

# Conductivity Sensors

## OLS 21

Two-electrode Sensors  
Connector or Fixed Cable version  
with integrated temperature sensor Pt 100  
Cell constant  $k=1/\text{cm}$



Sensors with a temperature sensor are used together with conductivity measuring instruments equipped with an integrated temperature compensation.

The compact conductivity sensors have been designed especially for measurements in medium and high conductivities. The measuring range for sensors with a cell constant of  $k = 1/\text{cm}$  is from  $10\mu\text{S}/\text{cm}$  to  $20\text{ mS}/\text{cm}$ .

#### Areas of application

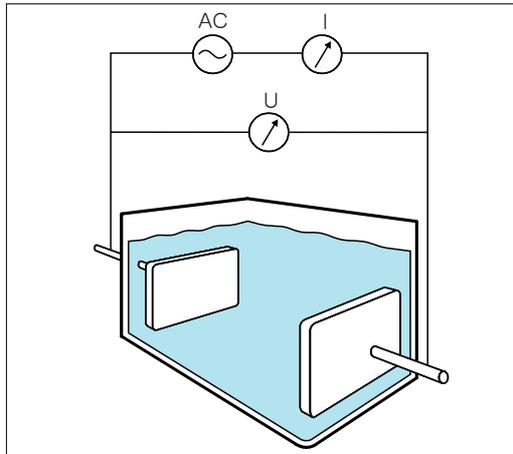
- Medium separation in low conductivities (milk/water)
- Medium separation in high conductivities (alkaline solution/water)
- Drinking water treatment
- Wastewater treatment

#### Benefits at a glance

- Different designs guarantee optimal adaptation to the process conditions and method of installation
- Available with connector or fixed cable
- High chemical, thermal and mechanical stability
- Installation in pipes or flow chambers
- Compact design
- Ingress protection IP 65 / NEMA 4X with connector
- Ingress protection IP 67 / NEMA 6 with fixed cable
- With inspection certificate acc. to EN 10204 3.1.B

## 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

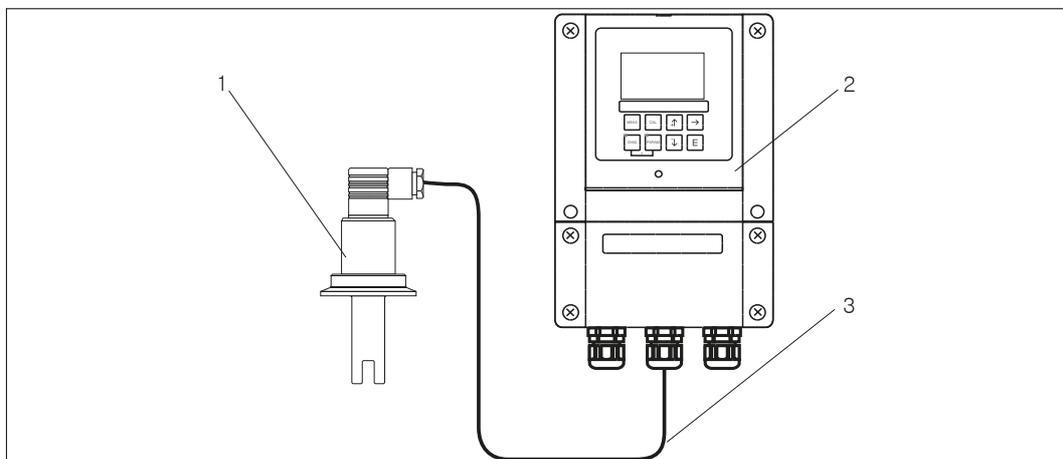
### OLS21

- **Electrodes**  
OLS 21 has two coaxial electrodes made of graphite for a large measuring range.
- **Temperature compensation**  
A Pt 100 temperature sensor is installed to measure the medium temperature.
- **Easy connection**  
The connector versions are connected via a 4-pole DIN 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.
- **Durability**  
The sensor is pressure-proof up to 16 bar / 232 psi (at 20 °C / 68 °F) and can be applied with temperatures of up to 150 °C / 302 °F (at 1 bar / 14.5 psi).

