

DESCRIPTION

The Badger Meter ModMAG[®] M2000 is the result of years of research and field use of electromagnetic flow meter technology. Based on Faraday's law of induction, these meters can measure water, wastewater, water-based fluids and other liquids that meet minimum electrical conductivity.

Designed, developed and manufactured under strict quality standards, this meter features sophisticated, processor-based signal conversion with accuracies of $\pm 0.20\%$ of rate ± 1 mm/s. The wide selection of liner and electrode materials helps provide maximum compatibility and minimum maintenance over a long operating period.

The meter is best suited for bidirectional flow measurement of fluids with a conductivity $> 5 \mu\text{S/cm}$ ($> 20 \mu\text{S/cm}$ for demineralized water). The meter has high accuracy, is easy to use, and can be chosen for a wide variety of applications. The backlit, four-line display shows all actual flow measuring data, daily and complete information, including alarm messages. The standard transmitter has 4 programmable digital outputs, one digital input, power output and different interfaces. Integrated system self checkup makes putting into operation and service easier. For service purpose, the meter configuration can be kept or transferred to another meter without a new parametering via the optional back-up parameter function.

APPLICATION

The M2000 transmitter can be integrally mounted to the sensor or can be remote-mounted, if necessary and has many advantages over other conventional technologies. The meter targets a variety of applications and is well suited for the diverse water and wastewater treatment industry. The M2000 meter can accurately measure fluid flow—whether the fluid is water or a highly corrosive liquid, very viscous, contains a moderate amount of solids, or requires special handling. Today, electromagnetic meters are successfully used in industries including building automation, oil and gas, food and beverage, pharmaceutical, water and wastewater, and chemical.

STRAIGHT PIPE REQUIREMENTS

Run sufficient straight-pipe at the sensor inlet and outlet for optimum meter accuracy and performance. An equivalent of 3...7 diameters of straight pipe is required on the inlet (upstream) side to provide a stable flow profile. Two (2) diameters are required on the outlet (downstream) side.

In applications with limited space, the M2000 can be installed with zero straight pipe requirements and fulfils the accuracy according OIML R49 and MID Annex MI-001.



FEATURES

- Available in sizes 0.25...78 in. (6...2000 mm)
- Accuracy of $\pm 0.2\%$ of reading ± 1 mm/s
- Flow Range 0.03...12 m/s
- Pulsed DC magnetic field for zero point stability
- Integral and remote signal converter availability
- Power Supply of 100...240V AC / 9...36V DC
- Corrosion-resistant liners for long life
- Measurement largely independent of flow profile
- User friendly programming procedure
- Empty pipe detection
- Power loss totalization
- Digital signal processor (32-bit)
- Non-volatile programming memory
- LCD display
- Rotating cover
- IP67 Housing
- Calibrated in state-of-the-art facilities
- Modbus[®], HART, Profibus DP, M-Bus, BACnet MS/TP, Modbus MS/TP, EtherNet/IP and BACnet/IP
- Integrated data logger
- Verifications device
- NSF/ANSI/CAN 61 and 372 listed
- CSA / AWWA C715 certified
- BEACON[®]/AquaCUE[®] connectivity

ELECTRODES

When looking from the end of the meter into the inside bore, the two measuring electrodes are positioned at three o'clock and nine o'clock. M2000 electromagnetic meters have an "empty pipe detection" feature. This is accomplished with a third electrode positioned in the meter at twelve o'clock.

If this electrode is not covered by fluid for a minimum five-second duration, the meter displays an "empty pipe detection" condition, sends out an error message, if desired, and stops measuring to maintain accuracy. When the electrode again becomes covered with fluid, the error message disappears and the meter resumes measuring.

As an option to using grounding rings, a grounding electrode (fourth electrode) can be built into the meter during manufacturing to assure proper grounding. The position of this electrode is at six o'clock.

OPERATION

The flow meter is a stainless steel tube lined with a non-conductive material. Outside the tube, two DC powered electromagnetic coils are positioned opposing each other. Perpendicular to these coils, two electrodes are inserted into the flow tube. Energized coils create a magnetic field across the whole diameter of the pipe.

As a conductive fluid flows through the magnetic field, a voltage is induced across the electrodes. This voltage is proportional to the average flow velocity of the fluid and is measured by the two electrodes. The M2000 transmitter receives the sensor's analog signal, amplifies that signal and converts it into digital information. At the processor level, the signal is analyzed through a series of sophisticated software algorithms. After separating the signal from electrical noise, it is converted into both analog and digital signals that are used to display rate of flow and totalization.

With no moving parts in the flow stream, there is no pressure lost. Also, accuracy is not affected by temperature, pressure, viscosity or density and there is practically no maintenance required.

SPECIFICATIONS

NOTE: Permanently connected equipment requires the special considerations to satisfy the CEC and the Canadian deviations in the standard, including overcurrent and fault protection as required.

NOTE: DN represents nominal diameter in mm.

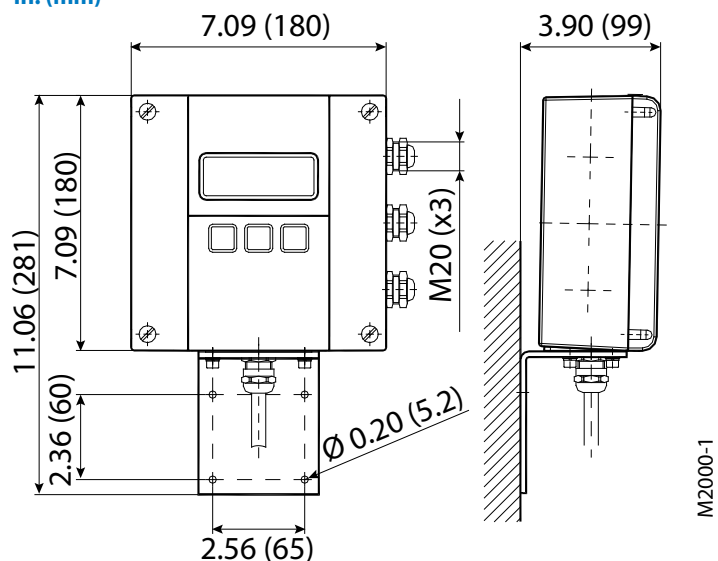
Transmitter Specifications

Flow Range	0.10...39.4 ft/s (0.03...12 m/s)
Accuracy	± 0.20% m.v. ± 1 mm/s OIML/MID: 2...12 in. (DN50...300) with 0d up and 0d downstream ±1% ≥ 0.5 ft/s (0.15 m/s)
Repeatability	± 0.1%
Power Supply	AC Power Supply: 100...240V AC (±10%); Typical Power: 20W A or 15W; Maximum Power: 26V A or 20W Optional DC Power Supply: 9...36V DC; Typical Power: 10W; Maximum Power: 14W
Analog Output	4...20 mA, 0...20 mA, 0...10 mA, 2...10 mA (programmable and scalable) Voltage sourced 24V DC isolated. Maximum loop resistance < 800 Ohms.
Digital Output	Four total, configurable 24V DC sourcing active output (up to 2), 100 mA total, 50 mA each; sinking open collector output (up to four), 30V DC max, 100 mA each; solid-state relay (up to 2), 48V DC, 500 mA max, either polarity Absolute Digital Encoded output for connectivity to AquaCUE or BEACON cellular endpoints
Digital Input	Max 30V DC (programmable – positive zero return, external totalizer reset or preset batch start)
Frequency Output	Scalable up to 10 kHz, open collector up to 1 kHz, solid-state relay
Misc Output	High/low flow alarm (0...100% of flow), error alarm, empty pipe alarm, flow direction, preset batch alarm, 24V DC supply, ADE
Communication	RS232 Modbus RTU; RS485 Modbus RTU, HART, Profibus DP, BACnet MS/TP, Modbus MS/TP, EtherNet/IP and BACnet/IP require separate daughterboards
Pulse Width	Scalable up to 10 kHz, passive open collector up to 10 kHz, active switched 24V DC. Up to two outputs (forward and reverse). Pulse width programmable from 1...1000 ms or 50% duty cycle.
Processing	32-bit DSP
Empty Pipe Detection	Field tunable for optimum performance based on specific application
Excitation Frequency	1 Hz, 3.75 Hz, 7.5 Hz or 15 Hz (factory optimized to pipe diameter)
Noise Dampening	Programmable 0...30 seconds
Low Flow Cut-Off	Programmable 0...10% of maximum flow
Galvanic Separation	250V
Fluid Conductivity	Minimum 5.0 µS/cm (minimum 20 µS/cm for demineralized water)
Fluid Temperature	With Remote Transmitter: PFA, PTFE & Halar 302° F (150° C) With Meter-Mounted Transmitter: Rubber 178° F, (80° C), PFA, PTFE & Halar 212° F (100° C)
Ambient Temperature	- 4...140° F (-20...60° C)
Relative Humidity	Up to 90 percent non-condensing

