

# The M-Series Eletta Flow Meter

High accuracy DP Flow Meter  
with multiple functions

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**Eletta flow**

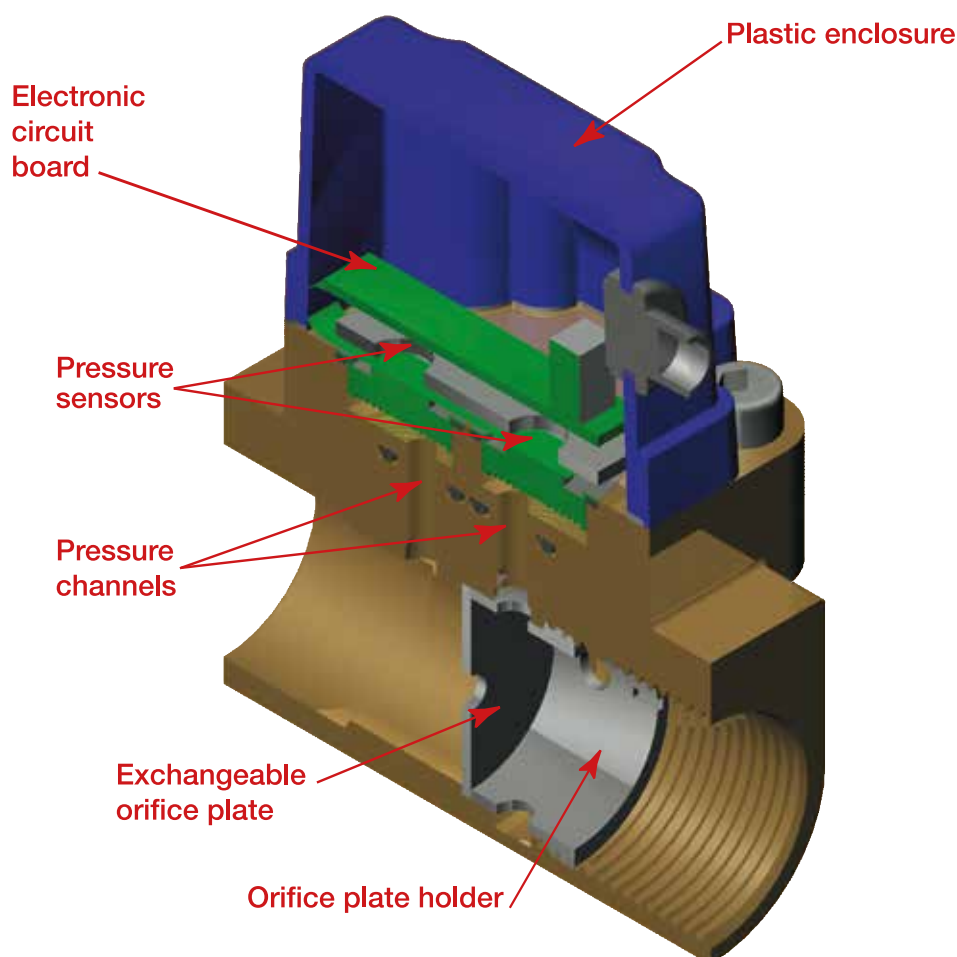
when you want to know

# Flow Meter with multiple functions for gases and liquids – M3

**The M-series Flow Meter, with its versatile and user-friendly design, naturally finds its place in the demanding and information-rich automation world of today's industry. It has become a must to communicate with overall systems in an online and accurate way. The M-series Flow Meter is Eletta Flow's answer to this demand.**

The M-series gives you a smart programmable electronic flow meter with multiple functions such as gas and liquid flow metering that can also be used as a standalone DP transmitter. All available parameters are accessible and configurable through a USB communication cable and the flow rate can be remotely read via a standard 4–20 mA output. Its small format and rugged industrial construction makes the M-series very attractive for a demanding OEM manufacturer looking for an economical but still long-lived solution for flow-supervising applications.

The Eletta Flow Monitors and Meters are known for their simplicity in construction. They all use the well-documented differential pressure (DP) measuring principle. The exchangeable calibrated orifice plate, expands the user friendliness.



## Pipe Sections



**G-BR – series**

The pipe section is constructed of copper alloy and fitted with BSP threads 15, 20 and 25 mm ( $\frac{1}{2}$ ",  $\frac{3}{4}$ " and 1").



**G-SS – series**

The pipe section is constructed of 316L stainless steel and fitted with BSP threads 15, 20 and 25 mm ( $\frac{1}{2}$ ",  $\frac{3}{4}$ " and 1").



