Badger Meter Europa

Electromagnetic amplifier type ModMAG™ M3000 & M4000

for all detectors

Description

The amplifier with modular design allows flow measurements in ex-zones 1 and 2, in either the mounted or remote version. The amplifier housing, made of powder-coated aluminium, is available in protection class IP67 and with a separate connection space. Programming can be done either with closed housing thanks to a magnetic pen or with open housing via three buttons. The four-line display shows all necessary data like actual flow, totalizer and status messages. The programmable excitation frequency even enables the amplifier to be adjusted for difficult metering applications. The new developed process for amplifier compensation enables a high accuracy, especially in the lower flow range.

Measuring principle

The operating principle of the electromagnetic flow meter is based on Faraday's law of magnetic induction: The voltage induced across any conductor, as it moves at right angles through a magnetic field, is proportional to the velocity of that conductor. The voltage induced within the fluid is measured by two diametrically opposed internally mounted electrodes. The induced signal voltage is proportional to the product of the magnetic flux density, the distance between the electrodes and the average flow velocity of the fluid.

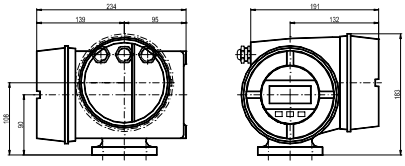
Applications

The ModMAG™ is especially suited for flow measurements in the chemical and pharmaceutical industry, as well as water and waste water plants with explosion-proof zones.

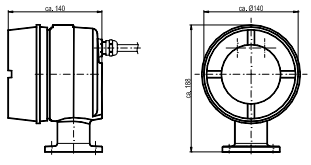
Technical data

Power supply	85 – 265 VAC, 45 – 65 Hz < 20 VA, optional 24 VDC
Accuracy	±0,25% of actual flow, ≥0,5 m/s ±1,25 mm/s of actual flow,<0,5 m/s
Repeatability	<0,1% of full scale
Flow range	0,03 – 12 m/s
Conductivity	min. 5 µS/cm
Flow direction	bi-directional
Display	LCD, 4 lines / 16 characters, backlit, actual flow, 3 totalizers, status display
Programming	3 buttons or via magnetic pen
Interface	RS232 for measuring values and programming
Analog output	0/4- 20 mA ≤750 ohms, flow direction is displayed upon a separate status output
Pulse output	active / passive selectable, 2 open collectors and 2 solid state relays
	Open collector: active 18 VDC, 25 mA, passive 24 VDC, 20 mA (max. 0,5 W)
Frequency output	max. 10 kHz (open collector)
Status output	min./max. alarm, preselction, flow direction, error message, free configurable
Empty pipe detection	separate electrode
Low flow cut off	0-10%
Housing	Powder coated aluminium die cast
Protection class	IP67
Cable insertion	3 x M 20
Ambient temperature	-20 up to +60°C
Ex proof version	FM/CSA class I, div. 1 / div. 2, ATEX EEx de [ia] IIC T4 (in process)

Dimensions



M3000/M4000

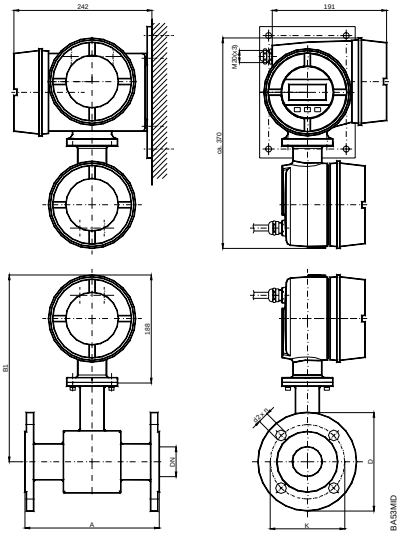


Junction box

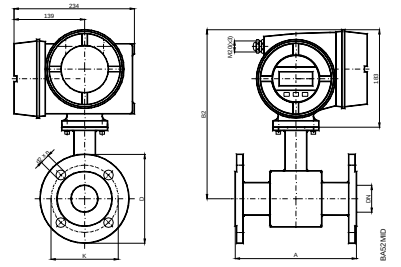
Badger Meter Europa GmbH - Karlstrasse 11 - 72660 Beuren (Germany)
Tel. +49-7025-9208-0 Fax +49-7025-9208-15 www.badgermeter.de E-mail:badger@badgermeter.de

Detector type II

Flange process connection



Wall mounted



Remote version

The electromagnetic detector type II is not only available in a number of different flange process connections (DIN, ANSI, JIS, AWWA, etc.) but also in a number of liners like hard rubber, soft rubber, PTFE, PFA or Halar. Available in sizes from DN 6 to DN 600 and nominal pressures up to PN 100, the detector type II is best suited for a variety of applications in the industry and the water/waste water industry.

