ALTOSONIC III

Technical Datasheet

Cost effective 3-beam ultrasonic flowmeter for custody transfer of liquid hydrocarbons

- Excellent long-term stability and high reliabilty
- Eliminates maintenance
- Non-intrusive, no moving parts; no pressure loss, no wear
- Compliant with OIML R-117 and API

KROHNE

3-Beam ultrasonic flowmeter

KROHNE's ALTOSONIC III offers decisive advantage over conventional, mechanical flowmeters in custody transfer metering applications. The absence of obstructions in the pipe and moving parts results in no wear and no pressure loss. The benefits this brings are maintenance free operation and simplified meter run configuration (smaller pump capacity, no filters required). This results in considerable cost savings in both capital expenditure (CAPEX) and operation expenditure (OPEX).

Highlights

- Cost effective alternative for conventional flowmeters like turbines or PD meters
- Large dynamic range
- Light weight and compact to build-in
- Bi-directional flow measurement
- Easy integration with any approved (existing) flow computer
- Integrated diagnostics

Industries

- Oil & Gas
- Refineries
- Petrochemical

Applications

- Refined product pipeline measurement
- Rail wagon and truck loading
- Terminal on- and off-loading
- Pipeline leak detection
- Custody transfer
- Fiscal metering
- Duty metering
- Allocation metering

ALTOSONIC: The choice for custody transfer

ALTOSONIC flowmeters are the result of 30 years of experience in ultrasonic technology. They are specially designed for custody transfer metering of hydrocarbon liquids and gasses.

Advantage of ultrasonic metering:

Non-intrusive, no blockage, no moving parts and therefore:

- No wear and tear, no periodic maintenance
- No pressure loss
- No strainers needed

All meters have complete diagnostics as standard

❶ ALTOSONIC V: 5-Beam custody transfer flowmeter for crude oil and oil products. The ALTOSONIC V is the only true multiproduct ultrasonic flowmeter in the market.
The first to enter the market, it has the longest experience and the widest installed base.

Superior performance

- Truly viscosity independent
- High dynamic range
- Chosen as master meter

Superior reliability

- Multiple beam ensure redundancy and validation of results
- Extensive diagnostics capabilities
- Consistent long term reliability

❷ ALTOSONIC IV: 4-Beam custody transfer flowmeter for gases.

- Compact and robust construction
- Fully encased cabling
- Miniaturised titanium transducers
- Low power consumption

❸ ALTOSONIC III: 3-Beam ultrasonic flowmeter. The economic solution for light liquid hydrocarbons.

- The successor to the standard turbine for single products

Technical data

ALTOSONIC III Ultrasonic flowmeter
ALTOSONIC III is available in a separate and in a compact version and consists of a UFS III ultrasonic flow sensor combined with a UFC III ultrasonic flow converter to make a complete flowmeter. Both the sensor and converter are approved for use in hazardous areas.

Versions

ALTOSONIC III C (compact)	UFC III C flow converter directly mounted on UFS III C flow sensor
ALTOSONIC III F (separate)	UFC III F flow converter remotely mounted from UFS III F flow sensor

Performance

Measurement functionality	Standard actual volume
Measuring range	v = 0 to 20 m/s (0 ft/s to 66 ft/s)
Linearity	< ± 0.15% of measured value (under reference conditions)
Repeatability	< ± 0.05%
Uncertainty	< ± 0.027% conforms to API standard
Viscosity	Up to 10 cSt for standard operation. For higher viscosities contact KROHNE
Zero stability	< 1 mm/s
Process conditions	Maximum solid particle content < 5% (by volume)
	Maximum gas content < 2% (by volume)

Approvals

Custody transfer	OIML R-117 Class 0.3
	ANSI/API MPMS 5.8-2004
	API MPMS Chapter 5 Section 8, Measurement of Liquid Hydrocarbons by
	Ultrasonic Flowmeters Using Transit Time Technology
EEx zone 1 (ATEX):	
- ALTOSONIC III/C-EEx	II 2 G EEx d [ib] IIC T6 ...T3 or II 2 G EEx de [ib] II C T6 ... T3
- UFS-III/F-EEx	II 2 G EEx ib IIC T6 ...T3
- UFC-III/F-EEx	II 2 G EEx d [ib] IIC T6
FM	FM Class I, Div. 1 & 2, Groups B, C & D
	FM Class II, Div. 1, Groups E, F & G and Div. 2, Groups F & G
	FM Class III, Div. 1 & 2
CSA	CSA Class I, Div. 1 & 2, Groups A, B, C & D
	CSA Class II, Div. 1 & 2, Groups E, F & G
	CSA Class III, Div. 1

Temperature range

	Process [°C]		Ambient [°C]		Process [°F]		Ambient [°F]	
	min.	max.	min.	max.	min.	max.	min.	max.
Compact	-25	140	-40	70	-13	284	-40	158
Separate	-25	180	-40	70	-13	356	-40	158
Special version	-170	500	-40	70	-274	932	-40	158

Ultrasonic flow sensor UFS III																
	ASME B16.5												ASME B16.47, A			
Nominal diameter [inch]	2	3	4	6	8	10	12	14	16	18	20	24	28	32	35	40

Pressure class

150 lbs RF	■
300 lbs RF	■
600 lbs RF/RTJ	■
900 lbs RF/RTJ	■
	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