Pollution Degree	2		
Installation Category	II		
Altitude	8202 ft (2500 m)		
Flow Direction	Unidirectional or bidirectional two separate totalizers (programmable)		
Totalization	Programmable/resettable		
Units of Measure	Ounce, pound, liter, US gallon, imperial gallon, barrel, hectoliter, mega gallon, cubic meter, cubic feet, acre feet		
Display	4 x 20 character display with backlight		
Programming	Three-button, external manual or remote		
Transmitter Housing	Cast aluminum, powder-coated paint		
Mounting	Meter mount or remote wall mount (bracket supplied)		
Locations	Indoor and outdoor		
Meter Enclosure Classification	Standard: NEMA 4X (IP67); Optional: Submersible NEMA 6P (IP68) depth of 2 m for 72 hr, remote transmitter required		
Junction Box Enclosure Protection	For remote transmitter option: powder-coated die-cast aluminum, NEMA 4 (IP67)		
Cable Entries	M20 cable glands (3)		
Optional Stainless Steel Grounding Rings	Meter Size	Thickness of one ring	Thickness of one ring (DIN Flanges)
	Up through 10 in.	0.135 in. (3.429 mm)	0.12 in. (3 mm)
	12...78 in.	0.187 in. (4.750 mm)	0.12 in. (3 mm)
NSF/ANSI/CAN 61 and 372 Listed	Models with hard rubber liner, 4 in. size and larger; PTFE liner, all sizes		
OIML R49-1 MID MI-001 AWWA C715	Size range: DN50...300 / 2...12 in. Minimum straight inlet flow: 0 DN /outlet flow: 0 DN Forward and reverse (bi-directional) flow on any orientation Ratio (Q3/Q1) up to 250 Accuracy Class 1		
Token Features	Data Logging (Blue token); Store/Restore (Red token); Firmware Upgrade (Black token)		

M2000 Transmitter Dimensions

in. (mm)



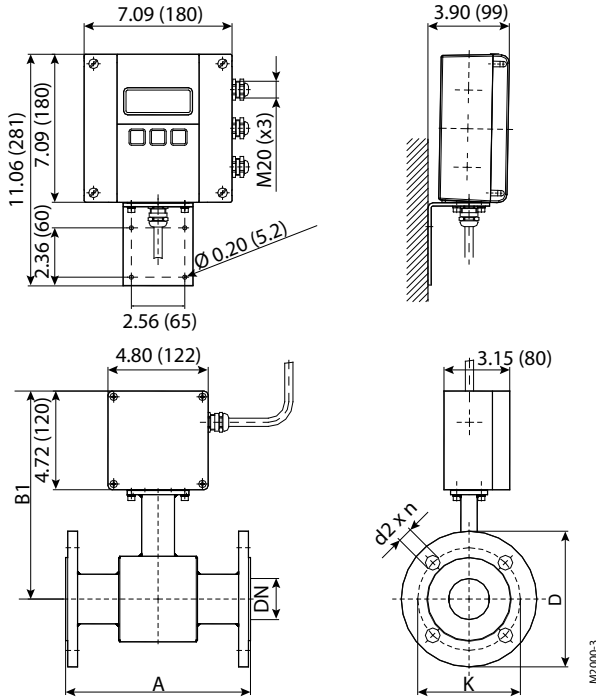
Sensor Type II Specifications

The electromagnetic sensor type II is not only available in a number of different flange process connections (DIN, ANSI, JIS, AWWA) but also in a number of liners like hard rubber, PTFE, PFA, or Halar. The sensor is configurable with up to 4 electrodes for measuring, empty pipe and grounding electrodes. Available in sizes from DN 6 TO DN 2000 and nominal pressures up to PN 100, the sensor type II is best suited for a variety of applications in the industry and the water/waste water industry.

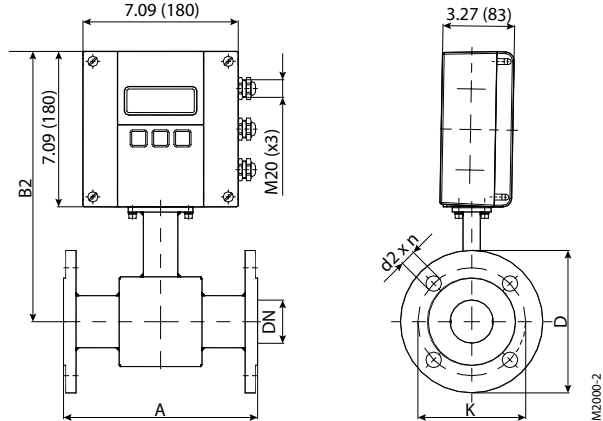
Size	1/4...78 in. (DN 6...2000)	
Flanges	Standard: ANSI B16.5, AWWA, ISO 1092-1, JIS and more in carbon steel; Optional: 304 or 316 stainless steel	
Nominal Pressure	Up to 1450 psi (100 bar)	
Pressure Rating	Line sizes 1/4...24 in: In accordance with ASME B16.5 Class 150 or Flange Rating Class 300 Line sizes 26...72 in: AWWA C-207 Class D or Class E Flange Rating	
Protection Class	NEMA 4X (IP67), optional NEMA 6P (IP68)	
Minimum Conductivity	5 µS/cm (20 µS/cm for demineralized water)	
Liner Material	Hard/soft rubber	1...78 in. (DN 25...2000) 32...176° F (0...80° C)
	PTFE	1/2...24 in. (DN 15...600) -40...302° F (-40...150° C)
	Halar (ECTFE)	12 in. (DN 300) and larger -40...302° F (-40...150° C)
	PFA	1/4...3/8 in. (DN 6...10) —
Electrodes Materials	Hastelloy C (standard), Tantalum Platinum / Gold plated, Platinum / Rhodium	
Housing	Standard: Carbon steel welded; Optional: 316 or 304 stainless steel	
Electrode Materials	Standard: Hastelloy C22; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodium	
Lay Length	1/4...3/4 in. (DN 6...20)	6.7 in. (170 mm)
	1...2 in. (DN 25...50)	8.9 in. (225 mm)
	2-1/2...4 in. (DN 65...100)	11.0 in. (280 mm)
	5...8 in. (DN 125...200)	15.8 in. (400 mm)
	10...14 in. (DN 250...350)	19.7 in. (500 mm)
	16...28 in. (DN 400...700)	23.6 in. (600 mm)
	30...40 in. (DN 750...1000)	31.5 in. (800 mm)
	48...56 in. (DN 1200...1400)	39.4 in. (1000 mm)
	64 in. (DN 1600)	63.0 in. (1600 mm)
	72 in. (DN1800)	70.9 in. (1800 mm)
78 in. (DN2000)	78.7 in. (2000 mm)	

Sensor Type II Dimensions

Remote Version in. (mm)



Mounted Version in. (mm)



IMPORTANT: Flange Sizes ≤ 24 in., Standard: ANSI B16.5 Class 150 RF forged carbon steel; Optional: 300 lb forged carbon steel, 316 or 304 stainless steel

Flange Sizes > 24 in., Standard: AWWA Class D Flanges RF forged carbon steel

Flange ANSI Class 150 Up to 24 in. ASME B16.5 / > 24 in. AWWA Class D (ASME 16.47)

Size DN		A Standard		A ISO*		B1		B2		D		K		d2 x n	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1/4	6	6.7	170	—	—	9.0	228	11.3	288	3.5	89	2.4	61	0.6 x 4	16 x 4
5/16	8	6.7	170	—	—	9.0	228	11.3	288	3.5	89	2.4	61	0.6 x 4	16 x 4
3/8	10	6.7	170	—	—	9.0	228	11.3	288	3.5	89	2.4	61	0.6 x 4	16 x 4
1/2	15	6.7	170	7.9	200	9.4	238	11.7	298	3.5	89	2.4	61	0.6 x 4	16 x 4
3/4	20	6.7	170	7.9	200	9.4	238	11.7	298	3.9	99	2.8	71	0.6 x 4	16 x 4
1	25	8.9	225	7.9	200	9.4	238	11.7	298	4.3	109	3.1	79	0.6 x 4	16 x 4
1-1/4	32	8.9	225	7.9	200	10.0	253	12.3	313	4.6	117	3.5	89	0.6 x 4	16 x 4
1-1/2	40	8.9	225	7.9	200	10.0	253	12.3	313	5.0	127	3.9	99	0.6 x 4	16 x 4
2	50	8.9	225	7.9	200	10.0	253	12.3	313	6.0	152	4.8	122	0.8 x 4	19 x 4
2-1/2	65	11.0	280	7.9	200	10.7	271	13.0	331	7.0	178	5.5	140	0.8 x 4	19 x 4
3	80	11.0	280	7.9	200	10.7	271	13.0	331	7.5	191	6.0	152	0.8 x 4	19 x 4
4	100	11.0	280	9.8	250	10.9	278	13.3	338	9.0	229	7.5	191	0.8 x 8	19 x 8
5	125	15.7	400	9.8	250	11.7	298	14.1	358	10.0	254	8.5	216	0.9 x 8	22 x 8
6	150	15.7	400	11.8	300	12.2	310	14.6	370	11.0	279	9.5	241	0.9 x 8	22 x 8
8	200	15.7	400	13.8	350	13.3	338	15.7	398	13.5	343	11.8	300	0.9 x 8	22 x 8
10	250	19.7	500	17.7	450	14.3	362	16.6	422	16.0	406	14.3	363	1.0 x 12	25 x 12
12	300	19.7	500	19.7	500	16.7	425	19.1	485	19.0	483	17.0	432	1.0 x 12	25 x 12
14	350	19.7	500	21.7	550	17.7	450	20.1	510	21.0	533	18.8	478	1.1 x 12	28 x 12
16	400	23.6	600	23.6	600	18.7	475	21.1	535	23.5	597	21.3	541	1.1 x 16	28 x 16
18	450	23.6	600	25.6	—	19.7	500	22.0	560	25.0	635	22.8	579	1.3 x 16	32 x 16
20	500	23.6	600	25.6	—	20.7	525	23.0	585	27.5	699	25.0	635	1.3 x 20	32 x 20
24	600	23.6	600	30.7	—	23.1	588	25.5	648	32.0	813	29.5	749	1.4 x 20	35 x 20
28	700	23.6	600	35.8	—	24.6	625	27.0	685	36.5	927	34.0	864	1.4 x 28	35 x 28
30	750	31.5	800	38.4	—	25.6	650	28.0	710	38.8	986	36.0	914	1.4 x 28	35 x 28
32	800	31.5	800	40.9	—	26.9	683	29.3	743	41.8	1062	38.5	978	1.6 x 28	41 x 28
36	900	31.5	800	46.1	—	28.5	725	30.9	785	46.0	1168	42.8	1087	1.6 x 32	41 x 32
40	1000	31.5	800	51.2	—	31.1	790	33.5	850	50.8	1290	47.3	1201	1.6 x 36	41 x 36
42	1050	39.4	1000	53.7	—	32.5	825	34.8	885	53.0	1346	49.5	1257	1.6 x 36	41 x 36
48	1200	39.4	1000	61.4	—	35.4	900	37.8	960	59.5	1511	56.0	1422	1.6 x 44	41 x 44
54	1350	39.4	1000	69.1	—	38.4	975	40.7	1035	66.3	1684	62.8	1595	1.9 x 44	48 x 44
56	1400	39.4	1000	71.7	—	39.4	1000	41.7	1060	68.8	1748	65.0	1651	1.9 x 48	48 x 48

