

#### Overview



SITRANS F M transmitter Transmag 2

SITRANS F M Transmag 2 is a pulsed alternating field magnetic flowmeter where the magnetic field strength is much higher than conventional DC pulsed magnetic flowmeters.

This makes it ideal for difficult applications like:

- High concentrated paper stock > 3%
- Heavy mining slurries
- Mining slurries with magnetic particles.

Transmag 2 is used with the SITRANS F M 911/E sensor, available with diameters of DN 65 and above.

#### Benefits

- Fast signal processing with 16-bit technology
- Automatic recognition of sensor type and calibration data as result of SmartPLUG
- PROFIBUS PA (profile 3.0) / HART communication
- Simple menu operation with two-line display
- Self-monitoring functions
- Internal simulator (for all input and output functions)
- Monitoring of sensor using magnetizing current and reference voltage as well as wet electrode function
- Analog output and digital outputs for pulses, device status, limits, flow direction, frequency output
- Optional passive switch input for resetting the counter values or for switching off the measuring equipment (PZR)
- With pulsed alternating field for minimum conductivity of 0.1  $\mu\text{S}/\text{cm}$  depending on the sensor
- Split mode

#### Application

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

- Pulp & Paper Industry
- Mining Industry

The measuring procedure with pulsed alternating field patented by Siemens AG is particularly suitable for media with a high solids content, or magnetically conducting media.

#### 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.

#### Function

##### 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 fulfil the task of a power supply unit which provides the magnet coils with a constant current.

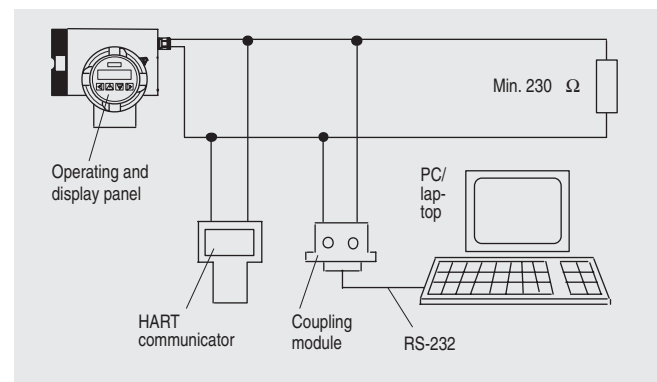
The magnetic flux density in the sensor is additionally monitored by reference coils.

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

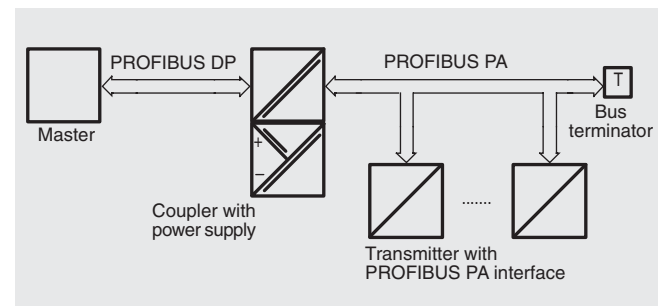
##### Displays and keypad

Operation of the Transmag 2 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

# SITRANS F flowmeters

## SITRANS F M

### Transmitter Transmag 2 with sensor 911/E

#### Technical specifications

##### Mode of operation and design

Measuring principle	Electromagnetic with pulsed alternating field (PAC)
Magnetic field excitation	Automatic power supply synchronization, or internal clock with DC power supply
- 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)

##### Outputs

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
	Only for 20 mA / HART devices (7ME5034-0.... or 7ME5034-2....)
• Signal	
- Upper limit	0/4 ... 20 mA, selectable
- Failure	20 ... 22.5 mA
• Load	3.6; 20 or 24 mA
- 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 <sub>i</sub> = 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	≤ 10,000 Hz
• Limits	Limits for flow and quantity, flow direction, alarm

