

Level Measuring Instruments



Electromagnetic flowmeters

Variable area flowmeters

Mass flowmeters

Ultrasonic flowmeters

Vortex flowmeters

Flow controllers

Level measuring instruments

Pressure and temperature

Heat metering

Communications technology

Switches, counters, displays and recorders

Engineering systems & solutions

Measurement instruments for Level



KROHNE Level Measuring Instruments

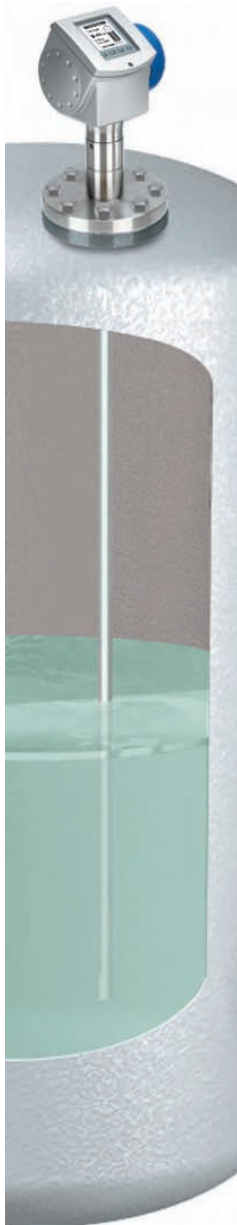
An extensive and varied range of measuring devices and switches is available for level measurement and detection of liquids and solids. Based on different measuring principles, advanced technology and strict quality assurance procedures, our highly accurate measuring devices are equal to even the toughest conditions.

In all cases, our measuring devices combine high accuracy and reliability with economic efficiency. Tell us the application you have in mind: we'll supply you with the ideal KROHNE level measuring system.

KROHNE level measuring devices comply with CE requirements and Namur directives. Our production facilities are certified to ISO 9001. Many of our devices have official approvals:

- "Ex" approval or equivalent
- approval as part of an overfill protection system,
- type approval certificates in conformity with the German pressure vessel code.

Our devices can be fitted with a wide choice of process connections, according to customer requirements.



KROHNE level production and marketing facilities are located in Germany, France, the United Kingdom, the United States and other countries for a variety of reasons. Primarily, it permits us to gain an international edge in applications. We make our products globally applicable. The latest in quality assurance and a particularly intense KANBAN production help us to substantially improve delivery times.

The KROHNE strategy

KROHNE is present in almost every plant and process in the world. As a global player, we react quickly to our customers' demands, whatever they ask, whenever they ask.

We are active members of all important industrial associations to make sure we anticipate industrial trends and then set the benchmarks that others follow.

At KROHNE, we pride ourselves on being easy to do business with. Our key objectives are to offer the best products for your applications and to ensure that co-operation with us is as easy as possible by supporting all our sales activities with extensive pre- and post-sales consultancy and technical assistance.

KROHNE - easy to work with.



Product Overview

Continuous measurement

Liquid	Interface Liquid	Powder Granulates	Paste		
OPTIWAVE 7300 C		OPTIWAVE 7300 C	OPTIWAVE 7300 C	Radar Max. meas. range 40 m / 131 ft Pressure -1 ... 40 bar / -14.5 ... 580 psig Flange temp. -40 ... +200°C / -40 ... +390°F	non-contact
OPTISOUND 3010 C OPTISOUND 3020 C		(OPTISOUND 3010 C) (OPTISOUND 3020 C)	(OPTISOUND 3010 C) (OPTISOUND 3020 C)	Ultrasonic Max. meas. range ¹⁾ Liquids: 8 m / 26 ft Solids: 3.5 m / 11.5 ft Pressure ¹⁾ -0.2 ... 2 bar / -3 ... 29 psig Product temp. ¹⁾ -40 ... +80°C / -40 ... +175°F	
OPTISOUND 3030 C (OPTISOUND 3040 C) (OPTISOUND 3050 C)		OPTISOUND 3030 C OPTISOUND 3040 C OPTISOUND 3050 C	OPTISOUND 3030 C OPTISOUND 3040 C OPTISOUND 3050 C	Max. meas. range ²⁾ Liquids: 1 ... 25 m / 3.3 ... 82 ft Solids: 1 ... 15 m / 3.3 ... 49 ft Pressure ²⁾ -0.2 ... 1.5 bar / -3 ... 22 psig Product temp. ²⁾ -40 ... +80°C / -40 ... +175°F	
OPTIFLEX 1300 C	OPTIFLEX 1300 C	OPTIFLEX 1300 C	OPTIFLEX 1300 C	Guided Radar (TDR) Max. meas. range 35 m / 115 ft Pressure -1 ... 40 bar / -14.5 ... 580 psig Flange temp. -40 ... +200°C / -40 ... +390°F	contact
BM 26 A	BM 26 A			Buoyancy Max. length 6 m / 19.7 ft Pressure -1 ... 120 bar / -14.5 ... 1740 psig Product temp. -200 ... +300°C / -325 ... +570°F	
BM 500			BM 500	Potentiometric Max. length 2 m / 7 ft Pressure -1 ... 16 bar / -14.5 ... 230 psig Product temp. -20 ... +140°C / -4 ... +285°F	

