

1 DESIGN AND FUNCTION

CPT Quantometers have been designed in order to provide our customers with reliable and inexpensive measuring instruments for secondary flow measurements. Our great experience in designing and manufacturing of turbine and rotary gas meters resulted in the development of industrial quantometers. Taking into account our customers' demands we created the instrument with excellent metrological characteristics and operating performance

close to performances of the turbine gas meters designed for custody transfer measurements. Other advantages of the CPT Quantometers are as follows: high quality, easy maintenance, wide range of external devices that can co-operate with the quantometers, e.g. volume correctors, data loggers, data transmission systems. Due to that the CPT Quantometers are well accepted by our domestic and foreign customers.

The basic components of the CPT Quantometer are as follows:

- pressure resistant meter body
- inlet flow conditioner
- measuring cartridge with the turbine wheel
- magnetic coupling as the transferring element between measuring cartridge and the index
- index head

Gas	Chemical symbol (formula)	Density ρ [kg/m ³]	Density related to air	Gas meter execution
Argon	Ar	1,66	1,38	standard IIB
Butane	C ₄ H ₁₀	2,53	2,10	standard IIB
Carbon dioxide	CO ₂	1,84	1,53	standard IIB
Carbon monoxide	CO	1,16	0,97	standard IIB
Ethane	C ₂ H ₆	1,27	1,06	standard IIB
Ethylene	C ₂ H ₄	1,17	0,98	standard IIB
Helium	He	0,17	0,14	standard IIB
Methane	CH ₄	0,67	0,55	standard IIB
Natural gas	-	~0,75	~0,63	standard IIB
Nitrogen	N ₂	1,16	0,97	standard IIB
Propane	C ₃ H ₈	1,87	1,56	standard IIB
Acetylene	C ₂ H ₂	1,09	0,91	special IIC
Hydrogen	H ₂	0,084	0,07	special IIC
Air	-	1,20	1,00	standard IIB

table 1: Physical properties of most popular gases that may be measured with the CPT Quantometer; density at 101,325 kPa and at 20°C

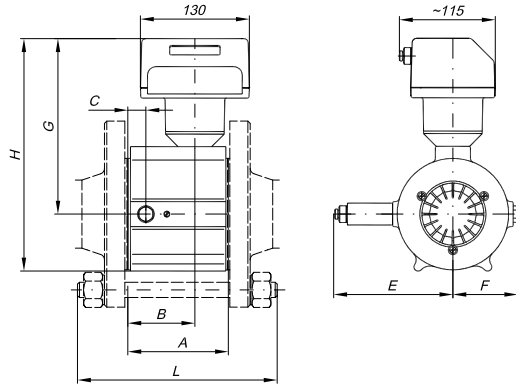
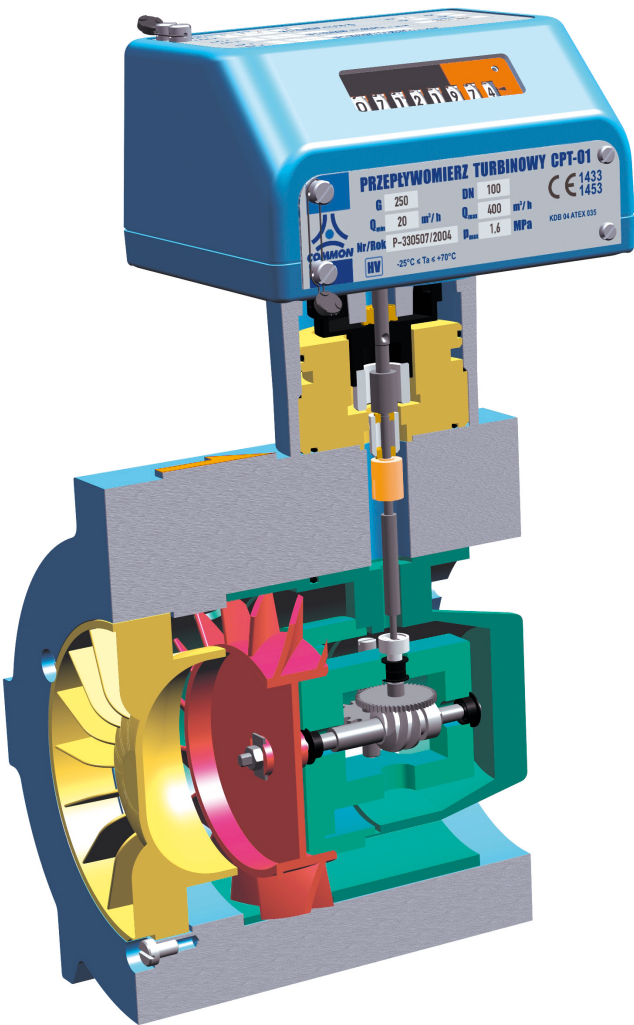


fig.1 Basic dimensions of CPT Quantometer

2 GENERAL TECHNICAL DATA

table 2:

DN		G	Maximum flow Q_{max} [m ³ /h]	Minimum flow Q_{min} [m ³ /h]	LF pulse rate [m ³ /pulse]
mm	inch				
50	2	40	65	6	0,1
		65	100	10	
65	2,5	65	100	10	1
		100	160	8	
80	3	100	160	8	1
		160	250	13	
		250	400	20	
100	4	160	250	13	1
		250	400	20	
		400	650	32	
150	6	400	650	32	1
		650	1000	50	
		1000	1600	80	
200	8	1000	1600	80	10
		1600	2500	130	

- pressure rating:
- nominal diameter:
- meter bodies:
- flow:
- rangeability:
- temperature range:
- allowed medias:
- operating position:

PN16, PN20, ANSI150
DN50 up to DN200 standard range, other on request
aluminium
6 to 2500 m³/h other on request
1:20 minimum at atmospheric pressure
Some smaller size meters have reduced ranges.
gas temperature -20°C to +60°C
ambient temperature -25°C to +70°C
see table 1
horizontal or vertical

		DN50	DN65	DN80	DN 100	DN 150	DN 200
A	mm	100	120	120	150	180	200
B	mm	65	80	80	100	127	146
C	mm	18	21	21	29	50	56
E	mm	157	169	169	182	207	223
F	mm	74	86	86	100	125	156
G	mm	198	209	209	223	241	272
H	mm	250	277	277	303	349	408
Weight	kg	3,5	4,9	5	7,2	11,6	49,2
bolts x L PN16	mm	4xM16x200	8xM16x220	8xM16x220	8xM16x250	8xM20x300	12xM20x320
bolts x L ANSI150	inch	4x5/8x7,75	4x5/8x8,75	4x5/8x9,0	8x5/8x10,25	8x3/4x12,0	8x3/4x13,0

3 MEASUREMENT OUTPUTS

PRESSURE OUTPUT

The operating pressure (reference pressure) can be taken from the pressure tap, marked pr, located on one side of the meter body.

PULSE SENSORS

The mechanical index unit indicates the actual volume of the measured gas at operating temperature and operating pressure. It can be rotated axially by 350° in order to facilitate the readings and enable easier connection of pulse sensor plugs. The index unit is provided with one low frequency LFK reed contact pulse transmitter, as a standard. On request the index may be equipped with:

- LFI inductive pulse sensor (NAMUR)
- HF inductive pulse sensor (NAMUR)

HF (index)	LFI	LFK
U _i = 20 V DC	U _i = 20 V DC	U _i = 15,5 V DC
I _i = 60 mA	I _i = 60 mA	I _i = 52 mA
P _i = 80 mW	P _i = 130 mW	P _i = 169 mW
L _i = 150 μH	L _i = 350 μH	L _i ≈ 0
C _i = 150 nF	C _i = 250 nF	C _i ≈ 0

table 3: Permissible supply parameters of intrinsically safe circuits.

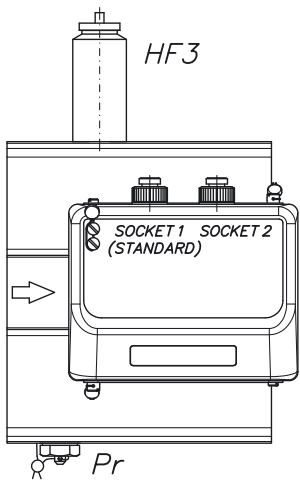


fig. 2 Location of measurement outputs (top view)

The CPT Quantometers may be provided with up to 7 pulse sensors:

- LFK – low frequency reed contact pulse sensor
 - LFI – low frequency inductive pulse sensor
 - HF – inductive pulse sensor in the index unit
 - HF – inductive pulse sensor over the turbine wheel
 - AFK – anti-fraud reed contact
- LFK 1, LFK 2
LFI 1, LFI 2
HF 1, HF 2
HF 3
AFK

The turbine wheel, as a standard, is made of aluminium. This allows to provide each CPT Quantometer with one HF3 inductive pulse sensor. There are no extra costs due to the replacement of the turbine wheel.

Pin No	Socket 1 pulse sensors	Socket 2 pulse sensors
1 - 4	LFK 1 (standard)	LFK 2
2 - 5	LFI 1	LFI 2
3 - 6	HF 1 or AFK	HF 2

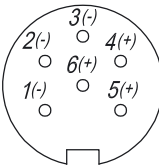


fig. 3 Pulse sensor pin numbering in sockets 1 and 2 installed in the index. The sockets match the TUCHEL plug No C091 31H006 100 2

Pin No	HF over turbine wheel
3 - 4	HF 3

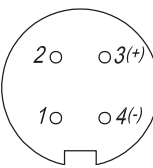


fig. 4 Pulse sensor pin numbering in socket of the HF3 pulse transmitter installed in the meter body. The sockets match the TUCHEL plug No C091 31D004 100 2

4 PRESSURE LOSS

The gas meter causes inevitable pressure loss. The value of pressure loss was determined for air at atmospheric conditions (density $\rho_0 = 1,2 \text{ kg/m}^3$), and is presented in figure 6.

Please use the following formula in order to determine the pressure loss Δp_{rz} [Pa] in operating conditions (different gases and pressures):

$$\Delta p_{rz} = \left(\frac{\rho}{\rho_0} \right) \cdot \left(\frac{p_a + p}{p_a} \right) \cdot \Delta p$$

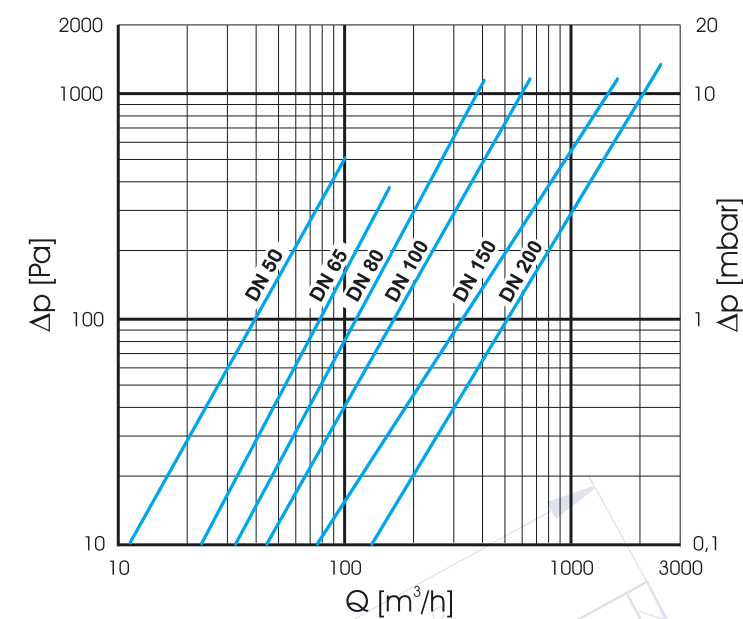


fig. 5 Diagram of pressure loss related to $\rho_0 = 1,2 \text{ kg/m}^3$ (air).

COMMON S.A. has an ongoing 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 COMMON S.A.

YOUR PARTNER



QUANTOMETER



COMMON S.A.

ul. Aleksandrowska 67/93

91-205 Łódź, Poland

tel. + 48 42 253 66 00

fax + 48 42 253 66 99

<http://www.common.pl>

e-mail: common@common.pl

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