sifam tinsley
PRECISION INSTRUMENTATION

PROCESS RECORDER WITH TOUCH SCREEN

KD10

USER MANUAL

CE

TABLE of CONTENT

1 General specification

1.1 Intended Use of the Recorder

The KD10 screen recorder is designed as a data collection station in measurement and control systems. It is used for measuring, visualizing, and monitoring parameters of technical processes in various industries, such as food processing, chemical, and paper industries. It can also function as an autonomous measuring and recording instrument.

The KD10 screen recorder is adapted for measuring voltage, current, temperature, resistance changes, and other quantities converted into electrical signals or parameters. Measurement data can also come from communication interfaces (Ethernet, RS485). The device performs all processes inherent to a measurement system, including input signal measurement, data processing, visualization, archiving, signaling, and communication with external systems.

Processed measurement data is stored in internal memory and on an SD card.

1.2 Device characteristics

- Intuitive operation using a touch screen and a graphical user interface based on the Linux system
- 5.6” TFT color LCD screen, 640x480 pixels
- communication interfaces: Ethernet 10/100 Base-T, Modbus TCP/IP Slave, Modbus TCP/IP Master, RS-485 Modbus Slave
- IP65 housing protection from the user's side
- time zone selection, automatic summer/winter time change, synchronization with a time server
- archival data recording on an SD card
- www and FTP server
- digital signature for archived data, stored in sqlite3, csv or binary format
- alarm and audit log
- firmware update option
- dedicated visualization in the form of, among others: digital, analogue, trends displays.
- extended mathematical functions

1.3 Safety of use

Note! Removing the recorder housing during the warranty period will invalidate the warranty.

- The assembly and installation of electrical connections should be performed by a person authorized to assemble electrical devices.
- Before turning on the power supply to the recorder, check the correctness of the connections.
- Before removing the recorder housing, turn off its power supply and disconnect the measuring circuits.
- The device is intended for installation and use in industrial electromagnetic environmental conditions.
- The building installation should have a switch or circuit breaker located near the device, easily accessible to the operator and appropriately marked.

1.3.1 Warning and information signs

One or more of the following symbols may be used on the recorder and in the materials supplied with the device:

	Note: pay attention to the description in the device's operating instructions.
	Protective conductor terminal.
	Note: device under voltage.
	Protection of electrostatically sensitive systems (ESD).
	Waste electrical and electronic equipment (WEEE). Dispose of in accordance with the law.

1.3.2 Safety of operation

The KD10 recorder meets the requirements for the safety of electrical measuring instruments for automation according to PN-EN 61010-1 and the requirements for immunity to disturbances occurring in an industrial environment according to PN-EN 61000-6-2 and PN-EN 61000-6-4.

Incorrect connection of the power supply, communication interfaces, measurement signals and use of equipment that is not in accordance with the description contained in this manual and the standards as above may damage the recorder.

The building installation should have a switch or circuit breaker, located near the device, easily accessible to the operator and appropriately marked.

1.3.3 Comments on device mounting

Various sources of interference affect the KD10 recorder continuously or in a pulsed manner from the power supply network (due to the operation of other devices) and also overlap with the measured signal or auxiliary circuits of the recorder. In particular, large pulse interferences are dangerous to the operation of the device, because they can cause sporadic erroneous measurement results or accidental activation of alarms. The level of such interferences should be reduced to a value lower than the recorder's immunity threshold, primarily through its appropriate mounting on the site.

In this respect, it is recommended to follow the following recommendations:

- do not power the recorder from the network near devices generating large pulse interferences in the power supply network and do not use common grounding circuits with them,
- signal cables should be shielded,
- the connections of communication interface circuits should be run individually in a shield as above twisted wires,
- all screens should be grounded on one side at the recorder,
- avoid a common grounding wire with other devices,
- apply the general rule that wires (bundles) leading different signals should be routed as far apart from each other as possible and intersections of such bundles should be made at a 90° angle,
- the building installation should have a switch or circuit breaker located near the device, easily accessible to the operator and appropriately marked,
- the recorder housing must not be dismantled, all repairs and changes to the device equipment should be performed by the manufacturer,
- the assembly and installation of electrical connections should be performed by a person with qualifications for the assembly of electrical devices,

- safeguards ensuring the safety of the device may be less effective if used contrary to the manufacturer's instructions and the principles of good engineering practice,
- the STAR-TEC 74271132 ferrite filter included in the equipment should be installed on the power supply cable (near the recorder).

1.3.4 ESD protection measures

The semiconductor elements used in the recorder's construction may be damaged by electrostatic discharge (ESD).

To prevent this, the following recommendations must be followed during service work:

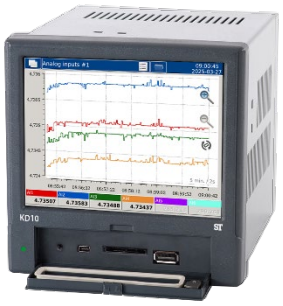
- dismantle the devices only in an area protected against electrostatic discharge,
- use conductive materials in the work area to dissipate electrostatic charges,
- use only antistatic packaging to store electronic components and packages,
- do not touch components and packages with your hands,
- do not keep materials susceptible to generating electrostatic charges in the work area.

1.4 Recorder set

The set includes:

1. KD10 recorder 1 pc.
2. Holder for mounting in a board 1 set (4 pcs.)
3. Set of plugs 1 set (quantity depends on the version)
4. Shortened user manual 1 pc.
5. SD memory card 1 pc.
6. Key 1 pc.
7. STAR-TEC ferry filter 74271132 1 pc.

1.



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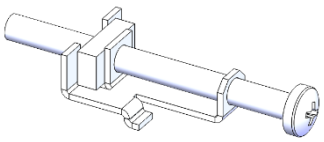

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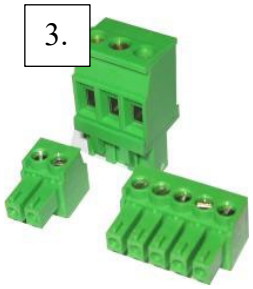

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1.5 Recorder construction

1.5.1 Back panels of the KD10 recorder

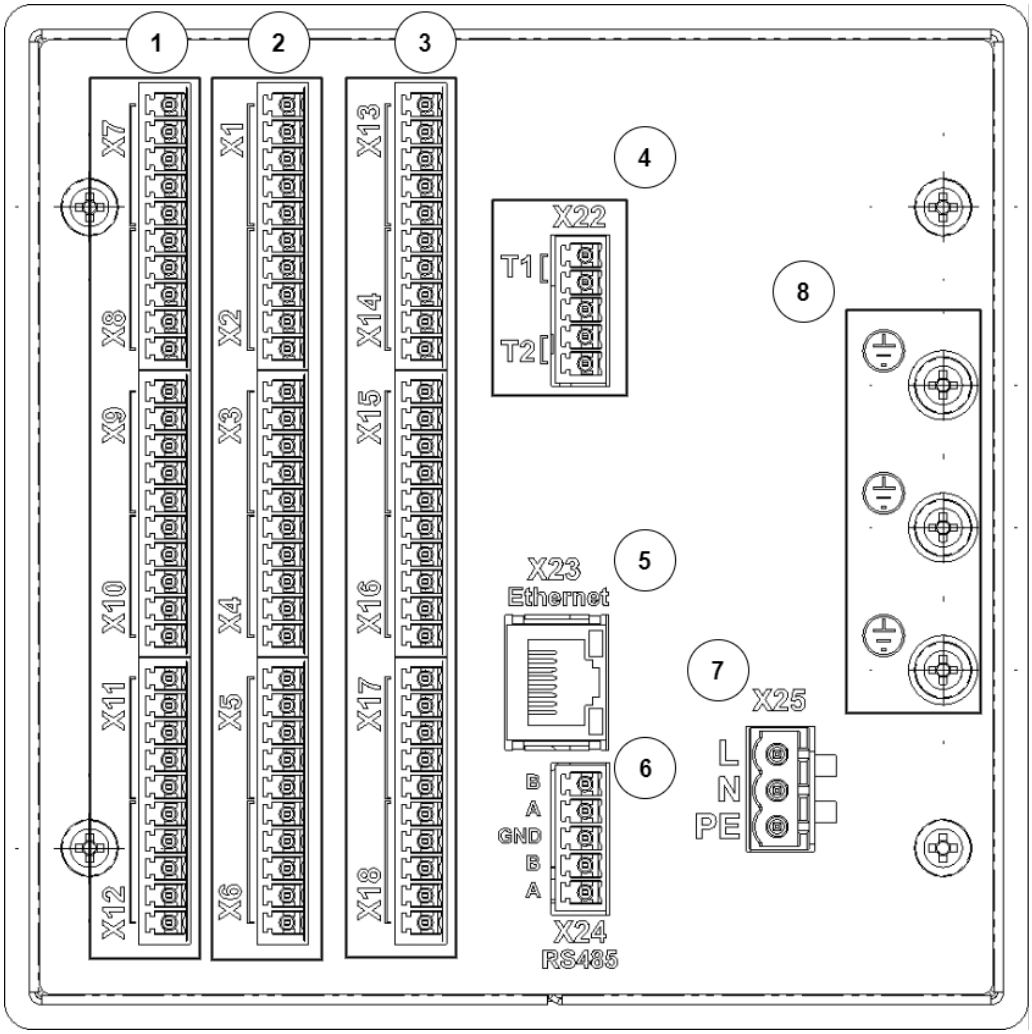


Figure 1: Back panel of the 18-channels recorder.

Element	Description
1	Slot 1 – 6 programmable measurement inputs (x7 ... x12)
2	Slot 2 - 6 programmable measurement inputs (x1 ... x6)
3	Slot 3 - 6 programmable measurement inputs (x13 ... x18)
4	Temperature or resistance measurement inputs. (x22)
5	Ethernet communication interface. (x23)
6	RS-485 Modbus Slave communication interface (x24)
7	KD10 recorder power supply (x25)
8	Grounding terminals for connecting screens

Figure 2 shows the terminal board 12-channels KD10 versions. The slot marked with number three can hold four different cards, depending on the version.

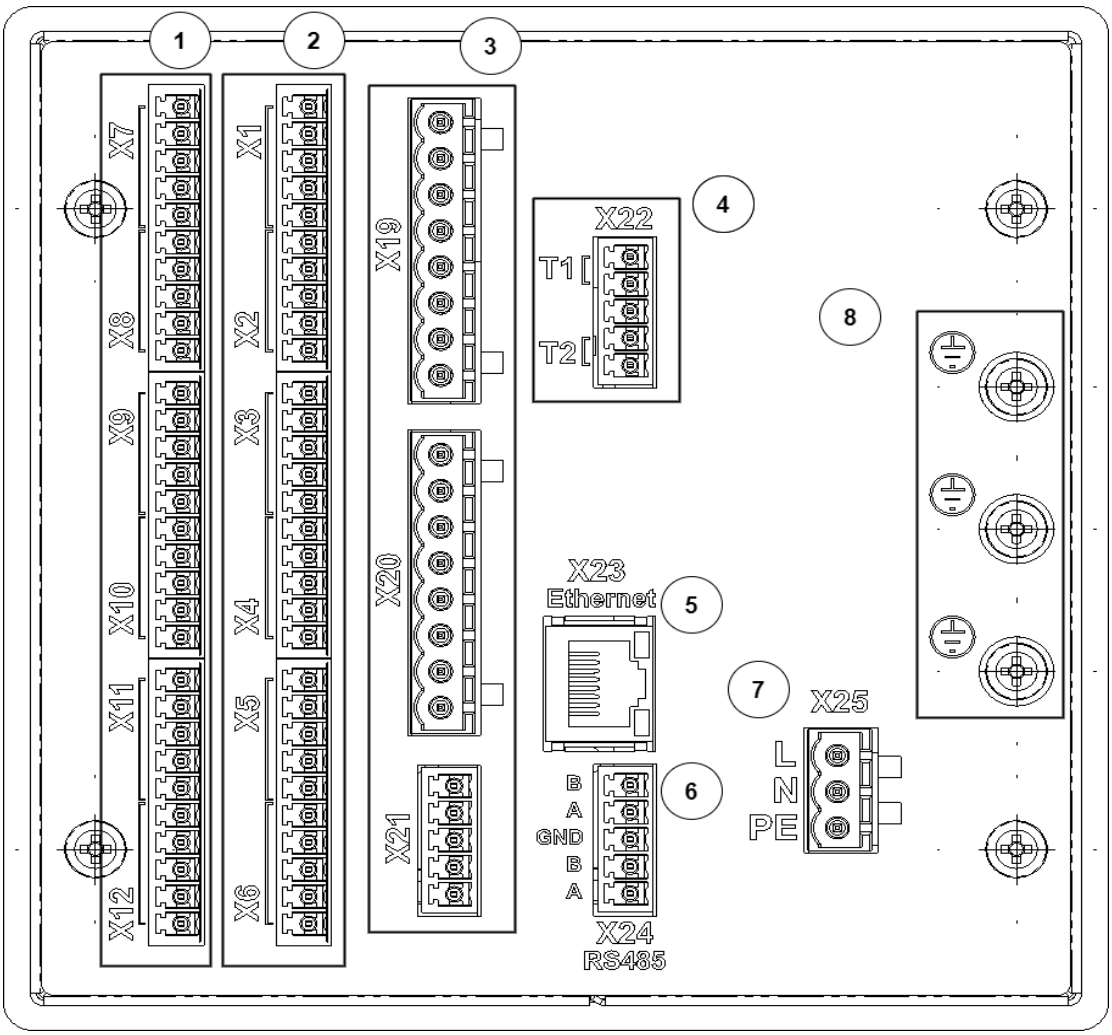


Figure 2: Back panel of the 12-channels recorder with extension cards.

Element	Description
1	Slot 1 – 6 programmable measurement inputs (x7 … x12)
2	Slot 2 – 6 programmable measurement inputs (x1 … x6)
3	Slot 3 with 4 possible extension cards (acc. to the ordering code): • 8 relay outputs (x19, x20) and RS-485 Modbus Master (x21) • 6 binary inputs (x20), 4 relay outputs (x19) and RS-485 Modbus Master (x21) • 6 binary inputs (x20), 3 analog outputs (x19) and RS-485 Modbus Master (x21) • 4 binary inputs (x21), 6 analog outputs (x19, x20)
4	Temperature or resistance measurement inputs (X22)
5	Ethernet communication interface (X23)
6	RS-485 Modbus Slave communication interface (X24)
7	KD10 recorder power supply (X25)
8	Grounding terminals for connecting screens

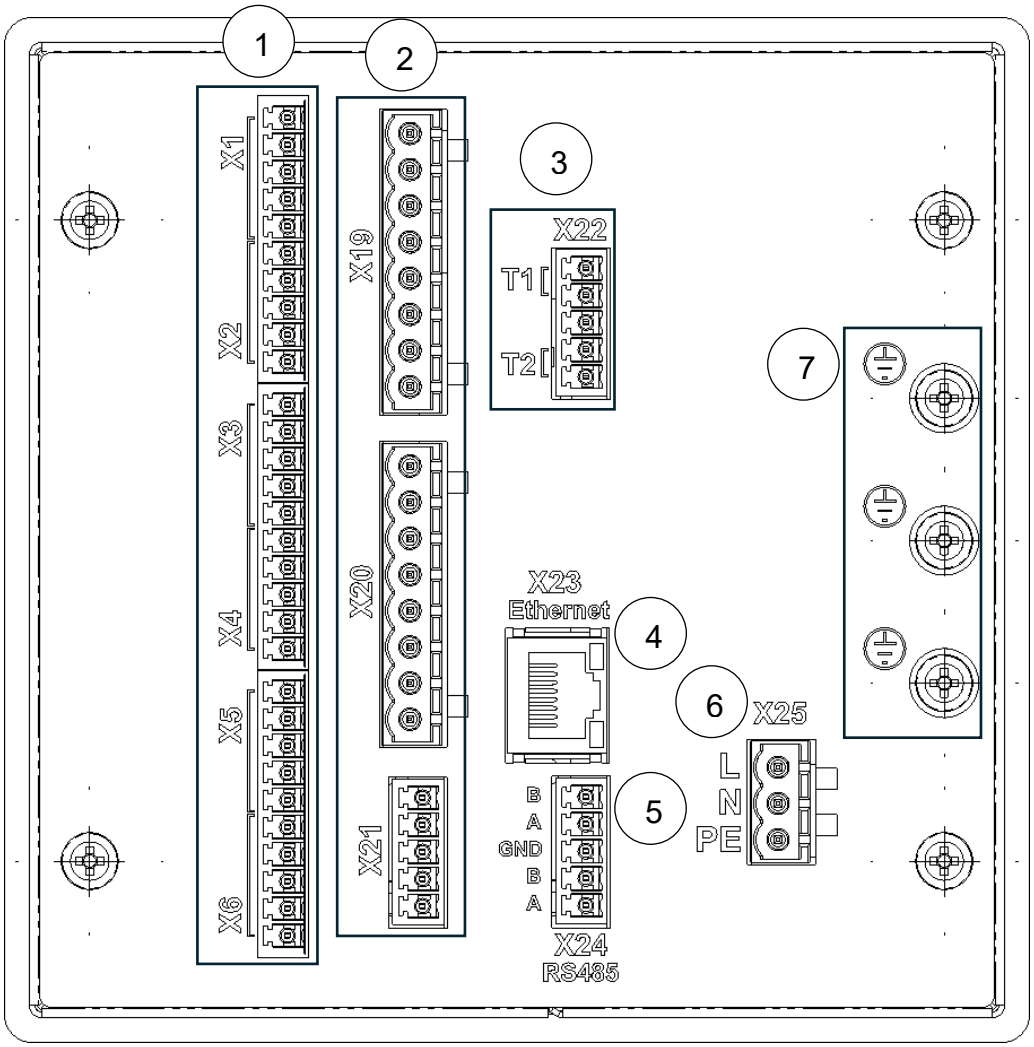


Figure 3: Back panel of the 6-channels recorder with extension cards.

Element	Description
1	Slot 1 – 6 programmable measurement inputs (x1 … x6)
2	Slot 3 with 4 possible extension cards (acc. to the ordering code): • 8 relay outputs (x19, x20) and RS-485 Modbus Master (x21) • 6 binary inputs (x20), 4 relay outputs (x19) and RS-485 Modbus Master (x21) • 6 binary inputs (x20), 3 analog outputs (x19) and RS-485 Modbus Master (x21) • 4 binary inputs (x21), 6 analog outputs (x19, x20)
3	Temperature or resistance measurement inputs (X22)
4	Ethernet communication interface (X23)
5	RS-485 Modbus Slave communication interface (X24)
6	KD10 recorder power supply (X25)
7	Grounding terminals for connecting screens.

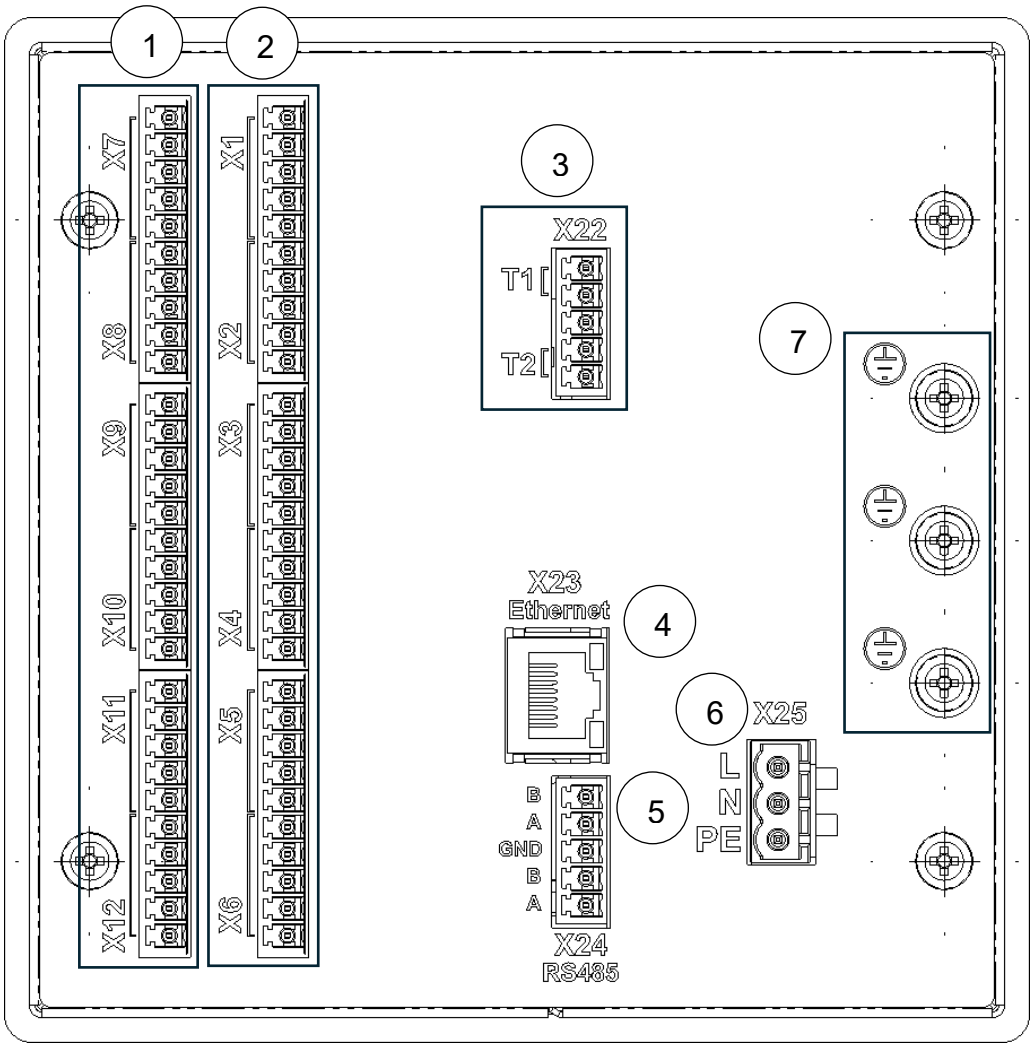


Figure 4: Back panel of the 12-channels recorder w/o extension cards.

Element	Description
1	Slot 1 – 6 programmable measurement inputs (x7 … x12)
2	Slot 2 – 6 programmable measurement inputs (x1 … x6)
3	Temperature or resistance measurement inputs (X22)
4	Ethernet communication interface (X23)
5	RS-485 Modbus Slave communication interface (X24)
6	KD10 recorder power supply (X25)
7	Grounding terminals for connecting screens

1.5.2 Connection of measurement signals

1.5.2.1 Programmable measurement inputs

- Connection diagram for DC voltage signals, +/-10V

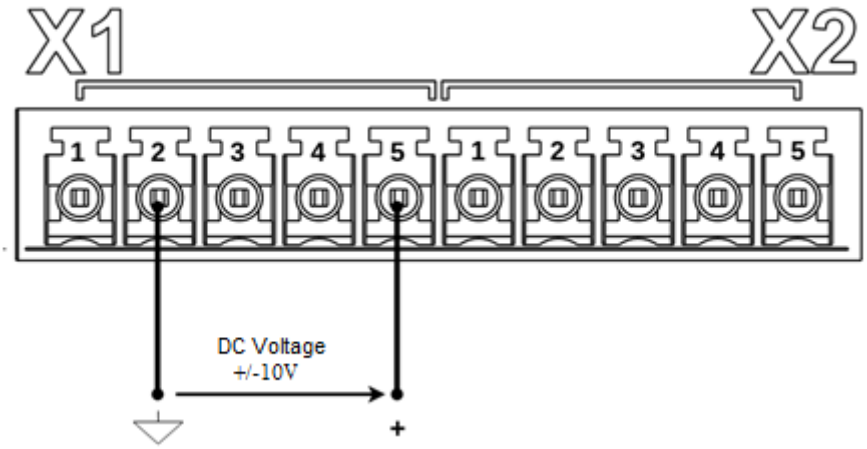


Figure 5: Connection diagram for DC voltage signals, +/-10 V.

- Connection diagram for DC current signals, +/-20mA

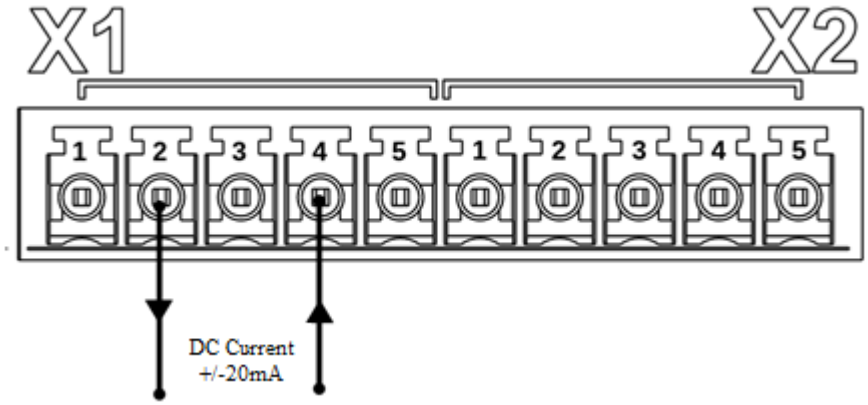


Figure 6: Connection diagram for DC current signals, +/-20 mA.

- Shunt and TC connection diagram

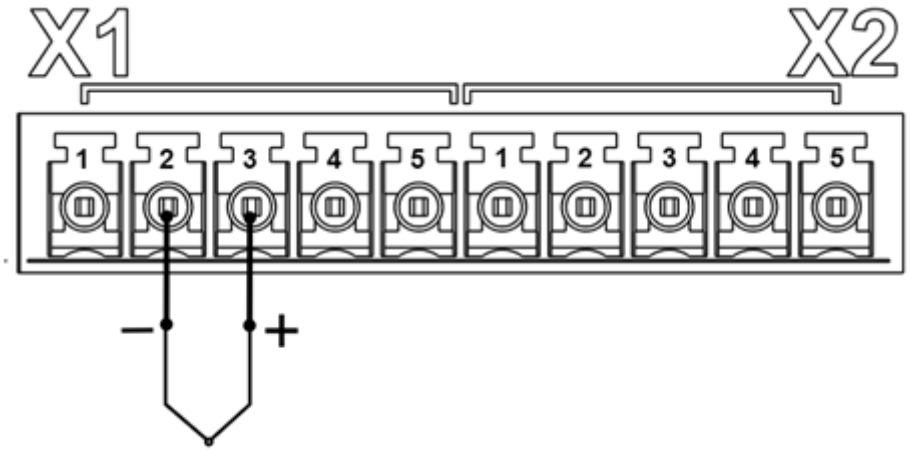


Figure 7:Shunt and thermocouple TC connection diagram.

- RTD connection diagram
-

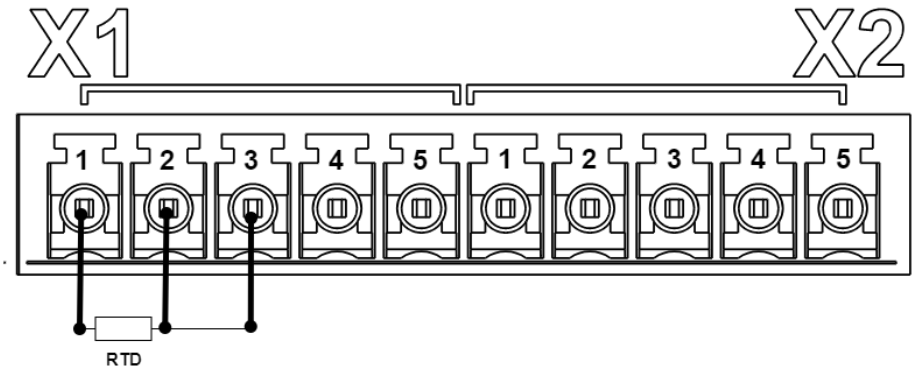


Figure 8: Resistance thermometer RTD connection diagram.

1.5.2.2 8 Relay Output Card

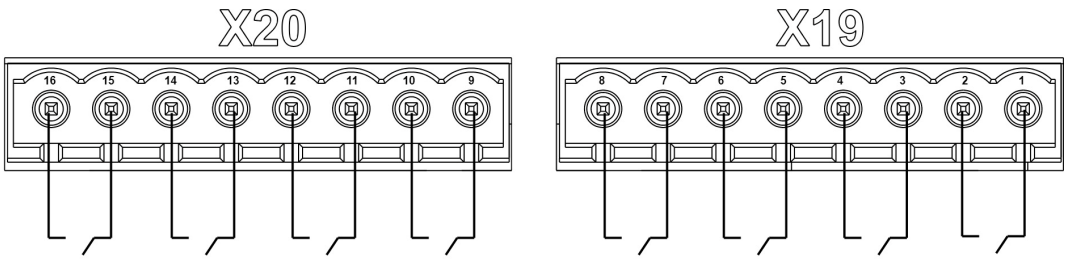


Figure 9: Relay outputs.

Relay outputs are normally open (NO). Where:

X19	X20
terminals 1-2: output 1	terminals 9-10: output 5
terminals 3-4: output 2	terminals 11-12: output 6
terminals 5-6: output 3	terminals 13-14: output 7
terminals 7-8: output 4	terminals 15-16: output 8

The card has a connector (X21) for the RS-485 Modbus Master interface.

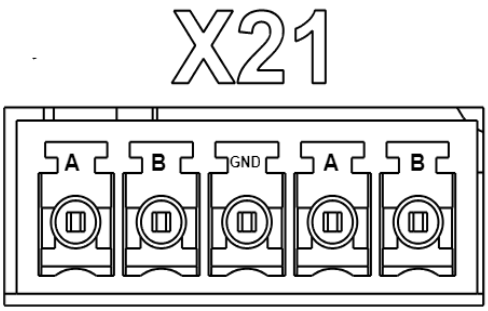


Figure 10: RS-485 interface.

1.5.2.3 6 binary inputs, 4 relay outputs card

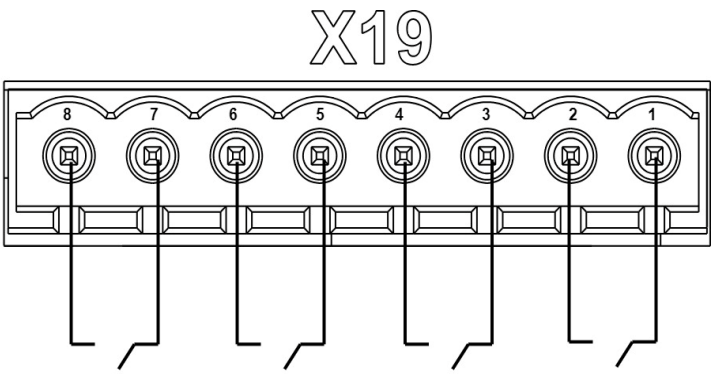


Figure 11: Relay outputs.

Connecting relay outputs
Relay outputs are normally open (NO). Where:

X19
terminals 1-2: output 1
terminals 3-4: output 2
terminals 5-6: output 3
terminals 7-8: output 4

Connections of binary inputs

Binary inputs controlled by signals:
0 V dc – binary input inactive
+5...24 V dc – input as binary input active
+8...24 V dc – input as counting input (high level)

X20	
Terminal 9	S(X) In1 binary input
Terminal 10	S(X) In2 binary input
Terminal 11	S(X) In3 binary input
Terminal 12	common for inputs S(X) In1-3
Terminal 13	S(X) In4 binary input
Terminal 14	S(X) In5 binary input
Terminal 15	S(X) In6 binary input
Terminal 16	common for inputs S(X) In4-6

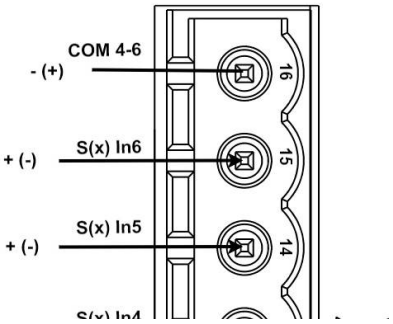
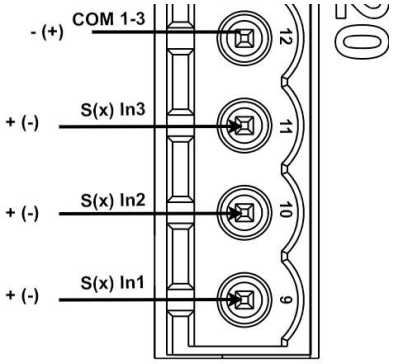


Figure 12: Binary inputs



The card has a connector (X21) for the RS-485 Modbus Master interface.

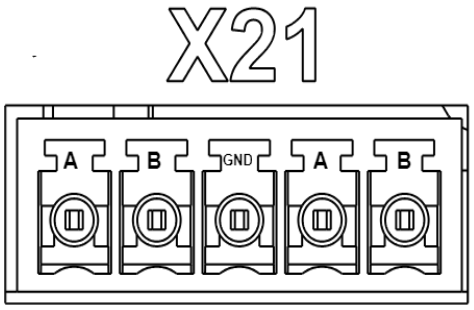


Figure 13: RS-485 interface.

