



## CGT-02

TURBINE GAS METER  
FOR FISCAL USE

# CGT-02

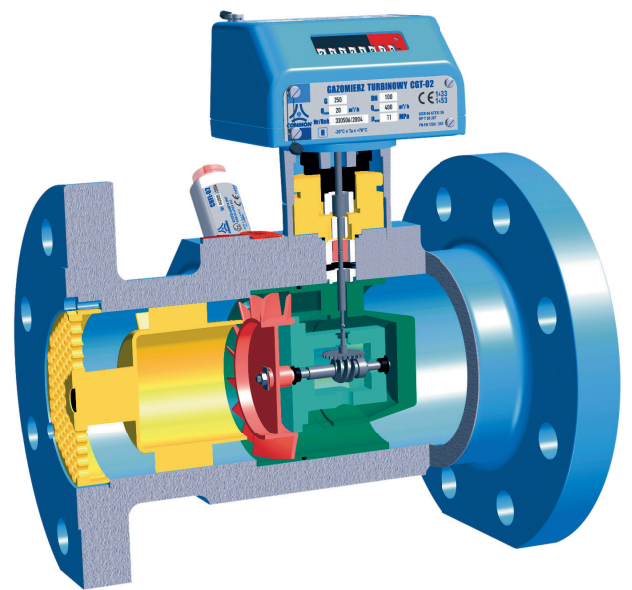
## Description

The turbine meter uses the principle of proportionality between the quantity of gas passing through the meter itself and the number of revolutions of the rotor. A mechanical / magnetic transmission system actuates the counting unit, installed in the upper part of a meter, which shows the volume of flowed gas to the operating conditions.

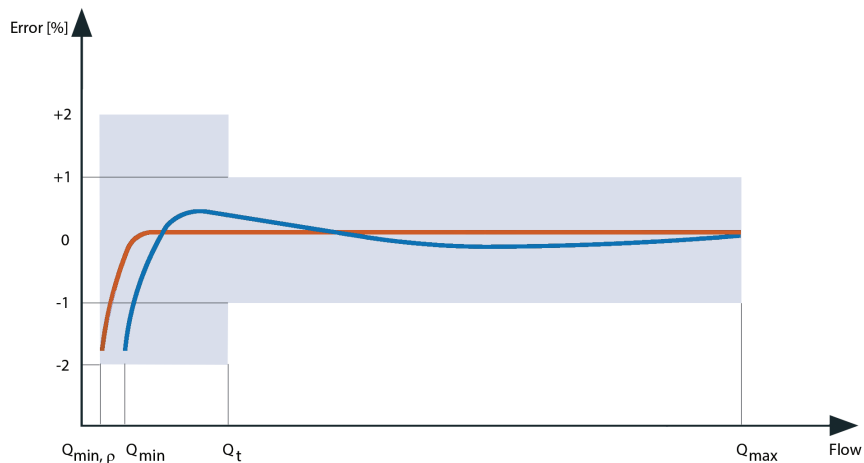
The high precision of the bearings, precise tolerances of all the parts of measurement and the application of a flow straightener with specific characteristics, reduce the pressure losses to minimum values.

The measuring cartridge is separate from the external body and is therefore extraneous to any mechanical stress due to non-perfect alignment of the flange and completely replaceable.

- Approvals MID - ATEX - PED
- EN12261 compliant
- Manufactured in accordance with ISO 9001 meet the ISO 9951 DIN 33800
- Environmental requirements: E2 - M2
- integrated flow straightener as standard (upstream = 2DN)
- Sizes from G65 DN50 to G6500 DN400, standard; larger sizes on request.
- Flow rates: 5 ÷ 10000 m<sup>3</sup>/h (standard)
- Standard ratio 1:20; ratios higher on request
- Fields pressure from PN10 to PN110 and ANSI 150 to ANSI 600
- Minimum pressure drop
- High measurement accuracy and stability over time.
- Length 3 DN
- Body stainless steel case or GGG40, compact and robust construction. aluminum impeller.
- Suitable for outdoor installation IP66/67
- The meters are equipped as standard with 2 generators of low frequency pulses (reed contact)
- On request they can also be installed in high-frequency pulse generators HF (NAMUR)
- Temperature range:  
gas temperature -25 ° C / + 70 ° C  
ambient temperature -25 ° C / + 70 ° C



