

Overview



Transmitter MAG 5000/6000 compact version (left) and 19" insert version (right)

The MAG 5000 and 6000 are transmitters engineered for high performance, easy installation, commissioning and maintenance. The transmitters evaluate the signals from the SITRANS F M sensors type MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P and MAG 5100 W.

- Transmitter types:
- MAG 5000: Max. measuring error $\pm 0.4 \% \pm 1 \text{ mm/s}$ (incl. sensor)
- MAG 6000: Max. measuring error $\pm 0.2 \% \pm 1 \text{ mm/s}$ (incl. sensor, see also sensor specifications) and with additional features such as: "plug & play" insert bus modules; integrated batch functions.

Benefits

- 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 additional 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 (see under SITRANS F M diagnostics)
- Batch control (MAG 6000 only)
- Custody transfer approval: PTB, OIML R 75, OIML R 117, OIML R 49, MI-001 and PTB K 7.2 for chilled water
- MAG 6000 with add-on bus modules for HART, FOUNDATION Fieldbus H1, DeviceNet, Modbus RTU/RS485, PROFIBUS PA and DP

Application

The SITRANS F M flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries. The main applications can be found in:

- Water and waste water
- Chemical and pharmaceutical industries
- Food and beverage industries
- Power generation and utility

Design

The transmitter is designed as either IP67 NEMA 4X/6 enclosure for compact or wall mounting or 19" version as a 19" insert as a base to be used in:

- 19" rack systems
- Panel mounting IP20/NEMA 1 (prepared for IP65/NEMA 2 display side)
- Back of panel mounting IP20/NEMA 1
- Wall mounting IP66/NEMA 4X

Several options on 19" versions are available such as:

- Transmitters mounted in safe area for Ex ATEX approved flow sensors (incl. barriers)
- Transmitters with electrode cleaning unit on request

Function

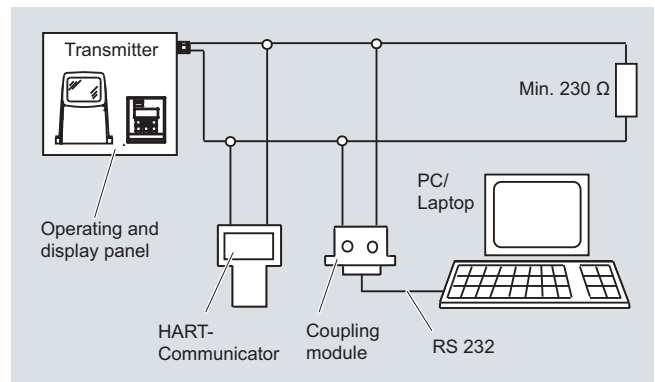
The MAG 5000/6000 are transmitters with a build-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

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

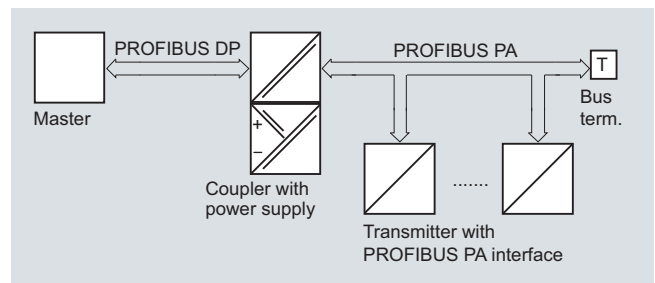
Displays and controls

Operation of the transmitter can be carried out using:

- Control 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



HART communication



PROFIBUS PA communication

Flow Measurement

SITRANS F M

Transmitter MAG 5000/6000

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	11 ... 30 V DC, $R_i = 4.4 \text{ K}\Omega$
• 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
• Load	$< 800 \Omega$
• Time constant	0.1 ... 30 s, adjustable

Digital output

Frequency	0 ... 10 kHz, 50% duty cycle (uni/bidirectional)
Pulse (active)	24 V DC, 30 mA, $1 \text{ K}\Omega \leq R_i \leq 10 \text{ K}\Omega$, short-circuit-protected (power supplied from flowmeter)
Pulse (passive)	3 ... 30 V DC, max. 110 mA, $200 \Omega \leq R_i \leq 10 \text{ K}\Omega$ (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
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Galvanic isolation	All inputs and outputs are galvanically isolated
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Max. measuring error (incl. sensor and zero point)

MAG 5000	0.4 % $\pm 1 \text{ mm/s}$
MAG 6000	0.2 % $\pm 1 \text{ mm/s}$

Rated operation conditions

Ambient temperature	
• Operation	- Display version: -20 ... +60 °C (-4 ... +140 °F) - Blind version: -20 ... +60 °C (-4 ... +140 °F)
• Storage	-40 ... +70 °C (-40 ... +158 °F)

Mechanical load (vibration)

