

# SHARKY FS 473

FLOW SENSOR | ULTRASONIC

**DIEHL**  
Metering



## APPLICATION

The ultrasonic flow sensor can be used for flow measuring in local and district heating / cooling systems.

## FEATURES

- ▶ 1st approval in Europe for ultrasonic flow sensor with a dynamic range (DR) of up to 1:250 ( $q_i:q_p$ ) in class 2 (depends on meter size), standard 1:100
- ▶ Extreme low power consumption --> longer battery lifetime
- ▶ Approved according EN 1434 and MID in class 2 and 3 and PTB K 7.2 (cooling)
- ▶ High long term stability, verified with independent AGFW test
- ▶ Applicable for different calculators with impulse input
- ▶ Free selectable impulse values, time continuously pulse, no puls packages
- ▶ The temperature range depending on the applicaton 5 ... 150 °C
- ▶ Battery or external power supply
- ▶ Specific housing for falling and rising pipes

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## GENERAL

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Application	Heating - cooling
Approval	MID and PTB K 7.2 for cooling
Ambient class	EN 1434 class C / MID class E2 + M2
Ambient temperature	°C 5 ... 55
Power supply	3.0 VDC battery - up to 12 years lifetime; external supply 3.0 ... 5.5 VDC
Mounting position	Any position
Protection class	Heating: IP 54; cooling: IP 65
Interfaces	Open Collector pulse output <sup>1</sup> - output for testing and communication <sup>2</sup>
Volume pulse value <sup>3</sup>	10 ml ... 5000 l/pulse (depending on sensor sizes and supply)
Cable length of impulse cable	2.4 m (4.9 or 9.9 m optional)
Material of the flow sensor body	Brass ( $q_p$ 0.6 ... 10 m <sup>3</sup> /h), grey cast iron ( $q_p$ 15 ... 60 m <sup>3</sup> /h)

<sup>1</sup> The pulse output can be chosen without galvanic isolation (standard) or with galvanic isolation (only with battery supply). The flow sensor has by default a 4-wire impulse cable.

<sup>2</sup> The output for testing is a combined pulse output. The flow sensor can either emit a high resolution test pulse (standard) or communicate via the same output. By using an adapter the flow sensor can be read via the HYDRO-SET software.

<sup>3</sup> The pulse duration is between 1 and 250 ms. It depends on the pulse value and on the nominal flow rate  $q_p$ .  
Standard pulse values: 1, 2.5, 10, 25, 100, 250 l/pulse

## TEMPERATURE RANGE

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Temperature range heating - battery supplied	°C 5 ... 90 / 5 ... 105 <sup>1</sup>
Temperature range heating - external supplied	°C 5 ... 130 / 150
Temperature range cooling - battery supplied	°C 5 ... 90 / 5 ... 105 <sup>1</sup>
Temperature range cooling - external supplied	°C 5 ... 120

<sup>1</sup> Only in rising or falling pipes or tilted horizontal installation

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## TECHNICAL DATA

Nominal flow rate	q <sub>p</sub>	m <sup>3</sup> /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 <sub>i</sub>	l/h	6	6	6	6	6	6	10
Minimum flow rate (DR 1:100)	q <sub>i</sub>	l/h	6	6	6	15	15	15	25
Maximum flow rate	q <sub>s</sub>	m <sup>3</sup> /h	1.2	1.2	1.2	3	3	3	5
Overload flow rate		m <sup>3</sup> /h	2.5	2.5	2.5	4.6	4.6	4.6	6.7
Pressure loss at q <sub>p</sub>	Δp	mbar	85	85	85	75	75	75	100
Temp. range heating		°C	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130
Kvs value (Δp=Q <sup>2</sup> /Kvs <sup>2</sup> )			2.06	2.06	2.06	5.48	5.48	5.48	7.91

Nominal flow rate	q <sub>p</sub>	m <sup>3</sup> /h	2.5	3.5	3.5	3.5	3.5	3.5
Nominal diameter	DN	mm	20	25	25	32	25	32
Overall length	L	mm	190	135	150	150	260	260
Starting flow rate		l/h	4	7	7	7	7	7
Minimum flow rate (DR 1:250)	q <sub>i</sub>	l/h	10	-	-	-	-	-
Minimum flow rate (DR 1:100)	q <sub>i</sub>	l/h	25	35	35	35	35	35
Maximum flow rate	q <sub>s</sub>	m <sup>3</sup> /h	5	7	7	7	7	7
Overload flow rate		m <sup>3</sup> /h	6.7	18.4	18.4	18.4	18.4	18.4
Pressure loss at q <sub>p</sub>	Δp	mbar	100	44	44	44	44	44
Temp. range heating		°C	5 ... 130	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150
Kvs value (Δp=Q <sup>2</sup> /Kvs <sup>2</sup> )			7.91	16.69	16.69	16.69	16.69	16.69

