→ Series **induQ®** VMM

→ Series **induQ®** VMI

→ Series **induQ®** VMZ

MAGNETIC INDUCTIVE FLOW SENSORS

Free Flow!

Principle of operation

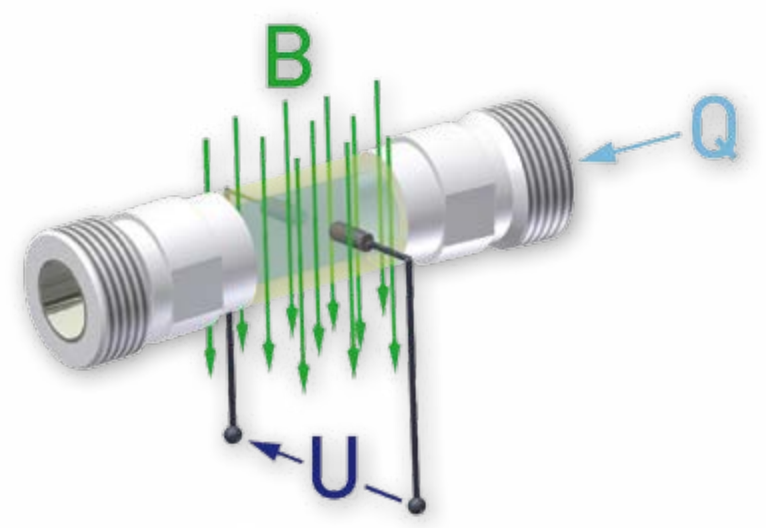
The smart flow sensors of the **induQ®** series operate according to the principle of induction: The measuring pipe is in a magnetic field (**B**). If an electrically conductive medium, with the flow (**Q**) to be measured, flows through the measuring pipe and thereby at a right-angle to the magnetic field, a voltage (**U**) is induced in the medium. This voltage is proportional to the average flow velocity and is picked up by two electrodes.

Regarding flow proportional output signals two versions are available depending on model:

- Frequency output signal
- Analog and frequency output signal

The pulse rate can be configured at the factory or on-site

The **induQ®** sensors enable the flow measurement/volume flow measurement or dosing of electrically conductive liquids without any moving parts. They are the ideal flow sensors when accuracy and reliability are a must.



Magnetic inductive flow measurement

Three series to meet every requirement

Thanks to the low price tag of SIKA's extremely compact **induQ®** electromagnetic flow sensors, this time-tested measurement method - deployed for decades in the field of process engineering - can now also be used in mechanical engineering and plant construction. Changes to the temperature, density, viscosity, concentration or electrical conductivity of the medium do not affect the output signal. You too will be impressed by the benefits afforded by the **induQ®** series:

- No moving parts
- No mechanical wear*
- Free pipe cross-section → no additional pressure drop
- Maintenance-free
- Fast response (< 500 ms or < 100 ms)
- Minimum inlet section requirements

* For aqueous media without solid fractions

VMI

Owing to its robust metal housing and stable metal process connections, the VMI series is ideal for use in the field of mechanical engineering and plant construction. Its design also makes it suitable for higher temperatures and process pressures, and the instrument is available in three different sizes.

VMZ

The VMZ is a magnetic inductive flow sensor for electrically conductive liquids and has been specially designed for OEM applications. Thanks to the use of cost-optimized plastic components, the VMZ is very reasonably priced, it has a compact and lightweight design and is available for seven flow ranges.
A calibration report is part of the delivery.

VMM

The magnetic-inductive **induQ®** flow sensors of the VMM series are thanks to their robust design suitable for use in harsher ambient conditions. The steel fitting is fully welded and therefore very stable and insensitive to interference.

The available nominal diameters from DN 32 to DN 200 cover measurement requirements for medium flow rates of up to 10 m/s. The large selection of high-quality materials provides for numerous application possibilities. Earth electrodes are available as an option. In addition, the VMM is available in both separate and compact design and is generally delivered with a calibration certificate. The electronic display allows customer-specific sensor configuration to meet the particular requirements on site.

Due to the principles involved, the inner wall of the device has to be electrically insulating. Since the robust measuring pipes of the VMM are made of stainless steel, they are lined with a non-conductive material. Hard rubber and PTFE are available as lining materials for the VMM. Depending on the process conditions such as medium, pressure and temperature, the most economical lining can therefore be used.

The electronic display unit is characterized, among other things, by the following functions:

- Rapid signal processing with a 16-bit microcontroller
- Analogue and digital outputs
  frequency or pulse output,
  device status, limits and flow direction
- Empty-pipe detection feature
- Low-flow suppression
- Easy menu-driven operation and programming
  (e.g. measuring range, pulse rate) by the user
  by means of a two-line alphanumeric display
- Password protection to prevent unauthorized access

Areas of application:

- Water and wastewater
- Mining, cement and minerals
- Pulp and paper industry
- Steel industry
- Energy industry and supply utilities
- Agriculture