1.5.2.4 6 binary inputs, 3 analog outputs card

The version with analog outputs uses the upper part of the extension card connector, and includes 3 pairs of terminals**:**

X19
Terminals 1– 2: analog output 1 (AO1)
Terminals 4 – 5: analog output 2 (AO2)
Terminals 7 – 8: analog output 3 (AO3)

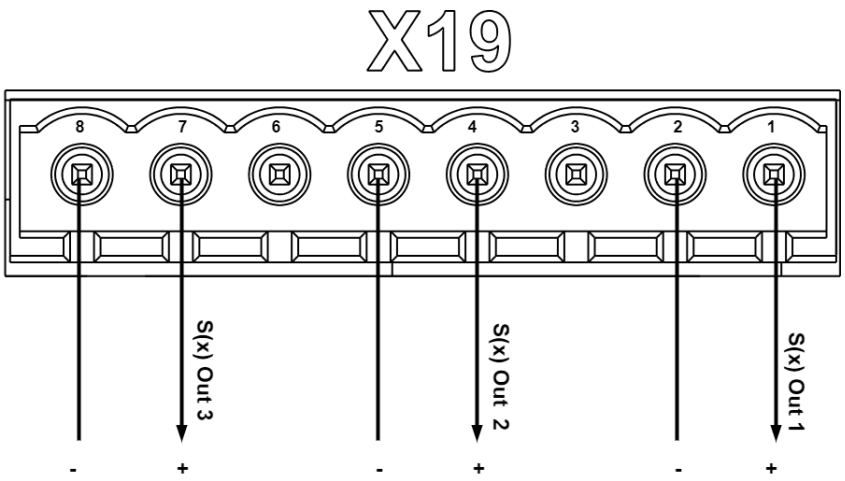


Figure 14: Binary inputs.

Binary input connection (Slot X20)
Binary inputs controlled by signals:

0 V dc – binary inactive input
+5...24 V dc – input as binary input active
+8...24 V dc – input as counting input (high level)

X20	
Terminal 9	S(X) In1 binary input
Terminal 10	S(X) In2 binary input
Terminal 11	S(X) In3 binary input
Terminal 12	common for inputs S(X) In1-3
Terminal 13	S(X) In4 binary input
Terminal 14	S(X) In5 binary input
Terminal 15	S(X) In6 binary input
Terminal 16	common for inputs S(X) In4-6

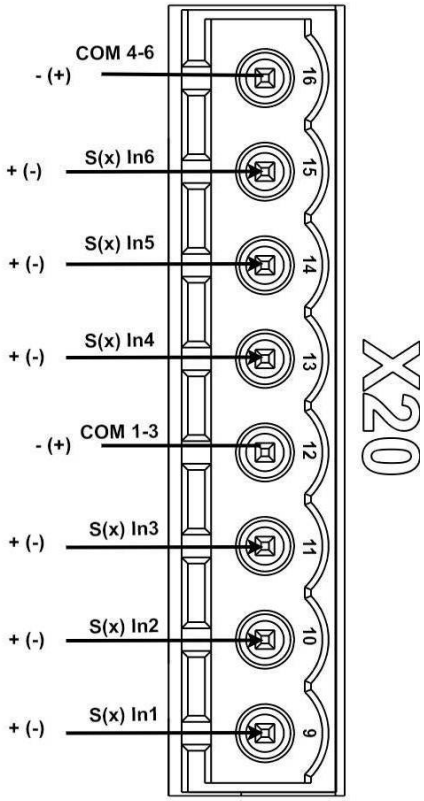


Figure 15: Binary inputs

The card has a connector (X21) for the RS-485 Modbus Master interface.

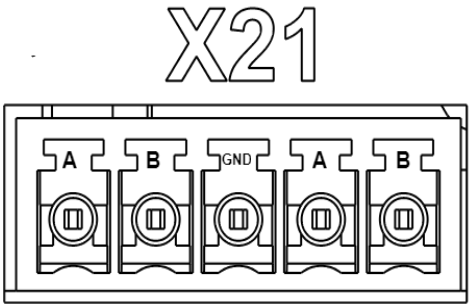


Figure 16: RS-485 interface

1.5.2.5 4 binary inputs, 6 analog outputs card

Connecting analog outputs

The version with analog outputs uses both connectors of the extension card, and includes 6 pairs of terminals:

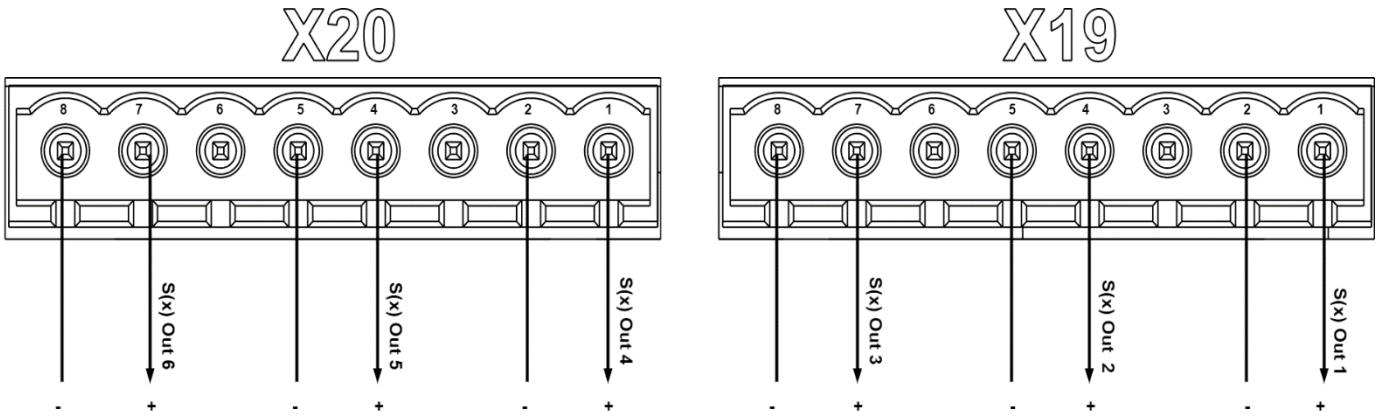


Figure 17: Analog outputs.

X19	X20
1 – 2 : 1 analog output	1 – 2 : 4 analog output
4 – 5 : 2 analog output	4 – 5 : 5 analog output
7 – 8 : 3 analog output	7 – 8 : 6 analog output

Binary input connection (Slot X21)

X21	
Terminal 1	S(X) In1 binary input
Terminal 2	S(X) In2 binary input
Terminal 3	S(X) In3 binary input
Terminal 4	S(X) In4 binary input
Terminal 5	common for inputs S(X) In1-4

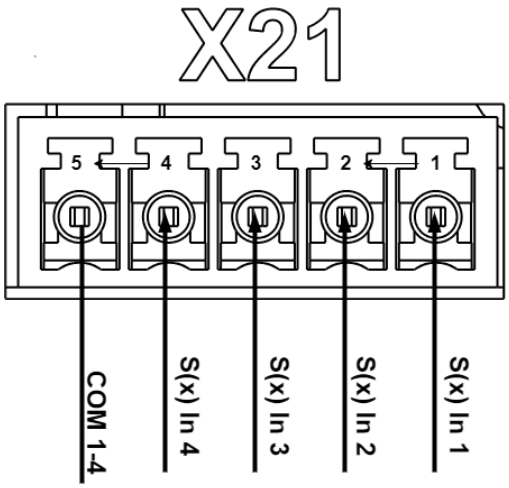


Figure 18: Binary inputs.

1.6 Mounting method

The KD10 recorder is designed to be mounted in a board using brackets. Housing dimensions 144 x 144 x 104 mm, mounting hole dimensions 138 x 138 mm.

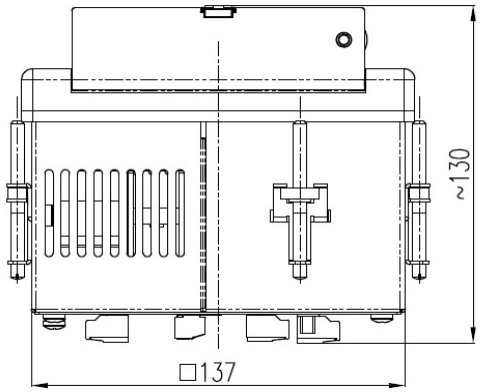


Figure 19: Dimensions - bottom.

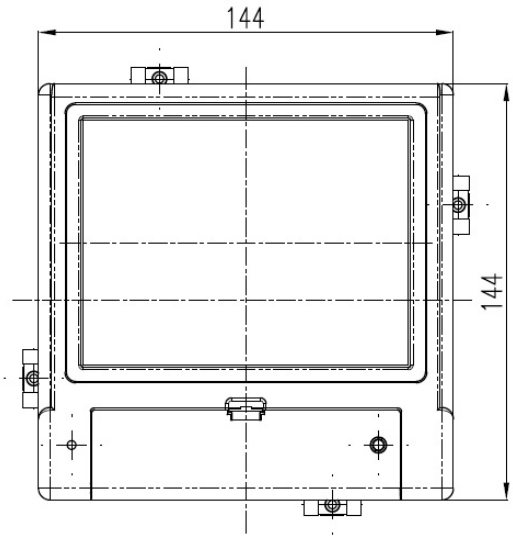


Figure 20: Dimensions- front.

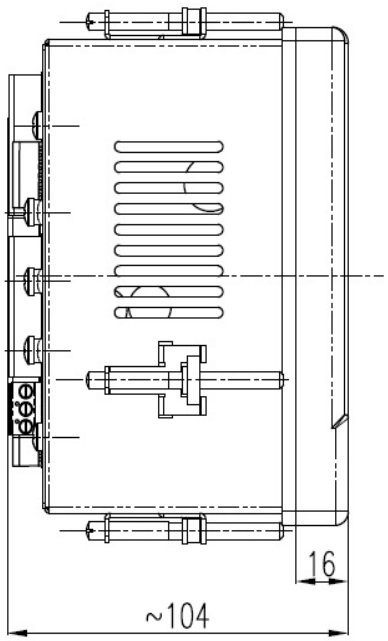


Figure 21: Dimensions-side.

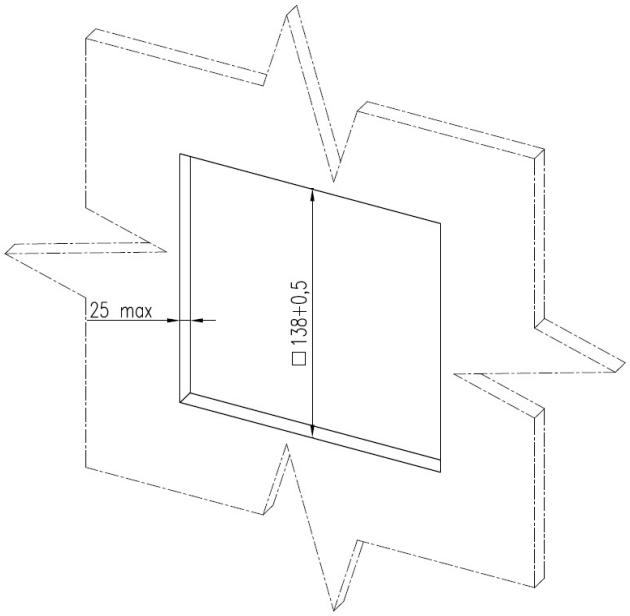


Figure 22: Dimensions – mounting hole.

2 Device operation

View of the main editing dialog window allowing for modification of numbers, characters or special characters. The example shown allows for entering characters (lowercase letters).

Figure 23: Keybord for editing.

Element	Description
1	Screen displaying the edited element.
2	Accepting the entered value and closing the dialog.
3	Switching the keyboard between lowercase and uppercase letters.
4	Changing tabs between the keyboard containing letters and the keyboard containing numbers and special characters.
5	Buttons allowing for moving the cursor left or right on the screen displaying the edited element (1).
6	Deleting a single element from the screen (1) located directly behind the cursor.
7	Closing the window without saving the name.

View of the dialog window allowing you to enter numeric values and available special characters.

Figure 24: Numeric Values and Special Characters Editor.

Numeric value editor Fig.25. The upper part contains the range of values that can be written. The provided functionality allows you to enter fixed-point values (example on the left) or floating-point values (example on the right), delete the entire screen displaying the edited value or a single digit.

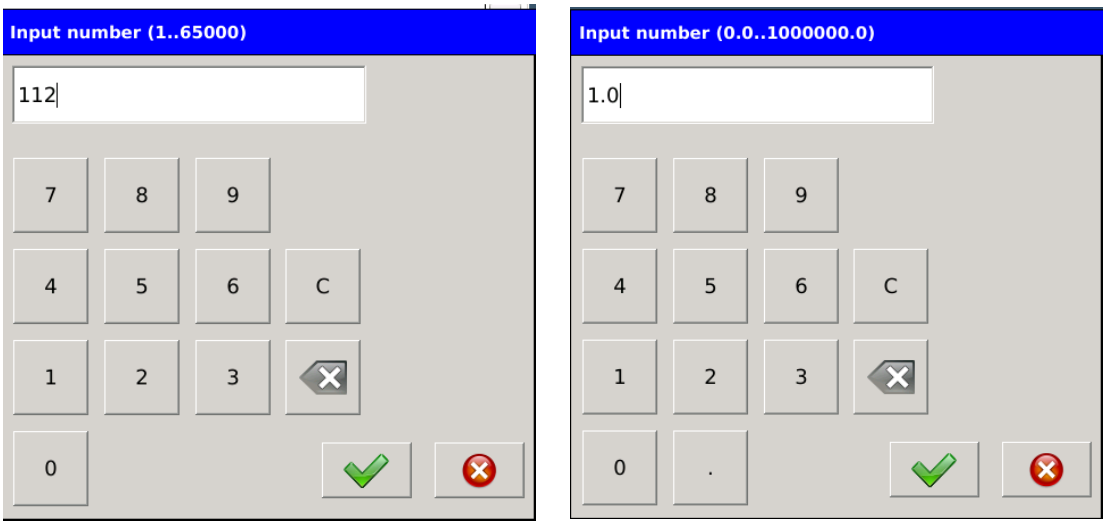


Figure 25: Numeric Value Editor.

Multiple selection list Fig.27 (example on the right), an element that allows you to select more than one option. Pointing at an unselected parameter on the screen will select it. Cancelling the selection is done by touching the screen again on the previously selected element. Additional buttons provide functions for automatically selecting or deselecting all options on the list. The selection list (example on the left), allows you to select only one of the available options.

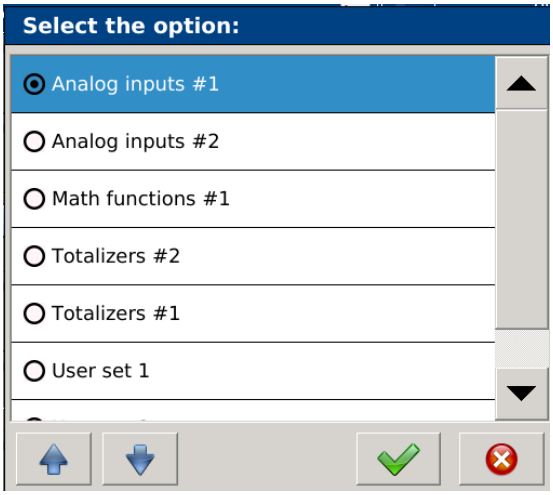


Figure 26: Single element selection list.

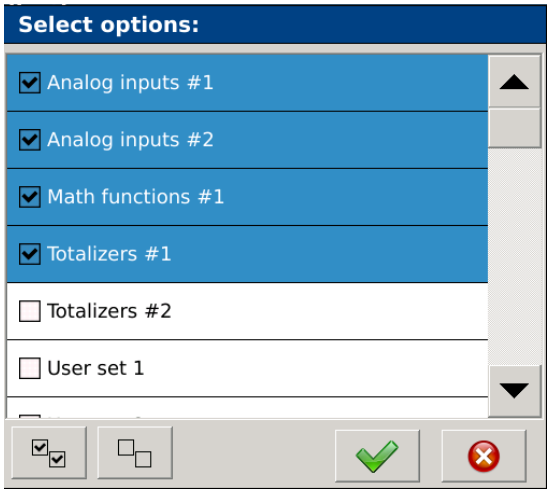


Figure 27: Multiple selection list

2.1 Main screen

After starting the device, the user will be redirected to the main screen Fig.28. When starting it for the first time (for the standard configuration), this will be the first view of the digital display screen.

The main screen is divided into elements belonging to three groups. Access to all elements assigned to individual groups is obtained by touching any point on the recorder screen.

The first group of **navigation elements** allows the user to change the way of presenting measured values limited by the settings of the current configuration.

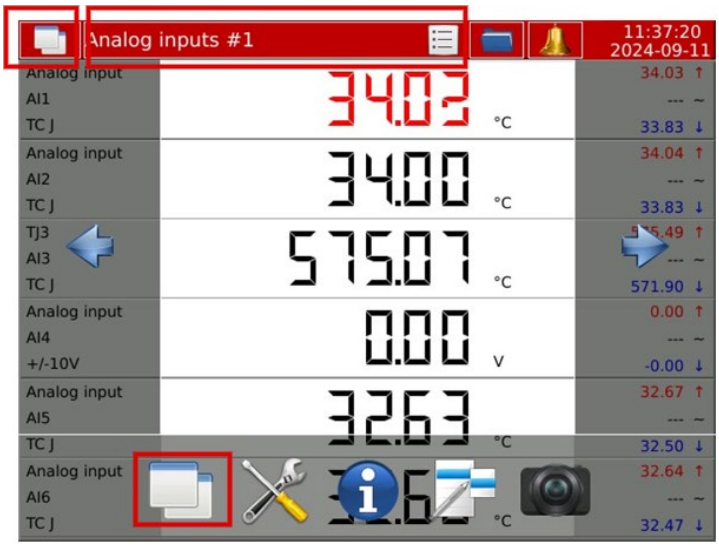


Figure 28: Main screen.

The next group consists of **functional elements** that allow you to change the current recorder settings and access advanced configuration settings.

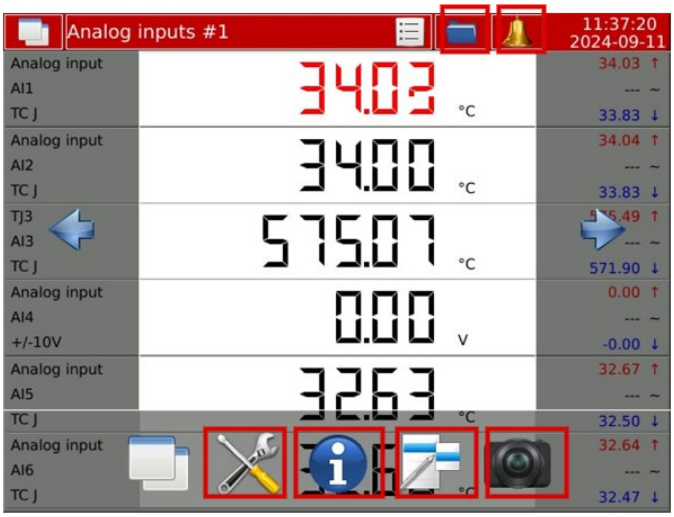


Figure 29: Main screen - functional elements.

2.1.1 Navigation

Pressing the screen area used to present the recorder data brings up a window used, among other things, to edit navigation.

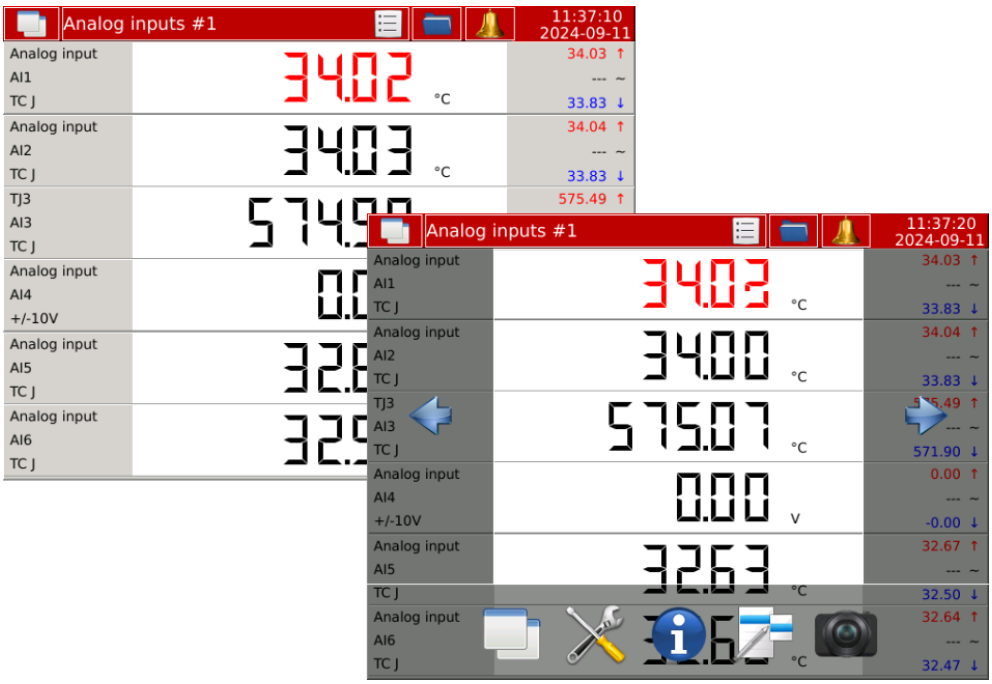


Figure 30: Main screen – navigation.

Below selected navigation elements are presented.

Symbol	Description
	Navigation for the currently set screen mode. The screen together with the views can be individually defined for a given configuration. By selecting the arrow pointing to the right, the device presents subsequent screen views. After reaching the last element, selecting the option to go to the right, we return to the first element. The option to go to the left is implemented in a similar way.
	The button is assigned to the option to go to the next screen. After selecting this option, the device presents the next screen available for the given configuration and the first defined view.

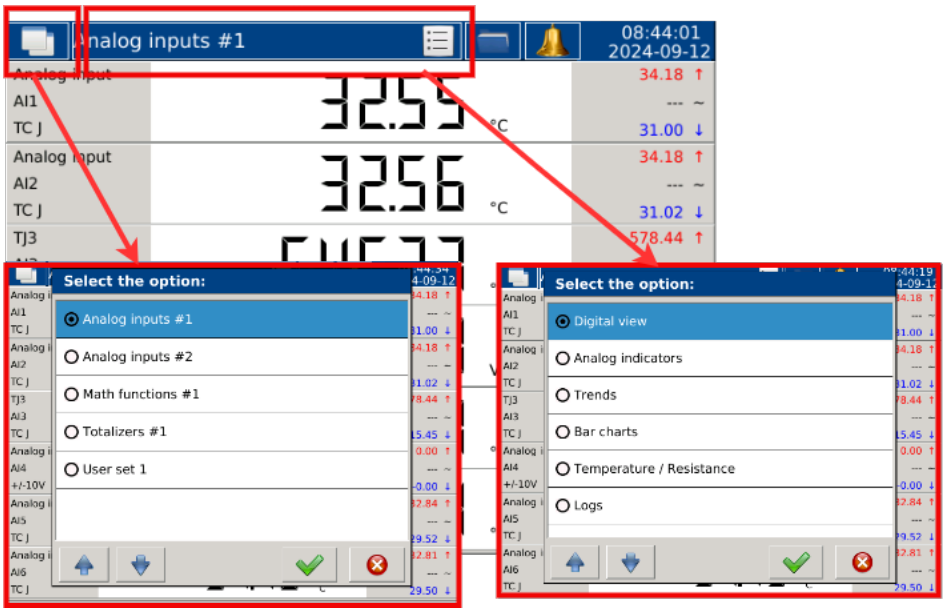


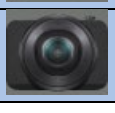
Figure 31: Main screen – screen selection lists.

Dialog Fig.31 (left) allows you to select one of the available screens. Using it, the user can go directly to the selected mode. The example shows the configuration settings containing all the possible screen views.

Dialog Fig.31 (right) shows an example of selecting a view available for the currently set screen mode. The example shows the standard views for the selected screen (Large digital displays).

2.1.2 Functionality

The table presents the individual elements of the main screen along with a description of their functionality.

Symbol	Description
	Transition to the control panel managing configurations, protected against unauthorized access by the login window..
	Transition to the system information tab.
	Transition to the context menu that allows you to manage selected device parameters. An example of the dialog is shown below.
	Screenshot function

The options available in the context menu depend on the screen on which it was invoked. The table below shows all the possible choices.

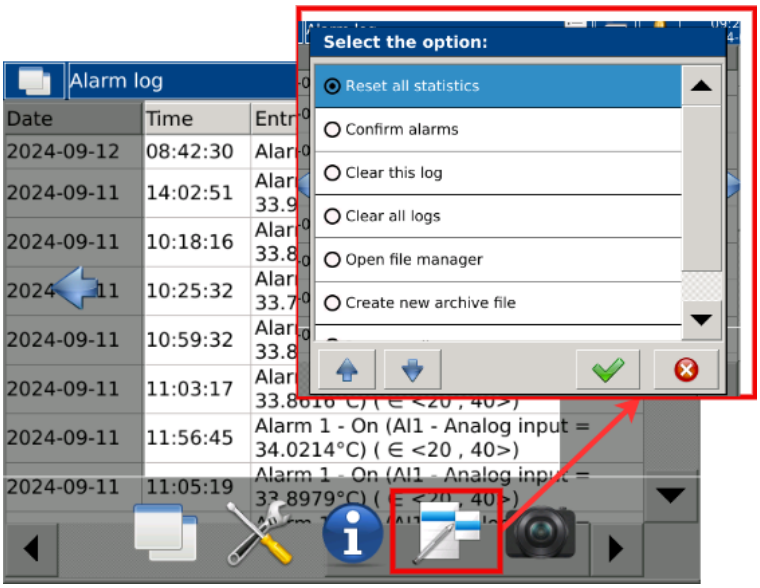


Figure 32: Contextual menu- alarm log.

To perform the described functions, permissions are required. After selection, it is necessary to confirm the permissions using the dialogue shown below.

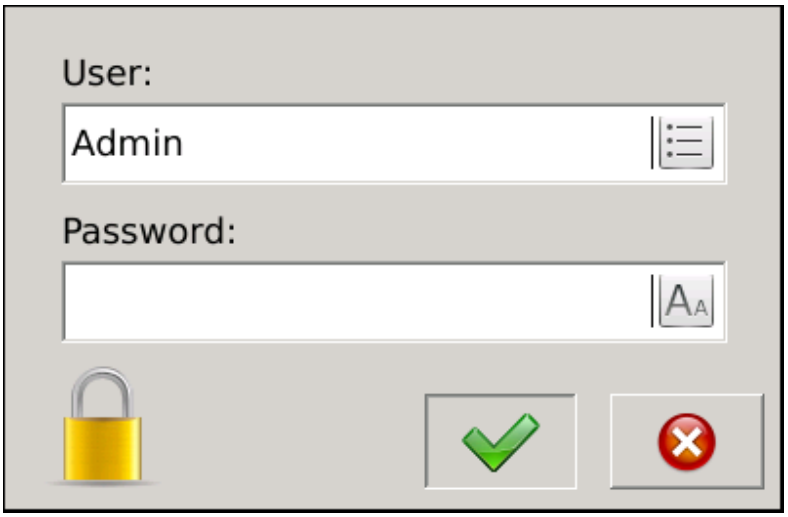


Figure 33: Log-in window.

2.2 Control panel

Control panel operation consists of selecting one of the available parameter groups. Individual groups allow for full configuration of the device depending on the user's requirements.

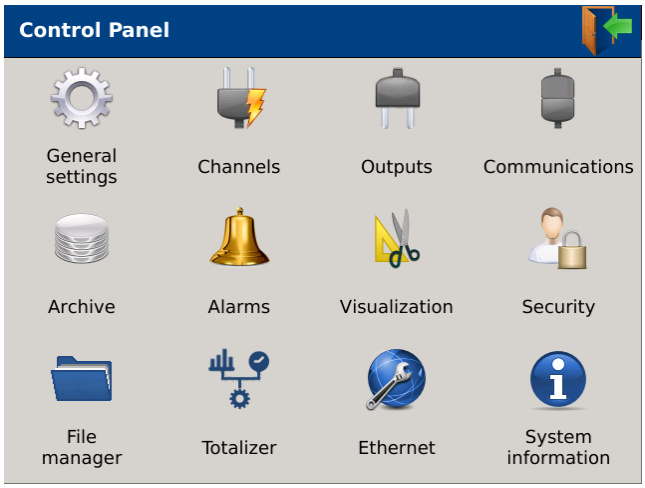


Figure 34: Control panel.

2.2.1 Navigation

The Control Panel is called up from the main screen using the button 

Configuration editing is performed by selecting the appropriate option from the main screen of the Control Panel. After pressing the selected icon with your finger, a dialogue appears presenting a set of configuration parameters.

In individual dialogues, the first tab is opened by default, subsequent tabs are switched according to the principle presented below.

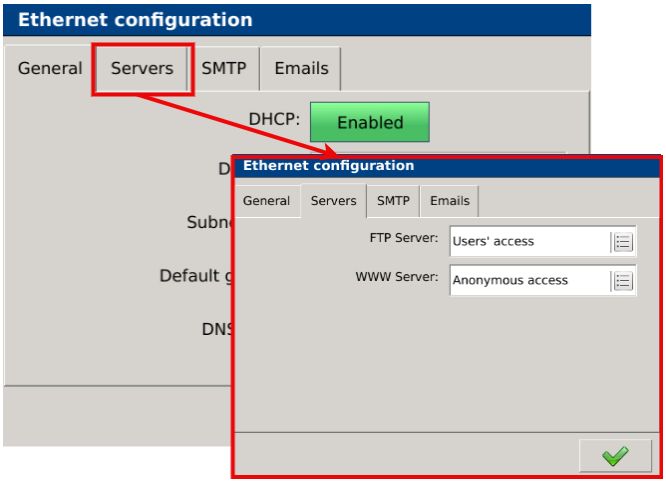


Figure 35: Ethernet Configuration Tabs - Switching.

Parameter groups such as Alarms or Security have an additional checkbox allowing you to select the parameter you are configuring. Navigation between them is performed as shown below Fig.36. By touching the selected box, we generate a selection list of available elements.

The main window also contains navigation buttons using  which you can change subsequent options without opening an additional window

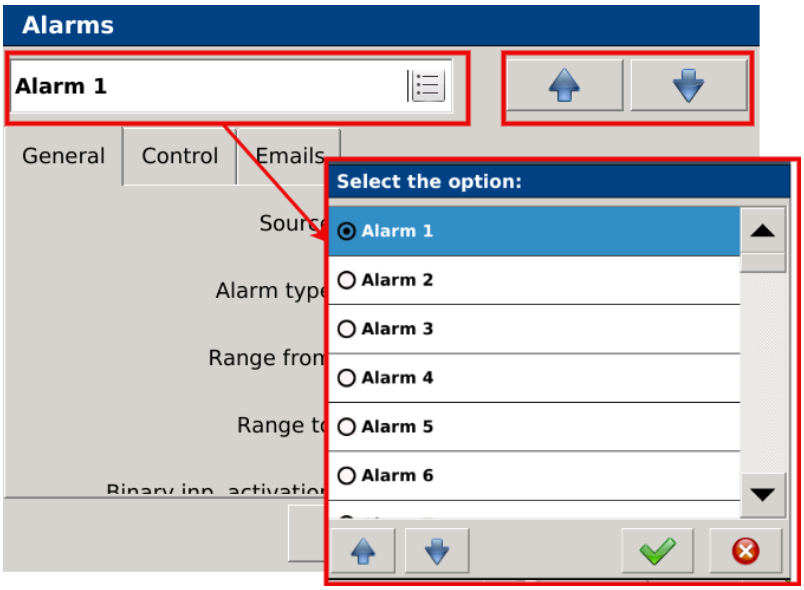


Figure 36: Alarm selection list.

2.2.2 Functionality

The transition to the Control Panel is preceded by a login window, which protects against unauthorized access to the device settings. Users are identified by their username and the password assigned to it. After logging in, the user is given the opportunity to choose one of three options for changing the configuration. Selecting the first option redirects to the main Control Panel window. Selecting the button that closes the window redirects to the main screen of the device.

