

Overview



SITRANS F M TRANSMAG 2 with the SITRANS F M 911/E sensor is a pulsed alternating field magnetic flowmeter where the magnetic field strength is much higher than conventional DC pulsed magnetic flowmeters.

Benefits

- Wide range of sizes DN 15 to DN 1000 (½" to 40")
- Broad range of liner and electrode materials for extreme process medias
- Fully welded construction provides a ruggedness that suits the toughest applications and environments.
- Automatic reading of SmartPLUG for easy commissioning
- Simple menu operation with two-line display
- Comprehensive self-diagnostic with selfmonitoring and internal simulation

Application

The main applications of the SITRANS F M transmitter TRANSMAG 2 can be found in the following sectors:

- Pulp and Paper industry
- Mining industry

The pulse alternating field technology is ideal for difficult applications like:

- High concentrated paper stock > 3 %
- Heavy mining slurries up to 70 % solid concentration
- Mining slurries with magnetic particles.
- Low conductive medias $\geq 1 \mu\text{S}/\text{cm}$ (0.1 $\mu\text{S}/\text{cm}$ depending on medium)

Design

- Available for remote mounting
- PROFIBUS PA (profile 2.0) / HART communication
- Analog output and digital outputs for pulses, device status, limits, flow direction, frequency output

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.

Function

The TRANSMAG 2 is a microprocessor-based transmitter with a built-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfill the task of a power supply unit which provides the magnet coils with a constant current.

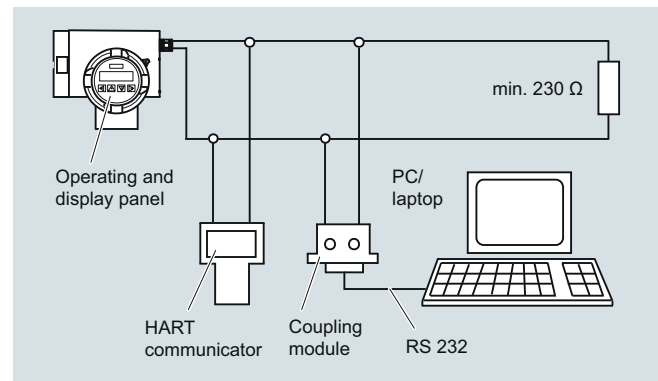
The magnetic flux density in the sensor is additionally monitored by reference coils.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

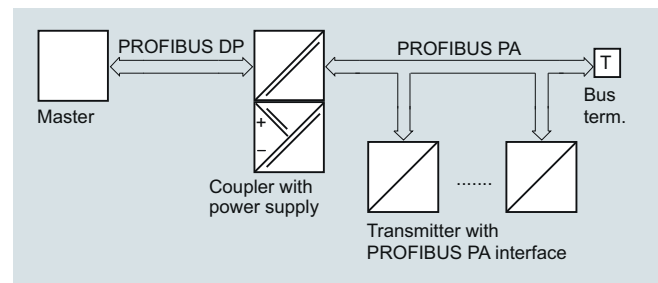
Displays and keypad

Operation of the transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication



HART communication



PROFIBUS PA communication

Flow Measurement

SITRANS F M

Transmitter TRANSMAG 2 with sensor 911/E

Technical specifications

Transmitter TRANSMAG 2

Mode of operation and design

Measuring principle	Electromagnetic with pulsed alternating field (PAC)
Magnetic field excitation	Automatic power supply synchronization
- 50 Hz AC power supply	Bipolar (16.7 Hz) Bipolar with prepulse (10 Hz) Unipolar (8.33 Hz)
- 60 Hz AC power supply	Bipolar (20 Hz) Bipolar with prepulse (12 Hz) Unipolar (10 Hz)

Accuracy under reference conditions

Measuring tolerance of pulse output	
• With $v > 0.25$ m/s (0.82 ft/s)	$\leq \pm 0.5$ % of measured value ± 1.2 mm/s (0.05 inch/s)
• With $v < 0.25$ m/s (0.82 ft/s)	± 2.5 mm/s (0.1 inch/s)
Measuring tolerance of analog output	As pulse output plus ± 0.1 % conversion error ± 20 μ A
Repeatability	0.2 % of measured value

