

## SITRANS FM (electromagnetic)

### Flow transmitters

#### SITRANS FMT020

##### 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
- Integrated self-verification via SIMATIC PDM and Webserver

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 DTM for FDTs (Field Device Tools).

##### Benefits

- Backwards compatible with older (up to 15 years) flow meter sensors (MAG 5100W)
- Fast start-up without zero-point adjustments
- Variety of functions for comprehensive device check, self-diagnosis, and onboard verification
- Vericator 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.

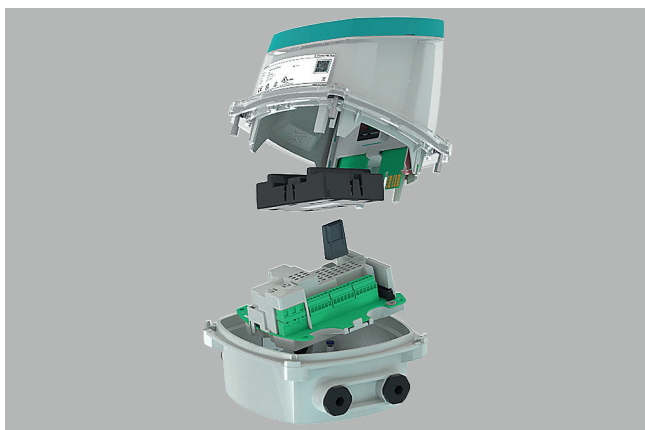
The modular design concept of the FMT020 makes it flexible to be remote connected or integral mounted with magnetic flow sensors of type SITRANS FMS500.

### 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.

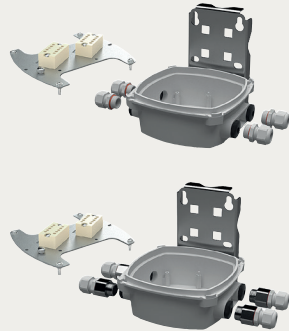
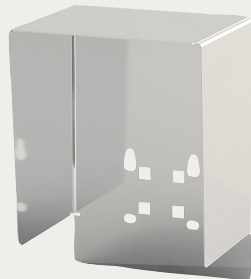


## Selection and ordering data






Transmitter SITRANS FMT020	Article No. 7ME6942- 0 A A 0 0 - 0 A A ●									
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.										
Power supply										
24 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.	
<b>General safety</b>	
CSA General Purpose	E06
<b>Communication</b>	
HART with 4...20 mA output, active or passive	F01
Modbus RTU / RS485	F04
PROFINET	F07
EtherNet/IP	F09

## Accessories FMT020

Description	Article No.	
<b>Communication add-on modules</b>		
HART with 4...20 mA output, active or passive	7ME6940-1CM10	
PROFINET	7ME6940-1CM20	
EtherNet/IP	7ME6940-1CM30	
Modbus RTU/RS485	7ME6940-1CM40	
<b>Wall-mounting unit</b> (including sensor terminal board), terminal box material polycarbonate, 1 pc. • M20 × 1.5 cable glands (4 pcs.)	7ME6940-1WU10	
• ½ inch NPT cable glands (4 pcs.)	7ME6940-1WU15	
<b>Sun shield for FMT020 transmitter, remote mount</b>	A5E01209496	

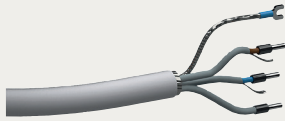
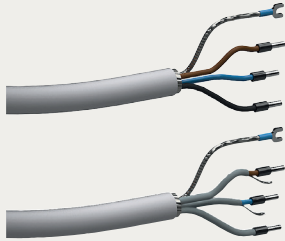

