Technical
Information
TI 110C/24/ae

Conductivity Measuring Cells
ConduMax W CLS 19

Two-electrode measuring sensors with cell constant k = 0.01/cm or k = 0.1/cm

Area of application

Measurement in pure and ultrapure water:

- Monitoring ion exchangers
- Reverse osmosis

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

- k = 0.01/cm: 0.04 to 20 μS/cm
- k = 0.1/cm: 0.1 to 200 μS/cm

Sensors with a Pt 100 temperature sensor are used together with the conductivity measuring instruments Liquisys M CLM 223/253 equipped with automatic temperature compensation.

For measurement of specific resistance, MΩ · cm, measuring ranges are available in the program of the transmitter.

Benefits at a glance

- Installation in pipes or flow chambers
- Pt 100 temperature sensor for temperature compensation
- Compact design
- Low cost

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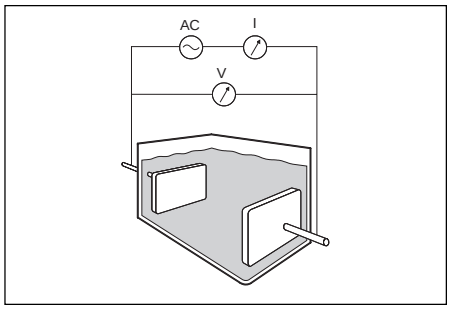
The Power of Know How

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 similar to a capacitor. The electric resistance or its reciprocal value, the conductance G, is measured according to Ohm's law. The specific conductivity **K** is determined using the cell constant k that is dependent on the sensor geometry.



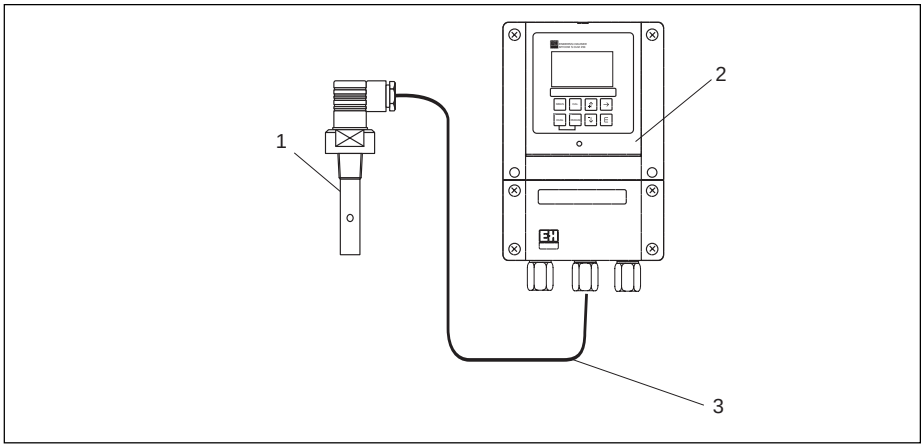
Conductive conductivity measurement
AC = Power supply
I = Current meter
V = Voltage meter

ConduMax W CLS 19 important properties

- **Electrodes**
  ConduMax W CLS 19 has coaxial measuring electrodes made of polished 316Ti stainless steel
- **Temperature compensation**
  In addition, a Pt 100 temperature sensor is installed to measure the process temperature.
- **Easy connection**
  The sensors are connected via a 4-pole DIN-plug that can be secured with a screw. The plug is equipped with a Pg 9 cable gland for insertion of the measuring cable
- **Installation**
  The sensor can be installed directly via the 1/2" NPT process connection. Mounting the sensor in cross or T-pieces with DN 20 requires a PVC-threaded coupling available as an accessory. For easy installation in cross or T-pieces with DN 32, 40 or 50, adapter couplings (made of PVC for gluing) and a 1-1/2" clamp coupling (made of PVDF) are available as accessories.
- **Durability**
  The sensor can withstand pressures up to 87 psi (6 bar) at 68°F (20°C) and can be applied with temperatures up to 140°F (60°C) at 14 psi (1 bar).

Measuring system

A complete measuring system consists of:
- A CLS 19 conductivity sensor
- A transmitter, e.g. Liquisys M CLM 253
- A CYK 71 measuring cable



Measuring system example
1 CLS 19 ConduMax W sensor
2 CLM 253 Liquisys M transmitter
3 Measuring cable

