OPTISENS COND 7200 Technical Datasheet

- Reliable conductive conductivity sensor for use in water analysis
- Sensor version for hygienic requirements
- Fully sterilisable sensor design

The documentation is only complete when used in combination with the relevant documentation for the signal converter.

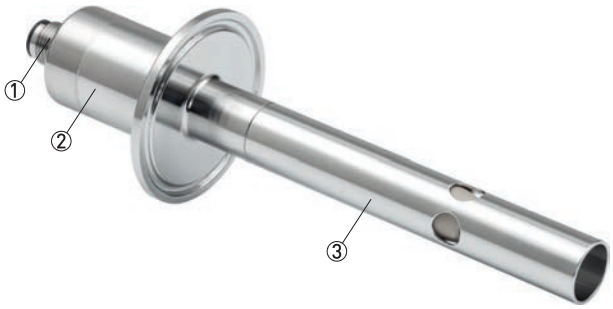
KROHNE

1.1 Conductivity sensor for water analysis

The conductive conductivity sensor **OPTISENS COND 7200** have a standardised robust design and a long lifespan. In combination with a **MAC 100** signal converter, it is possible to create an extremely reliable low-cost measurement system, which is suitable for a wide range of water analysis measurement tasks.

The conductive measurement principle is characterised by high sensitivity, especially at low conductivity values. For this reason, the **OPTISENS COND 7200** is perfect for quality control in water conditioning/preparation in the pharmaceutical, food and beverage industry.

The OPTISENS COND 7200 meet requirements of the pharmaceutical, food and beverage industry with a roughness of <0.8 µm and the test certificate to EN10 204-3.1.



① Process connection
② Conductivity cell
③ Stainless steel shaft with two-electrode

Highlights

- Sterilisable sensor design for hygienic requirements
- Small cell constants for pure water applications
- Integrated temperature sensor
- Standard design for all cell constants
- Long lifespan
- Suitable for connection to the MAC 100 signal converter

Industries

- Pharmaceutical industry
- Water industry
- Food and beverage industry

Applications

- Pure water monitoring
- Quality control in water conditioning and preparation
- Water treatment

1.2 Design and options

MAC 100 Multiparameter signal converter for liquid analytical measurements

A complete measuring system consists of:

- MAC 100 Multiparameter signal converter
- 1 or 2 sensors
- Mounting holders

Up to two sensors (for identical or different parameters) can be connected to the converter.

The signal converter MAC 100 can be adapted perfectly for your requirements: you specify the number and type of signal inputs and outputs you define the complexity of the measuring point and the number of parameters. The standardised user interface also speeds up commissioning of the device and opens access to a wide range of diagnostic functions for devices and processes.

OPTISENS COND 7200

The **OPTISENS COND 7200** is manufactured using high quality stainless steel (1.4435/316L) body and cell material with a surface roughness of <0.8 µm.

Sensor design is sterilisable up to 135°C/275°F.

Available cell constants
- c=0.01 (0.05...10 µS/cm)
- c=0.1 (0.001...1 mS/cm)

1.3 Conductive measurement

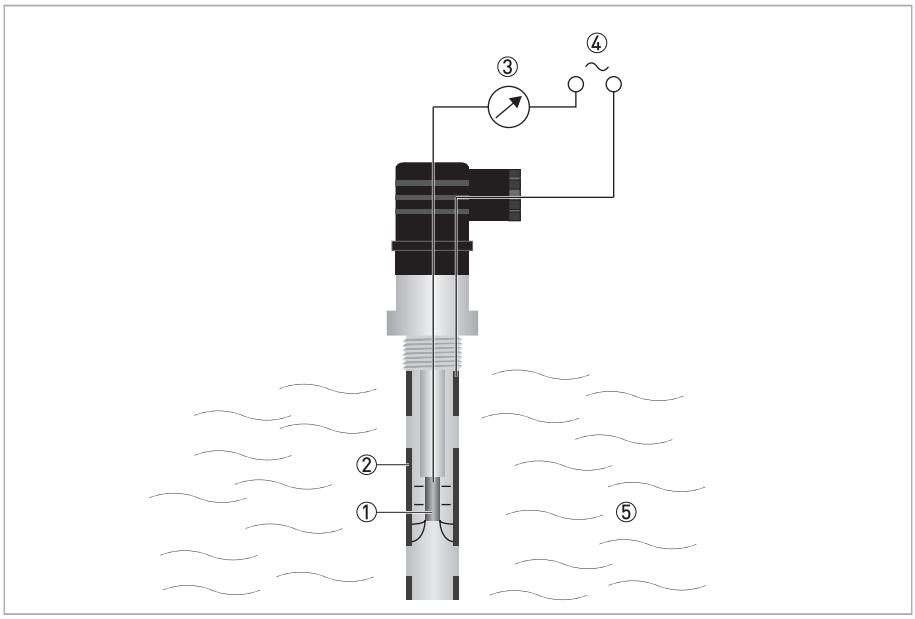


Figure 1-1: Measuring principle for conductivity measurement

① Inner electrode
② Outer electrode
③ Current measurement
④ Power supply
⑤ Measuring medium

The principle of conductivity measurement is defined as the capacity of a solution to conduct an electrical current between two electrodes. For determining the electrolytic conductivity it is necessary to record the number of dissolved ions summarily. The parameter serves as a scale for water purity and is given in Siemens. As there are two open cells, mutual voltage is being produced. This one on its part generates electricity depending on the resistance of the medium. As the medium is in direct contact with the electrode, the medium reacts faster to differences in measuring values. The integrated temperature sensor compensates the conductivity.
Using Ohm's law: Ohm = Voltage/Current, the resistance of a liquid can be determined by measuring the current while keeping voltage constant. Specific conductivity is defined by 1/resistance. The unit of measurement is Siemens and is normally expressed in µs/cm or mS/cm. An important criterion for the measuring range of conductivity cells is the geometry of the electrodes. There are two rules which are characteristic for conductivity measurement:

1. The larger the distance between the two electrodes, the larger the resistance.
2. The larger the electrode surface, the lower the resistance.

The surface area (A) and the distance (L) must be correctly matched to the desired measuring range. This is called the 'cell constant' defined as c=L/A.

2.1 Technical data

Measuring system

Measurement principle	Conductive conductivity
Measuring range	0.05...10 µS/cm (c=0.01) 0.001...1 mS/cm (c=0.1)

Materials

Construction	Body: Stainless steel 1.4435 (similar to 316 L, pharmaceutical version) Cell: Stainless steel 1.4435 (similar to 316 L, pharmaceutical version)
Sensor Options	With integrated Pt100 temperature sensor
Process connection	Clamp DN 25

Measuring accuracy

Conductivity accuracy	+/-10% from the nominal value ①

Operating conditions

Temperature range	0...+135°C / +32...+275°F
Max. operating pressure	16 bar at +25°C, 9 bar at +60°C / 232 psi at +77°F, 130.5 psi at +140°F

① Depending on the production conditions, the cell constant can deviate from the nominal value. This deviation can be compensated at the signal converter.

Electrical connection

Cable	Cable COND-W 7200	Cable COND-W 1200
Sensor-cable connection	M12 connector	4-pin connector (Hirschmann)
Cable length	10m / 33ft	5m / 16.5ft, 10m / 33ft, 15m / 49.5ft, 20m / 66ft
Cable options	Core end sleeves	

