OPTISONIC 7060

Technical Datasheet

Universal 2 beam ultrasonic process gas flowmeter

- Universal ultrasonic flow meter for measurement of process gasflow
- High measurement accuracy
- Wide application range
- Excellent long-term stability and high reliabilty
- Non intrusive, no moving parts; no pressure loss, no wear
- Eliminates maintenance

KROHNE

The specialist for gasflow measurement

The OPTISONIC 7060 performs consistent and accurately, even under harsh operating conditions. With specially designed ultrasonic transducers integrated in the meter body and an integrated protected cabling system, the OPTISONIC 7060 is extremely compact and robust.
The OPTISONIC 7060 is capable of performing flow measurement in virtually any process application in its standard configuration. The flowmeter will perform independent from gas properties and process conditions like density, pressure and temperature to a large extend. As such the OPTISONIC 7060 is a truly universal flowmeter.

Highlights

- Compact and robust design, with protected cabling
- All metal miniturized transducers
- Extensive diagnostic functions, accessible through standard software package
- Bi-directional
- Wide temperature range
- Hign turndown ration
- Low power consumption, less than 1W

Applications

- Process measurements in the chemical and petrochemical industry
- Check metering
- Power plants
- Compressor stations

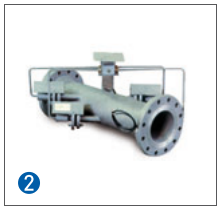
In-line Ultrasonic process flowmeter family

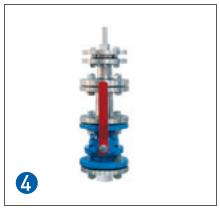
The UFM 3030 liquid process flowmeter consists of a UFS 3000 flow sensor and a flow converter, UFC 030. A UFS 3000 flow sensor can be build together with a UFC 030 flow converter as a compact flowmeter or can be installed separate as a field version.

UFC 030 flow converter

1. The flowconverter is fully digital and fitted with a digital signal processor and advanced software for optimal performance
2. For in-depth analysis of application and evaluation of flowmeter performance, the soundcheck interface and software is available

Ultrasonic liquid flow sensor family

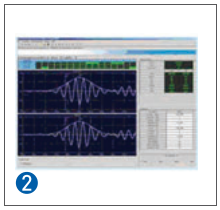




1. The UFS 3000, the universal ultrasonic flowsensor for liquids
2. For extreme high or low temperature applications from -170 up to 500 deg. C, the UFS 500 HT/LT flowsensor is available
3. For open channels or onsite welding in of sensors the UFS 800 C (for open channels) or OPTISONIC 800 W (weld in) are available. Depending on the pipe size the UFS 800 W can be fitted with 1, 2 or even 3 sensor pairs for optimal measurement performance
4. For piping that can not be drained, the UFM 800 HT (hot tap) is available. The UFM 800 HT can be fitted in 1, 2 or 3 path configuration depending on the pipe size, while the pipe remains filled and pressurized

The OPTISONIC 7060 C is a process gasflowmeter with a wide application range that can be used under harsh conditions. The OPTISONIC 7060 C consists of a flow sensor, OPTISONIC 7000 and a flow converter UFC 060. Standard the OPTISONIC 7000 is build together with a UFC 060 as a compact flowmeter

OPTISONIC 7060 C process gas flowmeter



1. The OPTISONIC 7060 C: a robust flow sensor combined with the UFC 060 flow converter, with a digital signal processor for optimal performance
2. The converter provides a range of diagnostics parameters. A software package is available for configuration, visualisation and analysis of diagnostics information

Technical Data

OPTISONIC 7060 is a gas flowmeter for measurement of process gasflow, air flow and gasflow in general. It consists of a OPTISONIC 7000 ultrasonic flow sensor combined with a UFC 060 ultrasonic flow converter build together to make a compact flowmeter. Both the sensor and converter are approved for use in hazardous areas.

Ultrasonic flowmeter OPTISONIC 7060 C

Versions

OPTISONIC 7060 C	Standard

Performance

Measurement functionality	Actual volume flow, actual totalised volume, flowspeed, velocity of sound
Max. deviation (under reference conditions)	< ± 1% of measured value for a flowspeed > 1 m/s (3 ft/s) (2 acoustic path's)
	< ± 2% of measured value for a flowspeed > 1 m/s (3 ft/s) (1 acoustic path)
Repeatability	< ± 0.2%

Approvals

ATEX (acc. to 94/9/EC)	II 2G EEx de ib [ia] IIA or IIC T4
CSA / US	CSA Class I, Div. 1, Groups B, C & D T4
	CSA Class I, Div. 2, Groups A, B, C, D T4

The OPTISONIC 7000 is a ultrasonic flowsensor for inline process measurement of gas. Depending on the flowsensor diameter it is fitted with either 1 or 2 acoustic paths, each acoustic path consisting of 2 transducers.

