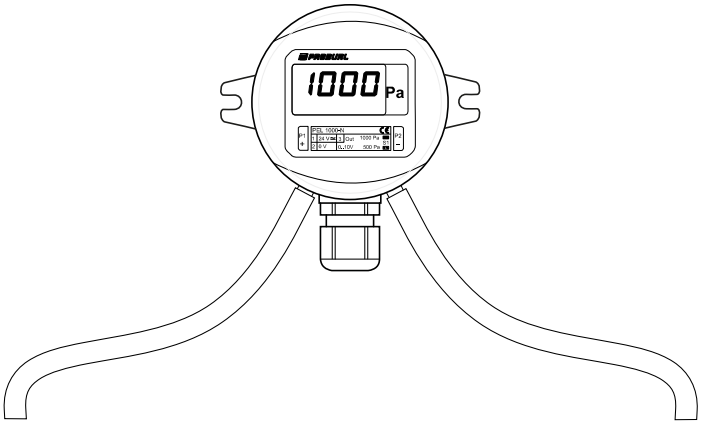
This user guide is for devices with the software version 2.1 or newer.

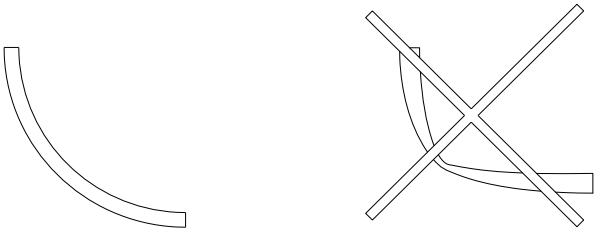
COMMISSIONING

Mounting

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



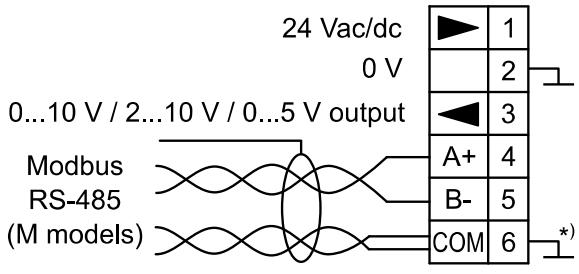
- The duct overpressure is detected by connecting the measuring point to + connector and by leaving the - connection open (surrounding space pressure). Accordingly, the duct under-pressure is detected by connecting the measuring point to - connector and by leaving the + connection open.
- Install the 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.
- Mount the device cable entry downwards, so that moisture and water gets out of the housing freely.

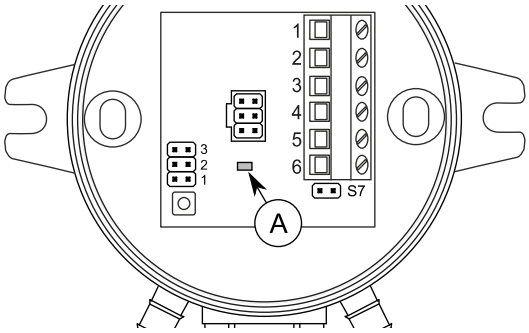
Wiring

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



*) COM terminal is internally connected to 0 V.

Indicator light functions

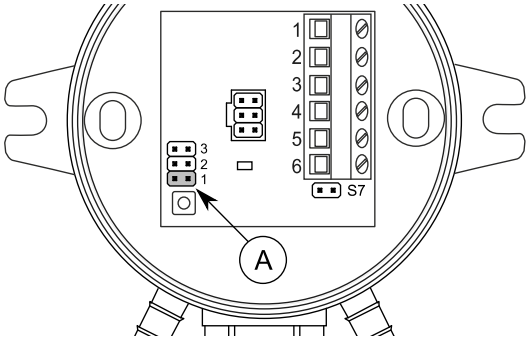


A. Indicator light

- The indicator light is illuminated for one second when the power is connected.
- The indicator light illuminates when the transmitter sends data to Modbus (M models only).

Selecting measuring range

Measuring range can be selected with the jumper 1.



A. Measuring range selection jumper

	0…500 Pa	**0…1000 Pa *)**
1	⚬ ⚬	■

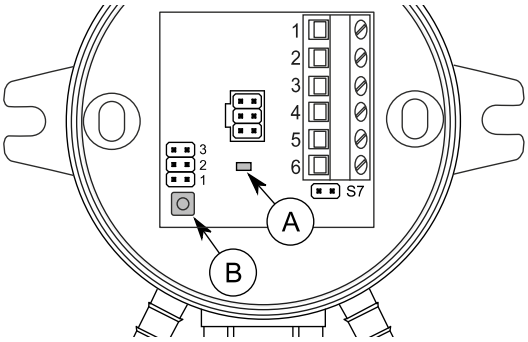
*) Factory setting. The 0…1000 Pa range is also used for the custom range setting.

