

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors

MAG 1100 F

Overview



The electromagnetic sensor SITRANS FM 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
- Sanitary design for CIP/SIP cleaning
- Easy commissioning, the SENSORPROM unit automatically updates settings
- Hose proof IP67/NEMA 4X enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints.

Application

The main applications of the SITRANS FM 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 terminal box
- ATEX 2G D version for hazardous areas (ceramic liner)

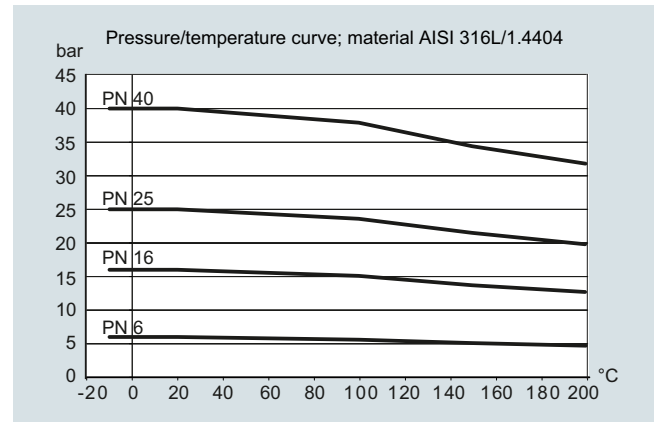
Mode of operation

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

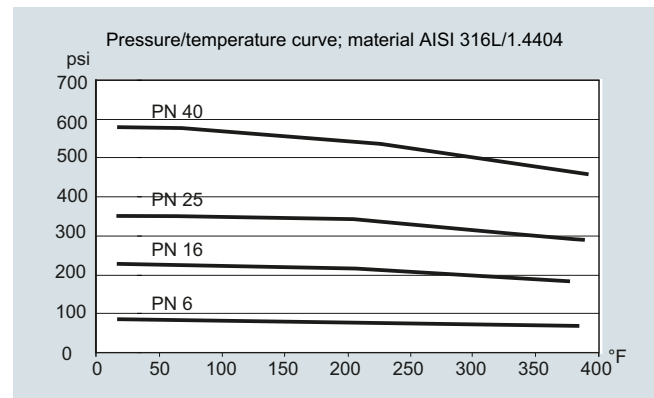
Integration

The complete flowmeter consists of a sensor and an associated transmitter SITRANS FM 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/RS 485, HART, FOUNDATION Fieldbus H1, DeviceNet.

