Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

Condumax W CLS15

Conductivity sensors, fixed cable or plug-in versions with integrated temperature sensor Pt 100
Cell constant k = 0.01 cm^{-1} or k = 0.1 cm^{-1}

Application

Measurement in pure and ultrapure water:
- Monitoring ion exchangers
- Reverse osmosis
- Distillation
- Chip cleaning

The measuring range of the sensors depends on the cell constant k:
- k = 0.01 cm^{-1}: 0.04 to 20 µS/cm
- k = 0.1 cm^{-1}: 0.1 to 200 µS/cm

Sensors with a Pt 100 temperature sensor are used together with conductivity measuring instruments equipped with automatic temperature compensation:
- Liquiline M CM42
- Mycom S CLM153
- Liquisys M CLM223/253

For measurement of resistivity, MΩ · cm measuring ranges are available in the menus of these transmitters.

Your benefits

- High measuring accuracy as cell constant is individually measured
- Installation in pipes or flow chambers
- Compact design
- Available with plug-in head or fixed cable
- Easy to clean thanks to polished measuring surfaces
- Can be sterilized up to max. 150 °C (302 °F)
- Stainless steel 1.4435 (AISI 316L)
- Available with inspection certificate according to EN 10204 3.1

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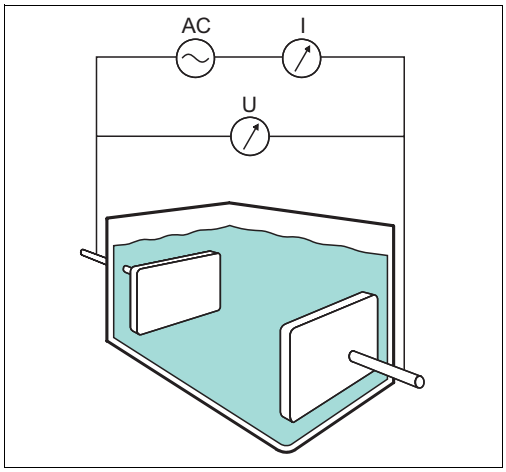
Function and system design

Measuring principle

Conductive measurement of conductivity



Conductive measurement of conductivity

AC Power supply
I Current meter
U Voltage meter

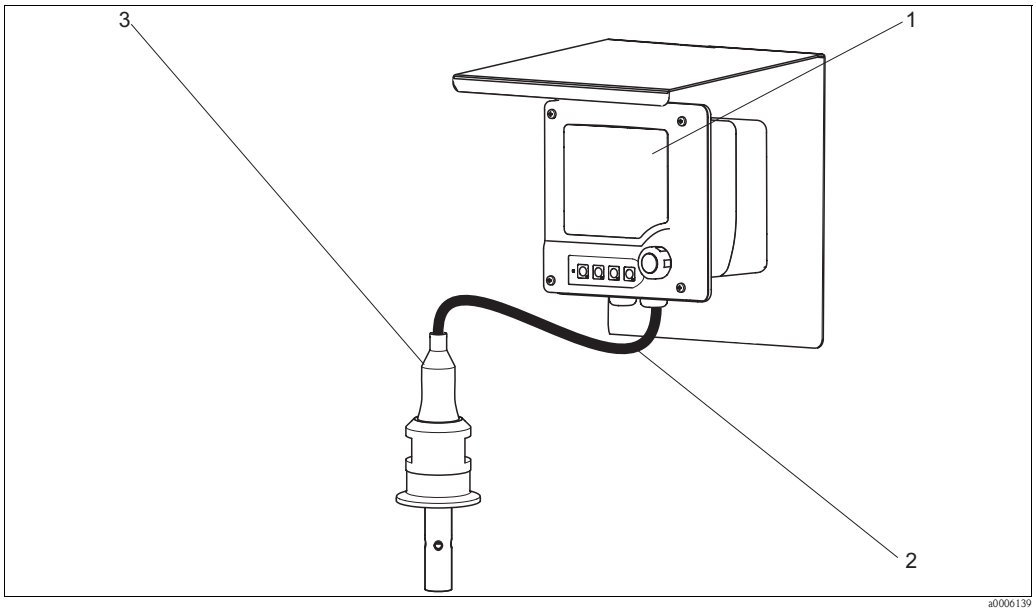
The conductivity of liquids is measured with a measuring system that has two coaxially arranged electrodes like a capacitor.
The electric resistance or its reciprocal value, the conductance G, is measured according to Ohm's law. The specific conductivity κ is determined using the cell constant k that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

Important properties Condumax W CLS15

- **Electrodes**
  Condumax W CLS15 has two coaxial measuring electrodes made of polished, stainless steel 1.4435 (AISI 316L).
- **Temperature sensor**
  In addition, a Pt 100 temperature sensor is installed in the inside electrode to measure the medium temperature.
- **Easy connection**
  The plug-in versions are connected via a 4-pole circular 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.
- **Installation**
  The sensors are available with various process connections and can be installed directly.
  For simple installation in cross or T-pieces with DN 32, 40 or 50, adapter couplings (made of PVC for cementing) are available.
- **Durable and sterilizable**
  The sensor is pressure-proof up to 12 bar at 20 °C (174 psi at 68 °F) and can be applied with temperatures of up to 120 °C at 1 bar (248 °F at 14.5 psi), short-time up to 150 °C at 1 bar (302 °F at 14.5 psi).

Measuring system

A complete measuring system comprises:
- a CLS15 conductivity sensor
- a transmitter, e.g. Liquiline M CM42
- for plug-in versions, a CYK71 or CYK71-Ex special measuring cable



Measuring system example

1 Liquiline M CM42
2 Special measuring cable
3 Condumax W CLS15

Input

Measured values

Conductivity
Temperature

Cell constant k

Depending on ordered version:
k = 0.01 cm^{-1}
k = 0.1 cm^{-1}

Measuring ranges

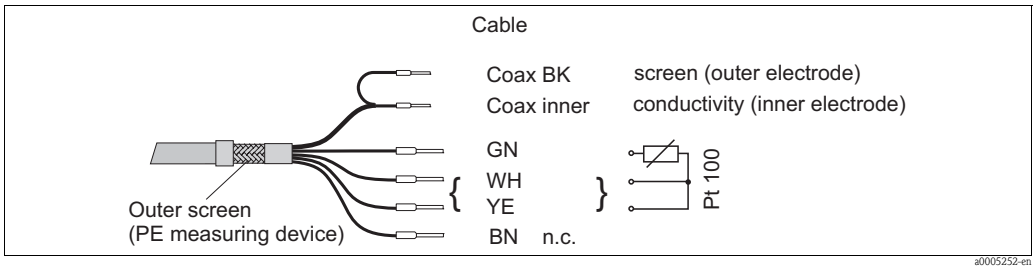
Conductivity	(referenced to water at 25 °C (77 °F))
k = 0.01 cm^{-1}:	0.04 µS/cm to 20 µS/cm
k = 0.1 cm^{-1}:	0.1 µS/cm to 200 µS/cm
Temperature	–20 to 150 °C (-4 to 302 °F)

Temperature sensor

Pt 100
Class A according to DIN IEC 751

Cable specification

Condumax W is connected to the transmitter using the special measuring cable CYK71 or CYK71-Ex or the fixed cable.

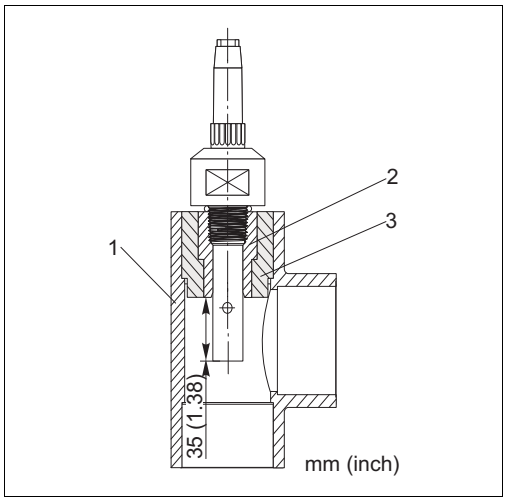


Special measuring cable CYK71 / CYK71-Ex or fixed cable

Installation

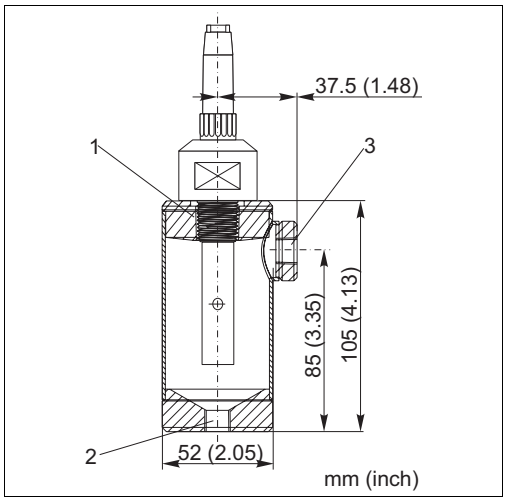
Installation instructions

The sensors are mounted directly via the thread NPT ½" or ¾" or clamp 1 ½" process connections. Optionally, the sensor can be installed in cross or T-pieces or in a flow chamber.



