

Battery-operated water meter MAG 8000

Overview



MAG 8000 is a comprehensive meter which intelligent information and high performance measurement as well as the easy to install concept take cost of ownership and customer service to a new level for water meter.

Benefits

Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities

Superior measurement

- Down to 0.2% maximum uncertainty
- OIML R 49 type approval
- Bi-directional measurement

Long lasting performance/Low cost of Ownership

- Verification according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measuring instruments (MID), Annex MI-001
- No moving parts means less wear and tear
- Up to 6 to 10 years maintenance-free operation in typical revenue application
- Robust construction build for the application

Intelligent information, easy to access

- Advanced information on site
- Data logger
- Advanced statistics and diagnostics
- Add-on communication modules

Application

The following MAG 8000 versions are available as stand-alone water meters:

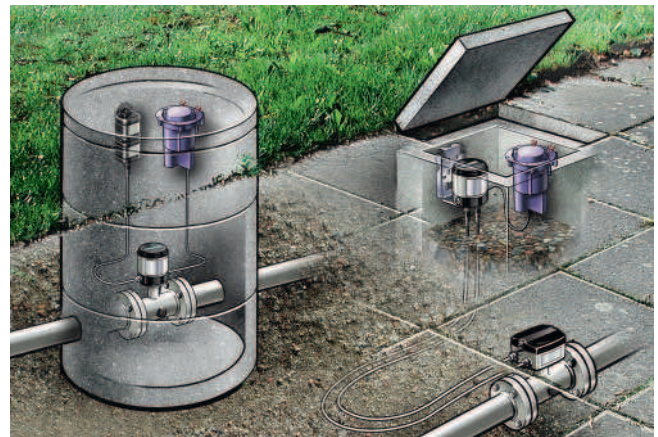
- MAG 8000 (7ME6810) for abstraction and distribution network
- MAG 8000 CT (7ME6820) for revenue and bulk metering
- MAG 8000 (7ME6880) for irrigation

Design

MAG 8000 is designed according to OIML R 49 and CEN EN 14154 water meter standards with focus on minimized power consumption.

The product program consists of

- Basic and advanced version
- Sensor sizes from DN 25 to 1200 (1" to 48")
- Compact and remote installation in IP68/NEMA 6P enclosure and factory-mounted cable
- SIMATIC PDM and Flow Tool PC configuration softwares



Add-on communication module (left), PC-IrDA connection (right)

Flow Measurement

SITRANS F M

Battery-operated water meter MAG 8000

Function

MAG 8000 is a microprocessor-based water meter with graphical display and key for optimum customer operation and information on site. The transmitter drives the magnetic field in the sensor, evaluates the flow signal from the sensor and calculates the volume passing through. It delivers the required information via the integrated pulse output or communication interfaces as part of a system solution. Its intelligent functionality, information and diagnostics ensure optimum meter performance and information to optimize water supply and billing.



MAG 8000 can be ordered as a Basic or an Advanced version.

Features / Version	MAG 8000 Basic	MAG 8000 Advanced
Measuring frequency in battery power mode (Manually selected)	1/15, 1/30 or 1/60 Hz	from 6.25 to 1/60 Hz depending of sensor size
Output MAG 8000	2 FW/RV/AI/CA (max. 50 Hz pulse rate)	2 FW/RV/AI/CA (max. 100 Hz pulse rate)
Communication	Add-on	Add-on
Data logger	Yes	Yes
Insulation test	No	Yes
Leakage detection	No	Yes
Meter utilization	No	Yes
Statistics	No	Yes
Tariff	No	Yes
Settle date (Revenue)	No	Yes

Some information is accessible via the display whereas all information is accessible via the IrDA communication interface with the PDM software. Data and parameters are registered in a EEPROM. They can all be read, but changing the information demands a software password or a hardware key attached to the printed circuit board.

The SIMATIC PDM tool gives the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with all specific data that define the quality status of the measurement.

The Qualification Certificate consists of two pages with information about the actual status of the sensor:

Part 1 provides general settings, sensor and battery info, totalizer values and pulse output settings.

Part 2 provides detailed information about electronic and sensor functionality and a main parameter list for evaluating the functionality of the MAG 8000 water meter.



Technical specifications

Transmitter

Installation MAG 8000	Integral (compact) or remote with factory mounted cable in 5, 10, 20 or 30 m lengths with IP68/NEMA 6P connectors. Connection is made at the transmitter bottom.
Enclosure	Stainless steel top housing (AISI 316) and coated brass bottom. Remote wall mount bracket in stainless steel (AISI 304).
Cable entries	2 x M20 (one gland for one cable of size 6 ... 8 mm (0.24 ... 0.31 ") is included in the standard delivery)
Display and key	<ul style="list-style-type: none"> • Display with 8 digits for main information. Index, menu and status symbols for dedicated information • Key for toggling through the information and reset customer totalizer • Selectable default information and accessible menus: <ul style="list-style-type: none"> - Operator - Meter - Service - Data Logger - Statistic and leakage (only Advanced version) - Revenue and Tariffs (only Advanced version) • Totalized information can be displayed with 1, 2, 3 decimals or automatic adjustment for maximum resolution

Flow unit MAG 8000

• Europe std.	Volume in m ³ and flow rate in m ³ /h
• US std.	Volume in Gallon and flow rate in GPM
• Australian std.	Volume in Ml and flow rate as Ml/d
	Other units selectable: <ul style="list-style-type: none"> • Volume: m³ x 100, l x 100, G x 100, G x 1000, MG, CF x 100, CF x 1000, AF, Al, kl • Flow: m³/min, m³/d, l/s, l/min, GPS, GPH, GPD, MGD, CFS, CFM, CFH • Other units are ordered from factory or manually configured on-site by sticking a label on the display and changing the scaling factors

Flow unit MAG 8000 CT

• Europe std.	Volume in m ³ and flow rate in m ³ /h
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Digital output MAG 8000

- 2 passive outputs (MOS), individual galvanically isolated
- Maximum load ± 35 V DC, 50 mA short circuit protected
- Output A function
Programmable as pulse volume – forward – reverse – forward/net – reverse/net
- Output B function
Programmable as pulse volume (like output A), or alarm
- Output
Max. pulse rate of 50 Hz (only Basic version) and 100 Hz (only Advanced version), pulse width of 5, 10, 50, 100, 500 ms

Communication

- IrDA: Standard integrated infrared communication interface with Modbus RTU protocol
- Add-on modules:
- RS 232 serial interface with Modbus RTU (Rx/Tx/GND), point to point with max. 15 m cable
 - RS 485 serial interface with Modbus RTU (+/-/GND), multipoint with up to 32 devices with max. 1000 m cable
- Modbus RTU protocol is an open protocol (further information available on request)
Serial speed 1200, 2400, 4800, 9600, 19200, 38400 Baud
- Encoder interface (for Itron 200WP) "Sensus protocol" for fixed network

Power supply

- Auto detection of power source with display symbol for operation power.
- Internal battery pack:
- 1 D-Cell 3.6 V/16.5 Ah
 - 2 D-Cell 3.6 V/33 Ah
- External battery pack:
- 4 D-Cell 3.6 V/66 Ah
- Mains Power supply:
- 12 ... 24 V AC/DC (10 ... 32 V) 2 VA
 - 115 ... 230 V AC (85 ... 264 V) 2 VA
- Both mains power supply systems are upgradable for battery backup via internal D-Cell (3.6 V 16.5 Ah) or external battery pack. The power supply has 3 m (9.8 ft) power cable for external connection to mains supply (without cable plug).

Flow Measurement

SITRANS F M

Battery-operated water meter MAG 8000

Features	
Application identification	Tag number up to 15 characters
Time and date	Real time clock
Totalizer	
MAG 8000	2 totalizer: Forward, Reverse, Bidirectional netflow calculation and free selectable start value. 1 customer totalizer, following totalizer 1 setting and resettable via display key or software with logging of date and time
Measurement	
Low flow cut-off	0.05% of Q_n (Q3) or free adjustable
Empty pipe detection	Symbolised in display
Data logger	Logging of 26 records: selectable as daily, weekly or monthly logging
Alarm	
Monitoring	Active alarm is indicated on the display Total hours an alarm has been active Numbers of times the alarm has been activated First time an alarm appears Last time the alarm disappears
Fatal faults	Signal insulation – Flow signal immunity is influenced (only Advanced version) Coil current – Fault in driving magnetic sensor field Amplifier – Fault in signal circuit Check sum – Fault in calculation or handling of data
Warning faults	Low Power – customer selectable battery alarm level or power drop out Flow overflow – Flow in sensor exceeds Q_{max} (Q4) (125% Q_n (Q3)) Pulse overflow on output A and B – Selected pulse volume is too small compared to actual flow rate and max. output pulse rate. Consumption – saved data logger consumption exceeds customer selected limit on high or low consumption Leakage – Leakage detected based on customer settings (only Advanced version) Empty pipe – no water in the pipe / sensor Low impedance - measured electrode impedance below customer low impedance level Flow limit – actual flow exceeds selected high flow limited
Meter status (tamper monitoring of revenue data)	Changing totalizers 1 and 2 Changing Tariff totalizer Changing Tariff settings Changing date and time Alarm has been active (see alarm log for details) Fault log has been reset Hardware parameter protection has been broken Meter has been repowered

Data protection	All data stored in an EEPROM. Totalizers 1 and 2 are backed up every 10 min, statistic every hour and power consumption and temperature measurement every 4 hour. Password protection of all parameters and hardware protection of calibration and revenue parameters.
Battery power management	Optimal battery information on remaining capacity. Calculated capacity includes all consuming elements and available battery capacity is adjusted related to change in ambient temperature. Numbers of power-ups Date and time registered for first and last time power alarm.
Diagnostic	
Continuous self test including	Coil current to drive the magnetic field Signal input circuit Data calculation, handling and storing
Alarm statistics and logging for fault analyzing	Electrode impedance to check actual media contact Flow simulation to check pulse and communication signal chain for correct scaling Number of sensor measurements (excitations) Transmitter temperature (battery capacity calculation) Low impedance alarm for change in media Flow alarm when defined high flow exceeds Verification mode for fast measure performance check
Insulation test (only Advanced version)	Test of signal immunity against disturbance and bad installation. Test interval is selectable and measurement is interrupted during the test period of 4 min.
Leakage detection (only Advanced version)	Monitoring the lowest flow or volume during selected time window within 24 hours. Leakage is detected over a selectable period where monitored value exceed the possible leakage level. Min and max values are stored with date registration. Last store value visible on the display.
Meter Utilization (only Advanced version)	6 registers for monitoring total time the meter has operated in different flow intervals. Registered intervals are free selectable as % of Q_n (Q3)
Tariff (only Advanced version)	6 tariff registers count the volume delivered within the selected tariff windows, based on time of day or flow rates or a combination. Tariff can also be used for consumption profile where consumption is related to different time intervals or flow rates. Tariff values visible on the display.

Settling date (only Advanced version)	On a predefined date the totalizer 1 index value is stored. Old values are stored to show the latest two totalized 1 index values. Settling values visible on the display.
Statistic (only Advanced version)	Min. flow rate with time and date registration Max. flow rate with time and date registration Min. daily consumption with date registration Max. daily consumption with date registration Latest 7 days total and daily consumption Actual month consumption Latest month consumption
PC Configuration Software PDM	<ul style="list-style-type: none"> • Meter configuration – online and offline mode • Own parameter settings • Parameter documentation • Print and export of data and parameters PDM 6.0 Service Pack 2 – Basic and Online version

Flow Measurement

SITRANS F M

MAG 8000 for abstraction and distribution network applications (7ME6810)

Overview



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Benefits

- Bury meters, IP 68
- Low cost of ownership
- Long-term stability
- Leak detection
- Low flow measurement

Technical specifications

Meter	
Accuracy	Standard calibration: ± 0.4% of rate ± 2 mm/s Extended calibration DN 50 ... DN 300 (2" ... 12"): ± 0.2 % of rate ± 2 mm/s
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F)
Media	0 ... +70 °C (32 ... +158 °F)
Storage	-40 ... +70 °C (-22 ... +158 °F)
Enclosure rating	IP68/NEMA 6P; Cable glands mounted requires Sylgard potting kit to remain IP68/NEMA 6P, otherwise IP67/NEMA 4 is obtained; Factory-mounted cable provides IP68/NEMA 6P
Drinking water approvals	<ul style="list-style-type: none"> • NSF/ANSI Standard 61 (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB)
Custody transfer approval	• OIML R 49 approval
Conformity	<ul style="list-style-type: none"> • PED: 97/23EC • EMC: IEC/EN 61000-6-3, IEC/EN 61000-6-2
Sensor version	DN 25 ... 1200 (1" ... 48")

Measuring principle	Electromagnetic induction
Excitation frequency	
Basic version	
• Battery-powered	DN 25 ... 150 (1" ... 6"): 1/15 Hz DN 200 ... 600 (8" ... 24"): 1/30 Hz DN 700 ... 1200 (28" ... 48"): 1/60 Hz
• Mains-powered	DN 25 ... 150 (1" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz DN 700 ... 1200 (28" ... 48"): 1.5625 Hz
Advanced version	
• Battery-powered	DN 25 ... 150 (1" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime) DN 700 ... 1200 (28" ... 48"): 1/60 Hz (adjustable up to 1.5625 Hz; redu- ced battery lifetime)
• Mains-powered	DN 25 ... 150 (1" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz DN 700 ... 1200 (28" ... 48"): 1.5625 Hz
Flanges	
EN 1092-1 (DIN 2501)	DN 25 and DN 40 (1" and 1½"): PN 40 (580 psi) DN 50 ... 150 (2" ... 6"): PN 16 (232 psi) DN 200 ... 1200 (8" ... 48"): PN 10 or PN 16 (145 psi or 232 psi)
ANSI 16.5 Class 150 lb	1" ... 24": 20 bar (290 psi)
AWWA C-207	28" ... 48": PN 10 (145 psi)
AS 4087	DN 50 ... 1200 (2" ... 48"): PN 16 (232 psi)
Liner	EPDM
Electrode and grounding electrodes	Hastelloy C276
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor.

Flow Measurement

SITRANS F M

MAG 8000 for abstraction and distribution network applications (7ME6810)

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS F M MAG 8000 water meter	7 ME 6 8 1 0 -	SITRANS F M MAG 8000 water meter	7 ME 6 8 1 0 -
Diameter		Communication interface	
DN 25 (1")	2 D	No additional "add-on" communication module installed	A
DN 40 (1½")	2 R	Serial RS 485 with Modbus RTU (Terminated as end device)	B
DN 50 (2")	2 Y	Serial RS 232 with Modbus RTU	C
DN 65 (2½")	3 F		
DN 80 (3")	3 M		
DN 100 (4")	3 T	Power supply	
DN 125 (5")	4 B	Internal battery (no battery included)	0
DN 150 (6")	4 H	Internal battery pack installed ²⁾	1
DN 200 (8")	4 P	External battery with 1.5 m (4.9 ft) power cable with IP68/NEMA 6P plugs, no battery included	2
DN 250 (10")	4 V	12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	3
DN 300 (12")	5 D	115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	4
DN 350 (14")	5 K		
DN 400 (16")	5 R		
DN 450 (18")	5 Y		
DN 500 (20")	6 F		
DN 600 (24")	6 P		
DN 700 (28") ¹⁾	6 Y		
DN 750 (30") ^{4/117}	7 D		
DN 800 (32") ^{4/117}	7 H		
DN 900 (36") ^{4/117}	7 M		
DN 1000 (40") ^{4/117}	7 R		
DN 1050 (42") ^{4/117}	7 T		
DN 1100 (44") ^{4/117}	7 V		
DN 1200 (48") ^{4/117}	8 B		
Flange norm and pressure rating		Operating instructions for SITRANS F M MAG 8000	
<u>EN 1092-1</u>		Description	Order No.
PN 10 (DN 200 ... 1200 (8" ... 48"))	B	Operating instructions for SITRANS F M MAG 8000	
PN 16 (DN 50 ... 1200 (2" ... 48"))	C	• English	A5E03071515
PN 16 none PED (DN 700 ... 1200 (28" ... 48"))	D	• German	A5E00740986
PN 40 (DN 25 ... 40 (1" ... 1½"))	F	• Spanish	A5E00741031
<u>ANSI B16.5</u>		• French	A5E00741021
Class 150	J		
<u>AWWA C-207</u>		This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.	
Class D (28" ... 48")	L	All literature is also available for free at: http://www.siemens.com/flowdocumentation	
<u>AS4087</u>			
PN 16 (DN 50 ... 1200 (2" ... 48"))	N		
Sensor version			
EPDM liner and Hastelloy electrodes	3		
Calibration			
Standard ± 0.4% of rate ± 2 mm/s	1		
Extended ± 0.2% of rate ± 2 mm/s DN 50 ... 300 (2" ... 12")	2		
Region version			
Europe (m ³ , m ³ /h, 50 Hz)	1		
USA (Gallon, GPM, 60 Hz)	2		
Australia (ML, l/h, 50 Hz)	3		
Transmitter type and installation			
Basic version integral on sensor	A		
Basic version remote, 5 m (16.4 ft) mounted cable on sensor with IP68/NEMA 6P plugs	B		
Do - 10 m (32.8 ft)	C		
Do - 20 m (65.6 ft)	D		
Do - 30 m (98.4 ft)	E		
Advanced version integral on sensor	K		
Advanced version remote, 5 m mounted cable on sensor with IP68/NEMA 6P plugs	L		
Do - 10 m (32.8 ft)	M		
Do - 20 m (65.6 ft)	N		
Do - 30 m (98.4 ft)	P		

Flow Measurement

SITRANS F M

MAG 8000 for abstraction and distribution network applications (7ME6810)

Selection and Ordering data	Order code
Additional information	
Please add “-Z” to Order No. and specify Order code(s) and plain text.	
<u>Flow unit</u>	
l/s	L00
MGD	L01
CFS	L02
l/min	L03
m ³ /min	L04
GPM	L05
CFM	L06
l/h	L07
m ³ /h	L08
GPH	L09
CFH	L10
GPS	L11
MI/d	L12
m ³ /d	L13
GPD	L14
<u>Totalizer</u>	
Volume calculation (default totalizer 1 = forward and totalizer 2 = reverse)	
Totalizer 1 = RV, reverse flow	L20
Totalizer 1 = NET, net flow	L22
Totalizer 2 = FW, forward flow	L30
Totalizer 2 = NET, net flow	L31
<u>Volume unit</u>	
m ³	L40
MI	L41
G	L42
AF	L43
l x 100	L44
m ³ x 100	L45
G x 100	L46
CF x 100	L47
MG	L48
G x 1000	L49
CF x 1000	L50
AI	L51
kl	L52
<u>Pulse set up</u> (default pulse A = forward and pulse B = Alarm)	
A function = RV, reverse flow	L62
A function = FWnet, forward net flow	L63
A function = RVnet, reverse net flow	L64
A function = Off	L65
Volume per pulse A = x 0.0001	L70
Volume per pulse A = x 0.001	L71
Volume per pulse A = x 0.01	L72
Volume per pulse A = x 0.1	L73
Volume per pulse A = x 1	L74
B function = FW, forward flow	L80
B function = RV, reverse flow	L81
B function = FWnet, forward net flow	L82
B function = RVnet, reverse net flow	L83
B function = Alarm	L84
B function = Call up	L85
Volume per pulse B = x 0.0001	L90
Volume per pulse B = x 0.001	L91
Volume per pulse B = x 0.01	L92
Volume per pulse B = x 0.1	L93
Volume per pulse B = x 1	L94

Selection and Ordering data	Order code
Additional information	
Please add “-Z” to Order No. and specify Order code(s) and plain text.	
<u>Data logger set up</u> (default month logging)	
DataloggerInterval = Daily	M31
DataloggerInterval = Weekly	M32
<u>Factory mounted cables</u>	
5 m (16.4 ft) pulse cable A+B	M81
5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	M82
20 m (65.6 ft) pulse cable A+B	M84
20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	M85
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	M87
Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	M89
SOFREL data logger cable 2 m with connector for SOFREL GSM module	M92

Flow Measurement

SITRANS F M

MAG 8000 CT for revenue and bulk metering (7ME6820)

Overview



Benefits

- MI-001, OIML R49 / OIML R49MAA
- Measurement in both directions
- Bury meters, IP 68
- Long-term stability/accuracy
- No moving parts - no maintenance
- Insignificant pressure drop
- Connectable to most common AMR systems
- Low flow measurement

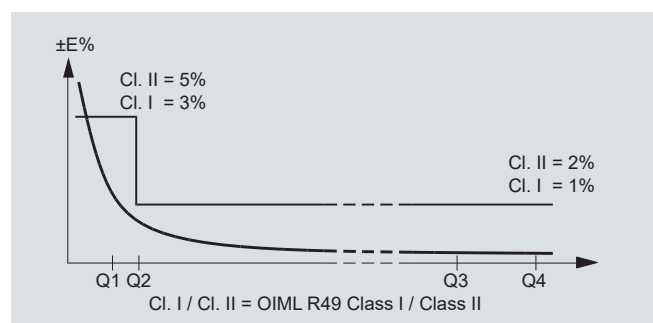
Technical specifications

Meter	
Accuracy	OIML R 49 for DN 50 ... DN 300 (2" ... 12"), Class 1 and 2 with turn down up to Q3/Q1 = 400 at Q2/Q1 = 1.6 MI-001 verification for DN 50 ... DN 600 (2" ... 24"), Class 2 with turn down ratio Q3/Q1 = 250, Q3/Q1 = 200 or Q3/Q1 = 160 at Q2/Q1 = 1.6
Media conductivity	Clean water > 20 µS/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F)
Media	0.1 ... +50 °C (32 ... +122 °F)
Storage	-40 ... +70 °C (-22 ... +158 °F)
Enclosure rating	IP68/NEMA 6P; Cable glands mounted requires Sylgard potting kit to remain IP68/NEMA 6P, otherwise IP67/NEMA 4 is obtained; Factory-mounted cable provides IP68/NEMA 6P
Drinking water approvals	<ul style="list-style-type: none"> • NSF/ANSI Standard 61 (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB)

Custody transfer approval	<ul style="list-style-type: none"> • OIML R 49 and OIML R49 MAA approval • MI-001 approval (Number: DK-0200-MI-001-002 and DK-0200-MI-001-011)
Conformity	<ul style="list-style-type: none"> • CEN EN 14154, ISO 4064 • PED: 97/23EC • EMC: IEC/EN 61000-6-3, IEC/EN 61000-6-2
Sensor version	DN 50 ... 600 (2" ... 24")
Measuring principle	Electromagnetic induction
Excitation frequency	
Basic version	
• Battery-powered	DN 50 ... 150 (2" ... 6"): 1/15 Hz DN 200 ... 600 (8" ... 24"): 1/30 Hz
• Mains-powered	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz
Advanced version	
• Battery-powered	DN 50 ... 150 (2" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime)
• Mains-powered	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz
Flanges	
EN 1092-1 (DIN 2501)	DN 50 ... 150 (2" ... 6"): PN 16 (232 psi) DN 200 ... 300 (8" ... 12"): PN 10 or PN 16 (145 psi or 232 psi) up to DN 600 (24") in preparation
ANSI 16.5 Class 150 lb	2" ... 12": 20 bar (290 psi) up to DN 600 (24") in preparation
AWWA C-207	28" ... 48": PN 10 (145 psi)
AS 4087	DN 50 ... 300 (2" ... 12"): PN 16 (232 psi) up to DN 600 (24") in preparation
Liner	EPDM
Electrode and grounding electrodes	Hastelloy C276
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor

MAG 8000 CT (Revenue program) water meter type approval

MAG 8000 CT program is type approved and verified according to international water meter standard OIML R 49. The Custody Transfer program is approved as Class I and Class II, for the sensor program from DN 50 to DN 300, at different Q3 and Q3/Q1. Q2/Q1 = 1.6 and follows OIML R 49 specification.



Flow Measurement

SITRANS F M

MAG 8000 CT for revenue and bulk metering (7ME6820)

OIML R 49 approval specification for Class I (1%)¹⁾

Size	50 (2")	65 (2½")	80 (3")	100 (4")	125 (5")	150 (6")	200 (8")	250 (10")	300 (12")
„R“ Q3/Q1	250	250	250	250	250	250	250	250	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]	0.40	0.64	1.00	1.60	2.50	4.00	6.40	10.0	16.0
Q1 [m³/h]	0.25	0.40	0.63	1.00	1.60	2.50	4.00	6.40	10.0

OIML R 49 approval specification for Class II (2%)¹⁾

Size	50 (2")	65 (2½")	80 (3")	100 (4")	125 (5")	150 (6")	200 (8")	250 (10")	300 (12")
„R“ Q3/Q1	400	400	400	400	400	400	400	400	250
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	0.40	0.63	1.00	1.60	2.50	4.00	6.40	10.0
Q1 [m³/h]	0.16	0.25	0.40	0.63	1.00	1.60	2.50	4.00	6.40

¹⁾ The product will be delivered according to requested specifications, which may deviate from the specifications of the approval frame described in tables below.

MAG 8000 CT (Revenue program) MI-001

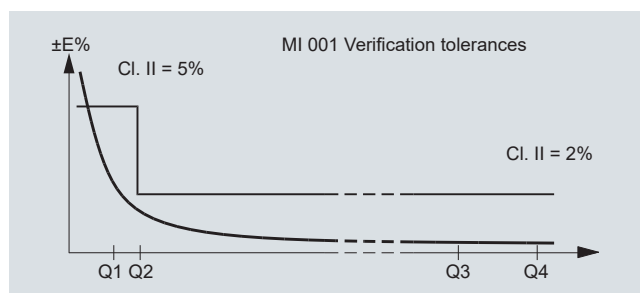
MAG 8000 CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 8000 CT MI-001 verified and labeled products are a Class II approval according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measuring instruments (MID), Annex MI-001 in the sizes from DN 50 to DN 600.

The MID certification is obtained as a B + D module approval according to the above mentioned directive.

Module B : Type approval according to OIML R 49

Module D : Quality insurance approval of production



MAG 8000 CT MI-001 verified and labeled products at a given Q3 and Q3/Q4 = 1.25 and Q2/Q1 = 1.6 measuring ranges see below table:

DN	50 (2")	65 (2½")	80 (3")	100 (4")	125 (5")	150 (6")	200 (8")	250 (10")	300 (12")
„R“ Q3/Q1	25	25	25	25	25	25	25	25	25
Q4 [m³/h]	18.75	31.25	50	78.75	125	200	312.5	500	750
Q3 [m³/h]	16	25	40	63	100	160	250	400	630
Q2 [m³/h]	0.96	1.60	2.60	4.03	6.40	10.24	16.00	25.60	38.4
Q1 [m³/h]	0.60	1.00	1.60	2.52	4.00	6.40	10.00	16.00	24.0

DN	50 (2")	65 (2½")	80 (3")	100 (4")	125 (5")	150 (6")	200 (8")	250 (10")	300 (12")
„R“ Q3/Q1	63	63	63	63	63	63	63	63	63
Q4 [m³/h]	18.75	31.25	50	78.75	125	200	312.5	500	750
Q3 [m³/h]	16	25	40	63	100	160	250	400	630
Q2 [m³/h]	0.38	0.63	1.02	1.60	2.54	4.06	6.35	10.20	15.24
Q1 [m³/h]	0.24	0.40	0.63	1.00	1.59	2.54	3.97	6.35	9.52

DN	50 (2")	65 (2½")	80 (3")	100 (4")	125 (5")	150 (6")	200 (8")	250 (10")	300 (12")
„R“ Q3/Q1	80	80	80	80	80	80	80	80	80
Q4 [m³/h]	18.75	31.25	50	78.75	125	200	312.5	500	750
Q3 [m³/h]	16	25	40	63	100	160	250	400	630
Q2 [m³/h]	0.31	0.50	0.80	1.20	2.00	3.20	5.00	8.00	12.0
Q1 [m³/h]	0.19	0.31	0.50	0.75	1.25	2.00	3.13	5.00	7.5

Flow Measurement

SITRANS F M

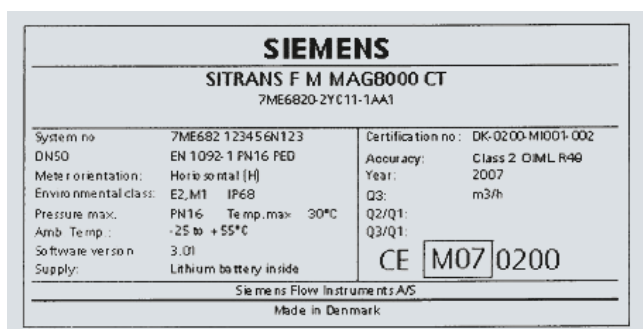
MAG 8000 CT for revenue and bulk metering
(7ME6820)

DN	50 (2")	65 (2½")	80 (3")	100 (4")	125 (5")	150 (6")	200 (8")	250 (10")	300 (12")
„R“ Q3/Q1	160	160	160	160	160	160	160	160	160
Q4 [m³/h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600
Q2 [m³/h]	0.40	0.63	1.00	1.60	2.50	4.00	6.30	10.00	16.00
Q1 [m³/h]	0.25	0.39	0.63	1.00	1.56	2.50	3.94	6.30	10.00

DN	50 (2")	65 (2½")	80 (3")	100 (4")	125 (5")	150 (6")	200 (8")	250 (10")	300 (12")
„R“ Q3/Q1	200	200	200	200	200	200	200	200	200
Q4 [m³/h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600
Q2 [m³/h]	0.32	0.50	0.80	1.28	2.00	3.20	5.00	8.00	12.60
Q1 [m³/h]	0.20	0.32	0.50	0.80	1.25	2.00	3.15	5.00	8.00

DN	50 (2")	65 (2½")	80 (3")	100 (4")	125 (5")	150 (6")	200 (8")	250 (10")	300 (12")
„R“ Q3/Q1	250	250	250	250	250	250	250	250	250
Q4 [m³/h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600
Q2 [m³/h]	0.26	0.40	0.64	1.02	1.60	2.56	4.00	6.40	10.24
Q1 [m³/h]	0.16	0.25	0.40	0.64	1.00	1.60	2.52	4.00	6.40

The Label is placed on the side of the encapsulation.
An example of the product label is shown below:



Installation conditions

Please refer to "System information SITRANS F M electromagnetic flowmeters".

Battery operation time and calculation

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity (drawing).

Flow Measurement

SITRANS F M

MAG 8000 CT for revenue and bulk metering
(7ME6820)

Selection and Ordering data	Order No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes	7 ME 6 8 2 0 -
	0 -
Diameter	
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
DN 350 (14") ¹⁾	5 K
DN 400 (16") ¹⁾	5 R
DN 450 (18") ¹⁾	5 Y
DN 500 (20") ¹⁾	6 F
DN 600 (24") ¹⁾	6 P
Flange norm and pressure rating	
EN 1092-1 PN 16	C
ANSI B16.5 Class 150	J
AS4087 PN 16	N
Approval/Verification³⁾	
Without verification according to OIML R 49	0
MI-001 Q3/Q1 = 25	1
MI-001 Q3/Q1 = 63	2
MI-001 Q3/Q1 = 80	3
MI-001 Q3/Q1 = 160	4
MI-001 Q3/Q1 = 200	5
MI-001 Q3/Q1 = 250	6
Without verification according to OIML R 49-Class 2 (Q3/Q1 = 100)	7
Without verification according to OIML R 49-Class 2 (Q3/Q1 = 250)	8
Region version	
Europe (m ³ , m ³ /h, 50 Hz)	1
USA (m ³ , m ³ /h, 60 Hz)	2
Transmitter type and installation	
Basic version integral on sensor	A
Basic version remote, 5 m (16.4 ft) mounted cable on sensor with IP68/NEMA 6P plugs	B
Do - 10 m (32.8 ft)	C
Do - 20 m (65.6 ft)	D
Do - 30 m (98.4 ft)	E
Advanced version integral on sensor	K
Advanced version remote, 5 m mounted cable on sensor with IP68/NEMA 6P plugs	L
Do - 10 m (32.8 ft)	M
Do - 20 m (65.6 ft)	N
Do - 30 m (98.4 ft)	P
Communication interface	
No additional "add-on" communication module installed	A
Serial RS 485 with Modbus RTU (Terminated as end device)	B
Serial RS 232 with Modbus RTU	C
Encoder interface for ITRON 200WP radio with "Sensus" protocol	D

Selection and Ordering data	Order No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes	7 ME 6 8 2 0 -
	0 -
Power supply	
Internal battery (no battery included)	0
Internal battery pack installed ²⁾	1
External battery with 1.5 m (4.9 ft) power cable with IP68/NEMA 6P plugs, no battery included	2
12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	3
115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection. (no battery included)	4

- Under preparation.
- Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
- For more details and references of the ranges please see the tables on pages 4/120 and 4/121.

Operating instructions for SITRANS F M MAG 8000

Description	Order No.
Operating instructions for SITRANS F M MAG 8000	
• English	A5E03071515
• German	A5E00740986
• Spanish	A5E00741031
• French	A5E00741021

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>

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Order No. and specify Order code(s) and plain text.	
<u>Totalizer</u>	
Volume calculation (default totalizer 1= forward and totalizer 2 = reverse)	
Totalizer 1 = RV, reverse flow	L20
Totalizer 1 = NET, net flow	L22
Totalizer 2 = FW, forward flow	L30
Totalizer 2 = NET, net flow	L31
<u>Pulse set up</u>	
(default pulse A= forward and pulse B = Alarm)	
A function = RV, reverse flow	L62
A function = FWnet, forward net flow	L63
A function = RVnet, reverse net flow	L64
A function = Off	L65
Volume per pulse A = x 0.001	L71
Volume per pulse A = x 0.01	L72
Volume per pulse A = x 0.1	L73
Volume per pulse A = x 1	L74
B function = FW, forward flow	L80
B function = RV, reverse flow	L81
B function = FWnet, forward net flow	L82
B function = RVnet, reverse net flow	L83
B function = Alarm	L84
B function = Call up	L85
Volume per pulse B = x 0.001	L91
Volume per pulse B = x 0.01	L92
Volume per pulse B = x 0.1	L93
Volume per pulse B = x 1	L94
<u>Data logger set up</u> (default month logging)	
DataloggerInterval = Daily	M31
DataloggerInterval = Weekly	M32
<u>Factory mounted cables</u>	
5 m (16.4 ft) pulse cable A+B	M81
5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	M82
20 m (65.6 ft) pulse cable A+B	M84
20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	M85
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	M87
Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	M89
5 ft. Encoder interface cable with connector for ITRON 200WP radio	M91
25 ft. Encoder interface cable with connector for ITRON 200WP radio	M90
SOFREL data logger cable 2 m with connector for SOFREL GSM module	M92

Flow Measurement

SITRANS F M

MAG 8000 for irrigation applications
(7ME6880)

Overview



Benefits

- Tamper-proof
- No maintenance
- Long-term stability/accuracy
- Connectable to most common AMR systems
- Custody transfer approval

Technical specifications

Meter	
Accuracy	
Standard calibration	± 0.8 % of rate ± 2.5 mm/s
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F)
Media	0 ... 70 °C (32 ... 158 °F)
Storage	-40 ... +70 °C (-22 ... +158 °F)
Enclosure rating	IP68/NEMA 6P rating; Cable glands mounted requires Sylgard potting kit to remain IP68/NEMA 6P, otherwise IP67/NEMA 4 is obtained; Factory-mounted cable provides IP68/NEMA 6P rating
Approvals	
Drinking water approvals	<ul style="list-style-type: none"> • NSF 61 (cold water) USA • WRAS (BS 6920 cold water) UK
Custody transfer approval	NMI10 Australia (under preparation)
Conformity	IEC/EN 61000-6-3, IEC/EN 61000-6-2
Sensor version	
Size, flange and pressure range	
• EN 1092-1 (DIN 2501) PN 10	DN 50 ... 600, drilled flanges (max. pressure 7 bar (101.5 psi))
• ANSI 16.5 Class 150 lb	2" ... 24", drilled flanges (max. pressure 7 bar (101.5 psi))
• AS 2091-1 Table D	Drilled flanges (max. pressure 7 bar (101.5 psi))
Max. excitation frequency	
Basic version	
• Battery-powered	DN 50 ... 600 (2" ... 24"): 1/15 Hz
• Mains-powered	DN 50 ... 600 (2" ... 24"): 3.125 Hz
Liner	Ebonite
Electrodes	Stainless steel

Flow Measurement

SITRANS F M

MAG 8000 for irrigation applications
(7ME6880)

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS F M MAG 8000 water meter including factory-mounted grounding rings	7 ME 6 8 8 0 -	SITRANS F M MAG 8000 water meter including factory-mounted grounding rings	7 ME 6 8 8 0 -
Diameter		Communication interface	
DN 50 (2")	2 Y	No additional "add-on" communication module installed	A
DN 65 (2½")	3 F	Serial RS 485 with Modbus RTU (Terminated as end device)	B
DN 80 (3")	3 M	Serial RS 232 with Modbus RTU	C
DN 100 (4")	3 T	Encoder interface	D
DN 125 (5")	4 B		
DN 150 (6")	4 H		
DN 200 (8")	4 P	Power supply	
DN 250 (10")	4 V	Internal battery (no battery included)	0
DN 300 (12")	5 D	Internal battery pack installed 2 D-cell ¹⁾	1
DN 350 (14")	5 K	External battery with 1.5 m (4.9 ft) power cable with IP68/NEMA 6P plugs, no battery included	2
DN 400 (16")	5 R	12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	3
DN 450 (18")	5 Y	115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	4
DN 500 (20")	6 F	Internal battery pack installed 1 D-cell ¹⁾	5
DN 600 (24")	6 P		
Flange norm and pressure rating		This device is shipped with a Quick Start guide and the SITRANS F manual CD containing the complete manual library. Printed Operating Instructions are available for purchase via PMD	
EN 1092-1 drilled pattern PN 10/7 bar (101 psi)	B		
ANSI B16.5 drilled pattern Class 150/7 bar (101 psi)	J		
AS2129 drilled pattern table D/7 bar (101 psi)	M		
Sensor version		¹⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.	
Ebonite liner and stainless steel electrodes	4		
Approval/Verification		Operating instructions for SITRANS F M MAG 8000	
Without verification	0	Description	Order No.
NMI approval (in preparation)	1	Operating instructions for SITRANS F M MAG 8000	
Region version		• English	A5E03071515
Europe (m ³ , m ³ /h, 50 Hz)	1	• German	A5E00740986
USA (Gallon, GPM, 60 Hz)	2	• Spanish	A5E00741031
Australia (ML, l/h, 50 Hz)	3	• French	A5E00741021
Transmitter type and installation		This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.	
Basic version integral on sensor	A	All literature is also available for free at:	
Basic version remote, 2 m (6.56 ft) mounted cable on sensor with IP68/NEMA 6P plugs	T	http://www.siemens.com/flowdocumentation	
Do - 5 m (16.4 ft)	B		
Do - 10 m (32.8 ft)	C		

Flow Measurement

SITRANS F M

MAG 8000 for irrigation applications
(7ME6880)

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Additional information		Additional information	
Please add "-Z" to Order No. and specify Order code(s) and plain text.		Please add "-Z" to Order No. and specify Order code(s) and plain text.	
<u>Flow unit</u>		<u>Data logger set up</u> (default month logging)	
l/s	L00	DataloggerInterval = Daily	M31
MGD	L01	DataloggerInterval = Weekly	M32
CFS	L02	<u>Factory mounted cables</u>	
l/min	L03	5 m (16.4 ft) pulse cable A+B	M81
m ³ /min	L04	5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	M82
GPM	L05	20 m (65.6 ft) pulse cable A+B	M84
CFM	L06	20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	M85
l/h	L07	Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	M87
m ³ /h	L08	Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	M89
GPH	L09	Encoder Interface, Itron Cable 5 ft.	M90
CFH	L10	Encoder Interface, Itron Cable 25 ft.	M91
GPS	L11	SOFREL data logger cable 2 m with connector for SOFREL GSM module	M92
MI/d	L12		
m ³ /d	L13		
GPD	L14		
<u>Totalizer</u>			
Volume calculation (default totalizer 1 = forward and totalizer 2 = reverse)			
Totalizer 1 = RV, reverse flow	L20		
Totalizer 1 = NET, net flow	L22		
Totalizer 2 = FW, forward flow	L30		
Totalizer 2 = NET, net flow	L31		
<u>Volume unit</u>			
m ³	L40		
MI	L41		
G	L42		
AF	L43		
l x 100	L44		
m ³ x 100	L45		
G x 100	L46		
CF x 100	L47		
MG	L48		
G x 1000	L49		
CF x 1000	L50		
AI	L51		
kl	L52		
<u>Pulse set up</u> (default pulse A = forward and pulse B = Alarm)			
A function = RV, reverse flow	L62		
A function = FWnet, forward net flow	L63		
A function = RVnet, reverse net flow	L64		
A function = Off	L65		
Volume per pulse A = x 0.0001	L70		
Volume per pulse A = x 0.001	L71		
Volume per pulse A = x 0.01	L72		
Volume per pulse A = x 0.1	L73		
Volume per pulse A = x 1	L74		
B function = FW, forward flow	L80		
B function = RV, reverse flow	L81		
B function = FWnet, forward net flow	L82		
B function = RVnet, reverse net flow	L83		
B function = Alarm	L84		
B function = Call up	L85		
Volume per pulse B = x 0.0001	L90		
Volume per pulse B = x 0.001	L91		
Volume per pulse B = x 0.01	L92		
Volume per pulse B = x 0.1	L93		
Volume per pulse B = x 1	L94		

Battery-operated water meter MAG 8000

Transmitter	
Installation	Compact (integral) Remote with factory-mounted cable (5, 10, 20 or 30 m)
Enclosure	Stainless steel top housing (AISI 316) and coated brass bottom. Remote wall mount bracket in stainless steel (AISI 304).
Cable entries	2 x M20 (one gland for one cable of size 6 ... 8 mm (0.02 ... 0.026 ft) is included in the standard delivery)
Display	Display with 8 digits for main information. Index, menu and status symbols for dedicated information
Flow unit	
Europe	Volume in m ³ and flow rate in m ³ /h
US	Volume in Gallon and flow rate in GPM
Australia	Volume in MI and flow rate as MI/d
Optional display units	Volume: m ³ x 100, l x 100, G x 100, G x 1000, MG, CF x 100, CF x 1000, AF, Al, kl Flow: m ³ /min, m ³ /d, l/s, l/min, GPS, GPH, GPD, MGD, CFS, CFM, CFH
Digital output	2 passive outputs (MOS), individual galvanically isolated Maximum load ± 35 V DC, 50 mA short circuit protected
Output A function	Programmable as pulse volume – forward – reverse – forward/net – reverse/net
Output B function	Programmable as pulse volume (like output A), alarm
Output	Max. pulse rate of 50 Hz (only Basic version) and 100 Hz (only Advanced version), pulse width of 5, 10, 50, 100, 500 ms
Communication	IrDA: Standard integrated infrared communication interface with Modbus RTU protocol
Add-on modules	<ul style="list-style-type: none"> RS 232 serial interface with Modbus RTU (Rx/Tx/GND), point to point with max. 15 m cable RS 485 serial interface with Modbus RTU (+/-/GND), multidrop with up to 32 devices with max. 1000 m cable Encoder interface module (for Itron 200WP) "Sensus protocol"
Power supply	Auto detection of power source with display symbol for operation power.
Internal battery pack	1 D-Cell 3.6 V/16.5 Ah 2 D-Cell 3.6 V/33 Ah
External battery pack	4 D-Cell 3.6 V/66 Ah
Mains power supply	<ul style="list-style-type: none"> 12 ... 24 V AC/DC (10 ... 32 V) 2 VA 115 ... 230 V AC (85 ... 264 V) 2 VA Both mains power supply systems are upgradable for battery backup via internal D-Cell (3.6 V 16.5 Ah) or external battery pack.
Cable	3 m (9.8 ft) for external connection to mains supply (without cable plug)

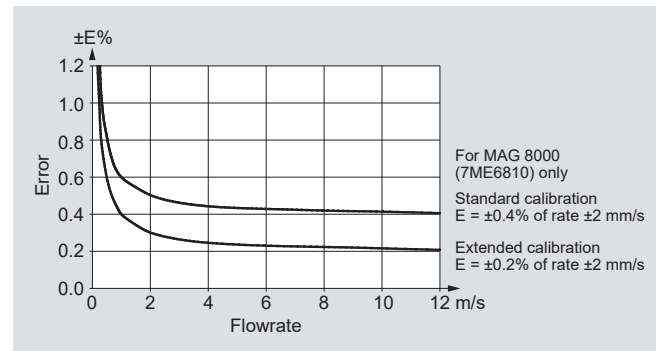
MAG 8000 water meter uncertainty

To ensure continuous accurate measurement, flowmeters must be calibrated. All measuring instrumentation, used in the calibration of the flowmeters, has either been calibrated by a UKAS or DANAK accredited laboratory or has been calibrated against certified master sensors. This provides an unbroken chain of measurement-traceability to national standards.

Siemens Flow Instruments can provide accredited calibration in the flow range from 0.0001 m³/h to 4350 m³/h.

The accreditation bodies DANAK and UKAS have signed the ILAC MRA agreement (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries world wide, including the US (NIST traceability).

The selected calibration determines the accuracy of the meter. A standard calibration results in max. ±0.4 % uncertainty and an extended calibration ±0.2 %. A calibration certificate follows every sensor and calibration data are stored in the meter unit.



Bonding and grounding

The sensor body must be grounded using grounding/bonding straps and/or grounding rings to protect the flow signal against stray electrical noise and/or lightning. This ensures that the noise is carried through the sensor body and a noise-free measuring area within the sensor body.

<p>M6 x 16</p> <p>Metal pipe Metal pipe</p>	Metal pipes On metal pipes, connect the straps to both flanges.
<p>Plastic pipe Plastic pipe</p>	Plastic pipes On plastic pipes and lined metal pipes, optional grounding rings must be used at both ends. Grounding rings has to be ordered separately see „Grounding ring KIT“
<p>M6 x 16</p> <p>Metal pipe Plastic pipe</p>	Combination of metal and plastic pipes A combination of metal and plastic requires straps for metal pipe and grounding rings for plastic pipe.

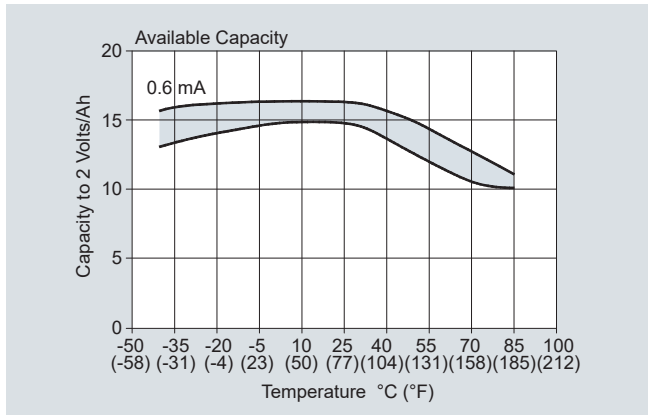
Flow Measurement SITRANS F M

Battery-operated water meter MAG 8000

Battery operation time and calculation

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity (drawing).



The effect from other temperatures can be seen from the figure. A variation in temperature from 15 °C to 55 °C (59 to 131 °F) reduces the capacity by 17% in the table from 15 Ah to 12.5 Ah.

At typical revenue scenario of expected battery operation time can be seen in the table.

The measurement for calculating the rest capacity of the battery life time is only completed if the system has no active fatal faults or the empty pipe is active. Maximum battery specification is 10 years operation.

Scenario - Revenue application	
Output A	Pulse rate max. 10 Hz
Output B	Alarm or call-up
Meter dialog	1 hour per month
Add-com	None
Temperature profile	<ul style="list-style-type: none"> • 5% at 0 °C (32 °F) • 80% at 15 °C (59 °F) • 15% at 50 °C (122 °F)

Battery lifetime (subject to the assumptions mentioned above)

MAG 8000 for abstraction and distribution network applications (7ME6810) and MAG 8000 CT for revenue and bulk metering (7ME6820)								
Excitation frequency (24 h operation)		1/60 Hz	1/30 Hz	1/15 Hz	1/5 Hz	1.5625 Hz	3.125 Hz	6.25 Hz
Two D-Cell battery 33 Ah Internal battery pack	DN 25 ... 200 (1" ... 8")	8 years	8 years	6 years	40 months	8 months	4 months	2 months
	DN 250 ... 600 (10" ... 24")	8 years	6 years	4 years	20 months	4 months	2 months	NA
	DN 700 ... 1 200 (28" ... 48")	6 years	4 years	2 years	1 year	2 months	NA	NA
Four D-Cell battery 66 Ah External battery pack	DN 25 ... 200 (1" ... 8")	N/A	10 years	10 years	80 months	16 months	8 months	4 months
	DN 250 ... 600 (10" ... 24")	N/A	10 years	10 years	40 months	8 months	4 months	NA
	DN 700 ... 1 200 (28" ... 48")	10 years	8 years	4 years	2 years	4 months	NA	NA

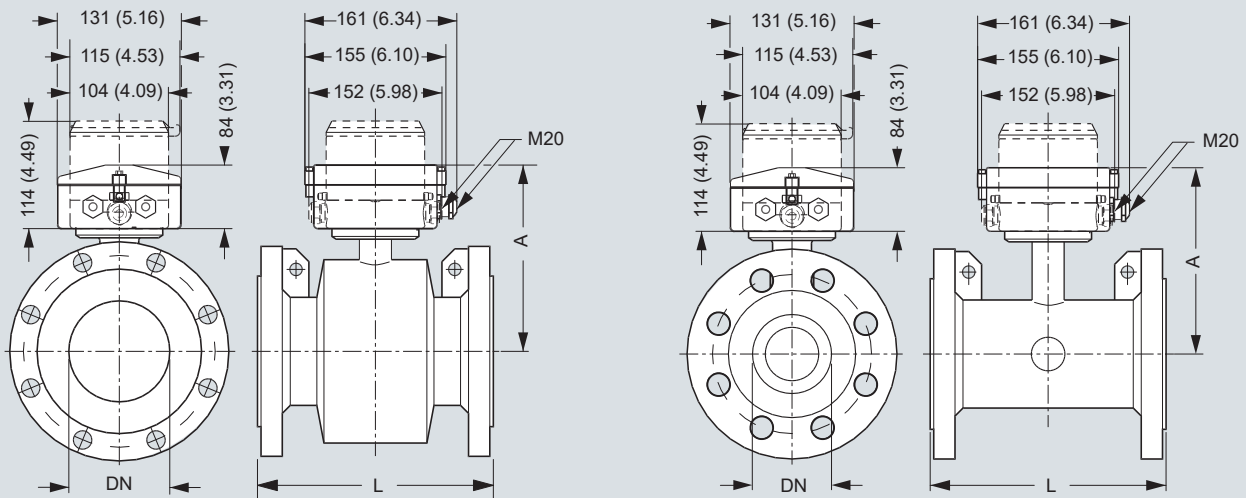
MAG 8000 for irrigation applications (7ME6880)								
Excitation frequency (24 h operation)		1/60 Hz	1/30 Hz	1/15 Hz	1/5 Hz	1.5625 Hz	3.125 Hz	
1 D-Cell battery	DN 50 ... 600 (2" ... 24")	52 months	40 months	25 months	12 months	2 months	1 months	
Two D-Cell battery 33 Ah Internal battery pack	DN 50 ... 600 (2" ... 24")	8 years	80 months	50 months	24 months	4 months	2 months	
Four D-Cell battery 66 Ah Internal battery pack	DN 50 ... 600 (2" ... 24")	10 years	10 years	8 years	48 months	8 months	4 months	

External battery pack can be used as battery backup for mains power supply.

Serial RS 232/RS 485 add-on communication modules are designed for mains powered systems as the battery operation time will be reduced. At 1 hour communication per month (all meter data collected 2 times per day) and the module is connected, the operation time is reduced to:

- RS 232 at low excitation frequency to 10% and at high excitation frequency to 80% of calculated operation time
- RS 485 at low excitation frequency to 50% and at high excitation frequency to 90% of calculated operation time

Dimensional drawings



DN 25 & 40 (1" & 1½") & DN 350 ... 1200 (14" ... 48")
For EPDM liner DN 50 ... 300 (2" ... 12") (7ME6810 and 7ME6820)

DN 50 ... 300 (2" ... 12")
For Ebonite liner (7ME6880 DN 50 ... 600 (2" ... 24"))
For MAG 8000 (7ME6880) for irrigation applications:
Sizes DN 50 ... 300: Add 7 mm (0.28") to length (L) in table below
Sizes DN 350 ... 600: Add 8 mm (0.31") to length (L) in table below

Dimensions in mm (inch)

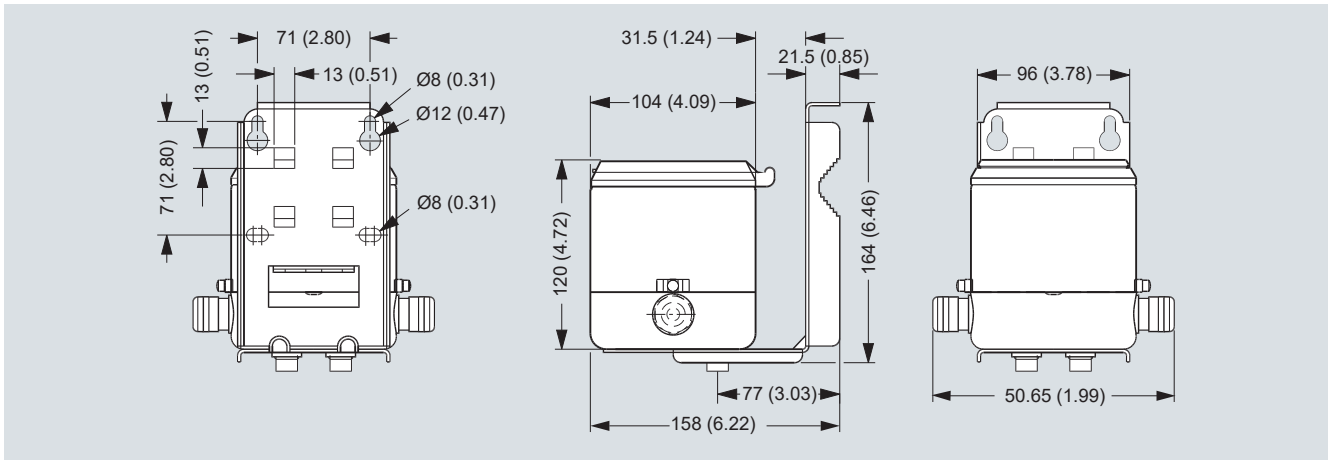
Nominal DN size	A	L, lengths						Weight ¹⁾	
		EPDM (7ME6810 and 7ME6820)	EN 1092-1 PN 10	EN 1092-1 PN 16/ PN 16 non PED	EN 1092-1 PN 40	ANSI 16.5 Class 150	AS 4087 PN 16	AWWA C-207 Class D	kg
mm (inch)	mm (inch)	mm	mm	mm	inch	mm	mm		
25 (1)	194 (7.7)	-	-	200	7.9	200	-	6	13
40 (1½)	204 (8.1)	-	-	200	7.9	200	-	9	20
50 (2)	195 (7.7)	-	200	-	7.9	200	-	11	25
65 (2½)	201 (8)	-	200	-	7.9	200	-	13	29
80 (3)	207 (8.2)	-	200	-	7.9	200	-	15	34
100 (4)	214 (8.5)	-	250	-	9.8	250	-	17	38
125 (5)	224 (8.9)	-	250	-	9.8	250	-	22	50
150 (6)	239 (9.5)	-	300	-	11.8	300	-	28	63
200 (8)	264 (10.5)	350	350	-	13.8	350	-	50	113
250 (10)	291 (11.5)	450	450	-	17.7	450	-	71	160
300 (12)	317 (12.6)	500	500	-	19.7	500	-	88	198
350 (14)	369 (14.6)	550	550	-	21.7	550	-	127	279
400 (16)	394 (15.6)	600	600	-	23.6	600	-	145	318
450 (18)	425 (16.8)	600	600	-	23.6	600	-	175	384
500 (20)	450 (17.8)	600	600	-	26.8	600	-	225	494
600 (24)	501 (19.8)	600	600	-	32.3	600	-	340	747
700 (28)	544 (21.4)	700	875/700	-	N/A	N/A	700	316	694
750 (30)	571 (22.5)	N/A	N/A	-	N/A	N/A	750	N/A	N/A
800 (32)	606 (23.9)	800	1000/800	-	N/A	N/A	800	398	1045
900 (36)	653 (25.7)	900	1125/900	-	N/A	N/A	900	476	1045
1000 (40)	704 (27.7)	1000	1250/1000	-	N/A	N/A	1000	602	1322
1050 (42)	704 (27.7)	N/A	N/A	-	N/A	N/A	1050	N/A	N/A
1100 (44)	755 (29.7)	N/A	N/A	-	N/A	N/A	1100	N/A	N/A
1200 (48)	810 (31.9)	1200	1500/1200	-	N/A	N/A	1200	887	1996

¹⁾ For remote version the sensor weight is reduced with 2 kg (4.5 lb)

Flow Measurement SITRANS F M

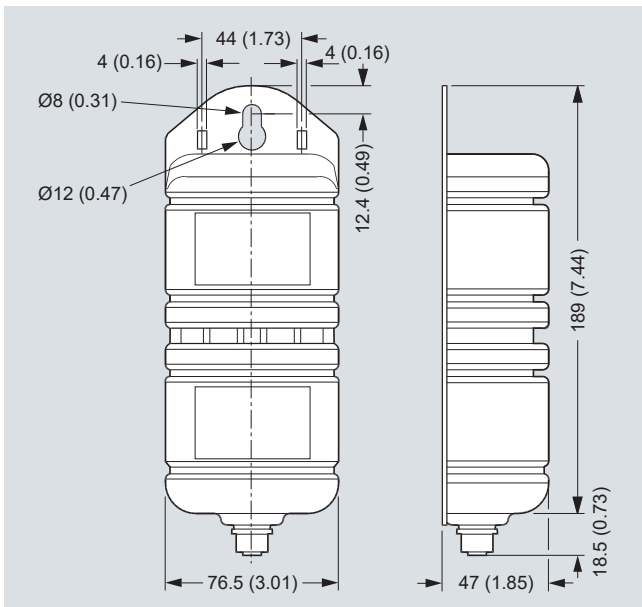
Battery-operated water meter MAG 8000

Remote version



Dimensions in mm (inch), weight 3.5 kg (8 lbs)

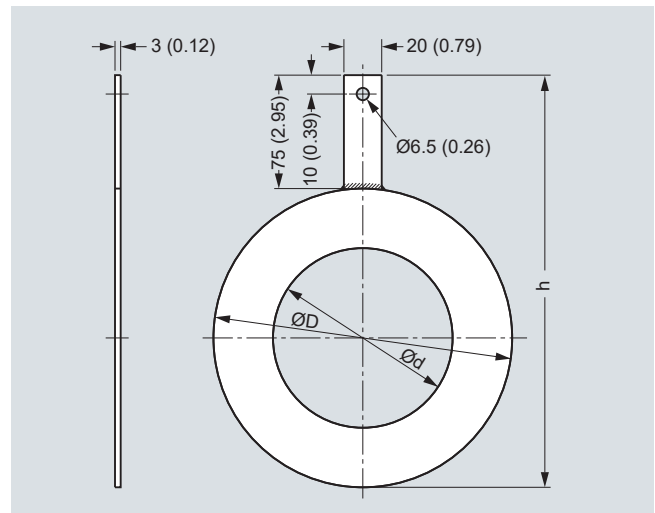
External battery pack



Dimensions in mm (inch), weight 2.0 kg (4.5 lbs)

Battery pack has to be mounted in upwards position to ensure maximum battery capacity.

Grounding rings

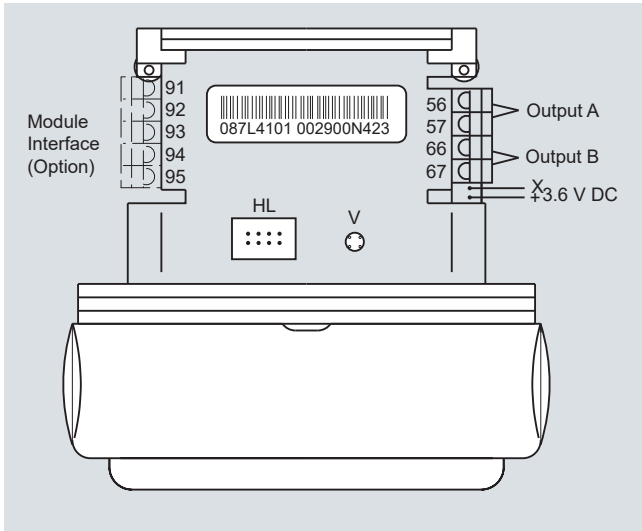


Dimensions in mm (inch) for grounding rings MAG 8000 with EPDM lining (7ME6810 and 7ME6820) DN 25 to DN 300

Dimension	Internal diameter (d)	Outside diameter (D)	h
DN 25	27	68	143
DN 40	38	88	163
DN 50	52	100	175
DN 65	64	120	195
DN 80	79	133	208
DN 100	95	158	233
DN 125	115	188	263
DN 150	145	216	336
DN 200	193	268	343
DN 250	246	324	399
DN 300	295	374	449

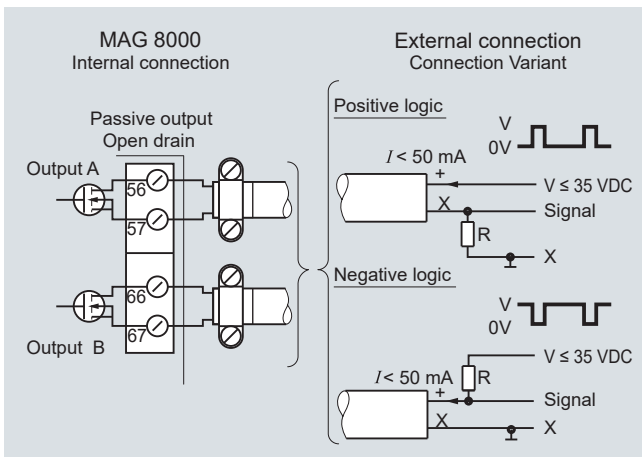
Schematics

Electrical installation and pulse output – Connection diagram



HL = Hardware lock key connection
V = Push button for verification mode

Pulse wire connection



The pulse output can be configured as volume, alarm or call-up. The output can be connected as positive or negative logic. R = pull up/down is selected in relation to the Vx power supply and with a max. current I of 50 mA.






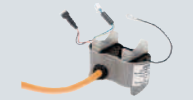



Use shielded cable to avoid EMC problems. Make sure the shield is correctly mounted under the cable clamp (no pig tail).





Flow Measurement

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Battery-operated water meter MAG 8000

Accessories

Description	Order No.	
PC Flow Tool on CD (Download for free from www.siemens.com/flow)	◆ FDK-087L6001	
IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable	◆ FDK-087L4163	
Battery backup for mains power supply, 1 pc. D-cell (3.6 V, 16.5 Ah) ¹⁾	◆ A5E03354392	
Internal battery pack, one set D-cell (3.6 V 33 Ah) and accessories for replacement ¹⁾	◆ FDK-087L4150	
External battery pack IP68/NEMA 6P with connector, four D-cell (3.6 V 66 Ah) ¹⁾	◆ FDK-087L4151	
Mains power supply 12 ... 24 V AC/DC with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	FDK-087L4210	
Mains power supply 115 ... 230 V AC with battery backup up and 3 m (9.8 ft) power cable for external connection (no battery included)	◆ FDK-087L4211	
RS 232 add-on module, point to point communication interface with Modbus RTU protocol	FDK-087L4212	
RS485 add-on module, multidrop communication interface with Modbus RTU protocol	◆ FDK-087L4213	
Encoder interface module, with "Sensus" protocol for ITRON 200WP radio, only for use with 7ME6820 route	A5E02475650	
One cable entry 6 ... 8 mm (0.24 ... 0.31 ") M20 brass glands package (1 pc)	FDK-087L4196	
One cable entry 2 ... 5 mm (0.08 ... 0.20 ") M12 brass glands with M20 reduction. Package of 10 pcs	FDK-087L4154	

Description	Order No.	
One cable entry 6 ... 8 mm (0.24 ... 0.31 ") M20 brass glands package (10 pcs)	FDK-087L4155	
One cable entry 8 ... 11 mm (0.31 ... 0.43 ") M20 brass glands package (10 pcs)	FDK-087L4156	
One cable entry 11 ... 15 mm (0.43 ... 0.59 ") M20 brass glands package (10 pcs)	FDK-087L4157	
Two cable entries 3.5 ... 5 mm (0.14 ... 0.20 ") M20 brass glands package (10 pcs)	FDK-087L4158	
Two cable entries 5.5 ... 7.5 mm (0.22 ... 0.30 ") M20 brass glands package (10 pcs)	FDK-087L4159	
IP68/NEMA 6P potting kit	◆ FDK-085U0220	
MAG 8000 Hardware key to access protected parameters	FDK-087L4165	
MAG 8000 demo - training unit pack operating on Alkaline batteries. Transmitter with Flow tool CD, IrDA interface adapter and hardware key (No dangerous goods limitations)	FDK-087L4080	
Alkaline battery for MAG 8000 demo transmitter (3 V 13 Ah) (No dangerous goods limitations)	FDK-087L4142	

◆ Short lead time (details in PMD)

¹⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

Flow Measurement SITRANS F M

Battery-operated water meter MAG 8000

When MAG 8000 (7ME6810 and 7ME6820) is installed in PVC or coated pipelines, grounding rings must be installed additionally.

Grounding rings, type C must be used for the 7ME6810 and 7ME6820 routes (sizes > DN 300). Please see grounding rings in the section MAG 3100 Grounding rings and be aware that the mentioned MLFB codes include only 1 grounding ring. Grounding rings DN 25 to DN 300 in stainless steel are packed in pairs and sold as a "grounding ring kit".

Dimension	Order No.
DN 25	◆ A5E01002946^{F)}
DN 40	◆ A5E01002947^{F)}
DN 50	◆ A5E01002948^{F)}
DN 65	◆ A5E01002950^{F)}
DN 80	◆ A5E01002952^{F)}
DN 100	◆ A5E01002953^{F)}
DN 125	◆ A5E01002954^{F)}
DN 150	◆ A5E01002955
DN 200	◆ A5E01002957^{F)}
DN 250	◆ A5E01002958^{F)}
DN 300	◆ A5E01002962^{F)}

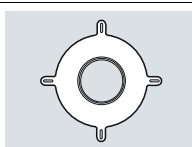


◆ Short lead time (details in PMD)

F) Subject to export regulations AL: 91999, ECCN: N.

MAG 8000 (7ME6880) grounding ring service kit, consisting of 2 pcs. grounding rings, screws and gaskets

Dimension	Order No.
DN 50 2"	◆ A5E03082907
DN 65 2½"	◆ A5E03082908
DN 80 3"	◆ A5E03082909
DN 100 4"	◆ A5E03082910
DN 125 5"	◆ A5E03082911
DN 150 6"	◆ A5E03082912
DN 200 8"	◆ A5E03082913
DN 250 10"	◆ A5E03082914
DN 300 12"	◆ A5E03082915
DN 350 14"	◆ A5E03082916
DN 400 16"	◆ A5E03082917
DN 450 18"	◆ A5E03082918
DN 500 20"	◆ A5E03082919
DN 600 24"	◆ A5E03082920



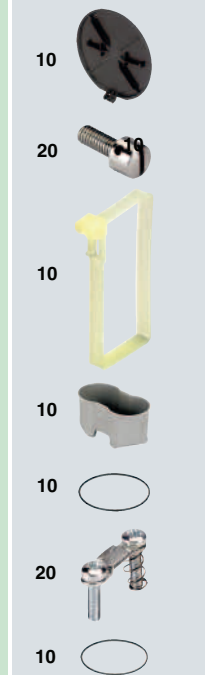
◆ Short lead time (details in PMD)

Spare parts

Description	Order No.
MAG 8000 (Basic version) transmitter compact replacement kit. System number specified by ordering. No battery included	FDK-087L4166
MAG 8000 (Basic version) transmitter remote replacement kit. System number specified by ordering. No battery included	FDK-087L4202



Description	Order No.
MAG 8000 (Advanced version) transmitter compact replacement kit. No battery included	FDK-087L4203
MAG 8000 (Advanced version) transmitter remote replacement kit. No battery included.	FDK-087L4204
MAG 8000 (Basic version) transmitter PCB replacement kit	A5E01171569^{F)}
MAG 8000 (Advanced version) transmitter PCB replacement kit	FDK-087L4168
Enclosure top including plastic lid, screws and blank product label	FDK-087L4167
Cable for external battery pack, 1.5 m (4.92 ft) with IP68/NEMA 6P connector	FDK-087L4152
5 ft. Encoder interface cable with IP68/NEMA 6P plugs included, for ITRON 200WP radio	A5E02551263
25 ft. Encoder interface cable with IP68/NEMA 6P plugs included, for ITRON 200WP radio	A5E02551182
Service tool kit package with various component for service and replacement.	FDK-087L4162





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Flow Measurement

SITRANS F M

Battery-operated water meter MAG 8000

Description	Order No.	
Remote cable set 5 m (16.4 ft) with IP68/NEMA 6P plugs - PG 13.5	FDK-087L4108	
Remote cable set 5 m (16.4 ft) with IP68/NEMA 6P plugs - M20	A5E00862482	
Remote cable set 10 m (32.8 ft) with IP68/NEMA 6P plugs - PG 13.5	FDK-087L4109	
Remote cable set 10 m (32.8 ft) with IP68/NEMA 6P plugs - M20	A5E00862487	
Remote cable set 20 m (65.6 ft) with IP68/NEMA 6P plugs - PG 13.5	FDK-087L4110	
Remote cable set 20 m (65.6 ft) with IP68/NEMA 6P plugs - M20	A5E00862492	
Remote cable set 30 m (98.4 ft) with IP68/NEMA 6P plugs - PG 13.5	FDK-087L4111	
Remote cable set 30 m (98.4 ft) with IP68/NEMA 6P plugs - M20	A5E00862497	

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