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 ± 0.4 % ± 1 mm/s (incl. sensor)
- MAG 6000: Max. measuring error ± 0.2 % ± 1 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

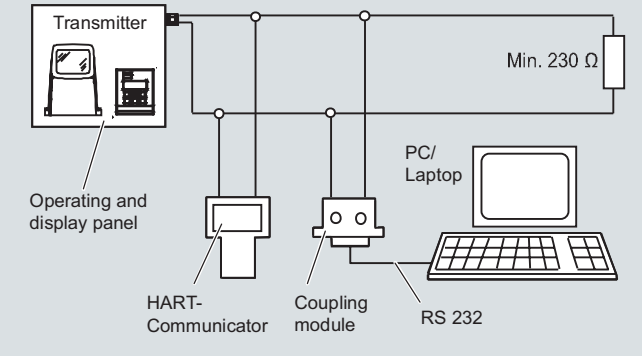
The MAG 5000/6000 are transmitters with a build-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

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

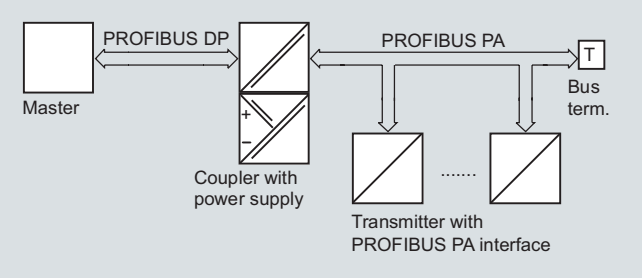
Displays and controls

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

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 x 10^{14} Ω
Input	
Digital input	11 ... 30 V DC, R_i = 4.4 KΩ
• Activation time	50 ms
• Current	$I_{11\ V\ DC}$ = 2.5 mA, $I_{30\ V\ DC}$ = 7 mA
Output	
Current output	
• Signal range	0 ... 20 mA or 4 ... 20 mA
• Load	< 800 Ω
• 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 KΩ ≤ R_i ≤ 10 KΩ, short-circuit-protected (power supplied from flowmeter)
Pulse (passive)	3 … 30 V DC, max. 110 mA, 200 Ω ≤ R_i ≤ 10 KΩ (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 galvanically isolated
Max. measuring error (incl. sensor and zero point)	
MAG 5000	0.4 % ±1 mm/s
MAG 6000	0.2 % ±1 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_2O 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

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
Time constant	Time constant as current output time constant
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
Power consumption	• 230 V AC: 17 VA • 24 V AC : 9 VA, I_N = 380 mA, I_{ST} = 8 A (30 ms) • 12 V DC : 11 W, I_N = 920 mA, I_{ST} = 4 A (250 ms)
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 moduls 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 ... +50 °C (-4 ... +122 °F)		
During storage	-20 ... +70 °C (-4 ... +158 °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

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**	

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	**7ME6920-2EB30-1AA0**	
MAG 6000 SV, 19" insert, in IP66/NEMA 4 , ABS plastic enclosure, incl. cleaning unit		
• 11 ... 30 V DC / 11 ... 24 V AC	**7ME6920-1PA30-1AA0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6920-1PA10-1AA0**	

◆ Short lead time (details in PMD)

Operating instructions for SITRANS F M MAG 5000/6000

Description	Order No.
Operating instructions for SITRANS F M MAG 5000/6000 IP67	
• English	**A5E02338368**
• German	**A5E02944982**
• Spanish	**A5E02944995**
• French	**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 ½" NPT cable glands	◆	**FDK-085U1053**	
Cable for standard electrode or coil, 3 x 1.5 mm² / 18 gage with shield PVC			
• Per foot		**TGX:001STCAB**	
• 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 mm²			
• Per foot		**TGX:001SPCAB**	
• 10 m (33 ft)	◆	**FDK-083F3020**[D)]	
• 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**[D)]	
• 200 m (656 ft)		**FDK-083F3057**[D)]	
• 500 m (1650 ft)		**FDK-083F3058**	
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)	◆	**A5E02296329**[D)]	
• 10 m (33 ft)	◆	**A5E01181647**	
• 15 m (49 ft)	◆	**A5E02296464**[D)]	
• 20 m (65 ft)	◆	**A5E01181656**[F)]	
• 25 m (82 ft)	◆	**A5E02296490**[D)]	
• 30 m (98 ft)	◆	**A5E02296494**[D)]	
• 40 m (130 ft)	◆	**A5E01181686**[F)]	
• 50 m (164 ft)	◆	**A5E02296498**[D)]	
• 60 m (200 ft)		**A5E01181689**[F)]	
• 100 m (330 ft)		**A5E01181691**[F)]	
• 150 m (500 ft)		**A5E01181699**[F)]	
• 200 m (650 ft)		**A5E01181703**[F)]	
• 500 m (1650 ft)		**A5E01181705**[F)]	

