

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FMS500

Overview



The SITRANS FMS500 is a magnetic flowmeter sensor suitable for volume flow measurement of liquids (conductive) and is the ideal product for applications in water abstraction, wastewater treatment, water distribution networks, and irrigation.

The rugged, fully welded design supports direct burial, constant flooding and to stand up a wide range of harsh chemicals found in water-based applications in many different industries.

Designed for highly accurate measurement in low-flow conditions, these meters can measure from very low velocities up to 10 m/s, giving it a very wide measurement range.

Combined with a flowmeter transmitter it is a traditional externally powered electromagnetic flowmeter system

Application

- Water abstraction
- Water treatment
- Water distribution network (leak detection management)
- Custody transfer water meters
- Irrigation
- Waste water treatment
- Filtration plant (e.g. reverse osmosis and ultra-filtration)
- Industrial water applications

The SITRANS FMS500 with its NBR or EPDM rubber lining is a flow meter sensor for all kinds of water applications such as ground water, potable water, cooling water, wastewater, sewage, or sludge applications.

Connected to the compatible transmitter SITRANS FMT020, either mounted remotely or as a compact unit, it forms the magnetic flow meter system SITRANS FM520 which can be used in almost all general-purpose water applications.

SITRANS FM520

Perfect match for a cost-effective solution for all water and wastewater applications. Standard measuring accuracy $\pm 0.4\%$ of the actual flow rate, optional a high accuracy calibration with $\pm 0.2\%$ of flow actual rate is available.

Benefits

- Zero Up and Zero Down installation capabilities
- NBR rubber liner for all water and wastewater applications
- EPDM liner specifically for drinking water applications requiring special approvals
- Soft elastomer facing provides high abrasion resistance
- Increased low flow accuracy for water leak detection
- Rugged construction with no moving parts for maintenance-free operation over many years
- Simple on-site upgrade to IP68 of a standard sensor allowing underground installation, permanent immersion or underwater installation
- Integrated grounding electrodes – no grounding rings required for many applications
- Short delivery time
- Built-in length according to ISO 20456 (up to DN 400 mm)
- SENSORPROM™ Technology provides an automatic upload of start-up settings and calibration data for easy commissioning
- Designed to allow in-situ verification for easy performance check
- In conformity with ISO 4064, OIML R49 and EN 14154
- Custody transfer approvals for cold water billing (MI-001)

Selection and ordering data

Sensor SITRANS FMS500							Article No. 7ME653- • - • • • • • - 1 • A •							
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.														
Transmitter variant														
No transmitter (sensor only)							0							
Transmitter SITRANS FMT020							2							
Diameter														
DN 15, ½ inch								1	V					
DN 25, 1 inch								2	D					
DN 40, 1½ inch								2	R					
DN 50, 2 inch								2	Y					
DN 65, 2½ inch								3	F					
DN 80, 3 inch								3	M					
DN 100, 4 inch								3	T					
DN 125, 5 inch								4	B					
DN 150, 6 inch								4	H					
DN 200, 8 inch								4	P					
DN 250, 10 inch								4	V					
DN 300, 12 inch								5	B					
DN 350, 14 inch								5	D					
DN 400, 16 inch								5	H					
DN 450, 18 inch								5	K					
DN 500, 20 inch								5	R					
DN 600, 24 inch								5	Y					
DN 700, 28 inch								6	B					
DN 750, 30 inch								6	D					
DN 800, 32 inch								6	H					
DN 900, 36 inch								6	K					
DN 1000, 40 inch								6	R					
DN 1050, 42 inch								6	Y					
DN 1100, 44 inch								7	D					
DN 1200, 48 inch								7	H					
DN 1400, 54 inch								7	M					
DN 1500, 60 inch								7	R					
DN 1600, 66 inch								7	V					
DN 1800, 72 inch								7	Y					
DN 2000, 78 inch								8	B					
Process connection														
EN 1092-1 PN 6 flanges									A					
EN 1092-1 PN 10 flanges									B					
EN 1092-1 PN 16 flanges (PED compliant)									C					
EN 1092-1 PN 16 flanges, non-PED type of equipment (excluded from scope of PED 2014/68/EU)									D					
EN 1092-1 PN 40 flanges									F					
ANSI B16.5 Class 150 flanges									J					
AWWA C-207 Class D flanges									M					
AS 4087 PN 16 flanges									S					
JIS B 2220:2004 10K flanges									W					
Process connection material														
Carbon steel ASTM A 105 with corrosion-resistant coating acc. to EN ISO 12944 grade C4									0					
Carbon steel ASTM A 105 with corrosion-resistant coating acc. to EN ISO 12944 grade C5 (300 µm)									1					
Liner material														
EPDM									2					
NBR									3					
Electrode material														
Hastelloy C276 / 2.4819											1			
Transmitter mounting & enclosure type														
No transmitter (sensor only)												A		
Compact design (integral mount), polycarbonate enclosure												G		
Remote design, polycarbonate enclosure (wall-mounting unit and sensor terminal board included)												J		

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Selection and ordering data (continued)

Sensor SITRANS FMS500	Article No. 7ME653-									
	•	-	•	•	•	•	•	-	1	• A •
Power supply										
None (sensor only)										0
12 ... 42 V DC										2
100 ... 240 V AC, 50/60 Hz										3

1) Not concerned by PED

Additional information	Order code
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Cable glands	
Without cable glands (blind plugs)	A00
M20x1.5 cable glands, grey, material polyamide	A02
M20x1.5 cable glands, Ex, black, material polyamide	A03
1/2 inch NPT cable glands, grey, material polyamide	A05
1/2 inch NPT cable glands, Ex, black, material polyamide	A06
Certificates	
Declaration of compliance with the order 2.1 (EN 10204)	C00
Inspection certificate 3.1 (EN 10204) - Material of pressure-containing and wetted parts	C12
Test report 2.2 (EN 10204)	C14
Inspection certificate 3.1(EN 10204) - Pressure test	C18
High accuracy calibration	
High accuracy calibration +/- 0.2% of the act. vol. flow, DN ≤ 200, ≤ 8 inch	D01
High accuracy calibration +/- 0.2% of the act. vol. flow, DN 250 ... 600, 10 ... 24 inch	D02
High accuracy calibration +/- 0.2% of the act. vol. flow, DN 700 ... 1200, 28 ... 48 inch	D03
High accuracy calibration +/- 0.2% of the act. vol. flow, DN ≥ 1400, ≥ 54 inch	D04
5-point calibration	
5-point factory calibration, DN ≤ 200, ≤ 8 inch	D10
5-point factory calibration, DN 250 ... 600, 10 ... 24 inch	D11
5-point factory calibration, DN 700 ... 1200, 28 ... 48 inch	D12
5-point factory calibration, DN ≥ 1400, ≥ 54 inch	D13
10-point calibration	
10-point factory calibration, DN ≤ 200, ≤ 8 inch	D15
10-point factory calibration, DN 250 ... 600, 10 ... 24 inch	D16
10-point factory calibration, DN 700 ... 1200, 28 ... 48 inch	D17
10-point factory calibration, DN ≥ 1400, ≥ 54 inch	D18
Default matched-pair calibration	
Default matched-pair factory calibration, DN ≤ 200, ≤ 8 inch	D20
Default matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch	D21
Default matched-pair factory calibration, DN 700 ... 1200, 28 ... 48 inch	D22
Default matched-pair factory calibration, DN ≥ 1400, ≥ 54 inch	D23
5-point matched-pair calibration	
5-point, matched-pair factory calibration, DN ≤ 200, ≤ 8 inch	D25
5-point, matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch	D26
5-point, matched-pair factory calibration, DN 700 ... 1200, 28 ... 48 inch	D27
5-point, matched-pair factory calibration, DN ≥ 1400, ≥ 54 inch	D28
10-point matched-pair calibration	
10-point, matched-pair factory calibration, DN ≤ 200, ≤ 8 inch	D30
10-point, matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch	D31

Additional information	Order code
10-point, matched-pair factory calibration, DN 700 ... 1200, 28 ... 48 inch	D32
10-point, matched-pair factory calibration, DN ≥ 1400, ≥ 54 inch	D33
Accredited ISO/IEC 17025 calibration	
ISO/IEC 17025 accredited, 5-point, matched-pair factory calibration, DN ≤ 200, ≤ 8 inch	D35
ISO/IEC 17025 accredited, 5-point, matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch	D36
ISO/IEC 17025 accredited, 5-point, matched-pair factory calibration, DN 700 ... 1200, 28 ... 48 inch	D37
ISO/IEC 17025 accredited, 5-point, matched-pair factory calibration, DN ≥ 1400, ≥ 54 inch	D38
FM-Fire Service	
Vds	D40
General safety	
CSA General Purpose	E06
Explosion protection	
ATEX (Europe) & IECEx (World)	E20
FM (USA & Canada)	E22
IECEx (World)	E23
Country specific approvals	
CRN (Canadian Reg. Number)	E70
CPA (China)	E75
FP2A (France)	E76
Drinking water approvals	
WRAS (WRc, BS 6920, GB)	E80
NSF/ANSI 61 (Cold water, US)	E81
ACS (France)	E82
Compliance to Trinkwasserverordnung §14 (Germany)	E83
Belgaqua (Belgium)	E84
AS/NZS 4020 (Australia/New Zealand)	E85
GB/T 5750 (China)	E86
KIWA (Netherlands)	E87
General purpose / Without drinking water approval	E89
Country of origin	
France	E90
Communication	
HART with 4 ... 20 mA output, active or passive	F01
Modbus RTU / RS485	F04
PROFIBUS PA	F05
PROFIBUS DP	F06
PROFINET	F07
EtherNet/IP	F09
MODBUS TCP/IP	F10
I/O extension	
Digital input / output, passive	F30
Custody transfer approval	
Without approval	G00
MI-001 cold water meter	G01
OIML R49 - Class 2 accuracy	G05
OIML R49 - Class 1 accuracy	G06

Selection and ordering data (continued)

Additional information	Order code
MI-001 - OIML R49 verification	
No initial verification, without certification, default factory calibration for DN 50 ... 300, 2 ... 12 inch	G10
Dynamic range Q3/Q1 = 40 DN 50 ... 300, 2 ... 12 inch	G11
Dynamic range Q3/Q1 = 80 DN 50 ... 300, 2 ... 12 inch	G13
Dynamic range Q3/Q1 = 160 DN 50 ... 300, 1 ... 12 inch	G16
Dynamic range Q3/Q1 = 200 DN 50 ... 300, 2 ... 12 inch	G17
Dynamic range Q3/Q1 = 400 DN 50 ... 300, 2 ... 12 inch	G20
No initial verification, without certification default factory calibration for DN 350 ... 600, 14 ... 24 inch	G30
Dynamic range Q3/Q1 = 40; DN 350 ... 600, 14 ... 24 inch	G31
Dynamic range Q3/Q1 = 80; DN 350 ... 600, 14 ... 24 inch	G33
Dynamic range Q3/Q1 = 160; DN 350 ... 600, 14 ... 24 inch	G36
Dynamic range Q3/Q1 = 200; DN 350 ... 600, 14 ... 24 inch	G37
Dynamic range Q3/Q1 = 400; DN 350 ... 600, 14 ... 24 inch	G40
No initial verification, without certification default factory calibration for DN 700 ... 1200, 28 ... 48 inch	G50
Dynamic range Q3/Q1 = 40; DN 700 ... 1200, 28 ... 48 inch	G51
Dynamic range Q3/Q1 = 80; DN 700 ... 1200, 28 ... 48 inch	G53
Dynamic range Q3/Q1 = 125; DN 700 ... 1200, 28 ... 48 inch	G55
Dynamic range Q3/Q1 = 160; DN 700 ... 1200, 28 ... 48 inch	G56
No initial verification, without certification, default factory calibration for DN 1400 ... 2000, 54 ... 78 inch	G60
Dynamic range Q3/Q1 = 40; DN 1400 ... 2000, 54 ... 78 inch	G61
Dynamic range Q3/Q1 = 80; DN 1400 ... 2000, 54 ... 78 inch	G63
Device options	
Sensor terminal board factory mounted	J00
Sensor cables factory mounted	J01
Factory preconfigured for transmitter mounting in compact design (integral mount)	J02
Display with protection cover	J03
Breathing vent M20 thread, IP67	J04
Breathing vent ½" NPT thread, IP67	J05
Industrial Micro-SD memory card, 20 GB storage capacity	J06
Nameplate in Chinese language	J20
Type of Ex protection	
Increased safety (Ex e) Zone 2	L12
Non-incendive (NI) Class I, Division 2	L15
Type of protection (IP)	
IP68 (NEMA 6P) protection class for sensor and transmitter, without potting (to 2 m depth, 10 days)	L50
IP68 (NEMA 6P) protection class for sensor in remote design, factory potted (to 10 m depth, continuously)	L51
PED options	
Not compliant to PED Cat I/II/III, approved for use under 2014/68/EU Art. 1 §2	P30
Sensor cables	
Cable kit with coil and electrode cable, standard type (3 × 1.5 mm ²), PVC jacket	
• 5 m (16 ft)	T00
• 10 m (33 ft)	T01
• 20 m (65 ft)	T03
• 30 m (98 ft)	T05
• 40 m (131 ft)	T06
• 50 m (164 ft)	T07
• 60 m (197 ft)	T08

Additional information	Order code
• 100 m (328 ft)	T11
• 150 m (492 ft)	T14
• 200 m (656 ft)	T16
• 500 m (1640 ft)	T18
Cable kit with coil cable standard type (3 × 1.5 mm ²) and electrode cable special type (3 × 0.25 mm ²), PVC jacket	
• 5 m (16 ft)	T50
• 10 m (33 ft)	T51
• 15 m (49 ft)	T52
• 20 m (65 ft)	T53
• 25 m (82 ft)	T54
• 30 m (98 ft)	T55
• 40 m (131 ft)	T56
• 50 m (164 ft)	T57
• 60 m (197 ft)	T58
• 100 m (328 ft)	T61
• 150 m (492 ft)	T64
• 200 m (656 ft)	T66
• 500 m (1640 ft)	T68
Device settings	
Measuring range: Upper range value for analog and frequency output (Q _{max}), unit, analog output is activated	Y01
Current output damping	Y02
Current output signal range (Default setting: 4 ... 20 mA NAMUR)	Y03
Low flow cut off	Y04
Flow direction (Default setting: Positive)	Y05
Empty pipe detection (Default setting: Off)	Y06
Mains frequency (Default setting: 50 Hz)	Y07
Operation language display (Default setting English)	Y24
Device address (PROFIBUS 0 ... 125)	Y25
Device identification	
Stainless steel TAG shield for transmitter, line 1, max. 32 characters	Y11
Stainless steel TAG shield for transmitter, line 2, max. 32 characters	Y12
TAG adhesive label for transmitter, line 1, max. 32 characters	Y13
TAG adhesive label for transmitter, line 2, max. 32 characters	Y14
Stainless steel TAG shield for sensor, line 1, max. 32 characters	Y15
Stainless steel TAG shield for sensor, line 2, max. 32 characters	Y16
TAG adhesive label for sensor, line 1, max. 32 characters	Y18
TAG adhesive label for sensor, line 2, max. 32 characters	Y19
Totalizer 1 settings	
Preset value	Y30
Unit (Default setting: m ³)	Y31
Direction (Default setting: Forward counting)	Y32
Failure mode (Default setting: Stop counting)	Y33
Decimal places (Default setting: 2)	Y34
Totalizer 2 settings	
Preset value	Y35
Unit (Default setting: m ³)	Y36

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Additional information	Order code
Direction (Default setting: Backward counting)	Y37
Failure mode (Default setting: Stop counting)	Y38
Decimal places (Default setting: 2)	Y39
Totalizer 3 settings	
Preset value	Y40
Unit (Default setting: m ³)	Y41

Additional information	Order code
Direction (Default setting: Forward / backward counting, net)	Y42
Failure mode (Default setting: Stop counting)	Y43
Decimal places (Default setting: 2)	Y44
Pulse output settings	
Volume per pulse	Y50
Pulse width	Y51

Technical specifications

SITRANS FMS500 flowmeter sensor	
Product characteristic	For demanding applications in the water & wastewater industry
Measurement of	Volume flow, flow velocity, electrical conductivity
Nominal diameter	Coned sensor (octagon liner): DN 15 ... 40 (½" ... 1½") Coned sensor: DN 50 ... 300 (2" ... 12") Full bore sensor: DN 350 ... 2000 (14" ... 78")
Mode of operation	
Measuring principle	Electromagnetic induction
Medium conductivity	Liquids with an electrical conductivity ≥ 5 µS/cm
Excitation frequency (mains supply: 50 Hz / 60 Hz)	DN 15 ... 65 (½" ... 2½"): 12.5 Hz / 15 Hz DN 80 ... 150 (3" ... 6"): 6.25 Hz / 7.5 Hz DN 200 ... 300 (8" ... 12"): 3.125 Hz / 3.75 Hz DN 350 ... 2000 (14" ... 78"): 1.5625 Hz / 1.875 Hz
Performance characteristics	
Electrical conductivity	Repeatability: Max. ±5 % of measured value ²⁾
Process connection	
Flanges ¹⁾	
• EN 1092-1	PN 6 (87 psi): Raised face DN 1400 ... 2000 (54" ... 78") PN 10 (145 psi) Flat face DN 200 ... 300 (8" ... 12") PN 10 (145 psi) Raised face DN 350 ... 2000 (14" ... 78") PN 16 (232 psi) Flat face DN 50 ... 300 (2" ... 12") PN 16 (232 psi) Raised face DN 350 ... 1200 (14" ... 48") PN 40 (580 psi) Flat face DN 15 ... 40 (½" ... 1½")
• ANSI B16.5	Class 150 Flat face ½" ... 12" Class 150 Raised face 14" ... 24"
• AWWA C-207	Class D Flat face 28 ... 80"
• AS/NZS 4087	PN 16 (232 psi) Flat face DN 50 ... 300 (2" ... 12") PN 16 (232 psi) Raised face DN 350 ... 1200 (14" ... 48")
• JIS B 2220:2004	10K DN 15 ... 600 (1" ... 24")
Rated operating conditions	
Ambient temperature	
• Sensor	-20 ... +70 °C (-4 ... +158 °F)
• Compact with transmitter	-20 ... +65 °C (-4 ... +149 °F)
Operating pressure (maximum operating pressure depending on flange type)	DN 15 ... 40 (1/2" ... 1½"): 0.01 bara... 40 barg (0.15 psia... 580 psig) DN 50 ... 300 (2" ... 12"): 0.03 bara... 20 barg (0.44 psia... 290 psig) DN 350 ... 1200 (14" ... 48"): 0.01 bara... 16 barg (0.15 psia... 232 psig) DN 1400 ... 2000 (54" ... 78"): 0.01 bara... 10 barg (0.15 psia... 145 psig)
Protection class	
• Standard	IP66/67, NEMA 4X/6
• Optional	IP68 and NEMA 6P (2 m, 10 days) for sensor in compact (integral mount) and remote design IP68 and NEMA 6P (10 m, continuously) for sensor in remote design
Mechanical load (vibration)	

Technical specifications (continued)

SITRANS FMS500 flowmeter sensor									
Integral mount / compact version	Vibration, sinusoidal according to IEC 60068-2-6 2 ... 4 Hz, 3.5 mm peak 8.4 ... 500 Hz, 1 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 <table border="1"> <tr> <td>Sensor</td><td>Transmitter</td></tr> <tr> <td> 2 ... 8.4 Hz, 7.5 mm peak 8.4 ... 500 Hz, 2 g peak </td><td> 2 ... 8.4 Hz, 1.5 mm peak 8.4 ... 500 Hz, 0.7 g peak </td></tr> </table> Vibration broad-band random, according to IEC 60068-2-64 <table border="1"> <tr> <td>Sensor</td><td>Transmitter</td></tr> <tr> <td> 10 ... 200 Hz, 0.01 g²/Hz 200 ... 500 Hz, 0.003 g²/Hz - Total: 1.54 g rms </td><td> 10 ... 200 Hz, 0.003 g²/Hz 200 ... 500 Hz, 0.001 g²/Hz - Total: 1.54 g rms </td></tr> </table>	Sensor	Transmitter	2 ... 8.4 Hz, 7.5 mm peak 8.4 ... 500 Hz, 2 g peak	2 ... 8.4 Hz, 1.5 mm peak 8.4 ... 500 Hz, 0.7 g peak	Sensor	Transmitter	10 ... 200 Hz, 0.01 g²/Hz 200 ... 500 Hz, 0.003 g²/Hz - Total: 1.54 g rms	10 ... 200 Hz, 0.003 g²/Hz 200 ... 500 Hz, 0.001 g²/Hz - Total: 1.54 g rms
Sensor	Transmitter								
2 ... 8.4 Hz, 7.5 mm peak 8.4 ... 500 Hz, 2 g peak	2 ... 8.4 Hz, 1.5 mm peak 8.4 ... 500 Hz, 0.7 g peak								
Sensor	Transmitter								
10 ... 200 Hz, 0.01 g²/Hz 200 ... 500 Hz, 0.003 g²/Hz - Total: 1.54 g rms	10 ... 200 Hz, 0.003 g²/Hz 200 ... 500 Hz, 0.001 g²/Hz - Total: 1.54 g rms								
Process temperature - NBR liner - EPDM liner	-10 ... +70 °C (14 ... 158 °F) -10 ... +70 °C (14 ... 158 °F)								
Pressure drop	DN 15 and 25 (½" and 1"): Max. 20 mbar (0.29 psi) at 1 m/s (3 ft/s) DN 40 ... 300 (1½" ... 12"): Max. 25 mbar (0.36 psi) at 3 m/s (10 ft/s) DN 350 ... 2000 (14" ... 78"): Insignificant								
Test pressure	1.5 × PN (where applicable)								
Design									
Dimensions	See dimensional drawings								
Weight	See dimensional drawings								
Material									
Housing and flanges	Carbon steel ASTM A 105 with corrosion resistant coating of Class C4 or C5 (durability up to 15 years) EN ISO 12944								
Measuring electrode	Hastelloy C276 / 2.4819								
Grounding electrode	Hastelloy C276 / 2.4819								
Measuring tube ²⁾	Stainless steel AISI 304 / 1.4301								
Terminal box	Polycarbonate								
Cable entries	4 × metric thread (size M20 × 1.5)								
Calibration									
Standard	Zero-point, 2 × 25 % and 2 × 90 %								
Optional	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max} - Matched pair calibration: default, 5-point or 10-point - ISO/IEC 17025 accredited, 5-point, matched-pair calibration								
Certificates and approvals									
General purpose	CE (LVD, PED, EMC, RoHS), UKCA								
Drinking water	EPDM: - WRAS (WRc, BS 6920 material approval for cold water, GB) - NSF/ANSI Standard 61 (Cold water, US) - ACS listed (France) - Compliance to Trinkwasserverordnung §14 (Germany) - Belgaqua (Belgium) - AS/NZS 4020 (Australia/New Zealand) - GB/T 5750 (China)								

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Technical specifications (continued)

SITRANS FMS500 flowmeter sensor

Custody transfer	• MI-001 cold water (EU): DN 50 ... 2000 (2 ... 78 inch)
Explosion protection	• FM - Non-incendive (NI) Class I, Division 2 ^{4), 5)} • ATEX / IECEx - Increased safety (Ex e) Zone 2 ^{4), 5)}
Others	• Environmental Product Declaration (EPD) • MCERTS (GB environmental) • EAC (Kazakhstan)

¹⁾ DN 750, DN 1050 and DN 1100 (30", 42" and 44") not available with EN 1092-1 (PN 10 and PN 16) and AS 4087 flanges

²⁾ The value applies for measurement between 15 µS/cm and 5000 µS/cm at a reference temperature of 25 °C (77 °F)

³⁾ DN > 300 (12")

⁴⁾ The Ex variant is only available with IP64 protection and in remote mounting

⁵⁾ Only allowed with flexible conduits

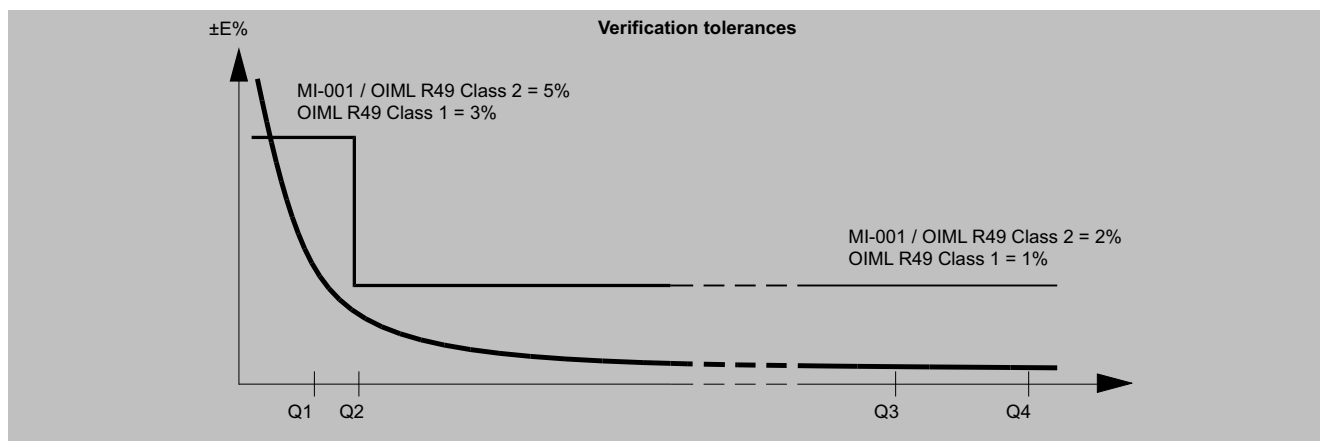
FMS500 (7ME653) with FMT020 (7ME694)

The FM520 water meter, which combines the FMS500 sensor and FMT020 transmitter, is EU-type approved according to MID Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on Measuring Instruments (Annex III – Water Meters MI-001). It also meets OIML R49 recommendations for Class 1 and 2 (Water meters for cold potable water and hot water).

Extensive testing has ensured its superior measurement accuracy, even under challenging inlet and outlet conditions. This allows for

flexible installation in tight spaces without the need for pipe re-routing, as the FMS500 functions as a OD/OD device for both Class 1 and Class 2 accuracy, requiring no inlet or outlet sections.

Furthermore, while primarily a cold water meter, the FM520 has been rigorously tested and passed at temperatures up to 50 °C (122 °F), including 30 °C (86 °F). This robust performance means it can be used for custody transfer (CT) purposes up to 50 °C (122 °F).



G00 - Without custody transfer approval

Order code: G10

Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
UxDx	0 x DN								
Orientation	All orientations								
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600

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Technical specifications (continued)

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G11									
Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
UxDx	0 × DN								
Orientation	All orientations								
"R" Q3/Q1	40	40	40	40	40	40	40	40	40
Q4 [m³/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600
Q2 [m³/h]	2.52	4	6.40	10	16	25.20	40	64	64
Q1 [m³/h]	1.58	2.50	4	6.25	10	15.75	25	40	40

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G13									
Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
UxDx	0 × DN								
Orientation	All orientations								
"R" Q3/Q1	80	80	80	80	80	80	80	80	80
Q4 [m³/h]	78.75	125	200	312.50	500	787.50	1250	2000	2000
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600
Q2 [m³/h]	1.26	2	3.20	5	8	12.60	20	32	32
Q1 [m³/h]	0.79	1.25	2	3.13	5	7.88	12.50	20	20

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G16									
Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
UxDx	0 × DN								
Orientation	All orientations								
"R" Q3/Q1	160	160	160	160	160	160	160	160	160
Q4 [m³/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600
Q2 [m³/h]	0.63	1	1.60	2.50	4	6.3	10	16	16
Q1 [m³/h]	0.39	0.63	1	1.56	2.5	3.94	6.25	10	10

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G17									
Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
UxDx	0 × DN								
Orientation	All orientations								
"R" Q3/Q1	200	200	200	200	200	200	200	200	200
Q4 [m³/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600
Q2 [m³/h]	0.5	0.8	1.28	2	3.2	5.04	8.00	12.8	12.8
Q1 [m³/h]	0.32	0.5	0.8	1.25	2	3.15	5.00	8	8

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FMS500

Technical specifications (continued)

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G20									
Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
UxDx	0 × DN								
Orientation	All orientations								
"R" Q3/Q1	400	400	400	400	400	400	400	400	400
Q4 [m³/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600
Q2 [m³/h]	0.25	0.4	0.64	1	1.6	2.52	4	6.4	6.4
Q1 [m³/h]	0.16	0.25	0.4	0.63	1	1.58	2.5	4	4

G00 - Without custody transfer approval Order code: G30					
Size	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
UxDx	0 × DN				
Orientation	Horizontal and vertical				
Q3 [m³/h]	2500	4000	4000	6300	6300

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G31					
Size	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
UxDx	0 × DN				
Orientation	Horizontal and vertical				
"R" Q3/Q1	40	40	40	40	40
Q4 [m³/h]	3125	5000	5000	7875	7875
Q3 [m³/h]	2500	4000	4000	6300	6300
Q2 [m³/h]	100	160	160	252	252
Q1 [m³/h]	62.5	100	100	157.5	157.5

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G33					
Size	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
UxDx	0 × DN				
Orientation	Horizontal and vertical				
"R" Q3/Q1	80	80	80	80	80
Q4 [m³/h]	3125	5000	5000	7875	7875
Q3 [m³/h]	2500	4000	4000	6300	6300
Q2 [m³/h]	50	80	80	126	126
Q1 [m³/h]	31.25	50	50	78.75	78.75

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G36					
Size	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
UxDx	0 × DN				
Orientation	Horizontal and vertical				
"R" Q3/Q1	160	160	160	160	160
Q4 [m³/h]	3125	5000	5000	7875	7875
Q3 [m³/h]	2500	4000	4000	6300	6300
Q2 [m³/h]	25	40	40	63	63
Q1 [m³/h]	15.63	25	25	39.38	39.38

Technical specifications (continued)

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G37						
Size	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")	
UxDx	0 × DN					
Orientation	Horizontal and vertical					
"R" Q3/Q1	200	200	200	200	200	
Q4 [m³/h]	3125	5000	5000	7875	7875	
Q3 [m³/h]	2500	4000	4000	6300	6300	
Q2 [m³/h]	20	32	32	50.40	50.40	
Q1 [m³/h]	12.50	20	20	31.50	31.50	

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G40						
Size	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")	
UxDx	0 × DN					
Orientation	Horizontal and vertical					
"R" Q3/Q1	400	400	400	400	400	
Q4 [m³/h]	3125	5000	5000	7875	7875	
Q3 [m³/h]	2500	4000	4000	6300	6300	
Q2 [m³/h]	10	16	16	25.20	25.20	
Q1 [m³/h]	6.25	10	10	15.75	15.75	

G00 - Without custody transfer approval Order code: G50						
Size	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
UxDx	0 × DN					
Orientation	Horizontal and vertical					
Q3 [m³/h]	6300	6300	6300	10000	10000	10000

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G51						
Size	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
UxDx	0 × DN					
Orientation	Horizontal and vertical					
"R" Q3/Q1	40	40	40	40	40	40
Q4 [m³/h]	7875	7875	7875	12500	12500	12500
Q3 [m³/h]	6300	6300	6300	10000	10000	10000
Q2 [m³/h]	252	252	252	400	400	400
Q1 [m³/h]	157.5	157.5	157.5	250	250	250

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G53						
Size	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
UxDx	0 × DN					
Orientation	Horizontal and vertical					
"R" Q3/Q1	80	80	80	80	80	80
Q4 [m³/h]	7875	7875	7875	12500	12500	12500
Q3 [m³/h]	6300	6300	6300	10000	10000	10000
Q2 [m³/h]	126	126	126	200	200	200
Q1 [m³/h]	78.75	78.75	78.75	125	125	125

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FMS500

Technical specifications (continued)

G06 - OIML R49 Class 1 Order code: G55						
Size	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
UxDx	0 x DN					
Orientation	Horizontal and vertical					
"R" Q3/Q1	125	125	125	125	125	125
Q4 [m³/h]	7875	7875	7875	12500	12500	12500
Q3 [m³/h]	6300	6300	6300	10000	10000	10000
Q2 [m³/h]	80.64	80.64	80.64	128	128	128
Q1 [m³/h]	50.4	50.40	50.40	80	80	80

G01 - MI-001 G05 - OIML R49 Class 2 Order code: G56						
Size	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
UxDx	0 x DN					
Orientation	Horizontal and vertical					
"R" Q3/Q1	160	160	160	160	160	160
Q4 [m³/h]	7875	7875	7875	12500	12500	12500
Q3 [m³/h]	6300	6300	6300	10000	10000	10000
Q2 [m³/h]	63	63	63	100	100	100
Q1 [m³/h]	39.375	39.38	39.38	62.50	62.50	62.50

G00 - Without custody transfer approval Order code: G60					
Size	DN 1400 (54")	DN 1500 (60")	DN 1600 (66")	DN 1800 (72")	DN 2000 (78")
UxDx	0 x DN				
Orientation	Horizontal				
Q3 [m³/h]	10000	10000	10000	10000	10000

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G61					
Size	DN 1400 (54")	DN 1500 (60")	DN 1600 (66")	DN 1800 (72")	DN 2000 (78")
UxDx	0 x DN				
Orientation	Horizontal				
"R" Q3/Q1	40	40	40	40	40
Q4 [m³/h]	12500	12500	12500	12500	12500
Q3 [m³/h]	10000	10000	10000	10000	10000
Q2 [m³/h]	400	400	400	400	400
Q1 [m³/h]	250	250	250	250	250

G01 - MI-001 G05 - OIML R49 Class 2 G06 - OIML R49 Class 1 Order code: G63					
Size	DN 1400 (54")	DN 1500 (60")	DN 1600 (66")	DN 1800 (72")	DN 2000 (78")
UxDx	0 x DN				
Orientation	Horizontal				
"R" Q3/Q1	80	80	80	80	80
Q4 [m³/h]	12500	12500	12500	12500	12500
Q3 [m³/h]	10000	10000	10000	10000	10000
Q2 [m³/h]	200	200	200	200	200
Q1 [m³/h]	125	125	125	125	125

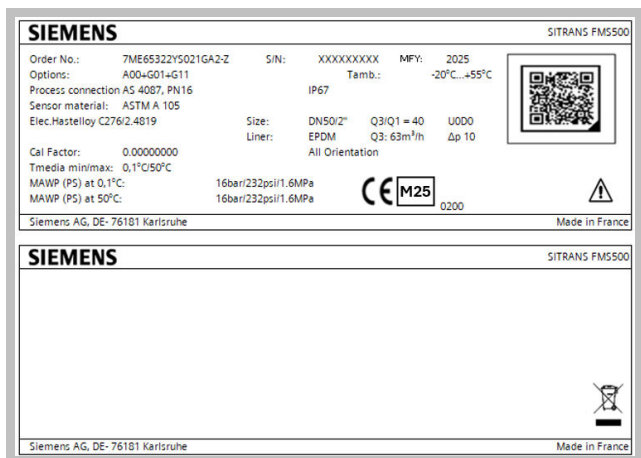
Flow Measurement

SITRANS FM (electromagnetic)

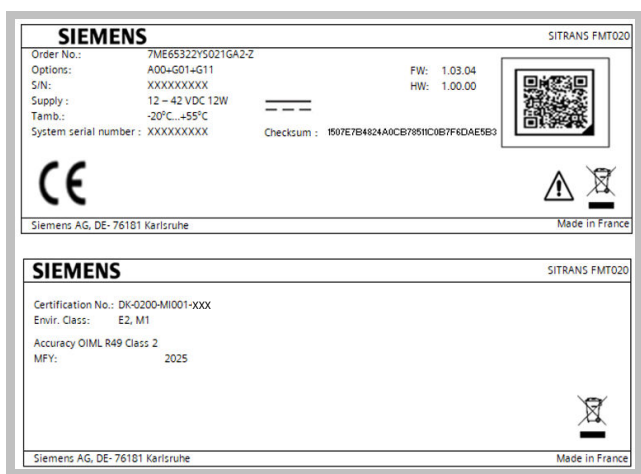
Flow sensors / SITRANS FMS500

Technical specifications (continued)

The following label is placed on the sensor terminal box and on the transmitter housing. An example of the product label is shown below:



Sensor label



Transmitter label

FM520 approvals are valid for:

Sizes	DN 50 ... 2000 (2" ... 78")
Performance range	R400 Class 2 & Class 1
Installation	- All orientation for DN 50 ... 300 (2 ... 12") - Horizontal and vertical for DN 350 ... 1200 (14 ... 48") - Horizontal for DN 1400 ... 2000 (54 ... 78") - Compact or remote with max. 500 m cable - Approved for forward metering but also designed to be used in reverse
Sensitivity class	U0D0 (The meter requires 0xD straight pipe upstream and 0xD straight pipe downstream from the sensor)
Temperature class	- T30 (0.1 ... 30 °C) - T50 (0.1 ... 50 °C)
Pressure	MAWP 16 (Maximum Allowable Working Pressure)
Electromagnetic class	E2
Mechanical class	M1, Class B and O (building and outdoors)
Climatic class	-20 ... 55 °C (-4 ... 131 °F)
Power supply	12 ... 42 V DC, 12 W 100 ... 240 V AC, 50 ... 60 Hz, 25 VA
Software	Designed according to WELMEC 7.2
Communication modules ¹⁾	HART, PROFINET, MODBUS and EtherNet/IP have been certified and can only be used where national regulations permit it. The reading of ancillary devices may be used for testing and verification and for remote reading of the water meter.

¹⁾ Communication module need to be ordered together with the system (FM520), a retrofit of the communication module is not possible since it would break the CT seals.

Special MI-001 settings:

- Unit: m³
- Low flow cut-off: 9 mm/s
- Digital output: pulses

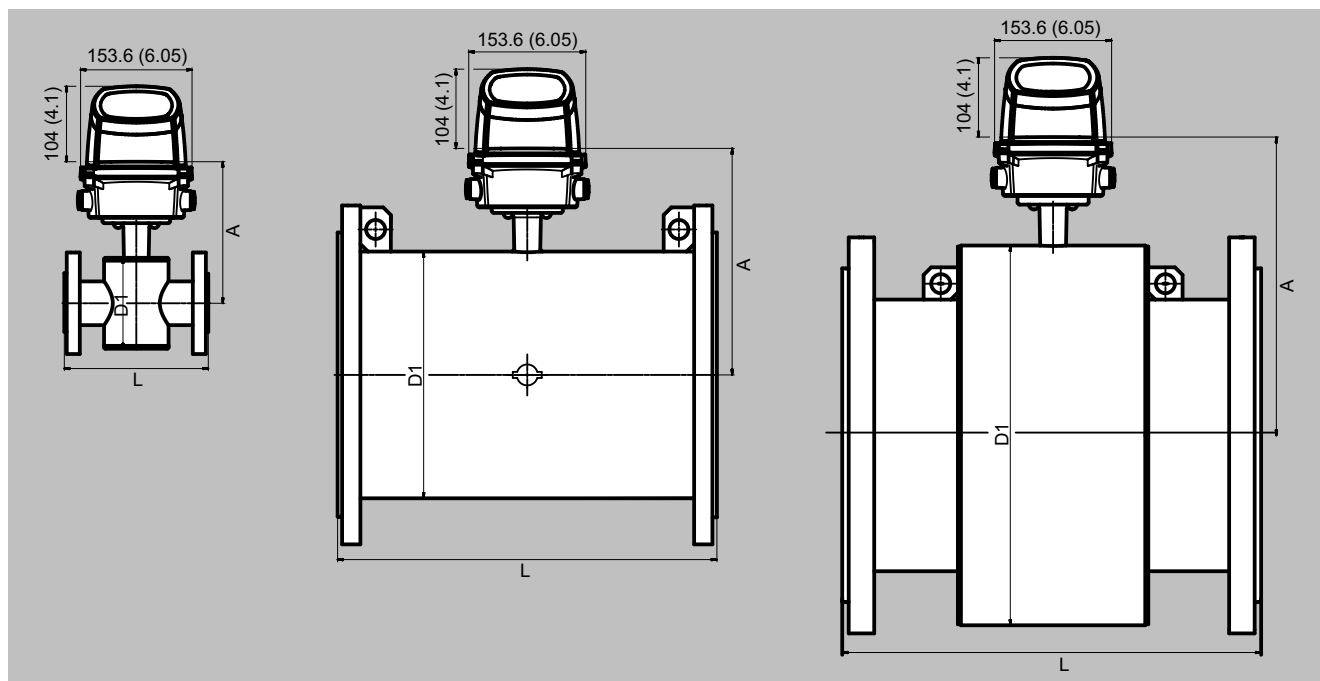
For other factory settings, see the operating instructions.

Flow Measurement

SITRANS FM (electromagnetic)

Flow sensors / SITRANS FMS500

Dimensional drawings



SITRANS FMS500 Sensor: DN 15 ... 40, ½" ... 1½" (left), DN 50 ... 300, 2" ... 12" (middle) and DN 350 ... 2000, 14" ... 80" (right)

Sensor SITRANS FMS500 (7ME653)									
Nominal diameter		A		D1		L ¹⁾		Weight ¹⁾	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[kg]	[lbs]
15	½	170	6.7	77	3.0	200	7.9	5	11
25	1	180	7.1	96	3.8	200	7.9	6	13
40	1½	195	7.7	127	5.0	200	7.9	9	20
50	2	181	7.1	76	3.0	200	7.9	10	22
65	2½	187	7.4	89	3.5	200	7.9	12	26
80	3	193	7.6	102	4.0	200	7.9	13	29
100	4	200	7.9	114	4.5	250	9.8	17	37
125	5	210	8.3	140	5.5	250	9.8	20	44
150	6	225	8.9	168	6.6	300	11.8	27	60
200	8	250	9.8	219	8.6	350	13.8	39	86
250	10	277	10.9	273	10.8	450	17.7	56	123
300	12	303	11.9	324	12.8	500	19.7	72	159
350	14	375	14.8	451	17.8	550	21.7	115	254
400	16	400	15.7	502	19.8	600	23.6	143	315
450	18	431	17.0	563	22.2	600	23.6	177	390
500	20	456	18.0	614	24.2	600	23.6	222	489
600	24	507	20.0	715	28.2	600	23.6	321	708
700	28	557	21.9	816	32.1	700	27.6	331	730
750	30	584	23.0	869	34.2	750	29.5	-	-
800	32	609	24.0	927	36.5	800	31.5	386	851
900	36	656	25.8	1032	40.6	900	35.4	482	1063
1000	40	707	27.8	1136	44.7	1000	39.4	672	1482
1050	42	707	27.8	1136	44.7	1000	39.4	-	-
1100	44	758	29.8	1238	48.7	1100	43.3	-	-
1200	48	813	32.0	1348	53.1	1200	47.2	1116	2460
1400	54	918	36.1	1574	65.94	1400	55.1	1592	3502
1500	60	965	38.0	1672	65.83	1500	59.1	1850	4070
1600	66	1018	40.1	1774	75.39	1600	63.0	2110	4642
1800	78	1116	43.9	1974	77.72	1800	70.9	2560	5632
2000	78	1216	47.9	2174	85.59	2000	78.9	3640	8008

Dimensional drawings (continued)

- ¹⁾ Weights are appr. for sensor with EN 1092-1 PN 16 flanges without transmitter. With transmitter FMT020 mounted, weight is increased by appr. 1.0 kg (2.2 lb).