CLS15 with NPT ½"process connection installed in commonly used T- or cross piece

1 T- or cross piece (DN 32, 40 or 50)
2 PVC-threaded coupling for cementing (NPT ½" for DN 20, see Accessories)
3 Adapter coupling for cementing (for DN 32, 40 or 50, see Accessories)



CLS15 with NPT ½" process connection installed in TSP C-LS011106-01 stainless steel flow chamber (see Accessories)

1 Sensor support NPT ½"
2 Inlet NPT ¼"
3 Outlet NPT ¼"

The measuring surfaces of the sensor must be completely wetted by the medium during operation. Minimum immersion depth is 32 mm (1.26").
When working in ultrapure water, ingress of air must be prevented since dissolved air, particularly CO_2, may increase conductivity by up to 3 µS/cm.

Environment

Ingress protection

IP 67

Process

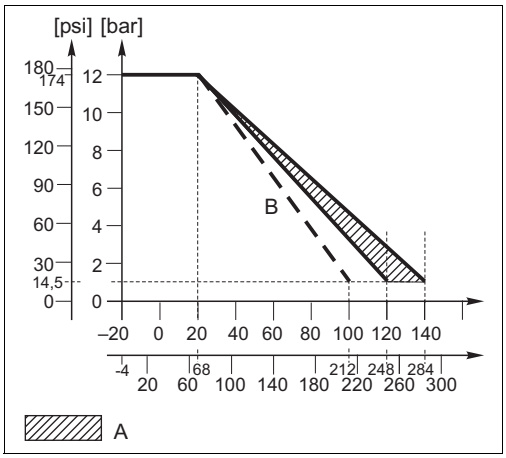
Process temperature

Thread version with fixed cable	-20 to 100 °C (-4 to 212 °F)
Thread version with plug-in head	
Normal operation:	- 20 to 120 °C (-4 to 248 °F)
Short-time operation (max. 30 min):	140 °C (284 °F)
Clamp version	
Normal operation:	-20 to 130 °C (-4 to 266 °F)
Short-time operation (max. 1 h):	max. 150 °C (302 °F)

Process pressure

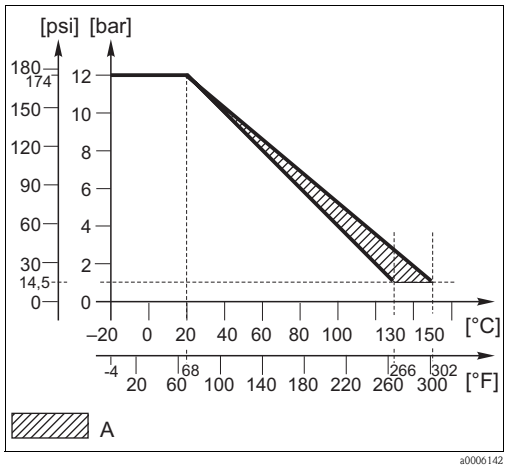
12 bar at 20 °C (174 psi at 68 °F)

Pressure/temperature load curves



Thread version

A Short-time sterilizable (30 min)
B Fixed-cable version with NPT ¾" thread

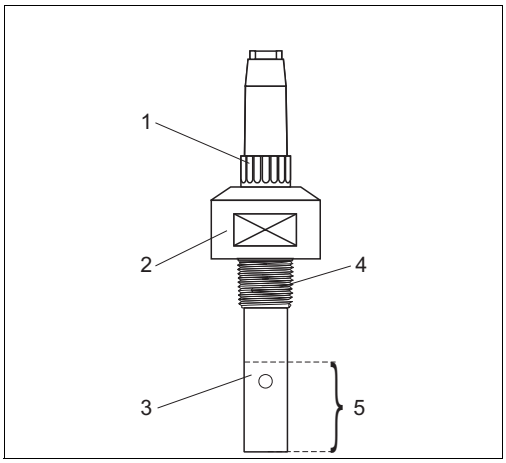


Clamp version

A Short-time sterilizable (1 h)

