Instructions for Use

MQMe

Quantometer with electronic meter index

living gas.

metreg
Metreg Technologies GmbH

Content

1 Area of application for the manual

This technical manual is intended for service personnel in the gas supply and gas distribution industry who have received corresponding training and who possess technical knowledge of the applicable technical rules and regulations as well as any higher level or operational requirements. Some examples are specialists or employees who have been trained in accordance with DVGW regulations G 492 and G 495 and are designated as qualified experts.

2 Basic safety instructions

Requirements for personnel

Work on the gas lines may only be carried out by suitable, reliable and trained personnel. Operating personnel must be trained and authorized for their assigned tasks by the system operator. Protective measures must be defined based on a risk assessment carried out in accordance with Article 5 of the German Occupational Safety Act (ArbSchG).

Intended use

MQMe Quantometers are designed for the measurement of the volume of combustible gases in the 1st, 2nd and 3rd families of gases (natural gas, town gas, propane, butane, other combustible gases), processed and purified biogas and air, as well as other inert, non-aggressive and non-explosive gases, that are used during operation. Depending on the design of the meter, the permissible operating pressure range is up to 20 bar at a gas temperature of between -20°C and +55°C.

The manufacturer is not liable for damages resulting from improper or inappropriate use.

Occupational safety

Wear the personal protective equipment stipulated by the applicable national regulations when working on the meter.

Operational safety

The meter may only be operated in a technically flawless and operationally safe condition. The operator is responsible for ensuring the operational safety of the device.

Product safety

The meter was manufactured and tested according to the latest technological standards. It fulfills all legal requirements and complies with the relevant EC Directives. The manufacturer declares this conformity by attaching the CE mark to the meter.

The meter left the factory in perfect condition. A manufacturer's warranty is only provided if the meter is installed and operated in accordance with the operating instructions.

3 Manufacturer's declaration

Declaration of Conformity (see Annex A, page 34)

4 Applications for the MQMe Quantometer

The MQMe Quantometer is designed for metering the volume of natural gas used within a company and is approved in accordance with European Regulation 2014/68/EU.

The MQMe Quantometer can be installed in potentially explosive atmospheres in category 1G (ATEX / IECEx Ex Zone 0) Ex ia II C T4 Ga (Annex B).

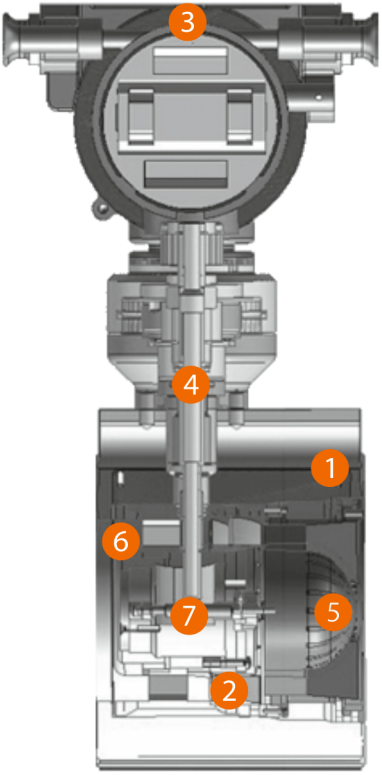
The MQMe Quantometer is suitable for measuring the volume of the following gases:

- Natural gas, town gas, propane, butane, ethylene, air, nitrogen and noble gases
- Other gases can be metered on request

Note: The MQMe Quantometer is not suitable for oxygen and highly corrosive gases, acetylene and other aggressive gases or explosive gases and gas mixtures.

Note: The MQMe Quantometer should not be used in the presence of strong pulsations. These conditions will increase the number of measurement errors and could significantly reduce the service life of the MQMe Quantometer.

5 Design of the MQMe Quantometer



Meter structure

1 Meter housing
2 Turbine wheel
3 Electronic meter index
4 Magnetoresistive sensor
5 Flow straightener
6 Measuring unit housing
7 Measuring unit

Note: In the case of failure or damage: Repairs may only be carried out by qualified and authorized service centers.

Fig. 1: Sectional drawing of the MQMe Quantometer

6 Technical Data

Meter type	MQMe Quantometer
Approval	ATEX / IECEx Ex-Zone 1; Ex ia II C T4 Ga; PED 2014/68/EU
Size	G 10 to G 1000
Nominal diameter	DN 25 (1“) to DN 150 (6“)
Pressure rating	PN 16 and ANSI CLASS 150, PN4 with screw connection
Measuring range	1:20 (an exception is the DN 25 with a range of 1:10)
Temperature range Gas temperature Ambient temperature Storage temperature	 -20°C to +55°C -25°C to +55°C -25°C to +55°C
Housing material	Aluminum
Max. operating temperature	20 bar overpressure
Accuracy	$Q_{min} \leq Q < Q_{max}$: ±1.0% von Q_{max}
Electronic meter index	
Counter	Electronic index with 9 digits
Meter index head	Aluminum alloy
Protection class	IP 65
Battery	Lithium battery (calculated service life under standard conditions of 5 years)
Display	LCD display for flow rate and volume under operating and standard conditions, pressure and temperature, as well as the status of the battery
Buttons	4 buttons
Memory	Non-volatile 512 k EEPROM memory for the parameters and saving 1500 data records
Integrated volume corrector (option)	AGA NX-19 or fixed factors
Standard conditions	selectable, standard configuration is 273.15 °K (0°C); 1013.25 mbar
Parameterization	Set in factory
Communication	
Pulse outputs	1 HF pulser Alternatively: 1 LF pulser Optional: additional 1 HF pulser (at the turbine wheel, only with external power supply)
LF pulser (alternative)	
Contact type	Normally open
Max. voltage	24 V
Max. current	110 mA
Max. resistance	5.1 Ω
Max. switching frequency f_{max}	10 Hz

HF pulser (standard)	
Max. voltage	24 V
Max. current	110 mA
Max. resistance	5.1 Ω
Max. switching frequency f_{max}	1000 Hz
HF pulser	Additional inductive sensor according to NAMUR (at the turbine wheel, only with external power supply)
Supply voltage	8.2 VCC (internal resistance 1 kΩ)
Power consumption	(sensor covered) <1 mA
Power consumption	(sensor free) >2.1 mA
Max. switching frequency f_{max}	1500 Hz
Analog output (option)	4–20 mA output (only with external power supply)
Serial communication (option)	M-Bus or Modbus/RS485 (Modbus/RS485 only with external power supply)
Protocol	M-Bus, Modbus RTU

Working range and pulse weighting data

DN [mm]	G-type	Q_{min} [m³/h]	Q_{max} [m³/h]	HF* [pulses/m³] ext. pulser	HF* [pulses/m³] int. pulser	L [pulses/m³]
25	10	1.6	16	185,000–195,000	15,080–16,250	10
25	16	2.5	25	185,000–195,000	15,080–16,250	10
25	25	4	40	185,000–195,000	15,080–16,250	10
25	40	6.5	65	185,000–195,000	15,080–16,250	10
50	40	3.25	65	101,000–107,000	8,416–8,916	10
50	65	5	100	101,000–107,000	8,416–8,916	10
80	100	8	160	26,400–27,200	1,885–2,266	1
80	160	12.5	250	26,400–27,200	1,885–2,266	1
80	250	20	400	26,400–27,200	1,885–2,266	1
100	160	12.5	250	13,100–13,900	935–992	1
100	250	20	400	13,100–13,900	935–992	1
100	400	32	650	13,100–13,900	935–992	1
150	400	32	650	5,100–5,400	318–386	1
150	650	50	1000	5,100–5,400	318–386	1
150	1000	80	1600	5,100–5,400	318–386	1

* The precise number of pulses is dependent on the meter size and the calibrated meter itself. The stated values are typical numbers. The exact values determined for each meter during the calibration are stated on the type plate for the HF sensor.

