Main configuration menu

All device settings can be made using the configuration menu buttons available. To enter the menu, press the [OK] button for about 2 seconds. The display will show 0000 indicating the service password input mode, the first digit will blink:

Enter the service password (default: 0000). The [UP/DOWN] buttons are used to change the value of a given item, the [OK] button confirms the set value of a given password position (currently set position blinks).

If you enter the incorrect password, an error message will be displayed:

and then the device will go into normal operation mode. After entering the correct password, the first item of the main configuration menu will be displayed:

Exiting the menu will occur automatically after 30 seconds of inactivity or after selecting "EXIT"

and confirming the selection with [OK]. After entering the correct password, it is remembered for 2 minutes after leaving the menu, which allows you to re-enter the settings (within 2 minutes from the last time you left the menu) without having to re-enter the password.

Alarm configuration menu

The device has 2 relay outputs, which are controlled by two user-configurable alarms. Alarm configuration menu can be found in position No. 1 in the main configuration menu - "ALAR":

After confirming the selection with [OK], the menu for selecting the alarm for configuration will be displayed. To access the configuration submenu of alarm No. 1, select "A1":

and then confirm your selection with [OK].

Position No. 1 of the alarm configuration submenu will be displayed - "En":

The "En" position is used to activate or deactivate the alarm function. After pressing the [OK] button, select whether you want the alarm function to be active - [YES] or inactive - [NO], and then confirm your selection with [OK].

Position No. 2 in the alarm configuration submenu is "LO":

The "LO" position is used to set the value of the lower threshold at which the alarm will be triggered. The value can be changed in the range from the value higher by 2 than the upper alarm threshold "HI" to the maximum displayed value (parameter "HI_d" in the analogue options).

Position No. 3 in the alarm configuration submenu is "HI":

The "HI" position is used to set the value of the upper threshold at which the alarm will be triggered. The value can be changed in the range from the value higher by 2 than the lower alarm threshold "LO" to the maximum displayed value (parameter "HI_d" in the analogue options).
After pressing the [OK] button, use the [UP/DOWN] buttons to set the expected value and then confirm the set value with the [OK] button.

If the difference between the "HI" and "LO" values is less than the currently set hysteresis value "HYST", then the value "HYST" will be automatically reduced to the value "x", where \( x = \frac{HYST}{HI_d - LO_d - 1} \).

Position No. 4 in the alarm configuration submenu is "HYST". (Hysteresis)

A drawing showing the operation of the alarm along with the set thresholds and the hysteresis value is shown below:

The "HYST" position is used to set the hysteresis value for both thresholds (lower and upper) of the alarm operation, in the range from 1 to "x", where \( x = \frac{HI_d - LO_d - 1}{HI_d - LO_d - 1} \), but no more than the difference between upper and lower alarm threshold.

After pressing the [OK] button, use the [UP/DOWN] buttons to set the expected value, and then confirm the set value with the [OK] button.

Position No. 5 in the alarm configuration submenu is "T_ON" (time to relay switch on):

The "T_ON" position is used to set the delay time for switching on the alarm relay in the range of 0÷180 s. After pressing the [OK] button, use the [UP/DOWN] buttons to set the expected value and then confirm the set value with the [OK] button.

Position No. 6 in the alarm configuration submenu is "TOFF" (time to relay switch off):

The "TOFF" position is used to set the delay time for switching off the alarm relay in the range of 0-180 sec. After pressing the [OK] button, use the [UP/DOWN] buttons to set the expected value.

Position No. 7 in the alarm configuration submenu is "BACK":

The "BACK" position is used to exit the alarm configuration menu.

Alarm No. 2 must be configured in the same way by selecting "A2" in the menu for alarm configuration.

Configuration menu for communication parameters

The menu for configuration of communication parameters can be found in item No. 2 in the main configuration menu "CONN":

After confirming the selection with the [OK] button, the configuration menu for communication parameters will be displayed.

Position No. 1 in the configuration menu for communication parameters is "ADDR":

The "ADDR" position is used to set the address of the device seen through the Modbus RTU protocol in the range of 1÷247.

After pressing the [OK] button, use the [UP/DOWN] buttons to set the expected value and then confirm the set value with the [OK] button.

