

# Conductivity Sensor OLS 15

**Two-electrode sensors  
cable or connector versions with integrated temperature sensor  
Pt 100.  
Cell constant  $k = 0.01 \text{ cm}^{-1}$  or  $k = 0.1 \text{ cm}^{-1}$**



## Application

Measurement in pure and ultrapure water:

- Monitoring ion exchangers
- Reverse osmosis
- Distillation
- Chip cleaning

The measuring range of the sensors depends on the cell constant  $k$ :

- $k = 0.01 \text{ cm}^{-1}$ :  $0.04 \dots 20 \mu\text{S/cm}$
- $k = 0.1 \text{ cm}^{-1}$ :  $0.1 \dots 200 \mu\text{S/cm}$

Sensors with a Pt 100 temperature sensor are used together with conductivity measuring instruments equipped with automatic temperature compensation:

- OLM 153
- OLM 223/253
- OLM 431

For measurement of specific resistance,  $\text{M}\Omega \cdot \text{cm}$  measuring ranges are available in the menus of these transmitters.



With ATEX approval for application in hazardous areas.

## Your benefits

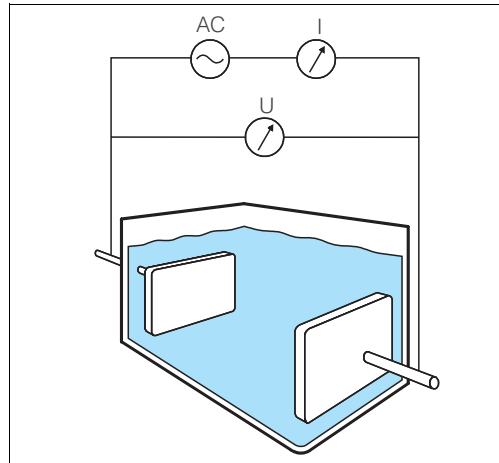
- High measuring accuracy as cell constant is individually measured
- Installation in pipes or flow chambers
- Compact design
- Available with plug-in head or fixed cable
- Easy to clean due to polished measuring surfaces
- Can be sterilised up to max.  $150 \text{ }^\circ\text{C}$  /  $302 \text{ }^\circ\text{F}$
- Stainless steel 1.4435 (AISI 316L)
- Available with inspection certificate according to EN 10204 3.1.B

*With  
quality certificate*

## Function and system design

### Measuring principle

### Conductive conductivity measurement



The conductivity of liquids is measured with a measuring system that has two coaxially arranged electrodes like a capacitor. The electric resistance or its reciprocal value, the conductance  $G$ , is measured according to Ohm's law. The specific conductivity  $\kappa$  is determined using the cell constant  $k$  that is dependent on the sensor geometry.

Conductive conductivity measurement

AC Power supply  
 I Current meter  
 U Voltage meter

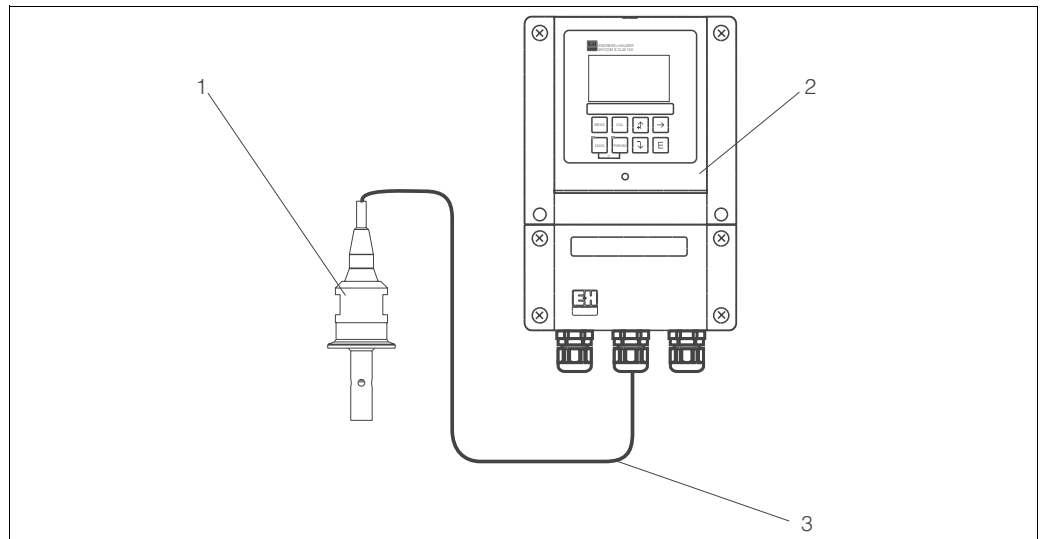
### Important properties OLS 15

- **Electrodes**  
 OLS 15 has two coaxial measuring electrodes made of polished, stainless steel 1.4435 (AISI 316L).
- **Temperature sensor**  
 In addition, a Pt 100 temperature sensor is installed in the inside electrode to measure the medium temperature.
- **Easy connection**  
 The connector versions are connected via a 4-pole circular plug. For introduction of the measuring cable, the plug is equipped with a Pg 9 cable gland.  
 The fixed cable versions are ready for operation and do not need any further cable connection.
- **Installation**  
 The sensors are available with various process connections and can be installed directly.  
 For simple installation in cross or T-pieces with DN 32, 40 or 50, adapter couplings (made of PVC for cementing) are available.
- **Durable and sterilisable**  
 The sensor is pressure-proof up to 12 bar / 174 psi (at 20 °C / 68 °F) and can be applied with temperatures of up to 120 °C / 248 °F (at 1 bar / 14.5 psi), short-time up to 150 °C / 302 °F (at 1 bar / 14.5 psi).

**Measuring system**

A complete measuring system comprises:

- an OLS 15 conductivity sensor
- a transmitter, e.g. OLM 153
- for connector versions, a OYK 71 or OYK 71-Ex special measuring cable



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Measuring system example

- 1 OLS 15
- 2 OLM 153 transmitter
- 3 Special measuring cable

**Input**

**Measured values**

Conductivity  
Temperature

**Cell constant k**

Depending on ordered version:  
k = 0.01 cm<sup>-1</sup>  
k = 0.1 cm<sup>-1</sup>

**Measuring ranges**

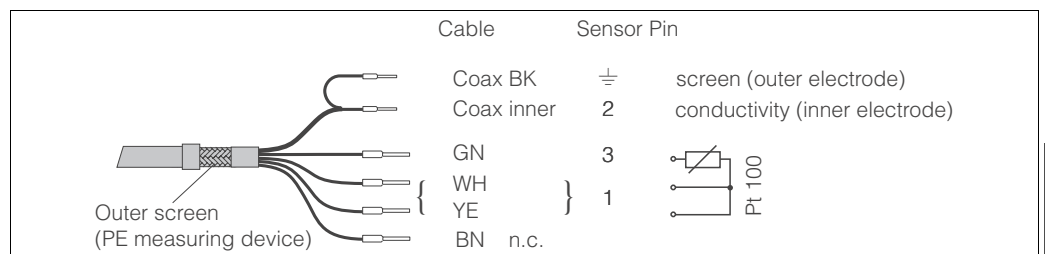
Conductivity	(referenced to water at 25 °C / 77 °F)
k = 0.01 cm <sup>-1</sup> :	0.04 µS/cm ... 20 µS/cm
k = 0.1 cm <sup>-1</sup> :	0.1 µS/cm ... 200 µS/cm
Temperature	-20 ... 150 °C / -4 ... 302 °F

**Temperature sensor**

Pt 100  
Class A according to DIN IEC 751

**Cable specification**

The OLS 15 is connected to the transmitter using the special measuring cable OYK 71 or OYK 71-Ex or the fixed cable.



