

Overview



The electromagnetic sensor SITRANS F M MAG 1100 F is designed to meet applications in the food and beverage industry.

Benefits

- Sensor sizes: DN 10 to DN 100 (3/8" to 4")
- AISI 316 stainless steel enclosure
- Sensor: Hygienic connection, 3A approval and EHEDG design
- Sanitary design for CIP / SIP cleaning
- Conforms to FDA
- Easy commissioning, the SENSORPROM unit automatically updates settings
- Hose proof IP67/NEMA 4X/6 enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints

Application

The main applications of the SITRANS F M electromagnetic sensors can be found in the following fields:

- Food industry
- Beverage industry
- Pharmaceutical industry

Design

- Unique mechanical design with a wide range of customer specified sanitary connection
- Compact or remote mounting possible easy "plug & play" field changeable
- Simple on site upgrade to IP68/NEMA 6P
- Ex ATEX 2G D version for hazardous areas (ceramic liner)

Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction where the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

The complete flowmeter consists of a sensor and an associated transmitter SITRANS F M MAG 5000, 6000 and 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as PROFIBUS DP and PA, MODBUS RTU/RS485, HART, FOUNDATION Fieldbus H1, DeviceNet.

Technical specifications

Measuring principle	Electromagnetic induction
Excitation frequency	DN 10 ... 65 (1/4" ... 2 1/2"): 12.5 Hz DN 80 ... 100 (3", 4"): 6.25 Hz
Process connection	
Nominal size	DN 10 ... DN 100 (3/8" ... 4")
Process connection	Hygienic adapters available for: <ul style="list-style-type: none"> • Direct welding onto pipe • Clamp fitting • Threaded fitting
Rated operating conditions	
<u>Ambient conditions</u>	
Ambient temperature ¹⁾	
• Sensor	-40 ... +100 °C (-40 ... +212 °F)
• Sensor ATEX	-20 ... +60 °C (-4 ... +140 °F)
• Compact transmitter MAG 5000/6000	-20 ... +50 °C (-4 ... +122 °F)
• Transmitter MAG 6000 I	-20 ... +60 °C (-4 ... +140 °F)
• Compact transmitter MAG 6000 I Ex d	-10 ... +60 °C (+14 ... +140 °F)
<u>Temperature of medium</u>	
MAG 1100 F (Ceramic)	-20 ... +150 °C (-4 ... +300 °F) Suitable for steam sterilization
MAG 1100 F (PFA)	-30 ... +130 °C (-20 ... +270 °F) Suitable for steam sterilization at 150 °C (300 °F)
<u>Temperature shock</u>	
MAG 1100 F	
• Duration ≤ 1 min, followed by 10 min rest	<ul style="list-style-type: none"> • DN 10, 15, 25: Max. ΔT ≤ 80 °C/min (3/8", 1/2", 1") Max. ΔT ≤ 80 K/min • DN 40, 50, 65: Max. ΔT ≤ 70 °C/min (1 1/2", 2", 2 1/2") Max. ΔT ≤ 70 K/min • DN 80, 100: Max. ΔT ≤ 60 °C/min (3", 4") Max. ΔT ≤ 60 K/min
MAG 1100 F (PFA)	Max. ± 100 °C (210 °F) momentarily
<u>Operating pressure</u>	
MAG 1100 F (Ceramic)	DN 10 ... 65: 40 bar (3/8" ... 2 1/2": 580 psi) DN 80: 37.5 bar (3": 540 psi) DN 100: 30 bar (4": 435 psi) Vacuum: 1 × 10 ⁻⁶ bar _{abs} (1.5 × 10 ⁻⁵ psi _{abs})
MAG 1100 F (PFA)	20 bar (290 psi) Vacuum: 0.02 bar _{abs} (0.3 psi _{abs})

¹⁾ Conditions are also dependent on liner characteristics

SITRANS F flowmeters

SITRANS F M

MAG 1100 F

Technical specifications (continued)

