

# OPTISONIC 3400

Ultrasonic flowmeter for liquids in all industrial applications



**KROHNE**

► *achieve more*

- ▶ Measurement of conductive and non-conductive, low and high viscous liquids, from -200 to +250 °C / -328 to +482 °F medium temperature
- ▶ Full bore unobstructed sensor tube, all-welded construction without moving parts
- ▶ Accurate bi-directional measurement that starts at nearly zero flow
- ▶ Advanced signal converter covers all I/Os, HART® 7, FOUNDATION™ fieldbus, PROFIBUS® PA, Modbus communication protocols and features enhanced diagnostics and status indications according to NAMUR NE 107

# Achieve more with KROHNE

Welcome to KROHNE. As a leader in process measuring technology, we're at home in a wide variety of industries worldwide. The name KROHNE has stood for innovative and reliable solutions since 1921. Our range of products now covers a large cross-section of measuring technology and analysis, from measurements at single points to complete system solutions. Our portfolio is rounded out by comprehensive services and consulting.

KROHNE is a major supplier of ultrasonic flowmeters, with a proven track record for durability, measuring accuracy and reproducibility. Building on over 90 years of knowledge and expertise, KROHNE now introduces the new OPTISONIC 3400 – a true multi-purpose flowmeter for liquids in all industrial processes.



## OPTISONIC 3400 – Multi-purpose, all-round

The OPTISONIC 3400 is a unique 3-beam inline ultrasonic flowmeter, especially designed for the continuous measurement of homogeneous conductive and non-conductive liquids in closed, completely filled pipeline circuits. It is able to measure actual volume and mass flow, the velocity of sound and diagnostic values of flowing liquids in a broad range of process applications, such as:

- general purpose/standard temperature, pressure, viscosity,
- cryogenic process temperatures as low as -200 °C / -328 °F,
- extended process temperatures up to +250 °C / +482 °F,
- high viscosity liquids up to 1000 cSt.

With the introduction of the OPTISONIC 3400, KROHNE again strengthens its ultrasonic product portfolio. The product rings in a new era marked by multi-purpose, all-round flow sensors and signal converters with full I/O options, plus full choice of communication protocols that include advanced diagnostics features. These durable instruments are highly functional, reliable and accurate over long periods of time.

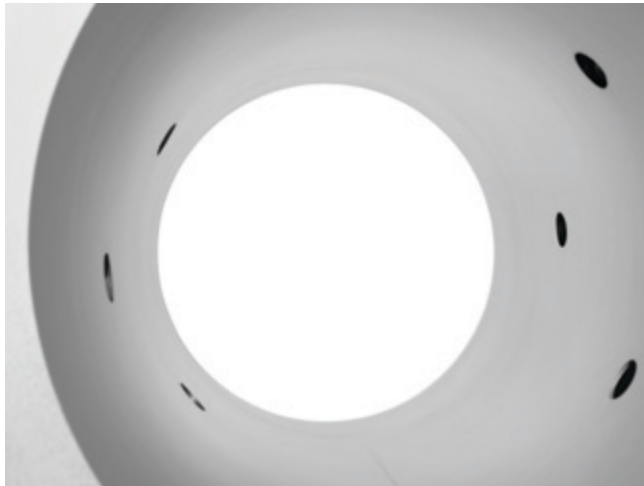
## Maximum durability for critical processes

