

SHARKY 775

COMPACT ENERGY METER | ULTRASONIC

DIEHL
Metering



APPLICATION

The ultrasonic compact energy meter can be used for measuring the energy consumption in heating / cooling application for billing purposes.

FEATURES

- ▶ Approval for ultrasonic meter with dynamic range up to 1:250 (qi:qp) in class 2 (depends on meter size), standard 1:100
- ▶ Improved power consumption --> longer battery lifetime
- ▶ Approved according MID in class 2 and 3 and PTB K 7.2 (cooling)
- ▶ High long term stability, verified at independent AGFW test
- ▶ Insensitive against dirt
- ▶ Versatile possibility of power supply
- ▶ Optional with integrated radio Open Metering Standard (868 or 434 MHz) Generation 3 Profile A or Generation 4 Profile B
- ▶ Individual remote reading (AMR) with add on modules Plug & Play
- ▶ Extensive readable data memory
- ▶ 3 communication interfaces (e. g. M-Bus + M-Bus + Radio)
- ▶ Significantly improved radio performance
- ▶ Leakage Detection

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GENERAL

		SHARKY
Application		Heating - cooling - heating/with cooling tariff (cooling tariff at $-dT$ and $t_{flow} < 20$ °C)
Approval		MID (DE-10-MI004-PTB013) and PTB K7.2 for cooling (DE-16-M-PTB-0001)
Mounting position flow sensor		Any position, calming sections not necessary, inlet installation / outlet installation / in field programmable
Protection class flow sensor		Heating: IP 54; cooling and heating/with cooling tariff: acc. IP 68
Battery supply		3.6 VDC A-cell up to 10,5 years lifetime (depending on configuration); 3.6 VDC D-cell up to 16 years lifetime
Mains supply		24 VAC (50 - 60 Hz); 230 VAC (50 - 60 Hz)
Temperature sensor type		Pt 100 or Pt 500 with 2-wire leads; \varnothing 5.2 / 6 mm or direct sensor
Cable length of temperature sensor		Pt 100: 1.9 m; Pt 500: 1.9 / 2.9 / 4.9 / 9.9 m
Absolute temperature range calculator	Θ °C	1 ... 180
Volume measuring cycle		With mains supply: $\frac{1}{8}$ s; with A-cell battery: 1 s; with D-cell battery: 1 s
Material of the flow sensor body		Brass or spheroidal cast iron (only q_p 15 up to q_p 100 m ³ /h)
Test possibilities		Via display, optical test pulses, test output or via NOWA software

CALCULATOR - BASIC FEATURES

		SHARKY
Environmental class		Class C
Ambient class		Class E2 + M2
Ambient operating temperature	°C	5 ... 55 (<35 °C have a positive lifetime effect)
Ambient storage temperature	°C	-25 ... +60 (>35 °C max. 4 weeks)
Protection class		IP 54
Communication		3 communication interfaces (e. g. M-Bus + M-Bus + Int. Radio; 2 primary addresses, 1 secondary address)
Integrated Radio		Optional
Interfaces standard		Optical ZVEI interface
Interfaces optional		2 Slots for modules with M-Bus, L-Bus, LON works, MOD Bus, RS232, RS485, pulse output, pulse input, combined pulse in-/output or analogue output
Temperature range heating	°C	5 ... 130 / 150 (depends on meter size)
Temperature range cooling	°C	5 ... 50
Temperature range heating/cooling	°C	5 ... 105
Extensive readable data memory		Periodical log ¹ ; 3 history logs; event memory

¹ Programmable storage interval (daily, weekly, monthly, ...)