Input

Measured values

Conductivity and temperature

Cell constant k

Dependent on version ordered:
k = 0.01/cm
k = 0.1/cm

Measuring ranges

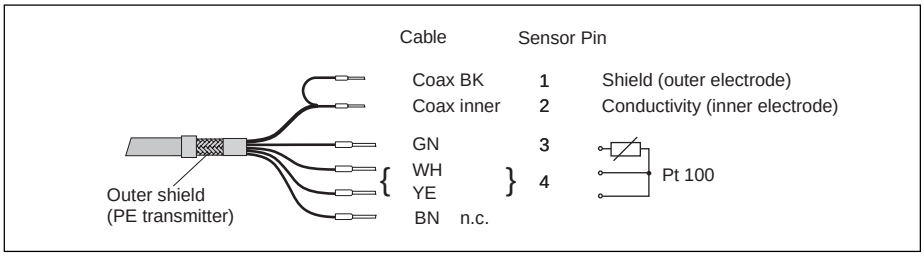
Conductivity	(referenced to water at 77°F)
k = 0.01/cm	0.04 µS/cm to 20 µS/cm
k = 0.1/cm	0.1 µS/cm to 200µS/cm
Temperature	14° to +140°F (-10° to +60°C)

Temperature sensor

Pt 100

Cable specifications

The ConduMax W is connected to the transmitter using the special measuring cable CYK 71



Measuring cable CYK 71

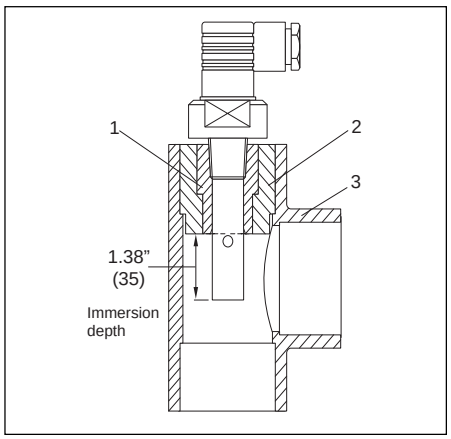
Installation

Installation instructions

The sensor is mounted directly via the 1/2" NPT process connection. Sensors can be mounted in a cross or T-piece with optional adapter couplings (see accessories).

When mounting the sensor, make sure that the measuring surfaces are completely wetted by the process fluid.

When working in ultrapure water, ingress of air must be avoided since dissolved air, particularly CO_2, may increase the conductiivity by up to 3 μS/cm.



Installation in cross or T-piece
1 PVC-threaded coupling (see accessoies)
2 Adapter coupling for gluing for DN 32, 40 or 50 (see accessories)
3 Cross or T-piece DN 32, 40 or 50

Environment

Ingress protection

NEMA 4 (IP 65)

Ambient temperature

Refer to process temperature

Process

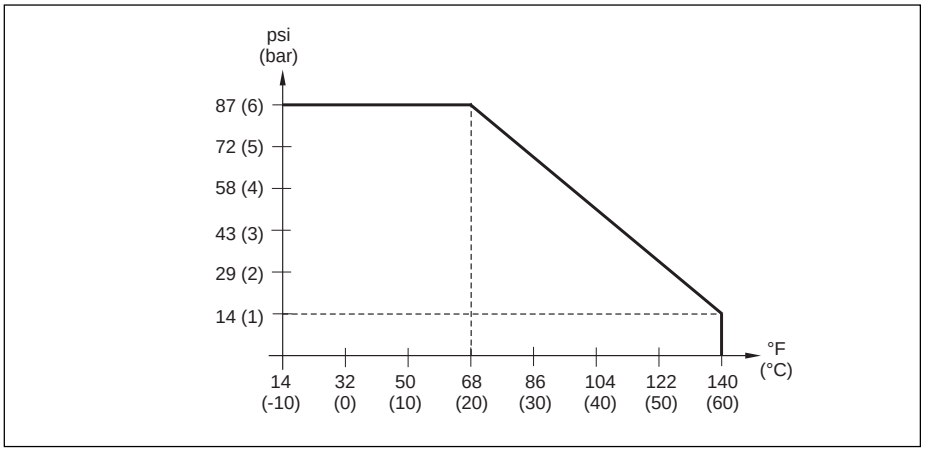
Process temperature

14° to +140°F (-10° to +60°C)

Process pressure

Maximum 87 psi (6 bar) at 140°F (60°C)

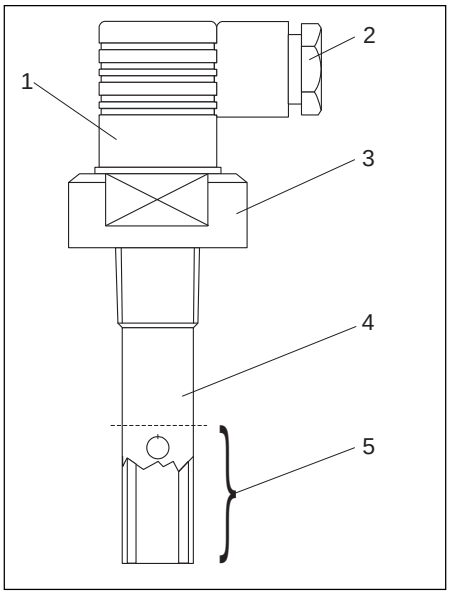
Pressure / temperature load curve



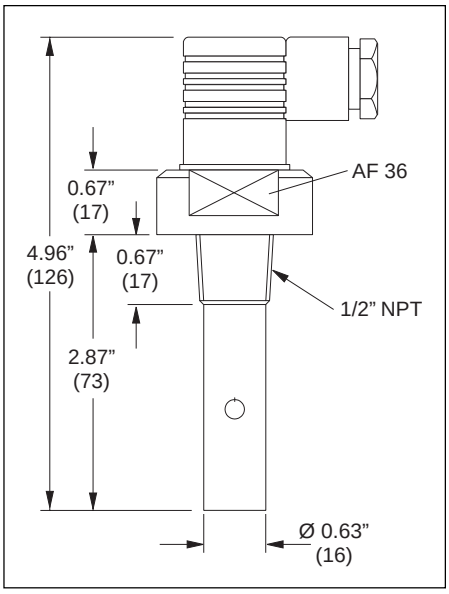
CLS 19 pressure/temperature load curve

Mechanical construction

Design, dimensions



CLS 19 design
1 Connection head
2 Measuring cable outlet
3 Threaded shaft (PES)
4 Electrodes (coaxially arranged)
5 Measuring surface



CLS 19, dimensions in inches (mm)

Weight	Approximately 0.2 lb (0.1 kg)	
Mateirals	Electrodes	316Ti SS
	Sensor shaft	PES (Polyethersulfone)
Process connection	1/2" NPT	
Cable connection	Pg 9 cable gland	

Ordering information

ConduMax W CLS 19

Conductivity Measuring Cell CLS 19 - 1 2 3 4

1 Measuring range and cell constant
- A Range: 0.04 - 20 µS/cm (k = 0.01)
- B Range: 0.1-200 µS/cm (k = 0.1)

2 Process connection/material
- 1A 1/2" NPT / sensor shaft PES

3 Cable connection
- 1 4-pole connector with Pg 9 fitting

4 Temperature sensor
- A Integrated Pt 100 temperature sensor
- D Without temperature sensor

Accessories

Installation couplings

PVC-threaded coupling
For cementing in standard PVC cross or T-pieces with DN 20, with G 1/2 internal thread, self-sealing, 1/2" NPT sensor thread: Order number: 5006636

PVC equalizing sleeves AM
For adapting the PVC threaded coupling to larger nominal diameters,
AM 32: for installation into cross or T-piece DN 32 Order number: 50004738
AM 40: for installation into cross or T-piece DN 40 Order number: 50004739
AM 50: for installation into cross or T-piece DN 50 Order number: 50004740

PVDF-threaded coupling
With G 1/2 internal thread and G 1 external thread, maximum pressure 174 psi (12 bar) at maximum 68°F (20°C), including o-ring, internal thread, self-sealing with 1/2" NPT sensor thread: Order number: 50004381

1/2" adapter clamp
Made of PVDF, for mounting CLS 19 sensor in a clamp adapter: Order number: 50043781

Measuring cables

Special measuring cable CYK 71 for two electrode conductivity sensors with integrated temperature sensors, 1 low-noise coaxial line, 4 auxiliary cores at 0.75 mm^2 each with a common shield, outer diameter 0.25" (7 mm).
Sold by 1 meter lengths, minimum 15 ft (5 m) Order number: 50085333
15 ft (5 m) length Order number: 50088280
30 ft (10 m) length Order number: 50088281
150 ft (50 m) length Order number: 50088284
300 ft (100 m) length Order number: 50088285

VDM junction box
for cable extension, with 10 screw terminals, NEMA 4X (IP 65)
Pg 13 cable entry Order number: 50003987
1/2" NPT cable entry Order number: 51500177

Calibration solutions	Calibration solutions are precision solutions to SRM (Standard Reference Material) of NIST for qualified cablibration of conductivity measuring systems according to ISO, accuracy ± 0.5%, with temperature table. CLY 11-A: 74 μS/cm, reference temperature 77°F (25°C), 500 ml container Order number: 50081902 CLY 11-B: 149.6 μS/cm, reference temperature 77°F (25°C), 500 ml container Order number: 50081903
Calibration set	ConCal conductivity calibration set is for ultrapure water applications, complete, factory-calibrated measuring set with certificate, traceable to SRM of NIST and DKD, comparative measurement in ultrapure water applications of up to 10 μS/cm. 230 VAC units, order number: 50083777 115 VAC units, order number: 50083778 ConCal recalibration, for factory recalibration and new issue of calibration certificate, traceable to SRM of NIST and DKD, factory calibration procedure according to ASTM D-5391-93. Order number: 51502486
Related products	ConduMax W CLS 15 conductivity sensor for measurement in pure and ultrapure water, see CLS 15 Technical Information TI 109C/24/ae.

Supplemental documentation

Transmitters	Liquisys M CLM 223/253 transmitter Technical Information	TI 193C/24/ae
Calibration solutions / Calibration set	CLY 11 Calibration solutions Technical Information	TI 162C/24/ae
	ConCal Calibration set Technical Information	TI 163C/24/ae

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TI 110C/24/ae/07.03