



OPTISONIC 6300 Technical Datasheet

Ultrasonic clamp-on flowmeter

- Flexible ultrasonic flowmeter solution
- Robust industrial clamp-on construction
- Immediate start-up
- Reliable measurement
- All in one concept



Clamp-on technology

KROHNE's OPTISONIC 6300 stands for continuity and long term reliability. Flow measurement can be done anywhere and start-up is immediate. The new OPTISONIC 6300 clamp-on flowmeter for liquids with its robust industrial construction and regreasing concept provides a revolutionary solution for easy handling.



Highlights

- Minimised uncertainty
- Optimised reliability
- Minimal maintenance
- Efficient regreasing concept
- Easy sensor mounting
- Installation wizard
- All in one system

Industries

- Chemicals
- Petrochemicals
- Power plants
- Water
- Oil & Gas
- Semi-conductor
- Food & Beverages
- Pharmaceuticals

Applications

- Chemical addition
- General process control
- Cooling water circuits
- Broad range of refined hydrocarbons
- Potable water
- De-ionized and demineralized water
- Sanitary flow rate measurements
- Purified water

OPTISONIC 6300 variants

The OPTISONIC 6300 is an ultrasonic clamp-on flowmeter that can be fitted on the outside of piping to measure the flowrate of liquids. The flowmeters consists of a combination of one or two OPTISONIC 6000 clamp-on sensor(s) and one UFC 300 ultrasonic flow converter.

OPTISONIC 6000 + UFC 300 = OPTISONIC 6300

OPTISONIC 6000 clamp-on sensors



- ❶ Small: chemical addition applications, cooling circuits
- ❷ Medium: purified water applications, hydrocarbons
- ❸ Large: all water applications, especially for large pipe sizes

UFC 300 ultrasonic flow converter



- ❶ UFC 300 W: Wall mounted, PA, non-Ex, IP65
- ❷ UFC 300 F: Field version, die-cast aluminum, (non-)Ex, IP66/67

OPTISONIC 6000 options

- ❶ OPTISONIC 6000 XT-small: sensor for extended temperature
- ❷ OPTISONIC 6000 XT-medium: Sensor for extended temperature

Technical data

Ultrasonic flowmeter OPTISONIC 6300

Versions

OPTISONIC 6300	Standard
OPTISONIC 6300 - Ex, zone 1/2	Option

Performance

Measurement functionality	Standard actual volume flow rate and totalised volume
Measuring range	0...20 m/s / 0...66 ft/s
Max. deviation (under reference conditions)	<± 1% of M.V. for DN ≥ 50 mm / 2", v > 0.5 m/s / 1.5 ft/s
	<± 3% of M.V. for DN < 50 mm / 2", v > 0.5 m/s / 1.5 ft/s
Repeatability	<± 0.2%
Process conditions	Solid particle content < 5% (by volume)
	Gas content < 2% (by volume)

Measurement configurations

Single path, single pipe or dual path/dual pipe	Standard
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Ultrasonic flow sensor OPTISONIC 6000

Versions

OPTISONIC 6000 - small (DN15...DN100 / ½"...4")	Standard
OPTISONIC 6000 - medium (DN50...DN600 / 2...24")	Standard
OPTISONIC 6000 - large (DN200...DN4000 / 8...160")	Standard
OPTISONIC 6000 XT - small (ext. temp. DN15...DN100 / ½"...4")	Option
OPTISONIC 6000 XT - medium (ext. temp. DN50...DN600 / 2...24")	Option

Pipe specifications

Material: metal, plastic, ceramic, asbestos cement, internal/external coated pipes (coatings and liners fully bonded to pipe wall)	Standard
Maximum pipewall thickness of 200 mm / 7.87"	Standard

Protection category

IP67	Standard
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Electric signal level

Ex-I, intrinsically safe circuits, floating	Standard
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Process temperature