VMM induQ®

Technical data

Type	VMM32	VMM40	VMM50	VMM65	VMM80	VMM100	VMM125	VMM150	VMM200
Characteristics									
Nominal diameter	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150	DN 200
Process connection	Flange connection in accordance with EN 1092-1, JIS B2220 10K or ANSI B16.5								
Flow range **→ Flow velocity [m/s]**	0...10								
→ Volumetric flow [m³/h]	0...29	0...45.2	0...70.7	0...119.5	0...181	0...282.7	0...441.8	0...636.2	0...1131
Accuracy*									
v = 1...10 m/s	±0.5 % of reading								
v < 1 m/s	±0.4 % of reading ±1 mm/s								
additionally									
Frequency output	±0.05 % per 10 K								
Analogue output	±0.1 % per 10 K								
Repeatability	±0.15 % of reading								
Response time	< 100 ms**								
Signal output starting from	> 0 m/s								
Medium / **min. conductivity of medium**	Water and other conductive liquids / 50 µS/cm								
Medium temperature									
→ Hard rubber	0...90 °C								
→ PTFE	-20...100 °C at 40 bar -20...150 °C at 25 bar -20...180 °C at 16 bar								
→ Process connections, steel	Min. -10 °C								
→ Process connections, stainless steel	Min. -20 °C								
Ambient temperature									
→ Hard rubber	0...80 °C								
→ PTFE	-20...100 °C								
→ Process connections, steel	Min. -10 °C								
→ Process connections, stainless steel	Min. -20 °C								
→ Display	-20...50 °C***								
Storage and transport temperature	-20...60 °C								
Compressive strength **→ EN1092-1**	PN 40	PN 40	PN 40	PN 16**** PN 40	PN 16 PN 40	PN 16 PN 40	PN 16 PN 40	PN 16 PN 40	PN 10 PN 16 PN 25 PN 40
→ JIS B2220 10K **→ ANSI B16.5 150 RF**	9.8 bar 19.6 bar (Process connection, steel) 15.9 bar (Process connection, stainless steel)								
Flow indication	LCD, backlighting								
Degree of protection EN 60529	IP67								

* Reference conditions: Media temperature 10...30 °C; Ambient temperature 20...30 °C; warm-up period 30 min.; straight pipe lengths; inlet 5 x DN, outlet 2 x DN, regularly centered and grounded

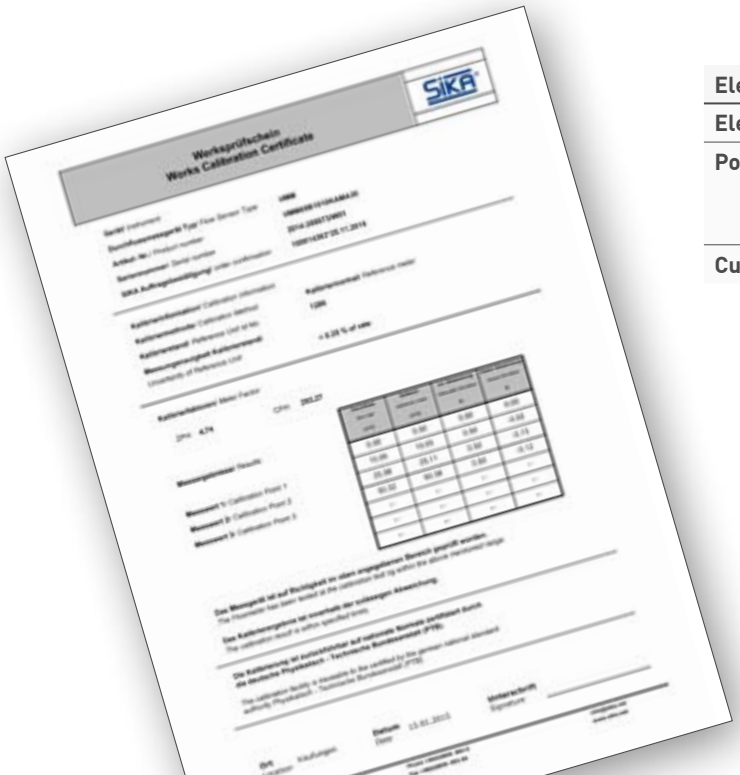
** Depending on the electronics settings

*** The readability of the LCD display is restricted below 0 °C

**** 8 bolt flanges

Output singals and electrical data

Typ	VMM32	VMM40	VMM50	VMM65	VMM80	VMM100	VMM125	VMM150	VMM200
Puls / frequency output									
→ **Configuration**	Pulse signal or frequency signal selectable								
Pulse output									
→ **Pulse rate (factory-set) [1/m³]**	1000	1000	1000	1000	1000	1000	1000	500	250
→ **Pulse significance**	≤ 1000 Pulse/s								
→ **Pulse width**	≥ 0.1 ms (max. 2 s), adjustable								
→ **Signal shape**	Squarewave signal								
Frequency output									
→ **Factory-scaled measuring range corresponds to 0...1 kHz [m³/h]**	0...10	0...10	0...20	0...50	0...50	0...70	0...100	0...150	0...250
→ **Frequency**	0...1 kHz								
→ **Signal shape**	Squarewave signal								
Analogue output									
→ **Factory-scaled measuring range corresponds to 4...20 mA [m³/h]**	0...10	0...10	0...20	0...50	0...50	0...70	0...100	0...150	0...250
→ **Operating range**	0 ... 20 mA / 4 ... 20 mA, selectable								
→ **Current limitation**	21.6 mA								
→ **Max. burden**	600 Ω								
→ **Short-circuit proof**	Permanent								
Alarm output									
→ **Quantity**	2								
→ **Version**	Optocoupler								
→ **Function**	Status output: Preflow, backflow, MIN flow rate, MAX flow rate, alarm (adjustable)								
→ **Switching values**	U_{max}: 30 V; I_{max}: 60 mA; P_{max}: 1,8 W								