Technical data

Size	DN 6 – 600 (1/4" ... 56")		
Process connections	Flange: DIN, ANSI, JIS, AWWA, etc.		
Nominal pressure	up to PN 100		
Protection class	IP65, optional IP68		
Min. conductivity	5 μS/cm		
Liner materials	Hard/soft rubber	from DN 25	0 up to +80°C
	PTFE	DN 6 – 600	-40 up to +150°C
	Halar (ECTFE)	from DN 300	-40 up to +150°C
Electrodes materials	Hastelloy C (Standard), Tantal Platinum / Gold plated, Platinum / Rhodium		
Housing	Carbon steel / optional stainless steel		
Lay length	DN 6 – 20	170 mm	
	DN 25 – 50	225 mm	
	DN 65 – 100	280 mm	
	DN 125 – 200	400 mm	
	DN 250 – 350	500 mm	
	DN 400 – 600	600 mm	

Dimensions (mm)

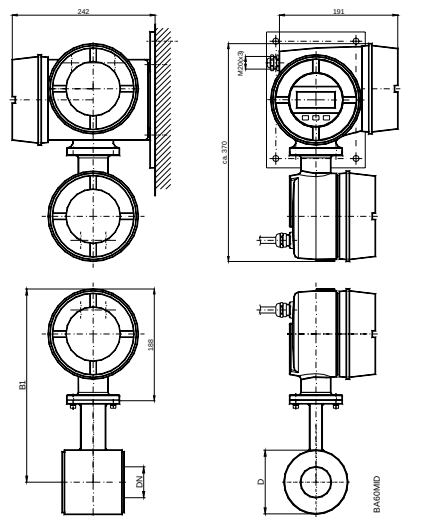
DN		A Std*	A ISO**	M3000 B1	M3000 B2	M4000 B1	M4000 B2	with ANSI-flanges ∅ D	with ANSI-flanges ∅ K	with ANSI-flanges ∅ d2xn	with DIN-flanges ∅ D	with DIN-flanges ∅ K	with DIN-flanges ∅ d2xn
6	1/4"	170	---	306,5	297,5	343,5	321,5	88,9	60,3	15,9 x 4	90	60	14 x 4
8	3/10"	170	---	306,5	297,5	343,5	321,5	88,9	60,3	15,9 x 4	90	60	14 x 4
10	3/8"	170	---	306,5	297,5	343,5	321,5	88,9	60,3	15,9 x 4	90	60	14 x 4
15	1/2"	170	200	306,5	297,5	343,5	321,5	88,9	60,3	15,9 x 4	95	65	14 x 4
20	3/4"	170	200	311,5	297,5	348,5	321,5	98,4	69,8	15,9 x 4	105	75	14 x 4
25	1"	225	200	316,5	298	353,5	322	107,9	79,4	15,9 x 4	115	85	14 x 4
32	1 1/4"	225	200	336,5	313,5	373,5	337,5	117,5	88,9	15,9 x 4	140	100	18 x 4
40	1 1/2"	225	200	341,5	312,5	377,5	336,5	127	98,4	15,9 x 4	150	110	18 x 4
50	2"	225	200	353,5	313	390,5	337	152,4	120,6	19 x 4	165	125	18 x 4
65	2 1/2"	280	200	384,5	331	421,5	355	177,8	139,7	19 x 4	185	145	18 x 4
80	3"	280	200	390,5	330,5	427,5	354,5	190,5	152,4	19 x 4	200	160	18 x 8
100	4"	280	250	416,5	337,5	453,5	361,5	228,6	190,5	19 x 8	220	180	18 x 8
125	5"	400	250	448,5	357	485,5	381	254	215,9	22,2 x 8	250	210	18 x 8
150	6"	400	300	474,5	370,5	511,5	394,5	279,4	241,3	22,2 x 8	285	240	22 x 8
200	8"	400	350	538,5	386,5	573,5	410,5	342,9	298,4	22,2 x 8	340	295	22 x 12
250	10"	500	450	631,5	474	668,5	488	406,4	361,9	25,4 x 12	395	350	22 x 12
300	12"	500	500	684,5	478,5	721,5	502,5	482,6	431,8	25,4 x 12	445	400	22 x 12
350	14"	500	550	734,5	501,5	---	---	533,4	476,2	28,6 x 12	505	460	22 x 16
400	16"	600	600	806,5	543,5	---	---	596,9	539,7	28,6 x 16	565	515	26 x 16
450	18"	600	---	840,5	558,5	---	---	635,0	577,8	31,7 x 16	---	---	---
500	20"	600	---	919,5	605,5	---	---	698,5	635,0	31,7 x 20	670	620	26 x 20
550	22"	600	---	955,5	616,5	---	---	749,3	692,1	34,9 x 20	---	---	---
600	24"	600	---	1021,5	650,5	---	--	812,8	749,3	34,9 x 20	780	725	30 x 20

Standard		
with ANSI-flanges	from DN 6 - 600	Lbs 150 lbs
with DIN flanges	from DN 6 – 200	PN 16
	from DN 250 – 600	PN 10

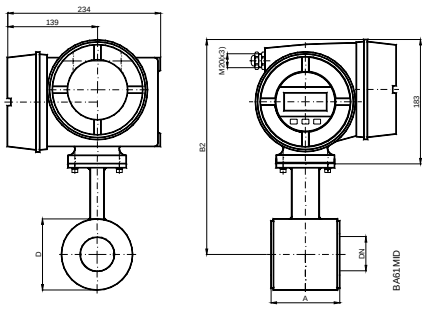
* Standard **ISO 13359

Detector type III

Wafer connection



Wall mounted



Remote version

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

Technical data

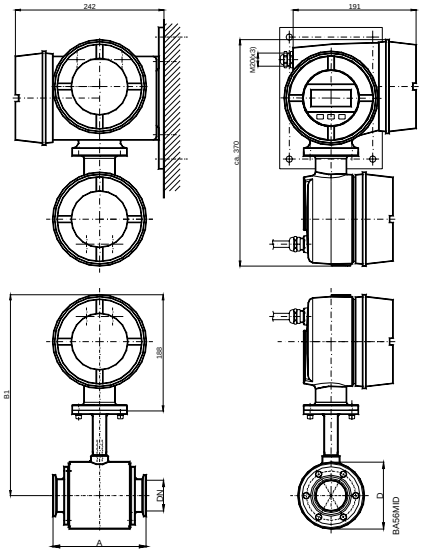
Size	DN 25 – 100 (1" ... 4")	
Process connections	Wafer connection (in-between flange mounting)	
Nominal pressure	PN 40	
Protection class	IP65, optional IP68	
Min. conductivity	5 μS/cm	
Liner materials	PTFE	-40 up to +150°C
Electrodes materials	Hastelloy C (Standard) Tantal Platinum / Gold plated Platinum / Rhodium	
Housing	Carbon steel / optional stainless steel	
Lay length	DN 25 – 50	100 mm
	DN 65 – 100	150 mm

Dimensions (mm)

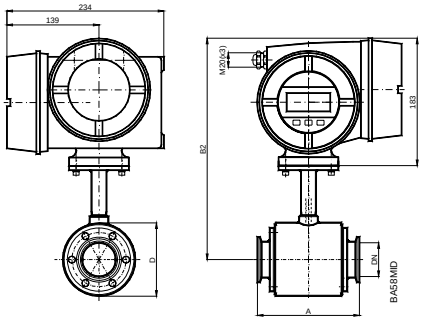
			M3000		M4000		
DN		A	B1	B2	B1	B2	D
25	1"	100	316,5	298	353,5	322	74
32	1 ¼"	100	336,5	313,5	373,5	337,5	84
40	1 ½"	100	341,5	312,5	377,5	336,5	94
50	2"	100	353,5	313	390,5	337	104
65	2 ½"	150	384,5	331	421,5	355	129
80	3"	150	390,5	330,5	427,5	354,5	140
100	4"	150	416,5	337,5	453,5	361,5	156
PN 40							