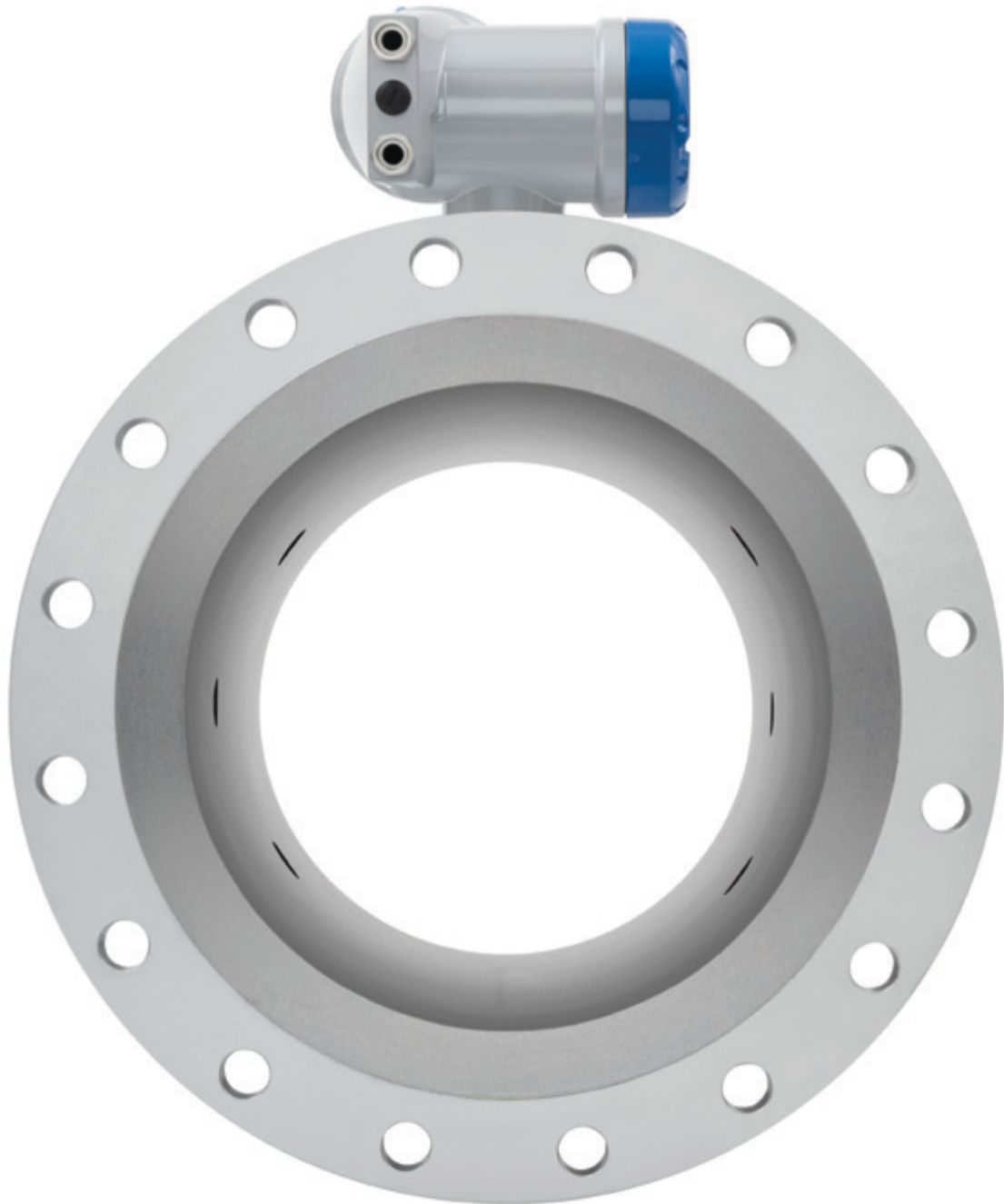
The sensor OPTISONIC 3000 features a robust, fully welded construction with patented inert metal transducer technology.

The mechanical construction of tubes, process connections and transducers are standardised for all versions, including meters for demanding applications such as high viscosity, extended process temperatures and cryogenic process temperatures.

The sensor is backward compatible with earlier models.

With the full bore unobstructed sensor tube without moving parts, the flowmeter measures bi-directionally, starting at nearly zero flow, and do not cause any pressure loss. This makes the OPTISONIC 3400 uniquely suitable for critical processes.



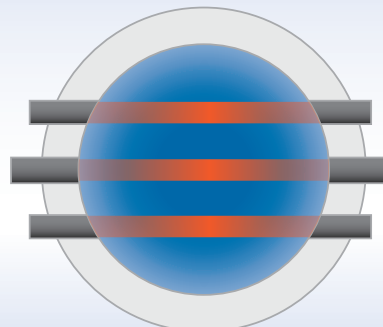
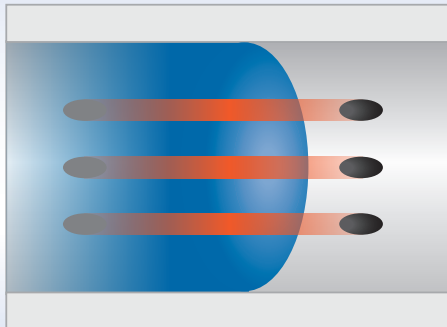


## Accurate flow measurement with continuous performance

Thanks to the new signal converter UFC 400, the OPTISONIC 3400 features improved accuracy, easier installation handling, dynamic path substitution, Reynolds correction and tube expansion correction. At almost zero flow, accurate flow measurement is still guaranteed.

The single signal converter concept with universal software applies to all sizes and versions of the OPTISONIC 3400 and supports all general purpose and more demanding applications with exceptional accuracy.

3 acoustic paths



The signal converter of OPTISONIC 3400 is a truly advanced solution with multiple choices I/Os, and communication protocols, including HART® 7, FOUNDATION™ fieldbus, Modbus, and PROFIBUS® PA. All communication protocols include diagnostics compliant with the NAMUR NE 107 guideline. This is an operator-friendly signal converter which quickly and accurately alerts process operators to less than ideal process conditions. Being able to react in a timely fashion, based on good information, ensures that consistent process and product integrity can be maintained.

Of course, the OPTISONIC 3400 has been approved for operation in hazardous environments worldwide: ATEX, IEC-Ex, cCSAus, NEPSI and other local certifications.



Failure



Out of specification



Function check

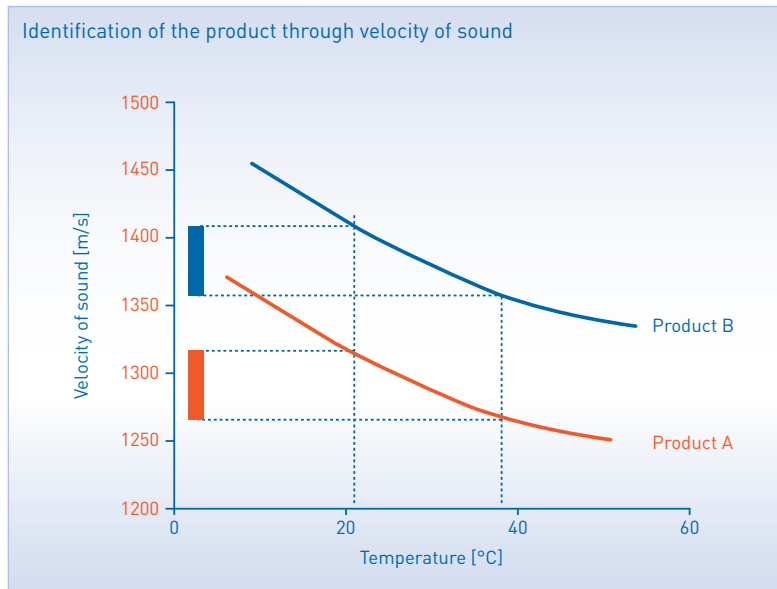


Maintenance required

## Process liquid measurement the smart way

The OPTISONIC 3400 is great for process liquid measurements just about anywhere, as long as the liquid is single-phase and relatively clean. Because of the differential transit time principle, pollution levels in the liquid should not exceed a few percent of gas bubbles and/or solid particles. In return all conductive and non-conductive liquids can be applied without too much consideration of chemical inertness, turndown ratio, accuracy span, maintenance or other risks related to wear or necessary replacements.

Unlike traditional mechanical flowmeters, the OPTISONIC 3400 ultrasonic flowmeter can measure multiple products without jeopardising accuracy or need to recalibrate.





## Bi-directional by nature

With known and stable liquid density, in addition to volumetric flow, mass measurement is also possible. Bi-directional flow measurement is a standard feature of the OPTISONIC 3400 which can also be used as a smart safety feature, e.g. triggering an alarm in case of a reverse flow.

This makes the OPTISONIC 3400 a truly unique multi-purpose, all-round ultrasonic flowmeter.



## Trouble-free installation



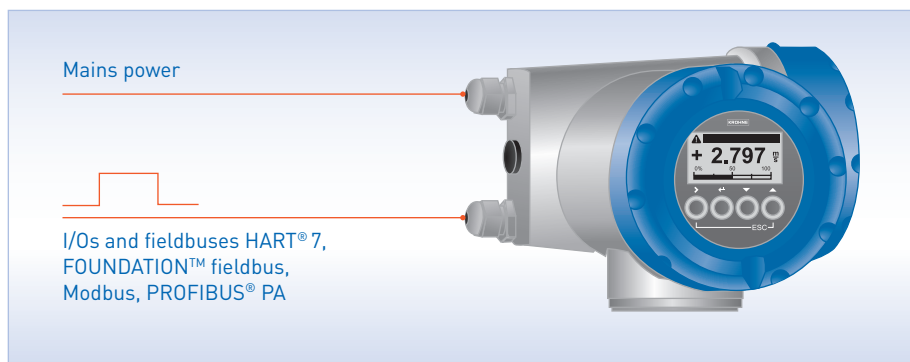
The installation requirements for the entire range of OPTISONIC 3400 flowmeters were specifically optimised for ease of use and time saving efficiency.

Commissioning the flanged flow sensor is easy, without the need for auxiliary parts like grounding rings, earth cables, flow straighteners or supports to bear the weight. What has to be considered to achieve optimum performance is the minimum required inlet/outlet sections of 5DN/3DN. Designed for easy handling, the flow sensor is lightweight, with compact dimensions. Mounting the flow sensor in buried pipelines is also no problem using the submersible product variant (IP68/NEMA 6P).

## Superior ease of use

Commissioning the new UFC 400 signal converter is consistent with the easy installation approach of the OPTISONIC 3400. The flowmeter is factory programmed according to customer requirements. The electrical connections of the signal converter are straightforward and all I/O connections (basic I/O, Ex-i I/O, modular I/O) are similar to all other KROHNE GDC devices. One new enhancement is the user display which is equipped with both optical and push buttons.

For the choice of fieldbuses, the accompanying DTMs, DDs and drivers are available free of charge via the KROHNE website.



Modbus





## Comes in all sizes, for all applications

The diameter range available is broad, from DN25 / 1 inch for dosing purposes, up to DN3000 / 120 inch for water transportation pipelines.

KROHNE also gives you a lot of flexibility in the choice of materials, offering carbon steel, stainless steel, low temperature carbon steel, duplex and more.

Flow sensor variants are compact and remote. In addition to flanged flow sensors, flangeless flow sensors for on-site welding onto the pipeline can be provided.

Available flow sensor options for demanding applications:

- extended process temperature up to +250 °C / +482 °F
- cryogenic as low as -200 °C / -328 °F
- high viscous liquids ranging from 100...1000 cSt



**OPTISONIC 3400 C**  
Small diameter, compact  
version, standard finish



**OPTISONIC 3400 C**  
Large diameter, compact  
version, standard finish



**OPTISONIC 3400 F**  
Small diameter, field  
version, stainless steel



**UFC 400 C**  
Compact version mounted  
directly on the measuring  
sensor



**UFC 400 F**  
The electrical connection  
to the measuring sensor  
via a signal cable  
(max. 30 m / 90 ft)

# Technical data

Design	3 parallel acoustic paths, fully welded
Diameter range	DN25...3000; 1...120 inch (all versions)
Wetted materials	Steel, stainless steel (others upon request)
Power supply	85...250 VAC; 11...31 VDC; 20.5...26 VAC/DC
I/Os	Current (incl. HART® 7), pulse, frequency and/or status output, limit switch and/or control input (depending on the I/O version)
Communication interfaces	Modbus RS485, HART® 7, FOUNDATION™ fieldbus ITK6.1, PROFIBUS® PA profile 3.02
Diagnostic functions	VDI NAMUR NE 107
Hazardous area approvals	ATEX, IEC-Ex, cCSAus, NEPSI

# Operating conditions

Properties of medium	Single phase liquid with <5% solid content, <2% gas content and max. 100 cSt
Option	High viscosity version up to 1000 cSt
Ambient temperature	-40...+65°C; -40...+149°F
Process temperature	Compact version: -45...+140°C; -49...+284°F Remote version: -45...+180°C; -49...+356°F Extended temperature version: -45...+250°C; -49...+482°F (only remote) Cryogenic version: -200...+180°C; -328...+356°F (only remote) High viscosity version: -45...+180°C; -49...+356°F
Process connections	EN1092-1: PN6...100; ASME B16.5: 150...900 lbs
Measuring range	v = 0.3...20 m/s; 1...66 ft/s (bi-directional)
Accuracy (under reference conditions)	±0.3% of measured value ±2 mm/s
Repeatability	0.2%
Inlet run	Minimum 5DN
Outlet run	Minimum 3DN
Mounting orientation	Horizontal and/or vertical

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## Product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature meters
- Pressure meters
- Analysis products
- Products and systems for oil & gas industry
- Measuring systems for the marine industry



[www.krohne.com](http://www.krohne.com)

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