Flow Center for M-series Manual

Contents

About this manual

• This manual relates to the M-series Flow Meter.
• Note that the latest version of this manual is always available as a PDF file on our web site www.eletta.com.
• **On our site you also find other interesting information such as leaflets, newsletters and application reports.**

Proprietary Rights

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Safety instructions

In this manual, this warning symbol is used to emphasize where you have to be particularly careful to avoid injury or damaging the product.

The M-series Flow Meter must not be installed in explosive environments. The product is not Ex-hazardous approved.

To prevent injury when installing the Flow Meter, make sure that the system is not pressurized from gas or liquid flow.

There are no serviceable parts inside the instrument. Eletta takes no responsibility for injury or damage caused by unauthorized disassembly.

Never open the instrument by unscrewing the four hexagon bolts at the top while the instrument is pressurized.

The electrical installation must only be made by authorized personnel.

Disconnect all power connections before installation or service.

Never exceed the maximum static pressure, which is specified on the product label, and in this manual.

Make sure that the correct electrical power is used.

1 General Information

1.1 General Description

This is a guide for setting up M-Series Flow Meters via Flow Center.

1.2 Prerequisites

These instructions are based on the premise that you have done the following things.

- Installed the M-series Flow Meter in the pipe
- Installed Flow Center software and configured it for the M-Series Flow Meter
- Have a basic understanding of Flow Center and Windows
- Have a communication cable for Flow Center *(Only required if more than 1 Flow Meter is used)*

Instructions on how to install the M-series and Flow Center can be found in the M-Manual
www.eletta.com ➞ Products ➞ Flow Meter M-series ➞ Manual

2 Configuring the Flow Meter
(This can be ignored if only 1 Flow Meter is used)

The M-Series Flow Meters are assigned the address "1" by default. Each Flow Meter has to have a unique address in order to properly communicate with each device. The maximum amount of devices supported in a Modbus network is 128.

In case of M-series with display: Connect the power supply to the communication cable, then connect the flow meter, then connect the cable to the computer/PC.

Connect the Flow Meter to a computer using the communication cable.
The communication cable will be assigned to a COM port.
Make sure that the drivers are installed correctly, if Windows doesn't recognize the communication cable as a "USB Serial Port".

The device drivers can be found at www.eletta.com ➞ Products ➞ Flow Meter M-series.
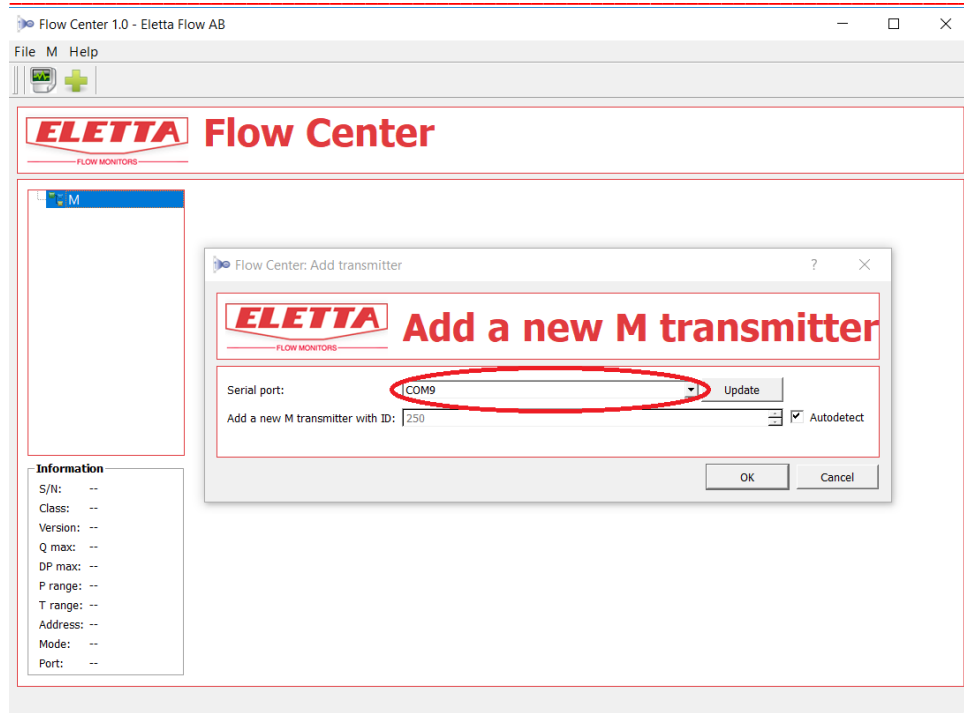
It is important that the COM port number is less than 10 or it might cause problems with Flow Center.

Open Windows device manager to see witch COM port is assigned to the communication cable.

Open Flow Center and connect to the Flow Meter by Selecting "M" and pressing the "+" button in the top left corner.
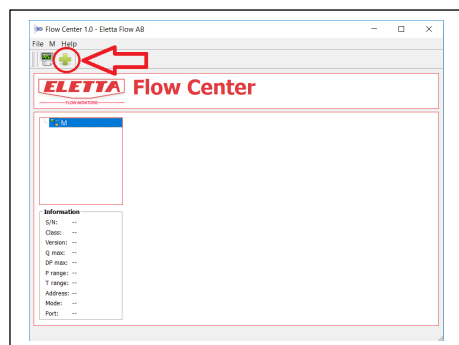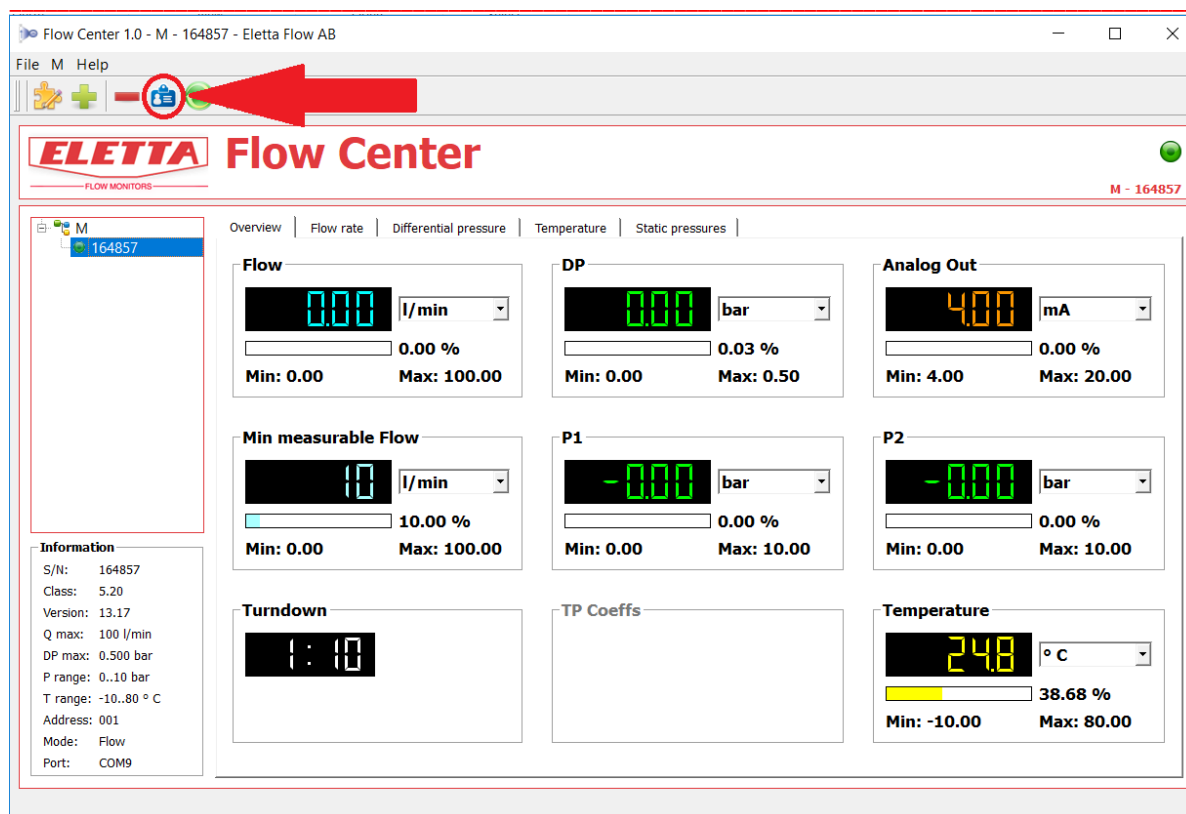

Select the assigned COM port and press "OK". Ignore the other settings.