Nominal diameter													
ASME [inch]	2	2,5	3	4	6	8	10	12	14	16	18	20	24
DN [mm]	50	65	80	100	150	200	250	300	350	400	450	500	600

Nominal flange pressure

DIN PN40	■	■	■										
DIN PN16				■	■	■	■						
DIN PN10								■	■	■	■	■	■
ASME B16.5 150 lbs RF													
ASME B16.5 300 lbs RF													
ASME B16.5 600 lbs RF/RTJ													
	For ASME: Pressure rating according to ASME B16.5 Group 2.3 materials.												
	Other combinations of diameter/pressure class are available on request.												
	For a detailed overview, see the dimensions and weights tables in this datasheet.												

Versions

≥DN80 (3"): flowsensor with 2 parallel acoustic paths			■	■	■	■	■	■	■	■	■	■	■
DN50 (2") & DN65 (2,5"): flowsensor with 1 acoustic path	■	■											

Nominal diameter													
ASME [inch]	2	2,5	3	4	6	8	10	12	14	16	18	20	24
DN [mm]	50	65	80	100	150	200	250	300	350	400	450	500	600

Materials

Flanges:													
Carbon steel ASTM A105	■	■	■	■	■	■	■	■	■	■	■	■	■
Stainless steel AISI 316 / 1,4404	■	■	■	■	■	■	■	■	■	■	■	■	■
Measuring tube:													
Carbon steel ASTM A106	■	■	■	■	■	■	■	■	■	■	■	■	■
Stainless steel AISI 316 / 1,4404	■	■	■	■	■	■	■	■	■	■	■	■	■
Transducers:													
Titanium	■	■	■	■	■	■	■	■	■	■	■	■	■
Hasteloy C	■	■	■	■	■	■	■	■	■	■	■	■	■
O-Rings:													
Viton	■	■	■	■	■	■	■	■	■	■	■	■	■
Kalrez	■	■	■	■	■	■	■	■	■	■	■	■	■
Transducer holders:													
Stainless steel AISI 316 L (1.4404)	■	■	■	■	■	■	■	■	■	■	■	■	■
Hasteloy C	■	■	■	■	■	■	■	■	■	■	■	■	■
	Other materials on request												

Coating

Standard paint, silver	■	■	■	■	■	■	■	■	■	■	■	■	■
Offshore paint system, silver	■	■	■	■	■	■	■	■	■	■	■	■	■
	Other coatings on request												

Calibration

5 points, with air at ambient pressure	■	■	■	■	■	■	■	■	■	■	■	■	■
High pressure calibration with natural gas	■	■	■	■	■	■	■	■	■	■	■	■	■

Protection category

IP 67 / IP 66 eq. NEMA 4/4X/6 (to IEC 529)	■	■	■	■	■	■	■	■	■	■	■	■	■

■ standard ■ optional □ on request

The converter is fully digital. Measured values are obtained using DSP (Digital Signal Processing) to ensure accurate and highly repeatable measurements. The converter has standard HART communication.

UFC 060

Versions	UFC 060 C (compact)
Materials	Converter housing standard Aluminium, optional Stainless Steel AISI 351CF (1.5581)
Coating	Standard silver, optional offshore paint (silver)
Protection category	IP 67 eq. NEMA 4/4X/6 (to IEC 529)
Overall functionality / Measurements available	Actual volume flow rate (continuous measurement)
	Actual totalized volume
	Gas velocity
	Flow direction (forward or reverse)
	Velocity of sound per acoustic channel
	Self diagnostics, e.g. velocity of sound / gain within range, signal to noise ratio too small
	General alarms
Local display	2 lines, 16 characters per line
	Measured values / (error) messages. Resetting of errors with a hand-held bar magnet.
	Units: actual flowrate in liter/s, m3/h, US gall/min or user-defined unit (e.g. US million gall/day).
Languages	standard English (GB), optional English (US) and German
Galvanic isolation	All inputs and outputs are galvanically isolated from the power supply and from each other
Power supply	Low voltage supply 12 - 28,8 V dc, power consumption approx. 1 W
Cable connection (for power supply and signal cables)	Standard M20 x 1,5 (ATEX version), optional 1/2" NPT (CSA version)

Temperature range	Process [°C]		Ambient [°C]		Process [°F]		Ambient [°F]	
	min.	max.	min.	max.	min.	max.	min.	max.

