

Magnetic Inductive Flow Meter

Series MAG-VIEW™



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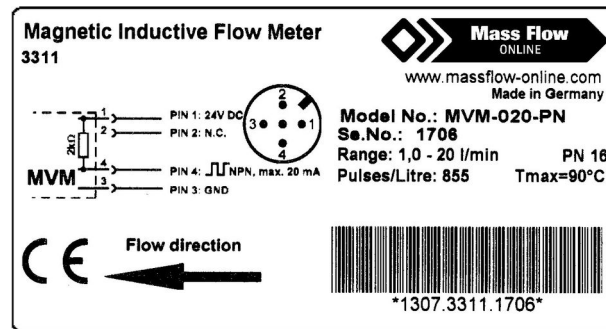
1 Device description and intended use

MASS FLOW ONLINE B.V. flow meter MAG-VIEW™ are used for continuously measuring flow rates or for dosing electrically conductive liquids. The operational safety of the supplied equipment is only guaranteed if it is operated according to its intended use (measuring and dosing of liquids). The specified limit values (see the chapter “Technical Data”) should never be exceeded.

It is your responsibility to select a technology which is suitable for your specific application, to install it correctly, to carry out tests and to maintain all the components.

The magnetic inductive flow meter features no moving parts and is, therefore, almost wear free and suitable for a wide range of measuring applications. A flow-proportional frequency signal is provided as the output signal.

Type plate



Functional principle

The magnetic inductive flow meter functions according to the induction principle:

The measuring pipe is located in a magnetic field (B). If an electrically conductive medium (V) flows through the measuring pipe and, therefore, at right angles to the magnetic field, a voltage (U) which is proportional to the mean flow velocity will be induced in the medium and subsequently picked up by the two electrodes.

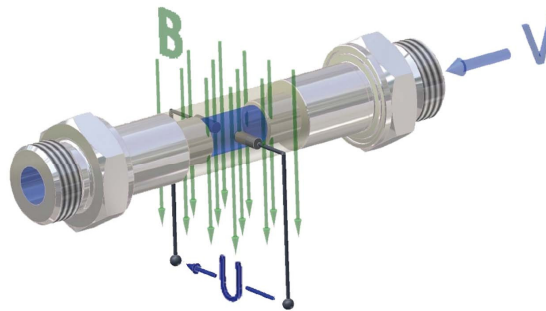


Fig. 1: Functional principle

2 Safety instructions

Always read the operating instructions carefully prior to installing the new product. Always adhere to the instructions contained herein, especially the safety instructions, otherwise there is a potential risk of personal injury and damage to instruments and systems.

Even though MASS FLOW ONLINE B.V. provides assistance through the respective literature, it is the responsibility of the customers to determine the suitability of the product for the specific application.

The magnetic inductive flow meters are state-of-the-art devices, concerning the accuracy, functioning and safe operation of the device.

However, professional and safety conscious conduct of the operator is required to ensure safe operation.

2.1 Qualified personnel

- ❖ The personnel entrusted with installing, operating and maintaining the MAG-VIEW™ have to be suitably qualified; the required knowledge can be gained via training courses or appropriate on-the-job instruction. The personnel have to be familiar with the contents of these instructions, which have to be available to them at all times.
- ❖ The electrical connection should only be carried out by a fully qualified electrician.
- ❖ All work has to be carried out in accordance with existing national regulations on accident prevention and safety at work and with any internal regulations of the operator, even if they are not specified in these instructions.

