Technical Information
TI373/e/09/02.05
51502592

Conductivity Sensors
OLS 50

Highly resistant Inductive Conductivity Sensor for Standard and High-Temperature Applications

PEEK version

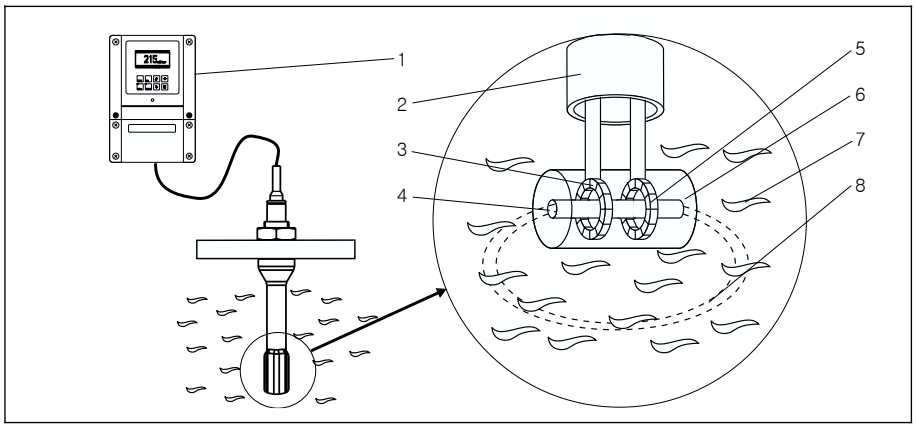
PFA version

The conductivity sensor OLS 50 is specially suitable for use in the chemical industry and in process engineering. The six-decade measuring range and high chemical resistance of the material in contact with the medium (PFA or PEEK) permit this sensor to be used in virtually any application conceivable. The whide temperature range of –20 to +125 °C (+18 0 °C) leaves nothing to be desired.

Areas of application
- Chemical industry
  - Concentration measurement of acids and alkalis
  - Product quality monitoring of chemical products in tanks and pipelines
- Phase separation of product/product mixtures in pipe systems in food and pharma industry

Benefits at a glance
- Measuring range from 5 µS/cm to 2000 mS/cm
- Chemical resistance due to PFA or PEEK coating
- PEEK version for high temperatures up to 180°C
- Total cable length of up to 55 m
- Dirt-repellent PFA surface
- Integrated, coated Pt 100 temperature sensor, error class A
- Large sensor opening, therefore low risk of soiling
- Can be installed in ≥ DN 80 tees with the outgoing diameter reduced to ≥ DN 50

Operating principle



Measuring and operating principle

1 Measuring instrument
2 Cable
3 Transmitting coil
4 Sensor opening
5 Receiving coil
6 Sensor housing
7 Medium
8 Induced electric current

Conductivity measurement
In inductive conductivity measurement, a transmitting coil (3) generates a magnetic alternating field that induces an electric voltage in a liquid. The ions present in the liquid enable a current flow which increases with increasing ion concentrations. The ion concentration serves as a measure of conductivity. The current (8) in the liquid generates a magnetic alternating field in the receiving coil (5). The resulting current induced in the receiving coil is measured and used to determine the conductivity value.

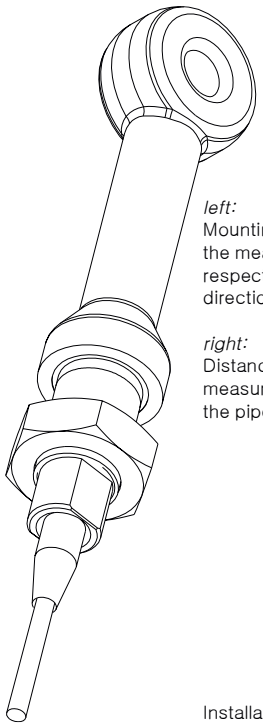
This measuring principle has the following advantages:
- No electrodes, therefore no polarisation
- Error-free measurement in strongly soiled media with a tendency to sediment
- Complete galvanic separation of measurement from medium.

