

# SHARKY 775

ULTRASONIC COMPACT ENERGY METER

**DIEHL**  
Metering



## APPLICATION

SHARKY 775 is a ultrasonic compact energy meter designed for measuring the energy consumption in heating and bifunctional (heating/cooling) application, for billing purposes. The measurement principle is static and based on the measurement of the transit time. Ultrasonic technology offers many benefits: no moving parts (prevents wear and tear of the metering components), low pressure loss, large metering dynamics and low start flowrate, insensitiveness to suspended particles...

## FEATURES

- ▶ MID approval in class 2 with dynamic range (qi:qp) up to 1:250 (depending on DN), standard 1:100
- ▶ Heat-transfer fluid: water
- ▶ Complete range from DN 15 qp 0.6 m<sup>3</sup>/h up to DN 100 qp 100 m<sup>3</sup>/h
- ▶ Low power consumption enabling a long battery lifetime (up to 16 years)
- ▶ Integrated radio option
- ▶ Modular version, M-Bus, M-Bus RS232, M-Bus RS485, Modbus RTU RS485, Analog outputs 4-20mA, pulse outputs and inputs
- ▶ Programmable installation side (in option)

# SHARKY 775

## ULTRASONIC COMPACT ENERGY METER

### BASIC FEATURES

SHARKY 775	
Application	Heating - bifunctional (heating/cooling)   Heat-transfer fluid: glycol-free water
Approval	MID (DE-10-MI004-PTB013)
Environmental class (EN 1434)	Class C
Ambient class (MID)	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)
Communication	3 communication interfaces (e. g. M-Bus or integrated radio + 2 communication modules)
Integrated Radio	Optional
Frequency band	868 or 434 MHz
Type of radio telegram	Open Metering Standard (OMS), optional individual encryption key
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: ~12 s; depending on length of telegram (duty cycle)
Test possibilities	Via display, optical test pulses, test output or via NOWA software

\*Standard conditions of use and temperature. Theoretical life, with no guarantee.

### REACH

Information pursuant to Article 33 (1) of Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006:

This product series contains components with the following substances in a concentration of more than 0.1% weight by weight (w/w):

- Lead (CAS no.: 7439-92-1)

- Lead titanium zirconium oxide (CAS no.: 12626-81-2)

### BASIC FEATURES - CALCULATOR

SHARKY 775	
Protection class	IP 54
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; Ø 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
Measuring cycle - flow	With mains supply: 1/8 s; with A-cell battery: 1 s; with D-cell battery: 1 s
Measuring cycle - temperature sensor	T s With mains supply: 2 s; with A-cell battery: 16 s; with D-cell battery: 4 s
Starting temperature difference	ΔΘ K 0.125
Min. temperature difference	ΔΘ <sub>min</sub> K 3
Max. temperature difference	ΔΘ <sub>max</sub> K 120 / 175 (heating)   50 (cooling)
Interfaces standard	Optical ZVEI interface
Interfaces optional	2 Slots for modules with M-Bus, L-Bus, LON works, LoRa, MOD Bus, RS232, RS485, pulse output, pulse input, combined pulse in-/output or analogue output
Extensive readable data memory	Periodical log <sup>1</sup> ; 3 history logs; event memory

<sup>1</sup> Programmable storage interval (daily, weekly, monthly, ...)

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### BASIC FEATURES - FLOW SENSOR

SHARKY 775	
Mounting position flow sensor	Any position, calming sections not necessary, inlet installation / outlet installation / in field programmable
Protection class flow sensor	Heating: IP 54; heating with cooling tariff: IP 65
Material of the flow sensor body	Brass or spheroidal cast iron (only $q_p$ 15 up to $q_p$ 100 m <sup>3</sup> /h)
Temperature range heating	°C 5 ... 105 / 130 / 150 (depends on meter size and material)
Temperature range cooling	°C 5 ... 50
Temperature range heating/cooling meter	°C 5 ... 105

