



OPTISENS COND Technical Datasheet

Conductive conductivity sensors

- Reliable conductive conductivity sensors for use in water analysis
- Wide measuring range for all water applications
- Rugged sensor design with integrated temperature sensor

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

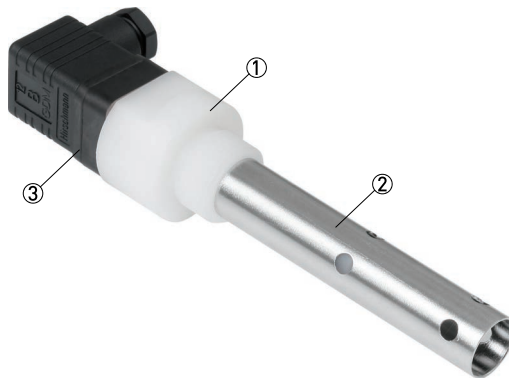
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1.1 Conductivity sensors for water analysis

Conductivity sensors from the **OPTISENS COND** series have a robust design and a long lifespan. In combination with the signal converters from the **MAC** series 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 majority of the sensors from the **OPTISENS COND** series are perfect for low-contaminated, non-corrosive media such as pure water, steam and cooling water.

Also a special industrial version with graphite electrodes for media separation, drinking water purification and wastewater checks/treatment is available.



- ① Process connection
- ② Shaft with two-electrode measuring cell
- ③ 4-pin right-angle plug (Hirschmann plug)

Highlights

- Available with a large range of cell constants for various applications
- Conductive measurement with two stainless steel, titanium or graphite electrodes
- Integrated temperature sensor
- Various designs suitable for a wide range of applications
- Long lifespan
- Suitable for connection to signal converters from the MAC series

Industries

- Water industry
- Power plants
- Metal and mining
- Paper industry
- Chemical industry
- Food and beverage
- Pharmaceutical industry

Applications

- Quality control of steam and cooling water
- Monitoring of filters / ion exchangers
- Quality control of pure water, drinking water
- Media separation, drinking water purification, wastewater checks/treatment

Overview of sensor groups

- **OPTISENS COND 12x0**
General purpose - water and wastewater
- **OPTISENS COND 32x0**
Low-range - condensate and (ultra-)pure water
- **OPTISENS COND 5200**
Low-range - condensate and (ultra-)pure water
- **OPTISENS COND 72x0**
Hygienic - food, beverages, pharmaceuticals

1.2 Design and options



A complete measuring system consists of:

- MAC series Multiparameter signal converter
- Up to 3 sensors
- Mounting holders

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

The MAC series signal converters 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 intuitive 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 sensors

The **OPTISENS COND** sensors are manufactured using different sensor shaft and electrode materials to cover a wide range of applications.

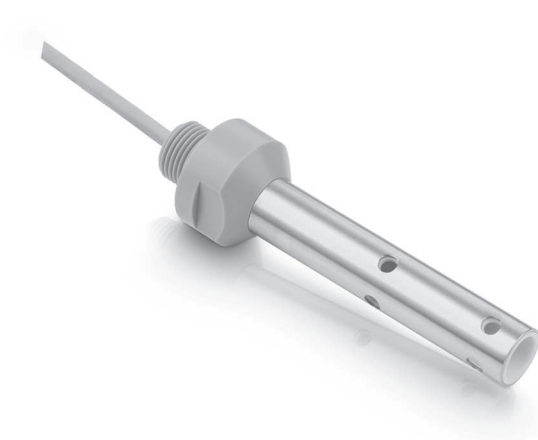
General purpose - water and wastewater

OPTISENS COND 1200



Conductive conductivity sensor for water, pure water and wastewater applications

- With two stainless steel electrodes (1.4571 / 316Ti), PVDF sensor body and Pt100 for temperature compensation
- Three cell constants for different measuring ranges: 0.1...200 $\mu\text{S}/\text{cm}$, 1...2000 $\mu\text{S}/\text{cm}$ and 0.1...20 mS/cm
- Max. +135°C / +275°F; Max. 16 bar / 232 psi
- Easy insertion installation with the ready-to-use SENSOFIT FLOW 1000 Y flow-through assembly or any G $\frac{3}{4}$ process connection
- Robust sensor design, long lifespan
- Reliable handling and low operating costs

OPTISENS COND 1210

Conductive conductivity sensor for water and treated wastewater applications in open basins or tanks

- With two stainless steel electrodes (1.4571 / 316Ti), PP sensor body and Pt100 for temperature compensation
- Two cell constants for different measuring ranges: 1...2000 $\mu\text{S}/\text{cm}$ and 0.1...20 mS/cm
- Max. +90°C / +194°F; Max. 16 bar / 232 psi
- Process connection: G $\frac{1}{2}$ (male, sensor rear end) for easy installation with the SENSOFIT IMM 1000 immersion assembly
- Robust sensor design with PP sensor body, long lifespan
- With attached cable up to 10 m / 33 ft
- Reliable handling and low operating costs

Low-range – condensate and (ultra-)pure water**OPTISENS COND 3200**

Conductive conductivity sensor for condensate, process, boiler feed or (ultra)pure water

- With stainless steel (1.4571/316Ti) or titanium electrodes, PVDF or stainless steel (1.4571/316Ti) sensor body and Pt100 for temperature compensation
- Two cell constants for different measuring ranges: 0.05...10 $\mu\text{S}/\text{cm}$, 1...1000 $\mu\text{S}/\text{cm}$
- Max. +135°C / +275°F; Max. 16 bar / 232 psi
- G $\frac{3}{4}$ process connection for easy insertion installation with the ready-to-use SENSOFIT FLOW 1000 Y flow-through assembly
- Other process connections: G $\frac{1}{2}$, G1 and $\frac{3}{4}$ NPT for insertion installation
- Low maintenance costs and a long life cycle

OPTISENS COND 3220

Conductive conductivity sensor for pure and process water with high temperatures and pressures (water/steam cycle applications, pressurized boilers)

- With stainless steel electrodes and rugged sensor body (all 1.4404/316L), Pt100 for temperature compensation
- Measuring range: 1...1000 $\mu\text{S}/\text{cm}$
- Max. +200°C / +392°F; Max. 40 bar / 580 psi
- 3/4 NPT process connection for insertion installation
- Low maintenance costs and a long life cycle

Rugged – chemicals and industrial wastewater**OPTISENS COND 5200**

Corrosion-resistant conductive conductivity sensor for harsh applications, e.g. industrial water, wastewater and chemical applications

- With graphite electrodes, PVDF sensor body and Pt100 for temperature compensation
- Rugged sensor with a wide dynamic range from 0.01...15 mS/cm
- Max. +130°C / +266°F; Max. 16 bar / 232 psi
- G3/4 process connection for easy insertion installation with the ready-to-use SENSOFIT FLOW 1000 Y flow-through assembly
- Other process connections: G1 and 3/4 NPT for insertion installation
- Low maintenance costs and a long life cycle

Hygienic – food, beverages, pharmaceuticals**OPTISENS COND 7200**

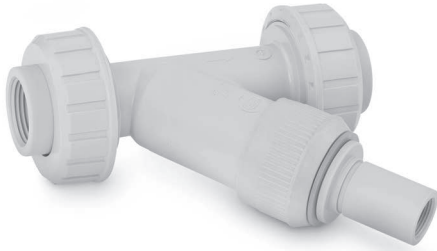
Hygienic conductive conductivity sensor for (ultra-)pure water applications in the food & beverage and pharmaceutical industry