2.2 Dimensions

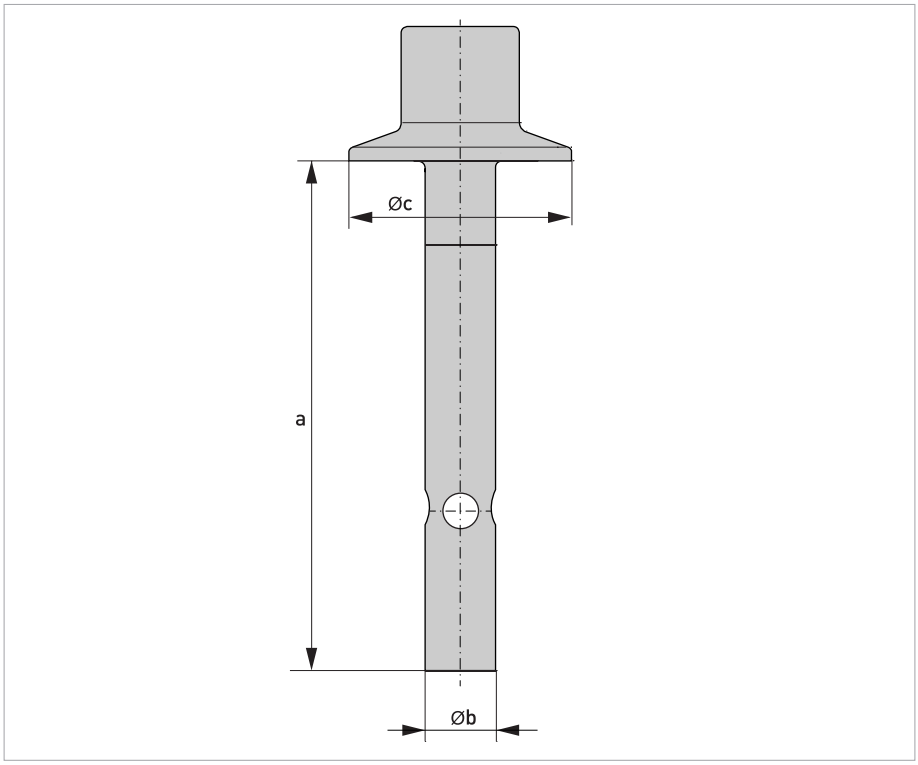


Figure 2-1: OPTISENS COND 7200

	Dimensions [mm]	Dimensions [inch]
a	115	4.53
b	Ø 16	Ø 0.63
c	Ø 50.5	Ø 1.99

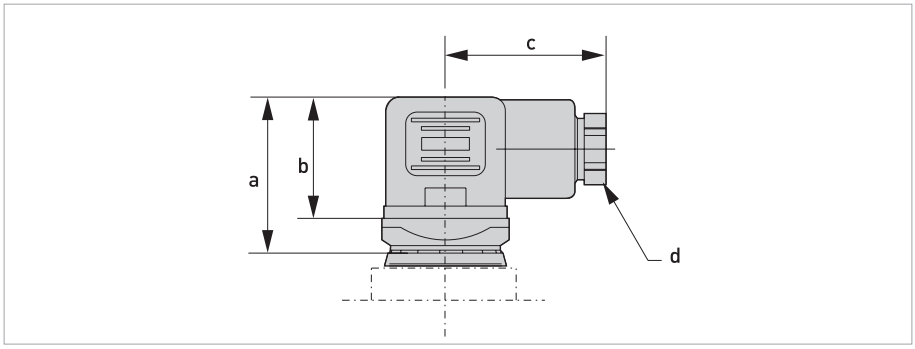


Figure 2-2: Angled connector (Hirschmann)

	Dimensions [mm]	Dimensions [inch]
a	34	1.34
b	27	1.06
c	35	1.38
d	Pg 9	

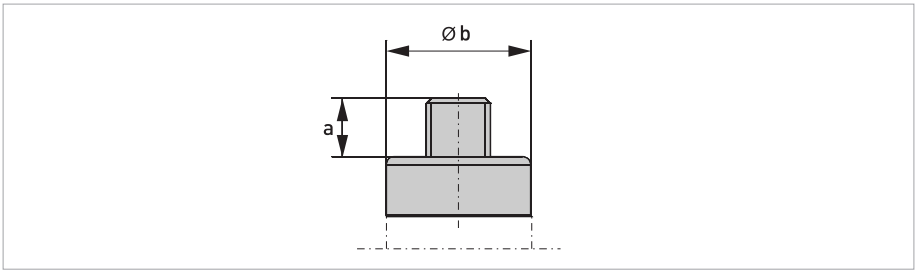


Figure 2-3: M12 connector

	Dimensions [mm]	Dimensions [inch]
a	11	0.43
b	Ø 27	Ø 1.06

2.3 Combination sensor/signal converter

Sensor type	Measured parameter	Measuring principle	Signal converter	
			Input A	Input B
pH	pH value	Potentiometric	X	X
ORP	ORP value	Potentiometric	X	X
Cl_2	Free chlorine	Amperometric	X	-
ClO_2	Chlorine dioxide	Amperometric	X	-
O_3	Ozone	Amperometric	X	-
DO	Dissolved oxygen	Amperometric ①	X	-
		Optical ①	X	-
COND	Conductivity/ specified resistance	Conductive	X	X
IND	Toroidal conductivity	Inductive	X	X
TUR	Turbidity	Optical ①	X	-

① only for single channel version

3.1 Notes on installation

Inspect the cartons carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

Do a check of the packing list to make sure that you have all the elements given in the order.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

3.2 Intended use

Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.

The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.

The intended use of OPTISENS COND 7200 conductivity sensor is the measurement of conductive liquids. The sensor is suitable for connection to the MAC 100 signal converter.

3.3 Pre-installation requirements

Never touch or scratch the sensor shaft or the inner electrode.
Make sure that the sensor shaft and the inner electrode are clean and dust-free. If necessary, clean the sensor as described in the manual of the sensor.

- *Install the sensor against the flow to ensure direct exposure of the electrodes.*
- *Avoid air getting trapped around the sensor.*
- *Avoid solids collection around the electrodes.*

3.4 Installing the sensor

3.4.1 General installation instructions

Ensure that the pipe is without pressure before installing or removing a sensor!

During installation you should fix a shut-off valve in front of and behind the instrument so that the sensor can be taken out of the bypass in case of check.

To achieve reliable measuring results, note the following item:

- *The sensor must always have full contact with the measuring medium.*

3.4.2 Mounting to a pipe or t-piece

Ensure that the pipe is without pressure before installing or removing a sensor!

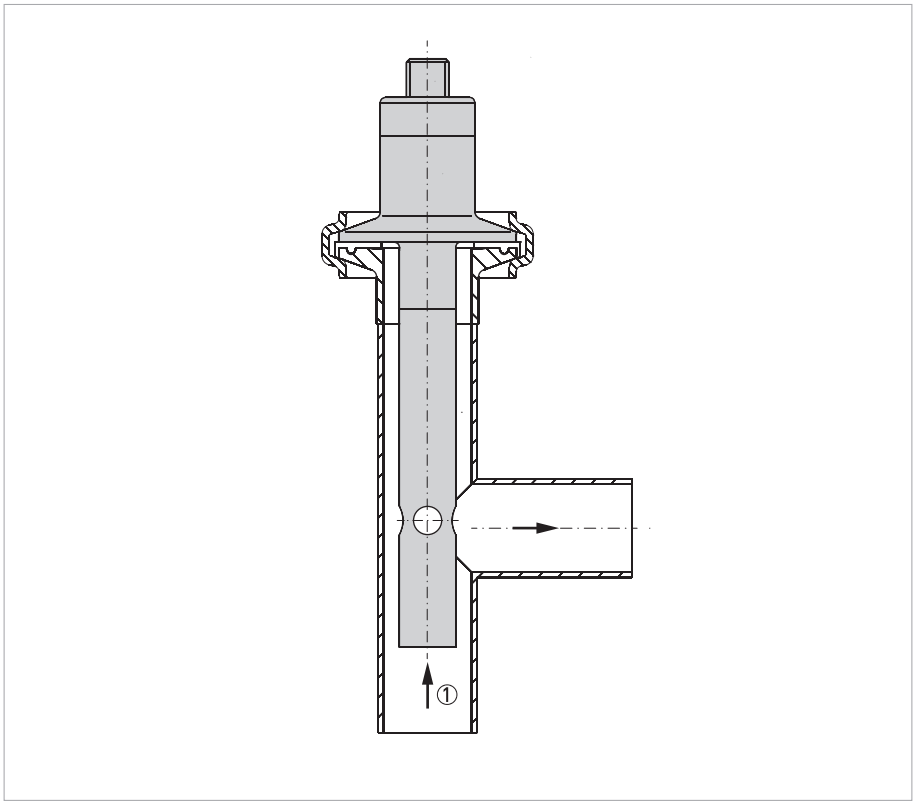


Figure 3-1: Mounting position

① Flow direction

4.1 Safety instructions

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Observe the national regulations for electrical installations!