The custom range is 0…1000 Pa as a default. The range can be changed by using ML-SER tool or by defining the high limit to the Modbus register 40006 (the low limit is 0 Pa).

ZERO POINT CALIBRATION

The zero point drift can be eliminated by performing the zero point calibration. It is recommended to calibrate the zero point every 6 months. At the commissioning the zero point calibration should be done after one hour of powering the transmitter.

1. Unplug the plastic tubes from the inlets.
2. Press the zeroing button until the indicator light lights up (without flashing).



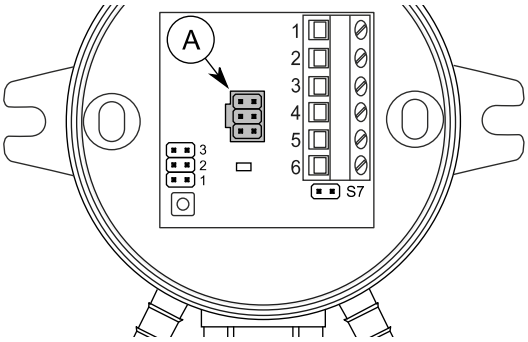
A. Indicator light
B. Zeroing button

ML-SER TOOL

With the ML-SER tool you can change the device settings, Modbus and controller 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.



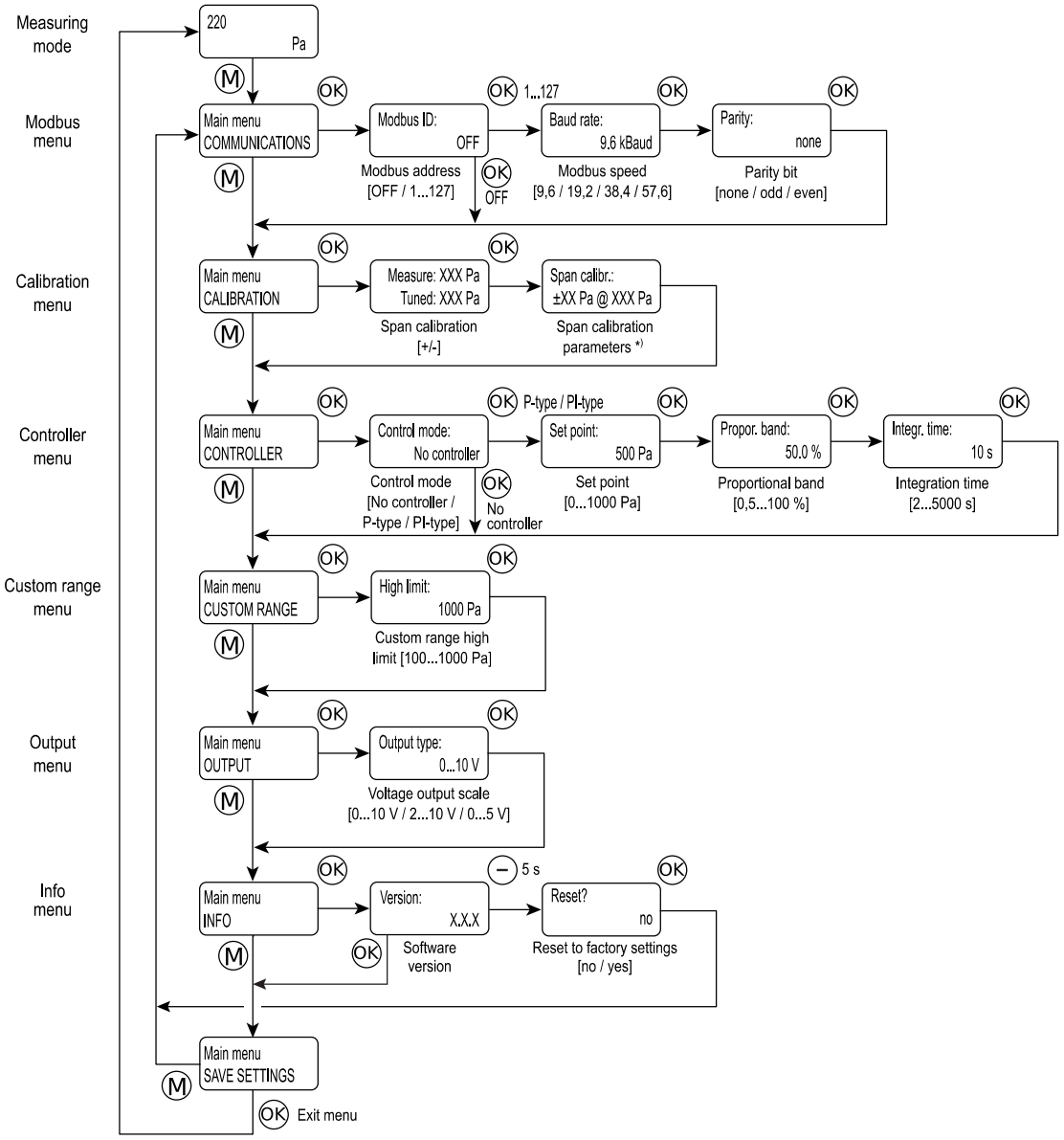
A. Display connector

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

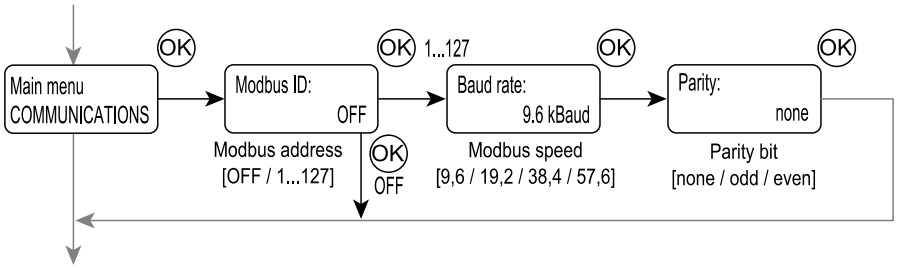
The device settings can be changed by using the ML-SER tool. You can proceed in the menu by pressing the M and OK buttons. The values can be changed with the "+" and "-" buttons. The value is accepted with the OK button. The following menu structure contains the factory settings.

The Modbus, controller function and analogue output are disabled in the menu mode. In addition, the analogue output maintains the same voltage, as it was before the menu mode.