Pressure/temperature curve; material AISI 316L/1.4404



Pressure/temperature curve; material AISI 316L/1.4404



Technical specifications

Measuring principle	Electromagnetic induction	Design	
Excitation frequency (Mains supply: 50 Hz/60 Hz)	DN 10 ... 65 (1/4" ... 2 1/2"): 12.5 Hz/15 Hz DN 80 ... 100 (3", 4"): 6.25 Hz/7.5 Hz	Weight	See Dimensional drawings
Process connection		Material	
Nominal size	DN 10 ... DN 100 (3/8" ... 4")	Enclosure	
Process connection	Hygienic adapters available for: <ul style="list-style-type: none"> • Direct welding onto pipe • Clamp fitting • Threaded fitting 	• MAG 1100 F	Stainless steel AISI 316L/1.4404
Rated operating conditions		Terminal box (remote version only)	
Ambient conditions		• Standard	Fibre glass reinforced polyamide
Ambient temperature		• Option	Stainless steel AISI 316/1.4436
• Sensor	-40 ... +100 °C (-40 ... +212 °F)	• Ex ATEX (remote version only)	Stainless steel AISI 316/1.4436
• Ex sensor	-20 ... +60 °C (-4 ... +140 °F)	Liner	
• Compact with transmitter MAG 5000/6000	-20 ... +60 °C (-4 ... +140 °F)	MAG 1100 F (Ceramic)	Aluminum oxide Al ₂ O ₃ (ceramics)
• Compact with transmitter MAG 6000 I	-20 ... +60 °C (-4 ... +140 °F)	MAG 1100 F (PFA)	Reinforced PFA (teflon) (not for Ex)
• Compact with transmitter MAG 6000 I Ex	-10 ... +60 °C (14 ... 140 °F)	Electrodes	
Temperature of medium		MAG 1100 F (Ceramic)	Platinum with gold/Titanium brazing alloy
MAG 1100 F (Ceramic)	-20 ... +150 °C (-4 ... +302 °F) Suitable for steam sterilization	MAG 1100 F (PFA)	<ul style="list-style-type: none"> • DN 10 ... 15 (3/8" ... 1/2"): Hastelloy C276/2.4819 • DN 25 ... 100 (1" ... 4"): Hastelloy C22/2.4602
MAG 1100 F (PFA)	-30 ... +130 °C (-22 ... +266 °F) Suitable for steam sterilization at 150 °C (302 °F)	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 6000 I: 2 x M25 (for supply/output) - MAG 6000 I Ex: 2 x M25 (for supply/output)
Temperature shock		Certificates and approvals	
MAG 1100 F		Calibration	
• 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 ≤ 144 °F/min) • DN 40, 50, 65: Max. ΔT ≤ 70 °C/min (1 1/2", 2", 2 1/2": Max. ΔT ≤ 126 °F/min) • DN 80, 100: Max. ΔT ≤ 60 °C/min (3", 4": Max. ΔT ≤ 108 °F/min) 	• Default calibration	Zero-point, 2 x 25 %, 2 x 90 %
MAG 1100 F (PFA)	Max. ± 100 °C (212 °F) momentarily	Hazardous areas	
Operating pressure		• MAG 1100 F (Ceramic)	
MAG 1100 F (Ceramic)	DN 10 ... 65: 40 bar (3/8" ... 2 1/2": 580 psi) DN 80: 25 bar (3": 363 psi) DN 100: 25 bar (4": 363 psi)	- Ex-sensor in compact or remote version with MAG 6000 I Ex	<ul style="list-style-type: none"> • ATEX, EAC Ex <ul style="list-style-type: none"> - Zone 1 Ex d e ia IIB T6 Gb • ATEX <ul style="list-style-type: none"> - Zone 21 Ex tD A21 IP67 • FM <ul style="list-style-type: none"> - NI Class I Div. 2 Groups A, B, C, D
MAG 1100 F (PFA)	Vacuum: 1 x 10 ⁻⁶ bar _{abs} (1.5 x 10 ⁻⁵ psi _{abs}) 20 bar (290 psi) Vacuum: 0.02 bar _{abs} (0.3 psi _{abs}) DN 80 ... DN 100: CO ₂ pressure max. 7 bar (101.5 psi)	- Standard sensor in compact or remote version with MAG MAG 5000/6000/6000 I Ex	• FM <ul style="list-style-type: none"> - NI Class I Div. 2 Groups A, B, C, D
Mechanical load (vibration)		• MAG 1100 F (PFA)	
	18 ... 1 000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36	- Standard sensor in compact or remote version with MAG MAG 5000/6000/6000 I Ex	• FM <ul style="list-style-type: none"> - NI Class I Div. 2 Groups A, B, C, D
	Sensor: 3.17 g RMS	Hygienic	
	Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 grms	• MAG 1100 F (Ceramic)	<ul style="list-style-type: none"> • 3A (remote version with Polyamide terminal box) • 3A (remote version with Polyamide terminal box) • Hygienic EC 1935:2004 European food contact material
	Sensor with compact MAG 6000 I/MAG 6000 I Ex mounted transmitter: 1.14 grms	• MAG 1100 F (PFA)	
	For compact installation with the MAG 6000 I/MAG 6000 I Ex, transmitter to be supported to avoid tension on sensor part.	Pressure equipment	PED - 2014/68/EU
Enclosure rating	IP67 to EN 60529 (NEMA 4X), 1 mH ₂ O for 30 min	Others	<ul style="list-style-type: none"> • EAC (Russia, Belarus, Kazakhstan) • KCC (South Korea)
EMC	2014/30/EU		

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors

MAG 1100 F

Technical specifications (continued)

Accessories

Weld-in adapter

Adapter for welding onto dairy pipe, stainless steel 1.4404	Tri-Weld ISO 2037, DIN 11850, SMS 3008, BS 4825-1
• DN 10, 15, 25, 40, 50 and 65 (3/8", 1/2", 1", 1 1/2", 2" and 2 1/2")	PN 40 (600 psi)
• DN 8 and DN 100 (3" and 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 316/1.4436
Gasket	
• MAG 1100 F (Ceramic)	FKM/FPM with stainless steel insert (AISI 304/1.4301) (-20 ... +150 °C (-4 ... +302 °F))
	EPDM (-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.

Selection and ordering data

Article No.

