## LUMEL

## SCREEN RECORDER

## KD6

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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

1 pc.
2. seal
3. holder for mounting in a board
4. screw set

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


Fig. 1 Recorder set

## 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 $96 \times 96 \times 77 \mathrm{~mm}$, mounting hole dimensions $92.5 \times 92.5 \mathrm{~mm}$. Outside the recorder, there are screw strips and self-locking ones which enable the connection of external wires with a crosssection of $2.5 \mathrm{~mm}^{2}$.


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, $24 \mathrm{~V} / 30 \mathrm{~mA}$ 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 $320 \times 240$ 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:

- 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) $4 \times$ relay ouput module ( Out1..Out4) $+4 \times$ binary inputs separated from each Rother $(\ln 1 . . \ln 4)$,
c) $4 x$ analog output module ( Out1..Out4 ) $+4 x$ binary inputs with common ground ( $\ln 1 . . \ln 4)$,
d) $4 \times$ programmable measuring inputs module ( $\ln 1 . . \ln 4$ ),

a)

b)

c)

d)

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 24 V (terminals 7,8 )
- two binary inputs $\operatorname{In} 1, \ln 2$ (terminals 9-12)
- two relay outputs Out1, Out2 (terminals 13-16)



### 5.3 Diagram of connections between logical channels and inputs / outputs



Fig.6. 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.


Fig. 7 The recorder screen after turning on the power

### 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 $\triangle$ 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 4 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 |
| :---: | :---: | :---: |
| 511 | Black - archive memory installed correctly |  |
| $5$ | Black - out of archive memory <br> Red - Invalid file system on the card |  |
| $14$ | 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: <br> Black - archiving in the group enabled, waiting for the archiving condition to be met. <br> Red - the archiving condition has been met and records are being saved. <br> Grey - group archiving disabled. | Numbers indicate the archiving group |
| 1\% | Filling up the file archive memory in percentage |  |
|  | Green background | Value in the range $0 \ldots 70 \%$ |
|  | 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 <br> overwrite mode starts and the oldest <br> archive files are deleted during further <br> archiving and new archive files are <br> created. |
| :--- | :--- | :--- |
|  | Blue pulsating background | Copying from internal memory to file <br> archive is in progress |
|  | File transfer to an external memory connected to <br> the USB Host port | Symbol indicating the connecting of an external <br> memory to the USB Host port |
| 年 |  |  |

### 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:

Switching between the presented groups of logical channels.


## Menu

Switching between different presentations of displayed data values in the current group

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 the main menu
Confirming the selection, introducing changes and exiting the edition window
Leaving the current submenu
Cancellation, no changes made
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 $\quad \Delta$ to select the appropriate configuration window and confirm by pressing the button


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).



Fig. 11 General settings
Menu parameters include as General settings:
Table 1.
$\begin{array}{|c|c|c|c|c|}\hline \text { No } & \text { Parameter name } & \text { Feature/value } & \text { Description } & \text { Factory set } \\ \hline 1 & \text { Language } & \text { English, Polish, Deutsch } & \text { Day /month /year } & \text { English } \\ \hline 2 & \text { Date } & \text { dd/mm/ /yyy } & \text { hol/06/2020 } \\ \hline 3 & \text { Time } & \text { hh:mm:ss } & \text { hours: minutes: seconds } & \text { Dype 1, Type 2 }\end{array}$ Type of display used $\left.\quad \begin{array}{c}\text { Depending on } \\ \text { equipment }\end{array}\right]$

### 6.5.2 Inputs

The device has 2 binary inputs $\ln 1, \ln 2$ in slot $Z$ and inputs related to the installed input modules in slots $\mathrm{X}, \mathrm{Y}$ (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. 12 Binary inputs


Fig. 13 Universal inputs

Table 2.

| No |  |  |  | Parameter name | Range | Notes／description | Factory set |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | $\begin{aligned} & \widehat{N} \\ & \frac{0}{\omega} \\ & \stackrel{\Sigma}{\Sigma} \\ & \frac{0}{\omega} \\ & \widehat{X} \\ & \frac{0}{\omega} \end{aligned}$ |  |  | Name |  | Name edition |  |
| 2 |  |  |  | Unit |  | N／A |  |
| 3 |  |  |  | OFF tag |  | Tag edition | OFF |
| 4 |  |  |  | ON tag |  | Tag edition | ON |
| 5 |  |  |  | Active state |  | $\begin{gathered} \mathrm{ON}=\text { high state of input } \\ \text { active } \\ \mathrm{ON}=\text { low state input } \\ \text { active. } \end{gathered}$ | $\begin{aligned} & \text { ON = } \\ & \text { high } \\ & \text { state } \end{aligned}$ |
| 6 |  |  |  | Input type | $-10 . .10,0 . .10 \mathrm{~V}$ $-300 . .300 \mathrm{mV}, 0 . .300$ mV $-75 . .75 \mathrm{mV}, 0 . .75 \mathrm{mV}$ $-40 . .40 \mathrm{~mA}, 0 . .40 \mathrm{~mA}$ $0 . .4000 \Omega$ |  | －10．．10 V |
| 7 |  |  |  | Name | $\mathrm{S}(\mathrm{X}) \ln 1 . . \mathrm{S}(\mathrm{Y}) \ln 4$ |  | S（X）In1．． 4 |
| 8 |  |  |  | Unit | $\mathrm{V}, \mathrm{mV}, \mathrm{mA}, \Omega$ |  | V |
| 9 |  |  |  | Filter | $0.5 . .60 .0 \mathrm{~s}$ |  | 0，5 s |
| 10 |  |  |  | Min | $\begin{gathered} -12 \mathrm{~V},-360 \mathrm{mV},-90 \mathrm{mV} \\ -48 \mathrm{~mA}, 0 \Omega \end{gathered}$ | Depending on the input range | －12．0 V |
| 11 |  |  |  | Max． | $\begin{gathered} 12 \mathrm{~V}, 360 \mathrm{mV}, 90 \mathrm{mV} \\ 48 \mathrm{~mA}, 405 \Omega \end{gathered}$ |  | 12.0 V |
| 12 |  | ざ |  | Input type | Pt100，Pt500，Pt1000 |  |  |
| 13 |  | $\stackrel{\text { ：}}{5}$ |  | Name | $\mathrm{S}(\mathrm{X}) \ln 1 . . \mathrm{S}(\mathrm{Y}) \ln 4$ |  | $\mathrm{S}(\mathrm{X}) \ln 1 . .4$ |
| 14 |  | $\stackrel{\rightharpoonup}{\Sigma}$ | O | Unit | ${ }^{\circ} \mathrm{C},{ }^{\circ} \mathrm{F}$ |  | ${ }^{\circ} \mathrm{C}$ |
| 15 |  | $\begin{aligned} & \infty \\ & \dot{C} \\ & \vdots \end{aligned}$ | -8 $\stackrel{\circ}{\circ}$ $\stackrel{\circ}{\circ}$ | The way of connecting the sensor |  | 3 wire 2 wire | 2 wire |
| 16 |  | $\stackrel{\dot{\Sigma}}{\stackrel{\Sigma}{x}}$ | 은 | Wires resistance | 0．00．．60．00 $\Omega$ ， |  | $0 \Omega$ |
| 17 |  | $\frac{x}{\omega}$ | $\stackrel{\rightharpoonup}{\square}$ | Correction | $-20.0 . .20 .0{ }^{\circ} \mathrm{C}$ |  | $0^{\circ} \mathrm{C}$ |
| 18 |  |  | 를 | Filter | 0．5．．60．0 s |  | 0，5 s |
| 19 |  |  |  | Min |  |  | $-200.0^{\circ} \mathrm{C}$ |
| 20 |  |  |  | Max． |  |  | $850.0^{\circ} \mathrm{C}$ |
| 21 |  |  |  | Input type | Ter J，K，N，E，T，S，R，B |  |  |
| 22 |  |  | $\infty$ | Name | $\mathrm{S}(\mathrm{X}) \ln 1 . . \mathrm{S}(\mathrm{Y}) \ln 4$ |  | $\mathrm{S}(\mathrm{X}) \ln 1 . .4$ |
| 23 |  |  | ๙ | Unit | ${ }^{\circ} \mathrm{C},{ }^{\circ} \mathrm{F}$ |  | ${ }^{\circ} \mathrm{C}$ |
| 24 |  |  | ๗ | Compensation | Auto，Manual |  | Manual |
| 25 |  |  | ト | Comp．temp． | 0．00．．60．00 ${ }^{\circ} \mathrm{C}$ |  | $0.0^{\circ} \mathrm{C}$ |
| 26 |  |  | ż | Correction | －20．00． $20.00{ }^{\circ} \mathrm{C}$ |  | $0.0^{\circ} \mathrm{C}$ |
| 27 |  |  | צ゙ | Filter | $0.5 . .60 .0 \mathrm{~s}$ |  | 0，5 s |
| 28 |  |  | $\begin{aligned} & \frac{2}{2} \\ & \stackrel{\rightharpoonup}{6} \\ & \hline \end{aligned}$ | Min | $-55^{\circ} \mathrm{C}$ | Depending on the choice of the thermocouple |  |
| 29 |  |  | ㅁㅡㅡ | Max． | $1765^{\circ} \mathrm{C}$ | 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 $\mathrm{X}, \mathrm{Y}$ 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．


Fig. 14 Relay outputs

Table 3.

| No |  |  |  | Parameter name | Range | Notes/ description | Factory set |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 |  |  |  | Source: | Logical channel 1 $\ldots$ Logical channel 60 | Selection of logical channel (1..60) | Logical channel 1 |
| 2 |  |  |  | Name |  | Output name | S(Y) Out1 |
| 3 |  |  |  | Unit |  | Unit name ( only reading) |  |
| 4 |  |  |  | OFF tag |  | Description edition | OFF |
| 5 |  |  |  | ON tag |  | Description edition | ON |
| 6 |  |  |  | Active state |  | On Off | On |
| 7 |  |  |  | Source: | Logical channel 1 $\ldots$ Logical channel 60 |  | Logical channel 1 |
| 8 |  |  |  | Name |  | Output name | $\mathrm{S}(\mathrm{X})$ Out1 |
| 9 |  |  |  | Unit | mA | Unit name ( only reading) | mA |
| 10 |  |  |  | Value when ERR | 0/4. 20 mA |  | 0.00 |
| 11 |  |  |  | Lower input value | +/-21474000.00 |  | -99999.99 |
| 12 |  |  |  | upper input value | +/-21474000.00 |  | 99999.99 |
| 13 |  |  |  | Lower output value | $0 . .20 \mathrm{~mA}$ |  | 4.00 mA |
| 14 |  |  |  | upper output value | $0 . .20 \mathrm{~mA}$ |  | 20.00 mA |
| 15 |  |  |  | Output range | $0 . .20 / 4.20 \mathrm{~mA}$ |  | $0 . .20 \mathrm{~mA}$ |

### 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.


Fig. 15 Logical channels - settings


Fig. 16 Logical channels - source

Table 4.

| No |  | Parameter name | Range | Notes/ description | Factory set |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Settings | Active channels | 1. 60 | Channels selection | Channels $\text { 1. } 16$ |
| 2 | $8$ | Source type | Inputs, Outputs, Modbus master Mathematical function From other channel Scaling function Alarm function |  | Inputs |
| 3 |  | Source: | Inputs <br> $S(Z) \ln 1, S(Z) \ln 2$, $S(X) \ln 1$.. $S(X) \operatorname{In} 4$, S(Y) In1 .. S(Y) In 4 <br> Outputs: <br> S(Z) Out1, S(Z) Out2, <br> S(X) Out1 .. $S(X)$ Out4 / 6, <br> S(Y) Out1 .. S(Y) Out4 / 6 Modbus master: <br> Master 1 .. Master 10 Mathematical function Mt1 .. Mt 20 From other channel Logical channel 1. Logical channel 10 |  | $\mathrm{S}(\mathrm{Z}) \mathrm{ln} 1$ |


|  |  | Scaling function <br> Scal 1 Scal 20 <br> Alarm function <br> 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.


Fig. 17 Groups - settings
Table 5.

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



### 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.


Fig. 18 Mathematical functions


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 |  | Source X | Logical channel 1. Logical channel 60 |  | Logical channel 1 |
| 4 |  | The value of $X$ | +/-214740000.0 |  | 0.0 |
| 5 |  | List of channels | Logical channel 1. <br> Logical channel 60 | Select up to 10 channels | 0/10 |
| 6 |  | In the event of an error | Add faulty channels, Skip faulty channels |  | Skip faulty channels |
| 7 |  | Type of source $Y$ | From the logical channel, Constant Y value |  |  |
| 8 |  | Source: Y | Logical channel 1. Logical channel 60 |  | Logical channel 1 |
| 9 |  | Y value | +/-214740000.0 |  | 0.0 |
| 10 |  | Min | +/-214740000.0 |  |  |
| 11 |  | Max. | +/-214740000.0 |  |  |
| 12 | 으 <br> 0 <br> 0 <br> 0 <br> 0.0 <br> 0 | Source: | Logical channel 1... Logical channel 60 |  | Logical channel 1 |
| 15 |  | Number of points | $2 . .10$ |  | 2 |
| 16 |  | Min | +/-214740000.0 |  | 0.0 |
| 17 |  | Max. | +/-214740000.0 |  | 0.0 |
| 18 |  | Unit |  | Unit edition |  |
| 19 |  | 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 | $\begin{aligned} & \text { No reaction } \\ & \text { ON, } \\ & \text { OFF } \end{aligned}$ |  | OFF |
| 25 |  | Alarm type | Manually off, manually on, below, above, intern. extern. |  | Manually off |
| 26 |  | Alarm lower threshold | +/-214740000.0 |  | -999999.9 |
| 27 |  | Alarm upper threshold | +/-214740000.0 |  | 999999.9 |
| 28 |  | Hysteresis | 0 .. 6500.0 |  | 0 |
| 29 |  | Alarm activation delay | 0 .. 65000 |  | 0 s |
| 31 |  | Min alarm activation time | 0 .. 65000 |  | 0 s |
| 32 |  | Min alarm off time | 0 .. 65000 |  | 0 s |
| 33 |  | Lock off alarm | Off. On |  | Off |
| 34 |  | Alarm signalling | Off. On |  | Off |
| 35 |  | Alarm reset | No Yes |  | No |


a) above


b) below

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. | $\operatorname{round}(\mathrm{x})$ | Returns the value of x rounded to the nearest integer |
| 2. | $\operatorname{sqrt}(\mathrm{x})$ | The square root of x |
| 3. | $\operatorname{abs}(\mathrm{x})$ | Absolute value of x |
| 4. | isErr $(\mathrm{x})$ | Returns 1 if the value is incorrect (e.g. Err, Lo, Hi) |
| 5. | isLo $(\mathrm{x})$ | Returns 1 if the value is incorrect (lower range exceeding) |
| 6. | isHi $(\mathrm{x})$ | Returns 1 if the value is incorrect (upper range exceeding) |
| 7. | $\operatorname{avg}(\mathrm{x} 1, \mathrm{x} 2, \mathrm{x} 3, \ldots)$ | Returns the average value of the numbers $\mathrm{x} 1, \mathrm{x} 2, \mathrm{x} 3 \ldots$ |
| 8. | $\operatorname{sum}(\mathrm{x} 1, \mathrm{x} 2, \mathrm{x} 3, \ldots)$ | Returns the sum of the numbers $\mathrm{x} 1, \mathrm{x} 2, \mathrm{x} 3 \ldots$ |
| 9. | $\operatorname{product}(\mathrm{x} 1, \mathrm{x} 2, \mathrm{x} 3, \ldots)$ | Returns the product of the numbers $\mathrm{x} 1, \mathrm{x} 2, \mathrm{x} 3 \ldots$ |
| 10. | $\min (\mathrm{x} 1, \mathrm{x} 2, \mathrm{x} 3, \ldots)$ | Returns the minimum value of the numbers $\mathrm{x} 1, \mathrm{x} 2, \mathrm{x} 3 \ldots$ |
| 11. | $\max (\mathrm{x} 1, \mathrm{x} 2, \mathrm{x} 3, \ldots)$ | Returns the maximum value of the numbers $\mathrm{x} 1, \mathrm{x} 2, \mathrm{x} 3 \ldots$ |
| 12. | $\mathrm{x}+\mathrm{y}$ | Addition |
| 13. | $\mathrm{x}-\mathrm{y}$ | Subtraction |
| 14. | $\mathrm{x}^{*} \mathrm{y}$ | Multiplication |
| 15. | $\mathrm{x} / \mathrm{y}$ | Division |
| 16. | $\mathrm{x}^{\wedge} \mathrm{y}$ | Exponentiation |


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


Fig. 22 Configuration of Modbus protocol parameters in Slave mode
Table 8.

| No | Parameter name | Feature $/$ value | Description <br> Address in Modbus <br> net | Factory set |
| :---: | :---: | :---: | :---: | :---: |
| 1 | Address | $1 . .247$ | 1 |  |
| 2 | Baud | $9600 \mathrm{~b} / \mathrm{s}, 19,2 \mathrm{~kb} / \mathrm{s}, 38,4 \mathrm{~kb} / \mathrm{s}$, <br> $57,6 \mathrm{~kb} / \mathrm{s}, 115,2 \mathrm{~kb} / \mathrm{s}$ | Baud rate: <br> RTU 2, RTU 8E1, | $115,2 \mathrm{~kb} / \mathrm{s}$ |
| 3 | Mode | Transmission mode: | RTU 8N1 8 N 1 |  |

### 6.5.8 Modbus Master / Slave

Modbus Master / Slave (Mstr / SIv) 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.


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


Fig. 24 Configuration of Master 1 - Master 10 parameters

Table 9.

| No |  |  |  | Parameter name | Range | Notes/ description | Factory set |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 |  | ©듷© |  | Work mode | Slave, Master |  | Slave |
| 2 |  |  |  | Quantity of masters | Master 1 .. Master 10 |  | 1 |
| 3 |  |  |  | Slave address | $1 . .247$ |  | 1 |
| 4 |  |  |  | Baud | $9600 \mathrm{~b} / \mathrm{s}, 19,2 \mathrm{~kb} / \mathrm{s}, 38,4 \mathrm{~kb} / \mathrm{s}$, $57,6 \mathrm{~kb} / \mathrm{s}, 115,2 \mathrm{~kb} / \mathrm{s}$ | Baud rate: | $115,2 \mathrm{~kb} / \mathrm{s}$ |
| 5 |  |  |  | Mode | RTU 8N2, RTU 8E1, RTU 801, RTU 8N1 | Transmission mode: | RTU 8N1 |
| 6 |  |  |  | Number of repetitions | $0 . .10$ |  | 0 |
| 7 |  |  | $\begin{gathered} \infty \\ 0 \\ 0 \\ =0 \\ 0 \\ \infty \end{gathered}$ | 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 |  |  |  | Register type | char / uchar / int / uint / long / ulong / float 1234/2143/4321/3412 |  | float4321 |
| 11 |  |  |  | Reading function | 0x03, 0x04 |  | 0x03 |
| 12 |  |  |  | Response waiting time | $100 . .10000 \mathrm{~ms}$ |  | 1000 ms |
| 13 |  |  |  | Repetition interval | 100 .. 10000 ms |  | 1000 ms |
| 14 |  |  | $\stackrel{\otimes}{0}$ | Name | ASCII chars |  | MM1-Reg1 |
| 15 |  |  | $\stackrel{\substack{\mathrm{N}}}{ }$ | Value type | Analogue, Binary |  | Binary |
| 16 |  |  |  | Min | +-2147000000 |  | -9999999 |
| 17 |  |  | $\stackrel{i}{5}$ | Max. | +-2147000000 |  | 9999999 |
| 18 |  |  | $\stackrel{0}{0.0}$ | Logical shift | None / >>right / <<left |  | none |
| 19 |  |  | ¢ | N bites logical shift | 1 .. 31 |  | 7 |
| 20 |  |  | $\left.\begin{aligned} & 4 \\ & 0 \\ & 0 \end{aligned} \right\rvert\,$ | OFF tag | ASCII chars |  | OFF |
| 21 |  |  | 읓 | ON tag | ASCII chars |  | ON |
| 22 |  |  | $\underset{\sim}{\sim}$ | 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.


Fig. 25 Ethernet - addresses


Fig. 26 Ethernet - FTP
Table 10.

| No |  | Parameter name | Range | Notes/ description | Factory set |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Address es | DHCP | Off/On | Enabling / disabling the DHCP client (support for automatic acquisition of IP protocol parameters of the meter Ethernet interface from external DHCP servers within the same local area network (LAN) | Off |
| 2 |  | Mode | Auto, $10 \mathrm{Mb} / \mathrm{s}, 100 \mathrm{Mb} / \mathrm{s}$ |  | Auto |
| 3 |  | IP address | 0.0.0.0...255.255.255.255 | 10.0.1.161 | - |
| 4 |  | Subnet mask | 0.0.0.0...255.255.255.255 | 255.0.0.1 | - |
| 5 |  | Default gateway | 0.0.0.0...255.255.255.255 | 0.0.0.0 | - |
| 6 |  | DNS address | 0.0.0.0...255.255.255.255 | 10.0.0.44 ○ о ¢ ¢ ¢ ¢ | - |
| 7 |  | MAC address |  | Aa:bb:cc:00:11:22 | - |
| 8 | Modbus TCP | Address | 1 ... 247 |  | 1 |
| 9 |  | Port | $80 \ldots 32000$ |  | 1 |
| 10 |  | Max. number of connections | $1 . . .4$ |  | 1 |
| 11 |  | Waiting time | $10 . .360 \mathrm{~s}$ |  | 60s |
| 12 | FTP | Port of commands | 20 ... 32000 |  | 21 |
| 13 |  | Data port | 20 ... 32000 |  | 1025 |
| 14 | Web | Port | 80 ... 32000 |  | 80 |
| 15 | SNTP | SNTP address | NTP server address | Time server IP address | 10.0.17.49 |
| 16 |  | Time difference with respect to UTC time | + or - | sign of the local time offset from UTC time | + |
| 18 |  | Hours offset from UTC time | 0 .. 12 | Hourly value of local time offset from UTC time | 1 |
| 19 |  | Automatic summer / winter time change | Yes, No |  | Yes |
| 20 |  | Synchronise the time | No, Yes | Time synchronization command from time 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 <br> set |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Admin | Password enabled | No Yes |  | No |
|  |  | Password: | $0 . .9999$ |  | Auto |



Fig. 27 Security - access password activation


Fig. 28 Security - an attempt to unblock the access password

## 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.
2 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).
$\beta$ If the user enters an incorrect password into the register 4000: In this case, the user gets error 3 as invalid data value.
4 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.
$\$$ 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),


Fig. 29 Information

| No | Parameter name | Feature/value | Description | Factory set |
| :---: | :---: | :---: | :---: | :---: |
| 1 | Type |  |  | KD6 |
| 2 | Execution code |  |  | e.g. .41100M0 |
| 3 | Loader version |  |  | 10.06 |
| 4 | Software version |  |  | 0.11 |
| 5 | Serial number |  |  | 4 Universal input |
| 6 | Slot $(X)$ card type |  |  | 210301 |
| 7 | Slot $(X)$ lader version |  |  | 0.70 |
| 8 | Slot $(X)$ software version |  |  | 6 relays |
| 9 | Slott $(Y)$ card type |  |  | 2.01 |
| 10 | Slot $(Y)$ loader version |  | 0.06 |  |
| 11 | Slot $(Y)$ software version |  |  | aa:bb:cc:00:11:22 |
| 12 | MAC address |  |  | On |
| 13 | DHCP |  |  | 192.168 .1 .100 |
| 14 | IP address |  |  | 192.255 .255 .0 |
| 15 | Subnet mask |  |  | $10,200,121,121$ |
| 16 | Default gateway |  |  |  |
| 17 | DNS address |  |  |  |

## 7 ARCHIVING MEASURED VALUES

### 7.1 I NTERNAL 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 4 MB 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.


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

$$
\begin{array}{llll}
\hline \text { date,time,record index, block,register1, name1, value1, } & \cdots & , \text { register } 6, \text { name } 6, \text { value } \\
\text { 2021-0 }
\end{array}
$$

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 $\ldots \rightarrow$ 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
- meter address
- baud rate
- Modbus
- information unit
- maximum time to start the response
- maximum number of read registers in one query
- 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,

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

### 8.2 Examples of register reading and recording

## Readout of $\mathbf{n}$-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 <br> address | Function | Registry address |  |  | Number of Registers |  |  | CRC |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |
| 01 | 03 | B1 | B0 | B1 | B0 | 02 |  |  |
| C7 3D |  |  |  |  |  |  |  |  |

Response:

| Device address | Function | Number of bytes | Value from the register OFAO(4000) |  | Value from the registerOFA1(4001) |  | CRC checksum |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | B1 | B0 | B1 | B0 |  |
| 01 | 03 | 04 | 00 | OA | 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

| . | Function | B1 | B0 | B1 | B0 | checksum |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 01 | 03 | $1 B$ | 58 | 00 | 04 | C3 3E |

Response:

| Device address | Function | 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) |  | CRC 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 1770 h (6000) - register values $10,100$.

Request

| Device <br> address | Function | Registry address |  |  | Number of device <br> registers |  |  | CRC <br> 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) |  | CRC checksum |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | B1 | B0 | B3 | B2 | B1 | B0 | B3 | B2 |  |
| 01 | 03 | 08 | 00 | 00 | 41 | 20 | 00 | 00 | 42 | C8 | E4 |

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 | Registry address |  | Number of device registers |  | CRC checksum |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | B1 | B0 | B1 | B0 |  |
| 01 | 03 | 1D | 4C | 00 | 02 | 03. B0 |

Response:

| Device address | Function | Number of bytes | Value from the register1D4C(7500) |  |  |  | Value from the register1D4D(7501) |  |  |  | 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:

| Device <br> address | Function | Registry address |  | Register value |  | CRC |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | B 1 | B 0 | B 1 | B0 |  |
| 01 | 06 | 0 F | A 0 | 02 | 1 F | CA 54 |

Response:

| Device <br> address | Function | Registry address |  | Register value |  | CRC |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | B 1 | B 0 | B 1 | B0 |  |
| 01 | 06 | 0 F | A 0 | 02 | 1 F | 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

| $\begin{array}{\|c} \begin{array}{c} \text { Device } \\ \text { address } \end{array} \end{array}$ | Function | Hi reg.address | $\begin{aligned} & \text { Lo reg. } \\ & \text { address } \end{aligned}$ | Number <br> of Hi <br> reg. | Number <br> of Hi <br> reg. | Number of bytes | Value for reg. OFA3 (4003) |  | Value for reg. OFA4 (4004) |  | CRC checksum |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  | B1 | B0 | B1 | B0 |  |
| 01 | 10 | OF | A3 | 00 | 02 | 04 | 00 | 14 | 07 | D0 | BB 9A |

Response:

| Device <br> address | Function | Registry address |  | Number of device <br> registers |  | CRC <br> checksum |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | B1 | B0 | B1 | B0 |  |
| 01 | 10 | $0 F$ | A3 | 00 | 02 | B2 FE |

## Device identification report (code 11h)

Example 7. Device identification Request:

| Device <br> address | Function | Checksum |
| :---: | :---: | :---: |
| 01 | 11 | C0 2C |

Response:

| Address | Function | Number <br> of bytes | ID | Device <br> state | Information field about the device firmware version (e.g. "KD6- <br> 1.00 b-1.06" - KD6 device with firmware version 1.00 and <br> bootloader version 1.06) | Checksum <br> (CRC) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 01 | 11 | 19 | CF | FF | $4 E 3433202 D 312 E 303020202020202020622 D$ | E0 24 |
| $312 E 303620$ |  |  |  |  |  |  |

### 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.

Table 13

| Wire no | Signal | Wire colour 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 |



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



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" $\rightarrow$ password: "Admin"; user
"user" $\rightarrow$ 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.


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.

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 <br> 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).