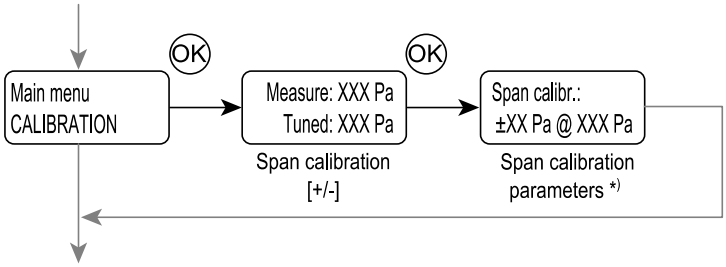
*) Span calibration parameters are displayed for two seconds before returning to the main menu.

Communications menu (M models only)



The Modbus settings can be changed through the COMMUNICATIONS menu.

Calibration menu



The CALIBRATION menu is for pressure measurement span calibration. To calibrate, you need to know the pressure measurement deviation at a single pressure.

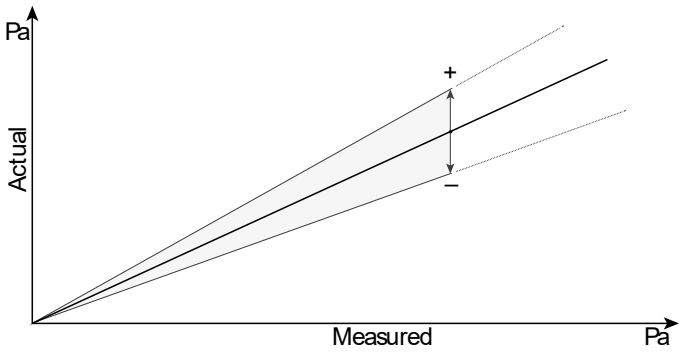
You need the following equipment for the calibration.

- ML-SER tool.
- A reference pressure meter.
- A stable pressure source (calibration pressure must be at least 275 Pa).
- Hoses for pressure connections.

Calibration

1. Connect the transmitter and the reference pressure meter to the same pressure source.
2. Connect the ML-SER to the transmitter.
3. Navigate to the calibration menu.
4. Read the pressure values from the ML-SER tool and the reference pressure meter.
5. Press + and – buttons on the ML-SER tool to adjust the transmitter pressure measurement to same value as the reference.

   The measurement can be tuned ±25 Pa.

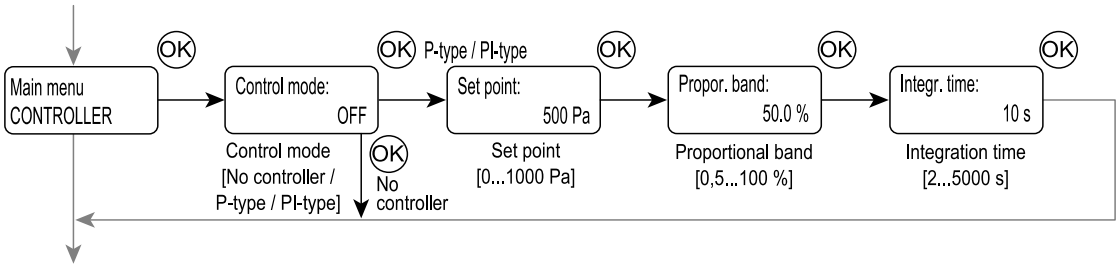


   For example, if you adjust +5 Pa at 1000 Pa, the device will now read 1005 Pa at that pressure. Correspondingly reading is corrected +10 Pa at 2000 Pa.

