ALTOSONIC V12

Technical Datasheet

12-chord ultrasonic gas flowmeter for custody transfer

- 10-reflection chords for the highest possible accuracy; 2-reflection chords for extra diagnosis options
- Built-in redundancy through dynamic chord substitution
- Performance monitoring and fouling detection

OIML

FM APPROVED

KROHNE

Ultrasonic gas flowmeter for custody transfer

As times change, so do the requirements for ultrasonic meters. Today it is assumed that an ultrasonic device measures accurately and precisely, but what about long-term reliability? After all, this depends on more than just the ultrasonic meter itself. The transferred effect of the high pressure calibration on the installation conditions in the measuring station and dirt, which may collect on the meter over time, can also have a negative effect.

The unique chord arrangement of the ALTOSONIC V12 enables it to generate diagnostic data for places where traditional ultrasonic meters gathered too little information or none at all: firstly at the pipe wall itself, scanning with reflection. Secondly, in close proximity to the pipe wall, using the geometrical arrangement of the outer chords. Thirdly, at the bottom of the pipe. This data is gathered using a separate diagnostic chord.

This extremely extensive diagnostic data allows the ALTOSONIC V12 to carry out self-monitoring, which sets the standard for other devices in terms of performance monitoring.

Highlights

- 12-chord design
- High reliability with built-in redundancy
- Swirl compensation in each measuring plane
- Transducer replacement under pressure
- Bi-directional flow measurement
- Fully encapsulated cabling
- Field display for main functions

Industries

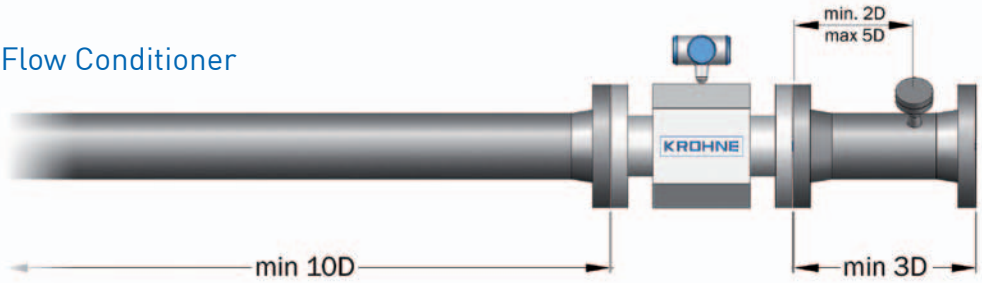
- Oil & Gas
- Petrochemical

Applications

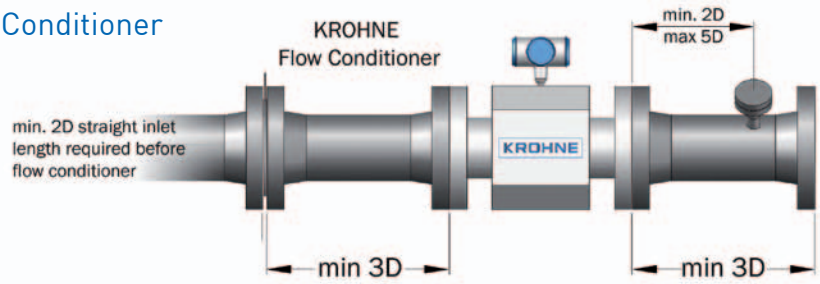
- Offshore FPSO and platforms
- Onshore exploration
- Transmission
- Underground gas storage (UGS)
- Distribution
- Large gas intakes, for example for power stations, petrochemical industry, aluminum smelters, etc.

Inlet / outlet run requirements

Without Flow Conditioner



With KROHNE Flow Conditioner



Under specific conditions ALTOSONIC V12 can be installed with just 5D and no flow conditioner, please consult KROHNE if this option is required.

Where traditional ultrasonic flow meters typically require 10D straight inlet piping with a flow conditioner or 20D without a flow conditioner, ALTOSONIC V12 only requires 5D with flow conditioner or 10D without flow conditioner. This not only minimizes the weight and footprint of the installation, but also saves on installation- and shipping costs, both during new installation as well as during re-calibration.