Cell constant and installation factor

The electric conductivity of the liquid primarily depends on the ion concentration. However, installation and sensor geometry are factors that need to be taken into acount. The cell constant describes the geometry of the sensor completely.

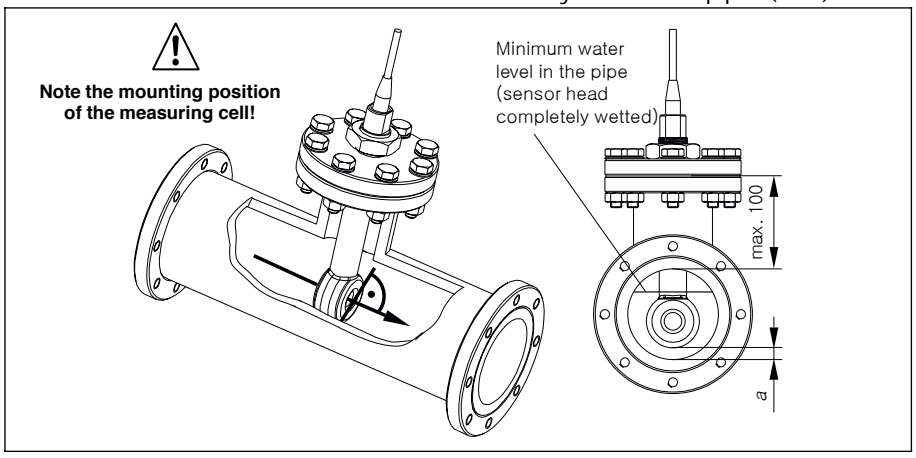
If the distance from the wall is sufficient (a > 30 mm), then it is not necessary to consider the installation factor (f = 1.00). If the distance from the wall is smaller, then the installation factor increases in the case of electrically insulating pipes (f > 1) and decreases in the case of electrically conductive pipes (f < 1).

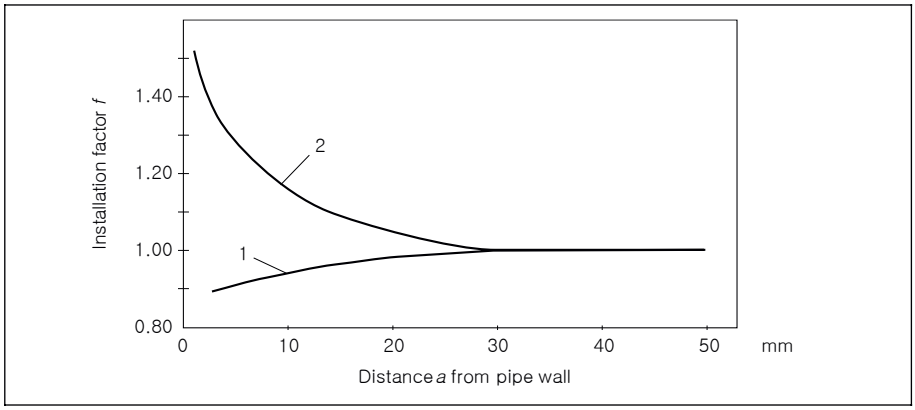
Installation



left:
Mounting position of the measuring cell with respect to the flow direction of the medium

