

SITRANS F flowmeters

SITRANS F M

Transmitter MAG 6000 I/6000 I Ex d e

Overview



The SITRANS F M MAG 6000 I/6000 I Ex d transmitter is designed for the demands in the process industry. The robust die cast aluminium housing provides superb protection, even in the most harsh industrial environments. Full input and output functionality is given even in the Ex version.

Benefits

- Full range of ATEX rated flowmeters with intrinsically safe rated input and outputs
- For compact or remote installation
- HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA and DP, MODBUS RTU/RS485 add-on communication modules available
- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection
 - 3 lines, 20 characters display in 11 languages
 - Flow rate in various units
 - Totalizer for forward, reverse and net flow as well as much more information available.
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging
- Batch control

Design

The transmitter is designed for either compact or remote installation in non-hazardous or hazardous areas (compact mounted transmitter to be ordered together with the sensors).

Function

The following functions are available:

- Flow rate
- 2 measuring ranges
- 2 totalizers
- Low flow cut-off
- Flow direction
- Error system
- Operating time
- Uni-/bidirectional flow
- Limit switches and pulse output
- Batch control

The MAG 6000 I/6000 I Ex d is a microprocessor-based transmitter with a build-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.

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

Displays and keypads

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 or MODBUS communication

Technical specifications

Mode of operation and design	
Measuring principle	Electromagnetic with pulsed constant field
Empty pipe	Detection of empty pipe (special cable required in remote mounted installation)
Excitation frequency	Depend on sensor size
Electrode input impedance	$> 1 \times 10^{14} \Omega$
Input	
Digital input	DC 11 ... 30 V, $R_i = 4.4 \text{ k}\Omega$
• Activation time	50 ms
• Current	$I_{11 \text{ V DC}} = 2.5 \text{ mA}$, $I_{30 \text{ V DC}} = 7 \text{ mA}$
Output	
Current output	
• Signal range	0 ... 20 mA or 4 ... 20 mA (active/ passive)
• Load	$< 560 \Omega$
• Time constant	0.1 ... 30 s, adjustable
Digital output	
Frequency	0 ... 10 kHz, 50% duty cycle (uni-/bidirectional)
Time constant	0.1 ... 30 s, adjustable
Pulse (passive)	3 ... 30 V DC, max 110 mA (30 mA Ex version), $200 \Omega \leq R_i \leq 10 \text{ k}\Omega$ (powered from connected equipment)
Time constant	0.1 ... 30 s, adjustable
Relay output	
Time constant	Changeover relay, same as current output
Load	42 V AC/2 A, 24 V DC/1 A
Low flow cut off	
	0 ... 9.9% of maximum flow
Galvanic isolation	
	All inputs and outputs are galvanic isolated
Max. measuring error	
MAG 6000 I/MAG 6000 I Ex d (incl. sensor)	$\pm 0.2 \% \pm 1 \text{ mm/s}$

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Rated operation conditions	
Ambient temperature	
• Operation	
- MAG 6000 I	-20 ... +60 °C (-4 ... +140 °F)
- MAG 6000 I Ex	-10 ... +60 °C (+14 ... +140 °F)
• Storage	-40 ... +70 °C (-40 ... +158 °F)
Mechanical load	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Transmitter: 1.14 grms
Degree of protection	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH ₂ O 30 min.)
EMC performance	EN 61326
Display and keypad	
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign
Keypad	Capacitive touch keypad with LED light for feedback indication
Time constant	Time constant as current output time constant
Design	
Enclosure material	Die cast aluminium, with corrosion resistant Basic Polyester power coating (min. 60 µm)
• Wall mounting	Wall mounting bracket enclosed for remote version
Dimensions	See dimensional drawings
Weight	See dimensional drawings
Power supply	
	<ul style="list-style-type: none"> Non Ex d: 18 ... 90 V DC; 115 ... 230 V AC; 50 ... 60 Hz Ex d: 18 ... 30 V DC Ex d: 115 ... 230 V AC; 50 ... 60 Hz
Power consumption	<ul style="list-style-type: none"> 230 V AC: 21.5 VA 24 V DC: 12 W, I_N = 380 mA, I_{ST} = 1 A (3 ms)
Certificates and approvals	
MAG 6000 I	<ul style="list-style-type: none"> CE C-tick FM class 1, div 2 FM class 1, zone 2 CSA class 1, div 2 CSA class 1, zone 2
MAG 6000 I Ex	<ul style="list-style-type: none"> IEC Ex de [ia] [ib] ia IIC T6 Gb Ex tDa 21 IP67 ATEX II 2(1)(2) GD EEx de [ia] ia [ib] IIC T6 FM class 1, zone 1 CSA class 1, zone 1

