



# GFO

GAS FLOW ONLINE

## Creators in flow

Rotor  
Gas  
Meter



## The Statement **Creators in Flow.**

GFO Europe with a passion for gas metering technology through the Spiral of Creation. This spiral of creation is the natural path from wish to reality. The GFO logo itself represents the Flower of Live, being the sacred geometry and to be seen in many cultures around the globe. The Flower of Life holds a secret symbol created by drawing 13 circles out of the Flower of Life. By doing this, one can discover the most important and sacred pattern in the universe. This is the source of all that exists; it's called the Fruit of Life. It contains 13 informational systems. Each one explains another aspect of reality. Thus these systems are able to give us access to everything ranging from the human body to gas meters to...the galaxies.

## Connecting tomorrow with today

GFO Europe finds its roots firmly embedded in the Netherlands. A country with a longstanding and prominent history of producing and exporting Natural Gas. Supporting technologies such as industrial gas meters, were then developed and consequently, ever since, have conquered the world. Based on their elaborate past and extensive track record in designing innovative gas meters, the GFO team NL works on the next generation of gas meter technologies by following regional and global market requirements while constantly setting gas meter technology trends for years to come. Gas Measurement is a science being in principle an intelligent technology mix of sophisticated R&D, advanced CNC machining and practical experience. Based on this principle and pursuing knowledge itself, long term Product reliability has been achieved. The GFO team NL of engineers continues fine-tuning their proven technologies for innovative gas meters. GFO Europe connects in full focus tomorrow's requirements with today's technologies.

## Operating Principle

The principal of the Rotary Gas Meter is well known. It is a positive displacement type of meter, passing pre-determined volumes of gas by means of two counter-rotating rotors or impellers. Four times per revolution a fixed unit of volume is displaced through the measurement chambers. The flowing gas volume is proportional to the number of revolutions of the output. The output of this



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model Rotary Gas Meter is a special designed magnetic coupling where one part is fitted inside the meter body and the associated part is placed in the read-out unit. The read-out unit can either be a mechanical index or an electronic index, with or without volume conversion and communication functions.

## The GFO-RM Features

With conventional types of Rotary meters, pipe-line stresses often causes the impellers to block or serious degrade the meter's performance. The GFO-RM series however is using square shaped impellers and rigid supporting front plate, this makes this meter fully insensitive to pipe-line stresses caused by misalignment. The unique symmetrical shape of the impeller allows the maximum amount of gas to be passed with the minimum leakage and since the width of the impeller tip is at least two times greater than conventional impeller tips, the unregistered leakage through the meter is significantly reduced, resulting in an enlarged turn down ratio.



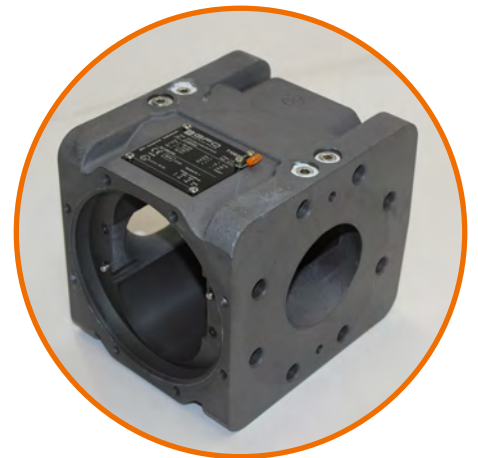
## Robust Design

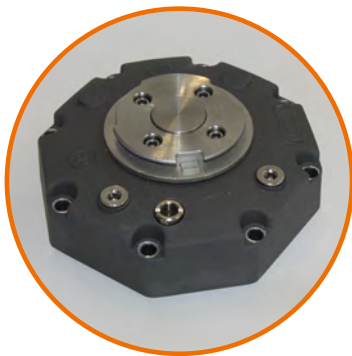
The robust design of the GFO-RM series is quite evident, namely:

- the shape of the meter body
- the shape of the impellers
- the design of the main shafts and its bearings
- the material selected for the meter body
- the overall dimensions of the meter

Therefore there are no bending, no twisting, no torque affects. The bearings are placed outside of the timing gears, which allows the connection between the impellers and the timing gears to be much stronger then with conventional types of rotor meters. Consequently, these rotor meters are far less vulnerable to improper start up or operation.

The GFO-RM series rotary meters are designed to provide maximum convenience for the user. All functions, such as the index, oil glass and oil filling plugs are accessible from the front. This also makes it possible to install the meter with its back against the wall, and thus saves space in confined areas such as basement installations.





## Multifunctional Coupling

To eliminate limitations to future upgrades both the GFO-RM series and the GFO-TM series are equipped with a hybrid magnetic coupling. Using a special designed magnet inside the meter, the reading of the meter can be changed from "mechanical" (magnet is used to drive the follower magnet of the mechanical index) to "electronic" (magnetic field orientation is used to activate pulse wires for detecting the rotation, direction and position of the impellers). The index and its functions can be exchanged with just "one twist and a click".



## Multifunctional Index

Mechanical index. The mechanical index contains a pocket that can hold different types of LF pick-ups such as reed switches, Wiegand sensors or fraud detection devices. This ability to change sensors quickly and easily, gives the meter maximum flexibility. The Mechanical index is 100% sealed to avoid condensation of the index.



## Sync Impeller Principle

A typical phenomenon with any rotary meter is the pulsating flow at the outlet of the rotary meter as gas passes through the set of impellers. The effect of such pulsations increases with pressure and flow quantity and can produce such strong pulsations that their resultant resonance can become destructive in the metering station. These pulsations can also actually limit the achievable Q max of the Rotary Meter. Additionally, the accuracy is affected by pulsations since the pressure in the measuring chambers, and as such the displaced volume, are varying. To compensate for the pulsation sine wave in the larger sizes of the GFO-RM series, the flow is divided and measured by two measuring chambers, each containing a pair of impellers. The phase of each pair has been shifted 45 degree (180 degrees in terms of the sine wave) from each other so that the pulsations oppose each other. The result is that nearly 100% of the pulsation is eliminated. The residual sine wave is significant smaller than the pulsation generated by Rotary Meters with only one measuring chamber. The elimination of the pulsation increases the lifetime of the meter, reduces the noise and improves the accuracy significantly.



## Approvals

The GFO-RM series is designed in accordance with all relevant and international published and accepted standards such as : **EC Directives, DIN 33800, EN 12480, AGA 7, ISO 9951, OIML R6 and R32**, prepared for the new OIML. Accredited according to Pressure Equipment Directive **PED. EU** and National metrological approvals by **NMi**.

## Verification & Calibration

The GFO-RM series are each supplied with a calibration certificate. The initial verification and the calibration are carried out at the GFO-factory on an NMi/VSL and/or PTB approved calibration bench.

## Installation

The GFO-RM series meters are designed in full compliance with European and major International Directives and guidelines such as the OIML, ISO and DVGW. The meter is designed for outdoor installation. Gas pipes must be clean and free from foreign impurities such as sand, dirt, welding debris and other particles as well as liquid. Generally it is recommended that a gas filter be installed upstream of the rotary meter, with a 160  $\mu$  filtration size. A bottle with sufficient lubrication oil is supplied with every meter.



## Technical Data



### Applications:

Media: Natural gas, town gas, propane, inert gases.

Industry: Gas supply, heating manufacturers, chemical industry

### Pressure ratings:

- Pressure ratings for PN10/16 and ANSI 150

- Various flanges are available on request

(DIN Flanges, ANSI Flanges, JIS Flanges and others).

### Nominal diameters:

1 ½ "up to 6" (DN 40 – DN 150).

### Measuring range:

160: 1 minimum or better at atmospheric conditions.

(EU standard = 1:20)

### Flow rates:

0,3 m<sup>3</sup>/h Up to 1.000 m<sup>3</sup>/h

**Repeatability:** 0,1 %

### Measuring accuracy:

0,2 Q max to Q max: ± 1 % or better

Q min to 0,2 Q max: ± 2 % or better

### Temperature range:

Standard: -25 °C to + 60 °C

On request: -40 °C to + 80 °C

## Standard Features



The standard mechanical meter index is fitted with a LF output.

Additional LF, HF outputs or smart electronics can be fitted.

The meters are also fitted with a number of pressure points

and thermo wells suitable for easy connection of electronic gas

volume conversion devices.



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Rating G-Rating	Size		Qmax		Qmin		LF pulses	
	Metric mm	Imperial inch	m <sup>3</sup> /h	cuft	m <sup>3</sup> /h	cuft/h	/m <sup>3</sup>	/cuft
G-10	40	1½"	16	560	0.30	11	10	0.1
G-16	40	1½"	25	880	0.30	11	10	0.1
G-25	40	1½"	40	1000	0.30	11	10	0.1
G-16	40/50	1½" - 2"	25	880	0.65	23	10	0.1
G-25	40/50	1½" - 2"	40	1500	0.65	23	10	0.1
G-40	40/50	1½" - 2"	65	2000	0.65	23	10	0.1
G-65	50	2"	100	3000	0.65	23	10	0.1
G-100	80	3"	160	5000	1.00	35	1	0.1
G-100	80	3"	160	5000	2.50	88	1	0.1
G-160	80	3"	250	7000	1.60	56	1	0.1
G-160	100	4"	250	7000	2.50	88	1	0.1
G-250	100	4"	400	11000	2.50	88	1	0.1
G-250-S	100	4"	400	16000	4.00	141	1	0.01
G-400-S	100	4"	650	23000	4.00	141	1	0.01
G-400-S	150	6"	650	23000	6.00	211	1	0.01
G-650-S	150	6"	1000	35000	6.00	211	1	0.01

Rating G-Rating	Volume dm <sup>3</sup>	Length mm	Height mm	Mounting		Weight kg
				metric	imperial	
G-10	0.26	171	120	4" M16	4½" UNC	4
G-16	0.26	171	120	4" M16	4½" UNC	4
G-25	0.26	171	120	4" M16	4½" UNC	4
G-16	0.69	171	180	4" M16	4½" UNC 1)	10
G-25	0.69	171	180	4" M16	4½" UNC 1)	10
G-40	0.69	171	180	4" M16	4½" UNC 1)	10
G-65	0.69	171	180	4" M16	4¾" UNC	10
G-100	1.11	171	200	8" M16	4¾" UNC	12
G-100	2.31	241	225	8" M16	8¾" UNC	18
G-160	2.31	241	225	8" M16	8¾" UNC	18
G-160	2.98	241	225	8" M16	8¾" UNC	27.5
G-250	2.98	241	225	8" M16	8¾" UNC	27.5
G-250-S	3.88	241	225	8" M16	8¾" UNC	45
G-400-S	3.88	241	225	8" M16	8¾" UNC	45
G-400-S	5.97	241	285	8" M20	8¾" UNC	53
G-650-S	5.97	241	285	8" M20	8¾" UNC	53

Note: GxxxS = Double sets of rotors in SYNC

- 1) Size 2" - 4¾" UNC

GFO has agents and representatives worldwide.

GFO has a continuing program of product research and development.

Technical specifications and construction may change due to improvements.

This publication serves as general information only, and all specifications are subject to confirmation by GFO



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