

OMEGA VI Rotary Gas Meter

Documentation and Technical Specifications



Advantages

- Compact one side closed construction, therefore light weight, high torsion rigidity and little danger for interlocking of rotors and housing
- Torsion-resistant housing designed by using ductile iron and aluminium components
- Square rotor design for short meter body, easy mounting and large cyclic volume (reduced rotor speed and low noise)
- Low speed magnetic coupling (low wear)
- All four mounting directions are possible without a second counter (specify flow direction in your order)
- Flow range up to 1 : 200
- Optimized inlet and outlet design to reduce pressure loss
- Dirt groove to reduce dust and particle sensitivity

Integrated thermo-wells for temperature or combined pressure/temperature measurement with a volume converter are optionally available.

Operation

The OMEGA VI rotary gas meter of **vemm tec** Messtechnik GmbH is a positive displacement meter for volume and flow rate measurement.

It is suited for measuring clean, dry, non-corrosive gases like natural gas, propane, butane, air, nitrogen, and others. The meter is used for highly accurate gas measurement where a large rangeability is required.

The meter measures the quantity of a flowing gas at actual gas pressure and actual gas temperature, i. e. at flowing conditions.

The metering principle of OMEGA VI is displacement of the metering chamber content by two special shaped rotors. The rotation of the rotors is transferred to a mechanical counter and accumulated as volume at measurement conditions. In addition, electronic pulses are generated for registration and/or for volume conversion to base conditions with an electronic conversion device.

OMEGA VI is designed to deal with over-ranging of 20 % of Q_{max} , this over-ranging must occur slowly and without pulsations.

Design

The rotary gas meter OMEGA VI has two identical, lob shaped rotors that roll off on each other without ever touching. A very small differential pressure of 0.02 mbar is sufficient to start the rotors and the meter. The performance of the meter is constant over years, because there is no wear on the moving parts in the measuring chamber. The bearings and gears are permanently lubricated by an oil mist. The body housing is of high strength ductile iron (EN-GJS-400-18-LT; GGG 40.3). This body material allows high pressures and provides noise dampening effects.

According to the MID approval the meters are suited for:

- Gas/Ambient temperature range -10 to +55 °C
- Gas/Ambient temperature range -20 to +55 °C (special operating range)
- Storage temperature -40 to +70 °C

Maximum pressure 20 bar(g); flange pattern PN10/16 or ANSI 150#. PED approved

Index Head with Pulse Outputs

A special design of both, measurement chamber and the lubrication system, enables you to install the meter in any of the four possible mounting positions (specify position in your order). In any case, the turnable index head is located at the front of the meter and you do not need a second counter. The gas flow direction through the meter is always the same.

The OMEGA VI is equipped with an IP67 index head with many outstanding features:

- Counter is low speed, low friction driven by gas tight magnetic coupling
- Eight-digit counter, non-resettable
- Standard equipped with 1 low frequency Reed switch, second Reed switch as an option
- Optional high frequency HF3 NAMUR sensor
- Index head can be fitted in 4 positions

Accuracy

The meter stops counting as soon as the gas flow stops. The high accuracy of OMEGA VI is applicable over a wide measurement range and in conformance with MID Class 1 Instruments:

$\pm 1 \%$ for Q_t to Q_{max}

$\pm 2 \%$ for Q_{min} to Q_t

$\pm 0.1 \%$ repeatability or better

Q_t is 0.1 Q_{max} (range >1:30) or 0.2 Q_{max} (range 1:30)

Alternative specifications on request.

Approvals

The OMEGA VI rotary gas meter complies with all national and international requirements for gas meters, such as EN 12480 and OIML R137-1. The approval for EU guideline 2014/32/EU (MID) is issued under No. DE-13-MI002-PTB005; other approvals are available. PED approval (2014/68/EU) is granted.

Verification and Calibration

Gas flow meters for custody transfer purposes need to be verified according to EU guideline 2014/32/EU (MID). The **vemm tec** test laboratory can perform verifications. A calibration certificate will be issued.

If the meter is not used for custody transfer purposes, a factory calibration is performed. The "Certificate of Conformity" proves that the meter has been tested and complies with the stated error limits.

On request, we can also take care of a high-pressure calibration, performed at our own high pressure calibration laboratory HPCL P5 (traceable to PTB) or at a certified independent institute.

Material and Safety Tests

All OMEGA VI rotary gas meters are pressure tested and verified in accordance with the specified maximum pressure and customer requirements.

- Hydro test of the meter housing at 2x maximum operating pressure
- Air seal test with the completely assembled meter at 1.1x maximum operating pressure
- Material : EN 10204 3.1
- EU-PED compliance: EU Directive 2014/68/EU
- EU-MID compliance: EU Directive 2014/32/EU

A material certification package can be ordered as an option. Other tests are available on request.

Documentation

The OMEGA VI comes with an installation, operation and maintenance manual.

Depending on the order and the meter chosen, the optionally ordered certification package contains:

- 3.1 certificate with declaration of conformity
- Material certificates for pressure containing parts
- Pressure test certificate
- Calibration certificates with data and curve (as ordered)
- CE conformity certificates (if applicable)

Installation

The gas flow must be free from liquids, dust and particles. The use of a sieve is mandatory (filter mesh 40 = 430 micron or smaller). It is recommended to use a 10 micron filter as well. The meter must not be installed in the lowest point in a gas line, because condensate and dirt tend to collect here.

The meter can be used horizontally or vertically, allowing all four mounting positions, as long as the rotor shafts remain in horizontal position.

Straight upstream or downstream pipe sections are not required for the OMEGA VI. The meter can be installed in the piping without additional support. It must be mounted without externally induced stress. Sudden or extreme pressure and flow variations as well as vibrations and pulsating flow must be avoided.

The meter is preferably installed indoors but is suitable for outdoor installation. In that case it is recommended to protect the meter from direct sunlight and rain.

Additional Instrumentation

The indicated volume will often be converted to volume at base conditions. Electronic volume converters usually measure pressure and temperature or only temperature.

• Pressure

Pressure taps (M12x1.5 or M16x1.5) enable the measurement of the static pressure in the meter housing. Especially for custody transfer applications, the pressure for volume conversion shall be measured at the upstream pressure point marked with Pr (also designated Pm).

The other pressure tap is located downstream at the meter body, marked with P.

• Temperature

The temperature measurement should preferably be located within 2 D upstream of the meter or directly installed in the meter body (M12x1.5). No pressure reducing parts should be located between the temperature sensor and the meter.

vemm tec offers a new PT-thermo-well for installation in the Pr point of OMEGA VI rotary gas meters (M16x1.5). It allows installation of both, temperature sensor and pressure transmitter at the meter inlet or outlet.

Alternatively standard thermo-wells are available that can be mounted in the upstream piping.

Volume Converters

vemm tec can provide you with electronic flow conversion devices such as sophisticated volume converters, optionally provided with GSM/GPRS communication.

We offer these devices (PTZ-BOX) on your request. Please inquire for more details.



Table:
OMEGA VI rotary gas meter

Nominal diameter [mm] (inch)	DN 50 (2")				DN 80 (3")			DN 100 (4")		
Body material	Ductile Iron				Ductile Iron			Ductile Iron		
Size rating ¹⁾	G25	G 40	G 65	max.	G 100	G 160	max.	G 160	G 250	max.
Flow Turn Down Ratio ²⁾	1:60	1:100	1:100	1:200	1:100	1:100	1:200	1:100	1:100	1:200
Q _{max} [m ³ /h]	40	65	100	120	160	250	280	250	400	480
Q _{min} [m ³ /h] ²⁾	0.65	0.65	1.0	0.6	1.6	2.5	1.4	2.5	4.0	2.4
Q _{start} [m ³ /h]	0.1				0.2			0.25		
1R1 (Reed): k-factor	10 Imp/m ³				1 Imp/m ³			1 Imp/m ³		
max. frequency [Hz]	0.11	0.18	0.28	0.33	0.04	0.07	0.08	0.07	0.11	0.13
HF3 (NAMUR): k-factor ³⁾	375.0 Imp/m ³				3551 Imp/m ³			2153 Imp/m ³		
max. Frequenz [Hz]	4.17	6.77	10.42	12.50	157.8	246.6	276.2	149.6	239.3	287.2
Pressure and pressure taps	M12 x 1.5 (2x) und M16 x 1.5 (2x)									
Pressure class (p _{max})	Maximum pressure 20 bar(g) Flange patterns PN10/16 und ANSI 150#									
Pressure loss [mbar]	< 0.2	< 0.5	< 1.2	< 1.8	< 1.2	< 2.9	< 3.6	< 1.8	< 4.6	< 6.6
	with natural gas of 1.0 bar abs at Q _{max}									
L [mm] total length	171				171			241		
A [mm] width	281				416			495		
B [mm]	196				248			290		
C [mm]	85				168			205		
D [mm] height	210				212			212		
Weight [kg]	22				20			33		
No of oil chambers	1				2			2		
Lubricant [ml] horizontal	25				2 x 24			2 x 24		
Lubricant [ml] vertical	75				2 x 24			2 x 24		

¹⁾ Other G-Values such as DN50 G16; DN80 G40/G65 and DN100 G65/G100 available on request

²⁾ with temperature range -10 to +55 °C. For -25 to +55 °C please enquire. Higher TDR please enquire

³⁾ Nominal value. Actual value will be determined during calibration

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