Overview

Magnetic flowmeter transmitter SITRANS FMT020

The new magnetic flow meter transmitter model SITRANS FMT020 is a high performance, robust and intelligent product, designed to fit perfectly for a wide area of process applications that require accurate, and reliable flow measurement of conductive fluids.

The SITRANS FMT020 is the next generation successor for the well-proven MAG 5000 and MAG 6000 transmitter series. The FMT020 retains all the unique features of this transmitter series such as the flexible installation concept with common housing for compact and remote mounting. It also maintains the modular design supporting easy exchangeability of the transmitter as well as the add-on communication modules, or the Sensorprom memory unit for fast commissioning, instant measurement, and data storage.

In addition, the FMT020 features the ability to simultaneously measure volumetric flow, flow velocity and electrical conductivity. It also offers enhanced diagnostics like empty pipe monitoring and device self-check, and comes with multi-functional input/output channels for process control, a unified operating concept and much more:

- High accuracy up to 0.2% of rate
- 3 totalizers for forward, reverse, and net flow
- Multi language, menu-guided operation
- Field bus: HART, PROFINET, EtherNet/IP, MODBUS RTU, MODBUS TCP/IP
- Integrated self-verification via SIMATIC PDM, Webserver and SITRANS mobile IQ

The transmitter can be configured locally via display and remotely over Fieldbus or Webserver. EDDs are available for SIMATIC PDM, AMS Device Manager, and AMS Trex Device Communicator, plus DTMs for FDTs (Field Device Tools).

Benefits

- Backwards compatible with older (up to 15 years) flow meter sensors (MAG 5100 W)
- Fast start-up without zero-point adjustments
- Variety of functions for comprehensive device check, self-diagnosis, and onboard verification
- Verificator compatible: Independently verifies performance of sensor, transmitter, and installation (including cable) without process interruption
- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- Multi-functional outputs for process control, minimum configuration with analog, digital (pulse, frequency, status), and relay output
- SD memory card for data logging, configuration backup, and firmware update
- Seamless field device integration in host systems

Application

The SITRANS FMT020 transmitter is engineered for high performance, easy installation, commissioning, and reduced maintenance.

The device is a truly robust solution and suitable for all-around applications but is also the ideal choice for demanding applications where higher diagnostics capability and functionality are important.

The transmitter can be combined with magnetic flow sensors of type SITRANS FMS500.

SITRANS FMS500

A flow meter sensor for all water and wastewater applications. With its coned design, increased low-flow accuracy is achieved making it especially useful for leak detection. It is suitable for direct burial and constant flooding. The SITRANS FMS500 complies with drinking water approvals.

Accuracy: 0.4% of rate, option for: 0.2% of rate

Range: DN 15 ... 1200 (½ ... 48")

Design

The transmitter is housed in a IP66/67, NEMA 4X/6 enclosure made of durable polycarbonate and creates together with a flow sensor a complete measurement system providing the measured flow values via a local display, multiple signal outputs or a fieldbus interface.

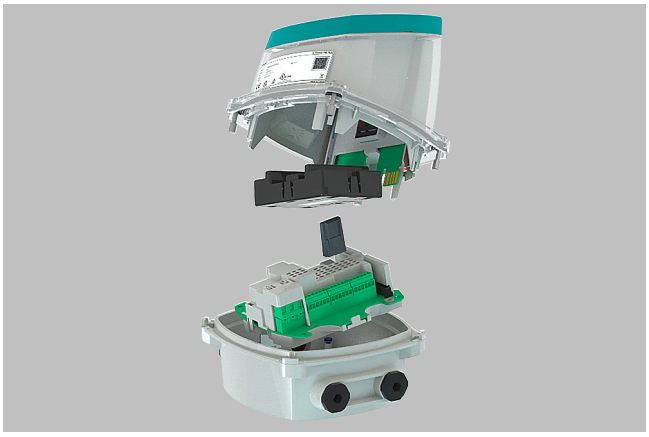
The modular design concept of the FMT020 makes it flexible to be remote connected or integral mounted with magnetic flow sensors of type SITRANS FMS500.

Integral-mount design

For devices with an integral-mount design, the transmitter and the sensor form a single mechanical unit.

Remote mount design

For devices with a remote mount design, the transmitter and sensor are mounted in separate locations. The electrical connection between the transmitter and the sensor is provided by sensor cables.



Selection and ordering data

Transmitter SITRANS FMT020	Article No. 7ME6942- 0 A A 0 0 - 0 ● ● ●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Transmitter mounting and enclosure type	
Polycarbonate enclosure, compact design	A
Remote design. polycarbonate housing (wall-mounting unit and sensor terminal board included)	B
Terminal box, electrical connection	
Without terminal box	A
Polycarbonate terminal box with M20 threads (incl. 4 pcs M20 cable glands)	B
Polycarbonate terminal box with M20 threads and ½" NPT adaptors (incl. 4 pcs ½" NPT cable glands)	C
Power supply	
12 ... 42 V DC	2
100 ... 240 V AC, 50/60 Hz	3

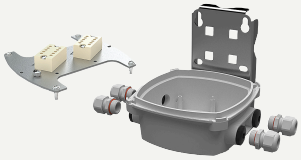
Additional information	Order code
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
General safety	
CSA General Purpose	**E06**
Explosion protection	
ATEX (Europe) & IECEx (World)	**E20**
FM (USA & Canada)	**E22**
IECEx (World)	**E23**
Country specific approvals	
CPA (China)	**E75**
Communication	
HART with 4 ... 20 mA output, active or passive	**F01**
Modbus RTU / RS485	**F04**

Additional information	Order code
PROFIBUS PA	**F05**
PROFIBUS DP	**F06**
PROFINET	**F07**
EtherNet/IP	**F09**
MODBUS TCP/IP	**F10**
I/O extension	
Digital input / output, passive	**F30**
Device options	
Industrial micro SD memory card, 20 GB storage capacity	**J06**
Name plate in Chinese language	**J20**
Type of Ex protection	
Increased safety (Ex e) Zone 2	**L12**
Non-incendive (NI) Class I, Division 2	**L15**

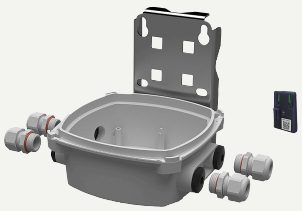
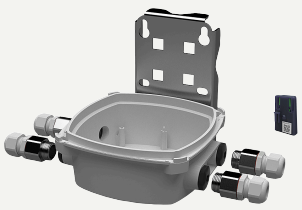
Accessories FMT020

Description	Article No.	
Communication add-on modules		
HART with 4 ... 20 mA output, active or passive	**7ME6940-1CM10**	
PROFINET	**7ME6940-1CM20**	
EtherNet/IP	**7ME6940-1CM30**	
Modbus RTU/RS485	**7ME6940-1CM40**	
PROFIBUS DP	**7ME6940-1CM50**	
PROFIBUS PA	**7ME6940-1CM60**	
MODBUS TCP/IP	**7ME6940-1CM70**	
I/O add-on modules Digital input / output, passive	**7ME6940-1DM10**	
Bluetooth adapter SITRANS AW050[2)] (including connection cable)	**7ME6940-1BT10**	

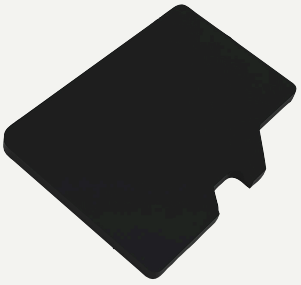
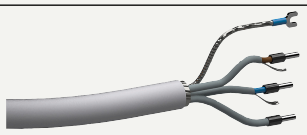
Selection and ordering data (continued)

Description	Article No.	
SensorPROM programmer (MAG 5000/6000 SensorPROM compatible)	7ME6940-1SP10	
Wall-mounting unit (including sensor terminal board), terminal box material polycarbonate		
• M20 × 1.5 cable glands (4 pcs.)	7ME6940-1WU10	
• ½ inch NPT cable glands (4 pcs.)	7ME6940-1WU15	
Display protection cover	7ME6940-1PL10	
Sun shield for transmitter, remote mount	A5E01209496	
Sun shield for transmitter, integral mount (compact design) Only suitable for FMS500 sensors DN 150 ... 1200 (6" ... 48")	A5E01209500	

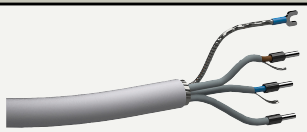
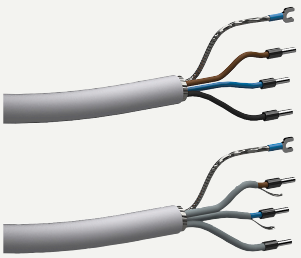
Selection and ordering data (continued)

Description	Article No.	
Transmitter conversion kit[1] for MAG 5000/6000 units, integral mount (compact design) including SensorPROM programmed, terminal box in polycarbonate, cable glands (4 pcs.), sensor housing seal, grounding wire, screws, new sensor nameplate (sensor order code and serial number must be specified when ordering)		
• M20 × 1.5 cable glands	7ME6940-1RF10	
• ½ inch NPT cable glands	7ME6940-1RF15	
Transmitter conversion kit[1] for MAG 5000/6000 unit, remote mount including wall-mounting unit with cable glands (4 pcs.), SensorPROM programmed (sensor order code and serial number must be specified when ordering)		
• M20 × 1.5 cable glands	7ME6940-1RF30	
• 1½ inch NPT cable glands	7ME6940-1RF35	
Cable glands, material polyamide 4 pcs.		
• M20 × 1.5	A5E52770729	

Selection and ordering data (continued)

Description	Article No.	
• ½ inch NPT	A5E52909970	
Breathing vent, IP67		
• M20	7ME6940-1BV10	
• ½ inch NPT	7ME6940-1BV15	
Industrial microSD memory card 20 GB storage capacity	A5E53821516	
Coil / electrode cable standard type 3 × 1.5 mm², screened, PVC jacket; Temperature range -30 ... +70 °C (-22 ... +158 °F)		
• 5 m (16.4 ft)	A5E02296523	
• 10 m (33 ft)	FDK:083F0121	
• 20 m (65 ft)	FDK:083F0210	
• 30 m (98 ft)	A5E02297309	
• 40 m (131 ft)	FDK:083F0211	
• 50 m (164 ft)	A5E02297317	
• 60 m (197 ft)	FDK:083F0212	
• 100 m (328 ft)	FDK:083F0213	
• 150 m (492 ft)	FDK:083F3052	
• 200 m (656 ft)	FDK:083F3053	
• 500 m (1640 ft)	FDK:083F3054	
Electrode cable special type (empty pipe detection or low conductivity), 3 × 0.25 mm², screened single core, PVC jacket; Temperature range -30 ... +70 °C (-22 ... +158 °F)		
• 10 m (33 ft)	FDK:083F3020	
• 20 m (65 ft)	FDK:083F3095	
• 40 m (131 ft)	FDK:083F3094	
• 60 m (197 ft)	FDK:083F3093	

Selection and ordering data (continued)

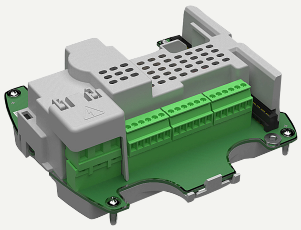
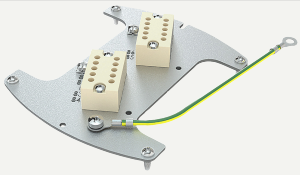
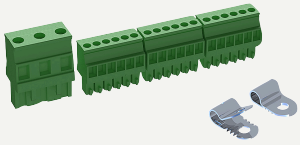
Description	Article No.	
• 100 m (328 ft)	FDK:083F3092	
• 150 m (492 ft)	FDK:083F3056	
• 200 m (656 ft)	FDK:083F3057	
• 500 m (1640 ft)	FDK:083F3058	
Sensor cable kit including coil cable standard type (3 × 1.5 mm², screened) and electrode cable special type (3 × 0.25 mm², screened single core), PVC jacket, Temperature range -30 ... +70 °C (-22 ... +158 °F)		
• 5 m (16.4 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 (131 ft)	A5E01181686	
• 50 m (164 ft)	A5E02296498	
• 60 m (197 ft)	A5E01181689	
• 100 m (328 ft)	A5E01181691	
• 150 m (492 ft)	A5E01181699	
• 200 m (656 ft)	A5E01181703	
• 500 m (1640 ft)	A5E01181705	
Potting kit for IP68 / NEMA 6P sealing of sensor terminal box	FDK:085U0220	

1) Only SITRANS FM MAG 5100W and MAG 3100 sensors, beginning with "7ME" and manufactured after 2011 are supported. Please check the sensor serial number or production date specified on the nameplate. All certificates valid for the old system (combination of sensor and transmitter), will lose their validity. The separate certificates will still be valid.

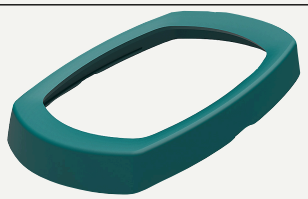
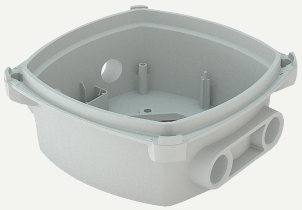
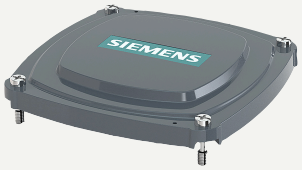
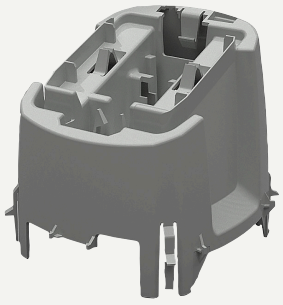
2) FMT020 with AW050 dongle is certified for RED, FCC (USA and Canada) and the certified list of countries for AW050 dongle is available on SiePortal. We expect that Compliance to local rules and regulations where the product or the dongle accessory will be used is under the responsibility of the person placing the order. Please reach out to your Regional Sales Partner to consider additional certification if needed. For additional support, please contact HQ.

Selection and ordering data (continued)

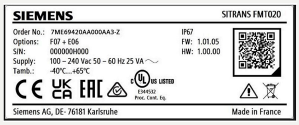
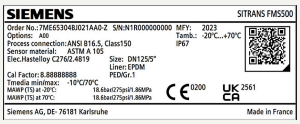
Spare parts FMT020

Description	Article No.	
Transmitter connection board with power supply (including screws, grounding wire), 1 pc.		
• 100 ... 240 V AC, 50/60 Hz	**7ME6940-1CB10**	
• 12 ... 42 V DC	**7ME6940-1CB20**	
Sensor terminal board (including screws, grounding wire), 1 pc	**A5E52775102**	
Connector set for transmitter connection board (power supply, IOs and communication) including earthing clips	**A5E52775452**	
Local display and operating unit (incl. ribbon cable and display holder), 1 pc.	**7ME6940-1DU10**	
FMT020 Sensorprom memory unit		
• Programmed 1 pc. (sensor order code and serial number must be specified when ordering)	**7ME6940-1SM10**	
• Not programmed 10 pcs.	**A5E52771927**	

Selection and ordering data (continued)

Description	Article No.	
Top housing material polycarbonate (including screws, gasket and display frame), 1 pc.	A5E52784564	
Display frame material polycarbonate, 1 pc.	A5E52771997	
Terminal box material polycarbonate (without cable glands and lid), 1 pc.	A5E52729542	
Terminal box lid material polycarbonate (including gasket), 1 pc.	A5E52729452	
Terminal box gasket 5 pcs.	A5E52729547	
Main board cover housing 1 pc.	A5E52784657	

Selection and ordering data (continued)

Description	Article No.	
Device nameplate		
• Transmitter (transmitter order code and serial number must be specified when ordering)	**A5E52864071**	
• Sensor (sensor order code and serial number must be specified when ordering)	**A5E52864088**	

Technical specifications

SITRANS FMT020 transmitter	
Measurement of	• Volume flow • Flow velocity • Electrical conductivity
Mode of operation	
Measuring principle	Electromagnetic with pulsed constant field
Empty pipe	Detection of empty pipe (electrode cable special type required in remote mounted installation)
Excitation frequency	Depends on the sensor size, please refer to "Technical specifications" for SITRANS FM sensors
Electrode input impedance	> 1 × 1014 Ω
Current output (active/passive)	
Signal range	0 ... 24 mA or 4 ... 20 mA Signal levels compliant with NAMUR NE 43 (3.8 to 20.5 mA)
Load	< 470 Ω
Resolution	< 1 µA
Accuracy	±20 µA
Temperature coefficient	< 50 ppm/K
Time constant	0.1 ... 100 s, adjustable
Digital output (active/passive)	
Frequency	0 ... 10 kHz, 50 % duty cycle (uni/bidirectional)
Pulse	40 µs ... 5 s pulse duration
Rating	
• Active operation mode	24 V DC, 30 mA, 1 kΩ ≤Ri ≤10 kΩ, short-circuit protected (powered from transmitter)
• Passive operation mode	3 ... 30 V DC, max. 110 mA, 200 Ω ≤Ri ≤10 kΩ (powered from connected supply)
Time constant	0.1 ... 100 s, adjustable
Relay output (passive)	
Type	SPDT Form C relay, potential-free change-over contacts, resistive load
Rating	2 A at 42 V AC, 1 A at 24 V DC
Durability	50 000 operations min. per relay
Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V
Rated operating conditions	
Installation environment	
• Location	Indoor/outdoor (altitude up to 2000 m)
• Installation (overvoltage) category	II
• Pollution degree	2
Ambient temperature	
• Transmitter	-40 ... +65 °C (-40 ... +149 °F) (max. humidity 98% RH)
• Display	-20 ... +60 °C (-4 ... +140 °F)
Storage temperature	
• Transmitter	-40 ... +70 °C (-58 ... +158 °F) (max. humidity 98% RH)
• Display	-40 ... +70 °C (-40 ... +158 °F)
Design	
Enclosure	
• Material	Polycarbonate

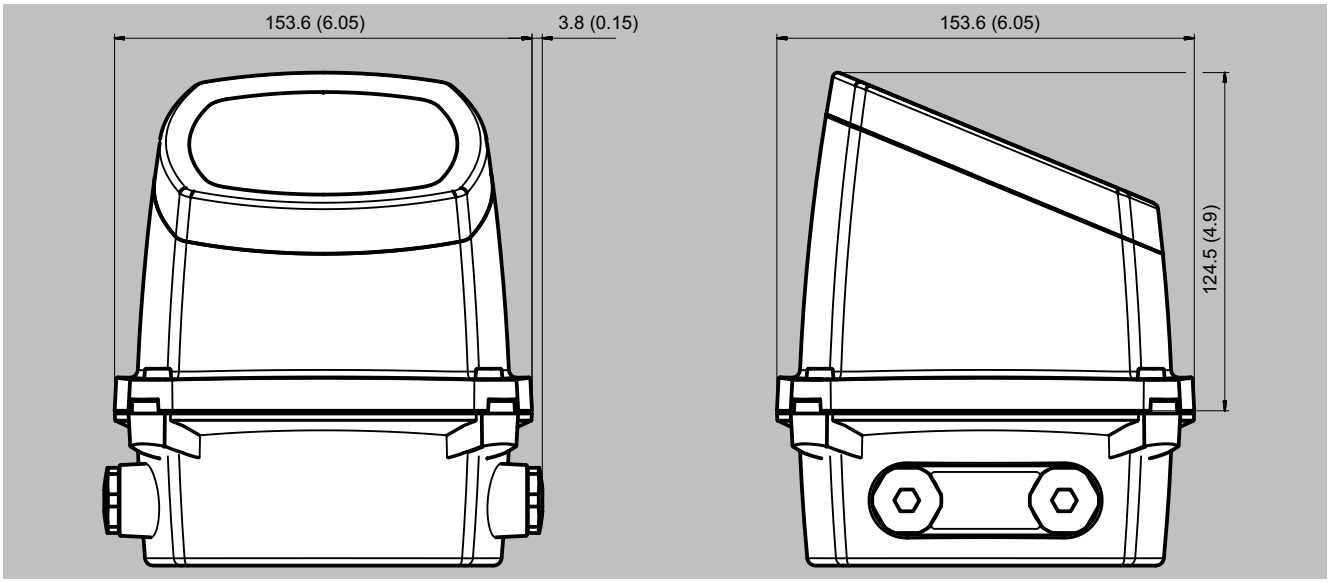
Technical specifications (continued)

SITRANS FMT020 transmitter	
• Degree of protection	IP66/67, NEMA 4X/6
Mechanical load	
Integral mount / compact version	Vibration, sinusoidal according to IEC 60068-2-6 • 2 ... 8.4 Hz, 3.5 mm peak • 8.4 ... 500 Hz, 1.0 g peak Vibration broad-band random, according to IEC 60068-2-64 • 10 ... 200 Hz, 0.003 g2/Hz • 200 ... 500 Hz, 0.001 g2/Hz • Total: 1.54 g rms
Remote version	Vibration, sinusoidal according to IEC 60068-2-6 • 2 ... 8.4 Hz, 1.5 mm peak • 8.4 ... 500 Hz, 0.7 g peak Vibration broad-band random, according to IEC 60068-2-64 • 10 ... 200 Hz, 0.003 g2/Hz • 200 ... 500 Hz, 0.001 g2/Hz • Total: 1.54 g rms
EMC performance	IEC/EN 61326-1, EN 55011 (Class A)
Dimensions	See dimensional drawings
Weight	See dimensional drawings
Display and control	
LCD display	60 × 40 mm (2.36 × 1.57 inch) LCD, 240 × 160 pixels resolution
Menu navigation	4 capacitive touch keys
Update time	Less than 1 second
Totalizers	3 × 14-digit counters for forward, net, or reverse flow
Memory card	Integrated microSD interface supporting memory cards up to 32 GB storage capacity
Power supply	
AC version	100 ... 240 V AC, 50/60 Hz, 25 VA
DC version	24 V DC ±20%, 12 W
Power consumption	
AC version	6.24 W
DC version	6.45 W
Communication	
Webserver	Web-based interface for local programming via web browser (only with PROFINET, EtherNet/IP communication)
Fieldbus	• HART 7 • PROFINET • PROFIBUS DP • PROFIBUS PA • EtherNet/IP • MODBUS RTU • MODBUS TCP/IP
Remote configuration	• EDD via SIMATIC PDM • SITRANS DTM via PACTware • EDS-AOP file
Certificates and approvals	
General purpose	• CE (LVD, EMC, RoHS), UKCA • UL, CSA certified per standard EN / IEC 61010-1
Explosion protection	• FM - Non-incendive (NI) Class I, Div 2 [1)] • ATEX / IECEx - Increased safety (Ex e) Zone 2 [1)]
Others	• Environmental Product Declaration (EPD) • EAC (Kazakhstan)

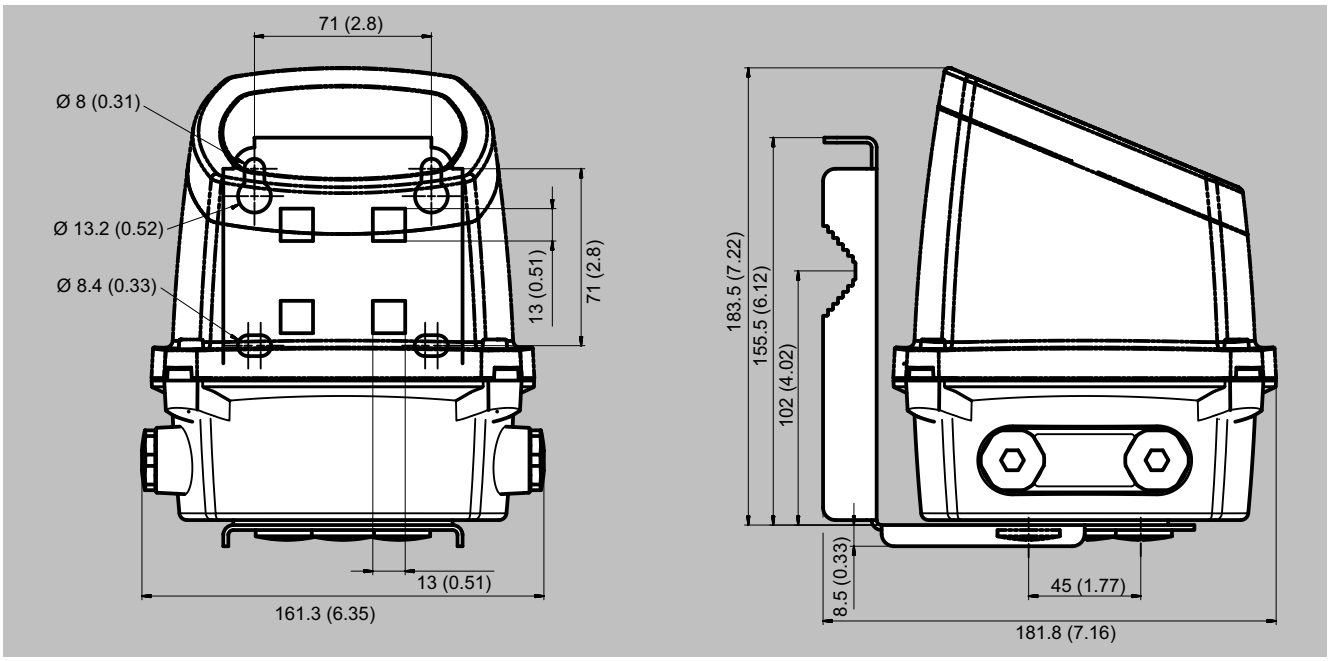
Technical specifications (continued)

1) The Ex variant is only available with IP64 protection and in remote mounting

Dimensional drawings



FMT020 transmitter integral mounted, dimensions in mm (inch)



FMT020 transmitter remote mounted, dimensions in mm (inch)