Reference conditions

• Process temperature	25 °C \pm 5 °C (77 °F \pm 9 °F)
• Ambient temperature	25 °C \pm 5 °C (77 °F \pm 9 °F)
• Warm-up time	Min. 30 min
• Installation conditions	Inlet pipe section $\geq 10 \times$ DN Outlet pipe section $\geq 5 \times$ DN Installed centered in pipe
• Medium	Water without gaseous or solid components

Calibration

Standard production calibration, calibration report shipped with sensor	2 x 20 %, 2 x 50 % and 2 x 100 %
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Output

Electrical isolation	Outputs electrically isolated from one another and from the power supply, max. 60 V permissible against PE/equipotential bonding
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Current output

	0/4 ... 20 mA (7ME5034-0.... or 7ME5034-2....)
• Signal	
- Upper limit	0/4 ... 20 mA, selectable
- Failure	20 ... 22.5 mA, optional 3.6; 20 or 24 mA
• Load	
- Output	max. 600 Ω , max. load voltage 15 V DC
- For HART communication	≥ 250 Ω

Communication

	Via analog output with PC coupling module or HART communicator
• Protocol	HART, version 5.1

Digital output

Signal

• Output	Configurable as active or passive signals
- Active signal	24 V DC, ≤ 24 mA, $R_i = 170$ Ω
- Passive signal	Open collector, max. 30 V DC, 200 mA

Output configuration

• Pulse	
- Pulse significance	≤ 5000 pulses/s
- Pulse width	≥ 0.1 ms
• Limit frequency	≤ 10000 Hz
• Limits	Limits for flow and quantity, flow direction, alarm

Digital output 2 (relay)

(only 7ME5034-0....)

Relay

• Rating	NC or NO function Max. 5 W, max. 50 V AC/DC, max. 200 mA
• Output configuration	Limits for flow and quantity, flow direction, alarm

Digital input (optional to digital output 2)

(only 7ME5034-2....)

• Input function configurable as high-active or low-active	Set measured value to zero or reset totalizer
• Signal voltage	Max. 30 V DC, $R_i = 3$ k Ω : High level: +11 ... +30 V DC Low level: -30 ... +5 V DC

For PROFIBUS devices

PROFIBUS PA (for PROFIBUS-devices 7ME5034-1....)

• Communication	Layer 1 and 2 according to PROFIBUS PA Transmission according to IEC 1158-2 Layer 7 (protocol layer) according to PROFIBUS PA and DP V1 (EN 50170) Device class B, device profile 2.0 Max. 4 simultaneous C2 connections
• Bus voltage	9 ... 32 V DC permissible
• Current consumption from bus	10 mA; limited to ≤ 15 mA in event of fault by electrical current limitation

Rated operating conditions

Installation conditions	See also sensor
Ambient temperature	
• Operation	-20 ... +60 °C (-4 ... +140 °F)
• Display module	0 ... 50 °C (32 ... 122 °F)
Storage	-25 ... +80 °C (-13 ... +176 °F)
Degree of protection	IP67/NEMA 4X
Electromagnetic compatibility (EMC)	
• Emitted interference	To IEC/EN 61326 for use in industrial areas
• Noise immunity	To IEC/EN 61326 for use in industrial areas

Transmitter TRANSMAG 2 with sensor 911/E

Medium conditions	
• Process temperature	-20 ... +150 °C (-4 ... 302 °F) depending on the liner
Minimum conductivity of medium	
• With SITRANS F M 911/E sensors	≥ 1 μS/cm (0.1 μS/cm depending on medium)
Design	
Weight of transmitter	4.4 kg (9.7 lb)
Remote version	Transmitter must be connected to sensor using shielded cable
Maximum cable length	100 m (328 ft)
Housing	Die-cast aluminum, painted
Displays and keypad	
General display	LCD, backlid, two lines with 16 characters each
Multi-display for	Flow, totalizer, flow velocity
Keypad	4 keys for entering parameters
Power supply	
corresponding to rating plate	
• AC supply	100 ... 250 V AC ± 15 %, 47 ... 63 Hz
• Power consumption	Approx. 120 ... 630 VA, depend- ing on sensor
Line fuse	100 ... 230 V AC: T1.6A
Magnet current fuse	F5A/250 V

Sensor cables between sensor and transmitter

Sufficient shielding must be provided, as well as fixed routing of the signal cables (electrode and coil cable).