UFS III C (compact)	UFC III C flow converter directly mounted on UFS III C flow sensor
UFS III F (separate)	UFC III F flow converter remotely mounted from UFS III F flow sensor

Materials

Flanges, stainless steel AISI 316 L (1.4404)	■
Measuring tube, stainless steel AISI 316 L (1.4404)	■
Housing, stainless steel AISI 316 L (1.4404)	■
Connection box, stainless steel AISI 316 L (1.4408)	■

Coating

Blasted	■
Offshore paint system, silver	■
	other finishes on request

Calibration

6 points, 1 point 3 repeats, with water	■
According to OIML: 6 points, each point 3 repeats, with water	■

Calibration options

Witnessed calibration	■
RVA certificate	■
Calibration with hydrocarbon	■

Protection category

IP67 / IP66 eq. NEMA 4/4X/6 to IEC 529	■

Sensor cable connection

M20 x 1,5	■
1/2" NPT	■
PF 1/2	■

Sensor cable length

5 m (15 ft)	■
10 / 15 / 20 / 25 / 30 m (30 / 45 / 60 / 75 / 90 ft)	■
	For separate versions only, cable type MR06, outer diameter = 11 mm / 0,43"

■ standard ■ optional □ on request

Installation	
General	For specific information please consult the operating and installation instructions or contact KROHNE.
Position	The flowmeter can be installed in a horizontal or vertical position. In a horizontal pipeline ensure that the acoustic channels are always in the horizontal plane.
Completely filled flow sensor	Install the UFS III ultrasonic flow sensor at a location where it will be completely filled under all circumstances, including at zero flow velocity.
Flow conditioning	Standard a 10D inlet section with ISO tube bundle flow conditioner must be installed upstream of the flowmeter. After the meter a straight outlet section of 5 D should be installed.
Zero checking	Zero setting is not required with ultrasonic flowmeters. For zero checking it is advised to install shutoff valves before or after the flow sensor.
Cavitation	At operation sufficient backpressure is required to prevent cavitation

Inlet flow conditioner and outlet section																
The flow sensor is delivered standard with a 10 D inlet flow conditioner. For optimal perfomance the flow sensor and flow conditioner are calibrated together. The flow sensor has to be installed with a staight outlet section with a minimum length of 5D.																
	ASME B16.5												**ASME B16.47, A**			
Nominal diameter [inch]	2	3	4	6	8	10	12	14	16	18	20	24	28	32	36	40

Pressure class

150 lbs RF	■
300 lbs RF	■
600 lbs RF/RTJ	■ (2–12)
900 lbs RF/RTJ	■ (2–12)
	Pressure rating according to ASME B16.5 Group 2.3 materials. For a detailed overview, see the dimensions and weights section of this datasheet.

Materials

Flange / Tube:	
Carbon steel ASTM A105 / Carbon steel ASTM A106	■
Stainless steel AISI 316 L (1.4404)	■

Finish

Silver	■
Offshore paint system, silver	■

■ standard ■ optional □ on request

The UFC III flow converter is fully digital. Measured values are obtained using DSP (Digital Signal Processing) to ensure accurate and highly repeatable measurements.

Ultrasonic flow converter UFC III

Versions

UFC III C (compact)	UFC III C flow converter directly mounted on UFS III C flow sensor
UFC III F (separate)	UFC III F flow converter remotely mounted from UFS III F flow sensor

Materials

Converter housing	Stainless steel AISI 316 L (1.4408)

Finish

Blasted	Standard
Offshore paint system, silver	Optional
	other paint systems on request

Protection category

IP67 / IP66 eq. NEMA 4/4X/6 (to IEC 529)	Standard

Overall functionality

Main features	Actual volume flow rate (continuous measurement) in m3, liters, US gallons, Bbl or user defined volume unit per hour, minute, second, or user defined time unit
	Flow direction (forward or reverse)
	Velocity of sound in m/s or ft/s, per acoustic channel
	Signal attenuation (in dB), per acoustic channel
	Self diagnostics, e.g. velocity of sound within range, reliability of received acoustic signal, flow sensor not filled
	Errors (flashing display and error code)

Local display

Operation	Cover removed: All display operations, including changing of settings and parameters can be done by using the push buttons. Cover in place: Measured values and (error) messages can be viewed. Resetting of errors is still possible using a hand-held bar mag
Units	Actual flowrate in liter/s, m3/h, US gall/min or user-defined unit (e.g. US million gall/day).
3-field LCD	The converter has a backlit local display with 3 push buttons. 1st line 8 character 7 segment alphanumeric display and symbols for key acknowledgement, 2nd line 10 character, 14 segment text display, 3rd line 5 markers to identify display in measuring mode

Languages

English (GB)	Standard
English (US)	Optional
German	Optional
French	Optional

Galvanic isolation

All inputs and outputs	Galvanically isolated from the power supply, but not from each other

Time constant

Time constant	0.025...99 seconds (programmable in increments of 0.01; 0.1 and 1.0 seconds)

Low-flow cutoff

Cutoff active value	1...19% programmable in increments of 1%
Cutoff de-active value	2...20%