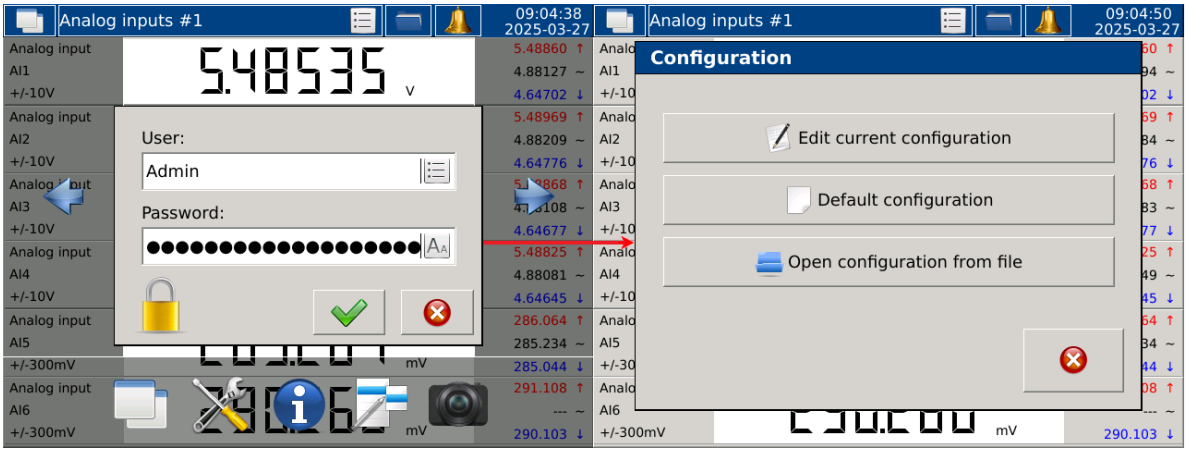
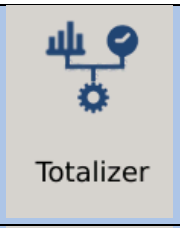
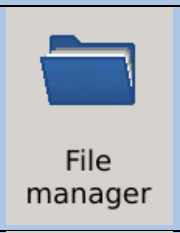
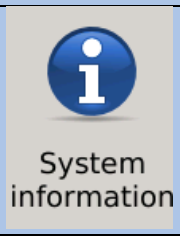


Figure 37: Configuration window- operation.

The individual Control Panel options are described in the list below.

Option	Description
 General settings	Selecting the device name and identifier. Changing the language, setting the date and time. Editing parameters related to the LCD, such as blanking, backlighting and screen calibration.
 Channels	Configuring logical channels for analog inputs, temperatures, mathematical functions and Modbus master inputs.
 Outputs	Depending on the version, allows for the configuration of analog outputs or relay outputs.
 Alarms	Settings for individual alarms including sources, type and conditions for switching on/off alarms. Additional options allow for the settings of relays, confirmations, switching delays and alarm logs.
 Visualization	Settings for screens and trends. The user can enable or disable individual screens, select ready-made sets of parameters or define their own that will be presented on the device. Settings related to trends include the selection of parameter sets and defining the data presentation field for individual sets.
 Ethernet	Settings for DHCP, IP address, subnet mask, default gateway and FTP server.
 Communications	Settings for the Modbus slave protocol allowing for setting the transmission mode and speed. Device identifier settings and parameters related to Modbus TCP, enabling or disabling and port number.
 Archive	Archiving parameter settings. General archiving parameters: number of records in file, archiving time range, conditional archiving. Managing individual archiving parameters: parameter selection, interval definition and archiving condition.
 Security	User permission settings. Ability to assign a name, password and access rights.

	Totalizer, or configuration of logical channel adders.
	File manager, which allows you to manage the contents of the SD card.
	General information about the system, memory, hardware, updates and access to the service tab.

2.3 Screens and views of data presentation

The visualization of measurement parameters has been divided into screens and groups of views assigned to them. Depending on the configuration settings, the user can make selected screens available for presentation along with the group of views assigned to them. For example, the first element that belongs to the group of screens is large digital displays. The user can assign selected measured values that will be made available on subsequent views.

2.3.1 Signs and colors of measurement parameters

The example below Fig.38 shows an example screen (large digital displays) with a view containing the values of analog inputs.

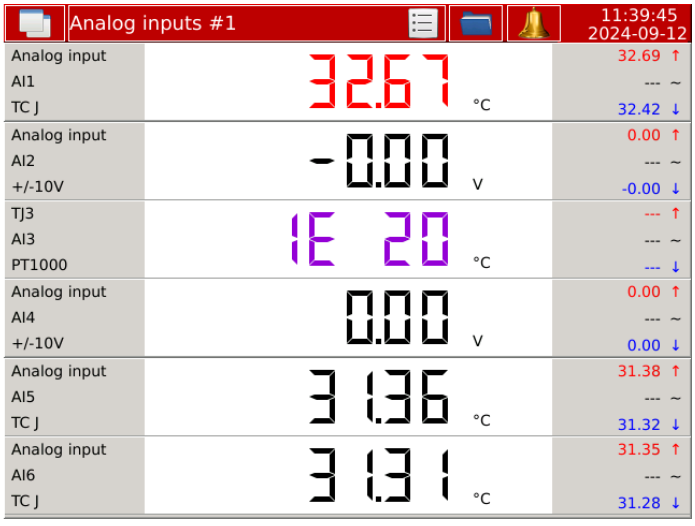


Figure 38: Screen with measurement values for analog inputs

Option	Description
1	Alarm occurrence on the displayed value.
2	Example of a correct measured value.
3	The value was not correctly calculated.

2.3.2 Functionality

Each of the screens has individual features for presenting data. The following sections describe the individual types, along with a description of the elements made available to the user.

2.3.2.1 Large digital displays

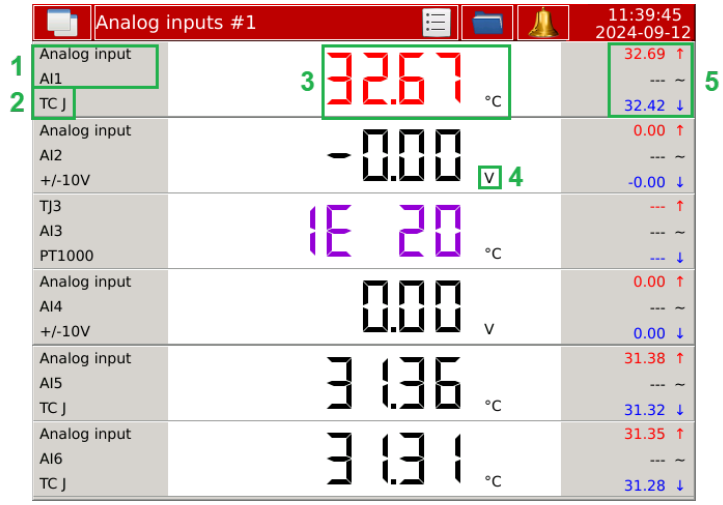


Figure 39: Large digital view.

Option	Description
1	Input name and input kind
2	Input type.
3	Measured value
4	Unit assigned to the measurement value.
5	Minimum, maximum and average values (enabled by setting the averaging window)

2.3.2.2 Analog indicators

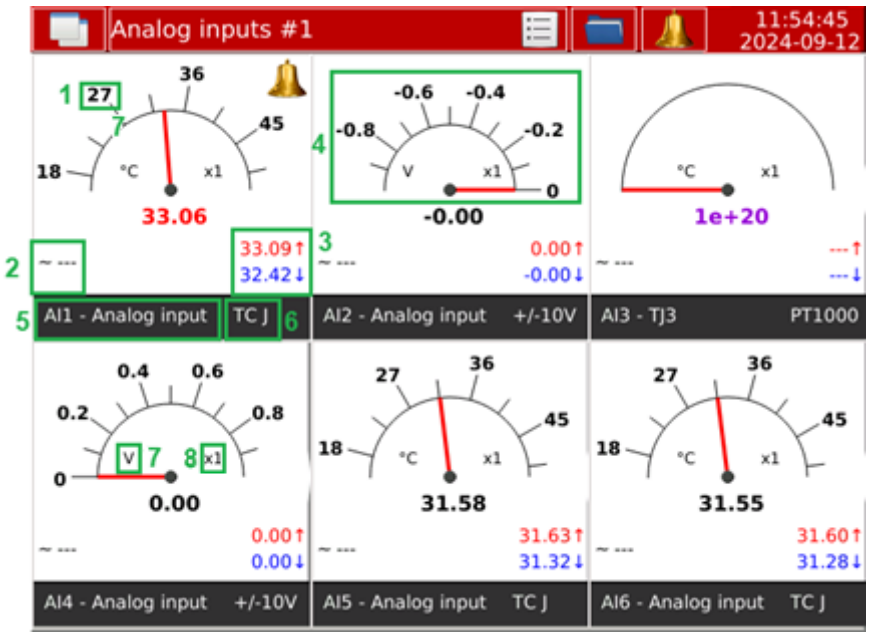


Figure 40: Analog indicators.

Option	Description
1	Indicated value.
2	Average measurement.
3	Minimum and maximum values
4	The scale of the analog display for a given value.
5	Input name
6	Input type
7	Unit
8	Scale

2.3.2.3 Trends

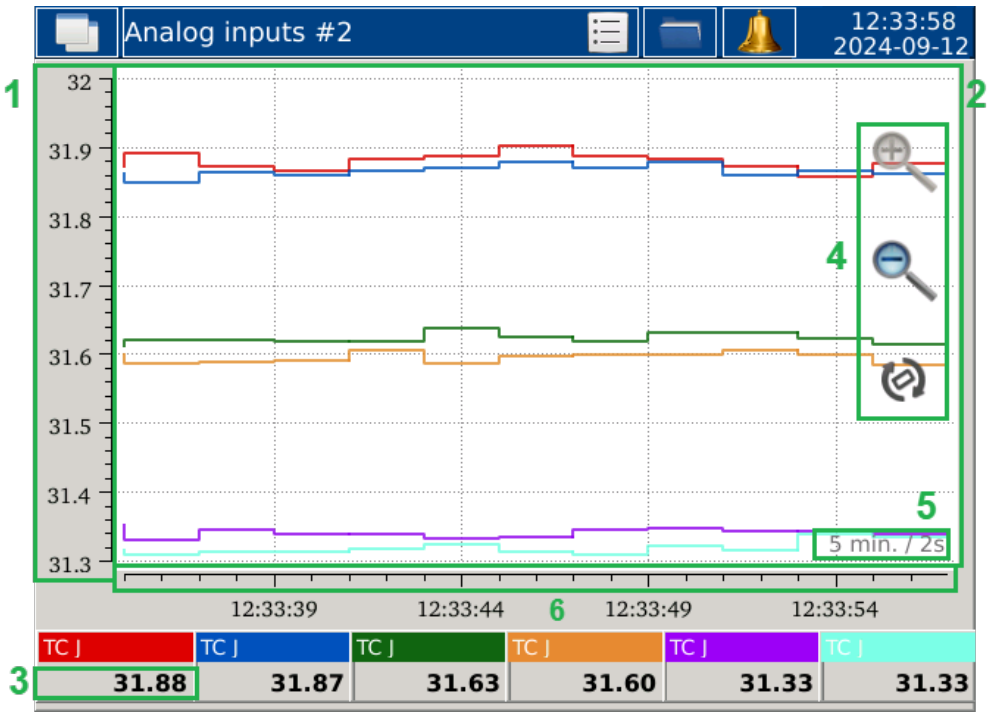


Figure 41: Trends.

Option	Description
1	Scale describing the range of values in the presented time. The range is automatically scaled with changes in the measured values.
2	Main window for presenting trends.
3	The value of the measured parameter in digital form.
4	A tool for zooming in and out, rotating the screen to a vertical position.
5	The time range for presenting values on trends with information on the frequency of parameter updates..
6	The time axis is updated automatically with subsequent measured values presented on the main screen.

2.3.2.4 Bargraphs

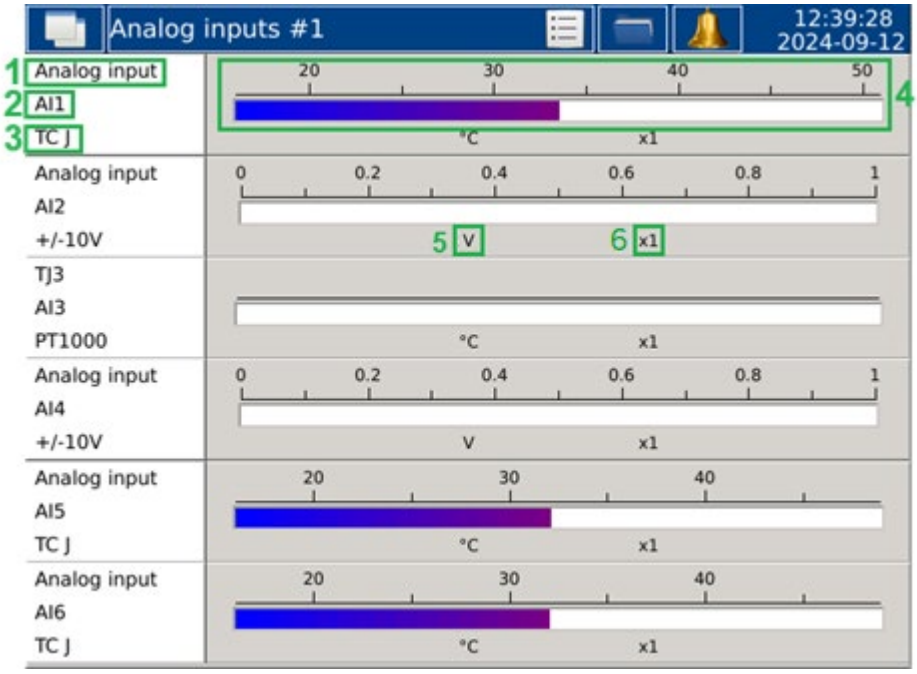


Figure 42: Bargraphs.

Option	Description
1	Input name
2	Input kind
3	Input type
4	Value on the scaled axis.
5	Unit
6	Scale

2.3.3 Temperature / resistance

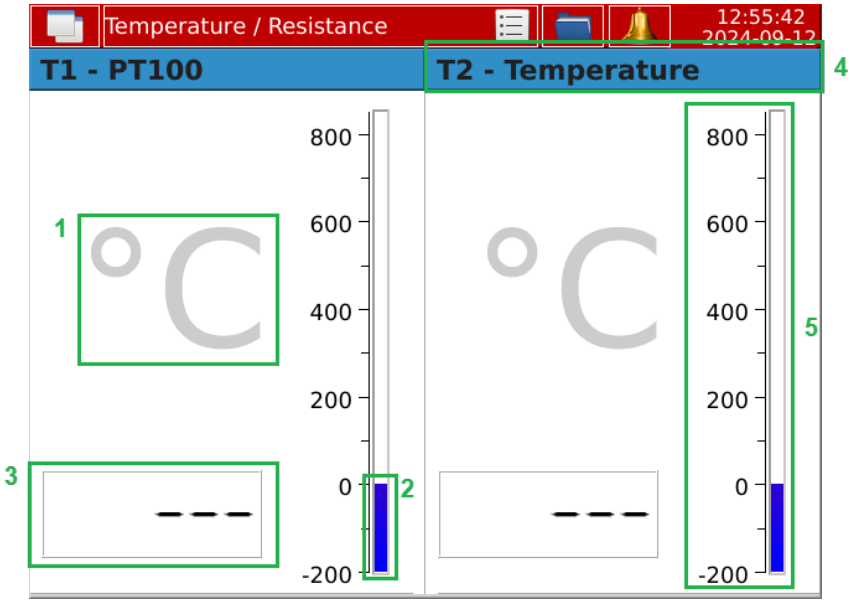


Figure 43: Temperature / resistance.

Option	Description
1	Description of the unit assigned to a given field. Depending on the sensor type (temperature or resistance)
2	Measured value indicator.
3	Measured value in digital form.
4	Description of the channel.
5	Measurement scale, adapted to the sensor type.

2.3.4 Binary inputs

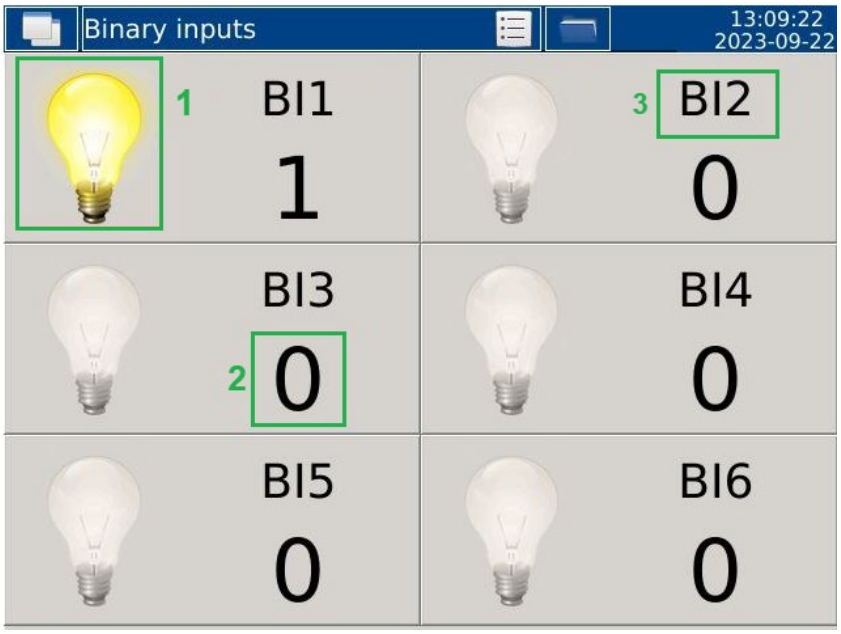


Figure 44: Binary inputs.

Option	Description
1	Visualization of binary input status: bulb on – binary input connected, bulb off – binary input disconnected.
2	Binary input status indicator: 1 – connected, 0 – disconnected.
3	Description of binary output, e.g.: BI2 – binary input number 2.

2.3.5 Logs

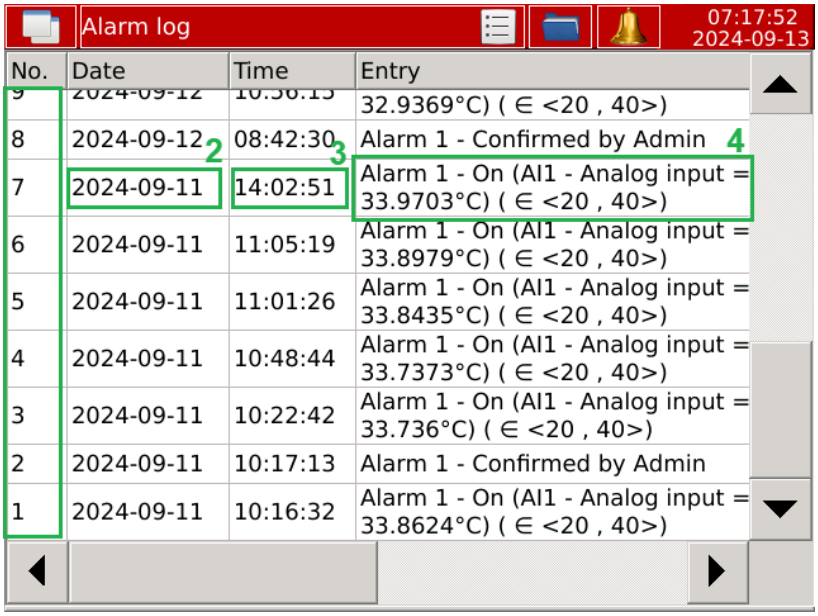


Figure 45: Logs.

Option	Description
1	The order in which the message occurred.
2	The date the message occurred.
3	The time the message occurred.
4	The content of the message.

Audit and alarm logs are saved on the SD card. The file containing the current logs can be saved in the following formats:

- **audit.log.csv – alarm.log.csv,**
- **audit.log.sqlite3 – alarm.log.sqlite3,**
- **audit.log.bin – alarm.log.bin.**

A preview of the files saved on the SD card is shown below.

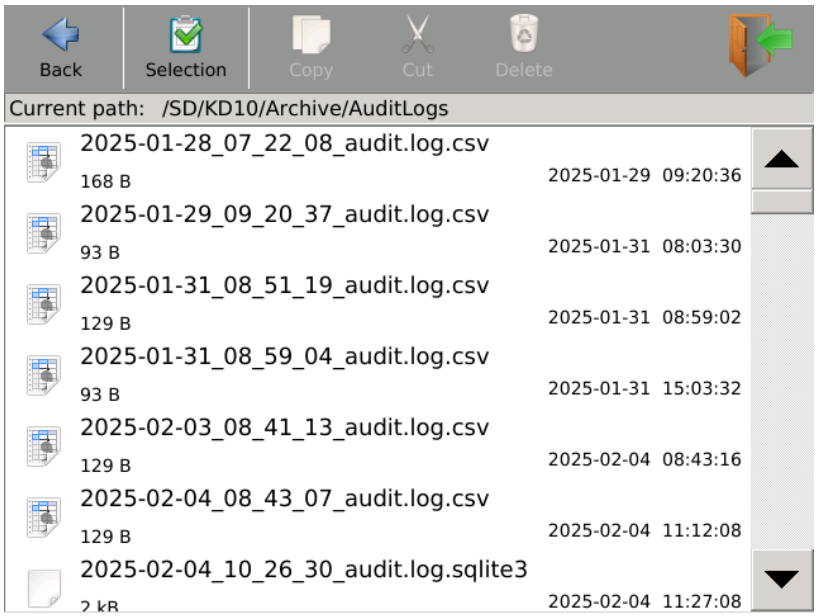


Figure 46: Audit logs – files saved on SD card..

Each of the audit and alarm log files can have 32kB.

The file name consists of its date and time of creation.

Example names:

- 2023-09-19_08_32_40_alarm.log.sqlite3
- 2023-09-19_09_10_05_alarm.log.csv
- 2023-09-19_09_12_12_audit.log.csv

2.4 Software update

To update the KD10 recorder software, download the update file from the manufacturer's website. The downloaded file should be copied to the recorder's SD card.

In the Control Panel, in the System Information tab, select the Update group and go to select the update file.

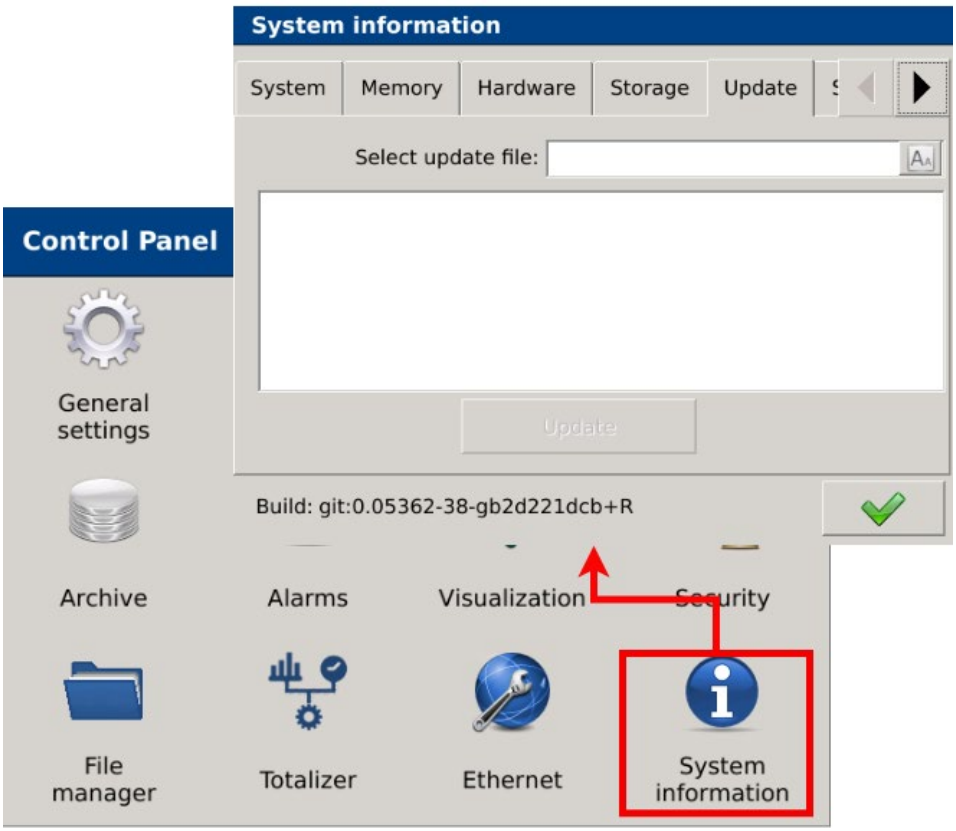


Figure 47: Control panel -> system information.

The user confirms the selection from the list of detected files. The next window will display information about the update. The process is confirmed by selecting the Update option.

3 Device parameter configuration

After logging in, the user is given the option to choose one of three options for configuration changes:

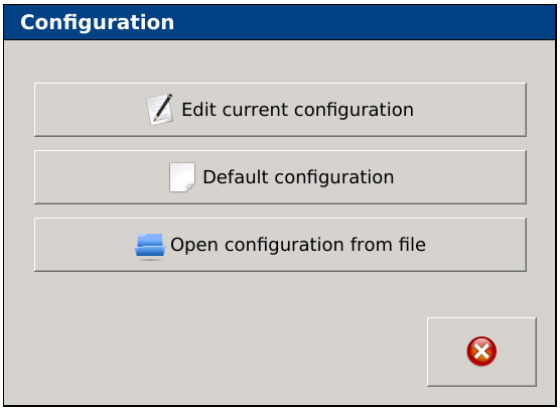


Figure 48: Configuration window.

Option	Description
Edit Current Configuration	Transit to the control panel.
Default Configuration	Restores the default configuration for the device.
Open Configuration from File	Launches a file browser with the ability to select available configuration files.

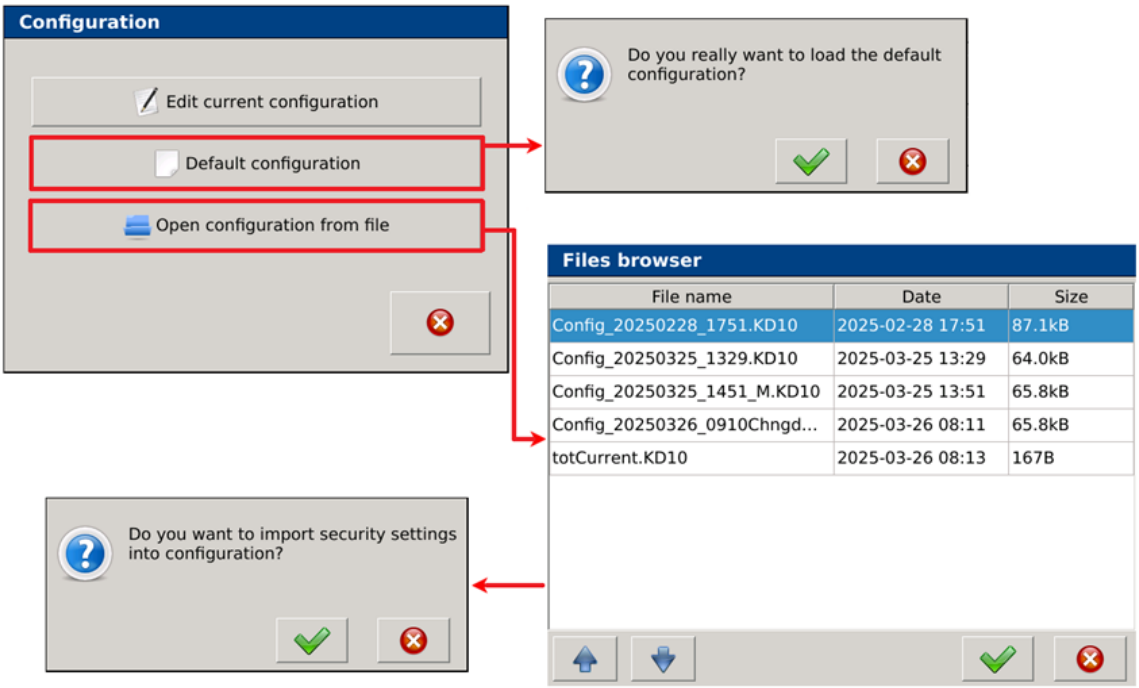


Figure 49: Configuration – default configuration.

Default configuration settings are preceded by a dialog requiring confirmation by the user.

The file browser displays available configuration files that can be opened and set in KD10. After chosing one of them, the dialog requiring confirmation by the user appears. The file browser window contains:

Option	Description
File name	Individual name defined by the user when saving.
Date	Restores the default configuration for the device.
Size	The amount of memory occupied by the file.

Closing the Control Panel window is shown below. After selecting the option, a dialog confirming that the configuration has been edited is displayed.

To save the configured configuration to a file, check the "Save to file" box.

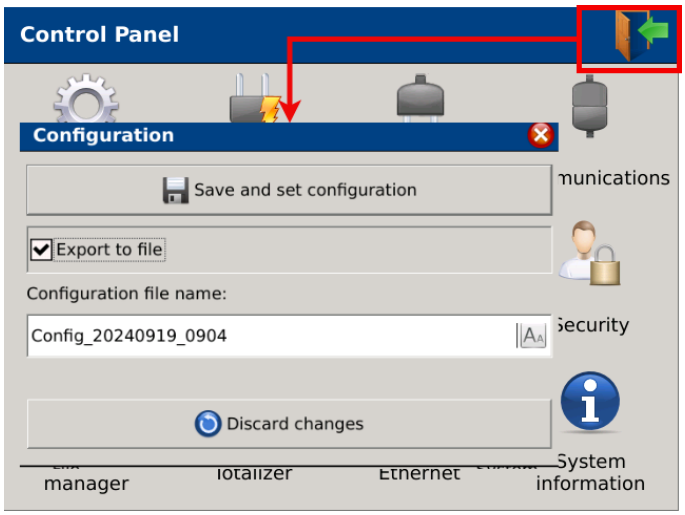


Figure 50: Saving the configuration.

After saving configuration device is reloading itself so it is important to remember to reset all statistics on specific tab (if needed). After reload all of them are going to be set to 0.

3.1 Configuration of general settings

3.1.1 Basic parameters

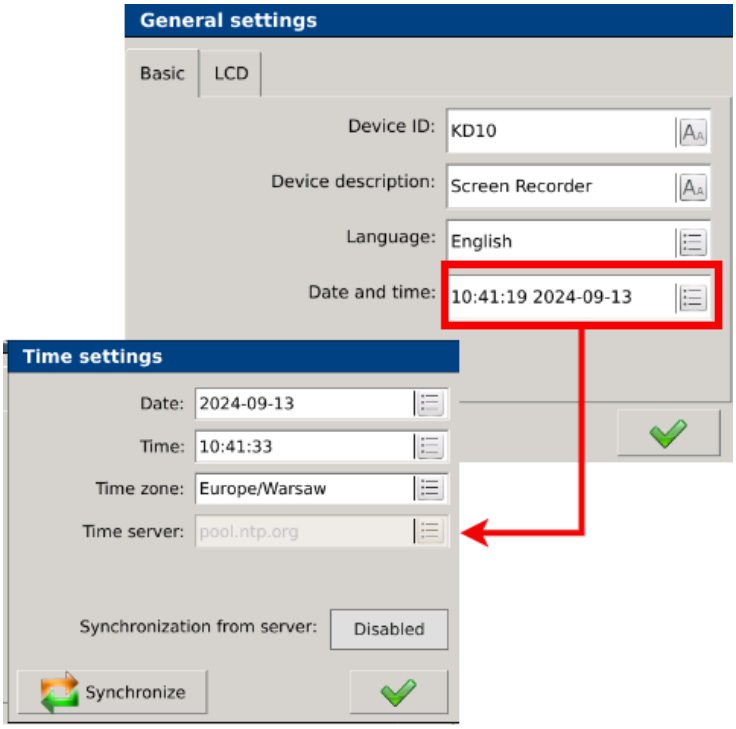


Figure 51: General settings - basic.

Parameter	Description
Device ID	Assigned identifier. The user can change the description.
Device description	Editable device description.
Language	Option allowing selection of the language for the device.
Date and time	Edit the date and time on the device.
Time zone	List of all time zones.
Time server	Selection of the time server providing the standard UTC time.
Automatic synchronization	Enabling synchronization with the server prevents manual setting of the date and time, which will be downloaded from the selected time server for the selected time zone. Disabling synchronization allows you to define your own date and time settings.
Synchronize	Forces synchronization of the system time in the application.

