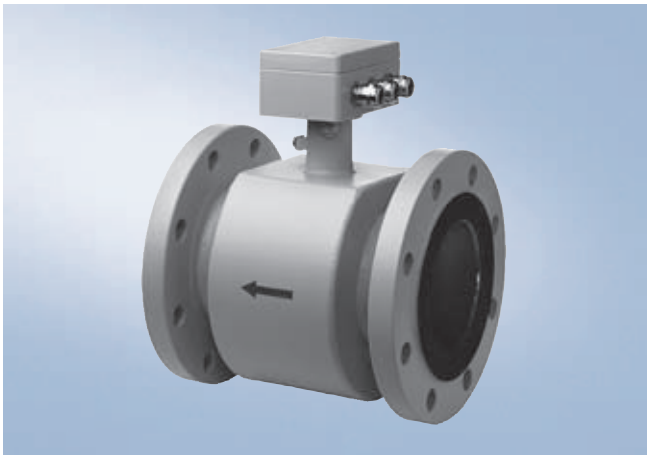
Flow sensor 911/E

Overview



Electromagnetic flowmeters are suitable for measuring the flow of almost all electrically conducting liquids, as well as sludges, pastes and slurries and magnetic conductive medias.

The magnetic field means they are suitable for flow velocities up to 12 m/s (39.4 ft/s) and for a minimum conductivity of 1 µS/cm (0.24 µS/ft) with a pulsed alternating field.

Benefits

- Fully-welded steel fitting
- Metering tube liners available made of hard/soft rubber, PTFE or Novolak
- Various flange connections available to EN 1092-1, ANSI B16.5
- Input amplifier with integral data component (smartPLUG) for all calibration values and customized settings if required.

Application

The main applications of the SITRANS F M electromagnetic flow sensor SITRANS F M 911/E with Transmag 2 can be found in the following fields:

- Pulp & Paper
- Mining
- Chemical

Design

The complete flowmeter consists of a flow sensor and an associated transmitter from the SITRANS F M Transmag 2 for pulsed alternating field. These are available as remote and compact versions (SITRANS F M 911/E compact version with Transmag 2 only possible with nominal diameters DN 65 to DN 600 (2½" to 24"). They operate according to Faradays law of induction where an electric voltage is induced in a conductor moving through a magnetic field.

Mode of operation

Information on operation can be found in the data sheet for the SITRANS F M transmitter Transmag 2.

Technical specifications

Mode of operation and design	
Measuring principle	Pulsed alternating field
Input	
Nominal diameters	DN 15 ... 600 (½" ... 24")
Metering tube connections	EN 1092-1, ANSI B16.5, others on request
Rated operating conditions	
Installation conditions	See system information
• Minimum process temperature	-20 °C (-4 °F)
• With hard rubber liner	Max. 90 °C (194 °F) Option: 100 °C (212 °F)
• With PTFE liner	• 150 °C (300 °F) at 25 bar (363 psi) • 100 °C (194 °F) at 40 bar (580 psi)
• With Novolak liner	130 °C (266 °F) at 40 bar (580 psi)
Ambient temperature limits	
• Remote versions	• -20 ... +65 °C (-4 ... +149 °F) • -20 ... +40 °C (-4 ... +104 °F) with a process temperature > 130 °C (> 266 °F)
• Compact versions up to DN 65 (2½")	• -20 ... +65 °C (-4 ... +149 °F) with a process temperature ≤ 60 °C (≤ 140 °F) • -20 ... +40 °C (-4 ... +104 °F) with a process temperature 60 ... 130 °C (140 ... 266 °F), depends on used sensor and its liner
Degree of protection	IP65 / NEMA 4, IP67 / NEMA 4X Optional IP68 / NEMA 6
Medium conditions	
Minimum conductivity	For alternating field > 1 µS/cm dependent on medium and flow velocity
Maximum flow velocity	12 m/s (39.4 ft/s)
Full scale value of flow velocity	
- Alternating field	0.15 ... 12 m/s (0.49 ... 39.4 ft/s)
Reference conditions	• Flow profile with symmetrical rotation in pipeline • Calibration with associated transmitter
Measuring tolerance including transmitter	See Transmag 2 transmitter The error limit applies to the flow velocity at the mounting location, with retention of the installation guidelines and the measuring conditions (see system information)
Process temperature	25 °C ±5 °C (77 °F ±9 °F)
Ambient temperature	25 °C ±5 °C (77 °F ±9 °F)
Warming-up time	30 min
Installation conditions	Inlet pipe section > 10 x DN, outlet pipe section > 5 x DN; installed perpendicular to flow axis
Medium	Clean water without gases or solids
Conductivity of medium	> 200 µS/cm

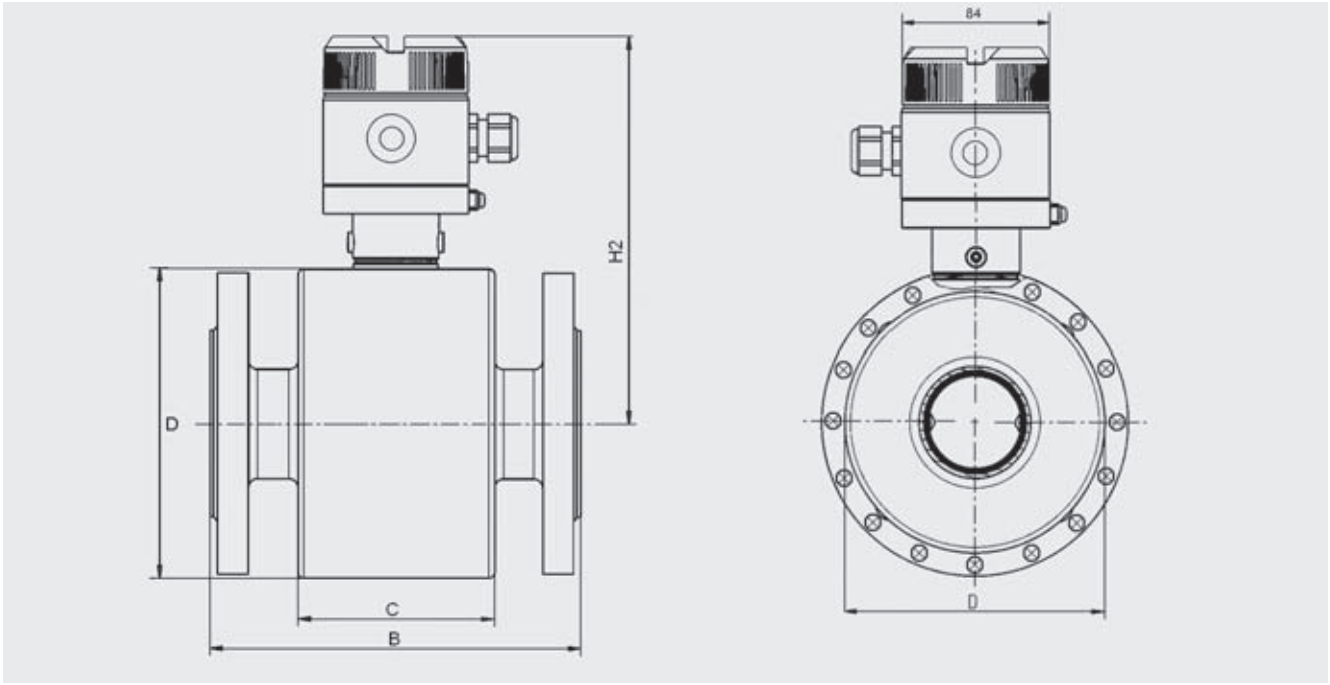
Notes on pressure equipment directive

The devices are designed for liquids of danger group "Gases of fluid group 1". The categories differ according to the version, and are listed in the table below.

The minimum temperature is defined at -10 °C (14 °F) for the flange materials C22.8 (1.0460) and ST52-5 (1.0570).
The minimum temperature is defined at -20 °C (-4 °F) for the flange material 1.4571/316Ti.

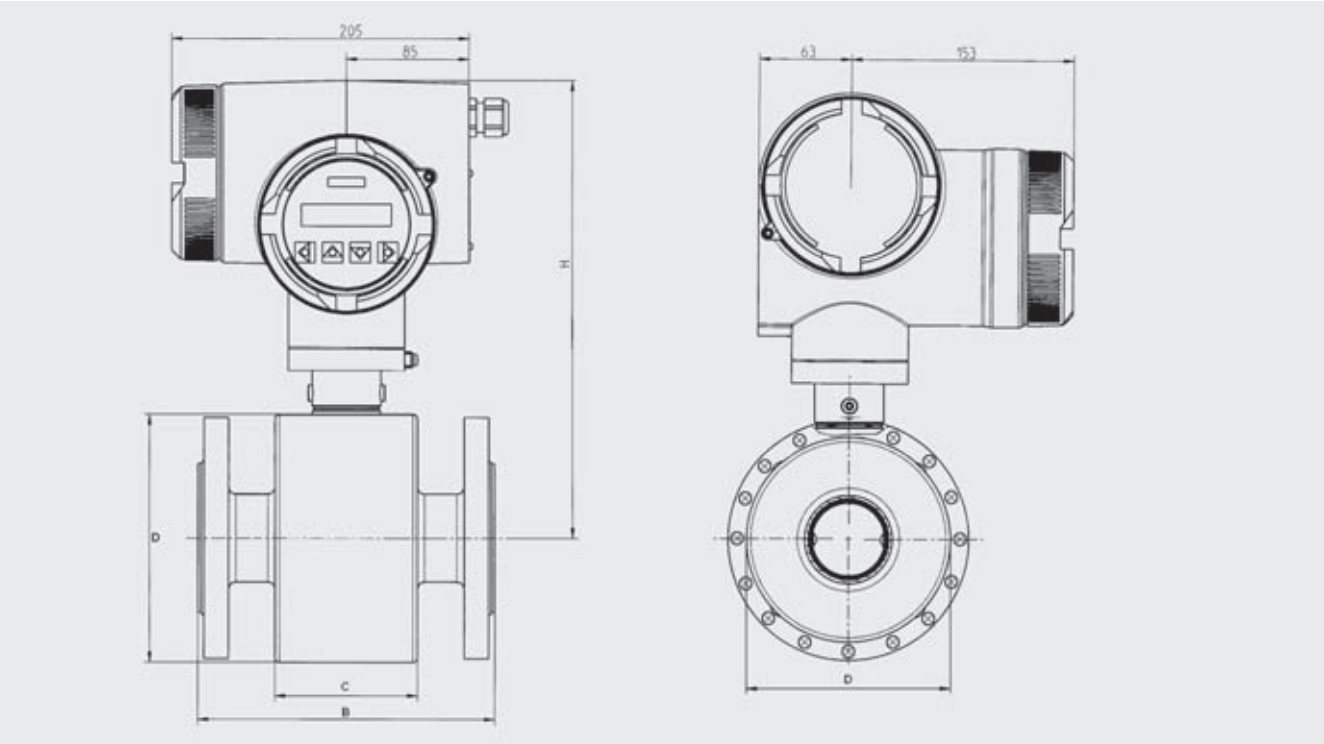
Classification according to pressure equipment directive (DGRL 97/23/EC)			
Nominal diameter DN (inches)	Nominal pressure PN (MWP psi)	Permissible media	Category
15 ... 25 (½" ... 1")	10 ... 40 (145 ... 580)	Gases fluid group 1 and liquids fluid group 1	Article 3.3
32 ... 100 (1¼" ... 4")	10 (145)	Gases fluid group 1 and liquids fluid group 1	I
32 ... 50 (1¼" ... 2")	16 (232)	Gases fluid group 1 and liquids fluid group 1	I
32 ... 40 (1¼" ... 1½")	25 (363)	Gases fluid group 1 and liquids fluid group 1	I
100 ... 350 (4" ... 12")	10 (145)	Gases fluid group 1 and liquids fluid group 1	II
65 ... 200 (2½" ... 8")	16 (232)	Gases fluid group 1 and liquids fluid group 1	II
50 ... 125 (2" ... 5")	25 (363)	Gases fluid group 1 and liquids fluid group 1	II
32 ... 80 (1¼" ... 3")	40 (580)	Gases fluid group 1 and liquids fluid group 1	II
350 ... 600 (14" ... 24")	10 (145)	Gases fluid group 1 and liquids fluid group 1	III
250 ... 600 (10" ... 24")	16 (232)	Gases fluid group 1 and liquids fluid group 1	III
150 ... 600 (6" ... 24")	25 (363)	Gases fluid group 1 and liquids fluid group 1	III
100 ... 600 (4" ... 24")	40 (580)	Gases fluid group 1 and liquids fluid group 1	III

Dimensional drawings



SITRANS F M flow sensor 911/E, remote version, dimensions in mm (inches)

Flow sensor 911/E



SITRANS F M flow sensor 911/E, compact version, dimensions in mm (inches)

Build-in-length 911/E [in mm and inches]

Norminal diameter	**DN 15**	**DN 20**	**DN 25**	**DN 32**	**DN 40**	**DN 50**	**DN 65**	**DN 80**	**DN 100**	**DN 125**	**DN 150**	**DN 200**	**DN 250**	**DN 300**	**DN 350**	**DN 400**	**DN 500**	**DN 600**
	½“	¾“	1“	1 ¼“	1 ½“	2“	2 ½“	3“	4“	5“	6“	8“	10“	12“	14“	16“	20“	24“
	Build-In-length B[1)]																	
Hard rubber version Soft rubber / neopren version PTFE-liner without protection washers	270 (10.63)			280 (11.02)			330 (12.99)	340 (13.39)		370 (14.57)		410 (16.14)	470 (18.50)	500 (19.68)	550 (21.65)	600 (23.62)	650 (25.59)	780 (30.71)
PTFE-liner with protection washers	276 (10.86)			286 (11.26)			336 (13.23)	346 (13.62)		376 (14.80)		416 (16.38)	476 (18.74)	510 (20.08)	560 (22.05)	610 (24.02)	660 (25.98)	790 (31.10)
Novolak-version	-					275 (10.83)	325 (12.79)	335 (13.19)	333 (13.11)	363 (14.29)		403 (15.87)	461 (18.15)	489 (19.25)	543 (21.38)	593 (23.35)	643 (25.32)	773 (30.43)
	Dimensions of sensor housing																	
Housing width C	170 (6.69)											240 (9.45)			306 (12.05)	360 (14.17)	412 (16.22)	552 (21.73)
Height H with compact version	281 (11.06)					285 (11.22)	291 (11.46)	298 (11.73)	314 (12.36)	326 (12.83)	345 (13.58)	371 (14.61)	408 (16.06)	441 (17.36)	553 (21.77)	578 (22.76)	633 (24.92)	688 (27.09)
Height H2 with remote version	175 (6.89)					180 (7.08)	187.5 (7.38)	195 (7.68)	215 (8.46)	230 (9.06)	252.5 (9.94)	285 (11.22)	330 (12.99)	370 (14.57)	347 (13.66)	372 (14.65)	424 (16.69)	477 (18.78)
Housing diameter D	135 (5.315)			169 (6.654)		184 (7.244)	249 (9.803)		274 (10.79)	298 (11.73)	324 (12.76)	394 (15.51)	442 (17.40)	492 (19.37)	469 (18.46)	536 (21.10)	631 (24.84)	746 (29.37)
Weight of PN10 Version in kg (MWP 145 psi version in lb)	8.0 (17.6)	8.5 (18.7)		11.0 (24.3)	11.5 (25.4)	25.0 (55.1)	26 (57.3)		28 (61.7)	34 (75.0)	38 (83.8)	68 (149.9)	80 (176.4)	90 (198.4)	110	150	210 (463)	370 (860)

1) Tolerance for Build-In-lenght: B + 0.0 mm (0.00 inches) /- 4.0 mm (-0.157 inches).
With protection rings or washers for > DN25 + 6.0 mm, > DN200 + 10.0 mm (> 1” + 0.236 inches. > 8” + 0.394 inches)

Selection and Ordering data	Order No.	Order code
SITRANS F M 911/E flow sensor		
Rubber liner	7ME51 ■■ - ■■■■■ - ■■■ 0	■■■
Nominal pressure		
PN 10 (MWP 145 psi)	1	
PN 16 (MWP 232 psi)	2	
PN 25 (MWP 363 psi)	3	
PN 40 (MWP 580 psi)	4	
Design		
Compact, alternating field up to DN 65 (2½")	1	
Remote, alternating field	3	
Liner		
Hard rubber		
• VHE/H3b	1	
• VHE/G31 up to 100 °C (212 °F)	2	
• VHE/181 (potable water)	3	
Soft rubber VWE/R61	4	
Neoprene BWE/DN 63	5	
Soft rubber VWE/1645 (potable water)	6	
Nominal diameter		
DN 15 (½")	A	
DN 20 (¾")	B	
DN 25 (1")	C	
DN 32 (1¼")	D	
DN 40 (1½")	E	
DN 50 (2")	F	
DN 65 (2½")	G	
DN 80 (3")	H	
DN 100 (4")	J	
DN 125 (5")	K	
DN 150 (6")	L	
DN 200 (8")	M	
DN 250 (10")	N	
DN 300 (12")	P	
DN 350 (14")	Q	
DN 400 (16")	R	
DN 500 (20")	S	
DN 600 (24")	T	
Other nominal diameters: specify in plain text	Z	J 1 Y
Connection flange		
EN 1092-1, mat. No. 1.0460/1.0570 (mild steel)	A	
EN 1092-1, mat. No. 1.4571/316Ti	B	
ANSI B 16.5 RF, mat. No. 1.0432/1.0570 (mild steel), to 10 bar (145 psi)	C	
ANSI 300 RF, steel, to 20 bar (290 psi)	D	
JIS 10 K, mat. No. 1.0570	E	
Other connection form	Z	K 1 Y
Electrode material		
Mat. No. 1.4571/316Ti	1	
Hastelloy C4 (mat. No. 2.4610)	2	
Titanium	3	
Tantalum	4	
Monel	5	
Platinum head with shaft, mat. No. 1.4571/316Ti	7	
Other materials: specify in plain text	9	L 1 Y

Selection and Ordering data	Order No.	Order code
SITRANS F M 911/E flow sensor		
Rubber liner	7ME51 ■■ - ■■■■■ - ■■■ 0	■■■
Sealing material		
Viton	1	
EPDM	2	
Kalrez	3	
Protection washers, protections rings		
Without	0	
With protection washers (only for soft rubber and Neoprene; order as accessory)	1	
With protection rings (only for soft rubber and Neoprene; order as accessory)	2	
Cable gland		
Pg 11	A	
½" NPT	B	
M16 x 1.5	C	
Degree of protection		
IP67/NEMA4X	B	
IP68/NEMA6, cable length 5 m (16.4 ft)	C	
IP68/NEMA6, cable length 10 m (32.8 ft)	D	
IP68/NEMA6, other cable lengths (order as accessory 7ME5930...)	E	

Further designs	Order Code
Please add **"-Z"** to Order No. and specify Order code(s).	
One earthing (grounding) electrode made of mat No. 1.4571/316Ti up to DN 300 (12")	**A01**
Two earthing (grounding) electrodes made of mat. No. 1.4571/316Ti above DN 350 (14")	**A02**
One earthing (grounding) electrode made of Hastelloy C4/2.4610 up to DN 300 (12")	**A03**
Two earthing (grounding) electrodes made of Hastelloy C4/2.4610 above DN 350 (14")	**A04**
Replaceable electrodes above DN 100 (4")	**A05**
Replaceable electrodes above DN 100 (4"), replaceable under pressure	**A06**
With 3-point calibration certificate up to DN 600 (24") or Q_{max} > 2000 m^3/h (8805 USgpm)	**B06**
With 6-point calibration certificate up to DN 600 (24") or Q_{max} > 2000 m^3/h (8805 USgpm)	**B07**
Rating plate inscription in English	**B11**
Acceptance test B to DIN 50049, Section 3.1 and EN 10204	**C12**
Factory certificate to EN 10204-2.2	**C14**
Silicone-free materials	**Y04**
Measuring-point number (max. 16 char.), specify in plain text. Y15:....	**Y15**
Measuring-point description (max. 27 char.), specify in plain text. Y16:....	**Y16**
Stainless steel tag plate	**Y17**
Special design, specify quotation No./date in plain text	**Y99**

Flow sensor 911/E

Selection and Ordering data	Order No.	Order code
SITRANS F M 911/E flow sensor		
Novolak liner	7ME52 ■■ - 0 ■■■■ - ■■■ 0	■■■
Nominal pressure		
PN 10 (MWP 145 psi)	1	
PN 16 (MWP 232 psi)	2	
PN 25 (MWP 363 psi)	3	
PN 40 (MWP 580 psi)	4	
Design		
Compact, alternating field up to DN 65 (2½")	1	
Remote, alternating field	3	
Nominal diameter		
DN 50 (2")	F	
DN 65 (2½")	G	
DN 80 (3")	H	
DN 100 (4")	J	
DN 125 (5")	K	
DN 150 (6")	L	
DN 200 (8")	M	
DN 250 (10")	N	
DN 300 (12")	P	
DN 350 (14")	Q	
DN 400 (16")	R	
DN 500 (20")	S	
DN 600 (24")	T	
Other nominal diameters: specify in plain text	Z	J 1 Y
Connection flange		
EN 1092-1, mat. No. 1.0460/1.0570 (mild steel)	A	
EN 1092-1, mat. No. 1.4571/316Ti	B	
ANSI B 16.5 RF, mat. No. 1.0432/1.0570 (mild steel), to 10 bar (145 psi)	C	
ANSI 300 RF, steel, to 20 bar (290 psi)	D	
JIS 10 K, mat. No. 1.0570	E	
Other connection form	Z	K 1 Y
Electrode material		
Mat. No. 1.4571/316Ti	1	
Hastelloy C4 (mat. No. 2.4610)	2	
Titanium	3	
Tantalum	4	
Platinum head with shaft, mat. No. 1.4571/316Ti	7	
Other materials: specify in plain text	9	L 1 Y
Sealing material		
Viton	1	
EPDM	2	
Kalrez	3	
Protection washers, protections rings		
Without	0	
With protection rings (order as accessory)	2	
Cable gland		
Pg 11	A	
½" NPT	B	
M16 x 1.5	C	

Selection and Ordering data	Order No.	Order code
SITRANS F M 911/E flow sensor		
Novolak liner	7ME52 ■■ - 0 ■■■■ - ■■■ 0	■■■
Degree of protection		
IP67/NEMA4X	B	
IP68/NEMA6, cable length 5 m (16.4 ft)	C	
IP68/NEMA6, cable length 10 m (32.8 ft)	D	
IP68/NEMA6, other cable lengths (order as accessory 7ME5930...)	E	

Further designs	Order Code
Please add **"-Z"** to Order No. and specify Order code(s).	
One earthing (grounding) electrode made of mat No. 1.4571/316Ti up to DN 300 (12")	**A01**
Two earthing (grounding) electrodes made of mat. No. 1.4571/316Ti above DN 350 (14")	**A02**
One earthing (grounding) electrode made of Hastelloy C4/2.4610 up to DN 300 (12")	**A03**
Two earthing (grounding) electrodes made of Hastelloy C4/2.4610 above DN 350 (14")	**A04**
Replaceable electrodes above DN 100 (4"), replaceable under pressure	**A06**
With 3-point calibration certificate up to DN 600 (24") or Q_{max} > 2000 m^3/h (8805 USgpm)	**B06**
With 6-point calibration certificate up to DN 600 (24") or Q_{max} > 2000 m^3/h (8805 USgpm)	**B07**
Rating plate inscription in English	**B11**
Acceptance test B to DIN 50049, Section 3.1 and EN 10204	**C12**
Factory certificate to EN 10204-2.2	**C14**
Silicone-free materials	**Y04**
Measuring-point number (max. 16 char.), specify in plain text. Y15:....	**Y15**
Measuring-point description (max. 27 char.), specify in plain text. Y16:....	**Y16**
Stainless steel tag plate	**Y17**
Special design, specify quotation No./date in plain text	**Y99**

Selection and Ordering data	Order No.	Order code
SITRANS F M 911/E flow sensor		
PTFE liner	7ME53 ■■ - 0 ■■■ 0 - ■■■ 0	■■■
Nominal pressure		
PN 10 (MWP 145 psi)	1	
PN 16 (MWP 232 psi)	2	
PN 25 (MWP 363 psi)	3	
PN 40 (MWP 580 psi)	4	
Design		
Compact, alternating field DN 65 to DM 600 (2½" to 24")	1	
Remote, alternating field	3	
Nominal diameter		
DN 25 (1")	C	
DN 32 (1¼")	D	
DN 40 (1½")	E	
DN 50 (2")	F	
DN 65 (2½")	G	
DN 80 (3")	H	
DN 100 (4")	J	
DN 125 (5")	K	
DN 150 (6")	L	
DN 200 (8")	M	
DN 250 (10")	N	
DN 300 (12")	P	
DN 350 (14")	Q	
DN 400 (16")	R	
DN 500 (20")	S	
DN 600 (24")	T	
Other nominal diameters: specify in plain text	Z	J 1 Y
Connection flange		
EN 1092-1, mat. No. 1.0460/1.0570 (mild steel)	A	
EN 1092-1, mat. No. 1.4571/316Ti	B	
ANSI B 16.5 RF, mat. No. 1.0432/1.0570 (mild steel), to 10 bar (145 psi)	C	
ANSI 300 RF, steel, to 20 bar (290 psi)	D	
JIS 10 K, mat. No. 1.0570	E	
Other connection form	Z	K 1 Y
Electrode material		
Mat. No. 1.4571/316Ti	1	
Hastelloy C4 (mat. No. 2.4610)	2	
Titanium	3	
Tantalum	4	
Platinum head with shaft, mat. No. 1.4571/316Ti	7	
Other materials: specify in plain text	9	L 1 Y

Selection and Ordering data	Order No.	Order code
SITRANS F M 911/E flow sensor		
PTFE liner	7ME53 ■■ - 0 ■■■ 0 - ■■■ 0	■■■
Protection washers, protections rings		
With protection washers (included as standard with PTFE, mat. No. 1.4571/316Ti)	1	
With protection rings required for PN 16 (MWP 232 psi) and above, order as accessory)	2	
With protection washers of other material (order as accessory)	3	
Cable gland		
Pg 11	A	
½" NPT	B	
M16 x 1.5	C	
Degree of protection		
IP67/NEMA4X	B	
IP68/NEMA6, cable length 5 m (16.4 ft)	C	
IP68/NEMA6, cable length 10 m (32.8 ft)	D	
IP68/NEMA6, other cable lengths (order as accessory 7ME5930...)	E	

Further designs	Order Code
Please add **"-Z"** to Order No. and specify Order code(s).	
One earthing (grounding) electrode made of mat No. 1.4571/316Ti up to DN 300 (12")	**A01**
Two earthing (grounding) electrodes made of mat. No. 1.4571/316Ti above DN 350 (14")	**A02**
One earthing (grounding) electrode made of Hastelloy C4/2.4610 up to DN 300 (12")	**A03**
Two earthing (grounding) electrodes made of Hastelloy C4/2.4610 above DN 350 (14")	**A04**
Replaceable electrodes above DN 100 (4"), replaceable under pressure	**A06**
With 3-point calibration certificate up to DN 600 (24") or Q_{max} > 2000 m^3/h (8805 USgpm)	**B06**
With 6-point calibration certificate up to DN 600 (24") or Q_{max} > 2000 m^3/h (8805 USgpm)	**B07**
Rating plate inscription in English	**B11**
Acceptance test B to DIN 50049, Section 3.1 and EN 10204	**C12**
Factory certificate to EN 10204-2.2	**C14**
Silicone-free materials	**Y04**
Measuring-point number (max. 16 char.), specify in plain text. Y15:....	**Y15**
Measuring-point description (max. 27 char.), specify in plain text. Y16:....	**Y16**
Stainless steel tag plate	**Y17**
Special design, specify quotation No./date in plain text	**Y99**