

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

- ▶ 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
- ▶ Applicable for different calculators with impulse input
- ▶ Continuous time-correct pulses - no pulse packages
- ▶ Free selectable impulse values
- ▶ The temperature range depending on the application up to 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 (DE-07-MI004-PTB022) and PTB K 7.2 for cooling (DE-19-M-PTB-0014)
Ambient class	EN 1434 class C / MID class E2 + M2
Ambient temperature	°C 5 ... 55 (<35 °C have a positive lifetime effect)
Battery 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; heating potted: IP 65; cooling: IP 65
Interfaces	Open Collector pulse output ¹ - output for testing and communication ²
Volume pulse value ³	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 ... 100 m ³ /h), spheroidal cast iron (q _p 15 ... 100 m ³ /h)

¹ 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.

² 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.

³ 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 ¹
Temperature range heating - external supplied	°C 5 ... 105 / 130 / 150 (depends on meter size and material)
Temperature range cooling - battery supplied / external supplied	°C 5 ... 50 / 5 ... 90

¹ Only in rising or falling pipes or tilted horizontal installation

TECHNICAL DATA

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	6	6	6	10
Minimum flow rate (DR 1:100)	q _i	l/h	6	6	6	15	15	15	25
Minimum flow rate (up side down installation)	q _i	l/h	6	6	6	6	6	6	10
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
Pressure loss at q _p	Δp	mbar	95	85	85	130	115	115	110
Temp. range heating - brass body		°C	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130	5 ... 130
Temp. range heating - spheroidal cast iron body / brass PN 40		°C	-	-	-	-	-	-	-
kv value		m ³ /h	1.95	2.06	2.06	4.16	4.42	4.42	7.54

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Nominal flow rate	q_p	m³/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
Minimum flow rate (up side down installation)	q _i	l/h	10	35	35	35	35	35	24
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
Pressure loss at q _p	Δp	mbar	110	65	65	65	65	65	190
Temp. range heating - brass body		°C	5 ... 130	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150	5 ... 150
Temp. range heating - spheroidal cast iron body / brass PN 40		°C	-	-	-	-	-	-	-
kv value		m ³ /h	7.54	13.73	13.73	13.73	13.73	13.73	13.76

Nominal flow rate	q_p	m³/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
Minimum flow rate (up side down installation)	q _i	l/h	24	24	24	24		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
Pressure loss at q _p	Δp	mbar	190	190	190	190	190	140
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 / brass PN 40		°C	-	-	-	-	-	-
kv value		m ³ /h	13.76	13.76	13.76	13.76	13.76	26.73

Nominal flow rate	q_p	m³/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 ¹	240 ¹	400 ¹
Minimum flow rate (DR 1:100)	q _i	l/h	100	150	250	400	600/1200 ²	1000/1200 ²
Minimum flow rate (up side down installation)	q _i	l/h	100	150	250	400	1200	1200
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
Pressure loss at q _p	Δp	mbar	140	165	75	80	75	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 / brass PN 40		°C	-	5 ... 105	5 ... 105	5 ... 105	5 ... 105	5 ... 105
kv value		m ³ /h	26.73	36.93	91.29	141.42	219.09	218.22

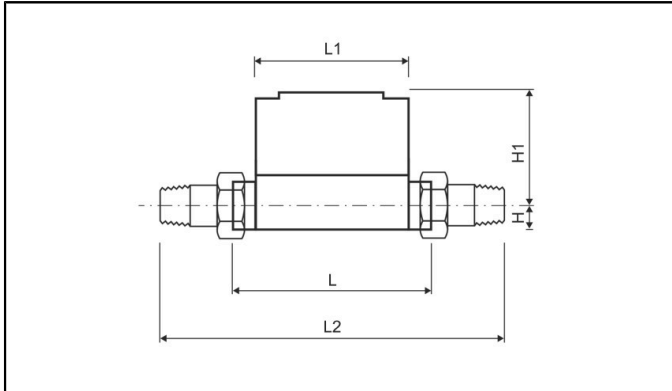
¹ Valid for horizontal installation only