right:
Distance *a* of the measuring cell from the pipe wall

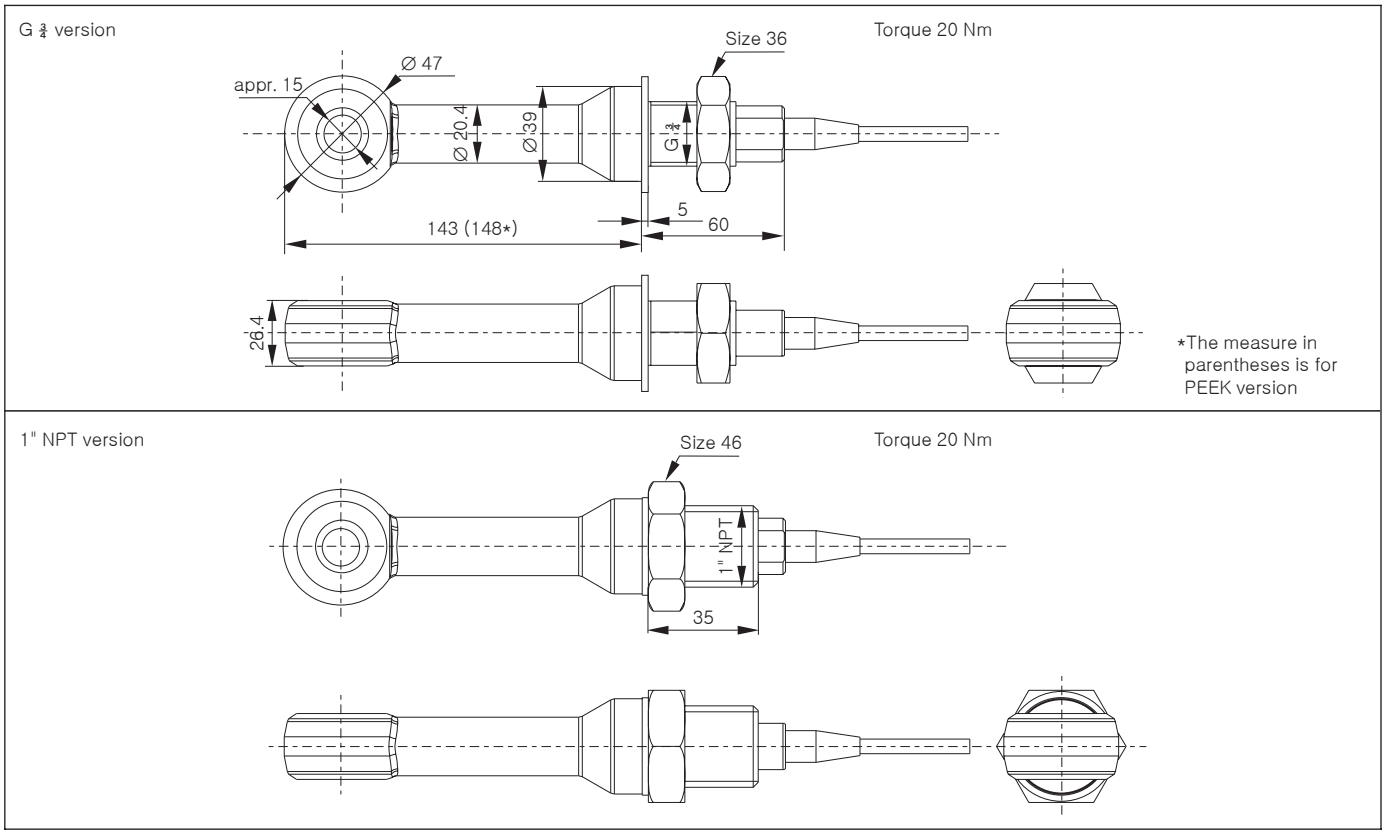




Installation factor *f* in dependence on distance *a* from pipe wall

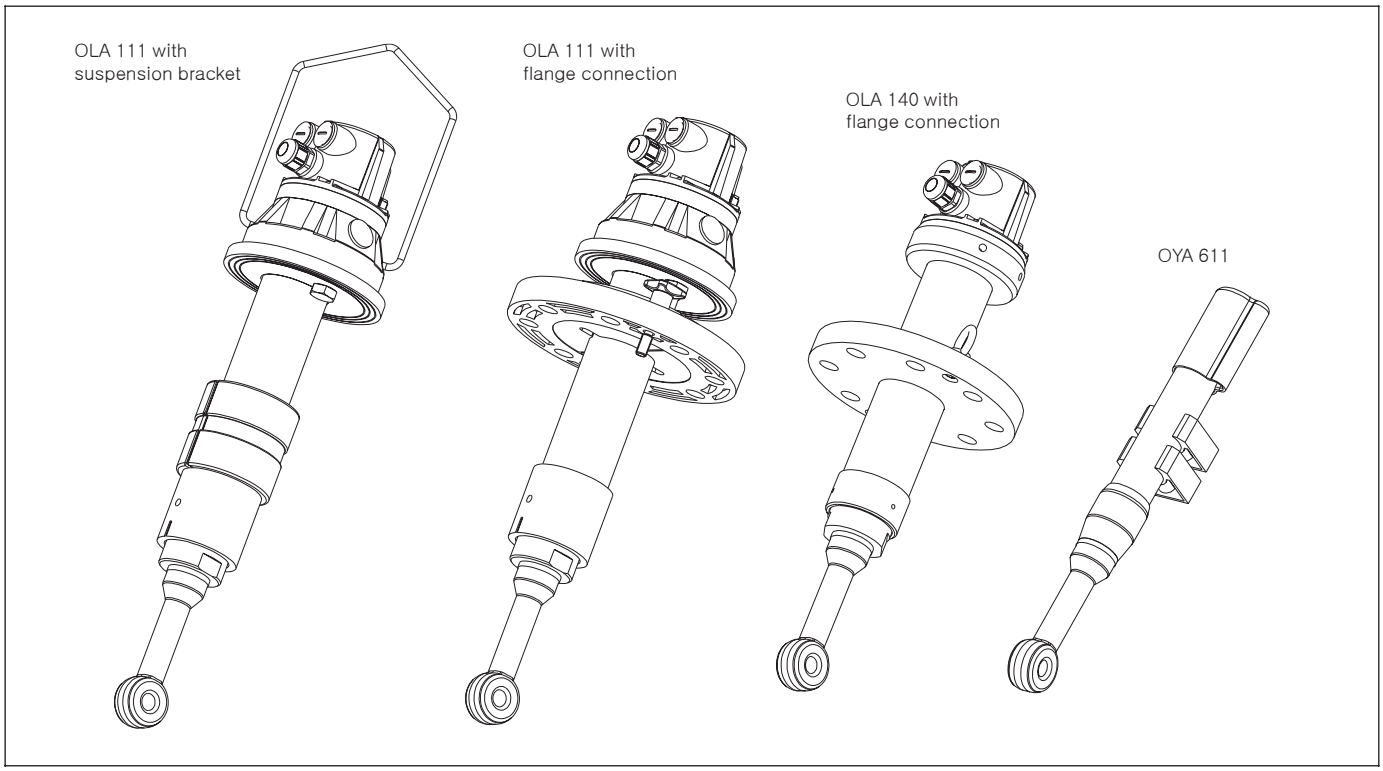
1 Conductive pipe
2 Insulating pipe

Dimensions



Dimensions: Versions with G ¾ thread (top) and 1" NPT thread (bottom)