Sensor SITRANS FM MAG 1100 F

7ME6140-

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

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

None (not suitable for 3A approval)

Weld in

DIN 11850
ISO 2037 (SMS 3008)
Tri-Weld/BS 4825-1

Clamp type

DIN 32676
ISO 2852 (SMS 3016)
Tri-Clamp/BS 4825-3

Threaded type

DIN 11851
SMS 1145¹⁾

Liner material

PFA 1
Ceramic 2

Gasket material¹⁾

EPDM flat gasket (3A) 0
FPM/FKM (3A) (only with ceramic liner) 2
EPDM-P gasket (only for PFA) (3A) 3

Electrode material

Hastelloy C (only with PFA liner) 1
Platinum (only with ceramic liner) 2

Transmitter

Standard sensor for remote transmitter (order transmitter separately), 3A approved A
Ex sensor for remote transmitter (order transmitter separately) 3A approved B
MAG 6000 I, Alu.18 ... 90 V DC, 115 ... 230 V AC C
MAG 6000 I, Aluminum 18 ... 30 V DC, Ex D
MAG 6000 I, Aluminum 115 ... 230 V AC, Ex E
MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC H
MAG 6000, Polyamide, 115 ... 230 V AC J
MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC K
MAG 5000, Polyamide, 115 ... 230 V AC L

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors

MAG 1100 F

Selection and ordering data

Article No.

Article No.

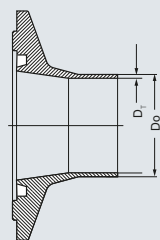
Accessories for MAG 1100 F sensor

Weld-in connection fittings for use with P gaskets (Stainless steel)

Material: AISI 316L (1.4404)
Only for liner PFA
2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
P gaskets not included

DIN 11850

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



10	13	1.5	10	A5E02054630
15	19	1.5	15	A5E02054633
20	23	1.5	15	A5E02054634
25	29	1.5	25	A5E02054635
32	35	1.5	25	A5E02054637
40	41	1.5	40	A5E02054638
50	53	1.5	50	A5E02054640
65	70	2.0	65	A5E02054643
80	85	2.0	80	A5E02054644
100	104	2.0	100	A5E02054646

ISO 2037

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

12.7	12.7	1.0	10	A5E03727946
17.2	17.2	1.0	15	A5E03728098
25	25	1.6	25	A5E02196073
33	33.7	1.6	25	A5E02196074
38	38	1.6	40	A5E02196075
40	40	1.6	40	A5E02196076
51	51	1.6	50	A5E02196077
63.5	63.5	1.6	65	A5E02196078
76.1	76.1	1.6	80	A5E02196080
101.6	101.6	2.0	100	A5E02196082

Tri-Weld (BS 4825-1)

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

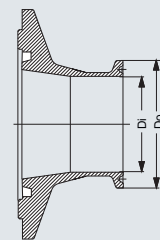
12.7	12.7	1.2	10	A5E02199113
19.05	19.05	1.2	15	A5E02199114
25.4	25.4	1.6	25	A5E02199115
38.1	38.1	1.6	40	A5E02199116
50.8	50.8	1.6	50	A5E02199117
63.5	63.5	1.6	65	A5E02199118
76.2	76.2	1.6	80	A5E02199119
101.6	101.6	2.0	100	A5E02199120

Clamp-type connection fittings for use with P gaskets (Stainless steel)

Material: AISI 316L (1.4404)
Only for liner PFA
2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
P gaskets not included

DIN 32676

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



10	34	10	10	A5E02211143
15	34	16	15	A5E02211144
25	50.5	22.6	25	A5E02211146
40	50.5	38	40	A5E02211147
50	64	50	50	A5E02211148
65	91	66	65	A5E02211151
80	106	81	80	A5E02211152
100	119	100	100	A5E02211153

ISO 2852

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

25	50.5	22.6	25	A5E02213581
33.7	50.5	31.3	25	A5E02213582
38	50.5	35.6	40	A5E02213583
51	64	48.6	50	A5E02213584
63.5	77.5	60.3	65	A5E02213585
76.1	91	72.9	80	A5E02213586
101.6	119	97.6	100	A5E02213587

Tri-Clamp (BS 4825-3)

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

12.7	25.4	9.5	10	A5E02213596
19.05	25.4	15.85	15	A5E02213597
25.4	50.5	22.2	25	A5E02213598
38.1	50.5	34.9	40	A5E02213599
50.8	64	47.6	50	A5E02213600
63.5	77.5	60.3	65	A5E02213601
76.2	91	73	80	A5E02213602
101.6	119	97.6	100	A5E02213603

D_o: Outer diameterD_i: Inner diameter

3

Selection and ordering data

Article No.

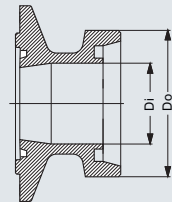
Article No.