- With standard stainless steel electrodes (Ø22 mm / 0.87"), P100 temperature sensor and 4-pin right angle connector
- Two cell constants for different measuring ranges: 0.05...10 µS/cm, 1...1000 µS/cm
- Max. +135°C / +275°F; Max. 16 bar / 232 psi
- Process connection: Clamp DN25-40, 1½"
- Short installation length of only 60 mm / 2.36"
- Fully sterilisable design with surface roughness of <0.8 µm
- Compliant with FDA and EC1935/2004 regulations
- Certificates for material, cell constant, surface roughness and FDA conformity

OPTISENS COND 7230

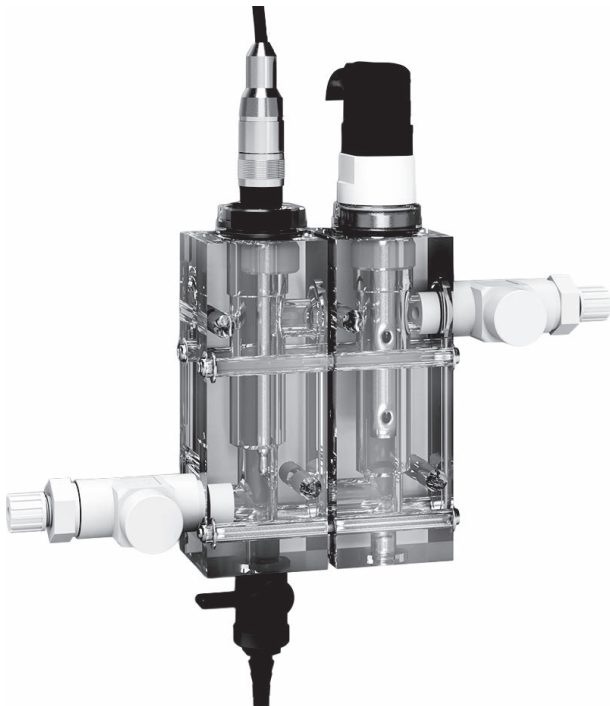
Hygienic conductive conductivity sensor for (ultra-)pure water applications in the food & beverage and pharmaceutical industry

- Extra slim design with Ø16 mm / 0.63" stainless steel electrodes, Pt100 temperature sensor and M12 connector
- Two cell constants for different measuring ranges: 0.05...10 µS/cm, 1...1000 µS/cm
- Max. +135°C / +275°F; Max. 16 bar / 232 psi
- Process connection: Clamp DN25-40, 1½"
- Installation length 115 mm / 4.53"
- Fully sterilizable design with surface roughness of <0.8 µm
- Compliant with FDA and EC1935/2004 regulations
- Certificates for material, cell constant, surface roughness and FDA conformity

SENSOFIT assemblies for OPTISENS COND sensors**SENSOFIT FLOW 1000 Y**

For OPTISENS COND 1200, 3200, 5200 with G 3/4 process connection

- Sensor connection: G 1/4 (female); Process connection: G 1 (female)
- For inline measurement at 180° Flow direction
- Max. +95°C / +203°F and 10 bar / 145 psi at 20°C / 68°F

SENSOFIT FLOW-cell

For panels XGAM010195 / ...196 / ...198

- Material: Acrylic glass, Sealings: EPDM, Valves: PP
- Max. +50°C / +122°F and 6 bar at 20°C (87 psi at 68°F)

SENSOFIT IMM 1000

For OPTISENS COND 1210

- Sensor connection: G $\frac{1}{2}$ (female); Process connection: immersion
- Immersion length: 1 m / 39.37"
- Max. +80°C / +176°F, pressureless

Special versions for special operating conditions or other materials are available on request.

For further information please consider the technical datasheets

1.3 Conductivity measurement

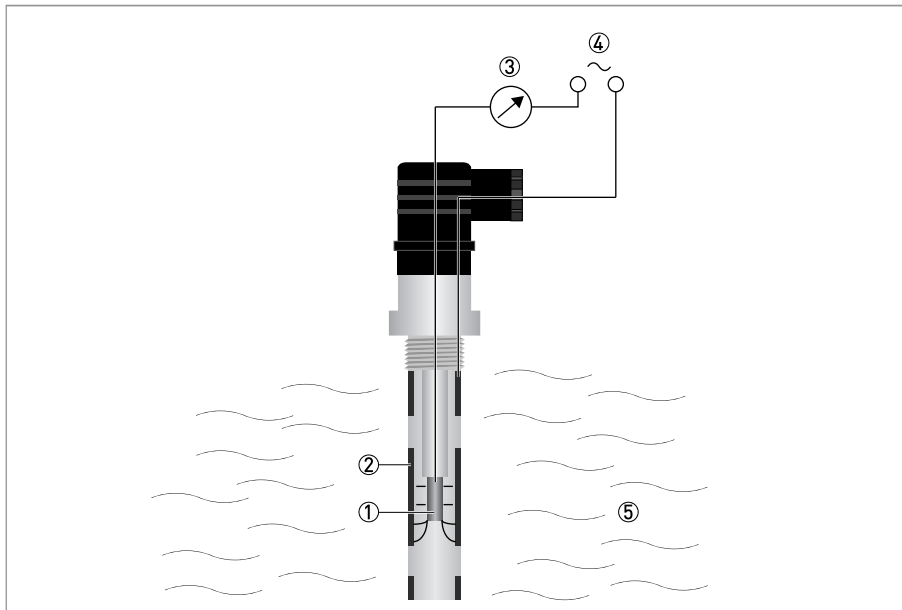


Figure 1-1: Measuring principle for conductivity measurement

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

The principle of conductivity measurement is based on the capacity of a solution to conduct an electrical current between two electrodes. In a solution, the current flows by ion transport. The higher the ion concentration, the more current can flow. Using Ohm's law: Resistance = Voltage/Current, the resistance of a liquid can be determined by measuring the current while keeping the voltage constant. Specific conductivity is defined by 1/resistivity. The unit of measurement is Siemens/meter and is normally expressed in $\mu\text{S}/\text{cm}$.

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

OPTISENS COND – conductive conductivity sensors with integral Pt100 temperature sensor