Mounting of measuring cell with assembly and G ¾ version

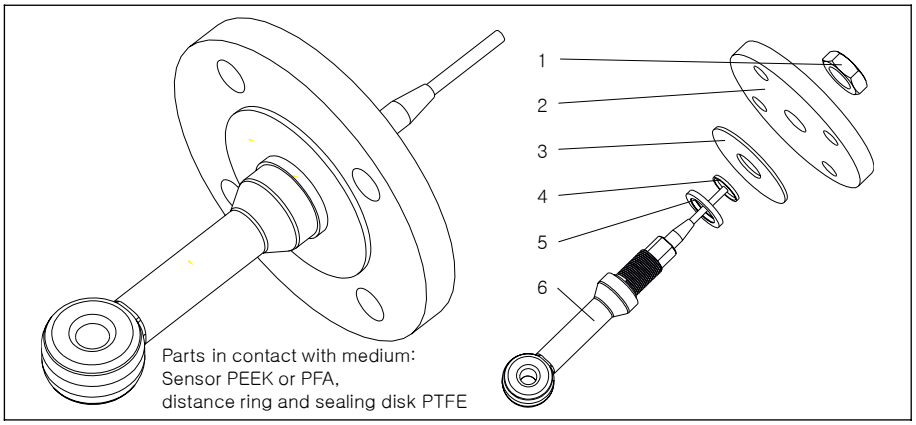


Assembly mounting of measuring cell, G ¾ version

Mounting of measuring cell with flange

Flange not in contact with medium, fixed flange (process connections 5, 6, 7)