6. Press OK to save the span calibration.

   The calibration parameter values are displayed for two seconds before returning to the menu.

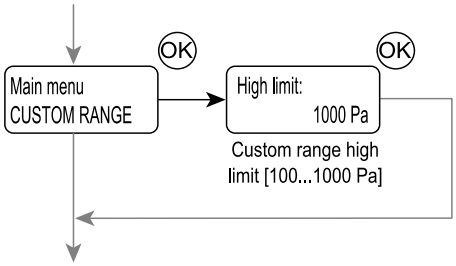
Controller menu



In the CONTROLLER menu the measurement output can be changed to controller output.

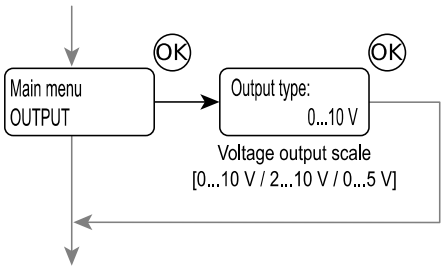
NOTE: The controller proportional band is 0.5…100 % from the selected pressure range.

Custom range menu



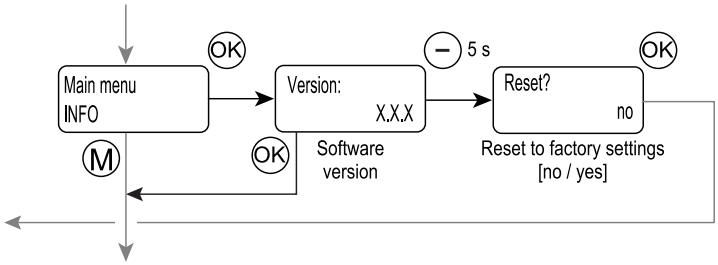
The CUSTOM RANGE menu is for setting the custom pressure range limits. The custom range is in use when 0…1000 Pa range is selected with the jumper.

Output menu



You can change the output scale 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.

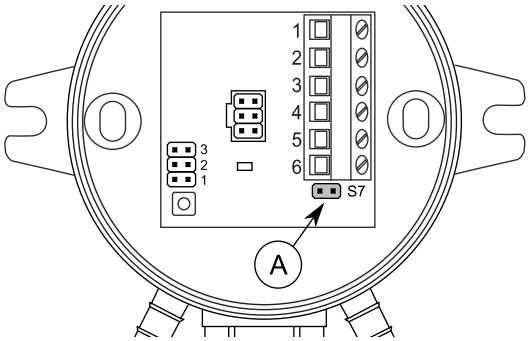
MODBUS

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

Bus termination

The Modbus can be terminated by placing the Modbus termination jumper (S7).



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 types:

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

Discrete inputs (read only)

Register	Parameter description	Data type	Value	Range
1000**1**	Zeroing button is pressed within 1 minute	bit	0…1	no=0, yes=1

Input registers (read only)

Register	Parameter description	Data type	Value	Range
3000**1**	Pressure measurement	signed	0…1100	0…1100 Pa
3000**2**	Selected pressure range	unsigned	0 - 1	0 = 0…500 Pa 1 = 0…1000 Pa / custom *)
3000**3**	Zero value of the sensor	signed	-200…200	-200…200 Pa
3000**4**	Analogue output voltage	unsigned	0…1000	0…10.00 V

*) The custom range is 0…1000 Pa as a default. The range can be changed by using ML-SER tool or by defining the high limit to the Modbus register 40006 (the low limit is 0 Pa).

Holding registers (read / write)

Register	Parameter description	Data type	Value	Range	Default
4000**1**	Control mode	unsigned	0 - 1 - 2	0 = off 1 = P 2 = PI	0
4000**2**	Set point	unsigned	0…1000	0…1000 Pa	500
4000**3**	Proportional band	signed	5…1000	0.5…100 %	500
4000**4**	Integration time	signed	2…5000	2…5000 s	10
4000**5**	Output mode	unsigned	0 - 1 - 2	0 = 0…10 V 1 = 2…10 V 2 = 0…5 V	0
4000**6**	Custom range high limit (low limit = 0 Pa)	unsigned	100…1000	100…1000 Pa	1000