Nominal flow rate	q <sub>p</sub>	m <sup>3</sup> /h	6	6	6	6	6	10
Nominal diameter	DN	mm	25	25	32	25	32	40
Overall length	L	mm	135	150	150	260	260	200
Starting flow rate		l/h	7	7	7	7	7	20
Minimum flow rate (DR 1:250)	q <sub>i</sub>	l/h	24	24	24	24	24	40 <sup>1</sup>
Minimum flow rate (DR 1:100)	q <sub>i</sub>	l/h	60	60	60	60	60	100
Maximum flow rate	q <sub>s</sub>	m <sup>3</sup> /h	12	12	12	12	12	20
Overload flow rate		m <sup>3</sup> /h	18.4	18.4	18.4	18.4	18.4	24
Pressure loss at q <sub>p</sub>	Δp	mbar	128	128	128	128	128	95
Temp. range heating		°C	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150
Kvs value (Δp=Q <sup>2</sup> /Kvs <sup>2</sup> )			16.77	16.77	16.77	16.77	16.77	32.44

Nominal flow rate	q <sub>p</sub>	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 <sub>i</sub>	l/h	40 <sup>1</sup>	60 <sup>1</sup>	100 <sup>1</sup>	160 <sup>1</sup>	240 <sup>1</sup>	400 <sup>1</sup>
Minimum flow rate (DR 1:100)	q <sub>i</sub>	l/h	100	150	250	400	600/1200 <sup>2</sup>	1000/1200 <sup>2</sup>
Maximum flow rate	q <sub>s</sub>	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
Pressure loss at q <sub>p</sub>	Δp	mbar	95	80	75	80	75	75
Temp. range heating		°C	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150
Kvs value (Δp=Q <sup>2</sup> /Kvs <sup>2</sup> )			32.44	53.03	91.29	141.42	219.09	219.09

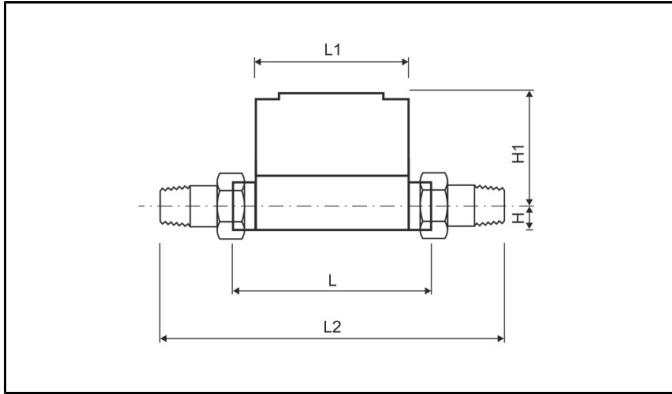
<sup>1</sup> Valid for horizontal installation only

<sup>2</sup> Up side down installation

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## DIMENSIONS THREAD VERSION



Nominal flow rate	q <sub>p</sub>	m <sup>3</sup> /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	-	190	230	-	230
Height	H	mm	14.5	18	18	14.5	18	18	18
Height	H1	mm	54.5	56.5	56.5	54.5	56.5	56.5	56.5
Length of electronic	L1	mm	90	90	90	90	90	90	90
Width of electronic	B	mm	65.5	65.5	65.5	65.5	65.5	65.5	65.5
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 $\frac{3}{4}$
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25	16/25
Weight		kg	0.6	0.61	0.63	0.6	0.61	0.63	0.61

Nominal flow rate	q <sub>p</sub>	m <sup>3</sup> /h	2.5	3.5	3.5	3.5	3.5	3.5
Nominal diameter	DN	mm	20	25	25	32	25	32
Overall length	L	mm	190	135	150	150	260	260
Overall length with coupling	L2	mm	-	255	270	270	380	380
Height	H	mm	18	23	23	23	23	23
Height	H1	mm	56.5	61	61	61	61	61
Length of electronic	L1	mm	90	90	90	90	90	90
Width of electronic	B	mm	65.5	65.5	65.5	65.5	65.5	65.5
Connection thread on meter		Inch	G1B	G1 $\frac{1}{4}$ B	G1 $\frac{1}{4}$ B	G1 $\frac{1}{2}$ B	G1 $\frac{1}{4}$ B	G1 $\frac{1}{2}$ B
Connection thread of coupling		Inch	R $\frac{3}{4}$	R1	R1	R1 $\frac{1}{4}$	R1	R1 $\frac{1}{4}$
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25
Weight		kg	0.63	0.88	0.93	1.08	1.35	1.35