Cable entries	
MAG 6000 I	Remote installation 2 x M25 (for supply/output) and 2 x M16 (for sensor connection) or 2 x ½" NPT (for supply/output) and 2 x M16 (for sensor connection)
MAG 6000 I Ex ATEX 2G D	2 x M20 (for supply/output) and 2 x M16 (for sensor connection)
Communication	
Non ATEX versions	HART, MODBUS RTU/RS 485, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA, PROFIBUS DP add-on modules
ATEX 2G D	HART, PROFIBUS PA, FOUNDATION Fieldbus H1 available as integrated version

Selection and Ordering data	Order No.
SITRANS F M Transmitter MAG 6000 I / Ex d	7ME6930-
Remote, local display, die cast aluminium	2BA-1A
Supply voltage	
115 ... 230 V AC, 50 ... 60 Hz; 18 ... 90 V DC	2
ATEX 2G D, 18 ... 30 V DC	4
ATEX 2G D, 115 ... 230 V AC, 50 ... 60 Hz	5
Ex approval	
None ATEX; FM/CSA class1 div 2	0
ATEX 2G D (For ATEX sensors: 7ME6110, 7ME6120, 7ME6140, 7ME6310, 7ME6320, 7ME6340)	2
Communication	
None (add-on modules can be ordered separately, see below)	A
HART	B
PROFIBUS PA Profile 3	F
PROFIBUS DP Profile 3 (not ATEX version)	G
MODBUS RTU/RS 485 (not ATEX version)	E
FOUNDATION Fieldbus H1	J
Cable gland entries	
Metric	0
½" NPT	2

◆ Short lead time (details in PMD)

This device is shipped with a Quick Start guide and the SITRANS F manual CD containing the complete manual library. Printed Operating Instructions are available for purchase via PMD.

Selection and Ordering data	Order code
Further design	
Please add "-Z" to Order No. and specify Order code(s) and plain text.	
Tag name plate, stainless steel fixed with SS wire (add plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Other, post-production requirements (add plain text)	Y99

Communication modules for MAG 6000 I (All standard outputs can still be used)

Description	Order No.
HART (only for MAG 6000 I/Ex)	◆ FDK-085U0321
MODBUS RTU/RS485	◆ FDK-085U0234
PROFIBUS PA Profile 3	◆ FDK-085U0236
PROFIBUS DP Profile 3	◆ FDK-085U0237
DeviceNet	◆ FDK-085U0229
FOUNDATION Fieldbus H1	◆ A5E02054250

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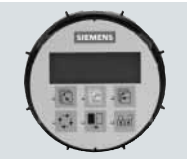






Transmitter MAG 6000 I/6000 I Ex d e

Accessories MAG 6000 I / MAG 6000 I Ex d e

Description	Order No.	
Cable for standard electrode or coil, 3 x 1.5 mm ² /18 gage with shield PVC		
• 10 m (33 ft)	◆ FDK-083F0121	
• 20 m (65 ft)	◆ FDK-083F0210	
• 40 m (130 ft)	◆ FDK-083F0211	
• 60 m (200 ft)	◆ FDK-083F0212	
• 100 m (330 ft)	◆ FDK-083F0213	
• 150 m (500 ft)	FDK-083F3052	
• 200 m (650 ft)	FDK-083F3053	
• 500 m (1650 ft)	FDK-083F3054	
Electrode cable for empty pipe or low conductivity, double shielded, 3 x 0.25 mm ² (cannot be used for Ex applications)		
• 10 m (33 ft)	◆ FDK-083F3020	
• 20 m (65 ft)	◆ FDK-083F3095	
• 40 m (130 ft)	FDK-083F3094	
• 60 m (200 ft)	FDK-083F3093	
• 100 m (330 ft)	FDK-083F3092	
• 150 m (500 ft)	FDK-083F3056	
• 200 m (650 ft)	FDK-083F3057	
• 500 m (1650 ft)	FDK-083F3058	
Cable kit with standard coil cable, 3 x 1.5 mm ² /18 gage with shield PVC and electrode cable double shielded, 3 x 0.25 mm ²		 
• 5 m (16 ft)	◆ A5E02296329	
• 10 m (33 ft)	◆ A5E01181647	
• 15 m (49 ft)	◆ A5E02296464	
• 20 m (65 ft)	◆ A5E01181656	
• 25 m (82 ft)	◆ A5E02296490	
• 30 m (98 ft)	◆ A5E02296494	
• 40 m (130 ft)	◆ A5E01181686	
• 50 m (164 ft)	◆ A5E02296498	
• 60 m (200 ft)	A5E01181689	
• 100 m (330 ft)	A5E01181691	
• 150 m (500 ft)	A5E01181699	
• 200 m (650 ft)	A5E01181703	
• 500 m (1650 ft)	A5E01181705	
Low noise electrode coax cable for low conductivity and high vibration levels of cables, 3 x 0.13 mm ²		
• 2 m (6.6 ft)	A5E02272692	
• 5 m (16.5 ft)	A5E02272723	
• 10 m (33 ft)	A5E02272730	

◆ Short lead time (details in PMD)

Spare parts

Description	Order No.	
Display	FDK-085U3122	
Accessory bag including cable gland inserts coil & electrode connectors	FDK-085U3144	
Electronics cover with Ex glass plate	A5E02593565	
Cover for connection board incl. gasket (for remote version)	7ME5933-0AC02	
Cover for mains supply/communication	7ME5933-0AC03	
Safety clamp	7ME5933-0AC06	
Standard wall mounting bracket	7ME5933-0AC04	
Special wall-/pipe mounting bracket kit	7ME5933-0AC05	

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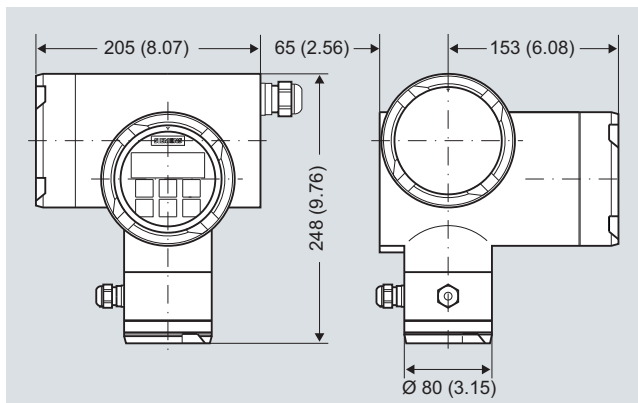
Transmitter MAG 6000 I/6000 I Ex d e

Complete spare part PCB unit

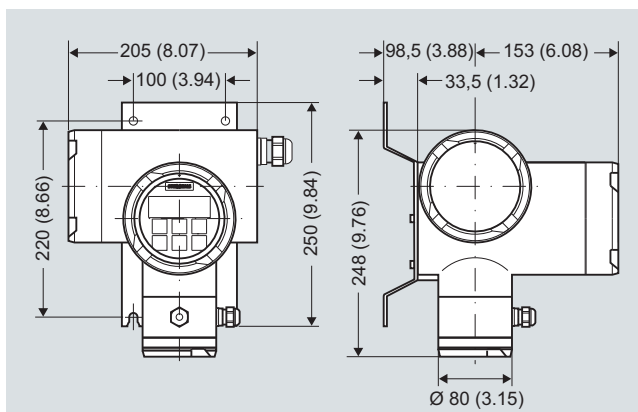
Description	Order No.
MAG 6000 I (Not ATEX)	FDK-085U3123
MAG 6000 I Ex d 18 ... 30 V DC Spare PCB unit for use with ATEX sensors with increased safety e (For ATEX sensors: 7ME6110, 7ME6120, 7ME6140, 7ME6310, 7ME6320, 7ME6340) (For 7ME6330 > DN300)	A5E01013340
MAG 6000 I Ex d 115 ... 230 V AC Spare PCB unit for use with ATEX sensors with increased safety e (For ATEX sensors: 7ME6110, 7ME6120, 7ME6140, 7ME6310, 7ME6320, 7ME6340) (For 7ME6330 > DN300)	A5E01013127
Ex d version 18 ... 30 V DC for sensors with intrinsic safety ib 7ME633 and 7ME613 (For sensors ≤ DN 300 (12"): 7ME6130, 7ME6150 and 7ME6330)	FDK-085U3124
Ex d version 115 ... 230 V AC for sensors with intrinsic safety ib 7ME633 and 7ME613 (For sensors ≤ DN 300 (12"): 7ME6130, 7ME6150 and 7ME6330)	FDK-085U3125



Dimensional drawings



Dimensions in mm (inch)



Dimensions in mm (inch), weight: 6 kg (13.5 lbs)

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Product selector link:

www.pia-selector.automation.siemens.com

Please also see www.siemens.com/SITRANSForordering
for practical examples of ordering

Schematics