◆ Short lead time (details in PMD)

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

F) Suject to export regulations AL: 9I999, ECCN: N

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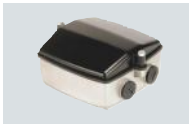
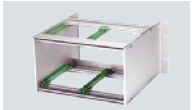
Transmitter MAG 5000/6000

Description	Order No.	
Cable glands, for above cable, 2 pcs.		
• M20 ◆	**A5E00822490**	
• ½“ NPT ◆	**A5E00822501**	
Sealing screws for sensor/ transmitter, 2 pcs	**FDK-085U0221**	
IP68 cland for amoured cable (1 pcs.)	**FDK-083U8244**	
Terminal box, in polyamide, inclusive lid		
• ½" NPT ◆	**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		
• ½" NPT	**A5E00836868**	
Potting kit for terminal box of MAG sensors for IP68/NEMA 6P (not for Ex sensors) ◆	**FDK-085U0220**	
Coil & electrode circuit protection	**FDK-LP-M1C2E**	
19" Cleaning unit insert for electrode cleaning, including connection plate, 115 -230 V AC, 50/60 Hz, 21 TE Replacement part only	**FDK-083F5036**	
19" Cleaning unit insert for electrode cleaning, including connection plate, 11-30 V DC/11-24 V AC, 21 TE Replacement part only	**FDK-083F5039**	
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**	

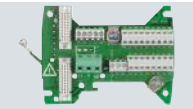
Description	Order No.	
IP66/NEMA 4X, wall mounting enclosure for 19“ inserts (without back plates)		
• 21 TE	**FDK-083F5037**	
• 42 TE	**FDK-083F5038**	
Front cover (7TE)	**FDK-083F4525**	

◆ Short lead time (details in PMD)

Back plates (if wall enclosure IP66 is used as part)

Description	Order No.	
Wall unit enclosure IP66, 12 ... 24 V, 115 ... 230 V		
• Transmitter	**A5E02559813**	
• Transmitter ia/e and safety barrier	**A5E02559814**	
• Transmitter ia/ib and safety barrier (only for sensors produced before October 2007)	**A5E02559812**	
• Transmitter and cleaning unit	**A5E02559815**	

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**	
MAGFLO Verificator, 60 Hz, includes software for PC and adapters for IP67 and rack mount enclosures. Not for TRANSMAG 2 or MAG6000i Industial encl.	**FDK-083F5061**	
Verificator Recertification - Yearly factory recertification of the Verificator is recommended to maintain traceability of system accuracy	**On request**	
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-083U7005**	
Display unit for MAG 5000/6000		
• 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