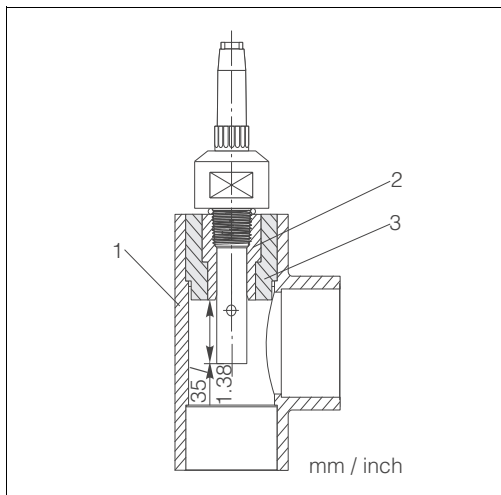
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Special measuring cable OYK 71 / OYK 71-Ex or fixed cable

## Installation

### Installation instructions

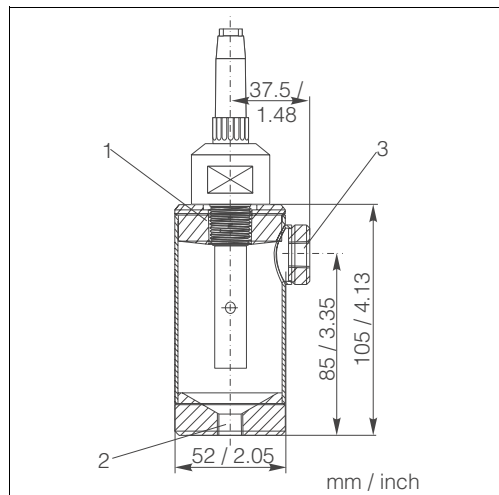
The sensors are mounted directly via the thread NPT 1/2" or 3/4" or clamp 1 1/2" process connections. Optionally, the sensor can be installed in cross or T-pieces or in a flow chamber.



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OLS 15 with NPT 1/2" process connection installed in commonly used T- or cross piece

- 1 T- or cross piece (DN 32, 40 or 50)
- 2 PVC-threaded coupling for cementing (NPT 1/2" for DN 20, see Accessories)
- 3 Adapter coupling for cementing (for DN 32, 40 or 50, see Accessories)



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OLS 15 with NPT 1/2" process connection installed in TSP C-LS011106-01 stainless steel flow chamber (see Accessories)

- 1 Sensor support NPT 1/2"
- 2 Inlet NPT 1/4"
- 3 Outlet NPT 1/4"

When installing the sensor, the measuring surfaces must be completely wetted by the medium during operation. Minimum immersion depth is 32 mm / 1.26".

When working in ultrapure water, ingress of air must be prevented since dissolved air, particularly CO<sub>2</sub>, may increase conductivity by up to 3 µS/cm.

## Environment

Ingress protection IP 67

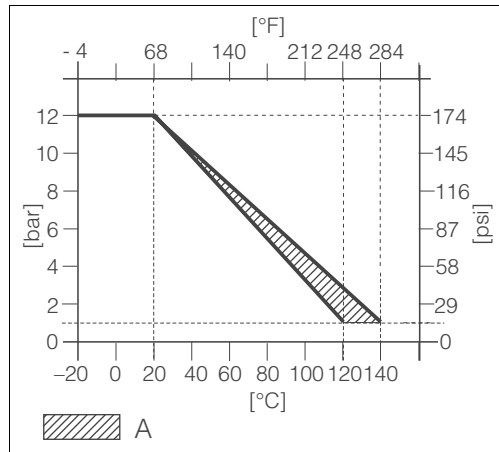
## Process

### Process temperature

Thread version	
Normal operation:	-20 ... 120 °C / -4 ... 248 °C
Short-time operation (max. 1 min):	max. 140 °C / 284 °F
Clamp version	
Normal operation:	-20 ... 130 °C / -4 ... 266 °F
Short-time operation (max. 1 h):	max. 150 °C / 302 °F

Process pressure 12 bar (at 20 °C) / 174 psi (at 68 °F)

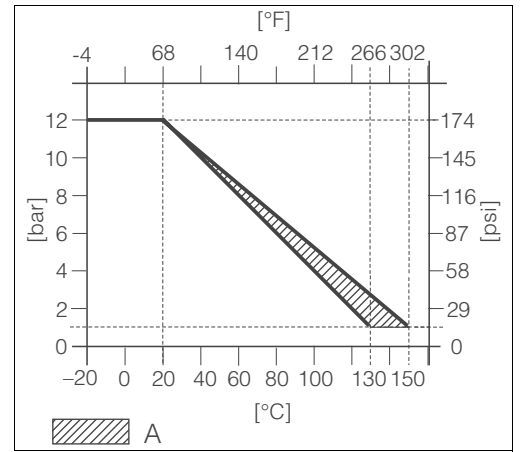
**Pressure/temperature load curves**



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*Thread version*

A = short-time sterilisable (30 min)



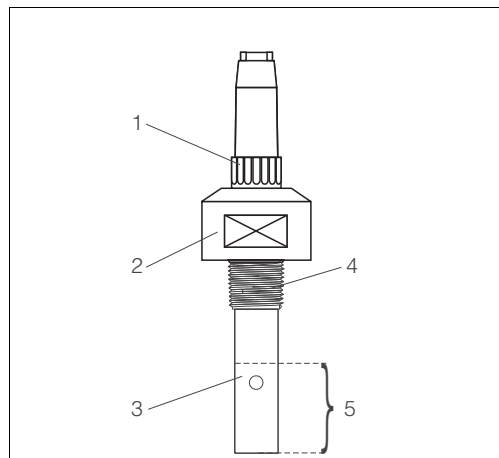
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*Clamp version*

A = short-time sterilisable (1 h)

**Mechanical construction**

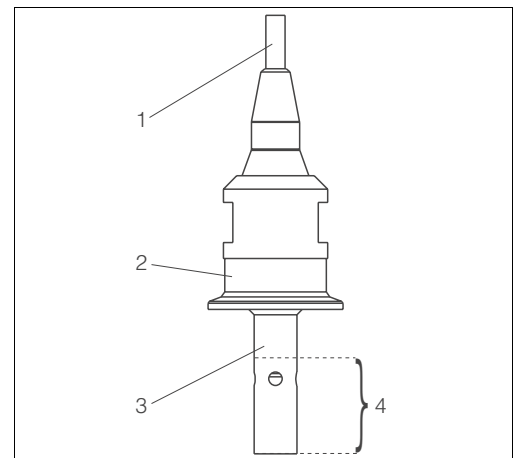
**Design, dimensions**



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*Connector version with NPT 1/2 "*

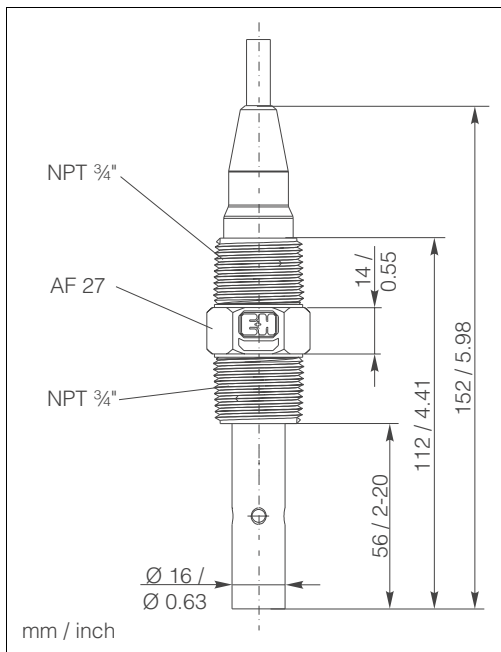
- 1 Connector
- 2 Connection head
- 3 Coaxial measuring electrode
- 4 Thread NPT 1/2"
- 5 Measuring surface



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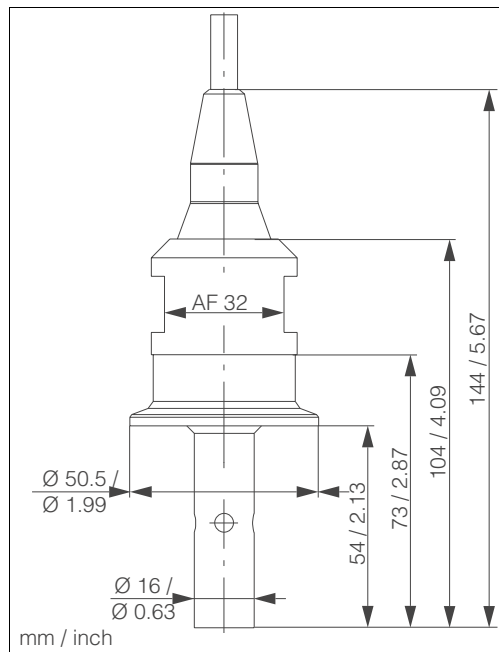
*Fixed cable version with clamp 1 1/2 "*

- 1 Fixed cable
- 2 Clamp 1 1/2"
- 3 Coaxial measuring electrode
- 4 Measuring surface



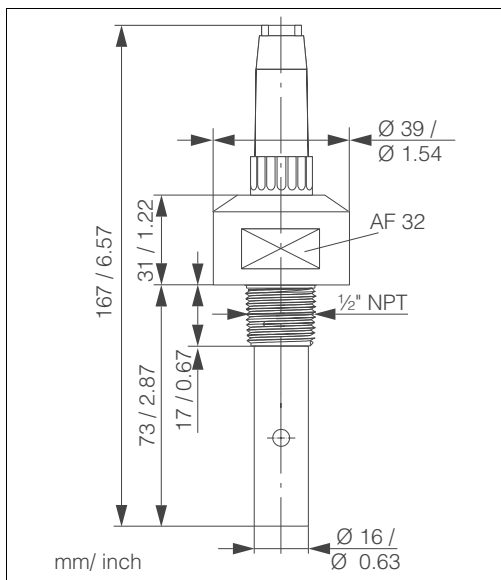
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Fixed cable version with NPT 1/2"



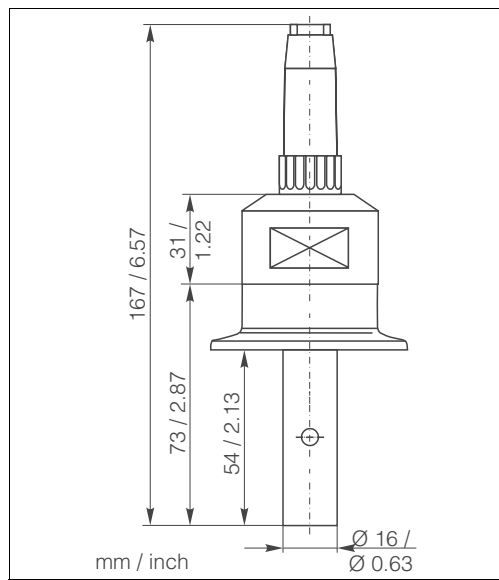
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Fixed cable version with clamp 1 1/2"



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Connector version with NPT 1/2"



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Connector version with clamp 1 1/2"

**Weight**

Depending on version, approx. 0.3 kg / 0.7 lb.

**Materials**

Electrodes polished, stainless steel 1.4435 (AISI 316L)  
 Sensor shaft polyethersulfone (PES)

**Surface roughness**

$R_a \leq 0.8 \mu\text{m}$   
 ( $R_a \leq 0.4 \mu\text{m}$  available under TSP C-LS020130-02)

**Process connection**

Fixed cable versions  
 Thread NPT 3/4"  
 Clamp 1 1/2" acc. to ISO 2852  
 Connector versions  
 Thread NPT 1/2"  
 Clamp 1 1/2" acc. to ISO 2852

<b>Electrical connection</b>	Connector version	with SXP plug and Pg 9 cable gland
	Fixed cable version	no additional cable required

## Certificates and approvals

<b>Ex approval</b>	<ul style="list-style-type: none"> <li>• ATEX II 1G EEx ia IIC T3 / T4 / T6</li> <li>• FM in combination with the OLM 431 and OLM 153 transmitters</li> </ul> <p>for all product versions listed in the product structure (see Ordering Information)</p>
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<b>Quality certificate</b>	with statement of the individual cell constant
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<b>Inspection certificate acc. to EN 10204 3.1.B</b>	available for clamp 1½" process connection
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## Ordering information

**Product structure OLS 15**

Measuring range and cell constant	
A	Measuring range: 0.04 ... 20 µS/cm (k = 0.01)
B	Measuring range: 0.1 ... 200 µS/cm (k = 0.1)
Process connection and materials	
1A	Thread NPT ½", sensor shaft PES (connector version only)
1M	Thread NPT ¾", sensor shaft PES (fixed cable version only)
3D	Clamp 1½", stainless steel 1.4435 (AISI 316L)
4D	Clamp 1½", stainless steel 1.4435 (AISI 316L), with inspection certificate EN 10204 3.1.B
Measuring cable connection	
1	4-pole SXP connector
2	with 5 m fixed cable
3	with 10 m fixed cable
Temperature sensor	
A	Integrated Pt 100 temperature sensor
OLS 15-	<b>complete order code</b>

## Accessories

- Installation** For sensors with NPT ½" process connection (OLS 15-x1Axx):
- PVC-threaded coupling  
For cementing in standard PVC cross or T-pieces with DN 20, with G ½ internal thread, self-sealing with ½" NPT sensor thread;  
order no. 50066536
  - PVC equalising sleeves AM  
For adaptation of the PVC-threaded coupling to larger nominal diameters,
    - AM 32  
for installation into cross or T-pieces DN 32, order no. 50004738
    - AM 40  
for installation into cross or T-pieces DN 40, order no. 50004739
    - AM 50  
for installation into cross or T-pieces DN 50, order no. 50004740
  - PVDF-threaded coupling  
With G ½ internal thread and G 1 external thread,  
pressure-proof up to 12 bar / 174 psi (at 20 °C / 68 °F), max. temperature 120 °C / 248 °F (at 1 bar / 14.5 psi), incl. O-ring,  
internal thread, self-sealing with NPT ½" sensor thread;  
order no. 50004381

- Flow chamber  
Stainless steel 1.4404 (AISI 316L), with inspection certificate EN 10204 3.1.B on demand,  
with NPT ½" sensor thread, NPT ¼" inlet and outlet;  
order no. TSP C-LS011106-01

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**Measuring  
cables**

- Special measuring cable / extension cable OYK 71  
for two-electrode conductivity sensors with integrated temperature sensor,  
1 low-noise coaxial line, 4 auxiliary cores at 0,75 mm<sup>2</sup> each with a common screen, outer diameter 7  
mm / 0,25"

Sold by the metre, minimum length 5 m / 15 ft    Order no. 50085333  
Length 5 m / 15 ft    Order no. 50088280  
Length 10 m / 30 ft    Order no. 50088281  
Length 50 m / 150 ft    Order no. 50088284  
Length 100 m / 300 ft    Order no. 50088285

- Special measuring cable / extension cable OYK 71-Ex  
for Ex applications,  
see OYK 71, but with a blue sheath

Sold by the metre, minimum length 5 m / 15 ft    Order no. 50085673

- Junction box VBM  
for cable extension, with 10 terminals, IP 65 / NEMA 4X

Cable entry Pg 13,5    Order no. 50003987  
Cable entry NPT ½"    Order no. 51500177

- Junction box VBM-Ex  
for cable extension in hazardous areas, with 10 high-impedance terminals (blue), IP 65 / NEMA 4X;  
order no. 50003991

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**Calibration  
solutions**

- Calibration solutions  
Precision solutions referred to SRM (Standard Reference Material) of NIST for qualified calibration of  
conductivity measuring systems according to ISO, accuracy ± 0,5 %, with temperature table,  
– OLY 11-A  
74 µS/cm (reference temperature 25 °C / 77 °F), 500 ml;  
order no. 50081902  
– OLY 11-B  
149,6 µS/cm (reference temperature 25 °C / 77°F), 500 ml;  
order no. 50081903

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**Related  
products**

- Conductive conductivity sensor OLS 16  
For measurement in pure and ultrapure water, with EHEDG and 3-A certificates,  
for ordering information, see the technical information of OLS 16