A new tab should appear under the category "M", the tab name is the serial number. Select it and a control panel should appear, this page shows the data output from the M-Series Flow Meter.
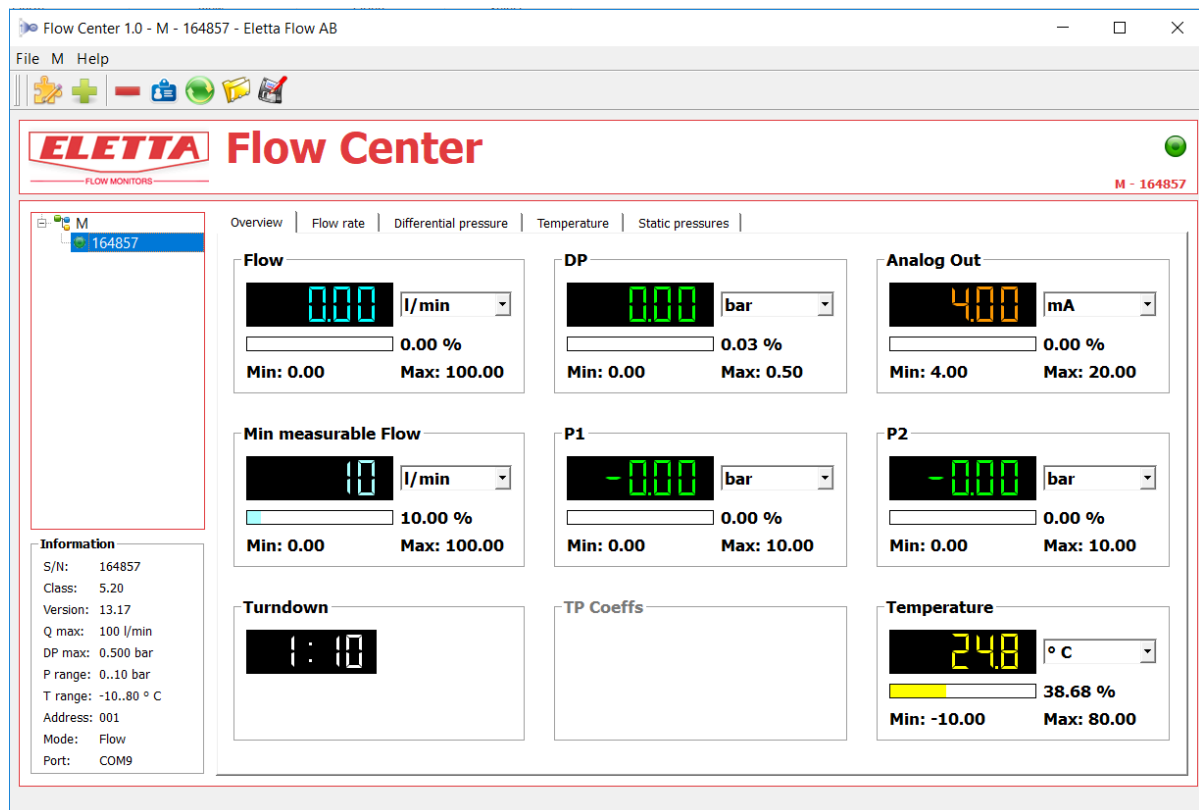
Press the blue "ID" button in the top left corner to change the device ID.

A window should appear with the option to change the Modbus ID. Change the ID to an unused ID and press "OK". Make a note of the new ID.
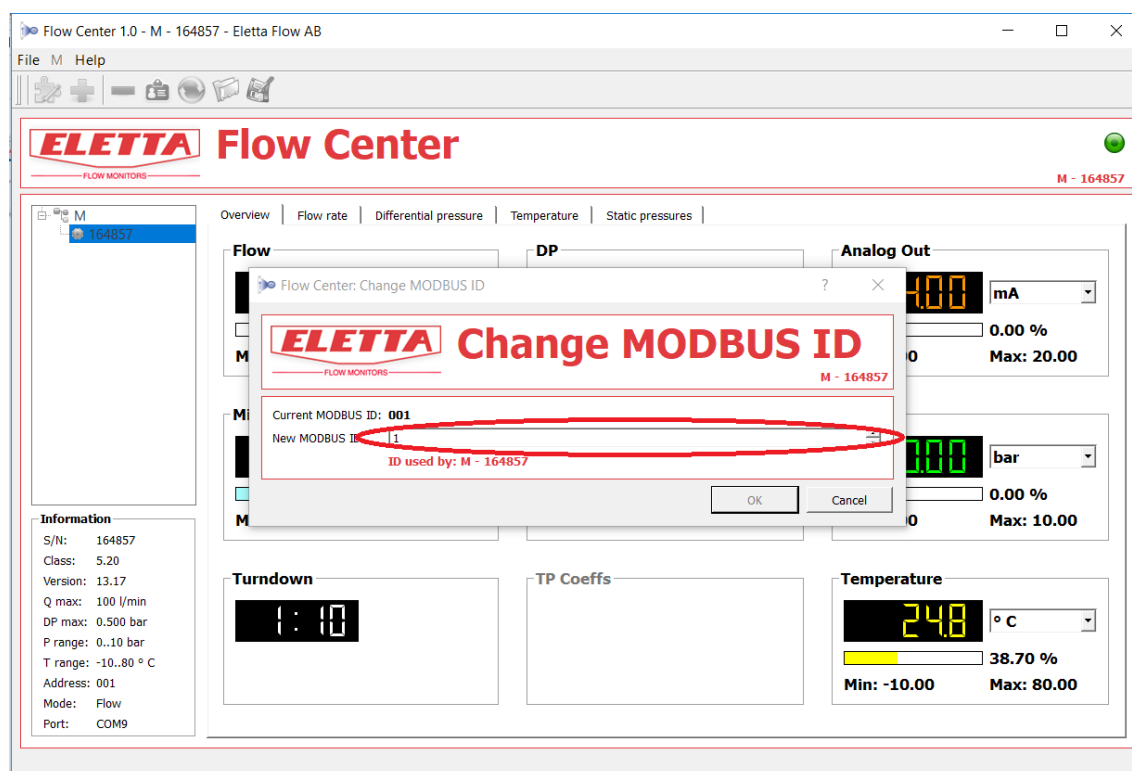
You can unplug the Flow Meter from the computer if the ID was successfully changed.
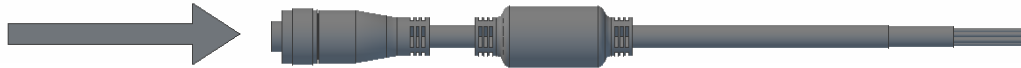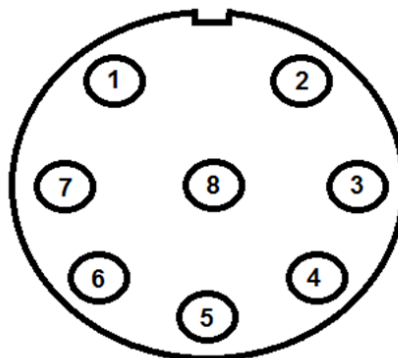
3 Electrical installation

