Zertifiziertes QM-System
DIN EN ISO 9001
Zertifikat-Nr. 01017

# Electromagnetic Flowmeter

all-metal design

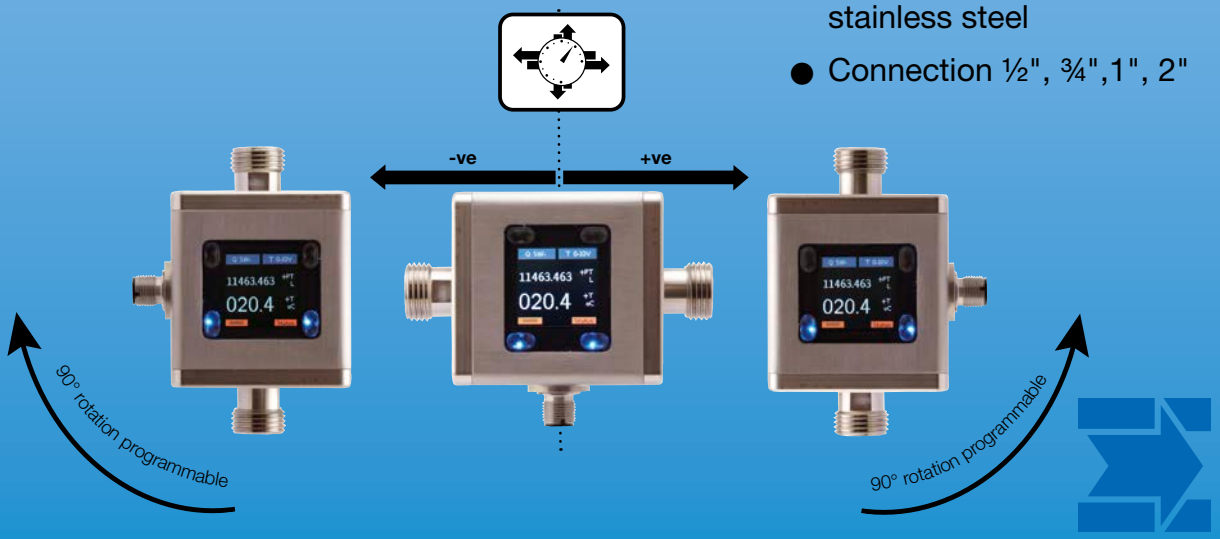
KOBOLD

measuring • monitoring • analysing

## MIM

IO-Link

- For measuring and monitoring of conductive liquids
- Accuracy: <±(0.8% of reading +0.5% of full scale)
- Flow and temperature measurement
- Monitoring, transmitter function, dosing
- Bidirectional measuring
- $p_{max}$: 16 bar; $t_{max}$: 140 °C
- All-metal design: stainless steel
- Connection ½", ¾",1", 2"




S5

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## Description

The new flowmeter MIM was developed for measuring and monitoring smaller- and medium-sized flow of conductive liquids in pipes.

The device operates according to the electromagnetic measurement principle. According to Faraday's Law of magnetic induction, a voltage is induced in a conductor moving through a magnetic field. The electrically conductive measuring agent acts as the moved conductor. The voltage induced in the measuring agent is proportional to the flow velocity and is therefore a value for the volumetric flow. The flowing media must have a minimum conductivity. The induced voltage is picked up by two sensing electrodes which are in contact with the measuring agent and sent to the measuring amplifier.

The flow rate will be calculated based on the cross sectional area of the pipe.

The measurement is not depending on the process liquid and its material properties such as density, viscosity and temperature. Two given outputs can be set to be switch, analogue or frequency. Also a dosing function can be selected, where output 1 is set as switch NPN / PNP / PP and output 2 is set as control input.

## Significant Characteristics

- Stainless steel design
- Flow- and temperature measurement
- Monitoring, dosing and transmitter function
- Dosing function with external control input
- Coloured, multi-parameter configurable TFT-display, rotatable in 90° steps
- Bidirectional measuring
- Intuitive setup menu via 4 optical touch keys
- 2 configurable outputs (pulse-/frequency-/alarm- and analogue output)
- Grand and resettable totaliser

## Technical Details

| | |
|---|---|
| Measurement process: | electromagnetic |
| Range: | see order details |
| Media: | conductive fluids |
| Minimum conductivity: | ≥20 µS/cm |
| Max. pressure: | 16 bar |
| Accuracy: | <±(0.8 % of reading + 0.5 % of full scale)* |
| Repeatability: | ±0.2 % of full scale |
| Response time flow $t_{90}$ (alarm / pulse / frequency output): | <100 ms |
| (analogue output): | <1 s |

### Temperature measurement

| | |
|---|---|
| Sensor: | PT1000 |
| Accuracy: | ≤±2 °C (flow >0.2 m/s) |
| Measuring range: | temperature range of medium |
| Response time temperature $t_{90}$ (signal output): | <20 s |
| Mounting position: | in all directions |
| In-/outlet: | 3 x DN / 2 x DN |
| Pressure drop: | see pressure loss diagram |
| Operation: | 4 optical touch sensors, useable with hand gloves** |
| Housing: | stainless steel 1.4404, display screen PMMA |

### Wetted parts

| | |
|---|---|
| Connection fitting: | stainless steel 1.4404 |
| Insulation parts: | PEEK |
| Electrodes: | stainless steel 1.4404 |
| Seals: | FKM (Option: EPDM) |
| Protection: | IP 67 |

### Temperature ranges

| Design | Electronics | Model | Seals material | Media temperature | Ambient temperature |
|---|---|---|---|---|---|
| compact version | C3T | MIM-12 MIM-13 | FKM | -20 °C ... +70 °C | -20 °C ... +60 °C |
| | | | EPDM | | |
| remote version (PVC cable) | P02[1] | MIM-12 MIM-13 | FKM | -20 °C ... +85 °C | -20 °C ... +60 °C (display electronics) |
| | | | EPDM | | -20 °C ... +85 °C (sensor) |
| remote version (ETFE cable) | E02[1] | MIM-12 | FKM | -20 °C ... +140 °C | -20 °C ... +60 °C (display electronics) |
| | | | | | -20 °C ... +140 °C (sensor) |
| | | MIM-13 | EPDM | -40 °C ... +140 °C | -20 °C ... +60 °C (display electronics) |
| | | | | | -40 °C ... +140 °C (sensor) |

[1] Cable length: 02 = 2 m, 05 = 5 m, 10 = 10 m, 15 = 15 m, 20 = 20 m

### Electrical data

| | |
|---|---|
| Supply voltage: | 19 - 30 $V_{DC}$, internal power consumption max. 200 mA |
| Display: | TFT display, 128 x 128 pixels, 1.4" display orientation in 90° steps adjustable |
| Display repetition rate: | 0.5 ... 10 s, adjustable |
| Pulse output | Push-Pull, freely scalable, configurable for partial and accumulated totaliser |
| Frequency output | Push-Pull, freely scalable, 2 kHz @ overflow<br>$f_{min}$ @ FS = 50 Hz<br>$f_{max}$ @ FS = 1000 Hz |
| Alarm output: | NPN, PNP, Push-Pull, configurable max. 30 $V_{DC}$, max. 200 mA short-circuit proof |

* Under reference conditions: media temperature: 15 °C ... 30 °C, 1 cSt, 500 µS/cm, 1 bar
ambience temperature: 15 °C ... 30 °C

** Limited functionality with black rubber gloves





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**Technical Details** (continued)

Analogue output: active, 3 wire, 0(4)-20 mA, max. load 500 Ω or 0(2)-10 $V_{DC}$, ($R_i$ = 500 Ω)

Control input: active signal $U_{high}$ max. 30 $V_{DC}$
0 <Low <10 $V_{DC}$
15 $V_{DC}$ <High <Vs

Dosing function: Dosing output OUT2:
Push-Pull, High active
Control input OUT1:
START/STOP 0,5 s <$t_{high}$ <4 s
RESET $t_{high}$ >5 s

Electrical connection: plug M12x1, 4-pin

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

## Connection/ranges

| Connection | Inside diameter (DN) | Range |
|---|---|---|
| G ½ | 5 mm | 0,03 ... 3 l/min / 0.04 ... 10 l/min |
| G ¾ | 10 mm | 0.1 ... 25 l/min / 0.2 ... 50 l/min |
| G 1 | 15 mm | 0.2 ... 50 l/min / 0.4 ... 100 l/min |
| G2/2" NPT | see dimensional drawing | 1.5 ... 350 l/min |

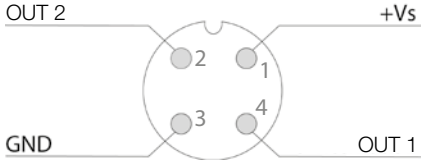
## Configuration of outputs

| **Output 1 (OUT1, PIN 4)** | **Output 2 (OUT2, PIN 2)** |
|---|---|
| Analogue output 4-20 mA | Analogue output 4-20 mA |
| Analogue output 0-20 mA | Analogue output 0-20 mA |
| Analogue output 2-10 V | Analogue output 2-10 V |
| Analogue output 0-10 V | Analogue output 0-10 V |
| 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 dosing function | Dosing output |

## IO-Link specification

Manufacturer ID: 1105 (decimal), 0 x 0451 (hex)
Manufacturer name: Kobold Messring GmbH
IO-Link specification: V1.1
Bitrate: COM3
Minimal cycle time: 1,1 ms
SIO-Mode: yes (OUT1 in configuration IO-Link)
Block parameterisation: yes
Operational readiness: 10 s
Max. cable length: 20 m

## Electrical Connection MIM-...C3T



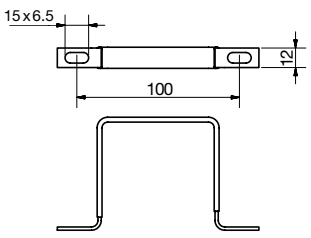
## **Order Details** (Example: **MIM-12 15H G5 C3T 0**)

| Model | Range | Connection | Electronics | Special version |
|---|---|---|---|---|
| **MIM-12** = housing/ electrode VA, FKM seal<br>**MIM-13**[4] = housing/ electrode VA, EPDM seal | **03H**[1] = 0,03 ... 3 l/min<br>**03G**[2] = 0.48 ... 48 GPH<br>**05H**[1] = 0.04 ... 10 l/min<br>**05G**[2] = 0.01 ... 2.6 GPM | **G4**[4] = G ½ male | **C3T** = compact, TFT display, 2 outputs (current/voltage/ pulse/frequency/alarm output configurable), M12x1 plug<br>**P02**[3] = remote version, TFT display, 2 m PVC cable, max. 85 °C<br>**E02**[3] = remote version, TFT display, 2 m ETFE cable, max. 140 °C | **0** = without<br>**K**[5] = including calibration report |
| | **10H**[1] = 0.1 ... 25 l/min<br>**10G**[2] = 0.025 ... 6.6 GPM<br>**15H**[1] = 0.2 ... 50 l/min<br>**15G**[2] = 0.05 ... 13 GPM | **G5**[4] = G ¾ male | | |
| | **15H**[1] = 0.2 ... 50 l/min<br>**15G**[2] = 0.05 ... 13 GPM<br>**20H**[1] = 0.4 ... 100 l/min<br>**20G**[2] = 0.1 ... 26 GPM | **G6**[4] = G 1 male | | |
| | **35H**[1] = 1.5 ... 350 l/min | **G9** = G 2 male | | |
| | **35G**[2] = 0.4 ... 90 GPM | **N9** = 2" NPT female | | |

[1] l/min-package (nameplate (l/min or ml/min, °C, bar)), calibrated range and temperature °C
[2] GPM-package (nameplate (GPM or GPH, °F, PSI)), calibrated range and temperature °F
[3] Cable length 02 = 2 m, 05 = 5 m, 10 = 10 m, 15 = 15 m, 20 = 20 m. Wall mounting brackets (brackets incl. accessories) is included in the scope of delivery.
[4] Regulation (EC) No. 1935/2004 for materials and articles intended to come into contact with food. Not for connection code G9/N9.
[5] Please specify number of measuring points in clear text.

## **Accessories (Spare part)**

| Description | Model | Image |
|---|---|---|
| Stainless steel wall mounting kit for remote version (2 brackets, without nuts/washers) | **ERS-ZOK-023618** |  |

| Description | Model | Dimensions [mm] | Image |
|---|---|---|---|
| Clamping bracket set for wall mounting (stainless steel with partial polyolefin sleeve) | **ZUB-MIM225128** |  |  |



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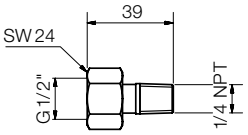
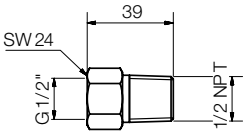
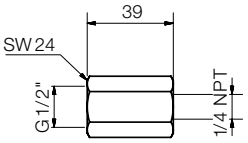
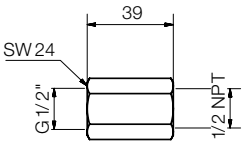
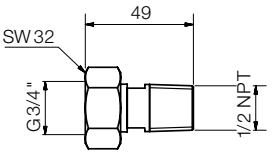
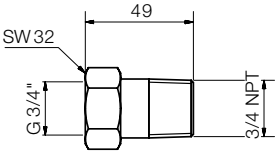
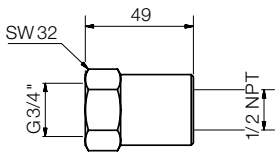
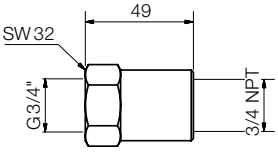
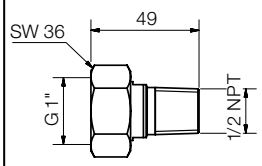
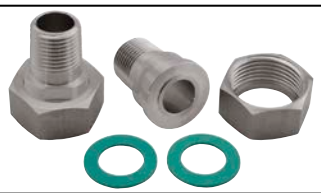
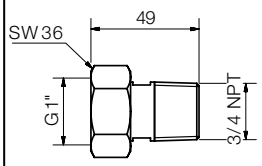
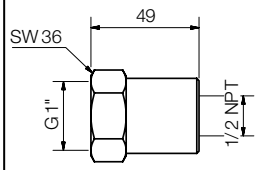
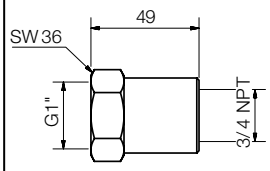
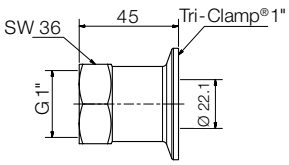
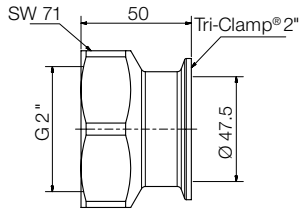
## Order Details MIM Fitting Sets Accessory Kits*

| Accessory kit number | Meter/ Process connection | Fitting set type | Dimensions [mm] | Image |
|---|---|---|---|---|
| **ZUB-AD2U15P08** | G ½ cap nut/ ¼" NPT male | Cap nut and union |  |  |
| **ZUB-AD2G15P15** | G ½ female/ ½" NPT male | Adapter |  |  |
| **ZUB-AD2G15N08** | G ½ female/ ¼" NPT female | Adapter |  |  |
| **ZUB-AD2G15N15** | G ½ female/ ½" NPT female | Adapter |  |  |
| **ZUB-AD2U20P15** | G ¾ cap nut/ ½" NPT male | Cap nut and union |  |  |
| **ZUB-AD2G20P20** | G ¾ female/ ¾" NPT male | Adapter |  |  |
| **ZUB-AD2G20N15** | G ¾ female/ ½" NPT female | Adapter |  |  |
| **ZUB-AD2G20N20** | G ¾ female/ ¾" NPT female | Adapter |  |  |

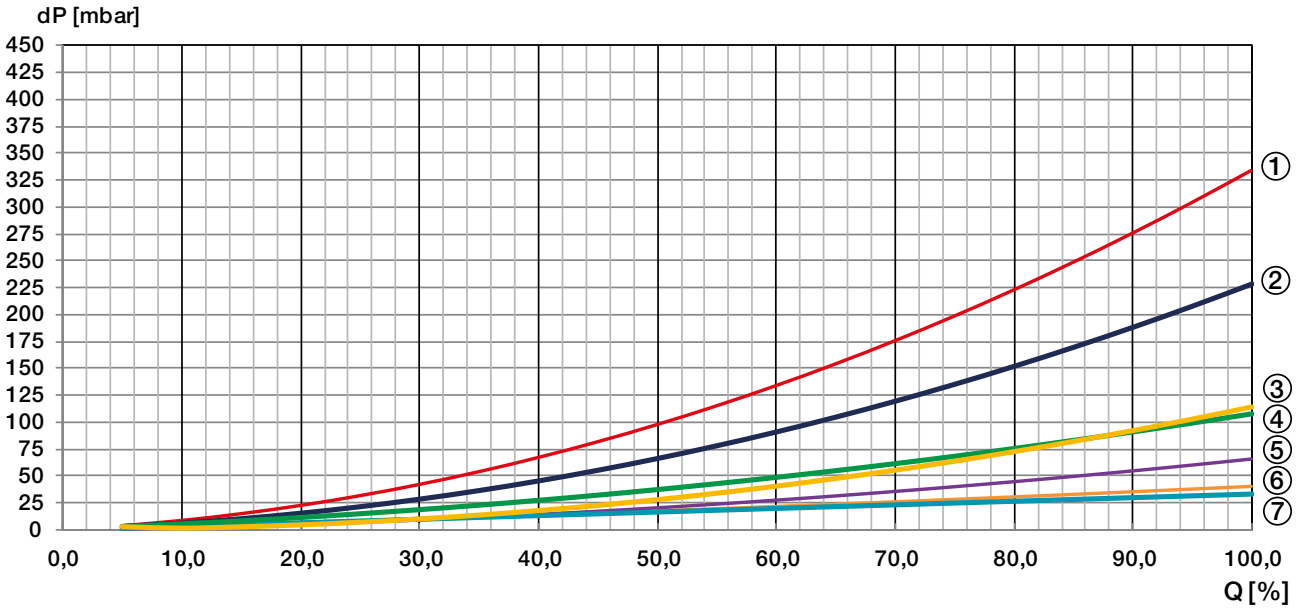
* ***Note:*** All fitting kits include 2 x Klinger SIL® flat sealing gaskets

**Order Details MIM Fitting Sets Accessory Kits*** (continued)

| Accessory kit number | Meter/ Process connection | Fitting set type | Dimensions [mm] | Image |
|---|---|---|---|---|
| **ZUB-AD2U25P15** | G 1<br>cap nut/<br>½" NPT male | Cap nut and union |  |  |
| **ZUB-AD2U25P20** | G 1<br>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-AD2G25T25** | G 1 female/<br>1" Tri-Clamp® | Adapter |  |  |
| **ZUB-AD2G50T50** | G 2 female/<br>2" Tri-Clamp® | Adapter |  |  |

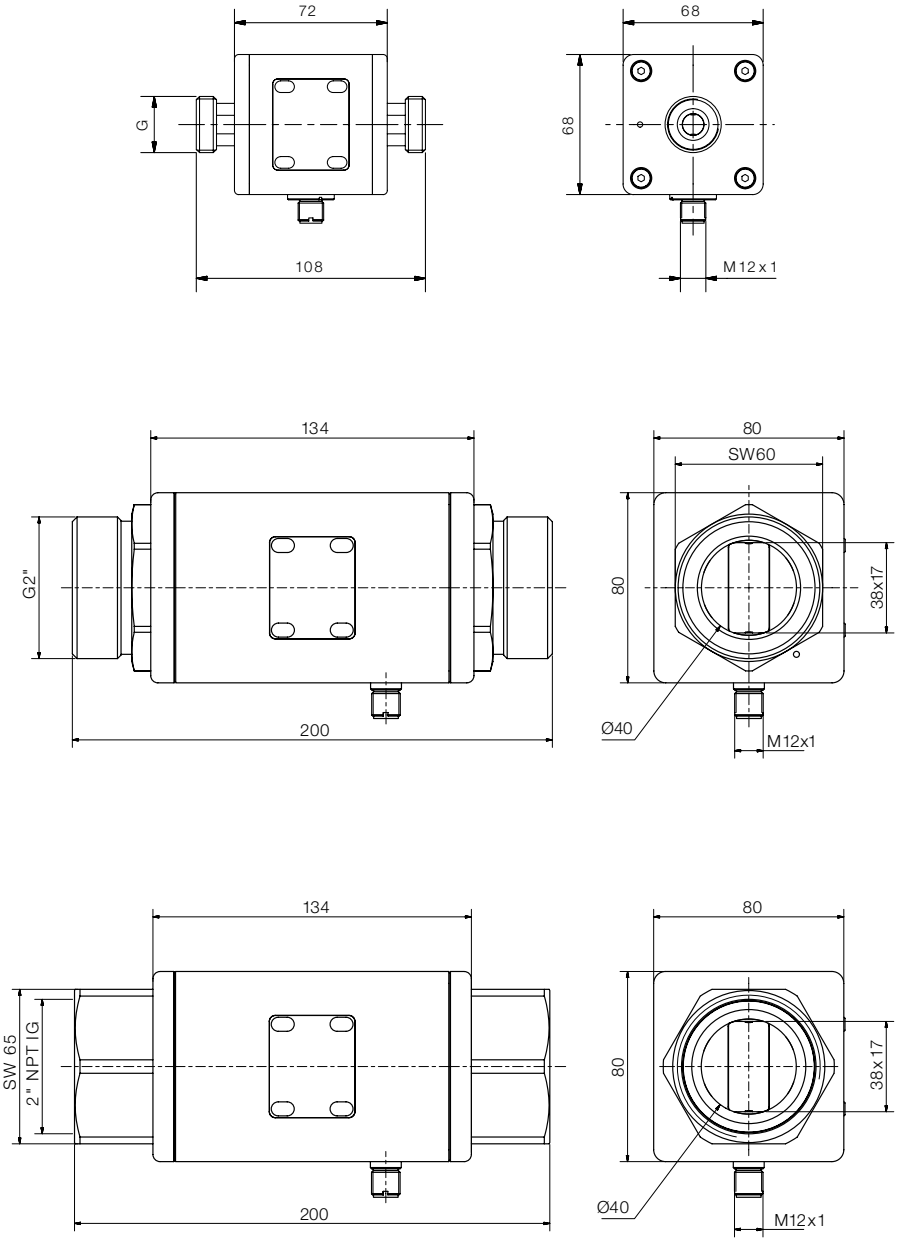
* ***Note:*** All fitting kits include 2 x Klinger SIL® flat sealing gaskets or 2 x FKM O-rings (for ZUB-AD2G50T50)

## Pressure Loss




① MIM-xx05xG4...
② MIM-xx15xG5...
③ MIM-xx35xx9...
④ MIM-xx20xG6...
⑤ MIM-xx10xG5...
⑥ MIM-xx03xG4...
⑦ MIM-xx15xG6...

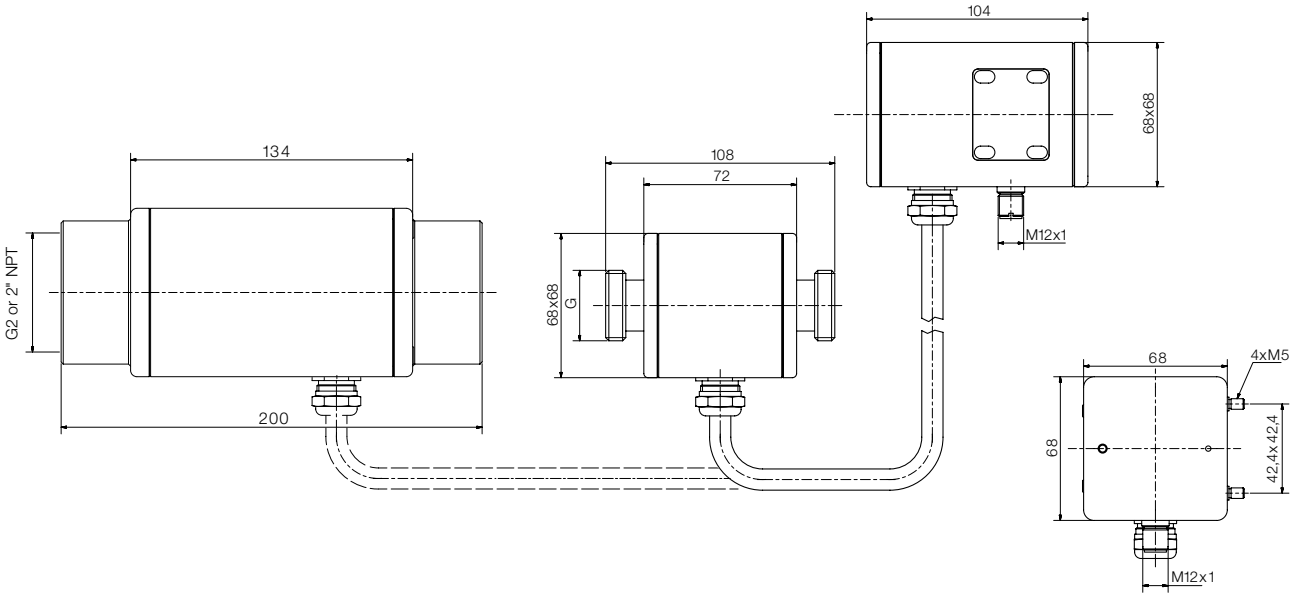
**Dimensions** [mm]
**Compact version**



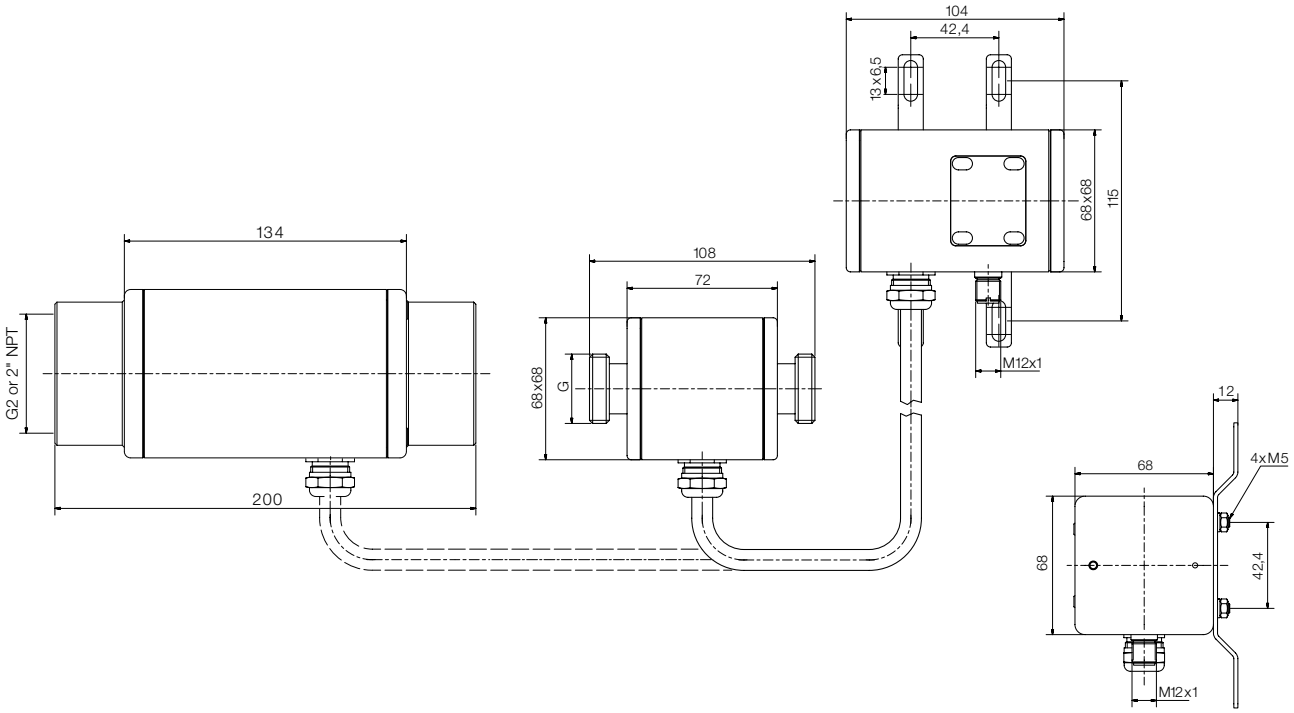
**Dimensions** [mm] (continued)

**Remote version**

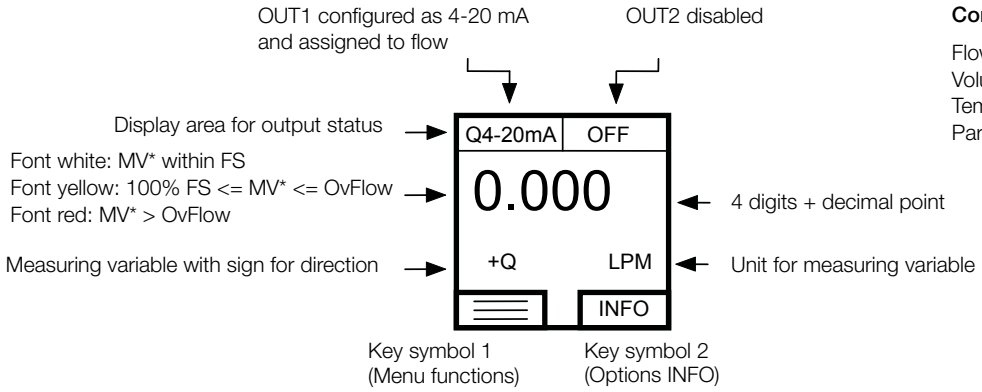
Without wall mounting brackets




With wall mounting brackets



## Measuring Mode, Display Layout »Single« configurable

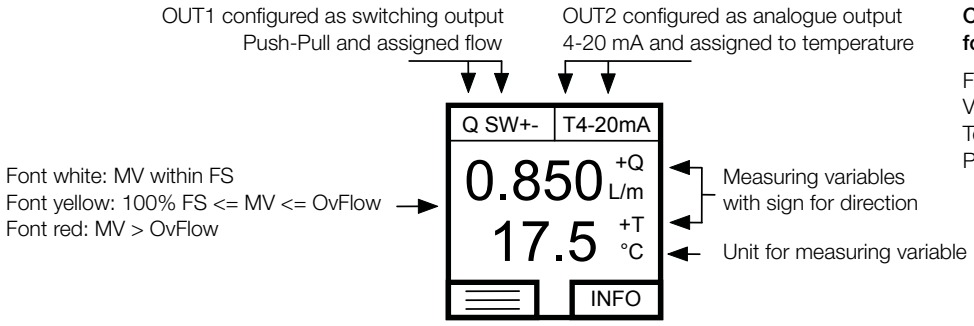



**Configurable variables**

| | |
|---|---|
| Flow rate | Q |
| Volume | AC |
| Temperature | T |
| Part Volume | PT |

* Measured Value

## Measuring Mode, Display Layout »Dual« configurable




**Configurable variables for both displays**

| | |
|---|---|
| Flow rate | Q |
| Volume | AC |
| Temperature | T |
| Part Volume | PT |