Other sizes on request

IMPORTANT: ISO* sensor lay length according to ISO 20456

Flange ANSI Class 300 ASME B16.5

Size DN		A Standard		A ISO*		B1		B2		D		K		d2 x n	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1/2	15	6.7	170	7.9	200	9.4	238	11.7	298	3.8	95	2.6	67	0.6 x 4	16 x 4
3/4	20	6.7	170	7.9	200	9.4	238	11.7	298	4.6	117	3.3	83	0.8 x 4	19 x 4
1	25	8.9	225	7.9	200	9.4	238	11.7	298	4.9	124	3.5	89	0.8 x 4	19 x 4
1-1/4	32	8.9	225	7.9	200	10.0	253	12.3	313	5.3	133	3.9	99	0.8 x 4	19 x 4
1-1/2	40	8.9	225	7.9	200	10.0	253	12.3	313	6.1	155	4.5	114	0.9 x 4	22 x 4
2	50	8.9	225	7.9	200	10.0	253	12.3	313	6.5	165	5.0	127	0.8 x 8	19 x 8
2-1/2	65	11.0	280	7.9	200	10.7	271	13.0	331	7.5	191	5.9	149	0.9 x 8	22 x 8
3	80	11.0	280	7.9	200	10.7	271	13.0	331	8.3	210	6.6	168	0.9 x 8	22 x 8
4	100	11.0	280	9.8	250	10.9	278	13.3	338	10.0	254	7.9	200	0.9 x 8	22 x 8
5	125	15.7	400	9.8	250	11.7	298	14.1	358	11.0	279	9.3	235	0.9 x 8	22 x 8
6	150	15.7	400	11.8	300	12.2	310	14.6	370	12.5	318	10.6	270	0.9 x 12	22 x 12
8	200	15.7	400	13.8	350	13.3	338	15.7	398	15.0	381	13.0	330	1.0 x 12	25 x 12
10	250	19.7	500	17.7	450	14.3	362	16.6	422	17.5	445	15.3	387	1.1 x 16	28 x 16
12	300	19.7	500	19.7	500	16.7	425	19.1	485	20.5	521	17.8	451	1.3 x 16	32 x 16
14	350	19.7	500	21.7	550	17.7	450	20.1	510	23.0	584	20.3	514	1.3 x 20	32 x 20
16	400	23.6	600	23.6	600	18.7	475	21.1	535	25.5	648	22.5	572	1.4 x 20	35 x 20
18	450	23.6	600	25.6	—	19.7	500	22.0	560	28.0	711	24.8	629	1.4 x 24	35 x 24
20	500	23.6	600	25.6	—	20.7	525	23.0	585	30.5	775	27.0	686	1.4 x 24	35 x 24
24	600	23.6	600	30.7	—	23.1	588	25.5	648	36.0	914	32.0	813	1.6 x 24	41 x 24

Other sizes on request

IMPORTANT: ISO* sensor lay length according to ISO 20456

Flange EN 1092-1 / PN 10

Size DN		A Standard		A ISO*		B1		B2		D		K		d2 x n	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
8	200	15.7	400	13.8	350	13.3	338	15.7	398	13.4	340	11.6	295	0.9 x 8	22 x 8
10	250	19.7	500	17.7	450	14.3	362	16.6	422	15.6	395	13.8	350	0.9 x 12	22 x 12
12	300	19.7	500	19.7	500	16.7	425	19.1	485	17.5	445	15.7	400	0.9 x 12	22 x 12
14	350	19.7	500	21.7	550	17.7	450	20.1	510	19.9	505	18.1	460	0.9 x 16	22 x 16
16	400	23.6	600	23.6	600	18.7	475	21.1	535	22.2	565	20.3	515	1.0 x 16	26 x 16
18	450	23.6	600	25.6	—	19.7	500	22.0	560	24.2	615	22.2	565	1.0 x 20	26 x 20
20	500	23.6	600	25.6	—	20.7	525	23.0	585	26.4	670	24.4	620	1.0 x 20	26 x 20
24	600	23.6	600	30.7	—	23.1	588	25.5	648	30.7	780	28.5	725	1.2 x 20	30 x 20
28	700	23.6	600	35.8	—	24.6	625	27.0	685	35.2	895	33.1	840	1.2 x 24	30 x 24
32	800	31.5	800	40.9	—	26.9	683	29.3	743	40.0	1015	37.4	950	1.3 x 24	33 x 24
36	900	31.5	800	46.1	—	28.5	725	30.9	785	43.9	1115	41.3	1050	1.3 x 28	33 x 28
40	1000	31.5	800	51.2	—	31.1	790	33.5	850	48.4	1230	45.7	1160	1.4 x 28	36 x 28
48	1200	39.4	1000	61.4	—	35.4	900	37.8	960	57.3	1455	54.3	1380	1.5 x 32	39 x 32
56	1400	39.4	1000	71.7	—	39.4	1000	41.7	1060	65.9	1675	62.6	1590	1.7 x 36	42 x 36

Other sizes on request

IMPORTANT: ISO* sensor lay length according to ISO 20456

Flange EN 1092-1 / PN 16

Size DN		A Standard		A ISO*		B1		B2		D		K		d2 x n	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1/4	6	6.7	170	—	—	9.0	228	11.3	288	3.5	90	2.4	60	0.6 x 4	14 x 4
5/16	8	6.7	170	—	—	9.0	228	11.3	288	3.5	90	2.4	60	0.6 x 4	14 x 4
3/8	10	6.7	170	—	—	9.0	228	11.3	288	3.5	90	2.4	60	0.6 x 4	14 x 4
1/2	15	6.7	170	7.9	200	9.4	238	11.7	298	3.7	95	2.6	65	0.6 x 4	14 x 4
3/4	20	6.7	170	7.9	200	9.4	238	11.7	298	4.1	105	3.0	75	0.6 x 4	14 x 4
1	25	8.9	225	7.9	200	9.4	238	11.7	298	4.5	115	3.3	85	0.6 x 4	14 x 4
1-1/4	32	8.9	225	7.9	200	10.0	253	12.3	313	5.5	140	3.9	100	0.7 x 4	18 x 4
1-1/2	40	8.9	225	7.9	200	10.0	253	12.3	313	5.9	150	4.3	110	0.7 x 4	18 x 4
2	50	8.9	225	7.9	200	10.0	253	12.3	313	6.5	165	4.9	125	0.7 x 4	18 x 4
2-1/2	65	11.0	280	7.9	200	10.7	271	13.0	331	7.3	185	5.7	145	0.7 x 4	18 x 4
3	80	11.0	280	7.9	200	10.7	271	13.0	331	7.9	200	6.3	160	0.7 x 8	18 x 8
4	100	11.0	280	9.8	250	10.9	278	13.3	338	8.7	220	7.1	180	0.7 x 8	18 x 8
5	125	15.7	400	9.8	250	11.7	298	14.1	358	9.8	250	8.3	210	0.7 x 8	18 x 8
6	150	15.7	400	11.8	300	12.2	310	14.6	370	11.2	285	9.4	240	0.9 x 8	22 x 8
8	200	15.7	400	13.8	350	13.3	338	15.7	398	13.4	340	11.6	295	0.9 x 8	22 x 12
10	250	19.7	500	17.7	450	14.3	362	16.6	422	15.9	405	14.0	355	1.0 x 12	26 x 12
12	300	19.7	500	19.7	500	16.7	425	19.1	485	18.1	460	16.1	410	1.0 x 12	26 x 12
14	350	19.7	500	21.7	550	17.7	450	20.1	510	20.5	520	18.5	470	1.0 x 16	26 x 16
16	400	23.6	600	23.6	600	18.7	475	21.1	535	22.8	580	20.7	525	1.2 x 16	30 x 16
18	450	23.6	600	25.6	—	19.7	500	22.0	560	25.2	640	23.0	585	1.2 x 20	30 x 20
20	500	23.6	600	25.6	—	20.7	525	23.0	585	28.1	715	25.6	650	1.3 x 20	33 x 20
24	600	23.6	600	30.7	—	23.1	588	25.5	648	33.1	840	30.3	770	1.4 x 20	36 x 20
28	700	23.6	600	35.8	—	24.6	625	27.0	685	35.8	910	33.1	840	1.4 x 24	36 x 24
32	800	31.5	800	40.9	—	26.9	683	29.3	743	40.4	1025	37.4	950	1.5 x 24	39 x 24
36	900	31.5	800	46.1	—	28.5	725	30.9	785	44.3	1125	41.3	1050	1.5 x 28	39 x 28
40	1000	31.5	800	51.2	—	31.1	790	33.5	850	49.4	1255	46.1	1170	1.7 x 28	42 x 28
48	1200	39.4	1000	61.4	—	35.4	900	37.8	960	58.5	1485	54.7	1390	1.9 x 32	48 x 32
56	1400	39.4	1000	71.7	—	39.4	1000	41.7	1060	66.3	1685	62.6	1590	1.9 x 36	48 x 36

Other sizes on request

IMPORTANT: ISO* sensor lay length according to ISO 20456

Flange EN 1092-1 / PN 25

Size DN		A Standard		A ISO*		B1		B2		D		K		d2 x n	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1/2	15	6.7	170	7.9	200	9.4	238	11.7	298	3.7	95	2.6	65	0.6 x 4	14 x 4
3/4	20	6.7	170	7.9	200	9.4	238	11.7	298	4.1	105	3.0	75	0.6 x 4	14 x 4
1	25	8.9	225	7.9	200	9.4	238	11.7	298	4.5	115	3.3	85	0.6 x 4	14 x 4
1-1/4	32	8.9	225	7.9	200	10.0	253	12.3	313	5.5	140	3.9	100	0.7 x 4	18 x 4
1-1/2	40	8.9	225	7.9	200	10.0	253	12.3	313	5.9	150	4.3	110	0.7 x 4	18 x 4
2	50	8.9	225	7.9	200	10.0	253	12.3	313	6.5	165	4.9	125	0.7 x 4	18 x 4
2-1/2	65	11.0	280	7.9	200	10.7	271	13.0	331	7.3	185	5.7	145	0.7 x 4	18 x 8
3	80	11.0	280	7.9	200	10.7	271	13.0	331	7.9	200	6.3	160	0.7 x 8	18 x 8
4	100	11.0	280	9.8	250	10.9	278	13.3	338	9.3	235	7.5	190	0.9 x 8	22 x 8
5	125	15.7	400	9.8	250	11.7	298	14.1	358	10.6	270	8.7	220	1.0 x 8	26 x 8
6	150	15.7	400	11.8	300	12.2	310	14.6	370	11.8	300	9.8	250	1.0 x 8	26 x 8
8	200	15.7	400	13.8	350	13.3	338	15.7	398	14.2	360	12.2	310	1.0 x 8	26 x 12
10	250	19.7	500	17.7	450	14.3	362	16.6	422	16.7	425	14.6	370	1.2 x 12	30 x 12
12	300	19.7	500	19.7	500	16.7	425	19.1	485	19.1	485	16.9	430	1.2 x 12	30 x 16
14	350	19.7	500	21.7	550	17.7	450	20.1	510	21.9	555	19.3	490	1.3 x 16	33 x 16
16	400	23.6	600	23.6	600	18.7	475	21.1	535	24.4	620	21.7	550	1.4 x 16	36 x 16
18	450	23.6	600	25.6	—	19.7	500	22.0	560	26.4	670	23.6	600	1.4 x 20	36 x 20
20	500	23.6	600	25.6	—	20.7	525	23.0	585	28.7	730	26.0	660	1.4 x 20	36 x 20
24	600	23.6	600	30.7	—	23.1	588	25.5	648	33.3	845	30.3	770	1.5 x 20	39 x 20
28	700	23.6	600	35.8	—	24.6	625	27.0	685	37.8	960	34.4	875	1.7 x 24	42 x 24
32	800	31.5	800	40.9	—	26.9	683	29.3	743	42.7	1085	39.0	990	1.9 x 24	48 x 24
36	900	31.5	800	46.1	—	28.5	725	30.9	785	46.7	1185	42.9	1090	1.9 x 28	48 x 28
40	1000	31.5	800	51.2	—	31.1	790	33.5	850	52.0	1320	47.6	1210	2.2 x 28	56 x 28

Other sizes on request

IMPORTANT: ISO* sensor lay length according to ISO 20456

Flange EN 1092-1 / PN 40

Size DN		A Standard		A ISO*		B1		B2		D		K		d2 x n	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1/2	15	6.7	170	7.9	200	9.4	238	11.7	298	3.7	95	2.6	65	0.6 x 4	14 x 4
3/4	20	6.7	170	7.9	200	9.4	238	11.7	298	4.1	105	3.0	75	0.6 x 4	14 x 4
1	25	8.9	225	7.9	200	9.4	238	11.7	298	4.5	115	3.3	85	0.6 x 4	14 x 4
1-1/4	32	8.9	225	7.9	200	10.0	253	12.3	313	5.5	140	3.9	100	0.7 x 4	18 x 4
1-1/2	40	8.9	225	7.9	200	10.0	253	12.3	313	5.9	150	4.3	110	0.7 x 4	18 x 4
2	50	8.9	225	7.9	200	10.0	253	12.3	313	6.5	165	4.9	125	0.7 x 4	18 x 4
2-1/2	65	11.0	280	7.9	200	10.7	271	13.0	331	7.3	185	5.7	145	0.7 x 4	18 x 8
3	80	11.0	280	7.9	200	10.7	271	13.0	331	7.9	200	6.3	160	0.7 x 8	18 x 8
4	100	11.0	280	9.8	250	10.9	278	13.3	338	9.3	235	7.5	190	0.9 x 8	22 x 8
5	125	15.7	400	9.8	250	11.7	298	14.1	358	10.6	270	8.7	220	1.0 x 8	26 x 8
6	150	15.7	400	11.8	300	12.2	310	14.6	370	11.8	300	9.8	250	1.0 x 8	26 x 8
8	200	15.7	400	13.8	350	13.3	338	15.7	398	14.8	375	12.6	320	1.2 x 8	30 x 12
10	250	19.7	500	17.7	450	14.3	362	16.6	422	17.7	450	15.2	385	1.3 x 12	33 x 12
12	300	19.7	500	19.7	500	16.7	425	19.1	485	20.3	515	17.7	450	1.3 x 12	33 x 16
14	350	19.7	500	21.7	550	17.7	450	20.1	510	22.8	580	20.1	510	1.4 x 16	36 x 16
16	400	23.6	600	23.6	600	18.7	475	21.1	535	26.0	660	23.0	585	1.5 x 16	39 x 16
18	450	23.6	600	25.6	—	19.7	500	22.0	560	27.0	685	24.0	610	1.5 x 20	39 x 20
20	500	23.6	600	25.6	—	20.7	525	23.0	585	29.7	755	26.4	670	1.7 x 20	42 x 20
24	600	23.6	600	30.7	—	23.1	588	25.5	648	35.0	890	31.3	795	1.9 x 20	48 x 20

Other sizes on request

IMPORTANT: ISO* sensor lay length according to ISO 20456

Weight and Flow Range

Size		Estimated Weight with M2000	Flow Range	
in.	DN		US	Metric
1/4	6	8 (3.5)	0.0134...5.4 GPM	0.051...20.4 l/min
5/16	8	8 (3.5)	0.0239...9.6 GPM	0.09...36.2 l/min
3/8	10	8 (3.5)	0.0373...14.9 GPM	0.141...57 l/min
1/2	15	10 (4.5)	0.084...33.6 GPM	0.318...127 l/min
3/4	20	10 (4.5)	0.149...60 GPM	0.57...226 l/min
1	25	11 (5)	0.233...93 GPM	0.88...353 l/min
1-1/4	32	13 (6)	0.382...153 GPM	1.45...579 l/min
1-1/2	40	15.5 (7)	0.6...239 GPM	2.26...905 l/min
2	50	19 (8.5)	0.93...373 GPM	3.53...1,414 l/min
2-1/2	65	27.5 (12.5)	1.58...631 GPM	0.358...143 m ³ /h
3	80	31 (14)	2.39...956 GPM	0.54...217 m ³ /h
4	100	42 (19)	3.73...1,494 GPM	0.85...339 m ³ /h
5	125	53 (24)	5.8...2,334 GPM	1.33...530 m ³ /h
6	150	60.5 (27.5)	8.4...3,361 GPM	1.91...763 m ³ /h
8	200	87 (39.5)	14.9...5,975 GPM	3.39...1,357 m ³ /h
10	250	129 (58.5)	23.3...9,336 GPM	5.3...2,121 m ³ /h
12	300	204 (92.5)	33.6...13,444 GPM	7.6...3,054 m ³ /h
14	350	262 (119)	45.7...18,299 GPM	10.4...4,156 m ³ /h
16	400	344 (156)	60...23,901 GPM	13.6...5,429 m ³ /h
18	450	397 (180)	76...30,250 GPM	17.2...6,870 m ³ /h
20	500	470 (213)	93...37,345 GPM	21.2...8,482 m ³ /h
22	550	549 (249)	113...45,188 GPM	25.7...10,263 m ³ /h
24	600	617 (280)	134...53,777 GPM	30.5...12,214 m ³ /h
28	700	—	183...73,197 GPM	41.6...16,625 m ³ /h
30	750	930 (422)	210...84,027 GPM	47.7...19,085 m ³ /h
32	800	1171 (531)	239...95,604 GPM	54.3...21,714 m ³ /h
36	900	1378 (625)	302...120,999 GPM	69...27,482 m ³ /h
40	1000	—	373...149,381 GPM	85...33,928 m ³ /h
48	1200	1788 (811)	538...215,109 GPM	122...48,857 m ³ /h
56	1400	—	732...292,787 GPM	166...66,499 m ³ /h
60	1500	2112 (958)	840...336,108 GPM	191...76,338 m ³ /h
64	1600	2339 (1061)	956...382,416 GPM	217...86,856 m ³ /h
72	1800	3219 (1460)	1210...483,996 GPM	275...109,927 m ³ /h
78	2000	4101 (1860)	1494...597,525 GPM	339...135,713 m ³ /h