**GL – series**

The pipe section is constructed of copper alloy and fitted with BSP/NPT threads from 15 mm to 40 mm ( $\frac{1}{2}$ " - 1  $\frac{1}{2}$ ").

## Benefits

- **Temperature & pressure compensated in gas flow measurement**
- **Three instruments in one – Gas, Liquid and Differential Pressure**
- **Three pressure classes, 10 bar, 25 bar or 50 bar**
- **Configurable through a laptop computer**
- **Two-wire power supply**
- **4 – 20 mA output linear to flow**
- **Temperature reading through Flow Center**
- **Small in size and light weight**
- **Rugged and sturdy design - no moving parts**
- **Interchangeable orifice plate for many flow ranges**

## The Product

The Eletta M-series Flow Meter is a unique product that can be used in three different modes: gas and liquid flow and differential pressure measurement. The product is the result of the work of engineers with many years of experience in designing flow monitors, flow switches and flow meters at Eletta Flow, Sweden. The M-series has an intelligent pressure assembly that uses two independent, absolute piezoresistive pressure sensors and calculates the differential pressure from their output. The sensor signal is measured up to 500 times per second with a highly precise 16-bit A/D converter. After each measurement, the exact pressure value is calculated (elimination of the linearity- and temperature errors). The analog output signal is updated via the D/A converter.

There is also a temperature sensor in the sensor assembly. One of the pressure sensors measures the static pressure in the process pipe and, together with the temperature, the M-series intelligent electronics corrects for variation in volume due to temperature or pressure changes in gas flow measurements. The well-proven and acknowledged principle of measuring flow with an orifice plate, creating a differential pressure that corresponds to the flow of liquids and gases, is hereby combined with a new smart pressure sensor arrangement in a compact and versatile flow meter with three possible modes of operation. As an OEM product, it will be difficult to match the performance-price ratio that the lightweight three-mode M-series Flow Meter can offer.

## Pipe Sections



### FA – series

The pipe section has a flanged (wafer) process pipe connection and the material is bronze DN15-DN32 (½" - 1 ¼") and painted cast iron sizes DN40 to DN400 (1 ½"-16")



### FSS – series

The flanged (wafer) pipe section is constructed of 316L stainless steel and is available from DN15 to DN500 (½"- 20")

## Modes

The use of intelligent digital electronics enables a number of opportunities. The M-series can, with standard settings, operate in three different modes:

- Gas-flow measurement with compensation for P and T in most gases
- Liquid-flow measurement
- Differential pressure measurement

The correct mode setting for each custom application is done at the factory before shipping, but it can also be conveniently reconfigured at the customer's site with a standard laptop and Flow Center, the software developed by Eletta.

### Liquid Flow

The M-series set in liquid-flow measurement mode is an accurate flow meter that can be used together with all different pipe sections shown above to measure liquid flow. Both viscous and nonviscous liquids can be measured, and the orifice can be designed to suit the application to meet the demands for pressure loss and accuracy. The flow turn down is 1:10 for nonviscous liquids.

### Gas Flow

In this mode, the flow meter can measure most gases even under unstable conditions. Normally, a DP flow meter will have an inaccuracy in the measured flow value when temperature and pressure varies. Taking advantage of the measured static pressure and temperature, the intelligent electronics calculate the true flow in real time and correct the output signal. This removes the common disadvantage often seen in using DP flow meters for gas. The M-series is one of the smallest gas flow meters on the market to measure most gases with an automatic compensation for changes in pressure and temperature.

### Differential Pressure

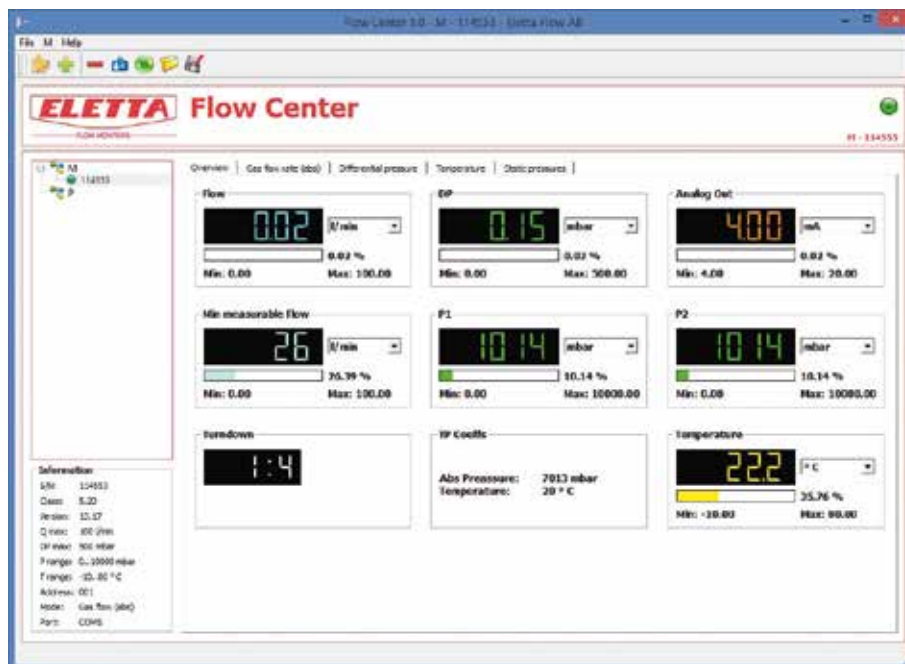
The M-series does not measure the differential pressure directly. Instead, it uses two absolute pressure sensors to take the measurement indirectly. By this design, this differential pressure transmitter is also more robust in relation to unbalanced (one-sided) overloading.