### DISPLAY

SHARKY 775	
Display indication	LCD, 8-digit
Units	MWh - kWh - GJ - Gcal - MBtu - gal - GPM - °C - °F - m <sup>3</sup> - m <sup>3</sup> /h
Total values	99,999,999 - 9,999,999.9 - 999,999.99 - 99,999.999 (depending on the nominal diameter)
Displayed values	Energy - Volume - Flow rate - Power - Temperature

### INTERFACES

SHARKY 775	
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
Wireless M-Bus	Open Metering Standard (OMS), Generation 3 Profile A or Generation 4 Profile B; frequency band 868 or 434 MHz
L-Bus	Adapter for external radio module, configurable telegram, according to EN13757-3, data reading and parametrization via 2 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 1,200 ... 115,200. The default communication: 9,600 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
LoRa	Five different telegrams can be selected via OTC App (AppStore Android). Up to 11 years lifetime with own battery and the modern ECO Mode. Transmission interval varies with the connection quality.
RS232	Serial interface for communication with external devices, a special data cable is required, M-Bus protocol, 300 and 2,400 baud
RS485	Serial interface for communication with external devices, power supply with 12 V ± 5 V, M-Bus protocol, 2,400 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

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## ULTRASONIC COMPACT ENERGY METER

### TECHNICAL DATA FLOW SENSOR

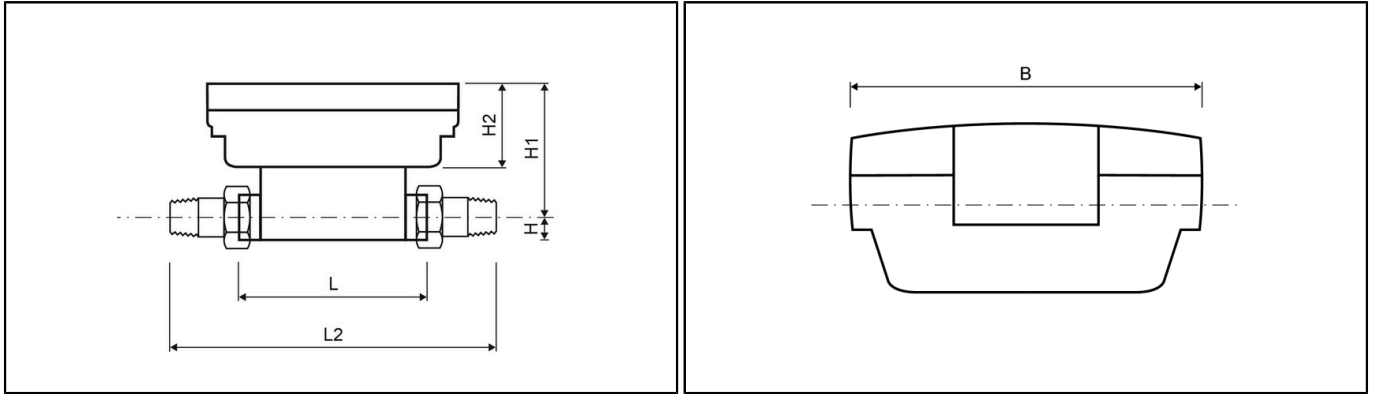
Nominal flow rate	$q_p$	m <sup>3</sup> /h	0.6	1.5	1.5	2.5	6	6
Nominal diameter	DN	mm	15	15	20	20	25	32
Overall length	L	mm	110	110	130	130	260	260
Starting flow rate		l/h	1	2.5	2.5	4	10	10
Minimum flow rate (DR 1:250)	$q_i$	l/h	-	6	6	10	24	24
Minimum flow rate (DR 1:100)	$q_i$	l/h	6	15	15	25	60	60
Maximum flow rate	$q_s$	m <sup>3</sup> /h	1.2	3	3	5	12	12
Overload flow rate		m <sup>3</sup> /h	2.5	4.6	4.6	6.7	18.4	18.4
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25
Pressure loss at $q_p$	$\Delta p$	mbar	95	120	75	100	128	128
Temp. range heating - brass body		°C	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 150	5 ... 150
Temp. range heating - spheroidal cast iron body		°C	-	-	-	-	-	-
kv value ( $q_p^2$ (m <sup>3</sup> /h) = kv <sup>2</sup> x $\Delta p$ (bar))			1.95	4.33	5.48	7.91	14.77	16.77
Nominal flow rate	$q_p$	m <sup>3</sup> /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 <sup>1</sup>	60 <sup>1</sup>	100 <sup>1</sup>	160	240 <sup>1</sup>	240 <sup>1</sup>
Minimum flow rate (DR 1:100)	$q_i$	l/h	100	150	250	400	600	1,000
Maximum flow rate	$q_s$	m <sup>3</sup> /h	20	30	50	80	120	120
Overload flow rate		m <sup>3</sup> /h	24	36	60	90	132	132
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	25	25
Pressure loss at $q_p$	$\Delta p$	mbar	140	134	120	140	130	210
Temp. range heating - brass body		°C	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150
Temp. range heating - spheroidal cast iron body		°C	-	5 ... 105	5 ... 105	5 ... 105	5 ... 105	5 ... 105
kv value ( $q_p^2$ (m <sup>3</sup> /h) = kv <sup>2</sup> x $\Delta p$ (bar))			26.73	40.09	91.29	141.42	219.09	218.22

<sup>1</sup> Only for horizontal installation

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## DIMENSIONS THREAD VERSION



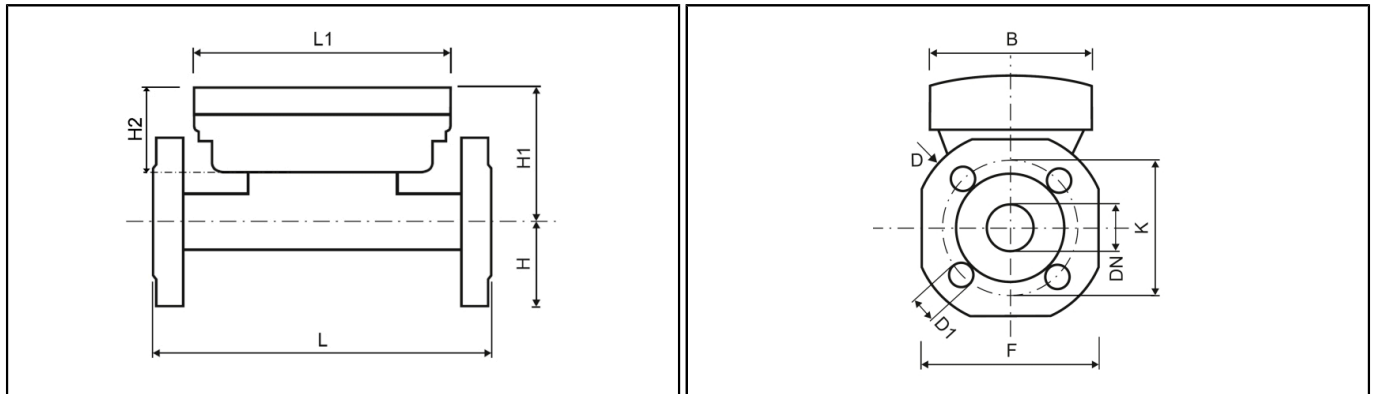
Nominal flow rate	$q_p$	m <sup>3</sup> /h	0.6	1.5	1.5	2.5	6	6
Nominal diameter	DN	mm	15	15	20	20	25	32
Overall length	L	mm	110	110	130	130	260	260
Overall length with coupling	L2	mm	190	190	230	230	380	380
Length of calculator	L1	mm	150	150	150	150	150	150
Height	H	mm	14.5	14.5	18	18	23	23
Height	H1	mm	82	82	84	84	88.5	88.5
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	G $\frac{3}{4}$ B	G $\frac{3}{4}$ B	G1B	G1B	G1 $\frac{1}{4}$ B	G1 $\frac{1}{2}$ B
Connection thread of coupling		Inch	R $\frac{1}{2}$	R $\frac{1}{2}$	R $\frac{3}{4}$	R $\frac{3}{4}$	R1	R1 $\frac{1}{4}$
Weight <sup>1</sup>		kg	0.76	0.76	0.85	0.85	1.5	1.5
Nominal flow rate	$q_p$	m <sup>3</sup> /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	R1 $\frac{1}{2}$	-	-	-	-	-
Weight <sup>1</sup>		kg	3.1	-	-	-	-	-