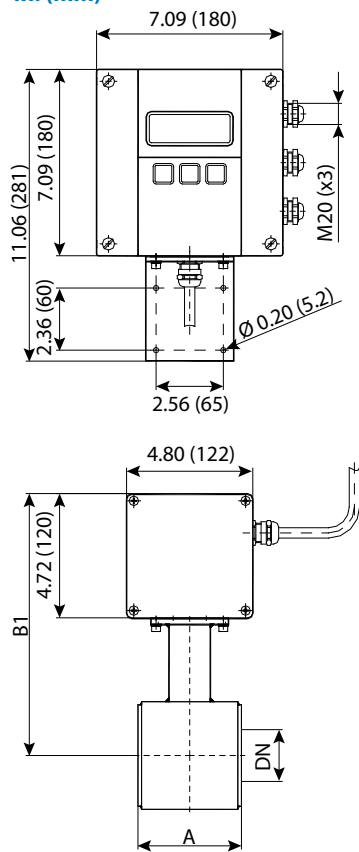
Sensor Type III Specifications

Thanks to its very short lay length, the sensor type III is often the right alternative to a lot of applications. Delivered with a PTFE liner, the sensor type III has a standard nominal pressure of PN 40.

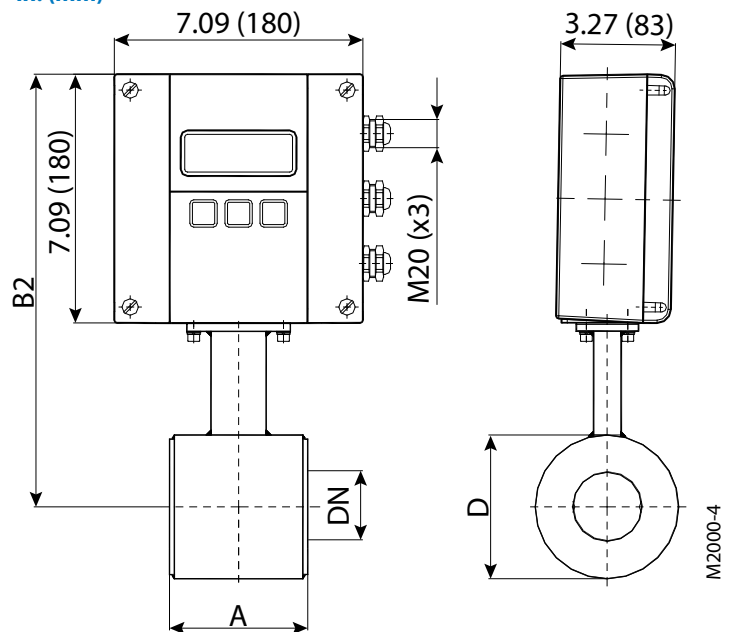
Size	1...4 in. (DN 25...100)	
Process Connection	Wafer connection (in-between flange mounting)	
Nominal Pressure	580 psi (40 bar)	
Protection Class	NEMA 4X (IP67), optional NEMA 6P (IP68)	
Minimum Conductivity	5 µS/cm (20 µS/cm for demineralized water)	
Liner Materials	PTFE	
Electrode Material	Hastelloy C (Standard), Tantal, Platinum / Gold Plated, Platinum / Rhodium	
Housing	Carbon Steel / optional stainless steel	
Lay Length	1...2 in. (DN 25...50)	4 in. (100 mm)
	2-1/2...4 in. (DN 65...100)	6 in. (150 mm)

Sensor Type III Dimensions

Remote Version
in. (mm)



Mounted Version
in. (mm)



in.	DN	A	B1	B2	D
1	25	3.94 (100)	9.37 (238)	7.24 (184)	2.91 (74)
1-1/4	32	3.94 (100)	9.57 (243)	7.44 (189)	3.31 (84)
1-1/2	40	3.94 (100)	9.76 (248)	7.64 (194)	3.70 (94)
2	50	3.94 (100)	9.96 (253)	7.83 (199)	4.09 (104)
2-1/2	65	5.91 (150)	10.47 (266)	8.35 (212)	5.08 (129)
3	80	5.91 (150)	10.67 (271)	8.54 (217)	5.51 (140)
4	100	5.91 (150)	10.98 (279)	8.86 (225)	6.14 (156)

580 psi (40 bar)

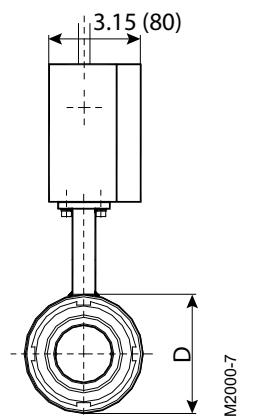
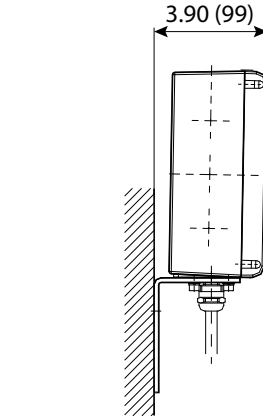
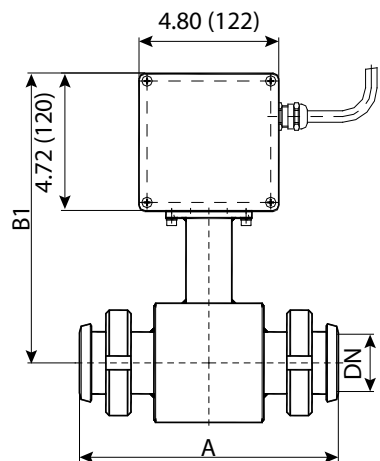
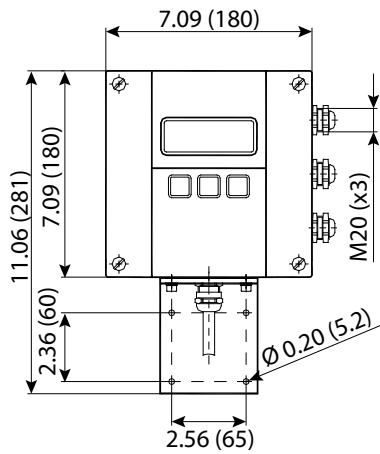
Sensor with Sanitary Process Connections Specifications

The sensor model is available with Tri-Clamp® BS4825/ISO2852, DIN11851, and more process connections. The sanitary sensor is delivered in a stainless steel housing and with PTFE/PFA lining.

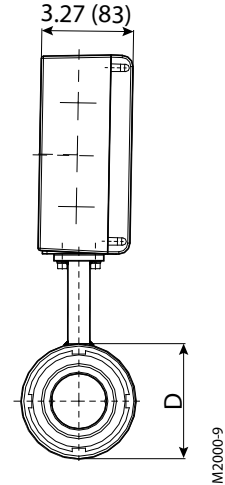
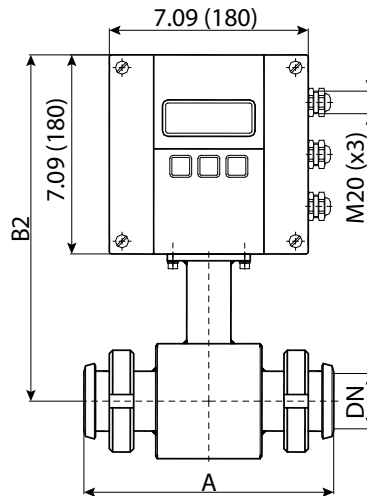
Size	3/8...4 in. (DN 10...100)		
Process Connection	Tri-Clamp BS4825/ISO2852, DIN 11851, customer specified, and more		
Nominal Pressure	145/230 psi (10/16 bar)		
Protection Class	NEMA 4X (IP67), optional NEMA 6P (IP68)		
Minimum Conductivity	5 µS/cm (20 µS/cm for demineralized water)		
Liner Materials	PTFE/PFA	-40...302° F (-40...150° C)	
Electrode Material	Standard: Hastelloy C; Optional: Tantal, Platinum / Gold plated, Platinum / Rhodium		
Housing	Standard: Carbon Steel; Optional: Stainless Steel		
Lay Length	Tri-Clamp Connection	3/8...2 in. (DN 10...50)	6 in. (145 mm)
		2-1/2...4 in. (DN 65...100)	8 in. (200 mm)
	DIN 11851 Connection	3/8...3/4 in. (DN 10...20)	7 in. (175 mm)
		1...2 in. (DN 25...50)	9 in. (225 mm)
		2-1/2...4 in. (DN 65...100)	11 in. (280 mm)