Electrical data	
Electrical connection	Cable gland M20 x 1.5
Power supply	230 VAC (-15 % / +10 %), 50/60 Hz 115 VAC (-15 % / +10 %), 50/60 Hz 19...36 VDC
Current consumption	15 VA

Types and materials

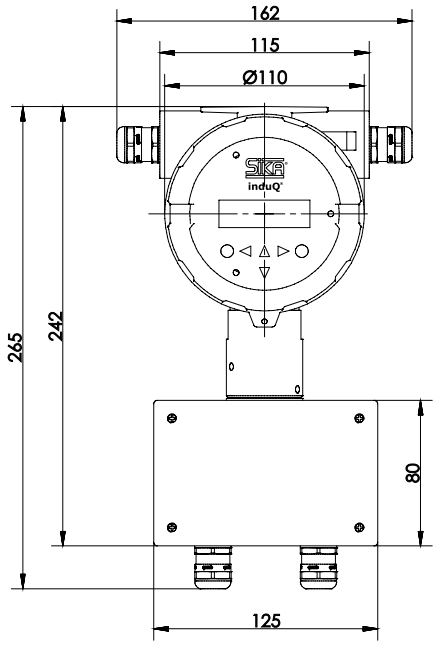
Compact type

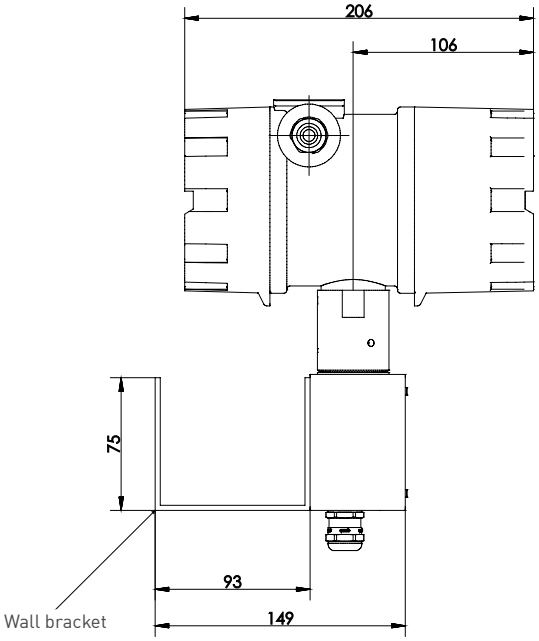
Separate type

Materials	
Not in contact with fluid	
Display housing	Casted aluminium
Sensor housing	Steel
Measuring pipe	Stainless steel
Process connection	Steel 1.0460 or stainless steel 1.4404
In contact with fluid	
Electrodes	Stainless steel 1.4571 or Hastelloy C276
Measuring pipe lining	PTFE or Hard rubber

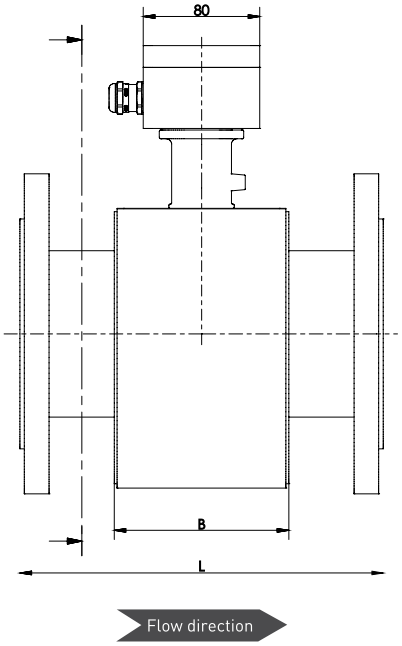
Dimensions

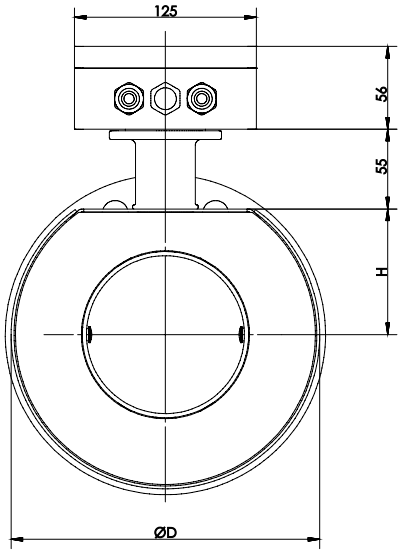
Separate type (Display)



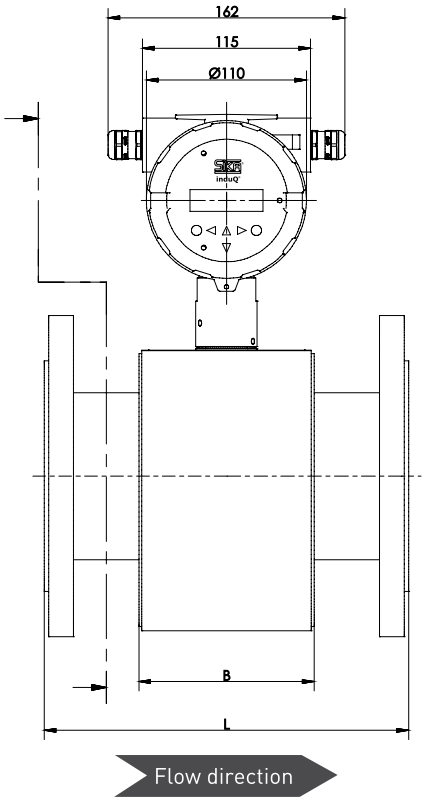


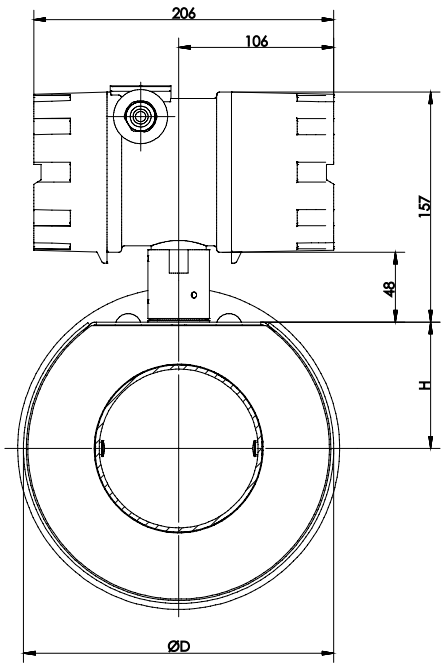
Separate type (Sensor)





Compact type





Dimensions [mm]

Process connection		Installation length L				Sensor			Weight EN 1092-1 [kg]
EN 1092-1 JIS B2220 10K	ANSI B16.5	Hard rubber	PTFE		Tolerance	B	D	H	
			Without protection rings	With protection rings					
DN 32	1¼"	200	200	206	+0 / -3	80	130	53	7
DN 40	1½"	200	200	206	+0 / -3	80	130	53	7,5
DN 50	2"	200	200	206	+0 / -3	80	140	57	9
DN 65	2½"	200	200	206	+0 / -3	80	155	63	10
DN 80	3"	200	200	206	+0 / -3	80	170	70	13
DN 100	4"	250	250	256	+0 / -3	120	210	86	15
DN 125	5"	250	250	256	+0 / -3	120	240	98	19
DN 150	6"	300	300	306	+0 / -3	120	285	117	23
DN 200	8"	350	350	360	+0 / -3	200	350	143	36

Order code

Order example	VMM32	A	1	0	1	0	KAMA	20
Nominal diameter								
DN 32 / 1¼"	VMM32							
DN 40 / 1½"	VMM40							
DN 50 / 2"	VMM50							
DN 65 / 2½"	VMM65							
DN 80 / 3"	VMM80							
DN 100 / 4"	VMM1C							
DN 125 / 5"	VMMV3							
DN 150 / 6"	VMM3L							
DN 200 / 8"	VMM2C							
Process connection								
EN 1092-1 PN 10 starting from DN 200		A						
EN 1092-1 PN 16 starting from DN 65		B						
EN 1092-1 PN 25 starting from DN 200		C						
EN 1092-1 PN 40 starting from DN 32		D						
JIS B2220 10K		J						
ANSI B16.5 150 RF		I						
Material process connection								
Steel 1.0460			1					
Stainless steel 1.4571			2					
Lining								
PTFE				0				
Hard rubber				1				
Material electrodes								
Stainless steel 1.4571					1			
Hastelloy C276					2			
Earth electrode								
Without						0		
One						1		
Two						2		
Type								
Compact type with display							KAMA	
Separate type with display							GAMA	
Power supply								
230 VAC, 50/60 Hz								20
115 VAC, 50/60 Hz								40
19...36 VDC								30

Accessories

Earthing ring VMM

Earthing ring

An earthing ring is used for the electrical reference and earthing of the medium being measured. It is necessary if the pipes are not electrically conductive or lined (plastic or concrete pipes, etc.). The earthing ring must be connected to the provided earthing screw of the sensor. Retrofitting is possible. Material stainless steel 1.4571.

Sensor cable set

Sensor cable between sensor and display unit (separate design) consisting of magnetic power cable and electrode cable for configuration of M16 x 1.5 screw connection.

Protection rings VMM

Pair of protection rings

Protection rings protect the inlet and outlet edges of the sensor against mechanical damage, in particular when abrasive media such as gravel, sand, etc. are concerned. At the same time, they also serve as earthing rings. The protection rings are firmly screwed to the sensor. Material stainless steel 1.4571.