	COND 1200	COND 1210	COND 3200	COND 3220	COND 5200	COND 7200	COND 7230
Cell constant* ①	C = 0.05 cm ⁻¹ : 0.1...200 µS/cm C = 0.2 cm ⁻¹ : 1...2000 µS/cm C = 1.0 cm ⁻¹ : 0.1...20 mS/cm	C = 0.2 cm ⁻¹ : 1...2000 µS/cm C = 1.0 cm ⁻¹ : 0.1...20 mS/cm	C = 0.01 cm ⁻¹ : 0.05...10 µS/cm C = 0.1 cm ⁻¹ : 0.001...1 mS/cm	C = 0.1 cm ⁻¹ : 0.001...1 mS/cm	C = 1.0 cm ⁻¹ : 0.01...15 mS/cm	C = 0.01 cm ⁻¹ : 0.05...10 µS/cm C = 0.1 cm ⁻¹ : 0.001...1 mS/cm	C = 0.01 cm ⁻¹ : 0.05...10 µS/cm C = 0.1 cm ⁻¹ : 0.001...1 mS/cm
Body material	PVDF	PP	PVDF or Stainless steel (1.4571 / 316Ti)	Stainless steel (1.4404 / 316L) PEEK	PVDF / PES	Stainless steel (1.4435 / 316L)	Stainless steel (1.4435 / 316L)
Electrode material	Stainless steel (1.4571 / 316Ti)	Stainless steel (1.4571 / 316Ti)	Stainless steel (1.4571 / 316Ti); or Titanium (with PVDF body)	Stainless steel (1.4404 / 316L)	Graphite	Stainless steel (1.4435 / 316L)	Stainless steel (1.4435 / 316L)
Process connection	G ¾	G ½ (at sensor rear end, immersion style)	G ½ G ¾ G 1 ¾ NPT	¾ NPT	G ¾ G 1 ¾ NPT	Clamp DN 25	Clamp DN 25
Insertion length	100 mm / 3.94"	100 mm / 3.94"	60 mm / 2.36"	45 mm / 1.77"	60 mm / 2.36"	60 mm / 2.36"	115mm / 4.53"
Diameter	20 mm / 0.79"	20 mm / 0.79"	16 mm / 0.63"; 22 mm / 0.87"	19 mm / 0.75"	23.5 mm / 0.93"	22 mm / 0.87"	16 mm / 0.63"
Temperature range	0...+135°C / +32...+275°F	0...+90°C / +32...194°F	0...+135°C / +32...+275°F	0...+200°C / +32...+392°F	0...+130°C / +32...+266°F	0...+135°C / +32...+275°F	0...+135°C / +32...+275°F
Max. operating pressure	16 bar at 25°C / 232psi at 77°F	16 bar at 25°C / 232psi at 77°F	16 bar at 25°C / 232psi at 77°F	40 bar at 25°C, 17 bar at 200°C / 580 psi at +77°F, 246 psi at +392°F	16 bar at 25°C / 232psi at 77°F	16 bar at 25°C / 232psi at 77°F	16 bar at 25°C / 232psi at 77°F
Sensor cable connection	4-pin angled connector	10 m / 33 ft. fix cable	4-pin angled connector	4-pin angled connector	4-pin angled connector	4-pin angled connector	M12 connector

Table 2-1: Different sensor types OPTISENS COND

① Nominal cell constant values; actual value may vary by +/- 10% and range

Connection cables for all sensors with 4-pin angled connector:

Cable length	3m / 9.8 ft
	5m / 16.5 ft
	10 m / 33 ft
	15 m / 49 ft
	20 m / 65 ft
	30 m / 98 ft

Table 2-2: Cable lengths for all sensors with 4-pin angled connector

Connection cables for sensor with M12 connector:

Cable length	10m / 33 ft
	25m / 82 ft

Table 2-3: Cable lengths for sensors with M12 connector

All cables are equipped with core end sleeves at the controller side.

2.2 Dimensions

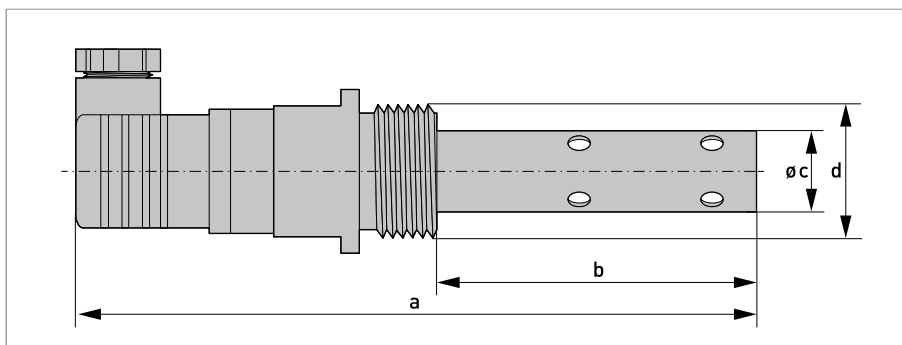


Figure 2-1: OPTISENS COND 1200

	Dimensions [mm]	Dimensions [inch]
a	186	7.32
b	100	3.94
c	Ø 20 mm	Ø 0.79
d	G3/4	

Table 2-4: Dimensions OPTISENS COND 1200

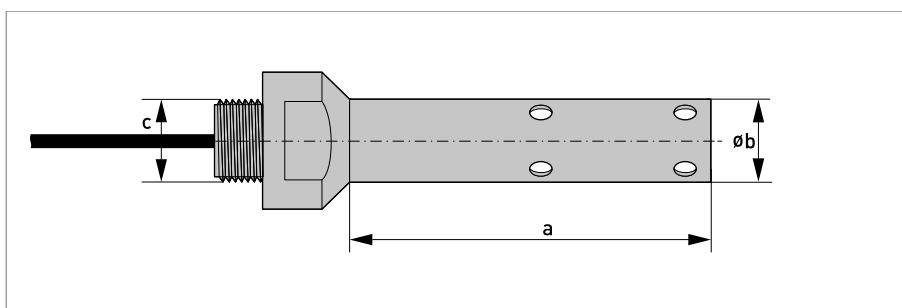


Figure 2-2: OPTISENS COND 1210 immersion version

	Dimensions [mm]	Dimensions [inch]
a	100	3.94
b	Ø 20	Ø 0.79
c	G1/2	

Table 2-5: Dimensions OPTISENS COND 1210

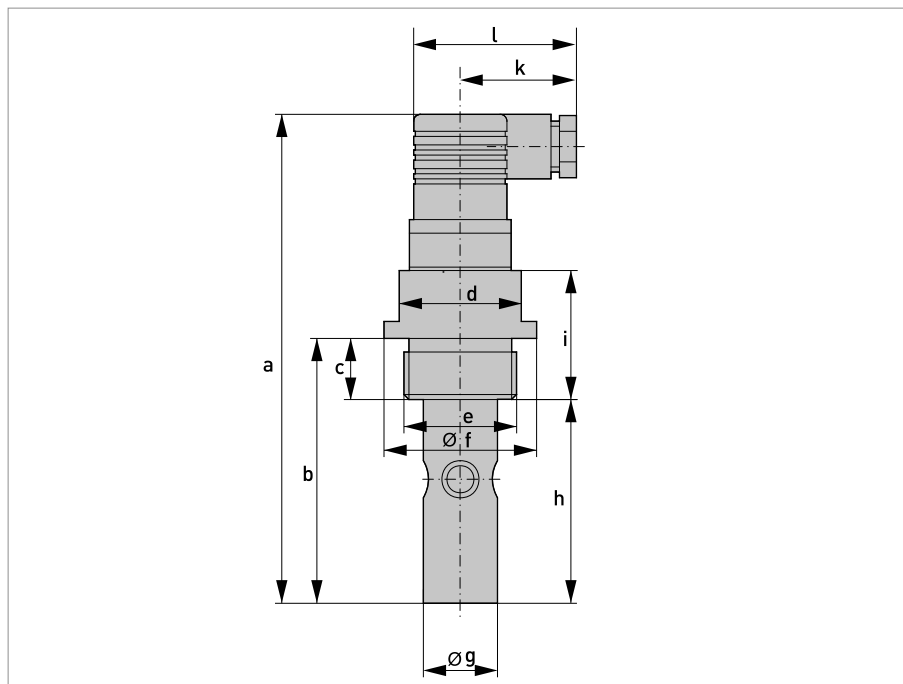


Figure 2-3: OPTISENS COND 3200

Dimension in mm										
a	b	c	d	e	f	g	h	i	k	l
145	80	20	36	3/4 NPT	45	22	60	38	37	50
	78	18		G1		22				
	76	16		G3/4		22				
	74	14		G1/2		16				

Table 2-6: Dimensions OPTISENS COND 3200

Dimension in inch										
a	b	c	d	e	f	g	h	i	k	l
5.71	3.15	0.79	1.42	3/4 NPT	1.77	0.87	2.36	1.5	1.46	1.97
	3.07	0.71		G1		0.87				
	3	0.63		G3/4		0.87				
	2.91	0.55		G1/2		0.63				

Table 2-7: Dimensions OPTISENS COND 3200

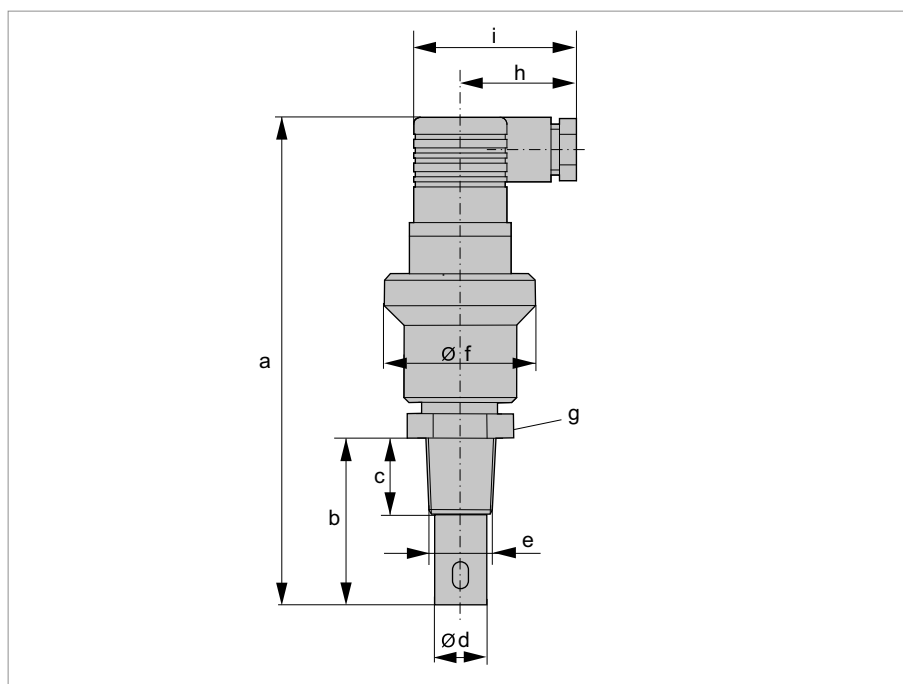


Figure 2-4: OPTISENS COND 3220

Dimension in mm								
a	b	c	d	e	f	g*	h	i
143	45	19	19	3/4 NPT	45	29	37	50

Table 2-8: Dimensions OPTISENS COND 3220

* Wrench size

Dimension in inch								
a	b	c	d	e	f	g*	h	i
5.63	1.77	0.75	0.75	3/4 NPT	1.77	1.14	1.46	1.97

Table 2-9: Dimensions OPTISENS COND 3220

* Wrench size

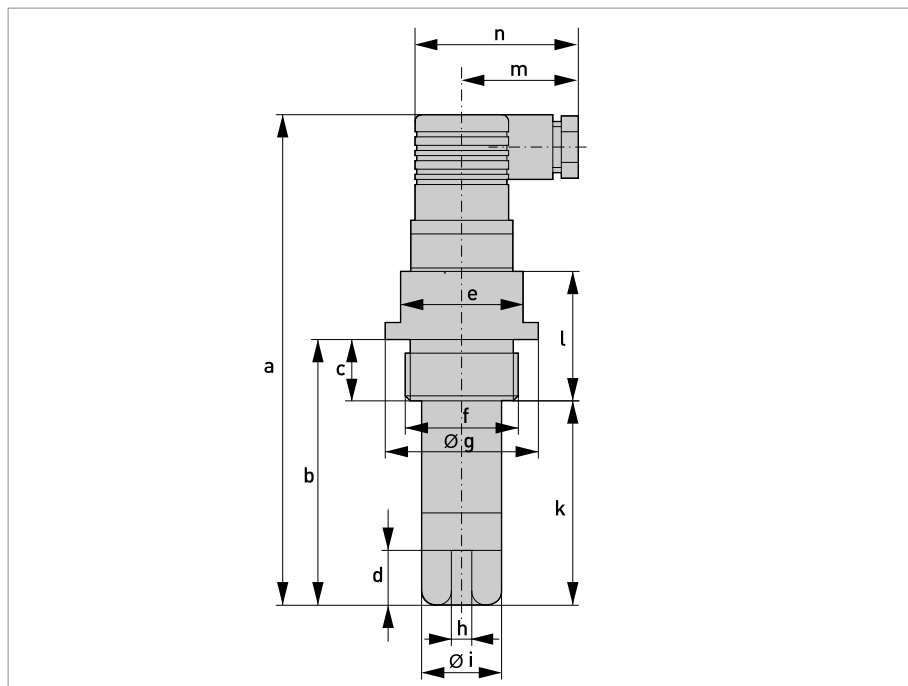


Figure 2-5: OPTISENS COND 5200

Dimension in mm												
a	b	c	d	e	f	g	h	i*	k	l	m	n
145	80	20	16	36	3/4 NPT	45	6	23.5	60	38	37	50
	78	18			G1							
	76	16			G3/4							

Table 2-10: Dimensions OPTISENS COND 5200

* Minimum inner diameter of 24.5 mm / 0.96" required for installation, refer to *Pre-installation requirements* on page 19 for details

Dimension in inch												
a	b	c	d	e	f	g	h	i*	k	l	m	n
5.71	3.15	0.79	1.42	1.42	3/4 NPT	1.77	0.24	0.93	2.36	1.5	1.46	1.97
	3.07	0.71			G1							
	3	0.63			G3/4							

Table 2-11: Dimensions OPTISENS COND 5200

* Minimum inner diameter of 24.5 mm / 0.96" required for installation, refer to *Pre-installation requirements* on page 19 for details

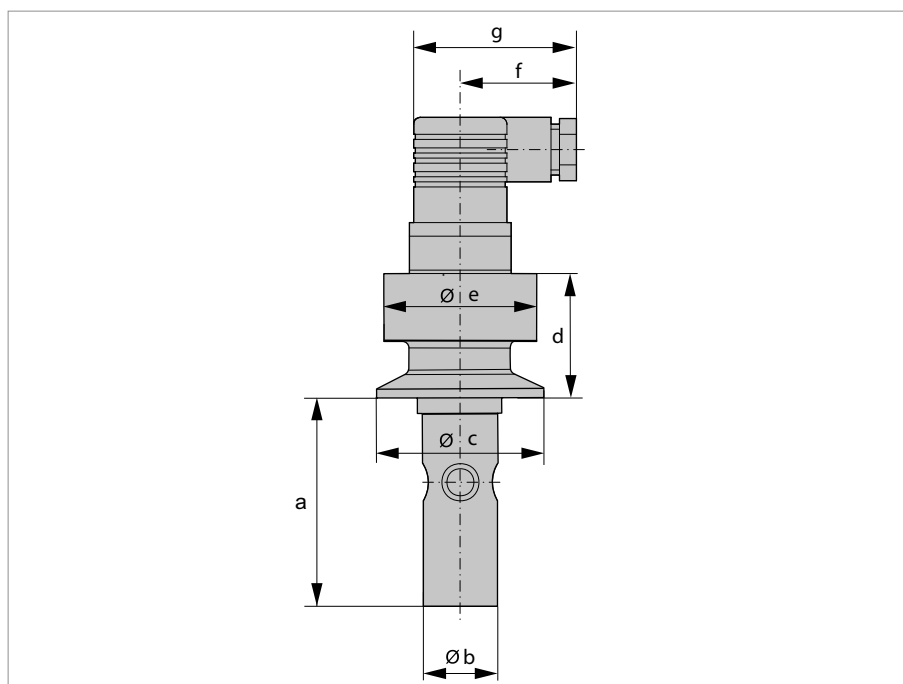


Figure 2-6: OPTISENS COND 7200

Dimension in mm						
a	b	c	d	e	f	g
60	22	50.5	38	45	37	50

Table 2-12: Dimensions OPTISENS COND 7200

Dimension in inch						
a	b	c	d	e	f	g
2.36	0.87	1.99	38	1.50	1.46	1.97

Table 2-13: Dimensions OPTISENS COND 7200

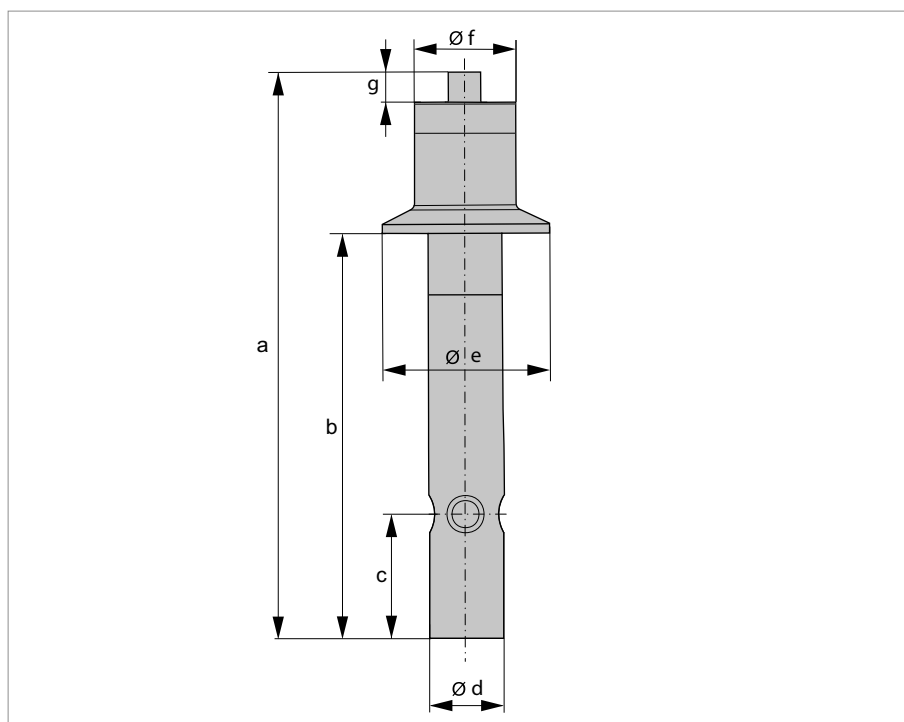


Figure 2-7: OPTISENS COND 7230

Dimension in mm						
a	b	c	d	e	f	g
167	115	36	16	50.5	27	11

Table 2-14: Dimensions OPTISENS COND 7230

Dimension in inch						
a	b	c	d	e	f	g
6.55	4.53	1.42	0.63	1.99	1.06	0.43

Table 2-15: Dimensions OPTISENS COND 7230

3.1 General notes on installation

Inspect the packaging 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 the OPTISENS COND conductivity sensor is the measurement of the electrical conductivity of liquids. The sensor can be operated by any suitable signal converter, e.g. MAC 100 or MAC 300.

3.3 Pre-installation requirements

- *Do not drop the device! Handle the device with care!*
- *Never touch or scratch the electrodes of the sensor.*
- *Do not make any mechanical modifications to the sensor (electrodes shortened, drilled, bent or scratched). This can result in the loss of proper functionality, as well as the rights under the device warranty.*
- *The sensor must be suitable for the temperature, pressure and medium conditions which are specified (including chemical resistance).*
- *The device must not be heated by radiated heat (e.g. exposure to the sun) to a surface temperature above the maximum permissible ambient temperature. If it is necessary to prevent damage from heat sources, a heat protection (e.g. sun shade) has to be installed.*

Only for OPTISENS COND 5200 sensors: Check the inner diameter of the process connection at the final measuring location before installing the sensor. For all sensor types with 3/4" thread, a minimum diameter of 24.5 mm / 0.96" is required. Otherwise the sensor cannot be installed or might be damaged.

Recommendation for 3/4 NPT threads:

Make the thread at the final measuring location acc. to standard and wide up lower end to 24.5 mm (lower end thread part is not needed for proper and water-tight installation). Never try to install a sensor in a fitting with less than 24.5 mm inner diameter.

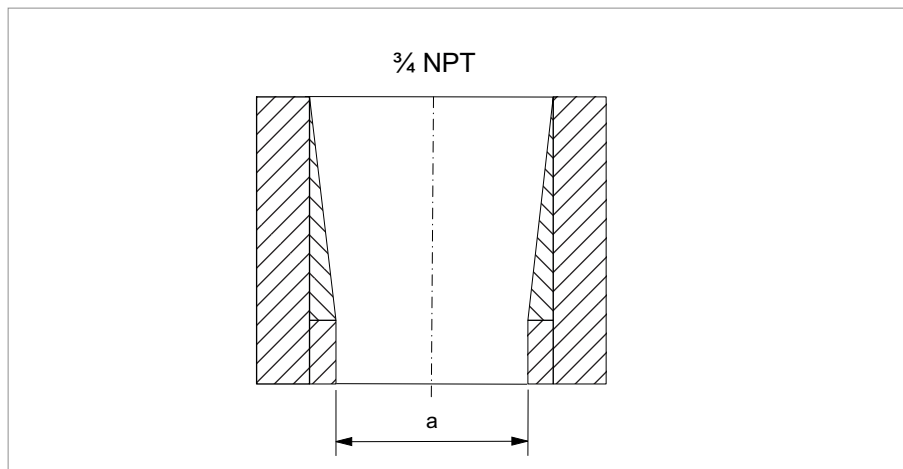


Figure 3-1: OPTISENS COND 5200 process connection (3/4 NPT)

$a = \text{min. } 24.5\text{mm} / 0.96''$

3.4 Installing the sensor

3.4.1 General installation instructions

To achieve reliable measuring results, note the following items:

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

Air /gas bubble trapping must be avoided in any case. Coatings on the electrodes must be avoided. Clean electrode surfaces regularly.

Particle collections in or around the sensor may lead to erratic readings. Install sensor in a way that particles cannot be trapped.

3.4.2 Flow-through assembly SENSOFIT FLOW 1000 Y

Ensure that the pipe is depressurized and empty before installing or removing a sensor!

The flow-through assembly is an optional accessory and not part of the standard scope of delivery. It has to be installed in pump or sample lines or directly in the process.

Make sure that there is sufficient and representative sample flow at the measuring point.

OPTISENS COND sensors must be equipped with G 3/4 process connection for use with SENSOFIT FLOW 1000 Y.

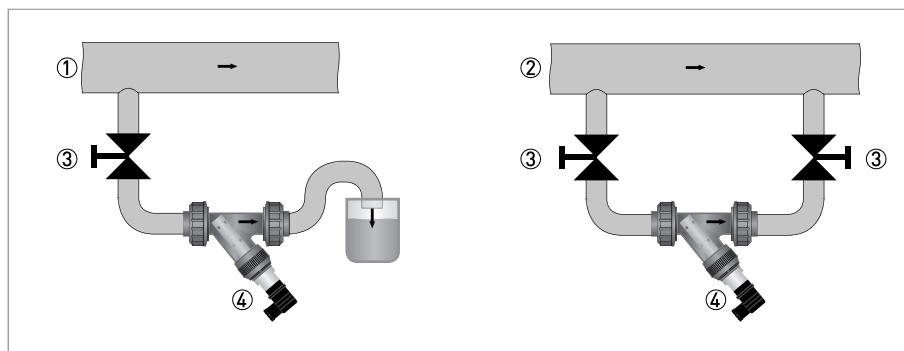


Figure 3-2: Possible mounting positions of the flow-through assembly

- ① Mounting in an outlet pipe
- ② Mounting in a bypass pipe
- ③ Shut-off valve
- ④ Sensor installed in flow through assembly

OPTISENS COND 1200 sensors can be installed in an arbitrary, also vertical position (refer to *General installation instructions* on page 20 and observe the mentioned hints). As the insertion lengths of OPTISENS COND 3200 and 5200 sensors are shorter, a horizontal position is recommended to ensure complete electrode wetting by the sample and optimum measuring results.

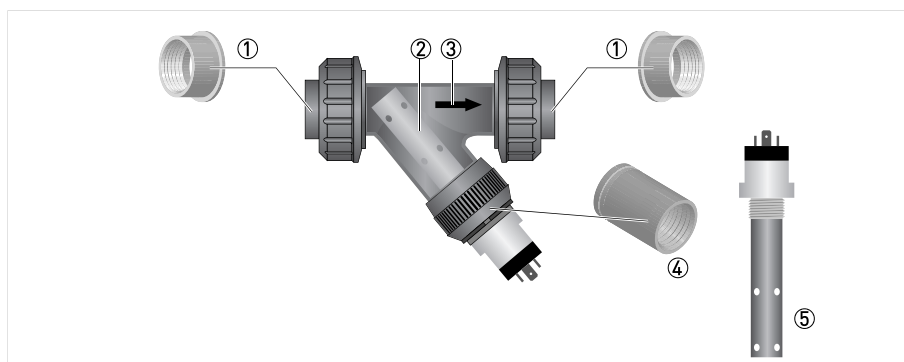


Figure 3-3: Installing the sensor into the flow-through assembly

- ① Process connection
- ② Outer electrode
- ③ Flow direction
- ④ Female thread
- ⑤ Sensor

- Apply a sealing ring suitable in size and material between sensor and assembly.
- Screw the sensor into the female thread ④ of the flow through assembly. Tighten the sensor by hand.
- Connect the cable plug to the sensor and tighten the screw.

3.4.3 Immersion assembly SENSOFIT IMM 1000

OPTISENS COND 1210 immersion style sensors can be used with SENSOFIT IMM 1000 immersion assemblies, or appropriate customer supplied components.

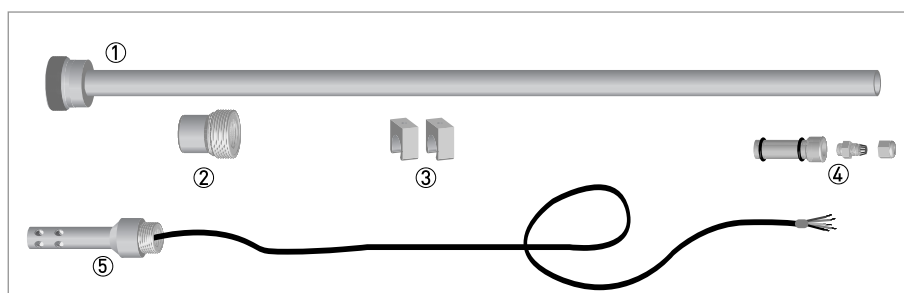


Figure 3-4: SENSOFIT IMM 1000

- ① Support pipe
- ② Sensor holder
- ③ Mounting brackets
- ④ Closing plug with cable gland
- ⑤ Sensor OPTISENS COND 1210 immersion style with G 1/2" thread and fix cable

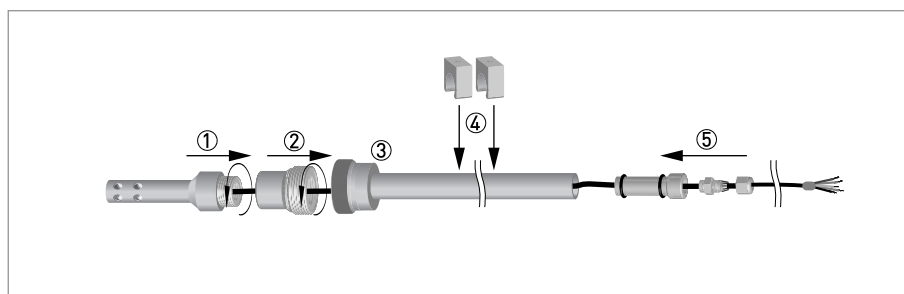


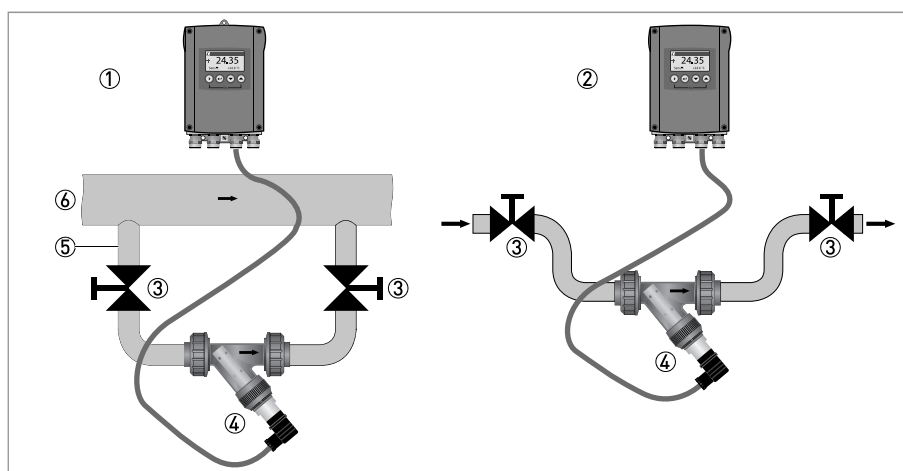
Figure 3-5: Mounting of the sensor with immersion assembly

- ① Sensor with attached cable
- ② Sensor holder
- ③ Support pipe
- ④ Mounting brackets onto support pipe
- ⑤ Closing plug with cable gland

- Pull the closing plug with cable gland ⑤ off the support pipe ③
- Push the sensor cable through the sensor- holder ② , the support pipe ③ and the closing plug with cable gland ⑤ .
- Screw the sensor holder ② into the support pipe ③ . Then screw the sensor ① into the sensor- holder ② .
- Push the closing plug with cable gland ⑤ into the support pipe again ③ . Tighten the cable gland.

3.5 Examples of a typical measuring point

The following examples each show the signal converter, a sensor with integrated temperature sensor, and the flow-through or immersion assembly.



- ① Bypass measurement
- ② In-line measurement
- ③ Shut-off valve
- ④ Flow-through assembly with sensor
- ⑤ Bypass pipe
- ⑥ Main pipe

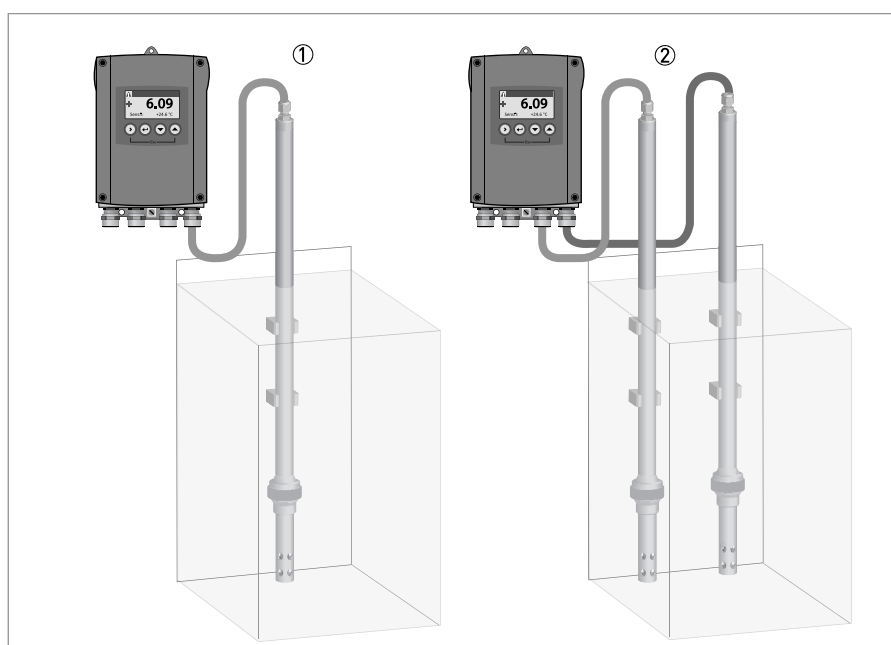


Figure 3-6: Installation with signal converter

- ① Single channel version
- ② Dual channel version

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 Connection of the sensor cable

*Moisture on the sensor connector must be avoided! Moisture may cause a short-circuit and a
malfunction of the sensor!*

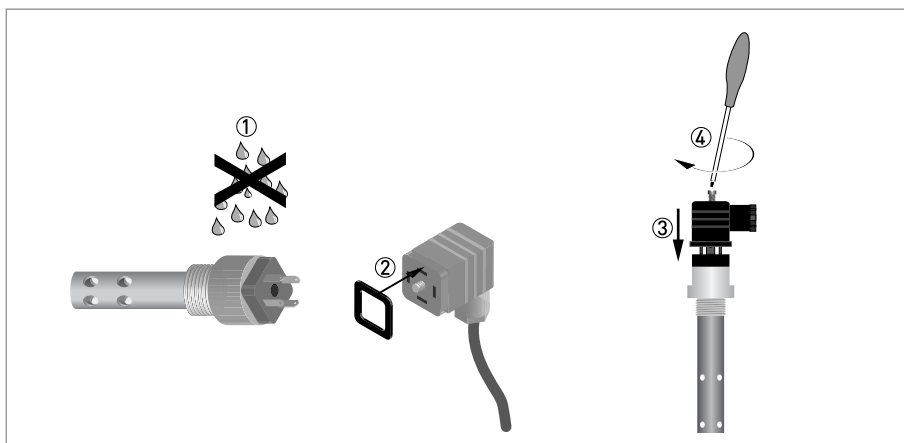


Figure 4-1: Connecting a 4-pin angled plug to the sensor

Ensure that both cable and sensor connector are absolutely dry ① .

Make sure that the seal is positioned on the sensor connector ② in the correct position.

Push the cable connector ③ on the sensor.

Tighten the screw with a screw driver ④ .

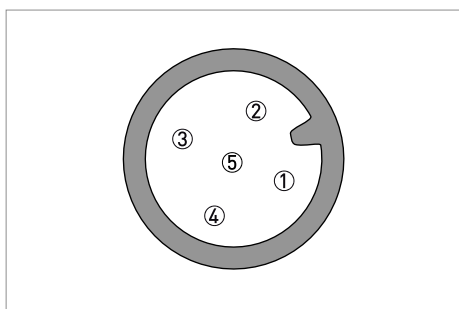


Figure 4-2: M12 sensor connector (OPTISENS COND 7230 only)

Pin	Contact	Colour
1	outer electrode	white
2	inner electrode	brown
3	Pt100	yellow
4	Pt100	green
5	not connected	

Table 4-1: Connector pin assignment M12 (OPTISENS COND 7230 only)

Ensure both cable and sensor connector are absolutely dry.

Make sure that M12 cable connector and sensor plug are aligned.

Push M12 cable connector carefully on the sensor plug.

Seal connection by turning cable connector nut into its final position (hand-tight). Do not use a tool here.

If a small amount of moisture (condensate, deionized water) has entered the connector, dry it with air (e.g. compressed air).

If liquids with higher conductivity (drinking water, process solutions) have entered the junction, it is recommended to replace the sensor. It can be tried to carefully clean the sensor contacts etc. with deionized water to remove conductive components.

Complete drying with compressed air is necessary in any case.

As it is difficult to clean the contacts of the cable plug, it is recommended to replace the sensor cable in this case to ensure full functionality.

4.2.1 Cable connection

In case that the cable length has to be modified, check the measuring accuracy and re-calibrate the sensor if necessary.

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

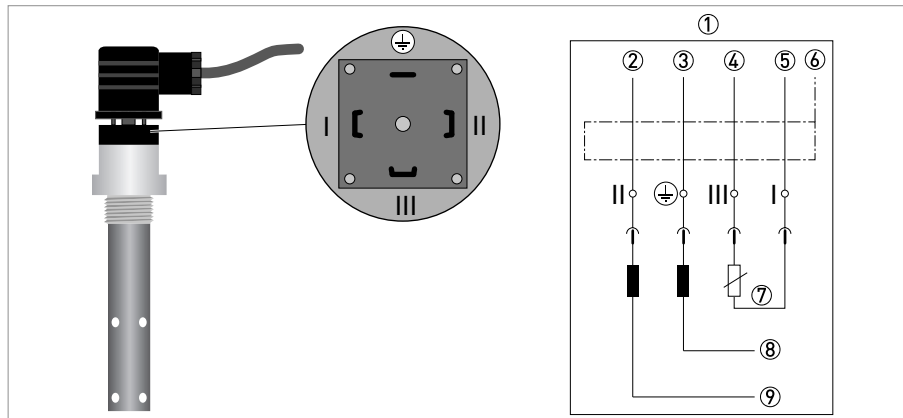


Figure 4-3: Cable assignment of a 4-pin angled plug

- ① Cable LIYCY 4x0.5 mm²
- 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 a 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!

Make sure that you have read and understood all instructions in the user manual of your signal converter.

Look at the device nameplate to ensure that the device is delivered according to your order.

MAC 100 sensor connection

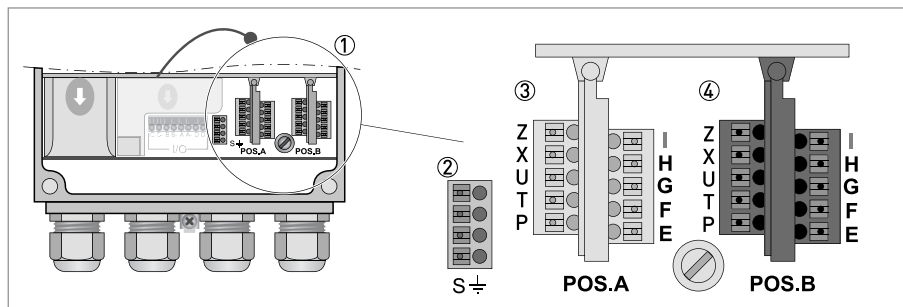


Figure 4-4: MAC 100 sensor connection terminals

- 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 version with dual channels the interfaces "Pos.A" and "Pos.B" are populated.

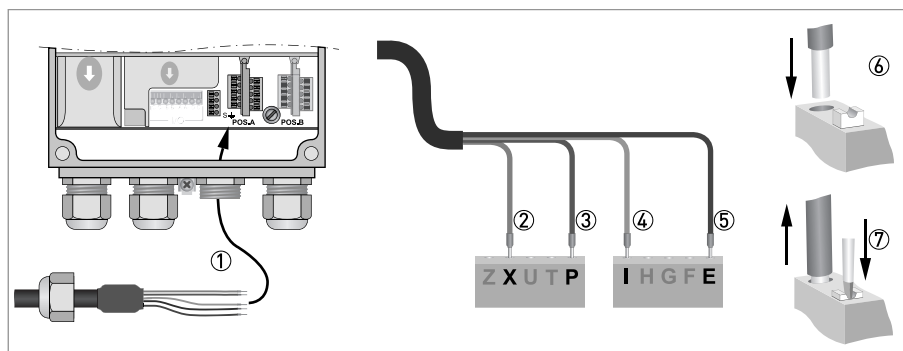


Figure 4-5: Electrical sensor connection to MAC 100

Connecting the sensor cable to the signal converter

- Thread the sensor cable through the middle right cable gland ① .
- Simply push the wires ⑥ into the correct positions of terminal block Pos. A or Pos. B as described in the chart below .
- To remove a cable, press down the white clip ⑦ on the corresponding terminal and pull the cable out.
- Connect the cable shield to terminal block S.

Wire	Terminal block Pos. A / B
Green ②	X
Yellow ③	P
White ④	I
Brown ⑤	E

Table 4-2: Sensor wiring to MAC 100 (4-pin and M12 sensors)

Sensor connection to MAC 300 or other signal converter

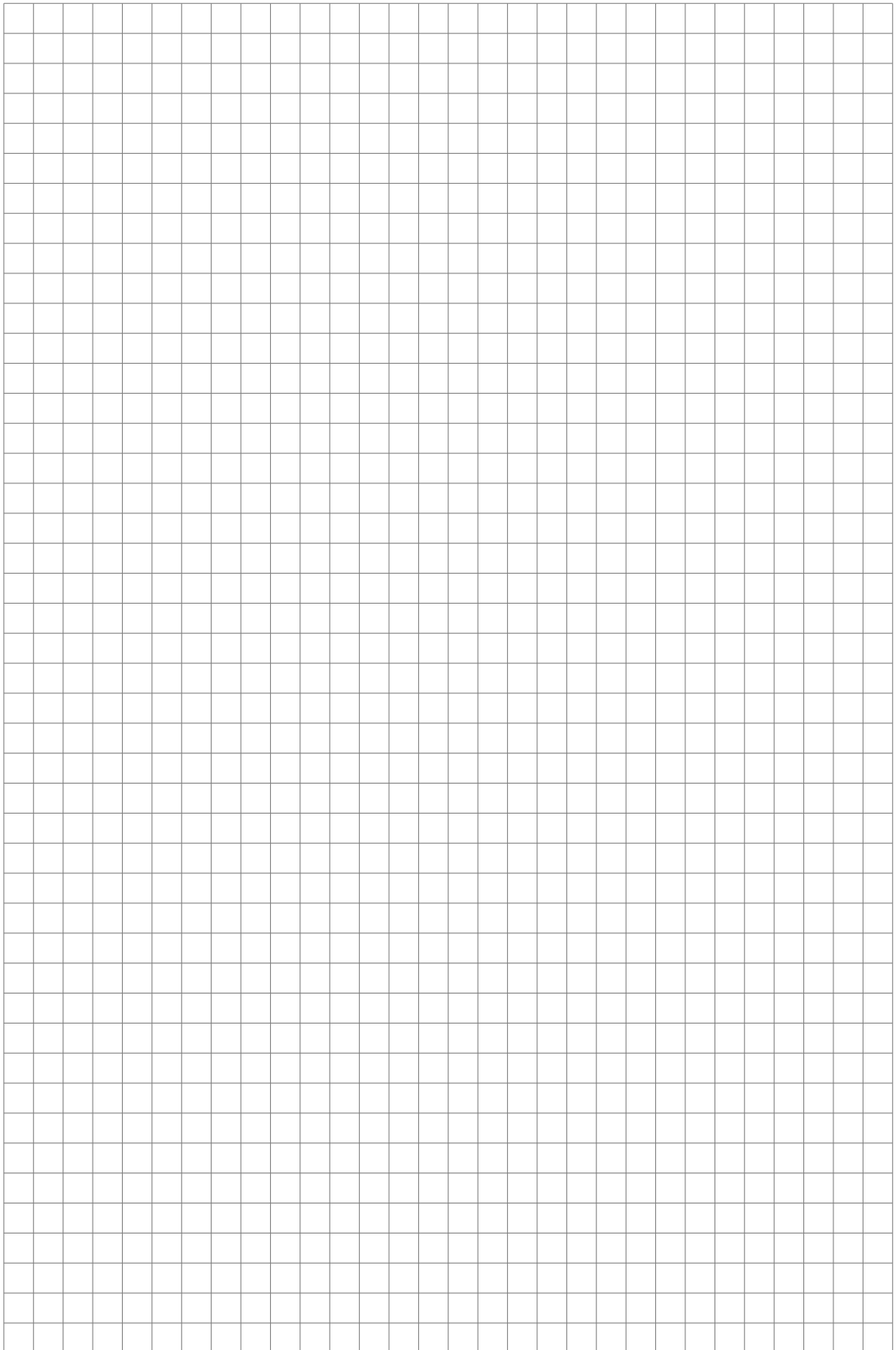
For connection and operation of OPTISENS COND sensors using MAC 300 or other signal converter please refer to the user manuals available for the transmitter.

5.1 Spare parts, consumables and accessories

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

Accessories	Order code
SENSOFIT IMM 1000 immersion holder	Please see technical datasheet SENSOFIT IMM 1000
SENSOFIT FLOW 1000 Y flow-through holder	Please see technical datasheet SENSOFIT FLOW 1000 Y
OPTISENS Cable COND-W-1200-3 (3m/9.84ft)	XGA W 0 21111
OPTISENS Cable COND-W-1200-5 (5m/16.5ft)	XGA W 0 21121
OPTISENS Cable COND-W-1200-10 (10m/33ft)	XGA W 0 21131
OPTISENS Cable COND-W-1200-15 (15m/49.5ft)	XGA W 0 21141
OPTISENS Cable COND-W-1200-20 (20m/66ft)	XGA W 0 21151
OPTISENS Cable COND-W-1200-30 (30m/98.4ft)	XGA W 0 21161





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