3.1.2 LCD settings

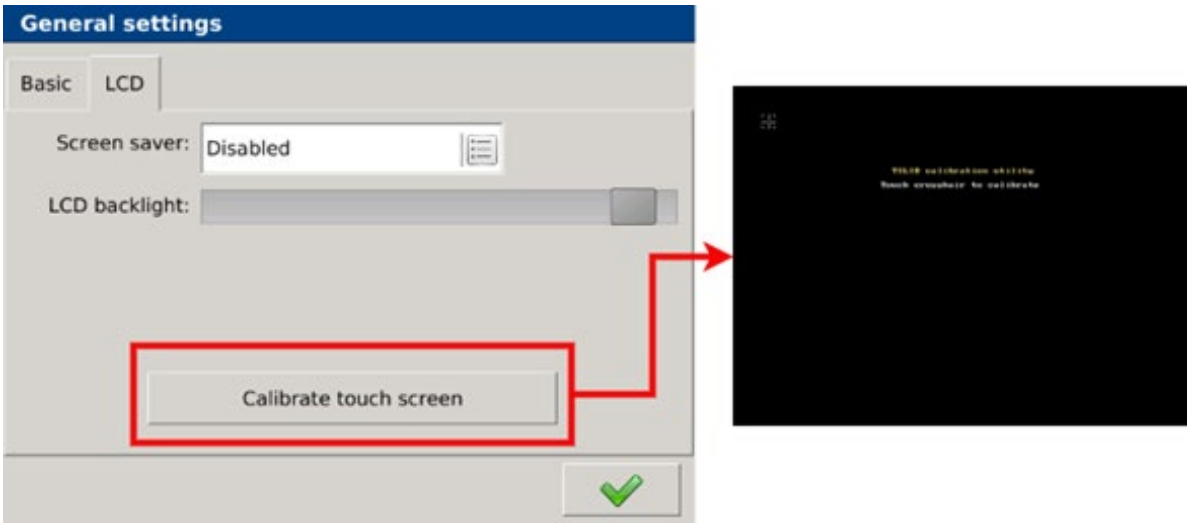


Figure 52: LCD settings.

Parameter	Description
Screen blanking	Option that allows you to turn on or off the screen blanking. The user selects from the list the time range after which the device screen will be blanked or the screen will remain on.
LCD backlight	Adjusting the device screen brightness. Using the slider, the user changes the backlight intensity. The maximum value will be set after moving to the right, moving to the left will reduce the screen brightness.
Touch screen calibration	By selecting the calibration option, the user operating the device will be redirected to the calibration window. In the next calibration steps, the screen should be touched at the points indicated on the screen. The screen is calibrated at five points, after calibration the device will return to the initial screen. It is not possible to interrupt the screen calibration, if the screen is incorrectly calibrated, the described process should be repeated.

3.2 Logical channel configuration.

Inputs for logical channels are: analog inputs, binary inputs, temperatures, mathematical functions, Modbus Master inputs. The channel configuration menu is shown in Fig.53. (Control panel → Channels)

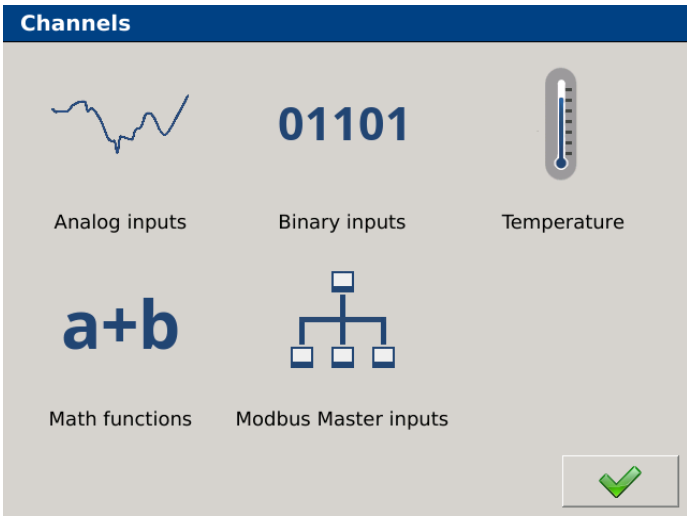


Figure 53: Configuration channel menu.

After clicking on the selected group, a list of available inputs will be displayed.

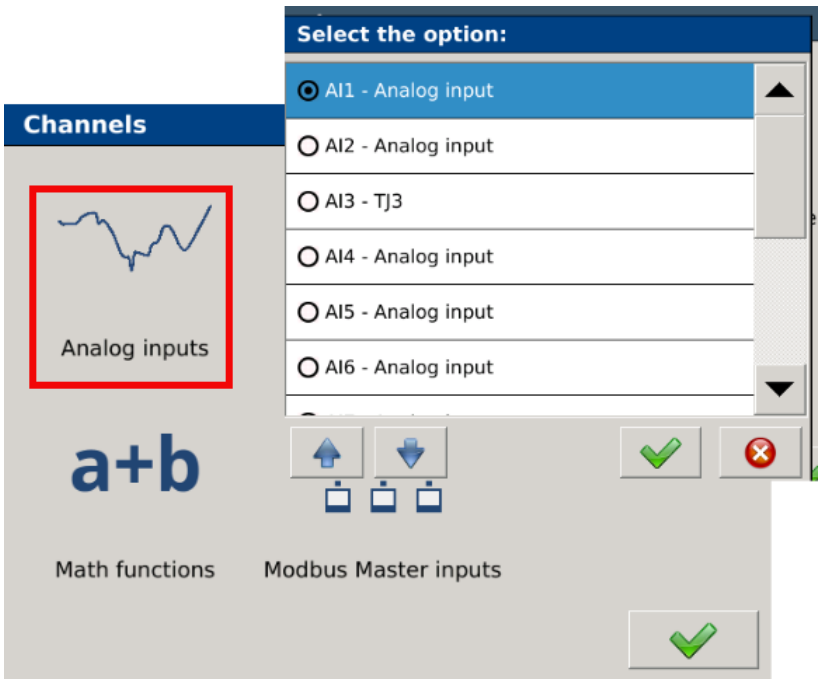


Figure 54: List of available inputs.

3.2.1 Analog Input Configuration – AI

KD10, depending on the version, has 6/12/18 programmable analog inputs.

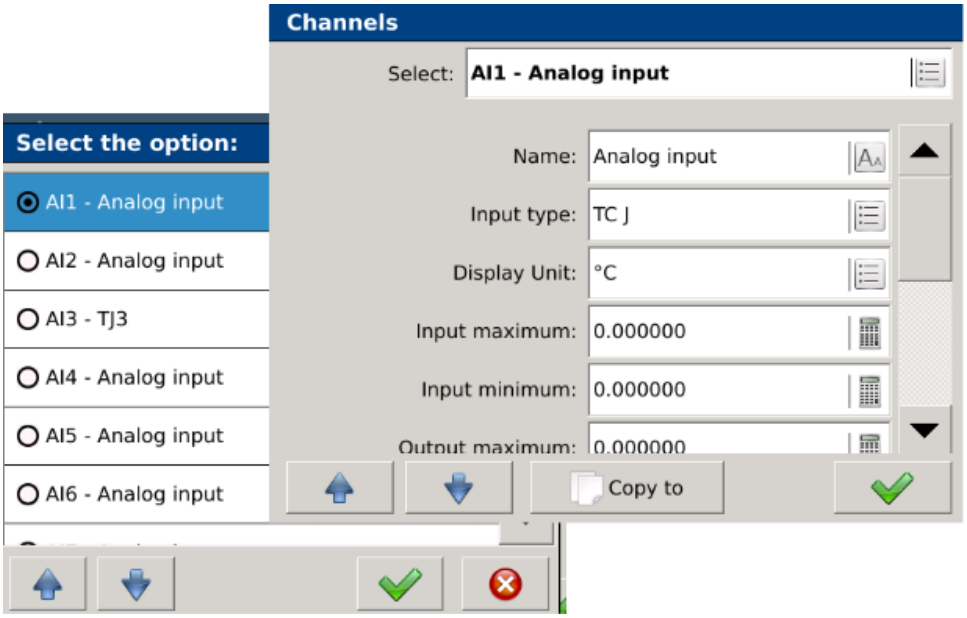


Figure 55: Analog input configuration window.

Parameter	Description
Name	Editable name
Input type	• PT100 • PT1000 • TC E • TC J • TC K • TC N • TC R • TC S • +/-60mV • +/-150mV • +/-300mV • +/-10V • +/-20mA • 4...20mA
Displayed unit	Selection of the displayed unit from the list. Possibility of creating a unit by the user.
Maximum input	-1000000.0... 1000000.0
Minimum input	-1000000.0... 1000000.0
Maximum output	-1000000.0... 1000000.0
Minimum output	-1000000.0... 1000000.0
Float precision	0...0.00000
Input averaging time	100...1000ms

Averaging window	0...3600s
Compensation type	Auto/Manual
Compensation value	0.0...20.0

3.2.2 Mathematical functions – MT

The device has the ability to set 18 mathematical functions MT1...MT18.

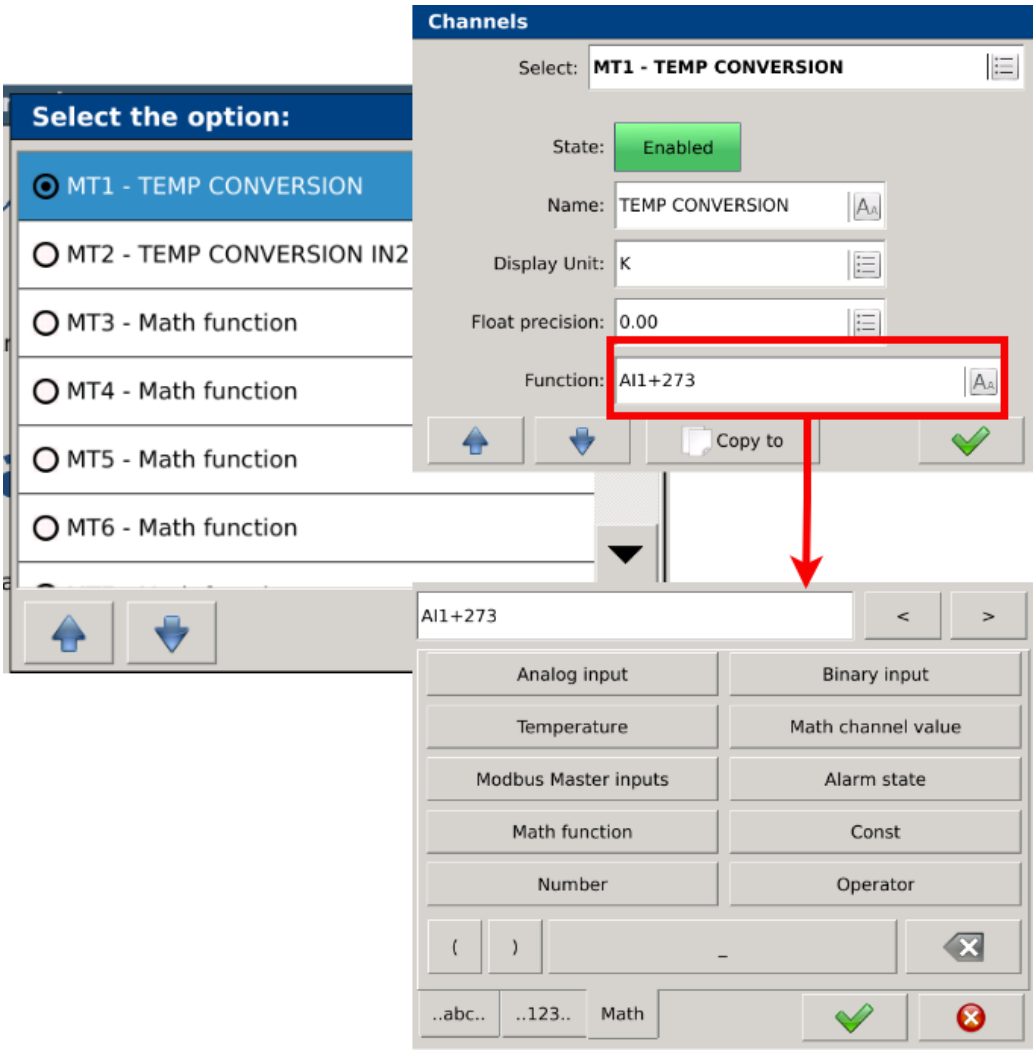


Figure 56: Mathematical function configuration window.

Parameters for configuring the mathematical function.

Parameter	Description
Status	Enable/disable the mathematical function
Name	Name edition
Displayed unit	Selection of the displayed unit from the list. Possibility of creating a unit by the user.
Function	Creating a mathematical function for this channel.

The data source for configuring the mathematical function are analog inputs, temperature, Modbus Master inputs, the value of another mathematical channel, binary inputs and alarm statuses, mathematical and logical operators, logical channel values such as: average, maximum and minimum values.

In the figure below, the data source for the function is the scaled value of the analog input.

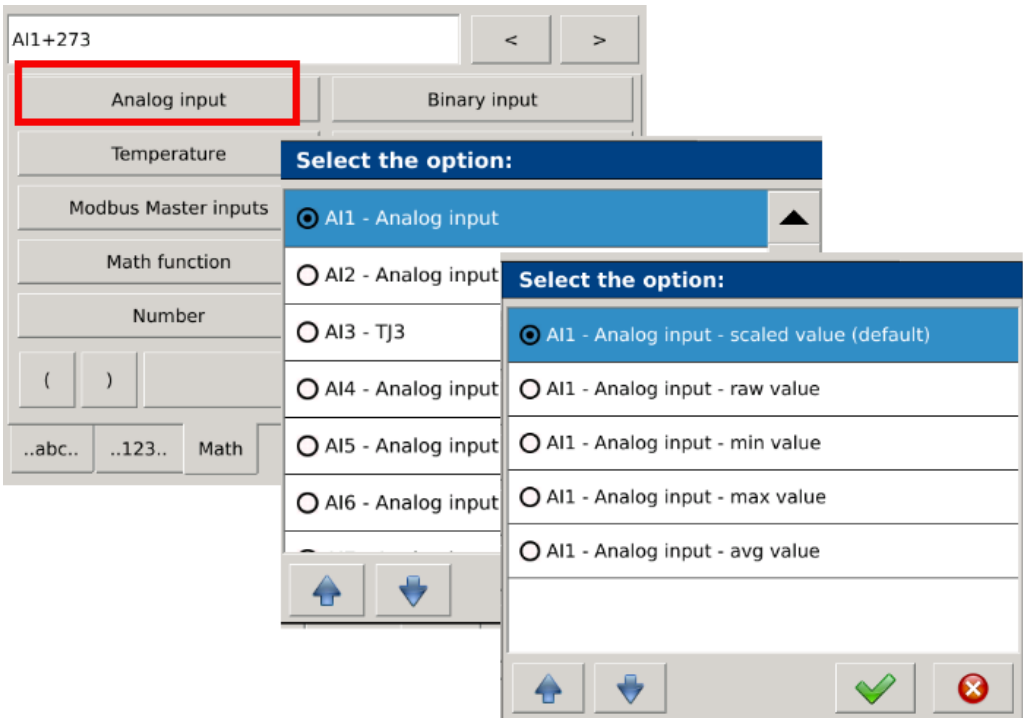


Figure 57: Selecting the data source for a mathematical function.

Available math and logic functions::

Function	**Description**
round(x)	Returns the value of x rounded to the nearest integer
sin(x)	Sine of x
asin(x)	Arcus sine of x
sinh(x)	Hyperbolic sine of x
cos(x)	Cosine of x
acos(x)	Arcus cosine of x
cosh(x)	Hyperbolic cosine of x
tan(x)	Tangent of x
atan(x)	Arcus tangent of x (in radians)
tanh(x)	Hyperbolic tangent of x
sqrt(x)	Square root of x
pow(x)	Power
fact(x)	Factorial
mod(val1,val2)	Returns the modulo of val1, val2
min(v1,v2,v3,...)	Returns the minimum value of v1,v2,v3...
max(v1,v2,v3,...)	Returns the maximum value of v1,v2,v3...
avg(v1,v2,v3,...)	Returns the average value of v1,v2,v3...
sum(v1,v2,v3,...)	Returns the sum of v1,v2,v3...
abs(x)	Absolute value
ceil(x)	Returns the smallest integer greater than or equal to x
floor(x)	Returns the largest integer less than or equal to x
log(x)	Natural logarithm of x
log10(x)	Decimal logarithm from the number x

3.2.3 Temperature and resistance.

The input signal for the logical channel can be temperature or resistance measurements T1 – T2.

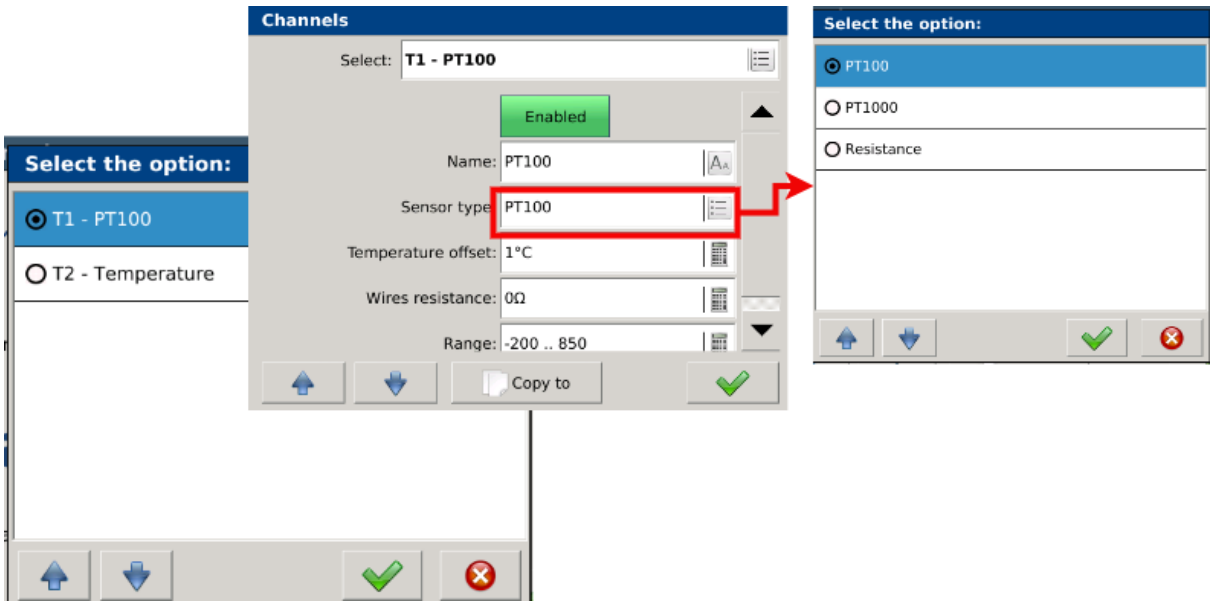


Figure 58: Temperature channel configuration window.

Parameters for configuring the temperature or resistance measurement input:

Parameter	Description
Status	Enabled / Disabled
Name	Editable name
Sensor type	Selection of temperature or resistance sensor (PT100, PT1000)
Temperature offset (PT100/ PT1000)	-100.0 …100.00
Wire resistance	0.0...10000.0
Range	Selection of the range for the selected sensor type. Provides the ability to change the standard minimum and maximum values assigned to the selected sensor.

3.2.4 Binary inputs

For the logical channel, you can select one of the available binary inputs BI as the input signal.

In the window with parameters for the binary channel, you can change its name and input mode.

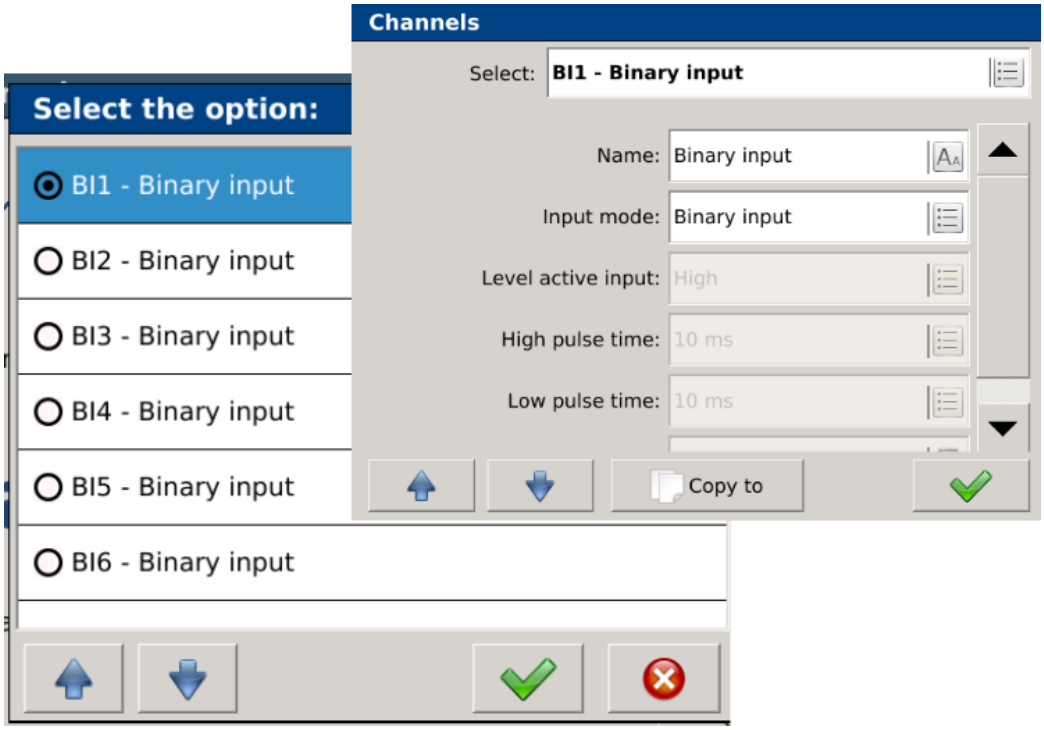


Figure 59: Binary input configuration window.

Parameter	Desription
Name	Editable name
Input mode	Binary input / Counter input
Parameters for input in counter mode	
Activity level	High / Low
High level time	1ms / 10ms / 100ms / 1s / 10s / 60s (10ms)
Low level time	1ms / 10ms / 100ms / 1s / 10s / 60s (10ms)
Number of pulses per 1	1...100000 (1000)

3.2.5 Modbus master inputs– MMI

The device has the ability to set 32 logical channels with a Modbus Master input (MMI1-MMI32). Modbus Master in RTU mode is available only in the version with a card with 8 relay outputs.

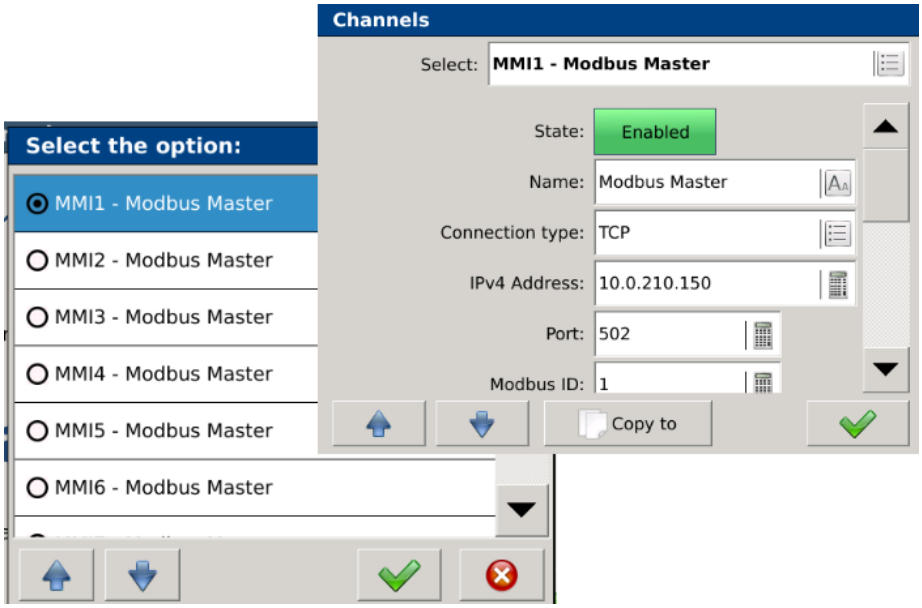


Figure 60: Configuraton window for MMI channel.

Parametry konfiguracyjne dla wejścia typu Modbus Master:

Parameter	**Description**
Status	Channel Enable/Disable
Name	Editable name
Connection type	TCP/RTU **(RTU for the specific versions of extension card)**
IPv4 Addres	IP address
Port	1...65535 (502 - default)
Modbus ID	1..255 (1 - default)
Register address	0...100000 (0 - default)
Quantity of registries	1…10 (1 - default)
Channel register	Selection of the register for the measurement channel for calculations and storing its value.
Register type	• int 16 • uint 16 • long 2x16 3210 • long 2x16 0123 • long 2x16 2301 • long 2x16 1032 • ulong 2x16 3210 • ulong 2x16 0123 • ulong 2x16 2301 • ulong 2x16 1032

	• float 2x16 3210 • float 2x16 0123 • float 2x16 2301 • float 2x16 1032 • float 32 3210 • float 32 0123 • float 32 2301 • float 32 1032
Reading function	• Read Holding Registers 0x03 • Read Input Registers 0x04
Scanning frequency	0s, 1s, 2s, 3s, 5s, 10s, 15s, 30s, 60s (0s)
Time limitations	100ms, 200ms, 300ms, 400ms, 500ms, 600ms, 700ms, 800ms, 900ms, 1000ms (100ms)
Displayed unit	Selection of the displayed unit from the list. Possibility of creating a unit by the user.
Float precision	0...0.00000

In the case of Modbus Master RTU configuration (for a device with a card with 8 relay outputs), you must set the transmission parameters, which are located in the "Communication" tab (Control Panel → Communication → Modbus RTU → Modbus Master).

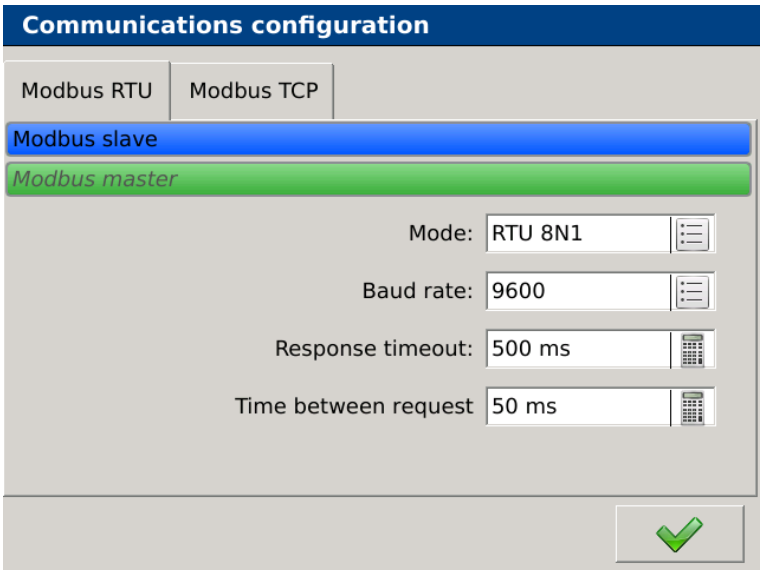


Figure 61: Configuration of Modbus Master RTU.

3.2.6 Alarm configuration

The device allows you to configure 64 alarms for measurement outputs.

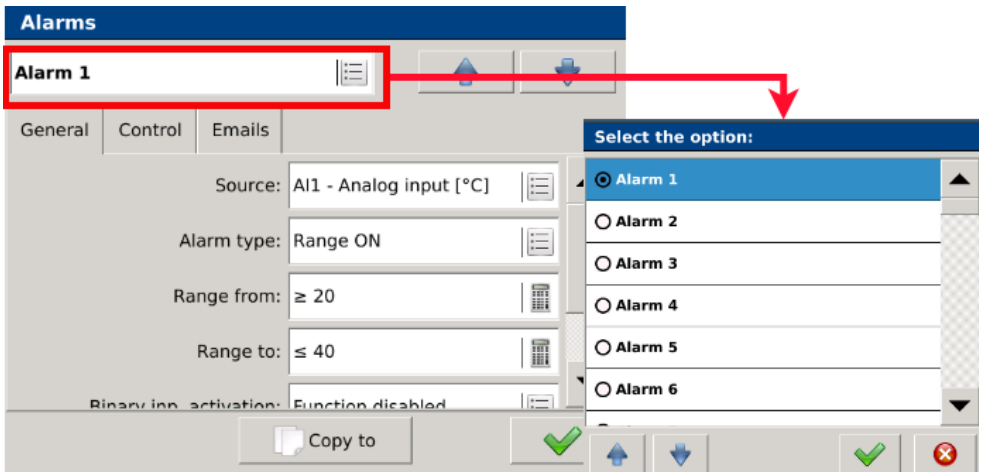


Figure 62: Alarm configuration-selection of the alarm.

Assigning an alarm to a given logical channel defines the source selection.

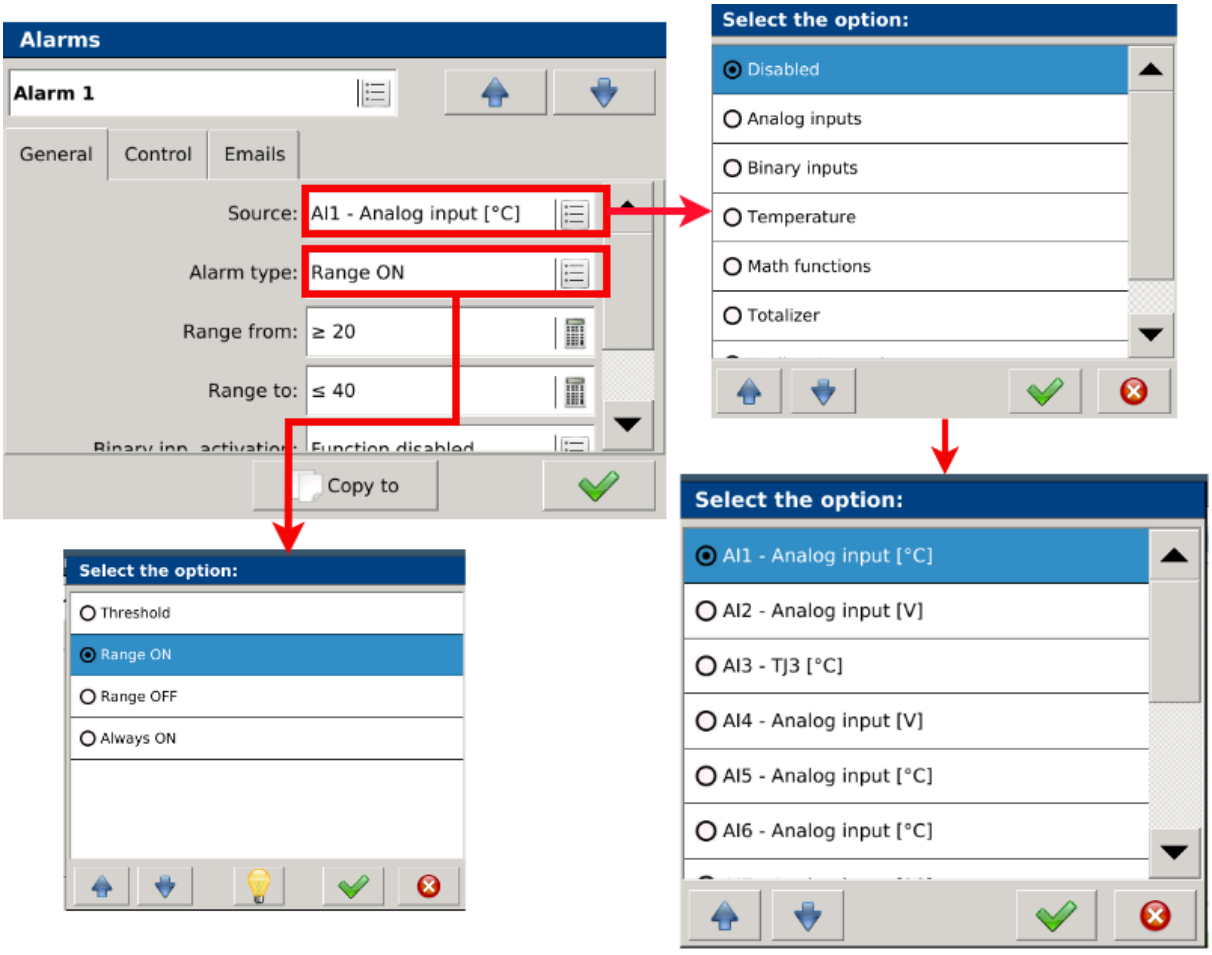


Figure 63: Alarms – general settings.

Parameter	Description
Source	Selection of the alarm source. First, the user selects a parameter group, and in the next step, a specific channel.
Threshold	The alarm is activated if the **ON condition** is met, deactivated if the **OFF condition** is met.
Enabled within the range	The alarm is enabled if the measured value is within the specified range. A value outside the range disables the alarm.
Disabled within the range	The alarm remains disabled if the measured value is within the specified range. A value outside the range enables the alarm.
Always enabled	The alarm is always enabled.
ON condition	The alarm enabling value.
OFF condition	The alarm disabling value.

In the case of the KD10 with relay outputs, it is possible to control alarm relays.