Order code

Order example	VMMZEW	32	A	1
Type				
Earthing ring	VMMZEW			
Protection rings (pair)	VMMZPR			
Nominal diameter				
DN 32 / 1¼"		32		
DN 40 / 1½"		40		
DN 50 / 2"		50		
DN 65 / 2½"		65		
DN 80 / 3"		80		
DN 100 / 4"		1C		
DN 125 / 5"		V3		
DN 150 / 6"		3L		
DN 200 / 8"		2C		
Process connection				
EN 1092-1			E	
JIS B2220 10K			J	
ANSI B16.5 150 RF			A	
Lining				
PTFE				0
Hard rubber				1

Sensor cable set - length of cable	Order code
5 m	VMMZSC000Z0005
10 m	VMMZSC000Z0010

VMI induQ®

Technical data

Type	VMI 07	VMI 10	VMI 20
Characteristics			
Nominal diameter	DN 7	DN 10	DN 20
Process connection	G½-ISO 228 male	G½-ISO 228 male	G 1-ISO 228 male
Flow range	1...20 l/min	2...40 l/min	10...200 l/min
Accuracy pulse output*	±1.5 % of reading ±0.3 % full scale		
Accuracy analogue output*	Additionally typical ±1.25 % of reading ±0.3 % full scale		
Repeatability*	1 %		
Repeatability with analogue output*	Additionally typical ±0.1 % of reading		
Response time	< 500 ms		
Signal output starting from	Approx. 0.5 l/min	Approx. 1 l/min	Approx. 5 l/min
Medium / min. conductivity of medium	Water and other conductive liquids / 50 µS/cm		
Medium temperature	5...90 °C		
Ambient temperature	5...70 °C		
Pressure rating	PN 16		
Flow indication	LED green, flow proportional blinking		
Degree of protection EN 60529	IP65 (with attached cable socket)		
Output signals			
Frequency output signal			
→ Pulse rate	Standard: 855 pulses/l, optional: 1...2000 pulses/l** factory setting	Standard: 855 pulses/l, optional: 1...1000 pulses/l** factory setting	Standard: 200 pulses/l, optional: 1...200 pulses/l** factory setting
→ Resolution	Standard: 1.2 ml/pulse, optional: 1.000...0.5 ml/pulse factory setting	Standard: 1.2 ml/pulse, optional: 1.000...1 ml/pulse factory setting	Standard: 5 ml/pulse, optional: 1.000...5 ml/pulse factory setting
→ Signal shape	Square wave signal NPN, internal pull-up resistor 2 kΩ, pulse duty ratio 50:50	Square wave signal NPN, internal pull-up resistor 2 kΩ, pulse duty ratio 50:50	Square wave signal NPN, internal pull-up resistor 2 kΩ, pulse duty ratio 50:50
→ Signal current	Max. 20 mA, current limited	Max. 20 mA, current limited	Max. 20 mA, current limited
Analog output signal (optional)	4...20 mA corresponds to 0...20 l/min***	4...20 mA corresponds to 0...40 l/min***	4...20 mA corresponds to 0...200 l/min***
→ Current limitation	Approx. 26 mA		
→ Max. burden	250 Ω to GND		
Electrical data			
Electrical connection	Plug connector M12 x 1		
Power supply	24 VDC (±10 %)		
Current consumption	Approx. 80 mA (pulse output) Approx. 95 mA (analogue output)		
Electrical protection measures	Short-circuit proof (up to 30 V) and polarity protection (up to -30 V)		

* Test conditions: Water 23 °C at 300µS; standard puls rate
** Not available with analogue output
*** Other ranges available on request

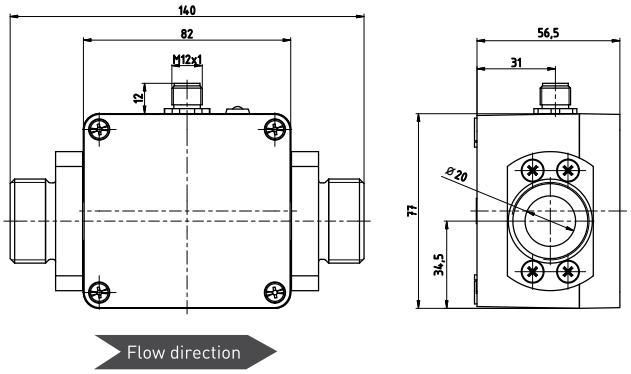
Dimensions and materials

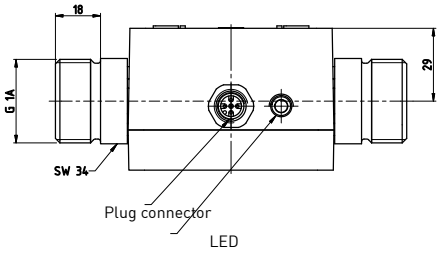
Type VMI

Side view VMI

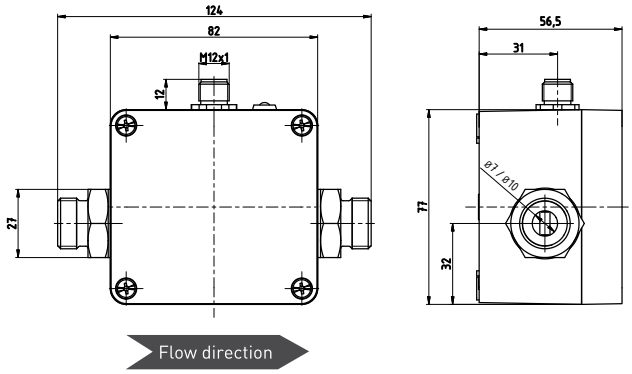
Materials	
Electrodes	Stainless steel 1.4571
Process connections	Stainless steel 1.4571
Measuring pipe	PEEK-GF30
Gasket	EPDM
Housing	Casted aluminium

