

Overview



The SITRANS F M MAGFLO MAG 1100 is an electromagnetic flow sensor in a compact wafer design designed for flow applications in the process industry.

Benefits

- Sensor sizes: DN 6 ... 100 (1/4" ... 4")
- Compact wafer design meets EN 1092, DIN and ANSI flange standards
- Corrosion resistant AISI 316 stainless steel sensor housing
- Highly resistant liner and electrodes fitting most extreme process media
- Temperature rating up to 200 °C (390 °F)
- 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 MAGFLO electromagnetic flow sensors can be found in the following fields:

- Process industry
- Chemical industry
- Pharmaceutical industry
- Water treatment like e.g. chemical dosing

Design

- Sanitary design for CIP/SIP cleaning
- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- Simple on site upgrade to IP68/NEMA 6P

Mode of operation

The flow measuring principle is based on Faradays 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 flow sensor and an associated transmitter SITRANS F M MAGFLO MAG 5000, 6000 or 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, PROFIBUS DP & PA, DeviceNet, CANopen, MODBUS RTU/RS 485.

Technical specifications

Measuring principle

Excitation frequency

Electromagnetic induction

DN 6 ... 65 (1/4" ... 2 1/2"): 12.5 Hz
DN 80 ... 100 (3", 4"): 6.25 Hz

Input

Nominal size

- MAG 1100 Ceramic
- MAG 1100 PFA

DN 6 ... DN 100 (1/4" ... 4")

DN 10 ... DN 100 (3/8" ... 4")

Mating flanges

EN 1092-1 (DIN 2501),
ANSI B 16.5 class 150 and 300 or equivalent

Option:
DN 6 or 10 (1/4" or 3/8"): 1/2" pipe connection adapters thread: 1/2" tapered ISO 7-1

Rated operating conditions

Ambient conditions

Ambient temperature

- Remote transmitter -40 ... +100 °C (-40 ... +210 °F)
- Compact transmitter MAG 5000/6000 -20 ... +50 °C (-4 ... +120 °F)
- Transmitter MAG 6000 I -20 ... +60 °C (-4 ... +140 °F)

Temperature shock

- MAG 1100 Ceramic

- Duration > 1 min

• DN 6, 10, 15, 25: Max. $\Delta T \leq 15$ °C/min (1/4", 3/8", 1/2", 1": Max. $\Delta T \leq 15$ K/min)

• DN 40, 50, 65: Max. $\Delta T \leq 10$ °C/min (1 1/2", 2", 2 1/2": Max. $\Delta T \leq 10$ K/min)

• DN 80, 100: Max. $\Delta T \leq 5$ °C/min (3", 4": Max. $\Delta T \leq 5$ K/min)

- Duration ≤ 1 min, followed by 10 min rest

• DN 6, 10, 15, 25: Max. $\Delta T \leq 80$ °C/min (1/4", 3/8", 1/2", 1": Max. $\Delta T \leq 80$ K/min)

• DN 40, 50, 65: Max. $\Delta T \leq 70$ °C/min (1 1/2", 2", 2 1/2": Max. $\Delta T \leq 70$ K/min)

• DN 80, 100: Max. $\Delta T \leq 60$ °C/min (3", 4": Max. $\Delta T \leq 60$ K/min)

- MAG 1100 PFA

Max. ± 100 °C (210 °F) momentarily

Operating pressure

- MAG 1100 Ceramic

DN 6 ... 65: 40 bar (1/4" ... 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 (1.5 x 10⁻⁶ psi)

- MAG 1100 PFA

20 bar (290 psi)

Vacuum: 0.02 bar (0.3 psi)

SITRANS F flowmeters

SITRANS F

MAGFLO MAG 1100

Technical specifications (continued)

<u>Mechanical load</u>	10 ... 1000 Hz random, 3.17 G rms in all directions to EN 60068-2-36 For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.
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Degree of protection (enclosure)

• Standard	IP67 to EN 60529 (NEMA 4X/6), 1 mH ₂ O for 30 min
• Option	IP68 to EN 60529 (NEMA 6P), 10 mH ₂ O cont.

Medium conditions

Temperature of medium

• MAG 1100 ceramic	
- Standard	-20 ... +150 °C (-4 ... +300 °F)
- High temperature	-20 ... +200 °C (-4 ... +390 °F)
• MAG 1100 PFA	
- PFA	-30 ... +130 °C (-20 ... +270 °F) Suitable for steam sterilization at 150 °C (300 °F)

EMC	89/336 EEC
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Design

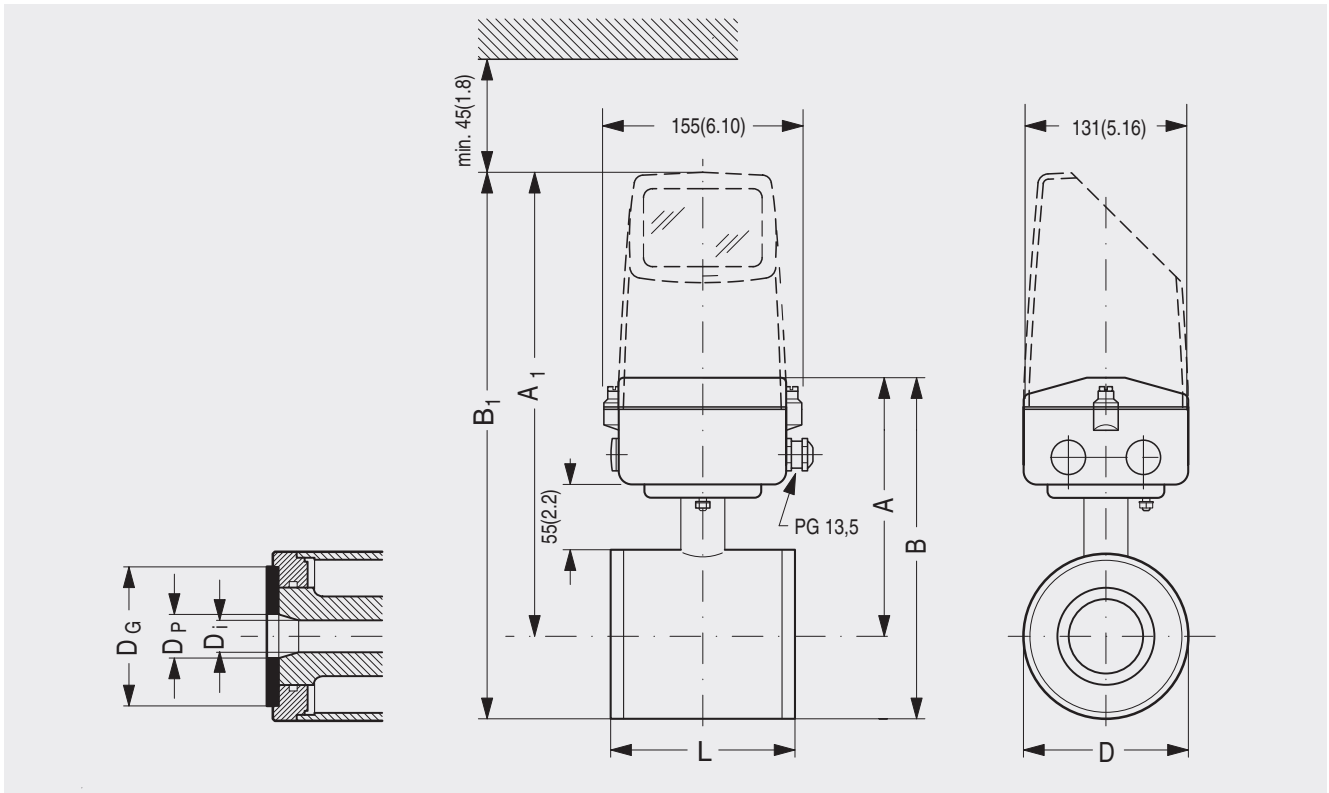
Weight	See Dimensional drawings
Material	
• Enclosure	
- MAG 1100	Stainless steel AISI 316L (1.4404)
• Terminal box	
- Standard	Fibre glass-reinforced polyamide
- High temperature and Ex (re- mote version only)	Stainless steel AISI 316 (1.4436)
• Fixing studs	Stainless steel AISI 304 (1.4301), Number and size to EN 1092- 1:2001
• Gaskets	
- Standard	EPDM (max. 150 °C, PN 40 (max. 300 °F, 600 psi)
- Optional	<ul style="list-style-type: none"> • Graphite (max. 200 °C, PN 40 (max. 390 °F, 600 psi) • PTFE (max. 130 °C, PN 25 (max. 270 °F, 300 psi)
• Metering tube connection DN 6 and DN 10 (¼" and 3/8")	Stainless steel, AISI 316, ½" tapered ISO 7-1
Liner	
• MAG 1100 Ceramic	Aluminium oxide Al ₂ O ₃ (ceramics)
• MAG 1100 PFA	Reinforced PFA
Electrodes	
• MAG 1100 Ceramic	Platinum with gold / Titanium brazing alloy
• MAG 1100 PFA	Hastelloy C276

Certificates and approvals

Ex approval sensor	ATEX EEx [ia][ib] IIB T4-T6
Conforms to	PED – 97/23 EC 3A, EHEDG (Ceramic)

Dimensional drawings

Sensor MAG 1100, compact/remote



Size	A ¹⁾	B ¹⁾	A ₁	B ₁	D	D ₁ (Al ₂ O ₃)	D ₁ PFA	D _P	D _G	Weight ²⁾
DN	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
6	161	186	314	339	48.3	6		17.3	34	2.2
10	161	186	314	339	48.3	10	10	13.6	34	2.2
15	161	186	314	339	48.3	15	16	17.3	40	2.2
25	169	201	322	354	63.4	25	26	28.5	56	2.7
40	181	223	334	376	84.0	40	38	43.4	75	3.4
50	189	240	342	393	101.6	50	50	54.5	90	4.2
65	199	259	352	412	120.0	65	66	68.0	112	5.5
80	205	271	358	424	133.0	80	81	82.5	124	7.0
100	218	297	371	450	159.0	100	100	107.1	145	10.0

Size	A ¹⁾	B ¹⁾	A ₁	B ₁	D	D ₁ (Al ₂ O ₃)	D ₁ PFA	D _P	D _G	Weight ²⁾
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lbs]
¼	6.34	7.33	12.36	13.35	1.90	0.24		0.68	1.34	4.8
3/8	6.34	7.33	12.36	13.35	1.90	0.39	0.39	0.53	1.34	4.8
½	6.34	7.33	12.36	13.35	1.90	0.59	0.63	0.68	1.57	4.8
1	6.66	7.92	12.68	13.94	2.50	0.98	1.02	1.12	2.20	4.9
1½	7.13	8.78	13.15	14.81	3.31	1.57	1.50	1.71	2.95	7.5
2	7.44	9.45	13.47	15.47	4.00	1.97	1.97	2.15	3.54	9.2
2½	7.84	10.20	13.86	16.22	4.72	2.56	2.60	2.68	4.41	12
3	8.07	10.67	14.10	16.70	5.24	3.15	3.19	3.25	4.88	15
4	8.59	11.70	14.61	17.72	6.26	3.94	3.94	4.22	5.91	22

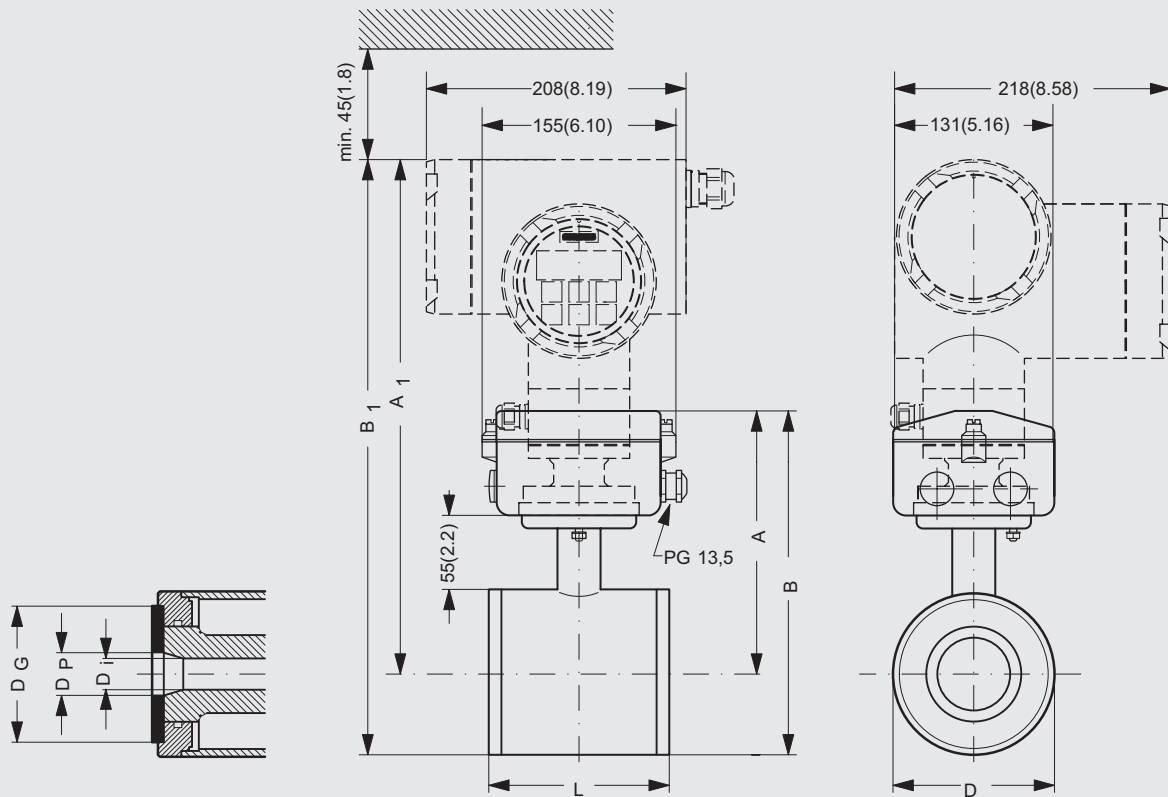
1) 13 mm / 0.5" shorter when the AISI terminal box is used (high temperature 200 °C (390 °F))

2) With transmitter MAG 5000 or MAG 6000 installed, weight is increased by approximately 0.8 kg (1.8 lb).

SITRANS F flowmeters

SITRANS F

MAGFLO MAG 1100



Size	A	B	A ₁ ¹⁾	B ₁ ¹⁾	D	D ₁ (Al ₂ O ₃)	D ₁ PFA	D _p	D _G	Weight ²⁾
DN	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
6	161	186	312	336	48.3	6		17.3	34	2.2
10	161	186	312	336	48.3	10	10	13.6	34	2.2
15	161	186	312	336	48.3	15	16	17.3	40	2.2
25	169	201	319	351	63.4	25	26	28.5	56	2.7
40	181	223	329	371	84.0	40	38	43.4	75	3.4
50	189	240	338	389	101.6	50	50	54.5	90	4.2
65	199	259	347	407	120.0	65	66	68.0	112	5.5
80	205	271	354	420	133.0	80	81	82.5	124	7.0
100	218	297	367	446	159.0	100	100	107.1	145	10.0

Size	A ¹⁾	B ¹⁾	A ₁	B ₁	D	D ₁ (Al ₂ O ₃)	D ₁ PFA	D _p	D _G	Weight ²⁾
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lbs]
¼	6.34	7.33	12.28	13.23	1.90	0.24		0.68	1.34	4.8
3/8	6.34	7.33	12.28	13.23	1.90	0.39	0.39	0.53	1.34	4.8
½	6.34	7.33	12.28	13.23	1.90	0.39	0.63	0.68	1.57	4.8
1	6.66	7.92	12.57	13.82	2.50	0.98	1.02	1.12	2.20	4.9
1½	7.13	8.78	12.95	14.61	3.31	1.57	1.50	1.71	2.95	7.5
2	7.44	9.45	13.31	15.31	4.00	1.97	1.97	2.15	3.54	9.2
2½	7.84	10.20	13.66	16.02	4.72	2.56	2.60	2.68	4.41	12
3	8.07	10.67	13.92	16.54	5.24	3.15	3.19	3.25	4.88	15
4	8.59	11.70	14.43	17.56	6.26	3.94	3.94	4.22	5.91	22

1) 7.6 mm (0.3 inch) higher in Ex version

2) With transmitter MAG 6000 I weight is increased by approximately 5.5 kg (12.1 lb).

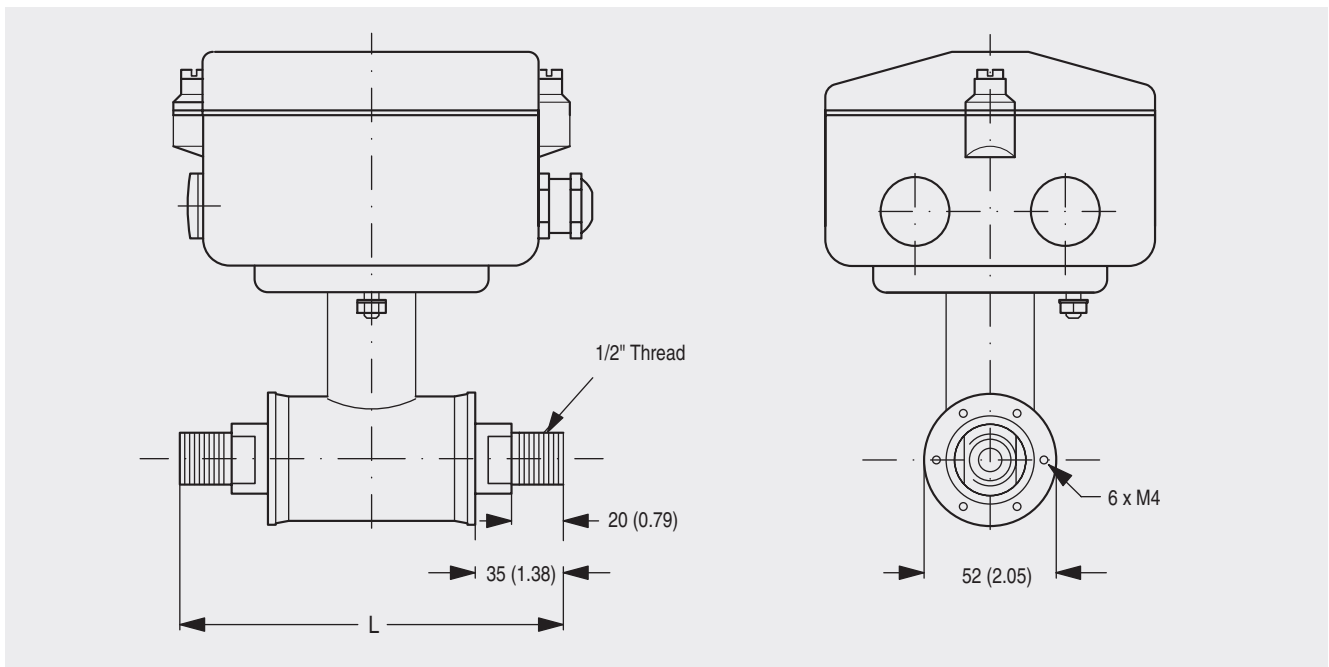
The total build-in length "L" [mm] / [inch] before assembling depends on the gasket selected

Size		EPDM		Graphite		PTFE (Teflon)		Without gasket		Earthing ring	
DN	Inch	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
6	1/4	64	2.52	66	2.60	70	2.75	64	2.52	77	3.03
10	3/8	64	2.52	66	2.60	70	2.75	64	2.52	77	3.03
15	1/2	65	2.56	66	2.60	70	2.75	64	2.52	77	3.03
25	1	80	3.15	81	3.19	85	3.35	79	3.10	92	3.62
40	1 1/2	95	3.74	96	3.78	100	3.94	94	3.70	107	4.21
50	2	105	4.13	106	4.17	110	4.33	104	4.05	117	4.61
65	2 1/2	130	5.12	131	5.15	135	5.31	129	5.05	142	5.60
80	3	155	6.10	156	6.14	160	6.30	154	6.00	167	6.57
100	4	185	7.28	186	7.31	190	7.48	184	7.20	197	7.76

The length "L" varies dependent on the gasket choice.

Without gasket		EPDM		Graphite		Teflon	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
150	5.9	150	5.9	152	6.0	156	6.1

Sensor MAG 1100 compact/separate



The MAG 1100 DN 6 and DN 10 (1/4" and 3/8") are prepared for assembly with the 1/2"G pipe connection.

SITRANS F flowmeters

SITRANS F M

Sensor MAGFLO MAG 1100, 1100 Ex, 1100 High Temperature

Selection and Ordering data	Order No.
Flowsensor SITRANS F M	
MAGFLO MAG 1100	7 M E 6 1 1 0 - ■ ■ A ■ 0 - ■ ■ A 0
Diameter	
DN 6 (1/4")	▶ 1 M
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
Liner material	
PFA	▶ 1
Ceramic	▶ 2
Electrode material	
Hastelloy C276 (only with PFA liner)	▶ 1
Platinum (only with ceramic liner)	▶ 2
Transmitter	
No transmitter	▶ A
MAG 6000 industry, 18 V ... 220 V, standard	▶ C
▶ Available ex stock	

Additional information	Order code
Please add "-Z" to Order No. and specify Order code(s) and plain text.	
Customer specific converter setup	Y20
Tag name made, 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
Power cable wired, specify cable order no.	Y40
Junction box IP68 with wired cable	Y41
Customer specific test	Y90
Special version with order no/date (add desired text)	Y99

Selection and Ordering data	Order No.
Flowsensor SITRANS F M	
MAGFLO MAG 1100 Ex, ATEX Ceramic liner, Platinum electrode	7 M E 6 1 3 0 - ■ ■ A 2 0 - 2 ■ ■ 0
Diameter	
DN 6 (1/4")	▶ 1 M
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
Transmitter	
No transmitter	▶ A
MAG 6000 industry, 18 V ... 30 V DC, ATEX	▶ D
MAG 6000 industry, 115 V ... 230 V, ATEX (pending)	▶ (E)
Communication	
No communication, add on possible	▶ A
HART	▶ B
PROFIBUS PA	▶ C
▶ Available ex stock	

Selection and Ordering data	Order No.
Flowsensor SITRANS F M	
MAGFLO MAG 1100 High Temperature Ceramic liner, Platinum electrode, Pg 13.5	7 M E 6 1 2 0 - ■ ■ A 2 0 - 2 A A 0
Diameter	
DN 15 (1/2")	▶ 1 V
DN 25 (1")	▶ 2 D
DN 40 (1 1/2")	▶ 2 R
DN 50 (2")	▶ 2 Y
DN 80 (3")	▶ 3 M
DN 100 (4")	▶ 3 T

Additional information	Order code
Please add "-Z" to Order No. and specify Order code(s) and plain text.	
Tag name made, 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
Power cable wired, specify cable order no.	Y40
Junction box IP68 NEMA 4X/6P with wired cable	Y41
Customer specific test	Y90
Special version with order no/date (add desired text)	Y99

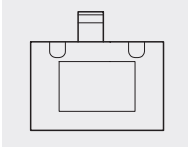
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SITRANS F flowmeters

SITRANS F M

Sensor MAGFLO MAG 1100, 1100 Ex,
1100 High Temperature

Selection and Ordering Data

Description	Order No.	Symbol
HART (for MAG 6000 I/Ex)	FDK:085U0321	
MODBUS RTU/RS485	FDK:085U0234	
PROFIBUS PA	FDK:085U0232	
PROFIBUS DP	FDK:085U0230	
CANopen	FDK:085U0228	
DeviceNet	FDK:085U0229	

Spare parts

	Order No.	Symbol
Display	FDK:085U3122	

Complete spare part PCB unit

	Order No.	Symbol
Not Ex	FDK: 085U3123	
Ex d version 18 ... 30 V DC	FDK: 085U3124	
Ex d version 115 ... 230 V AC	FDK: 085U3125	

Accessories

Order No.

for MAGFLO MAG 1100 flow sensor

Pipe connection ½"G external thread

Material: AISI 316; 2 pipe connections, 2 gaskets (EPDM), 12 M4 screws (12 mm)
 • For DN 6, ¼" and DN 10, 3/8" sensor ▶

FDK:083G0080

EPDM gaskets

Material: EPDM; each set includes: 2 EPDM gaskets, 2 earthing wires, 3 M6 screws

- DN 6/DN 10, ¼" / 3/8"
- DN 15, ½"
- DN 25, 1"
- DN 40, 1½"
- DN 50, 2"
- DN 65, 2½"
- DN 80, 3"
- DN 100, 4"

FDK:083G3116
FDK:083G3117
FDK:083G3119
FDK:083G3121
FDK:083G3122
FDK:083G3123
FDK:083G3124
FDK:083G3125

PTFE gaskets

Material: PTFE; each set includes: 2 gaskets, 2 earthing wires, 3 M6 screws

- DN 6/DN 10, ¼" / 3/8"
- DN 15, ½"
- DN 25, 1"
- DN 40, 1½"
- DN 50, 2"
- DN 65, 2½"
- DN 80, 3"
- DN 100, 4"

FDK:083G0156
FDK:083G0157
FDK:083G0159
FDK:083G0161
FDK:083G0162
FDK:083G0163
FDK:083G0164
FDK:083G0165

Graphite gaskets

Material: Graphite; each set includes: 2 gaskets

- DN 6/DN 10, ¼" / 3/8"
- DN 15, ½"
- DN 25, 1"
- DN 40, 1½"
- DN 50, 2"
- DN 65, 2½"
- DN 80, 3"
- DN 100, 4"

FDK:083G0116
FDK:083G0117
FDK:083G0119
FDK:083G0121
FDK:083G0122
FDK:083G0123
FDK:083G0124
FDK:083G0125

Grounding ring

Material: AISI 316 (mat. no. 1.4436); each set includes: 1 grounding ring, 3 teflon gaskets, 1 earth strap, 1 M6 screw

- DN 6/DN 10, ¼" / 3/8"
- DN 15, ½"
- DN 25, 1"
- DN 40, 1½"
- DN 50, 2"
- DN 65, 2½"
- DN 80, 3"
- DN 100, 4"

FDK:083G0686
FDK:083G0687
FDK:083G0689
FDK:083G0691
FDK:083G0692
FDK:083G0693
FDK:083G0694
FDK:083G0695

Grounding ring

Material: Hastelloy C; each set includes: 1 grounding ring, 3 teflon gaskets, 1 earth strap, 1 M6 screw

- DN 6/DN 10, ¼" / 3/8"
- DN 15, ½"
- DN 25, 1"
- DN 40, 1½"
- DN 50, 2"
- DN 65, 2½"
- DN 80, 3"
- DN 100, 4"

FDK:083G3256
FDK:083G3257
FDK:083G3259
FDK:083G3261
FDK:083G3262
FDK:083G3263
FDK:083G3264
FDK:083G3265

▶ Available ex stock.