DIN 11851 Connection Dimensions

Remote Version in. (mm)



Mounted Version in. mm

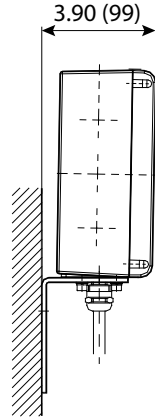
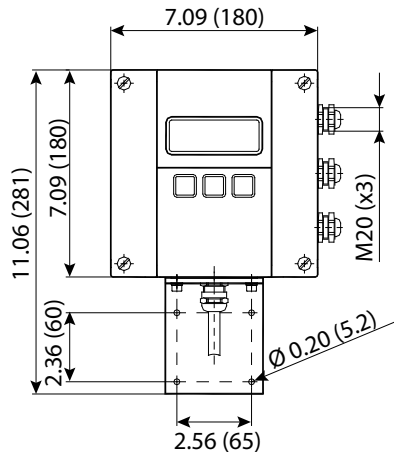


in.	DN	A	B1	B2	D
3/8	10	6.69 (170)	9.37 (238)	7.24 (184)	2.91 (74)
1/2	15	6.69 (170)	9.37 (238)	7.24 (184)	2.91 (74)
3/4	20	6.69 (170)	9.37 (238)	7.24 (184)	2.91 (74)
1	25	8.86 (225)	9.37 (238)	7.24 (184)	2.91 (74)
1-1/4	32	8.86 (225)	9.57 (243)	7.44 (189)	3.31 (84)
1-1/2	40	8.86 (225)	9.76 (248)	7.64 (194)	3.70 (94)
2	50	8.86 (225)	9.96 (253)	7.83 (199)	4.09 (104)
2-1/2	65	11.02 (280)	10.47 (266)	8.35 (212)	5.08 (129)
3	80	11.02 (280)	10.67 (271)	8.54 (217)	5.51 (140)
4	100	11.02 (280)	10.98 (279)	8.86 (225)	6.14 (156)

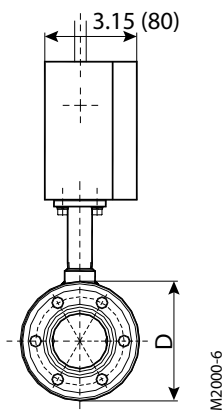
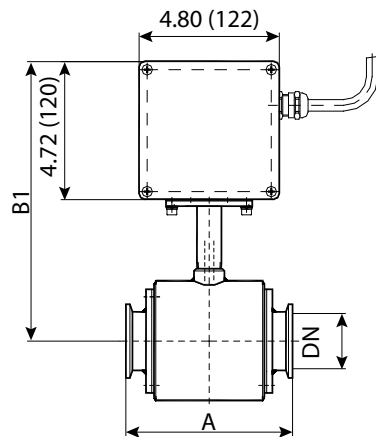
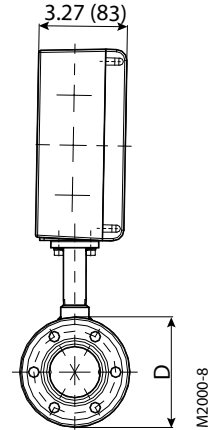
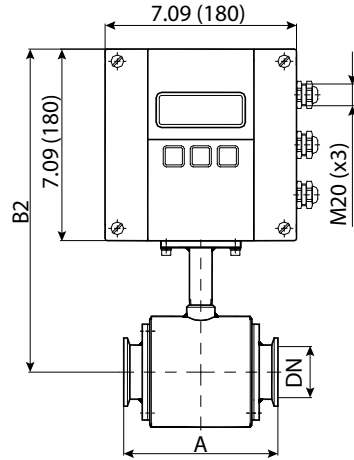
230 psi (16 bar)

Tri-Clamp Connection Dimensions

Remote Version in. (mm)



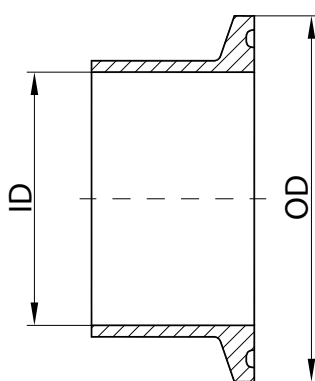
Mounted Version in. (mm)



in.	DN	A	B1	B2	D
3/8	10	5.71 (145)	8.98 (228)	7.52 (191)	2.91 (74)
1/2	15	5.71 (145)	8.98 (228)	7.52 (191)	2.91 (74)
3/4	20	5.71 (145)	8.98 (228)	7.52 (191)	2.91 (74)
1	25	5.71 (145)	8.98 (228)	7.52 (191)	2.91 (74)
1-1/2	40	5.71 (145)	9.37 (238)	7.91 (201)	3.70 (94)
2	50	5.71 (145)	9.57 (243)	8.11 (206)	4.09 (104)
2-1/2	65	7.87 (200)	10.08 (256)	8.62 (219)	5.08 (129)
3	80	7.87 (200)	10.28 (261)	8.82 (224)	5.51 (140)
4	100	7.87 (200)	10.59 (269)	9.13 (232)	6.14 (156)

150 psi (10 bar)

Tri-Clamp Connection

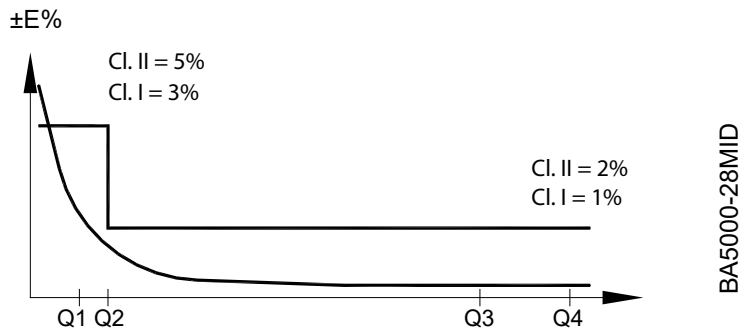


BS4825					ISO2852				
Size	OD		ID		Size	OD		ID	
in.	in.	mm	in.	mm	DN	in.	mm	in.	mm
—	—	—	—	—	10	0.98	25.0	0.55	14.0
1/2	0.98	25.0	0.37	9.4	15	1.99	50.5	0.71	18.1
3/4	0.98	25.0	0.62	15.75	20	1.99	50.5	0.90	22.9
1	1.99	50.5	0.87	22.1	25	1.99	50.5	1.13	28.7
—	—	—	—	—	32	2.52	64.0	1.51	38.4
1-1/2	1.99	50.5	1.37	34.8	40	2.52	64.0	1.74	44.3
2	2.52	64.0	1.87	47.5	50	3.05	77.5	2.22	56.3
2-1/2	3.05	77.5	2.37	60.2	65	3.58	91.0	2.84	72.1
3	3.58	91.0	2.87	72.9	80	4.17	106.0	3.32	84.3
4	4.69	119.0	3.83	97.4	100	5.12	130.0	4.32	109.7

Nominal Pressure 145 psi (10 bar)

OIML APPROVED METER

The M2000 is type approved according to the international water meter standards OIML R49. The meter is approved as Class I and Class II for the detector sizes 2...12 inches (DN 50...300).



$Q2/Q1 = 1.6$ and $Q4/Q3 = 1.25$

OIML R 49 specification for Class I

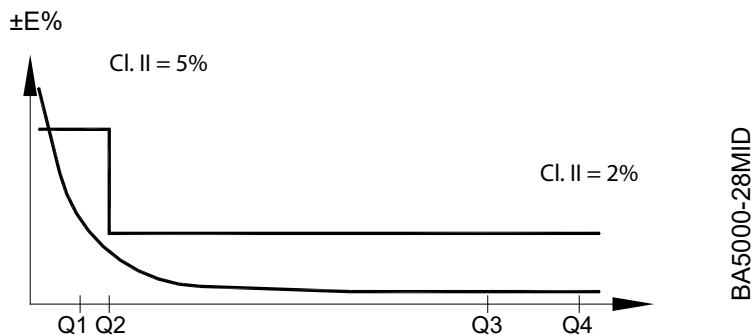
Size in. (DN)	2 (50)	2 1/2 (65)	3 (80)	4 (100)	5 (125)	6 (150)	8 (200)	10 (250)	12 (300)
R (Q3/Q1)	200	200	200	250	250	160	160	160	100
Q1 [m ³ /h]	0.315	0.5	0.8	1	1.6	3.94	6.25	10	15.63
Q2 [m ³ /h]	0.504	0.8	1.28	1.6	2.56	6,3	10	16	25
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600
Q4 [m ³ /h]	78.75	125	200	312.5	500	787.5	1250	2000	2000
OIML R49 Class	1								

OIML R 49 specification for Class II

Size in. (DN)	6 (150)	8 (200)
R (Q3/Q1)	250	250
Q1 [m ³ /h]	2.52	4
Q2 [m ³ /h]	4.03	6.4
Q3 [m³/h]	630	1000
Q4 [m ³ /h]	787.5	1250
OIML R49 Class	2	

MID APPROVED METER (MI-001)

The M2000 is type approved according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 Measuring Instruments (MID) Annex MI-001. The meter is approved for the detector sizes 2...12 inches (DN 50...300).



