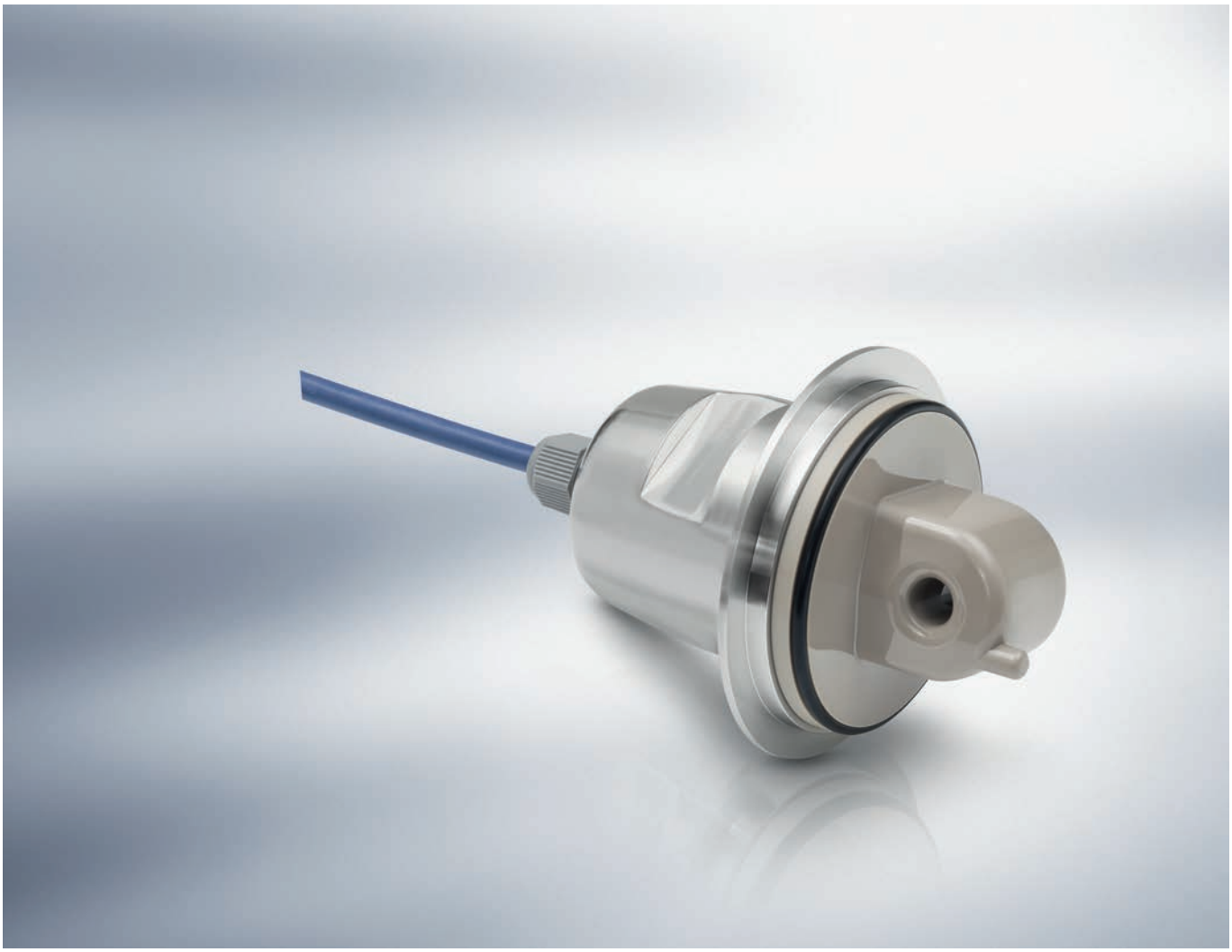


# OPTISENS IND 7000 Technical Datasheet

- Fully sealed hygienic inductive conductivity sensor with integrated temperature sensor
- FDA/food-use approved materials
- Compact design with a variety of process connections