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

4.2 Connecting the cable to the sensor

Moisture inside the sensor connector must be avoided! Moisture will shortcut the mV signal between the electrodes and deliver erratic readings!
If moisture has entered the connector dry it with air (e.g. hair blower).

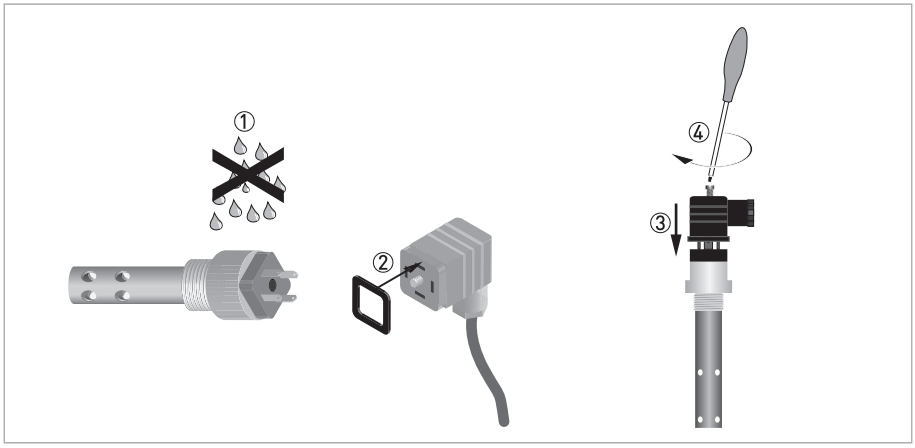


Figure 4-1: Connecting the Hirschmann plug to the sensor

Ensure that both cable and sensor connector are absolutely dry ①.
Make sure that the seal is positioned on the sensor connector ②.
Push the cable connector ③ on the sensor.
Screw the cable connector to the sensor and tighten it with a screw driver ④.

4.2.1 Cable assign of a Hirschmann plug

Do not shorten the cable length. This can influence the measuring accuracy.

The given colours only refer to the delivered cables! When using cables of a different provider, take into account the manufacturer's notes concerning the cable colour and designation.

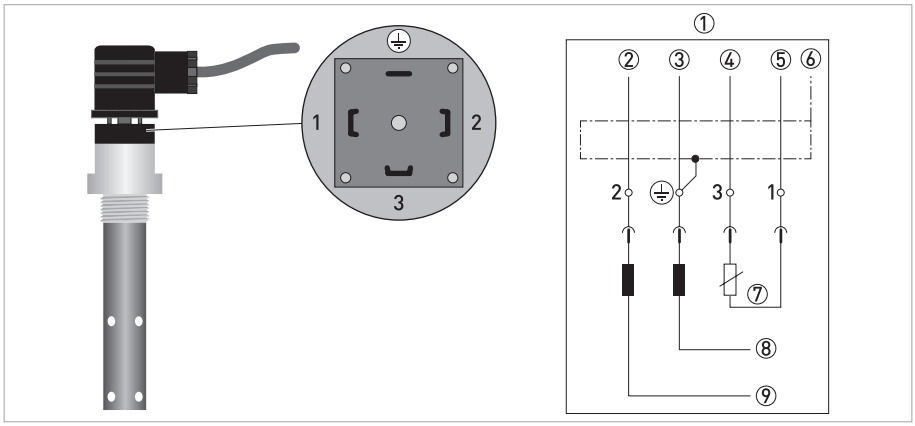


Figure 4-2: Cable assign of a Hirschmann plug

① Cable LIYCY 4x0.5 mm
② White
③ Brown
④ Yellow
⑤ Green
⑥ Shield
⑦ Pt100 sensor
⑧ Outer electrode
⑨ Inner electrode