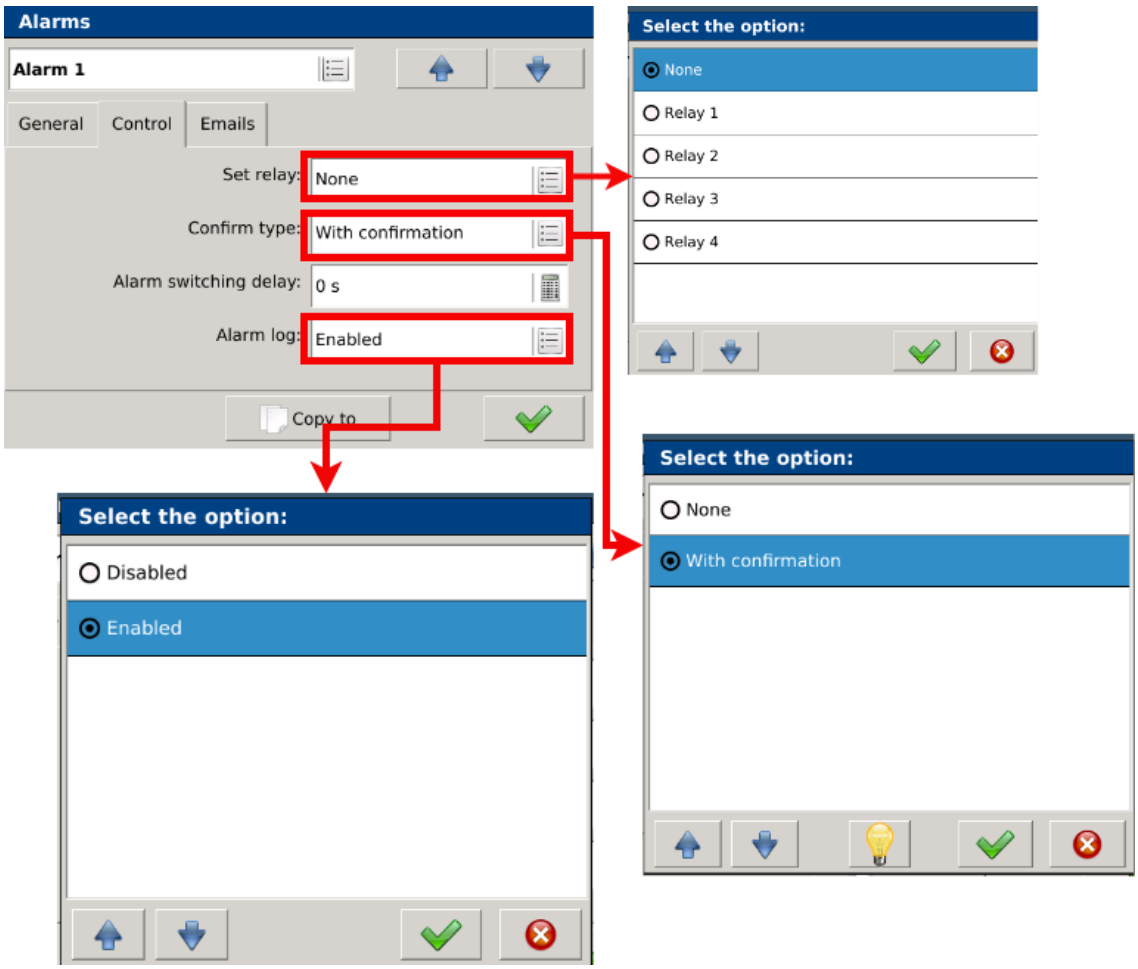


Figure 64: Configuration of the alarm as a relay.

Parameter		Description
Set relay		Assigning a relay to the alarm output.
Confirmation type:	None	Deactivating the alarm automatically removes information about the occurrence.
	With confirmation	After deactivating the alarm, information about the occurrence remains, which requires confirmation.
Alarm switching delay		Delay time for switching alarm states. After the event occurs, the alarm will be enabled or disabled, taking into account the set delay time.
Alarm log		Sets the option forcing the recording of alarm-related events to the alarm log (Alarm logs).

3.2.7 Totalizer – logical channel totalizers

KD10 has 12 totalizers (Counter/Integral) for logical channels (TOT1-TOT12), the totalizer configuration is located in the "Totalizer" tab (Control panel → Totalizer).

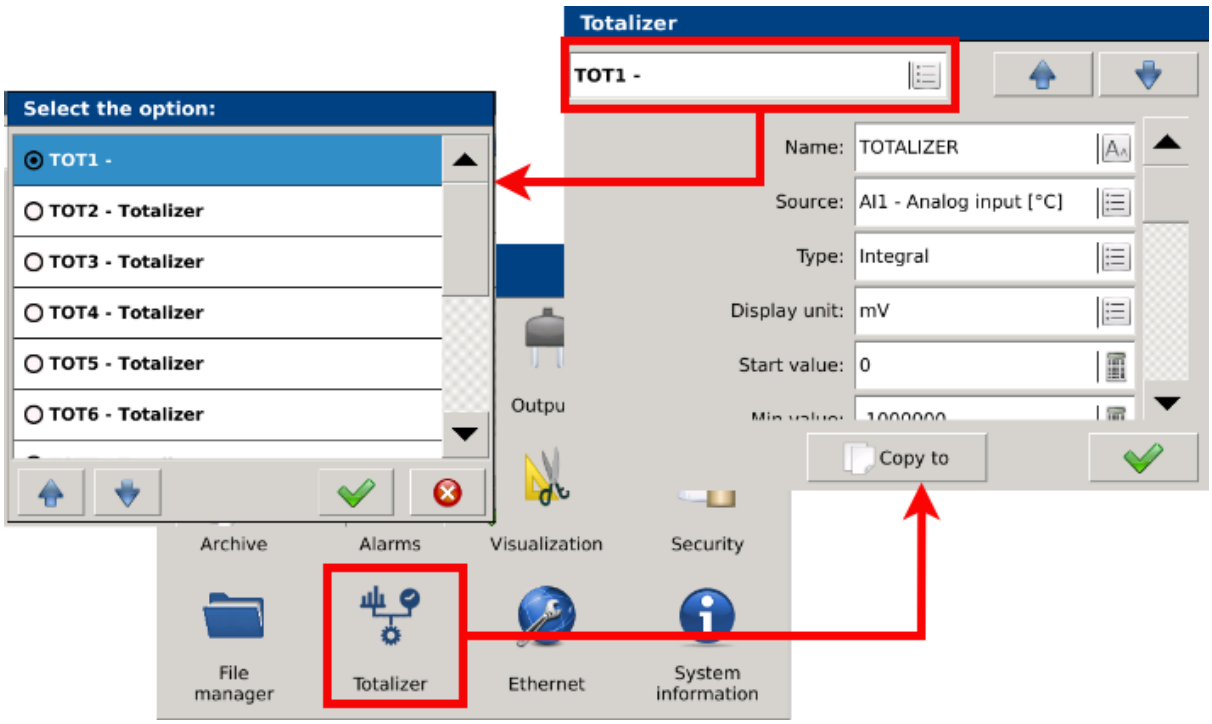


Figure 65: Totalizer configuration.

Below is a table with configuration parameters for the selected totalizer.

Parameter	**Description**
Name	Editable name
Source	Source of the signal for which the totalizer will count.
Type	Integrator/Counter.
Displayed unit	Select the displayed unit or create your own.
Initial value	-1000000...1000000
Minimum value	-1000000...1000000 (-100 - default)
Maximum value	-1000000...1000000 (100 - default)
Negative ranges	Enabled/Disabled
Overrun	0.0...10000.0
Multiplier	0.0...1000000.0
Counting direction	Up (Summary)/Down (Subtraction)
Float precision	0...0.00000
Time base	1sec /1min /1h /1 day
Reporting period	Specifies the interval at which the totalizer will be entered into the “Totalizer log”. **hh : mm : ss**
Counting type	Specifies the totalizer counting time, after which the totalizer counts again. Counting options: • Infinite, • Daily, • Daily from - to (at specific times), • Weekly, • Monthly
Day starting week	Day starting counting in weekly mode. • Monday • Tuesday • Wednesday • Thursday • Friday • Saturday • Sunday
From precised time (hour)	Time (hour) starting counting in "Daily from-to" mode **hh : mm : ss**
To precised time (hour)	Time (hour) defining the end of counting in "Daily from-to" mode **hh : mm : ss**
Reset hour	Specifies the hour of resetting the totalizer in daily, weekly and monthly mode, after which the totalizer counts again.
Resetting the totalizer by	Selecting a logical channel, the logical state of which is 1, will set the totalizer state to its programmed minimum value and restart counting.

Totalizer disabled by	Selecting a logical channel, the state of which is 1, will disable the totalizer operation.

The totalizers to be displayed are in the "Totalizers" data set.

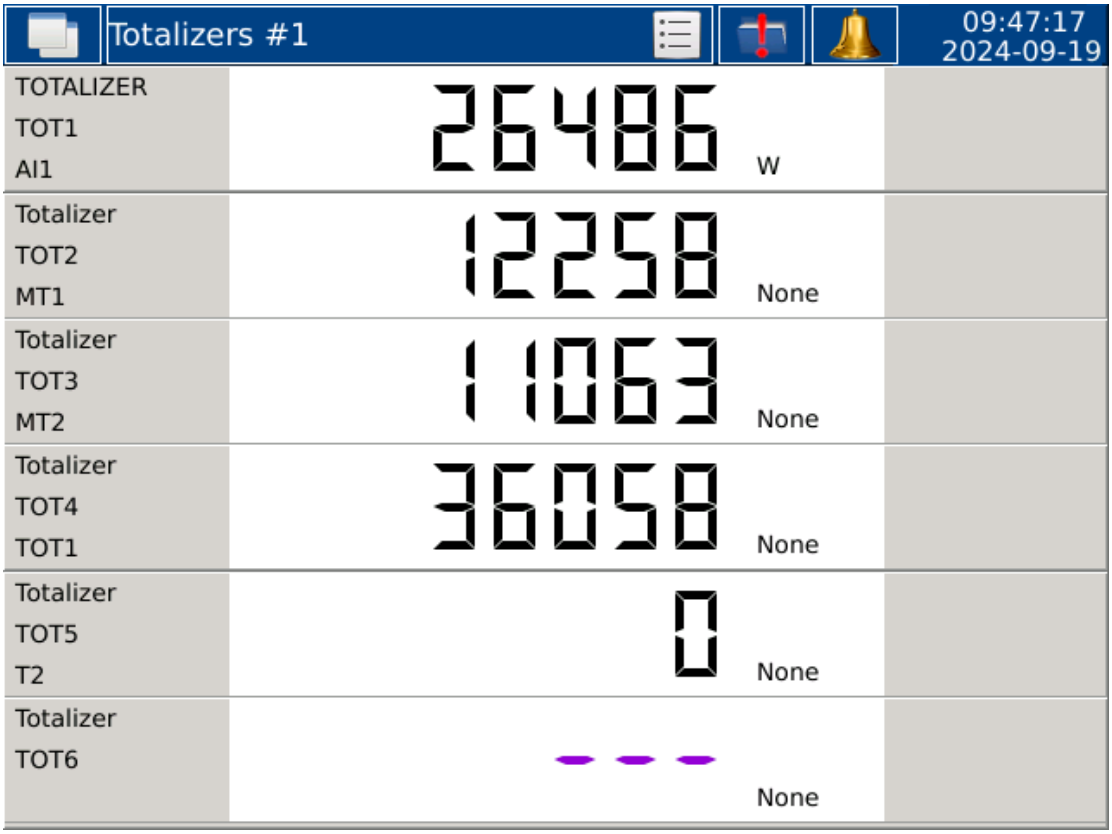


Figure 66: View for totalizers.

3.3 Modbus configuration

3.3.1 Modbus RTU configuration

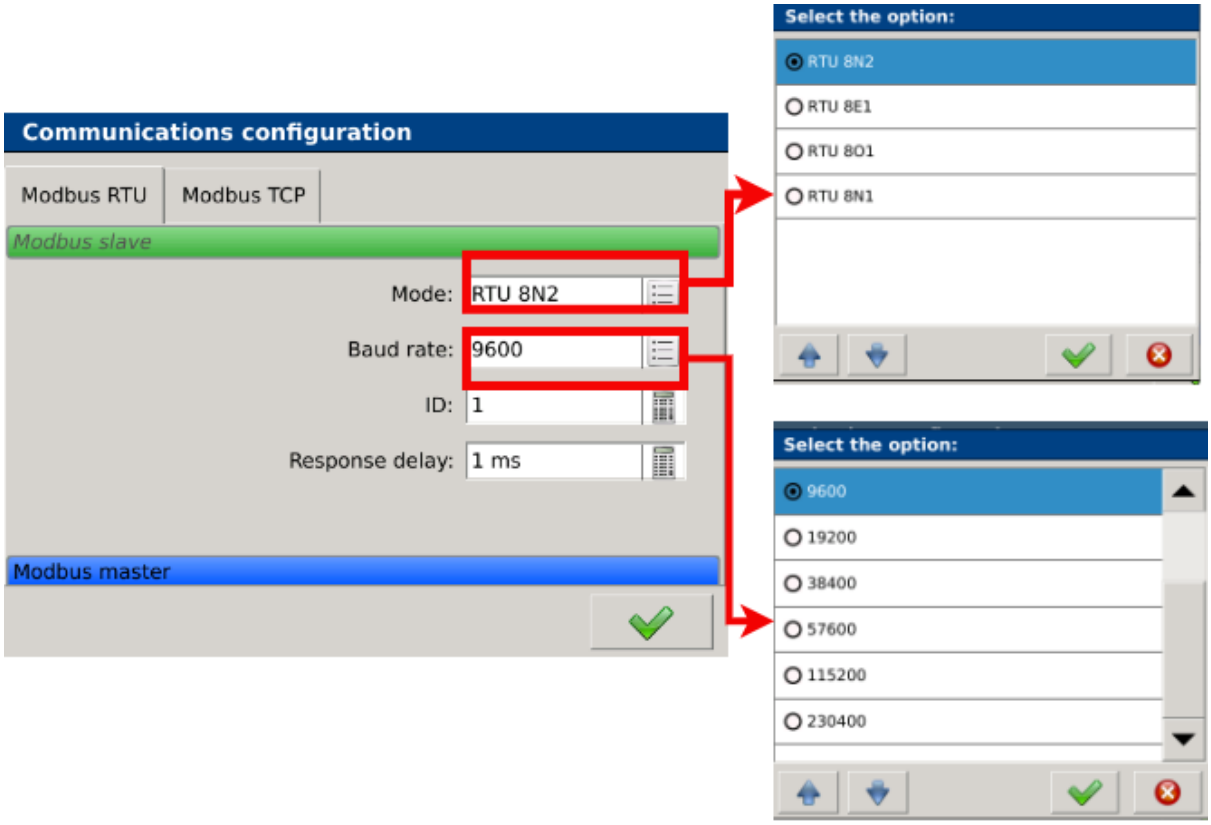


Figure 67: Modbus RTU configuration.

Parameter	Description
Mode	Specifies the type of RS-485 interface transmission frame.
Speed	RS-485 interface transmission speed.
ID	Device identifier in Modbus network.
Response delay	Force response time delay.

3.3.2 Modbus TCP configuration

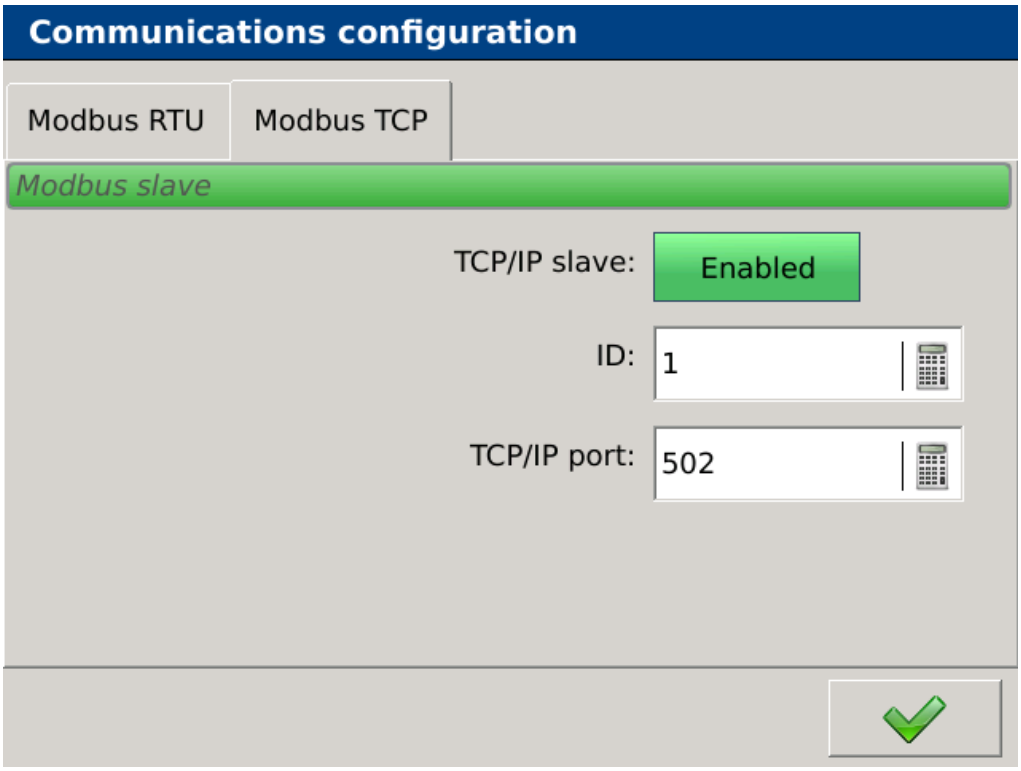


Figure 68: Modbus TCP configuration.

Parameter	Description
ID	The device identifier in the Modbus network.
TCP/IP slave	Enable or disable Modbus TCP/IP mode.
TCP/IP port	The port number of the Modbus TCP/IP protocol.

3.4 Visual screen configuration

3.4.1 Screens

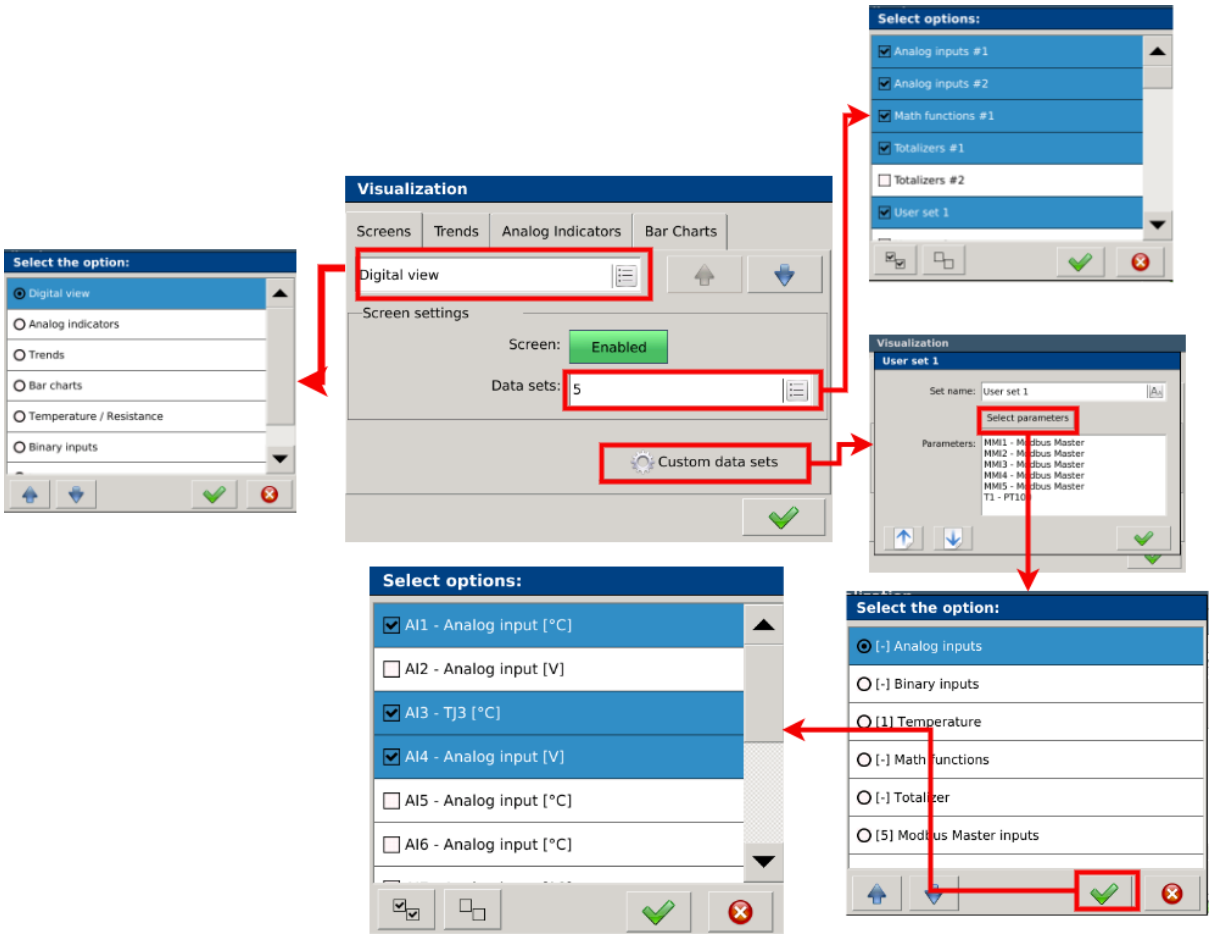


Figure 69: Screen configuration for large digital displays.

Parameter		Description
Large digital displays		The user selects the screen type using the selection list (as shown in the example, or using the buttons located to the right of the selection list).
Screen settings	View	Disabling the option removes the view from the list of views presenting the measured values of the screen.
	Data sets	The user can select sets of views available for the currently selected screen type (in the example presented - Large digital displays). Ready-made data sets and individually defined sets (user sets) are available for selection.
User sets	Set name	The user can define their own set name or leave the default name. Using the buttons, the user can navigate between user sets.
	Parameters	Function enabling the selection of parameters for the user set. First, the group to which the parameter is assigned is selected. Information about the selected parameters in a given group is

		convenient for the user. For example, the designation [2] Voltage informs that two parameters have been selected from the "Voltage" group. The designation [-] informs that there are no selected options in a given group. Additional options allow for quick selection or removal of all list elements.

3.4.2 Trends

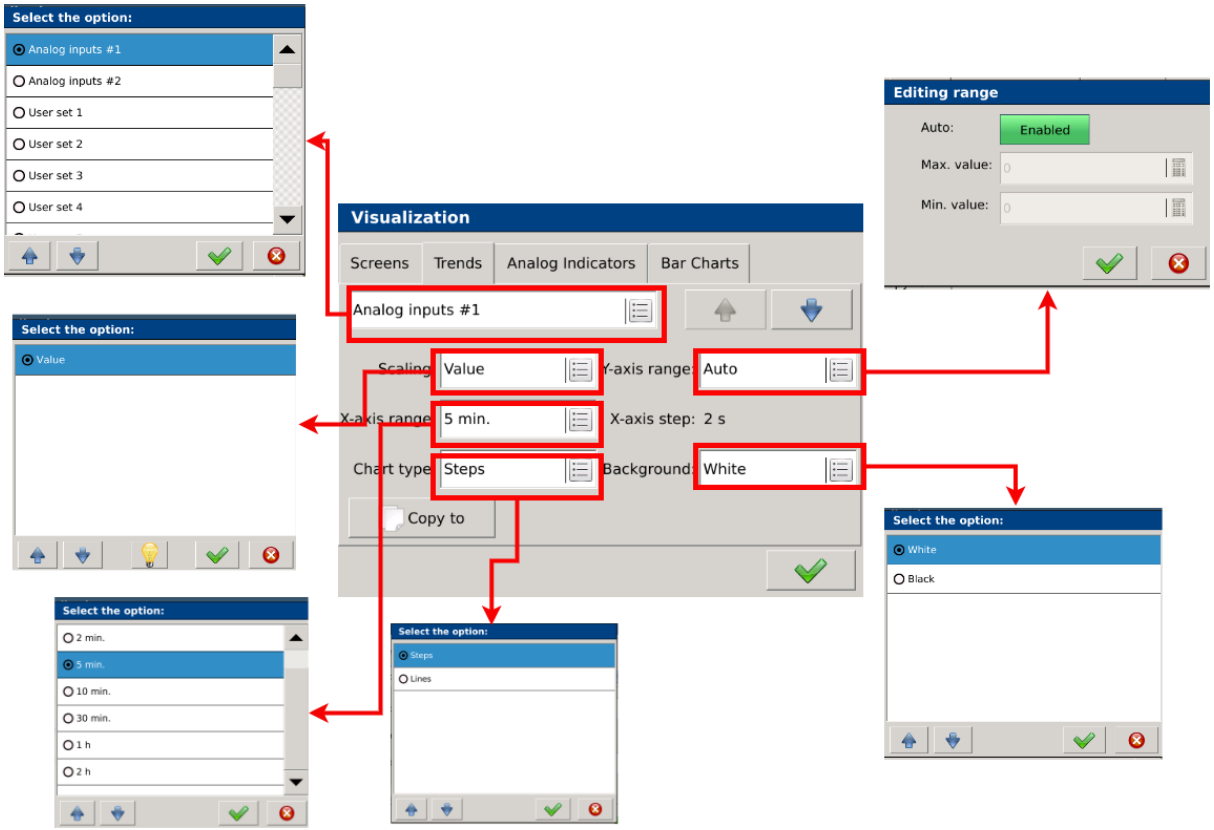


Figure 70: Configuration of screens for trends.

Parameter		Description
Scaling	Value	Scaling to parameter values.
	Percentage	Percentage scaling to the nominal value of the parameter range.
X-axis range		Time range of data presentation on the trend screen.
Chart type		Method of presentation of measured values. Depending on the selected option, data is presented in a step or linear form.
Background		Selection of the background color for trend screens.
Y-axis range	Automatic	Enabling or disabling scaling affects the ability to edit the maximum and minimum values presented on the Y-axis of the trend screen.
	Maximum value	Maximum value of the Y-axis for the parameter presented on the trend screen.

	Minimum value	Minimum value of the Y-axis for the parameter presented on the trend screen.

3.4.3 Analog indicators and bargraphs .

For analog displays and bargraphs, only the analog input and range are configured.

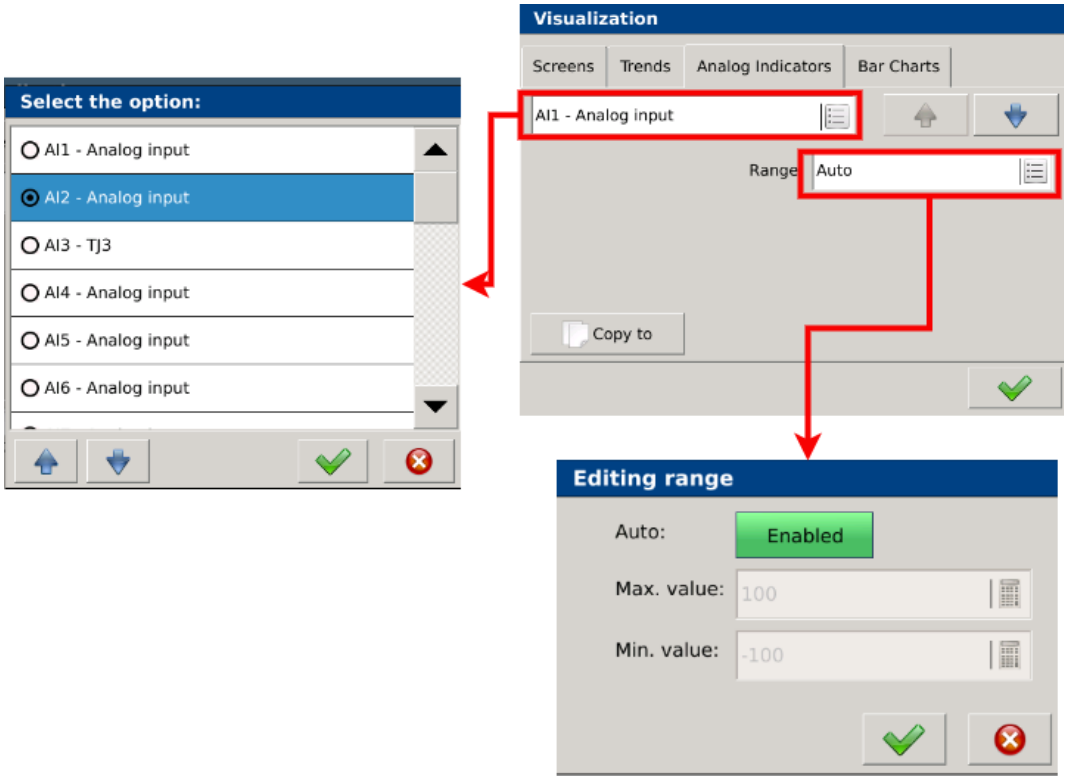


Figure 71: Screens configuration for analog indicators.

3.5 Ethernet configuration

3.5.1 General settings

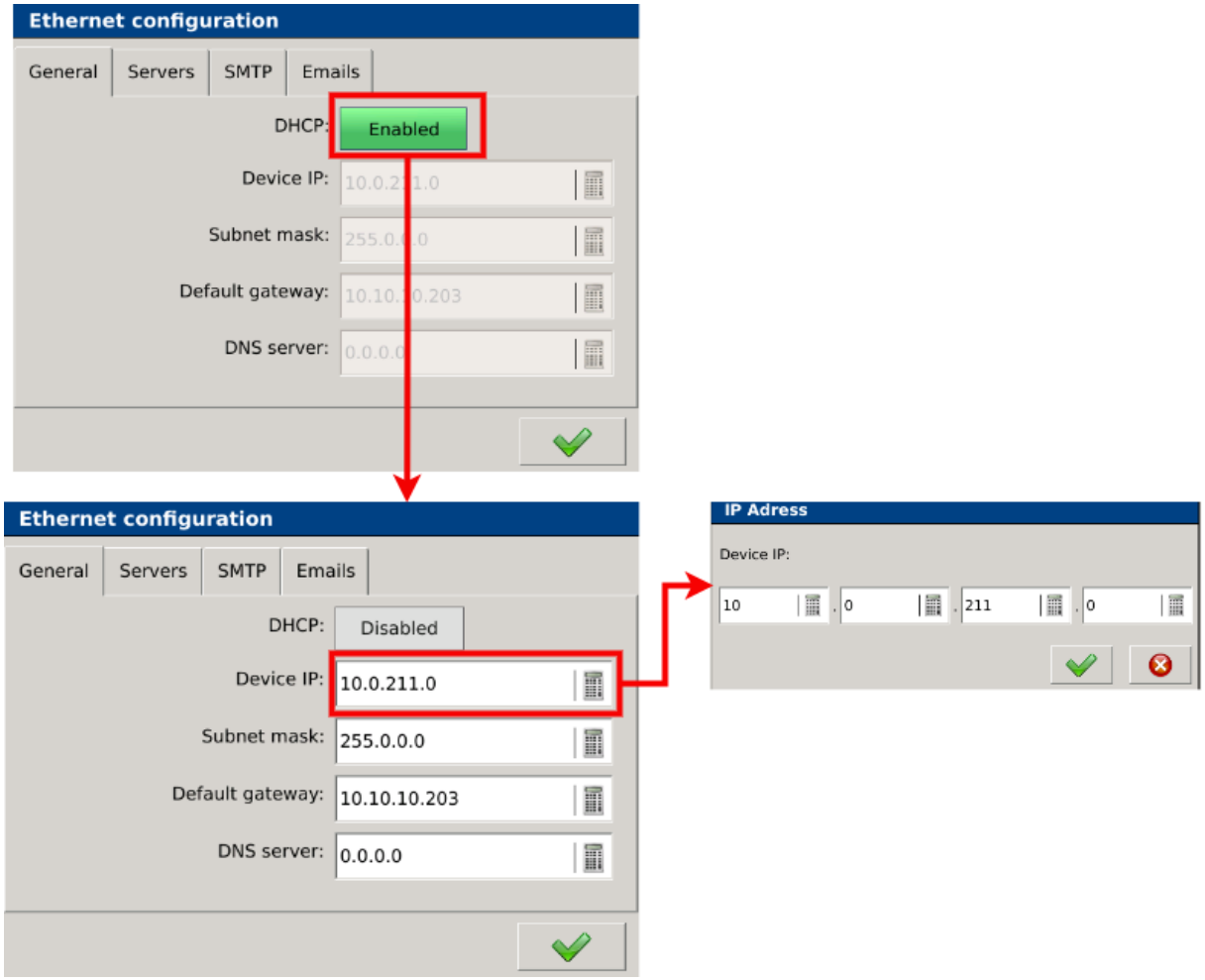


Figure 72: Window with ethernet configuration- General.

Parameter	Description
DHCP	Enables or disables DHCP support. When enabled, support for automatic acquisition of Ethernet interface IP protocol parameters from external DHCP servers within the same LAN is activated.
Device IP	Edit field for changing the IP address.
Subnet mask	Edit field for changing the subnet mask.
Default gateway	Edit field for changing the default gateway.