## Selection and ordering data (continued)

Description	Article No.
Sun shield for FMT020 transmitter, integral mount (compact design) Only suitable for FMS500 sensors DN 150 ... 1200 (6" ... 48")	A5E01209500 
Transmitter conversion kit <sup>1)</sup> for MAG 5000/6000 units, integral mount (compact design) including SensorPROM programmed, terminal box in polyamide, cable glands (4 pcs.), sensor housing seal, grounding wire , new sensor nameplate (sensor order code and serial numbers must be specified when ordering) <ul style="list-style-type: none"><li>M20 x 1.5 cable glands</li></ul>	7ME6940-1RF10  7ME6940-1RF15 
Transmitter conversion kit <sup>1)</sup> for MAG 5000/6000 unit, remote mount including wall-mounting unit, cable glands (4 pcs.), Sensor-PROM programmed (sensor order code and serial numbers must be specified when ordering) <ul style="list-style-type: none"><li>M20 x 1.5 cable glands</li></ul>	7ME6940-1RF30  7ME6940-1RF35 

## Selection and ordering data (continued)

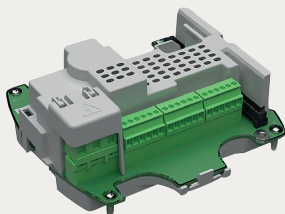
Description	Article No.	
<b>Cable glands, material polyamide</b> 4 pcs • M20 × 1.5          • ½ inch NPT	A5E52770729          A5E52909970	
<b>Industrial Micro-SD memory card</b> 8 GB storage capacity	A5E52967303	
<b>Coil / electrode cable standard type, 3 × 1.5 mm², screened, PVC jacket; Temperature range -30 ... +70 °C (-22 ... +158 °F)</b> • 5 m (16.5 ft) • 10 m (33 ft) • 20 m (65 ft) • 30 m (98 ft) • 40 m (131 ft) • 50 m (164 ft) • 60 m (197 ft) • 100 m (328 ft) • 150 m (492 ft) • 200 m (656 ft) • 500 m (1640 ft)	A5E02296523 FDK:083F0121 FDK:083F0210 A5E02297309 FDK:083F0211 A5E02297317 FDK:083F0212 FDK:083F0213 FDK:083F3052 FDK:083F3053 FDK:083F3054	
<b>Electrode cable special type</b> (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	

## Selection and ordering data (continued)

Description	Article No.	
<ul style="list-style-type: none"> <li>• 20 m (65 ft)</li> <li>• 40 m (131 ft)</li> <li>• 60 m (197 ft)</li> <li>• 100 m (328 ft)</li> <li>• 150 m (492 ft)</li> <li>• 200 m (656 ft)</li> <li>• 500 m (1640 ft)</li> </ul>	FDK:083F3095 FDK:083F3094 FDK:083F3093 FDK:083F3092 FDK:083F3056 FDK:083F3057 FDK:083F3058	
<b>Sensor cable kit</b> including coil cable standard type (3 × 1.5 mm <sup>2</sup> , screened) and electrode cable special type (3 × 0.25 mm <sup>2</sup> , screened single core), PVC jacket, Temperature range -30 ... +70 °C (-22 ... +158 °F) <ul style="list-style-type: none"> <li>• 5 m (16.5 ft)</li> <li>• 10 m (33 ft)</li> <li>• 15 m (49 ft)</li> <li>• 20 m (65 ft)</li> <li>• 25 m (82 ft)</li> <li>• 30 m (98 ft)</li> <li>• 40 m (131 ft)</li> <li>• 50 m (164 ft)</li> <li>• 60 m (197 ft)</li> <li>• 100 m (328 ft)</li> <li>• 150 m (492 ft)</li> <li>• 200 m (656 ft)</li> <li>• 500 m (1640 ft)</li> </ul>	A5E02296329 A5E01181647 A5E02296464 A5E01181656 A5E02296490 A5E02296494 A5E01181686 A5E02296498 A5E01181689 A5E01181691 A5E01181699 A5E01181703 A5E01181705	
<b>Potting kit</b> for IP68 / NEMA 6P sealing of sensor terminal box	FDK:085U0220	

<sup>1)</sup> Only SITRANS FM MAG 5100W sensors made in France are supported. Please check the sensor serial number or the country of origin specified on the name-plate.

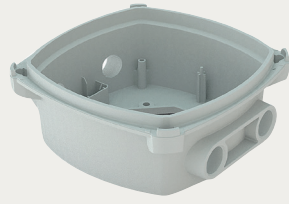
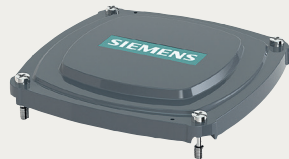

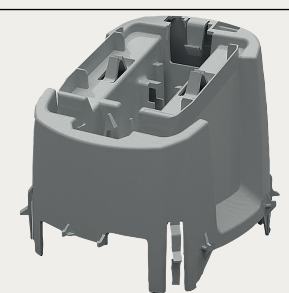
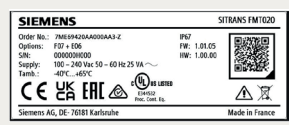
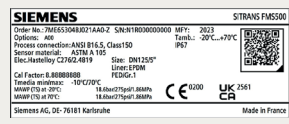
## Spare parts FMT020

Description	Article No.	
<b>Transmitter connection board with power supply</b> (including screws, grounding wire), 1 pc. <ul style="list-style-type: none"> <li>• 100 ... 240 V AC, 50/60 Hz</li> <li>• 24 V DC</li> </ul>	7ME6940-1CB10 7ME6940-1CB20	

## Selection and ordering data (continued)

Description	Article No.	
<b>Sensor terminal board</b> (including screws, grounding wire), 1 pc.	A5E52775102	
<b>Connector set for transmitter connection board</b> (power supply, IOs and communication) including earthing clips	A5E52775452	
<b>Local display and operating unit</b> (incl. ribbon cable and display holder), 1 pc.	7ME6940-1DU10	
<b>FMT020 Sensorprom memory unit</b> (sensor order code and serial numbers must be specified when ordering) <ul style="list-style-type: none"> <li>• Programmed 1 pc.</li> <li>• Not programmed 10 pcs.</li> </ul>	7ME6940-1SM10  A5E52771927	
<b>Top housing</b> (including screws, gasket and display frame), 1 pc.	A5E52784564	
<b>Display frame</b> 1 pc.	A5E52771997	

## Selection and ordering data (continued)

Description	Article No.	
<b>Terminal box</b> material polycarbonate (without cable glands and lid), 1 pc.	A5E52729542	
<b>Terminal box lid</b> material polycarbonate (including gasket), 1 pc.	A5E52729452	
<b>Terminal box gasket</b> 5 pcs.	A5E52729547	
<b>Main board cover housing</b> 1 pc.	A5E52784657	
<b>Device nameplate</b> • Transmitter	A5E52864071	
• Sensor	A5E52864088	



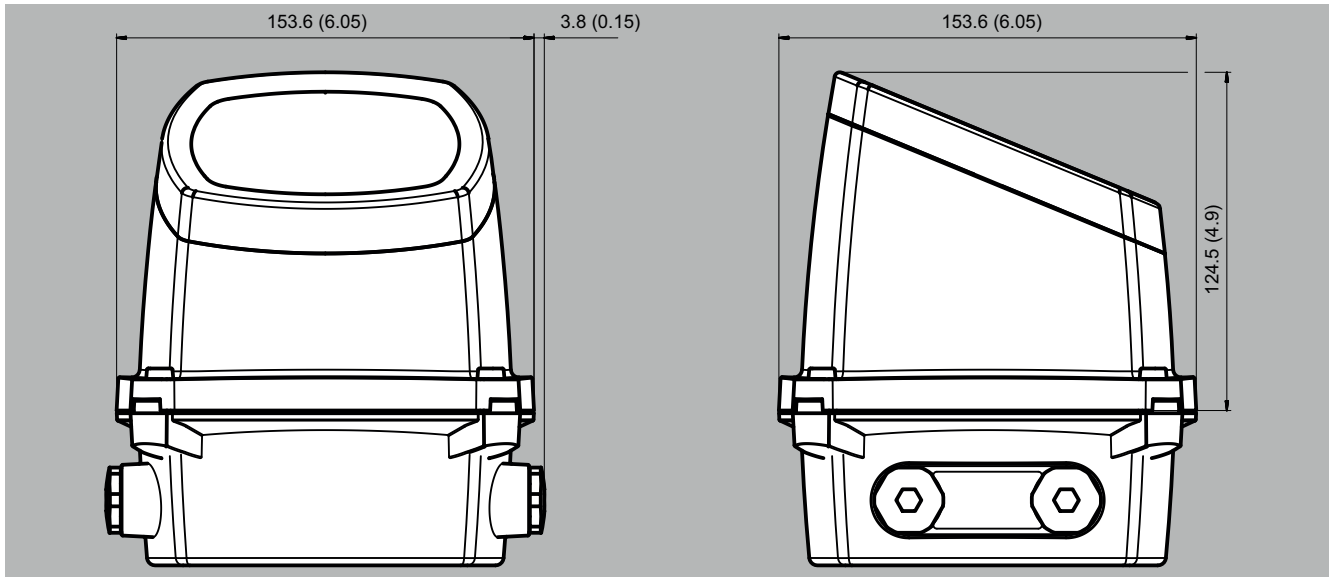
## Technical specifications

SITRANS FMT020 transmitter	
Measurement of	<ul style="list-style-type: none"> <li>• Volume flow</li> <li>• Flow velocity</li> <li>• Electrical conductivity</li> </ul>
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	$> 1 \times 10^{14} \Omega$
Current output (active/passive)	
Signal range	0 ... 20 mA or 4 ... 20 mA Signal levels compliant with NAMUR NE 43 (3.8 to 20.5 mA)
Load	$< 470 \Omega$
Resolution	$< 1 \mu A$
Accuracy	$\pm 20 \mu A$
Temperature coefficient	$< 50 \text{ ppm/K}$
Time constant	0.1 ... 100 s, adjustable
Digital output (active/passive)	
Frequency	0 ... 10 kHz, 50 % duty cycle (uni/bidirectional)
Pulse	40 $\mu s$ ... 5 s pulse duration
Rating	
• Active operation mode	24 V DC, 30 mA, $1 \text{ k}\Omega \leq R_i \leq 10 \text{ k}\Omega$ , short-circuit protected (powered from transmitter)
• Passive operation mode	3 ... 30 V DC, max. 110 mA, $200 \Omega \leq R_i \leq 10 \text{ k}\Omega$ (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 ... +80 °C (-58 ... +158 °F) (max. humidity 98% RH)
• Display	-40 ... +80 °C (-40 ... +176 °F)
Design	
Enclosure	
• Material	Polycarbonate

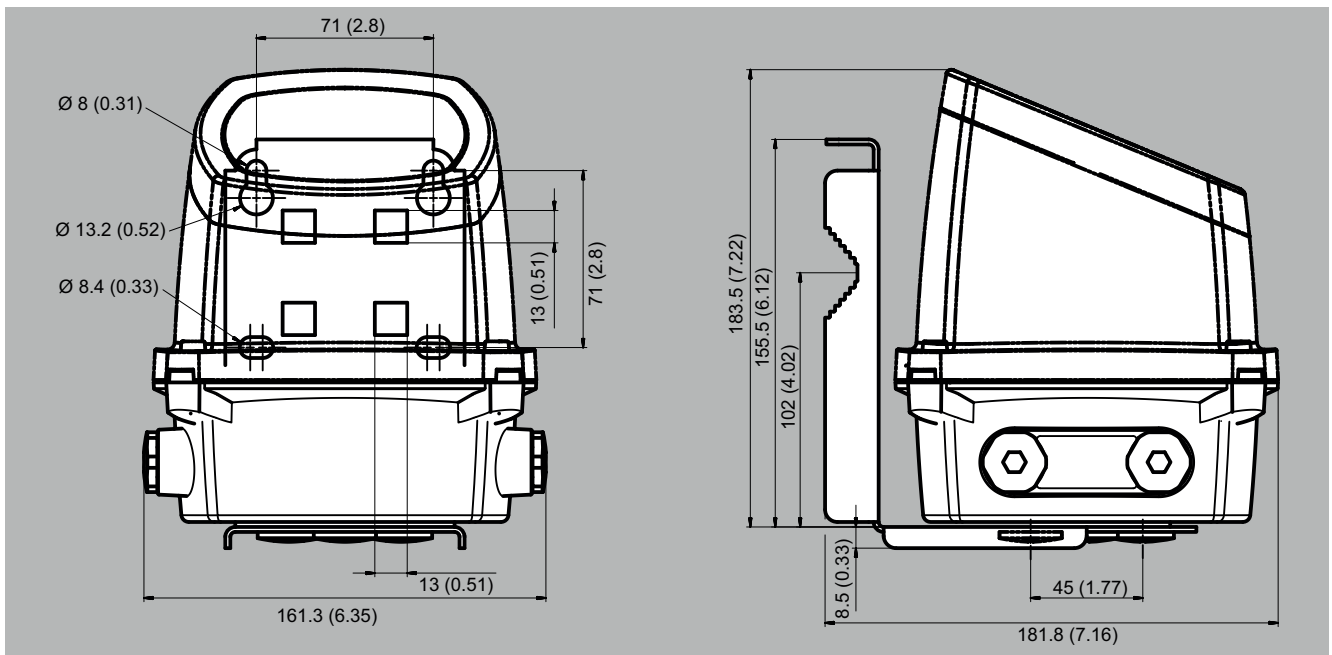
## Technical specifications (continued)

<b>SITRANS FMT020 transmitter</b>	
• Degree of protection	IP66/67, NEMA 4X/6
Mechanical load	
Integral mount / compact version	Vibration, sinusoidal according to IEC 60068-2-6 <ul style="list-style-type: none"> <li>• 2 ... 8.4 Hz, 3.5 mm peak</li> <li>• 8.4 ... 500 Hz, 1.0 g peak</li> </ul> Vibration broad-band random, according to IEC 60068-2-64 <ul style="list-style-type: none"> <li>• 10 ... 200 Hz, 0.003 g<sup>2</sup>/Hz</li> <li>• 200 ... 500 Hz, 0.001 g<sup>2</sup>/Hz</li> <li>• Total: 1.54 g rms</li> </ul>
Remote version	Vibration, sinusoidal according to IEC 60068-2-6 <ul style="list-style-type: none"> <li>• 2 ... 8.4 Hz, 1.5 mm peak</li> <li>• 8.4 ... 500 Hz, 0.7 g peak</li> </ul> Vibration broad-band random, according to IEC 60068-2-64 <ul style="list-style-type: none"> <li>• 10 ... 200 Hz, 0.003 g<sup>2</sup>/Hz</li> <li>• 200 ... 500 Hz, 0.001 g<sup>2</sup>/Hz</li> <li>• Total: 1.54 g rms</li> </ul>
EMC performance	IEC/EN 61326-1, EN 55011 (Class A)
Dimensions	See dimensional drawings
Weight	See dimensional drawings
<b>Display and control</b>	
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
<b>Memory card</b>	
	Integrated Micro-SD interface supporting memory cards up to 32 GB storage capacity
<b>Power supply</b>	
AC version	100 ... 240 V AC, 50/60 Hz, 25 VA
DC version	24 V DC ±20%, 12 W
<b>Power consumption</b>	
AC version	6.24 W
DC version	6.45 W
<b>Communication</b>	
Webserver	Web-based interface for local programming via web browser (only with PROFINET, EtherNet/IP communication)
Fieldbus	<ul style="list-style-type: none"> <li>• HART 7</li> <li>• PROFINET</li> <li>• EtherNet/IP</li> <li>• MODBUS RTU</li> </ul>
Remote configuration	<ul style="list-style-type: none"> <li>• EDD via SIMATIC PDM</li> <li>• SITRANS DTM via PACTware</li> <li>• EDS-AOP file</li> </ul>
<b>Certificates and approvals</b>	
General purpose	CE (LVD, EMC, RoHS), UKCA UL, CSA certified per standard EN / IEC 61010-1
Others	Environmental Product Declaration (EPD) EAC (Kazakhstan)

## Dimensional drawings



FMT020 transmitter integral mounted, dimensions in mm (inch)



FMT020 transmitter remote mounted, dimensions in mm (inch)