Position No. 2 in the configuration menu for communication parameters is "BAUD":

The "BAUD" position is used to set the communication speed of the RS-485 communication interface within the range of the values presented below:

- 1200 bps
- 2400 bps
- 4800 bps
- 9600 bps
- 19200 bps
- 38400 bps
- 57600 bps
- 115200 bps

If the difference between the "HI" and "LO" values is less than the currently set communication speed "BAUD", then the value "BAUD" will be automatically reduced to the value "x", where \( x = \frac{BAUD}{HI_d - LO_d - 1} \).

- 5 of 26 -

- 6 of 26 -

- 7 of 26 -

- 8 of 26 -
Position No. 3 in the configuration menu for communication parameters is "PARI":

The "PARI" position is used to set the RS-485 communication interface parity bits control within the range of the values shown below:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Information on display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parity check</td>
<td>disabled</td>
</tr>
<tr>
<td>Parity bit</td>
<td>Even</td>
</tr>
<tr>
<td>Odd parity bit</td>
<td>Odd</td>
</tr>
</tbody>
</table>

After pressing the [OK] button, set the expected value using the [UP/DOWN] buttons and then confirm the set value with the [OK] button.

According to the Modbus RTU standard, 2 stop bits are sent if the parity check is deactivated. When the parity check is enabled, 1 stop bit is sent:

- Data format without parity check:
  - Start bit: 8 data bits, 2 stop bits
- Data format with parity check:
  - Start bit: 8 data bits, Parity bit: 1 stop bit

Position No. 4 of the communication parameters configuration menu is "BACK":

The "BACK" item is used to exit the configuration menu for configuration of communication parameters.

Configuration menu for display settings

The configuration menu for display settings can be found in position No. 3 in the main configuration menu - "DISP":

When you confirm your selection with the [OK] button, the configuration menu for display settings is displayed.

Position No. 1 of the display settings configuration menu is "REFR":

The "REFR" position is used to set the refreshing time of the result shown on the display in the range of 0.1÷10 seconds.

After pressing the [OK] button, use the [UP/DOWN] buttons to set the expected value and then confirm the set value with the [OK] button.

Position No. 2 of the display settings configuration menu is "ACCU":

The "ACCU" position is used to select the accuracy of displaying the currently measured value the range of the values presented below:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Information on display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result with decimal part</td>
<td>00</td>
</tr>
<tr>
<td>Result without decimal part</td>
<td>00</td>
</tr>
</tbody>
</table>

After pressing the [OK] button, use the [UP/DOWN] buttons to set the expected value and then confirm the set value with the [OK] button.

Position No. 3 of the display settings configuration menu is "LED":

The "LED" position is used to enable or disable Modbus communication signaling with the [Tx] diode on the front panel of the device.

After pressing the [OK] button, set the expected value using the [UP/DOWN] buttons and then confirm the set value with the [OK] button.

Position No. 4 of the display settings configuration menu is "BACK":

The "BACK" position is used to exit the display settings configuration menu.

Analog settings menu

The menu for configuring the analog settings is in position No. 4 in the main configuration menu - "ANLG":

After confirming the selection with the [OK] button, the analog setting menu will be displayed, in which we set the parameters responsible for the selection of the analog input and for the characteristics of converting the analog value to the display indication.

The first item of this menu is "IN":

After confirming the selection with the [OK] button, we will enter the input selection:

The "CURR" position means that the value on the display will be converted in proportion to the current measured at the current input, while selecting the "VOLT" position:

means that the value on the display will be converted in proportion to the voltage measured at the voltage input.
The following items will be discussed in relation to the characteristics shown below:

*Fig. 2. Processing characteristics*

Position No. 2 in the analogue settings menu depends on the selected measurement input. If the current input is active, set the current for point P1 (Fig. 2), but if the voltage input is active, set the voltage for point P1 of the characteristic curve. Below is a description of both cases:

The position "LO_C" is used to set the current for point P1 on the characteristic curve.

After confirming the selection with the [OK] button, we will proceed to the setting of this value. The value is set in mA and can be changed from 0.0 mA to 20.0 mA.

The position "HI_C" is used to set the current for point P2 on the characteristic curve.

After confirming the selection with the [OK] button, we will proceed to the setting of this value. The value is set in mA and can be changed from 0.0 mA to 20.0 mA.