<u>Mechanical load</u>	18 ... 1000 Hz random in x, y z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 grms Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 grms Sensor with compact MAG 6000 I/MAG 6000 I Ex mounted transmitter: 1.14 grms For compact installation with the MAG 6000 I/MAG 6000 I Ex, transmitter to be supported to avoid tension on sensor part.
<u>Enclosure rating</u>	
Standard	IP67 to EN 60529 (NEMA 4X), 1 mH ₂ O for 30 min
Option on sensor (not for ATEX)	IP68 to EN 60529 (NEMA 6), 10 mH ₂ O cont.
EMC	89/336 EEC
Design	
Weight	See Dimensional drawings
<u>Material</u>	
Enclosure	
• MAG 1100 F	Stainless steel AISI 316L (1.4404)
Terminal box (remote version only)	
• Standard	Fibre glass-reinforced polyamide
• Option	Stainless steel AISI 316 (1.4436)
• Ex ATEX (remote version only)	Stainless steel AISI 316 (1.4436)
Liner	
MAG 1100 F (Ceramic)	Aluminium oxide Al ₂ O ₃ (ceramics)
MAG 1100 F (PFA)	Reinforced PFA (teflon) (no ATEX)
Electrodes	
MAG 1100 F (Ceramic)	Platinum with gold / Titanium brazing alloy
MAG 1100 F (PFA)	<ul style="list-style-type: none"> • DN 10 ... 15 (3/8" ... 1/2"): Hastelloy C276 • DN 25 ... 100 (1" ... 4"): Hastelloy C22
Cable entries	<ul style="list-style-type: none"> • Remote installation 2 x M20 or 2 x 1/2" NPT • Compact installation <ul style="list-style-type: none"> - MAG 5000/MAG 6000: 4 x M20 or 4 x 1/2" NPT - MAG 6000I: 2 x M25 (for supply/output) - MAG 6000I Ex. d: 2 x M20 (for supply/output)
Certificates and approvals	
MAG 1100 F (Ceramic)	3A (sensor with Polyamid terminal box), transmitter not part of the approval
• Ex ATEX approvals for sensor or compact with Mag 6000 I Ex	ATEX 2G D sensor EEx d e ia IIB T3 - T6
• Sensor with/without MAG 5000/6000/ 6000 I	CSA/FM Class 1 div 2
MAG 1100 F (PFA)	3A (sensor with Polyamid terminal box), transmitter not part of the approval CSA/FM Class 1 div 2
Conforms to	PED – 97/23/EC and CRN (PFA) FDA

Accessories

Weld-in adapter

Adapter for welding onto dairy pipe Tri-Clover, ISO 2037, DIN 11850, SMS 3008, BS 4825-1

• DN 10, 15, 25, 40, 50, 65 and 80 (3/8", 1/2", 1", 1 1/2", 2", 2 1/2" and 3") PN 40 (600 psi)

• DN 100 (4") PN 25 (350 psi)

Clamp adapter

Tri-Clamp, ISO 2852, DIN 32676, SMS 3016, BS 4825-3

DN 10, 15, 25, 40 and 50 (3/8", 1/2", 1", 1 1/2", and 2") PN 16 (200 psi)

DN 65, 80 and 100 (2 1/2", 3" and 4") PN 10 (150 psi)

Thread adapter

DIN 11851

• DN 10, 15, 25, and 40 (3/8", 1/2", 1", and 1 1/2") PN 40 (600 psi)

• DN 50, 65, 80 and 100 (2", 2 1/2", 3" and 4") PN 25 (350 psi)

ISO 2853, BS 4825-4

• DN 10, 15, 25, 40, 50, 65 and 80 (3/8", 1/2", 1", 1 1/2", 2", 2 1/2" and 3") PN 16 (200 psi)

SMS 1145

• DN 25, 40, 50, 65 and 80 (1", 1 1/2", 2", 2 1/2" and 3") PN 6 (80 psi)

Design

Material

Adapter Stainless steel AISI 316/Stainless steel AISI 304 (ISO 2852)

Gasket

• MAG 1100 F (Ceramic) FKM/FPM with stainless steel insert (AISI 304) (-20 ... +150 °C (-4 ... +302 °F))

• MAG 1100 F (PFA) EPDM (-20 ... +150 °C (-4 ... +302 °F))

NBR (-20 ... +100 °C (-4 ... +212 °F))

Note:

When combined sensor and adapter, the operating pressure is the lower rated of the pair.

SITRANS F flowmeters

SITRANS F M

MAG 1100 F

Selection and Ordering data	Order No.
Sensor SITRANS F M MAG 1100 F	7ME6140-
Diameter	
DN 10 (3/8") ▶	1 R
DN 15 (1/2") ▶	1 V
DN 25 (1") ▶	2 D
DN 40 (1 1/2") ▶	2 R
DN 50 (2") ▶	2 Y
DN 65 (2 1/2") ▶	3 F
DN 80 (3") ▶	3 M
DN 100 (4") ▶	3 T
Process connections	
No adaptors (specials see accessories) ▶	A
<u>Weld in</u>	
DIN 11850 ▶	B
ISO 2037 (SMS3008) ▶	C
BS 4825-1 ▶	D
Tri-Clamp®	E
<u>Clamp type</u>	
DIN 32676	G
ISO 2852 (SMS 3016)	H
BS 4825-3	J
Tri-Clamp®	K
<u>Threaded type</u>	
DIN 11851	M
SMS 1145	N
Liner material	
PFA (no ATEX) ▶	1
Ceramic ▶	2
Gasket material	
EPDM (FDA) (only with PFA liner) ▶	0
NBR (only with PFA liner) ▶	1
FPM/FKM (FDA) (only with ceramic liner) ▶	2
Electrode material	
Hastelloy C (only with PFA liner) ▶	1
Platinum (only with ceramic liner) ▶	2
Transmitter	
Sensor for remote transmitter (order transmitter separately) 3A	A
Sensor ATEX 2G D for remote transmitter (order transmitter separately) 3A	B
MAG 6000 I, Alu.18 ... 90 V DC, 115 ... 230 V AC	C
MAG 6000 I, Aluminium 18 ... 30 V DC, ATEX 2G D	D
MAG 6000 I, Aluminium 115 ... 230 V, ATEX 2G D	E
MAG 6000, Polyamid, 11 ... 30 V DC/11 ... 24 V AC	H
MAG 6000, Polyamid, 115/230 V AC	J
MAG 5000, Polyamid, 11 ... 30 V DC/11 ... 24 V AC	K
MAG 5000, Polyamid, 115/230 V AC	L
Communication	
No communication, add-on possible ▶	A
HART	B
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	F
PROFIBUS DP Profile 3 (no ATEX) (only MAG 6000/MAG 6000 I)	G
MODBUS RTU/RS 485 (no ATEX) (only MAG 6000/MAG 6000 I)	E
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	J

Selection and Ordering data	Order No.
Sensor SITRANS F M MAG 1100 F	7ME6140-
Cable glands/terminal box	
Metric: Polyamid terminal box or 6000I compact	1
1/2" NPT: Polyamid terminal box or 6000I compact	2
Metric: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)	3
1/2" NPT: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)	4
▶ Available ex stock	

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Order No. and specify Order code(s) and plain text.	
Customer specific converter setup	Y20
Tag name plate, stainless steel fixed with SS wire (add plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Factory certificate according to EN 10204-2.1	C15
Factory certificate according to EN 10204-2.2	C14
Sensor cables wired (specify cable order no.)	Y40
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable order no.) (no ATEX sensors)	Y41
Other postproduction requirements (add desired text)	Y99

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I/MAG 6000 I EX ATEX 2G D transmitters and sensors are delivered compact mounted from factory. Communication module will be pre-mounted in the transmitter.

Please use online Product selector to get latest updates.
Product selector link:
www.pia-selector.automation.siemens.com

Please also see www.siemens.com/SITRANSFordering for practical examples of ordering

SITRANS F flowmeters

SITRANS F M

MAG 1100 F

Accessories

Order No.

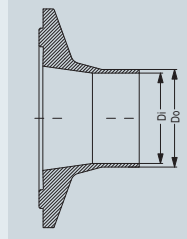
Weld in connection fittings for MAG 1100 F

Each of the following accessory order nos. comprises:

- 2 pcs. fittings
- 2 pcs. clamps (to join flow sensor and fitting)

DIN 11850

Adapter		Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)



10	13	10	10	▶ FDK-083G2116
15	19	16	15	▶ FDK-083G2117
20	23	20	15	FDK-083G2118
25	29	26	25	▶ FDK-083G2119
32	35	32	25	FDK-083G2120
40	41	38	40	▶ FDK-083G2121
50	53	50	50	▶ FDK-083G2122
65	70	66	65	▶ FDK-083G2123
80	85	81	80	▶ FDK-083G2124
100	104	100	100	▶ FDK-083G2125

ISO 2037 (SMS3008)

Adapter		Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)

10	13	10	10	▶ FDK-083G2116
15	19	16	15	▶ FDK-083G2117
25	25.6	22.6	25	▶ FDK-083G2109
28	28.6	25.6	25	FDK-083G2100
38	38.6	35.6	40	▶ FDK-083G2111
40	40.6	37.6	40	▶ FDK-083G2101
51	51.6	48.6	50	▶ FDK-083G2112
63.5	64.1	60.3	65	▶ FDK-083G2113
76.1	76.7	72.9	80	▶ FDK-083G2114
101.6	102.5	97.6	100	FDK-083G2115
114.3	115.6	110.3	100	FDK-083G2105

Tri-Clamp® (BS 4825-1)

Adapter		Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)

10	12.7	9.4	10	FDK-083G2276
15.9	19.05	15.75	15	FDK-083G2277
25	25.4	22.1	25	FDK-083G2279
38	38.1	34.8	40	FDK-083G2281
51	50.8	47.5	50	▶ FDK-083G2282
63.5 ¹⁾	63.5	60.2	65	FDK-083G2283
76.1	76.2	72.9	80	FDK-083G2284
102 ¹⁾	101.6	97.38	100	FDK-083G2285

Tri-Clamp® is a registered trademark of Ladish Co.

▶ Available ex stock

D_o: outer diameter
D_i: inner diameter

¹⁾ For BS4825-1 see ISO 2037

Accessories

Order No.

Clamp-type connection fittings for MAG 1100 F

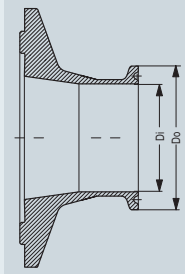
Sanitary pipe fittings for Clamp types

Each of the following accessory order nos. comprises:

- 2 pcs. fittings
- 2 pcs. clamps (to join flow sensor and fitting)

DIN 32676

Adapter		Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)



10	34	10	10	FDK-083G2186
15	34	16	15	FDK-083G2187
25	50.5	26	25	FDK-083G2179
40	50.5	38	40	FDK-083G2181
50	64	50	50	FDK-083G2182
65	91	66	65	FDK-083G2183
80	106	81	80	FDK-083G2184
100	119	100	100	FDK-083G2185

ISO 2852 (SMS 3016, BS 4825-3)

Adapter		Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)

10	34	10	10	FDK-083G2186
15	34	16	15	FDK-083G2187
25	50.5	26	25	FDK-083G2179
33.7	50.5	31.3	25	FDK-083G2190
38	50.5	35.6	40	▶ FDK-083G2191
51	64	48.6	50	FDK-083G2192
63.5	77.5	60.3	65	FDK-083G2193
76.1	91	72.9	80	FDK-083G2194
101.6	119	97.6	100	FDK-083G2195

Tri-Clamp®

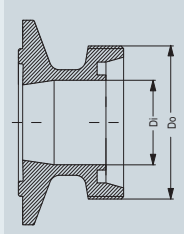
Adapter		Sensor	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)

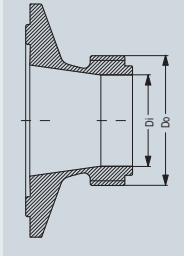
10	34	10	10	FDK-083G2286
15	34	16	15	▶ FDK-083G2287
25	50.5	22.6	25	▶ FDK-083G2289
38	50.5	35.6	40	▶ FDK-083G2291
51	64	48.6	50	▶ FDK-083G2292
63.5	77.5	60.3	65	▶ FDK-083G2293
76.1	91	72.9	80	▶ FDK-083G2294
101.6	119	97.6	100	FDK-083G2295


Tri-Clamp® is a registered trademark of Ladish Co.

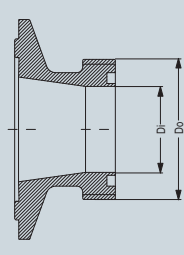
▶ Available ex stock

D_o: outer diameter
D_i: inner diameter

Accessories				Order No.
Threaded type connection fittings for MAG 1100 F				
Sanitary pipe fittings for Threaded types				
Each of the following accessory order nos. comprises:				
2 pcs. fittings				
2 pcs. clamps (to join flow sensor and fitting)				
DIN 11851				
<u>Adapter</u>		<u>Sensor</u>		
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
10	28	10	10	FDK-083G2156
15	34	16	15	▶ FDK-083G2157
20	44	20	15	FDK-083G2158
25	52	26	25	▶ FDK-083G2159
32	58	32	25	FDK-083G2160
40	65	38	40	▶ FDK-083G2161
50	78	50	50	▶ FDK-083G2162
65	95	66	65	▶ FDK-083G2163
80	110	81	80	FDK-083G2164
100	130	100	100	FDK-083G2165

ISO 2853				
<u>Adapter</u>			<u>Sensor</u>	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
25	37	22.6	25	FDK-083G2149
38	51	35.6	40	FDK-083G2151
51	64	48.6	50	FDK-083G2152
63.5	78	60.3	65	FDK-083G2153
76.1	91	72.9	80	FDK-083G2154
101.6	118	97.6	100	FDK-083G2155

BS 4825-4				
<u>Adapter</u>			<u>Sensor</u>	
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
25	37	22.6	25	FDK-083G2149
38	51	35.6	40	FDK-083G2151
51	64	48.6	50	FDK-083G2152
63.5	78	60.3	65	FDK-083G2153
76.1	91	72.9	80	FDK-083G2154
101.6	126	97.6	100	FDK-083G2145

Accessories				Order No.
Threaded type connection fittings for MAG 1100 F				
Sanitary pipe fittings for Threaded types				
Each of the following accessory order nos. comprises:				
2 pcs. fittings				
2 pcs. clamps (to join flow sensor and fitting)				
SMS 1145				
<u>Adapter</u>		<u>Sensor</u>		
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)	
25	40	22.6	25	FDK-083G2139
38	60	35.6	40	FDK-083G2141
51	70	48.6	50	FDK-083G2142
63.5	85	60.3	65	FDK-083G2143
76	98	72	65	FDK-083G2144
D _o : outer diameter				
D _i : inner diameter				