Power supply

Power consumption	approx. 10 VA / 10 W

Ultrasonic flow converter UFC III	
Mains supply	100...240 V AC (48...63 Hz) +10% / -15% (Standard)
Low voltage supply	24 V (AC or DC), AC: -10% / +15%, DC: 18...35 V (Optional)

Cable connection

M20 x 1,5	Standard
1/2" NPT	Optional
PF 1/2	Optional

Outputs

Current output

Function	Actual volume flow rate (continuous measurement)
	Flow direction indication (forward or reverse)
	Velocity of Sound (VOS)
	Transducer signal amplification
Settings	Q = 0%: 0...16 mA programmable in increments of 1 mA
	Q = 100%: 4...20 mA
Connection	Passive: external voltage (unmapped Character \xf020)18...24 V DC, load ≤ 680 Ohm (current limit 22 mA)

Pulse output

Function	Actual volume flow rate (continuous measurement)
	Flow direction indication (forward or reverse)
	Velocity of Sound (VOS)
	Transducer signal amplification
	Dual pulse output, 90° or 180° phase shifted from each other
	Pulse per volumetric unit (m3, liters, US gallons, Bbl or user defined volume unit)
Settings	Pulse/unit (max. 1500Hz) (example: 1000 pulses/barrel)
	Pulse duty cycle: 50%
Connection	Passive mode connection to electronic counter (EC). External voltage ≤ 19...32 V DC / I ≤ 150 mA

Status output

Function	Actual volume flow rate (continuous measurement)
	Flow direction indication (forward or reverse)
	Velocity of Sound (VOS)
	Transducer signal amplification
	Diagnostics alarm path errors, all errors
	Flow direction indication (forward or reverse)
	Alarm trip point (high and low) based on actual volume flow rate
Settings	On or Off
Connection	Passive mode connection to electronic input. External voltage ≤ 19...32 V DC / I ≤ 150 mA

Sizing

Choosing the correct size is very simple due to the extremely wide range of possible velocities. Typical flowrates for 1 m/s (3,3 ft/s) and 10 m/s (33 ft/s) are specified in the attached table. Pending on the application the ALTOSONIC III has a virtually unlimited flow velocity range.						
	1 m/s	10 m/s	1 m/s	10 m/s	1 m/s	10 m/s
Nominal diameter	3.3 ft/s	30 ft/s	3.3 ft/s	30 ft/s	3.3 ft/s	30 ft/s
	[m3/h]	[m3/h]	[GPM]	[GPM]	[BBL/h]	[BBL/h]

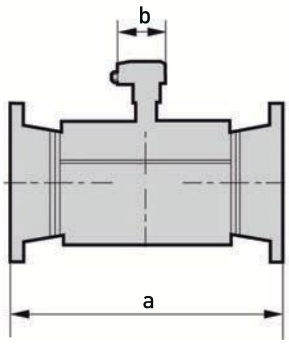
sizing

2"	7	73	32	321	46	459
3"	16	164	72	723	103	1033
4"	29	292	129	1285	184	1836
6"	66	657	289	2891	413	4132
8"	117	1167	514	5140	735	7345
10"	182	1824	803	8032	1148	11477
12"	263	2627	1157	11565	1653	16527
14"	358	3575	1574	15742	2249	22495
16"	467	4670	2056	20561	2938	29381
18"	591	5910	2602	26022	3719	37186
20"	730	7297	3212	32126	4591	45908
24"	1051	10507	4626	46261	6611	66108
28"	1430	14301	6297	62967	8998	89980
32"	1868	18679	8224	82243	11752	117525
36"	2364	23641	10408	104088	14874	148742
40"	2919	29186	12850	128504	18363	183632

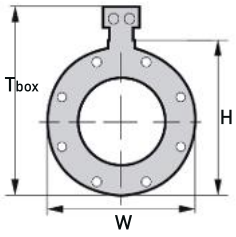
Dimensions and weights

b = 98 mm / 3,85"
c = 206 mm / 8,12"

ALTOSONIC III F Frontview



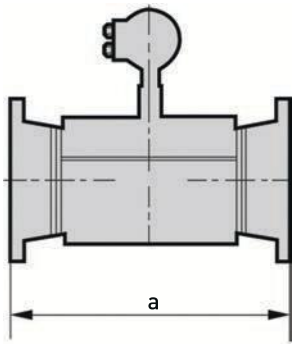
ALTOSONIC III F Sideview



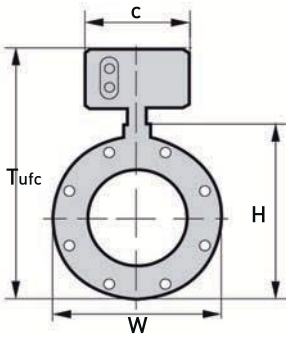
Nominal diameter	Dimensions [mm]				Approx. weight
ASME 150 lbs	a	Di	H	W	[kg]*
2"	290	49,2	180	150	14
3"	330	73,7	215	200	26
4"	380	97,2	247	220	33
6"	440	154,1	301	270	45
8"	600	202,7	358	370	72
10"	640	254,4	417	420	105
12"	710	304,7	480	470	145
14"	770	336,5	522	500	179
16"	830	387,3	579	550	221
18"	900	438,1	623	600	256
20"	950	484	680	650	335
24"	1080	579,6	788	750	500
28"	1140	691,2	896	870	577
32"	1260	792,8	1014	960	786
36"	1400	884,4	1118	1060	1136
40"	1500	986	1230	1150	1359
	Inner diameters based on schedule standard.				
	*Approx. weight of flow sensor in separate (F) version.				
	For compact (C) version: add 6.4 kg (14.1 lbs).				
	Weight converter incl. wallmount separate (F) version: 14 kg (30.9 lbs).				

Nominal diameter	Dimensions [inch]				Approx. weight
ASME 150 lbs	a	Di	H	W	[lbs]*
2"	11,42	1,94	7,09	5,91	31
3"	12,99	2,9	8,45	7,87	57
4"	14,96	3,83	9,74	8,66	73
6"	17,32	6,07	11,84	10,63	99
8"	23,62	7,98	14,09	14,57	159
10"	25,2	10,02	16,41	16,54	231
12"	27,95	12	18,91	18,5	320
14"	30,31	13,25	20,53	19,69	395
16"	32,68	15,25	22,78	21,65	487
18"	35,43	17,25	24,53	23,62	564
20"	37,4	19,06	26,78	25,59	739
24"	42,52	22,82	31,03	29,53	1102
28"	44,88	27,21	35,28	34,25	1272
32"	49,61	31,21	39,91	37,8	1733
36"	55,12	34,82	44,03	41,73	2504
40"	59,06	38,82	48,41	45,28	2996
	Inner diameters based on schedule standard.				
	*Approx. weight of flow sensor in separate (F) version.				
	For compact (C) version: add 6.4 kg (14.1 lbs).				
	Weight converter incl. wallmount separate (F) version: 14 kg (30.9 lbs).				

ALTOSONIC III C Frontview



ALTOSONIC III C Sideview



T_{box} = H + 71 mm / 2,8"
T_{ufc} = H + 165 mm / 6,5"

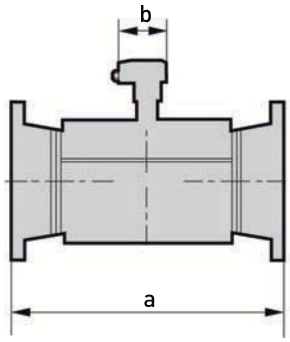
Nominal diameter	Dimensions [mm]					
ASME 150 lbs	10 D inlet spoolpiece			5 D outlet spoolpiece		
	a	Di	weight [kg]	a	Di	Approx. weight [kg]
2"	508	54,8	8	254	54,8	6
3"	762	77,9	20	381	77,9	13
4"	1016	104,7	32	508	104,7	18
6"	1524	158,7	65	762	158,7	31
8"	2032	206,3	125	1016	206,3	60
10"	2540	260,2	190	1270	260,2	89
12"	3048	309,6	325	1524	309,6	141
14"	3556	339,8	490	1778	339,8	197
16"	4064	390,6	560	2032	390,6	255
18"	4572	441,4	700	2286	441,4	307
20"	5080	489	1080	2540	489	431
24"	6096	590,6	1425	3048	590,6	615
28"	7112	695,4	1725	3556	695,4	766
32"	8128	797	2400	4064	797	1054
36"	9144	898,6	3055	4572	898,6	1338
40"	10160	996	4235	5080	996	1895

Nominal diameter	Dimensions [inch]					
ASME 150 lbs	10 D inlet spoolpiece			5 D outlet spoolpiece		
	a	Di	weight [lbs]	a	Di	Approx. weight [lbs]
2"	20	2,16	17,6	10	2,16	13
3"	30	3,07	44,1	15	3,07	29
4"	40	4,12	70,5	20	4,12	40
6"	60	6,25	143,3	30	6,25	68
8"	80	8,12	275,6	40	8,12	132
10"	100	10,24	418,9	50	10,24	196
12"	120	12,19	716,5	60	12,19	311
14"	140	13,38	1080,3	70	13,38	434
16"	160	15,38	1234,6	80	15,38	562
18"	180	17,38	1543,2	90	17,38	677
20"	200	19,25	2381	100	19,25	950
24"	240	23,25	3141,6	120	23,25	1356
28"	280	27,38	3803	140	27,38	1689
32"	320	31,38	5291,1	160	31,38	2324
36"	360	35,38	6735,2	180	35,38	2950
40"	400	39,21	9336,6	200	39,21	4178

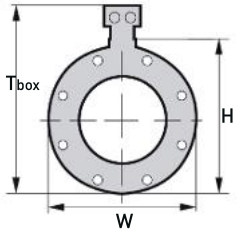
b = 98 mm / 3,85"
c = 206 mm / 8,12"

Nominal diameter	Dimensions [mm]				Approx. weight [kg]*
ASME 300 lbs	a	Di	H	W	
2"	300	49,2	185	150	15
3"	350	73,7	224	200	30
4"	400	97,2	260	220	42
6"	470	146,4	320	270	69
8"	620	193,7	377	370	115
10"	670	247,6	436	420	156
12"	750	298,4	499	470	213
14"	810	325,6	547	500	290
16"	870	376,4	604	550	358
18"	940	417,2	661	600	482
20"	1000	468	718	650	578
24"	1110	569,6	839	750	811
28"	1300	661,2	950	870	1223
32"	1440	752,8	1058	960	1714
36"	1580	854,4	1169	1060	2131
40"	1580	946	1204	1150	2100
	Inner diameters based on schedule standard.				
	*Approx. weight of flow sensor in separate (F) version.				
	For compact (C) version: add 6.4 kg (14.1 lbs).				
	Weight converter incl. wallmount separate (F) version: 14 kg (30.9 lbs).				

ALTOSONIC III F Frontview

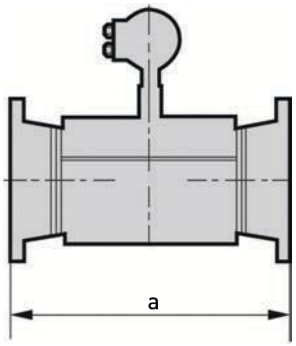


ALTOSONIC III F Sideview

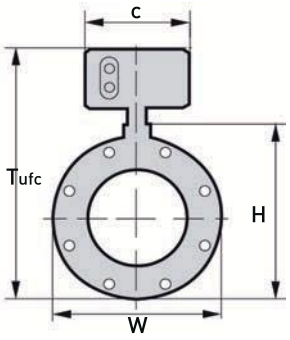


Nominal diameter	Dimensions [inch]				Approx. weight [lbs]*
ASME 300 lbs	a	Di	H	W	
2"	11,82	1,94	7,28	5,91	33
3"	13,78	2,9	8,83	7,87	66
4"	15,75	3,83	10,24	8,66	93
6"	18,5	5,76	12,59	10,63	152
8"	24,41	7,63	14,84	14,57	254
10"	26,38	9,75	17,16	16,54	344
12"	29,53	11,75	19,66	18,5	470
14"	31,89	12,82	21,53	19,69	639
16"	34,25	14,82	23,78	21,65	789
18"	37,01	16,43	26,03	23,62	1063
20"	39,37	18,43	28,28	25,59	1274
24"	43,7	22,43	33,03	29,53	1788
28"	51,18	26,03	37,41	34,25	2696
32"	56,69	29,64	41,66	37,8	3779
36"	62,2	33,64	46,03	41,73	4698
40"	62,2	37,24	47,41	45,28	4630
	Inner diameters based on schedule standard.				
	*Approx. weight of flow sensor in separate (F) version.				
	For compact (C) version: add 6.4 kg (14.1 lbs).				
	Weight converter incl. wallmount separate (F) version: 14 kg (30.9 lbs).				

ALTOSONIC III C Frontview



ALTOSONIC III C Sideview



T_{box} = H + 71 mm / 2,8"
T_{ufc} = H + 165 mm / 6,5"

Nominal size	Dimensions [mm]					
ASME 300 lbs	10 D inlet spoolpiece			5 D outlet spoolpiece		
	a	Di	weight [kg]	a	Di	weight [kg]
2"	508	53,94	10	254	53,94	7
3"	762	77,9	24	381	77,9	16
4"	1016	104,7	40	508	104,7	26
6"	1524	154,1	95	762	154,1	54
8"	2032	206,4	150	1016	206,4	84
10"	2540	257,4	250	1270	257,4	137
12"	3048	307	390	1524	307	204
14"	3556	339,8	500	1778	339,8	270
16"	4064	387,3	710	2032	387,3	376
18"	4572	434,9	1000	2286	434,9	509
20"	5080	482,6	1280	2540	482,6	672
24"	6096	581,1	2065	3048	581,1	1047
28"	7112	679,4	3023	3556	679,4	1543
32"	8128	781	3995	4064	781	2035
36"	9144	876,3	5635	4572	876,3	2877
40"	10160	976	6665	5080	976	3103

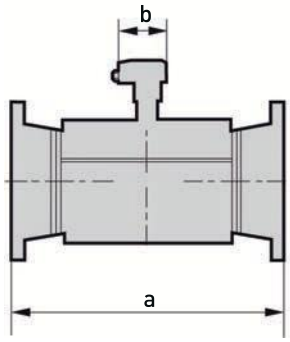
Nominal size	Dimensions [inch]					
ASME 300 lbs	10 D inlet spoolpiece			5 D outlet spoolpiece		
	a	Di	weight [lbs]	a	Di	weight [lbs]
2"	20	2,12	22	10	2,12	15
3"	30	3,07	52,9	15	3,07	35
4"	40	4,12	88,2	20	4,12	57
6"	60	6,07	209,4	30	6,07	119
8"	80	8,13	330,7	40	8,13	185
10"	100	10,13	551,2	50	10,13	302
12"	120	12,09	859,8	60	12,09	450
14"	140	13,38	1102,3	70	13,38	595
16"	160	15,25	1565,3	80	15,25	829
18"	180	17,12	2204,6	90	17,12	1122
20"	200	19	2821,9	100	19	1482
24"	240	22,88	4552,6	120	22,88	2308
28"	280	26,75	6664,6	140	26,75	3402
32"	320	30,75	8807,5	160	30,75	4486
36"	360	34,5	12423,1	180	34,5	6343
40"	400	38,43	14693,9	200	38,43	6841

b = 98 mm / 3,85"
c = 206 mm / 8,12"

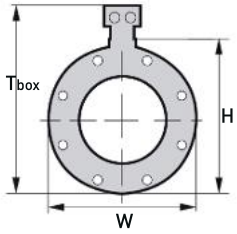
Nominal diameter	Dimensions [mm]				Approx. weight [kg]*
ASME 600 lbs	a	Di	h	w	
2"	320	49,2	185	150	17
3"	370	73,7	224	200	33
4"	440	97,2	270	220	53
6"	530	131,8	339	270	111
8"	660	189,1	396	370	165
10"	770	233	468	420	272
12"	830	273,8	518	470	359
14"	880	305,6	556	500	423
16"	960	346,4	623	550	603
	Inner diameters based on schedule standard.				
	*Approx. weight of flow sensor in separate (F) version.				
	For compact (C) version: add 6.4 kg (14.1 lbs).				
	Weight converter incl. wallmount separate (F) version: 14 kg (30.9 lbs).				

Nominal diameter	Dimensions [inch]				Approx. weight [lbs]*
ASME 600 lbs	a	Di	H	W	
2"	12,6	1,94	7,28	5,91	37
3"	14,57	2,9	8,83	7,87	73
4"	17,32	3,83	10,62	8,66	117
6"	20,87	5,19	13,34	10,63	245
8"	25,98	7,44	15,59	14,57	364
10"	30,31	9,17	18,41	16,54	600
12"	32,68	10,78	20,41	18,5	791
14"	34,65	12,03	21,91	19,69	933
16"	37,8	13,64	24,53	21,65	1329
	Inner diameters based on schedule standard.				
	*Approx. weight of flow sensor in separate (F) version.				
	For compact (C) version: add 6.4 kg (14.1 lbs).				
	Weight converter incl. wallmount separate (F) version: 14 kg (30.9 lbs).				

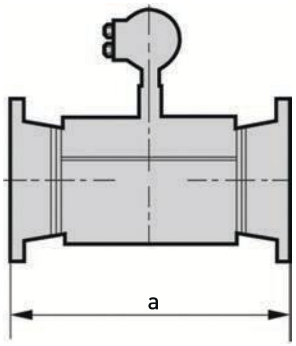
ALTOSONIC III F Frontview



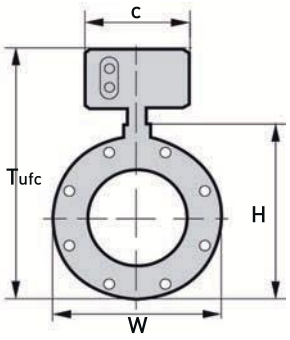
ALTOSONIC III F Sideview



ALTOSONIC III C Frontview



ALTOSONIC III C Sideview



T_{box} = H + 71 mm / 2,8"
T_{ufc} = H + 165 mm / 6,5"

Nominal diameter	Dimensions [mm]					
ASME 600 lbs	10 D inlet spoolpiece			5 D outlet spoolpiece		
	a	Di	weight [kg]	a	Di	weight [kg]
2"	508	52,5	11	254	52,5	9
3"	762	77,9	26	381	77,9	19
4"	1016	102,3	55	508	102,3	38
6"	1524	146,4	140	762	146,4	92
8"	2032	193,7	250	1016	193,7	154
10"	2540	242,8	445	1270	242,8	268
12"	3048	295,3	570	1524	295,3	339
14"	3556	325,4	760	1778	325,4	432
16"	4064	373,1	1105	2032	373,1	618

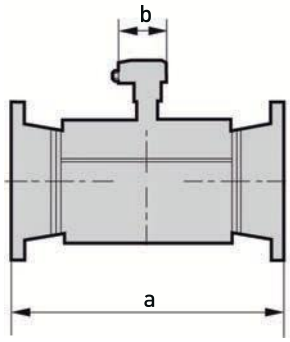
Nominal diameter	Dimensions [inch]					
ASME 600 lbs	10 D inlet spoolpiece			5 D outlet spoolpiece		
	a	Di	weight [lbs]	a	Di	weight [lbs]
2"	20	2,07	24,3	10	2,07	20
3"	30	3,07	57,3	15	3,07	42
4"	40	4,03	121,3	20	4,03	84
6"	60	5,76	308,6	30	5,76	203
8"	80	7,63	551,2	40	7,63	340
10"	100	9,56	981,1	50	9,56	591
12"	120	11,62	1256,6	60	11,62	747
14"	140	12,81	1675,5	70	12,81	952
16"	160	14,69	2436,1	80	14,69	1362

b = 98 mm / 3,85"
c = 206 mm / 8,12"

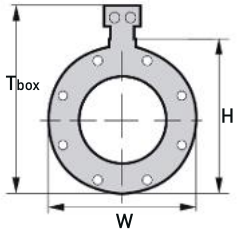
Nominal diameter	Dimensions [mm]				Approx. weight [kg]*
ASME 900 lbs	a	Di	H	W	
2"	380	49,2	210	150	27
3"	420	66,7	240	200	46
4"	470	87,3	279	220	69
6"	570	131,8	352	270	138
8"	750	169,1	422	370	256
10"	840	213	487	420	385
12"	920	263,8	544	470	507
	Inner diameters based on schedule standard.				
	*Approx. weight of flow sensor in separate (F) version.				
	For compact (C) version: add 6.4 kg (14.1 lbs).				
	Weight converter incl. wallmount separate (F) version: 14 kg (30.9 lbs).				

Nominal diameter	Dimensions [inch]				Approx. weight [lbs]*
ASME 900 lbs	a	Di	H	W	
2"	14,96	1,94	8,27	5,91	60
3"	16,54	2,63	9,45	7,87	101
4"	18,5	3,44	10,99	8,66	152
6"	22,44	5,19	13,84	10,63	304
8"	29,53	6,66	16,59	14,57	564
10"	33,07	8,39	19,15	16,54	849
12"	36,22	10,39	21,4	18,5	1118
	Inner diameters based on schedule standard.				
	*Approx. weight of flow sensor in separate (F) version.				
	For compact (C) version: add 6.4 kg (14.1 lbs).				
	Weight converter incl. wallmount separate (F) version: 14 kg (30.9 lbs).				

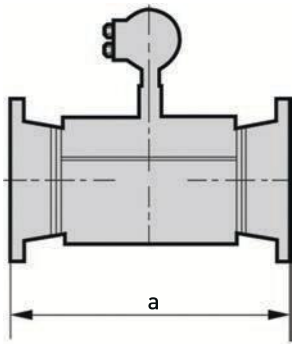
ALTOSONIC III F Frontview



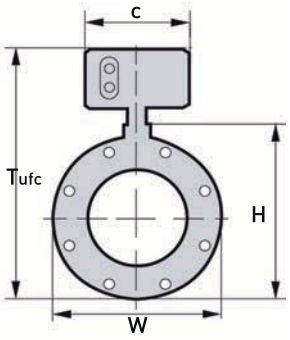
ALTOSONIC III F Sideview



ALTOSONIC III C Frontview



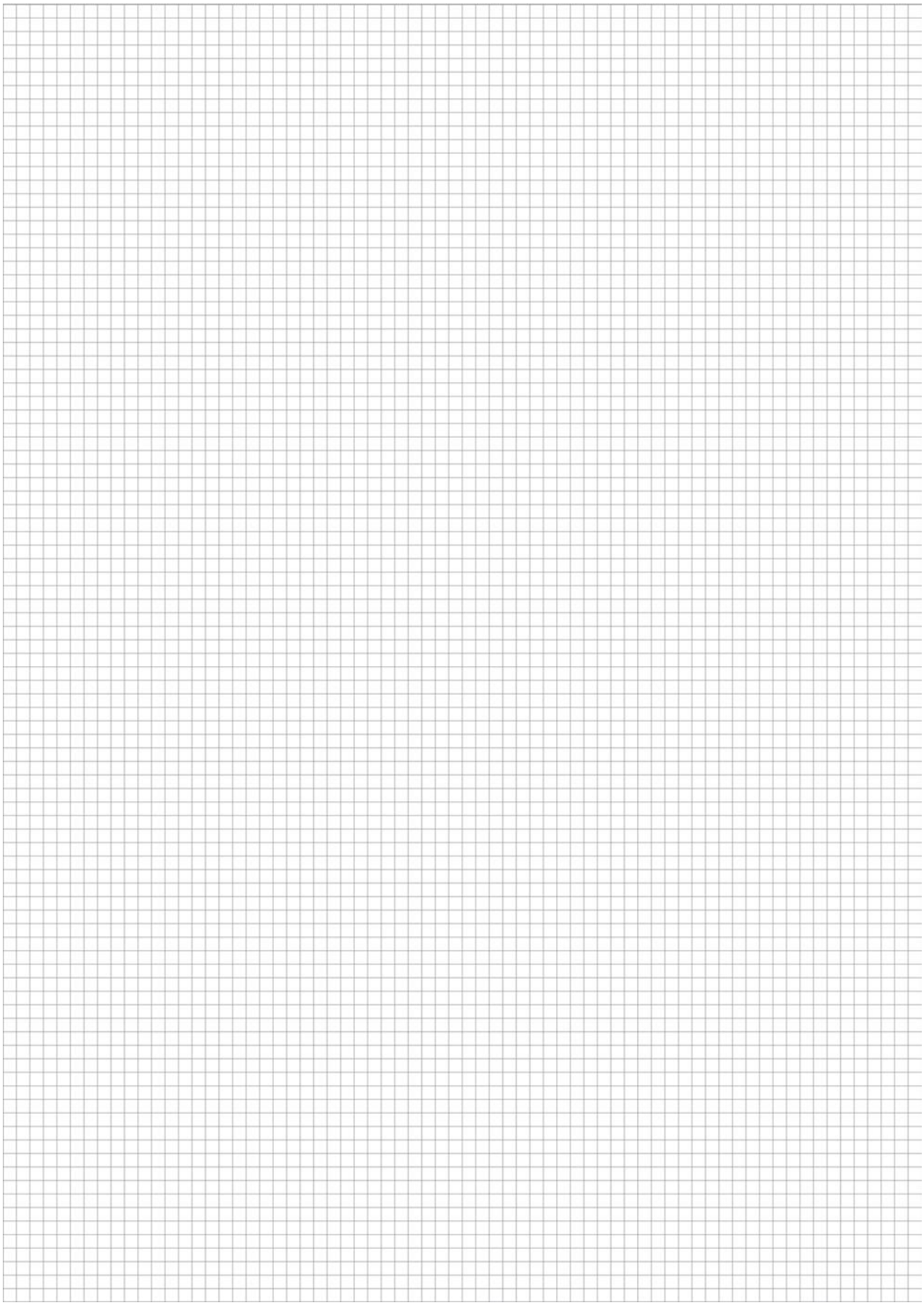
ALTOSONIC III C Sideview

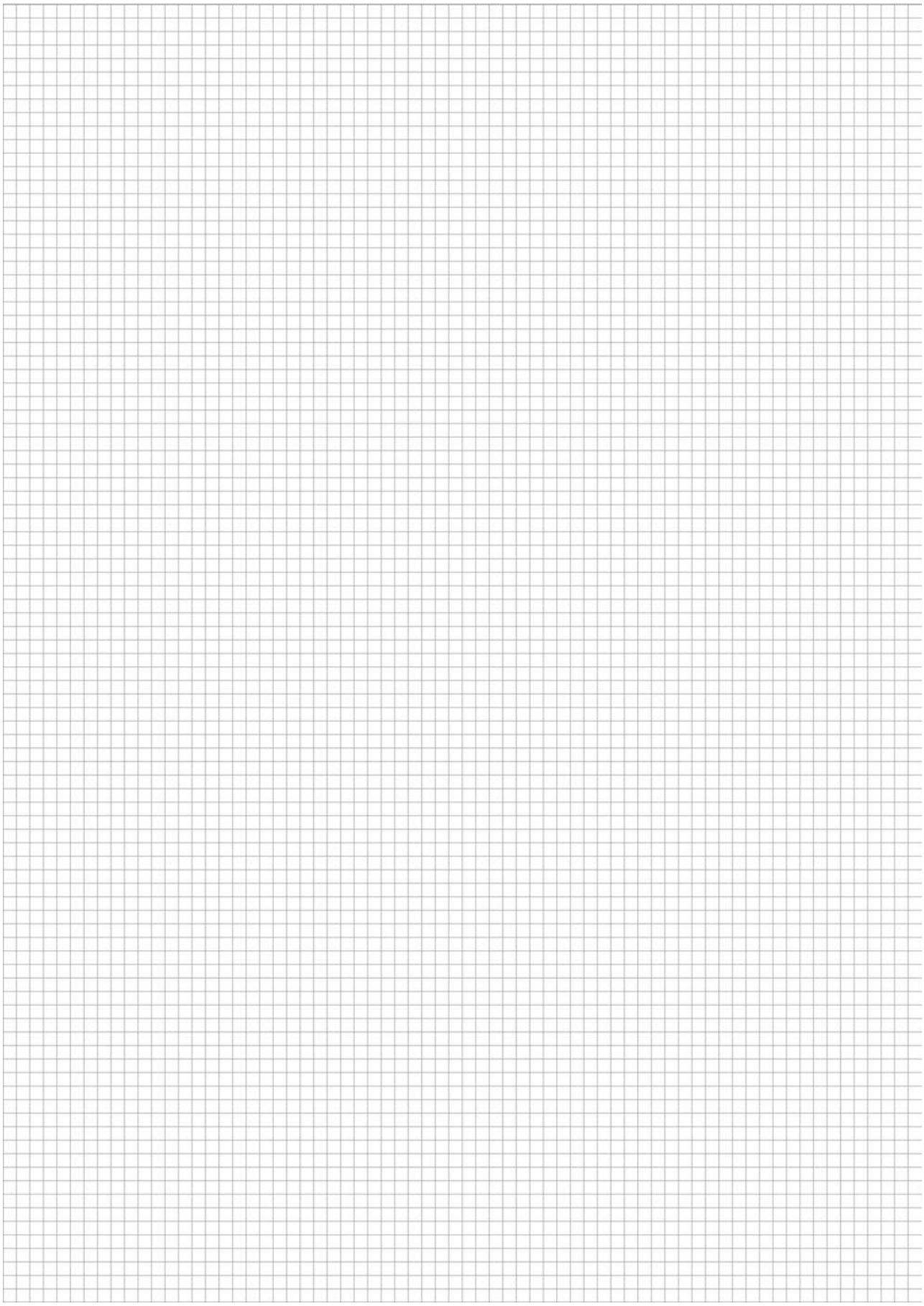


T_{box} = H + 71 mm / 2,8"
T_{ufc} = H + 165 mm / 6,5"

Nominal diameter	Dimensions [mm]					
ASME 900 lbs	10 D inlet spoolpiece			5 D outlet spoolpiece		
	a	Di	weight [kg]	a	Di	weight [kg]
2"	508	49,3	22	254	49,3	19
3"	762	73,7	40	381	73,7	30
4"	1016	97,2	70	508	97,2	51
6"	1524	146,4	165	762	146,4	116
8"	2032	182,6	350	1016	182,6	231
10"	2540	230,2	580	1270	230,2	371
12"	3048	280,9	815	1524	280,9	514

Nominal diameter	Dimensions [inch]					
ASME 900 lbs	10 D inlet spoolpiece			5 D outlet spoolpiece		
	a	Di	weight [lbs]	a	Di	weight [lbs]
2"	20	1,94	48,5	10	1,94	42
3"	30	2,9	88,2	15	2,9	66
4"	40	3,83	154,3	20	3,83	112
6"	60	5,76	363,8	30	5,76	256
8"	80	7,19	771,6	40	7,19	509
10"	100	9,06	1278,7	50	9,06	818
12"	120	11,06	1796,8	60	11,06	1133





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