

# Magnetic Inductive Flowmeter

## All-Metal Design

**BESTOBELL**  
**AQUATRONIX**  
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measuring  
•  
monitoring  
•  
analyzing

**MIM**



## IO-Link

- For Measurement and Monitoring of Conductive Liquids
- Flow and Temperature Measurement
- Switching, Transmitting, and Batching Functions
- Bi-directional Flow Measurement
- Rugged Stainless Steel Construction
- $p_{\max}$ : 230 PSI;  $t_{\max}$ : 284 °F
- Accuracy:  $< \pm (0.8\% \text{ of Reading} + 0.5\% \text{ of Full Scale})$



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## Description

The new MIM electromagnetic flowmeter measures and monitors small to medium sized flow of conductive liquids in pipes. According to Faraday's Law of magnetic induction, a voltage is induced in a conductor moving through a magnetic field. The electrically conductive measured media acts as the conductor. The voltage induced in the measured media is proportional to the flow velocity and is therefore a value for the volumetric flow. The induced voltage is detected by two sensing electrodes which are in contact with the measuring media and sent to an integrated amplifier. The flow rate will be calculated based on the cross sectional area of the pipe. The measurement does not depend on the process liquid and its properties such as density, viscosity and temperature. The two outputs can be independently set to switch, or provide an analog or frequency output. A batching function can also be selected, where output 1 is set to switch as NPN/ PNP/ PP and output 2 is set as the control input.

## Features

- Rugged Stainless Steel Construction
- Flow and Temperature Measurement
- Switching, Transmitting, and Batching Functions
- Batching Function with External Control Input
- Bi-directional Flow Measurement
- Colored, Multi-parameter, Configurable TFT Display, Rotatable in 90° Increments
- Intuitive Setup Menu via 4 Optical Touch Keys
- 2 Configurable Outputs (Pulse/Frequency/Alarm/Analog Output)
- Grand and Resettable Totalizer
- Drinking Water Approval

## Technical Details

**Measurement Principle:** Electromagnetic

**Ranges:** 0.16...16 GPH to 0.8...170 GPM

**Media:** Conductive Liquids

**Min. Conductivity:**  $\geq 20 \mu\text{S/cm}$

**Native Fittings:** G 1/4"...G 2, or 1/2" NPT...2" NPT

**Optional Fitting Kits:** 1/4"...1" NPT (Male or Female), 1" or 2" Tri-Clamp® (All Kits Include 2x Fittings and 2x Klinger SIL Gaskets except Kit ZUB-AD2G50T50 that Includes 2x Fittings and 2x FKM O-rings)

**Max. Pressure:** 230 PSI

**Accuracy<sup>1)</sup>:**  $< \pm (0.8\% \text{ of Reading} + 0.5\% \text{ of Full Scale})$

**Repeatability:**  $\pm 0.2\% \text{ of Full Scale}$

**Response Time Flow  $t_{90}$**

**Alarm/Pulse/Frequency Output:**  $< 100 \text{ ms}$

**Analog Output:**  $< 1 \text{ s}$

**Temperature Measurement**

**Sensor:** PT1000

**Accuracy:**  $< \pm 35.6 \text{ }^\circ\text{F}$  (Flow  $> 0.2 \text{ m/s}$ )

**Measuring Range:** Temperature Range of the Media

**Response Time Temp.  $t_{90}$  (Signal Output):**  $< 20 \text{ s}$

<sup>1)</sup> Reference Cond.: Media: 60...85 °F, 1 cSt, 500  $\mu\text{S/cm}$ , 15 PSI, Ambient: 60...85°F

<sup>2)</sup> Limited functionality with black rubber gloves



## Programming<sup>2)</sup>:

Via 4 Optical Touch Fields,  
Can be used with Gloves

## Mounting Position:

### Inlet/Outlet:

Universal  
3x Upstream, 2x Downstream

### Pressure Drop:

See Pressure Loss Diagram

### Housing:

316L Stainless Steel,  
PMMA Display Screen

## Wetted Parts

The wetted parts of MIM-13 (except G9/N9) are in conformance with DVGW 270 and WRAS guidelines for drinking water approval.