3.5.2 FTP and WWW server settings

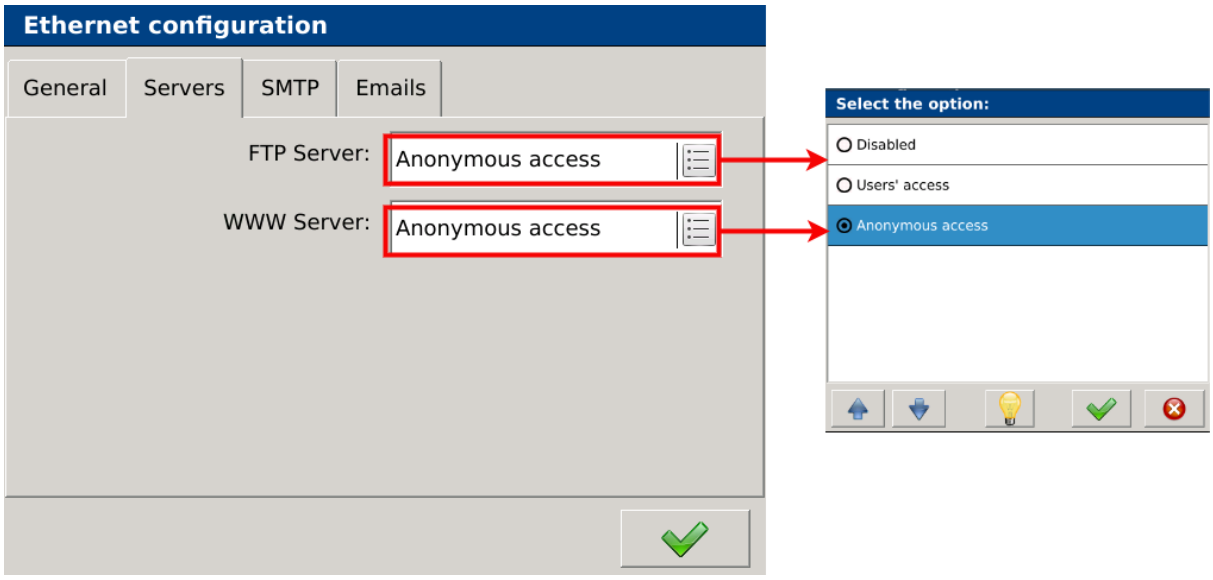


Figure 73: Ethernet configuration – Servers.

Parameter		Description
FTP server WWW server	Disabled	No access to the web or FTP server
	Authorized access	Access requiring authorization (requires logging in)
	Anonymous access	Access not requiring authorization (does not require logging in)

3.5.3 Mail Client Settings

The figure below shows the SMTP configuration dialog box.

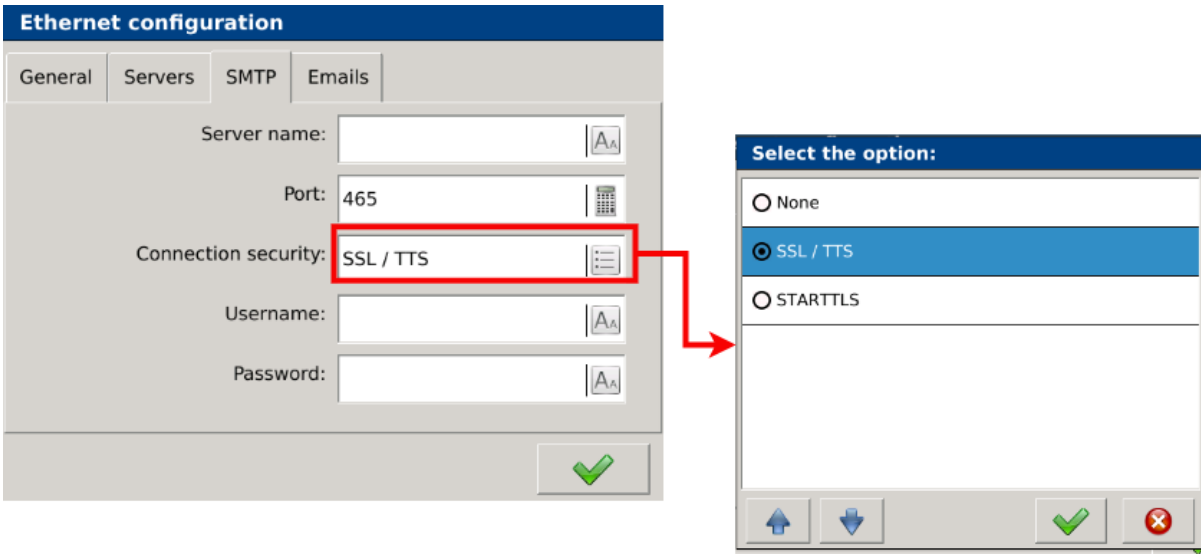


Figure 74: Ethernet configuration – SMTP.

Parameter	Description
Server name	Outgoing mail server
Port	Outgoing mail server port
Connection security	Select outgoing mail security option
User name	Message sender ID
Password	Access password

The email address list configuration is located in the "E-mail" tab and its contents are shown below in the figure.

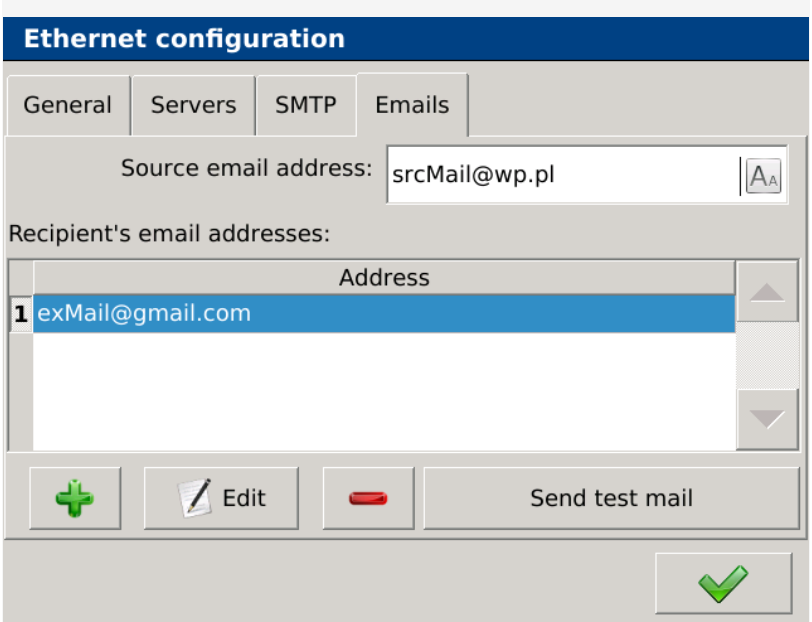
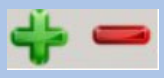


Figure 75: Ethernet configuration - E-mail.

Parameter	Description
Source Address	Outgoing Mail Server
List of Receiving Email Addresses	List of recipient addresses with the option of editing. **Maximum 10** addresses on the list.
	Add a new recipient address to the address list or remove an existing address from the list.
Edition	Change an existing address on the recipient list.
Send a test message	Send a test message to an address on the recipient list.

3.6 Archiving configuration

Within archiving, you can manage the following files:

- Archive with parameters selected by the client,
- Totalizer logs,
- Alarm logs,
- Audit logs

Files can be saved in 4 different formats. In the case of "Alarm log" and "Audit log" you can select their format and their size can be up to 32kB, after exceeding this capacity a new file is created.

In the case of "Totalizer log" and "Parameter archive", the user can specify the number of items in the file (1000 to 10000).

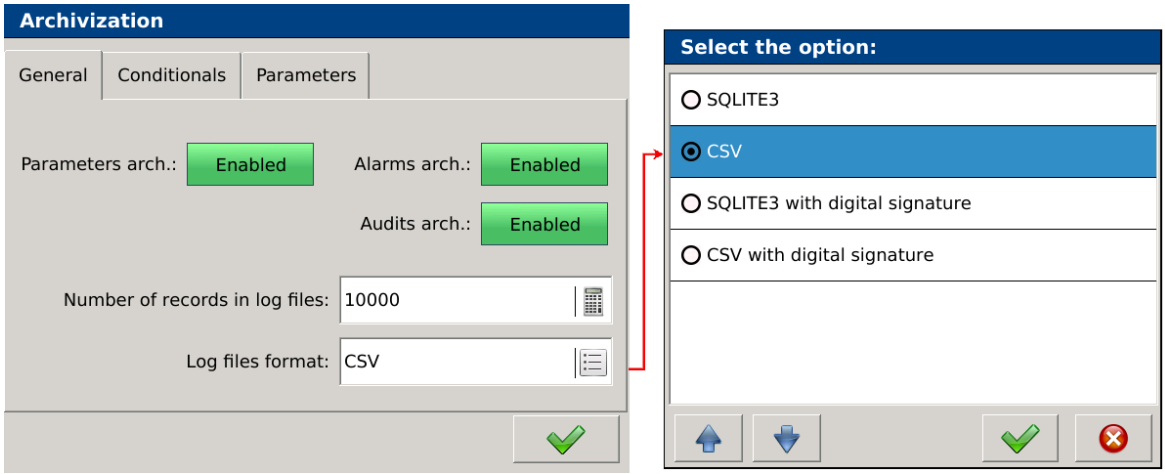


Figure 76: Archiving - general settings.

In the **"Conditions"** tab, the user can set the archiving conditions and time.

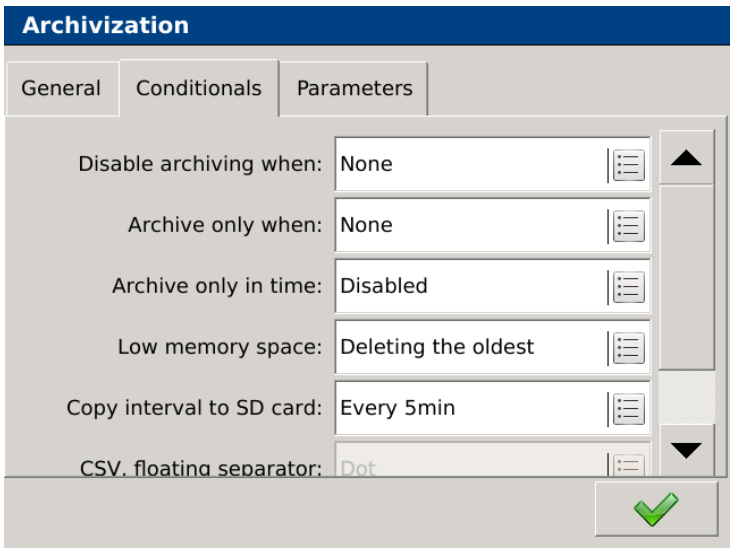


Figure 77: Archiving conditions.

Parameter	**Description**
Turn off archiving when	Selection of alarm that will turn off archiving. Alarm1...Alarm64
Archive only when	Selection of alarm for which archiving will be enabled.. Alarm1...Alarm64
Archiving only during	Editing the time limit.
Low memory space	When there is no more memory space on the SD card: - stop archiving - delete the oldest archiving file
Copy to SD card	Setting the time for cyclic copying of archiving files to the SD card: -1 min -5 min -10min -15min -30min -1h
CSV float separator	-Comma -Dot
CSV column separator	-Comma -Semi-colon -Tab

In the "**Parameters**" tab, the user defines the parameters that will be archived.

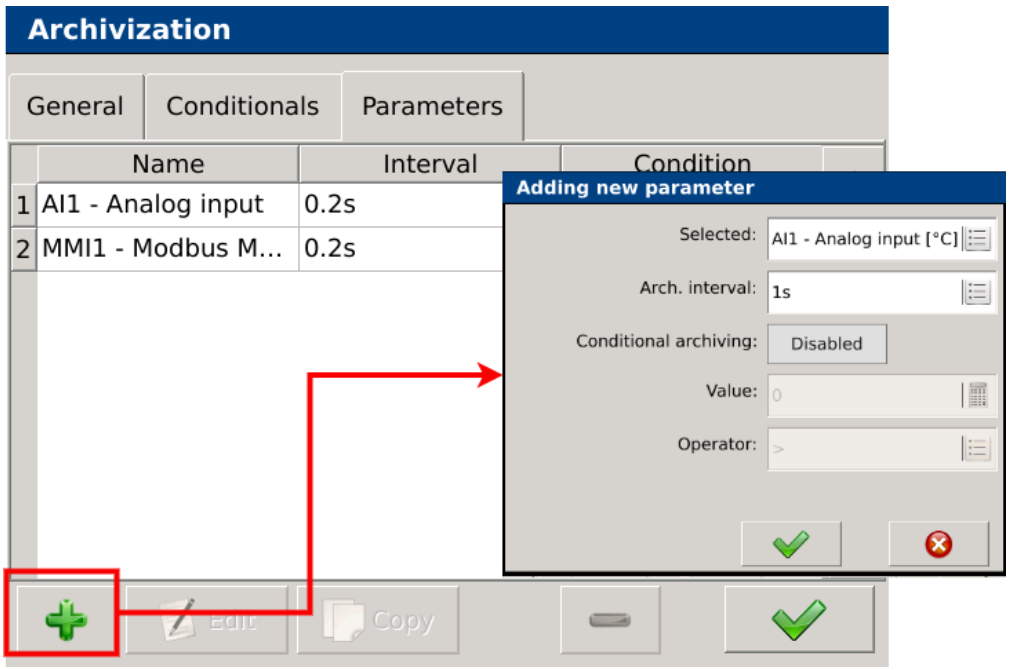


Figure 78: Archiving – adding a parameter.

Option	Description
Parameter	Selection of the archived parameter.
Archiving interval	Selection of the archiving interval of the selected parameter.
Conditional archiving	Enable or disable conditional archiving.
Condition	Condition of conditional archiving.
Value	Value assigned to the condition of conditional archiving.

3.7 Output configuration

Depending on the KD10 recorder version, it may have cards with analog or relay outputs. If the device does not have these cards, the options described in the following sections will be unavailable.

3.7.1 Relay output configuration

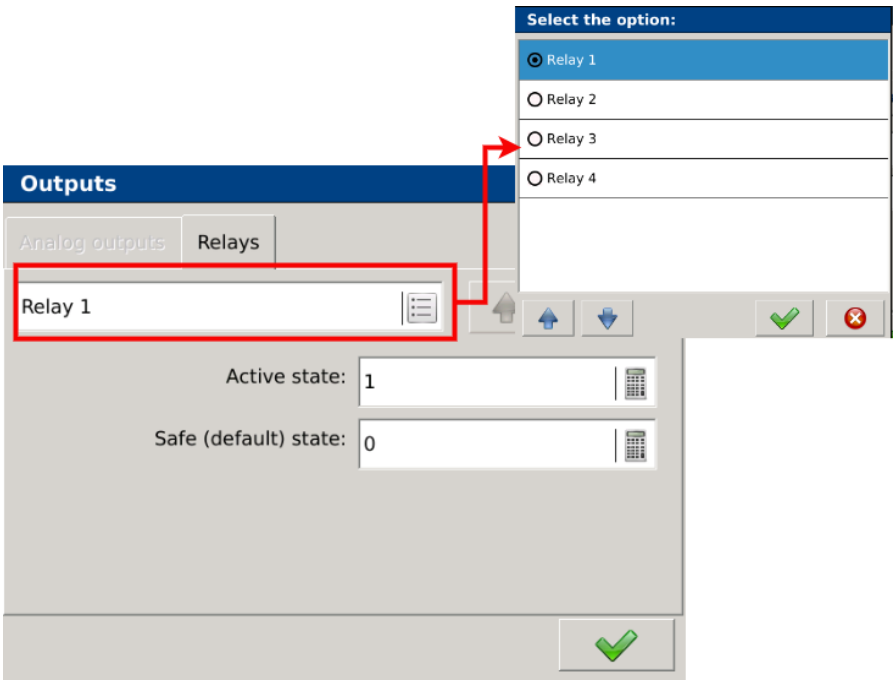


Figure 79: Output configuration – relays.

Option	Description
Relay number	Selection of the relay for configuration
Active state	Value set when the alarm condition assigned to the given relay is met.
Safe state	Value set when the assigned value is not ready.

3.7.2 Analog outputs configuration

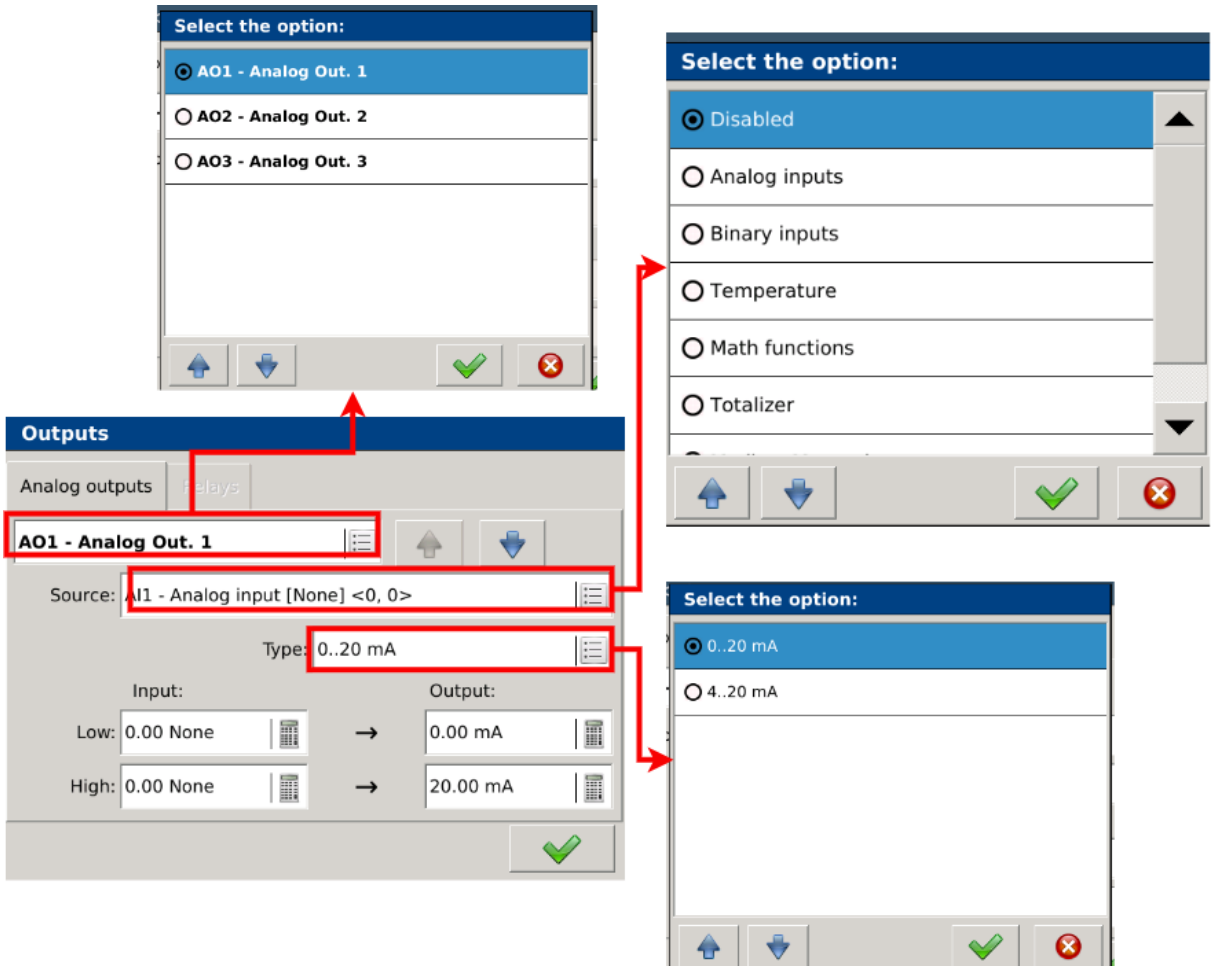


Figure 80: Analog outputs configuration.

Option		Description
Analog output number		Selection of the currently configured analog output.
Source		Selection of the input source assigned to the analog output.
Type		Selection of the range on the analog output.
Input	Low	Lower value (of the input source).
	High	Upper value (of the input source).
Output	Low	Lower value (on the analog output).
	High	Upper value (on the analog output).

3.8 Security configuration.

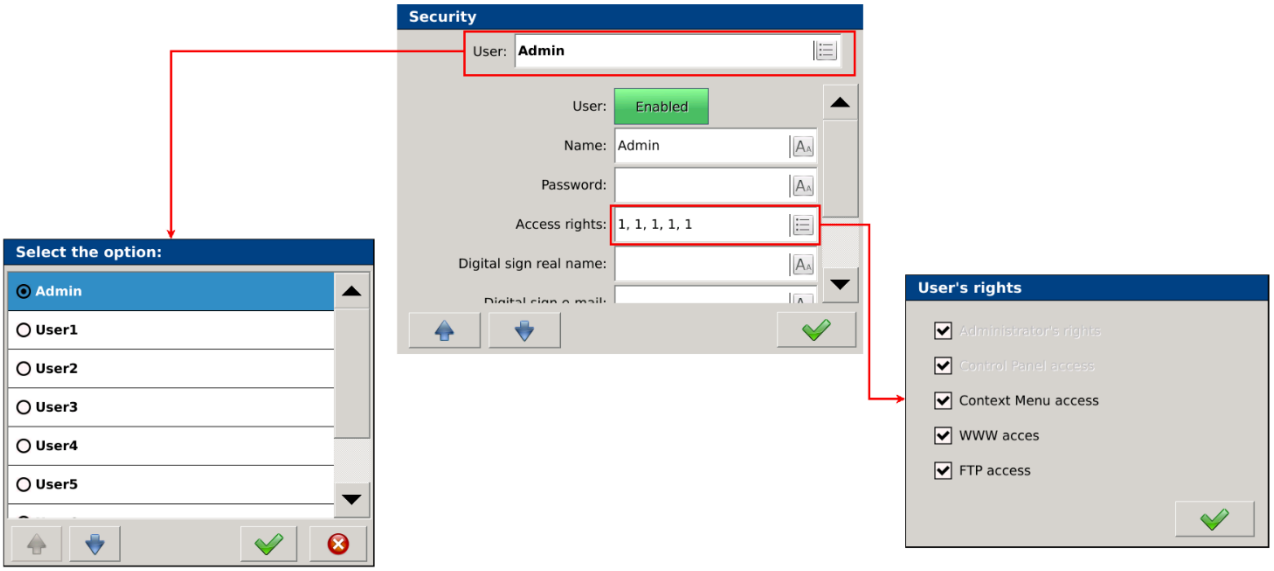


Figure 81: Setting user's rights.

Navigation between users can be performed using the selection list (called up after touching the field at the top of the main screen (in the example shown with the currently selected - Admin), or using the buttons  .

When user don't have administrator rights he can only see only one specific window that is dedicated to him.

In this tab is is possible to configure digital signature that is later used in archivisation after choosing **SQLITE3 with digital signature** or **CSV with digital signature** option.

User password need to be at least 8 characters long, must contain at least one lowercase and at least one uppercase letter, must have one numer and one symbol as well. If this requirements are not met password will not be saved and on the screen information dialog will appear (Fig.82.).

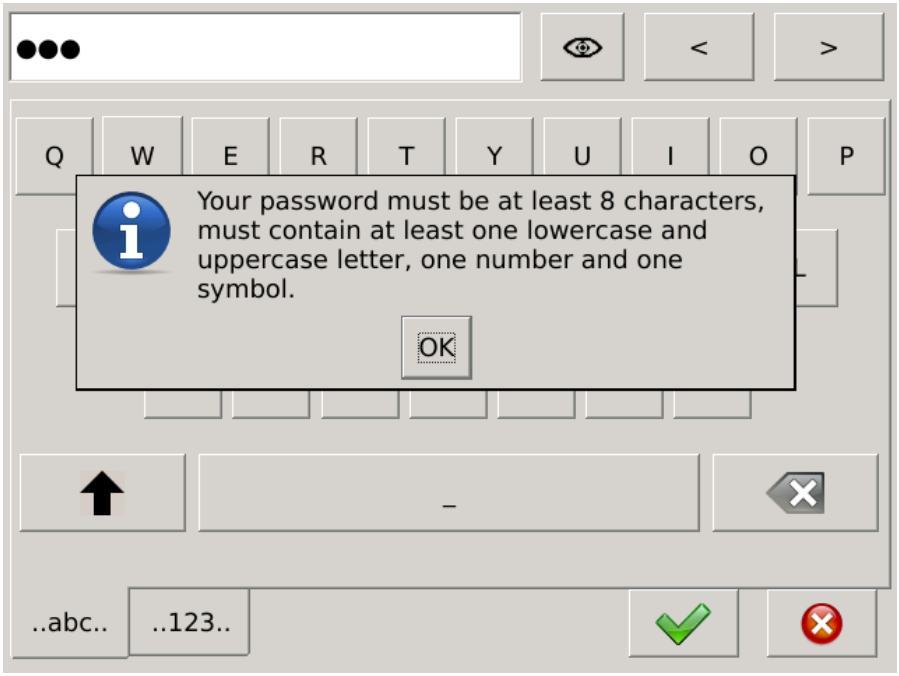


Figure 82: Digital sign password

Parameter		**Description**
User		Enables or disables the currently edited user..
Name		Editable user identifier. Contains eight defined users. Standard names: Admin, User 1, User 2 ... User 7.
Password		It is possible to assign a password to individual users. The password is required when logging in to the configuration settings.
Access rights	Administrator rights	Permissions allowing changing user rights.
	Control panel access	Possibility to view and edit control panel parameters.
	Context menu access	Allows you to confirm alarms in the context menu and additionally provides access to file management and alarm confirmation on the WWW page.
	WWW access	Authorized access to the WWW page.
	FTP access	Authorized access to the FTP server.
Digital sign real name		User name needed for digital sign
Digital sign e-mail		User e-mail needed for digital sign
Digital sign comment		User comment to digital sign (optional)
Digital sign expiration time		1 day – 50 years or infinity

4 File manager

The user can edit files stored on the SD card or USB host from the device using the file manager.

The transition to file management is shown below.

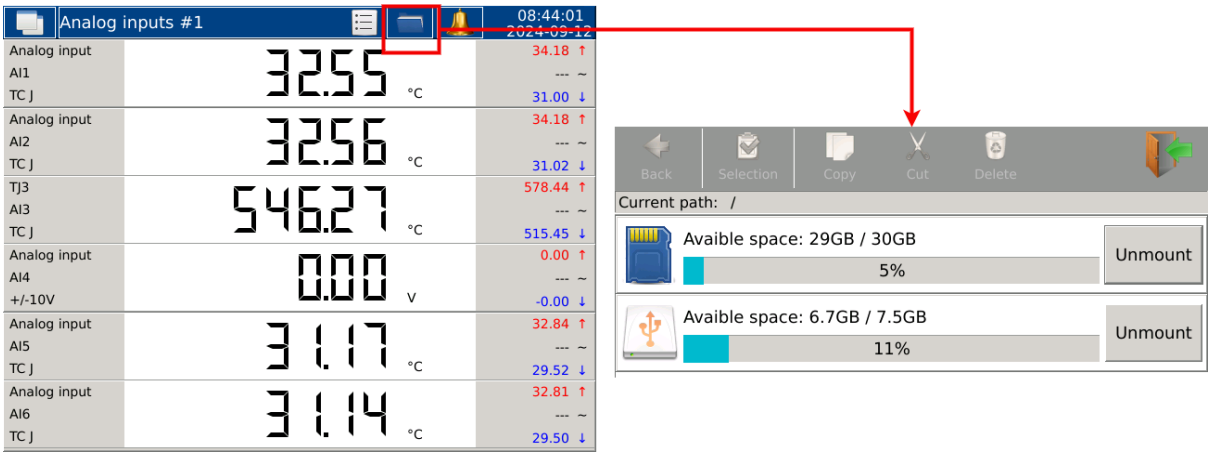


Figure 83: Passing to file manager - navigation

After selecting the editable resource in the form of an SD card or USB host, we gain the ability to edit the files on it. Below is an example of selecting a file on an SD card with the editing options assigned to it.

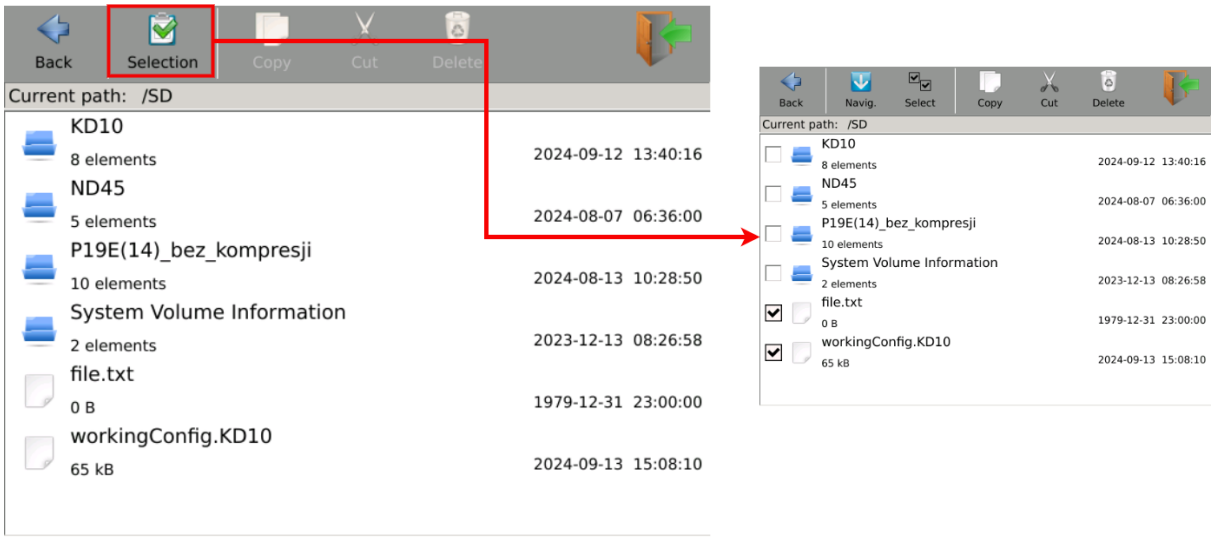
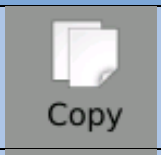
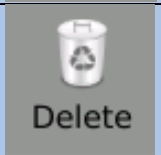
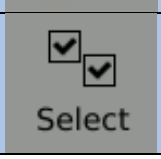


Figure 84: File manager – file selection.

Option	Description
	Copying the selected item to any selected location on the memory card.
	Moving the selected item to any selected location on the memory card.
	Deleting the selected item from the memory card.
	Exiting the file manager.
	Selecting selected files and folders.

5 Data archiving

A screenshot showing the window for managing the currently set parameters for archiving. The archive configuration is described in section 3.6 Archiving configuration.

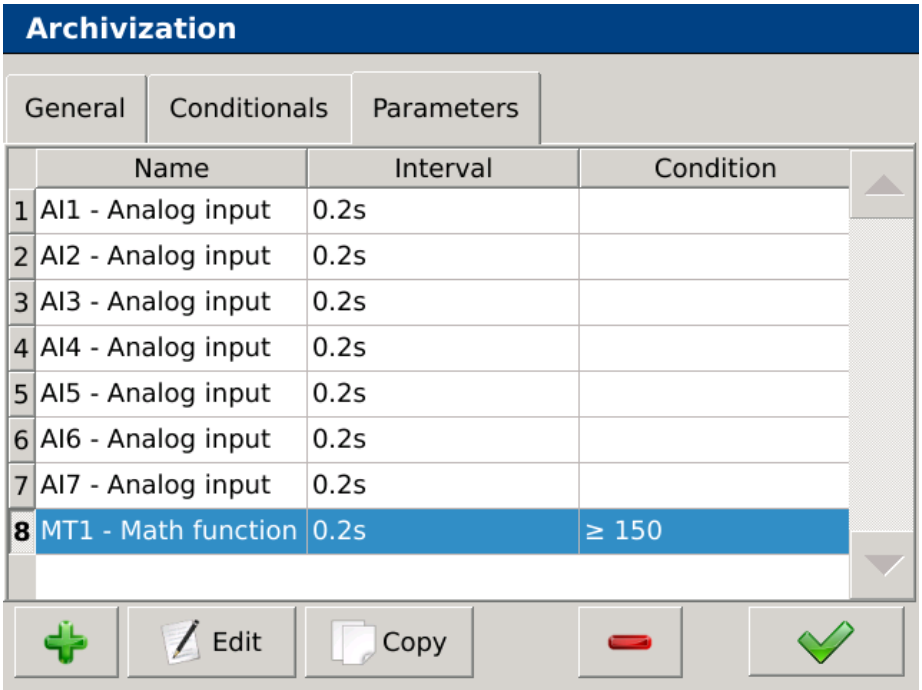


Figure 85: Edition window of archiving parameters.