4.3 Connecting the sensor cable to the signal converter

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

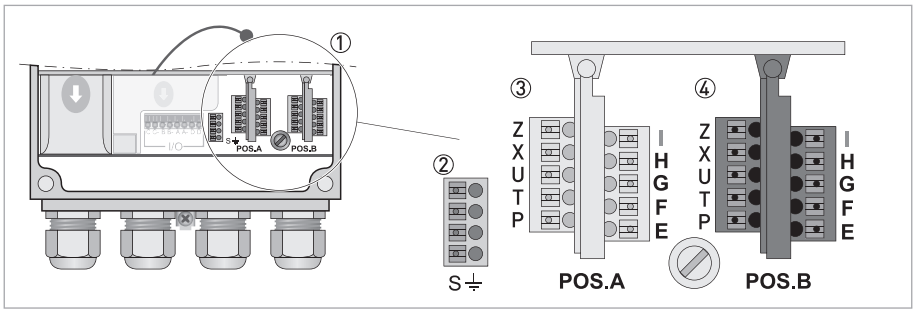


Figure 4-3: Junction of the signal converter

① Sensor connection terminals
② Terminal block S (protective earth)
③ Terminal block A: terminals for sensor
④ Terminal block B: terminals for sensor

When ordering the single channel version, only the interface "Pos.A" is populated. In the dual channel version the interfaces "Pos.A" and "Pos.B" are populated.

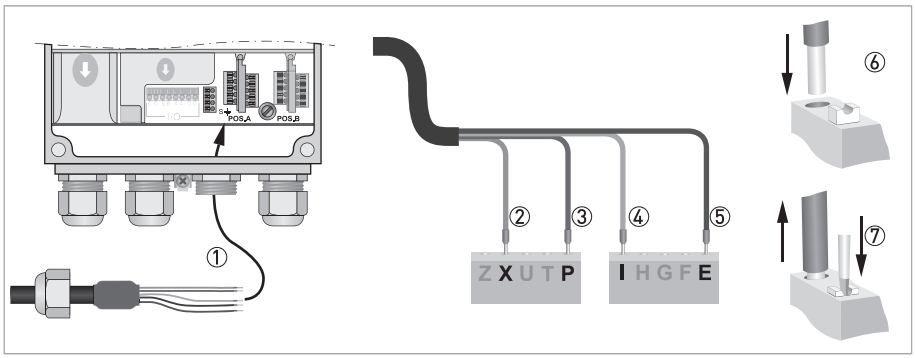


Figure 4-4: Connecting the sensor cable to the signal converter

- Thread the sensor cable through the middle right cable gland ①.
- Push the wire ⑦ into the terminal block Pos. A or Pos. B as described in the chart.
- To remove a cable, press down the white clip ⑧ on the corresponding terminal and pull the cable out.

Wire	Terminal block Pos. A / B

OPTISENS COND 7200 with COND-W-1200 cable (Hirschmann connector)

Green ②	X
Yellow ③	P
White ④	I
Brown ⑤	E

OPTISENS COND 7200 with COND-W-7200 cable (M12 connector)

Green ②	X
Yellow ③	P
White ④	I
Brown ⑤	E

5.1 Order code

The characters of the order code highlighted in light grey describe the standard.

