Magnetic Inductive Flow Meter

all-metal design

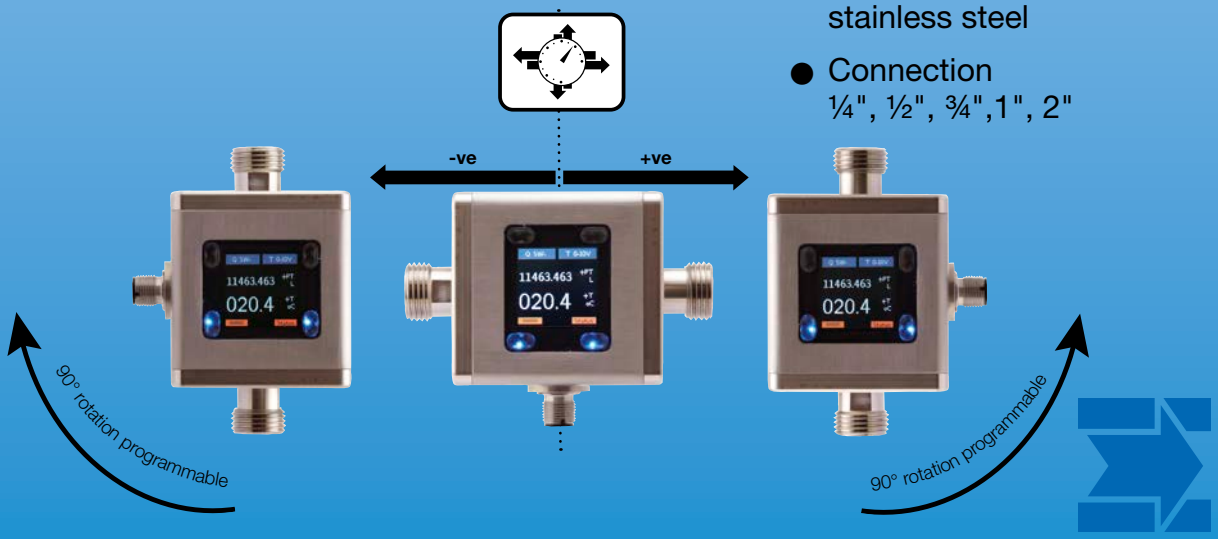
measuring • monitoring • analysing

MIM





- 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 ¼", ½", ¾",1", 2"



S5

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Description

The new flow meter 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. The units include a universal U-PACE electronics (Universal Precision and Control Electronics) which features two outputs arbitrarily configurable by the customer.

The U-PACE electronics offers various diagnostic functions and the following features:

- 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
- IO link function

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
- Food contact suitable
- CSA certification of U-PACE electronics for Ordinary Locations (Ordloc)
- International IECEE Certification acc. to CB-Scheme with U-PACE

Technical Details

Measurement process:	electromagnetic
Range:	see order details
Media:	conductive fluids
Minimum conductivity:	≥20 µS/cm (≥35 µS/cm for measuring range 01H/01G)
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 (depending on ambient temperature; flow >0.2 m/s)
Measuring range:	temperature range of medium
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 PC

Wetted parts

Connection fitting:	stainless steel 1.4404
Insulation parts:	PEEK
Electrodes:	stainless steel 1.4404
Seals:	FKM (Option: EPDM)
Protection:	IP 67
Conformity:	Regulation (EC) No 1935/2004 on materials and articles intended to come into contact with food

* 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

No responsibility taken for errors;
subject to change without prior notice.

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Technical Details (continued)

Temperature ranges

Design	Electronics	Model	Seals material	Media temperature	Ambient temperature
compact version	C3T	MIM-12 MIM-13	FKM	-20 °C … +70 °C [2]	-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
[2] Continuous -20 °C … +70 °C, short-term up to max. +85 °C (for max. 60 minutes at max. +40 °C ambient temperature and repetition earliest after 4 hours). Use of the electrical outputs remains limited to temperature range -20 °C … +70 °C.

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
f_{min} @ FS = 50 Hz
f_{max} @ FS = 1000 Hz

Alarm output: NPN, PNP, Push-Pull, configurable max. 30 V_{DC}, max. 200 mA short-circuit proof

Analogue output: active, 3 wire, 0(4)-20 mA, max. load 500 Ω or 0(2)-10 V_{DC}, (R_i = 500 Ω)
(factory calibrated with R_L = 1 MΩ)

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

When operated under the CSA Label, the equipments shall be supplied with an external power supply which fulfils the requirements of Cl. 6.3.1, 6.3.2, 9.4 of IEC/CSA/UL 61010-1 and fulfils the requirements of the national authorities.

For example, by the use of a Class 2 Limited Power Source (LPS)

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Connection/ranges

Connection	Inside diameter (DN)	Range
G ¼	2.4 x 3 mm	0.01 ... 1 l/min
G ½	5 mm	0.03 ... 3 l/min / 0.04 ... 10 l/min
½" NPT	5 mm	0.48 ... 48 GPH / 0.01 ... 2.6 GPM
G ¾	10 mm	0.1 ... 25 l/min / 0.2 ... 50 l/min
¾" NPT	10 mm	0.025 ... 6.6 GPM / 0.05 ... 13 GPM
G 1	15 mm	0.2 ... 50 l/min / 0.4 ... 100 l/min
1" NPT	15 mm	0.05 ... 13 GPM / 0.1 ... 26 GPM
G 2	see dimensional drawing	1,5 ... 350 l/min / 3 ... 650 l/min
2" NPT	see dimensional drawing	0,4 ... 90 GPM / 0,8 ... 170 GPM

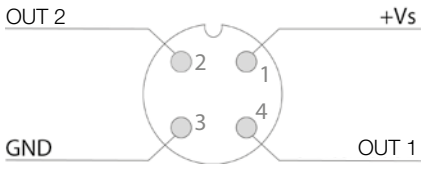
Configuration of outputs

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



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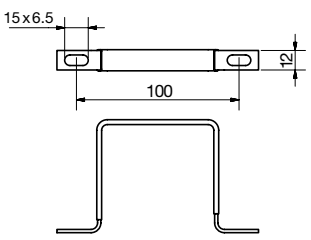
Order Details (Example: **MIM-12 15H G5 C3T 0**)

Model	Range	Connection	U-PACE Electronics	Special version
MIM-12 = housing/ electrode VA, FKM seal **MIM-13**[4] = housing/ electrode VA, EPDM seal	**01H**[1] = 0.01 ... 1 l/min **01G**[2] = 0.16 ... 16 GPH	**G2** = G ¼ male	**C3T** = compact, TFT display, 2 outputs (current/voltage/ pulse/frequency/alarm output configurable), M12x1 plug **P02**[3] = remote version, TFT display, 2 m PVC cable, max. 85 °C **E02**[3] = remote version, TFT display, 2 m ETFE cable, max. 140 °C	**0** = without **K**[5] = including calibration report
	03H[1] = 0.03 ... 3 l/min **05H**[1] = 0.04 ... 10 l/min	**G4** = G ½ male		
	03G[2] = 0.48 ... 48 GPH **05G**[2] = 0.01 ... 2.6 GPM	**N4** = ½" NPT female		
	10H[1] = 0.1 ... 25 l/min **15H**[1] = 0.2 ... 50 l/min	**G5** = G ¾ male		
	10G[2] = 0.025 ... 6.6 GPM **15G**[2] = 0.05 ... 13 GPM	**N5** = ¾" NPT female		
	15H[1] = 0.2 ... 50 l/min **20H**[1] = 0.4 ... 100 l/min	**G6** = G 1 male		
	15G[2] = 0.05 ... 13 GPM **20G**[2] = 0.1 ... 26 GPM	**N6** = 1" NPT female		
	35H[1] = 1.5 ... 350 l/min **40H**[1] = 3 ... 650 l/min	**G9** = G 2 male		
	35G[2] = 0.4 ... 90 GPM **40G**[2] = 0.8 ... 170 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] Measuring range code 35 is not in conformance with DVGW 270 and WRAS guidelines
[5] Number of measuring points (standard): 5