$Q2/Q1 = 1.6$ and $Q4/Q3 = 1.25$

Size in. (DN)	2 (50)	2-1/2 (65)	3 (80)	4 (100)	5 (125)	6 (150)	8 (200)	10 (250)	12 (300)
R (Q3/Q1)	200	200	200	250	250	250	250	160	100
Q1 [m ³ /h]	0.315	0.5	0.8	1	1.6	2.52	4	10	15.63
Q2 [m ³ /h]	0.504	0.8	1,28	1.6	2.56	4.03	6.4	16	25
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600
Q4 [m ³ /h]	78.75	125	200	312.5	500	787.5	1250	2000	2000

The conformity declaration of above certificate is according to module B (type approval) and D (quality insurance of production).

PART NUMBER CONSTRUCTION

If you are interested in a product configuration that is not designated for your region, please contact Badger Meter.

Sensor and Transmitter Ordering Information for North America Hard Rubber Liner

M2	MZ000	Meter Type	Detector			Electrodes & Grounding	Amplifier	Remote Cable Length	Communications/Outputs	Wiring Method	Unit of Measure Totalizer/ Flow Rate	Testing & Tagging
			HARD RUBBER C-Steel 150# flanges	HARD RUBBER C-Steel 300# flanges	HARD RUBBER Stainless Steel 150# flanges							
			R1	R2	R4							
		Meter Type-Standard LL										
		1/4 in.	002	N/A	N/A							
		5/16 in.	003	N/A	N/A							
		3/8 in.	004	N/A	N/A							
		1/2 in.	005	N/A	N/A							
		3/4 in.	007	N/A	N/A							
		1 in.	010									
		1-1/4 in.	012									
		1-1/2 in.	015									
		2 in.	020									
		2-1/2 in.	025									
		3 in.	030									
		4 in.	040									
		5 in.	050									
		6 in.	060									
		8 in.	080									
		10 in.	100									
		12 in.	120									
		14 in.	140									
		16 in.	160									
		18 in.	180									
		20 in.	200									
		22 in.	220									
		24 in.	240									
		28 in.	280									
		30 in.	300									
		32 in.	320									
		36 in.	360									
		40 in.	400	N/A								
		42 in.	420	N/A	N/A							
		48 in.	480	N/A	N/A							
		54 in.	540	N/A	N/A							
		Electrodes & Grounding										
		Alloy C with 316 Stainless Steel Grounding Rings				A						
		Stainless Steel with 316 Stainless Steel Grounding Rings				S						
		Platinum Plated with 316 Stainless Steel Grounding Rings				P						
		Tantalum with 316 Stainless Steel Grounding Rings				T						
		Platinum/Rhodium with 316 Stainless Steel Grounding Rings				R						
		Alloy C Electrode and Grounding Electrode				C						
		Stainless Steel Electrode and Grounding Electrode				D						
		Platinum Plated Electrode and Grounding Electrode				G						
		Tantalum Electrode and Grounding Electrode				L						
		Platinum/Rhodium Electrode and Grounding Electrode				H						
		Amplifier Type										
		110/220V AC; Meter Mounted				M						
		110/220V AC; Remote Mounted				R						
		110/220V AC; Remote Mounted; Submersible				S						
		110/220V AC; Remote Mounted; Submersible (IP68)				T						
		24V DC; Meter Mounted				E						
		24V DC; Remote Mounted				F						
		24V DC; Remote Mounted; Submersible				G						
		24V DC; Remote Mounted; Submersible (IP68)				B						
		Remote Cable Length										
		None				WW						
		5 ft. Standard Cable				AA						
		10 ft. Standard Cable				AB						
		15 ft. Standard Cable				AC						
		30 ft. Standard Cable				AF						
		50 ft. Standard Cable				AK						
		75 ft. Standard Cable				AR						
		100 ft. Standard Cable				BW						
		125 ft. Standard Cable				BE						
		150 ft. Standard Cable				BK						
		175 ft. Standard Cable				BR						
		200 ft. Standard Cable				DW						
		225 ft. Standard Cable				DE						
		250 ft. Standard Cable				DK						
		275 ft. Standard Cable				DR						
		300 ft. Standard Cable				EW						
		325 ft. Standard Cable				EE						
		350 ft. Standard Cable				EK						
		375 ft. Standard Cable				ER						
		400 ft. Standard Cable				FW						
		425 ft. Standard Cable				FE						
		450 ft. Standard Cable				FK						
		475 ft. Standard Cable				FR						
		500 ft. Standard Cable				GW						
		Communication/Outputs										
		Standard Output						S				
		Standard Output with HART						H				
		Standard Output with PROFIBUS DP						P				
		Standard Output with MODBUS 485 RTU						M				
		Standard Output with BACNET MS/TP						L				
		Wiring Method										
		None								XX		
		Twist Tight - 5 ft. (MTR, ASSY)								TF		
		Twist Tight - 10 ft. (MTR, ASSY)								TH		
		Twist Tight - 25 ft. (MTR, ASSY)								TJ		
		Twist Tight - 75 ft. (MTR, ASSY)								TK		
		Niocr - 6 ft. (MTR, ASSY)								NG		
		Niocr - 25 ft. (MTR, ASSY)								NJ		
		Iron - 5 ft. (MTR, ASSY)								CF		
		Iron - 25 ft. (MTR, ASSY)								CJ		
		Unit of Measure Totalizer/ Flow Rate										
		Gallons/gallons per minute									G	
		Gallons/cubic feet per minute									B	
		Gallons/cubic meters per second									D	
		Cubic Meters/gallons per minute									C	
		Cubic Meters/cubic meters per second									E	
		Cubic Meters/cubic meters per minute									T	
		Cubic Meters/cubic meters per hour									H	
		Cubic Feet/gallons per minute									F	
		Cubic Feet/cubic feet per minute									J	
		Cubic Feet/cubic meters per hour									K	
		Liters/gallons per minute									L	
		Liters/liters per second									N	
		Liters/liters per minute									P	
		Liters/liters per hour									Q	
		Million Gallons/gallons per minute									M	
		Gallons/millions gallons per day									R	
		Acres Feet/gallons per minute									A	
		Second-Foot Day/cubic feet per second									S	
		Custom Units									Z	
		Testing & Tagging										
		Factory Calibrated										F
		3rd Party Calibrated										3
		Factory Calibrated/Stainless Steel Tag										S
		3rd Party Calibrated w/ Stainless Steel Tag										T
		State of Kansas Certified										K

Sensor and Transmitter Ordering Information for North America
PTFE Liner

M2000	Meter Type	Detector				Electrodes & Grounding	Amplifier	Remote Cable Length	Communications/Outputs	Wiring Method	Unit of Measure Totalizer/Flow Rate	Testing and Tagging
		PTFE C-Steel 150# flanges	PTFE C-Steel 300# flanges	PTFE Stainless Steel 150# flanges	PFA Stainless Steel 150# Flanges							
Meter Type-Standard LL		P1	P2	P4	PA							
1/4 in.	002	N/A	N/A	N/A	\$	N/A	1,998					
5/16 in.	003	N/A	N/A	N/A	\$	N/A	1,998					
3/8 in.	004	N/A	N/A	N/A	\$	N/A	1,998					
1/2 in.	005					N/A						
3/4 in.	007					N/A						
1 in.	010					N/A						
1-1/4 in.	012					N/A						
1-1/2 in.	015					N/A						
2 in.	020					N/A						
2-1/2 in.	025					N/A						
3 in.	030					N/A						
4 in.	040					N/A						
5 in.	050					N/A						
6 in.	060					N/A						
8 in.	080					N/A						
10 in.	100					N/A						
12 in.	120					N/A						
14 in.	140					N/A						
16 in.	160					N/A						
18 in.	180					N/A						
20 in.	200					N/A						
22 in.	220					N/A						
24 in.	240					N/A						
28 in.	280	N/A	N/A	N/A		N/A						
30 in.	300	N/A	N/A	N/A		N/A						
32 in.	320	N/A	N/A	N/A		N/A						
36 in.	360	N/A	N/A	N/A		N/A						
40 in.	400	N/A	N/A	N/A		N/A						
42 in.	420	N/A	N/A	N/A		N/A						
48 in.	480	N/A	N/A	N/A		N/A						
54 in.	540	N/A	N/A	N/A		N/A						
Electrodes & Grounding												
Alloy C with 316 Stainless Steel Grounding Rings						A						
Stainless Steel with 316 Stainless Steel Grounding Rings						S						
Platinum Plated with 316 Stainless Steel Grounding Rings						P						
Tantalum with 316 Stainless Steel Grounding Rings						T						
Platinum/Rhodium with 316 Stainless Steel Grounding Rings						R						
Alloy C Electrode and Grounding Electrode						C						
Stainless Steel Electrode and Grounding Electrode						D						
Platinum Plated Electrode and Grounding Electrode						G						
Tantalum Electrode and Grounding Electrode						L						
Platinum/Rhodium Electrode and Grounding Electrode						H						
Amplifier Type												
110/220V AC; Meter Mounted						M						
110/220V AC; Remote Mounted						R						
110/220V AC; Remote Mounted; Submersible						S						
110/220V AC; Remote Mounted; Submersible (IP68)						T						
24V DC; Meter Mounted						E						
24V DC; Remote Mounted						F						
24V DC; Remote Mounted; Submersible						G						
24V DC; Remote Mounted; Submersible (IP68)						B						
Remote Cable Length												
None						WW						
5 ft. Standard Cable						AA						
10 ft. Standard Cable						AB						
15 ft. Standard Cable						AC						
30 ft. Standard Cable						AF						
50 ft. Standard Cable						AK						
75 ft. Standard Cable						AR						
100 ft. Standard Cable						BW						
125 ft. Standard Cable						BE						
150 ft. Standard Cable						BK						
175 ft. Standard Cable						BR						
200 ft. Standard Cable						DW						
225 ft. Standard Cable						DE						
250 ft. Standard Cable						DK						
275 ft. Standard Cable						DR						
300 ft. Standard Cable						EW						
325 ft. Standard Cable						EE						
350 ft. Standard Cable						EK						
375 ft. Standard Cable						ER						
400 ft. Standard Cable						FW						
425 ft. Standard Cable						FE						
450 ft. Standard Cable						FK						
475 ft. Standard Cable						FR						
500 ft. Standard Cable						GW						
Communications/Outputs												
Standard Output								S				
Standard Output with HART								H				
Standard Output with PROFIBUS DP								P				
Standard Output with MODBUS 485 RTU								M				
Standard Output with BACNET MS/TP								B				
Wiring Method												
None									XX			
Twist Tight - 5 ft. (MTR, ASSY)									TF			
Twist Tight - 10 ft. (MTR, ASSY)									TH			
Twist Tight - 25 ft. (MTR, ASSY)									TJ			
Twist Tight - 75 ft. (MTR, ASSY)									TK			
Nicol - 6 ft. (MTR, ASSY)									NG			
Nicol - 25 ft. (MTR, ASSY)									NJ			
Itron - 5 ft. (MTR, ASSY)									CF			
Itron - 25 ft. (MTR, ASSY)									CJ			
Unit of Measure Totalizer/Flow Rate												
Gallons/gallons per minute									G			
Gallons/cubic feet per minute									B			
Gallons/cubic meters per second									D			
Cubic Meters/gallons per minute									C			
Cubic Meters/cubic meters per second									E			
Cubic Meters/cubic meters per minute									T			
Cubic Meters/cubic meters per hour									H			
Cubic Feet/gallons per minute									F			
Cubic Feet/cubic feet per minute									J			
Cubic Feet/cubic meters per hour									K			
Liters/gallons per minute									L			
Liters/liters per second									N			
Liters/liters per minute									P			
Liters/liters per hour									Q			
Million Gallons/gallons per minute									M			
Gallons/millions gallons per day									R			
Acre Feet/gallons per minute									A			
Second-Foot Day/cubic feet per second									S			
Custom Units									Z			
Testing & Tagging												
Factory Calibrated										F		
3rd Party Calibrated										3		
Factory Calibrated/Stainless Steel Tag										S		
3rd Party Calibrated w/ Stainless Steel Tag										T		
State of Kansas Certified										K		