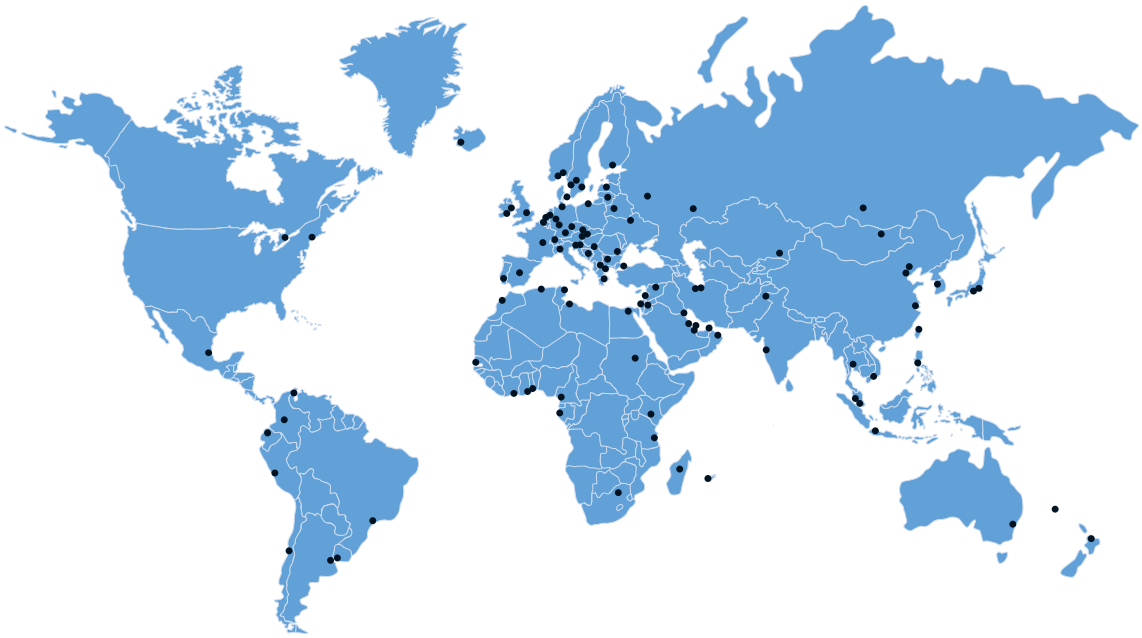
VGA I	**4**	**Sensor type**									
		B	OPTISENS COND 7200								
			Measuring range								
			A	0.05...10 µS/cm (c=0.01)							
			B	0.001...1 mS/cm (c=0.1)							
				Sensor features							
				4	Body: Stainless Steel (1.4435), Cell: Stainless Steel (1.4435)						
					Process conditions						
					1	0...+135°C, 16 bar at +25°C and 9 bar at +60°C +32...+275°F, 232 psi at +77°F and 130.5 psi at +140°F					
						Process connection					
						6	Clamp DN 25				
							Sensor options				
							1	Pt100			
								Sensor-cable connection			
								1	4-pin connector (Hirschmann)		
								2	M 12 connector		
									Documentation		
									0	none	
									1	English	
									2	German	
									3	French (available from Q1 2013)	
									4	Spanish (available from Q1 2013)	
										Certificates	
										1	3.1, FDA, ASTM
VGA I	**4**										

5.2 Spare parts, consumables and accessories

Spare parts	Order code
OPTISENS COND 7200-J-0.1-1.4435-C25	VGA I 4 BB4161101
OPTISENS COND 7200-J-0.01-1.4435-C25	VGA I 4 BA4161101
OPTISENS COND 7200-J-0.01-1.4435-C25-M12	VGA I 4 BA4161201
OPTISENS COND 7200-J-0.1-1.4435-C25-M12	VGA I 4 BB4161201

Consumables	Order code
Conductivity standard solution for calibration	
Standard solid solution 15 µS/cm, 1 x 250 ml	XGA S 030010
Standard solid solution 147 µS/cm, 1 x 250 ml	XGA S 030020
Standard solid solution 1413 µS/cm, 1 x 250 ml	XGA S 030030
Standard solid solution 25 mS/cm, 1 x 250 ml	XGA S 030040

Accessories	Order code
Sensor cables for M12 connector	
OPTISENS Cable COND-W-7200-10 (10 m / 33 ft)	XGA W 033231
Sensor cables for 4-pin connector (Hirschmann)	
OPTISENS Cable COND-W-1200-5 (5 m / 16.4 ft)	XGA W 0 21121
OPTISENS Cable COND-W-1200-10 (10 m / 33 ft)	XGA W 0 21131
OPTISENS Cable COND-W-1200-15 (15 m / 49.5 ft)	XGA W 0 21141
OPTISENS Cable COND-W-1200-20 (20 m / 66 ft)	XGA W 0 21151



KROHNE 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 the oil & gas industry
- Measuring systems for the marine industry

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