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

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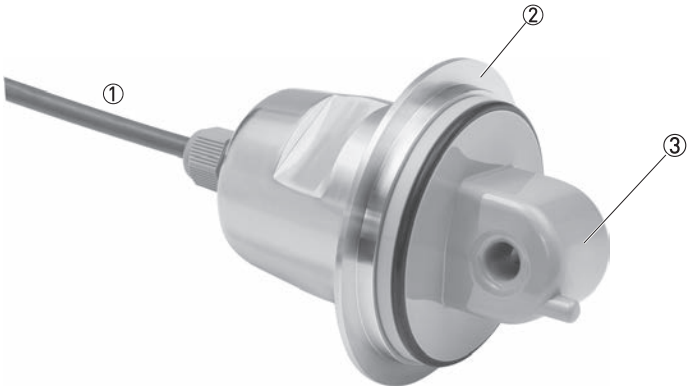
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## 1.1 Inductive conductivity sensor for liquid analysis

The inductive conductivity sensor **OPTISENS IND 7000** features a compact and hygienic design as well as a wide measuring range.

In combination with the MAC 100 signal converter, it is possible to create an extremely reliable and low-cost measuring system, which is suitable for a wide range of liquid analysis measurement tasks. This system is very well suited for conductivity measurements in hygienic applications in the pharmaceutical, food and beverage industry.




① Fixed cable 10 m
② Process connection
③ Measuring coils (primary and secondary coils)

## Highlights

- Sterilisable sensor design
- FDA/food-use approved PEEK material
- Various process connections for pipe or tank installation
- Integrated temperature sensor for automatic temperature compensation
- Constructed without seals
- EHEDG-compliant sensor design with DN40/125 Varivent® enhanced hygiene safety
- Suitable for connection to the MAC 100 signal converter

## Industries

- Pharmaceutical industry
- Food and beverage industry

## Applications

- Monitoring of cleaning operations (CIP)
- Process monitoring in breweries, soft drinks manufacturing/bottling, mineral springs, drinking water, liquid food production and dairies

## 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 IND 7000



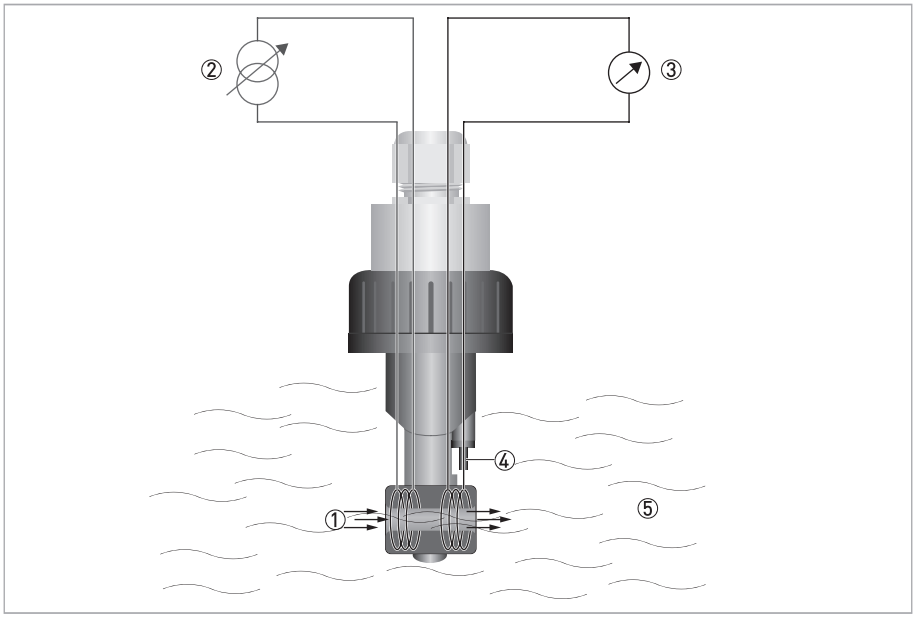
The OPTISENS IND 7000 sensor is manufactured using hygienic PEEK material. The sensor can be installed in pipelines and tanks.