This much shorter installation length permits planning of more compact new metering runs and slot-in replacement of conventional meters such as turbines during revamps.

Functions

Device	Ultrasonic gas flowmeter
Description	ALTOSONIC V12 consists of a meter body with ultrasonic transducers and a converter box for signal processing and counter display mounted on top of the meter body
Measurement functionality	Actual volume flow rate and totalized volume; bi-directional
Applications	Natural gas with a minimum of 75% methane, other applications on request

Nominal diameter

[mm]	100,150,200,250,300,350,400,450,500,600,750, 00,1000,1200,1400,1600, others on request
[inches]	4", 6", 8", 10", 12", 14", 16", 18", 20", 24", 30", 36", 40",42", 48", 56", 64", others on request Other diameters on request

Measurement accuracy

Accuracy (relative to calibration facility)	≤ ±0.5% of measured value, uncalibrated ≤ ±0.2% of measured value, high-pressure flow calibrated ≤ ±0.1% of measured value, high pressure flow calibrated and linearized
Repeatability	≤ ±0.1%

Operating conditions

Flow range	See flow table (last page)
Pressure	4...450 bar / 0.4...45 MPa / 60...6525 psi
Ambient temperature	-40...+60°C / -40...+140°F
Process temperature	-20...+100°C / -4...+212°F (-40...+100°C / -40...+212°F optional)
Wet gas content	Contact KROHNE
CO_2 content	Contact KROHNE

Materials

Flanges	Low temperature carbon steel A350 LF2, stainless steel, duplex
Measuring tube	Low temperature carbon steel A350 LF2 (≤ 12") or A333 GR6 (≥ 14"), stainless steel, duplex
Electronics housing	Stainless steel A316
Finish	Outside: 3-layer epoxy coating RAL 9006 (silver) Inside: corrosion preservative oil film other finishes on request

Electrical connection

Power supply	24 VDC / ≤10 W

Inputs / Outputs

	without integrated diagnostics board	with integrated diagnostics board
Digital output	4x output	5x output
Serial	2x modbus over RS 485	3x modbus over RS 485
Ethernet		2x Ethernet
Analog Output		1x 4-20 mA
Input		1x multidrop (dual) HART

Approvals

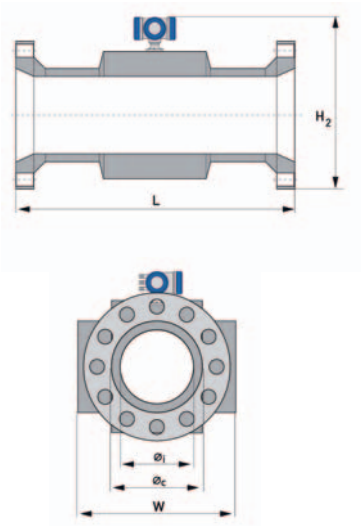
Custody transfer	OIML R137 class 0.5 by NMi MID (Measurement Instrument Directive 2004/22/EC) by NMi Fully complaint to AGA 9 and ISO 17089	
Hazardous Area	ATEX: IECEx: CSA: FM: FM:	II 2G Ex de ma IIB T5 Ex de ma IIB T5 Gb Class I, Div 1 and 2, Groups B,C,D T6 ...T4 and Class II, Div 1 and 2, Groups E,F,G Class I, Div 2, Groups C, D T5 and Class II, Div 1, Groups E,F,G (Type 4X) Class I, Zone 1, Aex de ma IIB T5, IP66
Protection	IP 66 and NEMA 4X NEMA 4x	

Verifications

Hydrostatic test (1.5xPdesign / 10min.)	Standard; witnessing optional
Factory Acceptance Test (FAT)	Standard; witnessing optional
Leakage test (1.1xPdesign / 30min.)	Optional; witnessing optional
High pressure flow calibration	Optional; witnessing optional

Dimensions and weights (metric)

[mm]		Øc min.	Øc max.	Øi	H2	L	W	Weight [kg]
ASME 150	100	102	107	96	520	300	330	119
	150	154	160	144	570	450	380	198
	200	202	207	191	620	600	430	301
	250	254	261	239	660	750	470	417
	300	303	312	284	740	900	540	706
	350	333	340	312	780	1050	570	267
	400	381	391	358	840	1200	620	375
	450	428	442	405	890	1350	670	495
	500	477	489	448	940	1500	720	666
	600	574	591	540	1050	1800	820	1080