Position No. 5 of this menu is "LO_d", which is responsible for setting the displayed value for point P1. In short, it is the value that will be displayed when the value of current or voltage (depending on the measurement input selection) equals "LO_C" or "LO_V" respectively.

After confirming the selection with the [OK] button, we move on to setting the value. This value can be changed from -999 to 9999. Pressing the [OK] button again saves the setting.

The sixth position in this menu is "HI_d", which is responsible for setting the displayed value for point P2. In short, it is the value that will be displayed when the value of current or voltage (depending on the measurement input selection) equals "HI_C" or "HI_V" respectively.

After confirming the selection with the [OK] button, we move on to setting the value. This value can be changed from -999 to 9999. Pressing the [OK] button again saves the setting.

The last menu item is "BACK":

The "BACK" position is used to return to the main setting menu.

---

**Configuration menu for general settings**

The menu for configuring general settings can be found in position No. 2 in the main configuration menu - "OTHR".

After confirming the selection with the [OK] key, the general settings configuration menu will be displayed.

Position No. 1 of the general settings configuration menu - "VERS":

The "VERS" position is used to check the software version of the device.

After pressing the [OK] button, the device software version will be displayed. Pressing the [OK] button again will return to the general settings configuration menu.

Position No. 2 of the general settings configuration menu - "FACT":

The "FACT" position is used to restore the factory settings of the device.

After pressing the [OK] button, the device will enter the service password entry mode. After entering the correct password, use the (UP/DOWN) buttons to select the desired action according to the following values:
and then confirm the set value by pressing [OK].

Position No. 2 of the general settings configuration menu - "PASS":

The "PASS" position is used to change the service password. After pressing the [OK] button, the device will enter the mode of entering the current service code.

After entering the correct password, 4 zeros will be displayed - use the [UP/DOWN] and [OK] buttons to enter the new password. If the operation is carried out correctly, the message "SAVE" will be displayed confirming the change of the password:

After changing the service code, the main configuration menu will exit. You will be able to enter the menu again after entering a new password.

Position No. 3 of the general settings configuration menu - "BACK":

The "BACK" position is used to exit the general settings configuration menu.

Restoring factory settings
It is possible to restore the device to its factory settings, for example in case of loss of the service password.

To do this, turn on the power of the device while holding down the [UP] and [DOWN] buttons and keep them pressed for 30 seconds from the moment the power is turned on. The factory settings reset will be confirmed by a test of the display.
Mounting

1. The device should be mounted in a cut-out prepared according to the following figure:

2. The device should be inserted from the front into the hole.

3. Then attach the fastening elements to the sides of the device from behind and stabilize the device with them.

Technical data

- Power supply: 9÷30 V AC/DC
- Current consumption: max. 100 mA
- Load current of the relays (AC-1): 0-20 mA/0-10 V
- Alarm hysteresis: 1-9999
- Lower alarm threshold: -9999-9998
- Upper alarm threshold: 1÷247
- Minimal indication: -999
- Maximum indication: 9999
- Communications parameters:
  - Speed (adjustable): 1200÷115200 bit/s
  - Address: 1÷247
  - Stop bits: 1 or 2
  - Data bits: 8
  - Parity check:
    - EVEN/ODD/NONE
  - Communication protocol:
    - Modbus RTU
  - Working temperature: -10÷40°C
  - Display height: 14 mm
  - Terminal dimensions: 72×36×72 mm
  - Display height: 1.0 mm²
  - Terminal dimensions: 2.5 mm²
- Measurement accuracy: 1%
- Measuring inputs separated: 0÷20 mA/0÷10 V
- Load current of the relays (AC-1): 6 A
- Current consumption max.: 100 mA
- Power supply: 9÷30 V AC/DC
- Terminal dimensions: 2.5 mm²
- Display height: 2.5 mm²
- Terminal dimensions: 0.4 Nm
- Mounting panel protection level: IP20

CE declaration

Copy of the CE declaration can be downloaded from the website: www.ff.com.pl from the product subpage

Communication parameters

- Modbus registers
  - Modbus RTU
  - Slave
  - Master
- Operating mode: SLAVE
- Range of network addresses: 1÷247
- Command codes:
  - 5: Read registers group
  - 6: Write a single register
  - 10: Write registers group
  - 16: Write Multiple Registers
- Communication speed:
  - 57600 (shown on the panel)

Modbus registers

- Measurement registers
  - Displayed value (value measured in millivolts)
  - Displayed value (value measured in microamperes)
  - Displayed value (fractional, decimal)
  - Displayed value (value measured in floating format)
  - Displayed value (value measured in microamperes)
  - Displayed value (value measured in floating format)
  - Displayed value (value measured in millivolts)
- Data bits: 8
- Parity:
  - [NC1]/EVEN/ODD
- Stop bits: 1
- Max. query frequency: 15 Hz

**Modbus registers**

<table>
<thead>
<tr>
<th>Address</th>
<th>Description</th>
<th>Type</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0000</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0001</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0002</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0003</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0004</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0005</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0006</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0007</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0008</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0009</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0010</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0011</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0012</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0013</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0014</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0015</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0016</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0017</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0018</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0019</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x001A</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x001B</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x001C</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x001D</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x001E</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x001F</td>
<td>Displayed value</td>
<td>int</td>
<td>R/W</td>
</tr>
</tbody>
</table>

**Communication parameters**

- **Data bits**:
  - 8
- **Parity**:
  - [NC1]/EVEN/ODD
- **Stop bits**:
  - 1
- **Max. query frequency**:
  - 15 Hz

**Address**

- **R** – read only, **R/W** – read and write

**Register - alarm 1**

<table>
<thead>
<tr>
<th>Address</th>
<th>Description</th>
<th>Type</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0010</td>
<td>Alarm activation</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0011</td>
<td>Lower alarm threshold</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0012</td>
<td>Upper alarm threshold</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0013</td>
<td>Alarm deactivation delay</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0014</td>
<td>Alarm activation delay</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0015</td>
<td>Current alarm status</td>
<td>int</td>
<td>R/W</td>
</tr>
</tbody>
</table>

**Register - alarm 2**

<table>
<thead>
<tr>
<th>Address</th>
<th>Description</th>
<th>Type</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0016</td>
<td>Alarm activation</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0017</td>
<td>Lower alarm threshold</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0018</td>
<td>Upper alarm threshold</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x0019</td>
<td>Alarm deactivation delay</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x001A</td>
<td>Alarm activation delay</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>0x001B</td>
<td>Current alarm status</td>
<td>int</td>
<td>R/W</td>
</tr>
</tbody>
</table>
### Registers of analog signal processing settings

<table>
<thead>
<tr>
<th>address</th>
<th>description</th>
<th>type</th>
<th>access</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Type of input</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Voltage of the initial characteristic point</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Current of the initial characteristic point</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Voltage of the final characteristic point</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Current of the final characteristic point</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Value of the final characteristic point</td>
<td>R/W</td>
<td></td>
</tr>
</tbody>
</table>

* R/W – read and write

### Communication settings

<table>
<thead>
<tr>
<th>address</th>
<th>description</th>
<th>type</th>
<th>access</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Modbus address</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>101</td>
<td>Transmission speed</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>102</td>
<td>Parity code</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>103</td>
<td>Serial number (MSW)</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>104</td>
<td>Serial number (LSW)</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>105</td>
<td>Software version</td>
<td>int</td>
<td>R/W</td>
</tr>
<tr>
<td>106</td>
<td>Manufacturing date</td>
<td>int</td>
<td>R/W</td>
</tr>
</tbody>
</table>

* R/W – read and write

### Other registers

<table>
<thead>
<tr>
<th>address</th>
<th>description</th>
<th>type</th>
<th>access</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>Display refresh interval</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>108</td>
<td>Display accuracy</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>109</td>
<td>Control of the communication mode</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>Password to access the menu from the keyboard</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>111</td>
<td>Operating time from power on (MSW)</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>112</td>
<td>Operating time from power on (LSW)</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>113</td>
<td>Serial number (MSW)</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>114</td>
<td>Serial number (LSW)</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>Manufacturing date</td>
<td>R/W</td>
<td></td>
</tr>
<tr>
<td>116</td>
<td>Communication card</td>
<td>R/W</td>
<td></td>
</tr>
</tbody>
</table>

* R – read only, R/W – read and write