##### Digital output 2 (relay) (only 7ME5034-0....)

Relay	NC or NO function
• Rating	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 or counter to zero
• Signal voltage	Max. 30 V DC, R <sub>i</sub> = 3 k: 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 3.0 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

##### Accuracy under reference conditions

Measuring tolerance of pulse output

• With $v > 0.25$ m/s (0.82 ft/s)	≤ ±0.5% of measured value ±0.0012 m/s (0.0039 ft/s)
• With $v < 0.25$ m/s (0.82 ft/s)	±0.0025 m/s (0.0082 ft/s)

Measuring tolerance of analog output  
As pulse output plus ±0.1% conversion error ±20 μA

Repeatability  
0.2% of measured value

##### Reference conditions

• Process temperature	25 °C ±5 °C (77 °F ±41 °F)
• Ambient temperature	25 °C ±5 °C (77 °F ±41 °F)
• Warm-up time	Min. 30 min
• Installation conditions	Inlet pipe section ≥ 10 x DN Outlet pipe section ≥ 5 x DN Installed centered in pipe

##### • Medium

• Conductivity	> 200 μS/cm
• Magnet current frequency	Bipolar with prepulse

##### Rated operating conditions

Installation conditions	See also sensors
Ambient temperature	
• Remote design	-20 ... +60 °C (-4 ... +140 °F)
• Compact design	-20 ... +60 °C (-4 ... +140 °F), process temperature up to 60 °C (up to 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 EN 61326 for use in industrial areas
• Noise immunity	To EN 61326 for use in industrial areas NAMUR NE21 for use in residential areas

#### Medium conditions

- Process temperature with compact design -20 ... +130 °C (-4 ... 266 °F) depending on sensor and ambient temperature

Minimum conductivity of medium

- With SITRANS F M 911/E sensors  $\geq 1 \mu\text{S/cm}$ , on request  $0.1 \mu\text{S/cm}$  depending on medium

#### Design

Weight of transmitter	4.4 kg (9.7 lb)
Compact versions	Transmitter fixed onto metering tube
Remote version	Transmitter must be connected to sensor using shielded cable
Maximum cable length	100 m (328 ft)
Housing	Die-cast aluminium, painted

#### Displays and keypad

General display	LCD, backlid, two lines with 16 characters each
Multi-display for	Flow, quantity, flow velocity
Keypad	4 keys for entering parameters

#### Power supply

corresponding to rating plate

• AC supply	100 ... 250 V AC $\pm 15\%$ , 47 ... 63 Hz
• Power consumption	Approx. 120 ... 630 VA, depending on sensor
Power failure	Bridging of min. 1 power supply cycle (> 20 ms)
Line fuse	100 ... 230 V AC: T1.6A
Magnet current fuse	F5A / 250 V

#### Certificates and approvals

Pressure equipment directive	Device is not subject to the pressure equipment directive
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# SITRANS F flowmeters

## SITRANS F M

### Transmitter Transmag 2 with sensor 911/E

Selection and Ordering data	Order No.
<b>SITRANS F M electromagnetic transmitter Transmag 2</b> for alternating field	7 ME 5 0 3 4 -  - AA 0
<b>Output/communication</b> 4 ... 20 mA with HART protocol PROFIBUS PA connection 4 ... 20 mA with HART protocol, digital input	0 1 2
<b>Auxiliary supply</b> 110 ... 230 V AC	AA
<b>Operator display and keypad</b> Without With	0 1
<b>Design</b> Remote design Compact design (DN 65 and above)	1 2
<b>Cable glands</b> M20/M16 x 1.5 ½" NPT	1 2

Selection and Ordering data	Order code
<b>Additional information</b> Please add "-Z" to Order No. and specify Order code(s) and plain text.	
Strengthened mounting bracket for wall and pipeline installation	A02
Rating plate inscription English	B11
Measuring range, specify in plain text: Y01: 0 to ... m <sup>3</sup> /h	Y01
Pulse significance, specify in plain text: Y02: 0 to ... pulses/l	Y02
Setting of digital outputs, specify in plain text: Y03: Setting of digital outputs: ...	Y03
Measuring-point number (max. 8 characters), specify in plain text: Y15: .....	Y15
Measuring-point description (max. 16 characters), specify in plain text: Y16: .....	Y16
Stainless steel tag plate	Y17
Special design specify in plain text, state quotation	Y99

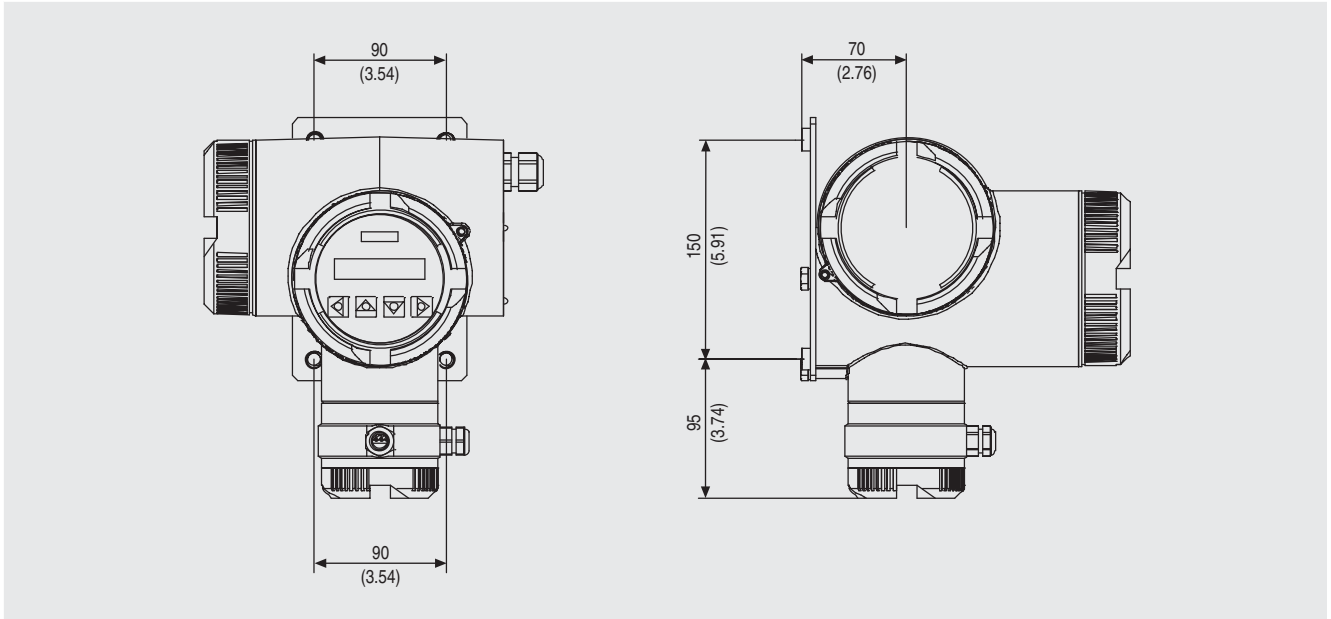
Selection and Ordering data	Order No.	Order code
<b>SITRANS F M Transmag 2 and sensor 911/E</b>	7 ME 5 9 3 0 -	
<b>Cable for remote versions</b> • Without cable • Suitable for sensor 911/E with alternating field, IP67 Magnet current cable 3 x 1.0 mm <sup>2</sup> (3 x 0.0016 inch <sup>2</sup> ), electrode/reference cable 7x0.5 mm <sup>2</sup> (7 x 0.0008 inch <sup>2</sup> ) - Length: 5 m (16.4 ft) - Length: 10 m (32.8 ft) - Specify other length: in plain text	A 0 0 - 0  A 0	
<b>Later 3-point calibration certificate for SITRANS F M</b> • Without • For SITRANS 911E up to DN 600, 24" (please specify Comm.-No. in plain text)	0 A 5 B 5 C 5 Z	J 1 Y A B

Selection and Ordering data	Order code
<b>Additional information</b> Please add "-Z" to Order No. and specify Order code(s) and plain text. Tag plate of stainless steel • Y30 - tag number (max. 16 digits, specify in plain text) • Special design, specify quotation No./date in plain text	Y17 Y99

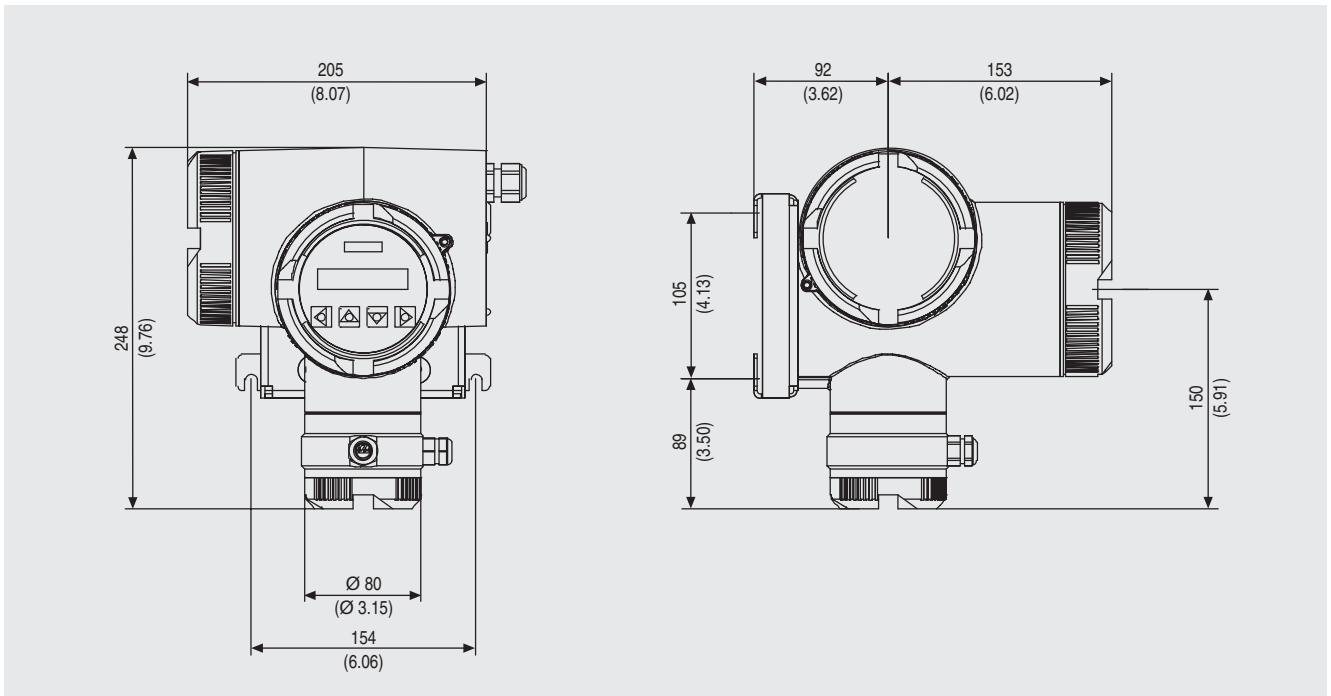
Selection and Ordering data	Order No.
<b>Accessories</b>	
<b>Instruction Manual for SITRANS F M Transmag 2</b> German English	A5E00102774 A5E00102775
<b>HART modem</b> • with RS232 interface • with USB interface	▶ 7MF4997-1DA <sup>D)</sup> ▶ 7MF4997-1DB <sup>D)</sup>
<b>SIMATIC PDM</b>	See Section 9

D) Subject to export regulations AL: N, ECCN: EAR99H.

#### Dimensional drawings



SITRANS F M transmitter Transmag 2 with standard mounting plate, dimensions in mm (inch)



SITRANS F M transmitter Transmag 2 with optional mounting plate also for pipeline mounting, dimensions in mm (inch)