



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Technical Information

Condumax W CLS19

Conductivity sensors

Two-electrode sensors with

cell constants $k = 0.01 \text{ cm}^{-1}$ or $k = 0.1 \text{ cm}^{-1}$



Application

Measurement in pure and ultrapure water:

- Monitoring ion exchangers
- Reverse osmosis

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

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

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

- Liquiline M CM42
- Liquisys M CLM223/253

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

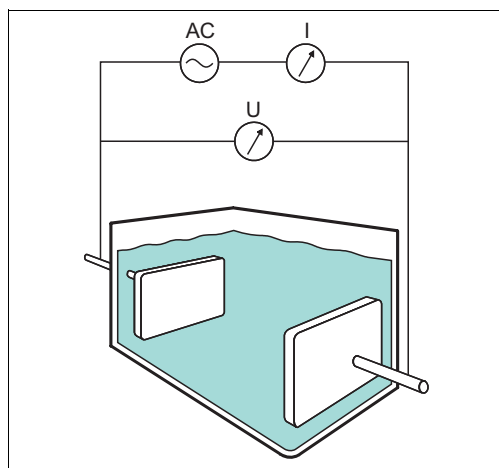
Your benefits

- Installation in pipes or flow chambers
- Pt 100 temperature sensor for temperature compensation
- Compact design
- Very good price

Function and system design

Measuring principle

Conductive measurement of conductivity



The conductivity of liquids is measured with the following measurement setup: Two electrodes are immersed in the medium. An AC voltage is applied to these electrodes which generates a current in the medium.

The electric resistance or its reciprocal value, the conductance G , is calculated according to Ohm's law. The specific conductivity κ is determined using the cell constant k that is dependent on the sensor geometry.

Conductive measurement of conductivity

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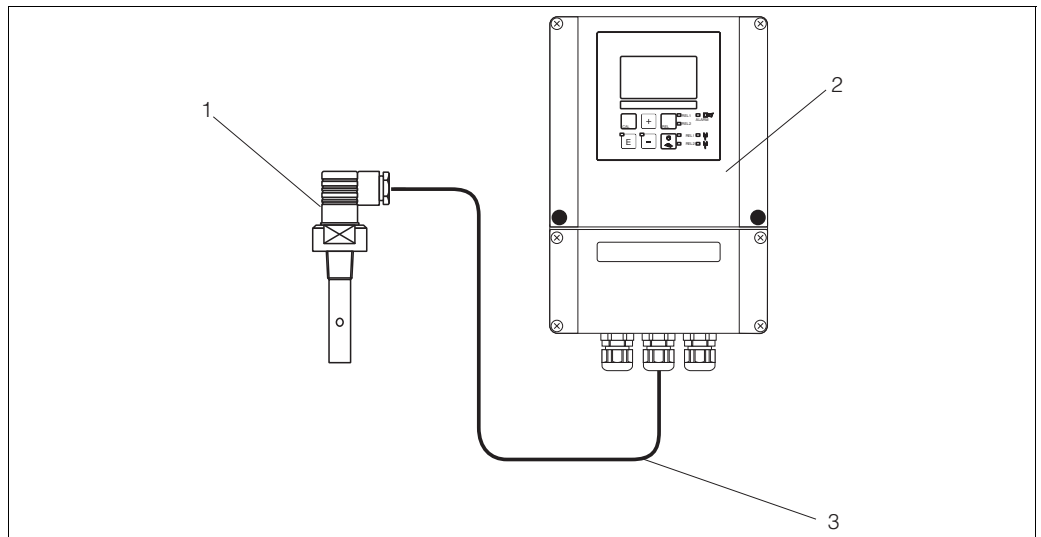
AC Power supply
 I Current meter
 U Voltage meter

Important properties

- **Electrodes**
 Condumax W CLS19 has coaxial measuring electrodes made of polished, stainless steel 1.4571 (AISI 316Ti).
- **Temperature sensor**
 In addition, a Pt 100 temperature sensor is installed to measure the medium temperature.
- **Easy connection**
 The sensors are connected via a 4-pole DIN-plug that can be secured with a screw. For introduction of the measuring cable, the plug is equipped with a Pg 9 cable gland.
- **Installation**
 The sensor can be installed directly via the NPT 1/2" process connection.
 Mounting the sensor in cross or T-pieces with DN 20 requires a PVC-threaded coupling that is available as accessory.
 For easy installation in cross or T-pieces with DN 32, 40 or 50, adapter couplings (made of PVC for cementing) and a 1 1/2" clamp coupling (made of PVDF) are available as accessories.
- **Durability**
 The sensor is pressure-proof up to 6 bar at 20 °C (87 psi at 68 °F) and can be applied with temperatures of up to 60 °C at 1 bar (140 °F at 14.5 psi).

Measuring system

- A complete measuring system comprises:
- a CLS19 conductivity sensor
 - a transmitter, e.g. Liquisys M CLM253
 - a CYK71 measuring cable

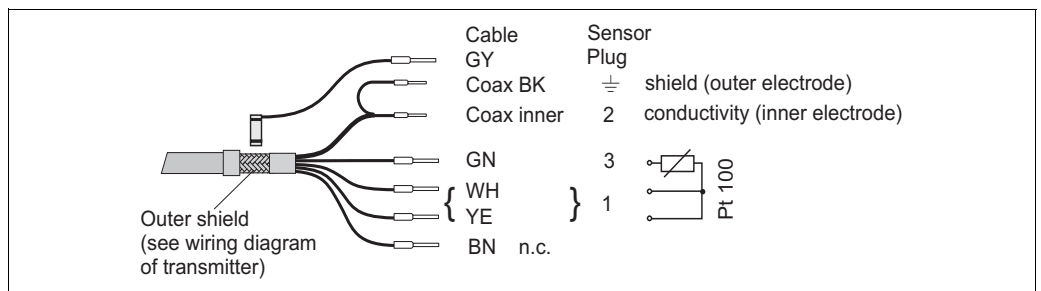


Measuring system example

- 1 Condumax W CLS19
- 2 Liquisys M CLM253 transmitter
- 3 Special measuring cable

Input

Measured values	Conductivity Temperature	
Cell constant k	Depending on ordered version: k = 0.01 cm ⁻¹ k = 0.1 cm ⁻¹	
Measuring ranges	Conductivity	(referenced to water at 25 °C (77°F))
	k = 0.01 cm ⁻¹ :	0.04 µS/cm to 20 µS/cm
	k = 0.1 cm ⁻¹ :	0.1 µS/cm to 200 µS/cm
	Temperature	-10 to 60 °C (14 to 140 °F)
Temperature sensor	Pt 100	
Cable specification	The Condumax W is connected to the transmitter using the special measuring cable CYK71.	

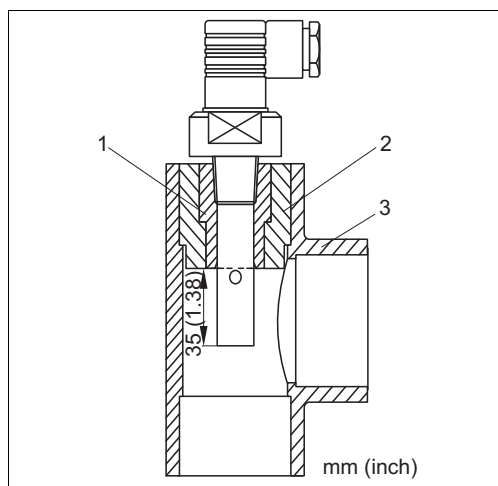


Special measuring cable CYK71

Installation

Installation instructions

The sensors are mounted directly via the NPT 1/2" process connection. Optionally, they can be installed in cross or T-pieces.



- 1 PVC-threaded coupling (see Accessories)
- 2 Adapter coupling for cementing for DN 32, 40 or 50 (see Accessories AM 32, 40 or 50)
- 3 Cross or T-piece DN 32, 40 or 50

Installation in cross or T-piece

When mounting the sensor, make sure that the electrodes are completely wetted by the medium. When working in ultrapure water, ingress of air must be avoided since dissolved air, particularly CO₂, may increase conductivity by up to 3 µS/cm.

Environment

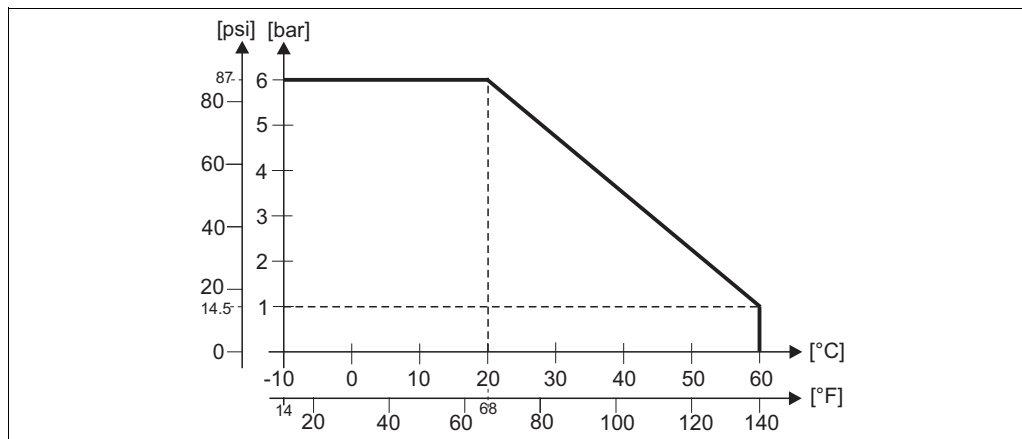
Ingress protection IP 65

Process

Process temperature -10 to 60 °C (14 to 140 °F)

Process pressure 6 bar at 20 °C (87 psi at 68 °F)

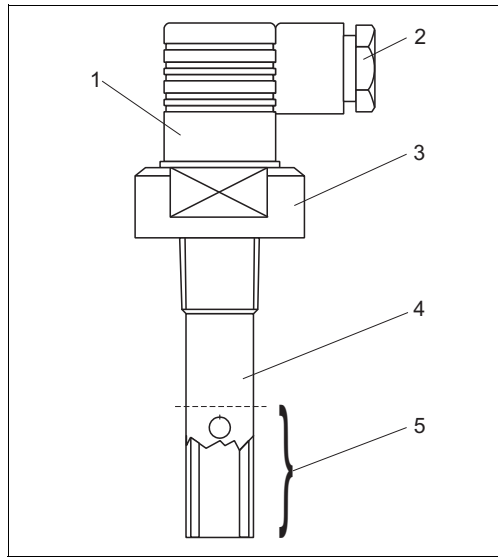
Pressure/temperature load curve



Pressure/temperature load curve of CLS19

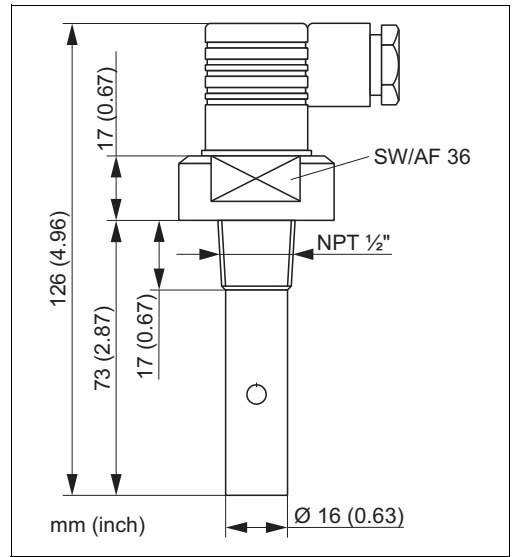
Mechanical construction

Design, dimensions



CLS19 design

- 1 Connection head
- 2 Measuring cable outlet
- 3 Threaded shaft (PES)
- 4 Electrodes (coxially arranged)
- 5 Minimum immersion depth



CLS19 dimensions

Weight approx. 0.1 kg (0.22 lbs)

Materials
 Electrodes stainless steel 1.4571 (AISI 316Ti)
 Sensor shaft PES (Polyethersulfone)

Process connection NPT 1/2" thread

Cable connection Pg 9 cable gland

Ordering information

Product structure

		Measuring range and cell constant	
A		Measuring range: 0.04 to 20 µS/cm (k = 0.01)	
B		Measuring range: 0.1 to 200 µS/cm (k = 0.1)	
		Process connection and materials	
1A		Thread NPT 1/2", sensor shaft PES	
		Measuring cable connection	
1		4-pole connector with Pg 9	
		Temperature sensor	
A		Integrated Pt 100 temperature sensor	
D		Without temperature sensor	
CLS19-			complete order code

Accessories

Installation

Threaded couplings

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

PVDF-threaded coupling

- With G ½ internal thread and G 1 external thread
- Pressure-proof up to 12 bar at 20 °C (174 psi at 68 °F), max. temperature 120 °C at 1 bar (248 °F at 14.5 psi), incl. O-ring
- Internal thread, self-sealing with NPT ½" sensor thread
- Order no. 50004381

Equalizing sleeves

PVC equalizing sleeves AM

- For adaptation of the PVC-threaded coupling to larger nominal diameters
- Diameters, order numbers:
 - 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

Adapters

Adapter clamp 1 ½"

- Made of PVDF for mounting the conductivity sensor in a clamp adaption
- Order no. 50043781

Connection

Measuring cables

CYK71 measuring cable

- Non-terminated cable for the connection of sensors or the extension of sensor cables
- Sold by the meter, order numbers:
 - non-Ex version, black: 50085333
 - Ex version, blue: 51506616

Junction boxes

Junction box VBM

- For cable extension
- 10 terminals
- Cable entries: 2 x Pg 13.5 or 2 x NPT ½"
- Material: aluminum
- Ingress protection: IP 65 (≅ NEMA 4X)
- Order numbers:
 - cable entries Pg 13.5: 50003987
 - cable entries NPT ½": 51500177

Transmitters

Liquiline M CM42

- Modular two-wire transmitter for Ex and non-Ex areas
- Hart®, PROFIBUS or FOUNDATION Fieldbus available
- Ordering acc. to product structure, see Technical Information (TI381C/07/en)

Liquisys M CLM223/253

- Transmitter for conductivity, field or panel-mounted housing,
- Hart® or PROFIBUS available
- Ordering acc. to product structure, see Technical Information (TI193C/07/en)

Calibration solutions

Precision solutions referred to SRM (Standard Reference Material) of NIST for qualified calibration of conductivity measuring systems according to ISO, with temperature table,

- CLY11-A
74 $\mu\text{S}/\text{cm}$ (reference temperature 25 °C (77 °F)), 500 ml (16.9 fl.oz);
Order no. 50081902
- CLY11-B
149.6 $\mu\text{S}/\text{cm}$ (reference temperature 25 °C (77°F)), 500 ml (16.9 fl.oz);
Order no. 50081903

Calibration set

Concal calibration set

- Conductivity calibration set for ultrapure water applications
- Complete, factory-calibrated measuring set with certificate, traceable to SRM of NIST and DKD
- For comparative measurement in ultrapure water applications up to max. 10 $\mu\text{S}/\text{cm}$
- Order numbers, versions:
 - 230 V AC: 50083777
 - 115 V AC: 50083778

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