**Fitting/Housing:** 316L Stainless Steel

**Insulation Parts:** PEEK

**Electrodes:** 316L Stainless Steel

**Seals:** FKM or EPDM

**Fitting Adapter:** 316L Stainless Steel

## Temperature Ranges

| Design                      | Electronics | Model  | Seal | Media Temperature         | Ambient Temperature               |
|-----------------------------|-------------|--------|------|---------------------------|-----------------------------------|
| Compact Version             | C3T         | MIM-12 | FKM  | -4...158 °F <sup>1)</sup> | -4...140 °F                       |
|                             |             | MIM-13 | EPDM |                           |                                   |
| Remote Version (PVC Cable)  | P02         | MIM-12 | FKM  | -4...185 °F               | -4...140 °F (Display Electronics) |
|                             |             | MIM-13 | EPDM |                           | -4...185 °F (Sensor)              |
| Remote Version (ETFE Cable) | E02         | MIM-12 | FKM  | -4...284 °F               | -4...140 °F (Display Electronics) |
|                             |             |        |      |                           | -4...284 °F (Sensor)              |
|                             |             | MIM-13 | EPDM | -40...284 °F              | -4...140 °F (Display Electronics) |
|                             |             |        |      |                           | -40...284 °F (Sensor)             |

<sup>1)</sup> Continuous -4...158 °F, short-term up to max. 185 °F (for max. 60 minutes at max. 104 °F ambient temperature and repetition earliest after 4 hours). Use of the electrical output remains limited to temperature range -4...158 °F.

## Electrical Data

### Supply Voltage:

19-30 V<sub>DC</sub>, Internal Power  
Consumption max. 200 mA

### Display:

TFT Display, 128x128 Pixels,  
1.4" Display, Orientation Adjustable  
in 90° Increments

### Display Repetition Rate:

0.5...10 s, Adjustable

### Pulse Output:

Push-Pull, Freely Scalable,  
Configurable for Partial and  
Accumulated Totalizer

## Magnetic Inductive Flowmeter, All-Metal Design Model MIM

### Technical Details (continued)

#### Electrical Data (continued)

|                           |                                                                                                                                                    |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Frequency Output:</b>  | Push-Pull, Fully Scalable,<br>2 kHz @ Overflow<br>50...1000 Hz at Full Scale,<br>User Programmable                                                 |
| <b>Alarm Output:</b>      | NPN, PNP, Push-Pull,<br>Configurable Max. 30 V <sub>DC</sub> ,<br>Max. 200 mA Short-Circuit<br>Proof                                               |
| <b>Analog Output:</b>     | Active, 3-wire, 4-20 mA,<br>Max. Load 500 Ω or 0-10 V <sub>DC</sub> ,<br>(R <sub>i</sub> = 500 Ω)                                                  |
| <b>Control Input:</b>     | Active Signal U <sub>high</sub> Max.<br>30 V <sub>DC</sub> , 0<Low<10 V <sub>DC</sub> ,<br>15V <sub>DC</sub> <High<V <sub>S</sub>                  |
| <b>Batching Function:</b> | Batching Output OUT2:<br>Push-Pull, High Active<br>Control Input OUT1:<br>START/STOP 0.5s < t <sub>high</sub> < 4s<br>RESET t <sub>high</sub> > 5s |

#### Shock Resistance

DIN EN 60068-2-27:2010: 20 g (11 ms)

#### Vibration Resistance

DIN EN 60068-2-6:2008: 5 g (10 ... 2000 Hz)

#### Environmental Testing

DIN EN 60068-2-30:2006: Severity Level b

#### IO-Link Specification

|                                |                                     |
|--------------------------------|-------------------------------------|
| <b>Manufacturer ID:</b>        | 1105 (Decimal), 0 x 0451 (Hex)      |
| <b>Manufacturer Name:</b>      | Kobold Messring GmbH                |
| <b>IO-Link Specification:</b>  | V1.1                                |
| <b>Bitrate:</b>                | COM3                                |
| <b>Minimal Cycle Time:</b>     | 1.1 ms                              |
| <b>SIO-Mode:</b>               | Yes (OUT1 in Configuration IO-Link) |
| <b>Block Parameterisation:</b> | Yes                                 |
| <b>Operational Readiness:</b>  | 10 s                                |
| <b>Max. Cable Length:</b>      | 20 m                                |

**Protection:** IP67

### Order Details (Example: MIM-12 05G N4 C3T 0)

| Model                                                | Measuring Range <sup>1)</sup>                                                                                                                                                                          | Native Connection                       | Electronics                                                                                                                            | Options                                                             |  |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--|
| MIM-12.. = SS Housing<br>SS Electrodes<br>FKM Seals  | ..01G.. = 0.16...16 GPH<br>..01H.. = 0.01...1 LPM                                                                                                                                                      | ..G2.. = G 1/4 Male                     | ..C3T.. = Compact TFT Display<br>2x Configurable Outputs<br>(Current/Voltage/Pulse/<br>Frequency/Alarm)<br>M12x1 Electrical Connection | 0 = without<br>K <sup>4)</sup> = Including<br>Calibration<br>Report |  |
|                                                      | ..03G.. = 0.48...48 GPH<br>..05G.. = 0.01...2.6 GPM                                                                                                                                                    | ..N4 <sup>3)</sup> .. = 1/2" NPT Female |                                                                                                                                        |                                                                     |  |
|                                                      | ..03H.. = 0.03...3 LPM<br>..05H.. = 0.04...10 LPM                                                                                                                                                      | ..G4 <sup>3)</sup> .. = G 1/2 Male      |                                                                                                                                        |                                                                     |  |
|                                                      | ..10G.. = 0.025...6.6 GPM<br>..15G.. = 0.05...13 GPM                                                                                                                                                   | ..N5 <sup>3)</sup> .. = 3/4" NPT Female |                                                                                                                                        |                                                                     |  |
| MIM-13.. = SS Housing<br>SS Electrodes<br>EPDM Seals | ..10H.. = 0.1...25 LPM<br>..15H.. = 0.2...50 LPM                                                                                                                                                       | ..G5 <sup>3)</sup> .. = G 3/4 Male      | ..P02 <sup>2)</sup> .. = Remote Display Version,<br>TFT Display, 2m PVC Cable,<br>Max. 185 °F                                          |                                                                     |  |
|                                                      | ..15G.. = 0.05...13 GPM<br>..20G.. = 0.1...26 GPM                                                                                                                                                      | ..N6 <sup>3)</sup> .. = 1" NPT Female   | ..E02 <sup>2)</sup> .. = Remote Display Version,<br>TFT Display, 2m ETFE Cable,<br>Max. 284 °F                                         |                                                                     |  |
|                                                      | ..15H.. = 0.2...50 LPM<br>..20H.. = 0.4....100 LPM                                                                                                                                                     | ..G6 <sup>3)</sup> .. = G 1 Male        |                                                                                                                                        |                                                                     |  |
|                                                      | ..35G.. = 0.4...90 GPM<br>..40G.. = 0.8...170 GPM                                                                                                                                                      | ..N9.. = 2" NPT Female                  |                                                                                                                                        |                                                                     |  |
|                                                      | ..35H.. = 1.5...350 LPM<br>..40H.. = 2.6...650 LPM                                                                                                                                                     | ..G9.. = G 2 Male                       |                                                                                                                                        |                                                                     |  |
|                                                      |                                                                                                                                                                                                        |                                         |                                                                                                                                        |                                                                     |  |
|                                                      |                                                                                                                                                                                                        |                                         |                                                                                                                                        |                                                                     |  |
|                                                      | Accessories: P/N 807.037 = 4-Pin Micro-DC Connector with 6-foot Cable<br>P/N 807.037/5M = 4-Pin Micro-DC Connector with 16-foot Cable<br>P/N 807.037/10M = 4-Pin Micro-DC Connector with 32-foot Cable |                                         |                                                                                                                                        |                                                                     |  |

<sup>1)</sup> Units of measure factory programmed: °F and PSI for GPM/GPH models, °C and bar for LPM models

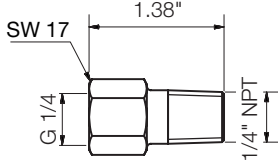
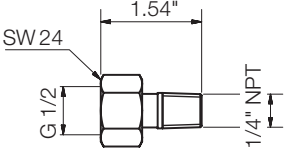
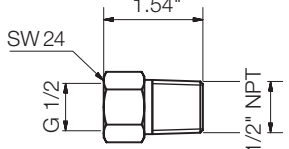
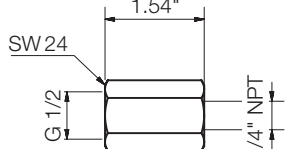
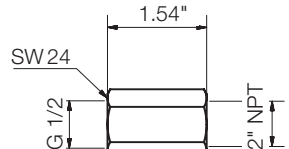
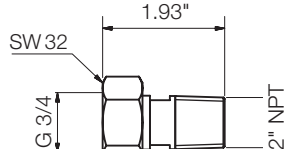
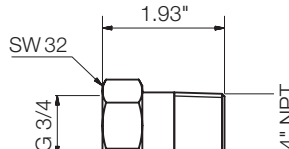
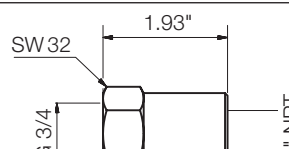
<sup>2)</sup> Order code substitution for longer cables: **02** = 2 m (6 ft), **05** = 5 m (16 ft), **10** = 10 m (32 ft), **15** = 15 m (49 ft), **20** = 20 m (65 ft).  
Wall mounting brackets (brackets incl. accessories) are included in the scope of delivery.

<sup>3)</sup> Regulation (EC) No. 1935/2004 for materials and articles intended to come in contact with food. Not for connection code G9/N9

<sup>4)</sup> Please specify number of measuring points in clear text

## Magnetic Inductive Flowmeter, All-Metal Design Model MIM

### Order Details MIM Fitting Accessory Kits

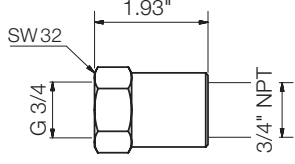
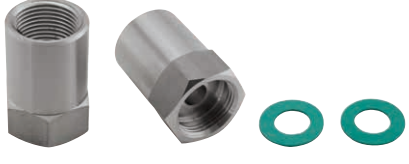
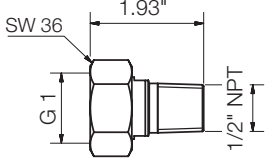
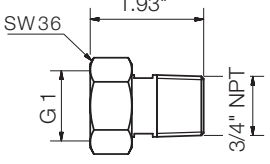
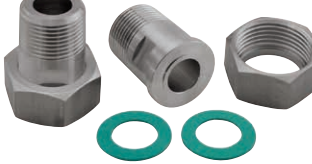
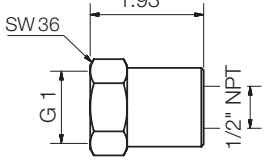
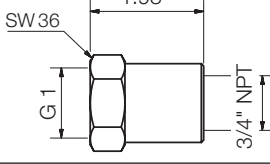
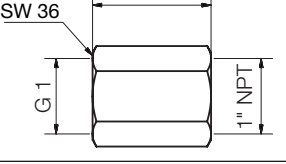
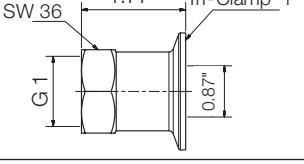
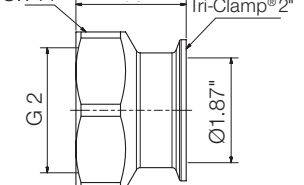
| Accessory Kit Number | Native Connection / Process Connection | Fitting Kit Type <sup>1/2)</sup> | Dimensions                                                                          | Image                                                                                 |
|----------------------|----------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| ZUB-AD2G08P08        | G 1/4 Female / 1/4" NPT Male           | Adapter                          |    |    |
| ZUB-AD2U15P08        | G 1/2 Cap Nut / 1/4" NPT Male          | Cap Nut and Union                |    |    |
| ZUB-AD2G15P15        | G 1/2 Female / 1/2" NPT Male           | Adapter                          |    |    |
| ZUB-AD2G15N08        | G 1/2 Female / 1/4" NPT Female         | Adapter                          |   |   |
| ZUB-AD2G15N15        | G 1/2 Female / 1/2" NPT Female         | Adapter                          |  |  |
| ZUB-AD2U20P15        | G 3/4 Cap Nut / 1/2" NPT Male          | Cap Nut and Union                |  |  |
| ZUB-AD2G20P20        | G 3/4 Female / 3/4" NPT Male           | Adapter                          |  |  |
| ZUB-AD2G20N15        | G 3/4 Female / 1/2" NPT Female         | Adapter                          |  |  |

<sup>1)</sup> All Fitting Kits Include 2x Fittings and 2x Klinger SIL® Flat Sealing Gaskets

<sup>2)</sup> Adapters and Unions are 316L SS, Cap Nuts are 304 SS

**Magnetic Inductive Flowmeter, All-Metal Design Model MIM**

**Order Details MIM Fitting Accessory Kits (Continued)**

| Accessory Kit Number | Native Connection/<br>Process Connection | Fitting Kit Type <sup>1)2)</sup> | Dimensions                                                                           | Image                                                                                 |
|----------------------|------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| ZUB-AD2G20N20        | G ¾ Female/<br>¾" NPT Female             | Adapter                          |    |    |
| ZUB-AD2U25P15        | G 1 Cap Nut/<br>½" NPT Male              | Cap Nut and Union                |    |    |
| ZUB-AD2U25P20        | G 1 Cap Nut/<br>¾" NPT Male              | Cap Nut and Union                |    |    |
| ZUB-AD2G25N15        | G 1 Female/<br>½" NPT Female             | Adapter                          |   |   |
| ZUB-AD2G25N20        | G 1 Female/<br>¾" NPT Female             | Adapter                          |  |  |
| ZUB-AD2G25N25        | G 1 Female/<br>1" NPT Female             | Adapter                          |  |  |
| ZUB-AD2G25T25        | G 1 Female/<br>1" Tri-Clamp®             | Adapter                          |  |  |
| ZUB-AD2G50T50        | G 2 Female/<br>2" Tri-Clamp®             | Adapter                          |  |  |

<sup>1)</sup> All Kits Include 2x Fittings and 2x Klinger SIL Gaskets except Kit Number ZUB-AD2G50T50 that Includes 2x Fittings and 2x FKM O-rings

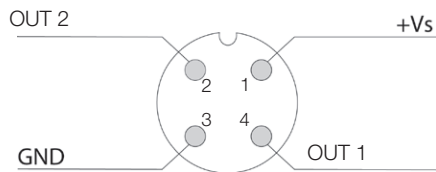
<sup>2)</sup> Adapters and Unions are 316L SS, Cap Nuts are 304 SS

## Magnetic Inductive Flowmeter, All-Metal Design Model MIM

### Accessories (Spare Part)

| Model          | Description                                                                                | Image                                                                               |
|----------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| ERS-ZOK-023618 | Stainless Steel Wall Mounting Kit for Remote Version<br>(2 Brackets, without Nuts/Washers) |  |
| ZUB-MIM225128  | Clamping Bracket Set for Wall Mounting (Stainless Steel with Partial Polyolefin Sleeve)    |  |

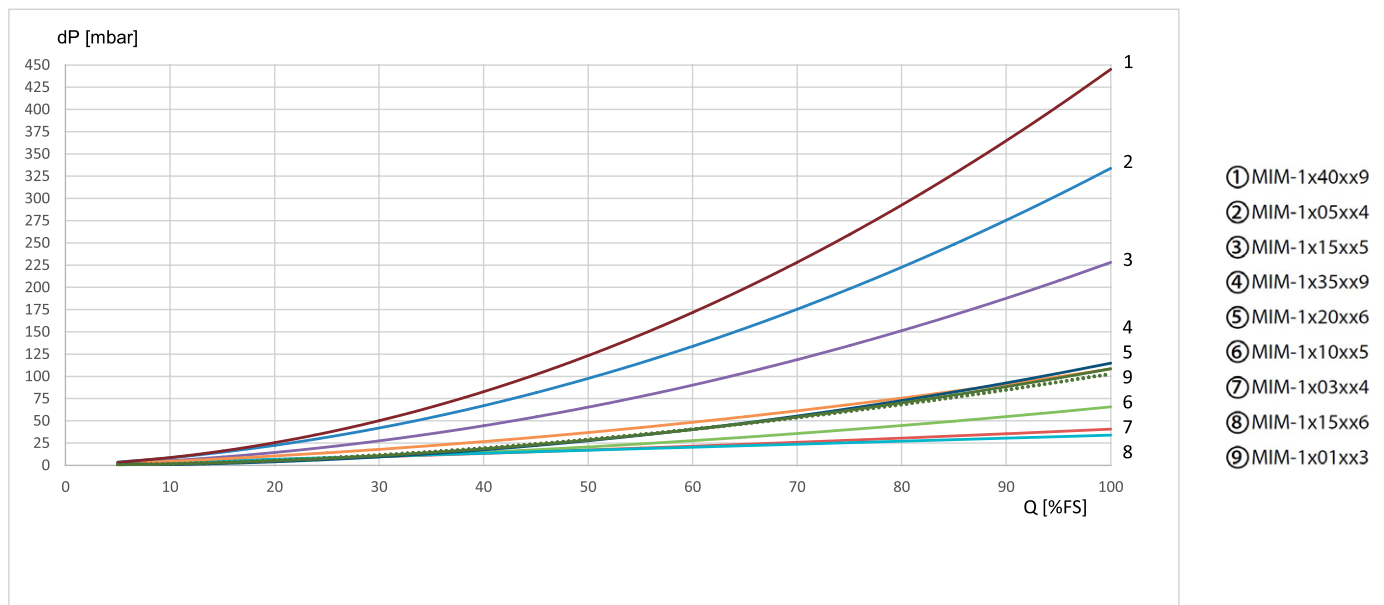
### Electrical Connection MIM-..C3T



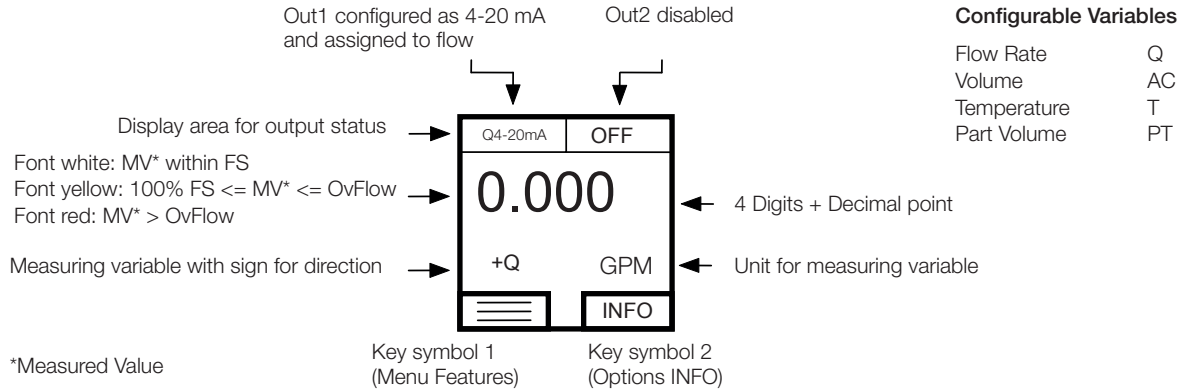
### Configuration of Outputs

| Output 1 (OUT1, PIN 4)                           | Output 2 (OUT2, PIN 2)             |
|--------------------------------------------------|------------------------------------|
| Analog Output 0-10 V <sub>DC</sub>               | Analog Output 0-10 V <sub>DC</sub> |
| Analog Output 4-20 mA                            | Analog Output 4-20 mA              |
| Switching Output NPN/PNP/PP                      | Switching Output NPN/PNP/PP        |
| Pulse Output PP                                  | Pulse Output PP                    |
| Frequency Output PP                              | Frequency Output PP                |
| Communication Mode KofiCom                       |                                    |
| Communication Mode IO-Link                       |                                    |
| Control Input                                    |                                    |
| Control Input Start/Stop/Reset Batching Function | Batching Function Switch/PP        |

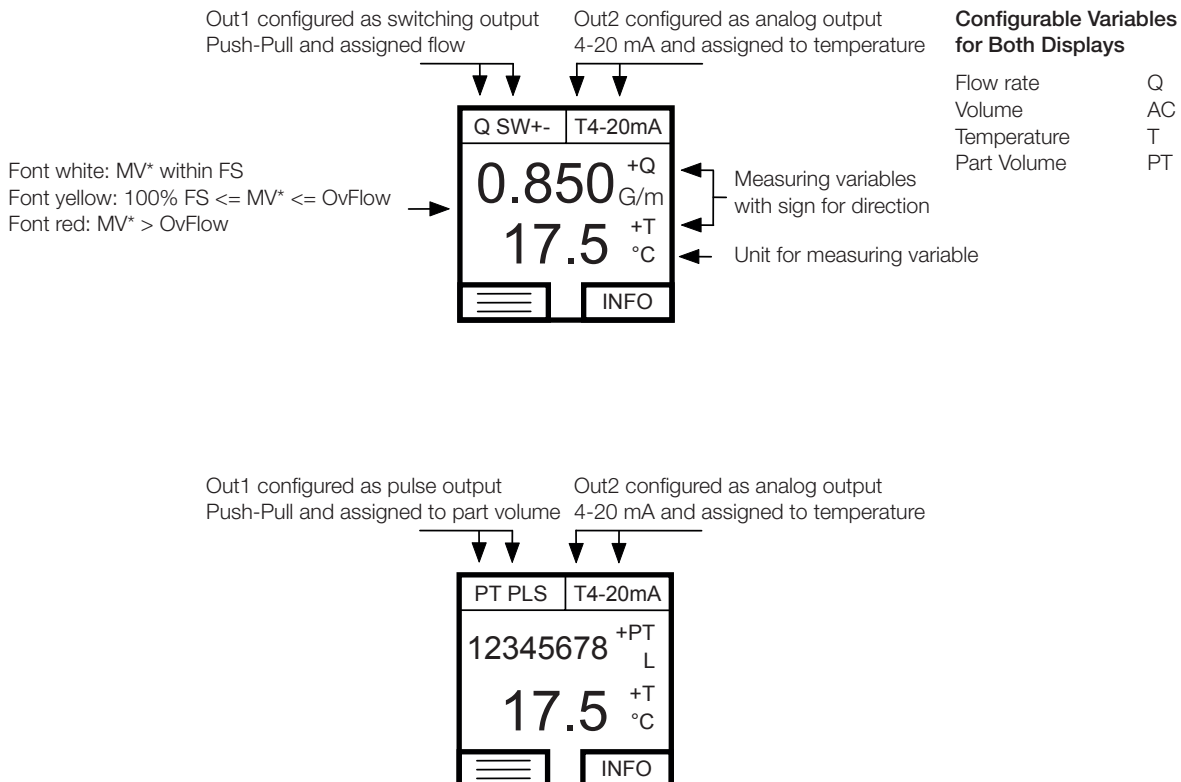
### Pressure Loss Diagram



### Measuring Mode: Display Layout "Single" Configurable



### Measuring Mode: Display Layout "Dual" Configurable

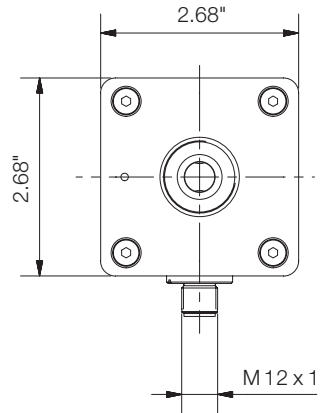
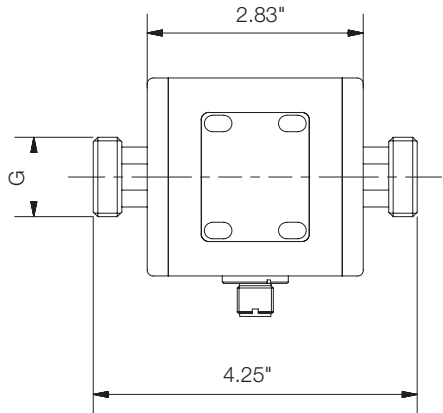


Magnetic Inductive Flowmeter, All-Metal Design Model MIM

Dimensions

Compact Version

| G   |
|-----|
| 1/4 |
| 1/2 |
| 3/4 |
| 1   |



| NPT |
|-----|
| 1/2 |
| 3/4 |
| 1   |