¹⁾ Data only applicable for OPTISOUND 3020 C

²⁾ Data only applicable for OPTISOUND 3040 C

Switches

Liquid	Interface Liquid	Powder Granulates	Paste		
OPTISWITCH 4100 OPTISWITCH 5100 OPTISWITCH 5150 OPTISWITCH 5200 OPTISWITCH 5250				Vibration Max. sensor length ³⁾ 6 m / 19.7 ft Pressure ³⁾ -1 ... 64 bar / -14.5 ... 930 psig Product temp. ³⁾ -50 ... +250°C / -58 ... +480°F	contact
		OPTISWITCH 3000 series		Max. sensor length ⁴⁾ 6 m / 20 ft Pressure ⁴⁾ -1 ... 16 bar / -14.5 ... 230 psig Product temp. ⁴⁾ -50 ... +250°C / -60 ... +480°F (with temp. adapter)	
LS 6200 LS 6300		LS 6250S	LS 6200 LS 6300	Electromagnetic waves Pressure -1 ... 16 bar / -14.5 ... 230 psig Product temp. -20 ... +140°C / -4 ... +285°F	
LS 7200/7201 LS 7210/7211 LS 7220/7221				Conductive Pressure -1 ... 16 bar / -14.5 ... 230 psig Product temp. -20 ... +140°C / -4 ... +285°F	

³⁾ Data only applicable for OPTISWITCH 5200 C

⁴⁾ Data only applicable for OPTISWITCH 3300 C

Continuous Radar

Continuous Ultrasonic

Continuous TDR

Continuous Buoyancy

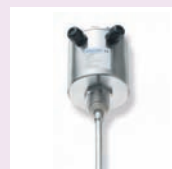
Continuous Potentiometric

Switches Vibration

Switches Electrom. waves

Switches Conductive

Software PACTware



OPTIWAVE – Works better than any radar ever before

OPTIWAVE 7300 C

In contrast to earlier radar devices, the new OPTIWAVE is able to operate over a larger bandwidth. This ensures a sharper resolution and higher accuracy. The higher signal dynamics of OPTIWAVE allow the detection of even the smallest level changes.

- **Simple installation**
- **Wizard driven**
- **PACTware-ready**
- **Easy to use**
- **Service and maintenance-free**

Objects in tank

Agitators, struts, inlets, ladders and similar objects have less effect on signal reduction.

The high-quality signal is easier to evaluate and the results are more accurate and repeatable.

Foam

The improved signal quality permits much clearer location of the product's true surface.

Agitated surface

Better signal production and improved PCB board characteristics allow the OPTIWAVE to determine the true level in the tank despite the agitated surface.

For all applications



- **Objects in tank**
- **Foam**
- **Agitated surface**



OPTIWAVE 7300 C

Product	Liquids, pastes and solids
Max. measuring range	40 m / 131 ft
Accuracy	±3 mm / ±0.12" (when L ≤ 10 m / 33 ft) ±0.03 % of measured distance (when L > 10 m / 33 ft)
Operating data	
Pressure	-1...40 bar / -14.5...580 psig
Flange temperature	-40...+200°C / -40...+390°F (std.)
Process connection	NPT 1 1/2"; G 1 1/2" Flange DN 40...DN 150 (PN 40 / PN 16); 1 1/2"...8" (150 lb / 300 lb); 10 K (40...100A)
Materials (Wetted parts)	Stainless steel (1.4404 / 316L); Hastelloy® C-22 (2.4602)
Human machine interface	Display in 9 languages, even in Chinese, Japanese and Russian
Approvals	
ATEX	ATEX II G/D 1, 1/2, 2 EEx ia IIC T6 ... T3 ATEX II G/D 1/2, 2 EEx d [ia] IIC T6 ... T3
FM / CSA: NEC 500/CEC:	Cl. I, Div. 1, Gr. ABCD (CSA: BCD only) (IS) Cl. I, Div. 1, Gr. ABCD (FM only) (XP) (XP/IS) Cl. I, Div. 2, Gr. ABCD (CSA: BCD only) (IS & XP) Cl. II, Div. 1, Gr. EFG; Cl. III (FM only) (XP) Cl. II Div. 1/2, Gr. EFG; Cl. III (IS) Cl. II/III, Div. 2, Gr. FG (XP/NI)
NEC 505/CEC:	Cl. I, Zone 0 AEx ia, Gr. IIC (IS); Cl. I, Zone 1 AEx d [ia], Gr. IIC (XP); Cl. I, Zone 2, AEx nA [ia], Gr. IIC (NI)
WHG (pending)	Overfill protection