2.2 Special safety instructions

- ❖ To avoid damage to the flow meters and to the monitored system, only use MASS FLOW ONLINE B.V. flow meters to measure liquid flows.
- ❖ Prior to installation, ensure whether the material of the flow meter is suitable for the medium which is to be measured.
- ❖ In order to achieve accurate measurements, only use liquids with a minimum conductivity of 50 µS/cm.
- ❖ Ensure that the max. specified operating pressure is not exceeded.
- ❖ Never remove a flow meter from a pipe system under pressure.
- ❖ Ensure that the max. specified operating temperatures are not exceeded.
- ❖ Select suitable measures to prevent the medium from freezing in the flow meter.
- ❖ Protect the flow meter against external magnetic fields in the immediate vicinity, since these can impair device functioning.
- ❖ **Caution: voltages!**
Always de-energize the system before connecting the connector cable.
- ❖ It is prohibited to remove or make type plates or any other information attached to the equipment indecipherable, otherwise all warranties and the responsibility of the manufacturer no longer apply.
- ❖ **Caution:** Ensure that the maximum electrical load specified on the type plate is never exceeded, otherwise the electronic unit will be damaged.
- ❖ **Attention:** Do not use MAG-VIEW™ in processes in which a disturbance possibly causes a risk for health and live of people.
- ❖ The customer is to verify the applicability of the product on the basis of our technical details and customer- and applicationspecific test to proof the products fitness for its purpose. By this checking, hazards and risks are subrogated to the customer and our warranty expires.

If problems or questions arise, please contact your supplier or MASS FLOW ONLINE B.V. directly:



3 Unpacking and inspecting the delivery

↪ Unpack your flow meter MAG-VIEW™.

The MAG-VIEW™ is delivered in special protective packaging. Keep this protective packaging for sending the instrument for repairs to the manufacturer or disposing the packaging under the official rules of the public waste disposal system of your area.

↪ Inspect the delivery first.

Standard delivery MAG-VIEW™:

- Flow meter
- User's Guide

4 Material specifications of components

Prior to installation, ensure whether the wetted components are suitable for the medium which is to be measured!

Components	Materials	Mediums contacting
Electrodes	Stainless Steel 1.4571	Yes
Process connections	Stainless Steel 1.4571	Yes
Pipe	PEEK Victrex 450GL30	Yes
Gasket	EPDM	Yes
Housing	Aluminium pressure diecasted	No

5 Suitable liquids (medium)

Liquids with a minimum conductivity of 50 µS/cm are suitable as the medium. Always ensure whether the material of the flow meter is suitable for the medium which is to be measured.

6 Installation of the flow meter

6.1 Mechanical installation

- Protect the flow meter against external magnetic fields in the immediate vicinity, since these can impair device functioning.

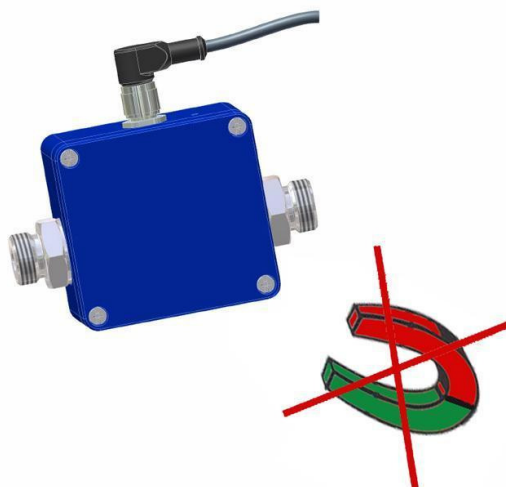


Fig. 2: No external magnetic fields in the immediate vicinity of the MAG-VIEW™

- The meter can be installed at any position in the pipe system. Straight pipe sections are recommended, since the flow velocity may vary in bends (see Fig. 3).

- Installation can occur in horizontal and vertical pipes. In horizontal pipes the meter should be installed in a horizontal position to ensure that the measuring electrodes are always wetted by the medium. The flow meter is only suitable for application in completely filled pipe systems.
- As a matter of principle magnetic inductive flow meters are widely independent from the flow profile. An inlet section is not absolutely necessary. To reach a most highly accuracy of the measurement, you should use straight inlet and outlet sections according to the nominal width (DN). The inlet section has to be at least 10 x DN; the outlet section 5 x DN in order to achieve the specified accuracy.