The output will give the user a linear signal for the DP, which can then be routed to, for example, a flow computer for square root extraction or be used as a level gauge in linear tanks.

It can also replace many of the more expensive DP transmitters on the market as a more economical and compact solution.

## Flow Center

Eletta has developed the Flow Center software, which enables the user of the M-series to read flow, temperature and pressure parameters simultaneously. It can also be used to reconfigure the M-series electronics in the field. Flow Center can be downloaded from Eletta web page. To communicate with the software you will need a special USB communication cable for the M-series. Flow Center makes it possible for the user to make zero adjustments, span settings, analog output settings, etc. The communication cable may be ordered as an option to the M-series.



*This picture shows the software's interface. The Overview tab gives a clear overview of all parameters in real time.*

## Eletta Flow Monitors and Meters Find out more

**The reliable function of the Eletta Liquid and Gas Flow Monitors and Meters has been Proven for over 50 years. The Products have been recognized for their simple and reliable construction, which include the unique lever sealing design and the smart pressure sensor assembly.**

**The Products are used in a variety of tough industrial applications that require reliability and sturdiness given by each instrument. It is often considered as a calibrated safety device which secures a trustworthy supervision in important process applications.**

**Find out more of the complete Product Line or details about the M-series on [www.eletta.com](http://www.eletta.com).**

## Specifications

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Flow range:</b>          | <b>Liquids:</b> see flow chart for standard flow ranges.<br><b>Gases:</b> will be calculated depending on application                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Flow turn-down:</b>      | 1:10 (valid for stable liquids)                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Accuracy:</b>            | +/- 0,05% F.S. of the max pressure.<br>This typically corresponds to a flow measurement accuracy in terms of linearity of better than +/-1% F.S. for water and air at reference conditions as per ISO-5167 standard. The combined uncertainty from factors of hysteresis, repeatability and temperature errors of the pressure sensors put together is below +/-1% F.S.<br>The actual system accuracy is depending on the mounting, allowable differential pressure, media and flow profile. |
| <b>Pressure classes:</b>    | Max pressure: 10 bar, 25 bar or 50 bar depending on version.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Wetted material:</b>     | Bronze, Copper alloy and 316L stainless steel or all 316L stainless steel                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>O-rings:</b>             | HNBR (nitrile rubber) FPM (fluorinated rubber) or EPDM                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Temperature range:</b>   | -10°C to 100°C (-14°F to 212°F). (Sensors Compensated from -10°C to 80°C (-14°F to 176°F).)                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Enclosure material:</b>  | PA 12 Grilamid with conductive layer inside                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Protection class:</b>    | IP67 (NEMA 4X)                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Power supply:</b>        | 8 – 28 VDC, 2-wire loop powered. 2 m cable incl. connector to meter and flying end to user                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Outputs:</b>             | <ul style="list-style-type: none"> <li>• 4 – 20 mA linear to flow or differential pressure</li> <li>• RS485 for communication with Flow Center</li> <li>• Modbus output over RS485 interface for Multi-Dropping up to 128 devices.</li> </ul>                                                                                                                                                                                                                                                |
| <b>Software:</b>            | Flow Center; configure and view parameters via a USB communication cable.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Process connections:</b> | DN 15 – 40, BSP/NPT thread<br>DN 15 – 500 DIN/ANSI flange (wafer)                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Approvals:</b>           | The Eletta Flow Monitors and Meters conforms with all the EU directives applicable for our products. Certificates can be found on our site: <a href="http://www.eletta.com">www.eletta.com</a> .                                                                                                                                                                                                                                                                                             |