⚠️ *The electrical installation must only be made by authorized Personnel!*

⚠️ *Do not install the M-series flow meter in Ex-hazardous areas!*

1	+ VDC	white
2	- (mA)	brown
3	RS485A	green
4	RS485B	yellow
5	Not active	grey
6	Not active	pink
7	Not active	blue
8	Not active	red

M12 - 8 pin

Connect Pin 1 (White) to a power source; the supported input voltage is 8-28VDC.

Connect Pin 2 (Brown) to ground of the control unit.

Connect Pin 3 (Green) to RS485A, A or D1 depending on the Master unit input.

Connect Pin 4 (Yellow) to RS485B, B or D0 depending on the Master unit input.

Leave all other pins unconnected (Grey, Pink, Blue and Red)

4 Modbus commands

The data stored in the M-Series Flow Meter is 16 bit signed temperature (T1-T2) and pressure (P1-P2) data.

The address is the value set in Flow Center during the previous step *(Default address: 1).*

The data is read through the Modbus command "03-Read Holding Registers".

The table below described the holding register addresses.
Note that the addresses are in hexadecimal (Base 16) and that the values should be divided by 100 to accurately depict the sensor values.

MODBUS StAdd (0xHILO)	Channel	Read/ Write	Unit	Description
0x0010	CH0	R	1/100 --	Calculated value
0x0011	P1	R	1/100 bar	Pressure of sensor1
0x0012	P2	R	1/100 bar	Pressure of sensor2
0x0013	T	R	1/100 °C	Temperature
0x0014	TOB1	R	1/100 °C	Temperature of sensor1
0x0015	TOB2	R	1/100 °C	Temperature of sensor2

Pressure can be configured in Flow Center but will default to bar when reading through Modbus.

Temperature can be configured in Flow Center but will default to Celsius when reading through Modbus.

Below is an example of a Modbus Master device configured to read the temperature from a Flow Meter.

5 Differential Pressure Measurements

The function of the Eletta Flow Meters and Flow Monitors is based on the proven and dependable differential pressure principle. The instruments use interchangeable sharp-edged orifice plates designed for different measurement ranges.

This is probably one of the oldest and most widely used principles for flow measurements. The principle benefits from simplicity and low cost. In addition, there exist a large amount of research data and experience, which is useful when predicting the behavior of a certain orifice plate.

Inserted into the Pipe Section of the Flow Meter, the orifice plate constitutes an area restriction that causes a pressure drop after the orifice plate. This pressure drop varies with the flow rate. This means that, in the flow direction, we will have one pressure before the orifice plate, and another after the plate. The first pressure will be slightly higher than the second.

The two pressures are lead through two separate channels to separate pressure sensors in the Control Unit. The two pressures are measured and the difference is calculated. This is called the *differential pressure.*

The flow (Q) and the differential pressure (**Δ**P) are proportional to each other. The relation can be approximated by the following formula.

$$Q = \sqrt{\Delta P}$$