CALCULATOR - INTEGRATED RADIO

		SHARKY
Frequency band		868 or 434 MHz
Type of radio telegram		Open Metering Standard (OMS), Generation 3 Profile A or Generation 4 Profile B
Transmission data updating		Online - no time delay between value measurement and data transmission
Data transmission		Unidirectional
Sending interval		With A-cell: 180 s (up to 10.5 years lifetime); with D-cell: 12 s (up to 16 years lifetime); with mains unit: up to 12 s; depending on length of telegram (duty cycle)

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DISPLAY

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Display indication	LCD, 8-digit
Units	MWh - kWh - GJ - Gcal - MBtu - gal - GPM - °C - °F - m ³ - m ³ /h
Total values	99,999,999 - 9,999,999.9 - 999,999.99 - 99,999.999
Values displayed	Energy - Power - Volume - Flow rate - Temperature and more

INTERFACES

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Optical	ZVEI interface, for communication and testing, M-Bus protocol
M-Bus	Configurable telegram, according to EN13757-3, two wires with non polarity, auto baud detect (300 and 2400 baud), one M-Bus load
L-Bus	Adapter for external radio module, configurable telegram, according to EN13757-3, data reading and parametrization are via two wires with polarity reversal protection
Modbus RTU	Polarity independent, Voltage 12 - 24 V AC/DC, <150 mW; protocol - Modbus RTU, Channel - EIA-485 (galvanic isolated), Baud rate 1200 ... 115200. The default communication: 9600 bps Baud rate, 8N1 data format, Modbus Slave ID - 1
LonWorks	Polarity independent; Voltage 12 - 24 V AC/DC, <150 mW; Channel - TP/FT-10, Baud rate - 78 kbits per second, Data format - Differential Manchester Coding
RS232	Serial interface for communication with external devices, a special data cable is required, M-Bus protocol, 300 and 2400 baud
RS485	Serial interface for communication with external devices, power supply with 12 V ± 5 V, M-Bus protocol, 2400 baud
Pulse output	Module with 2 Open Collector pulse outputs (potential-free), output 1: 4 Hz (pulse width 125 ms), pulse or static conditions (e.g. errors), output 2: 200 Hz (pulse width ≥ 5 ms), configurable via IZAR@MOBILE 2 software
Pulse input	Module with 2 pulse inputs, max. 20 Hz, configurable via IZAR@MOBILE 2 software, data can be transferred remotely
Combined pulse in-/output	Module with 2 pulse inputs and 1 pulse output, configurable via IZAR@MOBILE 2 software, needed for leak detection
Analogue output	Module for 4 ... 20 mA with 2 programmable passive outputs, programmable value in case of error

TEMPERATURE INPUT

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Measuring cycle	T	s	With mains supply: 2 s; with A-cell battery: 16 s; with D-cell battery: 4 s
Starting temperature difference	$\Delta\theta$	K	0.125
Min. temperature difference	$\Delta\theta_{\min}$	K	3
Max. temperature difference	$\Delta\theta_{\max}$	K	175

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TECHNICAL DATA FLOW SENSOR

Nominal flow rate	q_p	m ³ /h	0.6	0.6	0.6	1.5	1.5	1.5	2.5
Nominal diameter	DN	mm	15	20	20	15	20	20	20
Overall length	L	mm	110	130	190	110	130	190	130
Starting flow rate		l/h	1	1	1	2.5	2.5	2.5	4
Minimum flow rate (DR 1:250)	q_i	l/h	-	-	-	6	6	6	10
Minimum flow rate (DR 1:100)	q_i	l/h	6	6	6	15	15	15	25
Maximum flow rate	q_s	m ³ /h	1.2	1.2	1.2	3	3	3	5
Overload flow rate		m ³ /h	2.5	2.5	2.5	4.6	4.6	4.6	6.7
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25	16/25
Pressure loss at q_p	Δp	mbar	95	85	85	120	75	75	100
Temp. range heating		°C	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130
Kvs value (q_p^2 (m ³ /h) = $Kvs^2 \times \Delta p$ (bar))			1.95	2.06	2.06	4.33	5.48	5.48	7.91
Nominal flow rate	q_p	m ³ /h	2.5	3.5	3.5	3.5	3.5	3.5	6
Nominal diameter	DN	mm	20	25	25	25	32	32	25
Overall length	L	mm	190	135	150	260	150	260	135
Starting flow rate		l/h	4	10	10	10	10	10	10
Minimum flow rate (DR 1:250)	q_i	l/h	10	-	-	-	-	-	24
Minimum flow rate (DR 1:100)	q_i	l/h	25	35	35	35	35	35	60
Maximum flow rate	q_s	m ³ /h	5	7	7	7	7	7	12
Overload flow rate		m ³ /h	6.7	18.4	18.4	18.4	18.4	18.4	18.4
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25	16/25
Pressure loss at q_p	Δp	mbar	100	44	44	44	44	44	128
Temp. range heating		°C	5 ... 130	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150
Kvs value (q_p^2 (m ³ /h) = $Kvs^2 \times \Delta p$ (bar))			7.91	16.69	16.69	14.29	13.73	14.29	13.76
Nominal flow rate	q_p	m ³ /h	6	6	6	6	6	10	
Nominal diameter	DN	mm	25	25	32	32	40	40	
Overall length	L	mm	150	260	150	260	150	200	
Starting flow rate		l/h	10	10	10	10	10	20	
Minimum flow rate (DR 1:250)	q_i	l/h	24	24	24	24	-	40 ¹	
Minimum flow rate (DR 1:100)	q_i	l/h	60	60	60	60	60	100	
Maximum flow rate	q_s	m ³ /h	12	12	12	12	12	20	
Overload flow rate		m ³ /h	18.4	18.4	18.4	18.4	18.4	24	
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25	
Pressure loss at q_p	Δp	mbar	128	128	128	128	190	140	
Temp. range heating		°C	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150	
Kvs value (q_p^2 (m ³ /h) = $Kvs^2 \times \Delta p$ (bar))			16.77	16.77	13.76	14.77	13.76	26.73	