Nominal flow rate	q <sub>p</sub>	m <sup>3</sup> /h	6	6	6	6	6	10
Nominal diameter	DN	mm	25	25	32	25	32	40
Overall length	L	mm	135	150	150	260	260	200
Overall length with coupling	L2	mm	255	270	270	380	380	340
Height	H	mm	23	23	23	23	23	33
Height	H1	mm	61	61	61	61	61	66.5
Length of electronic	L1	mm	90	90	90	90	90	90
Width of electronic	B	mm	65.5	65.5	65.5	65.5	65.5	65.5
Connection thread on meter		Inch	G1 $\frac{1}{4}$ B	G1 $\frac{1}{4}$ B	G1 $\frac{1}{2}$ B	G1 $\frac{1}{4}$ B	G1 $\frac{1}{2}$ B	G2B
Connection thread of coupling		Inch	R1	R1	R1 $\frac{1}{4}$	R1	R1 $\frac{1}{4}$	R1 $\frac{1}{2}$
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25
Weight		kg	0.88	0.93	1.08	1.35	1.35	2.4

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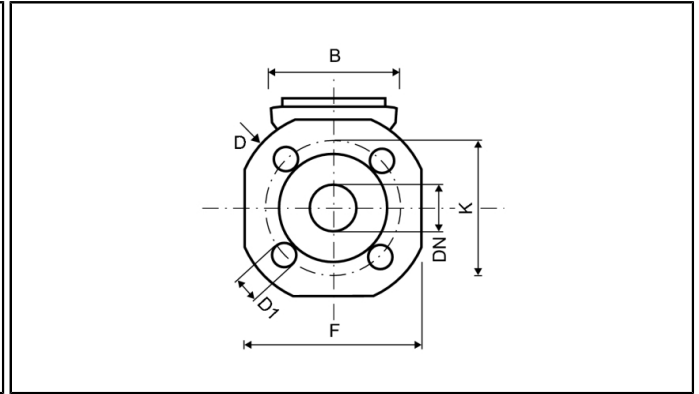
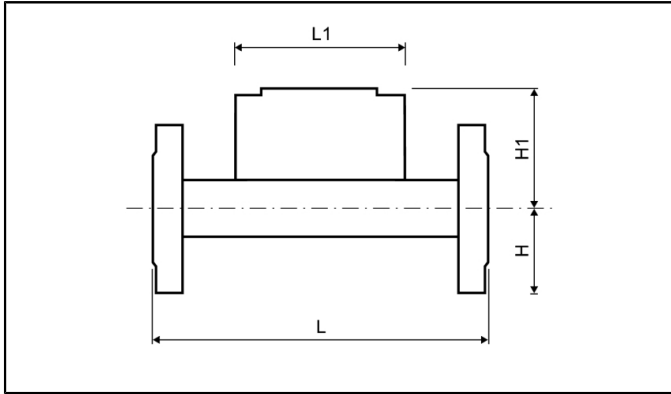
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Nominal flow rate	q <sub>p</sub>	m <sup>3</sup> /h	10	15	25	40	60	100
Nominal diameter	DN	mm	40	50	65	80	100	100
Overall length	L	mm	300	270	300	300	360	360
Overall length with coupling	L2	mm	440	-	-	-	-	-
Height	H	mm	33	-	-	-	-	-
Height	H1	mm	66.5	-	-	-	-	-
Length of electronic	L1	mm	90	-	-	-	-	-
Width of electronic	B	mm	65.5	-	-	-	-	-
Connection thread on meter		Inch	G2B	-	-	-	-	-
Connection thread of coupling		Inch	R1½	-	-	-	-	-
Operating pressure	PN	bar	16/25	-	-	-	-	-
Weight		kg	2.6	-	-	-	-	-

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## DIMENSIONS FLANGE VERSION



Nominal flow rate	$q_p$	m <sup>3</sup> /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
Height	H	mm	-	-	47.5	-	-	47.5	-
Height	H1	mm	-	-	56.5	-	-	56.5	-
Length of electronic	L1	mm	-	-	90	-	-	90	-
Width of electronic	B	mm	-	-	65.5	-	-	65.5	-
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	-
Operating pressure	PN	bar	-	-	16/25	-	-	16/25	-
Number of screwholes		pcs	-	-	4	-	-	4	-
Weight brass body <sup>2</sup>		kg	-	-	2.7	-	-	2.7	-
Weight grey cast iron body <sup>2</sup>		kg	-	-	-	-	-	-	-
Nominal flow rate	$q_p$	m <sup>3</sup> /h	2.5	3.5	3.5	3.5	3.5	3.5	
Nominal diameter	DN	mm	20	25	25	32	25	32	
Overall length	L	mm	190	135	150	150	260	260	
Height	H	mm	47.5	-	-	-	50	62.5	
Height	H1	mm	56.5	-	-	-	61	61	
Length of electronic	L1	mm	90	-	-	-	90	90	
Width of electronic	B	mm	65.5	-	-	-	65.5	65.5	
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	
Operating pressure	PN	bar	16/25	-	-	-	16/25	16/25	
Number of screwholes		pcs	4	-	-	-	4	4	
Weight brass body <sup>2</sup>		kg	2.7	-	-	-	3.35	4.65	
Weight grey cast iron body <sup>2</sup>		kg	-	-	-	-	-	-	

