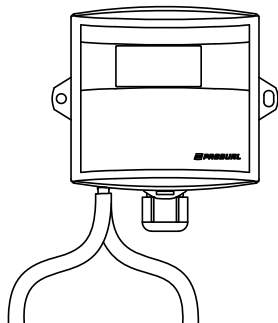


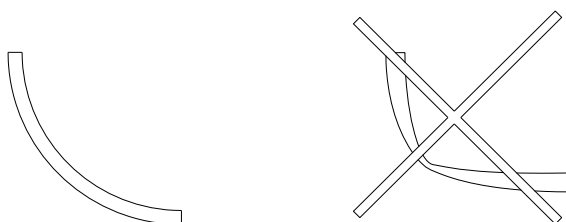
## COMMISSIONING

### Mounting

- The transmitter should be installed above the measuring point to avoid condensation problems.



- The duct overpressure is detected by connecting the measuring point to + connector and by leaving the - connection open (surrounding space pressure). Accordingly, the duct under-pressure is detected by connecting the measuring point to - connector and by leaving the + connection open.
- Install the measuring hoses carefully so that the hoses don't bend too tightly. Too tight curves may prevent the air flow to the sensor.

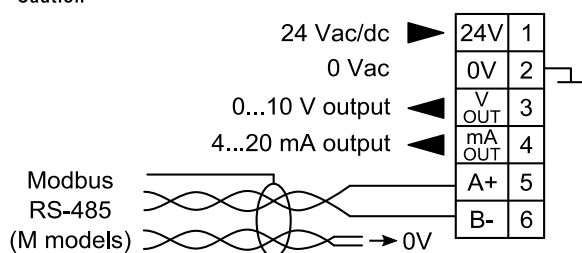


- The hose length doesn't effect on the measuring accuracy. However, long hoses generate delay on the measurement.

### Wiring

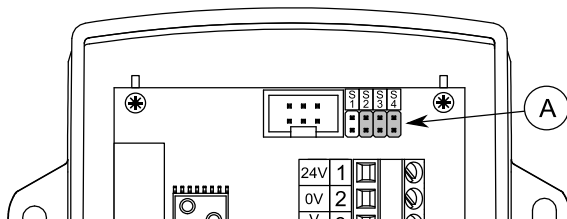


Device wiring and commissioning can only be carried out by qualified professionals. Always make the wirings while the power is switched off.



### Selecting the measuring range

The measuring range can be selected with the jumpers S2, S3 and S4.



A. Pressure selection jumpers

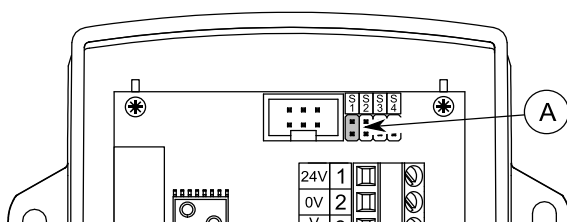
|    | $\pm 50$ | $\pm 100$ | $\pm 250$ | $\pm 500$ | 0...100 | 0...200 | 0...500 | 0...1000 <sup>*)</sup> |
|----|----------|-----------|-----------|-----------|---------|---------|---------|------------------------|
| S2 |          |           |           |           |         |         |         |                        |
| S3 |          |           |           |           |         |         |         |                        |
| S4 |          |           |           |           |         |         |         |                        |

<sup>\*)</sup> Factory setting. The 0...1000 Pa range is also used for the custom range setting.

The custom range is 0...1000 Pa as a default. The range can be changed by using ML-SER tool or by defining the limits to the Modbus registers 40001...40002.

### Selecting the time constant

The time constant can be selected with the jumper S1.



A. Time constant selection jumper

|    | 2 s | 8 s <sup>*)</sup> |
|----|-----|-------------------|
| S1 |     |                   |

<sup>\*)</sup> Factory setting.

## ZERO POINT CALIBRATION

The purpose of the zero point calibration is to remove the possible long term drift. The zero point is calibrated automatically every five minutes.

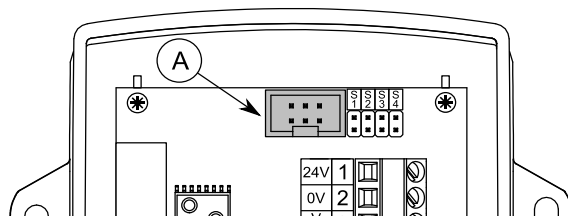
**NOTE:** The zero point calibration is also executed on the start-up and a minute after the start-up.

## ML-SER TOOL

With the ML-SER tool you can change the device settings, Modbus settings for example.

### Connecting ML-SER tool to the device

1. Remove the cover.
2. Disconnect the display cable (N models).
3. Connect the ML-SER tool cable to the display connector.



