



TYL Rotary Displacement Gas Meter



Applications

The TYL rotary displacement gas meter is a high precision instrument for gas volume measurement and flow measurement of natural gas and other non-aggressive gases in gas stations and plants. The TYL rotary gas meter is applicable in residential and office buildings as well as commercial and industrial plants.

Key features

- Meter sizes G 10 to G 1000
- Flow rates from 0.4 to 1600 m³/h
- Nominal sizes from DN 25 to DN 200
- Pressure class PN 10/16 and ANSI 150*
- No special servicing is required after installation. Generally the oil must be replaced at least every 5 years.
- Meter housing made of anodized high strength Aluminum
- Index head by default made of synthetic material, optional made of Aluminum
- Rotating counter (355 °)
- No inlet or outlet section required
- Horizontal and vertical mounting position
- Approvals according to MID (2014 /32 /EU), OIML, PED (PED 2014/68/EU), ATEX

Description and operation

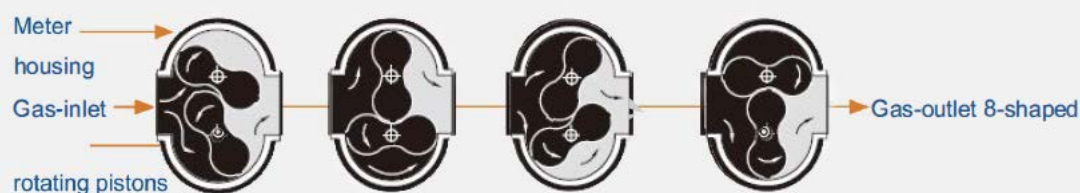
The TYL rotary gas meter registers the operating volume using an eight-digit mechanical counter. Via pulses the operating volume can be transferred to an electronic volume corrector and converted to normal or standard conditions. The TYL rotary meter is approved for custody transfer according to MID (2014 /32/EU) / OIML.

Rotary gas meters are operating according the displacement principle. In the meter housing are two 8-shaped coordinated rotating pistons without touching each other. The measuring chamber is regularly filled and emptied by the rotation. During each revolution four crescent-shaped volumes are moved through the measuring chamber, in which the rotation speed is proportional to the gas flow. The rotation of the pistons is synchronized by a gear train outside the measuring chamber.

* 16 barg max. with MID-Certificate

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.

Rotary gas meters are characterized by a very compact design and high accuracy. The TYL rotary meter requires no inlet or outlet pipe and is insensitive to severe gas flow fluctuations (discontinuous operation).



Technical specifications

Gas temperature:	-25 °C to +55 °C
Ambient temperature:	-25 °C to +55 °C
Storage temperature:	-30 °C to +60 °C
Operating pressure:	16 bar (g)
Protection class:	IP 67
Materials:	
• Meter housing:	Aluminum Alloy
• Pistons:	Aluminum Alloy
• Synchronization wheels:	Stainless steel
• Meter index head:	Synthetic material (standard), optional Aluminum
Certificate Number	HPiVS/P1001-103-Q-06
A TEX-Approval:	Ex-Zone 1
Certificate:	T10488
OIML - Recommendation:	The gas meter of the type TYL meets the requirements of OIML R137-1 & 2: 2012 "gas meters", confirmed by NMI
Repeatability:	< 0.1 %
Overload:	Short term up to 1.25 Q_{max}
Pressure change rate:	< 350 mbar/s
Counter:	Eight-digit mechanical roller counter
Meter index head:	Synthetic material(standard), Aluminum as an option Bi-directional index is available as an option(irrespective of the flow direction, forward or reverse, the index always positively accumulated) Index with mechanical drive instrument as an option
Pulse output:	1 LF-pulser (Reed contact) and 1 anti-tampering contact Option: 2 LF-pulsers (Reed contacts) and 1 MF-Pulser(only with aluminum index) and 1 HF-pulser
Connections:	
• Pressure:	2 connections (1 inlet and 1 outlet) with 1/4" NPT - thread
• Temperature:	2 x thermowell (1 inlet and 1 outlet) with 1/4" NPT - thread (option)

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Error limits and typical error curve

According to EN 12480 maximum permissible error limits:

$$Q_{\min} \leq Q < Q_t: \pm 2.0 \%$$

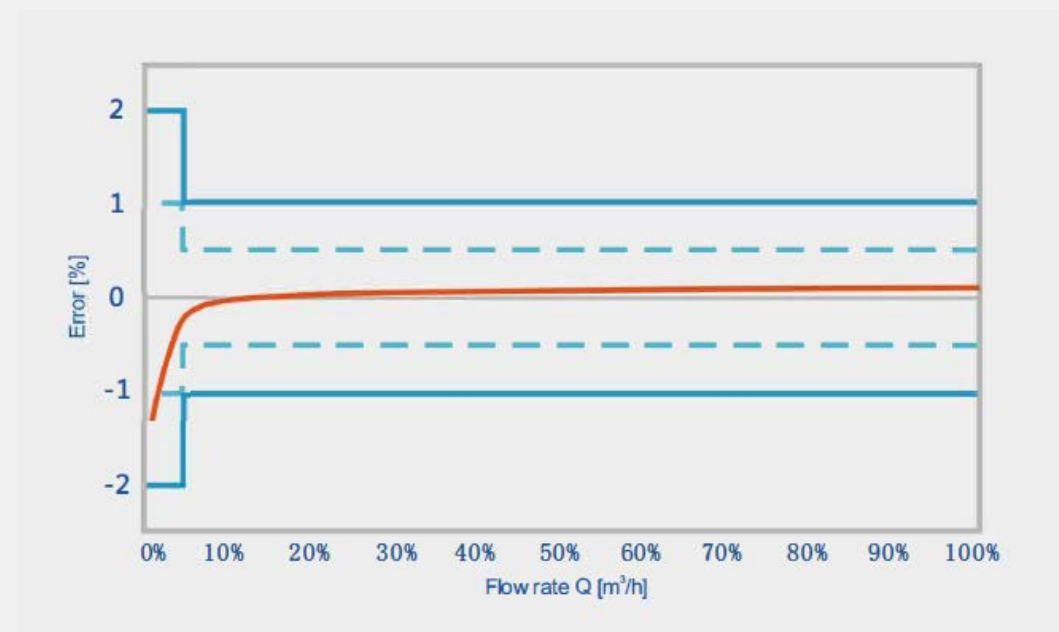
$$Q_t \leq Q \leq Q_{\max}: \pm 1.0 \%$$

Q_t = depends on the measuring range:

The initial calibration of the rotary meter TYL will always render results smaller than the maximum permissible errors defined by the international standards of EN 12480 and OIML. Lower calibration errors with only half the maximum permissible errors are available upon special request.

G-Typ	Q_t
G 10, G 16	$0,1 Q_{\max}$
G 25 to G 1000	$0,05 Q_{\max}$

Typical error curve



The rotary meters TYL show very stable and reproducible measurement results. The design of the housings and pressure containing parts has been optimized especially for robustness under torsional and bending stresses. The meters can withstand more than double the specified torsional and bending stresses implied through the installation as defined in EN 12480.

The lifetime durability of the TYL rotary meter 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. After machining all aluminum parts are hard anodized for less friction and higher resistance to wear and tear.

Performance data

DN [mm]	G-Type	Qmin [m³/h]	Qmax [m³/h]	Standard Rangeability	V [dm³]	LF [imp/m³]	MF [imp/m³]	HF [imp/m³]	Screwed connection
25	10	0.4	16	1:40	0.177	10	100	28098.8	RF/F-F
*1 1/2	16	0.5	25	1:50	0.210	10	100	23744.75	RF/F-F
50	16	0.5	25	1:50	0.210	10	100	23744.75	RF/F-F
50	25	0.5	40	1:80	0.283	10	100	17617	RF/F-F
50	40	0.5	65	1:130	0.566	10	100	8808.5	RF/F-F
50	65	0.5	100	1:200	0.708	10	100	7035.45	RF/F-F
80	100	0.65	160	1:250	1.05	1	10	4748.95	RF/F-F
80	160	1.6	250	1:160	2.78	1	10	1795.2	RF/F-F
100	160	1.6	250	1:160	2.78	1	10	1795.2	RF/F-F
100	250	2.0	400	1:200	4.20	1	10	1187.25	RF/F-F
100	400	3.2	650	1:200	5.66	1	10	883.2	RF/F-F
150	400	6.5	650	1:100	10.5	1	10	476.625	RF/F-F
150	650	10.0	1000	1:100	15.7	1	10	317.75	RF/F-F
200	1000	16.0	1600	1:100	19.7	0.1	1	253.675	RF/F-F

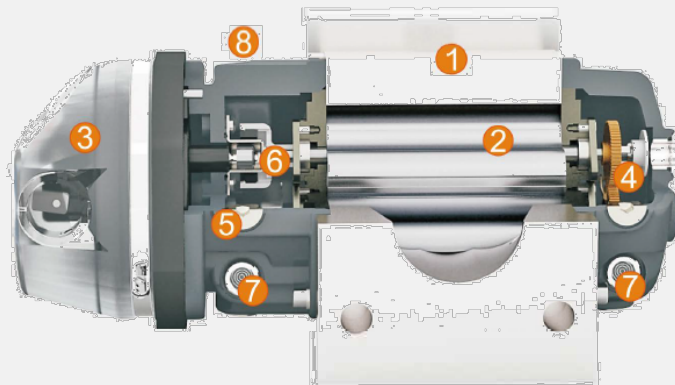
*NPT Screwed connection

The rotary meters TYL are manufactured with large measurement ranges due to the precision machining of the parts and a very reproducible assembly process.

DN [mm]	G-Typ	Pressure loss [mbar] at Q _{max} and p = 1 bar.a Air (p = 1.2 kg/m ₃)
25	10	0.8
50	16	1.5
50	25	1.3
50	40	2.4
50	65	4.2
80	100	4.2
80	160	5.0
100	160	3.9
100	250	5.0
100	400	7.0
150	400	4.3
150	650	4.7
200	1000	6.5

The pressure loss of the TYL meters is extremely low due to the very small manufacturing tolerances and the high precision, low friction parts. With the very low pressure loss the TYL rotary meters are very well suited for use in low pressure applications for burners or other processes requiring very tight process parameters.

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Meter Structure

1. Meter housing
2. Piston
3. Meter index head
4. Synchronization wheel
5. Oil lubricated bearings
6. Magnetic coupling
7. Oil inspection window
8. Oil filling or drain hole

The pressure containing housing (1) is high resistance to torsion and bending forces due to the large high strength aluminum cross sections. The profiles of the precision machined and dynamically balanced rotating impellers (2) have been computer optimized to produce a stable, small gap between the moving parts for best measurement results under all operating conditions. The high precision ball bearings "made in Germany" (5) with minimized tolerances are the basis for a very smooth operation and high bearing loads for rough operating conditions.

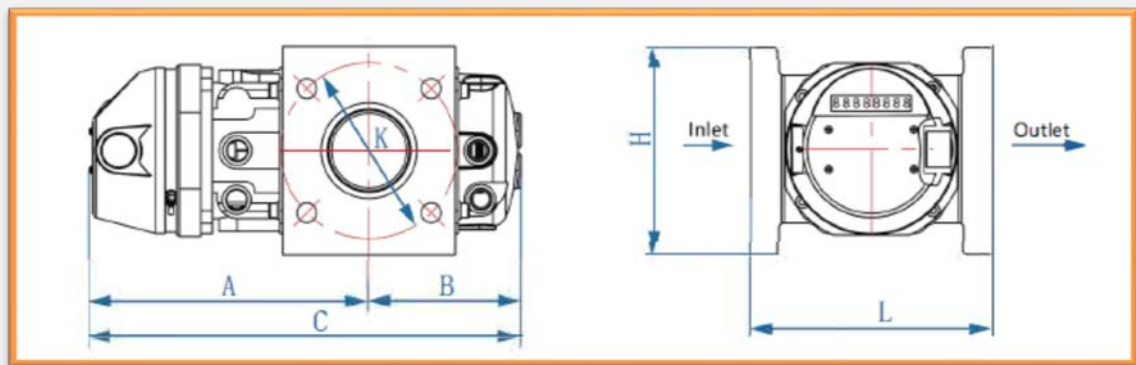
The synchronizing gears (4) made out of high strength stainless steel are providing for a very smooth operation of the meter. The lubrication oil is inserted into the front and back oil chambers through the filling plugs (8) before commissioning of the meter. The correct filling level can be checked through the oil gauge glasses (7). The rotation of the rotary impellers is transmitted by means of a mechanical gear train and the magnetic coupling (6) to the 8 digit mechanical counter with an environmental protection class of IP 67.

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 mechanical counter is 355° rotatable and thus the meter is installable both vertically and horizontally. The complete design of the meter is aimed at maximum robustness and long lifetime under operation at highest measurement accuracy.

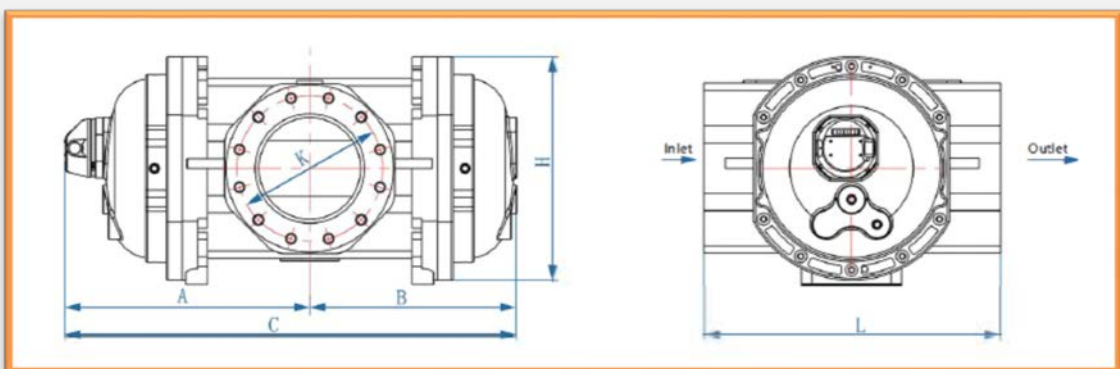
Dimensions, weights and connections

G - Typ	DN [mm]	C[mm]	Housing dimensions				Weight [kg]
			A[mm]	B[mm]	H[mm]	L[mm]	
10	25	300	197	103	125	130	4.8
16	50	315	200	115	150	171	4.5
25	50	353	219	134	150	171	8.0
40	50	357	218	139	180	171	10.0
65	50	387	233	154	180	171	11.5
100	80	461	270	191	180	171	15.0
160-3	80	485	278	207	240	241	27.5
160-4	100	485	278	207	240	241	28.0
250	100	598	334	264	240	241	38.5
400	100	720	397	323	240	241	48.5
400	150	688	378	310	460	450	102
650	150	826	447	379	460	450	125
1000	200	932	500	432	460	600	145

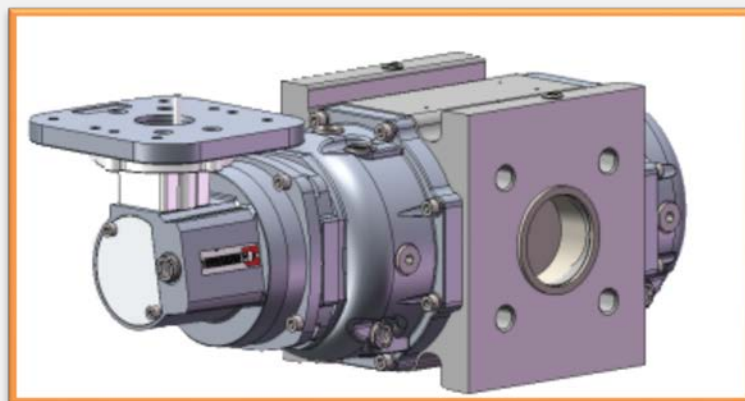
Housing dimensions for TYL rotary gas meters of G 10 to G 400 (DN 100):



Housing dimensions for TYL rotary gas meters of G 400 (DN 150) to G 1000:



Dimensions of Counter with Mechanical Drive Instrument will be supplied upon request, see picture as below.



Connections

DN [mm]	Flanges with threaded holes	
	EN 1092-1 PN 16	ANSI B 16.5 Class 150
25	4x M12	4 X M14
50	4x M16	4 X M16
80	8 x M16	4 X M16
100	8 x M16	8 x M16
150	8 x M20	8 x M20
200	12 x M20	8 x M20

TYL rotary meters have a standard flange hole pattern according to PN 16 EN 1092-1. Optionally upon customer request the TYL meters can also be supplied with flange hole patterns according to ANSI B 16.5 class 150 for a maximum operating pressure of 16 bar/ 1,6MPa.

Further specific technical details, especially for commissioning and operation are describe in the operation manual for TYL rotary meters.

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