## Measuring system

A complete measuring system comprises:

- an OLS 21 conductivity sensor
- a transmitter, e.g. OLM 253
- for connector versions, a OYK 71 or Fixed measuring cable



*Measuring system example*

1 OLS 21  
2 OLM 253 transmitter  
3 Measuring cable

## Operating principle

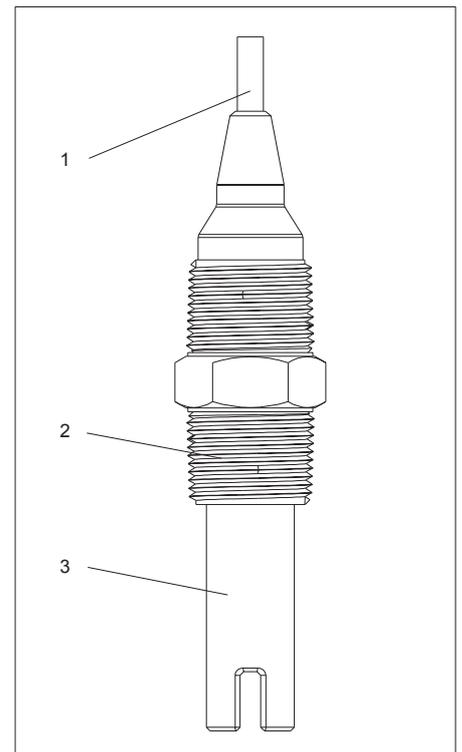
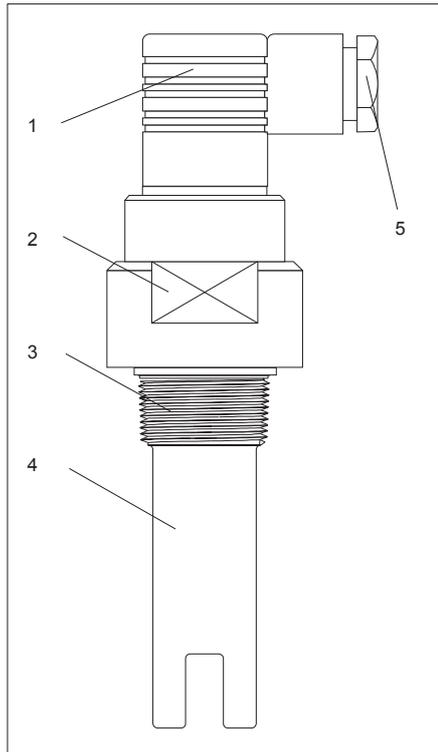
The two-electrode sensor OLS 21 is supplied with an alternating measuring voltage by the conductivity measuring transmitter. The alternating current flowing through the measuring electrodes and the medium is determined by the conductivity of the medium.

The sensors are connected via a four-pin plug connector which can be secured with a screw. The measuring cable is introduced through a Pg 9 cable gland.

The fixed cable versions are ready for operation and do not need any further cable connection.

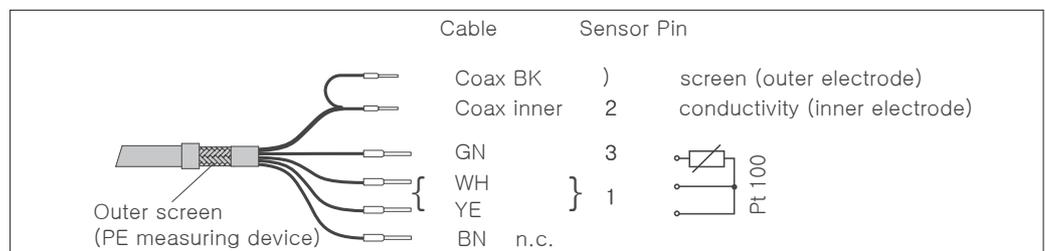
The sensors can be used at temperatures up to 150 °C.

