



Instruction Manual

DM01

Compact Magnetic Inductive Flowmeter



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Safety Information

General Instructions

To ensure safe operation, the device should only be operated according to the specifications in the instruction manual. The requisite Health & Safety regulations for a given application must also be observed. This statement also applies to the use of accessories.

Every person who is commissioned with the initiation or operation of this device must have read and understood the operating instructions and in particular the safety instructions!

The liability of the manufacturer expires in the event of damage due to improper use, non-observance of this operating manual, use of insufficiently qualified personnel and unauthorized modification of the device.

Proper Usage

Devices of the series DM01 are designed for magnetic inductive flow measurement of conductive liquids which do not attack the device materials. All other usage is regarded as being improper and outside the scope of the device.

The series DM01 flow meter devices should not be deployed as the sole agents to prevent dangerous conditions occurring in plant or machinery. Machinery and plant need to be designed in such a manner that faulty conditions and malfunctions do not arise that could pose a safety risk for operators.

Dangerous substances

For dangerous media such as e.g. Oxygen, Acetylene, flammable or toxic substances as well as refrigeration systems, compressors, etc. must comply with the relevant regulations beyond the general rules.

Qualified Personnel

The DM01 devices may only be installed by trained, qualified personnel who are able to mount the devices correctly. Qualified personnel are persons, who are familiar with assembling, installation, placing in service and operating these devices and who are suitably trained and qualified.

Inward Monitoring

Please check directly after delivery the device for any transport damages and deficiencies. Additional with reference to the accompanying delivery note the number of parts must be checked. Claims for replacement or goods which relate to transport damage can only be considered valid if the delivery company is notified without delay.

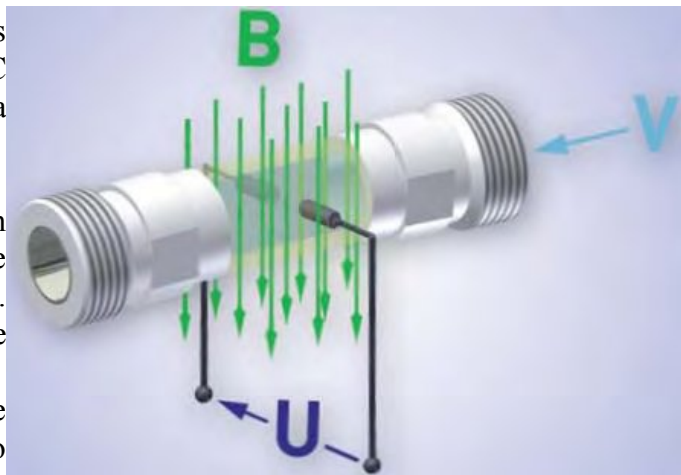
Functional Description

The magnetic inductive flow sensor functions according to the induction principle. A DC voltage is generated by the movement of a conductor in a magnetic field:

The measuring tube of the VMZ03 is located in a magnetic field (B). An electrically conductive medium (V) flows through the measuring tube. The positive and negative charge carriers are oppositely deflected.

A voltage (U) is generated at right angles to the magnetic field, which is picked up by the two electrodes.

Thereby, the induced voltage is proportional to the average flow velocity of the liquid. The electronics of the DM01 converts the induced voltage into a flow-proportional frequency signal.



Construction



The measuring tube with its earthing sleeves and electrodes passes through the housing and forms the external process connection of the DM01.

A magnetic field for the measurement process is generated inside the housing, which also contains the sensor and signal conditioning circuitry.

The two stainless steel electrodes are located in the middle of the measuring tube between the earthing sleeves.

The DM01 does not need any moving parts to make measurements. The inside of the measuring tube is completely open, allowing the fluid to flow unhindered through the measuring tube.

Installation

Before installing, check that

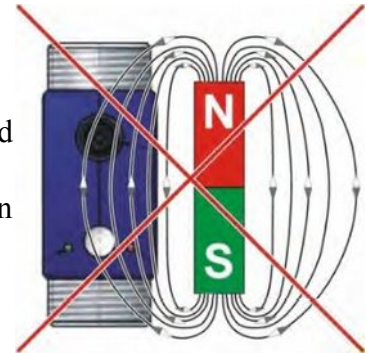
- the wetted materials of the device are suitable for the media being used.
- the equipment is switched off and is in a safe and de-energised state.
- the equipment is depressurised and has cooled down.

CAUTION!