Threaded type connection fittings for use with P gaskets (Stainless steel)

Material: AISI 316L (1.4404)
 Only for liner PFA
 2 pcs. fittings
 2 pcs. clamps (to join flow sensor and fitting),
 P gaskets not included

DIN 11851

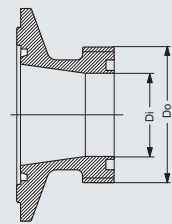
Adapter			Sensor
DN (mm)	D _o (mm)	D _T (mm)	DN (mm)



10	28	10	10	A5E02218293
15	34	16	15	A5E02218294
20	44	20	15	A5E02218295
25	52	26	25	A5E02218296
32	58	32	25	A5E02218297
40	65	38	40	A5E02218298
50	78	50	50	A5E02218299
65	95	66	65	A5E02218300
80	110	81	80	A5E02218301
100	130	100	100	A5E02218302

SMS 1145

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



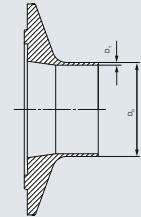
25	40	22.6	25	A5E02218310
38	60	35.6	40	A5E02218312
51	70	48.6	50	A5E02218313
63.5	85	60.3	65	A5E02218314
76	98	72	65	A5E02218315

D_o: Outer diameterD_i: Inner diameter
Weld-in connection fittings for use with flat gaskets (Stainless steel)

Material: AISI 316L (1.4404)
 For liner PFA and ceramic
 2 pcs. fittings
 2 pcs. clamps (to join flow sensor and fitting),
 Flat gaskets not included

DIN 11850

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



10	13	1.5	10	FDK:083G2116
15	19	1.5	15	FDK:083G2117
20	23	1.5	15	FDK:083G2118
25	29	1.5	25	FDK:083G2119
32	35	1.5	25	FDK:083G2120
40	41	1.5	40	FDK:083G2121
50	53	1.5	50	FDK:083G2122
65	70	2.0	65	FDK:083G2123
80	85	2.0	80	FDK:083G2124
100	104	2.0	100	FDK:083G2125

ISO 2037

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

12.7	12.7	1.0	10	A5E03720273
17.2	17.2	1.0	15	FDK:083G2107
25	25.6	1.6	25	FDK:083G2109
33.7	33.7	1.6	25	FDK:083G2100
38	38	1.6	40	FDK:083G2111
40	40	1.6	40	FDK:083G2101
51	51	1.6	50	FDK:083G2112
63.5	63.5	1.6	65	FDK:083G2113
76.1	76.1	1.6	80	FDK:083G2114
101.6	101.6	2.0	100	FDK:083G2115
114.3	118.3	2.0	100	FDK:083G2105

Tri-Weld (BS 4825-1)

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

12.7	12.7	1.2	10	FDK:083G2276
19.05	19.05	1.2	15	FDK:083G2277
25.4	25.4	1.6	25	FDK:083G2279
38	38.1	1.6	40	FDK:083G2281
50.8	50.8	1.6	50	FDK:083G2282
63.5	63.5	1.6	65	FDK:083G2283
76.2	76.2	1.6	80	FDK:083G2284
101.6	101.6	2.0	100	FDK:083G2285

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors

MAG 1100 F

Selection and ordering data

Article No.

Article No.

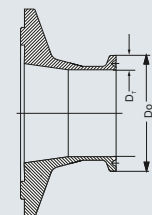
Clamp-type connection fittings for use with flat gaskets (Stainless steel)

Material: AISI 316L (1.4404)
For liner PFA and ceramic
2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
Flat gaskets not included

DIN 32676¹⁾

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

10	34	10	10
15	34	16	15
25	50.5	26	25
40	50.5	38	40
50	64	50	50
65	91	66	65
80	106	81	80
100	119	100	100



FDK:083G2186
FDK:083G2187
FDK:083G2179
FDK:083G2181
FDK:083G2182
FDK:083G2183
FDK:083G2184
FDK:083G2185

ISO 2852¹⁾

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

25	50.5	22.6	25
33.7	50.5	31.3	25
38	50.5	35.6	40
51	64	48.6	50
63.5	77.5	60.3	65
76.1	91	72.9	80
101.6	119	97.6	100

FDK:083G2189
FDK:083G2190
FDK:083G2191
FDK:083G2192
FDK:083G2193
FDK:083G2194
FDK:083G2195

Tri-Clamp (BS 4825-3)¹⁾

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

12.7	25.4	9.5	10
19.05	25.4	15.85	15
25.4	50.5	22.2	25
38.1	50.5	34.9	40
50.8	64	47.6	50
63.5	77.5	60.3	65
76.2	91	73	80
101.6	119	97.6	100

FDK:083G2286
FDK:083G2287
FDK:083G2289
FDK:083G2291
FDK:083G2292
FDK:083G2293
FDK:083G2294
FDK:083G2295

D_o: Outer diameter

D_i: Inner diameter

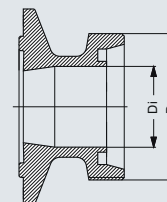
Threaded type connection fittings for use with flat gaskets (Stainless steel)

Material: AISI 316L (1.4404)
For liner PFA and ceramic
2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
Flat gaskets not included

DIN 11851¹⁾

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

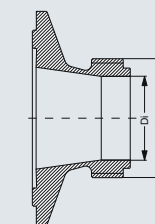
10	28	10	10
15	34	16	15
20	44	20	15
25	52	26	25
32	58	32	25
40	65	38	40
50	78	50	50
65	95	66	65
80	110	81	80
100	130	100	100



ISO 2853¹⁾

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

25	37	22.6	25
38	51	35.6	40
51	64	48.6	50
63.5	78	60.3	65
76.1	91	72.9	80



BS 4825-4¹⁾

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

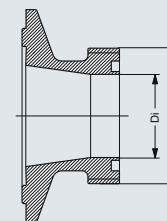
101.6	126	97.6	100
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SMS 11452²⁾

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

25	40	22.6	25
38	60	35.6	40
51	70	48.6	50
63.5	85	60.3	65
76	98	72	65



D_o: Outer diameter

D_i: Inner diameter

¹⁾ Suitable for 3A

²⁾ Not suitable for 3A

Selection and ordering data**Article No.****Spare parts for MAG 1100 F sensor****Gaskets**

(delivered in pairs, to be placed between flow sensor and adapter)

MAG 1100 F (PFA) - P gaskets

Rubber: EPDM

• DN 10	A5E02055286
• DN 15	A5E02055287
• DN 25	A5E02055290
• DN 40	A5E02055291
• DN 50	A5E02055292
• DN 65	A5E02055293
• DN 80	A5E02055295
• DN 100	A5E02055297

MAG 1100 F (ceramic) - Flat gaskets

Rubber: FKM/FPM

• DN 10	A5E00915707
• DN 15	A5E00915764
• DN 25	A5E00915771
• DN 40	A5E00915773
• DN 50	A5E00915775
• DN 65	A5E00915780
• DN 80	A5E00915782
• DN 100	A5E00915784

MAG 1100 F (PFA, ceramic) - Flat gaskets

Rubber: EPDM

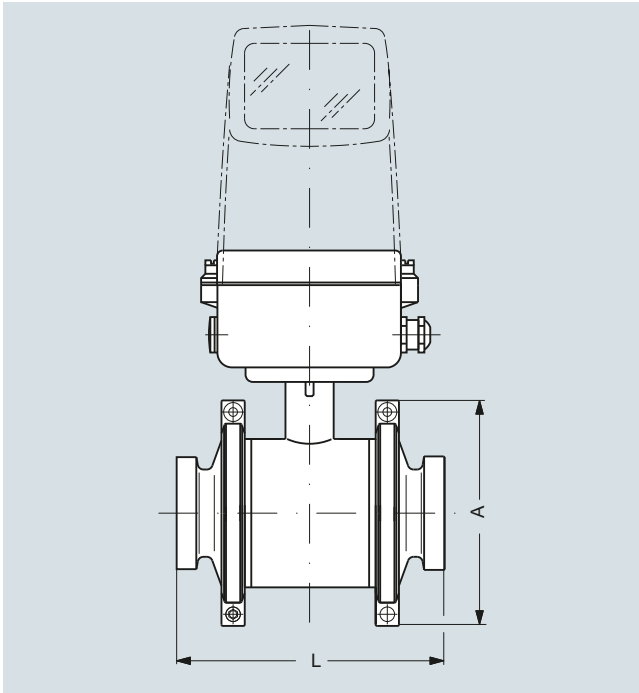
• DN 10	FDK:083G2206
• DN 15	FDK:083G2207
• DN 25	FDK:083G2209
• DN 40	FDK:083G2211
• DN 50	FDK:083G2212
• DN 65	FDK:083G2213
• DN 80	FDK:083G2214
• DN 100	FDK:083G2215

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

Dimensional drawings (continued)

Sensor MAG 1100 F compact/separate – built-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 built-in length "L" is independent of the adapter type selected.