-40...120°C / -40...284°F	Standard
-50...200°C / -58...392°F, XT version	Option

Sensor cable length

5 m / 15 ft	Standard
10 m / 30 ft	Option
20 m / 60 ft	Option
30 m / 90 ft	Option

Recommended mounting area

Inlet	≥ 10DN
Outlet	≥ 5DN

Ultrasonic flow converter UFC 300

Versions

W (wall)	UFC 300 W (general purpose)
F (field)	UFC 300 F (non-Ex)
F (i-)EEx, zone 1/2	UFC 300 F-Ex

Display languages

With local display	Standard
English, French, German	Standard

Flow sensor

OPTISONIC 6000	DN15...4000 / ½" ...160" ①
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Communication

Current, pulse & status output	Standard
HART® communication, control input	Standard

Power supply

100...230 VAC (-15/+10%), 50/60 Hz	Standard
24 VAC/DC	Option
Power consumption	22 VA

Approvals

EEx - zone 1/2	Option
FM - Class I DIV 1/2	Option
CSA - GP / Class I DIV 1/2	Option

Protection category

W (wall)	IP65 (eq. to NEMA 4/4X)
F (field)	IP66/67 (eq. to NEMA 6)

Temperature

Process	see flow sensor
Ambient	-40...60°C / -40...140°F
Storage	-50...70°C / -58...158°F

Cable connection

M20 x 1.5	Standard
½" NPT	Option
PF ½	Option

Materials used

Polyamide - polycarbonate (W-version)	Standard
Die-cast aluminium with polyurethane coating) (F-version)	Standard
Stainless steel 316 L / 1.4404 (F-version)	Option

Overall functionality

Highlights	Continuous measurement of actual volume flow rate, flow velocity, velocity of sound, damping of acoustic signal, signal to noise ratio
	Flow direction (forward or reverse)
	Totalisation of volume flow
	Reliability of flow measurement, Quality of acoustic signal

Current output

Function	All operating data configurable; galvanically isolated; HART® communication
Settings	
Q = 0%	0...15 mA
Q = 100%	10...22 mA
Error identification	0...22 mA
Connection Active:	
Basic/Modular IO	$I \leq 22 \text{ mA} / R_L \leq 1 \text{ k}\Omega$
Ex-I I/O	$I \leq 22 \text{ mA} / R_L \leq 470 \text{ }\Omega$
	$U_o = 21 \text{ V} / I_o = 90 \text{ mA}$
	$P_o = 0.5 \text{ W}$
	$C_o = 90 \text{ nF} / L_o = 2 \text{ mH}$
Connection Passive:	
Basic/Modular IO	$I \leq 22 \text{ mA} / U \leq 32 \text{ VDC}$
Ex-I I/O	$I \leq 22 \text{ mA}$
	$U_i = 30 \text{ V} / I_i = 100 \text{ mA}$
	$P_i = 1 \text{ W}$
	$C_i = 10 \text{ nF} / L_i \sim 0 \text{ mH}$

Pulse output and status output

Function	Configurable as pulse output, identification for automatic range change, indicator of flow direction, overflow, errors, trip point or empty pipe indication Valve control, if batch control function is activated
Settings	
Q = 100%	0.0001...10000 pulses/s or pulses/volume
Pulse width	0.1...1000 ms or auto or sym.
Status	On or Off
Connection Active:	
Basic IO	On request
Ex-I I/O	On request
Connection Passive:	
Basic IO	$f \leq 10 \text{ kHz}; I \leq 20 \text{ mA}$
	$f \leq 10 \text{ Hz}; I \leq 100 \text{ mA}$
	$U \leq 32 \text{ VDC} / I \leq 100 \text{ mA}$
Ex-I I/O	Acc. EN 60947-5-6
	$U_i = 30 \text{ V} / I_i = 100 \text{ mA}$
	$P_i = 1 \text{ W}$
	$C_i = 10 \text{ nF} / L_i \sim 0 \text{ mH}$
Connection NAMUR:	
Basic IO	On request
Ex-I I/O	"Active"