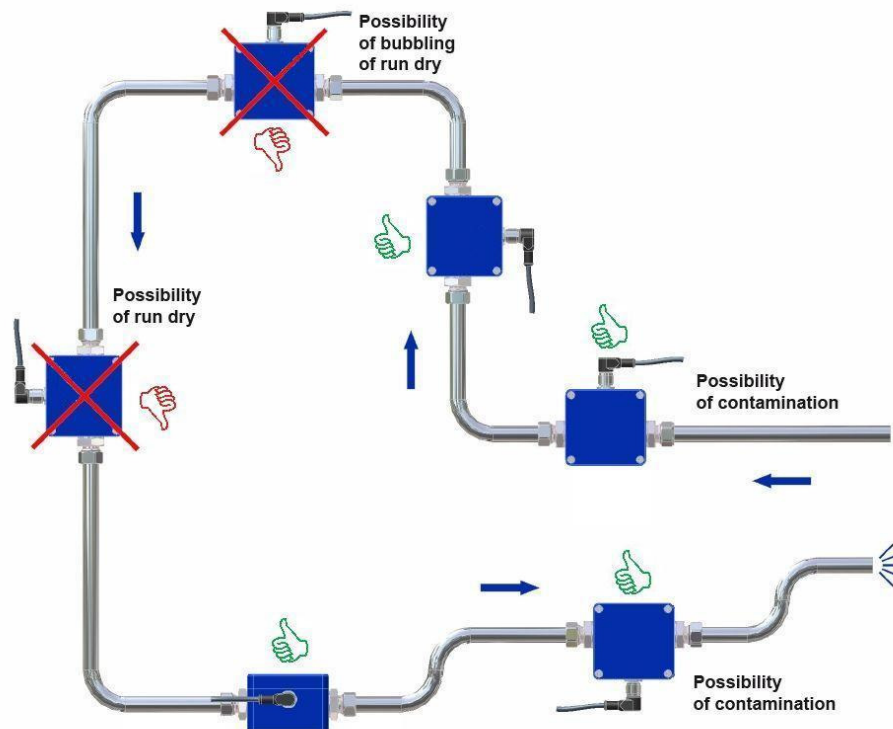


Fig. 3: Installation MAG-VIEW™

- The inlet and outlet sections and the gaskets must have the same or a slightly larger inside diameter than the measuring tube in order to achieve the specified accuracy.
- When tightening screw connections always grip the hexagon nut (see Fig. 4).



Fig. 4: Counterhold the screw connection

6.2 Electrical connection

Caution: voltages!

Always de-energize the system before connecting the wires.

Warning:

We recommend the use of shielded connecting cables only. The shield should not be connected to earth. We recommend to earth the pipes directly before and behind the MAG-VIEW™ (see Fig. 5).

MASS FLOW ONLINE B.V. offers appropriate connecting cables with 4 pin cable socket as accessories. The shield is connected with the knurled nut.

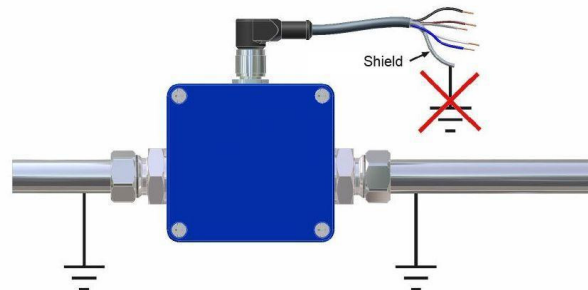


Fig. 5: Earth the pipes

Electrical connection with 4(5)-pin connector M12x1:

- ↪ Screw the 4-pin cable socket M12x1 onto the connector.
- ↪ Tighten it with a tightening torque of max. 1 Nm.
- ↪ Connect the connecting cables of the MAG-VIEW™ corresponding to Fig. 6.