Sanitary detector for Food

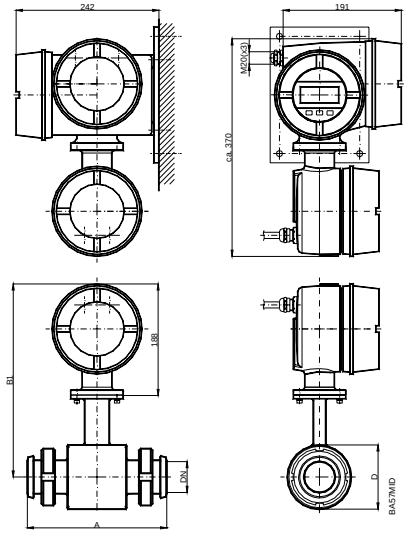
Process connections Tri-Clamp®, DIN 11851, ISO 2852, etc.



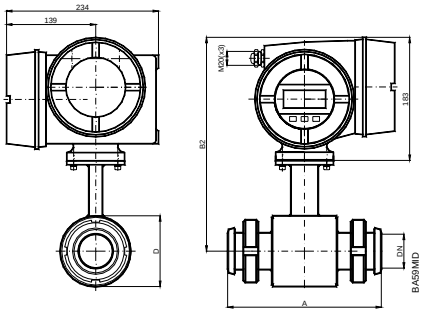
TriClamp®, wall mounted



TriClamp®, remote version



DIN 11851, wall mounted



DIN 11851, remote version

The sanitary detector was developed for the flow measurement of liquid food. This model is available with Tri-Clamp®, DIN 11851, ISO 2852 process connections and also with any special connections (customer specifications), The sanitary detector is delivered in a stainless steel housing and with PTFE lining.

Technical data

Size	DN 10 - 100 (3/8" ... 4")		
Process connections	Tri-Clamp®, DIN 11851, ISO 2852, etc.		
Nominal pressure	PN 10		
Protection class	IP65, optional IP68		
Min. conductivity	5 μS/cm		
Liner materials	PTFE		-40 up to +150°C
Electrodes materials	Hastelloy C (Standard) Tantal Platinum / Gold plated Platinum / Rhodium		
Housing	Carbon steel / optional stainless steel		
Lay length	Tri-Clamp® connection	DN 10 – 50	145 mm
		DN 65 – 100	200 mm
	DIN 11851 connection	DN 10 – 20	170 mm
		DN 25 – 50	225 mm
		DN 65 – 100	280 mm

Dimensions (mm) type Food Tri-Clamp®

			M3000		M4000		
DN		A	B1	B2	B1	B2	D
10	3/8"	145	306,5	297,5	343,5	321,5	74
15	1/2"	145	306,5	297,5	343,5	321,5	74
20	3/4"	145	311,5	297,5	348,5	321,5	74
25	1"	145	316,5	298	353,5	322	74
40	1 ½"	145	341,5	312,5	377,5	336,5	94
50	2"	145	353,5	313	390,5	337	104
65	2 ½"	200	384,5	331	421,5	355	129
80	3"	200	390,5	330,5	427,5	354,5	140
100	4"	200	416,5	337,5	453,5	361,5	156
PN 10							

Dimensions (mm) type Food DIN 11851

			M3000		M4000		
DN		A	B1	B2	B1	B2	D
10	3/8"	170	306,5	297,5	343,5	321,5	74
15	1/2"	170	306,5	297,5	343,5	321,5	74
20	3/4"	170	311,5	297,5	348,5	321,5	74
25	1"	225	316,5	298	353,5	322	74
32	1 ¼"	225	336,5	313,5	373,5	337,5	84
40	1 ½"	225	341,5	312,5	377,5	336,5	94
50	2"	225	353,5	313	390,5	337	104
65	2 ½"	280	384,5	331	421,5	355	129
80	3"	280	390,5	330,5	427,5	354,5	140
100	4"	280	416,5	337,5	453,5	361,5	156
PN 10							