² Up side down 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	-	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 ³ / ₄ B	G1B	G1B	G ³ / ₄ B	G1B	G1B	G1B
Connection thread of coupling	Inch		R ¹ / ₂	R ³ / ₄	R ³ / ₄	R ¹ / ₂	R ³ / ₄	R ³ / ₄	R 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 _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	-	255	270	380	270	380	255
Height	H	mm	18	23	23	23	23	23	23
Height	H1	mm	56.5	61	61	61	61	61	61
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		G1B	G1 ¹ / ₄ B	G1 ¹ / ₄ B	G1 ¹ / ₄ B	G1 ¹ / ₂ B	G1 ¹ / ₂ B	G1 ¹ / ₄ B
Connection thread of coupling	Inch		R ³ / ₄	R1	R1	R1	R1 ¹ / ₄	R1 ¹ / ₄	R1
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25	16/25
Weight		kg	0.63	0.88	0.93	1.35	1.08	1.35	0.88

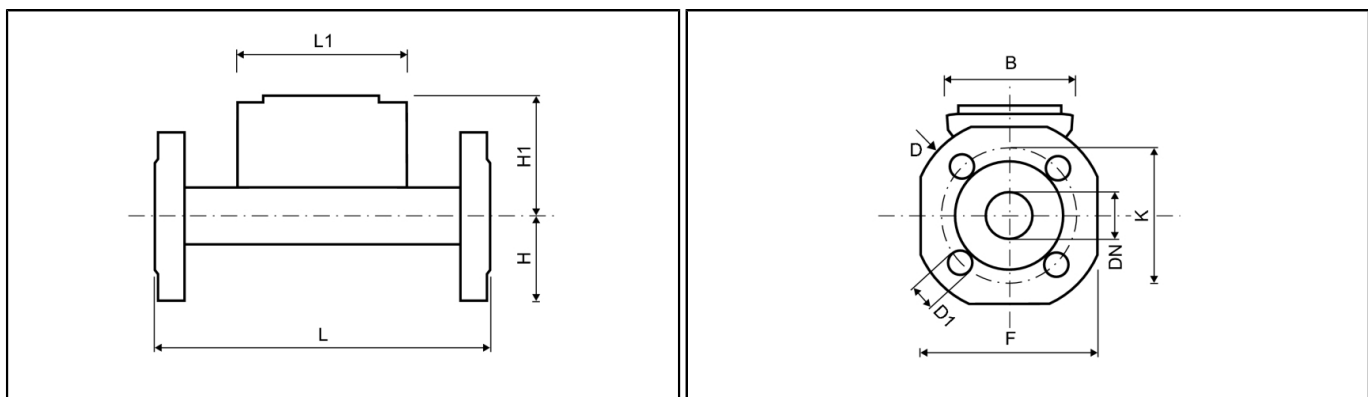
Nominal flow rate	q _p	m ³ /h	6	6	6	6	6	10
Nominal diameter	DN	mm	25	25	32	32	40	40
Overall length	L	mm	150	260	150	260	150	200
Overall length with coupling	L2	mm	270	380	270	380	-	340
Height	H	mm	23	23	23	23	33	33
Height	H1	mm	61	61	61	61	61	66.5
Length of electronic	L1	mm	90	90	90	90	90	90
Width of electronic	B	mm	65.5	65.5	65.5	65.5	65.5	65.5
Connection thread on meter	Inch		G1 ¹ / ₄ B	G1 ¹ / ₄ B	G1 ¹ / ₂ B	G1 ¹ / ₂ B	G2B	G2B
Connection thread of coupling	Inch		R1	R1	R1 ¹ / ₄	R1 ¹ / ₄	R1 ¹ / ₂	R1 ¹ / ₂
Operating pressure	PN	bar	16/25	16/25	16/25	16/25	16/25	16/25
Weight		kg	0.93	1.35	1.08	1.35	1.52	2.4

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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	-	-	-	-	-
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	-	-	-	-	-

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
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	-	-	16/25/40 ³	-
Number of screw holes		pcs	-	-	4	-	-	4	-
Weight brass body ²		kg	-	-	2.7	-	-	2.7	-
Weight spheroidal cast iron body ²		kg	-	-	-	-	-	-	-

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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
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	16/25/40 ³	-	-	16/25/40 ³	-	16/25/40 ³	-
Number of screw holes		pcs	4	-	-	4	-	4	-
Weight brass body ²		kg	2.7	-	-	3.35	-	4.65	-
Weight spheroidal cast iron body ²		kg	-	-	-	-	-	-	-

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
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	-	-
Screw hole diameter	D1	mm	-	14	-	18	-	-
Operating pressure	PN	bar	-	16/25/40 ³	-	16/25/40 ³	-	-
Number of screw holes		pcs	-	4	-	4	-	-
Weight brass body ²		kg	-	3.35	-	4.65	-	-
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
Height	H	mm	69	73.5	85	92.5	108	108
Height	H1	mm	66.5	71.5	79	86.5	96.5	96.5
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 ¹ / 190	180 ¹ / 190
Screw hole diameter	D1	mm	18	19	19	19	19 ¹ / 22	19 ¹ / 22
Operating pressure	PN	bar	16/25/40 ³	16/25/40 ³	16/25	16/25/40 ³	16/25	16/25
Number of screw holes		pcs	4	4	8	8	8	8
Weight brass body ²		kg	6.6	7.45	9.45	11.1	16.9	16.9
Weight spheroidal cast iron body ²		kg	-	6.31	8.08	10.01	15.76	15.75

¹ Values for PN 16 housing

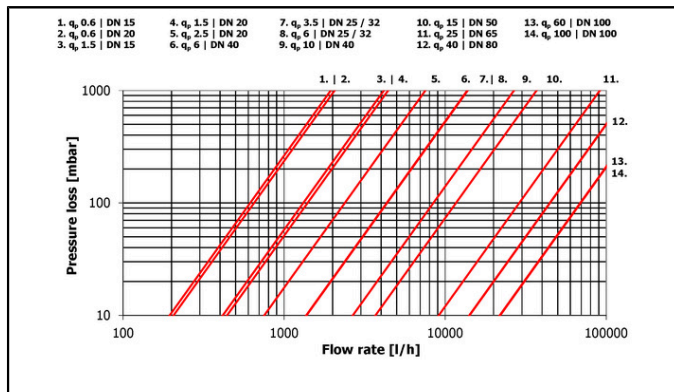
² Meter with battery and 2.4 m cable length of the pulse cable

³ Only up to 105 °C

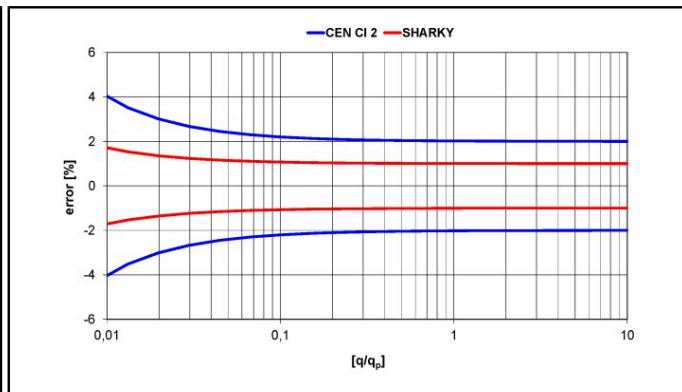
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PRESSURE LOSS GRAPH / TYPICAL ERROR GRAPH



Pressure loss graph



Typical error graph

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)
- 1,2-dimethoxyethane (CAS no.: 110-71-4)

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Economic Actor Information

Applicable regulation and legal obligations for products may change.

DIEHL METERING monitors applicable regulation to ensure their products comply at the date of placing on the market.

Each economic actor making products available on the market thereafter must independently keep informed about the current applicable regulation.

For questions, please contact: metering-germany-info@diehl.com