Control input

Function	Freeze output (e.g. during cleaning), forced return to zero, counter and error reset, ext. range selection.
Settings	Freeze outputs, output zero, reset counter, reset error
Connection Active:	
Basic IO	$I_{\text{nom}} 16 \text{ mA} / U_{\text{nom}} 24 \text{ VDC}$
Ex-I I/O	Acc. EN 60947-5-6
Connection Passive:	
Basic IO	$U \leq 32 \text{ VDC}$
	$U_{\text{on}} > 19 \text{ VDC} / U_{\text{off}} < 2.5 \text{ VDC}$
Ex-I I/O	On request
Connection NAMUR:	
Basic IO	On request
Ex-I I/O	"Active"

① Outer diameter: 20...4300 mm / 0.79...169.29"

I/O Specifications

I/O Specifications

Overall functionality

Function	Continuous measurement of actual volume flow, mass flow, flow speed, velocity of sound, gain, SNR, diagnosis value
	Bidirectional flow measurement and totalisation
	Signal quality bar graph

Current output

Function	All operating data configurable; galvanically isolated; HART® communication
Settings	Q = 0%: 0...15mA
	Q = 100%: 10...22mA
	Error identification: 0...22mA
Connection	
Basic / Modular IO: Active	$I \leq 22\text{mA} / R_L \leq 1\text{ k}\Omega$
Ex-i: Active	$I \leq 22\text{mA} / R_L \leq 470\ \Omega$
	$U_0 = 21\text{V} / I_0 = 90\text{mA}$
	$P_0 = 0.5\text{W}$
	$C_0 = 90\text{nF} / L_0 = 2\text{mH}$
Basic / Modular IO: Passive	$I \leq 22\text{mA} / U \leq 32\text{VDC}$
Ex-i: Passive	$I \leq 22\text{mA}$
	$U_i = 30\text{V} / I_i = 100\text{mA}$
	$P_i = 1\text{W}$
	$C_i = 10\text{nF} / L_i \sim 0\text{mH}$

Pulse output and Status output

Function	Configurable as pulse output, identification for automatic range change, indicator of flow direction, overflow, errors, trip point or empty pipe indication
Settings	Q = 100%: 0.0001...10000 pulses per second or pulses per unit volume
	Pulse width: 0.05...2000ms or auto or sym.
	Status: On or Off
Connection	
Basic / Modular IO: Passive	$f \leq 10\text{kHz} : I \leq 20\text{mA}$
	$f \leq 10\text{Hz} : I \leq 100\text{mA}$
	$U \leq 32\text{VDC} / I \leq 100\text{mA}$
Passive	$U_i = 30\text{V} / I_i = 100\text{mA}$
	$P_i = 1\text{W}$
	$C_i = 10\text{nF} / L_i \sim 0\text{mH}$
Active	$U_{\text{nom}} = 24\text{VDC} / I < 1\text{mA}$
	$U_0 = 1.5\text{V at } 10\text{mA}$
Namur (acc. to EN 60947-5-6)	Passive

Control input

Function	Freeze output (e.g. during cleaning), forced return to zero, counter and error reset, ext. range selection.
Settings	Freeze outputs, output zero, reset counter, reset error, start batch (in batch mode)
Connection	
Basic / Modular IO: Active	$I_{\text{nom}} = 16\text{mA} / U_{\text{nom}} = 24\text{VDC}$
Basic / Modular IO: Passive	$U \leq 32\text{VDC}$
	$U_{\text{on}} > 19\text{VDC} / U_{\text{off}} < 2.5\text{VDC}$
Namur (acc. to EN 60947-5-6)	Active

I/O-module combination possibilities

Communication	Basic I/O	Ex-i I/O ①	Modular I/O ②
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Current output

Active / passive	■	■	■
HART	■	■	■

Pulse and status output

Active	□	□	■
Passive	■	■	■
Namur (acc. to EN 60947-5-6)	□	□	■

Control input

Active	□	□	■
Passive	■	■	■
Namur (acc. to EN 60947-5-6)	□	□	■

Foundation Fieldbus

Foundation Fieldbus (pending)	□	■	■
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Protection

Ex-d / e	■	■	■
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■ standard ■ optional □ on request

Note:

- ① Ex-i I/O: up to 1 additional in-/output modules possible (see I/O-module combinations)
- ② Modular I/O: up to 2 additional in-/output module possible (see I/O-module combinations)