- left:  
OLS 21  
(connector version)  
with G1 thread
- 1 Four-pin connector
  - 2 Connector head with wrench area
  - 3 Threaded shaft
  - 4 Measuring electrode
  - 5 Pg 9 cable gland
- rechts:  
OLS 21  
(fixed cable version)  
with NPT 1" thread
- 1 Fixed cable
  - 2 Threaded shaft
  - 3 Measuring electrode



## Cable Specification

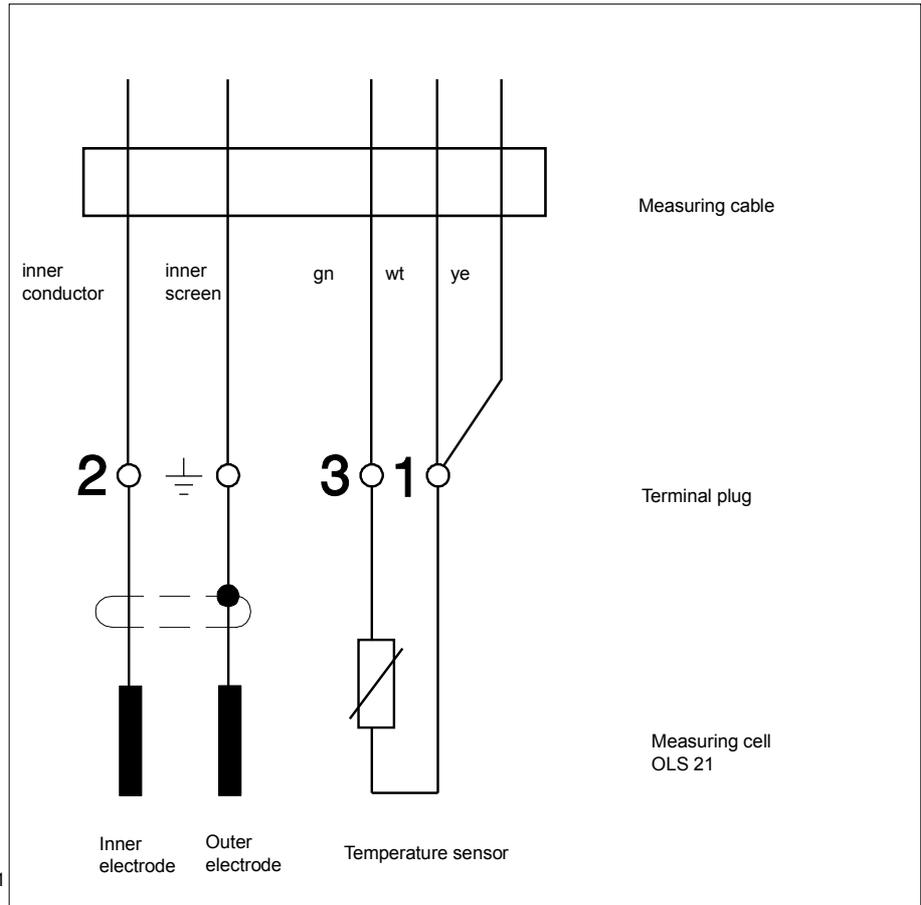
The OLS 21 is connected to the measuring transmitter using the special measuring cable OYK 71 or OYK 71-Ex or the fixed cable.



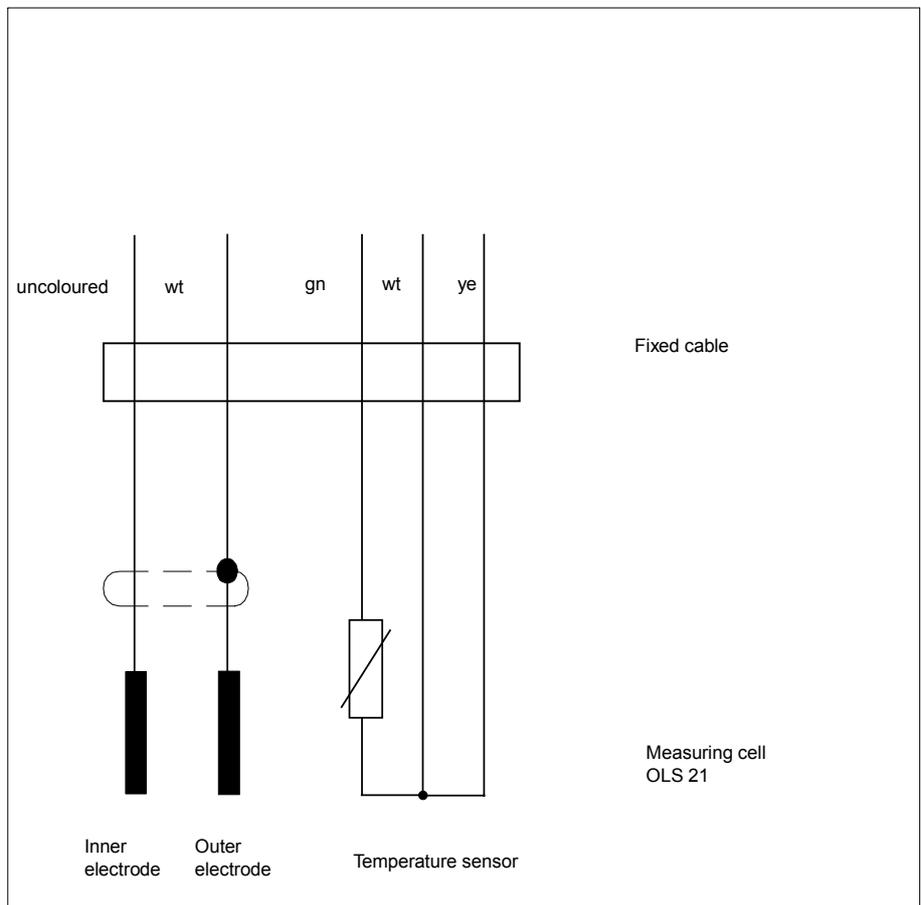
OYK 71 or fixed cable

# Electrical connections

Electrical connection OLS 21 connector versions

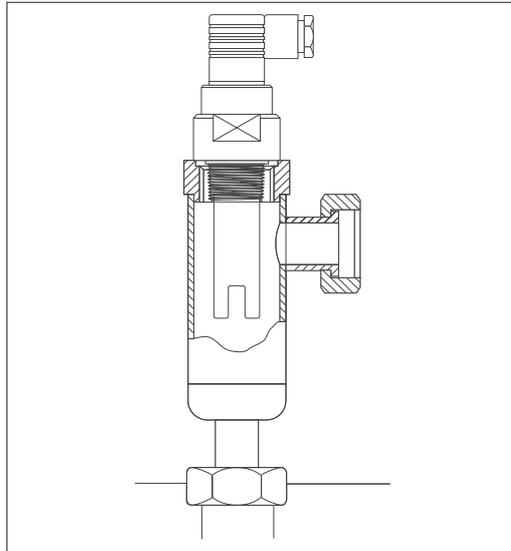


Electrical connection OLS 21 fixed cable versions

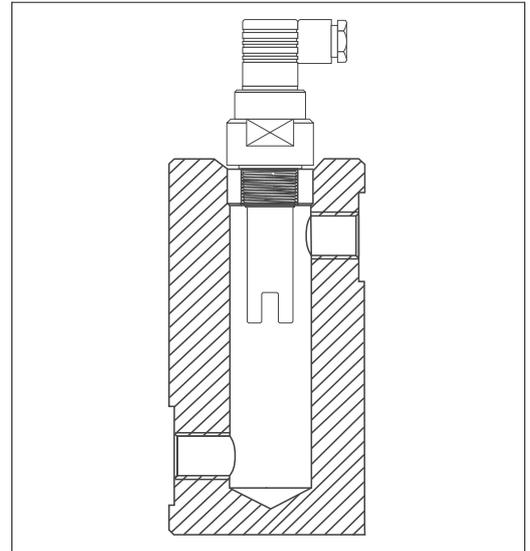


## Installation

The sensors are mounted directly via the process connection.  
Optionally, the sensor can be installed in a flow chamber.

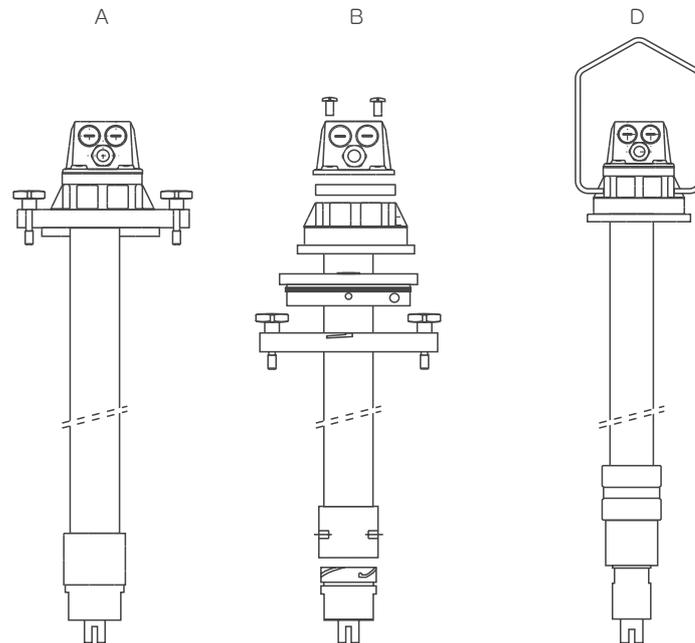


*Installation in the OLA 751 flow chamber*



*Installation in the OLA 752 flow chamber*

For installation of sensors with G1 thread in tanks, the OLA 111 immersion and process assembly is available (see Accessories).



*OLA 111, mounting versions A, B and D*

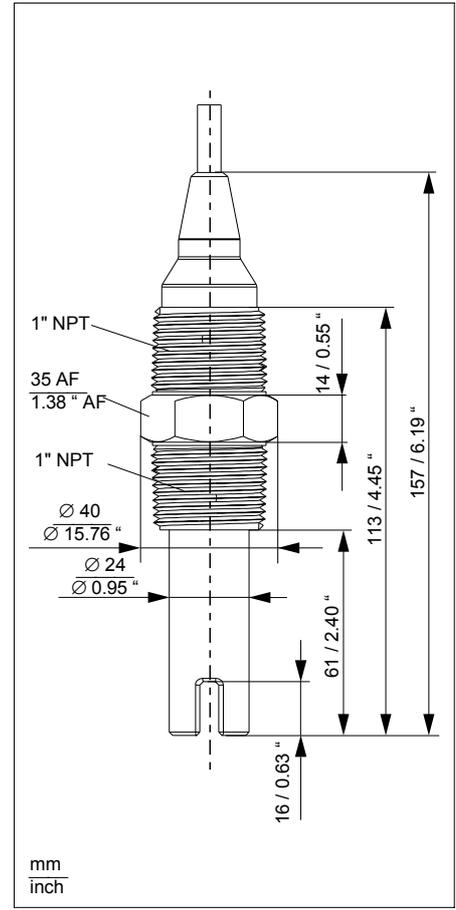
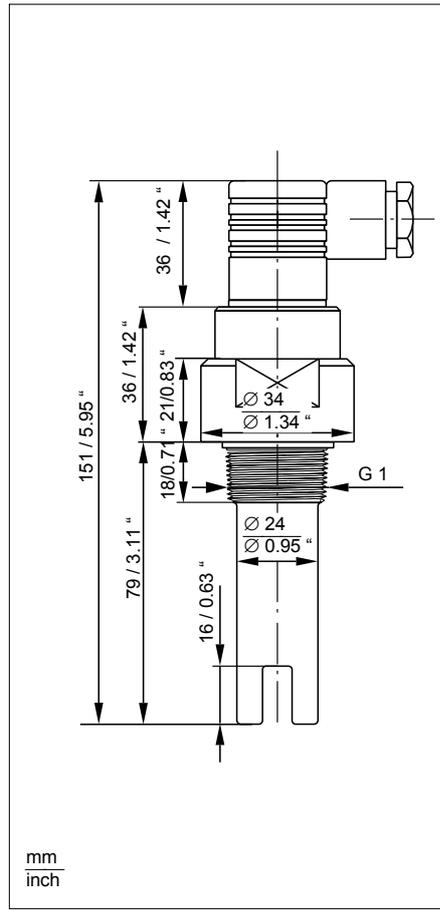
Note!

When installing the sensor, the measuring surfaces must be completely wetted by the medium during operation.

# Dimensions

left:  
OLS 21  
(connector version)  
with G1 thread

right:  
OLS 21  
(fixed cable version)  
with NPT 1" thread

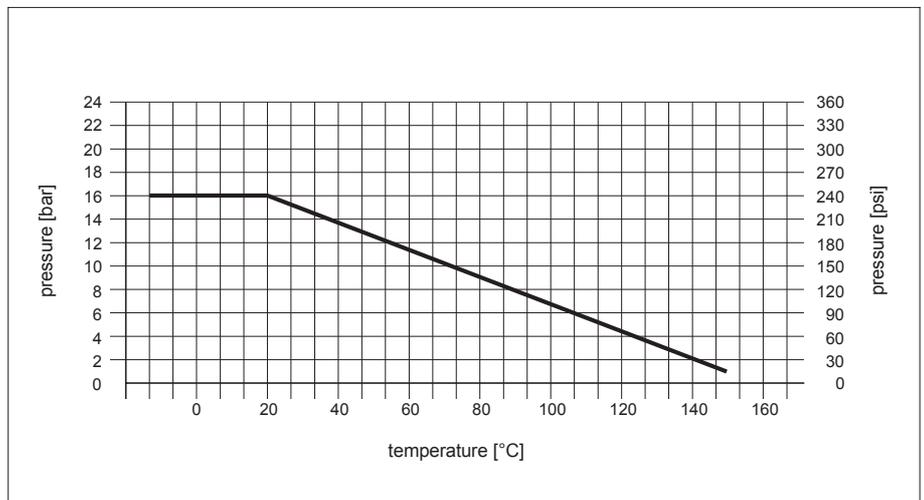


# Technical data

<b>Mechanical Data</b>	Electrode length	61 mm / 2.40 "	
	Electrode diameter	24 mm / 0.95 "	
<b>Material</b>	Sensor shaft	PES (polyethersulphone)	
	Electrode	Graphite	
<b>Conductivity Measurement</b>	Measuring range	10µS/cm to 20 mS/cm	
	Cell constant k	1/cm	
	Quality certificate	Inspection certificate acc. to EN 10204 Nr. 3.1.B (with indication of material and individual cell constant)	
	Temperature sensor	Pt 100	
<b>Process connection</b>	Thread	G 1	
	Connector version Fixed cable version	NPT 1 "	
	Connection	four-pin plug with Pg 9 cable gland	
<b>Operating data OLS 21</b>	Max. temperature	150 °C	
	Max. pressure	16 bar / 230 psi (20 °C)	
	Ingress protection	Connector version	IP 65 / NEMA 4X
		Fixed cable version	IP 67 / NEMA 6
<b>Flow chamber OLA 752</b>	Material	PP (polypropylene)	
	Max. temperature	90 °C	
	Max. pressure	6 bar / 90 psi (20 °C)	
	Process connection	2 x G ½, G 1	

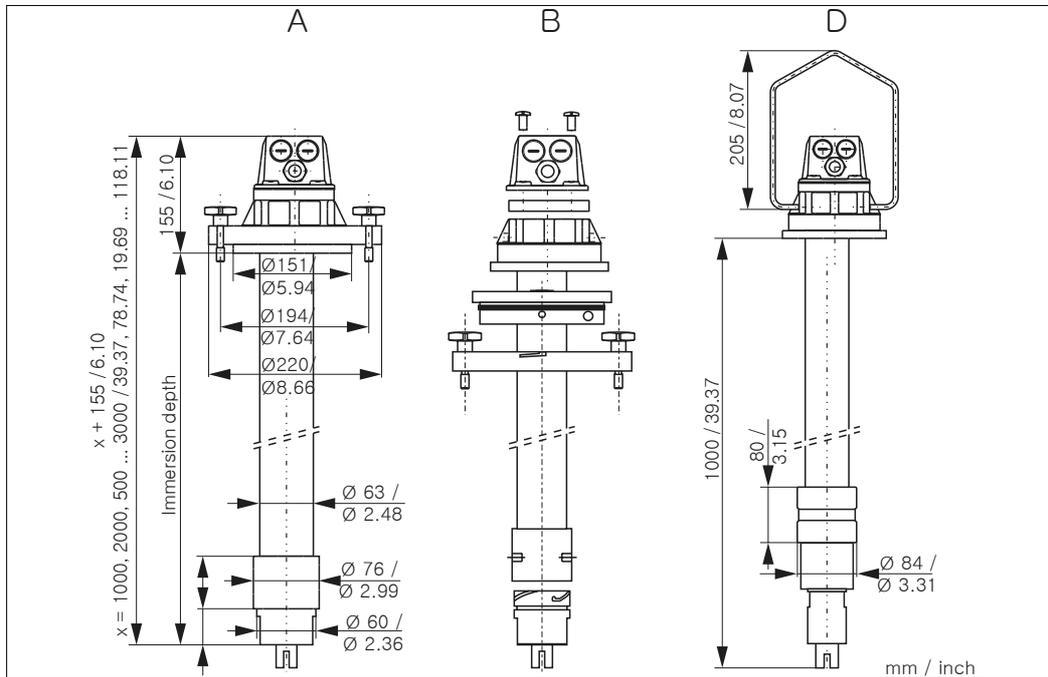
## Pressure/temperature diagram

Pressure/temperature diagram for inline installation



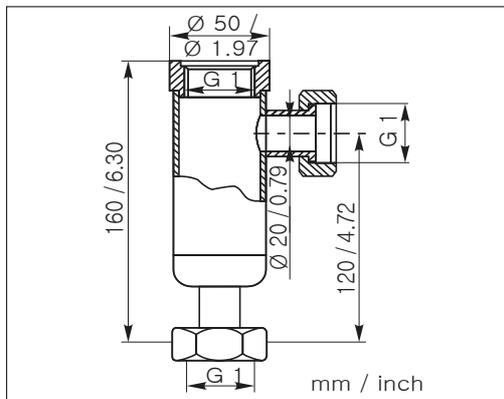
## Accessories

- OLA 111 immersion and process assembly  
For open and closed tanks with DN 100 flange,  
for ordering information, see Technical Information OLA 111



OLA 111, DN 100 flange, mounting versions A, B und D

- OLA 751 flow assembly



OLA 751 flow assembly

For installation of conductivity sensors with G 1 thread.

Inlet (bottom) and outlet (lateral) DN 20 with union nuts G 1.

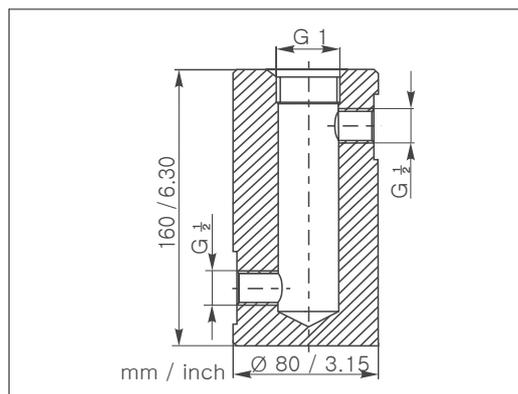
Stainless steel 1.4571 (AISI 316Ti)

Max. temperature: 160 °C / 320 °F

Max. pressure: 12 bar / 174 psi

Order no.: 50004201

□ OLA 752 flow chamber



For installation of conductivity sensors with G 1 thread  
Inlet (bottom) and outlet (lateral) DN 20 with G 1/2 internal thread  
Polypropylene (PP)  
Max. temperature: 90 °C / 194 °F  
Max. pressure: 6 bar / 87 psi  
Order no.: 50033772

OLA 752 flow chamber

## 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<sup>2</sup>mm each with a common screen, outer  
diameter 7 mm / 0,25"

Sold by the metre, minimum length 5 m

Length 5 m / 15 ft

Length 10 m / 30 ft

Length 50 m / 150 ft

Length 100 m / 300 ft

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

Cable entry Pg 13,5

Cable entry NPT 1/2"

# Product structure

Conductivity sensor OLS 21				
<b>Measuring range and cell constant</b> C 10.0µS ... 20.0 mS/cm ( $k = 1$ )				
<b>Process connection / material</b> 1E Process connection G 1 thread / PES (only connector) 1N Process connection NPT 1 " thread / PES (only fixed cable)				
<b>Cable connection</b> 2 With 5 m / 15 ft fixed cable 3 With 10 m / 30 ft fixed cable 4 Four-pin DIN connector with Pg 9 (measuring cable separately)				
<b>Temperature sensor</b> A With integrated Pt 100 temperature sensor D No temperature sensor				
OLS 21-				complete order code