Downloading archive files is possible via a web server, client FTP e.g. Filezilla software or directly from an SD card.

Archive files are supported in the following formats: .sqlite3, .sqlite3 with digital signature, .csv, .csv with digital signature.

Sample file with archived data: **2023-11-12_13_24_21.KD10Arch.sqlite3**

PowerArchive software is used to handle archiving files and verify digital signatures.

The digital signature is the “enciphered” information enabling to check the likehood of stored data in the “sqlite3 with digital signiature” and “CSV with digital signiature”.

The file name contains the date and time of file creation. In the above example, the file has already completed archiving (all records set in the archiving configuration are filled in).

After making changes to the archiving configuration (e.g. adding new parameters or changing the archiving conditions), a new file is created with the time and date of its creation.

The file contains basic information about the archived parameters:

Parameter	**Description**
id	automatically assigned record identifier,
idParameters	parameter identifier that is consistent with the defined parameter number
dataTime	date and time of occurrence of the archived parameter
value	archived parameter value
flag	status of the archived value: 0 – correct measurement 1 – no measurement value 128 – averaging of values for a given time window is not finished.

6 Alarms

The KD10 recorder in some versions (acc. to ordering code) is equipped with 4 or 8 relay alarm outputs.

The principles of configuring alarms are described in section *3.2.6. Alarm configuration.*

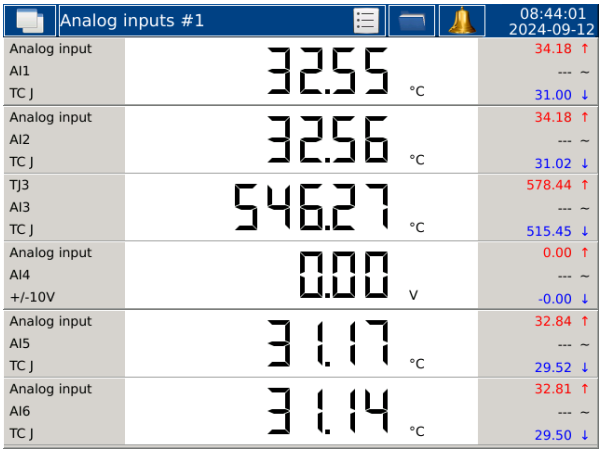


Figure 86: Screen view without active alarm.

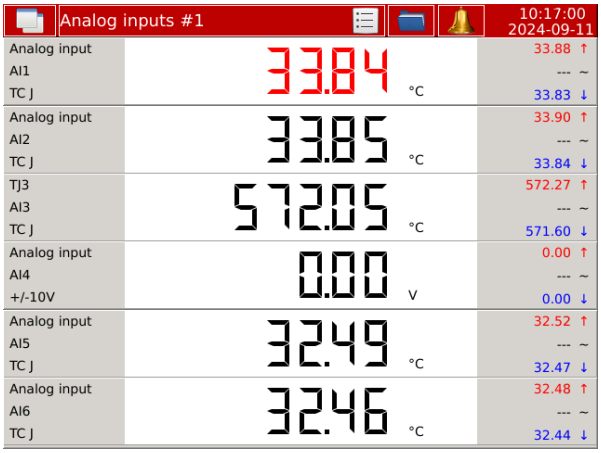


Figure 87: Screen view with active alarm.

The view on the left shows the operating mode in which no alarm-activating event occurred, while the view on the right shows the operating mode with an alarm enabled. Activating an alarm changes the color of the information bar at the top of the screen from green to red.

Additionally, an additional element is generated  .

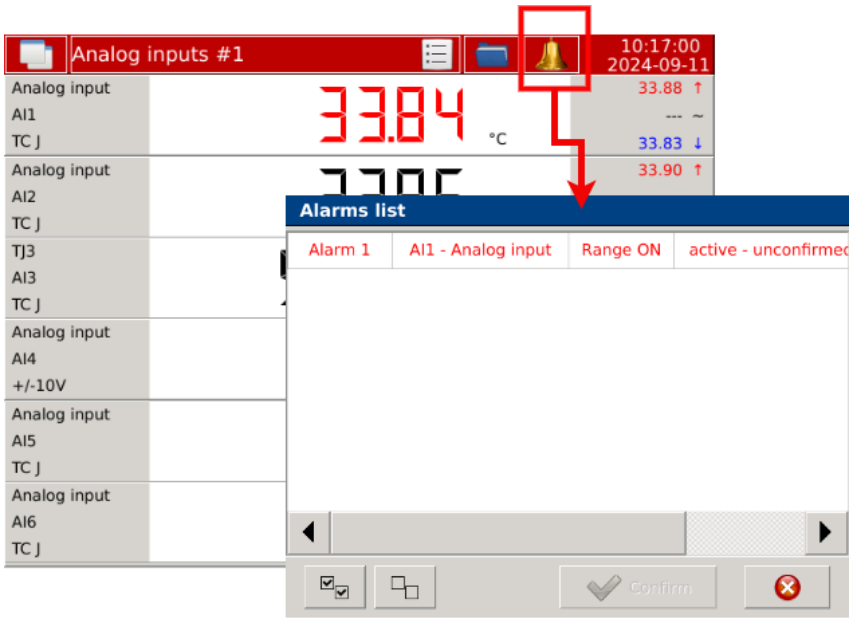


Figure 88: Alarm list.

After selecting the element generated when the alarm was enabled, a list of currently enabled alarms will be displayed.

Confirming the selected alarm changes its color and status description to confirmed, as in Figure 89.

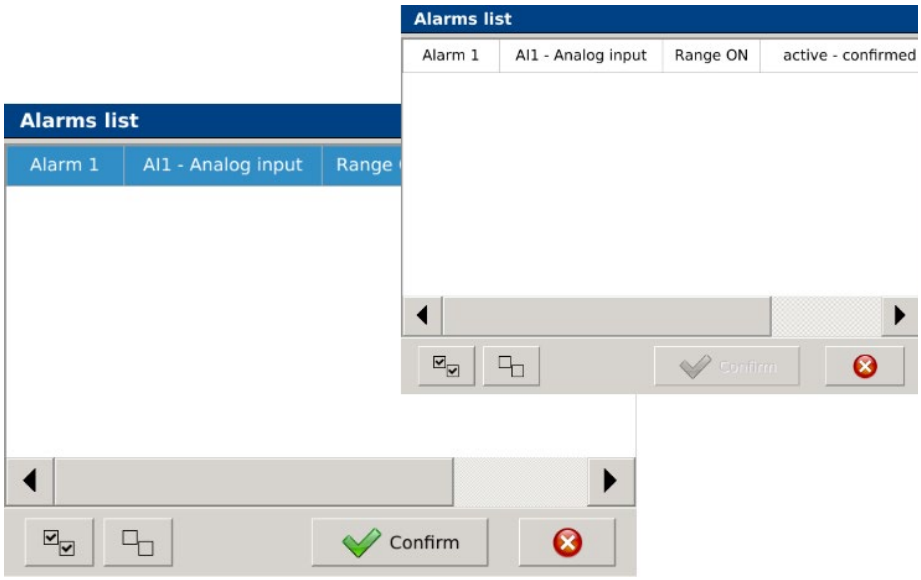


Figure 89: Confirmation of alarm from the list.

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Option	Description
1	Alarm number, set by the user.
2	Channel assigned to a given alarm. The parameter value causes the alarm to be turned on or off.
3	Alarm type assigned to the displayed event.
4	Current alarm status.
5	Main window with information about alarm occurrences.
6	Function allowing alarm confirmation.
7	Exit the dialogue.

If the option of reporting the alarm status in alarm logs was selected in the alarm configuration, events related to the alarm being turned on or off will be saved.

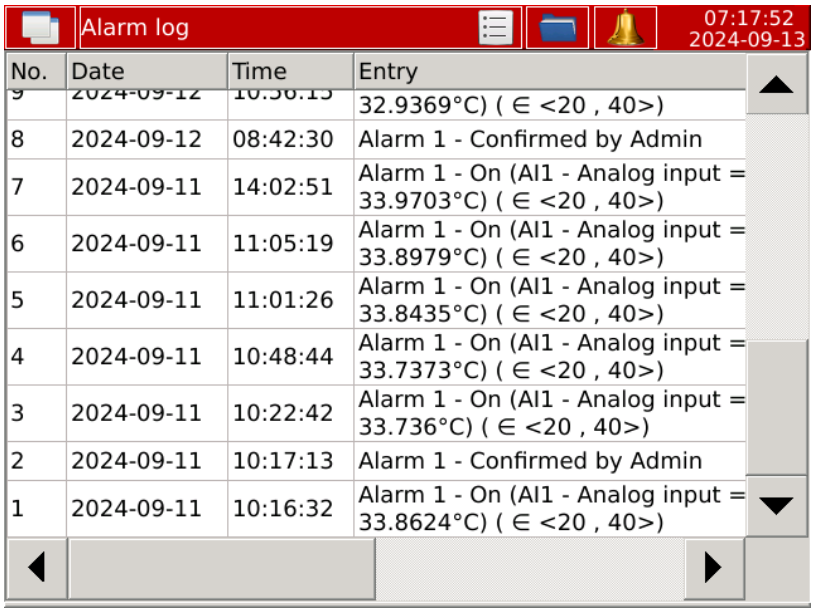

Figure 90: Alarm logs.

Option	Description
No	Number specifying the order of occurrence of events related to alarms.
Date	Date of occurrence of the event.
Time	Time of occurrence of the event.
Entry	Entry containing information about the event. The description includes the alarm identifier, event and value that caused the event.

Alarm log management is performed according to the example presented below. The Delete logs option clears the log window of saved entries. The Confirm alarms option redirects to the previously described dialogue allowing confirmation of selected alarms. The delete and confirm options require confirmation of the permissions held. After selecting the option, a dialogue is generated in which the user provides the user name and the password assigned to them.

Alarm logs are saved on the SD card. The file containing the current logs is saved as **alarm.log.bin, alarm.log.sqlite3 or alarm.log.csv.**

A preview of the file saved on the SD card is presented below.

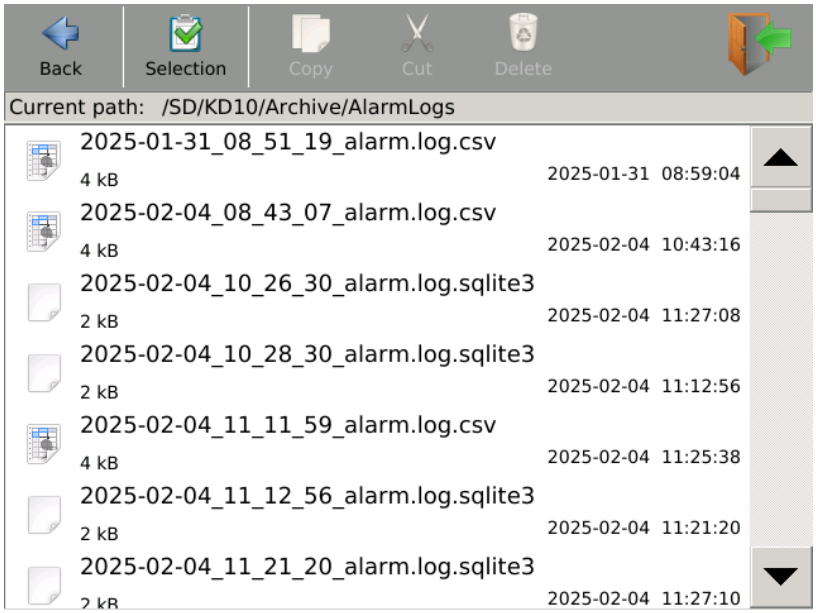

Figure 91: Alarms – files saved on the SD card..

The file name containing alarm logs has a maximum size limit. Once it is exceeded, another file is created, with a new date and time.

Example file name for 3 formats:

- 2023-09-07_12_23_04_alarm.log.bin
- 2023-09-07_12_26_30_alarm.log.sqlite3
- 2023-09-07_12_26_30_alarm.log.csv

7 WWW server

We obtain access to the WWW server by entering the IP address assigned to a given analyzer version in the browser window.

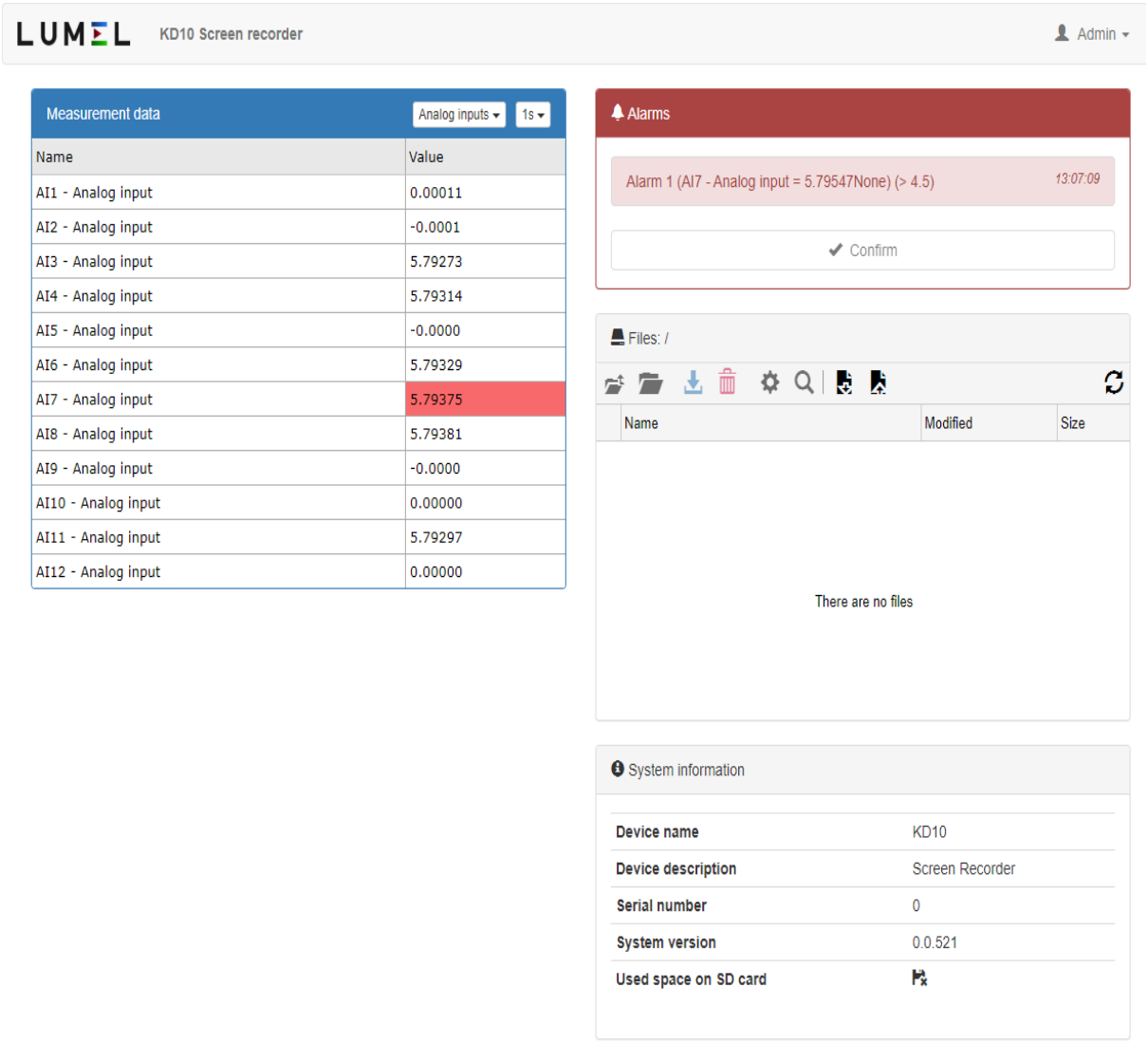

Figure 92: WWW website view.

7.1 Navigation

Depending on the Ethernet configuration settings, the user is provided with two modes of access to the www server. The first mode, Authorized access, is preceded by a login window. Anonymous access automatically redirects to a www page with limited functionality.

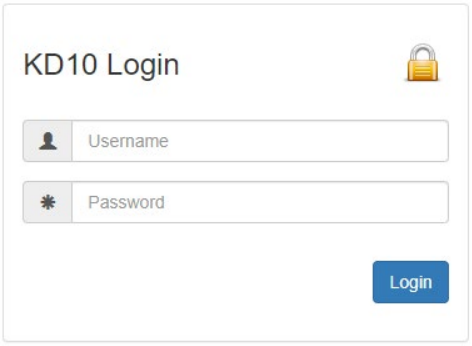

Figure 93: WWW server - login.

The page presents current measurement results with adjustable refresh time, visible in Figure 94. Measurement sets can be individually configured or presented in prepared sets. Values associated with the occurrence of an alarm (not confirmed) change color to red.

Measurement data — Analog inputs — 1s

Name	Value
AI1 - Analog input	0.00001
AI2 - Analog input	-0.0002
AI3 - Analog input	5.79215
AI4 - Analog input	5.79254
AI5 - Analog input	-0.0000
AI6 - Analog input	5.79270
AI7 - Analog input	5.79315
AI8 - Analog input	5.79320
AI9 - Analog input	0.00000
AI10 - Analog input	0.00000
AI11 - Analog input	5.79232
AI12 - Analog input	0.00000

Figure 94: Table with measurement values-www.

The alarm section presents the current alarm status, in authorized access mode, with the possibility of alarm confirmation.

Figure 95: Table with the list of active alarms.

The log file management, configuration and archiving section. Editing and viewing the module is only possible in authorized access mode.

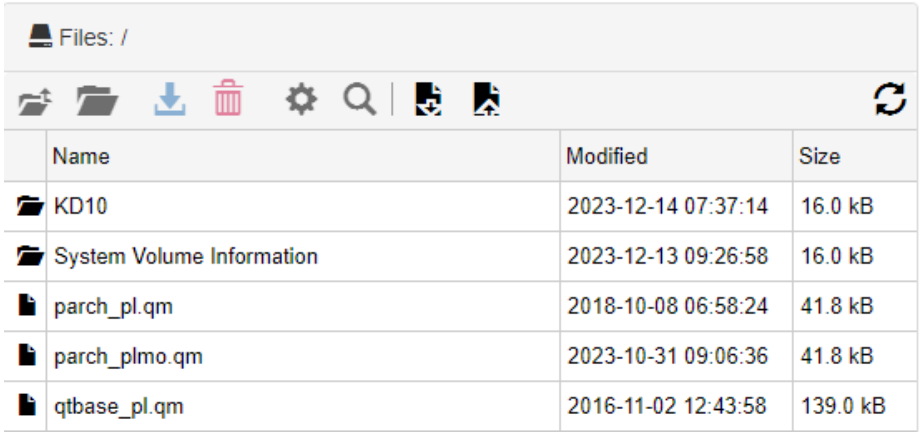

Figure 96: File manager – www.

The information section contains basic information about the system.

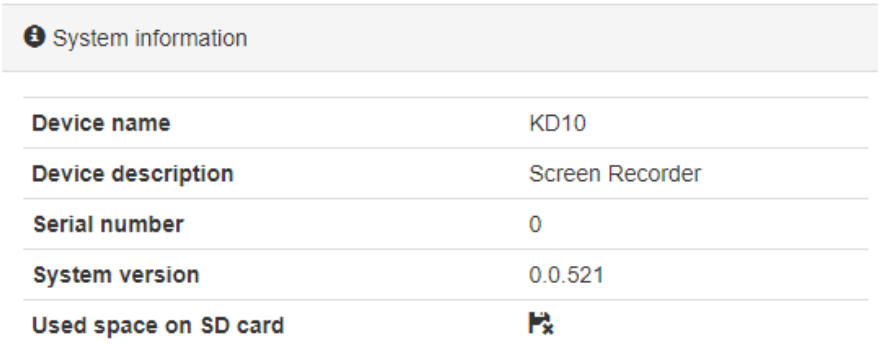

Figure 97: Information about the device - www.

7.2 Functionality

No	Option	Authorized access		Anonymous access
	General			
1	Login / Logout	✓		×
2	Device restart	✓		×
3	Configuration of user measurement data sets	✓		×
	Measurement data			
4	Measurement data preview	✓		✓
5	Selection of defined sets	✓		✓
6	Selection of user sets	✓		×
7	Measurement data refresh time change	✓		✓
8	Disabling measurement data refreshing	✓		✓
	Alarms			
9	Alarm preview	✓		✓
10	Alarm confirmation*	✓	×	×
	File			
11	File preview*	✓	×	×
12	Refreshing list of files*	✓	×	×
13	Opening and closing of directories*	✓	×	×
14	Files downloading*	✓	×	×
15	Files deleting*	✓	×	×
16	Setting a configuration from file*	✓	×	×
17	Archive file preview*	✓	×	×
	Information about system			
18	System information preview	✓		✓

* availability of the function depends on the user permission settings

7.2.1 Login / Logout

The login window is presented in point 7.1. Navigation. The login and password are consistent with the access permissions defined in the device in the Security tab

The option to log out from the server is located in the upper right corner of the browser. From the drop-down list after selecting the currently logged in user, select the **Logout** option.

7.2.2 Device restart

Remote restart of the device via the website can be performed as shown below.

From the drop-down list after selecting the currently logged in user, select the **Restart device** option.

In the next window, confirm the KD10 restart.

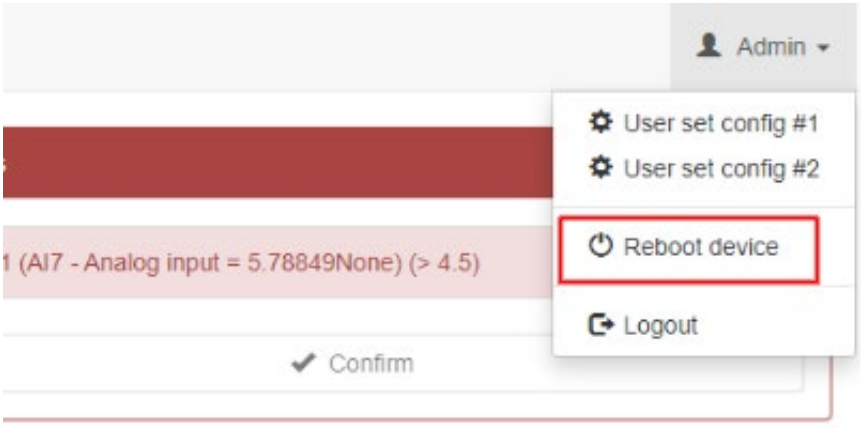

Figure 98: Selecting the device restart.

7.2.3 Configuration of User Measurement Data Sets

Defining measurement data sets can be done as shown below.

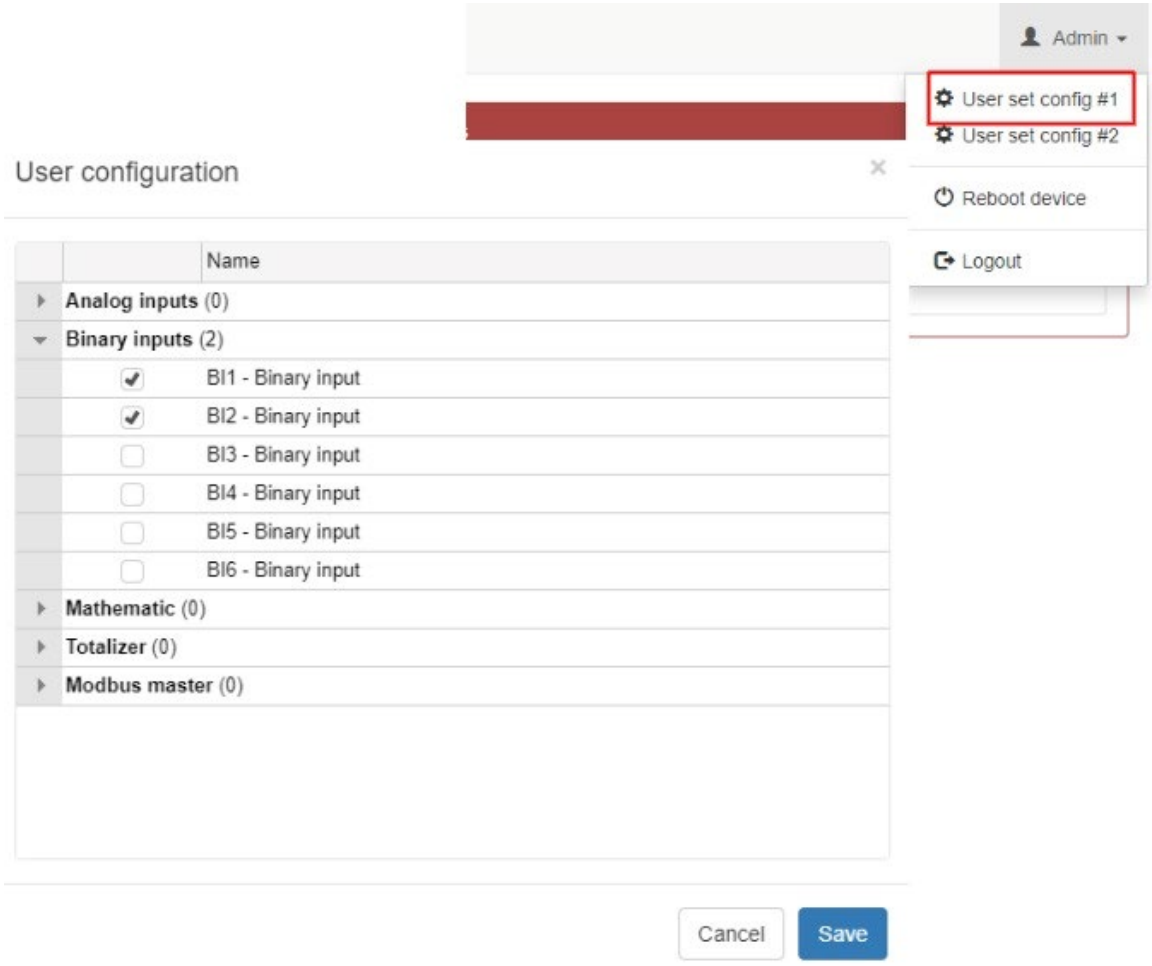

Figure 99: Selecting a user set - www page.

Set configuration.

In the next window, select the data to be presented in the measurement data window. The user selects a parameter group, in which, after extending the list, they can select or deselect selected parameters. After completing the configuration, select the **Save option** (to save changes) or **Cancel** (close the window without making changes).

7.2.4 Selecting and previewing measurement data sets.

Below is an extended list of measurement data sets, at the end there are sets configured by the user. Changing the refresh time allows you to regulate the frequency of updating the measurement data presented on the page.

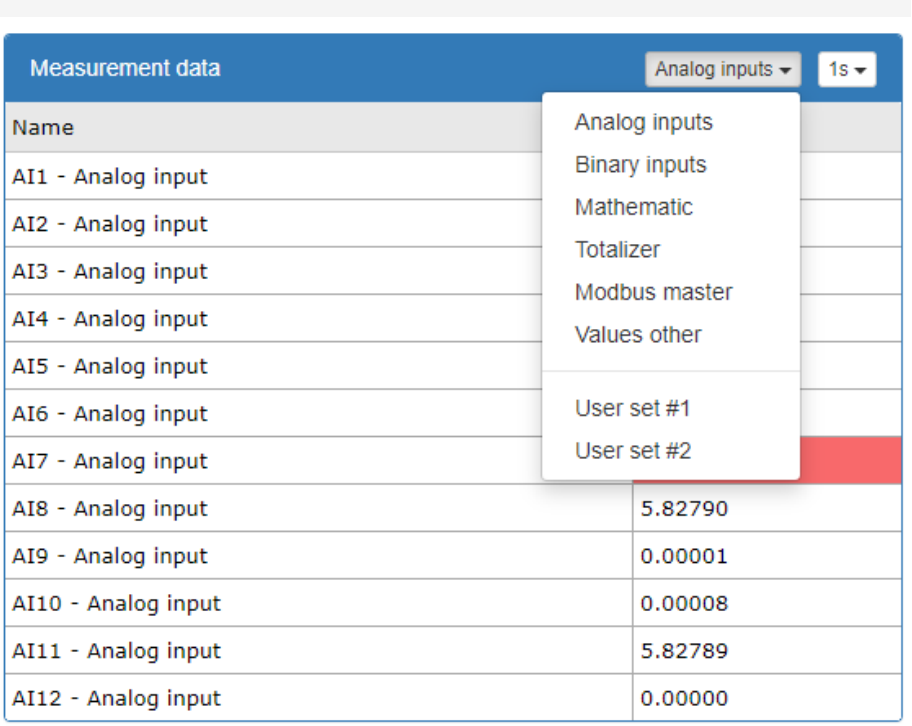

Figure 100: List of sets of displayed values.

7.2.5 Alarm confirmation

Alarm module window with information about alarm occurrences.

Figure 101: Occurence of alarm.

The user selects an alarm to be confirmed and confirms the selection with the **Confirm** option.

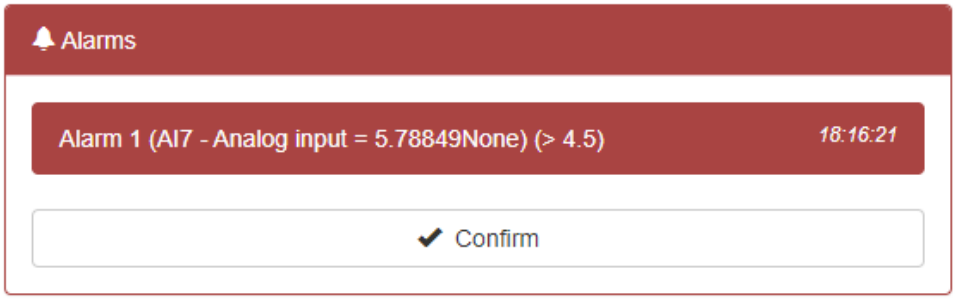

Figure 102: Selecting the alarm for confirmation.

7.2.6 File manager

Below is a description of the individual functions of the file manager on the www server.

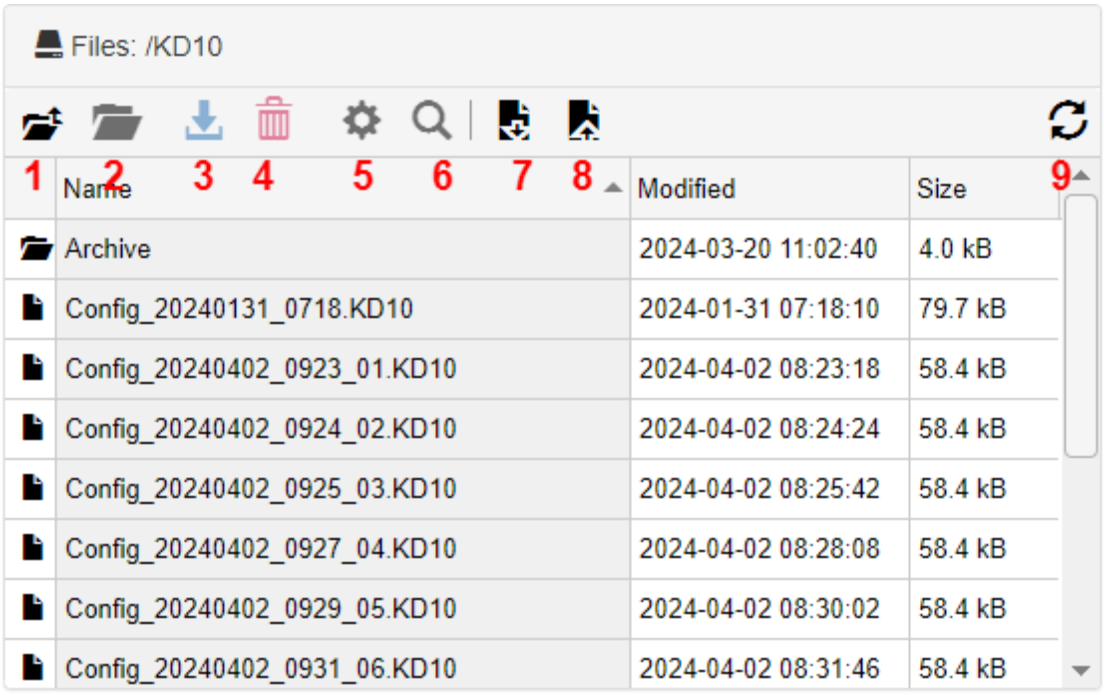

Figure 103: File manager window - www server.

Item number (icons)	Description
1	Go to the folder higher in the path.
2	Open the folder.
3	Download available files.
4	Delete files.
5	Set configuration from a file.
6	Preview of file contents (archive files).
7	Download the current configuration.
8	Transfer the file to the memory card.
9	Refresh and update the file list.