I/O modules

1	I/O	2	1st module	3	2nd module	
1	Basic	0	no module possible	0	no module possible	
2	Ex-i (Ia + Pp)	1	Ex-i (Ia + Pp/Cp)			
3	Ex-i (Ip + Pp)	2	Ex-i (Ip + Pp/Cp)			
4	Modular (Ia + Pa)	8	no module	8	no module	
6	Modular (Ia + Pp)	A	Ia	A	Ia	Ia = current output - active
7	Modular (Ia + Pn)	B	Ip	B	Ip	Ip = current output - passive
8	Modular (Ip + Pa)	C	Pa/Sa	C	Pa/Sa	Pa/Sa = pulse/status output - active, high current
B	Modular (Ip + Pp)	E	Pp/Sp	E	Pp/Sp	Pp/Sp = pulse/status output - passive, high current
C	Modular (Ip + Pn)	F	Pn/Sn	F	Pn/Sn	Pn/Sn = pulse/status output - passive, Namur

The UFC 300 with standard basic I/O covers almost all applications, having 4 I/Os:

- active/passive current output (+HART®)
- passive pulse/status output
- passive status output
- passive status output / control input

The I/O-module combination is thus 1-0-0 (see above).

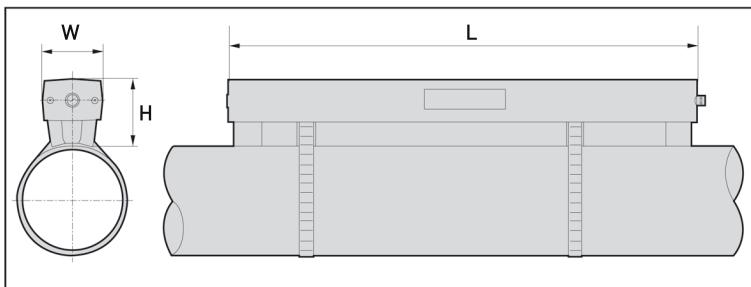
The UFC 300 with modular I/O can be tailor-made to any application:

- Suppose you require a converter with passive pulse output and 3 passive current outputs. The I/O-module combination then becomes B-B-B.
- Suppose you require a converter with 2 active pulse/status outputs. The I/O-module combination then becomes either 4-C-8 or 8-C-8 (depending on whether active or passive current output is required). The latter '8' indicates that 1 additional module can be added in future.

Example for combination of I/O's

Basic I/O			Ex- I/O			Modular I/O								
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1	0	0	2	0	0	4	8	8	8	8	8	D	8	8
			1			A	B		B	8		A	8	
			2				A			B			A	
							C			C			C	
			3	0	0		G			G			K	
			1			C	8		C	8		C	8	
			2				C			C			C	
							G			G			K	
			D	0	0	G	8		G	8		K	8	
			1				G			G			K	
			2										K	
			E	0	0	6	8	8	B	8	8	E	8	8
			1			A	8		B	8		A	8	
			2				A			B			A	
							E			E			C	
							K			K			K	
						E	8		E	8		C	8	
							E			E			C	
							K			K			K	
						K	8		K	8		K	8	
							K			K			K	
						7	8	8	C	8	8	F	8	0
						A	8		B	8		A		
							A			B		B		
							F			F		C		
							H			H		D		
						F	8		F	8		E		
							F			F		F		
							H			H		G		
						H	8		H	8		H		
							H			H		K		

