Battery-operated water meter MAG 8000/MAG 8000 CT

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
- 6 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

MAG 8000 has been developed as a stand alone water meter for applications within:

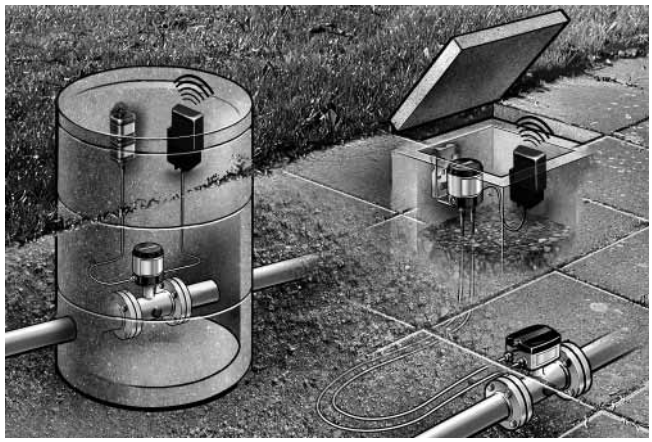
- Abstraction
- Distribution network
- Revenue and bulk metering
- Irrigation

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
- A Custody Transfer version for water billing, with type approval after OIML R 49 and verified according to MI-001 for DN 50 to DN 300 (2" to 12") pending up to DN 600 (24")
- 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)

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Battery-operated water meter MAG 8000/MAG 8000 CT

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 and MAG 8000 CT can be ordered as a Basic or an Advanced version. Both versions are configured to achieve 6 years battery operation in typical revenue applications.

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/MAG 8000CT	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

In MAG 8000 CT revenue parameters and data are protected against manipulation. Verification and sealings is used to obtain the MI-001 approval (MID).

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

Meter		
	MAG 8000 (7ME6810)	**MAG 8000 CT (7ME6820)**
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	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 300 (2" ... 12"), 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)	-20 ... +60 °C (-4 ... +140 °F)
Media	0 ... +70 °C (32 ... +158 °F)	0.1 ... +50 °C (32 ... +122 °F)
Storage	-40 ... +70 °C (-22 ... +158 °F)	-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	• NSF/ANSI Standard 61 (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB)	• 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	• OIML R 49 and OIML R49 MAA approval • MI-001 approval (Number: DK-0200-MI-001-002)
Conformity	• PED: 97/23EC • EMC: EN 61000-6-3, EN 61000-6-2, EN 61326-1	• CEN EN 14154, ISO 4064 • PED: 97/23EC • EMC: EN 61000-6-3, EN 61000-6-2, EN 61326-1
Sensor version	DN 25 … 1200 (1" … 48")	DN 50 ... 600 (2" ... 24") in preparation up to DN 600
Measuring principle	Electromagnetic induction	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	DN 50 ... 150 (2" ... 6"): 1/15 Hz DN 200 … 600 (8" … 24"): 1/30 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	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 … 600 (8" … 24"): 3.125 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 life-time)	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 25 ... 150 (1" ... 6"): 6.25 Hz DN 200 … 600 (8" … 24"): 3.125 Hz DN 700 ... 1200 (28" ... 48"): 1.5625 Hz	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 … 600 (8" … 24"): 3.125 Hz

SITRANS F M

Battery-operated water meter MAG 8000/MAG 8000 CT

Meter		
	MAG 8000 (7ME6810)	**MAG 8000 CT (7ME6820)**
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)	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	1" … 24": 20 bar (290 psi)	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 … 1200 (2" … 48"): PN 16 (232 psi)	DN 50 … 300 (2" … 12"): PN 16 (232 psi) up to DN 600 (24") in preparation
Liner	EPDM	EPDM
Electrode and grounding electrodes	Hastelloy C276	Hastelloy C276
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor	Grounding straps are premounted from the factory on each side of the sensor
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 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 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	• 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	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)	

Technical specifications

Transmitter	
Installation MAG 8000/ MAG 8000CT	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	• 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 and call-up function • Selectable default information and accessible menus: - 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: • 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 • Other units are ordered from factory or manually configured onsite 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
Digital output MAG 8000/ MAG 8000CT	• 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 or call-up • 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 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: 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)

Battery-operated water meter MAG 8000/MAG 8000 CT

Features	
Application identification	Tag number up to 15 characters
Time and date	Real time clock
Totalizer	
MAG 8000/ MAG 8000CT	2 totalizer: Forward, Reverse, Bidirectional netflow calculation and free selectable start value.
	1 customer totalizer, following totalizer 1 setting and resetable 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	Active alarm is indicated on the display
Monitoring	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	• 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

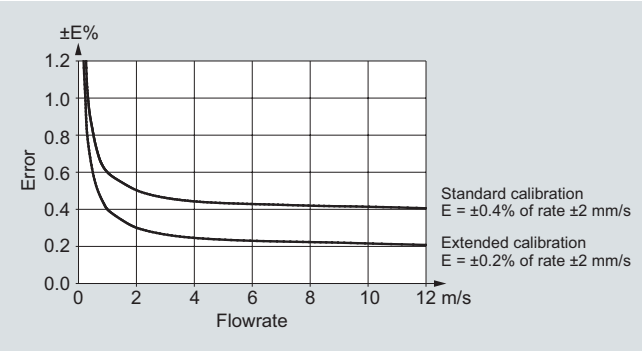
MAG 8000 water meter uncertainty

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 m^3/h to 4350 m^3/h.

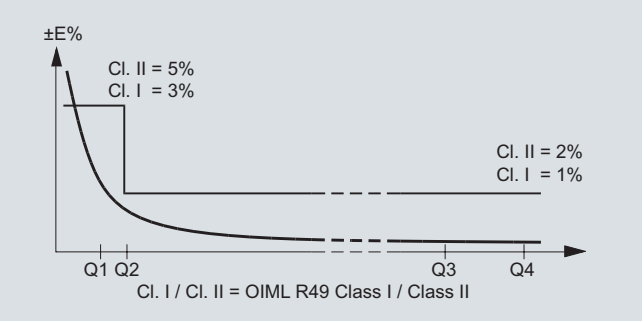
The accreditation bodies DANAK and UKAS have signed the ILAC MRA agreement (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries world wide, including the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



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.



Battery-operated water meter MAG 8000/MAG 8000 CT

OIML R 49 Pattern 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 [m^3/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000
Q3 [m^3/h]	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**	**1600**
Q2 [m^3/h]	0.40	0.64	1.00	1.60	2.50	4.00	6.40	10.0	16.0
Q1 [m^3/h]	0.25	0.40	0.63	1.00	1.60	2.50	4.00	6.40	10.0

OIML R 49 Pattern 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 [m^3/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000
Q3 [m^3/h]	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**	**1600**
Q2 [m^3/h]	0.25	0.40	0.63	1.00	1.60	2.50	4.00	6.40	10.0
Q1 [m^3/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

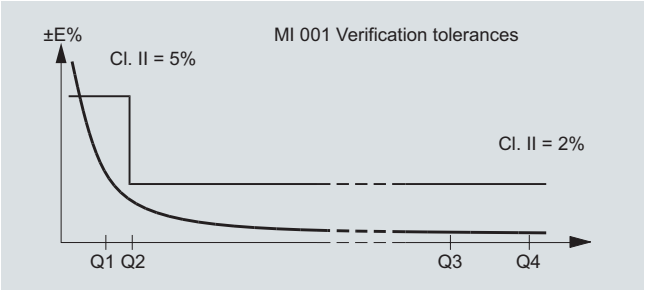
MAG 8000 CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 8000 CT MI-001 verified and labeled products are a Class II aproval 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 [m^3/h]	18.75	31.25	50	78.75	125	200	312.5	500	750
Q3 [m^3/h]	**15**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**600**
Q2 [m^3/h]	0.96	1.60	2.60	4.03	6.40	10.24	16.00	25.60	38.4
Q1 [m^3/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 [m^3/h]	18.75	31.25	50	78.75	125	200	312.5	500	750
Q3 [m^3/h]	**15**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**600**
Q2 [m^3/h]	0.38	0.63	1.02	1.60	2.54	4.06	6.35	10.20	15.24
Q1 [m^3/h]	0.24	0.40	0.63	1.00	1.59	2.54	3.97	6.35	9.52

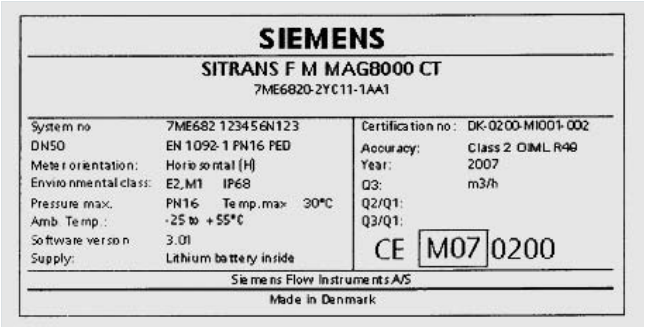
DN	50 (2“)	65 (2½“)	80 (3“)	100 (4“)	125 (5“)	150 (6“)	200 (8“)	250 (10“)	300 (12“)
„R“ Q3/Q1	80	80	80	80	80	80	80	80	80
Q4 [m^3/h]	18.75	31.25	50	78.75	125	200	312.5	500	750
Q3 [m^3/h]	**15**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**600**
Q2 [m^3/h]	0.31	0.50	0.80	1.20	2.00	3.20	5.00	8.00	12.0
Q1 [m^3/h]	0.19	0.31	0.50	0.75	1.25	2.00	3.13	5.00	7.5

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 [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]	0.40	0.63	1.00	1.60	2.50	4.00	6.30	10.00	16.00
Q1 [m^3/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 [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	2.00	3.20	5.00	8.00	12.60
Q1 [m^3/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 [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]	0.26	0.40	0.64	1.02	1.60	2.56	4.00	6.40	10.24
Q1 [m^3/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:

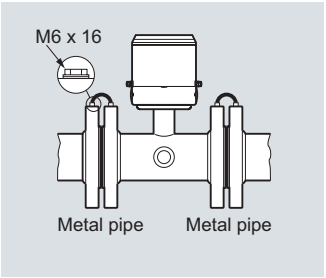


Installation conditions

Please refer to “System information SITRANS F M electromagnetic flowmeters”.
MAG 8000 CT has to be mounted in Integral (compact) and horizontal position only, to obtain the MI-001 certification.
Battery packs must be installed with the top part in upwards direction to reach maximum capacity.

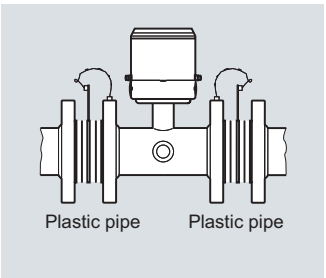
Bonding and grounding

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.



Metal pipelines

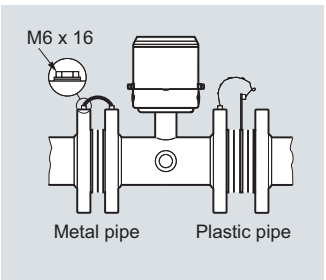
On metal pipelines, connect the straps to both flanges.



Plastic pipelines

On plastic pipelines and lined metal pipes, optional grounding rings must be used at both ends.

Grounding rings has to be ordered separately see „gounding ring KIT“

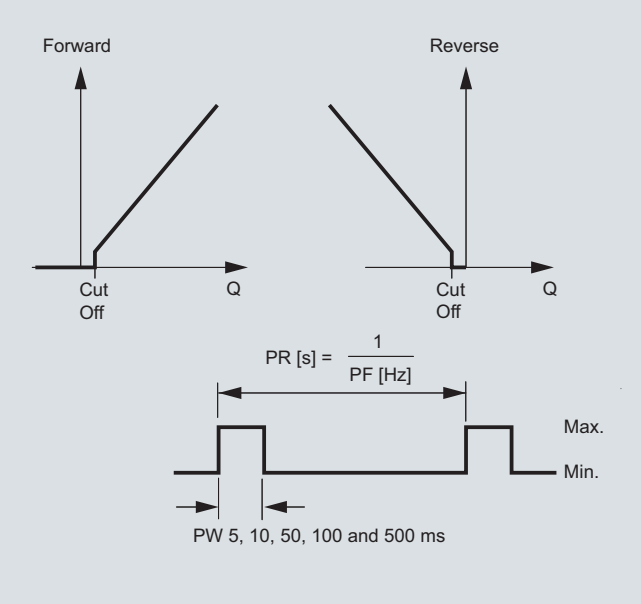


Combination of metal and plastic pipelines

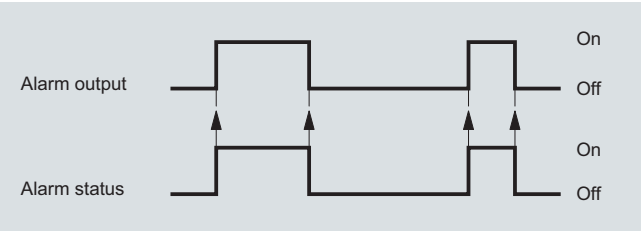
A combination of metal and plastic requires straps for metal pipeline and grounding rings for plastic pipeline.

Battery-operated water meter MAG 8000/MAG 8000 CT

Output configuration MAG 8000



Pulse volume: Output A/B configured as volume per pulse, the output delivers a pulse when the preset volume has passed the selected direction, calculated on forward/reverse or Net forward/reverse flow. The volume per pulse is freely scalable, from 0.0001 to 10 000 meter-unit per pulse. PR = pulse rate and PF = pulse frequency.



Alarm: The alarm will follow the internal alarm status.

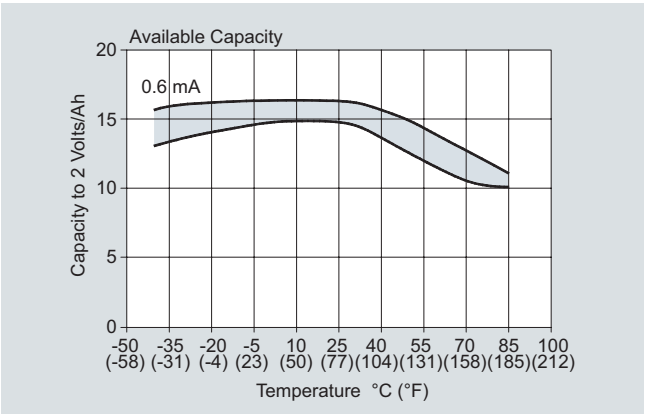
Output configuration MAG 8000 CT

MAG 8000 CT has same out put functionality as MAG 8000, due to MI-001 is only forward flow (output A predefined) and output B as Alarm output available).

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	• 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)

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

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

Selection and Ordering data	Order No.
SITRANS F M MAG 8000 water meter	**7ME6810 - ■■■■■ - ■■■■**
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]	**7T**
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 none 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	**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**

Selection and Ordering data	Order No.
SITRANS F M MAG 8000 water meter	**7ME6810 - ■■■■■ - ■■■■**
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**
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**

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

[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.

Selection and Ordering data	Order code
Additional information	
Please add **“-Z“** to Order 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**

Battery-operated water meter MAG 8000/MAG 8000 CT

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Order No. and specify Order code(s) and plain text.	
Volume unit	
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**
kI	**L52**
Pulse set up (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, 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	**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**
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**
SOFREL data logger cable 2 m with connector for SOFREL GSM module	**M92**

Selection and Ordering data	Order No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes	**7 M E 6 8 2 0 -**
	0
Diameter	
DN 50 (2")	**2 Y**
DN 65 (2½")	**3 F**
DN 80 (3")/Q3 150 m³/h (m³) without verification or DN 80 (3")/Q3 40 m³/h (m³) with MI-001 verification	**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")	**5 K**
DN 400 (16")	**5 R**
DN 450 (18")	**5 Y**
DN 500 (20")	**6 F**
DN 600 (24")	**6 P**
Flange norm and pressure rating	
EN 1092-1	
PN 16	**C**
ANSI B16.5	
Class 150	**J**
AS4087	
PN 16	**N**
Approval/Verification	
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 (Q3/Q1 = 100)	**7**
Without verification according to OIML R 49 (Q3/Q1 = 250)	**8**
Region version	
Europe (m³, m³/h, 50 Hz)[1]	**1**
USA (m³, m³/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 M E 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**

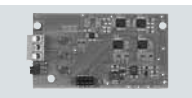
This device is shipped with a Quick Start guide and the SITRANS F manual CD containing the complete manual library. Printed Operating Instructions are available for purchase via PMD.

[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.

Battery-operated water meter MAG 8000/MAG 8000 CT

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Order No. and specify Order code(s) and plain text.	
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)	
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**
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	**M90**
25 ft. Encoder interface cable with connector for ITRON 200WP radio	**M91**
SOFREL data logger cable 2 m with connector for SOFREL GSM module	**M92**

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, one pc. D-cell (3.6 V, 16.5 Ah) Attention on note[1)]	◆ FDK-087L4201	
Internal battery pack, one set D-cell (3.6 V 33 Ah) and accessories for replacement Attention on note[1)]	◆ FDK-087L4150	
External battery pack IP68/NEMA 6P with connector, four D-cell (3.6 V 66 Ah) Attention on note[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	

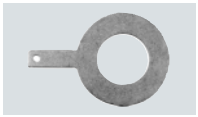
◆ Short lead time (details in PMD)

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.

Battery-operated water meter MAG 8000/MAG 8000 CT

MAG 8000 has built in Hastelloy grounding electrodes, when installed in PVC or coated pipelines, grounding rings must be installed additionally.

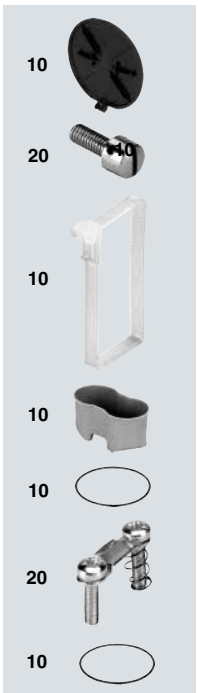
Grounding rings, type C must be used for the 7ME6810 and 7ME6820 routes (sizes > DN 300) and for the 7ME6880 route (all sizes). Please see grounding rings in the section MAG 3100 Grounding rings and be aware that the mentioned MLFB codes include only 1 grounding ring. Grounding rings DN 25 to DN 300 in stainless steel are packed in pairs and sold as a "grounding ring kit".

Dimension	Order No.	
DN 25	◆ **A5E01002946F)**	
DN 40	◆ **A5E01002947F)**	
DN 50	◆ **A5E01002948F)**	
DN 65	◆ **A5E01002950F)**	
DN 80	◆ **A5E01002952F)**	
DN 100	◆ **A5E01002953F)**	
DN 125	◆ **A5E01002954F)**	
DN 150	◆ **A5E01002955**	
DN 200	◆ **A5E01002957F)**	
DN 250	◆ **A5E01002958F)**	
DN 300	◆ **A5E01002962F)**	

◆ Short lead time (details in PMD)

Spare parts

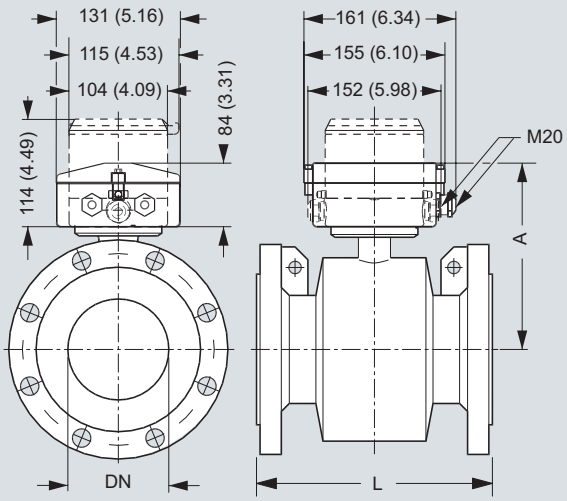
Description	Order No.	
MAG 8000 (Basic version) transmitter compact replacement kit. System number specified by ordering. No battery included	**FDK-087L4166**	
MAG 8000 (Basic version) transmitter remote replacement kit. System number specified by ordering. No battery included	**FDK-087L4202**	
MAG 8000 (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	**A5E01171569F)**	
MAG 8000 (Advanced version) transmitter PCB replacement kit	**FDK-087L4168**	

Description	Order No.	
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**	

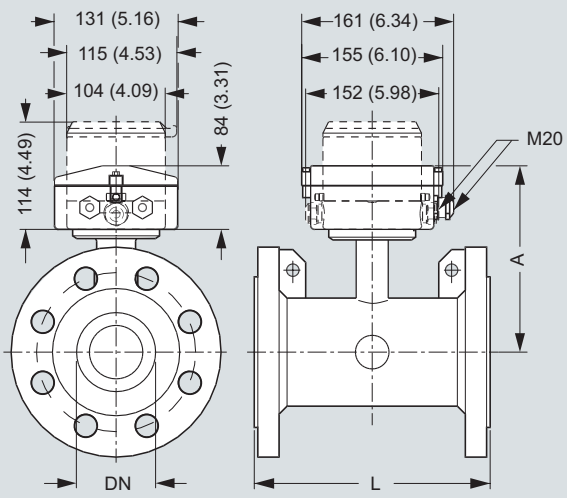
F) Subject to export regulations AL: 9I999, ECCN: N.

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	**On request**	
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	**On request**	
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	**On request**	
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	**On request**	

Dimensional drawings



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



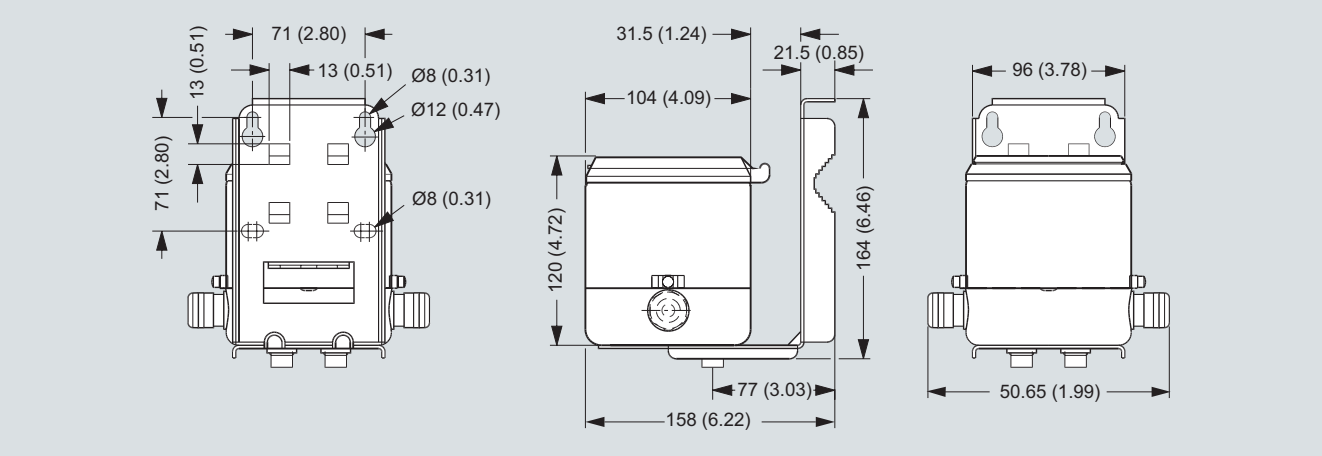
DN 50 ... 300 (2" ... 12")
For Ebonite liner (7ME6880 DN 25 ... 1200 (1" ... 48"))

Dimensions in mm (inch)

Nominal DN size	A	L, lenghts						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		
mm (inch)	mm (inch)	mm	mm	mm	inch	mm	mm	kg	lbs
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

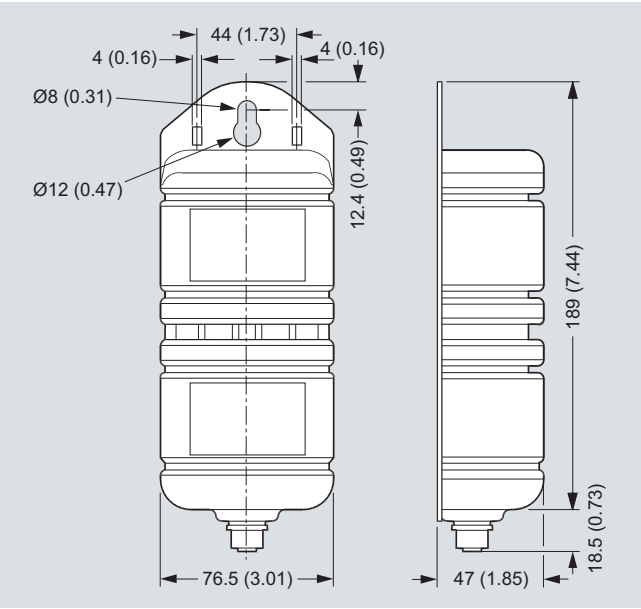
[1] For remote version the sensor weight is reduced with 2 kg (4.5 lb)

Remote version



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

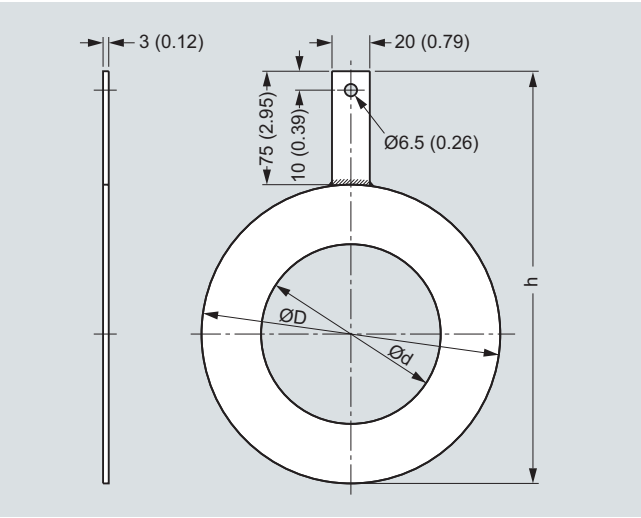
External battery pack



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

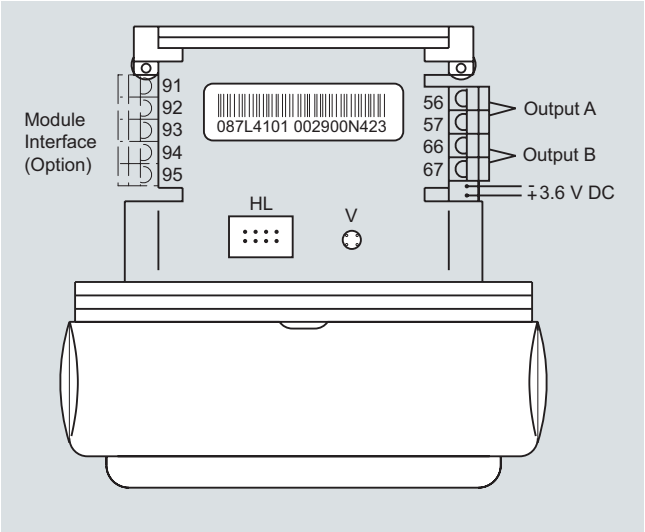


Dimensions in mm (inch) for grounding rings MAG 8000 with EPDM lining (7ME6810 and 7ME6820) DN 25 to DN 300

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

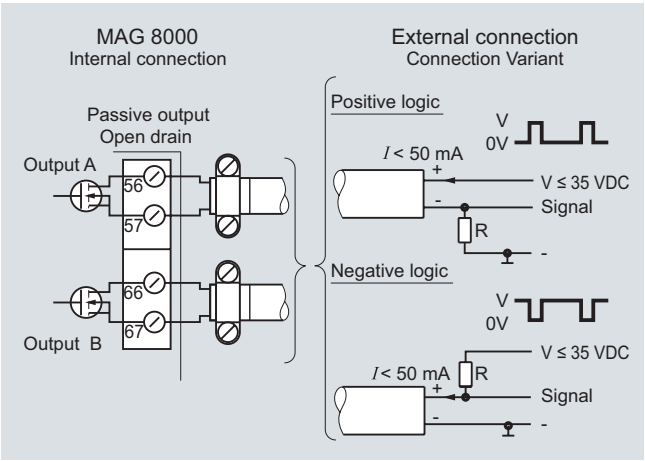
Schematics

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).