## Measuring accuracy

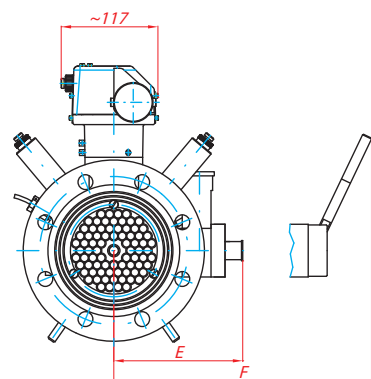
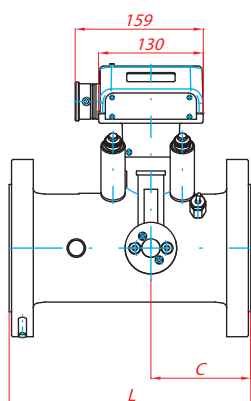


$$0,2 Q_{\max} \div Q_{\max} < \pm 1\%$$

$$Q_{\min} \div 0,2 Q_{\max} < \pm 2\%$$

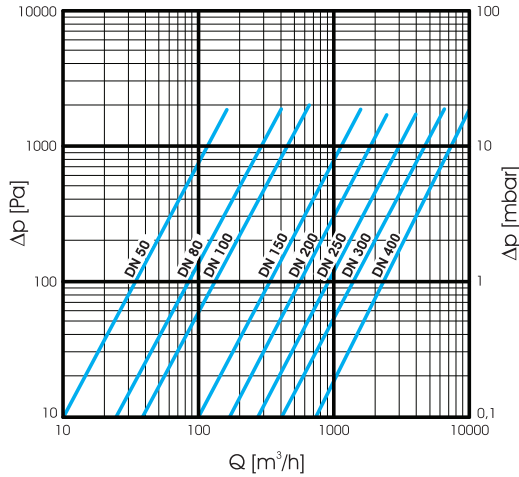
Blue curve, low pressure (1 bar ass.)  
Red curve, high pressure (> 5 bar ass.)

## Dimensions e weights



| DN   | L    | C   | E,F* | Pressure |     | Weight    |       |
|------|------|-----|------|----------|-----|-----------|-------|
|      |      |     |      | ANSI     | PN  | Cast iron | steel |
| mm   | mm   | mm  | mm   |          |     | kg        | kg    |
| 50   | 150  | 150 | 150  | -        | -   | 11        | 12    |
|      |      |     |      | 150      | 20  | 11        | 11    |
|      |      |     |      | 300      | 50  | -         | 12    |
| 80   | 240  | 95  | 146  | 600      | 110 | -         | 13    |
|      |      |     |      | -        | 16  | 19        | 24    |
|      |      |     |      | 150      | 20  | 18        | 24    |
| 100  | 300  | 124 | 222  | 300      | 50  | -         | 27    |
|      |      |     |      | 600      | 110 | -         | 30    |
|      |      |     |      | -        | 16  | 24        | 32    |
| 150  | 450  | 180 | 185  | 150      | 20  | 25        | 34    |
|      |      |     |      | 300      | 50  | -         | 42    |
|      |      |     |      | 600      | 110 | -         | 52    |
| 200  | 600  | 240 | 261  | -        | 16  | 47        | 64    |
|      |      |     |      | 150      | 20  | 46        | 64    |
|      |      |     |      | 300      | 50  | -         | 80    |
| 250  | 750  | 330 | 202  | 600      | 110 | -         | 105   |
|      |      |     |      | -        | 16  | 70        | 70    |
|      |      |     |      | 150      | 20  | 70        | 71    |
| 300  | 900  | 350 | 282  | 300      | 50  | -         | 100   |
|      |      |     |      | 600      | 110 | -         | 140   |
|      |      |     |      | -        | 16  | -         | 130   |
| 400  | 1200 | 400 | 232  | 150      | 20  | -         | 130   |
|      |      |     |      | 300      | 50  | -         | 175   |
|      |      |     |      | 600      | 110 | -         | 250   |
| 500  | 1500 | 450 | 308  | -        | 16  | -         | 190   |
|      |      |     |      | 150      | 20  | -         | 200   |
|      |      |     |      | 300      | 50  | -         | 260   |
| 600  | 1800 | 500 | 258  | 600      | 110 | -         | 340   |
|      |      |     |      | -        | 16  | -         | 350   |
|      |      |     |      | 150      | 20  | -         | 390   |
| 800  | 2400 | 650 | 345  | 300      | 50  | -         | 480   |
|      |      |     |      | 600      | 110 | -         | 580   |
|      |      |     |      | -        | 16  | -         | 580   |
| 1000 | 3000 | 800 | 387  | 150      | 20  | -         | 390   |
|      |      |     |      | 300      | 50  | -         | 480   |
|      |      |     |      | 600      | 110 | -         | 580   |