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

General configuration registers and archiving registers
Table 16

| Register address | Operati ons | Range | Description | By default |
| :---: | :---: | :---: | :---: | :---: |
| 4000 | RW | 0...9999 | Security - password | 0 |
| 4001 | RW |  | reserved |  |
| Group 1- archiving |  |  |  |  |
| 4002 | RW | $0 . .5$ | Group 1, Archiving type <br> 0 - manually disabled <br> 1 - manually activated <br> 2 - archiving below the lower archiving threshold <br> 3 - archiving above the upper archiving threshold <br> 4 - archiving between thresholds <br> 5 - archiving beyond Lo Hi thresholds | 0 |
| 4003 | RW | 0... 59 | Group 1, channel number triggering archiving | 0 |
| 4004 | RW | 1 .. 3600 | Group 1, archiving interval in seconds | 1 |
| 4005 | RW | $\begin{gathered} -2147400000 \\ 2147400000 \end{gathered}$ | Group 1, archiving lower threshold Lo | -9999999 |
| 4006 | RW |  | Group 1, archiving lower threshold Hi |  |
| 4007 | RW | $\begin{gathered} -2147400000 \\ . . \\ 2147400000 \end{gathered}$ | Group 1, archiving upper threshold Lo | 9999999 |
| 4008 | RW |  | Group 1, archiving upper threshold Hi |  |
| 4009 |  |  | reserved |  |
| 4010 |  |  | reserved |  |


| Register Opera address tions |  | Range | Description | By default |
| :---: | :---: | :---: | :---: | :---: |
| Group 2- archiving |  |  |  |  |
| 4011...4019 |  |  | Range of modifications as in registers 4005... 4013 |  |
| Group 3- archiving |  |  |  |  |
| 4020...4028 |  |  | Range of modifications as in registers 4005... 4013 |  |
| Group 4- archiving |  |  |  |  |
| 4029...4037 |  |  | Range of modifications as in registers 4005... 4013 |  |
| Group 5- archiving |  |  |  |  |
| 4038...4046 |  |  | Range of modifications as in registers 4005... 4013 |  |
| Group 6- archiving |  |  |  |  |
| 4047... 4055 |  |  | Range of modifications as in registers 4005... 4013 |  |
| Group 7- archiving |  |  |  |  |
| 4056... 4064 |  |  | Range of modifications as in registers 4005... 4013 |  |
| Group 8- archiving |  |  |  |  |
| 4065...4073 |  |  | Range of modifications as in registers 4005... 4013 |  |
| Group 9- archiving |  |  |  |  |
| 4074...4082 |  |  | Range of modifications as in registers 4005... 4013 |  |
| Group 10- archiving |  |  |  |  |
| 4083... 4091 |  |  | Range of modifications as in registers 4005... 4013 |  |
| 4092 |  |  | reserved |  |
| 4093 | RW | 0.1 | Keep the exported files on the device | 0 |
| 4094 | RW | 0.1 | Export files to external memory 0 - do not export, 1 - export | 0 |
| 4095 | RW | 0.1 | Copying the archive to the file archive memory " 1 " - copy the archive to the file archive memory / only those records that have been registered since the last copying / | 0 |
| 4096 | RW | 0.1 | Deleting the entire internal archive 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 | 1.. 247 | Address in Modbus net | 1 |
| 4101 | RW | $0 . .3$ | Transmission mode: 0->8n2, 1->8e1, 2-$>801,3->8 n 1$ | 3 |
| 4102 | RW | $0 . .4$ | $\begin{gathered} \text { Baud rate: } 0->9600 \\ 1->19200,2->38400,3->57600,4->115200 \\ \hline \end{gathered}$ | 4 |
| 4103 | RW |  | reserved |  |
| 4104 | RW | 0.1 | Update the modification of transmission data: | 0 |
| 4105 |  |  | reserved |  |
| 4106 |  |  | reserved |  |
| 4107 |  |  | reserved |  |
| 4108 |  |  | reserved |  |
| 4109 |  |  | reserved |  |
| 4110 |  |  | reserved |  |
| 4111 |  |  | reserved |  |
| 4112 |  |  | reserved |  |
| 4113 |  |  | reserved |  |
| 4114 |  |  | reserved |  |
| 4115 |  |  | reserved |  |
| 4116 |  |  | reserved |  |
| 4117 | RW | 0...65535 | third and second bytes (B3.B2) of the time server address format address: B3.B2.B1.B0 |  |
| 4118 | RW | 0...65535 | 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 | 0... 12 | Hourly offset of local time from UTC time | 1 |
| 4121 | RW | 0... 59 | Minute offset of local time from UTC time | 0 |
| 4122 | RW | 0, 1 | $\begin{gathered} \text { Seasonal time change } \\ 0-\text { Yes } \\ 1-\text { No } \end{gathered}$ | 0 |
| 4123 | RW | 0,1 | Synchronize RTC time from time server 0 - no action <br> 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) <br> 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 | 0... 65535 | Third and second byte (B3.B2) of the recorder IP address, IPv4 address format: B3.B2.B1.B0 | $\begin{gathered} 49320 \\ (0 \times C 0 A 8= \\ 192.168) \end{gathered}$ |
| 4132 | RW | 0... 65535 | First and zero byte (B1.B0) of the IP of recorder address, IPv4 address format:. B3.B2.B1.B0 | $\begin{gathered} 356(0 \times 0164 \\ =1.100) \\ \hline \end{gathered}$ |
| 4133 | RW | 0... 65535 | Third and second byte (B3.B2) of the recorder subnet mask, mask format. B3.B2.B1.B0 | 65535 |
| 4134 | RW | 0... 65535 | The first and zero byte (B1.B0) of the recorder subnet mask, mask format: B3.B2.B1.B0 | 65280 |
| 4135 | RW | 0... 65535 | Third and second byte (B3.B2) of the recorder default gateway, gateway address format: B3.B2.B1.B0 | 49320 |
| 4136 | RW | 0... 65535 | First and zero byte (B1.B0) of the recorder default gateway, gateway address format B3.B2.B1.B0 | 257 |
| 4137 | RW | 0... 65535 | Third and second byte (B3.B2) of the DNS recorder address, IPv4 address format:. B3.B2.B1.B0 | 0x0808=8.8 |
| 4138 | RW | 0... 65535 | 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 |  | reserved |  |
| 4141 | RW | 0 .. 2 | Ethernet interface baud rate:: <br> 0 - automatic selection of the baud rate: <br> $1-10 \mathrm{Mb} / \mathrm{s}$ <br> $2-100 \mathrm{Mb} / \mathrm{s}$ | 0 |
| 4142 | RW | 20... 65535 | FTP server command port number | 21 |
| 4143 | RW | 20... 65535 | FTP server data port number | 1025 |
| 4144 | RW | 1... 4 | The maximum number of simultaneous connections to the Modbus TCP / IP service | 1 |
| 4145 | RW | 10... 600 | Modbus TCP / IP service port closing time, value expressed in seconds | 60 |
| 4146 | RW | 0... 255 | Device address for Modbus TCP / IP protocol | 1 |
| 4147 | RW | 0... 65535 | Modbus TCP port number | 502 |
| 4148 | RW | 80... 65535 | 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, <br> 1 - memorizing new parameters and rebooting the <br> Ethernet interface, |  |
| 4150 | RW | $0 . .2$ | Menu language: 0-ENG, 1-PL, 2-DE |  |
| 4151 | RW | 0.1 | reserved | 0 |
| 4152 | RW | 0.1 | Saving standard parameters including Ethernet, | 0 |
| 4153 | RW | $0 . .59$ | Seconds | 0 |
| 4154 | RW | $0 . .2359$ | Hour $100+$ Minutes | 0 |
| 4155 | RW | $101 \ldots 1231$ | Month * $100+$ day | 0 |
| 4156 | RW | $2015 \ldots 2077$ | Year | 101 |
| 4157 | RW | 0.1 | Password disabled /enabled | 2015 |
| 4158 | RW |  | reserved | 0 |
| 4159 | RW |  | reserved |  |

Information registers of the recorder Table 17

| Register address | Operat ions | Range | Description | By default |
| :---: | :---: | :---: | :---: | :---: |
| 4400 | R |  | reserved |  |
| 4401 | R | $0 . .65535$ | ID | EE |
| 4402 | R | $0 . .65535$ | Recorder bootloader version $\times 100$ | - |
| 4403 | R | $0 . .65535$ | Recorder software version $\times 100$ | - |
| 4404 | R |  | reserved |  |
| 4405 | R | $0 . .65535$ | Execution code (the first 3 digits of the KD6 code $-X X X$ $x x \times x$ ) | - |
| 4406 | R | $0 . .65535$ | Execution code (the first 5 digits of the KD6 code $-\times \times \times$ - $\mathbf{X X} \mathbf{X} \mathbf{X}$ ) | - |
| 4407 | R | $0 . .65535$ | Slot 1 card identifier (according to the code $0 \times \mathrm{XXxx}$, detected 0 xxxXX | 0x0000 |
| 4408 | R | $0 . .65535$ | Slot 2 card identifier (according to the code $0 x \mathrm{XXxx}$, detected $0 x$ xxXX | 0x0000 |
| 4409 | R | $0 . .65535$ | Card software version in slot $1 \times 100$ | - |
| 4410 | R | $0 . .65535$ | Card software version in slot $2 \times 100$ | - |
| 4411 | R | $0 . .65535$ | Seventh and sixth bytes (B7.B6) of the serial number, $\mathrm{B7}: \mathrm{B} 6: \mathrm{B} 5: \mathrm{B} 4: \mathrm{B3}: \mathrm{B} 2: \mathrm{B} 1: \mathrm{B} 0$ format | - |
| 4412 | R | $0 . .65535$ | Fifth and fourth bytes (B5.B4) of the serial number, $\mathrm{B7}: \mathrm{B} 6: \mathrm{B} 5: \mathrm{B} 4: \mathrm{B} 3: \mathrm{B} 2: \mathrm{B} 1: \mathrm{B} 0$ format | - |
| 4413 | R | $0 . .65535$ | Third and second byte (B3.B2) of the serial number $\mathrm{B7}: \mathrm{B6}: \mathrm{B} 5: \mathrm{B} 4: \mathrm{B} 3: \mathrm{B} 2: \mathrm{B} 1: \mathrm{B0}$ format | - |
| 4414 | R | $0 . .65535$ | First and zero byte (B1.B0) of the serial number, B7:B6:B5:B4:B3:B2:B1:B0 format | - |
| 4415 | R | $0 . .65535$ | Status 1 register - description below | 0 |
| 4416 | R | $0 . .65535$ | Status 2 register - description below | 0 |
| 4417 | R | $0 . .65535$ | Status 3 register - description below | 0 |
| 4418 | R | $0 . .65535$ | Status 4 register - description below | 0 |
| 4419 | R | 0.65535 | Status 5 register - description below | 0 |
| 4420 | R | $0 . .65535$ | Status 6 register - description below | 0 |
| 4421 | R | 0... 65535 | Fifth and fourth byte (B5.B4) of the MAC recorder address, B5: B4: B3: B2:B1: B0 format | - |
| 4422 | R | 0...65535 | Third and second byte (B3.B2) of the MAC recorder address, $\mathrm{B} 5: \mathrm{B} 4: \mathrm{B} 3: \mathrm{B} 2: \mathrm{B} 1: \mathrm{B} 0$ format | - |
| 4423 | R | 0...65535 | First and zero byte (B1.B0) of the MAC recorder address, $\mathrm{B} 5: \mathrm{B} 4: \mathrm{B} 3: \mathrm{B2}: \mathrm{B} 1: \mathrm{B} 0$ format | - |
| 4424 | R | 0...65535 | State 7 register - description below | 0 |
| 4425 | R | $0 . .65535$ | Status of alarm 1 | 0 |
| 4426 | R | $0 . .65535$ | Status of alarm 2 | 0 |
| 4427 | R | $0 . .65535$ | Status of alarm 3 | 0 |
| 4428 | R | $0 . .65535$ | Status of alarm 4 | 0 |
| 4429 | R | $0 . .65535$ | Status of alarm 5 | 0 |
| 4430 | R | $0 . .65535$ | Status of alarm 6 | 0 |
| 4431 | R | $0 . .65535$ | Status of alarm 7 | 0 |
| 4432 | R | $0 . .65535$ | Status of alarm 8 | 0 |


| 4433 | R | $0 . .65535$ | Status of alarm 9 | 0 |
| :---: | :---: | :---: | :---: | :---: |
| 4434 | R | $0 . .65535$ | Status of alarm 10 | 0 |
| 4435 | R | $0 . .65535$ | Status of alarm 11 | 0 |
| 4436 | R | $0 . .65535$ | Status of alarm 12 | 0 |
| 4437 | R | $0 . .65535$ | Status of alarm 13 | 0 |
| 4438 | R | $0 . .65535$ | Status of alarm 14 | $\square$ |
| 4439 | R | $0 . .65535$ | Status of alarm 15 | 0 |
| 4440 | R | $0 . .65535$ | Status of alarm 16 | 0 |
| 4441 | R | $0 . .65535$ | Status of alarm 17 | 0 |
| 4442 | R | $0 . .65535$ | Status of alarm 18 | 0 |
| 4443 | R | $0 . .65535$ | Status of alarm 19 | 0 |
| 4444 | R | $0 . .65535$ | Status of alarm 20 | 0 |
| 4445 | R | $0 . .1000$ | Filling the archive files in \% | 0 |
| 4446 | R | $0 . .1000$ | 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

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

Bit 7-"1 "- reserved Bit 6-"1"- reserved Bit 5-"1"- reserved
Bit 4 - " 1 "- Slot 1 a card inconsistent with the execution code was detected
Bit 3 - " 1 " - Slot 1 - no card calibration
Bit 2 - " 1 " - Slot 1 - no communication with the card
Bit 1 - " 1 "- Slot 1 the card is waiting in the bootloader mode Bit $0-$ " 1 " - Slot 1 the card is in 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,

Bit 7 - copying the internal memory to the file archive from the 4th archiving group,
Bit 6 - copying the internal memory to the file archive from the 3rd archiving group,
Bit 5 - copying the internal memory to the file archive from the 2 nd archiving group,
Bit 4 - copying the internal memory to the file archive from the 1 st archiving group,
Bit 3 - File archive full, (less than 14 days until the file archive is full at 1 second interval)
Bit 2 - File archive full in 70\%
Bit 1 - File archive initialized correctly. Bit 0 - File archive system error