OPTIFLEX – Designed to satisfy better than any other TDR



Various probe types and materials to cover all applications



OPTIFLEX 1300 C

Product	Liquids, liquid interface, pastes and solids
Max. measuring range	35 m / 115 ft
Accuracy (in direct mode)	Liquids: ± 3 mm / 0.12" (L < 10 m / 33 ft); ± 0.03 % of measured distance (L > 10 m / 33 ft) Powders: ± 20 mm / ± 0.8 " Interface: ± 10 mm / ± 0.4 " (ϵ_r constant)
(in TBF mode)	± 20 mm / ± 0.8 " (ϵ_r constant)
Operating data Pressure Flange temperature	-1...40 bar / -14.5...580 psig -40...+200°C / -40...+390°F (std.)
Process connection	G 3/4" ... 1 1/2"; 3/4" ... 1 1/2" NPT Flange DN 25...DN 150 (PN 40 / PN 16); 1"...8" (150 lb / 300 lb); 10 K (40...100A)
Materials (Wetted parts)	Stainless steel (1.4404/316 L), Stainless steel (1.4401/316) Hastelloy® C-22 (2.4602)
Human machine interface	Display in 9 languages, even in Chinese, Japanese and Russian
Approvals ATEX	ATEX II G/D 1, 1/2, 2 EEx ia IIC T6 ... T3 ATEX II G/D 1/2, 2 EEx d [ia] IIC T6 ... T3
FM / CSA: NEC 500/CEC:	Cl. I, Div. 1, Gr. ABCD (CSA: BCD only) (IS) Cl. I, Div. 1, Gr. ABCD (FM only) (XP) (XP/IS) Cl. I, Div. 2, Gr. ABCD (CSA: BCD only) (IS & XP) Cl. II, Div. 1, Gr. EFG; Cl. III (FM only) (XP) Cl. II Div. 1/2, Gr. EFG; Cl. III (IS) Cl. II/III, Div. 2, Gr. FG (XP/NI)
NEC 505/CEC:	Cl. I, Zone 0 AEx ia, Gr. IIC (IS); Cl. I, Zone 1 AEx d [ia], Gr. IIC (XP); Cl. I, Zone 2, AEx nA [ia], Gr. IIC (NI)
WHG (pending)	Overfill protection

OPTIFLEX 1300 C

In contrast to earlier guided radar devices, the new OPTIFLEX with its more advanced design solutions has higher signal dynamics. Sharper pulses measure thinner interfaces. OPTIFLEX's exceptional timebase stability means it has better repeatability than older devices: this makes it an outstandingly reliable meter.

- **Simple installation**
- **Wizard driven**
- **PACTware-ready**
- **Easy to use**
- **Service and maintenance-free**

No interface is too thin

OPTIFLEX can detect and measure interfaces not much thicker than a 50 mm / 2" film of oil on water in a large tank.

Stable and reliable measurement

Despite disturbances such as strongly agitated surfaces, foam, coating of the probe or fine dust in the tank, OPTIFLEX will continue to measure where competitors' devices capitulate.

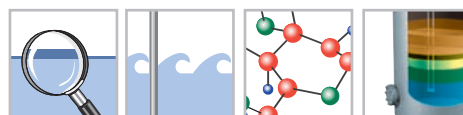
OPTIFLEX measures any product ...

Most 2-wire TDR devices measure down to a dielectric of 1.5. As a result, many organic compounds are not measured properly. OPTIFLEX measures down to 1.4 (and even 1.1 using its first-rate tank-bottom following mode).

... in any application

5 different probes means there's not an application that we can't handle.

For all applications



- **No interface too thin**
- **Stable and reliable measurement**
- **Measures any product in any application**

Continuous Radar

Continuous Ultrasonic

Continuous TDR

Continuous Buoyancy

Continuous Potentiometric

Switches Vibration

Switches Electrom. waves

Switches Conductive

Software PACTware

Continuous Ultrasonic

OPTISOUND 3010 C – 3030 C – for Liquids

OPTISOUND 3010 C – 3030 C

OPTISOUND 3010 C -3030 C are ultrasonic sensors for continuous level measurement, suitable for liquids and solids in virtually all industries, particularly in the water and wastewater industry. The transducer of the ultrasonic sensor emits short ultrasonic pulses to the measured product. These pulses are reflected by the product surface and received by the transducer as echoes. The running time of the ultrasonic pulses from emission to reception is proportional to the distance and hence to the level. The determined level is converted into an appropriate output signal and outputted as measured value.

Fields of application

- Level measurement during processing and storage of liquids
- Sumps, water and wastewater basins
- Noncontact flow measurement and detection in open channels



	OPTISOUND 3010 C	OPTISOUND 3020 C	OPTISOUND 3030 C
Product	Liquids, (solids)	Liquids, (solids)	Liquids, solids
Max. measuring range	Liquids: 5 m / 16 ft Solids: 2 m / 7 ft	Liquids: 8 m / 26 ft Solids: 3.5 m / 11.5 ft	Liquids: 15 m / 49 ft Solids: 7 m / 23 ft
Accuracy	Better than 0.2% or +/- 4 mm	Better than 0.2% or +/- 4 mm	Better than 0.2% or +/- 6 mm
Operating data Pressure Temperature	-0.2 ... 2 bar / -3 ... 30 psi -40°C ... +80°C / -40°F ... +180°F	-0.2 ... 2 bar / -3 ... 30 psi -40°C ... +80°C / -40°F ... +180°F	-0.2 ... 1 bar / -3 ... 14.5 psi -40°C ... +80°C / -40°F ... +180°F
Process connection	G1½"A	G2A	Compression flange DN 100; mounting strap
Materials (Wetted parts)	PVDF, EPDM	PVDF, EPDM	Stainless steel 1.4301 (304), 1.4571 (316 Ti), UP, EPDM
Options	2-wire / 4-wire 4 ... 20 mA / HART®	2-wire / 4-wire 4 ... 20 mA / HART®	2-wire / 4-wire 4 ... 20 mA / HART®
Approvals ATEX	II 1G, 1/2G, 2G EEx ia IIC T6	II 1G, 1/2G, 2G EEx ia IIC T6	-

OPTISOUND 3030 C – 3050 C – for Solids



OPTISOUND 3030 C – 3050 C

OPTISOUND 3030 C - 3050C are ultrasonic sensors for continuous level measurement, particularly suitable for solids, but also good for liquids. The transducer of the ultrasonic sensor emits short ultrasonic pulses to the measured product. These pulses are reflected by the product surface and received by the transducer as echoes. The running time of the ultrasonic pulses from emission to reception is proportional to the distance and hence to the level. The determined level is converted into an appropriate output signal and outputted as measured value.