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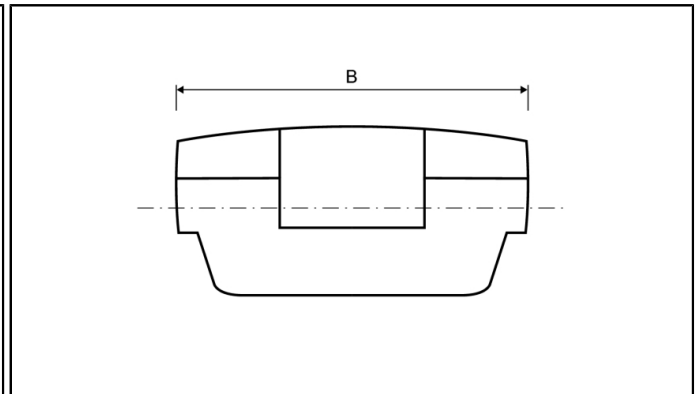
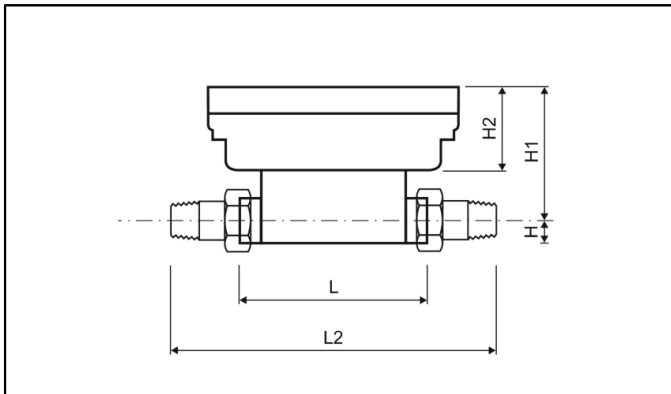
Nominal flow rate	q_p	m^3/h	10	15	25	40	60	100
Nominal diameter	DN	mm	40	50	65	80	100	100
Overall length	L	mm	300	270	300	300	360	360
Starting flow rate		l/h	20	40	50	80	120	120
Minimum flow rate (DR 1:250)	q_i	l/h	40 ¹	60 ¹	100 ¹	160	240 ¹	240 ¹
Minimum flow rate (DR 1:100)	q_i	l/h	100	150	250	400	600	1000
Maximum flow rate	q_s	m^3/h	20	30	50	80	120	120
Overload flow rate		m^3/h	24	36	60	90	132	132
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25
Pressure loss at q_p	Δp	mbar	140	134	120	140	130	210
Temp. range heating		°C	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150
Kvs value ($q_p^2 (m^3/h) = Kvs^2 \times \Delta p (bar)$)			26.73	40.09	91.29	141.42	219.09	218.22

¹ Only for horizontal installation

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DIMENSIONS THREAD VERSION



Nominal flow rate	q_p	m^3/h	0.6	0.6	0.6	1.5	1.5	1.5	2.5
Nominal diameter	DN	mm	15	20	20	15	20	20	20
Overall length	L	mm	110	130	190	110	130	190	130
Overall length with coupling	L2	mm	190	230	290	190	230	290	230
Length of calculator	L1	mm	150	150	150	150	150	150	150
Height	H	mm	14.5	18	18	14.5	18	18	18
Height	H1	mm	82	84	84	82	84	84	84
Height of calculator	H2	mm	54	54	54	54	54	54	54
Width of calculator	B	mm	100	100	100	100	100	100	100
Connection thread on meter	Inch		G $\frac{3}{4}$ B	G1B	G1B	G $\frac{3}{4}$ B	G1B	G1B	G1B
Connection thread of coupling	Inch		R $\frac{1}{2}$	R $\frac{3}{4}$	R $\frac{3}{4}$	R $\frac{1}{2}$	R $\frac{3}{4}$	R $\frac{3}{4}$	R $\frac{3}{4}$
Weight ¹	kg		0.76	0.85	0.96	0.76	0.85	0.96	0.85

Nominal flow rate	q_p	m^3/h	2.5	3.5	3.5	3.5	3.5	3.5	6
Nominal diameter	DN	mm	20	25	25	25	32	32	25
Overall length	L	mm	190	135	150	260	150	260	135
Overall length with coupling	L2	mm	290	255	270	380	270	380	255
Length of calculator	L1	mm	150	150	150	150	150	150	150
Height	H	mm	18	23	23	23	23	23	23
Height	H1	mm	84	88.5	88.5	88.5	88.5	88.5	88.5
Height of calculator	H2	mm	54	54	54	54	54	54	54
Width of calculator	B	mm	100	100	100	100	100	100	100
Connection thread on meter	Inch		G1B	G1 $\frac{1}{4}$ B	G1 $\frac{1}{4}$ B	G1 $\frac{1}{4}$ B	G1 $\frac{1}{2}$ B	G1 $\frac{1}{2}$ B	G1 $\frac{1}{4}$ B
Connection thread of coupling	Inch		R $\frac{3}{4}$	R1	R1	R1	R1 $\frac{1}{4}$	R1 $\frac{1}{4}$	R1
Weight ¹	kg		0.96	1.03	1.08	1.5	1.23	1.5	1.03

Nominal flow rate	q_p	m^3/h	6	6	6	6	6	10
Nominal diameter	DN	mm	25	25	32	32	40	40
Overall length	L	mm	150	260	150	260	150	200
Overall length with coupling	L2	mm	270	380	270	380	-	340
Length of calculator	L1	mm	150	150	150	150	150	150
Height	H	mm	23	23	23	23	23	33
Height	H1	mm	88.5	88.5	88.5	88.5	88.5	94
Height of calculator	H2	mm	54	54	54	54	54	54
Width of calculator	B	mm	100	100	100	100	100	100
Connection thread on meter	Inch		G1 $\frac{1}{4}$ B	G1 $\frac{1}{4}$ B	G1 $\frac{1}{2}$ B	G1 $\frac{1}{2}$ B	G2B	G2B
Connection thread of coupling	Inch		R1	R1	R1 $\frac{1}{4}$	R1 $\frac{1}{4}$	R1 $\frac{1}{2}$	R1 $\frac{1}{2}$
Weight ¹	kg		1.08	1.5	1.23	1.5	1.52	2.9

