the device allows you to operate logical functions, calculate the arithmetic mean, search for the maximum and minimum value and many other functions that are discussed in the table 7.

Scaling functions

It enables linear scaling of the result by means of a multi-point (2..10 points) characteristic.

Alarm function

Enables you to select the reaction of the alarm function in the event of an alarm state. The alarm occurs when the value from the logical channel being the data source meets the alarm conditions.

The recorder also allows you to set the behaviour of the alarm function when the value is outside the measuring range: lower or upper exceeding or a sensor or calibration error occurs.

Menu				
General settin	igs	-		
Inputs	Functions	in the second		
Outputs				
Logical chan	Mathematical	\Mat	hematical	
Groups	Scaling			4
Functions	Alarm	Mt 1	\Mt 1	
Exit		Mt 2		
			Function type	х & у
	Back	7	Type of X source	from logical channel
			X source	logical channel 1
		Back	Type of Y source	constant value Y
			Constant value Y	20916.0
			Back	▼ ▲ Select

Fig. 18 Mathematical functions

General setting	as	-		
Inputs	\Funct	ions		
Outputs				
Logical chan	Mathemat	tical		
Groups	Scaling	\Scaling		
Functions	Alarm			^
Exit	-	Scal 1	\Scal 1	
	Back		Source	Logical channel 1
			Number of points	2
			Min	0.0
		Back	▼ Max	5000.0
			Unit	
			Back	

Fig.19 Scaling functions

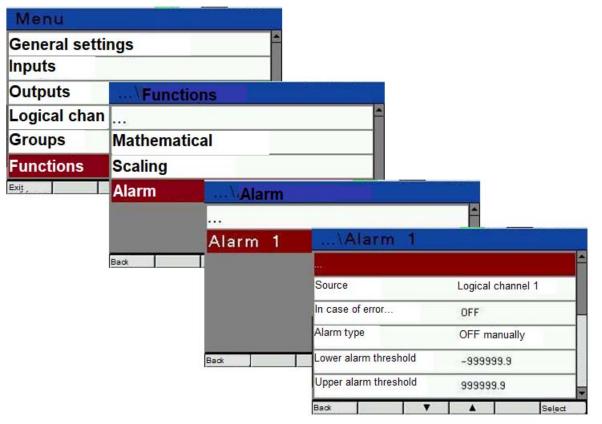
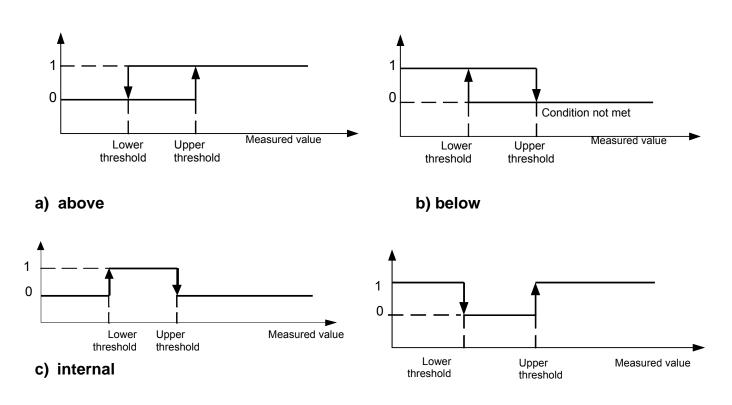


Fig.20 Alarm functions

						Table 6.
No			Parameter name	Range	Notes/ description	Factory set
1			Function type	According to table 7.		Off
2			Type of Source X	From a logical channel, Constant value of X		From the logical channel
3		.Mt20	Source X	Logical channel 1. Logical channel 60		Logical channel 1
4		٨t1.	The value of X	+/-214740000.0		0.0
5		tions N nnels)	List of channels	Logical channel 1. Logical channel 60	Select up to 10 channels	0/10
6		Mathematical functions Mt1Mt20 (assigned in logical channels)	In the event of an error	Add faulty channels, Skip faulty channels		Skip faulty channels
7		matica I logic	Type of source Y	From the logical channel, Constant Y value		
8		Mather jned ir	Source: Y	Logical channel 1. Logical channel 60		Logical channel 1
9		ssig	Y value	+/-214740000.0		0.0
10		<u>(a</u>	Min	+/-214740000.0		
11			Max.	+/-214740000.0		
12			Source:	Logical channel 1 Logical channel 60		Logical channel 1
15			Number of points	210		2
16			Min	+/-214740000.0		0.0
17	Gi		Max.	+/-214740000.0		0.0
18	Functi		Unit		Unit edition	
19	ш		X1	+/-214740000.0		0.0
20			Y1	+/-214740000.0		0.0
21			X2	+/-214740000.0		0.0
22			Y2	+/-214740000.0		0.0
24			In the event of an error	No reaction ON, OFF		OFF
25			Alarm type	Manually off, manually on, below, above, intern. extern.		Manually off
26		0	Alarm lower threshold	+/-214740000.0		-999999.9
27		a 2	Alarm upper threshold	+/-214740000.0		999999.9
28		Sc	Hysteresis	06500.0		0
29		Scaling functions Scal1Scal 20	Alarm activation delay	0 65000		0 s
31		tions	Min alarm activation time	0 65000		0 s
32		lunc	Min alarm off time	065000		0 s
33		ng t	Lock off alarm	Off. On		Off
34		cali	Alarm signalling	Off. On		Off
35		S	Alarm reset	No Yes		No



d) external

Fig.21 Alarm types or archiving types

- 0 alarm status or archiving status not fulfilled
- 1 alarm status or archiving status fulfilled

Other types of alarms or types of archiving:

- Manually on always on;
- Manually off always off,

List of available mathematical functions:

Table 7.

No	Function	Description
1.	round(x)	Returns the value of x rounded to the nearest integer
2.	sqrt(x)	The square root of x
3.	abs(x)	Absolute value of x
4.	isErr(x)	Returns 1 if the value is incorrect (e.g. Err, Lo, Hi)
5.	isLo(x)	Returns 1 if the value is incorrect (lower range exceeding)
6.	isHi(x)	Returns 1 if the value is incorrect (upper range exceeding)
7.	avg(x1,x2,x3,)	Returns the average value of the numbers x1, x2, x3
8.	sum(x1,x2,x3,)	Returns the sum of the numbers x1, x2, x3
9.	product(x1,x2,x3,)	Returns the product of the numbers x1, x2, x3
10.	min(x1,x2,x3,)	Returns the minimum value of the numbers x1, x2, x3
11.	max(x1,x2,x3,)	Returns the maximum value of the numbers x1, x2, x3
12.	x + y	Addition
13.	x – y	Subtraction
14.	x * y	Multiplication
15.	x / y	Division
16.	x ^ y	Exponentiation

17.	-X	Negation of the sign of the number x
18.	x > y	The logical operator greater than. Returns 1 if true, 0 if false.
19.	x < y	Logical operator less than Returns 1 if true, 0 if false.
20.	x >= y	Logical operator greater than or equal to. Returns 1 if true, 0 if false.
21.	x <= y	Logical operator less than or equal to. Returns 1 if true, 0 if false.
22.	x != y	The logical operator is different Returns 1 if true, 0 if false.
23.	x = = y	The logical comparison operator. Returns 1 if true, 0 if false.
24.	(x>0) AND (Y>0)	result = 1 if x and y are greater than zero
		otherwise the result is 0
25.	(x>0) OR (Y>0)	result = 1 when x or y is greater than zero w otherwise the result is 0
26.	(x>0) XOR (Y>0)	result = 1 when one of the values is greater than zero and the other is less than or equal to zero. If both values are less than or equal to zero, or both are greater than zero, the result is 0
27.	х&у	Logical product (conjunction). Returns 1 if true, 0 if false.
28.	x y	logical sum (alternative). Returns 1 if true, 0 if false.

Notes

- Trigonometric functions operate on radians
- Logical **true and false** a value other than 0 is treated as a logical value **true**, a value equal to 0 is treated as a logical value **false**.
- Functions **min, max, sum, avg, product** and all the others operate on instantaneous values, e.g. the **sum** function gives the sum of the instantaneous values given as parameters and not the sum of these values over time.

6.5.7 Modbus Slave

In the options, select Modbus Slave and approve the selection with the

button Menu. The list of Modbus Slave protocol parameters is presented in the table 8.

Outputs	*	
Logical channels	\Modbus	Slave
Groups		
Functions	Address	1
Modbus Slave	Baud rate	115,2 kb/s
Modbus Mstr/Slv	Mode	RTU 8N2

Fig.22 Configuration of Modbus protocol parameters in Slave mode

	0 0	,	,	Table 8.
No	Parameter name	Feature/value	Description	Factory set
1	Address	1 247	Address in Modbus net	1
2	Baud	9600 b/s, 19,2 kb/s, 38,4 kb/s, 57,6 kb/s, 115,2 kb/s	Baud rate:	115,2 kb/s
3	Mode	RTU 8N2, RTU 8E1, RTU 8O1, RTU 8N1	Transmission mode:	RTU 8N1

6.5.8 Modbus Master / Slave

Modbus Master / Slave (Mstr / Slv) mode allows to configure the KD6 recorder for reading

data from the SLAVE device sent via the RS-485 Master / Slave bus.

Data read in Modbus Master mode can be assigned to logical channels and then they can be: - displayed on the screen,

- used for calculations in other logic channels or as a data source for outputs to control any object.

Logical channels	-	<u>.</u>	
Groups	\Modbus	Mstr/Slv	
Functions			
Modbus Slave	Settings	\ISettings	
Modbus Mstr/Slv	Master 1		
Ethernet		Work mode	Master
Exit 🔰 🖌		Number of masters	1 / 10
		Slave address	1
	Back	Baud rate	115,2 kb/s
		Mode	RTU 8N2
		Back 🛛 🗸	▲ Sel

Fig.23 Configuration of Modbus protocol parameters in Master mode - general settings

\Master	1							
				F				
Settings		\Mod	bus	Mstr/Slv				
Range of reg.	1					Ê		
Range of reg.	2	Settings						
Range of reg.	3	Master	1	\Master	1			
Range of reg.	4						î	
Back	۲			Settings		VSettings		
				Range of reg.	1			
		Back		Range of reg.	2	,Slave address	1	
				Range of reg.	3	Number of registers	1	
				Range of reg.	4	1st register address	4000	
				Back	•	Number of bits	32 bits	
						Register type	uint	
						Back		Select
				\Master	1			
							<u> </u>	
				Settings				
				Range of reg	J. 1	\Range of reg.		
				Range of reg.	2			
				Range of reg.	3	Name	MM1-Reg1	
				Range of reg.	4	Type of value	Analogowy	
				Back	¥	Min	-9999999	
						Max	9999999	
						Logical shift	none	
						Back		Select

Fig.24 Configuration of Master 1 - Master 10 parameters

Ta	able	g
10	IDIC	ອ.

No				Parameter name	Range	Notes/ description	Factory				
NO				Falametel name	Kalige	Notes/ description	set				
							-				
1				Work mode	Slave, Master		Slave				
2				Quantity of masters	Master 1 Master 10		1				
3		0	S	S	Slave address	1 247		1			
4		Settings	Settings	Settings	Setting	Setting	ĥ	Baud	9600 b/s, 19,2 kb/s, 38,4 kb/s, 57,6 kb/s, 115,2 kb/s	Baud rate:	115,2 kb/s
5							5	Mode	RTU 8N2, RTU 8E1, RTU 801, RTU 8N1	Transmission mode:	RTU 8N1
6				Number of repetitions	0 10		0				
7				Slave address	1 247		1				
8				Number of registers	1 10		1				
9				Address of register 1	0x0000 0xFFFF		4000				
				Number of bites	32 bits / 16 bits		16 bits				
10	Master / Slave		Settings	Register type	char / uchar / int / uint / long / ulong / float 1234/2143/4321/3412		float4321				
11	Iste	10		Reading function	0x03, 0x04		0x03				
12	Ma	Master		Response waiting time	100 10000 ms		1000 ms				
13		Ma		Repetition interval	100 10000 ms		1000 ms				
14		-	ge	Name	ASCII chars		MM1-Reg1				
15		Master	Range	Value type	Analogue, Binary		Binary				
16		Ma		Min	+-2147000000		-9999999				
17			ir 1.	Max.	+-2147000000		9999999				
18			liste	Logical shift	None / >>right / < <left< td=""><td></td><td>none</td></left<>		none				
19			of register	N bites logical shift	1 31		7				
20			e of	OFF tag	ASCII chars		OFF				
21			Range (ON tag	ASCII chars		ON				
22			ц	Unit	ASCII chars						

6.5.9 Ethernet

The Ethernet menu allows you to configure the network settings in order to download and visualize data from the device via the Ethernet link.

Menu						
ogical channe	els	-				
Groups			<u>.</u>			
unctions	Ethernet			\Ethernet		
Modbus Sla	ve		^	•••	*	
Modbus Mst	Addresses	\Adresses		Addresses		
Ethernet	Modbus TCP			Modbus TCP	\Modbus TCF	
	FTP	DHCP	Zał.	FTP		
	www	Mode	10Mb/s	www	Address	1
	SNTP	IP address	192.168.1.100	SNTP	Port	502
	Back	Subnet mask	255.255.255.0	Back	Max connection number	1
		Default gateway	192.168.1.1	-	Waiting time	60 s
		Back Y	A Select		n	
					Back 🔻	▲ Selec

\Etherne		×	\Etherne		
Addresses			Addresses		
Modbus T	CP		Modbus T	СР	
FTP	\FTP		FTP	\FTP	
www			www		
SNTP	Command port	21	SNTP	Command port	21
Back	▼ Data port	1025	Back	▼ Data port	1025
	Back	Select		Back	▼ ▲ Select

Fig.26 Ethernet - FTP

_						Table 10.
No ·		Parameter name	Range	Notes	/ description	Factory set
1		DHCP	Off/On	Enabling / disablin client (support for acquisition of IP p parameters of the interface from ext servers within the network (LAN)	automatic protocol e meter Ethernet ernal DHCP	Off
2	Address	Mode	Auto, 10Mb/s, 100Mb/s			Auto
3	es	IP address	0.0.0.0255.255.255.255	10.0.1.161		-
4		Subnet mask	0.0.0.0255.255.255.255	255.0.0.1	HC HC HC	-
5		Default gateway	0.0.0.0255.255.255.255	0.0.0.0	Obtained from DHCP or entered manually when DHCF	-
6		DNS address	0.0.0.0255.255.255.255	10.0.0.44	Obtained from DHCP or entered manually when DHCP off	-
7		MAC address		Aa:bb:cc	::00:11:22	-
8		Address	1 247			1
9	Modbus	Port	80 32000			1
10	TCP	Max. number of connections	1 4			1
11		Waiting time	10 360 s			60s
12	FTP	Port of commands	20 32000			21
13		Data port	20 32000			1025
14 15	Web	Port SNTP address	80 32000 NTP server address	Time convo	r IP address	80 10.0.17.49
15		Time difference with	+ or -	sign of the local t		10.0.17.49
		respect to UTC time		UTC time		
18		Hours offset from UTC time	0 12	Hourly value of from UTC time	local time offset	1
19		Automatic summer / winter time change	Yes, No			Yes
20	5111	Synchronise the time	No, Yes	Time synchroniz from tir	zation command me server	No

Description of the Ethernet setting parameters: DHCP - dynamic host configuration protocol of network nodes, a communication protocol that allows the device to obtain configuration data from the server, i.e. IP address, subnet mask, IP address of the default gateway.

FTP File Transfer Protocol enables bi-directional file transfer on an FTP server

- FTP client system.

Connection via FTP protocol can operate in two modes: active and passive:

if the FTP connection is in active mode, it uses port 21 for commands (set up by the client) and port 20 for data transfer (set up by the server),

•if the FTP connection works in passive mode, it uses port 21 for commands and a port number greater than 1024 for data transmission (both connections are established by the client).

Modbus TCP - Modbus RTU protocol with a TCP interface that runs on the Ethernet network.

Web server port - a parameter that allows you to select the server port on which the website service is running. It allows you to connect to the device using a web browser on a selected port.

SNTP address - allows you to select the NTP server address, get the current time there from and, if necessary, correct the system clock. The device will connect to the selected server every 15 minutes and update its clock according to the time downloaded from the server. **Synchronize time parameter** - enables immediate manual synchronization of the device clock with the time downloaded from the NTP server, and thus checking the correctness of the provided NTP server address.

6.5.10 Security

						Table 11.
	No		Parameter name	Range	Notes/ description	Factory set
ĺ	1	Admin	Password enabled	No Yes		No
	2	Aurini	Password:	09999		Auto

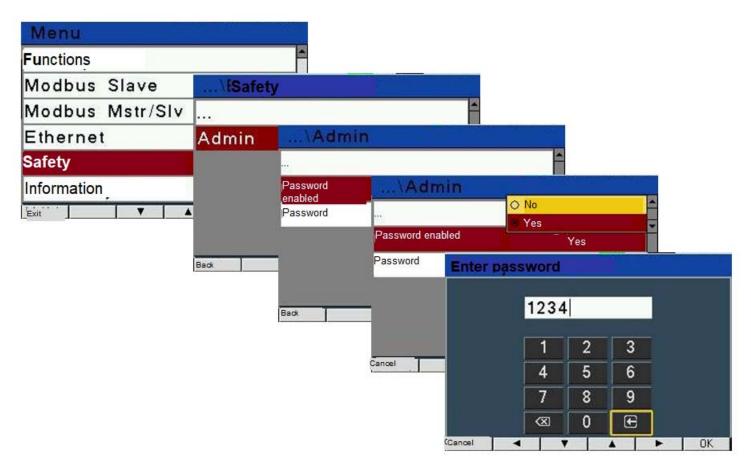
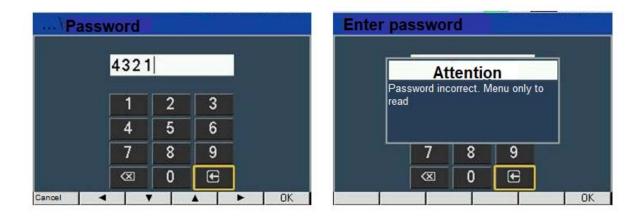
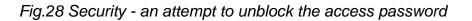


Fig.27 Security - access password activation





The principle of the access password

The intervention in the recorder configuration is protected with a password, if it has been entered and is different from zero. In the case of the password 0000, the password question is omitted. If the password is incorrect, the message 'Incorrect password. Read-only menu. " is displayed. Then it is possible to review the recorder configuration, but the changes are blocked.

The password for the configuration menu and the recorder configuration via the modbus interface is the same, but the unlocking of both the menu and the modbus interface must be done separately. If we unlock the recorder from the display menu, the modbus interface remains locked, and if we unlock the modbus interface, the menu remains locked.

If we change the password in the recorder menu or through the modbus interface, the changed password now applies to both the modbus interface and the recorder menu. Note that when it comes to modbus interface, both of these facts apply to modbus RS485 and modbus TCP interface.

Reading the MODBUS password register (register 4000)

1) If the value of register 4000 is read as 1: Then it means that the recorder is locked because the user entered a password other than "0000" to lock the recorder.

2) If the access to the recorder configuration is unlocked or the user has entered "0000" as the password, the register value 4000 is read as 0: This means full access to the recorder configuration, no password or the password lock has been disabled.

Saving the MODBUS password register

) If the recorder is blocked by a password, and the user wants to make changes in the recorder configuration, then the correct password should be entered into the register 4000 and only then the configuration can be modified.

If the recorder is locked with a password, and the user wants to disable it, enter the correct password to register 4000, and then enter the same register 0000" or:

- in the recorder menu, set the parameter "Security-> Admin-> Disabled password" to - YES.

- enter the value 0 into the register 4157 (lock with a password is disabled).

If the user enters an incorrect password into the register 4000: In this case, the user gets error 3 as invalid data value.

✤ If the user wants to change the password, he enters the correct password in register 4000, and then the changed password in the same register.

5 If the user wants to unlock the access, then make changes in the recorder configuration and block this access again, he must enter the correct password to the

register 4000, make changes to the device configuration, and then enter the current password to register 4000.

Note 1: If the user has set the correct password, and it is a password other than "0000", and the user unlocks the password, then after turning the power off and on again, access to the configuration is locked again with a password.

Note 2: The valid range of password values for the MODBUS register 4000 is "0000 ... 9999".

Note 3: The factory default password is "0000" and the password lock function is disabled.

6.5.11 Information

Using the Information menu, the user can learn basic information about the device: type of execution, loader and software version, installed I / O modules in slots

(X) i (Y), Menu		
Modbus Slav	e	
Modbus Mstr	/SIv	1
Ethernet	Information	
Safety		
Files	Туре	KD6
Information	Execution code	41100M0
Exit 🛛 💙	Loader version	1.06
	Software version	0.11
	Serial number	20060001
	Back	▼ ▲ Select

Fig.29 Information

Table 12. No Parameter name Description Factory set Feature/value KD6 1 Туре e.g. .41100M0 Execution code 2 3 Loader version 1.06 4 Software version 0.11 5 21030001 Serial number 4 Universal input Slot(X) card type 6 Slot (X) loader version 7 2.01 8 Slot (X) software version 0.70 9 Slot(Y) card type 6 relays 10 Slot (Y) loader version 2.01 11 Slot (Y) software version 0.06 12 MAC address aa:bb:cc:00:11:22 13 DHCP On 14 IP address 192.168.1.100 15 255.255.255.0 Subnet mask 192.168.1.1 16 Default gateway 17 DNS address 10,200,121,121

7 ARCHIVING MEASURED VALUES

7.1 INTERNAL MEMORY

KD6 recorders are equipped with 4MB internal memory and 8GB file archive memory intended for storing data recorded by the recorder. The internal memory of 4MB allows to register 40,960 records. This memory is a circular buffer.

7.2 CREATING A FILE ARCHIVE

After the internal 4MB memory is full by 70% or forced at any time: select the menu parameter "Groups \rightarrow Activities \rightarrow Copy archive to CSV file" set to "Yes".

Recorded data will be copied to the file archive. You can also start the procedure of copying to the archive via the RS485 interface (register 4095).

Example: file archive with the archiving period of 5 sec. allows registration for about 2 years. When the file archive is 70% full - the archive % full highlight will be orange (see: Status 3 Register - address 4417).

When the file archive is full to 95%, the overwrite mode starts when the oldest archive files are deleted during further archiving and new archive files are created.

When the file archive is full (less than 14 days until the file archive is full at 1 second interval), the highlighting colour will change to flashing red.

The KD6 recorder creates folders and files in the file archive during the internal memory copying. An example of the folders structure is shown in Figure 30.

Remote server	/21050010/2021/09/3						
B- } / B- } 210 B- ↓ B-	050010 2021 						
ile name 🔺	1.**	Fil	e type	Modification date	Access rights	Owner/	1
 07115343.0	CSV 4'	54 344 M	licrosoft E	2021-09-07	4-4-4	0.0	
07133851.0			And the state of the second				
3107123031.C	LOV 4.	54 272 M	licrosoft E	2021-09-07	-111	0.0	
07152358.0			licrosoft E	2021-09-07		00	
	CSV 45	54 272 M	Description of the second			1070 TO 10	
07152358.0	CSV 45 CSV 45	54 272 M 54 272 M	licrosoft E	2021-09-07		0.0	
07152358.0 07170905.0	CSV 45 CSV 45 CSV 45	54 272 M 54 272 M 54 272 M	licrosoft E licrosoft E	2021-09-07 2021-09-07		00	
07152358.0 07170905.0 07185412.0	CSV 45 CSV 45 CSV 45 CSV 45 CSV 45	54 272 M 54 272 M 54 272 M 54 272 M	licrosoft E licrosoft E licrosoft E	2021-09-07 2021-09-07 2021-09-07	 	000000	
07152358.0 07170905.0 07185412.0 07203919.0	CSV 45 CSV 45 CSV 45 CSV 45 CSV 45 CSV 45	54 272 M 54 272 M 54 272 M 54 272 M 54 272 M	licrosoft E licrosoft E licrosoft E licrosoft E	2021-09-07 2021-09-07 2021-09-07 2021-09-07	न-न-न न-न-न न-न-न	00 00 00 00	
07152358.0 07170905.0 07185412.0 07203919.0 07222426.0 08000933.0	CSV 45 CSV 45 CSV 45 CSV 45 CSV 45 CSV 45 CSV 45 CSV 45	54 272 M 54 272 M 54 272 M 54 272 M 54 272 M 54 272 M	licrosoft E licrosoft E licrosoft E licrosoft E licrosoft E	2021-09-07 2021-09-07 2021-09-07 2021-09-07 2021-09-08	 	00 00 00 00 00	
07152358.0 07170905.0 07185412.0 07203919.0 07222426.0	CSV 45 CSV 45 CSV 45 CSV 45 CSV 45 CSV 45 CSV 45 CSV 45 CSV 45 CSV 45	54 272 M 54 272 M	licrosoft E licrosoft E licrosoft E licrosoft E licrosoft E licrosoft E	2021-09-07 2021-09-07 2021-09-07 2021-09-07 2021-09-08 2021-09-08	 	00 00 00 00 00 00	

Fig.30 Folders structure in the file archive

The data in the archive are stored in files located in folders (year, month of copying the archive) - see Fig. 30. File names are marked as the day and time of copying the first record and have the format ddhhmmss.csv, where: dd-day, hh-hour, mm -minute, ss-second.

7.3 BUILDING ARCHIVE FILES

Files containing archived data have a column structure, where successive data columns are separated by a comma. The column description is placed in the first line of the file. Data records are arranged sequentially in lines. An example of a file is shown in Figure 31. **Fig.31 Sample archive file with data**

	-		
date, time, record index, block, register1, name1, value1,		,register6,name6,value6	
2021-07-13,14:02:10,0000018394,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:11,0000018395,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:12,0000018396,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:13,0000018397,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:14,0000018398,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:15,0000018399,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:16,0000018400,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:17,0000018401,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:18,0000018402,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:19,0000018403,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:20,0000018404,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:21,0000018405,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:22,0000018406,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:23,0000018407,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:24,0000018408,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:25,0000018409,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:26,0000018410,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:27,0000018411,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:28,0000018412,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:29,0000018413,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:30,0000018414,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:31,0000018415,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:32,0000018416,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:33,0000018417,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:34,0000018418,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:35,0000018419,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:36,0000018420,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	
2021-07-13,14:02:37,0000018421,10,14518,Ch10,0.000000E+00,		,14528,Ch15,0.000000E+00	

Subsequent fields included in the line describing the record have the following meaning:

- date date of data registration, the "-" character is the date separator
- time hour, minute, second of recorded data, the time separator is the character ":"
- record index a unique index of the record. Each record has its own individual number. This number increases with the saving of subsequent records.
- block reserved,
- register1 Modbus register address of the first archived value,
- name1 name of the logical channel of the first archived value,
- value1 the first archived value. The decimal separator is ".", The values are in engineering format.
- :
- register6 Modbus register address of the sixth archived value,
- name6 name of the logical channel of the sixth archived value,
- value6 sixth archived value. The decimal separator is ".", The values are in engineering format.

7.4 ARCHIVE DOWNLOAD

Archived data can be downloaded via Ethernet using the FTP protocol or via an external memory connected to the USB Host connector (Menu parameter "Groups \rightarrow Activities ... \rightarrow Auto export / files export " set to "On".

8 Serial interfaces

8.1 RS485 interface - list of parameters

The implemented protocol complies with the PI-MBUS-300 Rev G specification of the Modicon company. The list of parameters of the serial link of the KD6 recorder:

• ID	0xEE
meter address	1247,
baud rate	9.6, 19.2, 38.4, 57.6, 115.2 kbit / s,
Modbus	RTU operating mode,
 information unit 	8N2, 8E1, 8O1, 8N1,
 maximum time to start the response 	600 ms,
• maximum number of read registers in one of	luery
	- 61 registers - 4 bytes,
	- 122 registers - 2 bytes,
• implemented functions - 03, 04, 06, 16, 17,	
	- 03, 04 reading of registers,.
	 06 one register record,
	 16 record of n - registers,
	 17 device identification,
Eactory settings: address 1, haud rate 9,6 khit	/s RTU 8N2 mode

Factory settings: address 1, baud rate 9.6 kbit / s, RTU 8N2 mode,

8.2 Examples of register reading and recording

Readout of n-registers (code 03h)

Example 1. Readout of 2 16-bit integer registers, starting from the register with the address 0FA0h (4000) - register values 10, 100.

Request

Device		Registr	y address	Number	CRC	
address	Function	B1	B0	B1	B0	checksum
01	03	0F	A0	00	02	C7 3D

Response:

Device address	Function	Number of bytes		m the register (4000)	Value from 0FA1(CRC checksum	
			B1	В0	B1	В0	
01	03	04	00	0A	00	64	E4 6F

Example 2. Readout of 2 32-bit float registers as a combination of 2 16-bit registers, starting from the register with the address 1B58h (7000) - register values 10, 100.

Request

Address	Registry address	Number of device registers	CRC
---------	------------------	----------------------------	-----

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	Function	B1	B0	B1	B0	checksum
01	03	1B	58	00	04	C3 3E

Response:

Device address		Number of bytes	Value from the register 1B58(7000)		Value from the register 1B59(7001)		Value from the register 1B5A(7002)		Value from the register 1B5B(7003)		checksum
			B3	B2	B1	B0	B3	B2	B1	B0	
01	03	08	41	20	00	00	42	C8	00	00	E4 6F

Example 3. Readout of 2 32-bit float registers as a combination of 2 16-bit registers, starting from the register with the address 1770h (6000) - register values 10, 100.

Request

Device address	Function	Registr	y address	Number registers	CRC checksum	
		B1	B0	B1	B0	
01	03	17	70	00	04	4066

Response:

Device address	Function	Number of bytes	Value from the register 1770h(6000)		Value from the register 1770h(6000)		Value from the register 1772h(6002)		Value from the register 1772h(6002)		checksum
			B1	B0	B3	B2	B1	B0	B3	B2	
01	03	08	00	00	41	20	00	00	42	C8	E4 6F

Example 4. Readout of 2 32-bit integer registers, starting from the register with the address 1D4Ch (7500) - register values 10, 100.

Request

Device address	Function	Registr	ry address	Number register	CRC checksum	
		B1	B0	B1	В0	
01	03	1D	4C	00	02	03. B0

Response:

Device address		Number of bytes	Va	alue fro 1D4C(Va	CRC checksum				
			B3	B2	B1	B0	B3	B2	B1	B0	
01	03	08	41	20	00	00	42	C8	00	00	E4 6F

Readout of a single register (code 06h)

Example 5. Recording the value 543 (0x021F) to the register 4000 (0x0FA0)

Request:

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Device		Registi	ry address	Registe	CRC	
address	Function	B1	B0	B1	B0	checksum
01	06	0F	A0	02	1F	CA 54

Response:

Device	_	Regist	ry address	Registe	r value	CRC
address	Function	B1	B0	B1	B0	checksum
01	06	0F	A0	02	1F	CA 54

Recording to n-registers (code 10h)

Example 6. Recording of 2 registers starting from the register with the address 0FA3h

(4003). Recorded values 20, 2000.

Request

Device address	Function	Hi reg. address	0	of Hi	of Hi	Number of bytes	Value for reg. 0FA3 (4003)		Value for (4004)	CRC checksum	
				reg	reg		B1	B0	B1	B0	
01	10	0F	A3	00	02	04	00	14	07	D0	BB 9A

Response:

Device address	Function	Registry address		Number register	of device s	CRC checksum
			B0	B1	B0	
01	10	0F	A3	00	02	B2 FE

Device identification report (code 11h)

Example 7. Device identification Request:

Device address	Function	Checksum
01	11	C0 2C

Response:

Address	Function	Number of bytes	ID	Device state	Information field about the device firmware version (e.g. "KD6- 1.00 b-1.06" - KD6 device with firmware version 1.00 and bootloader version 1.06)	Checksum (CRC)
01	11	19	CF	FF	4E 34 33 20 2D 31 2E 30 30 20 20 20 20 20 20 20 62 2D 31 2E 30 36 20	E0 24

8.3 Connecting the 10/100-Base-T interface

To gain access to Internet services, it is required to connect the recorder to the network via the RJ45 socket located in the back / panel / part of the recorder, operating in accordance with the TCP / IP protocol.

Description of diodes of the recorder RJ45 socket:

- _yellow LED lights up when the recorder is correctly connected to the 100 Base-T Ethernet network, it is off when the recorder is not connected to the network or is connected to the 10-Base-T network.
- _green LED Tx / Rx, it is on when the recorder is sending and downloading data, it is on irregularly, when no data is sent, it is on continuously

It is recommended to use a twisted pair to connect the recorder to the network:

- U / FTP twisted pair with each pair foiled,
- F / FTP twisted pair with each pair foiled, additionally a cable in a foil screen,
- S / FTP (formerly SFTP) twisted pair with each pair foiled, additionally a cable in a mesh screen,
- SF / FTP (formerly S-STP) twisted pair with each pair, additionally foiled in a foil and mesh screen.

Twisted pair categories according to the European standard PN-EN 50173, minimum: class D (category 5) - for high-speed local networks, includes applications using the frequency band up to 100 MHz. For the Ethernet interface, use a twisted-pair STP (shielded) category 5 cable with RJ-45 plug with the colour of wires (according to table 13) in the following standard:

- EIA / TIA 568A for both pins at the so-called a straight connection of the KD6 to a network hub or switch,
- EIA / TIA 568A for the first pin and EIA / TIA 568B for the second pin at the so-called combined with interlacing (cross) used, among others. with direct connection of the KD6 recorder to the computer.

Wire no	Signal	Wire colou	r as per standard
		EIA/TIA 568A	EIA/TIA 568B
1	TX+	White and green	White and orange
2	TX-	Green	Orange
3	RX+	White and orange	White and green
4	EPWR+	blue	blue
5	EPWR+	White and blue	White and blue
6	RX-	Orange	Green
7	EPWR-	White and brown	White and brown
8	EPWR-	brown	brown

Table 13

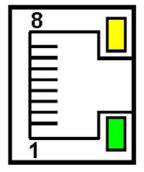


Fig.32. View and pin numbering of the recorder RJ45 socket

8.3.1 Web server

The KD6 recorder provides its own web server, which enables the remote monitoring of parameters displayed in individual screens (groups) of the recorder. In particular, the web site

allows you to obtain information about the device (serial number, execution code, software version, bootloader version, software versions of modules located in slot X and slot Y,

The access to the web server is obtained by entering the recorder IP address in the web browser, e.g. Http://192.168.1.030 (where 192.168.1.030 is the set recorder address). The standard port of the web server is "80". The server port can be changed by the user.

Note: For the proper functioning of the website, a browser with JavaScript support enabled and compatible with the XHTML 1.0 standard (all popular browsers, Internet Explorer version 8 or higher) is required.

8.3.1.1 General view

	0			23
	Ь	*	4	:
LUMEL				
Display of parameters				
Information about device Group 1				
Group 2				
Group 3 Display				
Group 4				
Group 5				
Group 6				
Group 7 Display				
Group 8				
Group 9 Display				
Group 10				

Fig.33. View of the recorder website

8.3.2 FTP server

The FTP file exchange protocol has been implemented in the KD6 recorders. The recorder acts as a server and it enables clients to access the internal memory of the recorder file system. The files can be accessed using a computer, tablet with an installed FTP client software or other device acting as an FTP client. For file transfer using the FTP protocol, the standard ports are "1025" - data port and "21" - command port. The user can change the ports used by the FTP protocol if necessary. Please note that the configuration of the server and FTP client ports must be the same.

The FTP client software must run in passive mode. In passive mode, the connection is fully

compiled by the client (the client decides about the choice of the data port). For file transmission with the recorder, it is possible to use a maximum of one connection at the same time, therefore the maximum number of connections in the client software should be limited to 1.

8.3.2.1 Selecting the FTP user (the possibility to change the password can be added to the recorder website)

The recorder has two user accounts for the FTP server protected with individual passwords:

- user: "Admin", password: "Admin" access to recording and reading of files
- user: "User", password: "Passftp" read-only access to the reading of archived files.

The name of the FTP server users cannot be changed, but the password for each user can be changed - it is recommended to change the passwords for security reasons. The password can be changed only through the website in the "Ethernet" parameter group. Passwords consist of 8 characters maximum. If the password is lost - which will make it impossible to use the FTP server, restore the default parameters of the Ethernet interface, e.g. from the menu: Settings \rightarrow Factory settings \rightarrow Yes, or by entering the value "1" in the register 4152. All standard meter parameters will be restored, including Ethernet interface parameters (acc. to table 9) and passwords for FTP server users:

user "admin" → password: "Admin"; user

"user" → password "passftp".

FileZilla can be an example of an FTP client. By entering the recorder IP address in the address field, you can view and download the archive files.

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war:	User n		[Password	Ports	Fast	l connection	-							
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atus: atus:	Obtaining of list of ca Listing of catalogues	in tintor	"/21050010/2021/09 50010/2021/09/7" zeo	7"											
atus: atus:	Obtaining of list of ca	talogues in	*/21050010/2021/09	/8"											
atus:	Listing of catalogues	in */2105	50010/2021/09/8" con	pleted with success											
atus: atus:	Starting dowloading	/23	050010/2021/09/7/0	transferred in 8 seconds											
atus:	Starting downloading		050010/2021/09/7/0												
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							7203919.CSV				Microsoft E		-1-1-1-	00	_
							7222426.CSV 8000933.CSV				Microsoft E	2021-09-08	4-4-4	00	
							8015440.CSV					2021-09-08		00	
							8033947.CSV				Microsoft E.,		4-4-4	00	
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							8071002.CSV					2021-09-08	4-4-4-	00	
						1800	8085625.CSV					2021-09-08		00	
							8104129.CSV			100000		2021-09-08	4-4-4	00	
							8123035.CSV					2021-09-08	4-4-4-	0.0	
							8141620.CSV					2021-09-08	4-4-4	00	
							8160127.CSV					2021-09-08	4-4-4-	DO	
							8174634.CSV					2021-09-08		00	
						100	8193141.CSV					2021-09-08	1-1-1-	0.0	
							8211649.CSV		9	54 272	Microsoft E	2021-09-08	4-4-4-	00	
						10	8230156.CSV		4	54 272	Microsoft E	2021-09-09	4-4-4	00	
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les in que	ue (5) Unsuccessi	1 carster	Successful transfe	(1)											

Fig.34 View of the FTP session called in FileZilla

8.3.3 Modbus TCP/IP

The KD6 recorder enables the access to internal registers through the Ethernet interface and Modbus TCP / IP protocol. To establish the connection, it is necessary to set the unique IP address in the network for the recorder and to set the connection parameters listed in the table 14.

Register	Description	default value
4146	Device address for Modbus TCP / IP protocol	1
4147	Modbus TCP port number	502
4145	Modbus TCP / IP service port closing time [s]	60
4144	Maximum number of simultaneous connections to the Modbus TCP / IP service	4

The device address is the device address for the Modbus TCP / IP protocol and is not the same as the address value for the Modbus RS485 protocol (Address in the Modbus network, register 4100). By setting the "Device address for Modbus TCP / IP" parameter of the recorder to the value of "255" the recorder will skip the address analysis in the Modbus protocol frame (broadcast mode).

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Table 1/

9 Map of the KD6 recorder registers

In the KD6 recorder, data are placed in 16-bit and 32-bit registers. Process variables and recorder parameters are placed in the address space of registers in a manner dependent on the type of the variable value. Bits in the 16-bit register are numbered from the youngest to the oldest (b0-b15). 32-bit registers include numbers of float type in the IEEE-754 standard. Sequence of 3210 bytes - the oldest one is sent as the first.

Table 15.

Address range	Value type	Description
4000– 4159	Integer (16 bits)	Registers for the general configuration of the recorder and archiving configuration. Value placed in one 16-bit register. Registers for recording and reading
4400– 4485	Integer (16 bits)	Information registers of the recorder. Value put into one 16-bit register. Read-only registers
5000- 8105	Integer (16 bits)	Configuration registers Modbus Master: Value placed in one 16-bit register. Registers for recording and reading
8110- 9360	Integer (16 bits)	Groups configuration registers Value placed in one 16-bit register Registers for recording and reading
9370- 10879	Integer (16 bits)	Inputs and Outputs configuration registers Value placed in one 16-bit register. Registers for recording and reading
10900- 11203	Integer (16 bits)	Logical channels configuration registers Value put into one 16-bit register. Registers for recording and reading
11300- 11699	Integer (16 bits)	Maths functions configuration registers Value put into one 16-bit register. Registers for recording and reading
11800- 12999	Integer (16 bits)	Scaling functions configuration registers Value put into one 16-bit register. Registers for recording and reading
13800- 14099	Integer (16 bits)	Alarm functions configuration registers Value placed in one 16-bit register. Registers for recording and reading
14300– 14411	float (2x16 bits)	Registers with inputs/outputs measurement values. Value put into one two 16-bits registers. Read-only registers
14500– 14619	float(2x 16 bits)	Registers with channels measurement values. Value placed in two 16-bit registers. Read-only registers

General configuration registers and archiving registers

Table 16

Register address		Range	Description	By default
•	•			
4000	RW	09999	Security - password	0
4001	RW		reserved	
		Group 1– archivin	g	
4002	RW	05	Group 1, Archiving type 0 - manually disabled 1 - manually activated 2 - archiving below the lower archiving threshold 3 - archiving above the upper archiving threshold 4 - archiving between thresholds 5 - archiving beyond Lo Hi thresholds	0
4003	RW	059	Group 1, channel number triggering archiving	0
4004	RW	1 3600	Group 1, archiving interval in seconds	1
4005	RW	-2147400000	Group 1, archiving lower threshold Lo	
4006	RW	 2147400000	Group 1, archiving lower threshold Hi	-99999999
4007	RW	-2147400000	Group 1, archiving upper threshold Lo	
4008	RW	 2147400000	Group 1, archiving upper threshold Hi	9999999
4009			reserved	
4010			reserved	

Register address		Range	Description	By default
		Group 2– archiving		
401140	19		Range of modifications as in registers 40054013	
4000 40		Group 3– archiving		
402040	28	Oneren 4. enekisine	Range of modifications as in registers 40054013	
402940	27	Group 4– archiving	Range of modifications as in registers 40054013	
402940	57	Group 5– archiving		
403840	46	Group 5- archiving	Range of modifications as in registers 40054013	
1000	10	Group 6– archiving		
404740	55		Range of modifications as in registers 40054013	
		Group 7– archiving		
405640	64		Range of modifications as in registers 40054013	
		Group 8– archiving	, , , , , , , , , , , , , , , , , , ,	
406540	73		Range of modifications as in registers 40054013	
		Group 9– archiving		
407440	82		Range of modifications as in registers 40054013	
		Group 10– archivin		
408340	91		Range of modifications as in registers 40054013	
4092			reserved	
4093	RW	0.1	Keep the exported files on the device	0
4094	RW	0.1	Export files to external memory	0
			0 - do not export, 1 - export	-
			Copying the archive to the file archive memory "1" - copy the archive to the file archive memory / only	
4095	RW	0.1	those records that have been registered since the last	0
			copying /	
			Deleting the entire internal archive	-
4096	RW	0.1	0 - no reaction, 1 - archive deleting	0
4097	RW	0 2	Field separator 0 - comma, 1- semicolon; 2 - tabulator "	,
4098	RW	0.1	Decimal separator 0 - dot'.' 1 - comma ','	
4099			reserved	
4100	RW	1247	Address in Modbus net	1
4101	RW	03	Transmission mode: 0->8n2, 1->8e1, 2-	3
-101	1.00	00	>801, 3->8n1	Ű
4102	RW	04	Baud rate: 0->9600	4
4103	RW		1->19200, 2->38400, 3->57600, 4->115200 reserved	
4103	RW	0.1	Update the modification of transmission data:	0
4105	1	0.1	reserved	0
4106			reserved	
4107			reserved	
4108			reserved	
4109			reserved	
4110			reserved	
4111			reserved	
4112			reserved	
4113			reserved	
4114			reserved	
4115			reserved	
4116			reserved	
4117	RW	065535	third and second bytes (B3.B2) of the time server address format address: B3.B2.B1.B0	
4118	RW	065535	First and zero byte (B1.B0) of the time server address, address format: B3.B2.B1.B0	
4119	RW	0.1	Local time offset from UTC 0 - positive + 1 - negative -	0

Group 10- archiving					
4120	RW	012	Hourly offset of local time from UTC time	1	
4121	RW	059	Minute offset of local time from UTC time	0	
4122	RW	0, 1	Seasonal time change 0 - Yes 1 - No	0	
4123	RW	0, 1	Synchronize RTC time from time server 0 - no action 1 - sync now	0	
4124			reserved		
4125			reserved		
4126			reserved		
4127			reserved		
4128			reserved		
4129			reserved		
4130	RW	0.1	Enabling / disabling the DHCP client (support for the automatic acquisition of IP protocol parameters of the meter Ethernet interface from external DHCP servers within the same LAN local network) 0 - DHCP service disabled - you must manually configure the IP address and the subnet mask of the recorder; 1- DHCP service enabled, the recorder will automatically receive the IP address, subnet mask and gateway address from the DHCP server after powering on, the gateway address will be the address of the server that assigned the parameters to the recorder,	1	
4131	RW	065535	Third and second byte (B3.B2) of the recorder IP address, IPv4 address format: B3.B2.B1.B0	49320 (0xC0A8 = 192.168)	
4132	RW	065535	First and zero byte (B1.B0) of the IP of recorder address, IPv4 address format:. B3.B2.B1.B0	356 (0x0164 = 1.100)	
4133	RW	065535	Third and second byte (B3.B2) of the recorder subnet mask, mask format. B3.B2.B1.B0	65535	
4134	RW	065535	The first and zero byte (B1.B0) of the recorder subnet mask, mask format: B3.B2.B1.B0	65280	
4135	RW	065535	Third and second byte (B3.B2) of the recorder default gateway, gateway address format: B3.B2.B1.B0	49320	
4136	RW	065535	First and zero byte (B1.B0) of the recorder default gateway, gateway address format B3.B2.B1.B0	257	
4137	RW	065535	Third and second byte (B3.B2) of the DNS recorder address, IPv4 address format:. B3.B2.B1.B0	0x0808=8.8	
4138	RW	065535	First and zero byte (B1.B0) of the DNS recorder address, IPv4 address format: B3.B2.B1.B0	0x0808=8.8	
4139	RW		reserved		
4140	RW RW	02	reserved Ethernet interface baud rate:: 0 - automatic selection of the baud rate: 1 - 10 Mb / s 2 - 100 Mb/s	0	
4142	RW	2065535	FTP server command port number	21	
4143	RW	2065535	FTP server data port number	1025	
4144	RW	14	The maximum number of simultaneous connections to the Modbus TCP / IP service	1	
4145	RW	10600	Modbus TCP / IP service port closing time, value expressed in seconds	60	
4146	RW	0255	Device address for Modbus TCP / IP protocol	1	
4147	RW	065535	Modbus TCP port number	502	
4148	RW	8065535	Web server port number	80	
4149	RW	0.1	Saving new parameters of the Ethernet interface and re-initializing the interface	0	

	Group 10- archiving					
			0 - without changes,			
			1 - memorizing new parameters and rebooting the			
			Ethernet interface,			
4150	RW	02	Menu language: 0-ENG, 1-PL, 2-DE	0		
4151	RW	0.1	reserved	0		
4152	RW	0.1	Saving standard parameters including Ethernet,	0		
4153	RW	059	Seconds	0		
4154	RW	02359	Hour * 100 + Minutes	0		
4155	RW	1011231	Month * 100 + day	101		
4156	RW	20152077	Year	2015		
4157	RW	0.1	Password disabled / enabled	0		
4158	RW		reserved			
4159	RW		reserved			

Information registers of the recorder Table 17

÷		isters of the rect		
Register address	•	Range	Description	By default
4400	R	-	record	
4400		0.05525	reserved	
4401	R R	065535 065535	ID Recorder bootloader version x 100	EE
				-
4403	R	065535	Recorder software version x100	-
4404	R		reserved	
4405	R	065535	Execution code (the first 3 digits of the KD6 code - X X X xx x x)	-
4406	R	065535	Execution code (the first 5 digits of the KD6 code - x x x XX X X)	-
4407	R	065535	Slot 1 card identifier (according to the code 0x XXxx, detected 0x xxXX	0x0000
4408	R	065535	Slot 2 card identifier (acco rdi ng to the code 0x XXxx, detected 0x xx XX	0x0000
4409	R	065535	Card software version in slot 1 x100	-
4410	R	065535	Card software version in slot 2 x100	-
4411	R	065535	Seventh and sixth bytes (B7.B6) of the serial number, B7:B6:B5:B4:B3:B2:B1:B0 format	-
4412	R	065535	Fifth and fourth bytes (B5.B4) of the serial number, B7:B6:B5:B4:B3:B2:B1:B0 format	-
4413	R	065535	Third and second byte (B3.B2) of the serial number B7:B6:B5:B4:B3:B2:B1:B0 format	-
4414	R	065535	First and zero byte (B1.B0) of the serial number, B7:B6:B5:B4:B3:B2:B1:B0 format	-
4415	R	065535	Status 1 register - description below	0
4416	R	065535	Status 2 register - description below	0
4417	R	065535	Status 3 register - description below	0
4418	R	065535	Status 4 register - description below	0
4419	R	065535	Status 5 register - description below	0
4420	R	065535	Status 6 register - description below	0
4421	R	065535	Fifth and fourth byte (B5.B4) of the MAC recorder address, B5: B4: B3: B2:B1: B0 format	-
4422	R	065535	Third and second byte (B3.B2) of the MAC recorder address, B5:B4:B3:B2:B1:B0 format	-
4423	R	065535	First and zero byte (B1.B0) of the MAC recorder address, B5:B4:B3:B2:B1:B0 format	-
4424	R	065535	State 7 register - description below	0
4425	R	065535	Status of alarm 1	0
4426	R	065535	Status of alarm 2	0
4427	R	065535	Status of alarm 3	0
4428	R	065535	Status of alarm 4	0
4429	R	065535	Status of alarm 5	0
4430	R	065535	Status of alarm 6	0
4431	R	065535	Status of alarm 7	0
4432	R	065535	Status of alarm 8	0
	••	0		

4433	R	065535	Status of alarm 9	0
4434	R	065535	Status of alarm 10	0
4435	R	065535	Status of alarm 11	0
4436	R	065535	Status of alarm 12	0
4437	R	065535	Status of alarm 13	0
4438	R	065535	Status of alarm 14	
4439	R	065535	Status of alarm 15	0
4440	R	065535	Status of alarm 16	0
4441	R	065535	Status of alarm 17	0
4442	R	065535	Status of alarm 18	0
4443	R	065535	Status of alarm 19	0
4444	R	065535	Status of alarm 20	0
4445	R	01000	Filling the archive files in %	0
4446	R	01000	Percentage of progress when copying the internal archive to the files archive %	0
4447	R			0
4461	R			
4462	R			0
4463	R			0
4464	R			0
4465	R			0
4466	R			0
4467	R			0
4468	R		reserved	0
4469	R			0
4470	R			0
4471	R			0
4472	R			0
4473	R			0
4474	R			0
4475	R			0
4476	R			0
4477	R			0
4478	R			0
4479	R			0
4480	R			0
4481	R			0
4482	R			0
4483	R			0
4484	R			0
4485	R			0

Device Status 1 Register (address 4415, R):

Bit 15 - "1" - FRAM memory damage.

Bit 14 - "1" - error in channel configuration registers Bit 13 - "1" - error in card configuration registers Bit 12 - "1" - error in modbus master configuration registers Bit 11 - "1" - error in configuration registers. Bit 10 - "1" - error in group configuration registers Bit 9 - "1" - calibration error Bit 8 - "1" - error in mathematical functions configuration registers

Bit 7 - "1" - error in scaling function configuration registers

Bit 6 - reserved

Bit 5 - "1" - error in alarm functions configuration registers

- Bit 4 "1" card inserted in Slot 2
- Bit 3 "1" card inserted in Slot 1
- Bit 2 "1" presence of USB, Ethernet and RS485 Bit 1 "1" date or time not set / RTC time battery used
- Bit 0 "1" external memory connected to the UBS

Status 2 Register - (address 4416, R):

Bit 15-"1"- reserved	Bit 7-"1"- reserved
Bit 14-"1 "- reserved	Bit 6-"1 "- reserved
Bit 13-"1 "- reserved	Bit 5-"1 "- reserved
Bit 12 - "1" - Slot 2 a card inconsistent with the	Bit 4 - "1" - Slot 1 a card inconsistent with the
execution code was detected	execution code was detected
Bit 11 - "1" - Slot 2 - no card calibration	Bit 3 - "1" - Slot 1 - no card calibration
Bit 10 - "1" - Slot 2 - no communication with the card	Bit 2 - "1" - Slot 1 - no communication with the card
Bit 9 - "1" - Slot 2 the card is waiting in the	Bit 1 - "1" - Slot 1 the card is waiting in the
bootloader mode Bit 8 - "1" - Slot 2 the card is in	bootloader mode Bit 0 - "1" - Slot 1 the card is in
the programming mode	the programming mode

Status 3 Register - (address 4417, R): File archive status

- Bit 15 connected Ethernet
- Bit 14 reserved
- Bit 13 copying the internal memory to the file archive from the 10th archiving group,
- Bit 12 copying the internal memory to the file archive from the 9th archiving group,
- Bit 11 copying the internal memory to the file archive from the 8th archiving group,
- Bit 10 copying the internal memory to the file archive from the 7th archiving group,
- Bit 9 copying the internal memory to the file archive from the 6th archiving group,
- Bit 8 copying the internal memory to the file archive from the 5th archiving group,

Status 4 Register - (address 4418, R): Archiving status p. 1

Bit 15 - Export of files to external memory (USB)

- Bit 14 "0" Export of files to external memory (USB) disabled "1" - Enabled export of files to external memory (USB)
- Bit 13 reserved,
- Bit 12 reserved,
- Bit 11 reserved,
- Bit 10 reserved,
- Bit 9 "1" Archiving group 10 is on,
- Bit 8 "1" Archiving group 9 is on,

State 5 Register - (address 4419, R): Archiving status p. 2

- Bit 15 reserved,
- Bit 14 reserved,
- Bit 13 reserved,
- Bit 12 reserved,
- Bit 11 reserved,
- Bit 10 reserved,
- Bit 9 "0" waiting for the meeting of archiving conditions,

"1" - archiving in the 10th archiving group,

- Bit 8 "0" waiting for the meeting of archiving conditions,
 - "1" archiving in the 9th archiving group,

Bit 7 - "0" - waiting for the meeting of archiving conditions, "1" - archiving in the 8th archiving group,

Bit 7 - copying the internal memory to the file

Bit 6 - copying the internal memory to the file

Bit 4 - copying the internal memory to the file

Bit 2 - File archive full in 70%

Bit 7 - "1" - Archiving group 8 is on,

Bit 6 - "1" - Archiving group 7 is on, Bit 5 - "1" - Archiving group 6 is on,

Bit 4 - "1" - Archiving group 5 is on, Bit 3 - "1" - Archiving group 4 is on,

Bit 2 - "1" - Archiving group 3 is on,

Bit 1 - "1" - Archiving group 2 is on,

Bit 0 - "1" - Archiving group 1 is on,

archive system error

archive from the 4th archiving group,

archive from the 3rd archiving group, Bit 5 - copying the internal memory to the file

archive from the 2nd archiving group,

archive from the 1st archiving group,

Bit 1 - File archive initialized correctly. Bit 0 - File

Bit 3 - File archive full, (less than 14 days until the file archive is full at 1 second interval)

- Bit 6 "0" waiting for the meeting of archiving conditions, "1" - archiving in the 7th archiving group,
- Bit 5 "0" waiting for the meeting of archiving conditions, "1" - archiving in the 6th archiving group,
- Bit 4 "0" waiting for the meeting of archiving conditions, "1" - archiving in the 5th archiving group,
- Bit 3 "0" waiting for the meeting of archiving conditions, "1" - archiving in the 4th archiving group,
- Bit 2 "0" waiting for the meeting of archiving conditions, "1" - archiving in the 3rd archiving group,
- Bit 1 "0" waiting for the meeting of archiving conditions, "1" - archiving in the 2nd archiving group,
- Bit 0 "0" waiting for the meeting of archiving conditions, "1" - archiving in the 1st archiving group,

Modbus Master configuration registers Table18

Register address	Operat ions	Range	Description	By default
5000	RW	0. 1	Work mode 0- slave; 1 – master	0
5001	RW	0x00000x03FF	Master n on / off bit 0 - 0- master 1 disabled, 1- master 1 enabled bit 1 - 0- master 2 disabled, 1- master 1 enabled bit 9 - 0- master 10 disabled, 1- master 10 enabled	1
5002	RW	1247	Slave device address (Operating mode = slave)	1
5003	RW	03	Transmission mode: 0->8n2, 1->8e1, 2- >8o1, 3->8n1	3
5004	RW	04	Baud rate:: 0->9600 1->19200, 2->38400, 3->57600, 4->115200	4
5005	RW	010	The number of repetitions before an error is reported	0
Master 1		4 047		4
5006 5007	RW RW	1247 110	Slave device address Number of registers to be read	1
5007	RW	0x00000xFFFF	First register address	4000
5009	RW	09	Register type 0 – char, 1 – uchar, 2 – int, 3 - uint, 4 – long, 5 – ulong, 6 – float 1234, 7 – float 2143, 8 – float 4321, 9 – float 3412	3
5010	RW	01	Reading function 0 – 0x03, 1 - 0x04	0
5011	RW	10010000 [ms]	Timeout for a response	1000
5012	RW	10010000 [ms]	Polling frequency (Interval)	1000
5013	RW	1.2	Number of bits 1 - 32 bits 2 - 16 bits	2
5014			reserved	
5015			reserved	
		Master 1 – registe		
5016	RW	12	Signal type 1 - analogue, 2 - binary (for value = 0 FALSE, for value! = 0 TRUE)	1
5017	RW	-2147400000	Min range Lo	0000000
5018	RW	2147400000	Min range Hi	-99999999
5019	RW	-2147400000	Max range Lo	99999999
5020	RW	2147400000	Max range Hi	9999999
5021	RW	02	Logical shift 0– None ,1- >>right ,2- < <left< td=""><td>0</td></left<>	0
5022 5023	RW RW	131 0x00000xFFFF	N bites logical shift Lo bitmask	7 0xFFFF
	-			
5024	RW	0x00000xFFFF	Hi bitmask (for Register type> 3)	0xFFFF
5025	RW	0, 0x20200x7A7A	OFF tag ASCII 2 and 1 characters (for Signal type = 1)	0x4F46
5026	RW	0, 0x20200x7A7A	OFF tag ASCII 4 and 3 characters	0x4620
5027	RW	0, 0x20200x7A7A	OFF label ASCII 6 and 5 characters	0x2020
5028	RW	0, 0x20200x7A7A	OFF label ASCII 8 and 7 characters	0x2020
5029	RW	0, 0x20200x7A7A	ON tag ASCII 2 and 1 characters (for Signal type = 1)	0x4F4E
5030	RW	0, 0x20200x7A7A	ON tag ASCII 4 and 3 characters	0x2020
5031	RW	0, 0x20200x7A7A	ON tag ASCII 6 and 5 characters	0x2020
5032	RW	0, 0x20200x7A7A	ON tag ASCII 8 and 7 characters	0x2020
5033	RW	0, 0x20200x7A7A	Register 1– name ASCII 2 and 1 characters	0x4D4D "MM"
5034	RW	0, 0x20200x7A7A	Register 1– name ASCII 4 and 3 characters	0x522D "R-"
5035	RW	0, 0x20200x7A7A	Register 1– name ASCII 6 and 5 characters	0x6765

				"ge
5036	RW	0, 0x20200x7A7A	Register 1– name ASCII 8 and 7 characters	0x0031
				1"
5037	RW	0, 0x20200x7A7A	Register 1 – name ASCII 10 and 9 characters	0x0000
5038	RW	0, 0x20200x7A7A	Register 1– name ASCII 12 and 11 characters	0x0000
5039	RW	0, 0x20200x7A7A	Unit name ASCII 2 and 1 characters	0x2020
5040	RW	0, 0x20200x7A7A	Unit name ASCII 4 and 3 characters	0x2020
5041	RW	0, 0x20200x7A7A	Unit name ASCII 6 and 5 characters	0x2020
5042	RW	0, 0x20200x7A7A	Unit name ASCII 8 and 7 characters	0x2020
5043		· ·	reserved	
5044			reserved	
5045			reserved	
		Master 1 – register		
5046507	75		Range of changes as in registers 5016 5045	
5076510	75	Master 1 – register		
5076510	5	Master 1 – registe	Range of changes as in registers 5016 5045	
5106513	35		Range of changes as in registers 5016 5045	
0100010		Master 1 – registe		
5136516	65	indetsi i rogistel	Range of changes as in registers 5016 5045	
		Master 1 – registe		
5166519	95		Range of changes as in registers 5016 5045	
		Master 1 – registe	7	
5196522	25		Range of changes as in registers 5016 5045	
		Master 1 – register		
5226525	55		Range of changes as in registers 5016 5045	
5050 500	25	Master 1 – registe		
5256528	35	Maatar 4 register	Range of changes as in registers 5016 5045	
5286531	15	Master 1 – register	Range of changes as in registers 5016 5045	
Master 2	15		Range of changes as in registers 5010 5045	
5316532	25		Range of changes as in registers 5006 5015	
0010002	.0	Master 2 – register		
5326535	5		Range of changes as in registers 5016 5045	
		Master 2 – registe		
5356538	35		Range of changes as in registers 5016 5045	
		Master 2 – register	r 3	
5386541	15		Range of changes as in registers 5016 5045	
		Master 2 – registe		
5416544	45	Maatar 2 register	Range of changes as in registers 5016 5045	
5446547	75	Master 2 – register	Range of changes as in registers 5016 5045	
0440047	5	Master 2 – registe		
5476550)5		Range of changes as in registers 5016 5045	
0		Master 2 – register	r7	
5506553	35		Range of changes as in registers 5016 5045	
		Master 2 – register	r 8	
5536556	65		Range of changes as in registers 5016 5045	
		Master 2 – register		
5566559	95		Range of modifications as in registers 50165045	
FF00 500	25	Master 2 – registe		
5596562	25		Range of changes as in registers 5016 5045	
Master 3	25		Pango of modifications as in registers 5006 5015	
5626563		Master 3 – registe	Range of modifications as in registers 50065015	
5636566	5	master 5 - register	Range of modifications as in registers 50165045	
0000000		Master 3 – registe		
5666569	25		Range of modifications as in registers 50165045	
0000008				

56965725	Range of modifications as in registers 50165045	
	Master 3 – register 4	
57265755	Range of modifications as in registers 50165045	
	Master 3 – register 5	
57565785	Range of modifications as in registers 50165045	
01000100	Master 3 – register 6	
57865815	Range of modifications as in registers 50165045	
07000010	Master 3 – register 7	_
58165845		_
50105045	Range of modifications as in registers 50165045	
50.40 5075	Master 3 – register 8	
58465875	Range of modifications as in registers 50165045	
	Master 3 – register 9	
58765905	Range of changes as in registers 5016 5045	
	Master 3 – register 10	
59065935	Range of changes as in registers 5016 5045	
Master 4		
59365945	Range of changes as in registers 5006 5015	
	Master 4 – register 1	
59465975	Range of changes as in registers 5016 5045	
	Master 4 – register 2	_
59766005	Range of changes as in registers 5016 5045	
39700005		
6006 6005	Master 4 – register 3	
60066035	Range of changes as in registers 5016 5045	
	Master 4 – register 4	
60366065	Range of changes as in registers 5016 5045	
	Master 4 – register 5	
60666095	Range of changes as in registers 5016 5045	
	Master 4 – register 6	
60966125	Range of changes as in registers 5016 5045	
	Master 4 – register 7	
61266155	Range of changes as in registers 5016 5045	
	Master 4 – register 8	
61566185	Range of changes as in registers 5016 5045	
01000100	Master 4 – register 9	
61866215	Range of changes as in registers 5016 5045	
01000215	Master 4 – register 10	
6046 6045		
62166245	Range of changes as in registers 5016 5045	_
Master 5		
62466255	Range of changes as in registers 5006 5015	
	Master 5 – register 1	
62566285	Range of changes as in registers 5016 5045	
	Master 5 – register 2	
62866315	Range of changes as in registers 5016 5045	
	Master 5 – register 3	
63166345	Range of changes as in registers 5016 5045	
	Master 5 – register 4	
63466375	Range of changes as in registers 5016 5045	
30100070	Master 5 – register 5	
63766405	Range of changes as in registers 5016 5045	
03700405		
6406 0405	Master 5 – register 6	
64066435	Range of changes as in registers 5016 5045	
0.100	Master 5 – register 7	
64366465	Range of changes as in registers 5016 5045	
	Master 5 – register 8	
64666495	Range of changes as in registers 5016 5045	
	Master 5 – register 9	
64966525	Range of changes as in registers 5016 5045	
	Master 5 – register 10	
65266555	Range of changes as in registers 5016 5045	
Master 6		

65566565		Range of changes as in registers 5006 5015
	Master 6 – registe	
65666595		Range of changes as in registers 5016 5045
	Master 6 – registe	
65966625		Range of changes as in registers 5016 5045
	Master 6 – registe	r 3
66266655		Range of changes as in registers 5016 5045
	Master 6 – registe	
66566685		Range of changes as in registers 5016 5045
	Master 6 – registe	
66866715		Range of changes as in registers 5016 5045
0000110110	Master 6 – registe	
67166745	mactor o rogioto	Range of changes as in registers 5016 5045
01100140	Master 6 – registe	
67466775	master o registe	Range of changes as in registers 5016 5045
07400773	Master 6 – registe	
6776 6905	waster o – registe	
67766805	Montor 6 registe	Range of changes as in registers 5016 5045
6906 6925	Master 6 – registe	
68066835	Maatan	Range of changes as in registers 5016 5045
0000 0005	Master 6 – registe	
68366865		Range of changes as in registers 5016 5045
Master 7		
68666875		Range of changes as in registers 5006 5015
0.070	Master 7 – registe	
68766905		Range of changes as in registers 5016 5045
	Master 7 – registe	
69067035		Range of changes as in registers 5016 5045
	Master 7 – registe	
69367065		Range of changes as in registers 5016 5045
	Master 7 – registe	
69667095		Range of changes as in registers 5016 5045
	Master 7 – registe	
69967125		Range of changes as in registers 5016 5045
	Master 7 – registe	
70267155		Range of changes as in registers 5016 5045
	Master 7 – registe	
70567185		Range of changes as in registers 5016 5045
	Master 7 – registe	
70867215		Range of changes as in registers 5016 5045
	Master 7 – registe	
71167245	indetain registe	Range of changes as in registers 5016 5045
	Master 7 – registe	
71467275	matter i registe	Range of changes as in registers 5016 5045
Master 8		
71767185		Range of changes as in registers 5006 5015
COL 1.101	Master 8 – registe	
7106 7015	waster o – registe	
71867215	Mootor Q menistr	Range of changes as in registers 5016 5045
7040 7045	Master 8 – registe	
72167245		Range of changes as in registers 5016 5045
	Mantan C. Lt	
70.40 7077	Master 8 – registe	
72467275		Range of changes as in registers 5016 5045
	Master 8 – registe Master 8 – registe	Range of changes as in registers 5016 5045
72467275 72767305	Master 8 – registe	Range of changes as in registers 5016 5045r 4Range of changes as in registers 5016 5045
72767305		Range of changes as in registers 5016 5045r 4Range of changes as in registers 5016 5045r 5
	Master 8 – registe Master 8 – registe	Range of changes as in registers 5016 5045r 4Range of changes as in registers 5016 5045r 5Range of changes as in registers 5016 5045
72767305	Master 8 – registe	Range of changes as in registers 5016 5045r 4Range of changes as in registers 5016 5045r 5Range of changes as in registers 5016 5045r 6
72767305	Master 8 – registe Master 8 – registe Master 8 – registe	Range of changes as in registers 5016 5045r 4Range of changes as in registers 5016 5045r 5Range of changes as in registers 5016 5045r 6Range of changes as in registers 5016 5045
72767305 73067335 73367365	Master 8 – registe Master 8 – registe	Range of changes as in registers 5016 5045r 4Range of changes as in registers 5016 5045r 5Range of changes as in registers 5016 5045r 6Range of changes as in registers 5016 5045r 7
72767305 73067335	Master 8 – registe Master 8 – registe Master 8 – registe	Range of changes as in registers 5016 5045r 4Range of changes as in registers 5016 5045r 5Range of changes as in registers 5016 5045r 6Range of changes as in registers 5016 5045
72767305 73067335 73367365	Master 8 – registe Master 8 – registe Master 8 – registe	Range of changes as in registers 5016 5045r 4Range of changes as in registers 5016 5045r 5Range of changes as in registers 5016 5045r 6Range of changes as in registers 5016 5045r 7Range of changes as in registers 5016 5045

73967425	Range of changes as in registers 5016 5045	
	Master 8 – register 9	
74267455	Range of changes as in registers 5016 5045	
	Master 8 – register 10	
74567485	Range of changes as in registers 5016 5045	
Master 9 74867495	Range of changes as in registers 5006 5015	
74807495	Master 9 – register 1	
74967525	Range of changes as in registers 5016 5045	
	Master 9 – register 2	
75267555	Range of changes as in registers 5016 5045	
7550 7505	Master 9 – register 3	
75567585	Range of changes as in registers 5016 5045 Master 9 – register 4	
75867615	Range of changes as in registers 5016 5045	
	Master 9 – register 5	
76167645	Range of changes as in registers 5016 5045	
	Master 9 – register 6	
76467675	Range of changes as in registers 5016 5045	
76767705	Master 9 – register 7 Range of changes as in registers 5016 5045	
70707705	Master 9 – register 8	
77067735	Range of changes as in registers 5016 5045	
	Master 9 – register 9	
77367765	Range of changes as in registers 5016 5045	
	Master 9 – register 10	
77667795	Range of changes as in registers 5016 5045	
Master 10 77967805	Range of changes as in registers 5006 5015	
11901005	Master 10 – register 1	
78067835	Range of changes as in registers 5016 5045	
	Master 10 – register 2	
78367865	Range of changes as in registers 5016 5045	
7000 7005	Master 10 – register 3	
78667895	Range of changes as in registers 5016 5045 Master 10 – register 4	
78967925	Range of changes as in registers 5016 5045	
1000	Master 10 – register 5	
79267955	Range of changes as in registers 5016 5045	
	Master 10 – register 6	
79567985	Range of changes as in registers 5016 5045	
7096 9015	Master 10 – register 7	
79868015	Range of changes as in registers 5016 5045 Master 10 – register 8	
80168045	Range of changes as in registers 5016 5045	
	Master 10 – register 9	
80468075	Range of modifications as in registers 50165045	
0070 0107	Master 10 – register 10	
80768105	Range of changes as in registers 5016 5045	
	"Register x - name" rs 1 10 name - "MM1-Reg1" "MM1-Reg10"	
Master 2 - Register	rs 1 10 name - MM1-Reg1 MM1-Reg10 rs 1 10 name - "MM2-Reg1" "MM2-Reg10"	
Master 3 - Register	rs 110 name - "MM3-Reg1" "MM3-Reg10"	
Master 4 - Register	rs 1 10 name - "MM4-Reg1" "MM4-Reg10"	
Master 5 - Register	rs 1 10 name - " MM5-Reg1 "" MM5-Reg10	
"Master 6 - Registe	ers 1 10 name -" MM6-Reg1 "" MM6-Reg10	
	ers 1 10 name -" MM7-Reg1 "" MM7-Reg10 ers 1 10 Name -" MM8 Reg1 "" MM8 Reg10	
	ers 1 10 Name -" MM8-Reg1 "" MM8-Reg10 ers 1 10 Name -" MM9-Reg1 "" MM9-Reg10	
	sters 1 10 name - "MM10-Reg1" "MM10-	
Reg10"	- -	

Group configuration registers

			t	Table 19
Register address	Operat ions	Range	Description	By default
8110	RW	0x00000x03FF	N group on / off bit 0 - 0- group 1 disabled, 1- group 1 enabled bit 1 - 0- group 2 disabled, 1- group 1 enabled	0x03FF
Crown 4			bit 9 - 0- group 10 disabled, 1- group 10 enabled	
Group 1	1		Number of displayed fields	
8111	RW	0x00000x003F	Number of displayed fields bit 0 - 0- field 1 disabled, 1- field 1 enabled bit 1 - 0- field 2 disabled, 1- field 1 enabled	0x003F
8112	RW	02	bit 5 - 0- field 6 disabled, 1- field 6 enabled Bar chart type 0 - disabled 1 - horizontal 2 - vertical	1
8113	RW	02	Line charts type 0 - disabled 1 - horizontal 2 - vertical	1
8114	RW	013	Time base 0 - 30 seconds, 1 - 1 minute, 2 - 2 minutes, 3 - 5 minutes, 4 - 10 minutes, 5 - 15 minutes, 6 - 30 minutes, 7 - 1 hour, 8 - 2 hours, 9 - 4 hours, 10 - 12 hours, 11 - 24 hours, 12 - 2 days, 13 - 7 days	2
8115	RW	01	Colour of background 0 – black, 1 – white	0
		Group 1– field 1		
8116	RW	059	Value source 059 – virtual channel no	1
8117	RW	16	Number of sectors	1
8118	RW	012	Colour of sector 1 0 - green, 1 - red, 2 - yellow, 3 - white, 4 - blue, 5 - purple, 6 - light blue, 7 - olive, 8 - black, 9 - light green, 10 - orange, 11 - dark red, 12 - grey	0
8119	RW	-2147400000	High-end colour value for sector 1 Lo x10	
8120	RW		High-end colour value for sector 1 Hi x10	0
8121	RW	012	Colour of sector 2 0 - green, 1 - red, 2 - yellow, 3 - white, 4 - blue, 5 -purple, 6 - light blue, 7 - olive, 8 - black, 9 - light green, 10 - orange, 11 - dark red, 12 - grey	1
8122	RW	-2147400000	High-end colour value for sector 2 Lo x10	4000
8123	RW		High-end colour value for sector 2 Hi x10	1000
8124	RW	012	Colour of sector 3 0 - green, 1 - red, 2 - yellow, 3 - white, 4 - blue, 5 -purple, 6 - light blue, 7 - olive, 8 - black, 9 - light green, 10 - orange, 11 - dark red, 12 - grey	2
8125	RW	-2147400000	High-end colour value for sector 3 Lo x10	
8126	RW		High-end colour value for sector 3 Hi x10	2000
8127	RW	012	Colour of sector 4 0 - green, 1 - red, 2 - yellow, 3 - white, 4 - blue, 5 -purple, 6 - light blue, 7 - olive, 8 - black, 9 - light green, 10 - orange, 11 -	3
0121			dark red 12 - grev	
8127	RW	-2147400000	dark red, 12 - grey High-end colour value for sector 4 Lo x10	

			Colour of sector 5	
8130	RW	012	0 - green, 1 - red, 2 - yellow, 3 - white, 4 - blue, 5 -purple, 6 -	4
			light blue, 7 - olive, 8 - black, 9 - light green, 10 - orange, 11 -	
8131	RW	-2147400000	dark red, 12 - grey High-end colour value for sector 5 Lo x10	4000
0131		-2147400000		4000
8132	RW	2147400000	High-end colour value for sector 5 Hi x10	
		2111100000	Colour of sector 6	
			0 - green, 1 - red, 2 - yellow, 3 - white, 4 - blue, 5 -purple, 6 -	_
8133	RW	012	light blue, 7 - olive, 8 - black, 9 - light green, 10 - orange, 11 -	5
			dark red, 12 - grey	
			Decimal point	
8134	RW	04	0 - automatic, 1 - 0, 2 - 0.0, 3 - 0.00, 4 - 0.000	0
0134	RVV	04	Binary values are always displayed without a	0
			decimal point as 0 or 1 values	
			Display of binary values 0 - as a numerical value (0 or 1)	
			1 - as a string	
8135	RW	01	(Following subtitles from registers are displayed: Label OFF,	0
			Label ON or in the case of mathematical functions 18 20, 33	
			43 the inscriptions TRUE, FALSE are displayed)	
		Group 1 - field 2		
813681	55		Range of modifications as in registers 81168135	
		Group 1 - field 3		
815681	75	<u> </u>	Range of modifications as in registers 81168135	
		Group 1 - field 4		
817681	95		Range of modifications as in registers 81168135	
		Group 1 - field 5		
819682	15		Range of modifications as in registers 81168135	
	~ -	Group 1 - field 6		
821682	35		Range of modifications as in registers 81168135	
Group 2 823682	40		Dange of modifications as in registers 9111 9115	
023002	40	Group 2 - field 1	Range of modifications as in registers 81118115	
824182	60	Group z - neiu i	Range of modifications as in registers 81168135	
024102	00	Group 2 - field 2		
826182	80		Range of modifications as in registers 81168135	
020102		Group 2 - field 3		
828183	00		Range of modifications as in registers 81168135	
		Group 2 - field 4		
830183	20		Range of modifications as in registers 81168135	
		Group 2 - field 5		
832183	40		Range of modifications as in registers 81168135	
		Group 2 - field 6		
834183	60		Range of modifications as in registers 81168135	
Group 3				
836183	65	Oneuro O - Calal d	Range of modifications as in registers 81118115	
0266 00	05	Group 3 - field 1	Dange of modifications on in registers 9440 9495	
836683	00	Group 3 - field 2	Range of modifications as in registers 81168135	
838684	05	Group 5 - field 2	Range of modifications as in registers 81168135	
000004	55	Group 3 - field 3		
840684	25		Range of modifications as in registers 81168135	
510001		Group 3 - field 4		
842684	45		Range of modifications as in registers 81168135	
		Group 3 - field 5		
84468465			Range of modifications as in registers 81168135	
		Group 3 - field 6		
846684	85		Range of modifications as in registers 81168135	
Group 4				
848684	90		Range of modifications as in registers 81118115	

	Oneren A. field A		
9401 9510	Group 4 - field 1	Dange of modifications on in registers 9116 9125	
84918510	Group 4 - field 2	Range of modifications as in registers 81168135	
85118530	Group 4 - field Z	Range of modifications as in registers 81168135	
00110000	Group 4 - field 3	Range of mounications as in registers of 100135	
85318550	Group 4 - neiu 3	Range of modifications as in registers 81168135	
00010000	Group 4 - field 4	Trange of modifications as in registers of 100100	
85518570		Range of modifications as in registers 81168135	
00010070	Group 4 - field 5		
85718590		Range of modifications as in registers 81168135	
00110000	Group 4 - field 6		
85918610		Range of modifications as in registers 81168135	
Group 5		<u> </u>	
86118615		Range of modifications as in registers 81118115	
	Group 5 - field 1		
86168635	•	Range of modifications as in registers 81168135	
	Group 5 - field 2		
86368655		Range of modifications as in registers 81168135	
	Group 5 - field 3		
86568675		Range of modifications as in registers 81168135	
	Group 5 - field 4		
86768695		Range of modifications as in registers 81168135	
0000 07/5	Group 5 - field 5		
86968715		Range of modifications as in registers 81168135	
0740 0705	Group 5 - field 6	Denne of medifications on in melatory 0140, 0405	
87168735		Range of modifications as in registers 81168135	
Group 6 87368740		Denze of medifications on in registers 0111, 0115	
87308740	Group 6 - field 1	Range of modifications as in registers 81118115	
87418760	Group 6 - field 1	Range of modifications as in registers 81168135	
07410700	Group 6 - field 2	Range of mounications as in registers of 100135	
87618780	Group 0 - field Z	Range of modifications as in registers 81168135	
01010100	Group 6 - field 3		
87818800		Range of modifications as in registers 81168135	
	Group 6 - field 4		
88018820		Range of modifications as in registers 81168135	
	Group 6 - field 5	5	
88218840		Range of modifications as in registers 81168135	
	Group 6 - field 6		
88418860		Range of modifications as in registers 81168135	
Group 7			
88618865		Range of modifications as in registers 81118115	
	Group 7 - field 1		
88668885		Range of modifications as in registers 81168135	
0000 0005	Group 7 - field 2		
88868905	Oneurs 7 Callo	Range of modifications as in registers 81168135	
8006 8005	Group 7 - field 3	Dense of modifications on in resisters 0440 - 0405	
89068925	Group 7 field 4	Range of modifications as in registers 81168135	
89268945	Group 7 - field 4	Range of modifications as in registers 81168135	
09200940	Group 7 - field 5	Nange of mounications as in registers of 100133	
89468965	oroup / - field 5	Range of modifications as in registers 81168135	
	Group 7 - field 6		
89668985		Range of modifications as in registers 81168135	
Group 8			
89868990		Range of modifications as in registers 81118115	
	Group 8 - field 1		
89919010		Range of modifications as in registers 81168135	
	Group 8 - field 2		
90119030		Range of modifications as in registers 81168135	

90319050 90519070	Group 8 - field 3 Group 8 - field 4	Range of modifications as in registers 81168135	
	Group 8 - field 4		
90519070			
		Range of modifications as in registers 81168135	
	Group 8 - field 5	5	
90719090	•	Range of modifications as in registers 81168135	
	Group 8 - field 6		
90919110		Range of modifications as in registers 81168135	
Group 9			
91119115		Range of modifications as in registers 81118115	
	Group 9 - field 1		
91169135		Range of modifications as in registers 81168135	
	Group 9 - field 2		
91269155		Range of modifications as in registers 81168135	
	Group 9 - field 3		
91569175		Range of modifications as in registers 81168135	
0.450 0.405	Group 9 - field 4		
91769195		Range of modifications as in registers 81168135	
0400 0045	Group 9 - field 5	Denne of medifications as is realisters 0440, 0405	
91969215	Oneren O. falal C	Range of modifications as in registers 81168135	
92169235	Group 9 - field 6	Dense of modifications on in registers 0116 0125	
Group 10		Range of modifications as in registers 81168135	
92369240		Range of modifications as in registers 81118115	
92309240	Group 10 - field 1		
92419260		Range of modifications as in registers 81168135	
52415200	Group 10 - field 2		
92619280		Range of modifications as in registers 81168135	
0201110200	Group 10 - field 3		
92819300		Range of modifications as in registers 81168135	
	Group 10 - field 4		
93019320		Range of modifications as in registers 81168135	
	Group 10 - field 5		
93219340		Range of modifications as in registers 81168135	
	Group 10 - field 6		
93419360	•	Range of modifications as in registers 81168135	

Inputs and	nputs and Outputs configuration registers Table 20					
Register address	Operati ons	Range	Description	By default		
			Slot (Z) Out 1 (relay)			
9370	RW	059	Value source (channel no.)	0		
9371	RW	01	Relay operation state 0 - normal (contacts closed in the active state) 1 - negated (contacts open in the active state)	0		
9372	RW	0, 0x20200x7A7A	OFF tag ASCII 2 and 1 characters	0x4F46		
9373	RW	0, 0x20200x7A7A	OFF tag ASCII 4 and 3 characters	0x4620		
9374	RW	0, 0x20200x7A7A	OFF tag ASCII 6 and 5 characters	0x2020		
9375	RW	0, 0x20200x7A7A	OFF tag ASCII 8 and 7 characters	0x2020		
9376	RW	0, 0x20200x7A7A	ON tag ASCII 2 and 1 characters	0x4F4E		
9377	RW	0, 0x20200x7A7A	ON tag ASCII 4 and 3 characters	0x2020		
9378	RW	0, 0x20200x7A7A	ON tag ASCII 6 and 5 characters	0x2020		
9379	RW	0, 0x20200x7A7A	ON tag ASCII 8 and 7 characters	0x2020		
9380			reserved			
9381			reserved			
9382			reserved			

Register address	Oper ations	Range	Description	Default
9383			reserved	
9384			reserved	
9385			reserved	
9386			reserved	
9387 9388			reserved	
9389			reserved reserved	
9390	RW	0, 0x20200x7A7A	name ASCII 2 and 1 characters	0x2020
9390	RW	0, 0x20200x7A7A	name ASCII 4 and 3 characters	0x2020
9392	RW	0, 0x20200x7A7A	name ASCII 6 and 5 characters	
9392	RW		name ASCII 8 and 7 characters	0x2020
	_	0, 0x20200x7A7A		0x2020
9394	RW	0, 0x20200x7A7A	name ASCII 10 and 9 characters	0x2020
9395	RW	0, 0x20200x7A7A	name ASCII 12 and 11 characters	0x2020
9396	R	0, 0x20200x7A7A	Unit ASCII 2 and 1 characters	0x2020
9397	R	0, 0x20200x7A7A	Unit ASCII 4 and 3 characters	0x2020
9398	R	0, 0x20200x7A7A	Unit ASCII 6 and 5 characters	0x2020
9399	R	0, 0x20200x7A7A	Unit ASCII 8 and 7 characters	0x2020
			Slot (Z) Out 2 (relay)	
94009429			As registers 9370. 9399	
	514/		Slot (Z) In 1 (binary input)	
9430	RW	0, 0x20200x7A7A	OFF tag ASCII 2 and 1 characters	0x4F46
9431 9432	RW RW	0, 0x20200x7A7A 0, 0x20200x7A7A	OFF tag ASCII 4 and 3 characters OFF tag ASCII 6 and 5 characters	0x4620 0x2020
9433	RW	0, 0x20200x7A7A	OFF tag ASCII 8 and 7 characters	0x2020
9434	RW	0, 0x20200x7A7A	ON tag ASCII 2 and 1 characters	0x4F4E
9435	RW	0, 0x20200x7A7A	ON tag ASCII 4 and 3 characters	0x2020
9436	RW	0, 0x20200x7A7A	ON tag ASCII 6 and 5 characters	0x2020
9437	RW	0, 0x20200x7A7A	ON tag ASCII 8 and 7 characters	0x2020
9438	RW	0.1	Active state for the input 0 - normal	0
9439			1 - negated reserved	
9440			reserved	
9441			reserved	
9442			reserved	
9443			reserved	
9444			reserved	
9445	RW	0, 0x20200x7A7A	name ASCII 2 and 1 characters	0x2020
9446	RW	0, 0x20200x7A7A	name ASCII 4 and 3 characters	0x2020
9447	RW	0, 0x20200x7A7A	name ASCII 6 and 5 characters	0x2020
9448 9449	RW RW	0, 0x20200x7A7A 0, 0x20200x7A7A	name ASCII 8 and 7 characters name ASCII 10 and 9 characters	0x2020 0x2020
9449 9450	RW	0, 0x20200x7A7A 0, 0x20200x7A7A	name ASCII 10 and 9 characters	0x2020 0x2020
9450 9451	RW	0, 0x20200x7A7A	Unit ASCII 2 and 1 characters	0x2020 0x2020
9452	R	0, 0x20200x7A7A	Unit ASCII 4 and 3 characters	0x2020
9453	R	0, 0x20200x7A7A	Unit ASCII 6 and 5 characters	0x2020
9454	R	0, 0x20200x7A7A	Unit ASCII 8 and 7 characters	0x2020
			Slot (Z) In 2 (binary input)	
94559479			As registers 9430. 9454	
6 x relay outp	outs mod	ule		
0400 0500			Slot (X) Out 1 (relay)	
94809509			As registers 9370. 9399 Slot (X) Out 2 (relay)	
95109539	+		As registers 9370. 9399	
00103008	+ +		Slot (X) Out 3 (relay)	
95409569	4		As registers 9370. 9399	

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Register address	Oper ations	Range	Description	By default
			Slot (X) Out 4 (relay)	
95709599			As registers 9370. 9399	
			Slot (X) Out 5 (relay)	
96009629			As registers 9370. 9399	
			Slot (X) Out 6 (relay)	
96309659			As registers 9370. 9399	
			Slot (Y) Out 1 (relay)	
96609689			As registers 9370. 9399	
0000 0740			Slot (Y) Out 2 (relay)	
96909719			As registers 9370. 9399	
0700 0740			Slot (Y) Out 3 (relay)	
97209749			As registers 9370. 9399	
0750 0770			Slot (Y) Out 4 (relay)	
97509779			As registers 9370. 9399	
97809809	+		Slot (Y) Out 5 (relay) As registers 9370. 9399	
91009009			Slot (Y) Out 6 (relay)	
98109839			As registers 9370. 9399	
		ula L Ax hinami inn	3	
4 x relay outp	uts moal	lie + 4 x binary inp	uts separated from each others	
0040.0000			Slot (X) Out 1 (relay)	
98409869			As registers 9370. 9399	
0070 0000			Slot (X) Out 2 (relay)	
98709899			As registers 9370. 9399	
0000 0000			Slot (X) Out 3 (relay)	
99009929			As registers 9370. 9399	
0000 0050			Slot (X) Out 4 (relay)	
99309959			As registers 9370. 9399	
99609984			Slot (X) In 1 (binary input)	
99609984			As registers 9430. 9454	
998510009			Slot (X) In 2 (binary input) As registers 9430. 9454	
990510009			Slot (X) In 3 (binary input)	
1001010034			As registers 9430. 9454	
1001010034			Slot (X) In 4 (binary input)	
1003510059			As registers 9430. 9454	
1003510059			Slot (Y) Out 1	
1006010089			As registers 9370. 9399	
1000010003			Slot (Y) Out 2	
1009010119			As registers 9370. 9399	
1000010110			Slot (Y) Out 3	
1012010149			As registers 9370. 9399	
			Slot (Y) Out 4	
1015010179			As registers 9370. 9399	
1010010110			Slot (Y) In 1 (binary input)	
1018010204			As registers 9430. 9454	
			Slot (Y) In 2 (binary input)	
1020510229			As registers 9430. 9454	
			Slot (Y) In 3 (binary input)	
1023010254			As registers 9430. 9454	
			Slot (Y) In 4 (binary input)	
1025510279			As registers 9430. 9454	
	outout m	odule + 4 x hinary	inputs with common ground	
. A unulogue			Slot (X) Out 1 (Analogue output)	1
10280	RW	059	Value source (channel no.)	0
	1		The output state in case of an event (error,	-
10281	RW	0/4002000	exceeding the range Lo or Hi) x100	0
	RW	-2147400000	Lo input lower threshold (Lo inp) x100	-9999999
10282				

Register address	Oper ations	Range	Description	By default
10284	RW	2147400000	Lo input upper threshold (Hi inp) x100	
10285	RW	-2147400000	Hi input upper threshold (Hi inp) x100	9999999
10286	RW	2147400000	Lo output lower threshold (Lo inp) x100	
10287	RW	02000	Hi output lower threshold (Lo inp) x100	400
10288	RW		Lo output upper threshold (Hi inp) x100	
10289	RW	0/400. 2000	Hi output upper threshold (Hi inp) x100	2000
10290	RW	0.1	Analogue output operating mode 0 - 0 20mA, 1 - 4 20 mA	0
10291			reserved	
10292			reserved	
10293			reserved	
10294			reserved	
10295	RW	0, 0x20200x7A7A	name ASCII 2 and 1 characters	0x2020
10296	RW	0, 0x20200x7A7A	name ASCII 4 and 3 characters	0x2020
10297	RW	0, 0x20200x7A7A	name ASCII 6 and 5 characters	0x2020
10298	RW	0, 0x20200x7A7A	name ASCII 8 and 7 characters	0x2020
10299	RW	0, 0x20200x7A7A	name ASCII 10 and 9 characters	0x2020
10299	RW	0, 0x20200x7A7A	name ASCII 12 and 11 characters	0x2020 0x2020
10301	R	0, 0x20200x7A7A	Unit ASCII 2 and 1 characters	0x2020 0x2020
10302	R	0, 0x20200x7A7A	Unit ASCII 4 and 3 characters	0x2020
10302	R	0, 0x20200x7A7A	Unit ASCII 6 and 5 characters	0x2020 0x2020
10303	R	0, 0x20200x7A7A	Unit ASCII 8 and 7 characters	0x2020 0x2020
10304	ĸ	0, 0X20200X7A7A	Slot (X) Out 2 (Analogue output)	0X2020
1030510329			As registers 10280. 10304	
1030510329			Slot (X) Out 3 (Analogue output)	
1033010354	-		As registers 10280. 10304	
1033010354	-			
1035510379	-		Slot (X) Out 4 (Analogue output) As registers 10280. 10304	
1035510379				
1038010404			Slot (X) In 1 (binary input)	
1038010404			As registers 9430. 9454	
1040510429			Slot (X) In 2 (binary input)	
1040510429			As registers 9430. 9454	
10100 10151			Slot (X) In 3 (binary input)	
1043010454			As registers 9430. 9454	
10155 10170			Slot (X) In 4 (binary input)	
1045510479			As registers 9430. 9454	
			Slot (Y) Out 1 (Analogue output)	
1048010504			As registers 10280. 10304	
			Slot (Y) Out 2 (Analogue output)	
1050510529			As registers 10280. 10304	
			Slot (Y) Out 3 (Analogue output)	
1053010554			As registers 10280. 10304	
			Slot (Y) Out 4 (Analogue output)	
1055510579			As registers 10280. 10304	
			Slot (Y) In 1 (binary input)	
1058010604			As registers 9430. 9454	
			Slot (Y) In 2 (binary input)	
1060510629			As registers 9430. 9454	
			Slot (Y) In 3 (binary input)	
1063010654			As registers 9430. 9454	
			Slot (Y) In 4 (binary input)	
1065510679			As registers 9430. 9454	
4 x programm	nable m	easuring inputs modu	le	
			Slot (X) In 1 (universal input)	
10680	RW	019	Input type	0
			0 - +-10V, 1 – 010V,	
			2 - +-300mV, 3 – 0300mV,	

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Register address	Oper ations	Range	Description	By default
			4 - +-75mV, 5 – 075mV,	
			6 - +-40mA, 7 – 040mA,	
			8 – Pt100, 9 – Pt500, 10 – Pt1000,	
			11 – 04000 Ohm,	
			12 – TC J, 13 – TC K,	
			14 – TC N, 15 – TC E,	
			16 – TC T, 17 – TC S, 18 – TC R, 19 – TC B	
			Sensor connecting type	
			0 - 3 wire, 1 - 2 wire	
10681	RW	01	or	1
			Type of compensation	
			0 - automatic, 1 - manual	
			Wire resistance x100	
10682	RW	06000	or	0
			Compensation value x100	
10683	RW	-200200	Temperature offset x10	0
10684	RW	50600	Averaging time x10	5
10685	RW	01	Unit for TC and Pt sensors	0
		01	$0 - C^{\circ}$ degree, $1 - F^{\circ}$ degree	- V
10686	RW	-9999999999999999	Min Lo x10	-120
10687	RW		Min. Hi x10	120
10688	RW	-99999999999999	Max Lo x10	120
10689	RW	0000000.0000000	Max Hi x10	120
10690			reserved	
10691			reserved	
10692			reserved	
10693			reserved	
10694	DW		reserved	
10695	RW		name ASCII 2 and 1 characters	
10696	RW		name ASCII 4 and 3 characters	
10697	RW		name ASCII 6 and 5 characters	
10698	RW		name ASCII 8 and 7 characters	
10699	RW		name ASCII 10 and 9 characters	
10700	RW		name ASCII 12 and 11 characters	
10701 10702	R R		Unit ASCII 2 and 1 characters Unit ASCII 4 and 3 characters	
10702	R		Unit ASCI 4 and 5 characters	
10704	R		Unit ASCII 8 and 7 characters	
10704	ĸ		Slot (X) In 2 (universal input)	
1070510729			As registers 10680. 10704	
1070510729			Slot (X) In 3 (universal input)	
1073010754			As registers 10680. 10704	
1073010734			Slot (X) In 4 (universal input)	
1075510779	├		As registers 10680. 10704	
1073310778	├───┤		Slot (Y) In 1 (universal input)	
1078010804	├		As registers 10680. 10704	
1070010004	├───┤		Slot (Y) In 2 (universal input)	
1080510829	┝───┤		As registers 10680. 10704	
1000010028	┝───┤		Slot (Y) In 3 (universal input)	
1083010854	┝───┤		As registers 10680. 10704	
1000010004	├		Slot (Y) In 4 (universal input)	
10855 10970	╞────┤			
1085510879			As registers 10680. 10704	

Logical channels configuration registers

	nanneis	configuration re	gisters lac	le 21
Register address	Opera tions	Range	Description	By default
10900	RW	0x00000xFFFF	Enabling / disabling logic channels 1 16 bit 0 - 0 - channel 1 disabled, 1 - channel 1 enabled bit 1 - 0 - channel 2 disabled, 1 - channel 2 enabled	0xFFFF
			bit 15 - 0- channel 16 disabled, 1- channel 16 enabled Enabling / disabling logic channels 17 32 bit 16 - 0 - channel 17 disabled, 1 - channel 17 enabled	
10901	RW	0x00000xFFFF	bit 17 - 0- channel 18 disabled, 1- channel 18 enabled	0x0000
			bit 31 - 0- channel 32 disabled, 1- channel 32 enabled	
10902	10902 RW 0x00000xFFFF		Enabling / disabling logic channels 33 48 bit 32 - 0 - channel 33 disabled, 1 - channel 33 enabled bit 33 - 0- channel 34 disabled, 1- channel 34 enabled 	0x0000
			bit 47 - 0- channel 48 disabled, 1- channel 48 enabled	
10903	RW	0x00000x0FFF	Enabling / disabling logic channels 49 60 bit 48 - 0 - channel 49 disabled, 1 - channel 49 enabled bit 49 - 0- channel 50 disabled, 1- channel 50 enabled 	0x0000
			bit 59 - 0- channel 60 disabled, 1- channel 60 enabled	
Logical c	hannel 1		Courses to res	
			Source type 0 - Inputs	
10904	RW	06	 1 - Outputs 2 - Modbus Master 3 - Mathematical function 4 - From another channel 5- Scaling function 6 - Alarm function 	0
10905	10905 RW 02/9/19/59		Source selection range of changes: for Source type = 0 and 1 - the range of changes depends on the recorder hardware configuration $(0 \dots 2-12)$ for Source type = 2 - range of changes $(0 \dots 9)$ for Source type = 3 - range of changes $(0 \dots 27)$ for Source type = 4 - range of changes $(0 \dots 59)$ for Source type = 5 and 6 - range of changes $(0 \dots 19)$	0
10906	RW	09	Register selection when Source Type: 2 - Modbus master 0 - Register 1,, 9 - Register 10	0
10907 10908			reserved reserved	
Logical c	hannel 2			
109091			Range of modifications as in registers 1090410908	
Logical c				
109141			Range of modifications as in registers 1090410908	
Logical c				
109191			Range of modifications as in registers 1090410908	
Logical c 109241			Range of modifications as in registers 1090410908	
Logical c				
109291 Logical c	0933		Range of modifications as in registers 1090410908	
109341	0938		Range of modifications as in registers 1090410908	
Logical c 109391	hannel 8		Pango of modifications as in registers 10004 10008	
Logical c			Range of modifications as in registers 1090410908	
109441 Logical c	0948		Range of modifications as in registers 1090410908	
109491		•	Range of modifications as in registers 1090410908	

Logical channel 11	
1095410958	Range of modifications as in registers 1090410908
Logical channel 12	
1095910963	Range of modifications as in registers 1090410908
Logical channel 13	
1096410968	Range of modifications as in registers 1090410908
Logical channel 14	
1096910973	Range of modifications as in registers 1090410908
Logical channel 15	
1097410978	Range of modifications as in registers 1090410908
Logical channel 16	
1097910983	Range of modifications as in registers 1090410908
Logical channel 17	
1098410988	Range of modifications as in registers 1090410908
Logical channel 18	
1098910993	Range of modifications as in registers 1090410908
Logical channel 19	
1099410998	Range of modifications as in registers 1090410908
Logical channel 20	
1099911003	Range of modifications as in registers 1090410908
Logical channel 21	
1100411008	Range of modifications as in registers 1090410908
Logical channel 22	
1100911013	Range of modifications as in registers 1090410908
Logical channel 23	
1101411018	Range of modifications as in registers 1090410908
Logical channel 24	
1101911023	Range of modifications as in registers 1090410908
Logical channel 25	
1102411028	Range of modifications as in registers 1090410908
Logical channel 26	
1102911033	Range of modifications as in registers 1090410908
Logical channel 27	
1103411038	Range of modifications as in registers 1090410908
Logical channel 28	
1103911043	Range of modifications as in registers 1090410908
Logical channel 29	
1104411048	Range of modifications as in registers 1090410908
Logical channel 30	
1104911053	Range of modifications as in registers 1090410908
Logical channel 31	Denne of modifications on in mainteen 40004 40000
1105411058	Range of modifications as in registers 1090410908
Logical channel 32	Dense of modifications as in registers 10004 - 10000
1105911063	Range of modifications as in registers 1090410908
Logical channel 33	Dense of modifications as in registers 10004 - 10000
1106411068	Range of modifications as in registers 1090410908
Logical channel 34	Dense of modifications as in registers 10004 10000
1106911073	Range of modifications as in registers 1090410908
Logical channel 35	Dense of modifications as in registers 10004 - 10000
1107411078	Range of modifications as in registers 1090410908
Logical channel 36	Pango of modifications as in registers 10004 10000
1107911083	Range of modifications as in registers 1090410908
Logical channel 37	Pango of modifications as in registers 10004 10009
1108411088	Range of modifications as in registers 1090410908
Logical channel 38	Dense of modifications on its registers (0004, 40000
1108911093	Range of modifications as in registers 1090410908
Logical channel 39	Dense of modifications on its registers (0004, 40000
1109411098	Range of modifications as in registers 1090410908
Logical channel 40	Denne of modifications on in maintene 10001 - 10000
1109911103	Range of modifications as in registers 1090410908

Logical channel 41		
1110411108	Range of modifications as in registers 1090410908	
Logical channel 42		
1110911113	Range of modifications as in registers 1090410908	
Logical channel 43		
1111411118	Range of modifications as in registers 1090410908	
Logical channel 44		
1111911123	Range of modifications as in registers 1090410908	
Logical channel 45		
1112411128	Range of modifications as in registers 1090410908	
Logical channel 46		
1112911133	Range of modifications as in registers 1090410908	
Logical channel 47		
1113411138	Range of modifications as in registers 1090410908	
Logical channel 48		
1113911143	Range of modifications as in registers 1090410908	
Logical channel 49		
1114411148	Range of modifications as in registers 1090410908	
Logical channel 50		
1114911153	Range of modifications as in registers 1090410908	
Logical channel 51		
1115411158	Range of modifications as in registers 1090410908	
Logical channel 52		
1115911163	Range of modifications as in registers 1090410908	
Logical channel 53		
1116411168	Range of modifications as in registers 1090410908	
Logical channel 54		
1116911173	Range of modifications as in registers 1090410908	
Logical channel 55		
1117411178	Range of modifications as in registers 1090410908	
Logical channel 56		
1117911183	Range of modifications as in registers 1090410908	
Logical channel 57		
1118411188	Range of modifications as in registers 1090410908	
Logical channel 58		
1118911193	Range of modifications as in registers 1090410908	
Logical channel 59		
1119411198	Range of modifications as in registers 1090410908	
Logical channel 60		
1119911203	Range of modifications as in registers 1090410908	
Table. Configuration register	ers of "Mt" mathematical functions Table 22	
	Sufficient param	

Register address	Operat ions	Range	Description	Sufficient param. in the maths function. ● - yes ⊠- no		By default	
Mt 1	Mt 1			16	711	1228	
11300	RW	028	Type of mathematical function 0 - function disabled 1 28 - function number (see the list of functions)	•	•	•	0
11301	RW	01	Source type 0– From a logical channel X 1– Constant value of X	•	X	•	0
11302	RW	059	No of the logical channel X	•	X	•	0
11303	RW	-	Numerical value X Lo x10				
11304	RW	2147400000 2147400000	Numerical value X Hi x10	•	X	•	0
11305	RW	00xFFFF	List of logical channel 1. 16 bit 0 - 0 - logic channel 1 not selected, 1- channel logical 1 selected. bit 1 - 0 - logic channel 2 not selected, 1- channel		•	X	0

<u> </u>		[logical 2 colocted		1	1	
			logical 2 selected.				
			bit 15 - 0 - logic channel 16 not selected, 1- logic channel 16 selected				
11306	RW	00xFFFF	List of logical channel 17. 32 bit 16 - 0 - logic channel 17 not selected, 1- logic channel 17 selected bit 17 - 0 - logic channel 18 not selected, 1- logic channel 18 selected bit 31 - 0 - logic channel 32 not selected, 1- logic channel 32 selected	X	•	X	0
11307	RW	00xFFFF	List of logical channel 33. 48 bit 32 - 0 - logic channel 33 not selected, 1- logic channel 33 selected bit 33 - 0 - logic channel 34 not selected, 1- logic channel 34 selected bit 47 - 0 - logic channel 48 not selected, 1- logic channel 48 selected	X	•	X	0
11308	RW	00x0FFF	List of logical channel 49. 60 bit 48 - 0 - logic channel 49 not selected, 1- logic channel 49 selected bit 49 - 0 - logic channel 50 not selected, 1- logic channel 50 selected bit 59 - 0 - logic channel 60 not selected, 1- logic channel 60 selected	X	•	X	0
11309	RW	01	In the event of an error: 0 – include channel with error in calculations 1 - omit channel in calculations	\boxtimes	•	X	1
11310	RW	01	Source type 0– From a logical channel Y 1– Constant value of Y	\boxtimes	X	•	0
11311	RW	059	No of the logical channel Y	X	X	٠	0
11312	RW	-	Numerical value Y Lo x10				
11313	RW	2147400000 2147400000	Numerical value Y Hi x10	\boxtimes	X	•	0
11314	RW	-	Min. value to display Lo x10				
11315	RW	2147400000 2147400000	Min. value to display Hi x10	•	•	•	- 9999999 9
11316	RW	-	Max. value to display Lo x10				
11317	RW	2147400000 2147400000	Max. value to display Hi x10	•	•	•	999999 9
11318			reserved				
11319			reserved				
Mt 2							
113201	1339		Range of changes as in registers 11300 11319				
Mt 3	1350		Range of changes as in registers 11300 11319				
Mt 4	1008						
113601	1379		Range of changes as in registers 11300 11319		ļ		
Mt 5	1200						
113801 ⁻ Mt 6	1399		Range of changes as in registers 11300 11319				
114001	1419		Range of changes as in registers 11300 11319				
Mt 7	1.1.0.2				1	1	
114201	1439		Range of changes as in registers 11300 11319				
Mt 8							

1144011459	Range of changes as in registers 11300 11319		
Mt 9			
1146011479	Range of changes as in registers 11300 11319		
Mt 10			
1148011499	Range of changes as in registers 11300 11319		
Mt 11			
1150011519	Range of changes as in registers 11300 11319		
Mt 12			
1152011439	Range of changes as in registers 11300 11319		
Mt 13			
1154011459	Range of changes as in registers 11300 11319		
Mt 14			
1156011579	Range of changes as in registers 11300 11319		
Mt 15			
1158011599	Range of changes as in registers 11300 11319		
Mt 16		•	
1160011619	Range of changes as in registers 11300 11319		
Mt 17			
11620. 11639	Range of changes as in registers 11300 11319		
Mt 18			
1164011659	Range of changes as in registers 11300 11319		
Mt 19			
1166011679	Range of changes as in registers 11300 11319		
Mt 20		· · ·	
1168011699	Range of changes as in registers 11300 11319		
	· · · · · · · · · · · · · · · · · · ·		

Configuration registers of "Scal" scaling functions

Table 23

		j		
Register address	Operatio ns	Range	Description	By default
Scal 1	ĮĮ			
11800	RW	059	No of the logical channel	0
11801	-	-	reserved	
11802	-	_	reserved	
11803	-		reserved	
11804	RW	220	Number of points of multi-points characteristics	0
11805	RW	-2147400000 	Input value 1 Lo x10	0
11806	RW	2147400000	Input value 1 Hi x10	
11807	RW	-2147400000 	Output value 1 Lo x10	0
11808	RW	2147400000	Output value 1 Hi x10	
11809	RW	-2147400000	Input value 2 Lo x10	10
11810	RW	2147400000	Input value 2 Hi x10	
11811	RW	-2147400000	Output value 2 Lo x10	
11812	RW	 2147400000	Output value 2 Hi x10	10
11813	RW	-2147400000 	Input value 3 Lo x10	0
11814	RW	2147400000	Input value 3 Hi x10	
11815	RW	-2147400000 	Output value 3 Lo x10	0
11816	RW	2147400000	Output value 3 Hi x10	
11817	RW	-2147400000 	Input value 4 Lo x10	0
11818	RW	2147400000	Input value 4 Hi x10	

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$\begin{array}{c c c c c c c c c c c c c c c c c c c $	11819 R		0447400000		
11821 RW -2147400000 Jought value 5 Lo x10 0 11821 RW -2147400000 Input value 5 Lo x10 0 11822 RW -2147400000 Output value 5 Lo x10 0 11823 RW -2147400000 Output value 5 Lo x10 0 11824 RW -2147400000 Output value 6 Lo x10 0 11825 RW -2147400000 Input value 6 Lo x10 0 11826 RW -2147400000 Output value 6 Lo x10 0 11827 RW -2147400000 Output value 6 Lo x10 0 11828 RW -2147400000 Output value 7 Lo x10 0 11828 RW -2147400000 Output value 7 Lo x10 0 11831 RW -2147400000 Output value 7 Lo x10 0 11833 RW -2147400000 Output value 8 Lo x10 0 11834 RW -2147400000 Input value 8 Lo x10 0 11835 RW -2147400000 Output value 9 Lo		RW	-2147400000	Output value 4 Lo x10	0
Inst. Input value 5 L0 X10 0 11822 RW 2147400000 Input value 5 Hi x10 0 11824 RW 2147400000 Output value 5 Lo x10 0 11824 RW 2147400000 Input value 5 Lo x10 0 11825 RW 2147400000 Input value 6 Lo x10 0 11826 RW 2147400000 Input value 6 Lo x10 0 11827 RW -2147400000 Output value 6 Lo x10 0 11828 RW -2147400000 Output value 6 Lo x10 0 11828 RW -2147400000 Input value 7 Lo x10 0 11829 RW -2147400000 Input value 7 Lo x10 0 11828 RW -2147400000 Output value 7 Lo x10 0 11829 RW -2147400000 Output value 7 Lo x10 0 11831 RW -2147400000 Output value 8 Lo x10 0 11833 RW -2147400000 Input value 8 Hi x10 0 <td< td=""><td>11820 R</td><td>RW</td><td>2147400000</td><td>Output value 4 Hi x10</td><td></td></td<>	11820 R	RW	2147400000	Output value 4 Hi x10	
11822 RW 2147400000 Input value 5 Hi x10 11823 RW -2147400000 Output value 5 Lo x10 0 11824 RW 2147400000 Output value 5 Hi x10 0 11825 RW -2147400000 Input value 6 Lo x10 0 11826 RW -2147400000 Input value 6 Lo x10 0 11827 RW -2147400000 Output value 6 Hi x10 0 11828 RW -2147400000 Output value 6 Hi x10 0 11828 RW -2147400000 Input value 7 Lo x10 0 11830 RW -2147400000 Input value 7 Lo x10 0 11831 RW -2147400000 Output value 7 Lo x10 0 11833 RW -2147400000 Input value 8 Lo x10 0 11835 RW -2147400000 Input value 8 Lo x10 0 11838 RW -2147400000 Input value 9 Lo x10 0 11838 RW -2147400000 Input value 9 Lo x10 0 <td>11821 R</td> <td>W</td> <td>-2147400000</td> <td>Input value 5 Lo x10</td> <td>0</td>	11821 R	W	-2147400000	Input value 5 Lo x10	0
ITR23 RW Cluput value 5 bit 10 0 11824 RW 2147400000 Output value 5 bit 10 0 11825 RW -2147400000 Input value 6 Lo x10 0 11826 RW 2147400000 Input value 6 Lo x10 0 11827 RW -2147400000 Output value 6 Hi x10 0 11828 RW -2147400000 Output value 6 Hi x10 0 11828 RW -2147400000 Input value 7 Lo x10 0 11828 RW -2147400000 Input value 7 Lo x10 0 11838 RW -2147400000 Output value 7 Lo x10 0 11838 RW -2147400000 Input value 7 Lo x10 0 11838 RW -2147400000 Input value 8 Lo x10 0 11838 RW -2147400000 Input value 9 Lo x10 0 11838 RW -2147400000 Input value 9 Lo x10 0 11840 RW -2147400000 Input value 9 Lo x10 0 <td>11822 R</td> <td>RW</td> <td>2147400000</td> <td>Input value 5 Hi x10</td> <td>. 0</td>	11822 R	RW	2147400000	Input value 5 Hi x10	. 0
I1824 RW -2147400000 Input value 6 In x10 0 11825 RW 2147400000 Input value 6 In x10 0 11826 RW 2147400000 Output value 6 In x10 0 11827 RW -2147400000 Output value 6 In x10 0 11828 RW 2147400000 Output value 6 In x10 0 11828 RW 2147400000 Input value 7 Lo x10 0 11830 RW -2147400000 Output value 7 Lo x10 0 11831 RW -2147400000 Output value 7 Lo x10 0 11832 RW 2147400000 Input value 8 Lo x10 0 11833 RW -2147400000 Input value 8 Lo x10 0 11835 RW -2147400000 Input value 8 Lo x10 0 11835 RW -2147400000 Input value 9 Lo x10 0 11838 RW -2147400000 Input value 9 Lo x10 0 11840 RW -2147400000 Input value 9 Lo x10	11823 R	RW		Output value 5 Lo x10	0
I1825 RW 2147400000 Input value 6 D x10 0 11826 RW 2147400000 Output value 6 Hi x10 0 11827 RW -2147400000 Output value 6 Hi x10 0 11828 RW 2147400000 Input value 6 Hi x10 0 11829 RW -2147400000 Input value 7 Lo x10 0 11830 RW -2147400000 Input value 7 Lo x10 0 11831 RW -2147400000 Output value 7 Lo x10 0 11833 RW -2147400000 Input value 7 Lo x10 0 11834 RW 2147400000 Input value 8 Lo x10 0 11835 RW -2147400000 Input value 8 Lo x10 0 11836 RW -2147400000 Input value 8 Lo x10 0 11837 RW -2147400000 Input value 9 Lo x10 0 11838 RW -2147400000 Input value 9 Lo x10 0 11840 RW 2147400000 Input value 9 Lo x10	11824 R	RW	2147400000	Output value 5 Hi x10	
I1320 RW -214740000 Output value 6 In X10 0 11827 RW 2147400000 Output value 6 In X10 0 11828 RW 2147400000 Input value 7 Lo x10 0 11830 RW 2147400000 Input value 7 Lo x10 0 11830 RW 2147400000 Input value 7 Lo x10 0 11831 RW -2147400000 Output value 7 Hi x10 0 11832 RW 2147400000 Output value 7 Lo x10 0 11833 RW -2147400000 Output value 7 Lo x10 0 11833 RW 2147400000 Input value 8 Lo x10 0 11835 RW -2147400000 Output value 8 Lo x10 0 11836 RW -2147400000 Input value 8 Lo x10 0 11837 RW -2147400000 Input value 9 Lo x10 0 11838 RW -2147400000 Output value 9 Lo x10 0 11840 RW 2147400000 Output value 9 Lo x10	11825 R	RW	-2147400000 	Input value 6 Lo x10	0
1182/ RW 214740000 Output value 6 L3 x10 0 11828 RW 214740000 Input value 7 Lo x10 0 11829 RW -2147400000 Input value 7 Lo x10 0 11830 RW 2147400000 Input value 7 Lo x10 0 11831 RW -2147400000 Output value 7 Lo x10 0 11832 RW 2147400000 Output value 7 Hi x10 0 11833 RW -2147400000 Output value 8 Lo x10 0 11834 RW 2147400000 Input value 8 Lo x10 0 11835 RW -2147400000 Output value 8 Lo x10 0 11836 RW 2147400000 Output value 8 Lo x10 0 11837 RW -2147400000 Output value 9 Lo x10 0 11838 RW -2147400000 Output value 9 Lo x10 0 11840 RW 2147400000 Output value 9 Lo x10 0 11841 RW -2147400000 Input value 10 Lo x10	11826 R	RW	2147400000	Input value 6 Hi x10	
11820 NW -214740000 Input value 7 Lo x10 0 11830 RW 214740000 Input value 7 Lo x10 0 11831 RW -2147400000 Output value 7 Hi x10 0 11831 RW -2147400000 Output value 7 Hi x10 0 11832 RW 2147400000 Output value 7 Lo x10 0 11833 RW -2147400000 Input value 8 Lo x10 0 11834 RW 2147400000 Input value 8 Hi x10 0 11835 RW -2147400000 Output value 8 Lo x10 0 11836 RW 2147400000 Output value 8 Lo x10 0 11837 RW -2147400000 Input value 9 Lo x10 0 11838 RW 2147400000 Input value 9 Lo x10 0 11840 RW 2147400000 Input value 9 Lo x10 0 11841 RW -2147400000 Input value 10 Lo x10 0 11842 RW 2147400000 Input value 10 Lo x10	11827 R	RW		Output value 6 Lo x10	0
Inses RW Input value 7 Di X00 0 11830 RW 214740000 Input value 7 Hi x10 0 11831 RW -214740000 Output value 7 Hi x10 0 11832 RW 214740000 Output value 7 Hi x10 0 11833 RW -214740000 Input value 7 Hi x10 0 11833 RW -214740000 Input value 8 Lo x10 0 11834 RW 214740000 Input value 8 Hi x10 0 11835 RW 214740000 Output value 8 Hi x10 0 11836 RW 214740000 Output value 8 Hi x10 0 11837 RW -214740000 Input value 9 Lo x10 0 11838 RW 214740000 Input value 9 Lo x10 0 0 11840 RW 214740000 Output value 9 Hi x10 0 0 11841 RW -2147400000 Input value 9 Lo x10 0 0 11842 RW 2147400000 Input value 1	11828 R	RW	2147400000	Output value 6 Hi x10	
11030 NW -2147400000 Output value 7 In X10 0 11831 RW -2147400000 Output value 7 In X10 0 11832 RW 2147400000 Input value 7 Hi x10 0 11833 RW -2147400000 Input value 8 Lo x10 0 11834 RW 2147400000 Input value 8 Hi x10 0 11835 RW -2147400000 Output value 8 Hi x10 0 11836 RW 2147400000 Output value 8 Hi x10 0 11836 RW -2147400000 Input value 9 Lo x10 0 11837 RW -2147400000 Input value 9 Lo x10 0 11838 RW -2147400000 Input value 9 Lo x10 0 11840 RW -2147400000 Output value 9 Hi x10 0 11841 RW -2147400000 Input value 9 Lo x10 0 11842 RW -2147400000 Input value 10 Lo x10 0 11843 RW -2147400000 Min. value for display L	11829 R	RW		Input value 7 Lo x10	0
11831 RW 214740000 Output value 7 t5 x10 0 11832 RW 214740000 Output value 7 Hi x10 0 11833 RW -214740000 Input value 8 Lo x10 0 11834 RW 214740000 Input value 8 Hi x10 0 11835 RW -214740000 Output value 8 Lo x10 0 11836 RW 214740000 Output value 8 Lo x10 0 11836 RW -214740000 Output value 9 Lo x10 0 11837 RW -214740000 Input value 9 Lo x10 0 11838 RW 214740000 Output value 9 Lo x10 0 11839 RW -214740000 Output value 9 Lo x10 0 11840 RW 214740000 Output value 9 Lo x10 0 11841 RW -2147400000 Input value 10 Lo x10 0 11842 RW 2147400000 Output value 10 Lo x10 0 11844 RW 2147400000 Min. value for display Lo x10	11830 R	RW	2147400000	Input value 7 Hi x10	
11802 NW -214740000 Input value 8 Lo x10 0 11833 RW -214740000 Input value 8 Lo x10 0 11834 RW 214740000 Input value 8 Hi x10 0 11835 RW -2147400000 Output value 8 Lo x10 0 11836 RW 2147400000 Output value 8 Lo x10 0 11836 RW 2147400000 Input value 9 Lo x10 0 11837 RW -2147400000 Input value 9 Lo x10 0 11838 RW 2147400000 Input value 9 Lo x10 0 11839 RW -2147400000 Output value 9 Lo x10 0 11840 RW 2147400000 Input value 9 Lo x10 0 11841 RW -2147400000 Input value 10 Lo x10 0 11842 RW -2147400000 Input value 10 Lo x10 0 11843 RW -2147400000 Min. value 10 Lo x10 0 11844 RW 21474000000 Min. value for display Lo x10<	11831 R	w		Output value 7 Lo x10	0
Instant RW Implu value 8 to x10 0 11834 RW 2147400000 Input value 8 Hi x10 0 11835 RW -2147400000 Output value 8 Lo x10 0 11836 RW -2147400000 Output value 8 Lo x10 0 11836 RW -2147400000 Output value 8 Lo x10 0 11837 RW -2147400000 Input value 9 Lo x10 0 11838 RW 2147400000 Input value 9 Lo x10 0 11838 RW -2147400000 Output value 9 Lo x10 0 11840 RW -2147400000 Output value 9 Lo x10 0 11840 RW -2147400000 Input value 9 Lo x10 0 11841 RW -2147400000 Input value 10 Lo x10 0 11842 RW -2147400000 Output value 10 Lo x10 0 11843 RW -2147400000 Min. value for display Lo x10 -9999999 11844 RW 2147400000 Min. value for display Hi x10 <td>11832 R</td> <td>RW</td> <td>2147400000</td> <td>Output value 7 Hi x10</td> <td></td>	11832 R	RW	2147400000	Output value 7 Hi x10	
Index Implex value of In X10 Implex value of In X10 <tht< td=""><td>11833 R</td><td>RW</td><td></td><td>Input value 8 Lo x10</td><td>0</td></tht<>	11833 R	RW		Input value 8 Lo x10	0
Inssign RW 2147400000 Output value 8 Hi x10 0 11836 RW 2147400000 Input value 8 Hi x10 0 11837 RW -2147400000 Input value 9 Lo x10 0 11838 RW 2147400000 Input value 9 Lo x10 0 11838 RW -2147400000 Output value 9 Lo x10 0 11839 RW -2147400000 Output value 9 Lo x10 0 11840 RW 2147400000 Output value 9 Lo x10 0 11840 RW 2147400000 Input value 9 Lo x10 0 11841 RW -2147400000 Input value 10 Lo x10 0 11842 RW -2147400000 Output value 10 Lo x10 0 11843 RW -2147400000 Output value 10 Lo x10 0 11843 RW -2147400000 Output value 10 Lo x10 0 11844 RW 2147400000 Min. value for display Lo x10 -9999999 11845 RW -2147400000 Max	11834 R	RW	2147400000	Input value 8 Hi x10	
11830 RW -214740000 Input value 9 Lo x10 0 11837 RW -214740000 Input value 9 Lo x10 0 11838 RW 214740000 Input value 9 Lo x10 0 11839 RW -214740000 Output value 9 Lo x10 0 11839 RW 214740000 Output value 9 Lo x10 0 11840 RW 214740000 Output value 9 Hi x10 0 11841 RW -214740000 Input value 9 Lo x10 0 11842 RW 214740000 Input value 10 Lo x10 0 11842 RW 214740000 Output value 10 Lo x10 0 11843 RW -2147400000 Output value 10 Lo x10 0 11844 RW 2147400000 Min. value for display Lo x10 -99999999 11845 RW -2147400000 Min. value for display Lo x10 -99999999 11846 RW 2147400000 Max value to display Lo x10 99999999 11847 RW -2147400000	11835 R	RW		Output value 8 Lo x10	0
11837 RW 214740000 Input value 9 Lo x10 0 11838 RW 2147400000 Input value 9 Hi x10 0 11839 RW -2147400000 Output value 9 Lo x10 0 11840 RW 2147400000 Output value 9 Hi x10 0 11840 RW 2147400000 Output value 9 Hi x10 0 11841 RW -2147400000 Input value 10 Lo x10 0 11842 RW 2147400000 Input value 10 Lo x10 0 11842 RW 2147400000 Output value 10 Lo x10 0 11843 RW -2147400000 Output value 10 Lo x10 0 11843 RW 2147400000 Min. value 10 Lo x10 0 11845 RW -2147400000 Min. value for display Lo x10 -9999999 11846 RW 2147400000 Max value to display Lo x10 -9999999 11847 RW -2147400000 Max value to display Lo x10 9999999 11848 RW 0,0x2020	11836 R	RW	2147400000	Output value 8 Hi x10	
11838 RW -2147400000 Output value 9 Hi x10 0 11839 RW -2147400000 Output value 9 Lo x10 0 11840 RW 2147400000 Output value 9 Hi x10 0 11840 RW -2147400000 Input value 9 Lo x10 0 11841 RW -2147400000 Input value 10 Lo x10 0 11842 RW -2147400000 Input value 10 Lo x10 0 11843 RW -2147400000 Output value 10 Lo x10 0 11844 RW 2147400000 Output value 10 Lo x10 0 11845 RW -2147400000 Output value 10 Lo x10 0 11845 RW -2147400000 Min. value for display Lo x10 -99999999 11846 RW 2147400000 Max value to display Lo x10 -99999999 11847 RW -2147400000 Max value to display Lo x10 9999999 11848 RW 2147400000 Max value to display Hi x10 0.0x2020 11849 RW	11837 R	RW		Input value 9 Lo x10	0
11839 RW 214740000 Output value 9 Hi x10 0 11840 RW 214740000 Input value 9 Hi x10 0 11841 RW -214740000 Input value 10 Lo x10 0 11842 RW 2147700000 Input value 10 Lo x10 0 11842 RW 2147400000 Output value 10 Lo x10 0 11843 RW -2147400000 Output value 10 Lo x10 0 11844 RW 2147400000 Output value 10 Lo x10 0 11844 RW 2147400000 Min. value 10 Lo x10 0 11845 RW -2147400000 Min. value for display Lo x10 -99999999 11846 RW 2147400000 Max value for display Lo x10 -99999999 11847 RW -2147400000 Max value to display Lo x10 99999999 11848 RW 2147400000 Max value to display Hi x10 0x2020 11849 RW -0,0x2020 Unit ASCII 2 and 1 characters 0x2020	11838 R	RW	2147400000	Input value 9 Hi x10	
11010 RW -2147400000 Input value 0 Hi X10 0 11841 RW -2147400000 Input value 10 Lo x10 0 11842 RW 2147400000 Input value 10 Lo x10 0 11843 RW -2147400000 Output value 10 Lo x10 0 11843 RW -2147400000 Output value 10 Lo x10 0 11844 RW 2147400000 Output value 10 Lo x10 0 11845 RW -2147400000 Min. value for display Lo x10 -99999999 11846 RW 2147400000 Min. value for display Lo x10 -99999999 11847 RW -2147400000 Max value to display Lo x10 99999999 11848 RW 0,0x2020 Max value to display Lo x10 99999999 11848 RW 0,0x2020 Unit ASCII 2 and 1 characters 0x2020 11849 RW 0,0x2020 Unit ASCII 2 and 1 characters 0x2020	11839 R	RW		Output value 9 Lo x10	0
11841 RW 214740000 Input value 10 L0 X10 0 11842 RW 214740000 Input value 10 Hi x10 0 11843 RW -214740000 Output value 10 Lo x10 0 11844 RW 214740000 Output value 10 Lo x10 0 11844 RW 214740000 Min. value 10 Lo x10 0 11845 RW -214740000 Min. value for display Lo x10 -9999999 11846 RW 214740000 Min. value for display Hi x10 -9999999 11847 RW -214740000 Max value to display Lo x10 9999999 11848 RW 214740000 Max value to display Lo x10 99999999 11848 RW 0,0x2020 Unit ASCII 2 and 1 characters 0x2020 11849 RW 0,0x2020 Unit ASCII 2 and 1 characters 0x2020	11840 R	RW	2147400000	Output value 9 Hi x10	
11842 RW -2147400000 2147400000 Output value 10 Lo x10 0 11843 RW -2147400000 Output value 10 Lo x10 0 11844 RW 2147400000 Output value 10 Hi x10 0 11845 RW -2147400000 Min. value for display Lo x10 -99999999 11846 RW 2147400000 Min. value for display Hi x10 -99999999 11846 RW -2147400000 Max value to display Lo x10 -99999999 11847 RW -2147400000 Max value to display Lo x10 99999999 11848 RW 0,0x2020 Max value to display Hi x10 0x2020 11849 RW 0,0x2020 Unit ASCII 2 and 1 characters 0x2020	11841 R	RW		Input value 10 Lo x10	0
11843 RW Output value 10 L0 x 10 0 11844 RW 2147400000 Output value 10 Hi x10 0 11844 RW -2147400000 Min. value for display Lo x10 -99999999 11846 RW 2147400000 Min. value for display Lo x10 -99999999 11846 RW 2147400000 Max value for display Lo x10 99999999 11847 RW -2147400000 Max value to display Lo x10 99999999 11848 RW 0,0x2020 Max value to display Hi x10 0x2020 11849 RW 0,0x2020 Unit ASCII 2 and 1 characters 0x2020 0,0x2020 0,0x2020 0x2020 0x2020 0x2020	11842 R	RW	2147400000	Input value 10 Hi x10	
11044 11044 <th< td=""><td>11843 R</td><td>RW</td><td></td><td>Output value 10 Lo x10</td><td>0</td></th<>	11843 R	RW		Output value 10 Lo x10	0
Instant RW Instant Instant <thinstant< th=""> <thinstant< th=""> <thinstan< td=""><td>11844 R</td><td>RW</td><td>2147400000</td><td>Output value 10 Hi x10</td><td></td></thinstan<></thinstant<></thinstant<>	11844 R	RW	2147400000	Output value 10 Hi x10	
11847 RW -2147400000 Max value to display Lo x10 9999999 11848 RW 2147400000 Max value to display Hi x10 9099999 11849 RW 0,0x2020 Unit ASCII 2 and 1 characters 0x2020 0,0x2020 0,0x2020 0x7A7A 0x2020 0x2020	11845 R	RW		Min. value for display Lo x10	-9999999
11847 RW Max value to display L0 x10 9999999 11848 RW 214740000 Max value to display Hi x10 9999999 11849 RW 0,0x2020 Unit ASCII 2 and 1 characters 0x2020 0,0x2020 0,0x2020 0x2020 0x2020 0x2020	11846 R	RW	2147400000	Min. value for display Hi x10	
11848 RW Max value to display H1x10 11849 RW 0,0x2020 0x7A7A Unit ASCII 2 and 1 characters 0x2020 0,0x2020 0,0x2020 0x2020	11847 R	RW		Max value to display Lo x10	9999999
11849 RW Unit ASCII 2 and 1 characters 0x2020 0x7A7A 0,0x2020 0 <td< td=""><td>11848 R</td><td>RW</td><td></td><td>Max value to display Hi x10</td><td></td></td<>	11848 R	RW		Max value to display Hi x10	
0,0x2020	11849 R	RW		Unit ASCII 2 and 1 characters	0x2020
	11850 R	RW	0,0x2020	Unit ASCII 4 and 3 characters	0x2020

		0,0x2020		
11851	RW	0,02020	Unit ASCII 6 and 5 characters	0x2020
		0x7A7A		
		0,0x2020		
11852	RW		Unit ASCII 8 and 7 characters	0x2020
		0x7A7A		
11853			reserved	
11854			reserved	
11855			reserved	
11856			reserved	
11857			reserved	
11858			reserved	
11859			reserved	
Scal 2	1010			
118601	1919		Range of changes as in registers 11800 11859	
Scal 3	1070		Dense of changes as in registers 11000 11050	
119201 ²	1979		Range of changes as in registers 11800 11859	
Scal 4	2020			
1198012	2039		Range of changes as in registers 11800 11859	
Scal 5	2000		Dense of changes on in registers 11000 11050	
Scal 6	2099		Range of changes as in registers 11800 11859	
1210012	2150		Range of changes as in registers 11800 11859	
Scal 7	2109		Range of changes as in registers 11000 11039	
1216012	2210		Range of changes as in registers 11800 11859	
Scal 8	2219			
1222012	2279		Range of changes as in registers 11800 11859	
Scal 9	2275			
1228012	2339		Range of changes as in registers 11800 11859	
Scal 10	-000			
1234012	2399		Range of changes as in registers 11800 11859	
Scal 11				
1240012	2459		Range of changes as in registers 11800 11859	
Scal 12				
1246012	2519		Range of changes as in registers 11800 11859	
Scal 13				
1252012	2579		Range of changes as in registers 11800 11859	
Scal 14				
1258012	2639		Range of changes as in registers 11800 11859	
Scal 15				
1264012	2699		Range of changes as in registers 11800 11859	
Scal 16				
1270012	2759		Range of changes as in registers 11800 11859	
Scal 17				
1276012	2819		Range of changes as in registers 11800 11859	
Scal 18				
1282012	2879		Range of changes as in registers 11800 11859	
Scal 19				
1288012	2939		Range of changes as in registers 11800 11859	
Scal 20				
1294012	2999		Range of changes as in registers 11800 11859	

Table: C	Table: Configuration registers of "Alarm" alarm functions Tab		ole 24	
Register address		Range	Description	By default
Alarm 1				
13800	RW	059	Channel no	0
13801	RW	02	Alarm state in case of error (Err, Hi, Lo) 0- no changes	2

			1 - alarm activated 2 - alarm disabled	
			Alarm type	
			0 - manually disabled	
12002	RW	0 5	1 - manually enabled	0
13802	RW	05	3 - active below the Lo threshold	0
			4 - active above the Hi threshold	
			5 - active between Lo Hi thresholds	
13803	RW	-2147400000	6 - active outside Lo Hi thresholds Lower threshold Lo x10	
13003		-2147400000		0
13804	RW	2147400000	Lower threshold Hi x10	0
13805	RW	-2147400000	Upper threshold Lo x10	
13806	RW	 2147400000	Upper threshold Hi x10	0
13807	RW	065000	Hysteresis x10	0
13808	RW	065000 s	Alarm activation delay	0
13809	RW	065000 s	Alarm de-activation delay	0
13810	RW	065000 s	Minimum alarm activation time	0
13811	RW	065000 s	Minimum alarm de-activation time	0
			Alarm latching	-
13812	RW	01	0- disabled	0
10012		0	1- enabled	Ũ
			Maintaining the alarm signalling on the display / in status	
13813	RW	01	0 - disabled	0
10010		0	1- enabled	Ũ
			Clearing the alarm / alarm support	
13814	RW	01	0 - no reaction	0
			1- clearing	-
Alarm 2	1			
138151	3829		Range of changes as in registers 13000 13014	
Alarm 3				
138301	3844		Range of changes as in registers 13000 13014	
Alarm 4				
138451	3859		Range of changes as in registers 13000 13014	
Alarm 5				
138601	3874		Range of changes as in registers 13000 13014	
Alarm 6				
138751	3889		Range of changes as in registers 13000 13014	
Alarm 7				
138901	3904		Range of changes as in registers 13000 13014	
Alarm 8				
139051	3919		Range of changes as in registers 13000 13014	
Alarm 9	2024		Dense of changes as is registers (2000) (2001)	
139201 Alarm 10			Range of changes as in registers 13000 13014	
139351			Range of changes as in registers 13000 13014	
Alarm 11				
Alarm 11 139501			Range of changes as in registers 13000 13014	
Alarm 12				
139651			Range of changes as in registers 13000 13014	
Alarm 13				
139801			Range of changes as in registers 13000 13014	
Alarm 14				
139951			Range of changes as in registers 13000 13014	
Alarm 15				
140101			Range of changes as in registers 13000 13014	
Alarm 16				
140251			Range of changes as in registers 13000 13014	
Alarm 17				
140401			Range of changes as in registers 13000 13014	
				• •

Alarm 18		
1405514069	Range of changes as in registers 13000 13014	
Alarm 19		
1407014084	Range of changes as in registers 13000 13014	
Alarm 20		
1408514099	Range of changes as in registers 13000 13014	

Registers with inputs/outputs measurement values

		ts/outputs me	asurement values	Table 25
Register	Operatio	Range	Description	By default
address	ns	i tango		Dy doldan
Slot(7)				
Slot (Z)		0.4	Clot (Z) Out1	
14300	R	0.1	Slot (Z) Out1	
14302	R	0.1	Slot (Z) Out2	
14304	R	0.1	Slot (Z) In1	
14306	R	0.1	Slot (Z) In2	
	outputs mo			
14308	R	0.1	Slot (X) Out 1	
14310	R	0.1	Slot (X) Out 2	
14312	R	0.1	Slot (X) Out 3	
14314	R	0.1	Slot (X) Out 4	
14316	R	0.1	Slot (X) Out 5	
14318	R	0.1	Slot (X) Out 6	
14320	R	0.1	Slot (X) Out 1	
			ry inputs separated from each others	
14322	R	0.1	Slot (X) Out 2	
14324	R	0.1	Slot (X) Out 3	
14326	R	0.1	Slot (X) Out 4	
14328	R	0.1	Slot (X) In 1	
14330	R	0.1	Slot (X) In 2	
14332	R	0.1	Slot (X) In 3	
14334	R	0.1	Slot (X) In 4	
			inary inputs with common ground	
14336	R	0. 22000	Slot (X) Out 1 (current) (mA x 1000)	
14338	R	0. 22000	Slot (X) Out 2 (current) (mA x 1000)	
14340	R	0. 22000	Slot (X) Out 3 (current) (mA x 1000)	
14342	R	0. 22000	Slot (X) Out 4 (current) (mA x 1000)	
14344	R	0.1	Slot (X) In 1	
14346	R	0.1	Slot (X) In 2	
14348	R	0.1	Slot (X) In 3	
14350	R	0.1	Slot (X) In 4	
		neasuring input		
14352	R		Slot (X) In 1(measurement value)	
14354	R		Slot (X) In 2(measurement value)	
14356	R		Slot (X) In 3(measurement value)	
14358	R		Slot (X) In 4(measurement value)	
	outputs mo			
14360	R	0.1	Slot (Y) Out 1	
14362	R	0.1	Slot (Y) Out 2	
14364	R	0.1	Slot (Y) Out 3	
14366	R	0.1	Slot (Y) Out 4	
14368	R	0.1	Slot (Y) Out 5	
14370	R	0.1	Slot (Y) Out 6	
			ry inputs separated from each other's	
14372	R	0.1	Slot (Y) Out 1	
14374	R	0.1	Slot (Y) Out 2	
14376	R	0.1	Slot (Y) Out 3	
14378	R	0.1	Slot (Y) Out 4	

Register address	Operatio ns	Range	Description	By default
14380	R	0.1	Slot (Y) In 1	
14382	R	0.1	Slot (Y) In 2	
14384	R	0.1	Slot (Y) In 3	
14386	R	0.1	Slot (Y) In 4	
4 x analogu	le output	module + 4 x binary	inputs with common ground	
14388	R	022000	Slot (Y) Out 1 (current) (mA x 1000)	
14390	R	022000	Slot (Y) Out 2 (current) (mA x 1000)	
14392	R	022000	Slot (Y) Out 3 (current) (mA x 1000)	
14394	R	022000	Slot (Y) Out 4 (current) (mA x 1000)	
14396	R	0.1	Slot (Y) In 1	
14398	R	0.1	Slot (Y) In 2	
14400	R	0.1	Slot (Y) In 3	
14402	R	0.1	Slot (Y) In 4	
4 x progran	nmable m	neasuring inputs mo	dule	
14404	R		Slot (Y) In 1(measurement value)	
14406	R		Slot (Y) In 2(measurement value)	
14408	R		Slot (Y) In 3(measurement value)	
14410	R		Slot (Y) In 4(measurement value)	

Registers with ch	hannels measurei	ment values
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	with channels r	neasurement values	Table 26
Register address	Operations	Description	By default
14500	R	Value from channel 1	
14502	R	Value from channel 2	
14504	R	Value from channel 3	
14506	R	Value from channel 4	
14508	R	Value from channel 5	
14510	R	Value from channel 6	
14512	R	Value from channel 7	
14514	R	Value from channel 8	
14516	R	Value from channel 9	
14518	R	Value from channel 10	
14520	R	Value from channel 11	
14522	R	Value from channel 12	
14524	R	Value from channel 13	
14526	R	Value from channel 14	
14528	R	Value from channel 15	
14530	R	Value from channel 16	
14532	R	Value from channel 17	
14534	R	Value from channel 18	
14536	R	Value from channel 19	
14538	R	Value from channel 20	
14540	R	Value from channel 21	
14542	R	Value from channel 22	
14544	R	Value from channel 23	
14546	R	Value from channel 24	
14548	R	Value from channel 25	
14550	R	Value from channel 26	
14552	R	Value from channel 27	
14554	R	Value from channel 28	
14556	R	Value from channel 29	
14558	R	Value from channel 30	
14560	R	Value from channel 31	
14562	R	Value from channel 32	
14564	R	Value from channel 33	
14566	R	Value from channel 34	
14568	R	Value from channel 35	
14570	R	Value from channel 36	

Register address	Operations	Description	By default
14572	R	Value from channel 37	
14574	R	Value from channel 38	
14576	R	Value from channel 39	
14578	R	Value from channel 40	
14580	R	Value from channel 41	
14582	R	Value from channel 42	
14584	R	Value from channel 43	
14586	R	Value from channel 44	
14588	R	Value from channel 45	
14590	R	Value from channel 46	
14592	R	Value from channel 47	
14594	R	Value from channel 48	
14596	R	Value from channel 49	
14598	R	Value from channel 50	
14600	R	Value from channel 51	
14602	R	Value from channel 52	
14604	R	Value from channel 53	
14606	R	Value from channel 54	
14608	R	Value from channel 55	
14610	R	Value from channel 56	
14612	R	Value from channel 57	
14614	R	Value from channel 58	
14616	R	Value from channel 59	
14618	R	Value from channel 60	

10 Technical data

Table 27.

Sensor type/ Input signal		Standard	Range		Basic error	
RTD	PT100		-200850 °C	-3281562 °F	0.2%	
	PT500	PN-EN 60751:2009	-200850 °C	-328…1562 °F	0.2%	
	PT1000		-200850 °C	-328…1562 °F	0.2%	
Fe-CuNi (J)			-100 1200°C	-1482192 °F	0.2%	
Cu-CuNi (T)			-100 400°C	-148752 °F	0.2%	
NiCr-NiAl (K)			-100 1370°C	-1482498 °F	0.2%	
PtRh10-Pt (S)		PN-EN 60584-1:2014	-5 1760°C	233200 °F	0.2%	
PtRh13-Pt (R)			-5 1760°C	233200 °F	0.2%	
PtRh30-PtRh6 (B)			200 1820°C	00 1820°C 3923200 °F		
NiCr-CuNi (E)			-100 1000°C	-1481832 °F	0.2%	
NiCrSi-NiSi (N)			-100 1300°C	-1482372 °F	0.2%	
Voltage			±10000 mV, ±300 mV, ±75 mV, 10000 mV, 300 mV, 75 mV,		0.2%	
Current			±40 mA, 40 mA		0.2%	
Resistance R			04000 Ω		0.2%	

KD6-09	User's manual 7
Reading field	3.5 "TFT colour graphic screen with a resolution of 320 x 240 pixels
Power module	Power consumption
	\leq 12 VA
	Serial slave interface RS485
	Modbus RTU 8N2,8E1,8O1,8N1. Address 1247,
	baud rate 9.6, 19.2, 38.4, 57.6, 115.2 kbit / s,
	maximum time to start the response: 600 ms
	24V sensors power supply output
	24 V d.c. ±10% / max 30 mA
	2 inputs In1, In2 01 V d.c inactive binary input , 5 24 V d.c active binary input, power consumption: 7.5 mA / 24V
	Relay outputs Out1, Out2 2 programmable relays, normally open volt-free contacts, load capacity (resistance) 0.5 A / 250 V a.c. or 5 A / 30 V d.c. Number of switching: mechanical minimum 5× 10 ₆ electric minimum 1 x 10 ₅
Communication module	Ethernet 10/100 Base-T, RJ45 socket, Web server, FTP server, Modbus TCP / IP server, DHCP client, NTP client For optimal EMC protection, the Ethernet wire should be shielded and the shield grounded.
	USB Host : By using the USB Host interface, the user can copy files between the internal memory and the device connected to the USB Host
	RS485 master Modbus RTU 8N2,8E1,8O1,8N1. Address 1247, baud rate 9.6, 19.2, 38.4, 57.6, 115.2 kbit / s,
Optional I / O modules (slot X	, slot Y):
Relay outputs module	Out1 Out6 programmable relays, normally open volt-free contacts, load capacity (resistance) 0.5 A / 250 V a.c. or 5 A / 30 V d.c. Number of switching: mechanical minimum 5× 10 ⁶ electric minimum 1 x 10 ⁵
4 x relay outputs module + 4 x binary inputs separated from each other's	Out1 Out4 programmable relays, normally open volt-free contacts, load capacity (resistance) 0.5 A / 250 V a.c. or 5 A / 30 V d.c. Number of switching: mechanical minimum 5×10^{6} electric minimum 1 x 10 ⁵

	In1 In4					
	01 V d.c inactive binary input , 6 24					
	V d.c active binary input, power					
	consumption: 7.5 mA / 24V					
4 x analogue output module + 4 x binary inputs with common	Out1 Out4					
ground	0 20 mA (420mA) programmable. Load resistance \leq 400 Ω Available voltage 10 V. Basic error 0.2%.					
	In1 In4 01 V d.c inactive binary input , 6 24 V d.c active binary input, power consumption: 7.5 mA / 24V					
4 x universal inputs module /	In1 In4					
temperature, resistance, standard signals /	4 RTD universal inputs (PT100, PT500, PT1000),					
-	TC (J, T, K, S, R, B, E, N), voltage ±75 mV, ±300 mV, ±10 V					
	current ±40 mA, Resistance R (0 4000 Ω). Resistance input current (RTD, R) 175 uA Resistance of external					
	measuring circuits for RTD inputs and resistance R:					
	max 60 Ω in each wire. The resistance of the supply wires					
	should be equal. The difference in the resistance of the wires leads to an additional measurement error.					
	All pins in universal inputs should be plugged in even if					
	they are not used for any connections.					
Real time clock	± 20ppm , real clock battery- CR1220					
Recording	Archiving period (registration interval) 13600 sec. Recording start modes: Manual off, Manual on, Below, Above, Inside, Outside,					
	Time of filling the file archive memory: depending on the					
	recording interval and the number of attached registration					
	groups, e.g. for the 1 second interval, when all 10 registration groups are switched on - the archive memory will be full in					
	about 60 days.					
Protection level	8GB file archive memory.					
provided by the casing						
	al side - IP 65 IP 20					
Weight 0.3 kg						
Dimensions 96 x 96 x 77 mm Reference conditions and rated operating conditions.						
- power supply	or 2060 V d.c.					
- ambient temperature	-1023 + 55° C, class K55 according to PN-EN61557-12					
- storage temperature	-20 + 70° C					
- humidity	0 406095% (inadmissible condensation)					

- any working position
- heating time 30 min.

Real time clock battery: CR1220

Additional errors:

in% of the basic error

- related to ambient temperature changes <50% / 10°C

Standards met by the meter

Electromagnetic compatibility:

- general requirements PN-EN IEC 61326-1
- resistance in industrial environments according to PN-EN 61000-6-2 resistance to induced common voltages of radio frequency:
 - level 2 in the frequency range 0.15 .. 1 MHz
 - level 3 in the 1 MHz range .. 80 MHz
 - noise emission according to PN-EN 61000-6-4

Safety Requirements:

- according to the PN-EN 61010-1 standard
- isolation between circuits: basic,
- installation category III
- pollution degree 2,
- maximum voltage in relation to earth:
 - for 300 V power circuits and relay outputs
 - for 50 V measuring inputs
 - for RS485, Ethernet, analogue outputs: 50 V
- altitude above sea level <2000m,

11 Kod wykonań

Kod wykonań rejestratora KD6 przedstawiono w tablicy 28

KD6 X	Х	Х	XX	Х	Х
I/O module – slot X*:					
4 x programmable measuring inputs module 4					
I/O module – slot Y:					
without module	0				
6 x relay outputs module	1				
4 x relay outputs module + 4 x binary inputs separated from each other	2				
4 x analog outputs module + 4 xbinary inputs with common ground	3				
4 x programmable measuring inputs module	4				
Supply voltage:		·			
85253 V a.c., 90300 V d.c.		1			
2060 V d.c.		2			
Version:					
standard			00		
custom-made**			XX		
Language:					
Polish/English				M	
other*				Х	
Acceptance tests:					
with test certificate					0
with calibration certificate					2
acc.to customer's request**					Х

 $^{\ast}\,$ all possible variants for slot X are described in the user manual in chapter 11

** only after agreeing with the manufacturer

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