Compact version	18 ... 1000 Hz, 3,17 g rms, sinusoidal in all directions to IEC 68-2-36
19" insert	1 ... 800 Hz, 1 g, sinusoidal in all directions to IEC 68-2-36

Degree of protection

Compact version	IP67/NEMA 4X/6 to IEC 529 and DIN 40050 (1 mH ₂ O 30 min.)
19" insert	IP20/NEMA 1 to IEC 529 and DIN 40050

EMC performance	IEC/EN 61326-1 (all environments) IEC/EN 61326-2-5
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Display and keypad

Totalizer	Two eight-digit counters for forward, net or reverse flow
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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
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Time constant	Time constant as current output time constant
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Design

Enclosure material	
• Compact version	Fiber glass reinforced polyamide; optional (IP65 only): AISI 316 stainless steel
• 19" insert	Standard 19" insert of aluminium/steel (DIN 41494), width: 21 TE, height: 3 HE
• Back of panel	IP20/NEMA 1; Aluminium
• Panel mounting	IP20/NEMA 1 (prepared for IP65/NEMA 2 display side); ABS plastic
• Wall mounting	IP66/NEMA 4X; ABS plastic

Dimensional drawings

Compact version	See dimensional drawings
19" insert	See dimensional drawings

Weight

Compact version	0.75 kg (2 lb)
19" insert	See dimensional drawings

Power supply	115 ... 230 V AC +10% -15%, 50 ... 60 Hz 11 ... 30 V DC or 11 ... 24 V AC
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Power consumption	230 V AC: 17 VA 24 V AC: 9 VA, $I_N = 380 \text{ mA}$, $I_{ST} = 8 \text{ A}$ (30 ms) 12 V DC: 11 W, $I_N = 920 \text{ mA}$, $I_{ST} = 4 \text{ A}$ (250 ms)
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Certificates and approvals

CE, C-UL general purpose, C-tick; FM Class 1, Div 2, CSA Class 1, Div 2	
Custody transfer approval (MAG 5000/6000 CT)	- Cold water: MI-001, PTB/OIML R 49 (pattern approval DE/DK) - Hot water: PTB and DANAK OIML R 75 (pattern approval DE/DK) (MAG 6000 CT) - Chilled water: PTB K 7.2 - Other media than water (milk, beer etc.): PTB and DANAK OIML R 117 (pattern approval DE/DK) (MAG 6000 CT)

Communication

Standard	
• MAG 5000	Without serial communication or HART as option
• MAG 6000	Prepared for client mounted add-on modules
Optional (MAG 6000 only)	HART, Modbus RTU/RS485, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA, PROFIBUS DP as add-on modules
• MAG 5000/6000 CT	No communication modules approved

Safety barrier (e/ia)



Application	For use with MAG 5000/6000 19" and MAG 1100 Ex ATEX/MAG 3100 Ex ATEX		
Ex approval	MAG 1100 Ex [EEx e ia] IIB ATEX		
	MAG 3100 Ex [EEx e ia] IIC ATEX		
Cable parameter	Group	Capacity in μF	Inductance in mH
Electrode	IIC	≤ 4.1	≤ 80
	IIB	≤ 45	≤ 87
	IIA	≤ 45	≤ 87
Ambient temperature			
During operation	$-20 \dots +50 \text{ }^{\circ}\text{C}$ ($-4 \dots +122 \text{ }^{\circ}\text{F}$)		
During storage	$-20 \dots +70 \text{ }^{\circ}\text{C}$ ($-4 \dots +158 \text{ }^{\circ}\text{F}$)		
Enclosure			
Material	Standard 19" insert in aluminium/steel (DIN 41494)		
Width	21 TE (4.75")		
Height	3 HE (5.25")		
Rating	IP20 / NEMA 1 to EN 60529		
Mechanical load	1 g, 1 ... 800 Hz sinusoidal in all directions to EN 60068-2-36		

Electrode cleaning unit for MAG 5000 or 6000 in 19" insert version



The purpose of electrode cleaning is to remove unwanted deposits on the electrodes in water applications by applying either a DC or AC voltage to the electrodes. AC cleaning is used in waste water applications to remove fatty deposits on the electrodes by warming up the electrode. DC cleaning is used in district heating applications to eliminate electrically conductive deposits.

Application for use with transmitters MAG 5000 and 6000 19" to clean the electrodes on sensors MAG 1100 or MAG 3100

- Must not be used with intrinsically safe Ex sensors
 - Not to be used with sensors with Hastelloy and Tantalum electrodes
- Available on request

Flow Measurement

SITRANS F M

Transmitter MAG 5000/6000

Selection and Ordering data

Transmitter MAG 5000

Description	Order No.	
Transmitter MAG 5000 Blind for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC / 11 ... 24 V AC	◆ 7ME6910-1AA30-0AA0	
• 115 ... 230 V AC, 50/60 Hz	◆ 7ME6910-1AA10-0AA0	
Transmitter MAG 5000 Display for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC / 11 ... 24 V AC	◆ 7ME6910-1AA30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	◆ 7ME6910-1AA10-1AA0	
• 115 ... 230 V AC, 50/60 Hz, with HART	7ME6910-1AA10-1BA0	
Transmitter MAG 5000 CT for compact and wall mounting, approved for custody transfer; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC / 11 ... 24 V AC	◆ 7ME6910-1AA30-1AB0	
• 115 ... 230 V AC, 50/60 Hz	◆ 7ME6910-1AA10-1AB0	
Transmitter MAG 5000 for 19" rack and wall mounting		
• 11 ... 30 V DC / 11 ... 24 V AC	7ME6910-2CA30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6910-2CA10-1AA0	

◆ Short lead time (details in PMD)

Transmitter MAG 6000

Description	Order No.	
Transmitter MAG 6000 Blind for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC / 11 ... 24 V AC	◆ 7ME6920-1AA30-0AA0	
• 115 ... 230 V AC, 50/60 Hz	◆ 7ME6920-1AA10-0AA0	
Transmitter MAG 6000 for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC / 11 ... 24 V AC	◆ 7ME6920-1AA30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	◆ 7ME6920-1AA10-1AA0	
Transmitter MAG 6000 for compact and wall mounting; IP65/NEMA 4, AISI 316 stainless steel (only for sensor with SS terminal box) (for remote installation order SS terminal box separately)		
• 11 ... 30 V DC / 11 ... 24 V AC	7ME6920-1QA30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6920-1QA10-1AA0	
Transmitter MAG 6000 CT for compact and wall mounting, approved for custody transfer (no communication modules possible); IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC / 11 ... 24 V AC	◆ 7ME6920-1AA30-1AB0	
• 115 ... 230 V AC, 50/60 Hz	◆ 7ME6920-1AA10-1AB0	
Transmitter MAG 6000 SV for compact and wall mounting; special excitation 44 Hz settings for Batch application DN ≤ 25/1" IP67/NEMA 4X/6, fibre glass reinforced polyamide		
11 ... 30 V DC / 11 ... 24 V AC	7ME6920-1AB30-1AA0	
115 ... 230 V AC, 50/60 Hz	7ME6920-1AB10-1AA0	
Transmitter MAG 6000 for 19" rack and wall mounting		
• 11 ... 30 V DC / 11 ... 24 V AC	◆ 7ME6920-2CA30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	◆ 7ME6920-2CA10-1AA0	
Transmitter MAG 6000 SV for 19" rack and wall mounting; special excitation 44 Hz settings for Batch application DN ≤ 25/1"		
• 11 ... 30 V DC / 11 ... 24 V AC	7ME6920-2CB30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6920-2CB10-1AA0	

Flow Measurement

SITRANS F M

Transmitter MAG 5000/6000

Description	Order No.	
MAG 6000 with IP66/NEMA 4X enclosure; 115 ... 230 V AC, 50/60 Hz	7ME6920-2EA10-1AA0	
MAG 6000 with safety barrier for Ex-approved sensors, complete mounted with IP66/NEMA 4X wall mounting enclosure, ATEX, 115 ... 230 V AC, 50/60 Hz • For ATEX 2G D sensors	7ME6920-2MA11-1AA0	
MAG 6000 SV, 19" insert, in IP66/NEMA 4X, ABS plastic enclosure, excitation frequency 44 Hz for Batch application DN ≤ 25/1", 11 ... 30 V DC, 11 ... 24 V AC, 50/60 Hz ◆ Short lead time (details in PMD)	7ME6920-2EB30-1AA0	

Operating instructions for SITRANS F M MAG 5000/6000

Description	Order No.
Operating instructions for SITRANS F M MAG 5000/6000 IP67 • English • German • Spanish • French	A5E02338368 A5E02944982 A5E02944995 A5E02944990
Operating instructions for SITRANS F M MAG 5000/6000 19" • English	A5E02082880

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
<http://www.siemens.com/flowdocumentation>

Communication modules for MAG 6000

Description	Order No.	
HART (not for MAG 6000 I)	◆ FDK-085U0226	
Modbus RTU/RS485	◆ FDK-085U0234	
PROFIBUS PA Profile 3	◆ FDK-085U0236	
PROFIBUS DP Profile 3	◆ FDK-085U0237	
DeviceNet	◆ FDK-085U0229	
FOUNDATION Fieldbus H1	◆ A5E02054250	

Accessories for MAG 5000 and MAG 6000

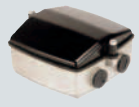
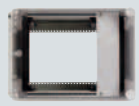
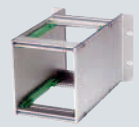
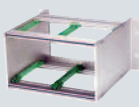
Description	Order No.	
Wall mounting unit for IP67/NEMA 4X/6 version, wall bracket, terminal box in polyamide • 4 x M20 cable glands • 4 x ½" NPT cable glands	◆ FDK-085U1018 ◆ FDK-085U1053	
Cable for standard electrode or coil, 3 x 1.5 mm² / 18 gage with shield PVC • 10 m (33 ft) • 20 m (65 ft) • 40 m (130 ft) • 60 m (200 ft) • 100 m (330 ft) • 150 m (500 ft) • 200 m (650 ft) • 500 m (1650 ft)	◆ FDK-083F0121 ◆ FDK-083F0210 ◆ FDK-083F0211 ◆ FDK-083F0212 ◆ FDK-083F0213 FDK-083F3052 FDK-083F3053 FDK-083F3054	
Electrode cable for empty pipe or low conductivity, double shielded, 3 x 0.25 mm² • 10 m (33 ft) • 20 m (65 ft) • 40 m (130 ft) • 60 m (200 ft) • 100 m (330 ft) • 150 m (500 ft) • 200 m (650 ft) • 500 m (1650 ft)	◆ FDK-083F3020^D ◆ FDK-083F3095 FDK-083F3094 FDK-083F3093 FDK-083F3092 FDK-083F3056^D FDK-083F3057^D FDK-083F3058	
Low-noise electrode coax cable for low conductivity and high vibration levels of cables, 3 x 0.13 mm² • 2 m (6.6 ft) • 5 m (16.5 ft) • 10 m (33 ft)	A5E02272692 A5E02272723 A5E02272730	
Cable kit with standard coil cable, 3 x 1.5 mm²/18 gage with shield PVC and electrode cable double shielded, 3 x 0.25 mm² • 5 m (16.5 ft) • 10 m (33 ft) • 15 m (49 ft) • 20 m (65 ft) • 25 m (82 ft) • 30 m (98 ft) • 40 m (130 ft) • 50 m (164 ft) • 60 m (200 ft) • 100 m (330 ft) • 150 m (500 ft) • 200 m (650 ft) • 500 m (1650 ft)	◆ A5E02296329^D ◆ A5E01181647 ◆ A5E02296464^D ◆ A5E01181656^F ◆ A5E02296490^D ◆ A5E02296494^D ◆ A5E01181686^F ◆ A5E02296498^D A5E01181689^F A5E01181691^F A5E01181699^F A5E01181703^F A5E01181705^F	 

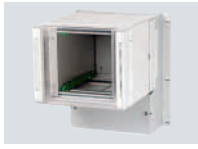
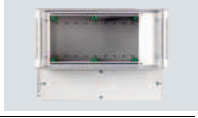
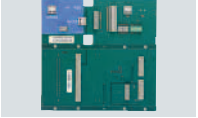
◆ Short lead time (details in PMD)

Flow Measurement

SITRANS F M

Transmitter MAG 5000/6000

Description	Order No.	
D) Subject to export regulations AL: N, ECCN: EAR99H F) Subject to export regulations AL: 91999, ECCN: N Cable glands, for above cable, 2 pcs. • M20 • ½" NPT	◆ A5E00822490 ◆ A5E00822501	 ½" NPT M20
Sealing screws for sensor/transmitter, 2 pcs	FDK-085U0221	
Terminal box, in polyamide, inclusive lid • M20 • ½" NPT	◆ FDK-085U1050 ◆ FDK-085U1052	
Terminal box lid, in polyamide	FDK-085U1003	
Terminal box, in stainless steel, inclusive lid for MAG 6000 in stainless steel and for all Ex sensors • M20 • ½" NPT	A5E00836867 A5E00836868	
Terminal box (3A) for MAG 1100 F in polyamide, inclusive lid • M20 • ½" NPT	A5E00822478 A5E00822479	
Potting kit for terminal box of MAG sensors for IP68/NEMA 6P (not for Ex sensors)	◆ FDK-085U0220	
19" safety barrier (21 TE) [EEx e ia] IIC for MAG 1100 Ex sensors and MAG 3100 Ex sensors, incl. back plate	FDK-083F5034	
Panel mounting enclosure for 19" insert (21 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	FDK-083F5030	
Panel mounting enclosure for 19" insert (42 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	FDK-083F5031	
Back of panel mounting enclosure for 19" insert (21 TE); IP20/NEMA 1 enclosure in aluminium	FDK-083F5032	
Back of panel mounting enclosure for 19" insert (42 TE); IP20/NEMA 1 enclosure in aluminium	FDK-083F5033	

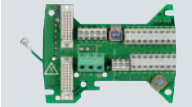
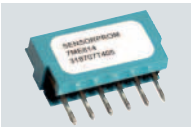
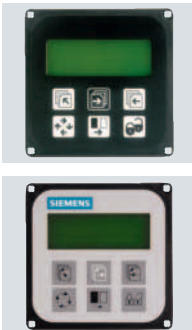
Description	Order No.	
IP66/NEMA 4X, wall mounting enclosure for 19" inserts (without back plates) • 21 TE • 42 TE	FDK-083F5037 FDK-083F5038	 
Front cover (7TE) ◆ Short lead time (details in PMD)	FDK-083F4525	
Back plates (if wall enclosure IP66 is used as part)		
Description	Order No.	
Wall unit enclosure IP66, 12 ... 24 V, 115 ... 230 V • Transmitter • Transmitter ia/e and safety barrier • Transmitter ia/ib and safety barrier (only for sensors produced before October 2007) • Transmitter and cleaning unit	A5E02559813 A5E02559814 A5E02559812 A5E02559815	 

Flow Measurement

SITRANS F M

Transmitter MAG 5000/6000

Spare parts

Description	Order No.	
Connection plate (for polyamide terminalbox)		
• 12 ... 24 V	A5E02559817	
• 115 ... 230 V	A5E02559816	
Connection plate (for stainless steel terminal-box)		
• 12 ... 24 V	A5E02604280	
• 115 ... 230 V	A5E02604272	
19" enclosure, 12 ... 24 V, 115 ... 230 V		
• Connection plate for standard 19" transmitter	A5E02559809	
• Connection plate for transmitter ia and safety barrier	A5E02559810	
• Connection plate for transmitter ia/ib and safety barrier (only for sensors produced before October 2007)	A5E02559811	
• Connection plate for transmitter and cleaning unit	FDK-083F4123	
SENSORPROM memory unit (Sensor code and serial numbers must be specified on order)		
• 2 kB (for MAG 5000/6000/ MAG 6000 I)	FDK-085U1005	
• 250 B (for MAG 2500/3000)	FDK-085U1008	
Display unit for MAG 5000/6000		
• black neutral front	FDK-085U1038	
• SiemensSiemens front	◆ FDK-085U1039	

◆ Short lead time (details in PMD)

Sun Shields for MAG 5000/6000 transmitters

Description	Order No.	
Sun lid for MAG 5000/6000 transmitter (Frame and lid)	A5E02328485	
Sun shield for remote MAG 5000/6000 transmitters	A5E01209496^{D)}	
Sun Shield for compact MAG 5000/6000 transmitters on MAG 3100 (DN 15 ... 2000 (½" ... 78") or MAG 5100 (DN 150 ... 1200 (6" ... 48"))	A5E01209500^{D)}	

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

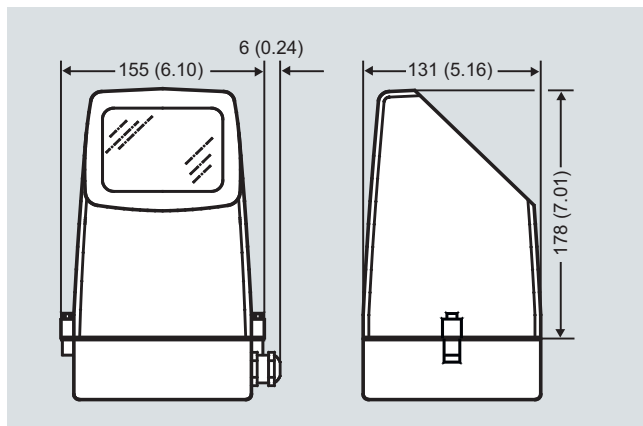
Flow Measurement

SITRANS F M

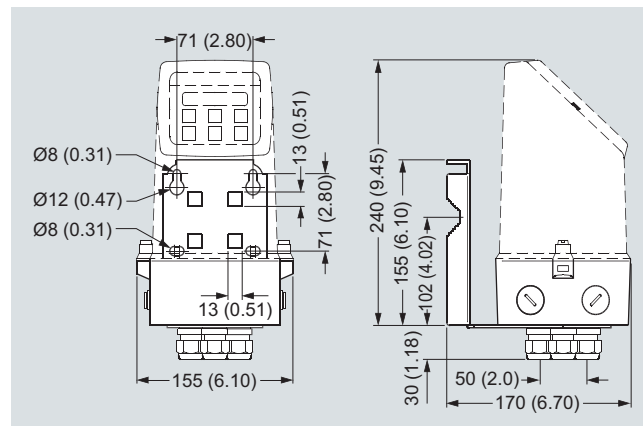
Transmitter MAG 5000/6000

Dimensional drawings

Transmitter IP67/NEMA 4X/6 compact polyamide

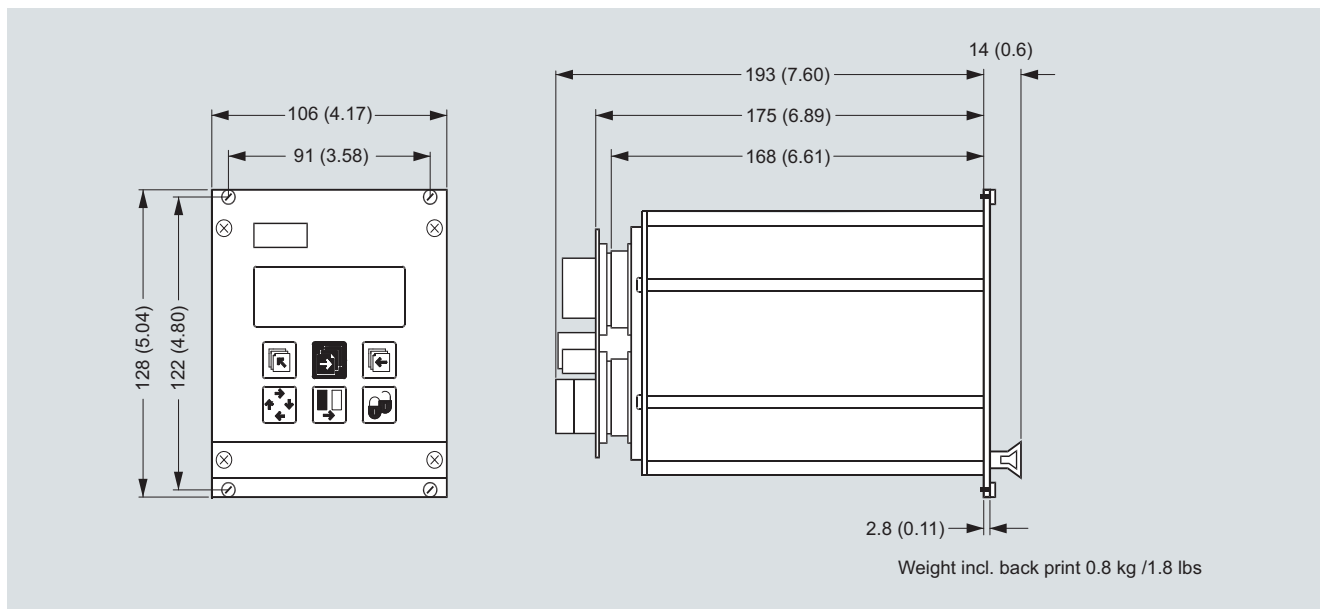


Transmitter compact mounted, dimensions in mm (inch)



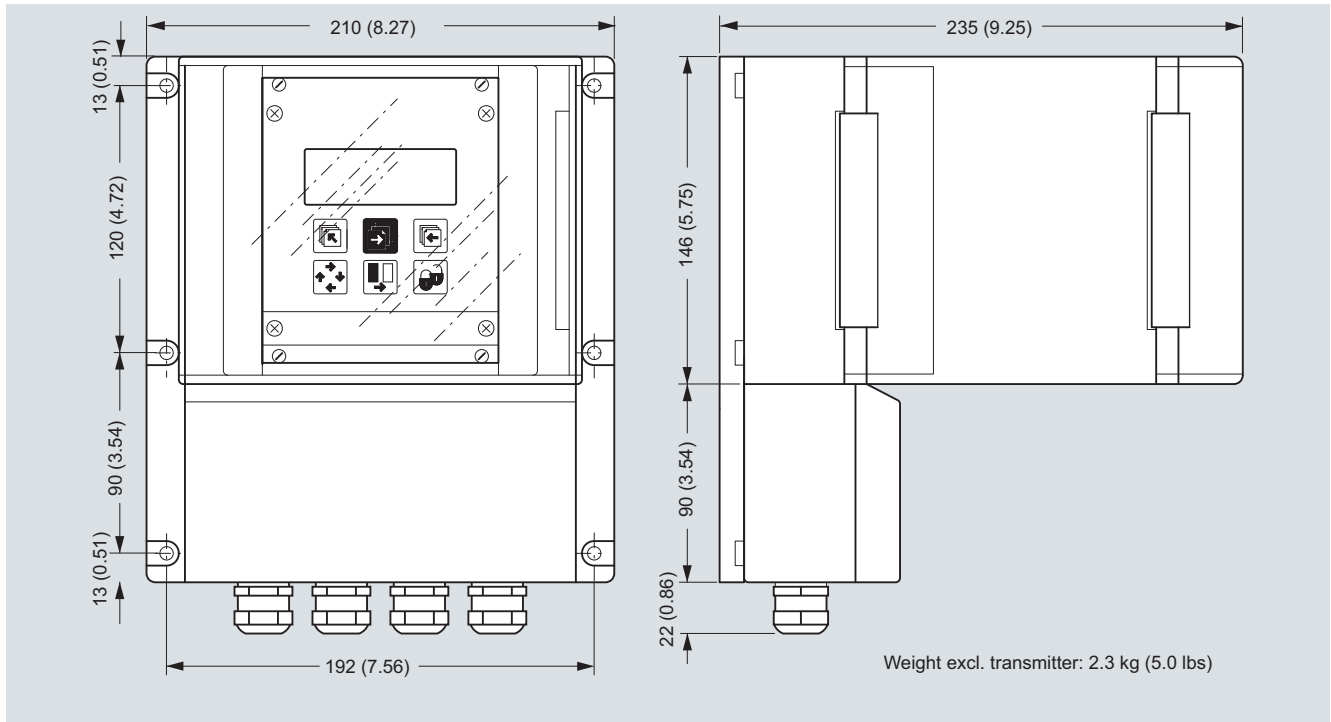
Transmitter wall mounted, dimensions in mm (inch)

Transmitter, 19" IP20/ NEMA 1 standard unit



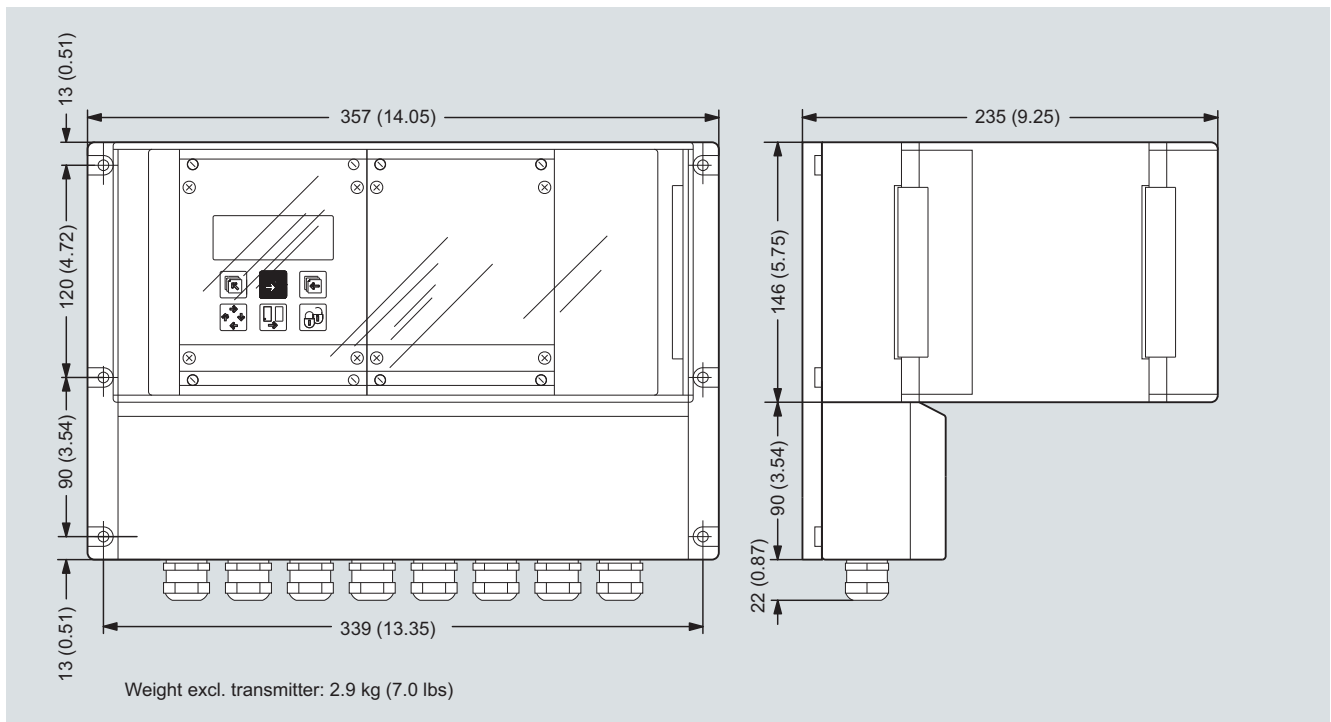
Dimensions in mm (inch)

Transmitter, wall mounting IP66/NEMA 4X, 21 TE



Dimensions in mm (inch)

Transmitter, wall mounting IP66/NEMA 4X, 42 TE



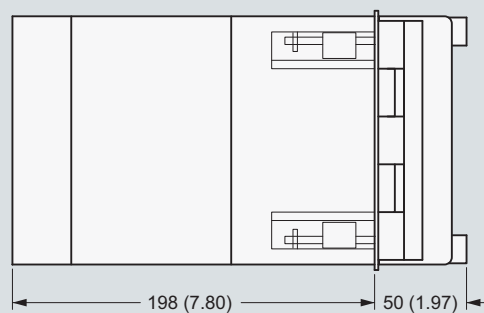
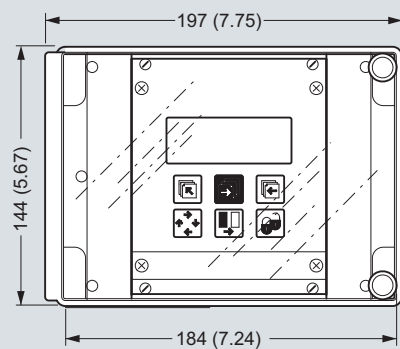
Dimensions in mm (inch)

Flow Measurement

SITRANS F M

Transmitter MAG 5000/6000

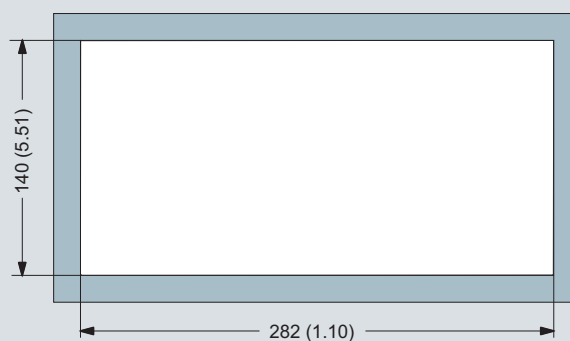
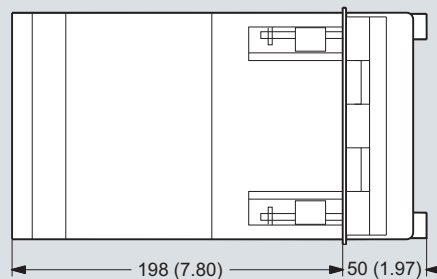
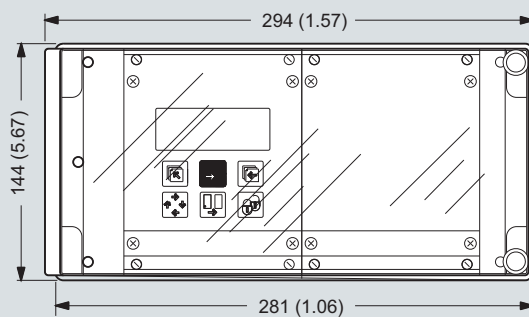
Transmitter, panel front IP20/NEMA 1, 21 TE



Weight excl. transmitter: 1.2 kg (2.7 lbs)

Dimensions in mm (inch)

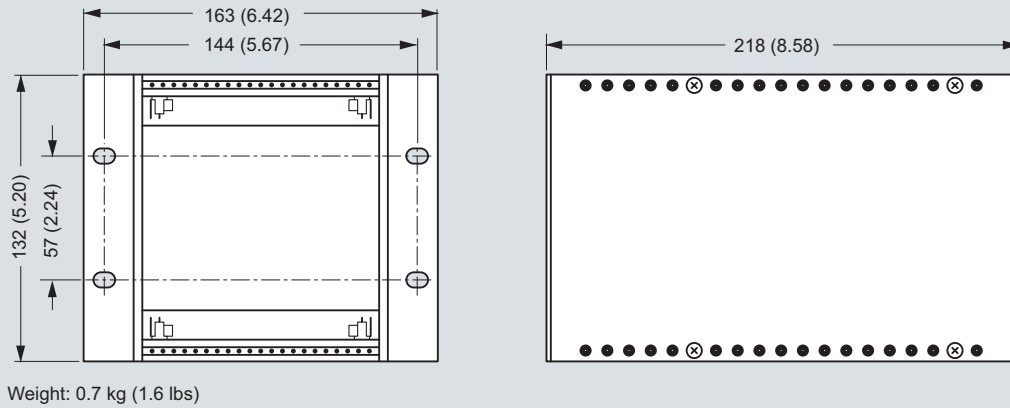
Transmitter, panel front IP20/NEMA 1, 42 TE



Weight excl. transmitter: 1,6 kg (3.5 lbs)

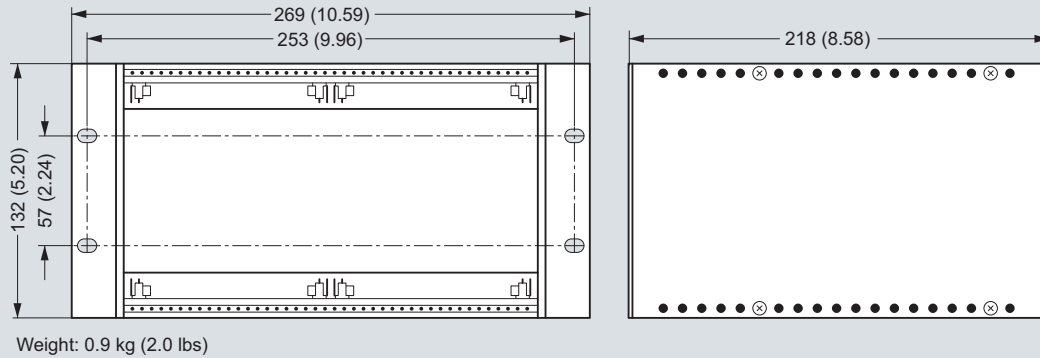
Dimensions in mm (inch)

Transmitter, back of panel IP20/NEMA 1, 21 TE



Dimensions in mm (inch)

Transmitter, back of panel IP20/NEMA 1, 42 TE



Dimensions in mm (inch)

Flow Measurement

SITRANS F M

Transmitter MAG 5000/6000

Schematics

Electrical connection

Grounding

PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 μ F capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

Output cables

If the output cable length is long in noisy environment, we recommend to use shielded cable.

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