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,

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,

## 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 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 2 nd 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 |  |
| :---: | :---: | :---: | :---: | :---: |
| 5000 | RW | 0.1 | Work mode 0-slave; 1 - master | 0 |
| 5001 | RW | 0x0000...0x03FF | Master n on / off <br> bit 0-0-master 1 disabled, 1- master 1 enabled bit 1 - 0 - master 2 disabled, 1- master 1 enabled <br> bit 9-0- master 10 disabled, 1- master 10 enabled | 1 |
| 5002 | RW | 1... 247 | Slave device address (Operating mode = slave) | 1 |
| 5003 | RW | 0... 3 | Transmission mode: $0->8 \mathrm{n} 2,1->8 \mathrm{e} 1,2-$ $>801,3->8 \mathrm{n} 1$ | 3 |
| 5004 | RW | 0... 4 | $\begin{gathered} \text { Baud rate:: 0->9600 } \\ 1->19200,2->38400,3->57600,4->115200 \end{gathered}$ | 4 |
| 5005 | RW | 0... 10 | The number of repetitions before an error is reported | 0 |
| Master 1 |  |  |  |  |
| 5006 | RW | 1... 247 | Slave device address | 1 |
| 5007 | RW | 1... 10 | Number of registers to be read | 1 |
| 5008 | RW | 0x0000...0xFFFFF | First register address | 4000 |
| 5009 | RW | 0... 9 | $\begin{aligned} & \text { Register type } \\ & 0 \text { - char, } 1 \text { - uchar, } 2 \text { - int, } 3 \text { - uint, } 4 \text { - long, } 5 \text { - ulong, } \\ & 6 \text { - float } 1234,7 \text { - float } 2143 \text {, } 8 \text { - float 4321, } 9 \text { - float } 3412 \\ & \hline \end{aligned}$ | 3 |
| 5010 | RW | 0... 1 | Reading function $0-0 \times 03,1$ - $0 \times 04$ | 0 |
| 5011 | RW | 100... 10000 [ms] | Timeout for a response | 1000 |
| 5012 | RW | 100... 10000 [ms] | Polling frequency (Interval) | 1000 |
| 5013 | RW | 1.2 | Number of bits <br> 1-32 bits <br> 2-16 bits | 2 |
| 5014 |  |  | reserved |  |
| 5015 |  |  | reserved |  |
| Master 1 - register 1 |  |  |  |  |
| 5016 | RW | 1... 2 | Signal type <br> 1 - analogue, 2 - binary (for value $=0$ FALSE, for value! $=0$ <br> TRUE) | 1 |
| 5017 | RW | $\begin{gathered} \hline-2147400000 \\ \ldots \\ 2147400000 \\ \hline \end{gathered}$ | Min range Lo | -9999999 |
| 5018 | RW |  | Min range Hi |  |
| 5019 | RW | -2147400000A2147400000 | Max range Lo | 9999999 |
| 5020 | RW |  | Max range Hi |  |
| 5021 | RW | 0... 2 | Logical shift 0 - None ,1->>right ,2- <<left | 0 |
| 5022 | RW | 1... 31 | N bites logical shift | 7 |
| 5023 | RW | 0x0000...0xFFFFF | Lo bitmask | 0xFFFF |
| 5024 | RW | 0x0000...0xFFFF | Hi bitmask (for Register type> 3) | 0xFFFF |
| 5025 | RW | 0, 0x2020..0x7A7A | OFF tag ASCII 2 and 1 characters (for Signal type = 1) | 0x4F46 |
| 5026 | RW | 0, 0x2020..0x7A7A | OFF tag ASCII 4 and 3 characters | 0x4620 |
| 5027 | RW | 0, 0x2020..0x7A7A | OFF label ASCII 6 and 5 characters | 0x2020 |
| 5028 | RW | 0, 0x2020..0x7A7A | OFF label ASCII 8 and 7 characters | 0x2020 |
| 5029 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 2 and 1 characters (for Signal type = 1) | 0x4F4E |
| 5030 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 4 and 3 characters | 0x2020 |
| 5031 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 6 and 5 characters | 0x2020 |
| 5032 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 8 and 7 characters | 0x2020 |
| 5033 | RW | 0, 0x2020..0x7A7A | Register 1- name ASCII 2 and 1 characters | $\begin{gathered} \hline \text { 0x4D4D } \\ \text { „MM" } \end{gathered}$ |
| 5034 | RW | 0, 0x2020..0x7A7A | Register 1- name ASCII 4 and 3 characters | $\begin{gathered} \text { 0x522D } \\ \text { „R-" } \end{gathered}$ |
| 5035 | RW | 0, 0x2020..0x7A7A | Register 1- name ASCII 6 and 5 characters | 0x6765 |


|  |  |  |  | "ge |
| :---: | :---: | :---: | :---: | :---: |
| 5036 | RW | 0, 0x2020..0x7A7A | Register 1- name ASCII 8 and 7 characters | $\begin{gathered} 0 \times 0031 \\ 1 " \end{gathered}$ |
| 5037 | RW | 0, 0x2020..0x7A7A | Register 1- name ASCII 10 and 9 characters | $0 \times 0000$ |
| 5038 | RW | 0, 0x2020..0x7A7A | Register 1- name ASCII 12 and 11 characters | 0x0000 |
| 5039 | RW | 0, 0x2020..0x7A7A | Unit name ASCII 2 and 1 characters | 0x2020 |
| 5040 | RW | 0, 0x2020..0x7A7A | Unit name ASCII 4 and 3 characters | 0x2020 |
| 5041 | RW | 0, 0x2020..0x7A7A | Unit name ASCII 6 and 5 characters | 0x2020 |
| 5042 | RW | 0, 0x2020..0x7A7A | Unit name ASCII 8 and 7 characters | 0x2020 |
| 5043 |  |  | reserved |  |
| 5044 |  |  | reserved |  |
| 5045 |  |  | reserved |  |
| Master 1 - register 2 |  |  |  |  |
| 5046...5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 1 - register 3 |  |  |  |  |
| 5076... 5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 1 - register 4 |  |  |  |  |
| 5106... 5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 1 - register 5 |  |  |  |  |
| 5136... 5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 1 - register 6 |  |  |  |  |
| 5166...5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 1 - register 7 |  |  |  |  |
| 5196... 5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 1 - register 8 |  |  |  |  |
| 5226... 5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 1 - register 9 |  |  |  |  |
| 5256...5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 1 - register 10 |  |  |  |  |
| 5286... 5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 2 |  |  |  |  |
| 5316...53 |  |  | Range of changes as in registers 5006 ... 5015 |  |
| Master 2 - register 1 |  |  |  |  |
| 5326...53 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 2-register 2 |  |  |  |  |
| 5356... 5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 2 - register 3 |  |  |  |  |
| 5386...5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 2 - register 4 |  |  |  |  |
| 5416...5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 2 - register 5 |  |  |  |  |
| 5446...5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 2 - register 6 |  |  |  |  |
| 5476...5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 2 - register 7 |  |  |  |  |
| 5506...5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 2 - register 8 |  |  |  |  |
| 5536... 5 |  |  | Range of changes as in registers $5016 \ldots 5045$ |  |
| Master 2 - register 9 |  |  |  |  |
| 5566...5 |  |  | Range of modifications as in registers 5016... 5045 |  |
| Master 2 - register 10 |  |  |  |  |
| 5596... 5 |  |  | Range of changes as in registers 5016 ... 5045 |  |
| Master 3 |  |  |  |  |
| 5626...563 |  |  | Range of modifications as in registers 5006... 5015 |  |
| Master 3 - register 1 |  |  |  |  |
| 5636... 56 |  |  | Range of modifications as in registers 5016... 5045 |  |
| Master 3 - register 2 |  |  |  |  |
| 5666... 5 |  |  | Range of modifications as in registers 5016... 5045 |  |
| Master 3 - register 3 |  |  |  |  |


| 5696...5725 | Range of modifications as in registers 5016... 5045 |  |
| :---: | :---: | :---: |
| Master 3 - register 4 |  |  |
| 5726...5755 | Range of modifications as in registers 5016... 5045 |  |
| Master 3 - register 5 |  |  |
| 5756...5785 | Range of modifications as in registers 5016... 5045 |  |
| Master 3 - register 6 |  |  |
| 5786...5815 | Range of modifications as in registers 5016... 5045 |  |
| Master 3 - register 7 |  |  |
| 5816...5845 | Range of modifications as in registers 5016... 5045 |  |
| Master 3 - register 8 |  |  |
| 5846...5875 | Range of modifications as in registers 5016... 5045 |  |
| Master 3 - register 9 |  |  |
| 5876...5905 | Range of changes as in registers 5016 ... 5045 |  |
| Master 3 - register 10 |  |  |
| 5906... 5935 | Range of changes as in registers 5016 ... 5045 |  |
| Master 4 |  |  |
| 5936... 5945 | Range of changes as in registers 5006 ... 5015 |  |
| Master 4 - register 1 |  |  |
| 5946... 5975 | Range of changes as in registers 5016 ... 5045 |  |
| Master 4 - register 2 |  |  |
| 5976...6005 | Range of changes as in registers 5016 ... 5045 |  |
| Master 4 - register 3 |  |  |
| 6006...6035 | Range of changes as in registers 5016 ... 5045 |  |
| Master 4 - register 4 |  |  |
| 6036...6065 | Range of changes as in registers 5016 ... 5045 |  |
| Master 4 - register 5 |  |  |
| 6066...6095 | Range of changes as in registers 5016 ... 5045 |  |
| Master 4 - register 6 |  |  |
| 6096...6125 | Range of changes as in registers 5016 ... 5045 |  |
| Master 4 - register 7 |  |  |
| 6126...6155 | Range of changes as in registers 5016 ... 5045 |  |
| Master 4 - register 8 |  |  |
| 6156...6185 | Range of changes as in registers 5016 ... 5045 |  |
| Master 4 - register 9 |  |  |
| 6186...6215 | Range of changes as in registers 5016 ... 5045 |  |
| Master 4 - register 10 |  |  |
| 6216...6245 | Range of changes as in registers 5016 ... 5045 |  |
| Master 5 |  |  |
| 6246...6255 | Range of changes as in registers 5006 ... 5015 |  |
| Master 5 - register 1 |  |  |
| 6256... 6285 | Range of changes as in registers 5016 ... 5045 |  |
| Master 5 - register 2 |  |  |
| 6286...6315 | Range of changes as in registers 5016 ... 5045 |  |
| Master 5 - register 3 |  |  |
| 6316...6345 | Range of changes as in registers 5016 ... 5045 |  |
| Master 5 - register 4 |  |  |
| 6346...6375 | Range of changes as in registers 5016 ... 5045 |  |
| Master 5 - register 5 |  |  |
| 6376...6405 | Range of changes as in registers 5016 ... 5045 |  |
| Master 5 - register 6 |  |  |
| 6406...6435 | Range of changes as in registers 5016 ... 5045 |  |
| Master 5 - register 7 |  |  |
| 6436...6465 | Range of changes as in registers 5016 ... 5045 |  |
| Master 5 - register 8 |  |  |
| 6466... 6495 | Range of changes as in registers 5016 ... 5045 |  |
| Master 5 - register 9 |  |  |
| 6496...6525 | Range of changes as in registers 5016 ... 5045 |  |
| Master 5 - register 10 |  |  |
| 6526...6555 | Range of changes as in registers 5016 ... 5045 |  |
| Master 6 |  |  |


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| :---: | :---: | :---: |
| 6556...6565 | Range of changes as in registers 5006 ... 5015 |  |
| Master 6 - register 1 |  |  |
| 6566...6595 | Range of changes as in registers 5016 ... 5045 |  |
| Master 6 - register 2 |  |  |
| 6596... 6625 | Range of changes as in registers 5016 ... 5045 |  |
| Master 6 - register 3 |  |  |
| 6626... 6655 | Range of changes as in registers 5016 ... 5045 |  |
| Master 6 - register 4 |  |  |
| 6656... 6685 | Range of changes as in registers 5016 ... 5045 |  |
| Master 6 - register 5 |  |  |
| 6686...6715 | Range of changes as in registers 5016 ... 5045 |  |
| Master 6 - register 6 |  |  |
| 6716...6745 | Range of changes as in registers 5016 ... 5045 |  |
| Master 6 - register 7 |  |  |
| 6746...6775 | Range of changes as in registers 5016 ... 5045 |  |
| Master 6 - register 8 |  |  |
| 6776... 6805 | Range of changes as in registers 5016 ... 5045 |  |
| Master 6 - register 9 |  |  |
| 6806... 6835 | Range of changes as in registers 5016 ... 5045 |  |
| Master 6 - register 10 |  |  |
| 6836...6865 | Range of changes as in registers 5016 ... 5045 |  |
| Master 7 |  |  |
| 6866...6875 | Range of changes as in registers 5006 ... 5015 |  |
| Master 7 - register 1 |  |  |
| 6876...6905 | Range of changes as in registers 5016 ... 5045 |  |
| Master 7 - register 2 |  |  |
| 6906...7035 | Range of changes as in registers 5016 ... 5045 |  |
| Master 7 - register 3 |  |  |
| 6936...7065 | Range of changes as in registers 5016 ... 5045 |  |
| Master 7 - register 4 |  |  |
| 6966...7095 | Range of changes as in registers 5016 ... 5045 |  |
| Master 7 - register 5 |  |  |
| 6996...7125 | Range of changes as in registers 5016 ... 5045 |  |
| Master 7 - register 6 |  |  |
| 7026...7155 | Range of changes as in registers 5016 ... 5045 |  |
| Master 7 - register 7 |  |  |
| 7056...7185 | Range of changes as in registers 5016 ... 5045 |  |
| Master 7 - register 8 |  |  |
| 7086...7215 | Range of changes as in registers 5016 ... 5045 |  |
| Master 7 - register 9 |  |  |
| 7116...7245 | Range of changes as in registers 5016 ... 5045 |  |
| Master 7 - register 10 |  |  |
| 7146...7275 | Range of changes as in registers 5016 ... 5045 |  |
| Master 8 |  |  |
| 7176...7185 | Range of changes as in registers $5006 \ldots 5015$ |  |
| Master 8 - register 1 |  |  |
| 7186...7215 | Range of changes as in registers 5016 ... 5045 |  |
| Master 8 - register 2 |  |  |
| 7216...7245 | Range of changes as in registers 5016 ... 5045 |  |
| Master 8 - register 3 |  |  |
| 7246...7275 | Range of changes as in registers 5016 ... 5045 |  |
| Master 8 - register 4 |  |  |
| 7276...7305 | Range of changes as in registers 5016 ... 5045 |  |
| Master 8 - register 5 |  |  |
| 7306...7335 | Range of changes as in registers 5016 ... 5045 |  |
| Master 8 - register 6 |  |  |
| 7336...7365 | Range of changes as in registers 5016 ... 5045 |  |
| Master 8 - register 7 |  |  |
| 7366...7395 | Range of changes as in registers 5016 ... 5045 |  |
|  |  |  |


| 7396...7425 | Range of changes as in registers 5016 ... 5045 |
| :---: | :---: |
| Master 8 - register 9 |  |
| 7426...7455 | Range of changes as in registers 5016 ... 5045 |
| Master 8 - register 10 |  |
| 7456...7485 | Range of changes as in registers 5016 ... 5045 |
| Master 9 |  |
| 7486... 7495 | Range of changes as in registers 5006 ... 5015 |
| Master 9 - register 1 |  |
| 7496... 7525 | Range of changes as in registers 5016 ... 5045 |
| Master 9 - register 2 |  |
| 7526...7555 | Range of changes as in registers 5016 ... 5045 |
| Master 9 - register 3 |  |
| 7556...7585 | Range of changes as in registers 5016 ... 5045 |
| Master 9 - register 4 |  |
| 7586...7615 | Range of changes as in registers 5016 ... 5045 |
| Master 9 - register 5 |  |
| 7616...7645 | Range of changes as in registers 5016 ... 5045 |
| Master 9 - register 6 |  |
| 7646...7675 | Range of changes as in registers 5016 ... 5045 |
| Master 9 - register 7 |  |
| 7676...7705 | Range of changes as in registers 5016 ... 5045 |
| Master 9 - register 8 |  |
| 7706...7735 | Range of changes as in registers 5016 ... 5045 |
| Master 9 - register 9 |  |
| 7736...7765 | Range of changes as in registers 5016 ... 5045 |
| Master 9 - register 10 |  |
| 7766... 7795 | Range of changes as in registers 5016 ... 5045 |
| Master 10 |  |
| 7796...7805 | Range of changes as in registers 5006 ... 5015 |
| Master 10 - register 1 |  |
| 7806... 7835 | Range of changes as in registers 5016 ... 5045 |
| Master 10 - register 2 |  |
| 7836...7865 | Range of changes as in registers 5016 ... 5045 |
| Master 10 - register 3 |  |
| 7866...7895 | Range of changes as in registers 5016 ... 5045 |
| Master 10 - register 4 |  |
| 7896...7925 | Range of changes as in registers 5016 ... 5045 |
| Master 10 - register 5 |  |
| 7926...7955 | Range of changes as in registers 5016 ... 5045 |
| Master 10 - register 6 |  |
| 7956...7985 | Range of changes as in registers 5016 ... 5045 |
| Master 10 - register 7 |  |
| 7986... 8015 | Range of changes as in registers 5016 ... 5045 |
| Master 10 - register 8 |  |
| 8016... 8045 | Range of changes as in registers 5016 ... 5045 |
| Master 10 - register 9 |  |
| 8046... 8075 | Range of modifications as in registers 5016... 5045 |
| Master 10 - register 10 |  |
| 8076...8105 | Range of changes as in registers 5016 ... 5045 |

Default values for: "Register x-name"
Master 1 - Registers 1 ... 10 name - "MM1-Reg1" ... "MM1-Reg10"
Master 2 - Registers 1 ... 10 name - "MM2-Reg1" ... "MM2-Reg10"
Master 3 - Registers 1. .. 10 name - "MM3-Reg1" ... "MM3-Reg10"
Master 4 - Registers 1 ... 10 name - "MM4-Reg1" ... "MM4-Reg10"
Master 5 - Registers 1 ... 10 name - "MM5-Reg1 "..." MM5-Reg10
"Master 6 - Registers 1 ... 10 name -" MM6-Reg1 "..." MM6-Reg10
"Master 7 - Registers 1 ... 10 name -" MM7-Reg1 "..." MM7-Reg10
"Master 8 -Registers 1 ... 10 Name -" MM8-Reg1 "..." MM8-Reg10
"Master 9 - Registers 1 ... 10 Name -" MM9-Reg1 "..." MM9-Reg10
"Master 10 - Registers 1 ... 10 name - "MM10-Reg1" ... "MM10-
Reg10"

## Group configuration registers

Table 19.

| Register address | Operat ions | Range | Description | $\begin{gathered} \mathrm{By} \\ \text { default } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: |
| 8110 | RW | 0x0000...0x03FF | N group on / off <br> bit 0-0-group 1 disabled, 1 - group 1 enabled <br> bit 1-0-group 2 disabled, 1 - group 1 enabled <br> bit 9-0-group 10 disabled, 1 - group 10 enabled | 0x03FF |
| Group 1 |  |  |  |  |
| 8111 | RW | 0x0000...0x003F | Number of displayed fields <br> bit $0-0$ - field 1 disabled, 1 - field 1 enabled bit $1-0$ - field 2 disabled, 1 - field 1 enabled <br> bit 5 - 0 - field 6 disabled, 1 - field 6 enabled | 0x003F |
| 8112 | RW | 0...2 | Bar chart type <br> 0 - disabled <br> 1 - horizontal <br> 2 - vertical | 1 |
| 8113 | RW | 0...2 | Line charts type <br> 0 - disabled <br> 1 - horizontal <br> 2 - vertical | 1 |
| 8114 | RW | 0... 13 | 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 | 0... 1 | Colour of background 0 - black, 1 - white | 0 |
| Group 1- field 1 |  |  |  |  |
| 8116 | RW | 0... 59 | Value source <br> $0 . . .59$ - virtual channel no | 1 |
| 8117 | RW | 1...6 | Number of sectors | 1 |
| 8118 | RW | 0... 12 | Colour of sector 1 <br> 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 | $\begin{aligned} & -2147400000 \\ & 2147400000 \\ & \hline \end{aligned}$ | High-end colour value for sector 1 Lo $\times 10$ | 0 |
| 8120 | RW |  | High-end colour value for sector $1 \mathrm{Hi} \times 10$ |  |
| 8121 | RW | 0... 12 | Colour of sector 2 <br> 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 | $-2147400000$ <br> 2147400000 | High-end colour value for sector 2 Lo x10 | 1000 |
| 8123 | RW |  | High-end colour value for sector $2 \mathrm{Hi} \times 10$ |  |
| 8124 | RW | 0... 12 | Colour of sector 3 <br> 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 | $\begin{aligned} & -2147400000 \\ & 2147400000 \end{aligned}$ | High-end colour value for sector 3 Lo x10 | 2000 |
| 8126 | RW |  | High-end colour value for sector $3 \mathrm{Hi} \times 10$ |  |
| 8127 | RW | 0... 12 | Colour of sector 4 <br> 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 | 3 |
| 8128 | RW | $\begin{aligned} & -2147400000 \\ & 2147400000 \end{aligned}$ | High-end colour value for sector 4 Lo x10 | 3000 |
| 8129 | RW |  | High-end colour value for sector $4 \mathrm{Hi} \times 10$ |  |


| 8130 | RW | 0... 12 | Colour of sector 5 <br> 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 | 4 |
| :---: | :---: | :---: | :---: | :---: |
| 8131 | RW | $\begin{gathered} \hline-2147400000 \\ \text { A. } \\ 2147400000 \\ \hline \end{gathered}$ | High-end colour value for sector 5 Lo x10 | 4000 |
| 8132 | RW |  | High-end colour value for sector $5 \mathrm{Hi} \times 10$ |  |
| 8133 | RW | 0... 12 | Colour of sector 6 <br> 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 | 5 |
| 8134 | RW | 0... 4 | Decimal point <br> 0 - automatic, $1-0,2-0.0,3-0.00,4-0.000$ <br> Binary values are always displayed without a decimal point as 0 or 1 values | 0 |
| 8135 | RW | 0... 1 | Display of binary values 0 - as a numerical value (0 or 1 ) <br> 1 - as a string <br> (Following subtitles from registers are displayed: Label OFF, <br> Label ON or in the case of mathematical functions 18 ... 20, 33 <br> ... 43 the inscriptions TRUE, FALSE are displayed) | 0 |
| Group 1 - field 2 |  |  |  |  |
| 8136... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 1 - field 3 |  |  |  |  |
| 8156... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 1 - field 4 |  |  |  |  |
| 8176...8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 1 - field 5 |  |  |  |  |
| 8196... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 1 - field 6 |  |  |  |  |
| 8216... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 2 |  |  |  |  |
| 8236... 8 |  |  | Range of modifications as in registers 8111... 8115 |  |
| Group 2 - field 1 |  |  |  |  |
| 8241... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 2 - field 2 |  |  |  |  |
| 8261... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 2 - field 3 |  |  |  |  |
| 8281...8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 2 - field 4 |  |  |  |  |
| 8301... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 2 - field 5 |  |  |  |  |
| 8321... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 2 - field 6 |  |  |  |  |
| 8341... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 3 |  |  |  |  |
| 8361... 8 |  |  | Range of modifications as in registers 8111... 8115 |  |
| Group 3 - field 1 |  |  |  |  |
| 8366... |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 3 - field 2 |  |  |  |  |
| 8386... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 3 - field 3 |  |  |  |  |
| 8406... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 3 - field 4 |  |  |  |  |
| 8426... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 3 - field 5 |  |  |  |  |
| 8446... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 3 - field 6 |  |  |  |  |
| 8466... 8 |  |  | Range of modifications as in registers 8116... 8135 |  |
| Group 4 |  |  |  |  |
| 8486... 8490 |  |  | Range of modifications as in registers 8111... 8115 |  |


| Group 4 - field 1 |  |  |
| :---: | :---: | :---: |
| 8491... 8510 | Range of modifications as in registers 8116... 8135 |  |
| Group 4 - field 2 |  |  |
| 8511... 8530 | Range of modifications as in registers 8116... 8135 |  |
| Group 4 - field 3 |  |  |
| 8531... 8550 | Range of modifications as in registers 8116... 8135 |  |
| Group 4 - field 4 |  |  |
| 8551... 8570 | Range of modifications as in registers 8116... 8135 |  |
| Group 4 - field 5 |  |  |
| 8571...8590 | Range of modifications as in registers 8116... 8135 |  |
| Group 4 - field 6 |  |  |
| 8591... 8610 | Range of modifications as in registers 8116... 8135 |  |
| Group 5 |  |  |
| 8611... 8615 | Range of modifications as in registers 8111... 8115 |  |
| Group 5 - field 1 |  |  |
| 8616... 8635 | Range of modifications as in registers 8116... 8135 |  |
| Group 5 - field 2 |  |  |
| 8636... 8655 | Range of modifications as in registers 8116... 8135 |  |
| Group 5 - field 3 |  |  |
| 8656... 8675 | Range of modifications as in registers 8116... 8135 |  |
| Group 5 - field 4 |  |  |
| 8676... 8695 | Range of modifications as in registers 8116... 8135 |  |
| Group 5 - field 5 |  |  |
| 8696...8715 | Range of modifications as in registers 8116... 8135 |  |
| Group 5 - field 6 |  |  |
| 8716...8735 | Range of modifications as in registers 8116... 8135 |  |
| Group 6 |  |  |
| 8736... 8740 | Range of modifications as in registers 8111... 8115 |  |
| Group 6 - field 1 |  |  |
| 8741... 8760 | Range of modifications as in registers 8116... 8135 |  |
| Group 6 - field 2 |  |  |
| 8761...8780 | Range of modifications as in registers 8116... 8135 |  |
| Group 6 - field 3 |  |  |
| 8781... 8800 | Range of modifications as in registers 8116... 8135 |  |
| Group 6 - field 4 |  |  |
| 8801... 8820 | Range of modifications as in registers 8116... 8135 |  |
| Group 6 - field 5 |  |  |
| 8821...8840 | Range of modifications as in registers 8116... 8135 |  |
| Group 6 - field 6 |  |  |
| 8841...8860 | Range of modifications as in registers 8116... 8135 |  |
| Group 7 |  |  |
| 8861... 8865 | Range of modifications as in registers 8111... 8115 |  |
| Group 7 - field 1 |  |  |
| 8866... 8885 | Range of modifications as in registers 8116... 8135 |  |
| Group 7 - field 2 |  |  |
| 8886... 8905 | Range of modifications as in registers 8116... 8135 |  |
| Group 7 - field 3 |  |  |
| 8906... 8925 | Range of modifications as in registers 8116... 8135 |  |
| Group 7 - field 4 |  |  |
| 8926...8945 | Range of modifications as in registers 8116... 8135 |  |
| Group 7 - field 5 |  |  |
| 8946...8965 | Range of modifications as in registers 8116... 8135 |  |
| Group 7 - field 6 |  |  |
| 8966...8985 | Range of modifications as in registers 8116... 8135 |  |
| Group 8 |  |  |
| 8986... 8990 | Range of modifications as in registers 8111... 8115 |  |
| Group 8 - field 1 |  |  |
| 8991... 9010 | Range of modifications as in registers 8116... 8135 |  |
| Group 8 - field 2 |  |  |
| 9011...9030 | Range of modifications as in registers 8116... 8135 |  |


| Group 8 - field 3 |  |
| :---: | :---: |
| 9031...9050 | Range of modifications as in registers 8116... 8135 |
| Group 8 - field 4 |  |
| 9051...9070 | Range of modifications as in registers 8116... 8135 |
| Group 8 - field 5 |  |
| 9071...9090 | Range of modifications as in registers 8116... 8135 |
| Group 8 - field 6 |  |
| 9091...9110 | Range of modifications as in registers 8116... 8135 |
| Group 9 |  |
| 9111... 9115 | Range of modifications as in registers 8111... 8115 |
| Group 9 - field 1 |  |
| 9116... 9135 | Range of modifications as in registers 8116... 8135 |
| Group 9 - field 2 |  |
| 9126...9155 | Range of modifications as in registers 8116... 8135 |
| Group 9 - field 3 |  |
| 9156...9175 | Range of modifications as in registers 8116... 8135 |
| Group 9 - field 4 |  |
| 9176...9195 | Range of modifications as in registers 8116... 8135 |
| Group 9 - field 5 |  |
| 9196...9215 | Range of modifications as in registers 8116... 8135 |
| Group 9 - field 6 |  |
| 9216...9235 | Range of modifications as in registers 8116... 8135 |
| Group 10 |  |
| 9236... 9240 | Range of modifications as in registers 8111... 8115 |
| Group 10 - field 1 |  |
| 9241... 9260 | Range of modifications as in registers 8116... 8135 |
| Group 10 - field 2 |  |
| 9261...9280 | Range of modifications as in registers 8116... 8135 |
| Group 10 - field 3 |  |
| 9281...9300 | Range of modifications as in registers 8116... 8135 |
| Group 10 - field 4 |  |
| 9301...9320 | Range of modifications as in registers 8116... 8135 |
| Group 10 - field 5 |  |
| 9321...9340 | Range of modifications as in registers 8116... 8135 |
| Group 10 - field 6 |  |
| 9341... 9360 | Range of modifications as in registers 8116... 8135 |

Inputs and Outputs configuration registers

| Register address | Operati ons | Range | Description | By default |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | Slot (Z) Out 1 (relay) |  |
| 9370 | RW | 0... 59 | Value source (channel no.) | 0 |
| 9371 | RW | 0... 1 | Relay operation state <br> 0 - normal (contacts closed in the active state) <br> 1 - negated (contacts open in the active state) | 0 |
| 9372 | RW | 0, 0x2020..0x7A7A | OFF tag ASCII 2 and 1 characters | 0x4F46 |
| 9373 | RW | 0, 0x2020..0x7A7A | OFF tag ASCII 4 and 3 characters | 0x4620 |
| 9374 | RW | 0, 0x2020..0x7A7A | OFF tag ASCII 6 and 5 characters | 0x2020 |
| 9375 | RW | 0, 0x2020..0x7A7A | OFF tag ASCII 8 and 7 characters | 0x2020 |
| 9376 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 2 and 1 characters | 0x4F4E |
| 9377 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 4 and 3 characters | 0x2020 |
| 9378 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 6 and 5 characters | 0x2020 |
| 9379 | RW | 0, 0x2020..0x7A7A | 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 |  |  | reserved |  |
| 9388 |  |  | reserved |  |
| 9389 |  |  | reserved |  |
| 9390 | RW | 0, 0x2020..0x7A7A | name ASCII 2 and 1 characters | 0x2020 |
| 9391 | RW | 0, 0x2020..0x7A7A | name ASCII 4 and 3 characters | 0x2020 |
| 9392 | RW | 0, 0x2020..0x7A7A | name ASCII 6 and 5 characters | 0x2020 |
| 9393 | RW | 0, 0x2020..0x7A7A | name ASCII 8 and 7 characters | 0x2020 |
| 9394 | RW | 0, 0x2020..0x7A7A | name ASCII 10 and 9 characters | 0x2020 |
| 9395 | RW | 0, 0x2020..0x7A7A | name ASCII 12 and 11 characters | 0x2020 |
| 9396 | R | 0, 0x2020..0x7A7A | Unit ASCII 2 and 1 characters | 0x2020 |
| 9397 | R | 0, 0x2020..0x7A7A | Unit ASCII 4 and 3 characters | 0x2020 |
| 9398 | R | 0, 0x2020..0x7A7A | Unit ASCII 6 and 5 characters | 0x2020 |
| 9399 | R | 0, 0x2020..0x7A7A | Unit ASCII 8 and 7 characters | 0x2020 |
|  |  |  | Slot (Z) Out 2 (relay) |  |
| 9400.. 9429 |  |  | As registers 9370. 9399 |  |
|  |  |  | Slot (Z) In 1 (binary input) |  |
| 9430 | RW | 0, 0x2020..0x7A7A | OFF tag ASCII 2 and 1 characters | 0x4F46 |
| 9431 | RW | 0, 0x2020..0x7A7A | OFF tag ASCII 4 and 3 characters | 0x4620 |
| 9432 | RW | 0, 0x2020..0x7A7A | OFF tag ASCII 6 and 5 characters | 0x2020 |
| 9433 | RW | 0, 0x2020..0x7A7A | OFF tag ASCII 8 and 7 characters | 0x2020 |
| 9434 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 2 and 1 characters | 0x4F4E |
| 9435 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 4 and 3 characters | 0x2020 |
| 9436 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 6 and 5 characters | 0x2020 |
| 9437 | RW | 0, 0x2020..0x7A7A | ON tag ASCII 8 and 7 characters | 0x2020 |
| 9438 | RW | 0.1 | Active state for the input 0 - normal <br> 1 - negated | 0 |
| 9439 |  |  | reserved |  |
| 9440 |  |  | reserved |  |
| 9441 |  |  | reserved |  |
| 9442 |  |  | reserved |  |
| 9443 |  |  | reserved |  |
| 9444 |  |  | reserved |  |
| 9445 | RW | 0, 0x2020..0x7A7A | name ASCII 2 and 1 characters | 0x2020 |
| 9446 | RW | 0, 0x2020..0x7A7A | name ASCII 4 and 3 characters | 0x2020 |
| 9447 | RW | 0, 0x2020..0x7A7A | name ASCII 6 and 5 characters | 0x2020 |
| 9448 | RW | 0, 0x2020..0x7A7A | name ASCII 8 and 7 characters | 0x2020 |
| 9449 | RW | 0, 0x2020..0x7A7A | name ASCII 10 and 9 characters | 0x2020 |
| 9450 | RW | 0, 0x2020..0x7A7A | name ASCII 12 and 11 characters | 0x2020 |
| 9451 | R | 0, 0x2020..0x7A7A | Unit ASCII 2 and 1 characters | 0x2020 |
| 9452 | R | 0, 0x2020..0x7A7A | Unit ASCII 4 and 3 characters | 0x2020 |
| 9453 | R | 0, 0x2020..0x7A7A | Unit ASCII 6 and 5 characters | 0x2020 |
| 9454 | R | 0, 0x2020..0x7A7A | Unit ASCII 8 and 7 characters | 0x2020 |
|  |  |  | Slot (Z) In 2 (binary input) |  |
| $9455 . .9479$ |  |  | As registers 9430. 9454 |  |
| $6 \times$ relay outputs module |  |  |  |  |
|  |  |  | Slot (X) Out 1 (relay) |  |
| $9480 . .9509$ |  |  | As registers 9370.9399 |  |
|  |  |  | Slot (X) Out 2 (relay) |  |
| $9510 . .9539$ |  |  | As registers 9370.9399 |  |
|  |  |  | Slot (X) Out 3 (relay) |  |
| 9540.. 9569 |  |  | As registers 9370. 9399 |  |


| Register address | Oper ations | Range | Description | By default |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | Slot (X) Out 4 (relay) |  |
| $9570 . .9599$ |  |  | As registers 9370.9399 |  |
|  |  |  | Slot (X) Out 5 (relay) |  |
| 9600.. 9629 |  |  | As registers 9370. 9399 |  |
|  |  |  | Slot (X) Out 6 (relay) |  |
| 9630.. 9659 |  |  | As registers 9370. 9399 |  |
|  |  |  | Slot (Y) Out 1 (relay) |  |
| $9660 . .9689$ |  |  | As registers 9370. 9399 |  |
|  |  |  | Slot (Y) Out 2 (relay) |  |
| $9690 . .9719$ |  |  | As registers 9370.9399 |  |
|  |  |  | Slot (Y) Out 3 (relay) |  |
| $9720 . .9749$ |  |  | As registers 9370.9399 |  |
|  |  |  | Slot (Y) Out 4 (relay) |  |
| 9750..9779 |  |  | As registers 9370.9399 |  |
|  |  |  | Slot (Y) Out 5 (relay) |  |
| 9780..9809 |  |  | As registers 9370. 9399 |  |
|  |  |  | Slot (Y) Out 6 (relay) |  |
| $9810 . .9839$ |  |  | As registers 9370. 9399 |  |

$4 \times$ relay outputs module $+4 \times$ binary inputs separated from each other

|  |  |  |
| :--- | :--- | :--- |
| $9840 . .9869$ |  |  |
|  |  |  |
| $9870 . .9899$ |  |  |

Slot (X) Out 1 (relay)
Slot (X) Out 2 (relay)

|  |  |  |
| :---: | :--- | :--- |
| $9900 . .9929$ |  |  |
|  |  |  |
| $9930 . .9959$ |  |  |
|  |  |  |
| 9960.9984 |  |  |

As registers 9370.9399
Slot (X) Out 3 (relay)
As registers 9370.9399
Slot (X) Out 4 (relay)
As registers 9370.9399
Slot (X) In 1 (binary input)
As registers 9430.9454
Slot (X) In 2 (binary input)
As registers 9430.9454
Slot (X) In 3 (binary input)
As registers 9430.9454
Slot (X) In 4 (binary input)
As registers 9430.9454
Slot (Y) Out 1
As registers 9370.9399
Slot (Y) Out 2
As registers 9370.9399
Slot (Y) Out 3
As registers 9370.9399
Slot (Y) Out 4
As registers 9370.9399
Slot (Y) In 1 (binary input)
As registers 9430. 9454
Slot (Y) In 2 (binary input)
As registers 9430.9454
Slot (Y) In 3 (binary input)
As registers 9430. 9454
Slot (Y) In 4 (binary input)
As registers 9430. 9454
$4 \times$ analogue output module $+4 \times$ binary inputs with common ground

|  |  |  | Slot (X) Out 1 (Analogue output) |  |
| :--- | :---: | :---: | :--- | :---: |
| 10280 | RW | $0 \ldots 59$ | Value source (channel no.) | 0 |
| 10281 | RW | $0 / 400 \ldots 2000$ | The output state in case of an event (error, <br> exceeding the range Lo or Hi) x100 | 0 |
| 10282 | RW | -2147400000 | Lo input lower threshold (Lo inp) x100 | -99999999 |
| 10283 | RW | $\ldots$ | Hi input lower threshold (Lo inp) $\times 100$ |  |



| Register address | Oper ations | Range | Description | By default |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\begin{array}{\|l} \hline 4 \text { - +-75mV, } 5-0 . .75 \mathrm{mV}, \\ 6-+-40 \mathrm{~mA}, 7-0 . .40 \mathrm{~mA}, \\ 8 \text { - Pt100, } 9-\text { Pt500, } 10-\mathrm{Pt} 1000, \\ 11 \text { - } 0 . .4000 \text { Ohm, } \\ 12 \text { - TC J, } 13 \text { - TC K, } \\ 14 \text { - TC N, } 15-\text { TC E, } \\ 16-\text { TC T, } 17-\text { TC S, } \\ 18 \text { - TC R, } 19-\text { TC B } \\ \hline \end{array}$ |  |
| 10681 | RW | $0 . .1$ | Sensor connecting type 0-3 wire, 1-2 wire or Type of compensation 0 - automatic, 1 - manual | 1 |
| 10682 | RW | 0... 6000 | Wire resistance $\times 100$ or Compensation value $\times 100$ | 0 |
| 10683 | RW | -200... 200 | Temperature offset $\times 10$ | 0 |
| 10684 | RW | 50... 600 | Averaging time x10 | 5 |
| 10685 | RW | $0 . .1$ | Unit for TC and Pt sensors $0-\mathrm{C}^{\circ}$ degree, $1-\mathrm{F}^{\circ}$ degree | 0 |
| 10686 | RW | -9999999.. 9999999 | Min Lo x10 | -120 |
| 10687 | RW |  | Min. Hi x10 |  |
| 10688 | RW | -9999999.. 9999999 | Max Lo x10 | 120 |
| 10689 | RW |  | Max Hi x10 |  |
| 10690 |  |  | reserved |  |
| 10691 |  |  | reserved |  |
| 10692 |  |  | reserved |  |
| 10693 |  |  | reserved |  |
| 10694 |  |  | 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 | R |  | Unit ASCII 2 and 1 characters |  |
| 10702 | R |  | Unit ASCII 4 and 3 characters |  |
| 10703 | R |  | Unit ASCII 6 and 5 characters |  |
| 10704 | R |  | Unit ASCII 8 and 7 characters |  |
|  |  |  | Slot (X) In 2 (universal input) |  |
| 10705.. 10729 |  |  | As registers 10680. 10704 |  |
|  |  |  | Slot (X) In 3 (universal input) |  |
| 10730.. 10754 |  |  | As registers 10680. 10704 |  |
|  |  |  | Slot (X) In 4 (universal input) |  |
| 10755.. 10779 |  |  | As registers 10680. 10704 |  |
|  |  |  | Slot (Y) In 1 (universal input) |  |
| 10780..10804 |  |  | As registers 10680. 10704 |  |
|  |  |  | Slot (Y) In 2 (universal input) |  |
| 10805.. 10829 |  |  | As registers 10680. 10704 |  |
|  |  |  | Slot (Y) In 3 (universal input) |  |
| 10830.. 10854 |  |  | As registers 10680. 10704 |  |
|  |  |  | Slot (Y) In 4 (universal input) |  |
| 10855.. 10879 |  |  | As registers 10680. 10704 |  |

Logical channels configuration registers
Table 21

| Register address | Opera tions | Range | Description | $\begin{gathered} \mathrm{By} \\ \text { default } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: |
| 10900 | RW | 0x0000...0xFFFF | 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 <br> bit 15-0-channel 16 disabled, 1 - channel 16 enabled | 0xFFFF |
| 10901 | RW | 0x0000...0xFFFF | Enabling / disabling logic channels 17 ... 32 bit 16-0-channel 17 disabled, 1 - channel 17 enabled bit 17-0-channel 18 disabled, 1 - channel 18 enabled <br> bit 31-0-channel 32 disabled, 1- channel 32 enabled | 0x0000 |
| 10902 | RW | 0x0000...0xFFFF | 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 <br> bit 47-0-channel 48 disabled, 1 - channel 48 enabled | 0x0000 |
| 10903 | RW | 0x0000...0x0FFF | 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 <br> bit 59-0-channel 60 disabled, 1 - channel 60 enabled | 0x0000 |
| Logical channel 1 |  |  |  |  |
| 10904 | RW | 0...6 | 0- Inputs 1 - Outputs 2 - Modbus Master 3 - Mathematical function 4 - From another channel $5-$ Scaling function 6 - Alarm function | 0 |
| 10905 | RW | 0...2/9/19/59 | Source selection range of changes: <br> for Source type $=0$ and 1 - the range of changes depends on the recorder hardware configuration (0 ... 2-12) <br> for Source type $=2$ - range of changes ( $0 \ldots 9$ ) <br> for Source type $=3$ - range of changes ( $0 \ldots 27$ ) <br> for Source type $=4-$ range of changes ( $0 \ldots 59$ ) <br> for Source type $=5$ and 6 - range of changes ( $0 \ldots$ 19) | 0 |
| 10906 | RW | 0...9 | Register selection when Source Type: 2 - Modbus master 0 - Register 1, ..., 9 - Register 10 | 0 |
| 10907 |  |  | reserved |  |
| 10908 |  |  | reserved |  |
| Logical channel 2 |  |  |  |  |
| 10909...1 |  |  | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 3 |  |  |  |  |
| 10914... |  |  | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 4 |  |  |  |  |
| 10919...1 |  |  | Range of modifications as in registers 10904...10908 |  |
| Logical channel 5 L |  |  |  |  |
| 10924...1 |  |  | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 6 |  |  |  |  |
| 10929...1 |  |  | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 7 |  |  |  |  |
| 10934...1 |  |  | Range of modifications as in registers 10904...10908 |  |
| Logical channel 8 |  |  |  |  |
| 10939... 1 | 943 |  | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 9 |  |  |  |  |
| 10944... 10948 |  |  | Range of modifications as in registers 10904...10908 |  |
| Logical channel 10 |  |  |  |  |
| 10949... 10953 |  |  | Range of modifications as in registers 10904... 10908 |  |


| Logical channel 11 |  |  |
| :---: | :---: | :---: |
| 10954...10958 | Range of modifications as in registers 10904...10908 |  |
| Logical channel 12 |  |  |
| 10959... 10963 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 13 |  |  |
| 10964... 10968 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 14 |  |  |
| 10969... 10973 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 15 |  |  |
| 10974...10978 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 16 |  |  |
| 10979... 10983 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 17 llat |  |  |
| 10984... 10988 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 18 |  |  |
| 10989...10993 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 19 |  |  |
| 10994...10998 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 20 |  |  |
| 10999...11003 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 21 |  |  |
| 11004...11008 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 22 |  |  |
| 11009...11013 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 23 |  |  |
| 11014...11018 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 24 |  |  |
| 11019...11023 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 25 |  |  |
| 11024...11028 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 26 |  |  |
| 11029... 11033 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 27 |  |  |
| 11034...11038 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 28 |  |  |
| 11039... 11043 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 29 |  |  |
| 11044...11048 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 30 |  |  |
| 11049...11053 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 31 |  |  |
| 11054...11058 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 32 |  |  |
| 11059... 11063 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 33 |  |  |
| 11064...11068 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 34 |  |  |
| 11069...11073 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 35 |  |  |
| 11074..11078 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 36 |  |  |
| 11079...11083 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 37 |  |  |
| 11084...11088 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 38 |  |  |
| 11089... 11093 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 39 |  |  |
| 11094...11098 | Range of modifications as in registers 10904... 10908 |  |
| Logical channel 40 |  |  |
| 11099... 11103 | Range of modifications as in registers 10904... 10908 |  |


| Logical channel 41 |  |  |
| :---: | :---: | :---: |
| 11104．．．11108 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 42 |  |  |
| 11109．．． 11113 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 43 |  |  |
| 11114．．． 11118 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 44 |  |  |
| 11119．．． 11123 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 45 |  |  |
| 11124．．．11128 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 46 |  |  |
| 11129．．． 11133 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 47 |  |  |
| 11134．．．11138 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 48 |  |  |
| 11139．．． 11143 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 49 |  |  |
| 11144．．． 11148 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 50 |  |  |
| 11149．．． 11153 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 51 |  |  |
| 11154．．．11158 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 52 |  |  |
| 11159．．．11163 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 53 |  |  |
| 11164．．．11168 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 54 |  |  |
| 11169．．． 11173 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 55 |  |  |
| 11174．．．11178 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 56 |  |  |
| 11179．．． 11183 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 57 |  |  |
| 11184．．． 11188 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 58 |  |  |
| 11189．．．11193 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 59 |  |  |
| 11194．．．11198 | Range of modifications as in registers 10904．．． 10908 |  |
| Logical channel 60 |  |  |
| 11199．．． 11203 | Range of modifications as in registers 10904．．． 10908 |  |

Table．Configuration registers of＂Mt＂mathematical functions Table 22

| Register address | Operat ions | Range | Description | Sufficient param． in the maths function．$\begin{aligned} & \bullet \text { - yes } \\ & \text { ख- no } \end{aligned}$ |  |  | By default |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Mt 1 |  |  |  | $1 . .6$ | $7 . .11$ | 12.28 |  |
| 11300 | RW | 0．．． 28 | Type of mathematical function 0 －function disabled 1 ．．． 28 －function number（see the list of functions） | $\bullet$ | $\bullet$ | $\bullet$ | 0 |
| 11301 | RW | 0．．． 1 | Source type <br> 0－From a logical channel <br> X 1－Constant value of $X$ | $\bullet$ | 囚 | $\bullet$ | 0 |
| 11302 | RW | 0．．． 59 | No of the logical channel X | $\bullet$ | 区 | $\bullet$ | 0 |
| 11303 | RW | $\begin{gathered} 2147400000 \\ \text { : } \\ 2147400000 \end{gathered}$ | Numerical value X Lo x10 | － | 区 | $\bullet$ | 0 |
| 11304 | RW |  | Numerical value $\mathrm{X} \mathrm{Hix10}$ |  |  |  |  |
| 11305 | RW | 0．．．0xFFFF | List of logical channel 1． 16 bit 0－0－logic channel 1 not selected， 1 －channel logical 1 selected． <br> bit 1－0－logic channel 2 not selected，1－channel | 区 | $\bullet$ | 区 | 0 |


|  |  |  | logical 2 selected． <br> bit 15－0－logic channel 16 not selected，1－ logic channel 16 selected |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 11306 | RW | 0．．．0xFFFF | 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 <br> bit 31－0－logic channel 32 not selected，1－ logic channel 32 selected | 区 | $\bullet$ | 区 | 0 |
| 11307 | RW | 0．．．0xFFFF | 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 <br> bit 47－0－logic channel 48 not selected，1－ logic channel 48 selected | 区 | $\bullet$ | 区 | 0 |
| 11308 | RW | 0．．．0x0FFF | 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 <br> bit 59－0－logic channel 60 not selected，1－ logic channel 60 selected | 区 | $\bullet$ | 区 | 0 |
| 11309 | RW | 0．．． 1 | In the event of an error： <br> 0 －include channel with error in calculations <br> 1 －omit channel in calculations | 区 | $\bullet$ | 区 | 1 |
| 11310 | RW | 0．．． 1 | Source type 0 －From a logical channel Y 1－Constant value of $Y$ | 区 | 区 | $\bullet$ | 0 |
| 11311 | RW | 0．．． 59 | No of the logical channel Y | 区 | 区 | $\bullet$ | 0 |
| 11312 | RW |  | Numerical value Y Lo x10 |  |  |  |  |
| 11313 | RW | $\begin{gathered} 2147400000 \\ 2147400000 \end{gathered}$ | Numerical value Y Hi x10 | 区 | 区 | $\bullet$ | 0 |
| 11314 | RW |  | Min．value to display Lo x10 |  |  |  |  |
| 11315 | RW | $\begin{aligned} & 2147400000 \\ & 2147400000 \end{aligned}$ | Min．value to display Hi x10 | $\bullet$ | $\bullet$ | $\bullet$ | $\begin{gathered} 999999 \\ 9 \end{gathered}$ |
| 11316 | RW |  | Max．value to display Lo x10 |  |  |  |  |
| 11317 | RW | $\begin{gathered} 2147400000 \\ \text {... } \\ 2147400000 \end{gathered}$ | Max．value to display Hi x10 | $\bullet$ | $\bullet$ | $\bullet$ | $\begin{gathered} 999999 \\ 9 \end{gathered}$ |
| 11318 |  |  | reserved |  |  |  |  |
| 11319 |  |  | reserved |  |  |  |  |
| Mt 2 |  |  |  |  |  |  |  |
| 11320．．． 11339 |  |  | Range of changes as in registers $11300 . .11319$ |  |  |  |  |
| Mt 3 |  |  |  |  |  |  |  |
| 11340．．． 11359 |  |  | Range of changes as in registers $11300 . .11319$ |  |  |  |  |
| Mt 4 |  |  |  |  |  |  |  |
| 11360．．． 11379 |  |  | Range of changes as in registers $11300 \ldots 11319$ |  |  |  |  |
| Mt 5 |  |  |  |  |  |  |  |
| 11380．．． 11399 |  |  | Range of changes as in registers $11300 \ldots 11319$ |  |  |  |  |
| Mt 6 |  |  |  |  |  |  |  |
| 11400．．． 11419 |  |  | Range of changes as in registers $11300 . .11319$ |  |  |  |  |
| Mt 7 |  |  |  |  |  |  |  |
| 11420．．． 11439 |  |  | Range of changes as in registers $11300 \ldots 11319$ |  |  |  |  |
| Mt 8 |  |  |  |  |  |  |  |


| 11440... 11459 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Mt 9 |  |  |  |  |  |
| 11460... 11479 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |
| Mt 10 |  |  |  |  |  |
| 11480... 11499 | Range of changes as in registers $11300 . . .11319$ |  |  |  |  |
| Mt 11 |  |  |  |  |  |
| 11500... 11519 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |
| Mt 12 |  |  |  |  |  |
| 11520... 11439 | Range of changes as in registers $11300 . . .11319$ |  |  |  |  |
| Mt 13 |  |  |  |  |  |
| 11540... 11459 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |
| Mt 14 |  |  |  |  |  |
| 11560... 11579 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |
| Mt 15 |  |  |  |  |  |
| 11580... 11599 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |
| Mt 16 |  |  |  |  |  |
| 11600... 11619 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |
| Mt 17 |  |  |  |  |  |
| 11620. 11639 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |
| Mt 18 |  |  |  |  |  |
| 11640... 11659 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |
| Mt 19 |  |  |  |  |  |
| 11660... 11679 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |
| Mt 20 |  |  |  |  |  |
| 11680...11699 | Range of changes as in registers 11300 ... 11319 |  |  |  |  |

Configuration registers of „Scal" scaling functions

| Register address | Operatio ns | Range | Description | By default |
| :---: | :---: | :---: | :---: | :---: |
| Scal 1 |  |  |  |  |
| 11800 | RW | 0... 59 | No of the logical channel | 0 |
| 11801 | - | - | reserved |  |
| 11802 | - | - | reserved |  |
| 11803 | - |  | reserved |  |
| 11804 | RW | 2... 20 | Number of points of multi-points characteristics | 0 |
| 11805 | RW | $\begin{gathered} -2147400000 \\ . . \\ 2147400000 \end{gathered}$ | Input value 1 Lo x10 | 0 |
| 11806 | RW |  | Input value $1 \mathrm{Hi} \times 10$ |  |
| 11807 | RW | $\begin{gathered} \hline-2147400000 \\ . . \\ 2147400000 \end{gathered}$ | Output value 1 Lo x10 | 0 |
| 11808 | RW |  | Output value $1 \mathrm{Hi} \times 10$ |  |
| 11809 | RW | $-2147400000$ | Input value 2 Lo x10 | 10 |
| 11810 | RW | 2147400000 | Input value $2 \mathrm{Hix10}$ |  |
| 11811 | RW | $\begin{gathered} -2147400000 \\ . \\ 2147400000 \end{gathered}$ | Output value 2 Lo x10 | 10 |
| 11812 | RW |  | Output value $2 \mathrm{Hi} \times 10$ |  |
| 11813 | RW | $-2147400000$ | Input value 3 Lo x10 | 0 |
| 11814 | RW | 2147400000 | Input value 3 Hi x10 |  |
| 11815 | RW | $\begin{gathered} -2147400000 \\ . . \\ 2147400000 \end{gathered}$ | Output value 3 Lo x10 | 0 |
| 11816 | RW |  | Output value $3 \mathrm{Hi} \times 10$ |  |
| 11817 | RW | $\begin{gathered} \hline-2147400000 \\ . . \\ 2147400000 \end{gathered}$ | Input value 4 Lo x10 | 0 |
| 11818 | RW |  | Input value 4 Hi x 10 |  |


| 11819 | RW |  | Output value 4 Lo x10 | 0 |
| :---: | :---: | :---: | :---: | :---: |
| 11820 | RW | 2147400000 | Output value $4 \mathrm{Hi} \times 10$ |  |
| 11821 | RW | -2147400000 | Input value 5 Lo x10 | 0 |
| 11822 | RW | 2147400000 | Input value $5 \mathrm{Hix10}$ |  |
| 11823 | RW | $-2147400000$ | Output value 5 Lo $\times 10$ | 0 |
| 11824 | RW | 2147400000 | Output value $5 \mathrm{Hi} \times 10$ |  |
| 11825 | RW | $-2147400000$ | Input value 6 Lo x10 | 0 |
| 11826 | RW | 2147400000 | Input value 6 Hix 10 |  |
| 11827 | RW | $-2147400000$ | Output value 6 Lo x10 | 0 |
| 11828 | RW | 2147400000 | Output value 6 Hi x 10 |  |
| 11829 | RW | $-2147400000$ | Input value 7 Lo x10 | 0 |
| 11830 | RW | 2147400000 | Input value $7 \mathrm{Hi} \times 10$ |  |
| 11831 | RW | $-2147400000$ | Output value 7 Lo x10 | 0 |
| 11832 | RW | 2147400000 | Output value $7 \mathrm{Hi} \times 10$ |  |
| 11833 | RW | $-2147400000$ | Input value 8 Lo x10 | 0 |
| 11834 | RW | 2147400000 | Input value $8 \mathrm{Hi} \mathrm{x10}$ |  |
| 11835 | RW | $-2147400000$ | Output value 8 Lo $\times 10$ | 0 |
| 11836 | RW | 2147400000 | Output value $8 \mathrm{Hi} \times 10$ |  |
| 11837 | RW | $-2147400000$ | Input value 9 Lo x10 | 0 |
| 11838 | RW | 2147400000 | Input value $9 \mathrm{Hix10}$ |  |
| 11839 | RW | $-2147400000$ | Output value 9 Lo $\times 10$ | 0 |
| 11840 | RW | 2147400000 | Output value $9 \mathrm{Hi} \times 10$ |  |
| 11841 | RW |  | Input value 10 Lo x10 | 0 |
| 11842 | RW | 2147400000 | Input value 10 Hix 10 |  |
| 11843 | RW | $-2147400000$ | Output value 10 Lo x10 | 0 |
| 11844 | RW | 2147400000 | Output value 10 Hi x 10 |  |
| 11845 | RW | $-2147400000$ | Min. value for display Lo x10 | -9999999 |
| 11846 | RW | 2147400000 | Min. value for display Hi x10 |  |
| 11847 | RW | $-2147400000$ | Max value to display Lo x10 | 9999999 |
| 11848 | RW | 2147400000 | Max value to display Hi x10 |  |
| 11849 | RW | $\begin{gathered} \hline 0,0 \times 2020 \\ \ldots \\ 0 \times 7 \mathrm{~A} 7 \mathrm{~A} \end{gathered}$ | Unit ASCII 2 and 1 characters | 0x2020 |
| 11850 | RW | $\begin{gathered} 0,0 \times 2020 \\ \ldots \\ 0 \times 7 \mathrm{~A} 7 \mathrm{~A} \end{gathered}$ | Unit ASCII 4 and 3 characters | 0x2020 |


| 11851 | RW | $\begin{gathered} 0,0 \times 2020 \\ \ldots \\ 0 \times 7 \mathrm{~A} 7 \mathrm{~A} \\ \hline \end{gathered}$ | Unit ASCII 6 and 5 characters | 0x2020 |
| :---: | :---: | :---: | :---: | :---: |
| 11852 | RW | 0,0×2020 <br> 0x7A7A | Unit ASCII 8 and 7 characters | 0x2020 |
| 11853 |  |  | reserved |  |
| 11854 |  |  | reserved |  |
| 11855 |  |  | reserved |  |
| 11856 |  |  | reserved |  |
| 11857 |  |  | reserved |  |
| 11858 |  |  | reserved |  |
| 11859 |  |  | reserved |  |
| Scal 2 |  |  |  |  |
| 11860... 11919 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 3 |  |  |  |  |
| Scal 4 ... Range of changes as in registers 1 $800 \ldots$... 1859 |  |  |  |  |
|  |  |  |  |  |
| 11980... 12039 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 5 |  |  |  |  |
| 12040... 12099 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 6 |  |  |  |  |
| 12100... 12159 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 7 |  |  |  |  |
| 12160... 12219 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 8 |  |  |  |  |
| 12220... 12279 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 9 |  |  |  |  |
| 12280...12339 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 10 loll |  |  |  |  |
| 12340...12399 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 11 |  |  |  |  |
| 12400... 12459 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 12 |  |  |  |  |
| 12460...12519 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 13 |  |  |  |  |
| $12520 \ldots 12579$ Range of changes as in registers 11800 ... 11859 |  |  |  |  |
|  |  |  |  |  |
| 12580... 12639 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 15 |  |  |  |  |
| 12640...12699 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 16 |  |  |  |  |
| 12700...12759 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 17 |  |  |  |  |
| 12760...12819 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 18 |  |  |  |  |
| 12820...12879 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 19 ll |  |  |  |  |
| 12880...12939 |  |  | Range of changes as in registers 11800 ... 11859 |  |
| Scal 20 |  |  |  |  |
| 12940...12999 |  |  | Range of changes as in registers 11800 ... 11859 |  |

Table: Configuration registers of „Alarm" alarm functions
Table 24

| Register address | Operat ions | Range | Description | By default |
| :---: | :---: | :---: | :---: | :---: |
| Alarm 1 |  |  |  |  |
| 13800 | RW | $0 . .59$ | Channel no | 0 |
| 13801 | RW | 0...2 | Alarm state in case of error (Err, Hi, Lo) 0 - no changes | 2 |


|  |  |  | 1 - alarm activated 2 - alarm disabled |  |
| :---: | :---: | :---: | :---: | :---: |
| 13802 | RW | 0... 5 | Alarm type <br> 0 - manually disabled <br> 1 - manually enabled <br> 3 - active below the Lo threshold <br> 4 - active above the Hi threshold <br> 5 - active between Lo Hi thresholds <br> 6 - active outside Lo Hi thresholds | 0 |
| 13803 | RW | -2147400000 | Lower threshold Lo x10 |  |
| 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 | 0...65000 | Hysteresis $\times 10$ | 0 |
| 13808 | RW | $0 . . .65000 \mathrm{~s}$ | Alarm activation delay | 0 |
| 13809 | RW | $0 . .65000 \mathrm{~s}$ | Alarm de-activation delay | 0 |
| 13810 | RW | $0 . .65000 \mathrm{~s}$ | Minimum alarm activation time | 0 |
| 13811 | RW | $0 . .65000 \mathrm{~s}$ | Minimum alarm de-activation time | 0 |
| 13812 | RW | 0... 1 | Alarm latching 0 - disabled 1- enabled | 0 |
| 13813 | RW | 0...1 | Maintaining the alarm signalling on the display / in status 0 - disabled <br> 1- enabled | 0 |
| 13814 | RW | 0...1 | Clearing the alarm / alarm support 0 - no reaction <br> 1 - clearing | 0 |
|  |  |  |  |  |
| 13815...13829 Range of changes as in registers 13000 ... 13014 |  |  |  |  |
|  |  |  |  |  |
| 13830... 13844 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 4 |  |  |  |  |
| 13845... 13859 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 5 |  |  |  |  |
| 13860... 13874 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 6 |  |  |  |  |
| 13875... 13889 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 7 |  |  |  |  |
| 13890...13904 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 8 |  |  |  |  |
| 13905...13919 Range of changes as in registers 13000 ... 13014 |  |  |  |  |
|  |  |  |  |  |
| 13920... 13934 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 10 loll |  |  |  |  |
| 13935... 13949 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 11 |  |  |  |  |
| 13950... 13964 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 12 |  |  |  |  |
| 13965... 13979 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 13 |  |  |  |  |
| Alarm 14 |  |  | Range of changes as in registers 13000 ... 13014 |  |
|  |  |  |  |  |
| 13995... 14009 |  |  | Range of changes as in registers 13000 ... 13014 |  |
|  |  |  |  |  |
| 14010...14024 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 16 |  |  |  |  |
| 14025...14039 |  |  | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 17 |  |  |  |  |
| 14040...14054 |  |  | Range of changes as in registers 13000 ... 13014 |  |


| Alarm 18 |  |  |
| :---: | :---: | :---: |
| 14055... 14069 | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 19 |  |  |
| 14070... 14084 | Range of changes as in registers 13000 ... 13014 |  |
| Alarm 20 |  |  |
| 14085... 14099 | Range of changes as in registers 13000 ... 13014 |  |

Registers with inputs/outputs measurement values
Table 25

| Register address | $\begin{aligned} & \text { Operatio } \\ & \mathrm{ns} \end{aligned}$ | Range | Description | By default |
| :---: | :---: | :---: | :---: | :---: |
| Slot (Z) |  |  |  |  |
| 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 |  |
| $6 \times$ relay outputs module |  |  |  |  |
| 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 |  |
| $4 \times$ relay outputs module $+4 \times$ binary 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$) \ln 1$ |  |
| 14330 | R | 0.1 | Slot ( X$) \ln 2$ |  |
| 14332 | R | 0.1 | Slot ( X ) $\ln 3$ |  |
| 14334 | R | 0.1 | Slot (X) $\ln 4$ |  |
| 4 x analogue output module +4 x binary 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$) \mathrm{In} 2$ |  |
| 14348 | R | 0.1 | Slot ( X$) \mathrm{ln} 3$ |  |
| 14350 | R | 0.1 | Slot ( X ) $\ln 4$ |  |
| $4 \times$ programmable measuring inputs module |  |  |  |  |
| 14352 | R |  | Slot ( X ) In 1(measurement value) |  |
| 14354 | R |  | Slot ( X$) \ln 2$ (measurement value) |  |
| 14356 | R |  | Slot ( X$) \mathrm{In} 3$ (measurement value) |  |
| 14358 | R |  | Slot ( X$) \ln 4$ (measurement value) |  |
| $6 \times$ relay outputs module |  |  |  |  |
| 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 |  |
| $4 \times$ relay outputs module $+4 \times$ binary 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) $\ln 3$ |  |
| 14386 | R | 0.1 | Slot (Y) In 4 |  |
| $4 \times$ analogue output module $+4 \times$ binary inputs with common ground |  |  |  |  |
| 14388 | R | $0 . .22000$ | Slot (Y) Out 1 (current) (mA x 1000) |  |
| 14390 | R | $0 . .22000$ | Slot (Y) Out 2 (current) (mA x 1000) |  |
| 14392 | R | $0 . .22000$ | Slot (Y) Out 3 (current) (mA x 1000) |  |
| 14394 | R | $0 . .22000$ | 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) $\ln 4$ |  |
| $4 \times$ programmable measuring inputs module |  |  |  |  |
| 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 channels measurement values

| Register <br> address | Operations | Description | By default |
| :--- | :--- | :--- | :--- |
| 14500 | R | Value from channel 1 |  |
| 14502 | R | Valu 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 | Valu 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 | Valu from channel 12 |  |
| 14524 | R | Valu 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 | Valu 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 | Valu 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 | Valu 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 | Valu from channel 34 |  |
| 14568 | R | Value from channel 35 |  |
| 14570 | R | Value from channel 36 |  |


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

## 10 Technical data

Table 27.

| Sensor type/ Input signal | Standard |  |  | Basic error |
| :---: | :---: | :---: | :---: | :---: |
| - PT100 | PN-EN 60751:2009 | $-200 \ldots 850^{\circ} \mathrm{C}$ | $-328 \ldots 1562{ }^{\circ} \mathrm{F}$ | 0.2\% |
| $\stackrel{\text { ¢ P P }}{\text { ¢ }}$ |  | $-200 . . .850^{\circ} \mathrm{C}$ | -328... $1562{ }^{\circ} \mathrm{F}$ | 0.2\% |
| PT1000 |  | $-200 \ldots 850^{\circ} \mathrm{C}$ | $-328 \ldots 1562{ }^{\circ} \mathrm{F}$ | 0.2\% |
| Fe-CuNi (J) | PN-EN 60584-1:2014 | $-100 . .1200^{\circ} \mathrm{C}$ | -148... $2192{ }^{\circ} \mathrm{F}$ | 0.2\% |
| Cu-CuNi (T) |  | $-100 . .400^{\circ} \mathrm{C}$ | $-148 . . .752{ }^{\circ} \mathrm{F}$ | 0.2\% |
| NiCr-NiAl (K) |  | $-100 . .1370^{\circ} \mathrm{C}$ | -148... $2498{ }^{\circ} \mathrm{F}$ | 0.2\% |
| PtRh10-Pt (S) |  | $-5 . .1760^{\circ} \mathrm{C}$ | 23... $3200{ }^{\circ} \mathrm{F}$ | 0.2\% |
| PtRh13-Pt (R) |  | $-5 . .1760^{\circ} \mathrm{C}$ | 23... $3200{ }^{\circ} \mathrm{F}$ | 0.2\% |
| PtRh30-PtRh6 (B) |  | 200 .. $1820^{\circ} \mathrm{C}$ | 392... $3200{ }^{\circ} \mathrm{F}$ | 0.5\% |
| NiCr-CuNi (E) |  | $-100 . .1000^{\circ} \mathrm{C}$ | -148... $1832{ }^{\circ} \mathrm{F}$ | 0.2\% |
| NiCrSi-NiSi (N) |  | $-100 . .1300^{\circ} \mathrm{C}$ | $-148 \ldots 2372{ }^{\circ} \mathrm{F}$ | 0.2\% |
| Voltage |  | $\pm 10000 \mathrm{mV}, \pm 300 \mathrm{mV}, \pm 75 \mathrm{mV}$, $10000 \mathrm{mV}, 300 \mathrm{mV}, 75 \mathrm{mV}$, |  | 0.2\% |
| Current |  | $\pm 40 \mathrm{~mA}, 40 \mathrm{~mA}$ |  | 0.2\% |
| Resistance R |  | 0 .. $4000 \Omega$ |  | 0.2\% |


| Reading field | 3.5 "TFT colour graphic screen with a resolution of $320 \times 240$ <br> pixels |
| :--- | :--- |
| Power module | Power consumption |
|  | $\leq 12 \mathrm{VA}$ |
|  | Serial slave interface RS485 |
|  | Modbus RTU 8N2,8E1,8O1,8N1. Address 1..247, |
|  | baud rate $9.6,19.2,38.4,57.6,115.2$ kbit / s, |
|  | maximum time to start the response: 600 ms |

## In1 .. In4

$0 . .1 \mathrm{~V}$ d.c. - inactive binary input , 6 ... 24
V d.c. - active binary input, power consumption: $7.5 \mathrm{~mA} / 24 \mathrm{~V}$
$4 x$ analogue output module +4 $x$ binary inputs with common ground

## Out1 .. Out4

$0 \ldots 20 \mathrm{~mA}(4 \ldots 20 \mathrm{~mA})$ programmable. Load resistance $\leq 400 \Omega$ Available voltage 10 V . Basic error $0.2 \%$.

## In1 .. In4

$0 . .1 \mathrm{~V}$ d.c. - inactive binary input , 6 ... 24
V d.c. - active binary input, power consumption: $7.5 \mathrm{~mA} / 24 \mathrm{~V}$

## In1 .. In4

4 RTD universal inputs (PT100, PT500, PT1000),
TC (J, T, K, S, R, B, E, N), voltage $\pm 75 \mathrm{mV}, \pm 300 \mathrm{mV}, \pm 10 \mathrm{~V}$ current $\pm 40 \mathrm{~mA}$, Resistance R (0 .. $4000 \Omega$ ).
Resistance input current (RTD, R) 175 uA Resistance of external measuring circuits for RTD inputs and resistance $R$ :
max $60 \Omega$ 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.
$\pm 20 \mathrm{ppm}$, real clock battery- CR1220
Archiving period (registration interval) $1 . .3600$ 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.
8GB file archive memory.

## Protection level

 provided by the casingfrom the frontal side - IP 65
terminals - IP 20
Weight 0.3 kg
Dimensions $96 \times 96 \times 77 \mathrm{~mm}$
Reference conditions and rated operating conditions.

- power supply $85 . .253 \mathrm{~V}$ a.c. (40..50..60..400) Hz or $90 . .300 \mathrm{~V}$ d.c. or $20 . .60 \mathrm{~V}$ d.c.
- ambient temperature
- storage temperature
- humidity
$-10 . .23$.. $+55^{\circ} \mathrm{C}$, class K55 according to PN-EN61557-12
-20 .. $+70^{\circ} \mathrm{C}$
0 .. 40 .. 60 .. $95 \%$ (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 $<50 \% / 10^{\circ} \mathrm{C}$


## 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 $<2000 \mathrm{~m}$,


## 11 Kod wykonań

Kod wykonań rejestratora KD6 przedstawiono w tablicy 28

| KD6 X | X | X | XX | X | X |
| :---: | :---: | :---: | :---: | :---: | :---: |
| I/O module - slot $\mathrm{X}^{*}$ : |  |  |  |  |  |
| 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 x binary inputs with common ground | 3 |  |  |  |  |
| $4 \times$ programmable measuring inputs module | 4 |  |  |  |  |
| Supply voltage: |  |  |  |  |  |
| 85...253 V a.c., $90 . . .300 \mathrm{~V}$ d.c. |  | 1 |  |  |  |
| 20...60V d.c. |  | 2 |  |  |  |
| Version: |  |  |  |  |  |
| standard |  |  | 00 |  |  |
| custom-made** |  |  | XX |  |  |
| Language: |  |  |  |  |  |
| Polish/English |  |  |  | M |  |
| other* |  |  |  | X |  |
| Acceptance tests: |  |  |  |  |  |
| with test certificate |  |  |  |  |  |
| with calibration certificate |  |  |  |  |  |
| acc.to customer's request** |  |  |  |  |  |

[^0]
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e-mail: export@lumel.com.pl

## Calibration \& Attestation:

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[^0]:    * all possible variants for slot X are described in the user manual in chapter 11
    ** only after agreeing with the manufacturer