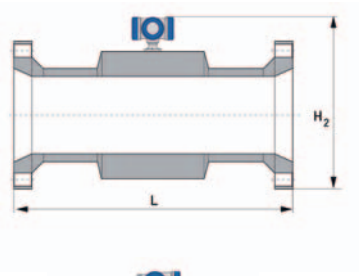
[mm]		Øc min.	Øc max.	Øi	H2	L	W	Weight [kg]
ASME 300	100	102	107	96	520	300	330	129
	150	154	160	144	570	450	380	218
	200	202	207	191	620	600	430	331
	250	254	261	239	680	750	470	465
	300	303	312	284	760	900	540	740
	350	333	340	312	810	1050	590	343
	400	381	391	358	870	1200	650	465
	450	428	442	405	920	1350	720	621
	500	477	489	448	980	1500	780	814
	600	574	591	540	1100	1800	920	1316

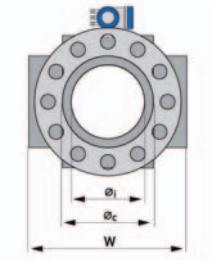
[mm]		Øc min.	Øc max.	Øi	H2	L	W	Weight [kg]
ASME 600	100	97	105	96	520	400	330	140
	150	146	158	144	575	450	375	248
	200	193	205	191	630	600	425	376
	250	242	258	239	710	750	510	548
	300	289	308	284	780	900	560	836
	350	317	337	312	815	1050	610	413
	400	363	388	358	880	1200	690	590
	450	409	435	405	930	1350	740	765
	500	455	483	448	1000	1500	820	1003
	600	547	581	540	1100	1800	940	1558

Measurements and weights are for reference only and might deviate depending on schedule size.

Dimensions and weights (imperial)

[inch]		Øc min.	Øc max.	Øi	H2	L	W	Weight [lbs]
ASME 150	4	4.02	4.21	3.78	20.47	11.81	12.99	262
	6	6.06	6.30	5.67	22.44	17.27	14.96	436
	8	7.95	8.15	7.52	24.41	23.62	16.93	664
	10	10.00	10.28	9.41	25.98	29.53	18.50	919
	12	11.93	12.28	11.18	29.13	35.43	21.26	1556
	14	13.11	13.39	12.28	30.71	41.34	22.44	589
	16	15.00	15.39	14.09	33.07	47.24	24.41	827
	18	16.85	17.40	15.94	35.04	53.15	26.38	1091
	20	18.78	19.25	17.64	37.01	59.06	28.35	1468
	24	22.60	23.27	21.26	41.34	70.87	32.28	2381





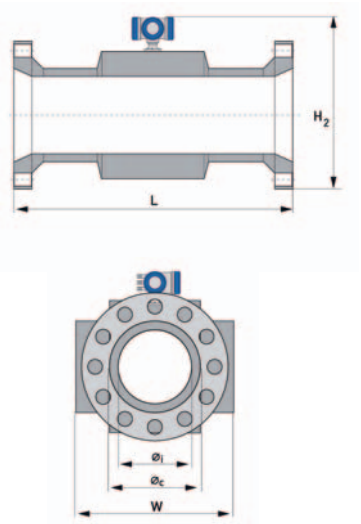
[inch]		Øc min.	Øc max.	Øi	H2	L	W	Weight [lbs]
ASME 300	4	4.02	4.21	3.78	20.47	11.81	12.99	284
	6	6.06	6.30	5.67	22.44	17.72	14.96	480
	8	7.95	8.15	7.52	24.41	23.62	16.93	730
	10	10.00	10.28	9.41	26.77	29.53	18.50	1025
	12	11.93	12.28	11.18	29.92	35.43	21.26	1631
	14	13.11	13.39	12.28	31.89	41.34	23.23	756
	16	15.00	15.39	14.09	34.25	47.24	25.59	1025
	18	16.85	17.40	15.94	36.22	53.15	28.35	1369
	20	18.78	19.25	17.64	38.58	59.06	30.71	1795
	24	22.60	23.27	21.26	43.31	70.87	36.22	2901