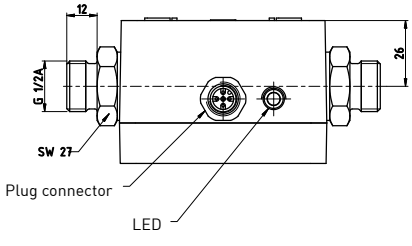
VMI 20



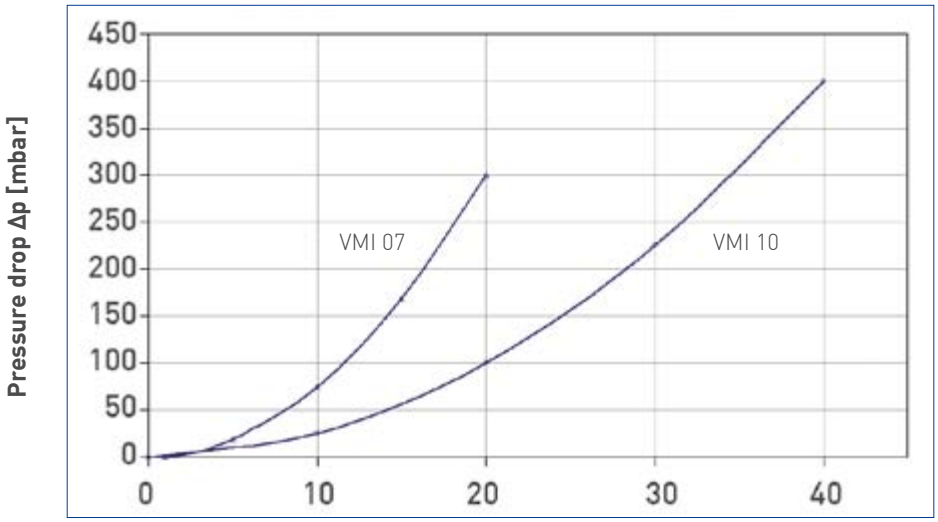


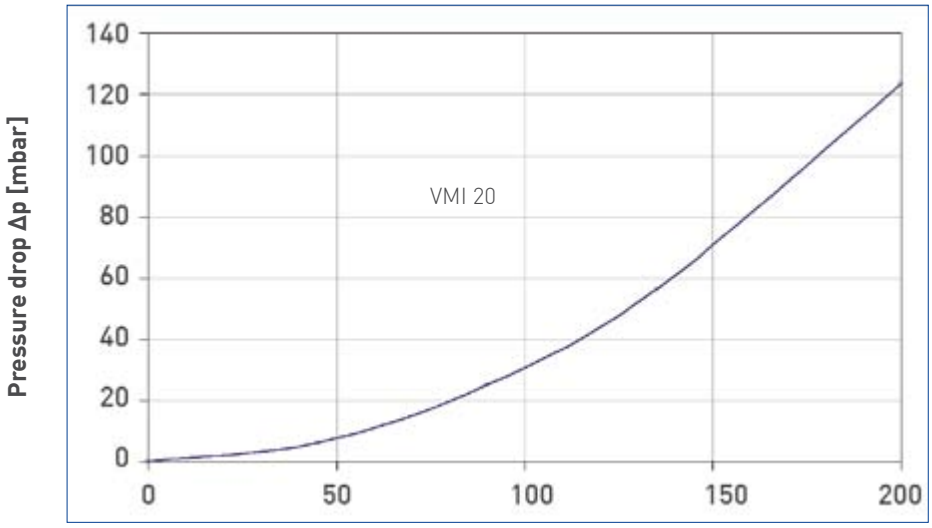
VMI 07/10





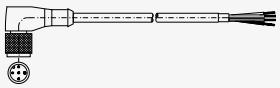
Typical pressure drop





Order code and accessories

Order example	VMI0720K7	2PT	0	A3
Nominal diameter				
DN 7	VMI0720K7			A3
DN 10	VMI1040K7			A3
DN 20	VMI2011K7			A5
Output signal				
Frequency output signal		2PT		
Analogue- and frequency output signal		BPT		
Mounting				
Without (standard)			0	
With fixing brackets			6	

Accessory part	Length	Order code	
Connection cable with 4-pin cable socket M12 x 1, angle type molded lead, sheathing material PUR, shielded, (T_{max} = 80 °C) - UL-approval	3 m 5 m 10 m	XVT 2053 XVT 2009 XVT 2070	