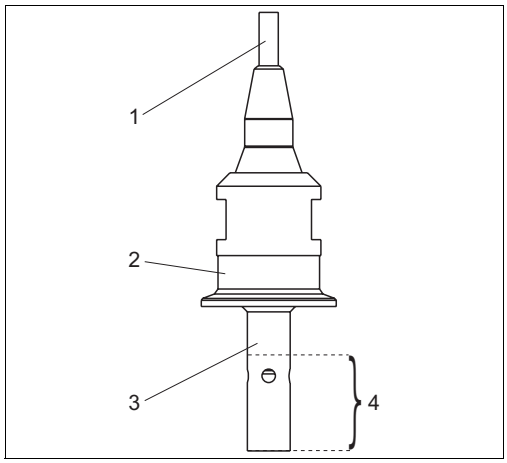
Mechanical construction

Design, dimensions



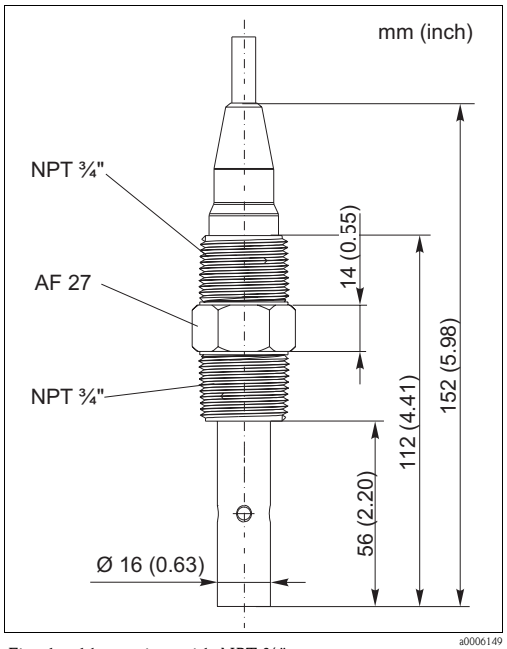
Plug-in head version with NPT ½ "

1 Connector
2 Plug-in head
3 Coaxial measuring electrode
4 Thread NPT ½"
5 Measuring surface

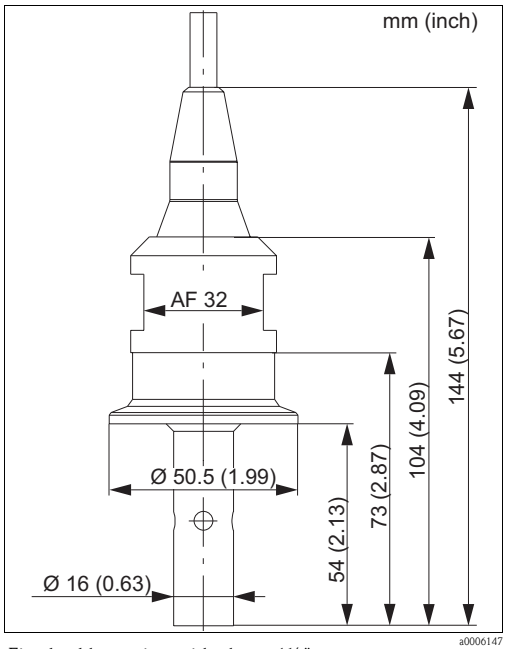


Fixed-cable version with clamp 1½"

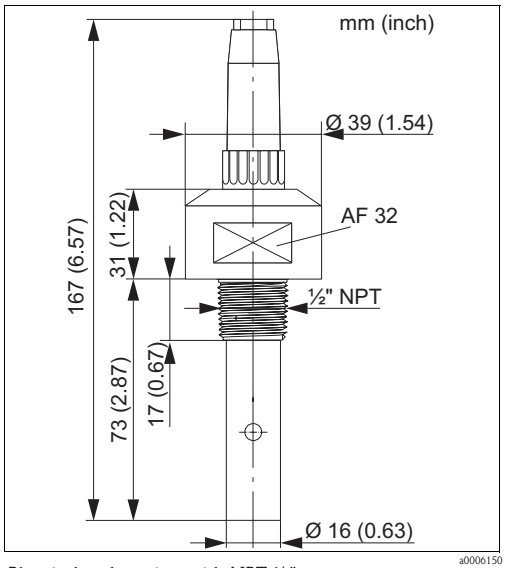
1 Fixed cable
2 Clamp 1½"
3 Coaxial measuring electrode
4 Measuring surface



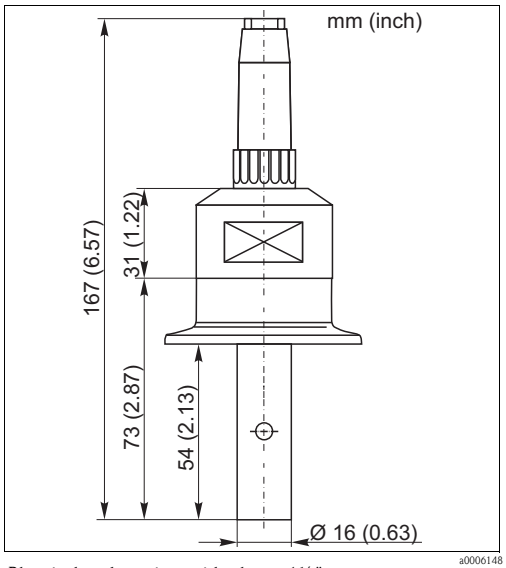
Fixed-cable version with NPT ¾"



Fixed cable version with clamp 1½"



Plug-in head version with NPT ½"



Plug-in head version with clamp 1½"

Weight

Depending on version, approx. 0.3 kg (0.7 lb.)

Materials

Electrodes	polished, stainless steel 1.4435 (AISI 316L)
Sensor shaft	polyethersulfone (PES)

Surface roughness

$R_a \leq 0.8$ µm
($R_a \leq 0.4$ µm available under TSP C-LS020130-02)

Process connection

Fixed-cable versions	
Thread	NPT ¾"
Clamp	1½" acc. to ISO 2852
Plug-in head versions	
Thread	NPT ½"
Clamp	1½" acc. to ISO 2852

Electrical connection

Plug-in head version	with SXP plug and Pg 9 cable gland
Fixed-cable version	no additional cable required

Certificates and approvals

Ex approval

- ATEX II 1G EEx ia IIC T3 / T4 / T6
- FM/CSA in combination with the Liquiline M CM42 and Mycom S CLM153 transmitters

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

Quality certificate

with statement of the individual cell constant

Inspection certificate acc. to EN 10204 3.1

available for clamp 1½" process connection

Ordering information

Product structure Condumax W CLS15

	Measuring range and cell constant					
	A	Measuring range: 0.04 ... 20 µS/cm (k = 0.01)				
	B	Measuring range: 0.1 ... 200 µS/cm (k = 0.1)				
	L	PWIS free for cell constant k = 0.1				
		Process connection and materials				
		1A	Thread NPT ½", sensor shaft PES (plug-in head versions only)			
		1M	Thread NPT ¾", sensor shaft PES (fixed-cable versions only)			
		3D	Clamp 1½", stainless steel 1.4435 (AISI 316L)			
		4D	Clamp 1½", stainless steel 1.4435 (AISI 316L), with inspection certificate EN 10204 3.1			
			Measuring cable connection			
			1	4-pole SXP connector		
			2	with 5 m fixed cable		
			3	with 10 m fixed cable		
				Temperature sensor		
				A	Integrated Pt 100 temperature sensor	
CLS15-						**complete order code**

Accessories

Installation

For sensors with NPT ½" process connection (CLS15-x1Axx):

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

Flow chambers

Flow chamber TSP
- Stainless steel 1.4404 (AISI 316L)
- with inspection certificate EN 10204 3.1.B on demand
- with NPT ½" sensor thread, NPT ¼" inlet and outlet
- order no. TSP C-LS011106-01

Connection

CYK71

CYK71 measuring cable
- non-terminated cable for the connection of sensors (e.g. conductivity 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, with 10 terminals
- IP 65 / NEMA 4X
- Material: aluminum
- Order numbers:
  - cable entry Pg 13.5: 50003987
  - cable entry NPT ½": 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

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 µS/cm (reference temperature 25 °C (77 °F)), 500 ml (16.9 fl.oz);
  order no. 50081902
- CLY11-B
  149.6 µS/cm (reference temperature 25 °C (77°F)), 500 ml (16.9 fl.oz);
  order no. 50081903

Calibration sets

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 10 µS/cm
- order numbers, versions:
  - 230 V AC: 50083777
  - 115 V AC: 50083778

Recalibration Concal
- 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 no. 51502486

International Headquarters

Endress+Hauser
GmbH+Co. KG
Instruments International
Colmarer Str. 6
79576 Weil am Rhein
Deutschland

Tel. +49 76 21 9 75 02
Fax +49 76 21 9 75 34 5
www.endress.com
info@ii.endress.com

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