## Pressure drop



The inevitable loss of pressure that is created during the flow of gas through the meter is determined to weather conditions.

To bring them back to the operating conditions, apply the following formula:

$$\Delta p_1 = \left( \frac{\rho_s}{\rho_a} \right) \cdot \left( \frac{p_m + p_s}{p_s} \right) \cdot \Delta p$$

Where:

$\Delta p_1$  = pressure loss at pm

$\Delta p$  = loss of pressure from the diagram (see technical specifications table)

$p_m$  = operating pressure in bar

$\rho_s$  = standard density of the gas in Kg/m<sup>3</sup>

$\rho_a$  = standard density of the air (1,2 Kg/m<sup>3</sup>)

$p_s$  = atmospheric pressure (1,01325 bar)

## Types of gas that can be measured by the meter:

| Gas             | Symbol                         | Density $\rho$<br>Kg/m <sup>3</sup> | Density related to air |
|-----------------|--------------------------------|-------------------------------------|------------------------|
| Carbon Dioxide  | CO <sub>2</sub>                | 1,84                                | 1,53                   |
| Argon           | Ar                             | 1,66                                | 1,38                   |
| Nitrogen        | N <sub>2</sub>                 | 1,16                                | 0,97                   |
| Butane          | C <sub>4</sub> H <sub>10</sub> | 2,53                                | 2,10                   |
| Helium          | He                             | 0,17                                | 0,14                   |
| Ethane          | C <sub>2</sub> H <sub>6</sub>  | 1,27                                | 1,06                   |
| Ethylene        | C <sub>2</sub> H <sub>4</sub>  | 1,17                                | 0,98                   |
| Natural Gas     |                                | ~0,75                               | ~0,63                  |
| Methane         | CH <sub>4</sub>                | 0,67                                | 0,55                   |
| Carbon monoxide | CO                             | 1,16                                | 0,97                   |
| Propane         | C <sub>2</sub> H <sub>8</sub>  | 1,87                                | 1,56                   |
| Air             |                                | 1,20                                | 1                      |

Values of density referred to:

p = 1,01325 bar T = 20°C

## Recommendations for installation and operation

1. The meters must be transported to the installation site in their original packaging
2. The meters must be handled with care and protected against falls, direct influence of rain, snow and high humidity
3. The measured gas must be clean, dry and should not contain solid impurities. It recommends the use of an input filter (10 microns)
4. On new installations, we recommend the use of a temporary conical filter.
5. The seals must be positioned so as not to disturb the flow of gas.
6. The gas flow must flow in the direction of the arrow on the meter body.
7. The incoming and outgoing pipes should not cause stress to the counter.
8. If used outdoors, the meter must be protected against the weather.
9. The opening valve must be operated slowly in order to ensure a gradual increase of the pressure
10. Minimum straights input  $\geq 2DN$

The CGT-02 turbine gas meters can have up to 8 pulse generators in DN50-DN80 range, and up to 10 pulse generators in DN100-DN300 range:

- LFK - low frequency pulse generator REED LFK1, LFK
- LFI - inductive low frequency pulse generator LFI1, LFI2
- HF - generator Inductive medium frequency pulses on the counter HF1, HF2
- HF - inductive high frequency pulse generator on the impeller HF3, HF4
- HF - generator of inductive high-frequency pulses of the reference wheel HF5, HF6
- AFK - REED contact our fraud

### Technical features

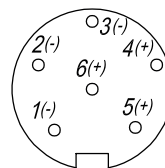
| DN<br>Nominal<br>Diameter | G      | Qmax              | Qmin<br>Rangeability |                   | LF<br>Low freq     | HF1, HF2<br>High freq<br>approximate | HF3 - HF6<br>High freq<br>approximate |
|---------------------------|--------|-------------------|----------------------|-------------------|--------------------|--------------------------------------|---------------------------------------|
|                           |        |                   | 1:20                 | 1:30              |                    |                                      |                                       |
| -                         | -      | m <sup>3</sup> /h | m <sup>3</sup> /h    | m <sup>3</sup> /h | imp/m <sup>3</sup> | imp/m <sup>3</sup>                   | imp/m <sup>3</sup>                    |
| DN 50                     | G 65   | 100               | 5                    | -                 | 10                 | 2610                                 | 9429                                  |
| DN 80                     | G 100  | 160               | 8                    | -                 | 1                  | 742                                  | 26974                                 |
|                           | G 160  | 250               | 13                   | 8                 | 1                  | 742                                  | 26974                                 |
|                           | G 250  | 400               | 20                   | 13                | 1                  | 470                                  | 17059                                 |
| DN 100                    | G 160  | 250               | 13                   | -                 | 1                  | 692                                  | 16782                                 |
|                           | G 250  | 400               | 20                   | 13                | 1                  | 692                                  | 16782                                 |
|                           | G 400  | 650               | 32                   | 20                | 1                  | 401                                  | 9719                                  |
| DN 150                    | G 400  | 650               | 32                   | 20                | 1                  | 227                                  | 6873                                  |
|                           | G 650  | 1000              | 50                   | 32                | 1                  | 227                                  | 6873                                  |
|                           | G 1000 | 1600              | 80                   | 50                | 0.1                | 129                                  | 3910                                  |
| DN 200                    | G 650  | 1000              | 50                   | 32                | 1                  | 114                                  | 3113                                  |
|                           | G 1000 | 1600              | 80                   | 50                | 0.1                | 116                                  | 3167                                  |
|                           | G 1600 | 2500              | 130                  | 80                | 0.1                | 67                                   | 2025                                  |
| DN 250                    | G 1000 | 1600              | 80                   | 50                | 0.1                | 58                                   | 2111                                  |
|                           | G 1600 | 2500              | 130                  | 80                | 0.1                | 58                                   | 2111                                  |
|                           | G 2500 | 4000              | 200                  | 130               | 0.1                | 34                                   | 1223                                  |
| DN 300                    | G 1600 | 2500              | 130                  | 80                | 0.1                | 32                                   | 1181                                  |
|                           | G 2500 | 4000              | 200                  | 130               | 0.1                | 32                                   | 1181                                  |
|                           | G 4000 | 6500              | 320                  | 200               | 0.1                | 19                                   | 680                                   |
| DN 400                    | G 2500 | 4000              | 200                  | 130               | 0.1                | 13                                   | 444                                   |
|                           | G 4000 | 6500              | 320                  | 200               | 0.1                | 13                                   | 444                                   |
|                           | G 6500 | 10000             | 500                  | 320               | 0.1                | 7.0                                  | 285                                   |

### Definitions and characteristics of pulse generators

| PIN nr | Connector<br>1  | Connector<br>2 |
|--------|-----------------|----------------|
| 1 - 4  | LFK1 (standard) | LFK2           |
| 2 - 5  | LFI1            | LFI2           |
| 3 - 6  | HF 1 o AFK      | HF2            |

| HF1, HF2     | LFK, AFK       | Connector<br>2 |
|--------------|----------------|----------------|
| Ui = 16 V DC | Ui = 15,5 V DC | Ui = 15,5 V DC |
| li = 25 mA   | li = 52 mA     | li = 52 mA     |
| Pi = 64 mW   | Pi = 169 mW    | Pi = 169 mW    |
| Li = 50 µH   | Li = 40 µH     | Li = 0         |
| Ci = 30 nF   | Ci = 28 nF     | Ci = 0F        |



The mechanical index can be rotated by 350 ° to facilitate the reading and the insertion of the connectors.

## Product range



Rotary piston gas meters



Turbine gas meters



Gas pressure regulators



Electronic volume correctors



Diaphragm gas meters



Smart meters

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