Dimensions and weights

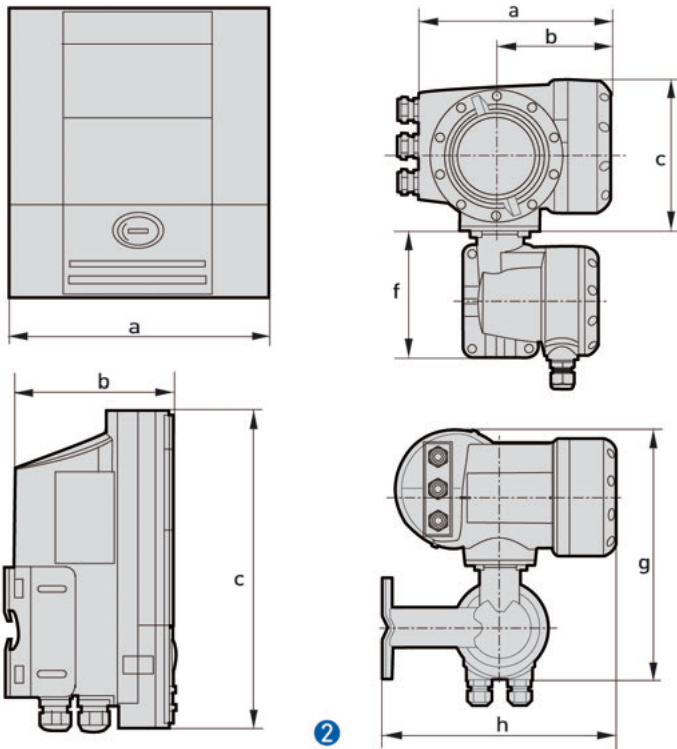


Version	Dimensions [mm]			Approx. weight (without cable / strip)
	L	H	W	[kg]
small	496.3	71	63.1	2.7
medium	826.3	71	63.1	3.6
large	496.3 ①	71 ①	63.1 ①	2.7 ①

① value for one of the 2 delivered rails

Version	Dimensions [inches]			Approx. weight (without cable / strip)
	L	H	W	[lbs]
small	19.5	2.8	2.5	6.0
medium	32.5	2.8	2.5	7.9
large	19.5 ①	2.8 ①	2.5 ①	6.0 ①

① value for one of the 2 delivered rails



1

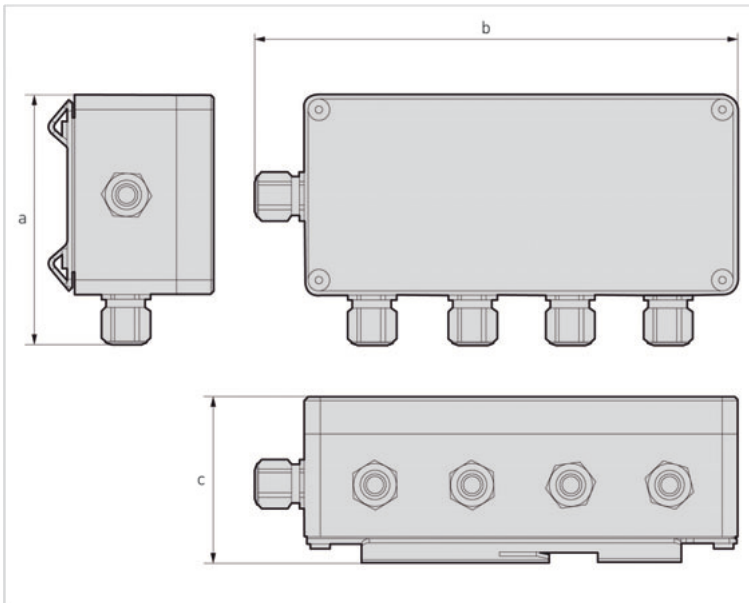
2

1 UFC 300 W

2 UFC 300 F

Version	Dimensions [mm]						Weight [kg]
	a	b	c	f	g	h	
UFC 300 W	198	138	299	-	-	-	2.4
UFC 300 F	202	120	155	141	296	277	5.7

Version	Dimensions [inches]						Weight [lbs]
	a	b	c	f	g	h	
UFC 300 W	7.8	5.4	11.8	-	-	-	5.3
UFC 300 F	7.75	4.75	6.1	5.5	11.6	10.9	12.6



	Dimensions [mm]			Approx. weight without cable/metal [kg]
	a	b	c	
Cable box	102	197	67	0.85

	Dimensions [inches]			Approx. weight without cable/metal [lbs]
	a	b	c	
Cable box	4.01	7.76	2.64	1.87



KROHNE Product 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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