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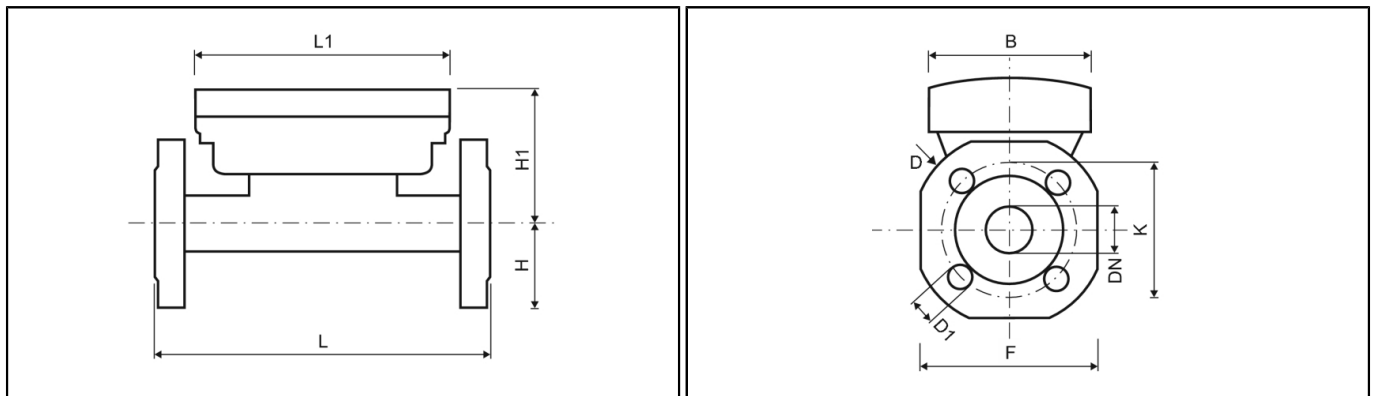
Nominal flow rate	q _p	m ³ /h	10	15	25	40	60	100
Nominal diameter	DN	mm	40	50	65	80	100	100
Overall length	L	mm	300	270	300	300	360	360
Overall length with coupling	L2	mm	440	-	-	-	-	-
Length of calculator	L1	mm	150	-	-	-	-	-
Height	H	mm	33	-	-	-	-	-
Height	H1	mm	94	-	-	-	-	-
Height of calculator	H2	mm	54	-	-	-	-	-
Width of calculator	B	mm	100	-	-	-	-	-
Connection thread on meter		Inch	G2B	-	-	-	-	-
Connection thread of coupling		Inch	R1½	-	-	-	-	-
Weight ¹		kg	3.1	-	-	-	-	-

¹ Meter with A-cell, without modules, 1.4 m cable length, 1.9 m cable length of temperature sensor Ø 5.2 mm

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DIMENSIONS FLANGE VERSION



Nominal flow rate	q_p	m ³ /h	0.6	0.6	0.6	1.5	1.5	1.5	2.5
Nominal diameter	DN	mm	15	20	20	15	20	20	20
Overall length	L	mm	110	130	190	110	130	190	130
Length of calculator	L1	mm	-	-	150	-	-	150	-
Height	H	mm	-	-	47.5	-	-	47.5	-
Height	H1	mm	-	-	84	-	-	84	-
Height of calculator	H2	mm	-	-	54	-	-	54	-
Width of calculator	B	mm	-	-	100	-	-	100	-
Flange dimension	F	mm	-	-	95	-	-	95	-
Flange diameter	D	mm	-	-	105	-	-	105	-
Hole circle diameter	K	mm	-	-	75	-	-	75	-
Screw hole diameter	D1	mm	-	-	14	-	-	14	-
Number of screwholes		pcs	-	-	4	-	-	4	-
Weight brass body ²		kg	-	-	2.75	-	-	2.75	-
Weight spheroidal cast iron body ²		kg	-	-	-	-	-	-	-
Nominal flow rate	q_p	m ³ /h	2.5	3.5	3.5	3.5	3.5	3.5	6
Nominal diameter	DN	mm	20	25	25	25	32	32	25
Overall length	L	mm	190	135	150	260	150	260	135
Length of calculator	L1	mm	150	-	-	150	-	150	-
Height	H	mm	47.5	-	-	50	-	62.5	-
Height	H1	mm	84	-	-	88.5	-	88.5	-
Height of calculator	H2	mm	54	-	-	54	-	54	-
Width of calculator	B	mm	100	-	-	100	-	100	-
Flange dimension	F	mm	95	-	-	100	-	125	-
Flange diameter	D	mm	105	-	-	114	-	139	-
Hole circle diameter	K	mm	75	-	-	85	-	100	-
Screw hole diameter	D1	mm	14	-	-	14	-	18	-
Number of screwholes		pcs	4	-	-	4	-	4	-
Weight brass body ²		kg	2.75	-	-	3.5	-	4.8	-
Weight spheroidal cast iron body ²		kg	-	-	-	-	-	-	-

