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
- PTB K7.2
- FM Fire Service Approval
- Bi-directional measurement

Long lasting performance/Low cost of Ownership

- No moving parts means less wear and tear
- Up to 6 to 10 years maintenance-free operation in typical revenue application
- Robust construction built for the application

Intelligent information, easy to access

- Embedded self-testing and alarm/fault detection feature
- Internal data logger
- Advanced statistics and diagnostics
- Various Add-on communication modules

Application

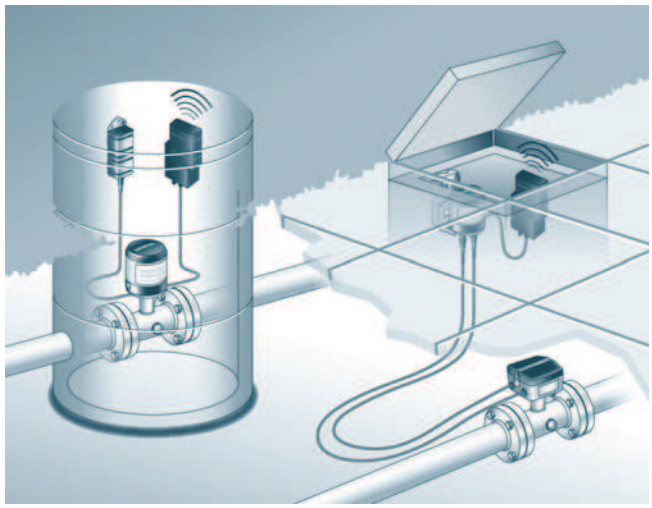
The following MAG 8000 versions are available as stand-alone water meters:

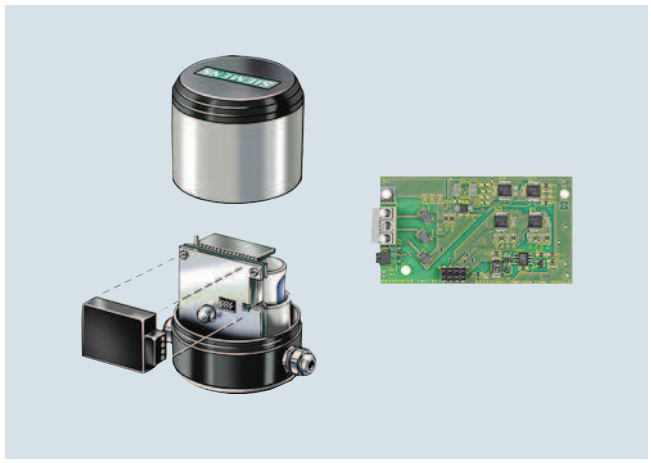
- MAG 8000 (7ME6810) for abstraction and distribution network
- MAG 8000 CT (7ME6820) for revenue and bulk metering
- MAG 8000 (7ME6880) for irrigation

Design

MAG 8000 is designed to minimize 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





Modbus/Encoder module

Battery-operated water meter MAG 8000

3G/UMTS module

PC-IrDA connection

MAG 8000 3G/UMTS Wireless Communication Module

The 3G/UMTS wireless communication module is a compact built-in solution which can be installed in the existing MAG 8000 with SW version 3.02 and higher, supporting HSDPA cat.8/HSUPA Cat.6 at 5 UMTS bands, with flexibility of backward compatible to GSM/GPRS network.

The 3G/UMTS module collects comprehensive measurement data from MAG 8000 at an interval down to 1 minute, allows for data transmission via numerous protocols including SMS, email via SMTP, email via SMTPS (TLS/SSL-based encryption), FTP, and FTPS (TLS/SSL-based encryption), with a customer configurable transmission interval (down to 1 hour). This provides customers with the flexibility to receive data via email, FTP or text message for the monitoring and control systems anywhere in the world.

TLS/SSL based data encryption provides a high level information security to protect customers data privacy.

The 3G/UMTS module offers

- Remote Qualification Certificate feature to enable the offsite diagnostic and audit on devices installed anywhere in the world
- 2-channel analog input measurement for external ratiometric pressure transmitter, transmission together with flow measurement (2-in-1 solution)
- 4-20 mA alarm signal detection and realtime SMS alarm for tamper protection and flooding situations
- Real-time clock synchronization with internet NTP server, ensuring that all measurement data is accurately time-stamped
- Data transmission at customer-specified points in time, allowing for synchronization of information from multiple MAG 8000 devices

The OPC server specifically designed for the MAG 8000 3G/UMTS module is offered free of charge. With this value-added package, the opportunity for measurement data collection and further processing/analyzing for system integration and automation is offered.

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 Irrigation	MAG 8000 Advanced
Measuring frequency in battery power mode (Manually selected)[1)]	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	Yes	Yes
Leakage detection	No	Yes
Meter utilization	No	Yes
Statistics	No	Yes
Tariff	No	Yes
Settle date (Revenue)	No	Yes

1) Excitation frequency settings with mains power supply, see technical specifications for each version

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.

SIMATIC PDM

Details about the SIMATIC PDM tool can be found in chapter "Communication and Software" (see page 8/5).

Technical specifications

Transmitter	
Installation	Compact (integral) Remote with factory-mounted cable 5, 10, 20 or 30 m (16.4, 32.8, 65.6 or 98.4 ft)
Enclosure	Stainl. 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
Resolution	Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default)
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 Ml and flow rate as Ml/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, BBL42 Flow: m^3/min, m^3/d, l/s, l/min, GPS, GPH, GPD, MGD, CFS, CFM, CFH, BBL42/s, BBL42/min, BBL42/h, BBL42/d
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	• 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" • 3G/UMTS module with or without analog input cable
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.
Cable	3 m (9.8 ft) for external connection to mains supply (without cable plug)

Features	
Application identification	Tag number up to 15 characters
Time and date	Device embedded Real Time Clock (Synchronization with NTP server if 3G/UMTS module connected)
Totalizer	
MAG 8000	Totalizer 1 and Totalizer 2: Configurable to Forward, Reverse and Bidirectional netflow Totalizer3 (following totalizer 1 setting) resetable via display key
Measurement	
Low flow cut-off	
• 7ME6810	Cut-off at 15 mm/s
• 7ME6820	Cut-off at 15 mm/s
• 7ME6880	1 % of Qmax (adjustable)
Empty pipe detection	Symbolised in display
Data logger	Logging of 26 records: selectable as daily, weekly or monthly logging
Alarm	Active alarm is indicated on the display
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	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	• Meter configuration – online and offline mode • Own parameter settings • Parameter documentation • Print and export of data and parameters • PDM 9.0 Service Pack 1

Battery-operated water meter MAG 8000

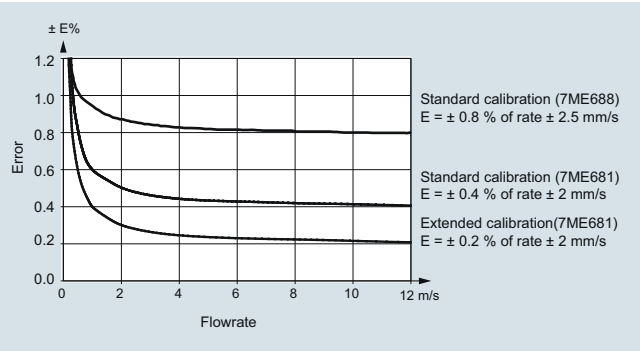
MAG 8000 water meter uncertainty

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

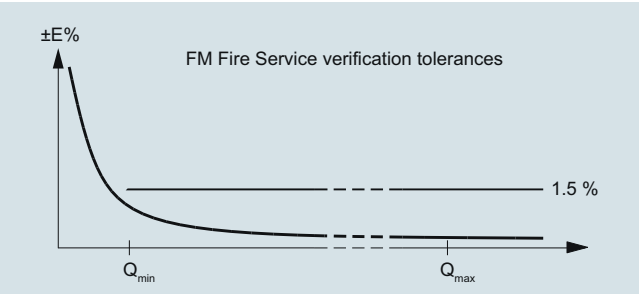
Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m^3/h to 10 000 m^3/h.
Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

The selected calibration determines the accuracy of the meter. A standard calibration results in max. ± 0.4 % uncertainty and an extended calibration ± 0.2 % (for MAG 8000 irrigation ± 0.8 %). A calibration certificate follows every sensor and calibration data are stored in the meter unit.



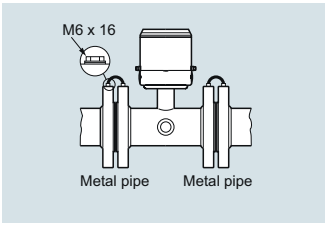
MAG 8000 (7ME6810) for Fire Service applications

MAG 8000 (7ME6810) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22



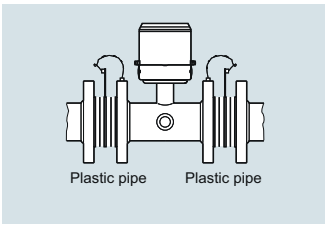
Grounding

The sensor body must be grounded using grounding straps and/or grounding rings to protect the flow signal against stray electrical noise. This ensures that the noise is carried through the sensor body and a noise-free measuring area within the sensor body. For MAG 8000 Irrigation grounding rings on both sides are factory-mounted.



Metal pipes

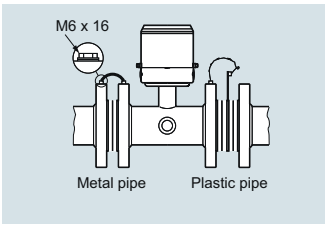
On metal pipes, connect the straps to both flanges.



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“



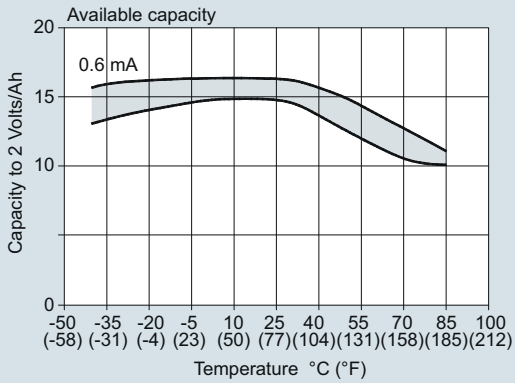
Combination of metal and plastic pipes

A combination of metal and plastic requires straps for metal pipe and grounding rings for plastic pipe.

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.



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

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

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	• 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**
2 D-Cell battery 33 Ah Internal battery pack	DN 25 ... 150 (1" ... 6")	9 years	9 years	7 years	43 months	8 months	3 months	2 months
	DN 200 … 600 (8" ... 24")	9 years	6 years	4 years	22 months	3 months	1 month	N/A
	DN 700 ... 1 200 (28" ... 48")	7 years	4 years	2 years	12 months	1 month	N/A	N/A
4 D-Cell battery 66 Ah External battery pack	DN 25 ... 150 (1" ... 6")	15 years	15 years	14 years	86 months	16 months	7 months	4 months
	DN 200 … 600 (8" ... 24")	15 years	13 years	8 years	44 months	7 months	3 months	N/A
	DN 700 ... 1 200 (28" ... 48")	14 years	9 years	5 years	24 months	3 months	N/A	N/A

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 Internal battery pack	DN 25 ... 600 (1" ... 24")	52 months	3 years	25 months	12 months	2 months	1 month
	DN 700 ... 1 200 (28" ... 48")	3 years	2 years	1 years	6 months	1 month	N/A
2 D-Cell battery 33 Ah Internal battery pack	DN 50 … 600 (2" ... 24")	8 years	6 years	4 years	22 months	3 months	2 months
	DN 700 ... 1 200 (28" ... 48")	6 years	4 years	2 years	12 months	1 month	N/A
4 D-Cell battery 66 Ah External battery pack	DN 50 ... 600 (2" ... 24")	10 years	10 years	8 years	44 months	7 months	4 months
	DN 700 ... 1 200 (28" ... 48")	10 years	8 years	5 years	24 months	3 months	N/A

Typical battery lifetime scenario for MAG 8000 with 3G module	
Transmission once a day and MAG 8000 factory settings	
2 D-Cell battery 33 Ah Internal battery pack	3 ... 4 years
4 D-Cell battery 66 Ah External battery pack	7 ... 8 years

External battery pack can be used as battery backup for mains power supply (if two cable entries in one cable gland are needed, order cable glands with two entries, see accessories on page 3/136).

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:
  - Switched on constantly:
    6.4 months for 2 D-cell internal battery pack / 12.8 months for 4 D-cell ext. battery pack
  - Switched on 2 s/day:
    39 months for 2 D-cell internal battery pack / 78 months for 4 D-cell ext. battery pack
- RS 485:
  - With the termination resistor on:
    2.3 months for 2 D-cell internal battery pack / 4.6 months for 4 D-cell ext. battery pack
  - With the termination resistor off:
    39 months for 2 D-cell internal battery pack / 78 months for 4 D-cell ext. battery pack, in case the entire communication time is less than 4 hours/day

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

Overview

Benefits

Easy to install

- Compact or remote solution with factory mounted cable
- 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

Long-term stability/Low cost of ownership

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfil various customer requirements for high cost efficiency
- Up to 0.2 % maximum uncertainty
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications

Intelligent information, easy to access

- Advanced information on site
- Advanced statistics and diagnostics
- Optional high-performance 3G/UMTS module offers an efficient solution for remote measurement and monitor via wireless networks.

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
Low flow cut-off (default)	15 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 (-40 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH_2O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH_2O for six months
Certificates and approvals	
Calibration	
• Standard calibration	2 x 25 % and 2 x 90 % (default)
• Special calibration	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, 10-point
Material certificate EN 10204-3.1	Available when ordering together with meter[1]
Drinking water approvals	• NSF/ANSI Standard 61[2] (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB)
Fire Service Approvals	FM Fire Service Meter (Class Number 1044)[3]
Conformity	• PED: 97/23EC[4] For pressure/temperature curves see MAG 3100 on page 3/68. • EMC: IEC/EN 61326
Sensor version	DN 25 … 1200 (1" … 48")
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4M, according to ISO 12944
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; reduced 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	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 C276/2.4819
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor.

1) Has to be ordered with the meter. It is not possible to order the certificate afterwards.

2) Including Annex G

3) Not for sensors with 300 µm coating.

4) For further information on the PED standard and requirements see page 10/15.

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

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter ↗	**7ME6810-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 25 (1“)	2D
DN 40 (1½“)	2R
DN 50 (2“)	2Y
DN 65 (2½“)	3F
DN 80 (3“)	3M
DN 100 (4“)	3T
DN 125 (5“)	4B
DN 150 (6“)	4H
DN 200 (8“)	4P
DN 250 (10“)	4V
DN 300 (12“)	5D
DN 350 (14“)	5K
DN 400 (16“)	5R
DN 450 (18“)	5Y
DN 500 (20“)	6F
DN 600 (24“)	6P
DN 700 (28“)[1]	6Y
DN 750 (30“)[1]	7D
DN 800 (32“)[1]	7H
DN 900 (36“)[1]	7M
DN 1000 (40“)[1]	7R
DN 1050 (42“)[1]	7U
DN 1100 (44“)[1]	7V
DN 1200 (48“)[1]	8B
Flange norm and pressure rating	
EN 1092-1	
PN 10 (DN 200 ... 1200 (8" ... 48"))	B
PN 16 (DN 50 ... 1200 (2" ... 48"))	C
PN 16 non-PED (DN 700 .... 1200 (28"... 48"))	D
PN 40 (DN 25 ... 40 (1" ... 1½“))	F
ANSI B16.5	
Class 150	J
AWWA C-207	
Class D (28" ... 48")	L
AS4087	
PN 16 (DN 50 ... 1200 (2" ... 48"))	N
Sensor version	
EPDM liner and Hastelloy electrodes, 150 µm coating	3
EPDM liner and Hastelloy electrodes , 300 µm coating	4
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, Ml/d, 50 Hz)	3
Transmitter type and installation	
Basic version integral on sensor	A
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs:	
• 5 m (16.4 ft)	B
• 10 m (32.8 ft)	C
• 20 m (65.6 ft)	D
• 30 m (98.4 ft)	E
Advanced version integral on sensor	K

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter	**7ME6810-**
Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs:	
• 5 m (16.4 ft)	L
• 10 m (32.8 ft)	M
• 20 m (65.6 ft)	N
• 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 with Sensus protocol	D
3G/UMTS communication module with remote antenna; 5 m (16.4 ft) cable	S
3G/UMTS communication module with analog inputs and remote antenna; 5 m (16.4 ft) cable	T
Power supply	
Internal battery (no battery included)	0
Internal battery pack installed[2]	1
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (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

[1] The Diameter DN 700 (28") to DN 1200 (48") is only available as remote transmitter type installation.

[2] 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.

Operating instructions for SITRANS F M MAG 8000

Description	Article No.
• English	**A5E03071515**
• German	**A5E00740986**

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Operating instructions for MAG 8000 3G/UMTS communication module

Description	Article No.
• English	**A5E03644134**

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Certificate	
Material certificate according to EN 10204-3.1	**C12**[1]
Special calibration	
5-point calibration for DN 15 ... DN 200[2]	**D01**
5-point calibration for DN 250 ... DN 600[2]	**D02**
5-point calibration for DN 700 ... DN 1200[2]	**D03**
10-point calibration for DN 15 ... DN 200[3]	**D06**
10-point calibration for DN 250 ... DN 600[3]	**D07**
10-point calibration for DN 700 ... DN 1200[3]	**D08**
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 ... DN 200	**D11**
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 ... DN 600	**D12**
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 ... DN 1200	**D13**
5-point, matched-pair calibration for DN 15 ... DN 200[2]	**D15**
5-point, matched-pair calibr. for DN 250 ... DN 600[2]	**D16**
5-point, matched-pair calibr. for DN 700 ... DN 1200[2]	**D17**
10-point, matched-pair calibr. for DN 15 ... DN 200[3]	**D18**
10-point, matched-pair calibr. for DN 250 ... DN 600[3]	**D19**
10-point, matched-pair calibr. for DN 700 ... DN 1200[3]	**D20**
Flow unit	
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**
Ml/d	**L12**
m^3/d	**L13**
GPD	**L14**
BBL42/s	**L15**
BBL42/min	**L16**
BBL42/h	**L17**
BBL42/d	**L18**
Totalizer 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**
Volume unit	
m^3	**L40**
Ml	**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**
Al	**L51**
kl	**L52**
BBL42 (US oil barrel, 1 barrel = 42 US gallons)	**L54**
Pulse set up (default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)	
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[4]	**L70**
Volume per pulse A = x 0.001[4]	**L71**
Volume per pulse A = x 0.01[4]	**L72**
Volume per pulse A = x 0.1[4]	**L73**
Volume per pulse A = x 1[4]	**L74**
B function = FW, forward flow	**L80**
B function = RV, verse 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[4]	**L90**
Volume per pulse B = x 0.001[4]	**L91**
Volume per pulse B = x 0.01[4]	**L92**
Volume per pulse B = x 0.1[4]	**L93**
Volume per pulse B = x 1[4]	**L94**
Data logger set up (default month logging)	
DataloggerInterval = Daily	**M31**
DataloggerInterval = Weekly	**M32**
Factory mounted cables	
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**
Encoder interface cable with connector for ITRON 200WP radio, lenght 25 ft	**M90**
Encoder interface cable with connector for ITRON 200WP radio, length 5 ft	**M91**
SOFREL cable 2 m for LS42 data logger	**M92**
SOFREL cable 2 m for LS-Flow data logger	**M97**
FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)	
DN 50, DN 80 and DN 100 (2", 3" and 4")	**P20**
DN 150 and DN 200 (6" and 8")	**P21**
DN 250 and DN 300 (10" and 12")	**P22**
Region/customer specific labels	
KCC label (South Korea)	**W28**
DIN 43863 label[1]	**H21**
DIN 43863 label with SWM mark[1]	**H22**

[1] Under preparation

[2] 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

[3] Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

[4] Pulse width = 10 ms

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

Overview

Benefits

Approvals
- MI-001, OIML R 49/OIML R 49 MAA
- PTB K7.2
- FM Fire Service

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

Long-term stability/Low cost of ownership
- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfil various customer requirements for high cost efficiency
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications
- Insignificant pressure drop

Intelligent information, easy to access
- Advanced information on site
- Advanced statistics and diagnostics
- Connectable to common AMR systems

Technical specifications

Meter	
Accuracy	OIML R 49/OIML R 49 MAA for DN 50 ... DN 300 (2" ... 12"), Class I and II with turn down up to Q3/Q1 = 400 at Q2/Q1 =1.6 MI-001 verification for DN 50 … DN 600 (2" ... 24"), Class II with turn down ratio Q3/Q1 = 250, Q3/Q1 = 200 or Q3/Q1 = 160 at Q2/Q1 = 1.6 FM Fire Service for DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") ± 1.5% (Q_{min} to Q_{max})
Low flow cut-off (default)	15 mm/s
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F) MI-001: -25 ... +55 °C (-13 ... +131 °F)
Media	0.1 ... 50 °C (32 ... 122 °F)
Storage	-40 ... +70 °C (-22 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH_2O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH_2O for six months
Certificates and approvals	
Calibration (standard)	2 x 25 % and 2 x 90 %
Material certificate EN 10204 3.1	Available when ordering together with meter[1]
Drinking water approvals	• NSF/ANSI Standard 61[2] (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB)
Fire Service approval	FM Fire Service (1044)[3]
Custody transfer approval	• OIML R 49 and OIML R 49 MAA approval (DN 50 ... DN 300 (2" ... 12")) • MI-001 approval (DN 50 ... DN 600 (2" ... 24")) (DK-0200-MI-001-011) • PTB K7.2
Conformity	• CEN EN 14154, ISO 4064 • PED: 2014/68/EU[4] • EMC: IEC/EN 61326
Sensor version	DN 50 ... 600 (2" ... 24")
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4M, according to ISO 12944
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

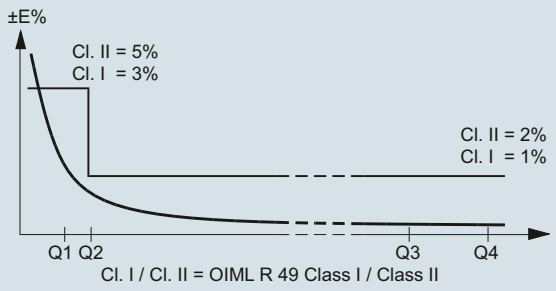
Advanced version	
• Battery-powered	DN 50 ... 150 (2" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) DN 200 … 600 (8" … 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime)
• Mains-powered	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 … 600 (8" … 24"): 3.125 Hz
Flanges	
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	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 C276/2.4819
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor

1) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
2) Including Annex G
3) Not for sensors with 300 µm coating.
4) For further information on the PED standard and requirements see page 10/15.

3

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.



Cl. I / Cl. II = OIML R 49 Class I / Class II

OIML R 49/2006-DK2-10.01 Revision 1 approval specification for Class I (1 %)[1)]

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")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R" Q3/Q1	250	250	250	250	250	250	250	250	125	-	-	-	-	-
Q1 [m^3/h]	0.25	0.40	0.63	1.00	160	2.50	4.00	6.40	12.8	-	-	-	-	-
Q2 [m^3/h]	0.40	0.64	1.00	1.60	2.60	4.00	6.40	10.24	20.48	-	-	-	-	-
Q3 [m^3/h]	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**	**1600**	-	-	-	-	-
Q4 [m^3/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000	-	-	-	-	-

OIML R 49/2006-DK2-10.01 Revision 1 approval specification for Class II (2 %)[1)]

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")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R" Q3/Q1	400	400	400	400	400	400	400	400	200	-	-	-	-	-
Q1 [m^3/h]	0.16	0.25	0.40	0.63	1.00	1.60	2.50	4.00	10.00	-	-	-	-	-
Q2 [m^3/h]	0.25	0.40	0.63	1.00	1.60	2.50	4.00	6.40	16.00	-	-	-	-	-
Q3 [m^3/h]	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**	**1600**	-	-	-	-	-
Q4 [m^3/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000	-	-	-	-	-

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 for revenue and bulk metering (7ME6820)

MAG 8000 CT (Revenue program) MI-001

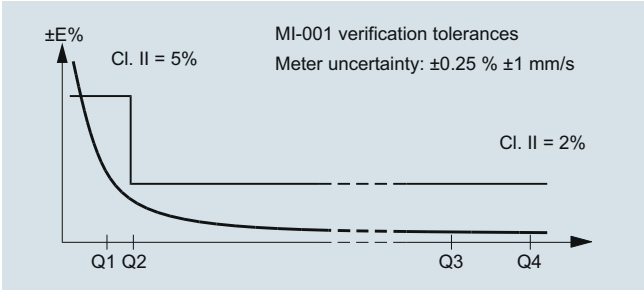
MAG 8000 CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 8000 CT MI-001 verified and labeled products are a Class II aproval according to Directive 2014/32/EU of the European Parliament and Council of 26 February, 2014 on measuring instruments, Annex VI Thermal Energy Meters (MI-004) in the sizes from DN 50 to DN 400.

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 Q4/Q3 = 1.25 and Q2/Q1 = 1.6 measuring ranges see below table:

7ME6820-xxxx1	**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“)**	**DN 350 (14“)**	**DN 400 (16“)**	**DN 450 (18“)**	**DN 500 (20“)**	**DN 600 (24“)**
„R“ Q3/Q1	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Q4 [m^3/h]	20	31.25	50	78.75	125	200	312.5	500	787.5	1250	1250	1250	2000	3125
Q3 [m^3/h]	**16**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**630**	**1000**	**1000**	**1600**	**1600**
Q2 [m^3/h]	0.96	1.60	2.60	4.03	6.40	10.24	16	25.60	40.3	64	64	64	102.4	160
Q1 [m^3/h]	0.60	1	1.60	2.52	4	6.40	10	16	25.2	40	40	40	64	100

7ME6820-xxxx2	**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“)**	**DN 350 (14“)**	**DN 400 (16“)**	**DN 450 (18“)**	**DN 500 (20“)**	**DN 600 (24“)**
„R“ Q3/Q1	63	63	63	63	63	63	63	63	63	63	63	63	63	63
Q4 [m^3/h]	20	31.25	50	78.75	125	200	312.5	500	750	1250	1250	3125	3125	5000
Q3 [m^3/h]	**16**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1000**	**2500**	**2500**	**4000**
Q2 [m^3/h]	0.41	0.63	1.02	1.60	2.54	4.06	6.35	10.16	16	25.4	25.4	63.49	63.49	101.6
Q1 [m^3/h]	0.25	0.40	0.63	1	1.59	2.54	3.97	6.35	10	15.9	15.9	39.68	39.68	63.49

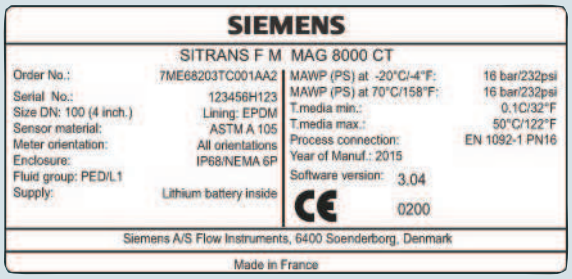
7ME6820-xxxx3	**DN 50 (2“)**	**DN 65 (2½“)**	**DN 80 (3“)**	**DN 100 (4“)**	**DN 125 (5“)**	**DN 150 (6“)**	**DN 200 (8“)**	**DN 250 (10“)**	**DN 300 (12“)**	**DN 350 (14“)**	**DN 400 (16“)**	**DN 450 (18“)**	**DN 500 (20“)**	**DN 600 (24“)**
„R“ Q3/Q1	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Q4 [m^3/h]	20	31.25	50	78.75	125	200	312.5	500	1250	2000	2000	5000	5000	7875
Q3 [m^3/h]	**16**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**1000**	**1600**	**1600**	**4000**	**4000**	**6300**
Q2 [m^3/h]	0.32	0.50	0.80	1.20	2	3.20	5	8	20	32	32	80	80	126
Q1 [m^3/h]	0.20	0.31	0.50	0.75	1.25	2	3.13	5	12.50	20	20	50	50	78.75

7ME6820-xxxx4	**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“)**	**DN 350 (14“)**	**DN 400 (16“)**	**DN 450 (18“)**	**DN 500 (20“)**	**DN 600 (24“)**
„R“ Q3/Q1	160	160	160	160	160	160	160	160	160	160	160	160	160	-
Q4 [m^3/h]	50	78.75	125	200	312.5	500	787.5	1250	2000	2000	2000	7875	7875	-
Q3 [m^3/h]	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**	**1600**	**1600**	**6300**	**6300**	-
Q2 [m^3/h]	0.40	0.63	1	1.60	2.50	4	6.30	10	16	16	16	63	63	-
Q1 [m^3/h]	0.25	0.39	0.63	1	1.56	2.50	3.94	6.25	10	10	10	39	39	-

7ME6820-xxxx5	**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“)**	**DN 350 (14“)**	**DN 400 (16“)**	**DN 450 (18“)**	**DN 500 (20“)**	**DN 600 (24“)**
„R“ Q3/Q1	200	200	200	200	200	200	200	200	200	-	-	-	-	-
Q4 [m^3/h]	50	78.75	125	200	312.5	500	787.5	1250	2000	-	-	-	-	-
Q3 [m^3/h]	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**	-	-	-	-	-
Q2 [m^3/h]	0.32	0.50	0.80	1.28	2	3.20	5.04	8	12.8	-	-	-	-	-
Q1 [m^3/h]	0.20	0.32	0.50	0.80	1.25	2	3.15	5	8	-	-	-	-	-

7ME6820-xxxx6	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“)	DN 350 (14“)	DN 400 (16“)	DN 450 (18“)	DN 500 (20“)	DN 600 (24“)
„R“ Q3/Q1	250	250	250	250	250	250	250	250	-	-	-	-	-	-
Q4 [m^3/h]	50	78.75	125	200	312.5	500	787.5	1250	-	-	-	-	-	-
Q3 [m^3/h]	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**-**	**-**	**-**	-	-	-
Q2 [m^3/h]	0.26	0.40	0.64	1.02	1.60	2.56	4	6.40	-	-	-	-	-	-
Q1 [m^3/h]	0.16	0.25	0.40	0.64	1	1.60	2.52	4	-	-	-	-	-	-

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”.

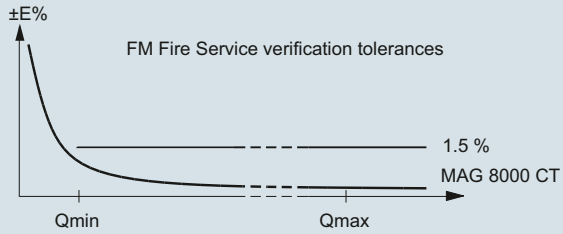
Battery operation time and calculation

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).

MAG 8000 CT (7ME6820) for Fire Service applications

MAG 8000 CT (7ME6820) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



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

Selection and Ordering data	Article No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes ↗	7ME6820-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 50 (2")	2Y
DN 65 (2½")	3F
DN 80 (3")	3M
DN 100 (4")	3T
DN 125 (5")	4B
DN 150 (6")	4H
DN 200 (8")	4P
DN 250 (10")	4V
DN 300 (12")	5D
DN 350 (14")[1]	5K
DN 400 (16")[1]	5R
DN 450 (18")[1]	5Y
DN 500 (20")[1]	6F
DN 600 (24")[1]	6P
Flange norm and pressure rating	
EN 1092-1	
PN 16	C
ANSI B16.5	
Class 150	J
AS4087	
PN 16	N
Sensor version	
EPDM liner and Hastelloy electrodes, 150 µm coating	0
EPDM liner and Hastelloy electrodes, 300 µm coating	4
Approval/Verification[3]	
Without verification according to OIML R 49[4]	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 calibrated to OIML R 49-Class II (Q3/Q1 = 100)	7
Without verification calibrated to OIML R 49-Class II (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 cables mounted on sensor with IP68/NEMA 6P plugs	
5 m (16.4 ft)	B
10 m (32.8 ft)	C
20 m (65.6 ft)	D
30 m (98.4 ft)	E
Advanced version integral on sensor	K
Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs	
5 m (16.4 ft)	L
10 m (32.8 ft)	M
20 m (65.6 ft)	N
30 m (98.4 ft)	P

Selection and Ordering data	Article No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes	7ME6820-
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
3G/UMTS communication module with remote antenna; 5 m (16.4 ft) cable	S
3G/UMTS communication module with analog inputs and remote antenna; 5 m (16.4 ft) cable	T
Power supply	
Internal battery (no battery included)	0
Internal battery pack installed[2]	1
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (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

1) Under preparation.

2) 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.

3) For more details and references of the ranges please see the tables on pages 3/125 to 3/127.

4) Standard calibration or according to FM Fire Service requirements if P20, P21 or P22 is selected as Z option.

Operating instructions for SITRANS F M MAG 8000

Description	Article No.
• English	A5E03071515
• German	A5E00740986

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Operating instructions for MAG 8000 3G/UMTS communication module

Description	Article No.
• English	A5E03644134

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	**C12**[1]
FP2E marking (France only)	**C17**
Totalizer 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**
Pulse set up (default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)	
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[2]	**L71**
Volume per pulse A = x 0.01[2]	**L72**
Volume per pulse A = x 0.1[2]	**L73**
Volume per pulse A = x 1[2]	**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[2]	**L91**
Volume per pulse B = x 0.01[2]	**L92**
Volume per pulse B = x 0.1[2]	**L93**
Volume per pulse B = x 1[2]	**L94**
Data logger set up (default month logging)	
DataloggerInterval = Daily	**M31**
DataloggerInterval = Weekly	**M32**
Factory mounted cables	
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 cable 2 m for LS42 data logger	**M92**
SOFREL cable 2 m for LS-Flow data logger	**M97**
FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)	
DN 50, DN 80 and DN 100 (2", 3" and 4")	**P20**
DN 150 and DN 200 (6" and 8")	**P21**
DN 250 and DN 300 (10" and 12")	**P22**

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Region/customer specific label	
KCC label (South Korea)	**W28**
FP2E label (France)	**H20**
DIN 43863 label[1]	**H21**
DIN 43863 label with SWM mark[1]	**H22**

[1] Under preparation

[2] Pulse width = 10 ms

3

MAG 8000 for irrigation applications (7ME6880)

Overview

Benefits

- IP68/NEMA 6P rating with tamper proof
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities
- No moving parts in a robust construction means less wear and tear
- Up to 8 years maintenance-free operation in typical application
- Connectable to AMR systems
- Adaptor for conduit installation to provide a clean, protected pathway for device cables

Technical specifications

Meter	
Accuracy	± 0.8 % ± 2.5 mm/s ± 0.4 % ± 2.5 mm/s NMI (class 2.5)
Low flow cut-off (default)	1.0 %
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 (-40 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH_2O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH_2O for six months
Approvals	
Drinking water approvals	• ANSI/NSF 61[1] (cold water) USA • WRAS (BS 6920 cold water) UK
Custody transfer approval	NMI M 10 Australia (DN 50 to DN 1200)
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4M, according to ISO 12944
Conformity	IEC/EN 61326
Flanges	
EN 1092-1 (DIN 2501) PN 10 drilled pattern	DN 50 ... 600 (2" ... 24") (max. pressure 7 bar (101.5 psi))
ANSI 16.5 Class 150 drilled pattern	2" ... 24" (max. pressure 7 bar (101.5 psi))
AS 2091-1 Table D drilled pattern	DN 50 ... 600 (2" ... 24") (max. pressure 7 bar (101.5 psi))
AS 2129 Table E	DN 25, DN 40, DN 125 (1", 1½", 5")
AS 4087 PN 16	DN 50 ... DN 1200 (2" ... 48")
Excitation frequency	
Battery-powered	DN 50 … 600 (2" … 24"): 1/15 Hz DN 700 … 1200 (28" … 48"): 1/60 Hz
Mains-powered	DN 50 … 600 (2" … 24"): 3.125 Hz DN 700 … 1200 (28" … 48"): 1.5625 Hz
Liner	Ebonite
Electrodes	Stainless steel AISI 316Ti/1.4571

[1] Including Annex G

NMI M 10 measuring range

7ME6880	DN 25 (1“)	DN 40 (1½“)	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“)	DN 350 (14“)
„R“ Q3/Q1	10	10	10	10	10	10	10	10	10	10	10	10
Q4 [m^3/h]	11.25	28.75	43.75	75	112.5	175	275	375	687.5	750	1625	2125
Q3 [m^3/h]	**9**	**23**	**35**	**60**	**90**	**140**	**220**	**300**	**550**	**600**	**1300**	**1700**
Q1 [m^3/h]	0.9	2.3	3.5	6	9	14	22	30	55	60	130	170

7ME6880	DN 400 (16“)	DN 450 (18“)	DN 500 (20“)	DN 600 (24“)	DN 700 (28“)	DN 750 (30“)	DN 800 (32“)	DN 900 (36“)	DN 1000 (40“)	DN 1050 (42“)	DN 1100 (44“)	DN 1200 (48“)
„R“ Q3/Q1	10	10	10	10	10	10	10	10	10	10	10	10
Q4 [m^3/h]	2125	2250	2250	2250	4375	4375	5000	5000	5000	5000	5000	5000
Q3 [m^3/h]	**1700**	**1800**	**1800**	**1800**	**3500**	**3500**	**4000**	**4000**	**4000**	**4000**	**4000**	**4000**
Q1 [m^3/h]	170	180	180	180	350	350	400	400	400	400	400	400

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter including factory-mounted grounding rings ↗	**7ME6880-** ■■■■■-■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 25 (1“)	2D
DN 40 (1½“)	2R
DN 50 (2“)	2Y
DN 65 (2½“)	3F
DN 80 (3“)	3M
DN 100 (4“)	3T
DN 125 (5“)	4B
DN 150 (6“)	4H
DN 200 (8“)	4P
DN 250 (10“)	4V
DN 300 (12“)	5D
DN 350 (14“)	5K
DN 400 (16“)	5R
DN 450 (18“)	5Y
DN 500 (20“)	6F
DN 600 (24“)	6P
DN 700 (28“)	6Y
DN 750 (30“)	7D
DN 800 (32“)	7H
DN 900 (36“)	7M
DN 1000 (40“)	7R
DN 1050 (42“)	7U
DN 1100 (44“)	7V
DN 1200 (48“)	8B
Flange norm and pressure rating	
EN 1092-1 drilled pattern PN 10/max. 7 bar (101 psi)	B
ANSI B16.5 drilled pattern Cl 150/max. 7 bar (101 psi)	J
AS2129 drilled pattern table D/max. 7 bar (101 psi)	M
AS2129 table E (DN 25, DN 40, DN 125)	G
AS4087 PN 16 (DN 50 ... DN 1200)	N
Sensor version	
Ebonite liner and stainless steel electrodes	4
Calibration	
± 0.8 %, ± 2.5 mm/s	0
± 0.4 %, ± 2.5 mm/s	1
NMI (2.5 %)	3
Region version	
Europe (m^3, m^3/h, 50 Hz)	1
USA (Gallon, GPM, 60 Hz)	2
Australia (Ml, Ml/d, 50 Hz)	3
Transmitter type and installation	
Basic version integral on sensor	A
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs	
2 m (6.56 ft)	T
5 m (16.4 ft)	B
10 m (32.8 ft)	C
20 m (65.6 ft)	D
30 m (98.4 ft)	E

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter including factory-mounted grounding rings	**7ME6880-** ■■■■■-■■■■
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 inferface	D
3G/UMTS communication module with remote antenna and 5 m (16.4 ft) cable	S
3G/UMTS communication module with analog input, remote antenna and 5 m (16.4 ft) cable	T
Power supply	
Internal battery (no battery included)	0
Internal battery pack installed 2 D-cell[1) 2)]	1
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (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
Internal battery pack installed 1 D-cell[1) 2)]	5

[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.

[2)] Can be ordered by US region only.

Operating instructions for SITRANS F M MAG 8000

Description	Article No.
• English	**A5E03071515**
• German	**A5E00740986**

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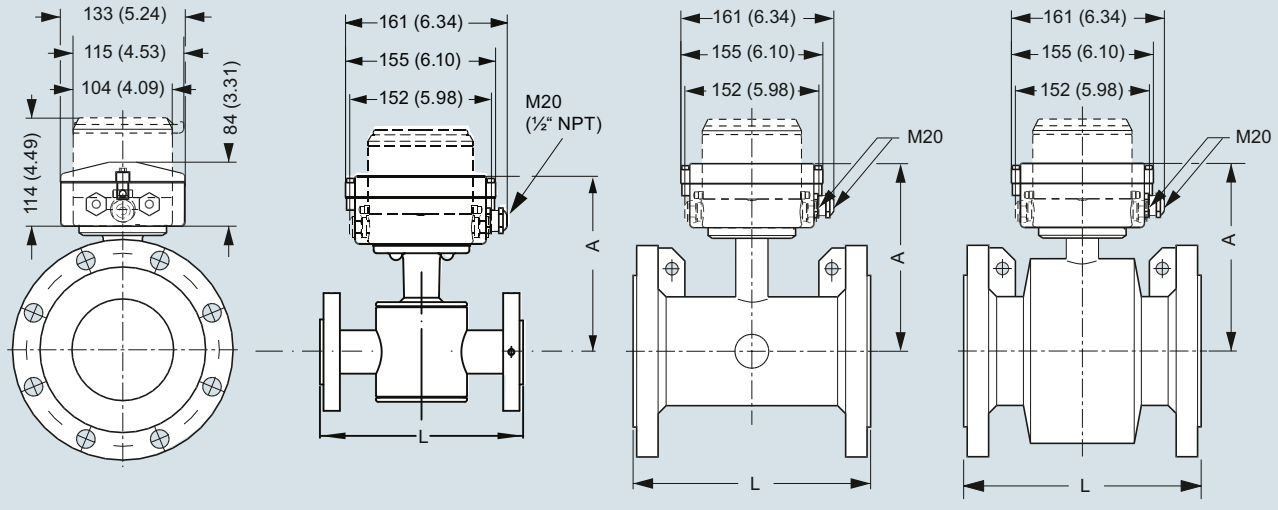
MAG 8000 for irrigation applications (7ME6880)

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Flow unit	
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**
Ml/d	**L12**
m^3/d	**L13**
GPD	**L14**
Totalizer 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**
Volume unit	
m^3	**L40**
Ml	**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**
Al	**L51**
kl	**L52**
Pulse set up (default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)	
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 [1]	**L70**
Volume per pulse A = x 0.001 [1]	**L71**
Volume per pulse A = x 0.01 [1]	**L72**
Volume per pulse A = x 0.1 [1]	**L73**
Volume per pulse A = x 1 [1]	**L74**
Pulse A pulse width 5 ms (volume per pulse x 1)	**L75**
Pulse A pulse width 10 ms (volume per pulse x 1)	**L76**
Pulse A pulse width 50 ms (volume per pulse x 1)	**L77**
Pulse A pulse width 100 ms (volume per pulse x 1)	**L78**
Pulse A pulse width 500 ms (volume per pulse x 1)	**L79**
B function = FW, forward flow	**L80**
B function = RV, verse 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**

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Volume per pulse B = x 0.0001 [1]	**L90**
Volume per pulse B = x 0.001 [1]	**L91**
Volume per pulse B = x 0.01 [1]	**L92**
Volume per pulse B = x 0.1 [1]	**L93**
Volume per pulse B = x 1 [1]	**L94**
Device operation	
Only operator menu activated	**M11**
Data logger set up (default month logging)	
DataloggerInterval = Daily	**M31**
DataloggerInterval = Weekly	**M32**
Factory mounted cables	
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 cable 2 m for LS42 data logger	**M92**
SOFREL cable 2 m for LS-Flow data logger	**M97**
Adaptors for conduit installation	**M94**

[1] Pulse width = 10 ms

Dimensional drawings



7ME6810/7ME6820	DN 25 and 40 (1" and 1½")	DN 50 ... 300 (2" ... 12")	DN 350 ... 1200 (14" ... 48")
7ME6880	N/A	N/A	DN 25 ... 600 (1" ... 24") For DN 50 ... 300 (2" ... 12"): Add 7 mm (0.28") to length (L) For DN 350 ... 1200 (14" ... 48"): Add 8 mm (0.31") to length (L)

Dimensions in mm (inch)

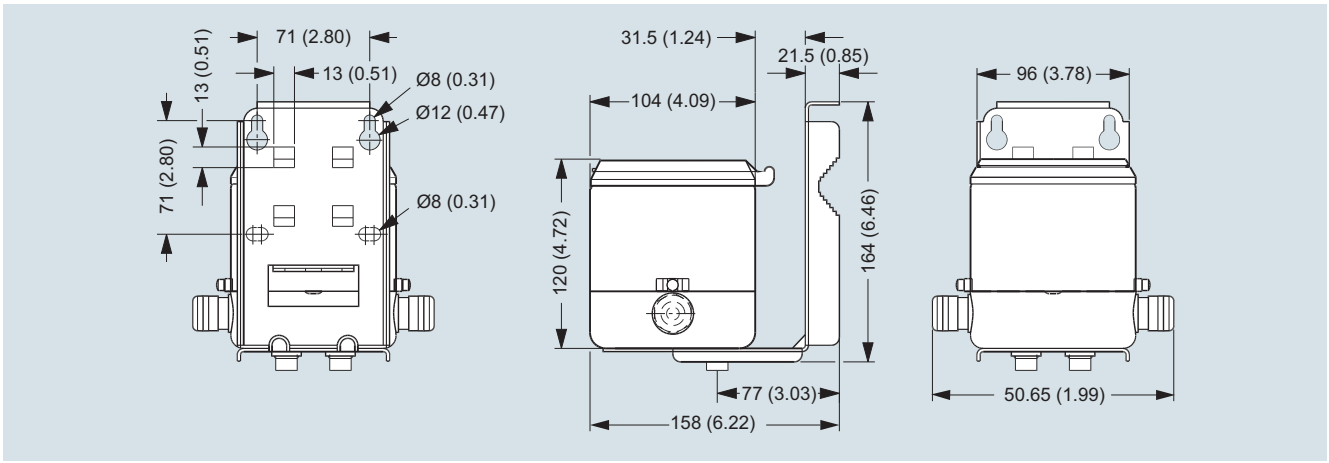
Nominal DN size	A	L, lenghts[1]							Weight[2]	
	EPDM (7ME6810 and 7ME6820)	EN 1092-1 PN 10	EN 1092-1 PN 16/ PN 16 non-PED	EN 1092-1 PN 40	ANSI 16.5 Class 150	AS 4087 PN 16	AWWA C-207 Class D	AS 2129 Table E		
mm (inch)	mm (inch)	mm	mm	mm	inch	mm	mm	mm	kg	lb
25 (1)	188 (7.4)	-	-	200	7.9	200	-	200	6	13
40 (1½)	203 (8.0)	-	-	200	7.9	200	-	200	9	20
50 (2)	178 (7.0)	-	200	-	7.9	200	-	-	11	25
65 (2½)	181 (7.1)	-	200	-	7.9	200	-	-	13	29
80 (3)	191 (7.5)	-	200	-	7.9	200	-	-	15	34
100 (4)	197 (7.8)	-	250	-	9.8	250	-	-	17	38
125 (5)	210 (8.3)	-	250	-	9.8	250	-	250	22	50
150 (6)	224 (8.8)	-	300	-	11.8	300	-	-	28	63
200 (8)	249 (9.8)	350	350	-	13.8	350	-	-	50	113
250 (10)	276 (10.9)	450	450	-	17.7	450	-	-	71	160
300 (12)	303 (11.9)	500	500	-	19.7	500	-	-	88	198
350 (14)	365 (14.4)	550	550	-	21.7	550	-	-	127	279
400 (16)	391 (15.4)	600	600	-	23.6	600	-	-	145	318
450 (18)	421 (16.6)	600	600	-	23.6	600	-	-	175	384
500 (20)	447 (17.6)	600	600	-	26.8	600	-	-	225	494
600 (24)	497 (19.6)	600	600	-	32.3	600	-	-	340	747
700 (28)	548 (21.6)	700	875/700	-	N/A	700	700	-	316	694
750 (30)	573 (22.6)	N/A	N/A	-	N/A	N/A	750	-	N/A	N/A
800 (32)	603 (23.7)	800	1000/800	-	N/A	800	800	-	398	1045
900 (36)	656 (25.8)	900	1125/900	-	N/A	900	900	-	476	1045
1000 (40)	708 (27.9)	1000	1250/1000	-	N/A	1000	1000	-	602	1322
1050 (42)	708 (27.9)	N/A	N/A	-	N/A	N/A	1050	-	N/A	N/A
1100 (44)	759 (29.9)	N/A	N/A	-	N/A	N/A	1100	-	N/A	N/A
1200 (48)	814 (32.0)	1200	1500/1200	-	N/A	1200	1200	-	887	1996

1) Tolerances on built-in length:
DN 15 to DN 200 (½" to 8"): +0/-3 mm (+0/-0.12"), DN 250 to DN 400 (10" to 16"): +0/-5 mm (+0/-0.20"),
DN 450 to DN 600 (18" to 24"): +5/-5 mm (+0.20/-0.20"), DN 700 to DN 1200 (28" to 48"): +10/-10 mm (+0.39/-0.39")

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

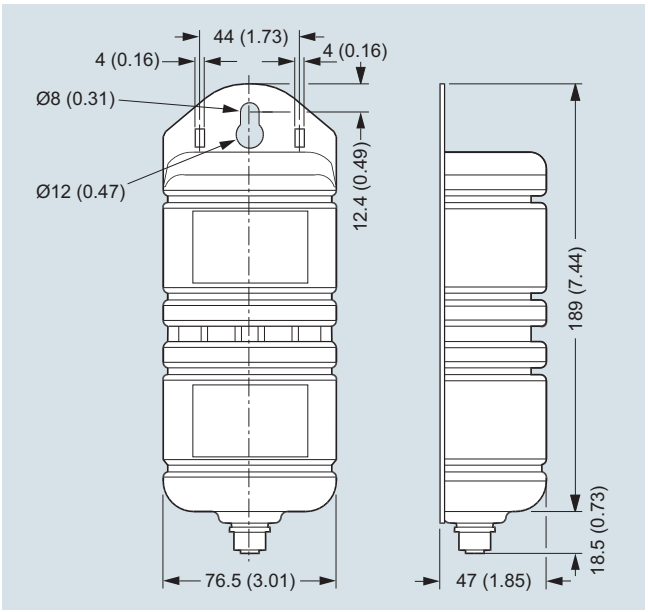
Battery-operated water meter MAG 8000

Remote version



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

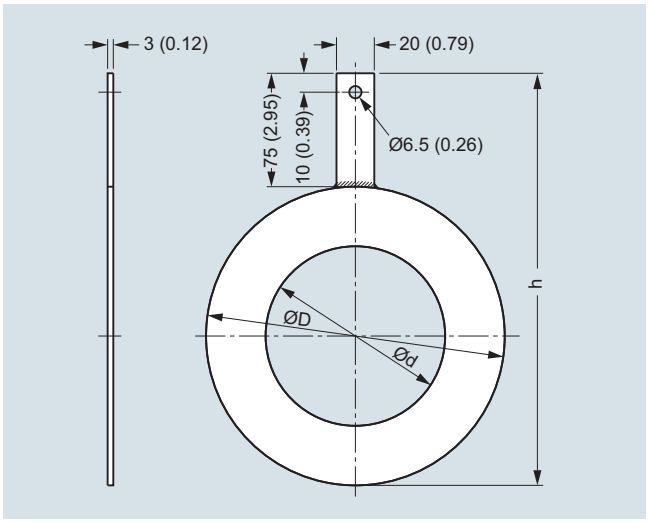
External battery pack



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

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

Grounding rings

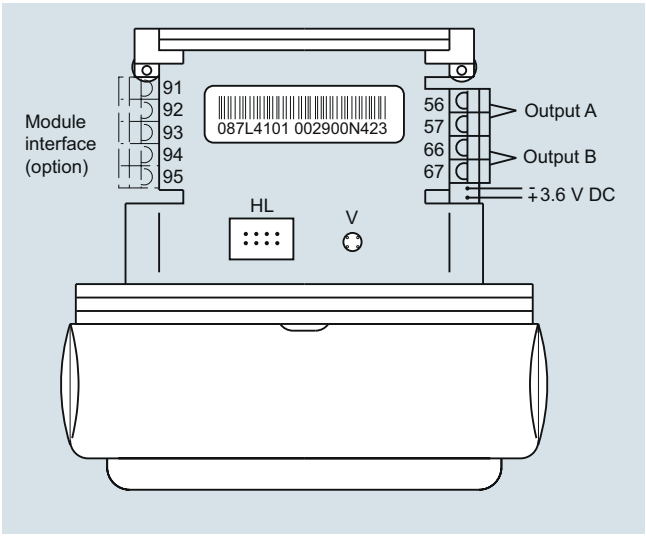


Dimensions in mm (inch) for grounding rings MAG 8000 with EPDM lining (7ME6810 and 7ME6820) DN 25 to DN 300

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	291
DN 200	193	268	343
DN 250	246	324	399
DN 300	295	374	449

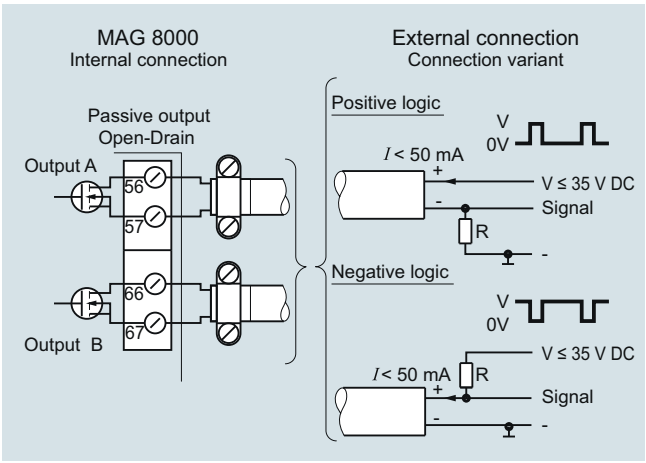
Schematics

Electrical installation and pulse output – Connection diagram



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

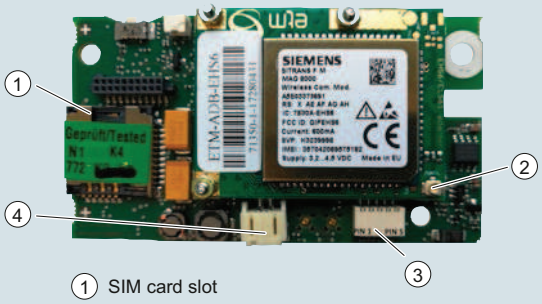
Pulse wire connection



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).

Electrical installation of 3G/UMTS module



1. SIM card slot
2. 3G/UMTS antenna connector
3. Analog inputs inlet
4. Rechargeable battery inlet

3