The integrated temperature sensor is enclosed in the inductive conductivity sensor.

The measuring cell with two inner, ring-shaped measuring coils is completely sealed and is therefore not in contact with the media.

## 1.3 Conductivity measurement - inductive

The inductive measurement method enables largely maintenance-free acquisition of specific conductivity, even in the toughest media conditions. In the principle of inductive measurement, the sensor consists of a sender-recipient-coil.
The well-known Faraday Law of magnetic induction is used here to determine conductivity in solutions at higher values, where direct contact measurement is not well suited. When a magnetic field is generated by an electrical coil and a second electrical coil is placed next to it, a certain amount of electric energy will be transferred to it. With an inductive conductivity sensor, the process media flows directly through the middle of both coils. As the voltage in the first coil is constant, the amount of energy transferred to the second coil is directly proportional to the electrical resistance of the solution. Due to said voltage and the cell constant the conductivity can be measured.




① Flow direction
② Power supply - Polarisation voltage measurement
③ Current measurement
④ Exposed temperature sensor Pt1000
⑤ Measuring medium

## 2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Download Center).*

### Measuring system

| | |
|---|---|
| Measuring principle | Inductive conductivity |
| Measuring range | 0.5...2000 mS/cm |

### Design

| | |
|---|---|
| Construction | PEEK / Stainless steel 1.4301, AISI304, EPDM sealing (only for Varivent®) |
| Cell constant | c= 5.0 1/cm,<br>c= 5.15 1/cm (only DN40/125 Varivent®) |
| Process connection pipe installation | G1 1/2 A thread<br>G2 A thread<br>MK DN50 milk cone<br>MK DN65 milk cone<br>DN40/125 Varivent® |
| Temperature sensor | Pt1000 |

### Measuring accuracy

| | |
|---|---|
| Conductivity accuracy: | ≤ 1% (measured value) |

### Operating conditions

| | |
|---|---|
| Temperature range | -10°C...+125°C / +14°F...+257°F<br>≤ +150°C / +302°F (≤ 60 min, ≤ 5 bar/72.5 psi) |
| Max. operating pressure | 12 bar at +20°C / 174 psi at +68°F |
| | 10 bar at +80°C / 145 psi at +176°F |
| | 6 bar at +125°C / 116 psi at +257°F |

### Installation conditions

| | |
|---|---|
| Process connection | G1 1/2 A male thread<br>G2 A male thread<br>MK DN50 milk cone<br>MK DN65 milk cone<br>DN40/125 Varivent® |

### Electrical connection

| | |
|---|---|
| Cable | Attached cable |
| Cable length | 10 m / 33 ft |
| Cable options | Core end sleeve |