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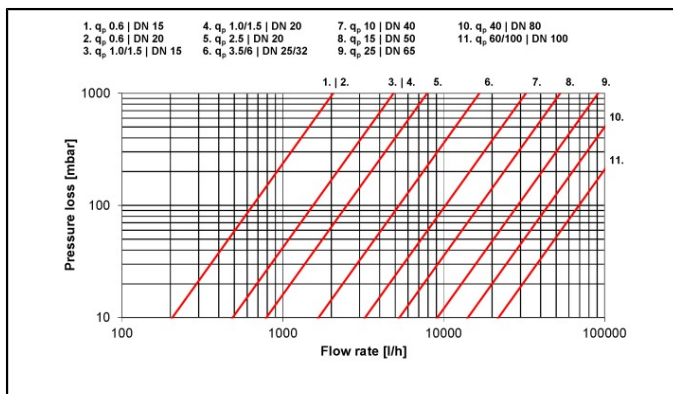
Nominal flow rate	q <sub>p</sub>	m <sup>3</sup> /h	6	6	6	6	6	10
Nominal diameter	DN	mm	25	25	32	25	32	40
Overall length	L	mm	135	150	150	260	260	200
Height	H	mm	-	-	-	50	62.5	-
Height	H1	mm	-	-	-	61	61	-
Length of electronic	L1	mm	-	-	-	90	90	-
Width of electronic	B	mm	-	-	-	65.5	65.5	-
Flange dimension	F	mm	-	-	-	100	125	-
Flange diameter	D	mm	-	-	-	114	139	-
Hole circle diameter	K	mm	-	-	-	85	100	-
Screwhole diameter	D1	mm	-	-	-	14	18	-
Operating pressure	PN	bar	-	-	-	16/25	16/25	-
Number of screwholes		pcs	-	-	-	4	4	-
Weight brass body <sup>2</sup>		kg	-	-	-	3.35	4.65	-
Weight grey cast iron body <sup>2</sup>		kg	-	-	-	-	-	-

Nominal flow rate	q <sub>p</sub>	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
Height	H	mm	69	73.5	85	92.5	108	108
Height	H1	mm	66.5	71.5	79	86.5	96.5	95.5
Length of electronic	L1	mm	90	90	90	90	90	90
Width of electronic	B	mm	65.5	65.5	65.5	65.5	65.5	65.5
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 <sup>1</sup> / 190	180 <sup>1</sup> / 190
Screwhole diameter	D1	mm	18	18	18	19	19 <sup>1</sup> / 22	19 <sup>1</sup> / 22
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25
Number of screwholes		pcs	4	4	8	8	8	8
Weight brass body <sup>2</sup>		kg	6.6	7.45	9.45	11.1	16.9	16.9
Weight grey cast iron body <sup>2</sup>		kg	-	6.31	8.08	10.01	15.76	15.75

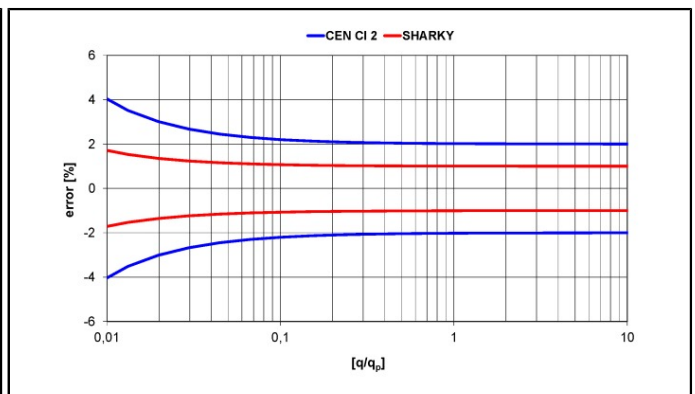
<sup>1</sup> Values for PN 16 housing

<sup>2</sup> Meter with battery and 2.4 m cable length of the pulse cable

## PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph