Parsmega
industrial automation

User Manual

# Analog Indicator

# PM-AD11


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# Contents

# 1 Introduction

## 1.1 The purpose of the manual

This manual contains all the information needed to set up, install, wiring and communicate with the PM-AD11 module.

## 1.2 Technical knowledge required

In order to understand this booklet, a basic acquaintance with electrical topics is required.

## 1.3 Manual validation

This booklet is valid for this specification.

| MODEL | Hardware | Software |
|---|---|---|
| PM-AD11 | V2.1 | V12.0 |

## 1.4 Technical Support

To get technical support through the following contact:

- Email: **info@parsmega.com**
- Phone: **+98 21 91009955**
- WhatsApp: **+98 9981122566**

# 2 safety tips

- Starting the module by non-experts and ignoring the commands may cause serious damage to the module.
- This module does not directly pose a risk to human life.
- The use of this module is not approved for use in life-threatening devices.

# 3 Describtion

## 3.1 Basic describtion

PM-AD11 is an analog signal indicator that can convert and display analog signals of 0-10V, 0-5V, 0-20mA and 4-20mA and resistive ruler. Also, this indicator has the ability to convert the input signal to all types of analog isolated signals 0-10V, 0-5V, 0-20mA and 4-20mA .

This indicator also has 3 output relays.

The PM-AD11 indicator has an RS485 serial communication port that can be connected to a computer and control equipment such as (HMI and PLC) using the Modbus protocol.

The power supply voltage is 220 volts. (Safety points must be observed when connecting the power supply).

## 3.2 Module Uses

This module is used to display and isolate the analog signal and other things such as:

- industrial automation
- Measuring and laboratory machines and devices

## 3.3 Technical Specifications

- Has a display
- 24bit analog to digital converter
- One analog input channel
- One isolated analog output channel
- The working temperature range is +30 ~ +75 degrees Celsius
- RS485 serial communication with MODBUS protocol support

### 3.4 Indicator dimensions

This indicator has dimensions of 108 x 96 x 48 mm, the size of the screen installation area is 91 x 45 mm.

# 4 Instalation

## 4.1 Observe EMC items

This product is designed and manufactured to work in industrial environments. However, for proper operation, you should check and eliminate the issues that cause the module to malfunction.

## 4.2 Cases that cause system malfunctions

• Electromagnetic field

• Telecommunication cables

• Power circuit cable

## 4.3 Things to consider

### 4.3.1 Convenient ground connection

• When installing the module on the panel body, make sure that the panel body is connected to the ground.

• All ineffective metal parts are (firmly) grounded.

• When connecting varnished wires to ground connection, remove the varnish from that part.

### 4.3.2 Appropriate wiring method

• Divide your system cables into different groups (high voltage, power supply, and signal, analog).

• Always transfer the power cable from another duct.

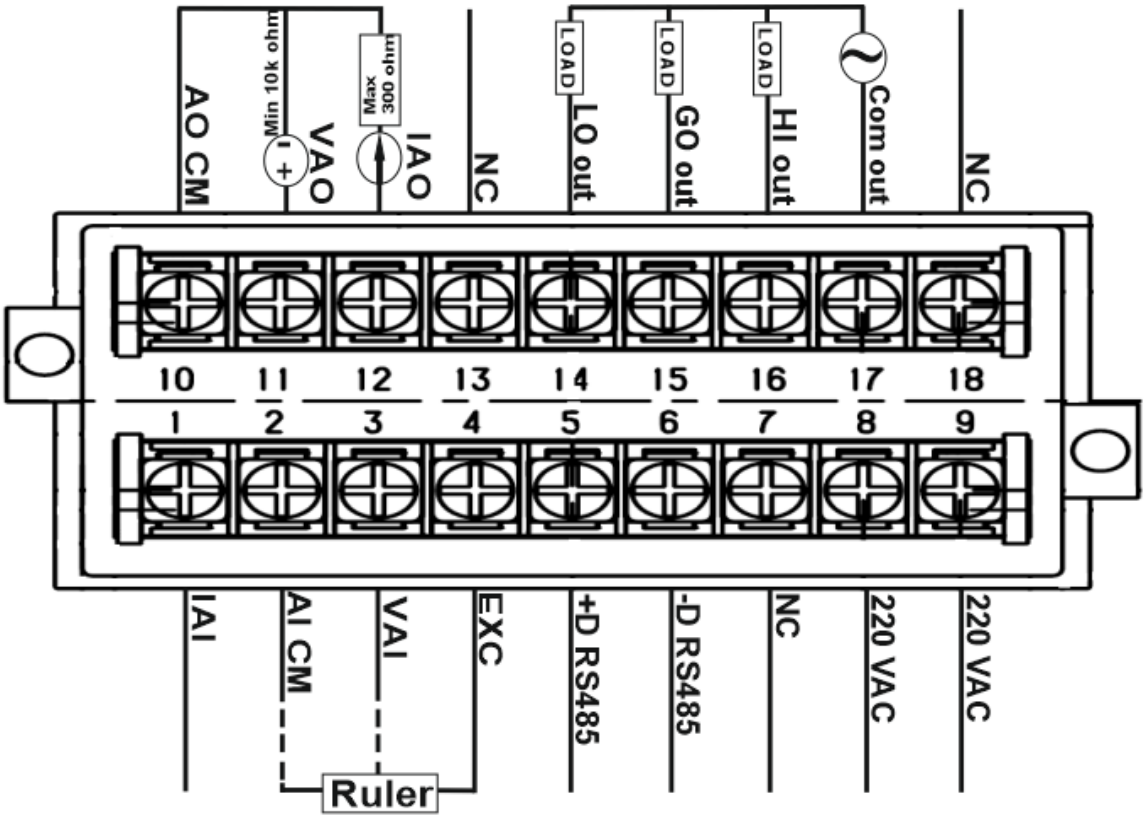
• Always place your analog cables close to the body of the panel and rails (which are grounded).

### 4.3.3 Cable shield connection

- Make sure the shields are properly grounded.
- Try to keep a small part of the cable without a shield.

# 5 Connections

All the connections of this module are screws




Indicator connection view

## 5.1 Connections group

The connections of this module include 5 main groups:

- Power
- Relay outputs
- RS485 serial
- Analog output
- Analog inpput

## 5.2 Power supply connection

The proper power supply for this module is 220VAC. (24 volt DC power supply can be selected if needed).

| Function | Tag | Terminal Number |
|---|---|---|
| Input power supply voltage (24 V in the model with DC power supply) | 220v AC | 9 |
| Input power supply voltage (zero volt in the model with DC power supply) | 220v AC | 8 |

## 5.3 Output Connections

**Notice**

Be sure to know the status of the outputs before connecting them. During the initial setup, all the outputs may be active.

This module has 3 relay outputs as follows

| Terminal Number | Tag | Application |
|---|---|---|
| 17 | Com out | Common outputs |
| 16 | HI out | HIGH Output relay |
| 15 | GO out | GO Output relay |
| 14 | LO out | LOW Output relay |

- The maximum acceptable contact current of output relays is equal to 5A at 220 VAC voltage.
- The activation of the outputs depends on the setting of the parameters, which will be discussed in the parameters section.

## 5.4 Analog output

> **Notic**
>
> Be sure to know the status of the output analog before connecting it. At the time of initial setup, the output analog may have a value.

- The PM-AD11 display has an isolated analog output (analog output is optional).
- The analog output has several modes: 4~20, 0~20 mA, 0~5, and 0~10V.

| Terminal Number | Tag | Aplliction |
|---|---|---|
| 10 | AO CM | Output analog return path |
| 11 | VAO | Analog voltage output |
| 12 | IAO | Analog current output |

**Note:** In current mode, the maximum resistance in series with the loop is 300 ohms. In voltage mode, the minimum load resistance is 10 kilo ohms.

**Note:** The value of L.SC (Low Scale) and h.SC (High Scale) parameters are the basis of the analog output function in the resistance ruler connection mode, and in other cases, the analog input signal is equivalent to the analog output signal.

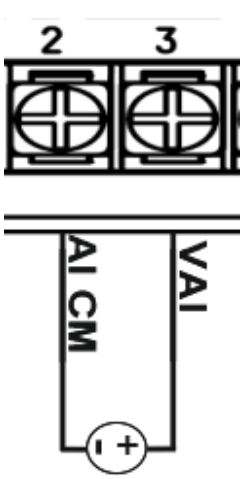
## 5.5 Analog input

The PM-AD11 indicator has the ability to convert and display signals 0~10V, 0~5V, 0~20mA and 4~20mA, as well as a resistance ruler. This indicator reads the value of the input signal and displays it as a scaled value. When connecting the voltage signals 0~10V and 0~5V, the positive wire of the voltage signal should be connected to terminal 3 (VAI) and the negative wire should be connected to terminal 2 (AI CM), and when connecting the current signals 0~20mA and 4~20mA, the positive wire of the signal should be connected. Connect the current to terminal 1 (IAI) and the negative wire to terminal 2 (AI CM). To connect the resistance ruler, it is possible to provide the necessary voltage to excite the ruler by using terminal number 4 (EXC), that is, connect the upper end of the ruler to terminal number 4 (EXC) and the middle end (output) of the resistance ruler to terminal number 3. VAI) and connect the lower end of the ruler (ground) to

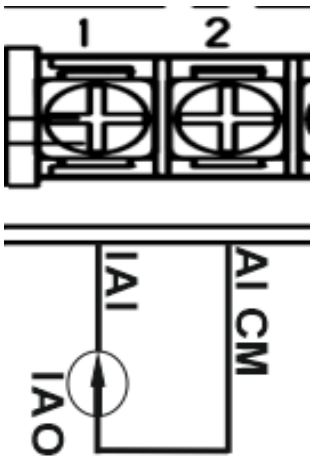
terminal number 2 (AI CM). The output voltage of terminal number 4 (EXC) is 10 volts.

| Terminal Number | Tag | Application |
|---|---|---|
| 1 | IAI | Analog current input |
| 2 | AI CM | Analog reference (ground) input |
| 3 | VAI | Analog voltage input |
| 4 | EXC | Excitation voltage output |

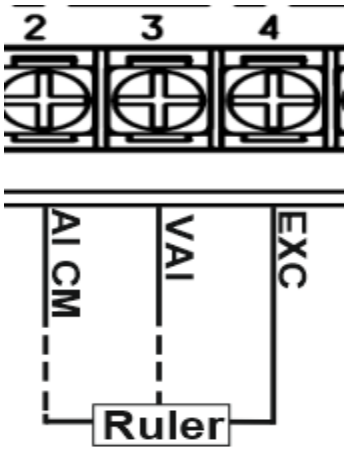
The following figure shows the connection view in the order of how to connect the resistance ruler and current input and voltage input:




voltage signal connection




current signal connection




Resistance ruler connection

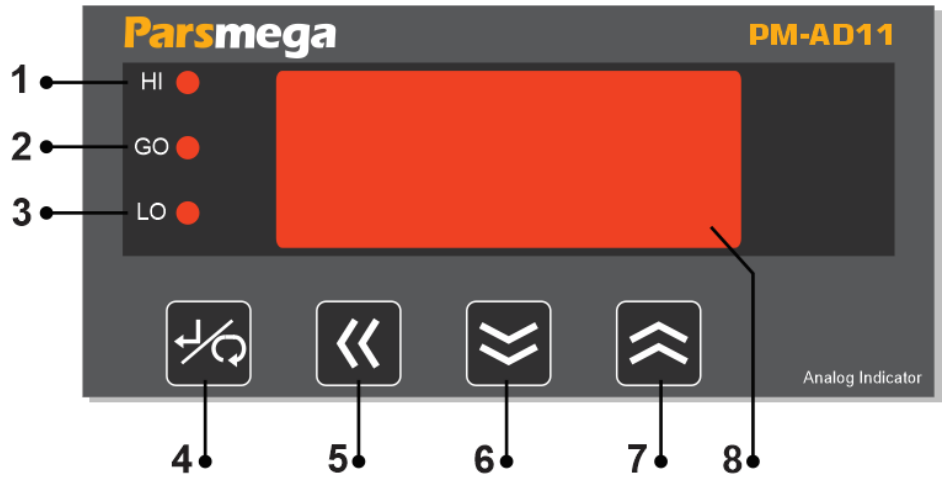
## 5.6 RS485 Serial connection

This module is equipped with an RS485 serial port on which the MODBUS (RTU, ASCII) protocol is implemented.

| Terminal Number | Tag | Application |
|---|---|---|
| 5 | + D RS485 | Positive data |
| 6 | - D RS485 | Negative data |

## 5.7 Indicator panel

This indicator module has 4 push buttons and 3 LEDs. The keys have different and adjustable functions in different states, and the LEDs can show the active or inactive state of the outputs.




1. The **HI** output status LED will be on if the output is active.
2. The **GO** output status LED will be on if the output is active.
3. The **LO** output status LED will be on if the output is active.
4. **Enter key:** This key has two functions. To enter the device settings menu, you must press the key for more than 3 seconds, and to exit the menus without saving the changes, press the key for one second.
5. **Shift key:** This key has two functions, it acts as a shift between numbers in the settings menu of the device, and it acts as an output activator outside the settings menu and on the main screen, that is, if any of the outputs is active by pressing This key outputs are disabled and to reactivate this key must be pressed again.
6. **Down key:** This key has two functions: it acts as a digit reducer in the settings menu of the device, and outside the settings menu and on the main page, it acts as a reset of the parameters of the highest and lowest value (that is, the value of these two parameters with the value that was pressed when The key is displayed (replaces) and works
7. **Up key:** This key has two functions, it acts as a digit increaser in the settings menu of the device, and outside the settings menu and on the main page (if the Auto dI FF function is active in the AdI F menu) it changes the

current value as the value. It puts zero in the dIFF menu, or if a resistance ruler is connected, it saves the current value as ruler zero.

8. Display

The following table shows the functions of the keys in different menus and situations

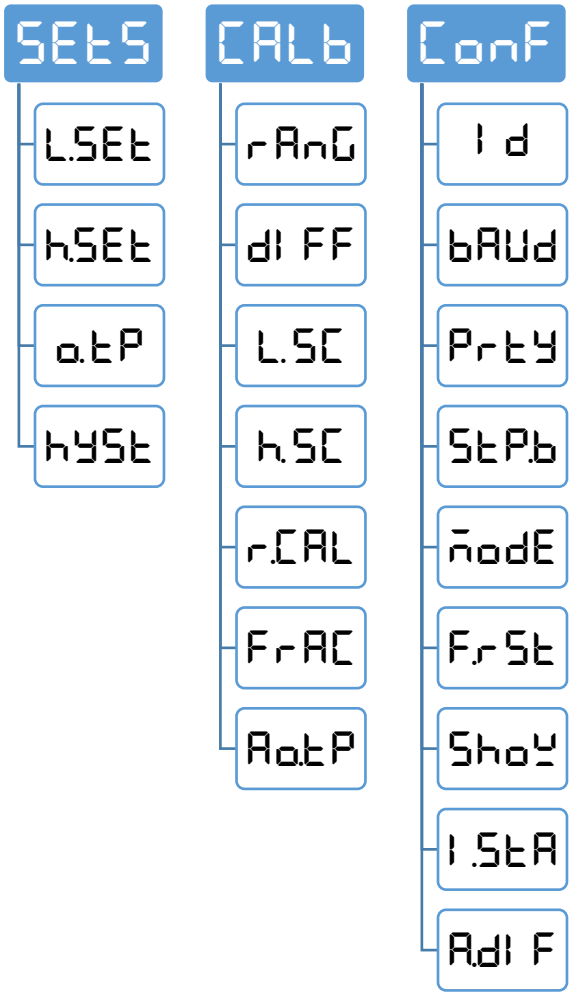
| Key - indicator | When setting the parameter | | Inside the settings menu | | Out of the settings menu | |
|---|---|---|---|---|---|---|
| | to keep | push | to keep | push | to keep | push |
| Enter | Confirm parameter changes | Cancel parameter change | Enter the selected menu | Return to previous menu | Enter the settings menu | |
| ◄ Shift | Shift between parameter digits | Shift between parameter digits | --- | --- | --- | Enable and disable outputs |
| ▲ Up | Continuously increase the parameter | increase the parameter | ---- | Go to the menu above | --- | Auto Diff Reset to zero |
| ▼ Down | Continuous decrease the parameter | Parameter reduction | --- | Go to the bottom of the menu | --- | Max and Min Reset |

Holding the key to confirm the function is 3 seconds.

# 6 Menu-Indicator

- All parameters are set with default values at the time of purchase.
- You can also do this with the reset command.
- The length of all variables is word
- Some parameters require a reboot to take effect.
- The parameters and menus of the device have different categories for settings, which we will explain below. In the next table, we see the general structure of the menus.

## 6.1 General structure table of menus



## 6.2 How to work with menus

1. To enter the settings, you need to hold the EntEr key for 3 seconds. After entering the settings, SEtS will be displayed on the top line, which is the first category of settings related to the communication settings of the device.
2. Now you can select other settings with the ▲/▼ key.
3. After selecting the setting category, you can enter the parameters of that setting category by holding the EntEr key.
4. If you select and enter the Conf settings category, the term Id will be displayed. Which represents the value of the Id parameter of the device's Modbus connection.
5. Now you can select other parameters with ▲/▼ keys.
6. After selecting the parameter, you can edit the value of that parameter by holding the EntEr key.
7. Assuming selection and entering the parameter Id, the value of the parameter will start flashing.
8. Now you can use the ▲/▼ key to change the value of the parameter and use the ◄ key to select more valuable digits (tenths, hundredths or hundredths and tenths in decimal numbers) to change.
9. After setting the appropriate value, you can save the parameter by holding the EntEr key.

**Notes:**

- In each step, by pressing the EntEr key, you can go back to the previous step, exit the settings menu, or cancel saving the parameter value.
- The parameter values have a predefined limit, for example the ConF-Id parameter value can be selected between 1 and 247

## 6.3 Communication settings menu and parameter (ConF)

In the CoMM menu, it is related to serial communication settings, in which there are the following sub-menus:

- **Id (Device ID):** In Modbus communication, every device connected to the bus has a unique ID.
- **bAUd (Baud Rate):** RS485 serial data transmission speed can be set in this menu.
- **PrtY (Parity Bit):** In this menu, the parity bit of RS485 serial communication can be set.
- **StPb (Stop Bit):** In this menu, the number of RS485 serial communication stop bits can be set.
- **modE (RTU/ASCII):** In this menu, RTU or ASCII type of Modbus communication is selected.
- **FrSt (Reset to Factory):** In this menu, the indicator can be returned to the initial settings. For this reason, after entering this menu, the term rESt will be displayed as a flashing symbol, which can be reset by saving this term and turning the display off and on.

Note that the system must be reset once to apply the above parameters.

- **Shoy (Show):** In this menu, the parameter displayed on the main screen is selected.
- **I.StA (Initial State):** In this menu, the initial state of the display relay outputs is selected. If the on option is selected, when the device is turned on, the relay outputs are active or inactive according to the current value (according to the present value). Value which is compared with LSEt and hSEt parameters) but if the oFF option is selected when the device is turned on, the relay outputs are inactive (regardless of the current value and LSEt and hSEt parameters) and the activation of the outputs depends on pressing the Shift key. During the measurement process, the outputs can be disabled or enabled by pressing the shift key.
- **Adi F (Auto Difference(Zero)):** In this menu, the function of the Auto difference (Zero) function is set, if this parameter is set to on, the Auto

Difference function is activated by pressing the up key on the main screen, and if which is set to oFF will be disabled.

**Operation of the Auto Difference function:** There is a possibility that a value other than zero will be displayed on the display when the zero signal is applied. This difference value can be entered manually in the CALb menu under the dI FF menu if the Auto Difference function is active. When the up Key is pressed on the main page, the present value is saved as dI FF in this menu. And if the resistance ruler is connected to the display (if the Auto Difference function is active), by pressing the up key, the present value of the resistance ruler will be considered as zero.

**Note:** If the raw number (numerical display minus the dIFF parameter) is between -99 and 99, the Auto Difference function will work.

## conF (configuration) parameters menu table

| Menu title | Menu parameter | Default |
|---|---|---|
| Id | 1~247 | 1 |
| bAUd | 2.4<br>4.8<br>9.6<br>14.4<br>19.2<br>28.8<br>38.4<br>57.6<br>76.8<br>115.2<br>230.4 | 9600 |
| PrtY | non = nonE<br>odd = odd<br>even = EuEn | even |
| StPb | 1stop bit = 1Sb<br>2 stop bit = 2Sb | 1 bit |
| nodE | RTU = rtU<br>ASCII (8bit) = ASC8<br>ASCII (7bit) = ASC7 | RTU |
| FrSt | rESt | ---- |

| | | |
|---|---|---|
| **SHow** | Present Value = **PV**<br>Max Value = **HI.PE**<br>Min Value = **Lo.PE** | Present value |
| **I.StA** | Relay output initial state active = **on**<br>Relay output initial state deactive = **oFF** | initial state active |
| **A.dIF** | Auto Difference (Zero) function enable = **on**<br>Auto Difference (Zero) function disable = **oFF** | On |

## Address table of communication parameters

| Title | Variable type | length | Reading Writing | Address | Description | Default |
|---|---|---|---|---|---|---|
| ID | Unsigned int | 1 | RW | 40001<br>0 d<br>0 h | 1~247 | 1 |
| Baud Rate | Unsigned int | 1 | RW | 40002<br>1 d<br>1 h | 0~10<br>0=2400<br>1=4800<br>2=9600<br>3=14400<br>4=19200<br>5=28800<br>6=38400<br>7=57600<br>8=76800<br>9=115200<br>10=230400 | 2 |
| parity | Unsigned int | 1 | RW | 40003<br>2 d<br>2 h | 0=none<br>1=odd<br>2=even | 2 |
| Stop bit | Unsigned int | 1 | RW | 40004<br>3 d<br>3 h | 0=1 bit<br>1=2 bit | 0 |
| Mode | Unsigned int | 1 | RW | 40005<br>4 d<br>4 h | 0=RTU<br>1=ASCII (8bit)<br>2=ASCII (7bit) | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Show parmeter | Unsigned int | 1 | RW | 40035<br>34 d<br>22 h | 0=PV<br>1=high peak (max value)<br>2=Low peak (Min value) | 0 |
| output Initial State | Unsigned int | 1 | RW | 40036<br>35 d<br>23 h | 1=on<br>0=off | 1 |
| Automatic Difference function | Unsigned int | 1 | RW | 40037<br>36 d<br>4 h2 | 1=on<br>0=off | 1 |

## 6.4 Calibration menu and parameter (CALb)

The calibration menu is related to the calibration and grading settings (Scale) and setting the specifications of the input signal and output signal. The sub-menus of this menu are:

- **rAnG (Input Signal Range):** In this menu, it is possible to specify the type of input signal to the indicator. The PM-AD11 indicator can convert and display signals 0~5V, 0~20mA, 4~20mA and 0~10V, as well as a resistance ruler.
- **dI FF (Difference):** dI FF menu is used in two ways
    1. When connecting the signals of 0~5V, 0~20mA, 4~20mA and 0~10V to the indicator and if a signal with a value of zero is applied to the input of the indicator, but the indicator displays a value other than zero, the value shown by the indicator can be changed. Entered manually in this menu to make the value zero. For example, if the value of the display shows the number 10 by applying a zero signal, by placing the number -10 in the dI FF menu, the value of the display will be zero.

    **Note:** The decimal value is not effective when entering the difference value in the dI FF menu. For example, if the decimal value is set to 2 and when

the zero signal is applied, the indicator displays the number 0.10 in the dI FF menu, then the number -10 should be entered.

2. If the type of input signal is selected in the rAnG menu of the ruler, during the calibration of the ruler in the zeroing stage, the ruler will enter this menu and without entering any parameters, we will only save. This defines the zero point for the ruler.

- L.SC **(Low Scale):** The lower limit of the read value (scaled) of the input signal is set in this menu.
- h.SC **(High Scale):** The upper limit of the read value (scaled) of the input signal is set in this menu.

**Note:** If the L.SC (Low Scale) and h.SC (High Scale) parameters are set to zero, the value of the input voltage or current signal will be displayed.

**Note:** The value of L.SC (Low Scale) and h.SC (High Scale) parameters is based on the performance of the analog output (only in the resistance ruler connection mode) and the relay outputs (the performance of the relay outputs according to the value of the parameters L.SEt and h.SEt in the SEtS menu, for example, if the value of the parameter L.SC (Low Scale) is equal to zero and the value of the parameter h.SC (High Scale) is 1000, and the display range will be from 0 to 1000, and the parameters must be L.SEt and h.SEt the value of Set in the SEtS menu for correct operation in this range. Or, for example, if a 300 mm ruler is connected to the indicator and you need an analog output in the range of 0 to 100 mm, set the Low Scale parameter to zero and the High Scale parameter to We put 100. By doing this, the analog output will change in the range of 0 to 100 mm.

In the table below, examples of setting values to two parameters, low scale and high scale, are shown according to the input signals:

| Input Signal | Sclae setup | | Indicator value |
|---|---|---|---|
| | Upper limit h.SC | lower limit L.SC | |
| 0 ~ 10.00 volt | 0 | 0 | 0 ~ 10.00 volt |
| 0 ~ 1800 | 1800 | 0 | 0 ~ 1800 |
| -1000 ~ 5000 | 5000 | -1000 | -1000 ~ 5000 |
| 5000 ~ -1000 | -1000 | 5000 | 5000 ~ -1000 |
| 1000 ~ 6000 | 6000 | 1000 | 1000 ~ 6000 |
| 6000 ~ 1000 | 1000 | 6000 | 6000 ~ 1000 |
| 0 ~ 200 | 200 | 0 | 0 ~ 200 |
| 4.00 ~ 20.00 | 0 | 0 | 4.00 ~ 20.00 |
| 0 ~ 200 | 200 | 0 | 0 ~ 200 |
| -1000 ~ 200 | 200 | -1000 | -1000 ~ 200 |
| 200 ~ -1000 | -1000 | 200 | 200 ~ -1000 |

- r.CAL **(Ruler calibration)**: if the rULr ruler input signal type is selected in the rAnG menu, in the ruler calibration stage, after the zeroing step in the dI FF menu, move the ruler course and after measuring the displacement value, enter it in the r.CAL menu and then save (this menu is only used when connecting the ruler.)
- FrAC **(Fraction):** The number of decimal points on the main screen can be set in this menu (and it has no effect when setting parameters in different menus).
  **Example:** We consider that a 200 Bar pressure sensor is connected to the indicator and we want to observe the value of the pressure sensor with the accuracy of one tenth. For this, by setting the L.SC (Low Scale) parameters equal to zero and the h.SC parameter. (High Scale) with 2000 I specify the lower and upper limits of the scale and then I enter the number 1 in the FrAC menu.

**Note:** The value of the fractin parameter has no effect when setting other parameters and is only effective when displayed on the main page. For example, in the example above, if we want to set the value of the parameters L.SEt and h.SEt, which are in the SEtS menu and are related to the relay outputs, to operate at a pressure of 100 and 150 Bar, according to the parameter The L.SC (Low Scale) and h.SC (High Scale) that are set should be set to 1000 in the L.SEt menu and 1500 in the h.SEt menu.

- AotP **(Analog Output Type):** By entering this parameter, you can select the type of analog output signal.

  The analog output has several modes: 4~20, 0~20 mA, 0~5, and 0~10V.

## 6.5 Calibration of resistance ruler

After connecting the resistance ruler to the display, perform the following steps to calibrate the ruler:

1. Select the type of input signal in the rAnG menu of the ruler.
2. Place the ruler in the place where the zero point of the measurement is, then enter the dl FF menu and save the menu without entering any parameters.
3. Move the ruler and measure the displacement value from the zero area, then enter the r.CAL menu (do not change the displacement value of the ruler and keep the ruler fixed) and enter the displacement value and then save. Pay attention, if the displacement number has a decimal digit, you can enter the digit with the appropriate coefficient and enter the coefficient value as a decimal in the FrAc menu. For example, if the displacement number is equal to 25.8 mm, enter the number 258 and set the number 1 in the FrAc menu so that a corresponding display number is displayed.

**Calibration parameters menu table**

| Menu title | Menu parameter | Defualt |
|---|---|---|
| rAnG<br>Input signal type | 4 20 = 4~20 mA<br>0 20 = 0~20 mA<br>0 10 = 0~10 V<br>0 5 = 0~5 V<br>rULr = Ruler Resistance ruler | 4~20 mA |
| dI FF<br>difference amount (zeroing) | -99 ~ 99<br>(When connecting, the ruler is used to determine the zero point) | 0 |
| L.SC<br>Lower limit of the scale | Lower limit of scaling | 0 |
| h.SC<br>Upper limit of the scale | Upper limit of scaling | 0 |
| r.CAL<br>Ruler Calibrate | A resistance ruler is used for calibration when connecting. | 0 |
| FrAC<br>Number of decimals | The number of decimals displayed on the main screen is set. | 0 |
| AotP<br>Output analog signal type | 0-5 = 0-50V<br>0- 10 =0-10V<br>0-20 =0-20 mA<br>4-20 =4-20 mA | 4~20 mA |

**Address table of calibration parameters**

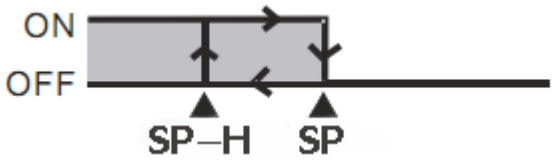
| Title | Variable type | length | Writing ability | Address | Description | Defualt |
|---|---|---|---|---|---|---|
| Input signal type | unsigned int | 1 | RW | 40024<br>23 d<br>17 h | 0~4<br>0=4-20mA<br>1=0-20mA<br>2=0-10V<br>3=0-5V<br>4=Ruler | 0 |
| difference amount (zeroing) | signed int | 1 | RW | 40025<br>24 d<br>18 h | -99~99 | 0 |
| Lower limit of the scale | signed int | 1 | RW | 40026<br>25 d<br>19 h | -999~9999 | 0 |
| Upper limit of the scale | signed int | 1 | RW | 40027<br>26 d<br>1A h | -999~9999 | 0 |
| Ruler calibration value | signed int | 1 | RW | 40028<br>29 d<br>1B h | -999~9999 | 0 |
| Number of decimals | unsigned int | 1 | RW | 40029<br>28 d<br>1C h | 0~3 | 0 |
| Output analog signal type | unsigned int | 1 | RW | 40030<br>29 d<br>1D h | 0~3<br>0=4-20mA<br>1=0-20mA<br>2=0-10V<br>3=0-5V | |

## 6.6 Set points menu and parameters (SEtS)

The device has 3 relay outputs. For the relay output comparison function, two comparison points are used which are located in the L.SEt and h.SEt menus. Also, the operation mode of the outputs and the amount of hysteresis (Hysteresis) are specified in this menu.

- L.SEt (Low Set point): the low set point value that is set to compare with the present value.
- h.SEt (High Set point): the high set point value that is set to compare with the present value.

  **Note:** For the proper functioning of the relay outputs when setting the L.SEt and h.SEt parameters, it should be noted that it is better for the L.SEt and h.SEt parameters to be within the range of the two L.SC parameters (Low Scale) and h.SC (High Scale) to set the high and low level of scaling so that the outputs are stimulated according to the displayed value.
- oUtP (Output Type): The comparative operation mode of the relay outputs is set in this menu.
- HYSt (Hysteresis): In this menu, the hysteresis value of the outputs is set.



**Below are the types of output comparison modes:**

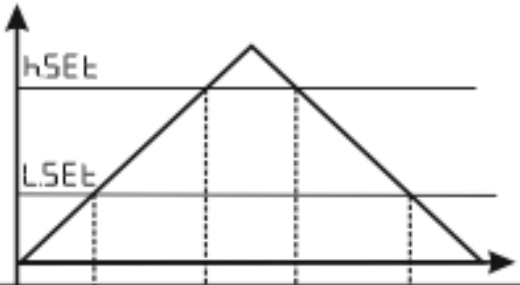
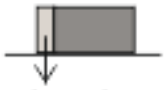
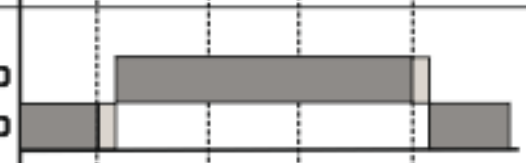
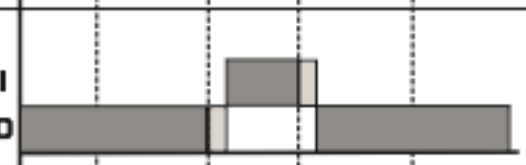
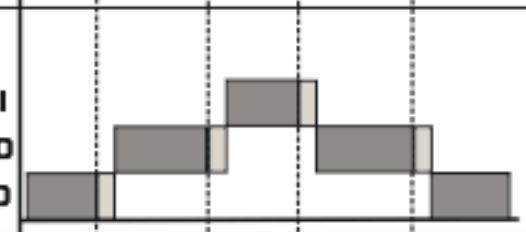
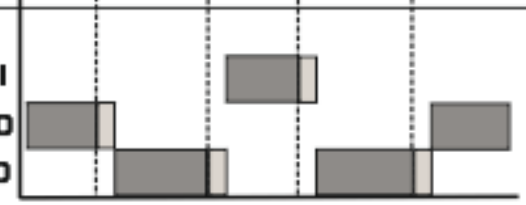
| Output mode | Output Operation | Explantion |
|---|---|---|
| |  |  |
| oFF | | NO Comparative Output |
| LLot |  | PV < L.SET LO out on<br>PV > L.SET GO out on |
| hhot |  | PV < H.SET GO out on<br>PV > H.SET HI out on |
| Lhot |  | PV < L.SET LO out on<br>L.SET > PV > H.SET GO out on<br>PV > H.SET HI out on |
| hLot |  | PV < L.SET GO out on<br>L.SET > PV > H.SET LO out on<br>PV > H.SET HI out on |

**Table of relay output menus**

| Menu Title | Menu Parameter | Defualt |
|---|---|---|
| L.SEt | Low Set point: The low setpoint value to compare with the present value | 0 |
| h.SEt | High Set point: High set point value to compare with present value | 0 |
| hYSt | Hysteresis: hysteresis value of the outputs | 0 |
| o.tP | Output type: the mode of comparative operation of the relay outputs<br>oFF = inactive comparison (outputs off)<br>LLoP<br>hhoP<br>LhoP<br>hLoP | oFF |

**Address table of relay output parameters**

| Title | Variable type | length | Writing ability | Address | Description | Defualt |
|---|---|---|---|---|---|---|
| Set point Lower amount | signed int | 1 | RW | 40016<br>15 d<br>F h | -999 ~9999 | 0 |
| Set point upper amount | signed int | 1 | RW | 40017<br>16 d<br>10 h | -999 ~ 9999 | 0 |
| Hysteresis Waste outputs | Unsigned int | 1 | RW | 40018<br>17 d<br>11 h | 0 ~ 99 | 0 |
| Mode of comparative performance of outputs | Unsigned int | 1 | RW | 40019<br>18 d<br>12 h | 0=OFF<br>1=LL.OP<br>2=HH.OP<br>3=LH.OP<br>4=HL.OP | 0 |

## 6.7 Readable information parameter

This parameter is only accessible through serial communication and cannot be seen through indicator menus. All the following parameters are read only

| Title | Variable type | length | Writing Reading | Address | Description | Defualt |
|---|---|---|---|---|---|---|
| Firmware ver | Float | 2 | R | 40007<br>6 d<br>6 h | | |
| Hardware ver | Float | 2 | R | 40009<br>8 d<br>8 h | | |
| Model | Unsigned int | 1 | R | 40011<br>10 d<br>A h | | |
| Serial number | Unsigned long | 2 | R | 40012<br>11 d<br>B h | | |
| Analog converter raw number | Unsigned long | 2 | R | 40048<br>47 d<br>2F h | | |
| Upper amount | Signed int | 1 | R | 40050<br>49 d<br>31 h | | |
| Lower amount | Signed int | 1 | R | 40051<br>50 d<br>32 h | | |
| Present value | Signed int | 1 | R | 40052<br>51 d<br>33 h | | |

## 6.8 Commands

All commands are written in a register, the specifications of that register are as follows.

**All commands will be executed after a maximum of 500 milliseconds.**

| Title | Variable type | length | Writing ability | Address | Description | Defualt |
|---|---|---|---|---|---|---|
| Command register | Unsigned int | 1 | W | 40042<br>41 d<br>29 h | - | - |

**The list of commands is as follows**

| Number | function | code |
|---|---|---|
| 1 | None<br>No function | 0 |
| 2 | Ruler Zero<br>zeroing the resistance ruler (in calibration) | 1 |
| 3 | Ruler Calibration trigger<br>After entering the ruler displacement value in the "Ruler calibration value" parameter, this command must be executed. | 2 |
| 4 | Automatic Difference<br>Automatic zeroing | 3 |
| 5 | Save | 4 |

**All values are in decimal**.

**Number 1: None**
No function (default value)

**Number 2: Ruler Zero**
During the calibration of the resistance ruler through serial communication and in the first stage of calibration, this command is used to define the zero point of the ruler.

**Number 3:** Calibrate the ruler (Ruler Calibration trigger)

This command is used to calibrate the resistance line. After defining the zero point, I move the ruler and measure the displacement value, and after entering the displacement value of the ruler in the parameter "calibration value of the ruler", this command is entered in the command register.

Pay attention, if the displacement number has a decimal digit, you can enter the digit with the appropriate coefficient and in the "number of decimals" parameter, enter the coefficient value as a decimal. For example, if the displacement number is equal to 25.8 mm, enter the number 258 and set the number 1 in the "number of decimals" parameter in the menu so that a corresponding indicator number is displayed.

**Number 4: Save**

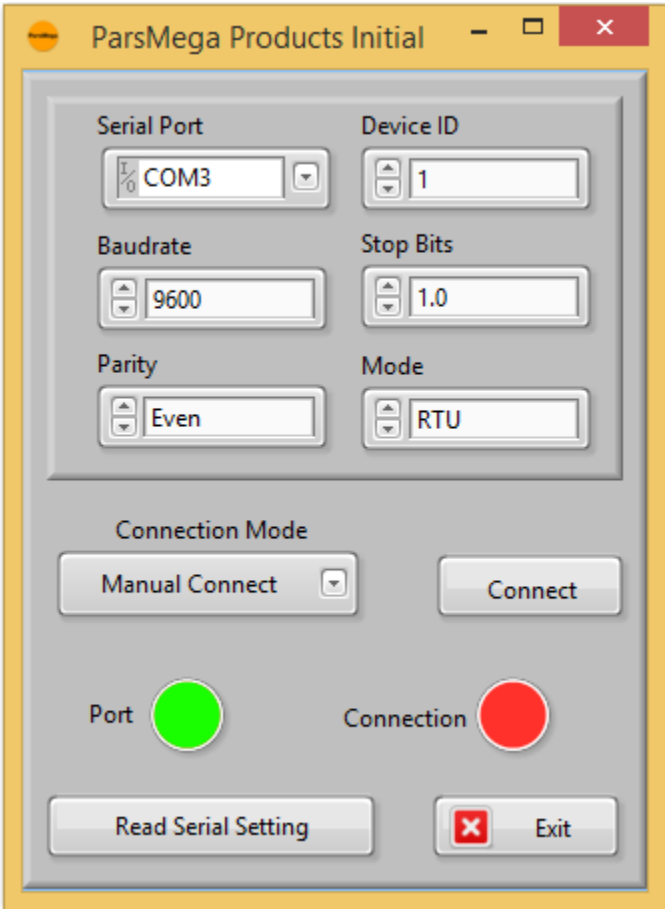
If the parameters of the indicator are changed through serial communication, this command is used to save the parameters.

# 7 computer software for transmitter settings

For the settings and monitoring of the transmitter, a computer program has been prepared by ParsMega Company, which includes all the features of the indicator.

## 7.1 Introduction

By running the program, the following page will open at first:



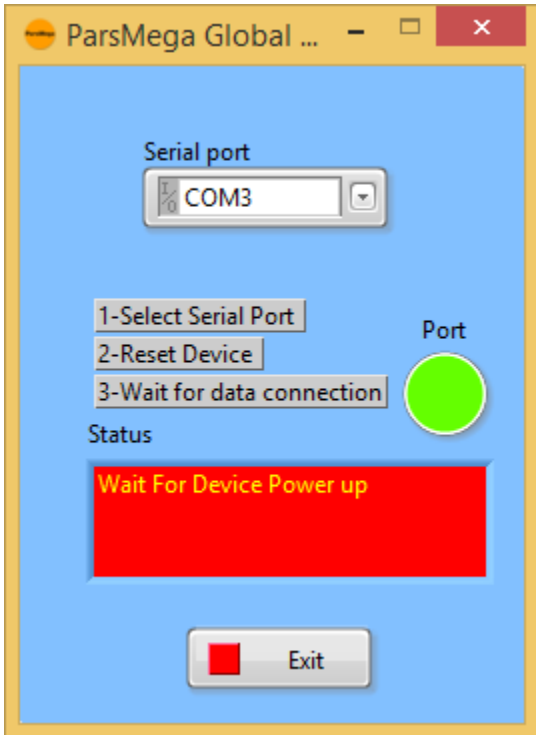

- **Serial Port:** The number of the serial port to which the transmitter is connected.

  When the correct port is selected, the Port indicator will turn green.
- **Device ID:** ID of the transmitter, which is 1 by default in the transmitter.
- **Baud Rate**: The baud rate of serial communication is 9600 by default.
- **Stop Bit**: The Stop bit specifier is in serial communication and is 1 bit by default.

- **Parity:** The serial communication parity parameter is even by default.

  When the connection is established, the Connection indicator will turn green and this page will be closed automatically and the main page of the program will be opened.

- **Read Serial Setting**: If you do not know what settings are on the device and communication is not established, press this button to go to another page where it is possible to read these parameters.




If you have pressed the "Read Serial Setting" button on the previous page, the above page will open. After opening this page, first select the port (if selected correctly, the port will be green) and then turn the device off and on, after reading these values, this page will be closed and the main page will be opened.