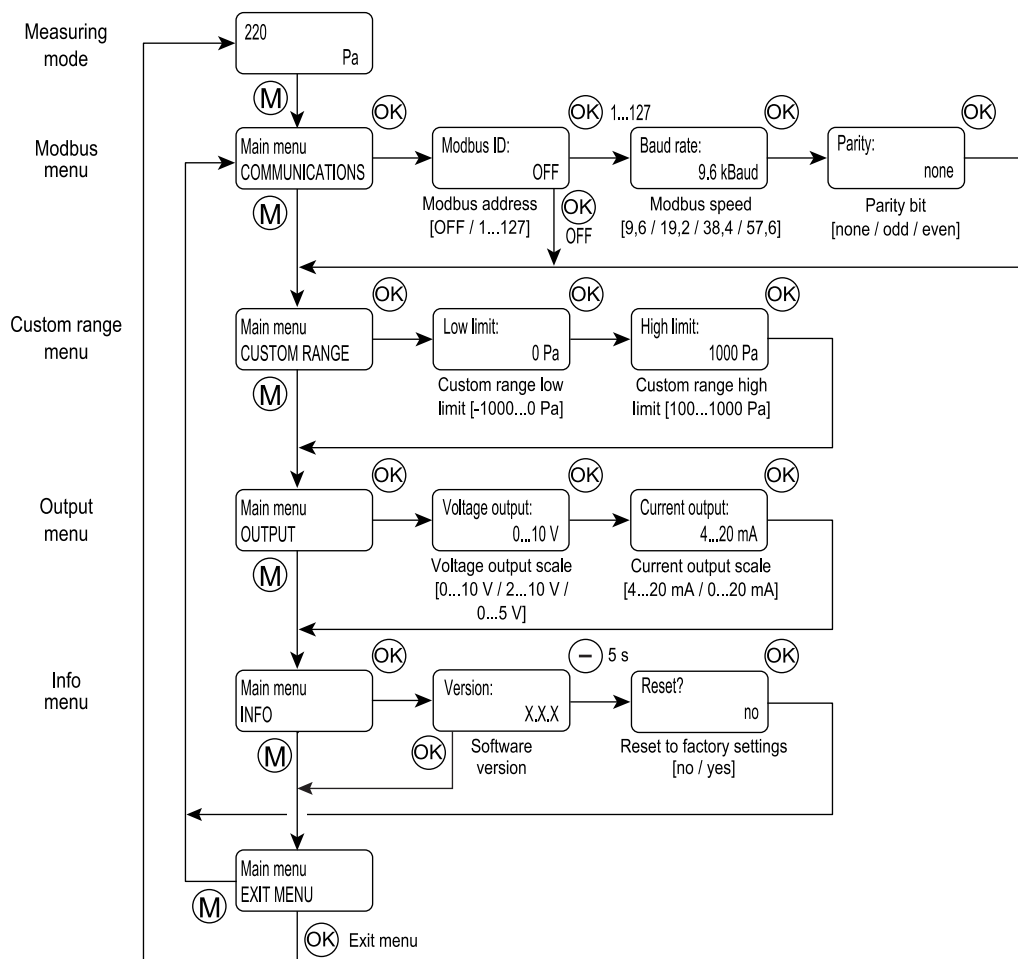
A. Display connector

When the ML-SER is successfully connected, the pressure measurement value is displayed on the ML-SER tool display. The connecting can take few seconds.

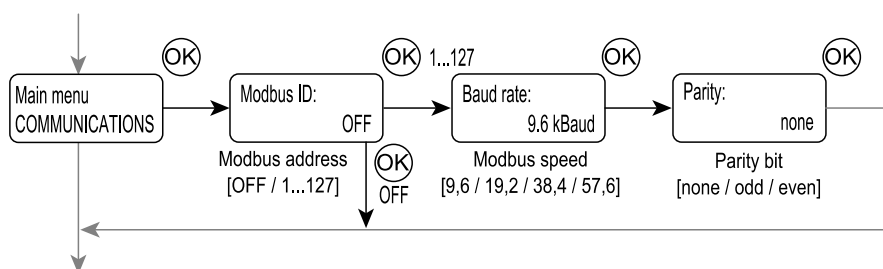
### ML-SER menu

The device settings can be changed by using ML-SER tool. You can proceed in the menu by pressing the M and OK buttons. The values can be changed with the "+" and "-" buttons. The value is accepted with the OK button. The settings are saved when returning the main menu. The following menu structure contains the factory settings.

The Modbus and analogue outputs are disabled when entering the menu for the measuring mode. In addition the analogue outputs maintain the same voltage, as they were before entering the menu.

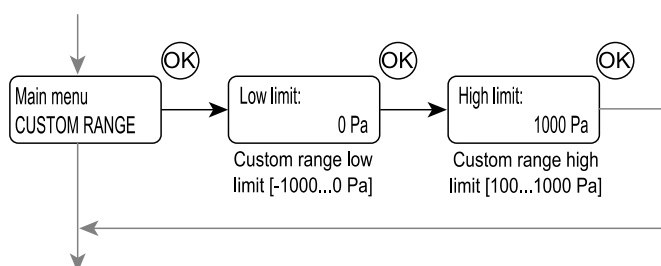


### Communications menu (M models only)



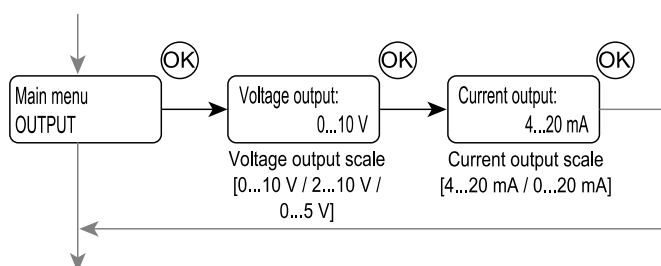
The Modbus settings can be changed through the COMMUNICATIONS menu.