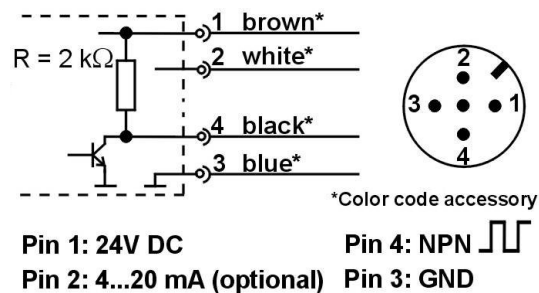


Fig. 6: Electrical connection

Important!

Do not connect Pin 5 (centre)!

The output signal PIN 4 is a flow proportional frequency signal (see Fig. 7). It represents a square-wave output signal whose amplitude roughly corresponds to the supply voltage. The supply voltage and the output signal are not galvanically isolated.

After switch on, the operating status is shown by multiple flashing of the LED. Throughout the operating, the LED flash corresponding to the flow rate:

- No flow rate ⇒ no flashing.
- Low flow rate ⇒ slow flashing.
- High flow rate ⇒ fast flashing.

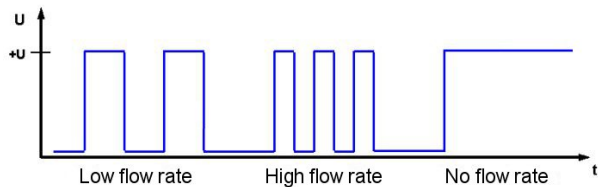


Fig. 7: Frequency output signal

The optional analog output PIN 2 provides a flow proportional signal current of 4...20 mA. Please note the max. load of 250 Ω to GND.

Connection to an Programmable Logic Controller (PLC):

Most digital PLC inputs are designed for connection to PNP signals. The MAG-VIEW™ has an NPN frequency signal with an integrated 2kΩ pull-up resistor. Its signal current of ~12 mA is recognised as a signal by the current PLC. Thus, operating a MAG-VIEW™ with a PLC should not present any problems. The frequency output of the MAG-VIEW™ should be attached to a digital input of the SPS.

Important! Please ensure that your PLC is able to process the high frequencies of the MAG-VIEW™ output signal.

- ↪ Attach the connecting cable of the MAG-VIEW™ to the PLC as illustrated in diagram 8.

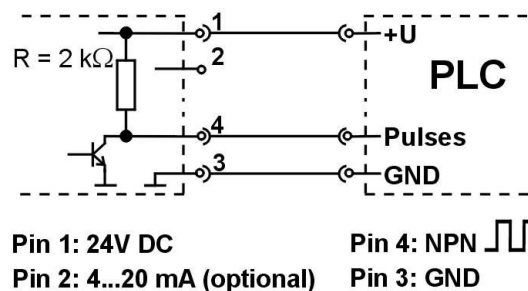


Fig. 8: Electrical connection to an PLC

7 Maintenance and repairs

The flow meter is maintenance-free and cannot be repaired by the user. In the unlikely event of a defect, the device has to be returned to the manufacturer for repair work.

8 Decommissioning and disposal

- ✘ Never remove a flow meter from a system under pressure.
- ✘ Remove all the electrical connectors and disassemble the flow meter.
- ✘ The flow meter consists of various materials. Never dispose of the flow meter in domestic waste.
- ✘ Return the flow meter to the manufacturer for correct disposal.