VMZ induQ®

Technical data

Type	VMZ 030	VMZ 081	VMZ 082	VMZ 153	VMZ 204	VMZ 205	VMZ 256
Characteristics							
Nominal diameter	DN 3	DN 8	DN 8	DN 15	DN 20	DN 20	DN 25
Process connection	G⅜ B male	G½ B male	G½ B male	G¾ B male	G 1 B male	G 1 B male	G 1¼ B male
Flow range	0.1...2 l/min	0.25...5 l/min	1...20 l/min	2.5...50 l/min	5...100 l/min	10...200 l/min	12.5...250 l/min
Accuracy*	1 % of reading						
Repeatability	1 %						
Response time	<100 ms						
Signal output starting from	0.05 l/min	0.1 l/min	0.25 l/min	1 l/min	2 l/min	4 l/min	5 l/min
Max. Flow rate	2.5 l/min	6 l/min	25 l/min	60 l/min	120 l/min	240 l/min	300 l/min
Medium / min. conductivity of medium	Water and other conductive liquids / 20 µS/cm						
Medium temperature	-10...60 °C (non-freezing)						
Ambient temperature	5...60 °C						
Max. pressure rating	10 bar at 20 °C, 8 bar at 40 °C, 6 bar at 60 °C						
Indications	Red LED = power, green LED = flow rate						
Degree of protection EN 60529	IP65 (with attached cable socket)						
Output signals							
→ Puls rate**	10 000 pulses/l	4000 pulses/l	1000 pulses/l	400 pulses/l	200 pulses/l	100 pulses/l	80 pulses/l
→ Resolution**	0.1 ml/Puls	0.25 ml/Puls	1 ml/Puls	2.5 ml/Puls	5 ml/Puls	10 ml/Puls	12.5 ml/Puls
→ Signal shape	Frequency signal, square wave, can be connected as PNP or NPN open collector pulse duty ratio 50:50						
→ Signal current	Max. 25 mA						
Electrical data							
Electrical connection	4 pin plug connector M12 x 1						
Power supply	24 VDC (±15 %) or 12 VDC (±15 %)						
Power consumption	0.6 W						
Electrical protection measures	Short-circuit proof and polarity protection						

* Test conditions: Water 23 °C

** Other pulse rates / resolutions available on request
optional output signal with lower frequency, designed specifically for connection to digital PLC inputs


Endprüfung & Kalibrierung Durchflusssensor VMZ
Final Test & Calibration Flow Sensor VMZ
SIKA

Artikelnummer Article No.	VMZ256S2PEG24660	Ort Place	SIKA FlowLabs Ausmass et Beaufitru
Seriennummer Serial No.	12462	Datum Date	11.12.2014 14:55:54
Produktionsauftrag Production Order No.	14200	Prüfer Test Engineer	LIONEL
Dateipfad Path	C:\Work\Q2\Files\ReportFiles\VMZ\1420 0\L\O\12462.doc	Bewertung Valuation	i.O.
Prüfstand Test Bench	Q21	Prüf Software Test Software	4.7
Durchfluss-Referenzen Reference flow meter	MID, DN06, Inventar Nr. 10-0815 & MID, DN25, Inventar Nr. 10-0817 Mag Meters, DN06, Inventory No. 10-0816 & DN25, Inventory No. 10-0817		0,5%
Messunsicherheit des Prüfstandes Measurement uncertainty of test bench			

Kalibrierergebnis
Calibration Results

Durchfluss Referenz Reference Flow Rate [l/min]	Prüfling Device Under Test f [Hz]
12.42	16.56
60.02	80.12
100.01	133.13
149.77	199.42
199.83	266.39
249.91	333.21

Pulse_Rate_[1/l]:

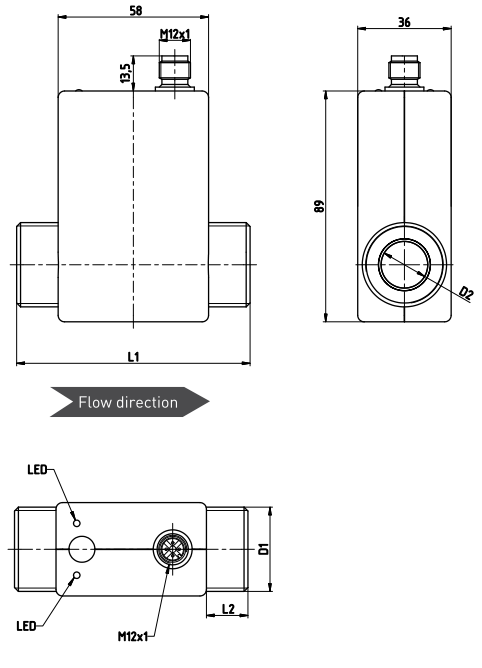
Dimensions and materials

Type VMZ

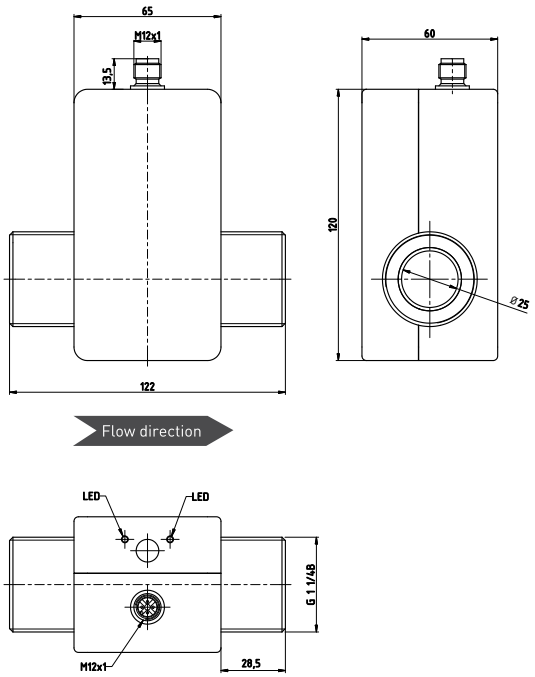
Materials	
Electrodes and grounding rings	Stainless steel 316L
Measuring pipe and process connections	POM or PVDF
O-rings	EPDM
Housing	ABS