At the request of the customer, the LF output can be programmed with 100 pulses/m³, 10 pulses/m³, 1 pulse/m³ or 0.1 pulses/m³.

7 Installation

7.1 Requirements and recommendations

Before installing the Quantometer

1. Remove the protective film from the inlet and outlet of the meter.
2. Check the completeness of the meter (e.g. cover plugs, volume of oil supplied) and for any possible transport damage.
3. Check that the turbine wheel rotates easily and stops smoothly, e.g. by blowing into the MQMe Quantometer.
4. Ensure that there are no impurities, condensation, deposits or welding and drilling residues in the pipeline. It is especially important to clean any elbow pipes in vertical installations to prevent any damage if this dirt passes through the meter. A cone-shaped startup filter can be installed to protect the meter during its initial operation. This filter and the collected dirt should then be removed after 4–6 weeks at the latest to prevent any disruption to the flow profile and thus a reduction in the measuring accuracy.
5. In order to achieve a high level of accuracy, it is recommended that a straight inlet pipe with a nominal size of ≥ 3 DN and an outlet pipe with a nominal size of ≥ 2 DN are used.
6. Vibrations and pulsations should be avoided at the measurement location. The installation of a suitable compensator can effectively dampen this kind of interference.
7. Abrupt changes in the flow rate and strong pulsating flows of gas will increase measurement errors. These issues can arise due to e.g. solenoid valves frequently switching on and off. Pressure surges – especially due to the quick opening of valves – can damage the ball bearing in the turbine wheel and cause the meter to fail during prolonged operation.
8. Filters (with a small mesh size) should be installed upstream of the meter to protect it, in particular, against dirt particles >50 µm both during startup and in continuous operation.
9. The gas must be dry. If condensation occurs, it is recommended that a condensate separator is installed upstream of the meter (a separator is already integrated into some types of filter).
   In this case, it is recommended that the meter
   - is installed with a flow direction from the top to the bottom and
   - not at the lowest point of the pipeline.

7.2 Installation location/direction of flow of the gas

The MQMe Quantometer can either be installed horizontally or vertically.

Horizontal installation

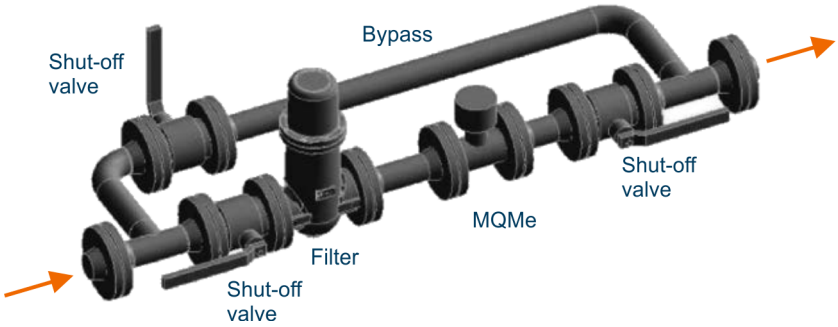


Fig. 2 Typical horizontal installation of the MQMe Quantometer (recommended)

Vertical installation

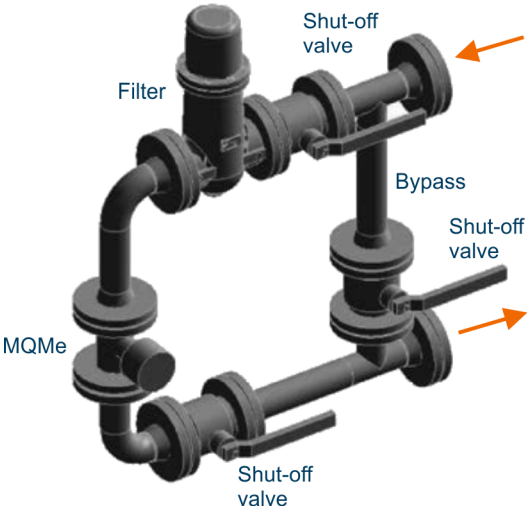


Fig. 3 Typical vertical installation of the MQMe Quantometer

Note: The gas must flow in the direction of the arrow, see figure.

7.3 Equipment required for the installation

- Suitable and certified gaskets according to DIN EN 1514-1
- Screws according to DIN 976 DIN ISO 4014 and ASME B 1.1
- Nuts according to DIN 934 DIN EN ISO 4032 and ASME B 1.1
- Washers according to DIN EN ISO 7085 (DIN 125)
- Equipotential bonding with a minimum cross-section of 4 mm^2
- For Quantometers with an oil pump: Oil according to the specifications Shell Morlina S2 BL 5 or Shell Morlina S2 BL 10

DN [mm]	Pressure ANSI class	Flanges according to ANSI B 16.5 Threaded bolts with continuous thread and nuts					
		Min. operating temperature of the screws and nuts	Number of screws	Strength class of the screws	Strength class of the nuts	Length of the threaded rods	
						PN16	ANSI B16.5 Class150
25*	150	-25°C	4 x M12	ASTM A193			
				Grade B7	Grade 2H		
50	150	-25°C	4 x M16	ASTM A193	ASTM A194	165	170
				Grade B7	Grade 2H	165	170
80	150	-25°C	8 x M16	ASTM A193	ASTM A194	210	225
				Grade B7	Grade 2H	210	225
100	150	-25°C	8 x M16	ASTM A193	ASTM A194	240	255
				Grade B7	Grade 2H	240	255
150	150	-25°C	8 x M20	ASTM A193	ASTM A194	285	312
				Grade B7	Grade 2H	285	312

* Flange with threaded holes

DN [mm]	Pressure class PN	Flanges according to DIN EN 1092-1 Hexagon screws and nuts					
		Min. operating temperature of the screws and nuts	Number of screws	Strength class of the screws	Strength class of the nuts	Length of the threaded rods	
						PN16	ANSI B16.5 Class150
25*	16	-10°C	4 x M12	5.6 / 8.8			
50	16	-10°C	4 x M16	5.6 / 8.8	5 / 8	165	170
80	16	-10°C	8 x M16	5.6 / 8.8	5 / 8	210	225
100	16	-10°C	8 x M16	5.6 / 8.8	5 / 8	240	255
150	16	-10°C	8 x M20	5.6 / 8.8	5 / 8	285	312

* Flange with threaded holes

DN [mm]	Pressure class PN	Flanges according to DIN EN 1092-1 Hexagon screws and nuts					
		Min. operating temp. of the screws and nuts	Number of screws	Screw material	Nut material	Length of the threaded rods	
						PN16	ANSI B16.5 Class150
25*	16	-40°C	4 x M12	25CrMo4			
50	16	-40°C	4 x M16	25CrMo4	25CrMo4	165	170
80	16	-40°C	8 x M16	25CrMo4	25CrMo4	210	225
100	16	-40°C	8 x M16	25CrMo4	25CrMo4	240	255
150	16	-40°C	8 x M20	25CrMo4	25CrMo4	285	312

* Flange with threaded holes

7.4 Implementation

Installation of the MQMe Quantometer

1. Clean the flange surfaces (e.g. with petroleum).
2. The meter should preferably be installed horizontally with the meter index at the top.
3. The gas must flow in the direction of the arrow indicated on the meter.
4. During the installation, check that the gaskets are fitted concentrically so that no sealing elements protrude into the pipeline.
5. In addition to the length of the meter itself, it is necessary to leave enough room for the two gaskets between the inlet and outlet flanges for the installation.
6. The meter must be installed without any tension. For this purpose, ensure that the meter axis is properly aligned with the pipeline axis.
7. Carry out a proper leak test of the flange connections.
8. If necessary, turn the general direction of the meter display by 180°, see “Changing the turning range”, page 14.

1 Screw connection on the meter index head

9. Connect the equipotential bonding with a minimum cross-section of 4 mm² to the screw connection provided for this purpose on the meter index head (1).

Fig. 4 Connection for the equipotential bonding

Check the following when installing the meter

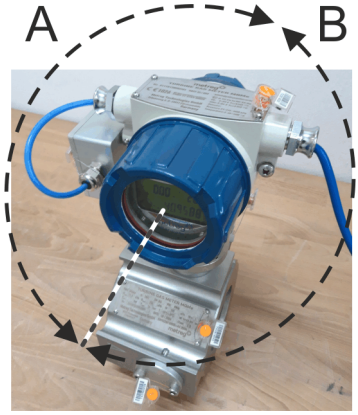
1. The meter has been installed in the correct flow direction.
2. The meter has been installed without any leaks.
3. The meter has been installed without any tension.
   - In a horizontal pipeline, the meter is installed with the meter index head in an upright position. In the case of vertical installations, the oil pump (if present) must be installed in an upright position.
   - Connection screws and nuts must be tightened crosswise.
   - See section 13, page 32, for instructions on connecting to the pressure measuring points.
   - See section 13.2, page 32, for instructions on connecting to the temperature measuring points.
4. The angle of rotation of the meter display corresponds to the operator's requirements, see "Changing the turning range", page 14.

It is recommended that a protective cover is fitted in the case of external installations.

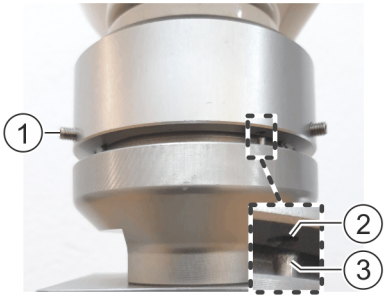
After installing the meter: Welding work on the pipeline or on the flanges near to the meter is not permitted.

Changing the turning range

The meter has a rotatable display with a turning range of 180° (A). The angle of rotation can be changed to the other 180° (B) by turning the base by 180°.



1. Loosen the 3 radial stud screws (1) on the base of the meter index head.
2. Slightly lift up the meter index head until the positioning pin (3) has been completely pulled out of the drilled hole (2).
3. Turn the meter index head by 180° in a clockwise direction and lower it again so that the pin is now seated in the drilled hole on the opposite side (2).
4. Tighten the stud screws (1) again by hand.
5. Make a note of the turning direction so that if the meter index head is adjusted again you can avoid turning it in the same direction and possibly damaging the cable connections.



1 Stud screws
2 Positioning pin
3 Drilled hole

8 Commissioning

The MQMe Quantometers is commissioned after installation.

Commissioning of the MQMe Quantometer

1. For MQMe Quantometers with an oil pump: Lubricate the meter in accordance with section 9.3, page 18:
2. Slowly open the valve upstream of the meter (Fig. 2 and Fig. 3) to pressurize the pipeline up to the operating pressure.
3. The rate of increase in pressure should not exceed 350 mbar/s.
   Attention: Risk of damage due to pressure surges
4. When the operating pressure has been reached, the valve upstream of the meter can be fully opened.
5. Slowly open the valve downstream of the meter (Fig. 2 and Fig. 3).
6. When the operating pressure has been reached, the valve downstream of the meter can be fully opened.
7. Remove the startup filter after 4–6 weeks (if installed).
   Attention: Risk of damage due to foreign bodies in the line

Note: For MQMe Quantometers with an oil pump, the meter must be lubricated before commissioning, see section 9, page 15.

9 Maintenance/lubrication

9.1 Maintenance

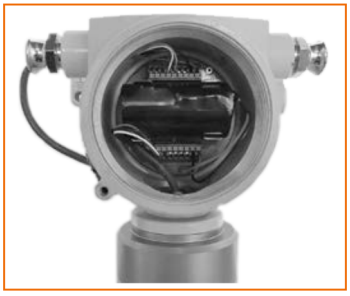
1. MQMe Quantometers without oil pumps do not require any special maintenance. They are maintenance-free.
2. MQMe Quantometers with oil pumps require regular maintenance, see section 9.3, page 18:
3. The MQMe Quantometer may only be repaired by trained and authorized personnel, e.g. service engineers from Metreg Technologies.
4. Replace the battery after a maximum of 5 years.

9.2 Replacing the battery

Note:

- **Only special lithium batteries from Metreg Technologies GmbH may be used.**
- **Lithium batteries are subject to special safety rules with respect to their handling, transport and storage. These rules must be observed. Especially due to their high energy density, there is risk of fire if the batteries are handled incorrectly.**
- **The cable connections (red & black) must NOT touch each other or be short circuited. There is an acute risk of fire.**
  Attention: This also applies to replaced batteries!
- **The battery may only be replaced by a person trained in explosion protection.**
- **The explosion protection regulations in the relevant country must be observed.**
- **It is not permitted to replace the battery in a potentially explosive atmosphere.**
- **No data transmission is possible while the battery is being replaced.**

Order text	Order no.
Replacement set	88000255
Consisting of:	
1x meter seal	
1x lithium battery	
1x instructions for replacing the battery	



Warning: Ensure that there are no short circuits when replacing the battery.

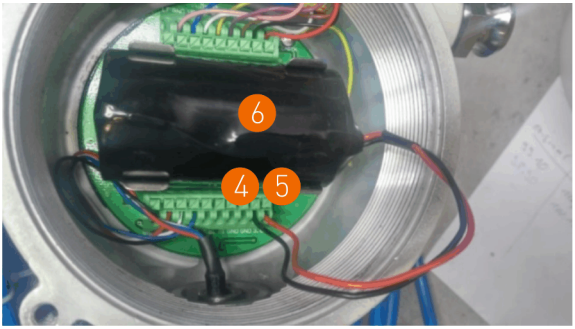
Warning: The battery may only be replaced in an Ex zone if it has been guaranteed that the area is Ex-free.

Fig. 5 Rear of the electronic meter index head

1 Seal
2 Screw
3 Cover

1. Remove the seal (1) on the rear of the electronic meter index head.
2. Remove the screws (2) on the rear of the electronic meter index head and unscrew the cover (3).

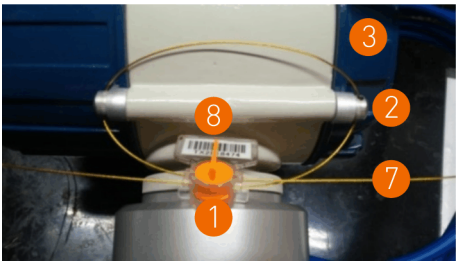
Fig. 6 Safeguards on the rear cover



4 GND terminal
5 3.6 V terminal
6 Battery

Fig. 7 Terminals for connecting the battery

3. Remove the red and black wires from the GND terminal (4) and the 3.6 V terminal (5) on the far right of the lower terminal block by pressing the clamping buttons.
4. Remove the battery (6) and insert the new battery in the same orientation.
5. Insert the red wire from the new battery into the 3.6 V terminal (5) and the black wire into the GND terminal (4).
6. Check whether the battery symbol appears on the display.
   Note: If the battery symbol flashes, the new battery is also nearly empty and must be replaced, see section 11.3, page 21.



1 Seal
2 Screw
3 Cover
7 Sealing wire
8 Crosspiece

Fig. 8 Safety seal on the cover of the meter index head

1. Carefully close the rear cover (3) on the electronic meter index head and make sure that none of the internal wires are jammed during this process. Fix the cover in place by tightening the screw (2) by hand.
2. Seal the meter against unauthorized access again using the supplied safety seal (1).
3. To do this, insert the ends of the sealing wire (7) into the holes in the seal (1) from both sides.
4. Then turn the crosspiece (8) in a clockwise direction until the wire has been inserted so far that the crosspiece breaks.

9.3 Lubrication

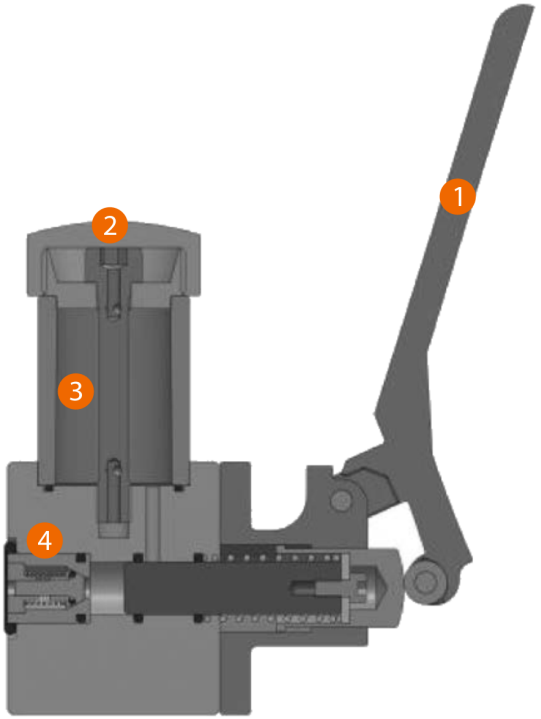
Note: MQMe Quantometers with permanently lubricated ball bearings (no oil pump) are maintenance-free. MQMe Quantometers with oil pumps require regular lubrication, see section 9, page 15.

Process for the first lubrication

1. It is recommended that you only use oil sold by Metreg Technologies. A pack of oil for the initial commissioning is supplied with the meter.
2. Approved oils are: Shell Morlina S2 BL 5 or Shell Morlina S2 BL 10.
3. Fill with oil before commissioning the meter and after correct installation as described in section 7, page 9.
4. Add the correct volume of oil to the oil reservoir and then pull the pump lever in a horizontal direction.
5. Depending on the size of the meter, the following strokes are required:
   DN 50: 3 strokes
   DN 80: 5 strokes
   DN 100: 5 strokes
   DN 150: 9 strokes
6. After completing the lubrication process, the oil reservoir should be closed tightly again to prevent any contamination of the lubrication system.

Regular lubrication

1. Lubricate every 2–3 months if the gas is clean and a filter has been installed upstream of the meter:
   DN 50: 2 strokes
   DN 80: 4 strokes
   DN 100: 4 strokes
   DN 150: 7 strokes.
2. If the gas is dirty or contains moisture, the meter should be lubricated at least every month.



1 Pump lever
2 Oil reservoir cover
3 Oil reservoir
4 One-way valve

Fig. 9 Sectional drawing of the oil pump

10 Decommissioning

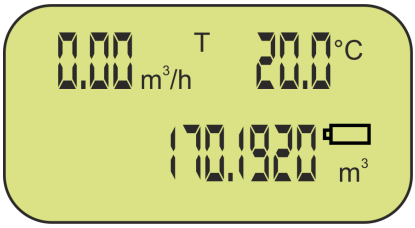
1. Ensure that there is sufficient ventilation in the installation room.
2. The gas may only be released into the free air and in locations where there are no active ignition sources.
3. Reduce the operating pressure slowly (e.g. <350 mbar/s).
4. The screws and nuts on the flanges may only be removed when the pipeline has been completely depressurized.
5. Carefully remove the meter from the pipeline.

11 Electronic meter index

11.1 Display

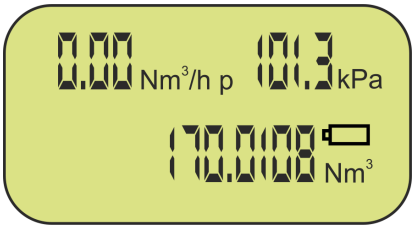
The display is a segment LCD display. The display is used to visualize the flow rate and volume under operating and standard conditions, the pressure and temperature, as well as the status of the battery. The display for the total volume of gas has 4 decimal places. The meter index has 9 digits. 2 decimal places are displayed for the volumetric flow rate. The maximum value is 9999 m^3/h. If this value is exceeded, the display will flash.

Display 1



The flow rate in the operating condition (Qm, m^3/h), the temperature (T,°C) – determined as a fixed value or using a temperature sensor – and the volume in the operating state (^{Vm}, m^3) are shown on the display.

Display 2



The flow rate in the standard condition (Qm, m^3/h), the pressure (p, kPa) – determined as a fixed value or using a pressure sensor – and the volume in the standard condition (^{Vb}, N m^3) are shown on the display.

Note: The p is shown quite close to the h but belongs to the pressure display.

11.2 Buttons

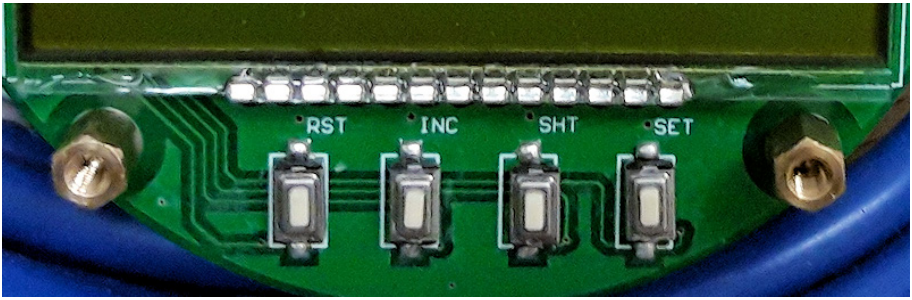


Fig. 10 Buttons on the electronic meter index

The electronic meter index is equipped with 4 buttons:

- Reset button (RST)
- Increment button (INC)
- Shift button (SHT)
- Setting button(SET)

The user can change, set and save various parameters on site using the corresponding buttons or combination of buttons.

The process for changing the parameters is described in section 12, page 29.

11.3 Power supply

Power is supplied to the MQMe Quantometer via an internal 3.6 V lithium battery with a power consumption of <0.7 mW. The calculated service life of the lithium battery under standard conditions is 5 years. The charging status of the battery is shown on the LCD display. If the battery voltage falls below 3.0 V, the battery status display flashes "▭". This indicates that the battery must be replaced within 30 days. The electronics in the MQMe Quantometer permanently monitor the voltage from the internal lithium battery.

The process for replacing the battery is described in section 9.1, page 16.

Alternatively, the MQMe Quantometer can be operated using an optional external power supply. The internal battery is not active in this case. The terminal assignments for the external power supply are described in Fig. 11 to Fig. 15.

11.4 Memory

The electronic meter index on the MQMe Quantometer is equipped with 512 kB non-volatile EEPROM memory that can store 1500 data records and all parameters.

11.5 Integrated volume corrector (option)

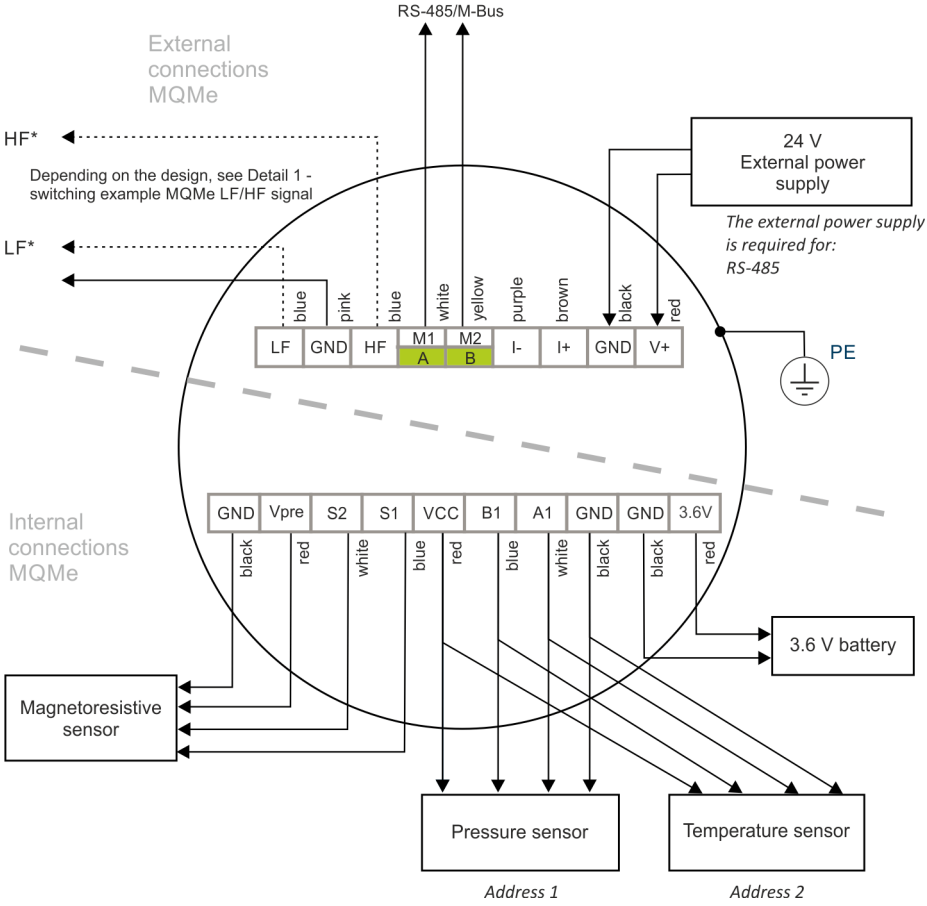
The electronic meter index on the MQMe Quantometer can be optionally fitted with an electronic volume corrector. In this case, the flow rate and volume of the gas under standard conditions are calculated in accordance with AGA NX-19. An external pressure and temperature sensor must be installed for these calculations. If a pressure and temperature sensor is not installed, fixed values can be set for the calculations according to AGA NX-19. The standard configurations set in the factory are 273.15 °K (0°C); 1013.25 mbar, unless otherwise agreed.

11.6 Pressure and temperature sensor

If an external pressure and temperature sensor is connected to the MQMe Quantometer, the necessary wiring is described in Fig. 11 to Fig. 15. Communication with the external sensors is via a bus system. Pressure sensors with measuring ranges of 5 and 10 bar absolute pressure are supported.

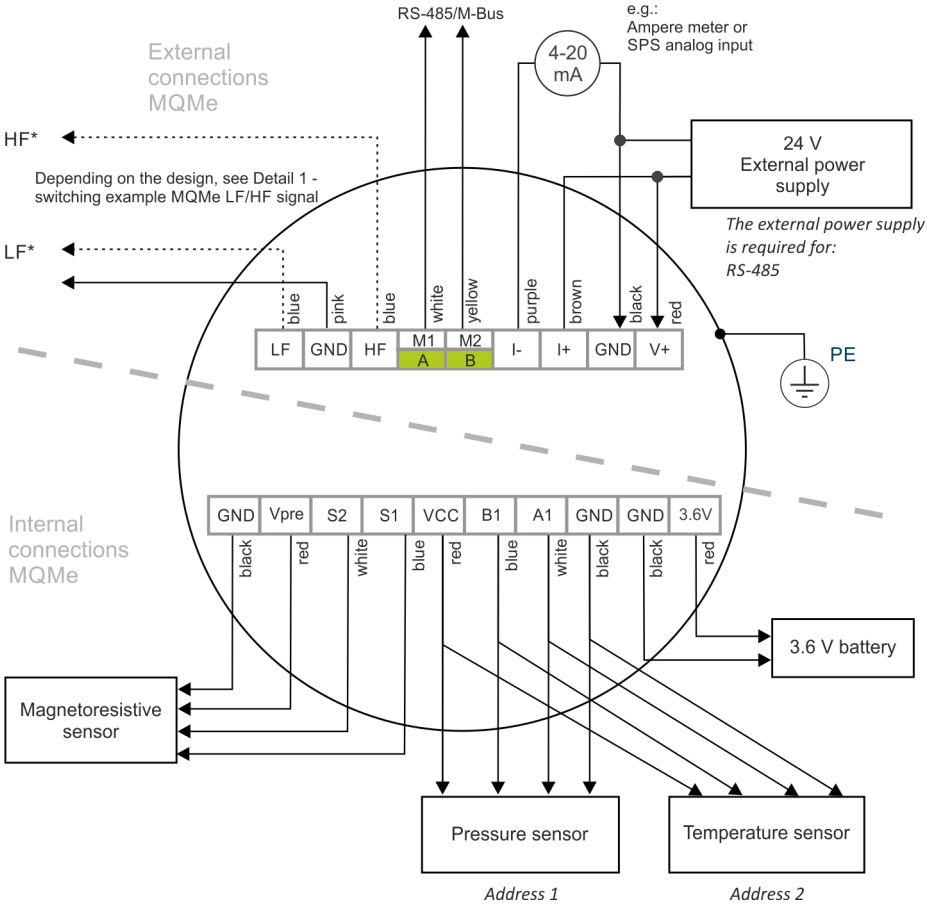
11.7 Communication

The MQMe Quantometer has several options for transmitting the measured and calculated data to a digital control system (DCS) or SCADA. The MQMe Quantometer can be optionally equipped with a RS485 or M-Bus interface and a high frequency (HF) or low frequency (LF) pulser (for configuration with volume correction).
In addition, a scalable 4–20 mA output signal can be optionally used for transmitting the data. The rotation of the turbine wheel can also be monitored using an external high frequency (HF) sensor. The signal from the HF sensor enables the actual gas flow to be determined to a high level of precision and it can be transmitted to any digital control system (DCS) or SCADA for control and regulation purposes.



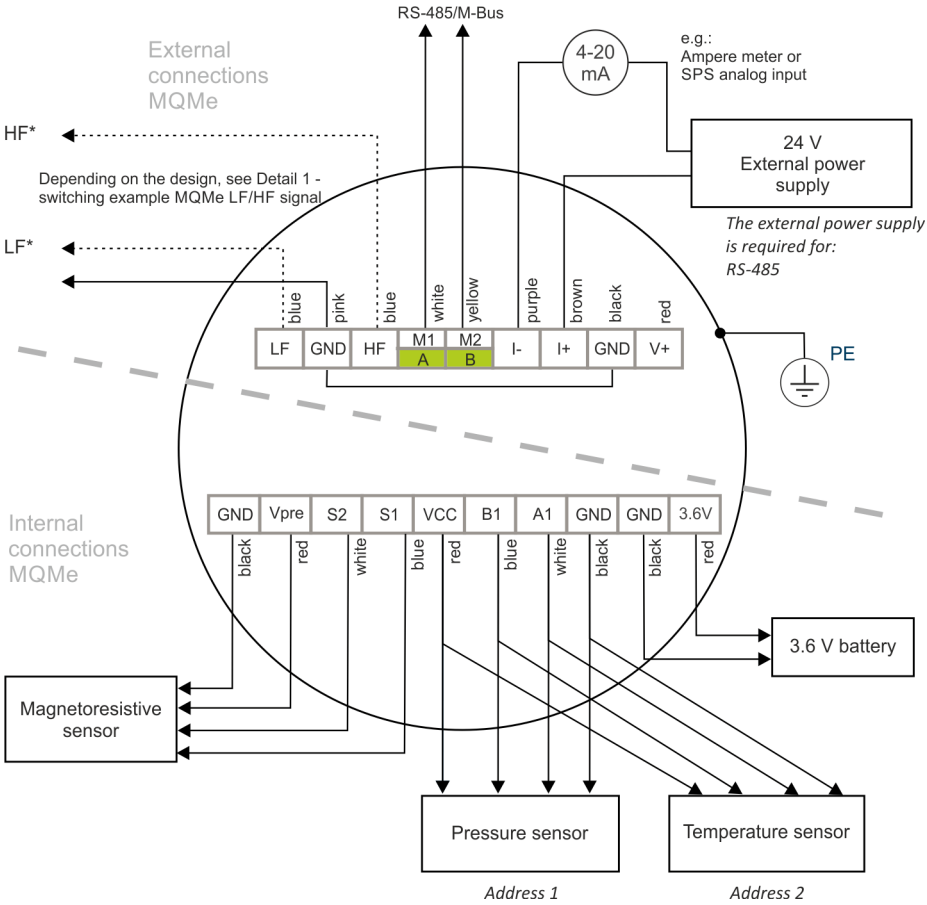
* Please note: HF and LF signals cannot be sent in parallel (simultaneously)

Fig. 11 Variant 1 MQMe without 4–20 mA



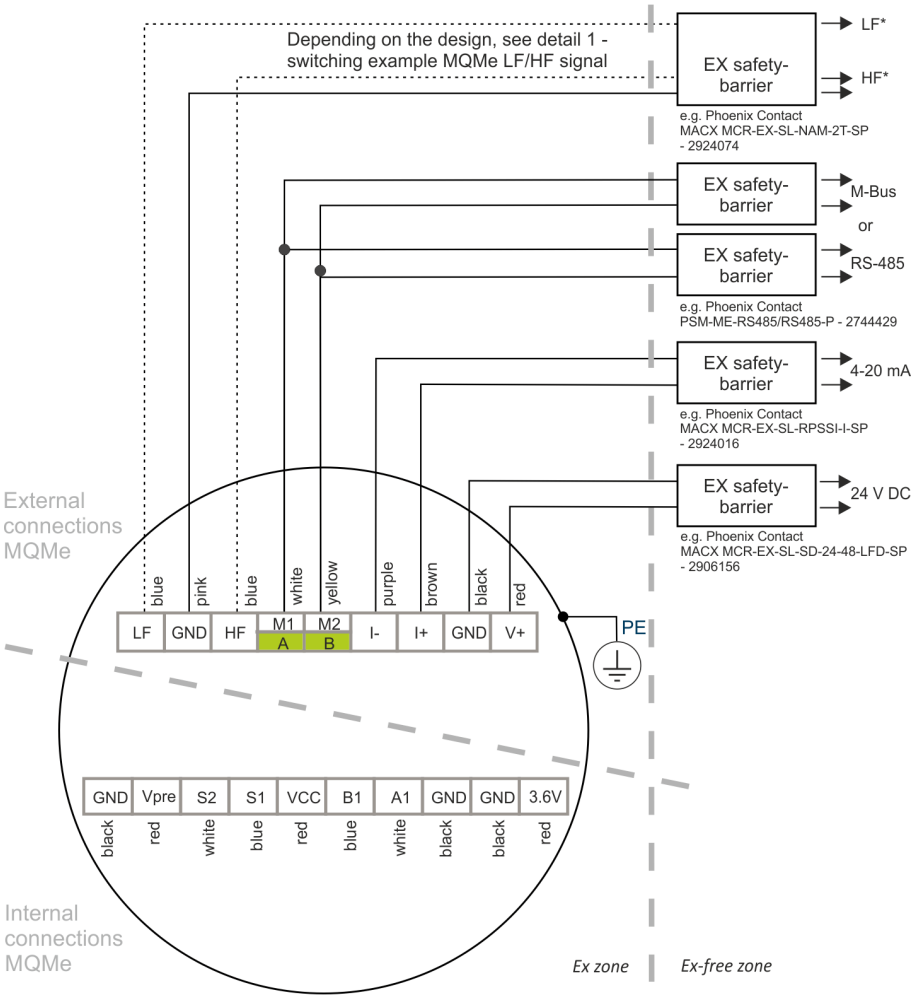
* Please note: HF and LF signals cannot be sent in parallel (simultaneously)

Fig. 12 Variant 2 MQMe 4–20 mA with external supply



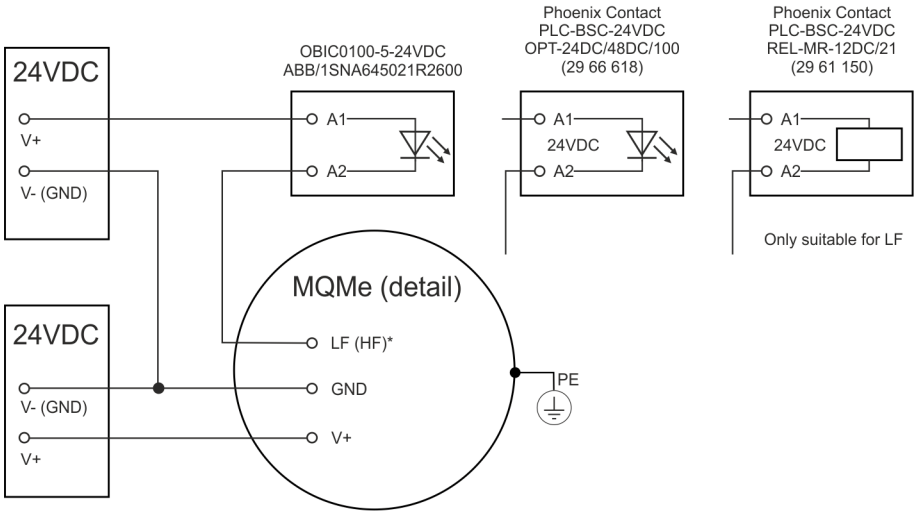
* Please note: HF and LF signals cannot be sent in parallel (simultaneously)

Fig. 13 Variant 3 MQMe 4–20 mA without external supply



* Please note: HF and LF signals cannot be sent in parallel (simultaneously)

Fig. 14 Variant 4 MQMe without 4–20 mA and without external supply



* Please note: HF and LF signals cannot be sent in parallel (simultaneously)

Fig. 15 Detailed switching example for the MQMe LF and HF signal

Pulsers

A low frequency (LF) pulser or a high frequency (HF) pulser are integrated into the standard version of the MQMe Quantometer.

The high frequency (HF) pulser is used to measure the current gas flow to a high level of precision. One additional HF pulser can be optionally installed on the meter to scan the turbine wheel. The external HF pulser is designed in accordance with the NAMUR specifications and is typically connected to an input on the station computer or a correspondingly equipped volume corrector. Shielded cables should be used for the connection cables. The rotating blades on the turbine wheel are scanned by the high frequency sensor as they pass by the surface of the sensor. Each blade that passes the sensor generates a pulse. Fig. 11 to Fig. 15 are schematic diagrams for the wiring of the internal pulsers.

The connection to the HF pulser (optional external pulser: scanning of the turbine wheel, only with an external power supply, the signal cannot be switched by the electronics on the MQMe) is established via the following connections:

- pink (-)
- blue (+)

The standard HF signal is not required for configurations with an integrated volume corrector. An LF signal is issued instead for the standard flow.

Note: All of the pulsers are intrinsically safe. If the MQMe Quantometer is installed in a potentially explosive atmosphere, connections to devices such as a volume corrector or a station computer that are located outside of the potentially explosive atmosphere must be established using intrinsically safe circuits, see Fig. 11 to Fig. 15.

RS485-Modbus and M-BUS communication

The meter can be optionally equipped in the factory with either a RS485 Modbus or a M-Bus interface. The baud rate is 2400 and supports the Modbus RTU protocol. The wiring via M-Bus and RS485 is illustrated in Fig. 11 to Fig. 15.

4–20 mA output signal

The MQMe Quantometer has a configurable passive two-wire output signal (4–20 mA). The current flow rate under operating or standard conditions (configuration with a volume corrector) can be transmitted via the 4–20 mA signal. The flow rate is 0 at 4 mA and a corresponding maximum value can be set for 20 mA. The maximum deviation is: ±0.5% FS. The wiring for the analogue 4–20 mA output signal is illustrated in Fig. 11 to Fig. 15.

The maximum value typically corresponds to the Q_{max} of the meter or 4 times the Q_{max} for the output of the standard volume (if the volume corrector has been configured) and can be subsequently adjusted (see section 12, page 29).

12 Setting the parameters

12.1 Preparation

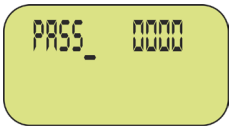
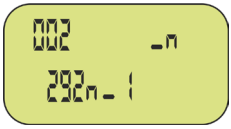
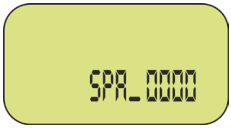
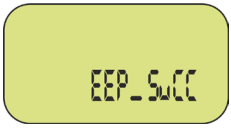
It is possible to change various settings directly on the meter. The 4 buttons located underneath the front screw-on cover on the meter index head can be used for this purpose, see section 11.2, page 21.

To reach the buttons, proceed as follows:

- Remove the seal between the front and rear screws on the cover for the electronic meter index.
- Loosen the screws on the front of the meter index head and unscrew the cover.
- Remove the 3 screws for the display cover.
- Change the relevant parameter using the 4 buttons, see Fig. 10.
- After changing the parameter, screw on the display cover and then the cover for the electronic meter index head.
- Fix the cover in place using the connection screws.

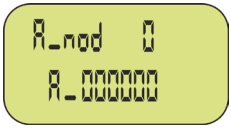
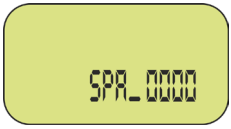
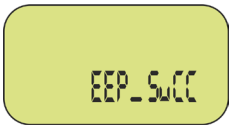
12.2 Changing the primary address

Set the desired primary address using the 4 buttons.

Action	Display	Input/output
1. Press **INC**, then **SET**.		PASS_0000 User password 1 • No entry is required.
2. Press **SET**.		002 _n Primary address (0–255) • Change the digit with **INC** • Change the position with **SHT**
3. Press **RST**.		SPA_0000 User password 2 • Enter 1111 using **INC** (digit) and **SHT** (position)
4. Press **RST**.		EEP_SuCC Data has been saved successfully EEP_Err Error when saving

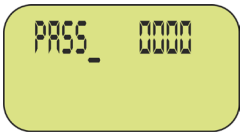
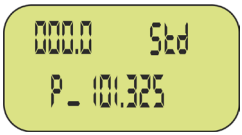
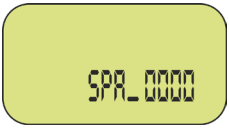
12.3 Changing the measuring range – 4 to 20 mA signal

Set the desired measuring range using the 4 buttons.

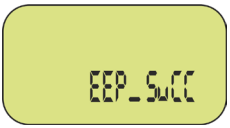
Action	Display	Input/output
1. Press **INC**, then 5x **SET** and 1x **SHT**.		A_000000 Flow at 20 mA Example: A_002500 = 2500 m^3/h (flow at 20 mA) • Change the digit with **INC** • Change the position with **SHT**.
2. Press **RST**.		SPA_0000 User password 2 • Enter 1111 using INC (digit) and SHT (position)
3. Press **RST**.		EEP_SuCC Data has been saved successfully EEP_Err Error when saving

12.4 Changing the standard conditions (p and T)

Set the desired standard values for the pressure and temperature using the 4 buttons.

Action	Display	Input/output
1. Press **SHT**, then **SET**.		PASS_0000 User password 1 • No entry is required.
2. Press 2x **SET**.		000.0 Standard temperature Tn in°C (DE: 0°C) P_101.325 Standard pressure pn in kPa (DE: 101.325 kPa) • Change the digit with INC • Change the position with **SHT.**
3. Press **RST**.		SPA_0000 User password 2 • Enter 1111 using **INC** (digit) and **SHT** (position)

4. Press **RST**.

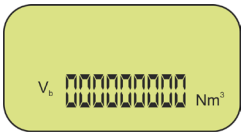
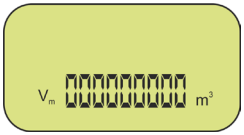
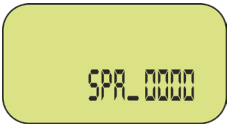
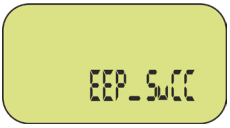


EEP_SuCC
Data has been saved successfully

EEP_Err
Error when saving

12.5 Resetting the volume counter

Reset the counter.

Action	Display	Input/output
1. Press **SET**.		PASS_0000 User password 1 • No entry is required
2. Press **SET**.		Vb 000000000 Nm³ Volume under measuring conditions • Change the digit with **INC** • Change the position with **SHT.** **Note: The decimal places cannot be changed.**
3. Press **SET**.		Vm 000000000 m³ Volume under measuring conditions • Change the digit with **INC** • Change the position with **SHT.** **Note: The decimal places cannot be changed.**
4. Press **RST**.		SPA_0000 User password 2 • Enter 1111 using **INC** (digit) and **SHT** (position)
5. Press **RST**.		EEP_SuCC Data has been saved successfully EEP_Err Error when saving

13 Measuring points

13.1 Pressure measuring point

There is a pressure measuring point (1) on the housing of the MQMe Quantometer for measuring the reference pressure. It is designed for a straight steel tube fitting according to DIN 2353 with a diameter of 6 mm.

The material used for the tube should be selected according to DIN EN 10305-1. Only seamless tubes made out of stainless steel according to DIN EN 10216-5:2014-03 may be used. Tubes made out of non-stainless steel or non-metallic materials are not permitted.

1 Pressure measuring point

Fig. 16 Position of the pressure measuring point

13.2 Temperature measuring point

There is a temperature measuring point (2) on the housing of the MQMe Quantometer for measuring the gas temperature. The temperature pick-up is closed off with a safety screw (G ¼"). If you intend to use the temperature measuring point, remove the safety screw and replace it with a temperature pocket with a G ¼'' thread. The temperature pocket should be designed for use with temperature sensors with a diameter of 6 mm.

Note: If the temperature measuring point on the meter is not used, the temperature should be measured in the pipeline 1–3 DN downstream of the MQMe Quantometer.

2 Temperature measuring point

Fig. 17 Position of the temperature measuring point

14 Cleaning

It is not permitted to use any solvents to clean dust and dirt from the meter. Only a damp cleaning cloth is suitable for this purpose.

15 Transport and storage

The MQMe Quantometer and all its accessories should be stored in their original packaging. Ensure that the meter is secured to prevent it rotating or slipping. Take special care when loading and transporting the meter to the installation location.

Some important requirements for transport and storage are:

- Protective film is fitted to both flanges on the meter.
- The oil pump (if present) is not filled during transport.
- Protect the meter against rain and moisture.
- Protect the meter against mechanical impact or shocks.
- Carefully check the following when unpacking the meter:
  - The packing list to ensure that all of the listed parts are present
  - Every individual part for damage

16 Disposal

Particular care was taken during the design of the MQMe Quantometer to ensure that as few composite materials were used as possible. This design concept enables a high degree of recycling. Therefore, we are also willing to take back the device / product and dispose of it professionally.

All products marked with this symbol are electrical and electronic devices (Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE)) and must not be disposed of together with unsorted household waste. Instead, to protect human health and the environment, you must take your waste equipment to an officially designated collection point for the recycling of waste electrical and electronic equipment. Proper disposal and recycling help to avert potentially harmful consequences for the environment and people.

For further information on the location and conditions of such collection points, please contact the installer or local authorities.

National regulations

The national regulations and disposal guidelines must be observed for all disposal measures.

17 Annex A

CE Declaration of Conformity

EU-Konformitätserklärung
EU-Declaration of Conformity
Declaration UE de conformité

Metreg Technologies GmbH
Tränkeweg 9
15517 Fürstenwalde

Produkt
Product
Produit

Elektronisches Quantometer
Electronical Quantometer - Turbine Gas Flow Meters
Quantomètres électronique - Compteurs de gaz

Typ, Ausführung **MQMe**
Type, Model
Marquage de produit

Richtlinie Directive Directive	**PED**	**ATEX**
Produktkennzeichnung Product marking Marquage de produit	ohne/without/sans - DN25 CE - DN50 CE 0035 - DN80-DN150	Ex II 1G Ex ia IIC T4 Ga CE 1026
EU-Richtlinien EU-Directives Directives européenne	2014/68/EU	2014/34/EU
Normen Standards Normes	OIML 137-1&2 DIN EN 12261	EN 60079-0:2012+A11:2013 EN 60079-11:2012
EU-Baumusterprüfung EU Type-Examination Décision d'approbation européenne	HpiVS/P1001-103-Q-04	CNEX 17 ATEX 0008X
Überwachungsverfahren Surveillance Procedure Methode à garder	2014/68/EU Annex III Modul H	EN ISO/IEC 80079-34 FTZÚ 17 ATEX Q 004
Überwachungsinstanz des Systems Surveyor of the System Auditeur de la systéme	Notified Body 0035 TÜV Rheinland Gerhard-Neumann-Str. 1 15236 Frankfurt (Oder)	Notified Body 1026 FTZÚ, s.p. Pikartská 7 716 07 Ostrava-Radvanice

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
Die entsprechend gekennzeichneten Produkte sind nach den aufgeführten Richtlinien und Normen hergestellt. Sie stimmen mit den geprüften Baumustern überein. Die Herstellung unterliegt dem genannten Überwachungsverfahren. Durch den Zusammenbau der Produktkomponenten werden keine zusätzlichen Zündquellen erzeugt.

This declaration of conformity is issued under the sole responsibility of the manufacturer.
Products labelled accordingly are manufactured according to the listed directives and standards. They correspond to the type approval samples. The production is subject to the stated surveillance procedures. No additional ignition sources are being created by assembly of the product's components.

La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.
Les produits désignés en conséquence ont été fabriqués conformément aux exigences des exigences des Directives et Normes citées. Ils conformes au type éprouvé. La fabrcation ets soumise au Procédé de surveillance indiqué. L'assemblage des composants du produit ne génére aucune source d'allumage supplémentaire.

Unterzeichnet für und im Namen von: Metreg Technologies GmbH
Signed for and on behalf of:
Signé pour et au nom de:

Till Kirchner
Geschäftsführer

Fürstenwalde, 06.04.2021

18 Annex B

The external pulser, which directly scans the turbine wheel, has its own ATEX approval with the following markings:

HF pulser	Proximity switch according to NAMUR specifications	PTB 01 ATEX 2191 ⟨Ex⟩ II 1G Ex ia IIC T6 IECE x BVS 06.0003 ⟨Ex⟩ ia IICT6/T5 Ga

Your contact:

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