Fields of application

- Level measurement during processing and storage of solids
- Level indication of solids in silos and hoppers
- Level measurement in stone crushers
- Profile measurement on conveyor belts

Continuous
Radar

Continuous
Ultrasonic

Continuous
TDR

Continuous
Buoyancy

Continuous
Potentiometric

Switches
Vibration

Switches
Electrom. waves

Switches
Conductive

Software
PACTware

	OPTISOUND 3030 C	OPTISOUND 3040 C	OPTISOUND 3050 C
Product	Liquids, solids	Solids, (liquids)	Solids, (liquids)
Max. measuring range	Liquids: 15 m / 49 ft Solids: 7 m / 23 ft	Liquids: 25 m / 82 ft Solids: 15 m / 49 ft	Liquids: 45 m / 147.6 ft Solids: 25 m / 82 ft
Accuracy	Better than 0.2% or +/- 6 mm	Better than 0.2% or +/- 6 mm	Better than 0.2% or +/- 6 mm
Operating data			
Pressure	-0.2 ... 1 bar / -3 ... 14.5 psi	-0.2 ... 1.5 bar / -3 ... 20 psi	-0.2 ... 1.5 bar / -3 ... 20 psi
Temperature	-40°C ... +80°C / -40°F ... +180°F	-40°C ... +80°C / -40°F ... +180°F	-40°C ... +80°C / -40°F ... +180°F
Process connection	Compression flange DN 100, mounting strap	flange DN 200, with swivelling holder ≥ DN 50	flange DN 250, with swivelling holder ≥ DN 50
Materials (Wetted parts)	Stainless steel 1.4301 (304), 1.4571 (316 Ti), UP, EPDM	PP, Alu, galvanized steel, PA, UP, stainless steel 316 Ti	PP, Alu, galvanized steel, PA, UP, Alu/PE foam rubber coating
Options	2-wire / 4-wire 4 ... 20 mA / HART®	4-wire 4 ... 20 mA / HART®	4-wire 4 ... 20 mA / HART®
Approvals ATEX	-	II 1/2 D IP66 T	II 1/2 D IP66 T

BM 26 / BM 26 A – Bypass Level Indicator

BM 26 / BM 26 A

The BM 26 operates on the principle of communicating vessels.

The measuring chamber is connected to the side of the tank so that the same conditions are obtained in the chamber as those in the tank.

The float is equipped with a system of permanent magnets to transmit measured values to the local indicator.

The magnetic field generated by the float either rotates a column of magnetic yellow- and black-sided flaps according to the liquid level, or displaces a follower magnet in the glass indication tube, depending on the method of indication chosen.

The number of reversed yellow magnetic flaps, or the vertical position of the follower magnet, indicates the liquid level.

- **For Level or Interface measurement**
- **Particularly suitable for use with highly corrosive, noxious or flammable substances and ideal for severe operating conditions**
- **Simple rugged design**

Limit switch options



MS 15 EXD

MS 15 EXI

MS 20 EXI



BM 26 A

Product	Liquids
Measuring range (standard)	0.3 ... 6 m / 1 ... 20 ft
Accuracy	± 10 mm / ± 0.4" of measured value
Operating data	
Pressure, standard	-1 ... 40 bar / -14.5 ... 580 psig
Pressure, option	120 bar / 1740 psig
Temperature, standard	-40°C ... +200°C / -40 ... +390°F
Temperature, option	-200°C ... +300°C / -325 ... +570°F
Density	≥ 0.5 kg/l / 21.2 lb/ft³
Viscosity	max. 5000 mPa·s / 3.36 lb/ft·s
Process connection	Flange DN 15 ... DN 50 / 1/2" ... 2"
Materials (Wetted parts)	Stainless steel, titanium, Hastelloy, PTFE, PVC, PVDF/hard glass
Options/Accessories	Limit switches, Level transducer, Heating system, High temperature/low temperature lagging
Approvals	
ATEX	ATEX II 1/2 G or ATEX II 1 G EEx d ia IIC T3 ... T6 or EEx d IIC T3 ... T6, EEx ia IIC T3 ... T6



BM 500 – dependable level measurement solution for hygienic applications



BM 500

Product	Liquids, pastes
Measuring range (standard)	2 m / 7 ft
Repeatability	± 4 mm / ± 0.15"
Operating data	
Pressure	-1 ... 16 bar / -14.5 ... 230 psig
Temperature	-20°C ... +140°C / -4°F ... +285°F
Conductivity	≥ 1 µS/cm
Process connection	Tri-Clamp, Tuchenhausen Varivent, SMS, 11851
Materials (Wetted parts)	Stainless steel
Options/Accessories	Hygienic adapter sleeve
Approvals	EHEDG, 3A

BM 500

The BM 500 level transmitter operates on the potentiometric measuring principle and is designed for use in all electrically conductive products with a minimum conductivity of 1 µS/cm (e.g. distilled water).

This method is particularly suitable for measuring level in small vessels containing paste, heavy caking or viscous products.

The electronic evaluation unit is integrated in the connecting head and supplies an output signal of 4 ... 20 mA that is proportional to level.

The HWM 500 hygienic process welding sleeve ensures installation in conformity with standards of hygiene. Due to its ability to withstand high temperatures (140°C / 285°F), the BM 500 is eminently suitable for CIP cleaning and sterilizing processes.

- **Hygienic installation**
- **Measurement independent of product properties**
- **Unaffected by deposits and foam**
- **Particularly suitable for small tanks**
- **Level measurement possible from 50 mm / 2"**
- **Fast response time**

Continuous
Radar

Continuous
Ultrasonic

Continuous
TDR

Continuous
Buoyancy

Continuous
Potentiometric

Switches
Vibration

Switches
Electrom. waves

Switches
Conductive

Software
PACTware

OPTISWITCH 3000 series

OPTISWITCH 3000 series

The tuning fork is piezoelectrically energised and vibrates at its mechanical resonance frequency of approx. 145 Hz. The piezoelectric elements are fastened mechanically and are therefore not subject to temperature shock limitations. When the tuning fork is immersed in the product, the amplitude of the vibration changes. This change is detected by the integrated electronics and converted into a switching command.

The models OPTISWITCH 3100 C, 3200 C and 3300 C are available in standard, cable and tube versions. These are ideal for numerous applications thanks to the many process options available. They are completely made of stainless steel and have all standard approvals.

Unlike the other models in the series, the OPTISWITCH 3000 C has a small number of options. It is a cheap model with a plastic threaded process connection, a plastic housing and no approvals.

Fields of application

- Overfill and dry run protection
- Nearly unaffected by the chemical and physical properties of the solid



	OPTISWITCH 3000 C	OPTISWITCH 3100 C
Product	Solids	Solids
Max. sensor length	-	-
Density	> 0.08 g/cm ³ (> 0.003 lbs/in ³)	> 0.08 g/cm ³ (> 0.003 lbs/in ³)
Operating data		
Pressure	-1 ... 6 bar / -14.5 ... 90 psi	-1 ... 16 bar / -14.5 ... 230 psi
Temperature	-50°C ... +100°C / -60°F ... +210°F	-50°C ... +250°C / -60°F ... +480°F (with temp. adapter)
Process connection	G1 ¹ / ₂ "A	G1 ¹ / ₂ "A; flanges
Materials (Wetted parts)	Stainless steel 316 L, PP	Stainless steel 316 L
Options / Accessories	Relay, transistor, 2-wire output, contactless electronic switch	Relay, transistor, 2-wire 8/16 mA output, contactless electronic switch
Approvals		
ATEX (Electronics C, R, T)	-	II 1/2 G, 2G EEx d IIC T6 II 1/2 D, IP6X T
(Electronics 2-wire)		II 1G, 1/2 G, 2 G EEx ia IIC T6 II 1G, 1/2 G, 2 G EEx ia IIC T6 + II 1/2 D IP6X T II 1/2 G, 2 G EEx d IIC T6 II 1/2 D IP6X T

Ideal for solids



	OPTISWITCH 3200 C	OPTISWITCH 3300 C
Product	Solids	Solids
Max. sensor length	80 m / 260 ft	6 m / 20 ft
Density	> 0.08 g/cm ³ (> 0.003 lbs/in ³)	> 0.08 g/cm ³ (> 0.003 lbs/in ³)
Operating data		
Pressure	-1 ... 6 bar / -14.5 ... 90 psi	-1 ... 16 bar / -14.5 ... 230 psi
Temperature	-20°C ... +80°C / -5°F ... +180°F	-50°C ... +250°C / -60°F ... +480°F (with temp. adapter)
Process connection	G1½"A; flanges	G1½"A; flanges
Materials (Wetted parts)	Stainless steel 316 L, PUR, CR, NBR	Stainless steel 316 L
Options / Accessories	Relay, transistor, 2-wire 8/16 mA output, contactless electronic switch	Relay, transistor, 2-wire 8/16 mA output, contactless electronic switch
Approvals		
ATEX (Electronics C, R, T)	II 1/2 D IP6X T	II 1/2 G, 2 G EEx d IIC T6 II 1/2 D IP6X T
(Electronics 2-wire)	II 1 G, 1/2 G, 2 G EEx ia IIC T6 II 1 G, 1/2 G, 2 G EEx ia IIC T6 + II 1/2 D IP6X T	II 1 G, 1/2 G, 2 G EEx ia IIC T6 II 1 G, 1/2 G, 2 G EEx ia IIC T6 + II 1/2 D IP6X T II 1/2 G, 2 G EEx d IIC T6 II 1/2 D IP6X T