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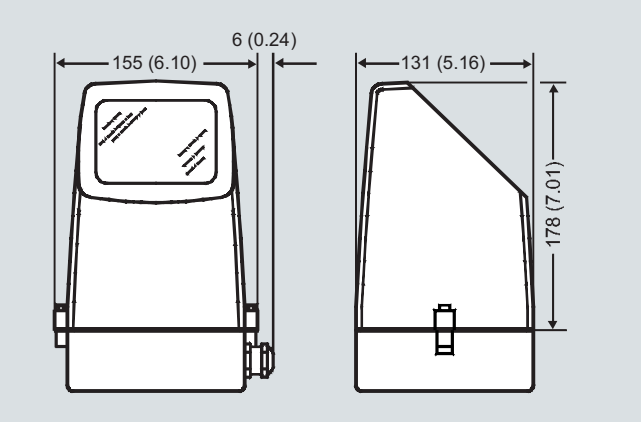
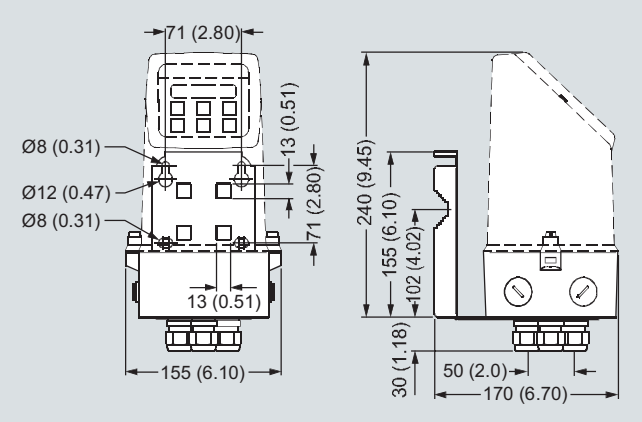
Dimensional drawings

Transmitter IP67/NEMA 4X/6 compact polyamide

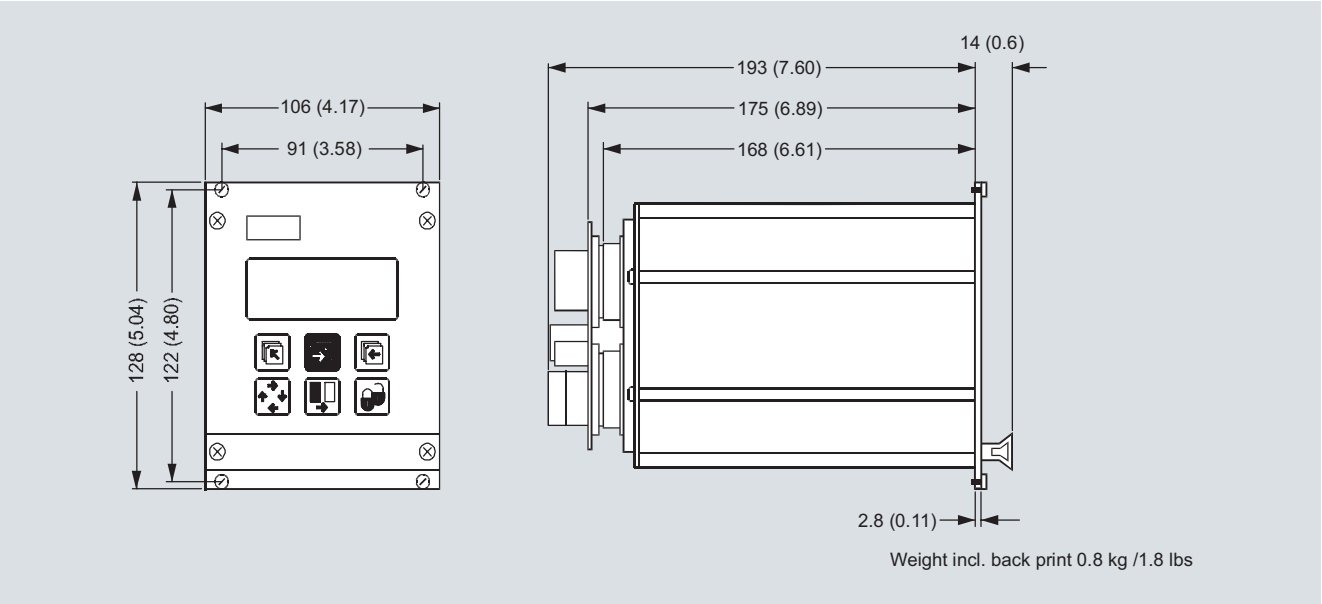


Transmitter compact mounted, dimensions in mm (inch)



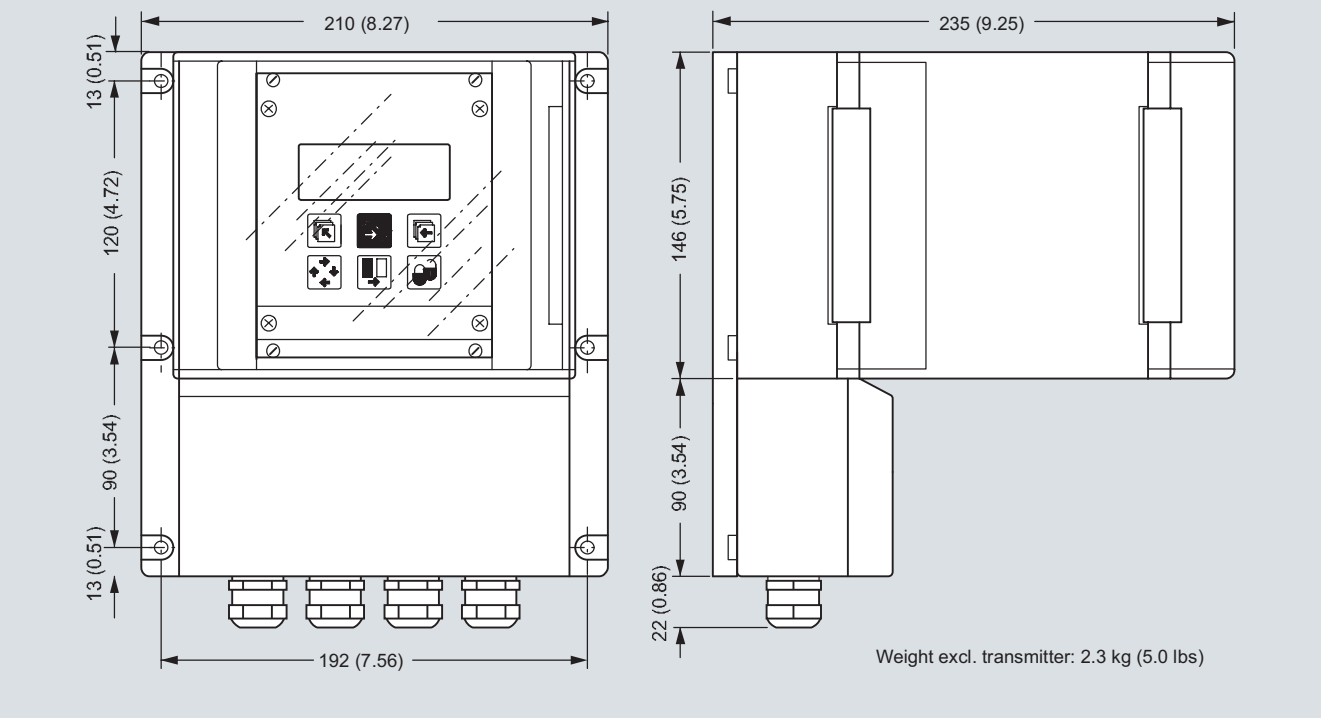
Transmitter wall mounted, dimensions in mm (inch)

Transmitter, 19" IP20/ NEMA 1 standard unit



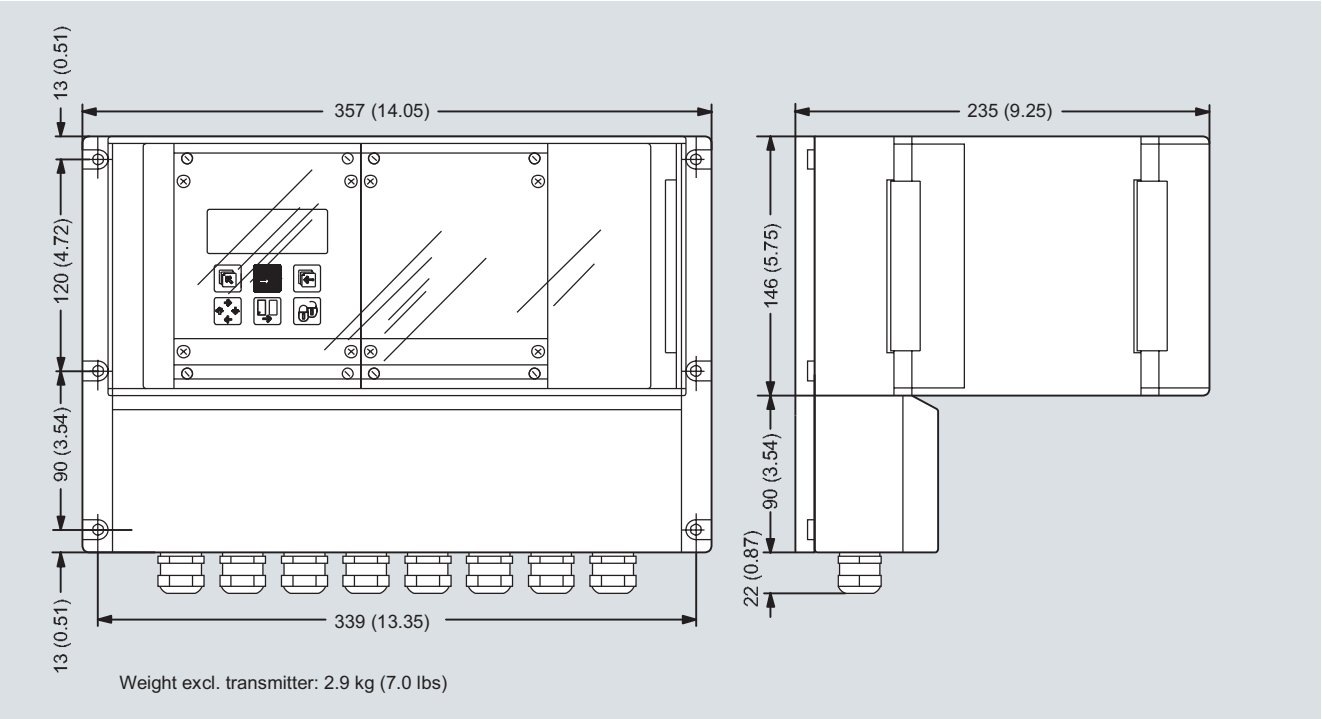
Dimensions in mm (inch)

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



Dimensions in mm (inch)

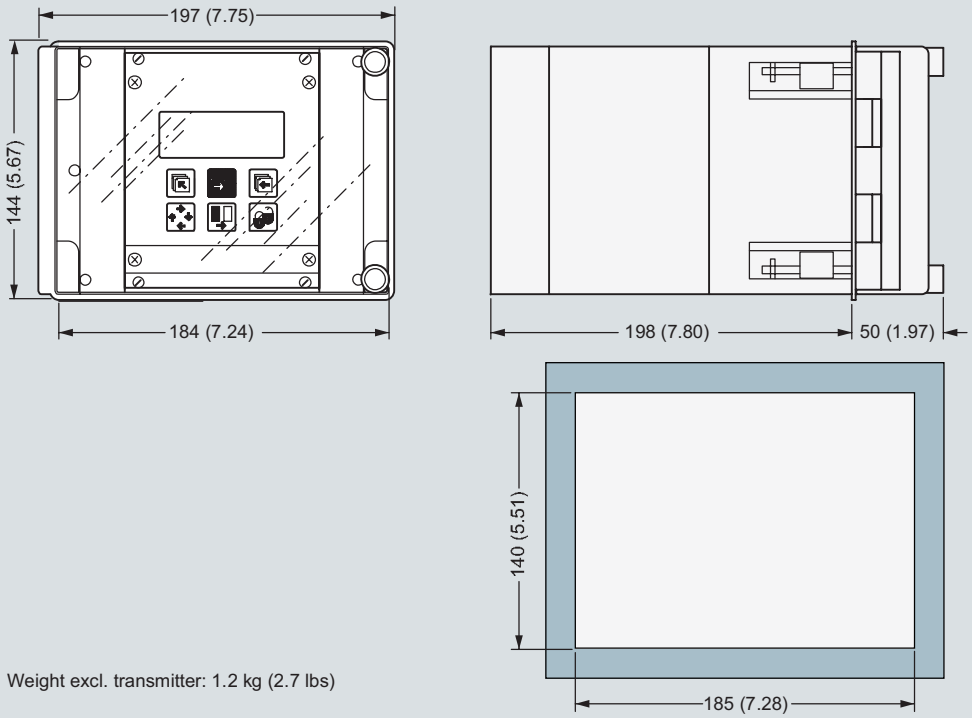
Transmitter, wall mounting IP66/NEMA 4X, 42 TE



Dimensions in mm (inch)

Transmitter MAG 5000/6000

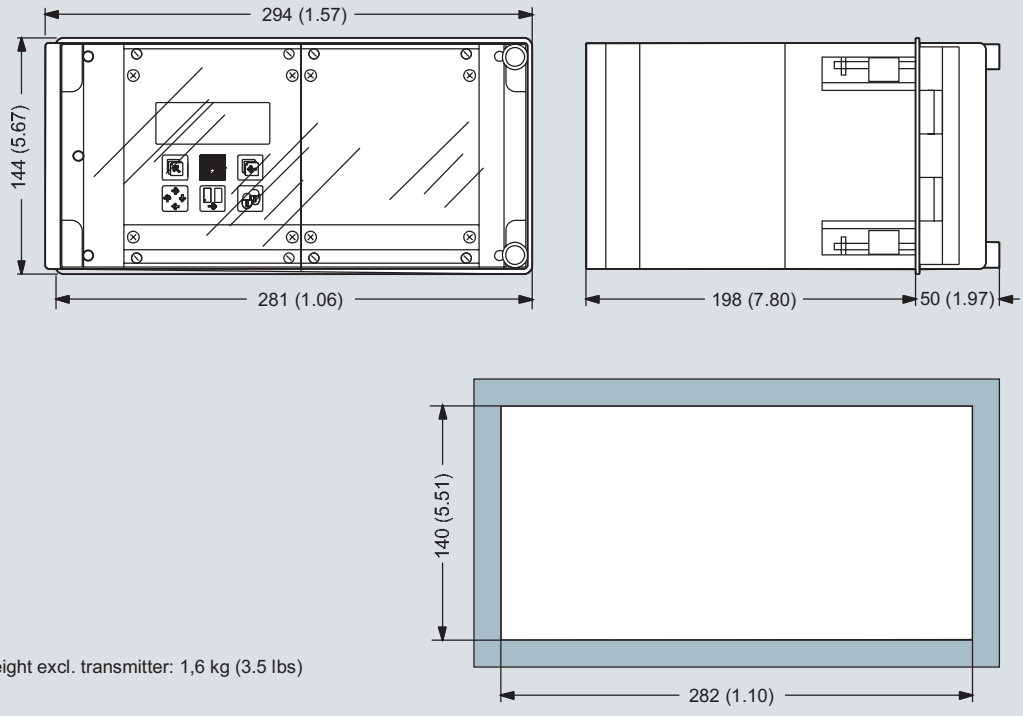
Transmitter, panel front IP20/NEMA 1, 21 TE



Weight excl. transmitter: 1.2 kg (2.7 lbs)

Dimensions in mm (inch)

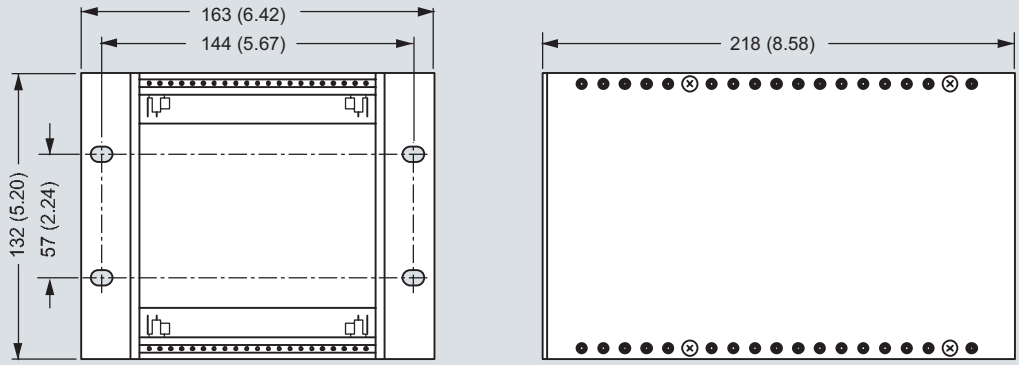
Transmitter, panel front IP20/NEMA 1, 42 TE



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

Dimensions in mm (inch)

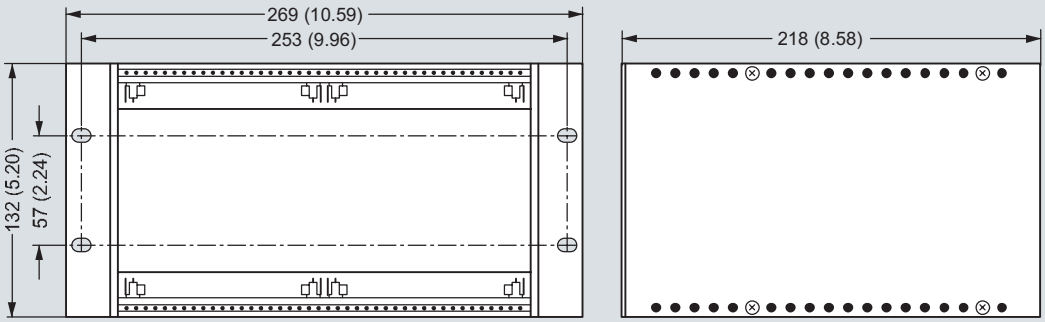
Transmitter, back of panel IP20/NEMA 1, 21 TE



Weight: 0.7 kg (1.6 lbs)

Dimensions in mm (inch)

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



Weight: 0.9 kg (2.0 lbs)

Dimensions in mm (inch)

Schematics

Electrical connection

Grounding

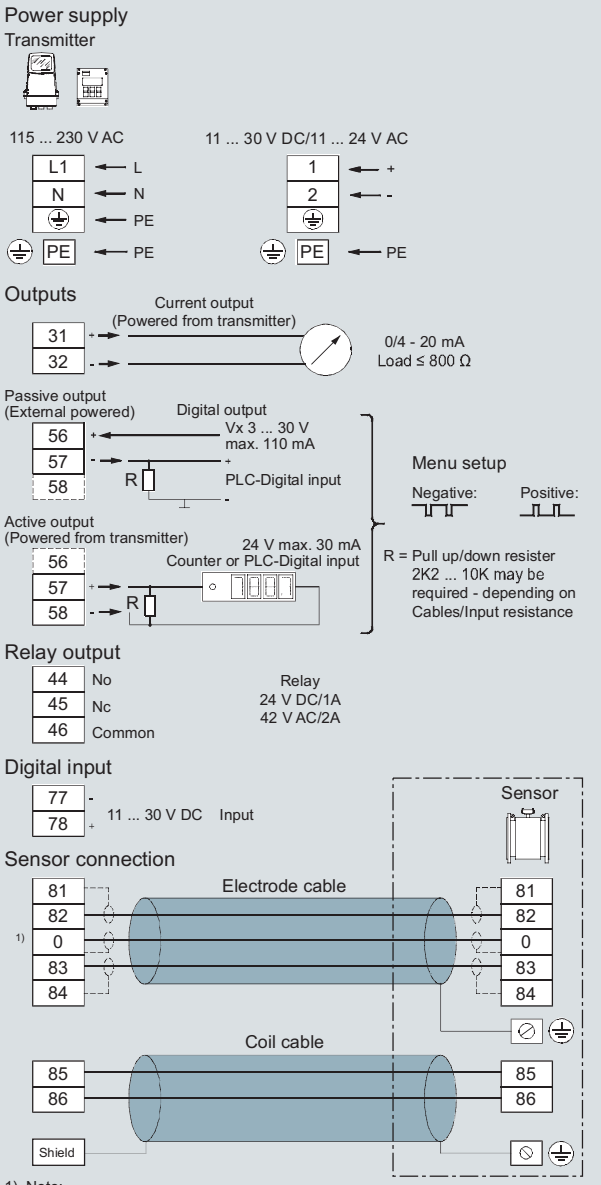
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF 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.



1) Note:
Special cable with individual wire shields (shown as dotted lines) are only required when using empty pipe function or long cables.