Spare parts for MAG 1100 F		Order No.
Gaskets		
(2 pcs., between flow sensor and adapter)		
<u>MAG 1100 F (ceramic)</u>		
Rubber: FKM/FPM (FDA)		
• DN 10	▶	A5E00915707 ^{F)}
• DN 15	▶	A5E00915764 ^{F)}
• DN 25	▶	A5E00915771 ^{F)}
• DN 40	▶	A5E00915773 ^{F)}
• DN 50	▶	A5E00915775 ^{F)}
• DN 65	▶	A5E00915780 ^{F)}
• DN 80	▶	A5E00915782 ^{F)}
• DN 100	▶	A5E00915784 ^{F)}
<u>MAG 1100 F (PFA)</u>		
Rubber: EPDM (FDA)		
• DN 10	▶	FDK-083G2206
• DN 15	▶	FDK-083G2207
• DN 25	▶	FDK-083G2209
• DN 40	▶	FDK-083G2211
• DN 50	▶	FDK-083G2212
• DN 65	▶	FDK-083G2213
• DN 80	▶	FDK-083G2214
• DN 100	▶	FDK-083G2215
Rubber: NBR		
• DN 10	▶	FDK-083G2216
• DN 15	▶	FDK-083G2217
• DN 25	▶	FDK-083G2219
• DN 40	▶	FDK-083G2221
• DN 50	▶	FDK-083G2222
• DN 65	▶	FDK-083G2223
• DN 80	▶	FDK-083G2224
• DN 100	▶	FDK-083G2225

▶ Available ex stock

F) Subject to export regulations AL: 91999, ECCN: N.

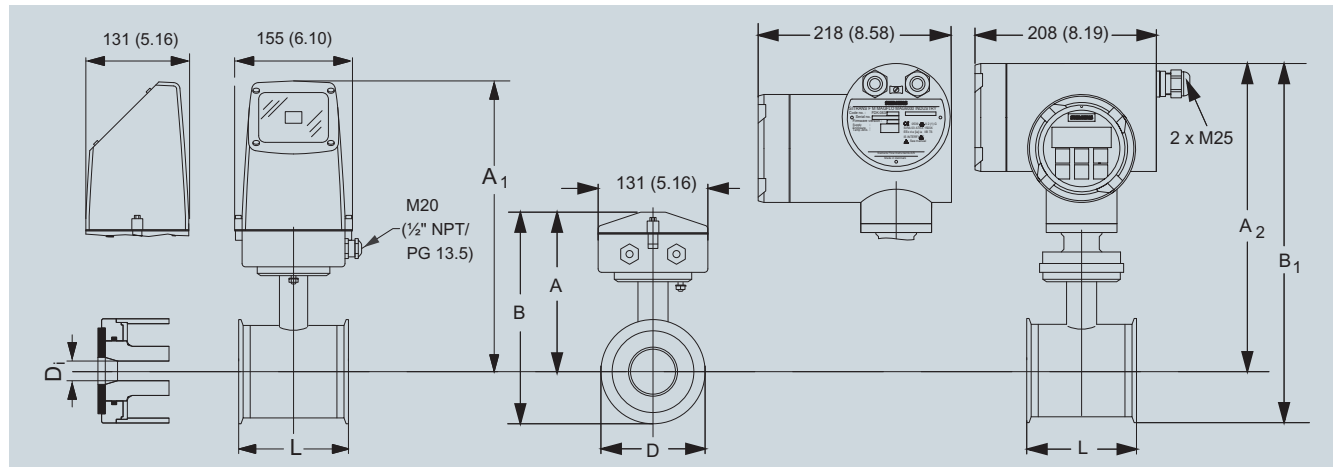
SITRANS F flowmeters

SITRANS F M

MAG 1100 F

Dimensional drawings

Sensor MAG 1100 F compact/remote



Important note:

For compact installation with MAG 6000 I/Ex - transmitter to be supported to avoid tension on the sensor part.

Size	L	A	A ₁ / A ₂ ³⁾	B ²⁾	B ₁	D	D ₁ (Al ₂ O ₃)	D ₁ PFA	Weight ¹⁾
DN	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
10	64	161	315	193.7	344.7	64.0	10	10	2.2
15	64	161	315	193.7	344.7	64.0	15	16	2.2
25	79	169	323	207.5	359.0	77.5	25	26	2.7
40	94	179	333	228.0	379.0	91.0	40	38	3.4
50	104	188	342	247.7	398.7	119.0	50	50	4.2
65	131	197.5	351	262.6	413.6	130.0	65	66	5.5
80	156	204	357	281.0	432.0	155.0	80	81	7.0
100	186	217	370	308.0	459.0	183.0	100	100	10.0

Size	L	A	A ₁ / A ₂ ³⁾	B ²⁾	B ₁	D	D ₁ (Al ₂ O ₃)	D ₁ PFA	Weight ¹⁾
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
3/8	2.52	6.34	12.40	7.62	13.57	2.52	0.39	0.39	4.8
1/2	2.52	6.34	12.40	7.62	13.57	2.52	0.59	0.63	4.8
1	3.11	6.66	12.72	8.17	14.13	3.05	0.98	1.02	4.9
1 1/2	3.70	7.05	13.11	8.98	14.92	3.58	1.57	1.50	7.5
2	4.09	7.40	13.47	9.75	15.70	4.68	1.97	1.97	9.2
2 1/2	5.16	7.78	13.82	10.34	16.28	5.12	2.56	2.60	12.0
3	6.14	8.03	14.06	11.06	17.01	6.10	3.15	3.19	15.0
4	7.32	8.54	14.57	12.13	18.07	7.20	3.94	3.94	22.0

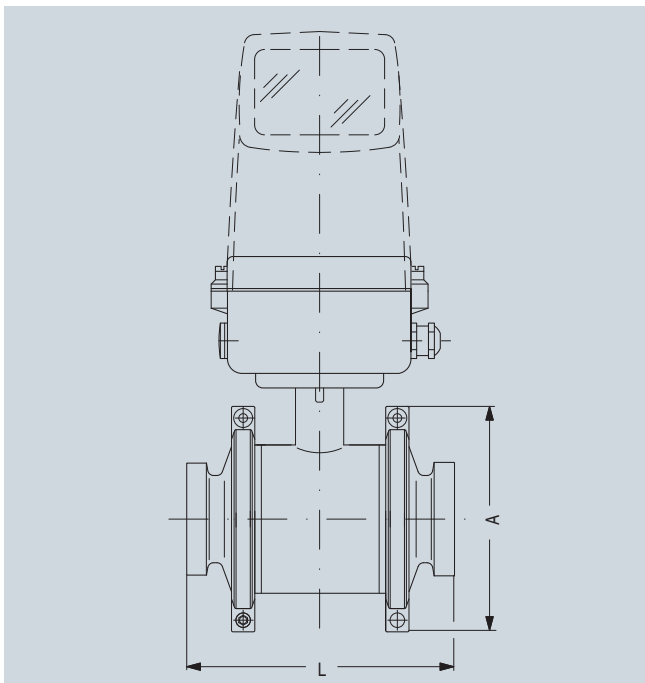
¹⁾ With transmitter MAG 5000 or MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lb)

With MAG 6000 I weight is increased with 5.5 kg (12.1 lbs)

²⁾ 14.5 mm (0.57") shorter when the AISI terminal box is used (always ATEX version)

³⁾ A₂ is 3 mm (0.12") shorter than A₁

Sensor MAG 1100 F compact/separate – build-in length



Size		A		L ¹⁾	
DN	Inch	[mm]	[inch]	[mm]	[inch]
10	3/8	99	3.90	146	5.75
15	1/2	99	3.90	146	5.75
25	1	113	4.45	161	6.34
40	1 1/2	126	4.96	176	6.93
50	2	154	6.06	186	7.32
65	2 1/2	165	6.50	223	8.78
80	3	200	7.87	258	10.16
100	4	225	8.86	288	11.34

¹⁾ The total build-in length "L" is independent of the adapter type selected.