9 Technical data

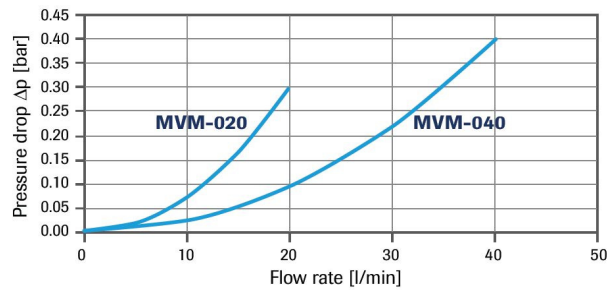
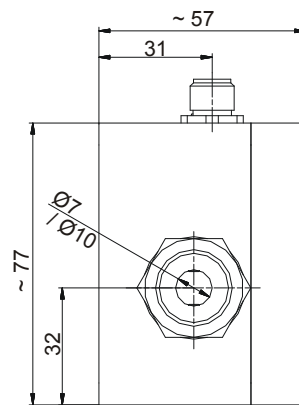
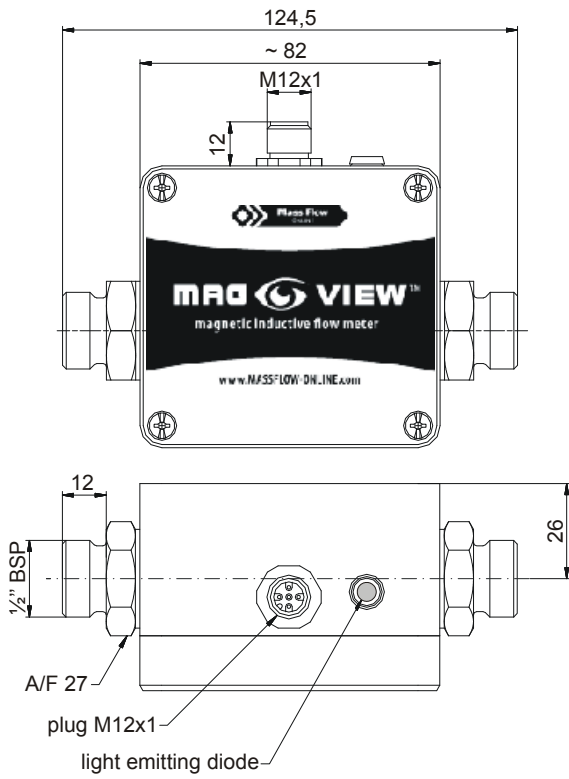
The technical data of customised versions may differ from the data in these instructions. Please observe the information specified on the type plate.

Typ	MVM-020	MVM-040	MVM-200
Characteristics measurement device			
Measurement range	1...20 l/min	2...40 l/min	10...200 l/min
Accuracy	±2 % of reading		
Reproducibility	1 %		
Start of output signal	~ 0,5 l/min	~ 1 l/min	~ 5 l/min
Response time	< 500 ms		
Flow indication	LED green, flow proportional flashing		
Characteristics output signal			
Frequency output:			
- Pulse rate / K-factor	855 pulses/l	855 pulses/l	200 pulses/l
- Resolution	1,2 ml/pulse	1,2 ml/pulse	5 ml/pulse
- Signal shape	Square wave signal • duty cycle 50:50 NPN, 2 kΩ pull-up resistor (built-in)		
- Signal current	max. 20 mA, current limited		
Analog output (optional):			
- Signal current	4...20 mA corresp. 0...20 l/min*	4...20 mA corresp. 0...40 l/min*	4...20 mA corresp. 0...200 l/min*
- max. signal current	~ 26 mA		
- max. load	250 Ω to GND		
Electrical characteristics			
Supply voltage	24 VDC ±10 %		
Current consumption	max. 80 mA		
Electrical connection	4(5)-pin-plug M12x1		
Electrical protection measures	short-circuit proof (up to 30 V) polarity protection (up to -30 V)		
Degree of protection	IP 65		
Process variables			
Medium to measure	Water and other conductive liquids		
min. conductivity of the mediums	50 μS/cm (lower conductivity affects the accuracy)		
max. medium temperature	90 °C		
min. medium temperature	0 °C (not freezing)		
Ambient temperature	5...70 °C		
Nominal diameter	DN 7	DN 10	DN 20
Nominal pressure	PN 16		
Process connection	½" BSP male thread		1" BSP male thread

* other range on request

10 Dimensions, pressure drop

MVM-020 and MVM-040



MVM-200