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Conductive

Software
PACTware

OPTISWITCH 4100 – economical and compact

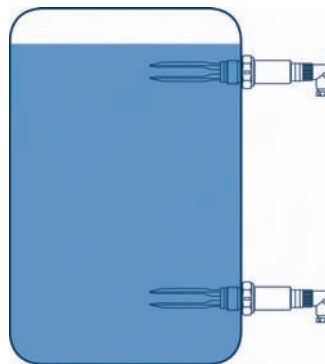
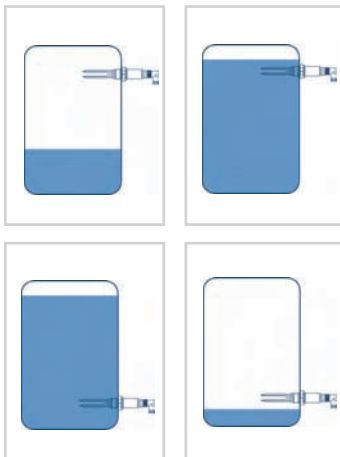
OPTISWITCH 4100

The tuning fork is piezoelectrically energised and vibrates at its mechanical resonance frequency of approx. 400 Hz. This frequency is transferred to the OPTISWITCH 4100 electronics. When the tuning fork is submerged in the product, the frequency changes. This change is detected by the integrated electronics and converted into a switching command.

- **Set-up without adjustment**
- **Economical and compact**
- **Unaffected by product variations in density, conductivity, dielectric constant or viscosity**
- **Insensitive to foam, pressure and temperatures variations**
- **Insensitive to external vibrations**
- **Off-the-shelf design**
- **Proven technology**

Fields of application

- Overfill or dry-run protection
- Particularly suitable for applications in confined spaces



OPTISWITCH 4100

Product	Liquids
Max. sensor length	100 mm / 0.3 ft
Repeatability	± 2 mm / ± 0.08"
Operating data	
Pressure	-1 ... 40 bar / -14.5 ... 580 psig
Temperature	-40°C ... +150°C / -40°F ... +300°F
Density	≤ 0.6 kg/l / 37.5 lb/ft³
Viscosity	max. 10 000 mPa · s
Process connection	G1A, NPT 1"
Materials (Wetted parts)	Stainless steel 1.4571 (316 Ti)
Approvals WHG	Overfill protection



OPTISWITCH 5000 series – ideal for liquids



OPTISWITCH 5000 series

Product	Liquids
Max. sensor length	6 m / 19.7 ft
Repeatability	± 2 mm / ± 0.08"
Operating data	
Pressure	-1 ... 64 bar / -14.5 ... 930 psig
Temperature (with temp. adapter)	-50°C ... +250°C / -60°F ... +480°F
Density	0.5 ... 2.5 kg/l / 31.2 ... 155.8 lb/ft³
Viscosity	max. 10 000 mPa · s
Process connection	G 3/4"A; 3/4" NPT; G1A; 1 NPT Flange ≥ DN 25 / 1", Bolting, Tri-Clamp, Cone, Tuchenhagen Varivent
Materials (Wetted parts)	Stainless steel 316 L, Hastelloy® C4, Hastelloy® C4 enamelled, Stainless steel ECTFE/PFA coated
Options/Accessories	Outputs: NAMUR, 2-wire 8/16 mA, double relay, transistor, contact- less switch, welding socket
Approvals	
ATEX	ATEX II 1/2 G EEx d IIC T2 ... T6 N/Z-electronics: ATEX II 1 G or II 1/2 G or II 2 G EEx ia IIC T6
FM	IS Class I, II, III; Div. 1; Gr. A ... G XP Class I; Div. 1; Gr. A ... D NI Class I; Div. 2; Gr. ABCDFG Class I; Zone 0; AEx ia; Gr. IIC Type 4X/6
WHG	Overfill protection

OPTISWITCH 5000 series

The tuning fork is piezoelectrically energised and vibrates at its mechanical resonance frequency of approx. 1200 Hz. The piezoelectric elements are fastened mechanically and are therefore not subject to temperature shock limitations. When the tuning fork is immersed in the product, the frequency changes. This change is detected by the integrated electronics and converted into a switching command. The models OPTISWITCH 5100 and 5150 are short versions without extension, whereas OPTISWITCH 5200 and 5250 can be ordered with extension tubes. The level switches OPTISWITCH 5150 and 5250 have a polished surface especially suitable for hygienic applications.

- **Set-up without adjustment**
- **Integrated fault monitoring**
- **Unaffected by product variations in density, conductivity, dielectric constant or viscosity**
- **Insensitive to foam, pressure and temperatures variations**
- **Insensitive to external vibrations**
- **Electronics replaceable under process conditions**

Fields of application

- Overfill or dry-run protection
- Suitable for applications in confined spaces (fork length only 40 mm / 1.6")

Continuous
Radar

Continuous
Ultrasonic

Continuous
TDR

Continuous
Buoyancy

Continuous
Potentiometric

Switches
Vibration

Switches
Electrom. waves

Switches
Conductive

Software
PACTware

LS 6200 / LS 6300 – limit switch for liquids and pastes

LS 6200 / LS 6300

Electromagnetic waves penetrate the liquid product and their transit time changes as a function of the dielectric constant.

This measurement method can be used for all applications including processes that involve changing the product.

Deposits, foam and condensate are not detected. The hygienic process welding sleeve ensures virtually flush-front installation in conformity with hygiene standards.

- For universal use, insensitive to adhesive substances and foam
- No pipe blockages, no pressure drop independent of location and vibration
- Hygienic installation
- Fast response time

Fields of application

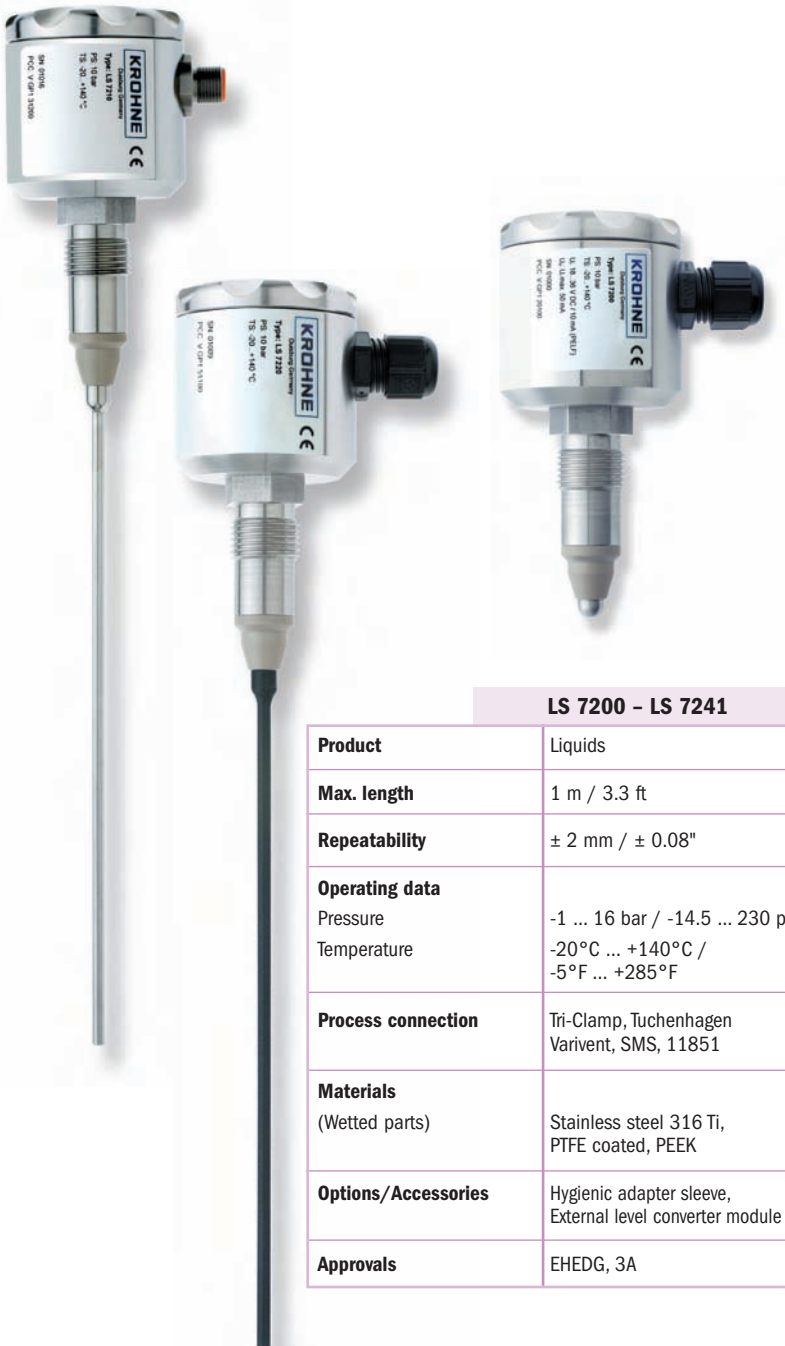
- Level detection
- Dry-run protection for pipes sized DN 15 / DN 25 and higher

Accessories



	LS 6200	LS 6300
Product	Liquids, pastes	Liquids, pastes, slurries
Repeatability	± 2 mm / ± 0.08"	± 2 mm / ± 0.08"
Operating data		
Pressure	-1 ... 16 bar / -14.5 ... 230 psig	-1 ... 16 bar / -14.5 ... 230 psig
Temperature	-20°C ... +140°C / -5°F ... +285°F	-20°C ... +130°C / -5°F ... +265°F
Density	0.8 kg/l / 49.8 lb/ft³	0.6 kg/l / 37.5 lb/ft³
Dielectric constant	> 10 (≥ 1.4 for LS 6250S)	> 10 (≥ 1.4 for LS 6300S)
Process connection	Tri-Clamp, Tuchenhausen Varivent, SMS, 11851	Tri-Clamp, Tuchenhausen Varivent, SMS, 11851
Materials (Wetted parts)	Stainless steel 316 Ti, PEEK	Stainless steel 316 Ti, PEEK
Options/Accessories	Hygienic adapter sleeve	Hygienic adapter sleeve
Approvals	EHEDG, 3A	EHEDG, 3A

LS 7200 – LS 7241 for detecting the level of conductive liquids or dry-run protection of pumps



LS 7200 – LS 7241

Product	Liquids
Max. length	1 m / 3.3 ft
Repeatability	± 2 mm / ± 0.08"
Operating data	
Pressure	-1 ... 16 bar / -14.5 ... 230 psig
Temperature	-20°C ... +140°C / -5°F ... +285°F
Process connection	Tri-Clamp, Tuchenhausen Varivent, SMS, 11851
Materials (Wetted parts)	Stainless steel 316 Ti, PTFE coated, PEEK
Options/Accessories	Hygienic adapter sleeve, External level converter module
Approvals	EHEDG, 3A

LS 7200 – LS 7241

The hygienic conductive sensors type LS 72XX pick up the electrical resistance of the tank product when the electrode is in contact with the product. The wall of the vessel or the pipe acts as reverse potential.