Temperatures

Standard	-25	100	-20	60	-13	212	-4	140
Extended process temperature	-25	180	-20	60	-13	356	-4	140
	Ambient temperature of -40 °C / -40 °F on request							

Communications and connections

Current output (IO)

Function	Actual volume flow rate (continuous measurement)
	Gas velocity
	Velocity of Sound (VOS)
	HART communication
Settings	Active / passive
Connection active	Load ≤ 250 ohm (current limit 22 mA)
Connection passive	External voltage max. 30 VDC

Pulse output (D1)

Function	Pulse per measured unit
Settings	Open collector or NAMUR
	Pulse/unit (max. 6000 Hz)
	pulse duration 0.05...1 s or to NAMUR (EN 50227)
Connection	Passive mode connection to electronic counter (EC).
	External voltage ≤ 30 VDC / I ≤ 100 mA, optically isolated

Status output (D2+D3)

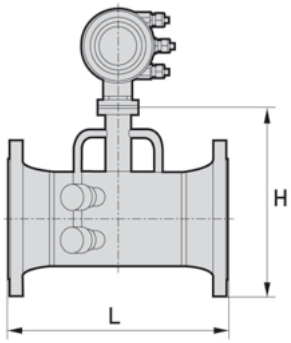
Function	Reduced accuracy, Direction of flow, Warning
Settings	Open collector or NAMUR
Connection	Passive mode connection to electronic input.
	External voltage ≤ 30 VDC / I ≤ 100 mA, optically isolated

No.	Connection for	Function	Terminal
1	Power supply		1+, 2-
2	Analog output AO 0	Active / Passive	31, 32
3	Serial port	Modbus (RS485)	33, 34
4	Digital output DO 1	Passive	51, 52
5	Digital output DO 2	Passive	41, 42
6	Digital output DO 3	Passive	81, 82
	Please refer to the instruction manual in the Dowload Center of the KROHNE internet site on www.krohne.com for detailed information on how to connect signal inputs and outputs.		

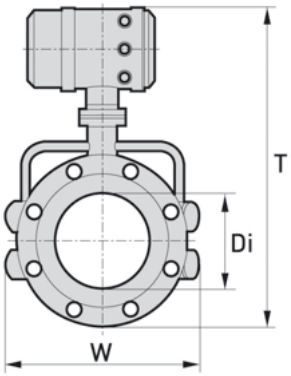
Flowtable

Meter size		Max gas velocity		Max flowrate		Max flowrate @ 30m/s		Minimum flowrate	
DIN [mm]	ASME [inch]	[m/s]	[ft/s]	[m^3/h]	[ft^3/h]	[m^3/h]	[ft^3/h]	[m^3/h]	[ft^3/h]
Sizing									
50	2	57	187	402	14197	212	7486.74	1.4	49
65	2,5	57	187	680	24014	357	12607.39	2.4	85
80	3	57	187	1000	35315	540	19070	6	212
100	4	53	174	1600	56503	900	31783	8	282
150	6	45	148	3000	105944	2000	70629	18	636
200	8	43	141	4800	169510	3360	118657	31	1095
250	10	45	148	7800	275454	5220	184342	47	1660
300	12	32	105	7800	275454	7380	260622	62	2190
400	16	30	98	12000	423776	12000	423776	87	3072
450	18	30	98	17170	606353	17170	606353	115	4061
500	20	30	98	21200	748761	21200	748761	138	4873
600	24	30	98	30550	1078992,9	30550	1078993	200	7062
	The OPTISONIC 7060 C flowmeter should be installed with 10xD straight pipesection upstream and 5xD straight pipe section downstream.								
	For more detailed installation instructions please consult the operation and installation instructions in the handbook								