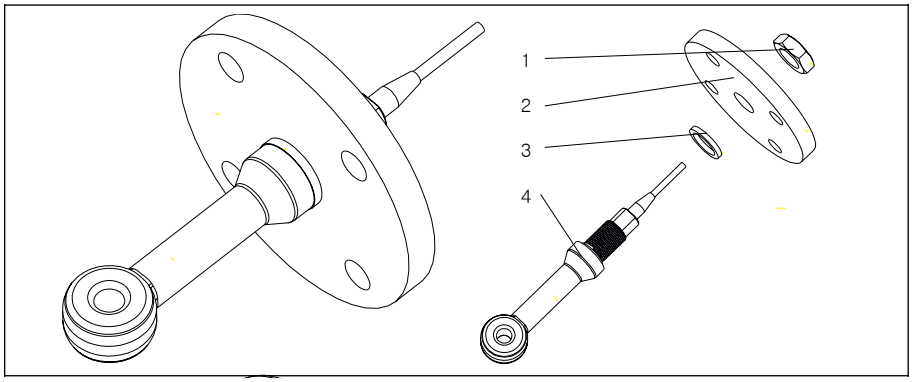
1 Nut
2 Flange
3 Sealing disk
4 Distance ring
5 Sealing
6 Sensor



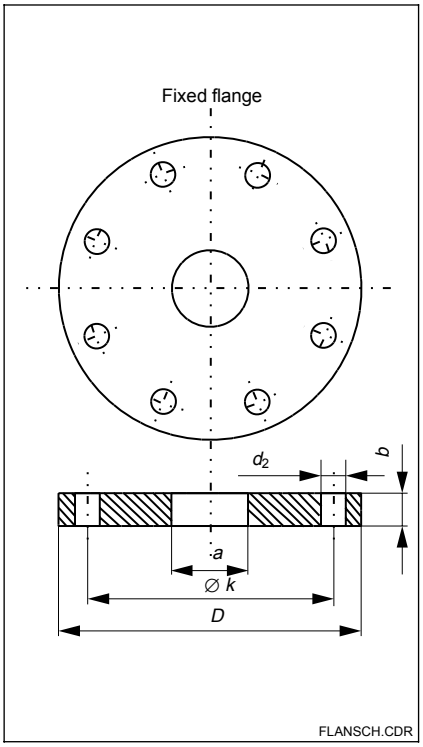
Flange in contact with medium

Fixed flange (process connections 3, 4)

1 Nut
2 Flange
3 Sealing
4 Sensor

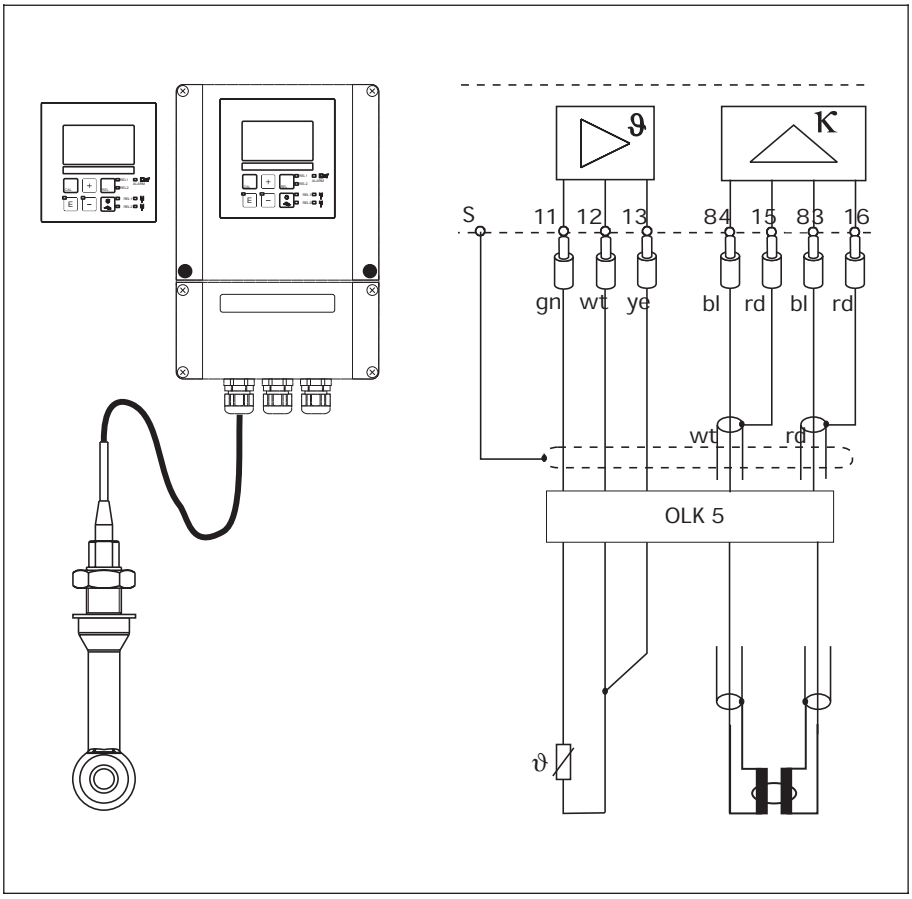


Flange dimensions



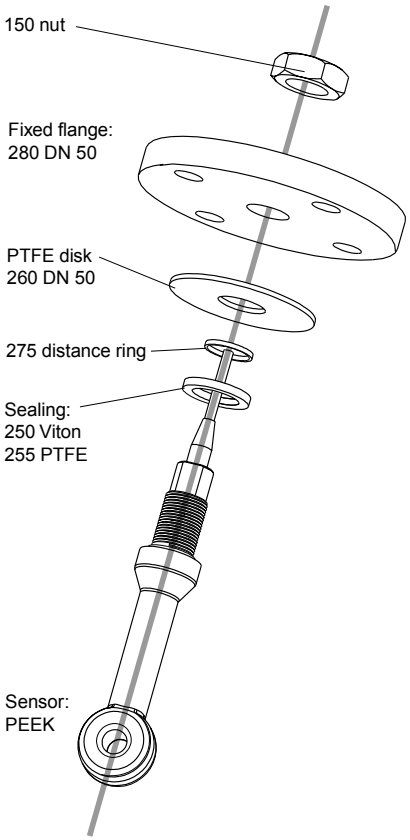
Fixed flange SS 316L	**DN 50 PN 16**
D	165
∅ *k*	125
d_2	4 x 18
b	18
a	27
Screws	M 16

Cable connection



Cable connection at transmitter OLM 223/253

Accessories / service kits



Sealing kits

❏ Kit OLS 50 PTFE sealing
Pos. 150, nut
Pos. 255, PTFE sealing (2 pcs.)

❏ Kit OLS 50 Viton sealing
Pos. 150, nut
Pos. 250, Viton sealing (3 pcs.)

❏ Kit OLS 50 PTFE disk DN 50
Pos. 275, distance ring

Kits for fixed flanges

❏ Kit OLS 50 flange DN 50, SS 316L
Pos. 150, nut
Pos. 280, flange DN 50
(Kit OLS 50 PTFE disk DN 50 additionally required for aggressive media!)

Accessories

❏ Extension cable OLK 5

❏ Immersion assembly OLA 140

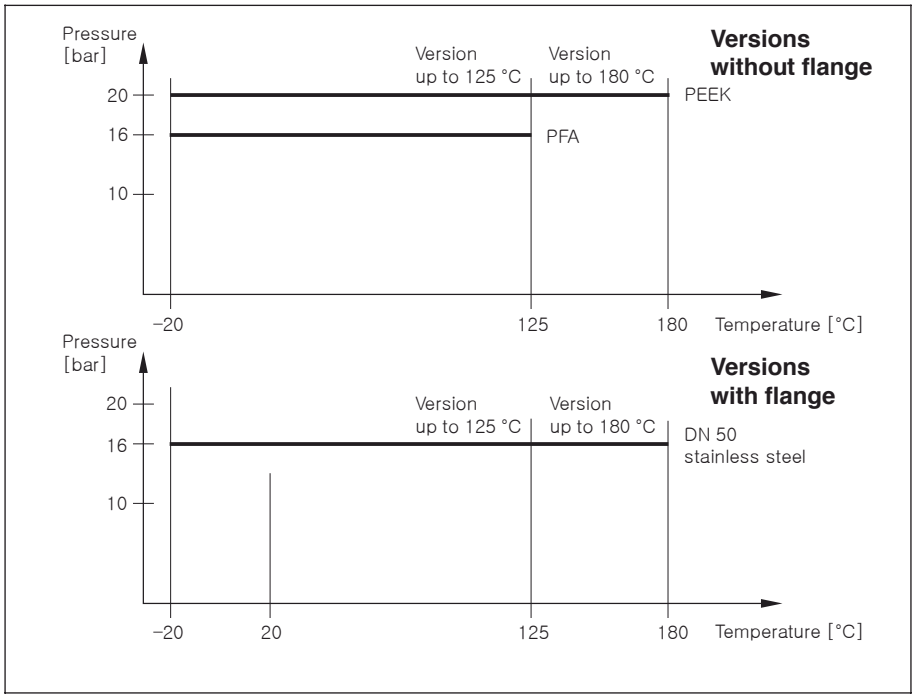
Resistance table

Chemical attack			
Medium	**Concentration [%]**	**Temperature [°C]**	**PFA**
Nitric acid HNO_3	5	20	+
		60	+
	up to 40	20	+
		60	+
Phosphoric acid H_3PO_4	up to 10	20	+
		60	+
Sodium hydroxide solution NaOH	3	20	+
		50	+
		80	+

Chemical attack			
Medium	**Concentration [%]**	**Temperature [°C]**	**PEEK**
Nitric acid HNO_3	up to 5	20	+
		60	+
	up to 40	20	+
		60	–
Phosphoric acid H_3PO_4	up to 10	20	+
		60	+
Sodium hydroxide solution NaOH	up to 3	20	+
		50	+
		80	+

Resistances
PEEK and PFA
+ resistant
– not resistant

Pressure–temperature curves



Pressure-temperature curves in dependence on material and flange version

Technical data

General specifications

Manufacturer	ISI Europa
Product designation	OLS 50

Measuring range	0 ... 2000 mS/cm
Cell constant	appr. 2 cm^{-1}
Storage temperature	–20 ... +80 °C
Protection class (DIN 40050)	IP 67 (sensor in mounted state combined with original sealing)
Meas. value deviation for –20 ... 100 °C	±(5 µS/cm + 0.5 % of measured value)
Meas. value deviation for > 100 °C	±(10 µS/cm + 0.5 % of measured value)

Temperature measurement

Temperature sensor	Pt 100, class A acc. to IEC 751
Temperature response t_{90} – PEEK version – PFA version	90 % of upper temperature display limit (acc. to DIN 746-1): approx. 7 min approx. 26 min

Installation

Required pipe diameter	≥ DN 80 (consider installation factor if pipe diameter < DN 110)
Installation in reduced outgoing line	≥ DN 50

Product structure

Conductivity sensor OLS 50