Accessories (Spare part)

Description	Model	Dimensions [mm]	Image	Weight (Set)
Clamping bracket set for wall mounting (stainless steel with partial polyolefin sleeve)	**ZUB-MIM225128**			96 g

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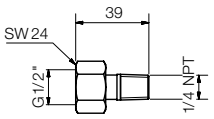
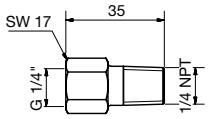
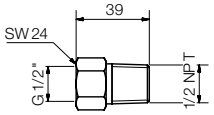
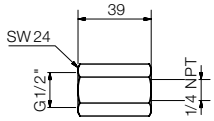
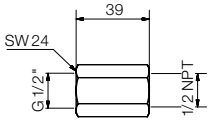
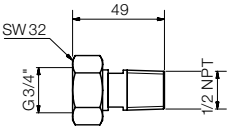
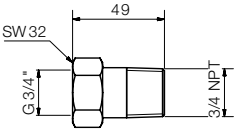
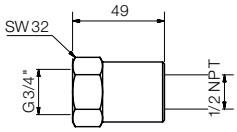
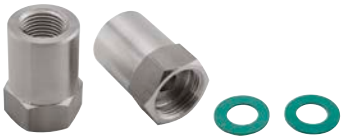
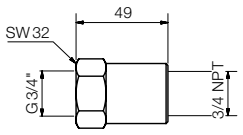
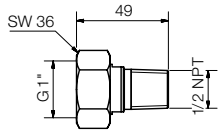
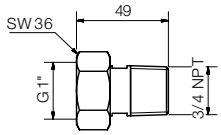
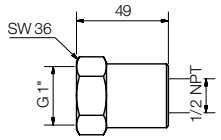
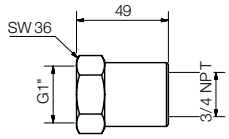
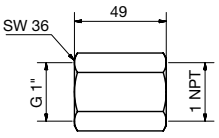
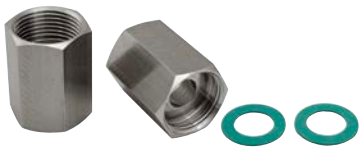
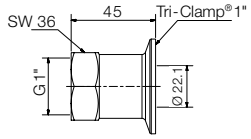
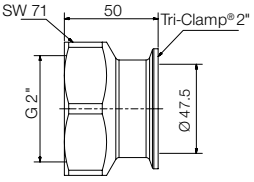
Order Details MIM Fitting Sets Accessory Kits*

Accessory kit number	Meter/ Process connection	Fitting set type	Dimensions [mm]	Image	Weight (Set)
ZUB-AD2U15P08	G ½ cap nut/ ¼" NPT male	Cap nut and union			117 g
ZUB-AD2G08P08	G ¼ female/ ¼" NPT male	Adapter			73 g
ZUB-AD2G15P15	G ½ female/ ½" NPT male	Adapter			184 g
ZUB-AD2G15N08	G ½ female/ ¼" NPT female	Adapter			223 g
ZUB-AD2G15N15	G ½ female/ ½" NPT female	Adapter			153 g
ZUB-AD2U20P15	G ¾ cap nut/ ½" NPT male	Cap nut and union			264 g
ZUB-AD2G20P20	G ¾ female/ ¾" NPT male	Adapter			368 g
ZUB-AD2G20N15	G ¾ female/ ½" NPT female	Adapter			431 g

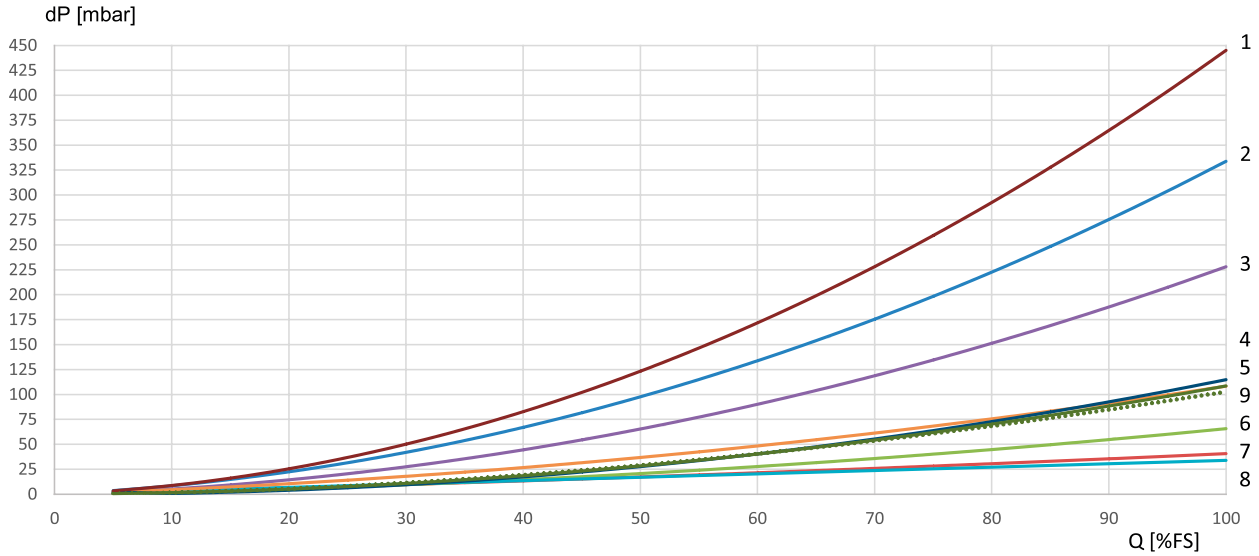
* ***Note:*** All fitting kits include 2 x Klinger SIL® flat sealing gaskets

Order Details MIM Fitting Sets Accessory Kits* (continued)

Accessory kit number	Meter/ Process connection	Fitting set type	Dimensions [mm]	Image	Weight (Set)
ZUB-AD2G20N20	G ¾ female/ ¾" NPT female	Adapter			359 g
ZUB-AD2U25P15	G 1 cap nut/ ½" NPT male	Cap nut and union			260 g
ZUB-AD2U25P20	G 1 cap nut/ ¾" NPT male	Cap nut and union			329 g
ZUB-AD2G25N15	G 1 female/ ½" NPT female	Adapter			485 g
ZUB-AD2G25N20	G 1 female/ ¾" NPT female	Adapter			410 g
ZUB-AD2G25N25	G 1 female/ 1" NPT female	Adapter			391 g
ZUB-AD2G25T25	G 1 female/ 1" Tri-Clamp®	Adapter			372 g
ZUB-AD2G50T50	G 2 female/ 2" Tri-Clamp®	Adapter			1041 g

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

Pressure Loss



①MIM-1x40xx9
②MIM-1x05xx4
③MIM-1x15xx5
④MIM-1x35xx9
⑤MIM-1x20xx6
⑥MIM-1x10xx5
⑦MIM-1x03xx4
⑧MIM-1x15xx6
⑨MIM-1x01xx2

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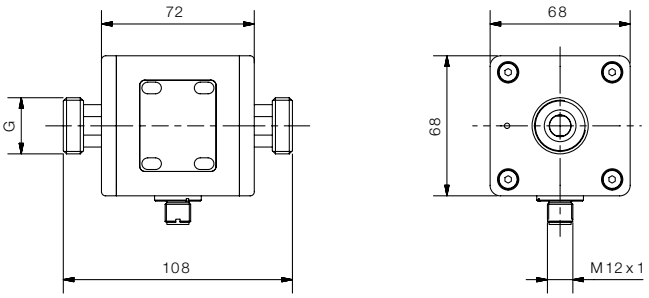
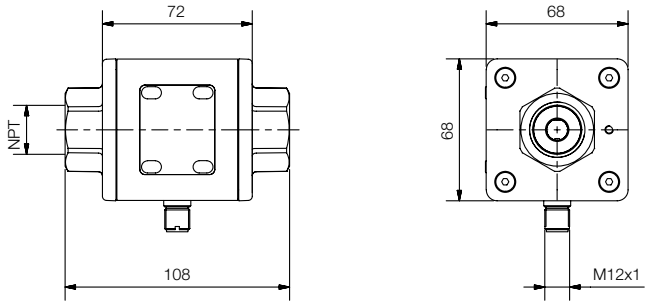
Dimensions [mm]

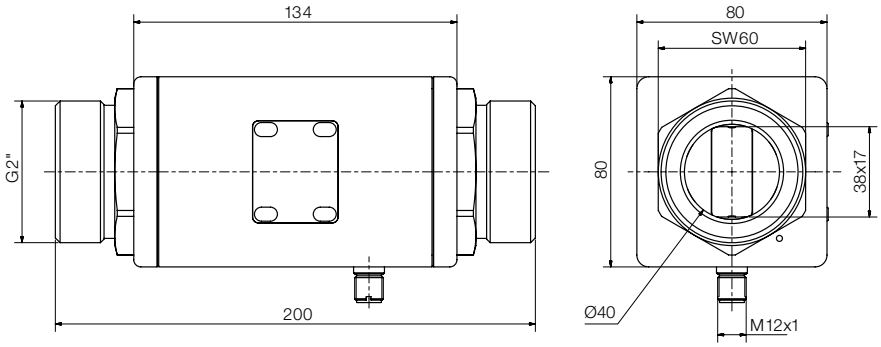
Compact version

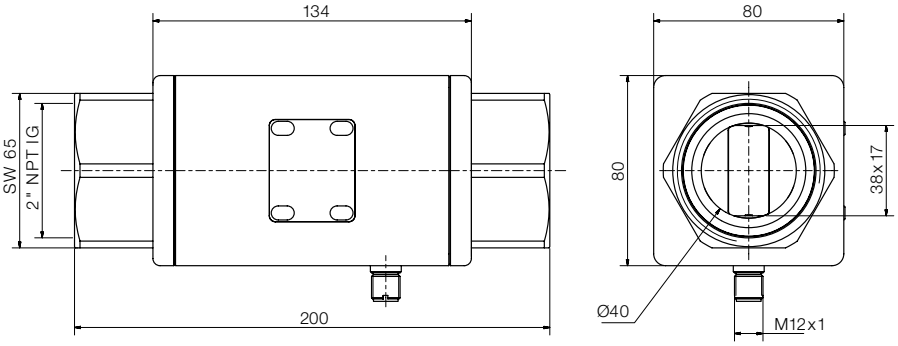
G
¼
½
¾
1



NPT
½
¾
1







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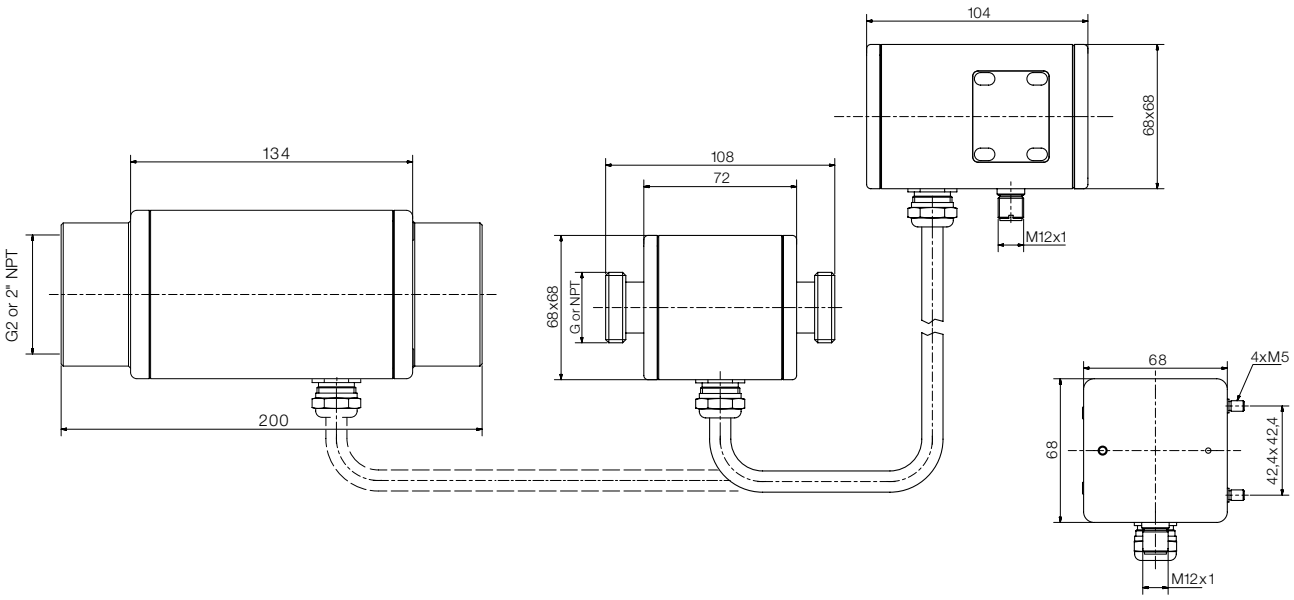
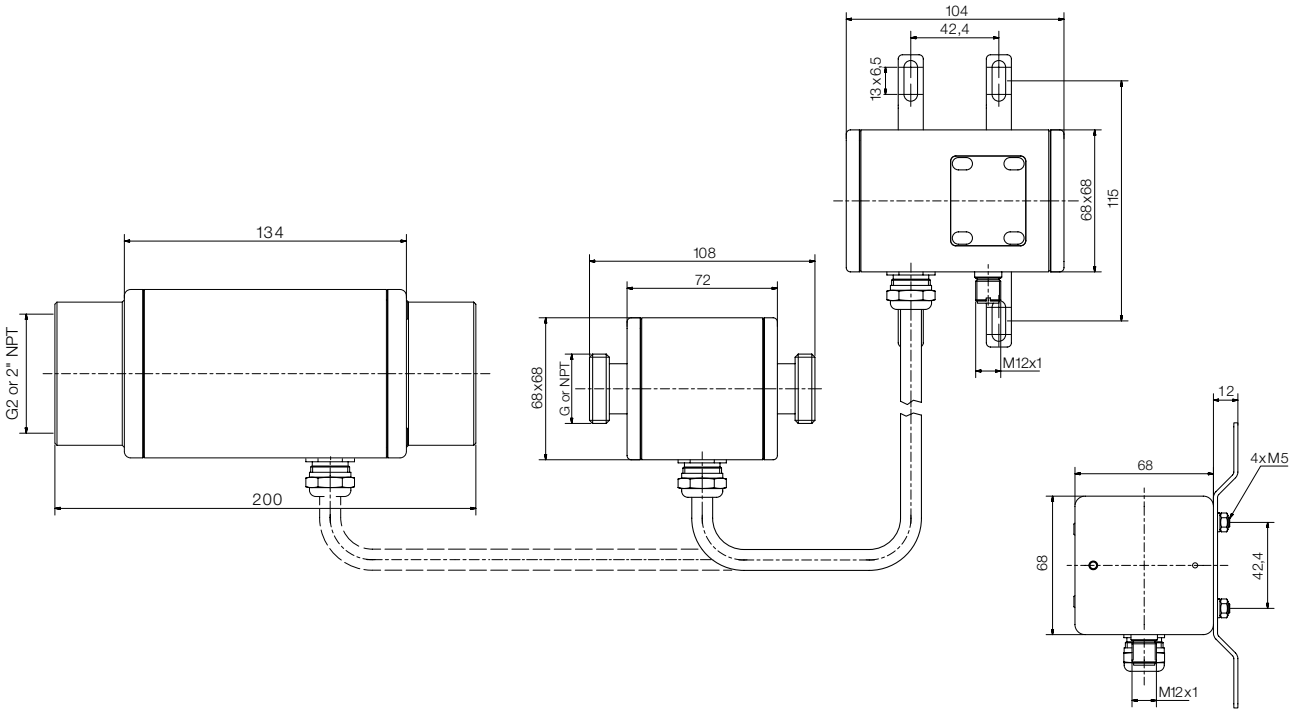
Dimensions [mm] (continued)