## 2.2 Dimensions

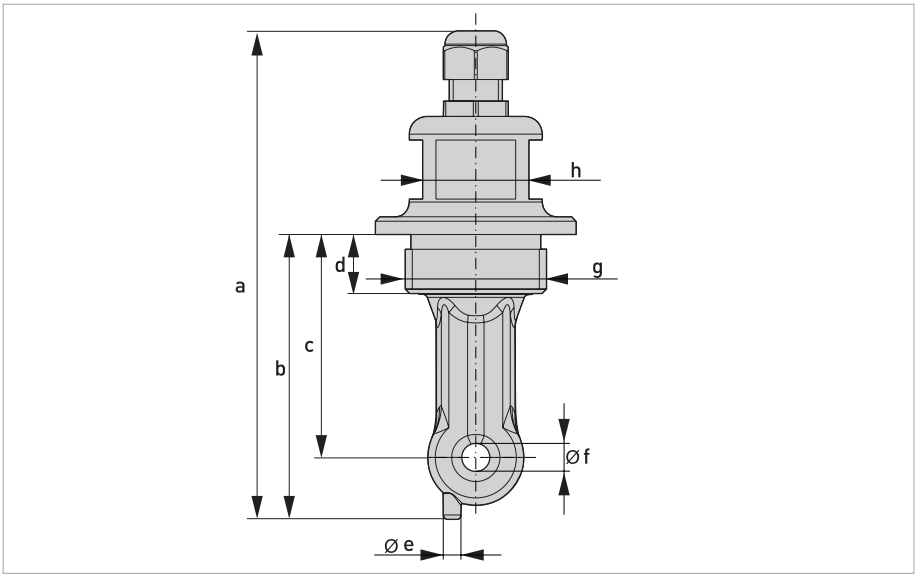



Figure 2-1: OPTISENS IND 7000 with G1 1/2 A or G2 A male thread

| | Dimensions [mm] | Dimensions [inch] |
|---|---|---|
| a | 166 | 6.54 |
| b | 96 | 3.78 |
| c | 75 | 2.95 |
| d | 20 | 0.79 |
| e | 6 | 0.24 |
| f | 9.5 | 0.37 |
| g | G1 1/2 A or G2 A | |
| h | 36 | 1.42 |

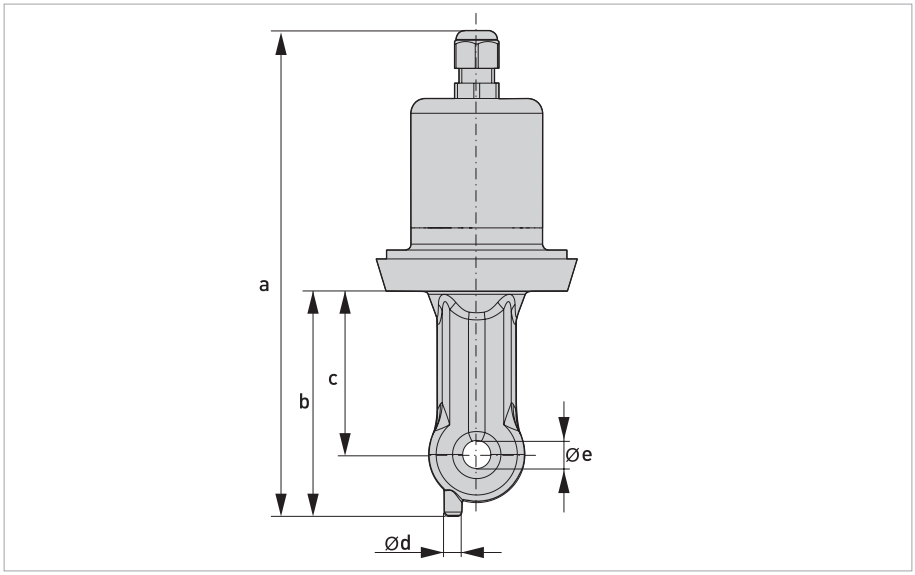



Figure 2-2: OPTISENS IND 7000 with MK DN50 or MK DN65 milk cone

| | Dimensions [mm] | | Dimensions [inch] | |
|---|---|---|---|---|
| Milk cone | DN50 | DN65 | DN50 | DN65 |
| a | 165 | 166 | 6.5 | 6.54 |
| b | 76 | | 3 | |
| c | 55 | | 2.17 | |
| d | 6 | | 0.24 | |
| e | 9.5 | | 0.37 | |

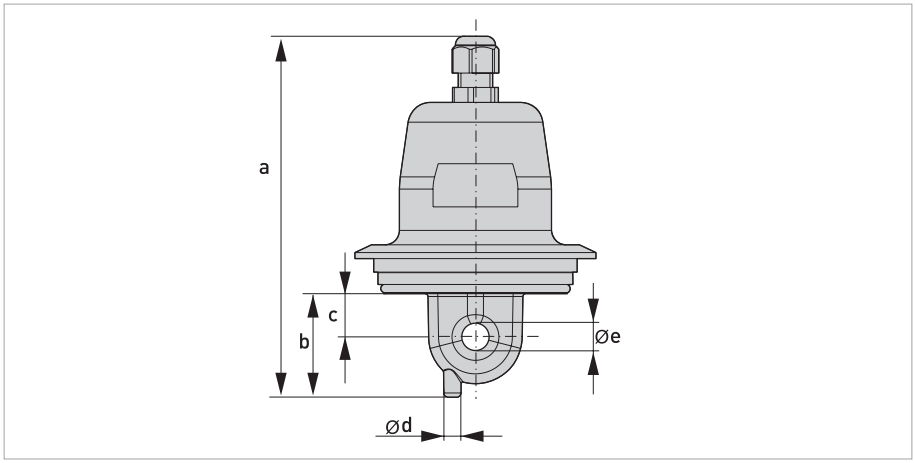



Figure 2-3: OPTISENS IND 7000 with DN40/125 Varivent®

| | Dimensions [mm] | Dimensions [inch] |
|---|---|---|
| Varivent® | DN40/125 | |
| a | 126 | 4.96 |
| b | 36 | 1.42 |
| c | 15 | 0.59 |
| d | 6 | 0.24 |
| e | 9.5 | 0.37 |

## 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 IND 7000 conductivity sensor is the measurement of conductive liquids. The sensor is suitable for connection to the MAC 100 signal converter.

## 3.3 Installing the sensor

### 3.3.1 General installation instructions

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

*This installation procedure is only recommended for very clean water without any particles in the water. Otherwise turn the flow-through holder and be sure that the tube is completely filled with water, otherwise the measuring reading is wrong.*

*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 items:*

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

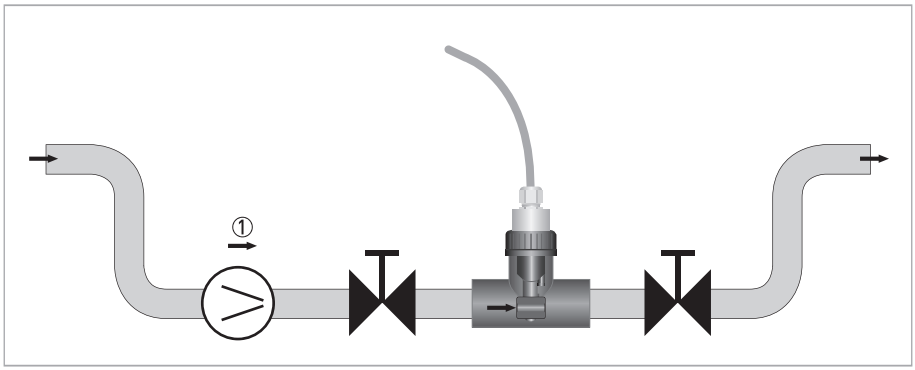



Figure 3-1: Installation requirements

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!*

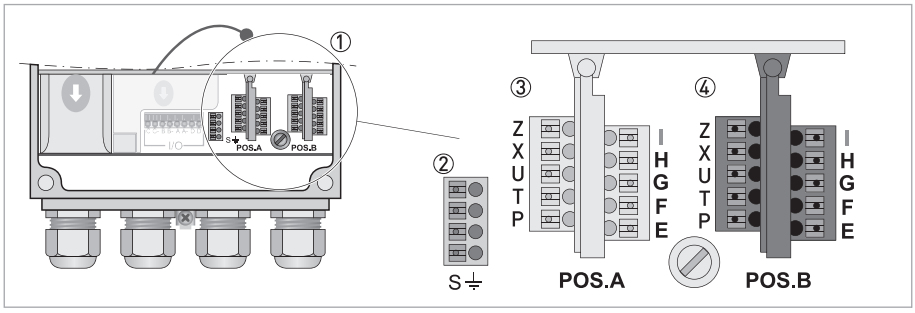
*Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.*

*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 sensor cable to the signal converter

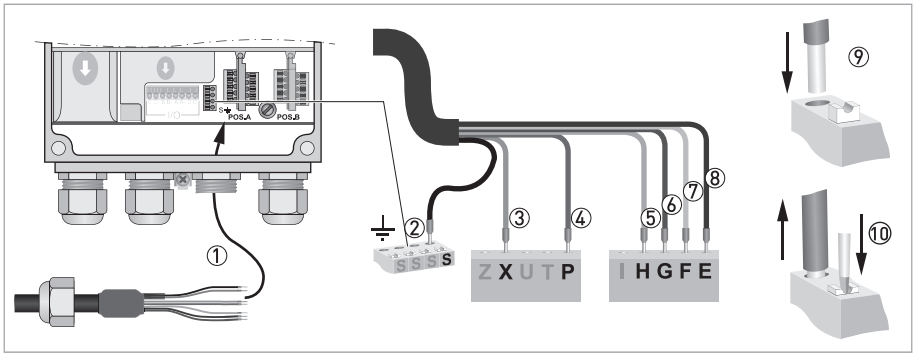
*All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!*

*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.*




① Sensor connection terminals
② Terminal block S (protective earth)
③ Terminal block A : terminal 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.




The following instructions describe the connection of the sensor cable

### Connecting the sensor cable to the signal converter

- Thread the sensor cable through the middle right cable gland (1).
- Push the wire (9) into the terminal block Pos A as described in the chart.
- To remove a cable, press down the white clip (10) on the corresponding terminal and pull the cable out.

| Wire | Terminal block A or B |
|---|---|
| Shield (2) | S |
| Yellow - Pt1000 (3) | X |
| Green - Pt1000 (4) | P |
| Shield from pink (5) | H |
| Pink (6) | G |
| White (7) | F |
| Brown (8) | E |

## 5.1 Order code

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

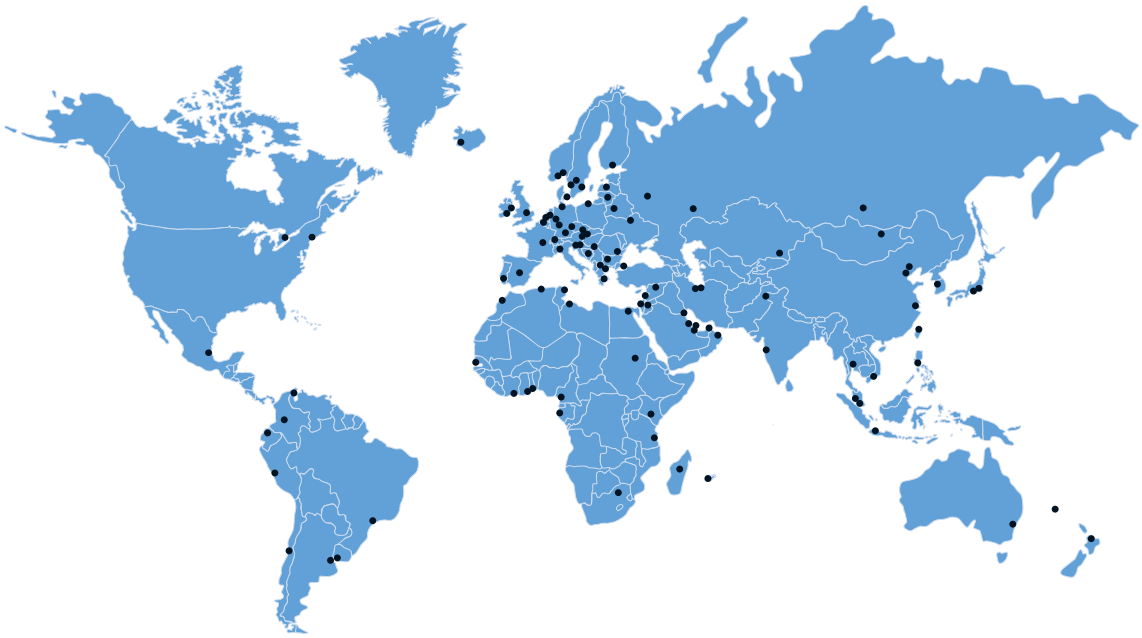
| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VGA J | 4 | Sensor type | | | | | | | | | | | | |
| | | 1 | OPTISENS IND 7000 | | | | | | | | | | | |
| | | | Measuring range | | | | | | | | | | | |
| | | | A | 0.5...2000 mS/cm | | | | | | | | | | |
| | | | | Sensor features | | | | | | | | | | |
| | | | | C | PEEK (FDA) | | | | | | | | | |
| | | | | | Process conditions | | | | | | | | | |
| | | | | | C | -10°C...+125°C (+150°C ≤ 60min. ≤ 5 bar), 10 bar at +80°C / +14°F...+257°F (302°F ≤ 60 min. ≤ 72.5 psi), 145 psi at +176°F | | | | | | | | |
| | | | | | | Process connection | | | | | | | | |
| | | | | | | G | MK DN50 milk cone (DIN 11851) | | | | | | | |
| | | | | | | H | MK DN65 milk cone (DIN 11851) | | | | | | | |
| | | | | | | L | DN40/125 Varivent® (hygienic version) | | | | | | | |
| | | | | | | M | G1 1/2 A thread | | | | | | | |
| | | | | | | N | G2 A thread | | | | | | | |
| | | | | | | | Sensor options | | | | | | | |
| | | | | | | | B | Integrated temperature sensor | | | | | | |
| | | | | | | | | Sensor-cable connection | | | | | | |
| | | | | | | | | 4 | Attached cable | | | | | |
| | | | | | | | | | Cable | | | | | |
| | | | | | | | | | 1 | Cable IND-W-7000 | | | | |
| | | | | | | | | | | Cable features | | | | |
| | | | | | | | | | | 1 | Standard | | | |
| | | | | | | | | | | | Cable length | | | |
| | | | | | | | | | | | A | 10 m / 33 ft | | |
| | | | | | | | | | | | | Cable options | | |
| | | | | | | | | | | | | 1 | Core end sleeves | |
| | | | | | | | | | | | | | Documentation | |
| | | | | | | | | | | | | | 0 | None |
| | | | | | | | | | | | | | 1 | English |
| | | | | | | | | | | | | | 2 | German |
| | | | | | | | | | | | | | 3 | French (available from Q1 2013) |
| | | | | | | | | | | | | | 4 | Spanish (available from Q1 2013) |
| | | | | | | | | | | | | | | Certificates |
| | | | | | | | | | | | | | | 1 EHEDG (Varivent®), FDA (PEEK) only available for DN40/125 Varivent® |
| | | | | | | | | | | | | | | 2 FDA (PEEK) |
| VGA J | 4 | | | | | | | | | | | | | |

## 5.2 Spare parts, consumables and accessories

| Spare parts | Order code |
|---|---|
| OPTISENS IND 7000-PK-MK50-10 | VGA J 4 1ACCGB411A102 |
| OPTISENS IND 7000-PK-MK65-10 | VGA J 4 1ACCHB411A102 |
| OPTISENS IND 7000-PK-VAR40-10 | VGA J 4 1ACCLB411A101 |
| OPTISENS IND 1000-PK-G1 1/2 A | VGA J 4 1ACCMB411A102 |
| OPTISENS IND 1000-PK-G2 A | VGA J 4 1ACCNB411A102 |

| Accessories | Order code |
|---|---|
| DN50 MK weld-on threaded adapter DIN 11851 | XGA S 070010 |
| DN50 MK clip collar DIN 11851 | XGA S 070020 |
| DN65 MK clip collar DIN 11851 | XGA S 070030 |





## 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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www.krohne.com

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