[inch]		Øc min.	Øc max.	Øi	H2	L	W	Weight [lbs]
ASME 600	4	3.82	4.13	3.78	20.47	15.75	12.99	309
	6	5.75	6.22	5.67	22.64	17.72	14.76	547
	8	7.60	8.07	7.52	24.80	23.62	16.73	829
	10	9.53	10.16	9.41	27.95	29.53	20.08	1208
	12	11.38	12.13	11.18	30.71	35.43	22.05	1846
	14	12.48	13.27	12.28	32.09	41.34	24.02	910
	16	14.29	15.28	14.09	34.65	47.24	27.17	1301
	18	16.10	17.13	15.94	36.61	53.15	29.13	1687
	20	17.91	19.02	17.64	39.37	59.06	32.28	2211
	24	21.54	22.87	21.26	43.31	70.87	37.01	3435

Measurements and weights are for reference only and might deviate depending on schedule size.

Dimensions and weights (metric)

[mm]		Øc min.	Øc max.	Øi	H2	L	W	Weight [kg]
ASME 900 [mm]	100	97	103	96	520	400	330	152
	150	146	155	144	590	450	390	273
	200	193	203	191	660	600	470	431
	250	242	255	239	730	750	550	605
	300	289	304	284	810	1200	610	941
	350	317	334	312	840	1050	650	519
	400	363	381	358	890	1200	710	671
	450	409	429	405	960	1350	790	926
	500	455	478	448	1020	1500	860	1190
	600	547	575	540	1160	1800	1050	2128



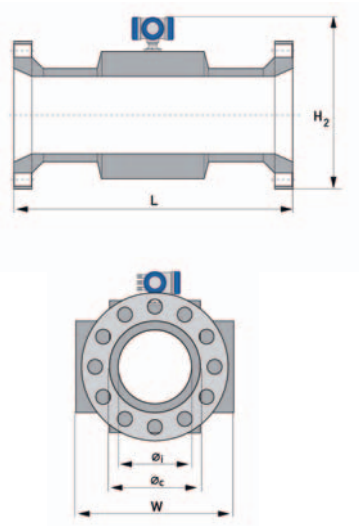
[mm]		Øc min.	Øc max.	Øi	H2	L	W	Weight [kg]
ASME 1500	100	96	101	96	530	400	340	181
	150	138	144	138	600	600	400	325
	200	180	191	180	660	800	480	485
	250	227	244	227	760	1000	580	795
	300	269	294	269	860	1200	660	1240
	350	295	325	295	940	1400	750	1585
	400	339	375	339	1000	1600	820	2050
	450	381	425	381	1070	1800	910	tba
	500	425	475	425	1130	2000	980	tba
	600	509	575	509	1270	2400	1160	tba

[mm]		Øc min.	Øc max.	Øi	H2	L	W	Weight [kg]
ASME 2500	150	130	144	130	681	750	490	552
	200	170	191	170	729	1000	550	825
	250	213	244	213	844	1250	670	1505
	300	253	294	253	947	1500	750	2250

Measurements and weights are for reference only and might deviate depending on schedule size.

Dimensions and weights (imperial)

[inch]		Øc min.	Øc max.	Øi	H2	L	W	Weight [lbs]
ASME 900 [inch]	4	3.82	4.06	3.78	20.47	15.75	12.99	335
	6	5.75	6.10	5.67	23.23	17.72	15.35	602
	8	7.60	7.99	7.52	25.98	23.62	18.50	950
	10	9.53	10.04	9.41	28.74	29.53	21.65	1334
	12	11.38	11.97	11.18	31.89	47.24	24.02	2075
	14	12.48	13.15	12.28	33.07	41.34	25.59	1144
	16	14.29	15.00	14.09	35.04	47.24	27.95	1479
	18	16.10	16.89	15.94	37.80	53.15	31.10	2041
	20	17.91	18.82	17.64	40.16	59.06	33.86	2623
	24	21.54	22.64	21.26	45.67	70.87	41.34	4691



[inch]		Øc min.	Øc max.	Øi	H2	L	W	Weight [lbs]
ASME 1500	4	3.77	3.98	3.77	20.87	15.75	13.39	399
	6	5.41	5.67	5.41	23.62	23.62	15.75	717
	8	7.07	7.50	7.07	25.97	31.50	18.90	1069
	10	8.92	9.60	8.92	29.92	39.37	22.83	1753
	12	10.58	11.56	10.58	33.86	47.24	25.98	2734
	14	11.63	12.80	11.63	37.01	55.12	29.53	3495
	16	13.35	14.76	13.35	39.37	62.99	32.28	4520
	18	15.01	16.73	15.01	42.13	70.87	35.83	tba
	20	16.73	18.70	16.73	44.49	78.74	38.58	tba
	24	20.06	22.64	20.06	50.00	94.49	45.67	tba

[inch]		Øc min.	Øc max.	Øi	H2	L	W	Weight [lbs]
ASME 2500	6	5.11	5.67	5.11	26.80	29.53	19.29	1217
	8	6.71	7.50	6.71	28.68	39.37	21.65	1819
	10	8.37	9.60	8.37	33.21	49.21	26.38	3318
	12	9.97	11.56	9.97	37.27	59.06	29.53	4961

Measurements and weights are for reference only and might deviate depending on schedule size.

Flow Table

Size [mm]	Size [inch]	Qmin	Qmax
		[m3/h]	
100	4	25	1,000
150	6	45	2,300
200	8	75	4,100
250	10	110	6,200
300	12	140	8,200
350	14	170	9,700
400	16	210	11,700
450	18	240	13,900
500	20	260	15,700
600	24	285	21,400
700	28	450	30,000
750	30	650	44,000
800	32	800	55,000
900	36	880	58,000
950	38	1,200	75,000
1000	40	1,600	94,000
1050	42	2,100	117,000
1200	48	1,200	75,000
1400	56	1,600	94,000
1600	64	2,100	117,000

Qt = 0.1*Qmax
For piping > Sch 80 values may vary slightly. Calculations shall be used as an indication.
Please ask KROHNE Engineering for detailed sizing.

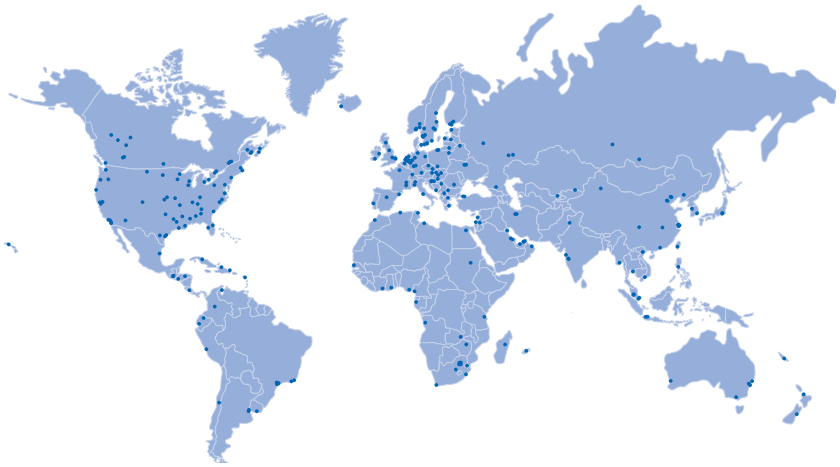
KROHNE Oil & Gas
Overview

Systems

- Flowmeters for custody transfer
- Liquid flowmetering systems
- Gas flowmetering systems
- Wet gas metering systems
- Provers & master meters
- Flow computing, supervisory software & analyzer management
- Calibration systems
- Tank inventory & management systems
- Analyzer houses and shelters
- Loading & off-loading systems
- Leak detection and localisation systems
- Revamps & upgrades
- Testing, installation, commissioning, service training

Products

- Gas ultrasonic flowmeters for custody transfer
- Liquid ultrasonic flowmeters for custody transfer
- Mass flowmeters for custody transfer
- Venturis for wet gas metering
- Prover sphere detectors
- Flow computers
- Supervisory systems
- Meter validation software packages
- Electromagnetic flowmeters
- Level measuring instruments
- Variable area flowmeters
- Temperature measuring instruments
- Pressure measuring instruments
- Analyzers
- Vortex flowmeters
- Flow controllers



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