Signal cables must be routed free of vibration, and protected against strong magnetic and stray fields. In case of doubt, the sensor cables must be routed in grounded steel conduit. The cable length between the sensor and transmitter must not exceed 100 m (328 ft).

Selection and Ordering data	Article No.
SITRANS F M Transmitter TRANSMAG 2	7ME5034 - AA11 - AA0
Remote with standard wall mounting bracket, local display, die cast alumi- num	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Output/communication	
4 ... 20 mA with HART	0
PROFIBUS PA	1
4 ... 20 mA with HART and digital input	2
Cable glands	
M20 x 1.5	1
½" NPT	2

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Special mounting bracket for wall and pipeline instal- lation	A02
Transmitter setting for parameter "TAG number" (specify in plain text, max. 8 characters)	Y15
Transmitter setting for parameter "TAG descriptor" (specify in plain text, max. 16 characters)	Y16
Tag name plate, stainless steel (specify in plain text)	Y17
Special version (specify in plain text)	Y99

Operating instructions for SITRANS F M TRANSMAG 2

Description	Article No.
• English	A5E00102775
• German	A5E00102774




All literature is available to download for free, in a range of languages, at
www.siemens.com/processinstrumentation/documentation

Flow Measurement









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Transmitter TRANSMAG 2 with sensor 911/E

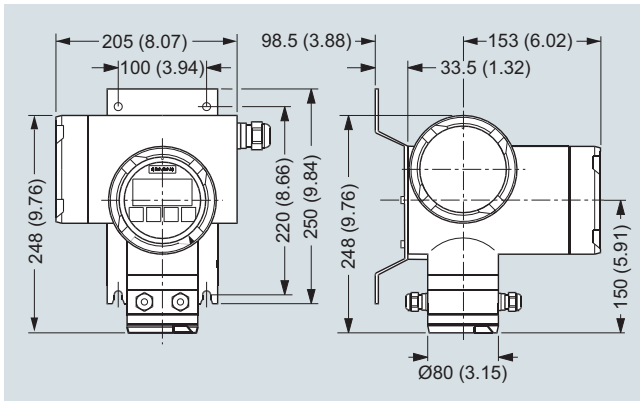
Accessories

Description	Article No.	
Standard wall-mounting bracket, stainless steel AISI 316L/1.4404	7ME5933-0AC04	
Special wall-mounting bracket, BI 2.5 DIN 59382 X6Cr17	7ME5933-0AC05	
Potting kit for IP68/ NEMA 6P sealing of sensor junction box	FDK:085U0220	

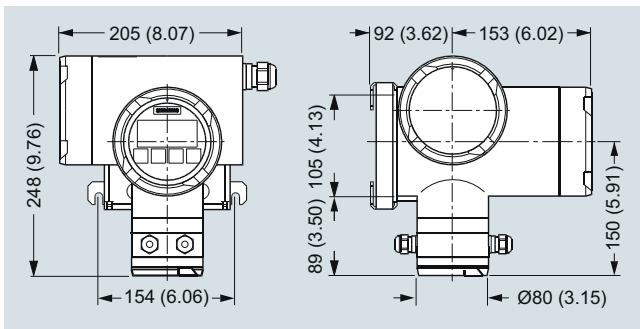
Spare parts

Description	Article No.	
Display unit	7ME5933-0AC00	
Display lid (Ex) in die-cast aluminum, with corrosion resistant coating (min. 60 µm)	7ME5933-0AC01	
Blind lid for sensor cables connection compartment (only remote version) in die-cast aluminum, with corrosion resistant coating (min. 60 µm) incl. O-ring seal	7ME5933-0AC02	
Blind lid (mains supply, input/outputs) in die-cast aluminum, with corrosion resistant coating (min. 60 µm)	7ME5933-0AC03	
Safety clamp for electronic cover with glass plate (7ME5933-0AC01)	7ME5933-0AC06	
M20 cable gland set for power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	A5E02246350	
1/2" NPT cable gland set for power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	A5E02246396	
M16 x 1.5 cable gland set for sensor connection, brass chrome, 2 pcs. and 2 pcs. blind • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +105°C (-4 ... +221 °F)	A5E02246369	

Dimensional drawings

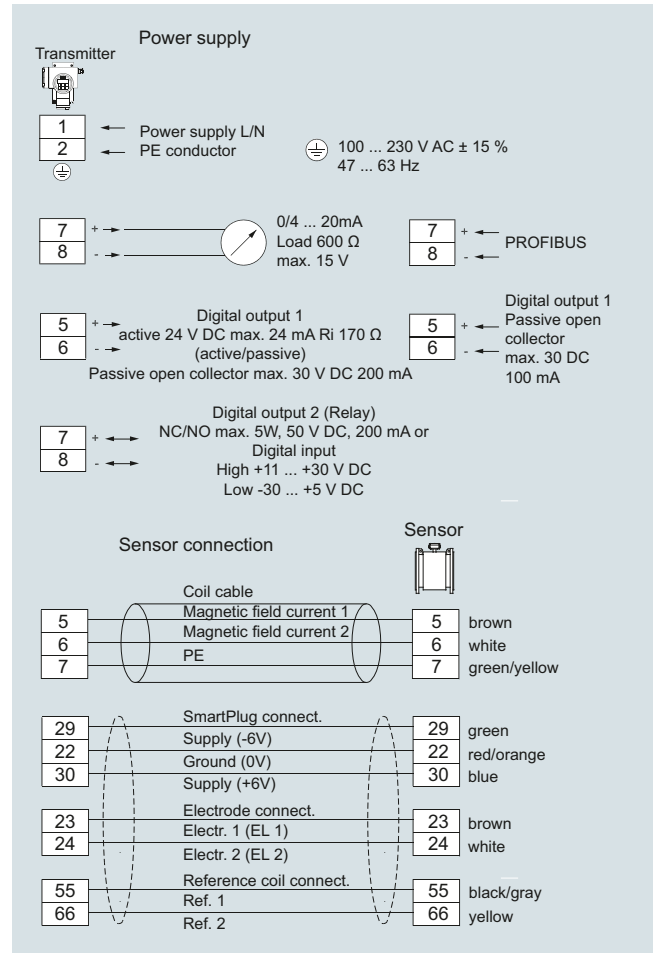


SITRANS F M transmitter TRANSMAG 2 with wall-mounting bracket, dimensions in mm (inch)



SITRANS F M transmitter TRANSMAG 2 with special wall-mounting bracket, dimensions in mm (inch)

Schematics



SITRANS F M transmitter TRANSMAG 2, connection diagram

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Transmitter TRANSMAG 2 with sensor 911/E

911/E sensor

Process connection

Nominal diameters	DN 15 ... 1000 (½" ... 40")
Metering tube connections	EN 1092-1, ANSI B16.5, AWWA C-207 and JIS 10 K

Rated operating conditions

<u>Installation conditions</u>	See system information
• Soft rubber liner	0 ... 70 °C (32 ... 158 °F)
• Hard rubber liner	0 ... 90 °C (32 ... 194 °F) Option: 100 °C (212 °F)
• PTFE liner	<ul style="list-style-type: none"> • -20 ... +150 °C (-4 ... +302 °F) at 25 bar (363 psi) • -20 ... +100 °C (-4 ... +212 °F) at 40 bar (580 psi)
• Linatex (rubber) liner	-40 ... +70 °C (-40 ... +158 °F) (for temperatures below -20 °C (-4 °F) AISI 316L/1.4404 flanges must be used)
• Novolak liner	130 °C (266 °F) at 40 bar (580 psi)
Degree of protection	IP67/NEMA 4X Optional IP68/NEMA 6

Medium conditions

Maximum flow velocity	12 m/s (39.4 ft/s)
Full scale value of flow velocity	0.15 ... 12 m/s (0.49 ... 39.4 ft/s)

Design

Weight	See dimensional drawings
Flange and housing material	Carbon steel ASTM A 105, with corrosion resistant coating Corrosivity category C3 according to ISO 12944-2 or AISI 316L/1.4404 flanges and carbon steel housing ASTM A 105, with corrosion resistant coating Corrosivity category C3, according to ISO 12944-2
Measuring pipe material	Stainless steel AISI 304 or higher
Electrode material	<ul style="list-style-type: none"> • AISI 316/1.4571 • Hastelloy C276/2.4819 • Platinum • Titanium • Tantalum
Grounding electrode material	Defined via the Order code

Protection ring



Function	To protect the edges of liners from abrasion (e.g. gravel, sand etc.). Used mainly with soft rubber liners and for PTFE liners at high temperatures from 100 to 150 °C (212 to 302 °F).
Contact with medium	Yes, please always check resistance to measured medium.
Material	Stainless steel AISI 316/1.4571, optionally Hastelloy C276/2.4819
Material thickness	The overall length of the sensor is increased by <ul style="list-style-type: none"> • 6 mm for DN 15 to DN 150 (0.24" for ½" to 6") or • 10 mm for DN 200 to DN 600 (0.4" for 8" to 24")
Standard	Optional for all liners. Must be ordered separately.
Article No.	7ME5942-...

Grounding ring



Function	Electrical reference and grounding of the medium. Required if the pipelines are not electrically conducting or are lined (plastic pipelines, concrete pipelines etc.). All grounding rings must be connected to the grounding screw present on the sensor.
Contact with medium	Yes, please always check resistance to measured medium.
Material	Stainless steel AISI 316/1.4571 or Hastelloy C4/2.4610
Material thickness	The overall length of the sensor is increased by 2 mm (0.08") per grounding ring.
Standard	Optional for all liners. Required between the medium and sensor for equipotential bonding between non-conducting pipelines or lined pipelines.
Article No.	7ME5943-...

Important:

The rings must be ordered together with the sensor. Gaskets are not included. In case of replacement please include the sensor MLFB code on the order.

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.

For further information on the PED standard and requirements, see page 10/15.

Classification according to pressure equipment directive (PED 2014/68/EU)					
Nominal diameter		Nominal pressure		Permissible media	Category
DN	(inch)	PN	(MWP psi)		
15 ... 25	(½" ... 1")	40	(580)	Gases fluid group 1 and liquids fluid group 1	Article 4.3
200 ... 300	(8" ... 12")	10	(145)	Gases fluid group 1 and liquids fluid group 1	II
65 ... 250	(2½" ... 10")	16	(232)	Gases fluid group 1 and liquids fluid group 1	II
40 ... 100	(1½" ... 4")	40	(580)	Gases fluid group 1 and liquids fluid group 1	II
350 ... 1000	(14" ... 40")	10	(145)	Gases fluid group 1 and liquids fluid group 1	III
300 ... 1000	(12" ... 40")	16	(232)	Gases fluid group 1 and liquids fluid group 1	III
200 ... 600	(8" ... 24")	25	(363)	Gases fluid group 1 and liquids fluid group 1	III
125 ... 600	(5" ... 24")	40	(580)	Gases fluid group 1 and liquids fluid group 1	III

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Transmitter TRANSMAG 2 with sensor 911/E

Selection and Ordering data	Article No.
Flowsensor SITRANS F M 911/E	7ME5610 - AA
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Nominal 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 65 (2 1/2")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
DN 350 (14")	5 K
DN 400 (16")	5 R
DN 450 (18")	5 Y
DN 500 (20")	6 F
DN 600 (24")	6 P
DN 700 (28")	6 Y
DN 800 (32")	7 H
DN 900 (36")	7 M
DN 1000 (40")	7 R
Flange norm and pressure rating	
EN 1092-1, PN 10 (DN 200 ... 1000 (8" ... 40"))	B
EN 1092-1, PN 16 (DN 65 ... 1000 (2 1/2" ... 40"))	C
EN 1092-1, PN 25 (DN 200 ... 1000 (8" ... 40"))	E
EN 1092-1, PN 40 (DN 15 ... 1000 (1/2" ... 40"))	F
ANSI B16.5, Class 150 (1/2" ... 24") ¹⁾	J
ANSI B16.5, Class 300 (1/2" ... 24") ²⁾	K
AWWA C-207 Class D (28" ... 40")	L
JIS 10 K (1/2" ... 24")	R
Flange material	
Mid steel flanges 1.0460/1.0570	1
Stainless steel flanges, AISI 316L/1.4404	3
Liner material	
Soft rubber (DN 25 to DN 1000)	1
PTFE (DN 15 to DN 600)	3
Hardrubber (DN 15 to DN 1000)	4
Linatex (DN 25 to DN 1000)	5
Novolak (sealing material FFKM) (DN 50 to DN 1000)	6
Electrode material	
AISI 316Ti/1.4571	1
Hastelloy C276/2.4819	2
Platinum	3
Titanium	4
Tantalum	5
Cable glands/terminal box	
Metric: Polyamide terminal box	1
1/2" NPT: Polyamide terminal box	2
Metric: Stainless steel terminal box	3
1/2" NPT: Stainless steel terminal box	4

Selection and Ordering data	Order Code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Two grounding electrodes made of stainless steel AISI 316Ti/1.4571	A02
Two grounding electrodes made of Hastelloy C276/2.4819	A04
Two grounding electrodes made of Platinum	A05
Two grounding electrodes made of Titanium	A06
Two grounding electrodes made of Tantalum	A07
Factory certificate to EN 10204-2.2	C14
Material certificate according to EN 10204-3.1	C16
Power supply 110 V/60 Hz	P01
Flow range setting: Specify upper flow range value	Y01
Pulse output setting: Specify pulse value (1 pulse/unit)	Y02
Silicon-free version	Y04
Tag name plate, stainless steel (specify in plain text)	Y17
Special version (specify in plain text)	Y99
1) 20 °C (68 °F), max. 19.6 bar (285 psi) for steel flanges and max. 15.9 bar (231 psi) for stainless steel flanges	
2) 20 °C (68 °F), max. 51.1 bar (741 psi) for steel flanges and max. 41.4 bar (600 psi) for stainless steel flanges	

Selection and Ordering data	Article No.	Order code
SITRANS F M TRANSMAG 2 and sensor 911/E	7ME5930 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	5 A00 - 0AA0	
Cable		
Cable kit for sensor 911/E with alternating field, Magnet current cable 3 x 1.0 mm ² (3 x 0.0016 inch ²), electrode/reference cable 7 x 0.5 mm ² (7 x 0.0008 inch ²) with shield PVC		
• Length: 5 m (16.4 ft)	B	
• Length: 10 m (32.8 ft)	C	
• Length: 20 m (65.6 ft)	D	
• Length: 30 m (98.4 ft)	E	
• Length: 40 m (131 ft)	F	
• Length: 50 m (164 ft)	G	
• Length: 60 m (197 ft)	H	
• Length: 80 m (260 ft)	J	
• Length: 100 m (328 ft)	K	
• Other length (specify in plain text)	Z	J1Y

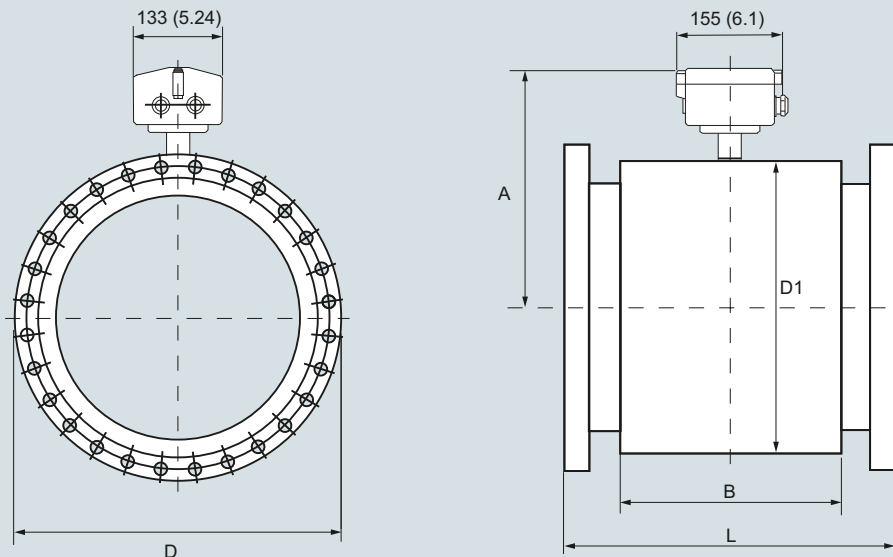
Selection and Ordering data	Article No.
SITRANS F M electromagnetic flowmeter	
Protection ring for 911/E sensor (2 pcs.) ↗	7ME5942 - 
Grounding ring for 911/E sensor (1 pc.) ↗	7ME5943 - 
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Nominal diameter	
DN 15 (½")	1 V
DN 25 (1")	2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
DN 350 (14")	5 K
DN 400 (16")	5 R
DN 450 (18")	5 Y
DN 500 (20")	6 F
DN 600 (24")	6 P
DN 700 (28")	6 Y
DN 800 (32")	7 H
DN 900 (36")	7 M
DN 1000 (40")	7 R
Flange design	
EN 1092-1, PN10	B
EN 1092-1, PN16	C
EN 1092-1, PN25	E
EN 1092-1, PN40	F
AISI B16.5, class 150	J
AISI B16.5, class 300	K
AWWA C-207, class D	L
JIS B2220, 10K	R
Material	
Stainless steel AISI 316/1.4571	1
Hastelloy C4/2.4610	2
Liner	
Soft rubber	1
PTFE	3
Hard rubber	4
Linatex	5
Novolak	6

Flow Measurement

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Transmitter TRANSMAG 2 with sensor 911/E

Dimensional drawings



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

Built-in length 911/E [in mm and inch]

Nominal diameter	DN 15 ½"	DN 25 1"	DN 40 1 ½"	DN 50 2"	DN 65 2 ½"	DN 80 3"	DN 100 4"	DN 125 5"	DN 150 6"	DN 200 8"	DN 250 10"	
Built-in length L¹⁾												
Hard rubber version	270 (10.63)		280 (11.02)		330 (12.99)		340 (13.39)		370 (14.57)		410 (16.14)	
Linatex/soft rubber version	270 (10.63)		280 (11.02)		330 (12.99)		340 (13.39)		370 (14.57)		410 (16.14)	
PTFE-liner without protection rings	270 (10.63)		280 (11.02)		330 (12.99)		340 (13.39)		370 (14.57)		410 (16.14)	
Novolak-version	-		275 (10.83)		325 (12.79)		335 (13.19)		333 (13.11)		362 (14.25)	
Dimensions of sensor housing												
Housing width B	170 (6.69)									240 (9.45)		
Height A	206 (8.11)		222 (8.74)		229 (9.02)		262 (10.32)		274 (10.79)		286 (11.26)	
Housing diameter D ₁	135 (5.35)		167 (6.58)		182 (7.17)		247 (9.73)		272 (10.71)		296 (11.65)	
Weight of PN16 version in kg (MWP 232 psi version in lb) approx.	8.0 (17.64)	8.5 (18.74)	11.5 (25.35)	25.0 (55.12)	26 (57.32)	27 (59.53)	28 (61.73)	34 (74.95)	38 (83.78)	68 (149.9)	81 (178.6)	
Nominal diameter	DN 300 12"	DN 350 14"	DN 400 16"	DN 450 18"	DN 500 20"	DN 600 24"	DN 700 28"	DN 750 30"	DN 800 32"	DN 900 36"	DN 1000 40"	
Built-in length L¹⁾												
Hard rubber version	500 (19.68)		550 (21.65)		600 (23.62)		650 (25.59)		780 (30.71)		910 (35.83)	
Linatex/soft rubber version	500 (19.68)		550 (21.65)		600 (23.62)		660 (25.98)		650 (25.59)		780 (30.71)	
PTFE-liner without protection rings	500 (19.68)		550 (21.65)		600 (23.62)		660 (25.98)		650 (25.59)		780 (30.71)	
Novolak-version	489 (19.25)		538 (21.18)		592 (23.31)		638 (25.12)		638 (25.12)		772 (30.39)	
Dimensions of sensor housing												
Housing width B	240 (9.45)		225 (8.86)		250 (9.84)		270 (10.63)		300 (11.81)		360 (14.17)	
Height A	383 (15.08)		375 (14.76)		400 (15.75)		433 (17.05)		453 (17.84)		505 (19.88)	
Housing diameter D ₁	490 (19.29)		474 (18.66)		524 (20.63)		591 (23.26)		629 (24.76)		734 (28.90)	
Weight of PN10 Version in kg (MWP 145 psi version in lb) approx.	95 (209.4)	118 (260.2)	161 (354.9)	185 (407.9)	233 (513.7)	401 (884.1)	420 (925.9)	450 (992.1)	500 (1102.3)	560 (1234.6)	620 (1366.9)	

¹⁾ Tolerance for built-in length: L + 0.0/-4.0 mm (+0.00/-0.157 inch)

With protection rings for > DN25 + 6.0 mm, > DN200 + 10.0 mm (> 1" + 0.236 inch, > 8" + 0.394 inch)