8 Construction

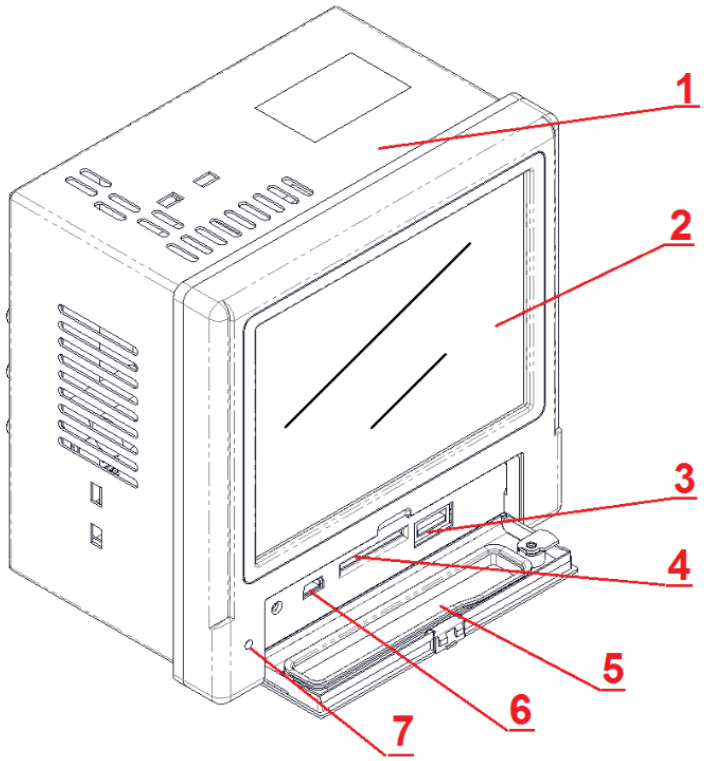

Figure 104: Construction of the device.

Element	Description
1	Recorder housing.
2	LCD touch screen.
3	USB Host.
4	SD card slot.
5	Door with lock.
6	USB Device.
7	LED diode

8.1 Screen

5.6-inch TFT color LCD screen, 640x480 pixel resolution, with touch panel.

8.2 RS485 interface

The KD10 recorder has a serial port in the RS-485 standard for communication in computer systems and with other Master devices. The asynchronous, character MODBUS communication protocol has been implemented on the serial link. The transmission protocol describes the

methods of exchanging information between devices via a serial link. The implemented protocol is compliant with the PI-MBUS-300 Rev G specification by Modicon. The configuration of the serial port settings is shown in point x.

Parameter	Description
Identifier	0xD8
Meter address	Values from 1 to 247
Transmission speed	1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, 19200 bit/s, 38400 bit/s, 57600 bit/s, 115200 bit/s, 230400 bit/s. (115200 bit/s – default)
Operating mode	Modbus RTU
Information unit	8N2, 8E1, 8O1, 8N1. (8N2 – default)
Maximum response time	1000 ms
Maximum number of read registers	122 registers – 2 bytes
Implemented functions	03, 04 – reading registers (common address space)
	17 – device identification

Reading 4 16-bit integer registers, starting from register with address 00 01 float (2 x16 bits).

Demand:

Device Address	Function	Register Address	Number of Registers	CRC Checksum
01	04	00 01	00 04	20 0B

Response :

Device Address	Function	Number of Bytes	Value of registers				CRC Checksum
			01	02	03	04	
01	04	08	00 0A	00 0B	00 63	00 64	DA 39

Function 03 – reading of n-registers:
Reading of 4 16-bit registers, starting from register address 00 01.

Demand:

Device Address	Function	Register Address	Number of Registers	CRC Checksum
01	03	00 01	00 04	15 C9

Response :

Device Address	Function	Number of Bytes	Value of registers				CRC Checksum
			01	02	03	04	
01	04	08	70 A4	41 CD	00 00	41 A2	55 CB

Function 17 – device identification :

Demand:

Device Address	Function	Register Address
01	11	C0 2C

Response :

Device Address	Function	Number of Bytes	Device ID	Device Status	CRC Checksum
01	11	02	D8	FF	A7 7C

8.3 Ethernet interface

The KD10 network parameter recorder is equipped with an Ethernet interface that allows the meter to be connected to a local or global network using an RJ45 socket. Implemented network services supported by the Ethernet interface: WWW server, FTP server, Modbus Slave TCP/IP.

Note! Detailed information on the configuration of the interface in the device is described in section *3.5. Ethernet configuration.*

Access to Ethernet services requires connecting the KD10 recorder to the network using an RJ45 socket operating in accordance with the TCP/IP protocol located at the rear of the housing.

Description of the meter's RJ45 socket diodes:

• yellow diode - lights up when KD10 is properly connected to the Ethernet 100 Base-T network, does not light up when KD10 is not connected to the network or is connected to a 10-Base-T network.

• green diode - Tx/Rx, lights up when the meter sends and receives data, lights up irregularly, lights up continuously when data is not being transmitted

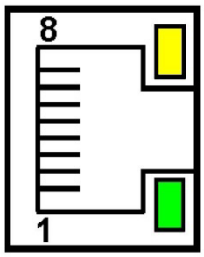

Figure 105: Ethernet.

To connect KD10 to the network, it is recommended to use a twisted pair:

• U/FTP – twisted pair with each pair foiled,

• F/FTP – twisted pair with each pair foiled, additionally with a cable in a foil screen,

• S/FTP (formerly SFTP) – twisted pair with each pair foiled, additionally with a cable in a mesh screen,

• SF/FTP (formerly S-STP) – twisted pair with each pair foiled, additionally with a foil and mesh screen.

Core No.	Signal	Core Color According to Standard	
		EIA/TIA 568A	EIA/TIA 568B
1	TX+	white-green	white-orange
2	TX-	green	orange
3	RX+	white-orange	white-green
4	EPWR+	blue	blue
5	EPWR+	white-blue	white-blue
6	RX-	orange	green
7	EPWR-	white-brown	white-brown
8	EPWR-	brown	brown

Twisted pair categories according to the European standard EN 50171 minimum: class D (category 5) - for fast local networks, covers applications using a frequency band of up to 100 MHz. For the Ethernet interface, a twisted pair STP (shielded) category 5 cable with an RJ-45 plug with wire colors (in accordance with the colors described in the table) in the following standard should be used:

- EIA/TIA 568A for both plugs in the so-called straight connection KD10 to a network concentrator (hub) or network switch (switch),
- EIA/TIA 568A for the first plug and EIA/TIA 568B for the second plug in the so-called crossover connection used, among others, when directly connecting the N100 meter to a computer.

8.4 USB interface

The recorder has two USB interfaces. USB Host and USB Device.

Using the USB Host interface, the user can copy files between the SD card and the device connected to the USB Host. The USB Device acts as a service connector.

8.5 SD memory card

The standard data carrier in KD10 is an SD card with a capacity of up to 32 GB.

The SD card stores archived data (depending on the configuration) and logs of alarms, audits, events related to dips, increases and decreases.

All archived data files and logs are first saved in the internal memory of the recorder (maximum 20 MB). After the file is saved, it is transferred to the SD card.

If the KD10 does not have an SD card installed during operation, all files (currently saved and those that have already been completed) are saved in the internal memory. After the card is installed, all completed files will be transferred from the internal memory.

Note! In the event of a power failure, a maximum of 1 MB of data saved in the internal memory is guaranteed to be saved.

9 Programs on PC

9.1 KD10 Setup

KD10 Setup is a program that enables the creation of a configuration file for the KD10 recorder. This file, placed on an SD card, allows the user's configuration to be loaded onto the KD10 device.

9.1.1 Program Operation

The interface of **KD10 Setup** is identical to the menu of the KD10 recorder, making it easy to use.

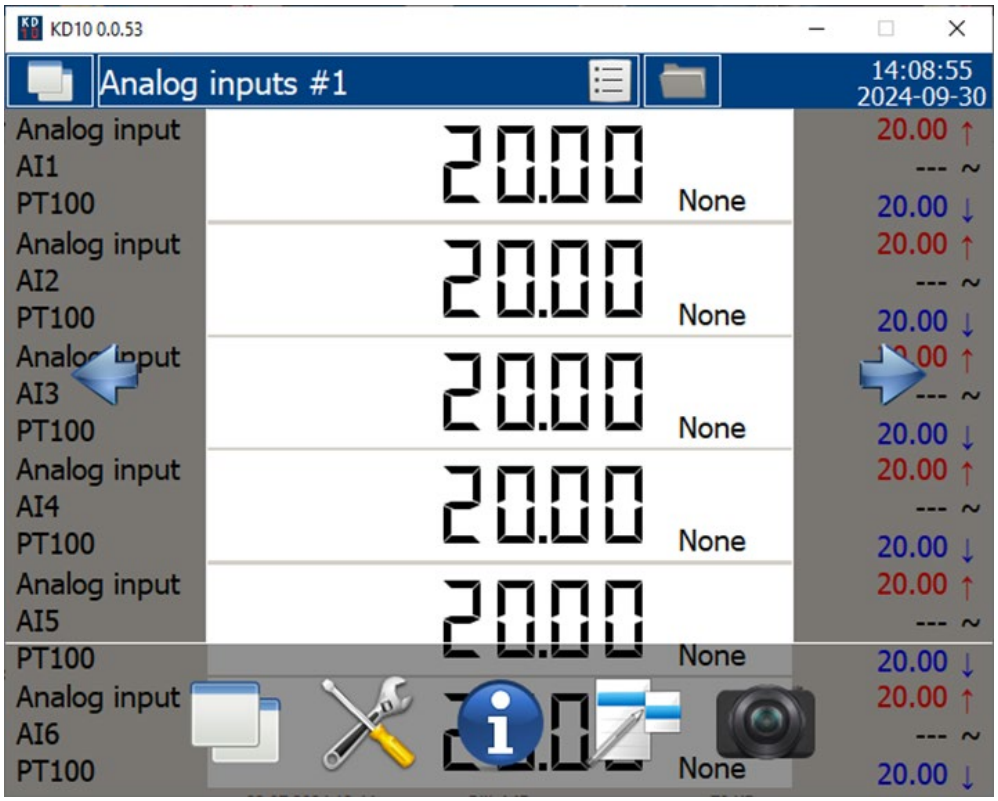

Figure 106: KD10 Setup software view.

After entering the settings  , a window appears for selecting the measurement card, depending on the number of analog inputs.

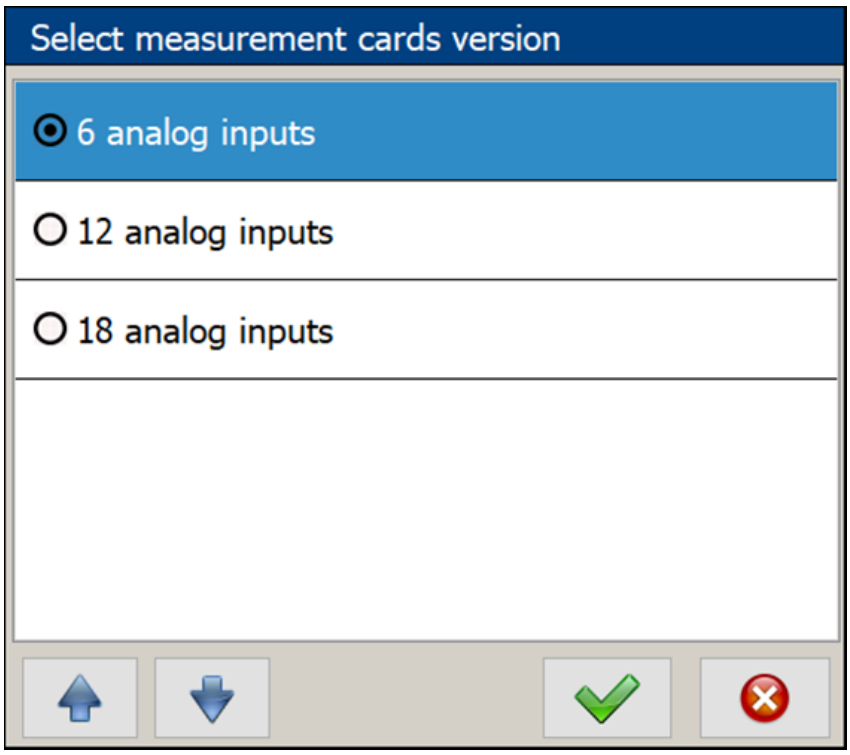

Figure 107: Measurement card selection options.

The next step is to select the extension card.

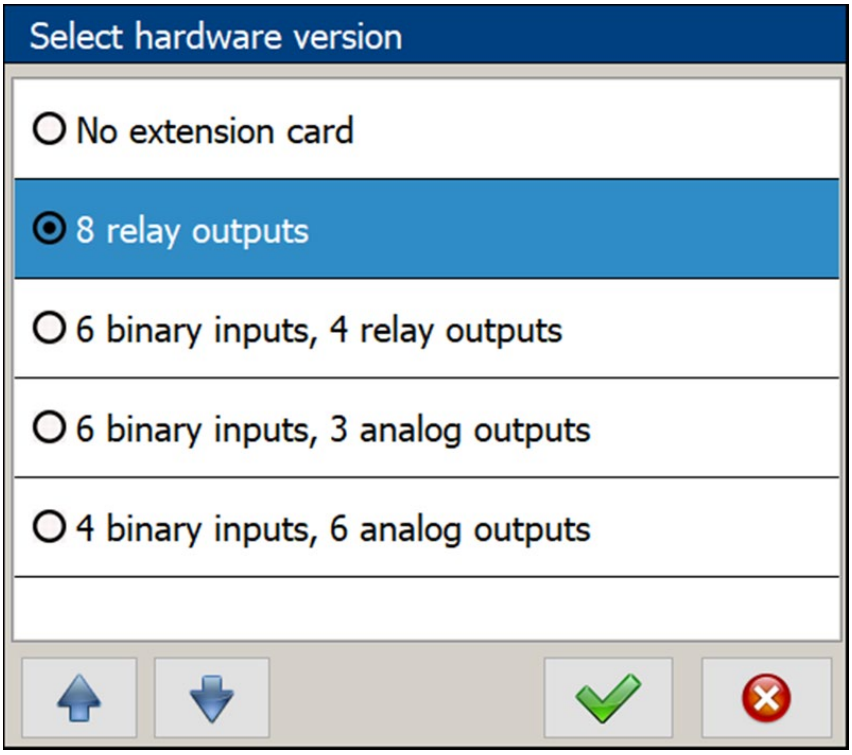

Figure 108: Extension card selection options.

Once the appropriate cards for the configurable device have been chosen, the user proceeds to configure and view the control panel.

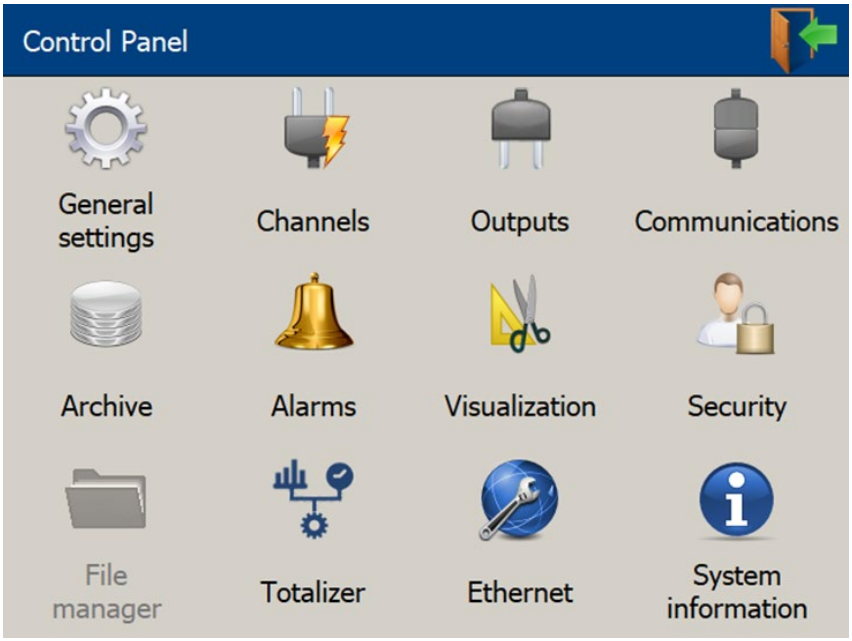

Figure 109: Control panel tab in PC version..

After setting all the options and closing the control panel, the user's configuration is saved.

9.1.2 Saving the configuration file

The configuration file is saved in the folder where the **KD10 Setup** program was installed.

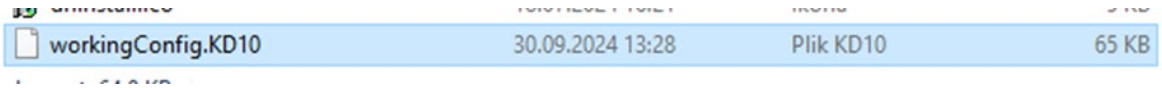

Figure 110: Configuration file.

To load the configuration onto the KD10 recorder, this file must be copied to an SD card.

10 Technical data

10.1 Measurements

Measurement ranges

Input type	Indication range (Nominal range)	Accuracy class
PT100	-200...850 ºC (-200...850 ºC)	0,1
PT1000	-200...850 ºC (-200...850 ºC)	
400 Ω	0...440 Ω (0...400 Ω)	
4000 Ω	0...4040 Ω (0...4000 Ω)	
Type E thermocouple	-205...1000 ºC (-200...1000 ºC)	
Type J thermocouple	-205...1200 ºC (-200...1200 ºC)	
Type K thermocouple	-205...1372 ºC (-200...1372 ºC)	
Type N thermocouple	-205...1372 ºC (-200...1372 ºC)	
Type R thermocouple	-50...1768 ºC (-50...1768 ºC)	
Type S thermocouple	-50...1768 ºC (-50...1768 ºC)	
+/-60 mV voltage input	-75...75 mV (-60...60 mV)	
+/-150 mV voltage input	-155...155 mV (-150...150 mV)	
+/-300 mV voltage input	-310...310 mV (-300...300 mV)	
+/-10 V voltage input	-13...13 V (-10...10 V)	
+/-20 mA current input	-24...24 mA (-20...20 mA)	
4...20 mA current input	3,6...22.0 mA (4...20 mA)	

Measuring path parameters

Current in the sensor circuit during resistance measurements	< 175 µA
Input resistance during voltage measurements: thermocouples, +/-60 mV, +/-150 mV, +/-300 mV, +/-10 V	> 1 MΩ
Input resistance for current ranges	< 11 Ω
Range of compensation of resistance of measuring leads (maximum resistance of a single wire)	< 20 Ω
Range of automatic compensation of temperature of terminals for measurements with thermoelectric sensors	-30...80 ºC
Channel-to-Channel Isolation	500 V dc

Additional measurement errors

Automatic compensation of reference junction temperature	< 1 ºC
Automatic compensation of wire resistance for thermoresistance sensors	< 0.5 ºC
Automatic compensation of wire resistance for resistance measurements	< 0.2 Ω (400 Ω range) < 2 Ω (4000 Ω range)
From ambient temperature changes (main measuring path and wire resistance compensation paths)	50% class / 10 K

Measurement Frequency: 10 Hz (the card performs measurements every 100 ms)

10.2 Extension cards

Additional cards and their inputs depend on the KD10 recorder version code.

10.2.1 Three isolated analog outputs

Parameter	Value
Type:	3 galvanically isolated current outputs
Output signal::	0/4...20 mA
Output measurement error:	±0.2 % of measurement range
Load resistance:	≤ 500 Ω
Insulation:	500 V dc
Response time:	200 ms

10.2.2 Six isolated analog outputs

Parameter	Value
Type:	6 galvanically isolated current outputs
Output signal::	0/4...20 mA
Output measurement error:	±0.1 % of measurement range
Load resistance:	≤ 500 Ω
Insulation:	500 V dc
Response time:	200 ms

10.2.3 Binary inputs

Parameter	Value
Type:	2 groups of 3 binary inputs with common ground
Control signal:	0/5...24 V dc
Switching frequency:	up to 4 Hz input voltage from the range +5...24 V dc up to 500 Hz input voltage from the range +8...24 V dc
Insulation:	1200 V ac/dc

10.2.4 Relay outputs

Parameter	Value
Type:	8 or 4 programmable electromagnetic relays, Normally open (NO)
Contact voltage / load current:	≤ 250 V ac / 1.5 A ≤ 30 V dc / 1 A
Output measurement error:	200 ms + histeresis time

10.3 Reference and rated operating conditions

Storage conditions (temperature and humidity)	Temperature : -20…50°C (-4…122°F) Humidity : below 75% RH (non-condensing)
Operating conditions (temperature and humidity)	Temperature : 0…50°C (32…122°F) Humidity :75% RH (non-condensing)
Power supply	85…240 V ac, 40...400Hz 90…320 V dc
Power consumption	Power supply ≤ 20VA
Dust and water resistanc	IP54 – from the front side IP20 – from the side of terminals

10.4 Safety of operation according to PN-EN 61010-1, basic insulation

Installation category	III
Pollution degree	2
Insulation voltage to earth	RS485: 500V ac/dc Ethernet : 250V ac / 500V dc Temperature measurement input: 500V ac/dc Voltage input: 2140 V ac/dc Power supply and relay output circuits: 2140 V ac/dc Analog input: 500V ac/dc Binary input: 1200V ac/dc
Maximum operating voltage to earth	For power supply and relay output circuits: 300 V For measurement input: 500 V For RS485, Ethernet, relay outputs, analog outputs and binary input circuits: 50 V
Height above sea level	< 2000 m

10.5 Electromagnetic compatibility

Electromagnetic emission	According to EN 61000-6-4
Interference resistance	According to EN 61000-6-2

10.6 Mounting

Dimensions	144 W x 144 H x 90 D mm (5.669" W x 5.669" H x 3.897" D)
Mounting Cutout Dimensions	138-0.5 W x 138-0.5 H mm (5.433-0.02" W x 5.433-0.02" H)
Weight	1,6 kg (5.44 oz.)

10.7 Compliance with standards

PN EN 61010	Safety of operation
PN EN 61000-6-4	Electromagnetic compatibility
PN EN 61000-6-2	
PN EN 50160	Measurements and calculations of parameters
PN EN 61000-4-30	
PN EN 61000-4-7	
PN EN 61557	

10.8 Register tables

The KD10 recorder contains data placed in 16- and 32-bit registers. Bits in 16-bit registers are numbered from the youngest to the oldest (b0 … b15). 32-bit registers (4 bytes, 2 x 16 bits) contain float registers with the following byte arrangement: B4 B3 B2 B1.

Note! All given addresses are physical addresses. In some computer programs, logical addressing is used, in which case the addresses should be increased by 1.

The KD10 register map is shown below.

Address Range	Register type	Description
0000 - 0019	Integer (16 bits)	Information and status registers.
0300 - 0363	Integer (16 bits)	Alarms
0800 - 0802	Float (2 x 16 bits)	Temperature
0900 - 0910	Float (2 x 16 bits)	Binary input
1000 - 1170	Float (2 x 16 bits)	Universal analog measurement inputs
1200 - 1222	Float (2 x 16 bits)	Totalizer
1600 - 1634	Float (2 x 16 bits)	Mathematical functions
2000 - 2062	Float (2 x 16 bits)	Modbus Master → for one selected register
2400 - 3020	Float (2 x 16 bits) x 10	Modbus Master Group → transfer

10.8.1 Information registers and statuses

Register	Register type	Parameter
0000	Integer (16 bits)	Device identifier - 0xEF(239)
0001	Integer (16 bits)	Main program version
0002	Integer (16 bits)	Measurement card program version
0003	Integer (16 bits)	Status 1
0004	Integer (16 bits)	Status 2
0005	Integer (16 bits)	Status 3
0006	Integer (16 bits)	Time: seconds
0007	Integer (16 bits)	Time: hours and minutes (hour * 100 + minutes)
0008	Integer (16 bits)	Date: month and day (month * 100 + day)
0009	Integer (16 bits)	Date: year
0010	Integer (16 bits)	Serial number
0011	Integer (16 bits)	Serial number
0012	Integer (16 bits)	Password to confirm the CMD command
0013	Integer (16 bits)	Number assigned to the CMD command
0014	Integer (16 bits)	Hardware version of the device

0015	Integer (16 bits)	Fifth and fourth byte (B5.B4) of the meter's MAC address, format: B5:B4:B3:B2:B1:B0 25651 (0x6433 = 64:33)
0016	Integer (16 bits)	Third and second byte (B3.B2) of the meter's MAC address, format: B5:B4:B3:B2:B1:B0 56090 (0xDB1A = DB:1A)
0017	Integer (16 bits)	First and zero byte (B1.B0) of meter MAC address, format B5:B4:B3:B2:B1:B0 27051 (0x69AB = 69:AB)
0018	Integer (16 bits)	Third and second byte (B3.B2) of meter IP address, address format IPv4 : B3.B2.B1.B0 49320 (0xC0A8 = 192.168)
0019	Integer (16 bits)	First and zero byte (B1.B0) of meter IP address, address format IPv4 : B3.B2.B1.B0 356 (0x0164 = 1.100)

10.8.2 Binary input registers

Register	Register type	Description
0900	Float 3210 (2 x 16 bits)	Binary output 0
0902	Float 3210 (2 x 16 bits)	Binary output 1
0904	Float 3210 (2 x 16 bits)	Binary output 2
0906	Float 3210 (2 x 16 bits)	Binary output 3
0908	Float 3210 (2 x 16 bits)	Binary output 4
0910	Float 3210 (2 x 16 bits)	Binary output 5

10.8.3 Universal Analog Measuring Input Registers

Register	Register type	Parameter
1000	Float 3210 (2 x 16 bits)	Universal Analog Input1
1010	Float 3210 (2 x 16 bits)	Universal Analog Input 2
1020	Float 3210 (2 x 16 bits)	Universal Analog Input 3
1030	Float 3210 (2 x 16 bits)	Universal Analog Input 4
1040	Float 3210 (2 x 16 bits)	Universal Analog Input 5
1050	Float 3210 (2 x 16 bits)	Universal Analog Input 6
1060	Float 3210 (2 x 16 bits)	Universal Analog Input 7
1070	Float 3210 (2 x 16 bits)	Universal Analog Input 8
1080	Float 3210 (2 x 16 bits)	Universal Analog Input 9
1090	Float 3210 (2 x 16 bits)	Universal Analog Input 10
1100	Float 3210 (2 x 16 bits)	Universal Analog Input 11
1110	Float 3210 (2 x 16 bits)	Universal Analog Input 12
1120	Float 3210 (2 x 16 bits)	Universal Analog Input 13
1130	Float 3210 (2 x 16 bits)	Universal Analog Input 14
1140	Float 3210 (2 x 16 bits)	Universal Analog Input 15
1150	Float 3210 (2 x 16 bits)	Universal Analog Input 16

1160	Float 3210 (2 x 16 bits)	Universal Analog Input 17
1170	Float 3210 (2 x 16 bits)	Universal Analog Input 18

10.8.4 Totalizer

Register	Register type	Parameter
1200	Float 3210 (2 x 16 bits)	Totalizer 0
1202	Float 3210 (2 x 16 bits)	Totalizer 1
1204	Float 3210 (2 x 16 bits)	Totalizer 2
1206	Float 3210 (2 x 16 bits)	Totalizer 3
1208	Float 3210 (2 x 16 bits)	Totalizer 4
1210	Float 3210 (2 x 16 bits)	Totalizer 5
1212	Float 3210 (2 x 16 bits)	Totalizer 6
1214	Float 3210 (2 x 16 bits)	Totalizer 7
1216	Float 3210 (2 x 16 bits)	Totalizer 8
1218	Float 3210 (2 x 16 bits)	Totalizer 9
1220	Float 3210 (2 x 16 bits)	Totalizer 10
1222	Float 3210 (2 x 16 bits)	Totalizer 11

10.8.5 Mathematical functions

Register	Register type	Description
1600	Float 3210 (2 x 16 bits)	Mathematical function 0
1602	Float 3210 (2 x 16 bits)	Mathematical function 1
1604	Float 3210 (2 x 16 bits)	Mathematical function 2
1606	Float 3210 (2 x 16 bits)	Mathematical function 3
1608	Float 3210 (2 x 16 bits)	Mathematical function 4
1610	Float 3210 (2 x 16 bits)	Mathematical function 5
1612	Float 3210 (2 x 16 bits)	Mathematical function 6
1614	Float 3210 (2 x 16 bits)	Mathematical function 7
1616	Float 3210 (2 x 16 bits)	Mathematical function 8
1618	Float 3210 (2 x 16 bits)	Mathematical function 9
1620	Float 3210 (2 x 16 bits)	Mathematical function 10
1622	Float 3210 (2 x 16 bits)	Mathematical function 11
1624	Float 3210 (2 x 16 bits)	Mathematical function 12
1626	Float 3210 (2 x 16 bits)	Mathematical function 13
1628	Float 3210 (2 x 16 bits)	Mathematical function 14
1630	Float 3210 (2 x 16 bits)	Mathematical function 15
1632	Float 3210 (2 x 16 bits)	Mathematical function 16

1634	Float 3210 (2 x 16 bits)	Mathematical function 17

10.8.6 Modbus Master – one selected register

Register	Register type	Description
2000	Float 3210 (2 x 16 bits)	MODBUS MASTER 0
2002	Float 3210 (2 x 16 bits)	MODBUS MASTER 1
2004	Float 3210 (2 x 16 bits)	MODBUS MASTER 2
2006	Float 3210 (2 x 16 bits)	MODBUS MASTER 3
2008	Float 3210 (2 x 16 bits)	MODBUS MASTER 4
2010	Float 3210 (2 x 16 bits)	MODBUS MASTER 5
2012	Float 3210 (2 x 16 bits)	MODBUS MASTER 6
2014	Float 3210 (2 x 16 bits)	MODBUS MASTER 7
2016	Float 3210 (2 x 16 bits)	MODBUS MASTER 8
2018	Float 3210 (2 x 16 bits)	MODBUS MASTER 9
2020	Float 3210 (2 x 16 bits)	MODBUS MASTER 10
2022	Float 3210 (2 x 16 bits)	MODBUS MASTER 11
2024	Float 3210 (2 x 16 bits)	MODBUS MASTER 12
2026	Float 3210 (2 x 16 bits)	MODBUS MASTER 13
2028	Float 3210 (2 x 16 bits)	MODBUS MASTER 14
2030	Float 3210 (2 x 16 bits)	MODBUS MASTER 15
2032	Float 3210 (2 x 16 bits)	MODBUS MASTER 16
2034	Float 3210 (2 x 16 bits)	MODBUS MASTER 17
2036	Float 3210 (2 x 16 bits)	MODBUS MASTER 18
2038	Float 3210 (2 x 16 bits)	MODBUS MASTER 19
2040	Float 3210 (2 x 16 bits)	MODBUS MASTER 20
2042	Float 3210 (2 x 16 bits)	MODBUS MASTER 21
2044	Float 3210 (2 x 16 bits)	MODBUS MASTER 22
2046	Float 3210 (2 x 16 bits)	MODBUS MASTER 23
2048	Float 3210 (2 x 16 bits)	MODBUS MASTER 24
2050	Float 3210 (2 x 16 bits)	MODBUS MASTER 25
2052	Float 3210 (2 x 16 bits)	MODBUS MASTER 26
2054	Float 3210 (2 x 16 bits)	MODBUS MASTER 27
2056	Float 3210 (2 x 16 bits)	MODBUS MASTER 28
2058	Float 3210 (2 x 16 bits)	MODBUS MASTER 29
2060	Float 3210 (2 x 16 bits)	MODBUS MASTER 30
2062	Float 3210 (2 x 16 bits)	MODBUS MASTER 31

10.8.7 Modbus Master – transferred group

Register	Register type	Description
2400	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 0
2420	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 1
2440	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 2
2460	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 3
2480	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 4
2500	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 5
2520	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 6
2540	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 7
2560	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 8
2580	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 9
2600	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 10
2620	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 11
2640	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 12
2660	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 13
2680	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 14
2700	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 15
2720	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 16
2740	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 17
2760	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 18
2780	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 19
2800	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 20
2820	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 21
2840	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 22
2860	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 23
2880	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 24
2900	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 25
2920	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 26
2940	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 27
2960	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 28
2980	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 29
3000	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 30
3020	Float 3210 (2 x 16 bits) x 10 registers	MODBUS MASTER GROUP 31

11 Order codes

KD10 screen recorder	X	X	XX	X	X
Measuring inputs:					
6 programmable measurment inputs	1				
12 programmable measurment inputs	2				
18 programmable measurment inputs	3				
Additional Inputs/Outputs[1]					
lack		0			
8 relay outputs		1			
6 digital inputs, 4 relay outputs		2			
6 digital inputs, 3 analog outputs		3			
4 digital inputs, 6 analog outputs		4			
Version					
standard			00		
special*			XX		
Language version:					
multilinguage (polish/english)				M	
other*				X	
Acceptance tests:					
without extra requirements					0
with an extra quality inspection certificate					1
With a calibration certificate					2
according to customer’s request*					X

[1]option not available for 18 programmable inputs

*only after agreement with the manufacturer

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