Front view



Side view

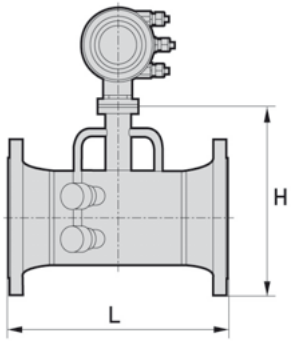


Dimensions and weights

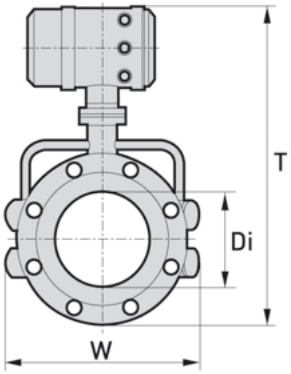
Nominal size	Dimensions [inch]					Approx. weight
ASME	L	Di	H	W	T_{060}	[lbs]
ASME 150 lbs						
2	11.81	2.06	15.74	9.25	23.02	33
2.5	11.81	2.46	16.53	9.64	23.81	44
3	15.74	3.06	17.32	9.84	24.6	44
4	15.74	4.02	18.5	10.82	25.78	44
5	15.74	5.04	19.68	11.61	26.98	66
6	15.74	6.06	20.66	12.59	27.94	77
8	15.74	8.12	23.03	14.37	30.31	88
10	19.68	10.24	25.39	16.14	32.67	99
12	19.68	12.24	27.75	19.01	35.03	121
14	27.55	13.37	29.52	20.98	36.8	143
16	31.49	15.37	31.69	23.5	38.97	165
18	31.49	17.36	33.46	25	40.74	209
20	31.49	19.24	35.82	27.51	43.1	265
24	31.49	23.24	39.96	32	47.24	386
ASME 300 lbs						
2	11.81	2.06	15.94	9.25	23.22	40
2.5	11.81	2.46	16.73	9.64	24.01	49
3	15.74	3.06	17.51	9.84	24.79	62
4	15.74	4.02	19.09	10.82	26.37	88
5	15.74	5.04	20.07	11.61	27.35	99
6	17.71	6.06	21.45	12.59	28.73	132
8	17.71	7.98	23.62	15	30.9	187
10	19.68	10.01	25.98	17.51	33.26	265
12	23.62	11.93	28.54	20.51	35.82	386
14	27.55	13.12	30.51	22.99	37.79	529
16	31.49	15	32.67	25.51	39.95	683
18	31.49	16.86	35.03	27.99	42.31	849
20	31.49	18.81	37.2	30.51	44.48	1014
24	35.43	22.62	41.92	35.98	49.2	1499

Nominal size	Dimensions [inch]					Approx. weight
ASME	L	Di	H	W	T_{060}	[lbs]
ASME 600 lbs						
2	11.81	1.93	15.94	9.25	23.02	44
2.5	11.81	2.32	16.73	9.64	24.01	55
3	17.71	2.9	17.51	9.84	24.79	77
4	17.71	3.82	19.48	10.74	26.76	121
5	17.71	4.81	21.06	12.99	28.34	172
6	19.68	5.76	22.24	14.76	29.52	220
8	19.68	7.62	24.4	16.49	31.68	320
10	23.62	9.55	27.36	20	34.64	507
12	27.55	11.37	29.33	22	36.61	650
14	27.55	12.5	30.7	23.74	37.98	772
16	31.49	14.31	33.46	27	40.74	1091
18	35.43	16.11	35.62	29.25	42.9	1378
20	35.43	17.93	37.99	32	45.27	1709
24	39.37	21.56	42.51	37	49.79	2502
	Inner diameter Di based on schedule standard.					
	Approx. weight of flowmeter					
	For temperatures > 100°C add 7.78" / 200 mm to height for extended converter neck					

Front view



Side view



Nominal size	Dimensions [mm]					Approx. weight
ASME[inch]	L	Di	H	W	T_{060}	[kg]
ASME 150 lbs						
2	300	52.48	400	235	585	15
2.5	300	62.68	420	245	605	20
3	400	77.92	440	250	625	20
4	400	102.26	470	275	655	20
5	400	128.2	500	295	685	30
6	400	154.08	525	320	710	35
8	400	206.4	585	365	770	40
10	500	260.3	645	410	830	45
12	500	311.1	705	483	890	55
14	700	339,76	750	533	935	65
16	800	390.56	805	597	990	75
18	800	441.16	850	635	1035	95
20	800	488.94	910	699	1095	120
24	800	590.54	1015	813	1200	175
ASME 300 lbs						
2	300	52.48	405	235	590	18
2.5	300	62.68	425	245	610	22
3	400	77.92	445	250	630	28
4	400	102.26	485	275	670	40
5	400	128.2	510	295	695	45
6	450	154.08	545	320	730	60
8	450	202.74	600	381	785	85
10	500	254.46	660	445	845	120
12	600	303.18	725	521	910	175
14	700	333.34	775	584	960	240
16	800	381	830	648	1015	310
18	800	428.44	890	711	1075	385
20	800	477.82	945	775	1130	460
24	900	574.64	1065	914	1250	680
ASME 600 lbs						
2	300	49.22	405	235	590	20
2.5	300	58.98	425	245	610	25
3	450	73.66	445	250	630	35
4	450	97.18	495	273	680	55
5	450	122.24	535	330	720	78
6	500	146.36	565	375	750	100
8	500	193.7	620	419	805	145
10	600	242.82	695	508	880	230
12	700	288.84	745	559	930	295
14	700	317.5	780	603	965	350
16	800	363.52	850	686	1035	495
18	900	409.34	905	743	1090	625
20	900	455.62	965	813	1150	775
24	1000	547.68	1080	940	1265	1135
	Inner diameter Di based on schedule standard.					
	Approx. weight of flowmeter					
	For temperatures > 100°C add 7.78" / 200 mm to height for extended converter neck					

KROHNE Overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Mass flowmeters
- Ultrasonic flowmeters
- Vortex flowmeters
- Flow controllers
- Level measuring instruments
- Pressure gauges
- Temperature measuring instruments
- Water solutions & analysis
- Oil and gas turnkey solutions

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