

Flow Measurement

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, 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.



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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 1/2" NPT adaptors (incl. 4 pcs 1/2" 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


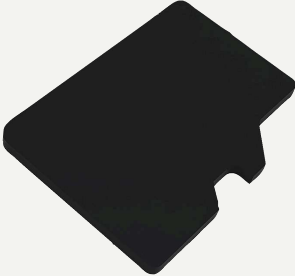


Accessories FMT020

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 AW050²⁾ (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 <ul style="list-style-type: none"> • M20 × 1.5 cable glands (4 pcs.) 	7ME6940-1WU10	
<ul style="list-style-type: none"> • 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)


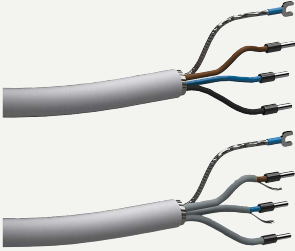

Description	Article No.	
<ul style="list-style-type: none"> • ½ inch NPT 	A5E52909970	
Breathing vent, IP67 <ul style="list-style-type: none"> • M20 • ½ inch NPT 	7ME6940-1BV10 7ME6940-1BV15	
Industrial microSD memory card 20 GB storage capacity	A5E53821516	
Coil / electrode cable standard type 3 × 1.5 mm ² , screened, PVC jacket; Temperature range -30 ... +70 °C (-22 ... +158 °F) <ul style="list-style-type: none"> • 5 m (16.4 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	
Electrode cable special type (empty pipe detection or low conductivity), 3 × 0.25 mm ² , screened single core, PVC jacket; Temperature range -30 ... +70 °C (-22 ... +158 °F) <ul style="list-style-type: none"> • 10 m (33 ft) • 20 m (65 ft) • 40 m (131 ft) • 60 m (197 ft) 	FDK:083F3020 FDK:083F3095 FDK:083F3094 FDK:083F3093	

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Selection and ordering data (continued)

Description	Article No.	
<ul style="list-style-type: none"> • 100 m (328 ft) • 150 m (492 ft) • 200 m (656 ft) • 500 m (1640 ft) 	FDK:083F3092 FDK:083F3056 FDK:083F3057 FDK:083F3058	
Sensor cable kit including coil cable standard type (3 × 1.5 mm ² , screened) and electrode cable special type (3 × 0.25 mm ² , screened single core), PVC jacket, Temperature range -30 ... +70 °C (-22 ... +158 °F)		
<ul style="list-style-type: none"> • 5 m (16.4 ft) • 10 m (33 ft) • 15 m (49 ft) • 20 m (65 ft) • 25 m (82 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) 	A5E02296329 A5E01181647 A5E02296464 A5E01181656 A5E02296490 A5E02296494 A5E01181686 A5E02296498 A5E01181689 A5E01181691 A5E01181699 A5E01181703 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. <ul style="list-style-type: none"> • 100 ... 240 V AC, 50/60 Hz • 12 ... 42 V DC 	7ME6940-1CB10 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 <ul style="list-style-type: none"> • Programmed 1 pc. (sensor order code and serial number must be specified when ordering) • Not programmed 10 pcs. 	7ME6940-1SM10 A5E52771927	

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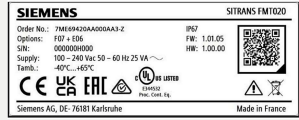
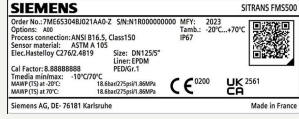
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Selection and ordering data (continued)

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 <ul style="list-style-type: none"> • Transmitter (transmitter order code and serial number must be specified when ordering) 	A5E52864071	 <p>SIEMENS SITRANS FMT020 Order No.: 7M616426AA000AA3-Z Options: F03 + E06 S/N: 0000000000 Supply: 100-240 Vac 50-60 Hz 25 VA Temp.: -40°C...+65°C IP67 FW: 1.01.05 HR: 1.00.00 CE UK ENEC ETL HE LITHIUM Siemens AG, DE-76181 Karlsruhe Made in France</p>
<ul style="list-style-type: none"> • Sensor (sensor order code and serial number must be specified when ordering) 	A5E52864088	 <p>SIEMENS SITRANS FM5500 Order No.: 7M615500B0211A02-Z S/N: N1800000000 M/FY: 2023 Options: A08 Process connection: ANSI B16.5, Class150 Sensor material: ACTM A 105 Electrode alloy: C2762.4B19 Size: DN125S1 Line: EPDM PEDIG1 Call Factor: 0.88888888 Temp. range: -10°C/20°C MAWP 17.5 at 20°C: 18.8bar/27psi/1.8MPa MAWP 17.5 at 70°C: 18.8bar/27psi/1.8MPa IP67 Temp.: -20°C...+70°C CE 0200 UK CA 2561 Siemens AG, DE-76181 Karlsruhe Made in France</p>

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Technical specifications

SITRANS FMT020 transmitter	
Measurement of	<ul style="list-style-type: none"> • Volume flow • Flow velocity • Electrical conductivity
Mode of operation Measuring principle Empty pipe Excitation frequency Electrode input impedance	Electromagnetic with pulsed constant field Detection of empty pipe (electrode cable special type required in remote mounted installation) Depends on the sensor size, please refer to "Technical specifications" for SITRANS FM sensors $> 1 \times 10^{14} \Omega$
Current output (active/passive) Signal range Load Resolution Accuracy Temperature coefficient Time constant	0 ... 24 mA or 4 ... 20 mA Signal levels compliant with NAMUR NE 43 (3.8 to 20.5 mA) $< 470 \Omega$ $< 1 \mu\text{A}$ $\pm 20 \mu\text{A}$ $< 50 \text{ ppm/K}$ 0.1 ... 100 s, adjustable
Digital output (active/passive) Frequency Pulse Rating <ul style="list-style-type: none"> • Active operation mode • Passive operation mode Time constant	0 ... 10 kHz, 50 % duty cycle (uni/bidirectional) 40 μs ... 5 s pulse duration 24 V DC, 30 mA, $1 \text{ k}\Omega \leq R_i \leq 10 \text{ k}\Omega$, short-circuit protected (powered from transmitter) 3 ... 30 V DC, max. 110 mA, $200 \Omega \leq R_i \leq 10 \text{ k}\Omega$ (powered from connected supply) 0.1 ... 100 s, adjustable
Relay output (passive) Type Rating Durability	SPDT Form C relay, potential-free change-over contacts, resistive load 2 A at 42 V AC, 1 A at 24 V DC 50 000 operations min. per relay
Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V
Rated operating conditions Installation environment <ul style="list-style-type: none"> • Location • Installation (overvoltage) category • Pollution degree Ambient temperature <ul style="list-style-type: none"> • Transmitter • Display Storage temperature <ul style="list-style-type: none"> • Transmitter • Display 	Indoor/outdoor (altitude up to 2000 m) II 2 -40 ... +65 °C (-40 ... +149 °F) (max. humidity 98% RH) -20 ... +60 °C (-4 ... +140 °F) -40 ... +70 °C (-58 ... +158 °F) (max. humidity 98% RH) -40 ... +70 °C (-40 ... +158 °F)
Design Enclosure <ul style="list-style-type: none"> • Material 	Polycarbonate

Technical specifications (continued)

SITRANS FMT020 transmitter	
<ul style="list-style-type: none"> Degree of protection 	IP66/67, NEMA 4X/6
Mechanical load	Vibration, sinusoidal according to IEC 60068-2-6
Integral mount / compact version	<ul style="list-style-type: none"> 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
Remote version	<ul style="list-style-type: none"> 10 ... 200 Hz, 0.003 g2/Hz 200 ... 500 Hz, 0.001 g2/Hz Total: 1.54 g rms Vibration, sinusoidal according to IEC 60068-2-6 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> HART 7 PROFINET PROFIBUS DP PROFIBUS PA EtherNet/IP MODBUS RTU MODBUS TCP/IP
Remote configuration	<ul style="list-style-type: none"> EDD via SIMATIC PDM SITRANS DTM via PACTware EDS-AOP file
Certificates and approvals	
General purpose	<ul style="list-style-type: none"> CE (LVD, EMC, RoHS), UKCA UL, CSA certified per standard EN / IEC 61010-1
Explosion protection	<ul style="list-style-type: none"> FM - Non-incendive (NI) Class I, Div 2 ¹⁾ ATEX / IECEx - Increased safety (Ex e) Zone 2 ¹⁾
Others	<ul style="list-style-type: none"> Environmental Product Declaration (EPD) EAC (Kazakhstan)

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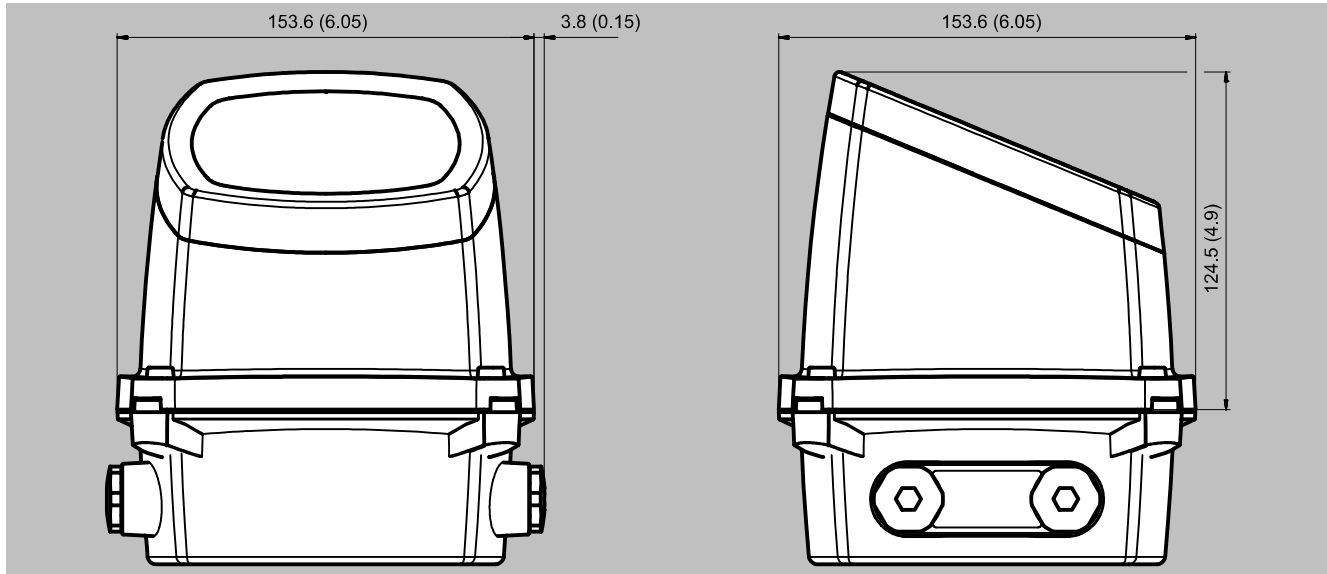
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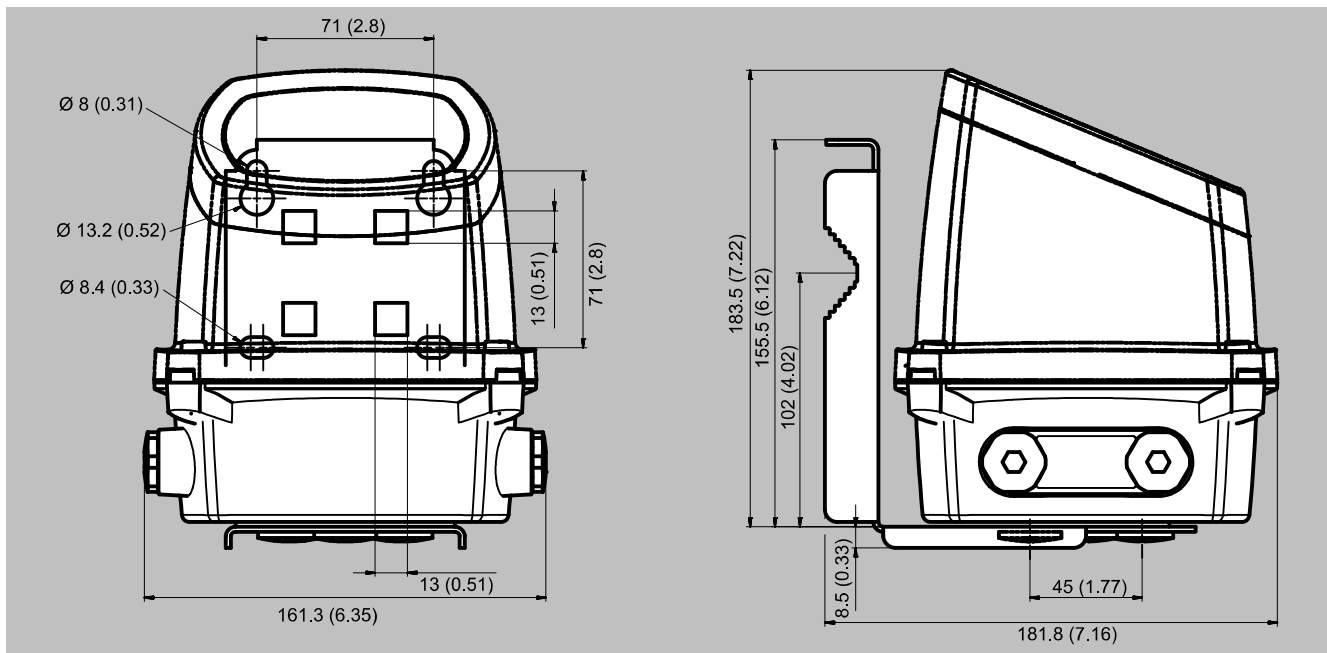
Technical specifications (continued)

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)