### Custom range menu



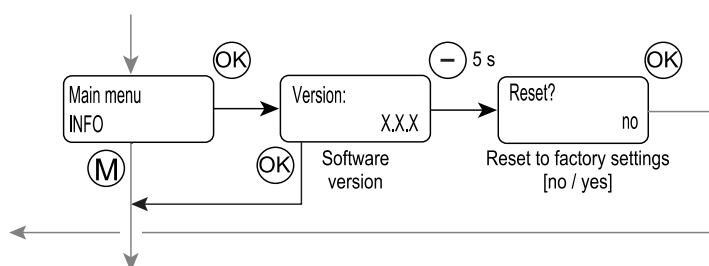
The CUSTOM RANGE menu is for setting the custom pressure range limits. The custom range is in use when all the pressure range selection jumpers are placed.

### Output menu



You can change the measurement output scales through the OUTPUT menu.

### Info menu



The INFO menu can be used for checking the software version and resetting to the factory settings.

### Resetting to the factory settings

1. Press the "-" button for five seconds in the software version display.
2. Change the resetting dialog answer to "yes".
3. Press OK button.

The factory settings are now reset.

## MODBUS

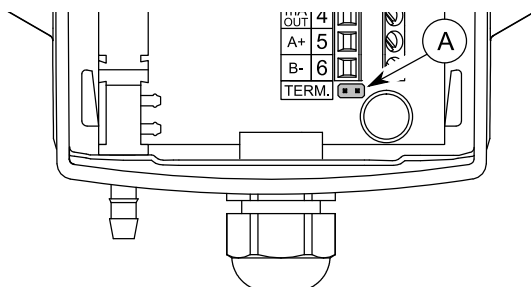
### Bus properties

|              |                               |
|--------------|-------------------------------|
| Protocol     | RS-485 Modbus RTU             |
| Bus speed    | 9600/19200/38400/57600 bit/s  |
| Data bits    | 8                             |
| Parity       | none/odd/even                 |
| Stop bits    | 1                             |
| Network size | up to 127 devices per segment |

**NOTE:** The memory durability is 10000 write cycles.

### Bus termination

The Modbus can be terminated by placing the Modbus termination jumper.



A. Modbus termination jumper

### Supported Modbus functions

|      |                               |
|------|-------------------------------|
| 0x01 | Read Coils                    |
| 0x02 | Read Discrete Inputs          |
| 0x03 | Read Holding Registers        |
| 0x04 | Read Input Registers          |
| 0x05 | Write Single Coil             |
| 0x06 | Write Single Register         |
| 0x0F | Write Multiple Coils          |
| 0x10 | Write Multiple Registers      |
| 0x17 | Read/Write Multiple Registers |

## Modbus registers

Data type:

bit = 0 or 1  
unsigned = unsigned integer (0...65535)  
signed = integer (-32768...32767)

### Input registers (read only)

| Register | Parameter description   | Data type | Value          | Range                                                                                                                                                               |
|----------|-------------------------|-----------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 30001    | Pressure measurement    | signed    | -32768...32768 | -32768...32768 Pa                                                                                                                                                   |
| 30002    | Time constant           | unsigned  | 0...60         | 0...60 s                                                                                                                                                            |
| 30003    | Selected pressure range | unsigned  | 0...7          | 0 = -50...50 Pa<br>1 = -100...100 Pa<br>2 = -250...250 Pa<br>3 = -500...500 Pa<br>4 = 0...100 Pa<br>5 = 0...200 Pa<br>6 = 0...500 Pa<br>7 = 0...1000 Pa / custom *) |
| 30004    | Measurement output      | signed    | 0...1000       | 0...100,0 %                                                                                                                                                         |

\*) The custom range is 0...1000 Pa as a default. The range can be changed by using ML-SER tool or by defining the limits to the Modbus registers 40001...40002.

### Holding registers (read / write)

| Register | Parameter description   | Data type | Value     | Range                                       | Default |
|----------|-------------------------|-----------|-----------|---------------------------------------------|---------|
| 40001    | Custom scale low limit  | signed    | -10...0   | -1000...0 Pa                                | 0       |
| 40002    | Custom scale high limit | signed    | 1...10    | 100...1000 Pa                               | 10      |
| 40003    | Voltage output scale    | unsigned  | 0 - 1 - 2 | 0 = 0...10 V<br>1 = 2...10 V<br>2 = 0...5 V | 0       |
| 40004    | Current output scale    | unsigned  | 0 - 1     | 0 = 4...20 mA<br>1 = 0...20 mA              | 0       |