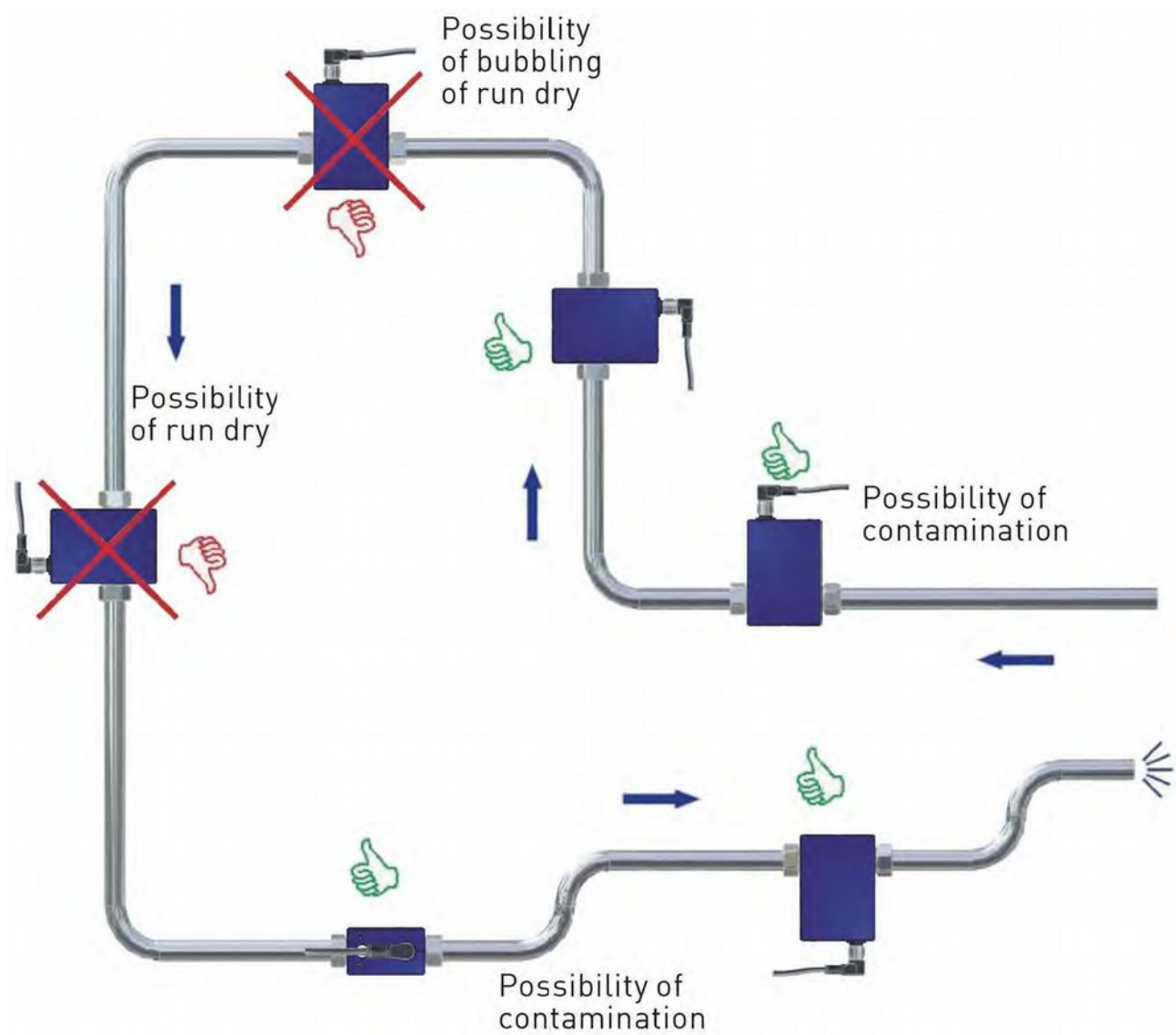
Risk of malfunction due to external magnetic fields!

Magnetic fields close to the device can cause malfunctions and should be avoided.

Ensure that no external magnetic fields are present at the installation site of the DM01.



The DM01 can always be installed anywhere along the pipeline. However, straight sections of piping are preferable.



- Installation can occur in horizontal and vertical pipes. The flow sensor is only suitable for application in completely filled pipe systems.
- As a matter of principle magnetic inductive flow sensors 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.
- 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.
- If two or more DM01 devices are used side by side, maintain a separation of at least 2.5 cm between adjacent devices. If adjacent devices are too close together, operation of both devices may be impaired due to mutual interference.



Assembly

The DM01 is installed directly into the pipeline. The compact design and light weight of the unit make wall-mounting unnecessary.

IMPORTANT NOTICES:

- Only use suitable gaskets for installation.
 - Observe the flow direction indicated on the type plate.
 - Observe the mounting dimensions
1. Select an appropriate location for installation.
 2. To ensure the best possible measuring accuracy, a vertical installation position with increasing flow is preferable (no collecting of dirt deposits).
 3. Install the appropriate screwed connections at the installation location.
 4. Insert the DM01 together with the gaskets.
 5. Screw the union nuts of the screwed connection onto the process connections of the DM01.



CAUTION! Material damage!

Maximum torque 5 Nm. While tightening, counter the DM01 only by hand! If you use an open-end or a pipe wrench, the DM01 can be damaged.

- Tighten both union nuts with a maximum torque of 5 Nm.



Electrical Connection

The electrical connection of the DM01 is via the 4-pin plug M12x1 at the top of the housing.

CAUTION! Electric current!

The electrical connection should only be carried out by a fully qualified electrician.

- De-energize the electrical system before connecting the DM01.

Connection and wiring:

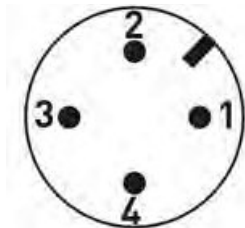
- Screw the coupling socket of the connection cable to the plug of the DM01.
- Tighten the knurled nut of the coupling socket with a maximum torque of 1 Nm.
- Connect the connection cables according to the following wiring diagrams.

Pin assignment:

Pin 1: +UB

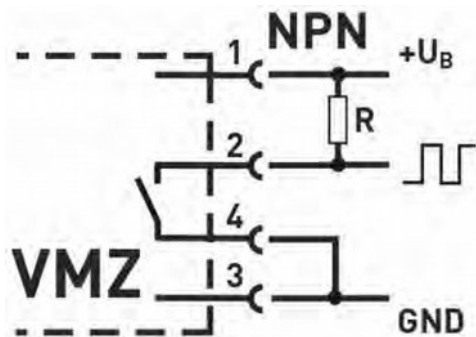
Pin 3: GND

Pin 2 / 4: Frequency output NPN/PNP

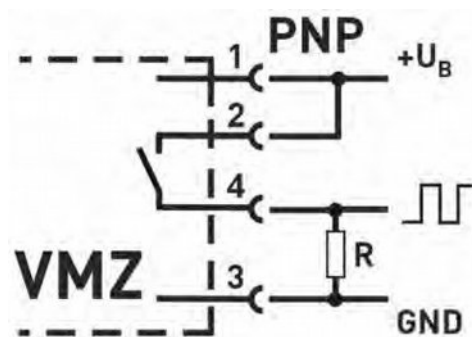


Pin configuration with

NPN frequency output:



PNP frequency output:



Pull-up- / pull-down-resistors R.

We recommend using resistors of $\sim 1 \text{ k}\Omega$ (12V) respectively $\sim 2.2 \text{ k}\Omega$ (24V) and 0.25 W for the pull-up / pull-down wiring.

- Please note that the maximum signal current of 25 mA will not be exceeded.

Commissioning

Check that

- the DM01 has been installed correctly and that all screw connections are sealed.
- the electrical wiring has been connected properly.
- the measuring system is vented by flushing.

The DM01 has no switch and cannot be switched on or off on its own. Switching on and off is carried out by the applied supply voltage.

Switch on the supply voltage.

The red LED lights up permanently. The DM01 is ready for use and goes into measuring operation.



Measuring operation

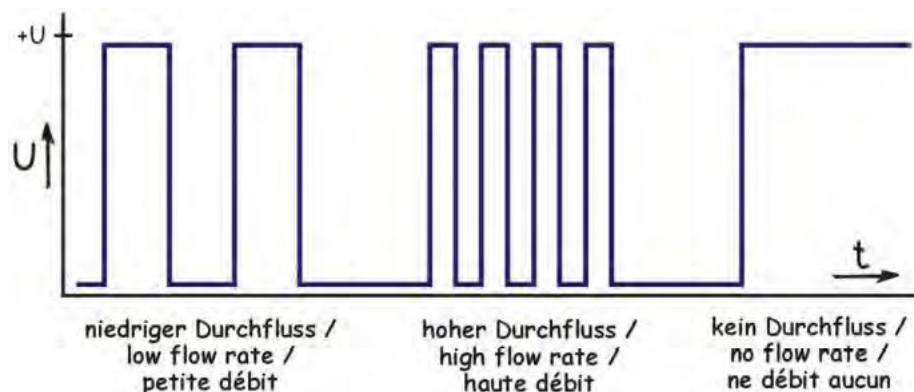
In the measuring mode, the red LED is permanently lit and indicates that the DM01 is operational. The green LED flashes proportional to the measured flow.

The human eye cannot detect the flashing any longer from a frequency of $\sim 30 \dots 40$ Hz. In that case the green LED seems to be lit permanently.



Frequency output:

The frequency output provides a flowproportional PNP/NPN square wave signal. The frequency changes according to the flow



Maintenance and cleaning

The DM01 is maintenance-free and cannot be repaired by the user. In case of a defect, the device must be replaced or sent back the manufacturer for repair.

CAUTION! Material damage!

When opening the device, critical parts or components can be damage.

▶ Never open the device and perform any repair yourself.

Cleaning:

Clean the DM01 with a dry or slightly damp lint-free cloth. Do not use sharp objects or aggressive agents for cleaning.

Return shipment to PKP Prozessmesstechnik

Comply with the instructions below before returning the unit.

- Clean the device thoroughly. This is of extreme importance if the medium is hazardous to health, i.e. caustic, toxic, carcinogenic or radioactive etc.
- Remove all residues of the media and pay special attention to sealing grooves and slits.
- Attach a note describing the malfunction, state the application field and the chemical/ physical properties of the media.
- Send the device to:

PKP Prozessmesstechnik GmbH
Service
Borsigstraße 24
D-65205 Wiesbaden-Nordenstadt
Germany

Pressure drop