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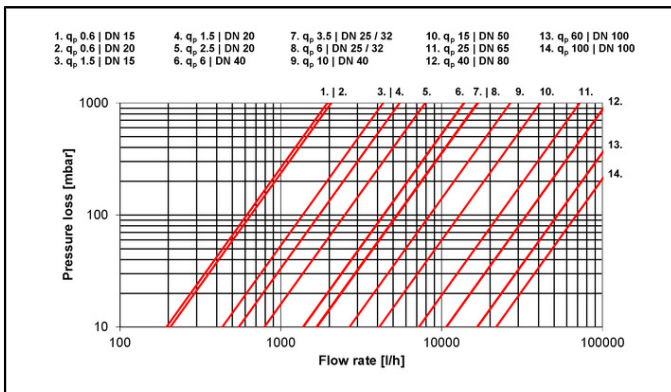
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Nominal flow rate	q _p	m ³ /h	6	6	6	6	6	10
Nominal diameter	DN	mm	25	25	32	32	40	40
Overall length	L	mm	150	260	150	260	150	200
Length of calculator	L1	mm	-	150	-	150	-	-
Height	H	mm	-	50	-	62.5	-	-
Height	H1	mm	-	88.5	-	88.5	-	-
Height of calculator	H2	mm	-	54	-	54	-	-
Width of calculator	B	mm	-	100	-	100	-	-
Flange dimension	F	mm	-	100	-	125	-	-
Flange diameter	D	mm	-	114	-	139	-	-
Hole circle diameter	K	mm	-	85	-	100	-	-
Screw hole diameter	D1	mm	-	14	-	18	-	-
Number of screw holes		pcs	-	4	-	4	-	-
Weight brass body ²		kg	-	3.5	-	4.8	-	-
Weight spheroidal cast iron body ²		kg	-	-	-	-	-	-
Nominal flow rate	q _p	m ³ /h	10	15	25	40	60	100
Nominal diameter	DN	mm	40	50	65	80	100	100
Overall length	L	mm	300	270	300	300	360	360
Length of calculator	L1	mm	150	150	150	150	150	150
Height	H	mm	69	73.5	85	92.5	108	108
Height	H1	mm	94	99	106.5	114	119	119
Height of calculator	H2	mm	54	54	54	54	54	54
Width of calculator	B	mm	100	100	100	100	100	100
Flange dimension	F	mm	138	147	170	185	216	216
Flange diameter	D	mm	148	163	184	200	235	235
Hole circle diameter	K	mm	110	125	145	160	180 ¹ /190	180 ¹ /190
Screw hole diameter	D1	mm	18	18	18	19	19 ¹ /22	19 ¹ /22
Number of screw holes		pcs	4	4	8	8	8	8
Weight brass body ²		kg	6.4	7.0	8.9	10.9	16.4	16.4
Weight spheroidal cast iron body ²		kg	-	5.9	7.7	9.6	15.2	15.2

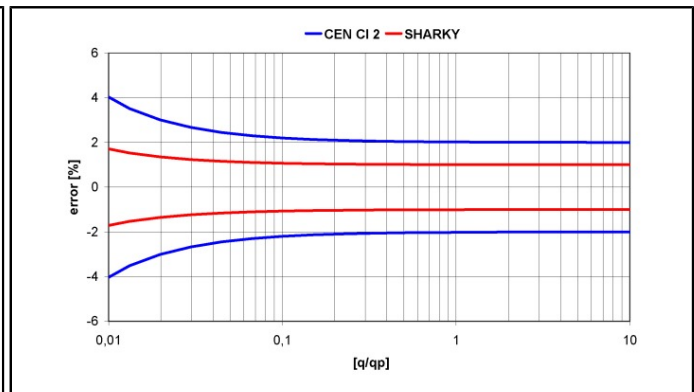
¹ Value for PN 16 housing

² Meter with A-cell, without modules, 1.4 m cable length, 1.9 m cable length of temperature sensor Ø 5.2 mm

PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph