

MQM

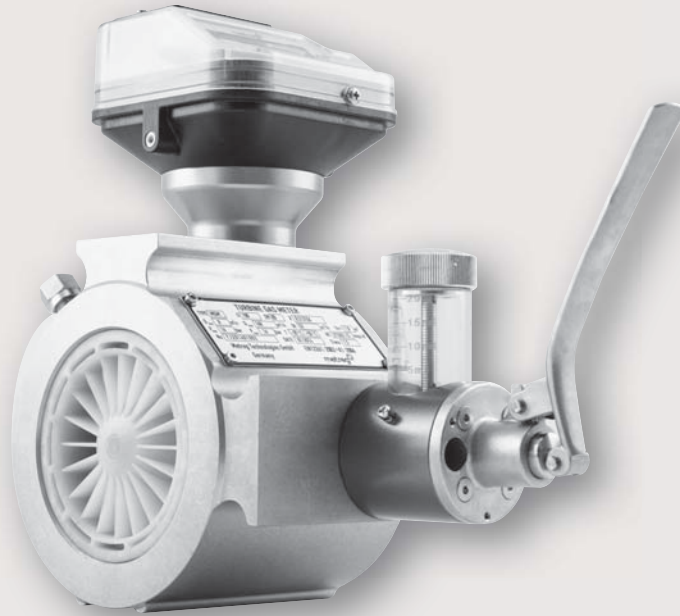
Quantometer



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Metreg Technologies GmbH

MQM Quantometer



Applications

The MQM Quantometer is a turbine meter for operational natural gas - volume measurement and for other non-aggressive gases such as propane, butane, air, CO₂ or inert gases used in internal and controlling processes of various types, especially in industrial thermoprocessing facilities.

Key features

- Meter size G 10 to G 1000
- Flow rates from 16 to 1600 m³/h
- Nominal sizes from DN 25 (1") to DN 150 (6")
- Pressure class PN 10/16 and ANSI Class 150
- Measuring range 1:20
- Meter body made of anodized high strength Aluminum
- Maintenance free based on permanent lubrication of the ball bearings
- Manual lubrication of the ball bearings by means of oil pump as option
- Index head standard made of engineered polymer material, optional made of Aluminum
- Rotating index head (355 °)
- Recommended straight inlet pipe $\geq 3DN$ and outlet pipe $\geq 2DN$
- Horizontal and vertical mounting position
- Approval according to PED (PED 97/23/EG)

Description and operation

The MQM Quantometer is a turbine gas meter that registers the operating volume using an eight-digit mechanical counter. Via pulses the operating volume can be transferred to an electronic volume corrector and converted to normal or standard conditions.

The Quantometer MQM is a volume flow meter. The flow of the gas to be measured causes the turbine rotor to rotate. The gas flow is narrowed on an annular cross section, is accelerated and directed onto the smooth-running Aluminum rotor. The number of rotations is proportional to the measured gas volume; the frequency of rotations is proportional to the actual gas flow. The rotation of the rotor is connected to a speed-reducing gear train and transmitted via a magnetic coupling from the gas pressurized area to the adjustable 8 digit roller counter in the atmospheric environment.

The actual volume flow can be transmitted to electronic volume correctors or data loggers via low frequency (LF-) pulses generated by Reed contacts. In the meter's index head is also located an anti-tampering contact.

The rotation of the rotor can be scanned additionally with one frequency (HF-) sensor as an option. The HF-sensor signal allows the determination of the actual gas flow in high-resolution.

Technical specifications

Gas temperature:	-20 °C to +60 °C
Ambient temperature:	-25 °C to +55 °C
Storage temperature:	-25 °C to +55 °C
Operating pressure:	20 bar max.
Protection class:	IP 65
Materials:	
• Meter housing:	Aluminum alloy
• Turbine rotor:	Aluminum alloy
• Meter index head:	Synthetic material (standard), optional Aluminum
PED-Approval:	Hpi / 222-103-Q-01
ATEX-Approval:	Ex-Zone 1
Reproducibility:	< 0.2 %
Overload:	Short term up to 1.25 Q _{max}
Pressure change rate:	< 0.35 bar/s
Counter:	Eight-digit mechanical roller counter
<i>Meter index head:</i>	Standard synthetic material, aluminum as option
Pulse output:	1 LF-pulser (Reed contact) and 1 anti-tampering contact Option: additionally 1 HF-pulser
Connections:	
• Pressure:	1 connection with ¼" NPT – thread
• Temperature:	1 thermowell with G ¼" – thread (option)

Error limits

Maximum permissible error limits:

$$Q_{\min} \leq Q < Q_t: \pm 3.0 \%$$

$$Q_t \leq Q \leq Q_{\max}: \pm 1.5 \%$$

$$Q_t = 0.2 Q_{\max}$$

The Quantometers MQM are all initially calibrated within the specified measurement errors. Reduced measurement errors limits are optionally available.

The Quantometers MQM are manufactured with large measurement ranges due to the precision machining of the parts and a reproducible assembly process. The standard calibrated measurement range for the MTM is 1:20 under atmospheric conditions.

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Performance data

DN [mm]	G-Typ	Q _{min} [m ³ /h]	Q _{max} [m ³ /h]	HF* [imp/m ³]	NF [imp/m ³]	pressure loss [mbar] bei Q _{max} and ρ=1 bar abs.	
						Air (ρ=1.2 kg/m ³)	Natural gas (ρ=0.83 kg/m ³)
25	10	2	16	140000	10	23	15
25	16	2,5	25	140000	10	24	16
25	25	4	40	140000	10	25	17
50	40	6,5	65	104000	10	14	9
50	65	10	100	104000	10	15	10
80	100	8	160	27000	1	6	4
80	160	12,5	250	27000	1	15	10
80	250	20	400	27000	1	25	17
100	160	12,5	250	13500	1	5	4
100	250	20	400	13500	1	12	8
100	400	32	650	13500	1	25	17
150	400	32	650	5400	1	6	4
150	650	50	1000	5400	1	16	11
150	1000	80	1600	5400	1	25	17

* The absolute number of the pulses depends on the meter size and the single meter itself. The stated values are of typical size. Exact values determined by calibration of the meter are located on the nameplate.

The Quantometer MQM show very stable and reproducible measurement results. The measurement cartridge has been designed to be assembled into the pressure containing housing positioned by soft O-rings. This makes the MQM meter very robust against any torsional and bending stresses resulting out of installation stresses. The meters can withstand far more than double the specified torsional and bending stresses implied through the installation as defined for example in EN 12261.

The lifetime durability of the Quantometer MQM is very stable due to the large dimensioned high precision ball bearings "made in Germany" along with the high precision machining of the body and all moving parts. All MQM Quantometers are equipped with machined aluminum turbine wheels. After machining all aluminum parts, especially the turbine wheel, are hard anodized for less friction and higher resistance to mechanical wear and tear or chemical influences.

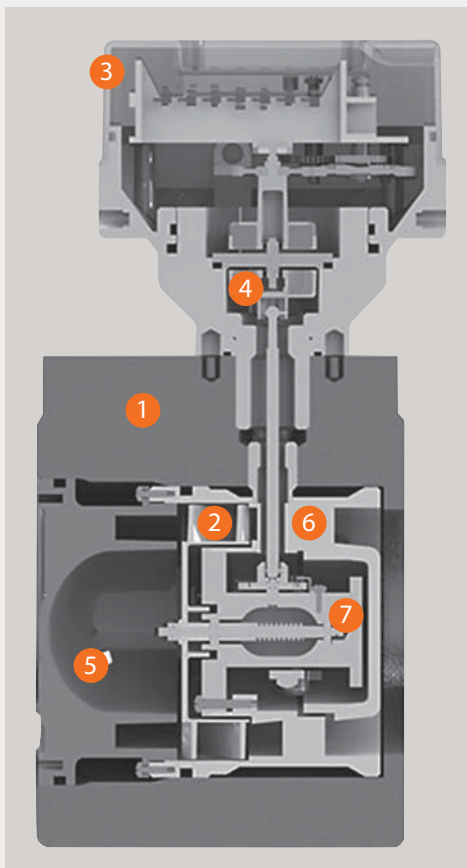
In case of contaminations or dust in the measured gas it is recommended to install an optional oil lubrication pump for longer lifetime.

Meter design

The pressure containing housing (1) is very robust against torsional or bending forces due to the large cross sections. The aluminum turbine wheel (2) is machined out of full material on a 5 axis machine, dynamically precision balanced, and hard anodized. The computer optimized profile of the turbine blades in combination with the fluid dynamic optimized inlet flow straightener (5) provide for a very stable measurement characteristic also under elevated pressure operating conditions.

The high precision ball bearings "made in Germany" ensure minimal friction under all operating conditions. The complete measuring cartridge (6) is positioned in the housing by O-rings. This design feature also creates a circular room with absolute static operating pressure for very precise pressure measurement without any dynamic flow influences. The turning of the turbine wheel is transmitted via a low friction gear train (7) and a pressure stable and leak tight magnetic coupling (4) to the eight digit mechanical counter (3) with an environmental protection class of IP 65. The Quantometer MQM can be installed horizontally and vertically up or down due to the 355° turnable index head.

The exchangeable low frequency (LF) switch in combination with an anti-tampering contact provides for the electrical connection to an electronic volume corrector and a possible further AMR device. The optional oil lubrication of the ball bearings is ensured through the lubrication pump. The complete design of the MQM Quantometer has been aimed to be very robust in combination with highest measurement performance.

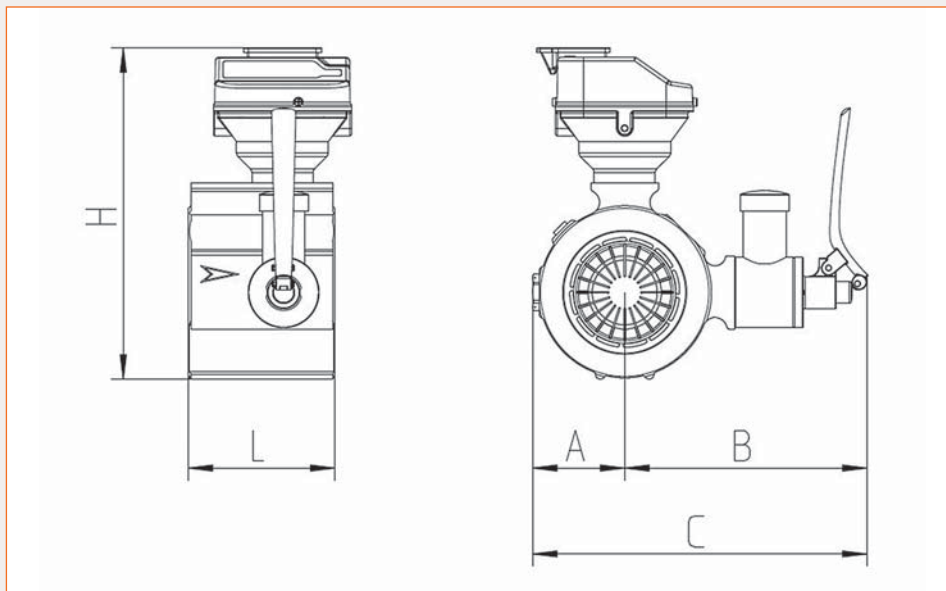


- 1 Pressure containing housing
- 2 Turbine wheel
- 3 Mechanical counter / index
- 4 Magnetic coupling
- 5 Inlet flow straightener
- 6 Measuring cartridge
- 7 Gear train

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Dimensions, weights and connections

DN [mm]	Housing dimensions [PN 16 / ANSI 150]							Weight without pump [kg]	Weight without pump [kg]
	L [mm]	A [mm]	B no pump [mm]	B no pump [mm]	C no pump [mm]	C with Ppump [mm]	H [mm]		
25	150	65	60	135	125	205	195	4.0	4.8
50	75	55	65	145	120	200	225	2.8	3.6
80	120	80	90	250	170	330	260	5.0	5.8
100	150	90	100	260	190	350	285	6.8	7.6
150	180	115	120	280	235	395	335	11.6	12.4



The pressure loss of the MQM Quantometer is minimized through a fluid dynamically optimized inlet diffuser, very low manufacturing tolerances and the high precision, low friction ball bearings. The optimized flow conditions allow a minimal straight inlet pipe of ≥ 3 DN. If the installation conditions allow or in case of severe flow perturbations acc. to OIML a straight inlet length of ≥ 5 DN is recommended."

Connections

DN [mm]	Flanges with threaded holes	
	DIN EN 1092-1 PN 16	ANSI B 16.5 Class 150
25	4 x M12	4 x 1/2"
50	4 x M16	4 x 5/8"
80	8 x M16	4 x 5/8"
100	8 x M16	8 x 5/8"
150	8 x M20	8 x 3/4"

MQM Quantometer housings are manufactured with flanges as a "sandwich" design to be installed between two inlet and outlet pipe flanges on a standard basis with raised face (RF) flanges according to DIN/EN 1092-1 or ANSI B 16.5 for class 150 with a maximum operating pressure of 16 bar/ 1,6 MPa. The necessary bolts, nuts, washers and gaskets are provided optionally with the meter.

More technical details, especially for commissioning and operation, please refer to the operation manual of the MTM turbine meter.





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