Sensor and Transmitter Ordering Information for North America Halar Liner

M2	Meter Type	Detector	Electrodes & Grounding	Amplifier	Remote Cable Length	Communications/Outputs	Wiring Method	Unit of Measure Totalizer/ Flow Rate	Testing & Tagging
		HALAR C-Steel 150# flanges H1	HALAR C-Steel 300# flanges H2						
			HALAR Stainless Steel 150# flanges H4						
			N/A						
	Meter Type-Standard LL								
	14 in.	140							
	16 in.	160							
	18 in.	180							
	20 in.	200							
	22 in.	220							
	24 in.	240							
	28 in.	280							
	30 in.	300							
	32 in.	320							
	36 in.	360							
	40 in.	400							
			Electrodes & Grounding						
			Alloy C with 316 Stainless Steel Grounding Rings	A					
			Stainless Steel with 316 Stainless Steel Grounding Rings	S					
			Platinum Plated with 316 Stainless Steel Grounding Rings	P					
			Tantalum with 316 Stainless Steel Grounding Rings	T					
			Platinum/Rhodium with 316 Stainless Steel Grounding Rings	R					
			Alloy C Electrode and Grounding Electrode	C					
			Stainless Steel Electrode and Grounding Electrode	D					
			Platinum Plated Electrode and Grounding Electrode	G					
			Tantalum Electrode and Grounding Electrode	L					
			Platinum/Rhodium Electrode and Grounding Electrode	H					
			Amplifier Type						
			110/220V AC; Meter Mounted	M					
			110/220V AC; Remote Mounted	R					
			110/220V AC; Remote Mounted; Submersible	S					
			110/220V AC; Remote Mounted; Submersible (IP68)	T					
			24V DC; Meter Mounted	E					
			24V DC; Remote Mounted	F					
			24V DC; Remote Mounted; Submersible	G					
			24V DC; Remote Mounted; Submersible (IP68)	B					
			Remote Cable Length						
			None		WW				
			5 ft. Standard Cable		AA				
			10 ft. Standard Cable		AB				
			15 ft. Standard Cable		AC				
			30 ft. Standard Cable		AF				
			50 ft. Standard Cable		AK				
			75 ft. Standard Cable		AR				
			100 ft. Standard Cable		BW				
			125 ft. Standard Cable		BE				
			150 ft. Standard Cable		BK				
			175 ft. Standard Cable		BR				
			200 ft. Standard Cable		DW				
			225 ft. Standard Cable		DE				
			250 ft. Standard Cable		DK				
			275 ft. Standard Cable		DR				
			300 ft. Standard Cable		EW				
			325 ft. Standard Cable		EE				
			350 ft. Standard Cable		EK				
			375 ft. Standard Cable		ER				
			400 ft. Standard Cable		FW				
			425 ft. Standard Cable		FE				
			450 ft. Standard Cable		FK				
			475 ft. Standard Cable		FR				
			500 ft. Standard Cable		GW				
			Communications/Outputs						
			Standard Output			S			
			Standard Output with HART			H			
			Standard Output with PROFIBUS DP			P			
			Standard Output with MODBUS 485 RTU			M			
			Standard Output with BACNET MS/TP			B			
			Wiring Method						
			None				XX		
			Twist Tight - 5 ft. (MTR, ASSY)				TF		
			Twist Tight - 10 ft. (MTR, ASSY)				TH		
			Twist Tight - 25 ft. (MTR, ASSY)				TJ		
			Twist Tight - 75 ft. (MTR, ASSY)				TK		
			Nicor - 6 ft. (MTR, ASSY)				NG		
			Nicor - 25 ft. (MTR, ASSY)				NJ		
			Itron - 5 ft. (MTR, ASSY)				CF		
			Itron - 25 ft. (MTR, ASSY)				CJ		
			Unit of Measure Totalizer/ Flow Rate						
			Gallons/gallons per minute					G	
			Gallons/cubic feet per minute					B	
			Gallons/cubic meters per second					D	
			Cubic Meters/gallons per minute					C	
			Cubic Meters/cubic meters per second					E	
			Cubic Meters/cubic meters per minute					T	
			Cubic Meters/cubic meters per hour					H	
			Cubic Feet/gallons per minute					F	
			Cubic Feet/cubic feet per minute					J	
			Cubic Feet/cubic meters per hour					K	
			Liters/gallons per minute					L	
			Liters/liters per second					N	
			Liters/liters per minute					P	
			Liters/liters per hour					Q	
			Million Gallons/gallons per minute					M	
			Gallons/millions gallons per day					R	
			Acre Feet/gallons per minute					A	
			Second-Foot Day/cubic feet per second					S	
			Custom Units					Z	
			Testing & Tagging						
			Factory Calibrated						F
			3rd Party Calibrated						3
			Factory Calibrated/Stainless Steel Tag						S
			3rd Party Calibrated w/ Stainless Steel Tag						T
			State of Kansas Certified						K

Sensor Ordering Information for International

	MID		-		/		-		/		-		-		/		-	
Model	MID electromagnetic flow meter	MID																
Type	Type 2	2																
	Type 3	3																
	Type 5	5																
	Type 6	6																
Size	DIN 6 to DN 2000																	
Pressure rate																		
Process connection	DIN flanges																	F
	ANSI flanges																	A
	Threads acc. DIN 11851																	D
	Tri-Clamp®																	T
	Wafer																	W
Material	C-steel																	ST
	SST 1.4301 (ANSI 304)																	V2
	SST 1.4404 (ANSI 316)																	V4
Liner	PTFE																	PT
	(DN 6-10)																	PFA
	Hard rubber																	HG
	Softrubber																	WG
	Halar																	HA
Electrodes	Measure + empty pipe electrode																	ML
	Measure + grounding + empty pipe electrode																	MEL
Electrode material	Hastelloy C																	HC
	Tantalum																	TA
	Platinum/gold plated																	PG
	Platinum/Rhodium																	PR
Housing	C-steel																	St
	SST 1.4301 (ANSI 304)																	V2
	SST 1.4404 (ANSI 306)																	V4

Example: MID 2 - 100 / 16 - F / St - HG - ML / HC - St

Transmitter Ordering Information for International

					m
Amplifier	M2000 (85-265 VAC)	M20A			
	M2000 (9-36 VDC)	M20D			
Mounted/remote/cable length	Amplifier detector mounted			M	
	Remote version cable length			R	
Remote amplifier with cable length	Remote amplifier with 10 m cable length				10
	Remote amplifier with 15 m cable length				15
	Remote amplifier with 20 m cable length				20
	Remote amplifier with 25 m cable length				25
	Remote amplifier with 30 m cable length				30

Example: M10A R 15 m

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