<sup>1</sup> 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

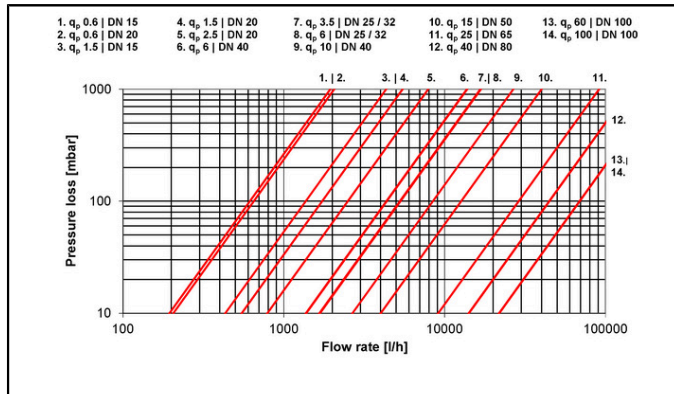


Nominal flow rate	$q_p$	m <sup>3</sup> /h	0.6	1.5	1.5	2.5	6	6
Nominal diameter	DN	mm	15	15	20	20	25	32
Overall length	L	mm	110	110	130	130	260	260
Length of calculator	L1	mm	-	-	-	-	150	150
Height	H	mm	-	-	-	-	50	62.5
Height	H1	mm	-	-	-	-	88.5	88.5
Height of calculator	H2	mm	-	-	-	-	54	54
Width of calculator	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 screwholes		pcs	-	-	-	-	4	4
Weight brass body		kg	-	-	-	-	3.5	4.8
Weight grey cast iron body		kg	-	-	-	-	-	-
Nominal flow rate	$q_p$	m <sup>3</sup> /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	190	190
Screw hole diameter	D1	mm	18	18	18	19	22	22
Number of screwholes		pcs	4	4	8	8	8	8
Weight brass body		kg	6.4	7.0	8.9	10.9	16.4	16.4
Weight grey cast iron body		kg	-	5.9	7.7	9.6	15.2	15.2

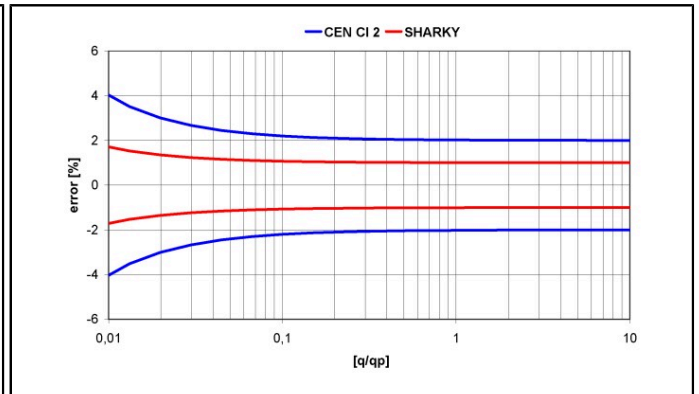
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## PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph