Technical Information
TI 085//e00/06.03
51502591

Conductivity Sensor
OLS 21

Two-electrode sensors
fixed cable or connector versions with integrated Pt 100 temperature sensor.
Cell constant k = 1 cm^{-1}

Application

Measurements in media of medium and high conductivities:
- Medium separation in medium conductivities (milk/water)
- Medium separation in high conductivities (alkaline solution/water)
- Drinking water treatment
- Wastewater treatment

The cell constant of the sensor is k = 1 cm^{-1}. The measuring range reaches from 10 µS/cm to 20 mS/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, MΩ · cm measuring ranges are available in the menues of these transmitters.

With ATEX approval for application in hazardous areas.

Your benefits

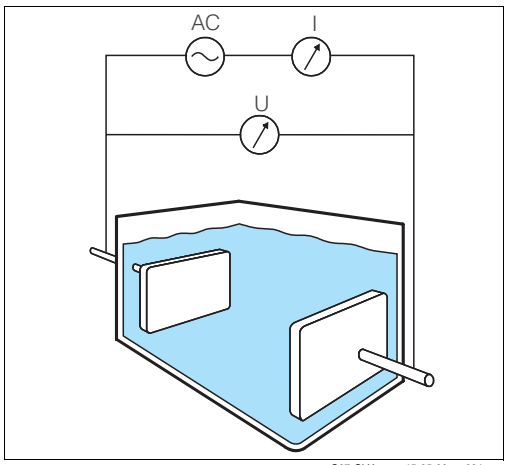
- Different designs guarantee optimum adaptation to the process conditions and methods of installation
- Installation in pipes or flow chambers
- Compact design
- Available with connector or fixed cable
- High chemical, thermal and mechanical stability
- IP 65 (with connector) / IP 67 (with fixed cable)
- Quality certificate with statement of the individual cell constant

With quality certificate

Function and system design

Measuring principle

Conductive conductivity measurement



Conductive conductivity measurement

AC Power supply
I Current meter
U Voltage meter

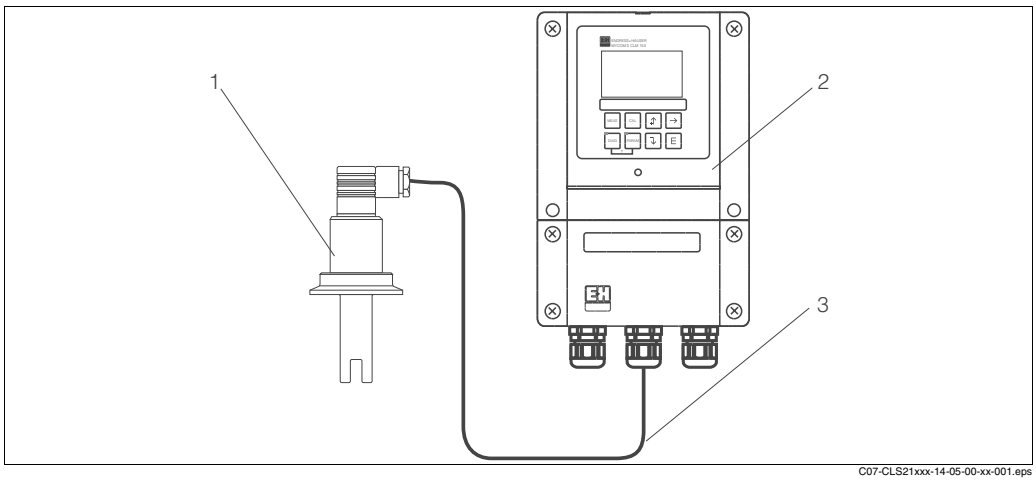
The conductivity of liquids is measured with a measuring system that has two coaxially arranged electrodes like a capacitor.
The electric resistance or its reciprocal value, the conductance G, is measured according to Ohm's law. The specific conductivity κ is determined using the cell constant k that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

Important properties OLS 21

- **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 153
- for connector versions, a OYK 71 or OYK 71-Ex special measuring cable



Measuring system example

1 OLS 21
2 OLM 153 transmitter
3 Special measuring cable

Input

Measured values

Conductivity
Temperature

Cell constant k

$k = 1\ cm^{-1}$

Measuring ranges

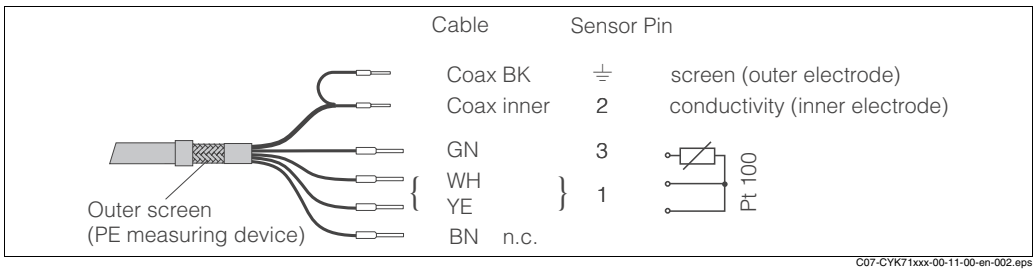
Conductivity	10 µS/cm ... 20 mS/cm
Temperature	–20 ... +150 °C / -4 ... +302 °F

Temperature sensor

Pt 100

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.

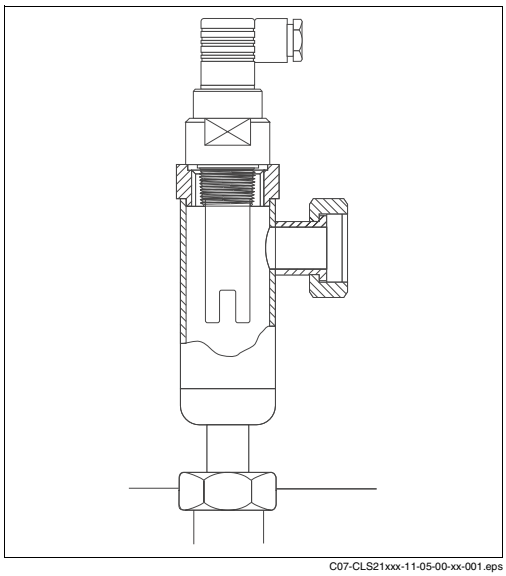


OYK 71/OYK 71-Ex or fixed cable

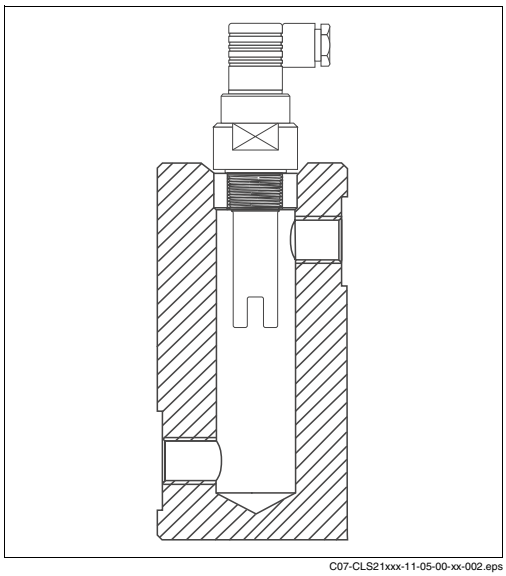
Installation

Installation instructions

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

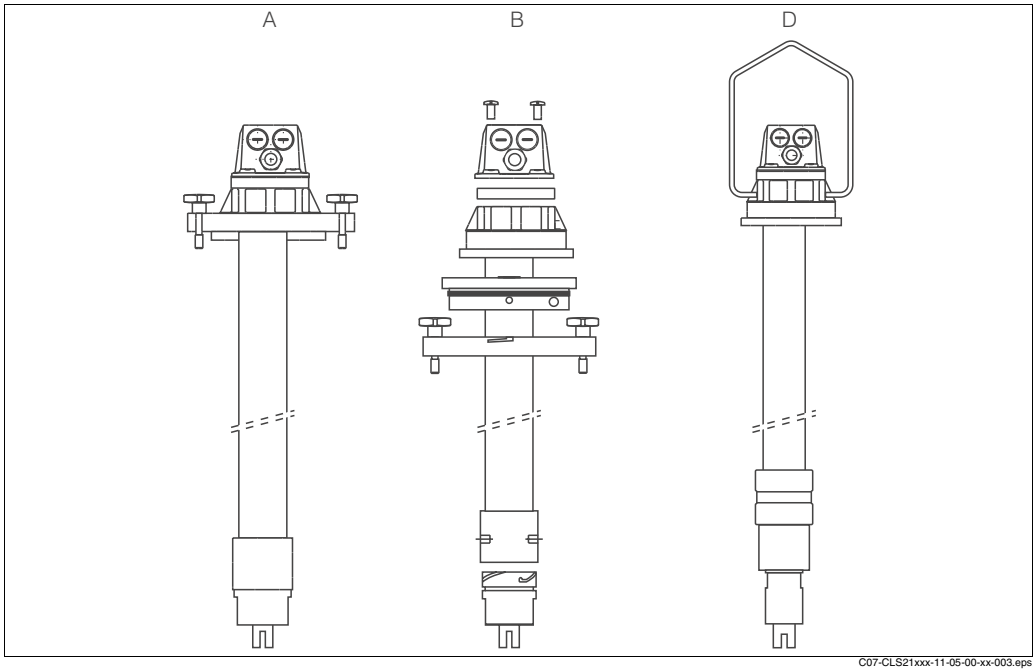


Installation in the OLA 751 flow chamber



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.

Environment

Ingress protection

IP 67 / NEMA 6 (fixed cable)
IP 65 / NEMA 4X (connector)

Process

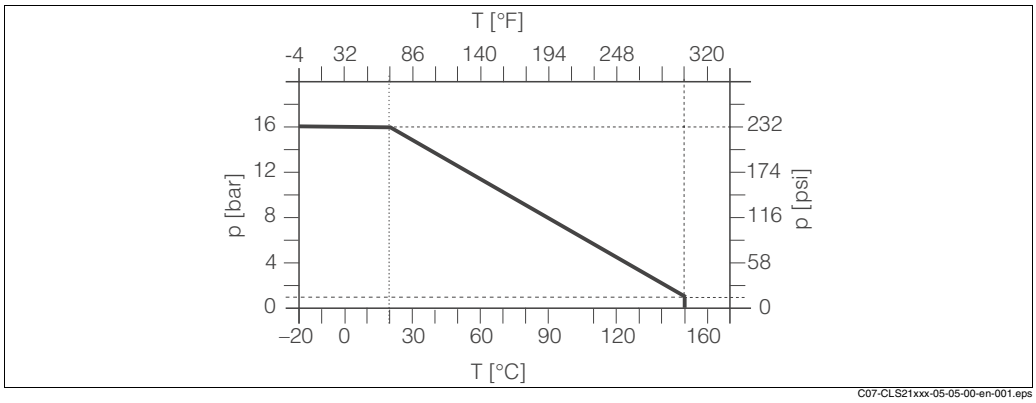
Process temperature

-20 ... 150 °C (at 1 bar) / -4 ... 302 °F (at 14.5 psi)

Process pressure

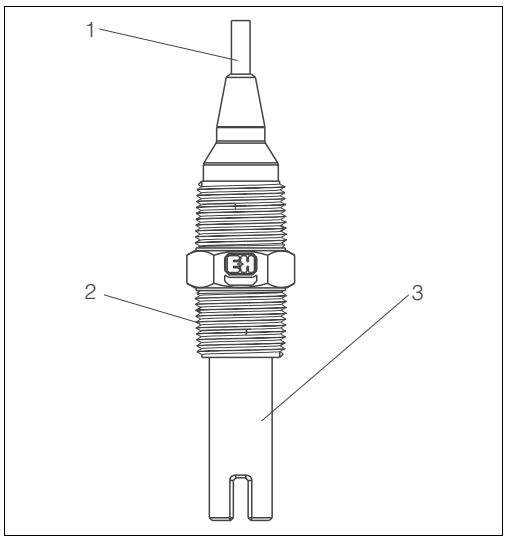
16 bar (at 20 °C) / 232 psi (at 68 °F)

Pressure/temperature load curve



Mechanical construction

Design, dimensions



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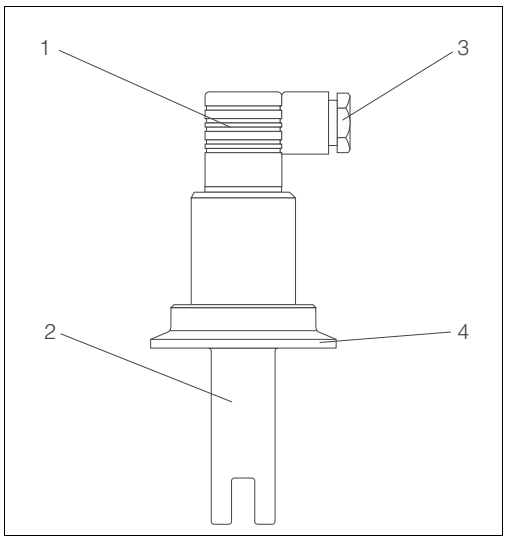
Fixed cable version with NPT 1" thread

1 Fixed cable
2 NPT 1" thread
3 Measuring electrode



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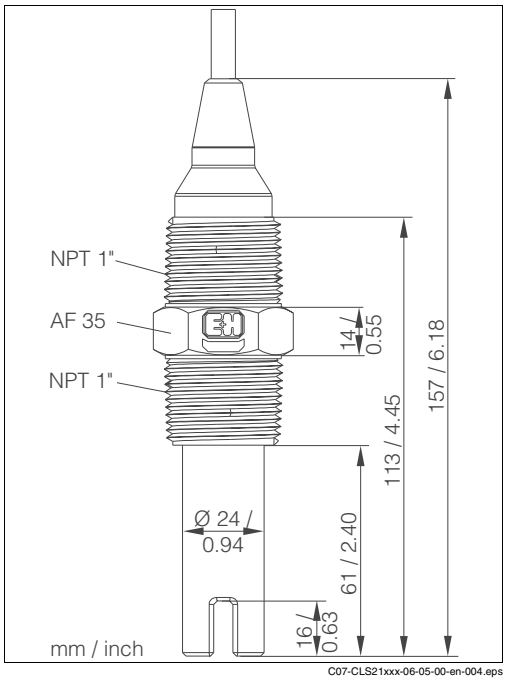
Connector version with 2" clamp

1 Four-pole connector
2 Measuring electrode
3 Pg 9 cable gland
4 2" clamp



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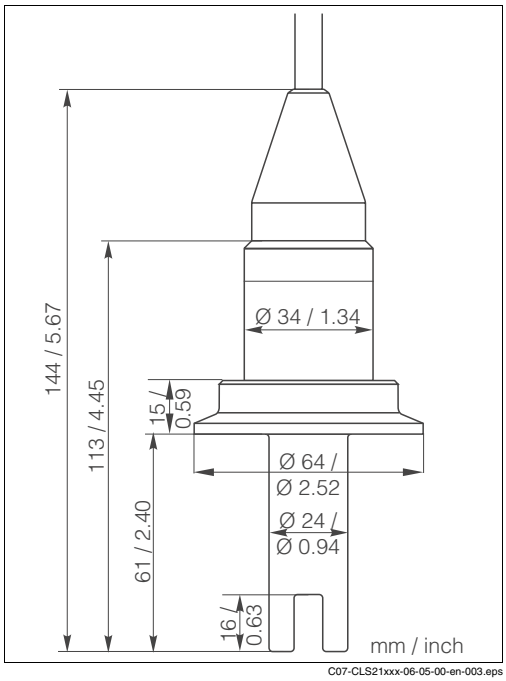
Fixed cable version with NPT 1" thread



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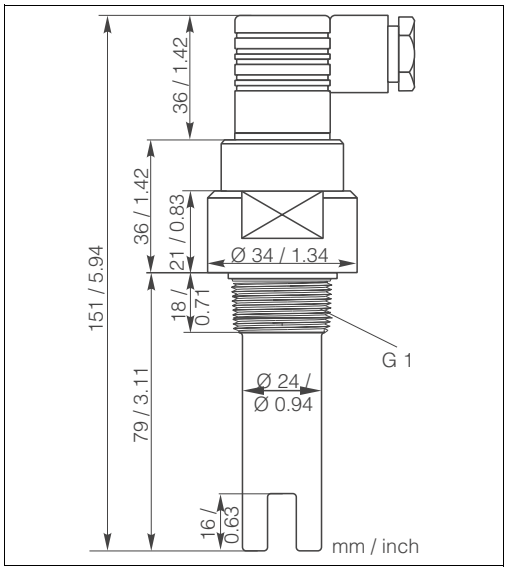
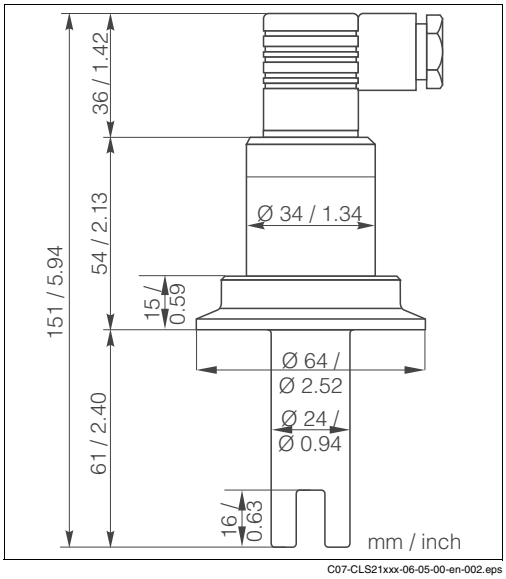
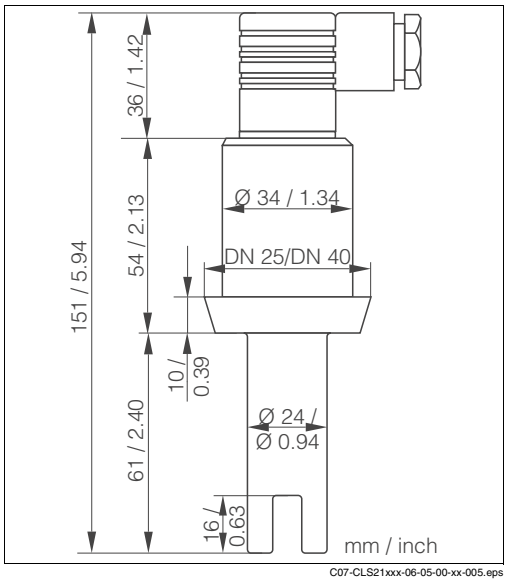
Fixed cable version with 2" clamp



Connector version with G 1 thread



Connector version with 2" clamp



Connector version with dairy fitting

Weight	Depending on version, approx. 0.3 kg / 0.7 lb.	
Materials	Electrodes	graphite
	Sensor shaft	polyethersulfone (PES)
Process connections	Fixed cable version	
	Thread	NPT 1"
	Clamp	2" acc. to ISO 2852
	Connector version	
	Thread	G 1
	Dairy fitting	DN 25 or DN 40 acc. to DIN 11851
	Clamp	2" acc. to ISO 2852

Certificates and approvals

Ex approval

- ATEX II 1G EEx ia IIC T3 / T4 / T6
- FM in combination with the OLM 431 and OLM 153 transmitters

for all product versions listed in the product structure (see Ordering Information)

Quality certificate

with statement of the individual cell constant

Ordering information

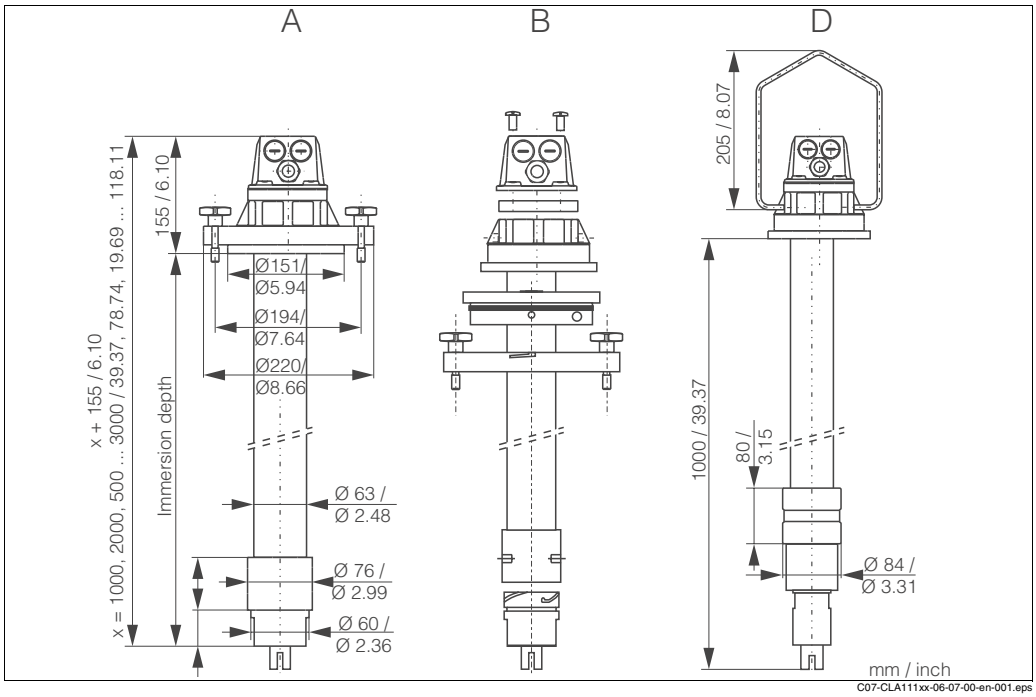
Product structure OLS 21

	Measuring range and cell constant				
	C	Measuring range: 10.0 µS ... 20 mS/cm (k = 1)			
		Process connection and materials			
		1E	Thread G 1, PES (connector version only)		
		1N	Thread NPT 1", PES (fixed cable version only)		
		2A	Dairy fitting DN 25, DIN 11851, PES (connector version only)		
		2B	Dairy fitting DN 40, DIN 11851, PES (connector version only)		
		3B	Clamp 2", PES		
			Measuring cable connection		
			2	with 5 m / 16.41 ft fixed cable	
			3	with 10 m / 32.81 ft fixed cable	
			4	four-pole DIN connector with Pg 9	
				Temperature sensor	
				A	Integrated Pt 100 temperature sensor
				D	No temperature sensor
OLS 21-					**complete order code**

Accessories

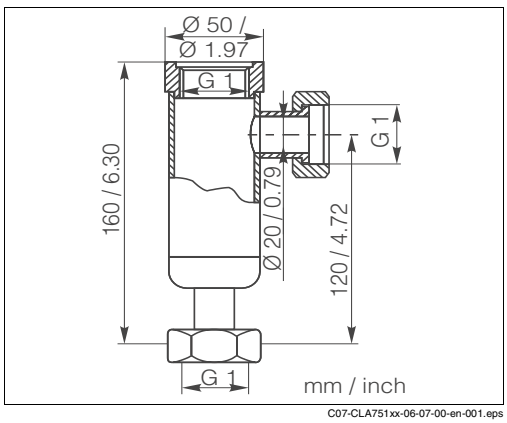
Assemblies

❑ 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

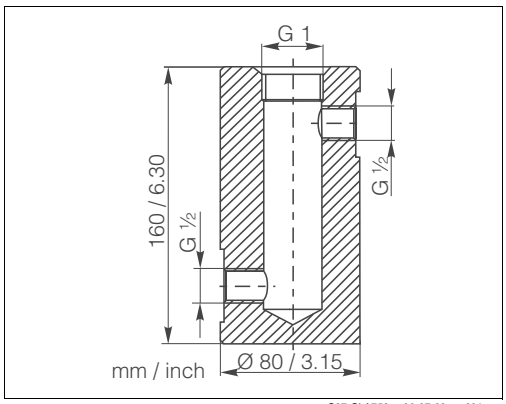
❑ OLA 751 flow assembly



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



OLA 752 flow chamber

For installation of conductivity sensors with G 1 thread
Inlet (bottom) and outlet (lateral) DN 20 with G ½ internal thread
Polypropylene (PP)
Max. temperature: 90 °C / 194 °F
Max. pressure: 6 bar / 87 psi
Order no.: 50033772

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^2 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

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), 500 ml;
order no. 50081902
– OLY 11-B
149.6 µS/cm (reference temperature 25 °C), 500 ml;
order no. 50081903
– OLY 11-C
1.406 mS/cm (reference temperature 25 °C), 500 ml;
order no. 50081904
– OLY 11-D
12.64 mS/cm (reference temperature 25 °C), 500 ml;
order no. 50081905

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