Stump electrodes for pipe installation (LS 7200/7201) or mono or multiple rods (LS 7210-7240) are available for installation in tanks.

The sensor rods are made from stainless steel or coated to make them insensitive for foam or product build up. Sensor rods can be shortened without special tools.

- **Optimized flow geometry**
- **Precise switching point**
- **Hygienic installation**

The electronics is either integrated in the electronic compartment or can be placed in the panel room. On varying products (with different conductivities), the sensitivity can be adjusted via a contact input.

With a huge variety of hygienic process connections, a crevice-free installation can be achieved. These connections are EHEDG-approved as they are so easy to clean.

Continuous Radar

Continuous Ultrasonic

Continuous TDR

Continuous Buoyancy

Continuous Potentiometric

Switches Vibration

Switches Electrom. waves

Switches Conductive

Software PACTware

Accessories



Standard Configuration Tool for KROHNE devices

PACTware – simple and intuitive

PACTware

OPTIFLEX and OPTIWAVE are PACTware-ready. Each device is supplied ex factory with the appropriate DTM (Device Type Manager).

A DTM is a device driver making available the device functionality independent from the FIELDBUS protocol and providing a graphical user interface optimized for device operation and configuration.

Simple on-screen and intuitive setup procedure for devices without a display, or for set up from the Central Control Room. Summarized setup provides perfect control of initial input, and guarantees perfect results. All features of PACTware are fully supported:

- Displays measured values
- Records measured information during operation
- Shows status of device
- Gives stepwise setup with on-screen progress check
- Displays summary of setup selection for final supervision



Oscilloscope screen (TDR)

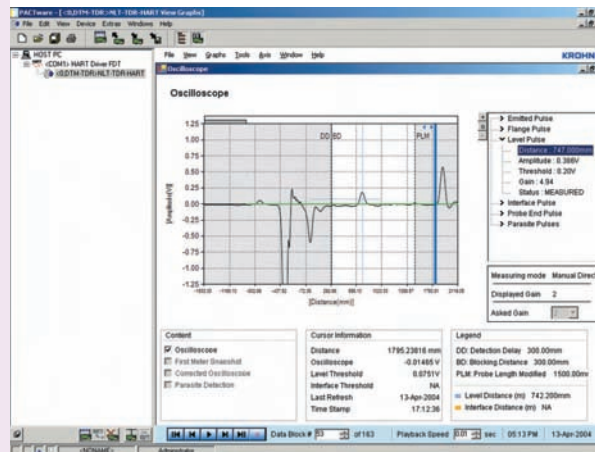
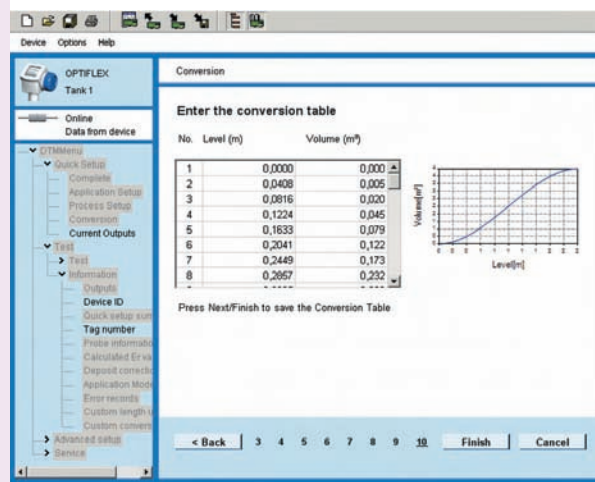


Table graph (Radar and TDR)



Empty spectrum screen (Radar)

Continuous
Radar

Continuous
Ultrasonic

Continuous
TDR

Continuous
Buoyancy

Continuous
Potentiometric

Switches
Vibration

Switches
Electrom. waves

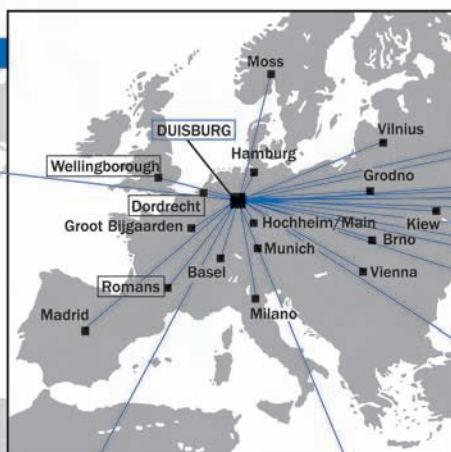
Switches
Conductive

Software
PACTware

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