Remote version

Without wall mounting brackets



With wall mounting brackets



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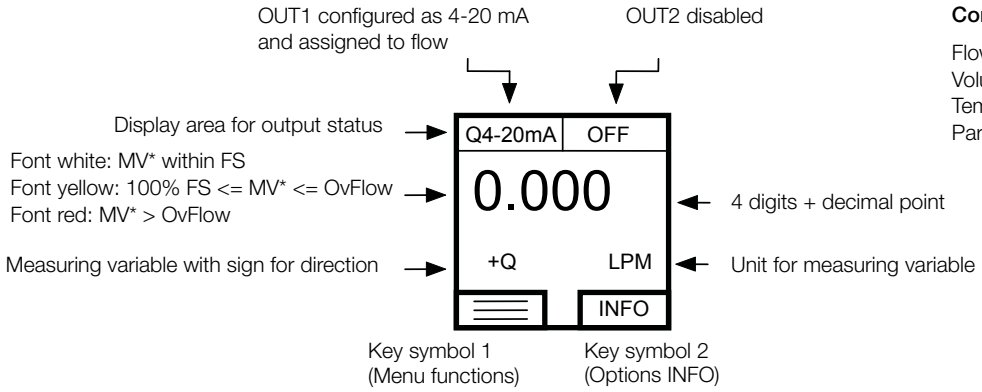
Measuring Mode, Display Layout »Single« configurable

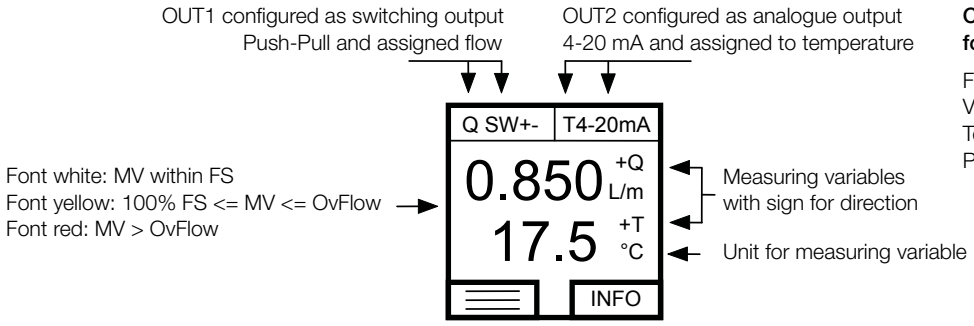


Configurable variables

Flow rate	Q
Volume	AC
Temperature	T
Part Volume	PT

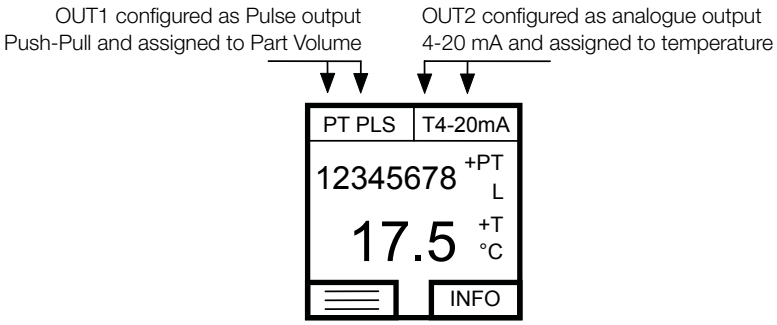
* Measured Value

Measuring Mode, Display Layout »Dual« configurable



Configurable variables for both displays

Flow rate	Q
Volume	AC
Temperature	T
Part Volume	PT



No responsibility taken for errors;
subject to change without prior notice.