Dimensions [mm]				
Type	**L1**	**L2**	**D1**	**D2**
VMZ 030	85	13.3	G⅜ B	Ø 3
VMZ 081	85	13.3	G½ B	Ø 8
VMZ 082	85	13.3	G½ B	Ø 8
VMZ 153	90	16	G¾ B	Ø 14
VMZ 204	90	16	G 1 B	Ø 18
VMZ 205	90	16	G 1 B	Ø 18

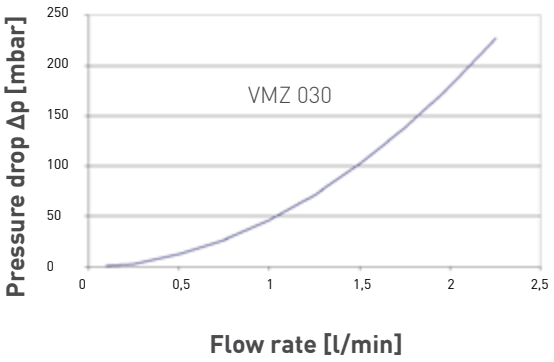
VMZ 03/08/15/20

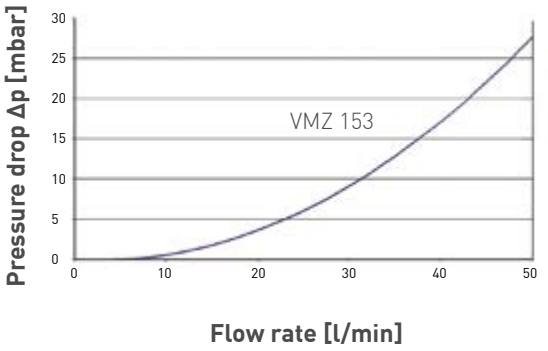


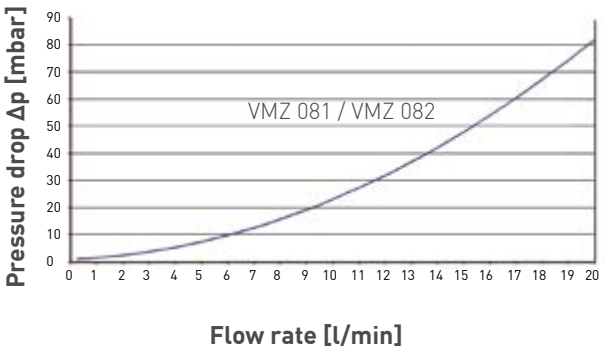
VMZ 25

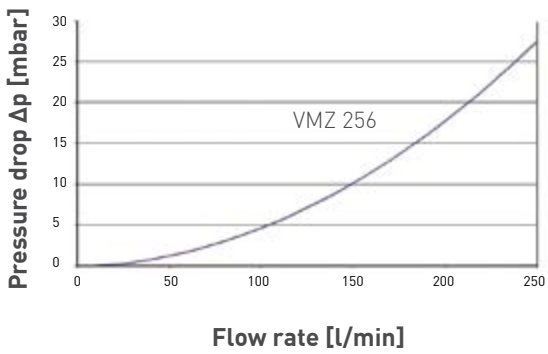


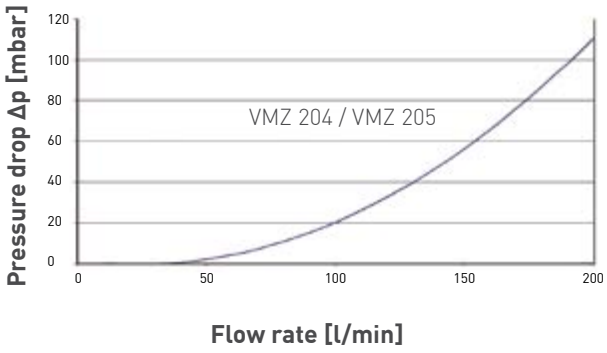
Typical pressure drop











Order code and accessories

Order example	VMZ030S1	DE	G14	211
Flow range				
0.1...2 l/min	VMZ030S1			211
0.25...5 l/min	VMZ081S1			310
1...20 l/min	VMZ082S1			320
2.5...50 l/min	VMZ153S1			430
5...100 l/min	VMZ204S1			540
10...200 l/min	VMZ205S1			550
12.5...250 l/min	VMZ256S2			660
Measuring pipe				
POM		DE		
PVDF		PE		
Power supply				
12 VDC			G14	
24 VDC			G24	

Accessory part	Length	Order code	
Connection cable with 4-pin cable socket M12 x 1, angle type molded lead, sheathing material PUR, shielded, (T_{max} = 80 °C) - UL-approval	3 m 5 m 10 m	XVT 2053 XVT 2009 XVT 2070	
4 pin cable socket M12 x 1 angle type, unassembled		VT 1331