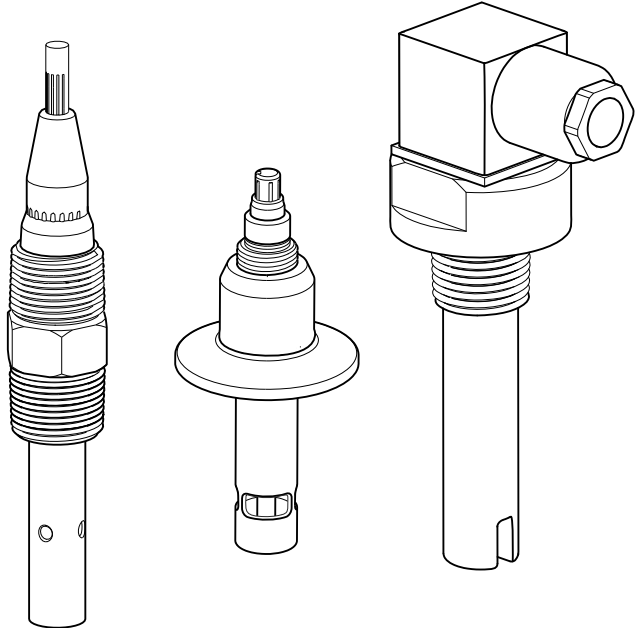


# Operating Instructions

## Condumax CLS15/16/21

Analog sensors

For conductive measurement of conductivity in liquids







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# 1 Document information

## 1.1 Warnings


Structure of information	Meaning
<p> <b>DANGER</b></p> <p><b>Causes (/consequences)</b>                      Consequences of non-compliance (if applicable)                      ► Corrective action</p>	<p>This symbol alerts you to a dangerous situation.                      Failure to avoid the dangerous situation <b>will</b> result in a fatal or serious injury.</p>
<p> <b>WARNING</b></p> <p><b>Causes (/consequences)</b>                      Consequences of non-compliance (if applicable)                      ► Corrective action</p>	<p>This symbol alerts you to a dangerous situation.                      Failure to avoid the dangerous situation <b>can</b> result in a fatal or serious injury.</p>
<p> <b>CAUTION</b></p> <p><b>Causes (/consequences)</b>                      Consequences of non-compliance (if applicable)                      ► Corrective action</p>	<p>This symbol alerts you to a dangerous situation.                      Failure to avoid this situation can result in minor or more serious injuries.</p>
<p> <b>NOTICE</b></p> <p><b>Cause/situation</b>                      Consequences of non-compliance (if applicable)                      ► Action/note</p>	<p>This symbol alerts you to situations which may result in damage to property.</p>

## 1.2 Symbols

-  Additional information, tips
-  Permitted or recommended
-  Forbidden or not recommended

## 2 Basic safety instructions

### 2.1 Requirements for the personnel

- Installation, commissioning, operation and maintenance of the measuring system may be carried out only by specially trained technical personnel.
  - The technical personnel must be authorized by the plant operator to carry out the specified activities.
  - The electrical connection may be performed only by an electrical technician.
  - The technical personnel must have read and understood these Operating Instructions and must follow the instructions contained therein.
  - Measuring point faults may be repaired only by authorized and specially trained personnel.
-  Repairs not described in the Operating Instructions provided may only be carried out directly by the manufacturer or by the service organization.

### 2.2 Designated use

The conductivity sensors are designed for the conductive measurement of the conductivity of liquids.

*They are used in the following fields:*

Sensor	Applications	Hazardous areas
Condumax CLS15	Measurements in pure and ultrapure water	Approved for Ex zone 0
Condumax CLS16	Measurements in pure and ultrapure water with hygienic requirements	Approved for Ex zone 0
Condumax CLS21	Measurements in media with medium or high conductivity	Approved for Ex zone 0

Use of the device for any purpose other than that described, poses a threat to the safety of people and of the entire measuring system and is therefore not permitted.

The manufacturer is not liable for damage caused by improper or non-designated use.

### 2.3 Workplace safety

As the user, you are responsible for complying with the following safety conditions:

- Installation guidelines
- Local standards and regulations
- Regulations for explosion protection

#### **Electromagnetic compatibility**

- The product has been tested for electromagnetic compatibility in accordance with the applicable European standards for industrial applications.
- The electromagnetic compatibility indicated applies only to a product that has been connected in accordance with these Operating Instructions.

## 2.4 Operational safety

1. Before commissioning the entire measuring point, verify that all connections are correct. Ensure that electrical cables and hose connections are undamaged.
2. Do not operate damaged products, and safeguard them to ensure that they are not operated inadvertently. Label the damaged product as defective.
3. If faults cannot be rectified:  
Take the products out of operation and safeguard them to ensure that they are not operated inadvertently.

## 2.5 Product safety

### 2.5.1 State of the art

The product is designed to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate. The relevant regulations and European standards have been observed.

### 2.5.2 Electrical equipment in hazardous areas

#### ATEX II 1G EEx ia IIC T3/T4/T6

- The sensors CLS15/CLS16/CLS21 have been developed and manufactured in compliance with applicable European standards and guidelines and are suitable for use in hazardous areas. The EC type examination certificate confirms compliance with the harmonized European standards for using the sensors in hazardous areas. The corresponding EC declaration of conformity is part of this document.
- The sensors may only be operated on suitable intrinsically safe circuits. Make sure that the maximal permissible sensor input characteristic values, the maximum permissible inductance  $L_i$  and capacitance values  $C_i$  in these circuits and the ambient temperature ranges indicated are not exceeded.
- The electrical connection must be made according to the wiring diagram of the transmitter.
- Metallic process connection parts must be mounted at the mounting location electrostatically conductive ( $< 1 \text{ M}\Omega$ ).
- The CLS15-type sensors with non-metal process connections and the CLS21-type sensors may only be employed for measurement in liquids with a minimum conductivity of  $10 \text{ nS/cm}$ .
- The CLS15-type sensors with non-metal process connections may not be operated under process conditions in which electrostatic charging of the sensor, and particularly of the electrically insulated outer electrode, is likely to occur.
- The maximum permissible cable length is limited by the maximum permissible characteristic values of the transmitter: the total of the maximum permissible inductance  $L_i$  and capacitance values  $C_i$  for the sensor and measuring cable may not exceed the maximum permissible inductance  $L_o$  and capacitance values  $C_o$  for the transmitter.
- When connected to the Mycom S CLM153 transmitter, the maximum permissible length of measuring cables CYK7 1/CYK7 1-Ex or CPK9 is 16 m. When connected to the Liquiline M CM42 transmitter, the maximum length is 50 m.
- Full compliance with regulations for electrical systems in hazardous locations (EN/IEC 60079-14) is mandatory when using the devices and sensors.

*Temperature classes*

Name	Type						Medium temp. T <sub>a</sub> for temperature class (Tn)	Cat.
			x1	x2	x3	x4		
Condumax	CLS15	-	*	**	*	A	-20 °C ≤ Ta ≤ +140 °C (T3) -20 °C ≤ Ta ≤ +115 °C (T4) -20 °C ≤ Ta ≤ +65 °C (T6)	II 1G
Condumax	CLS16	-	X	**	*	A	-5 °C ≤ Ta ≤ +150 °C (T3) -5 °C ≤ Ta ≤ +120 °C (T4) -5 °C ≤ Ta ≤ +70 °C (T6)	II 1G
	CLS16	-	X	**	*	B	-5 °C ≤ Ta ≤ +150 °C (T3) -5 °C ≤ Ta ≤ +115 °C (T4) -5 °C ≤ Ta ≤ +65 °C (T6)	II 1G
Condumax	CLS21	-	*	**	*	D	-20 °C ≤ Ta ≤ +135 °C (T3) -20 °C ≤ Ta ≤ +130 °C (T4) -20 °C ≤ Ta ≤ +80 °C (T6)	II 1G
	CLS21	-	*	**	*	A	-20 °C ≤ Ta ≤ +135 °C (T3) -20 °C ≤ Ta ≤ +115 °C (T4) -20 °C ≤ Ta ≤ +65 °C (T6)	II 1G

X ... Variant not applicable

x1 ... Measuring range and cell constant (no Ex relevance)

x2 ... Process connection / material (no Ex relevance)

x3 ... Measuring cable connection

x4 ... Temperature sensor: A = Pt 100, B = Pt 1000, D = without temperature sensor

- If the specified medium temperatures are complied with, temperatures that are not permitted for the respective temperature class will not occur on the equipment.
- With the exception of sensor version CLS15-\*1M\*\*, for functional reasons the CLS15 sensors may only be operated up to 120 °C (248 °F) during continuous operation / and up to 140 °C (284 °F) for short periods. The CLS15-\*1M\*\* version may only be operated up to 100 °C (212 °F) during continuous operation.
- For functional reasons, the CLS16 sensors may only be operated up to 120 °C (248 °F) during continuous operation / and up to 150 °C (302 °F) for short periods.

**FM/CSA IS/NI Cl.1 Div.1&2 Gr. A-D**

Observe the documentation and the control drawings of the transmitter.

## 3 Incoming acceptance and product identification

### 3.1 Incoming acceptance

1. Verify that the packaging is undamaged.
  - ↳ Notify your supplier of any damage to the packaging.  
Keep the damaged packaging until the matter has been settled.
2. Verify that the contents are undamaged.
  - ↳ Notify your supplier of any damage to the delivery contents.  
Keep the damaged products until the matter has been settled.
3. Check the delivery for completeness.
  - ↳ Check it against the delivery papers and your order.
4. Pack the product for storage and transportation in such a way that it is protected against impact and moisture.
  - ↳ The original packaging offers the best protection.  
The permitted ambient conditions must be observed (see "Technical data").

If you have any questions, please contact your supplier or your local sales center.

### 3.2 Product identification

#### 3.2.1 Nameplate

The nameplate provides you with the following information on your device:

- Manufacturer identification
- Extended order code
- Serial number
- Ambient and process conditions
- Safety information and warnings
- Cell constant (nominal value)
- Protection class
- Ex labeling on hazardous area versions



Compare the data on the nameplate with your order.

#### 3.2.2 Product identification

##### Product page

[www.endress.com/cls15](http://www.endress.com/cls15)

[www.endress.com/cls16](http://www.endress.com/cls16)

[www.endress.com/cls21](http://www.endress.com/cls21)

## Interpreting the order code

The order code and serial number of your device can be found in the following locations:

- on the nameplate
- in the delivery papers

## Obtaining information on the device

1. Go to the product page for your device on the internet.
2. In the navigation area on the right-hand side, select "Check your device features" under "Device support".
  - ↳ An additional window opens.
3. Enter the order code from the nameplate into the search field.
  - ↳ You will receive information on each feature (selected option) of the order code.

## 3.3 Scope of delivery

The scope of delivery includes:

- Sensor in the version ordered
- Cable connector, for connecting to CYK71 measuring cable (only for plug-in head versions CLS15 CLS21)
- Operating Instructions

## 3.4 Certificates and approvals

### 3.4.1 CE mark

#### Declaration of Conformity

The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EC directives. The manufacturer confirms successful testing of the product by affixing to it the CE mark.

### 3.4.2 Ex approvals

ATEX II 1G EEx ia IIC T3/T4/T6

FM/CSA IS/NI Cl. I Div.1&2 Gr. A-D in conjunction with Liquiline M CM42 transmitter

### 3.4.3 EHEDG (CLS16 only)

Validated as follows:

- Cleanability in accordance with EHEDG, Document 2
- Sterilizability in accordance with EHEDG, Document 5
- Bacteria-tightness in accordance with EHEDG, Document 7

### 3.4.4 FDA (CLS16 only)

All materials in contact with the product are listed by the FDA.

#### **3.4.5 Manufacturer inspection certificate**

Stating the individual cell constant

#### **3.4.6 Biological reactivity test (USP class VI, CLS16 only)**

Biological reactivity test certificate according to USP (United States Pharmacopeia) class VI part <87> and part <88> with batch traceability of materials in contact with the medium

#### **3.4.7 Inspection certificate in accordance with EN 10204 3.1**

A test certificate 3.1 in accordance with EN10204 is supplied depending on the version (→ Product Configurator on the product page).

#### **3.4.8 ASME (CLS16 only)**

Manufactured in accordance with ASME criteria (American Society of Mechanical Engineers)

#### **3.4.9 Certification body**

**DEKRA EXAM GmbH**

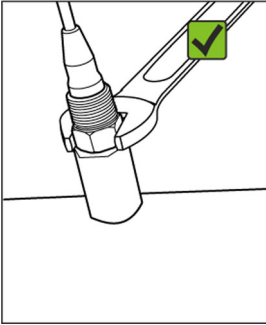
Bochum

## 4 Installation

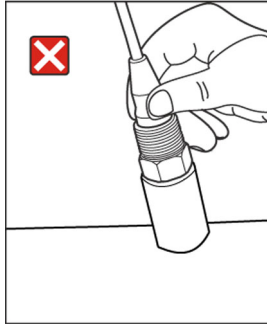
### 4.1 Installing the sensor

#### 4.1.1 CLS15

The sensors are installed directly via the process connection thread NPT ½" or ¾" or Clamp 1 ½". As an option, the sensor can also be installed using a commercially available T-piece or cross fitting or using a flow assembly.



A0025005



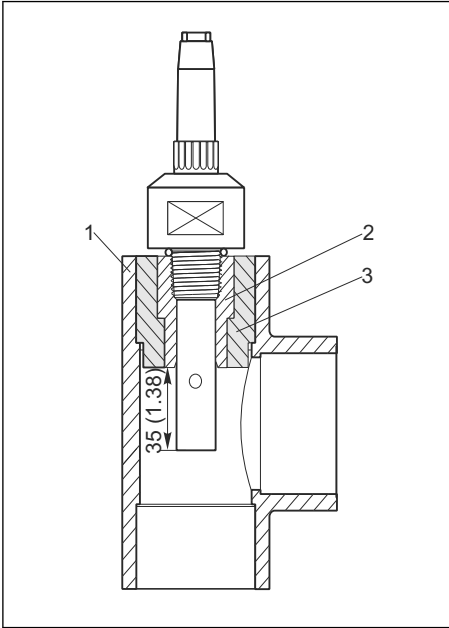
A0025006

#### NOTICE

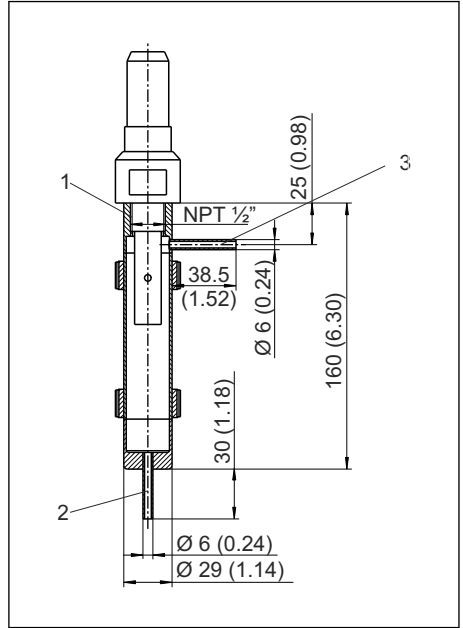
##### Incorrect mounting or disassembly

The sensor head could become loose and fall off, resulting in total sensor failure

- ▶ Only mount the sensor via the process connection.
- ▶ To do so, use a suitable tool, such as an open-ended wrench.



A0024199



A0024200

1 With NPT 1/2" thread in T-piece or cross fitting

- 1 T-piece or cross fitting (DN 32, 40 or 50)
- 2 Glue-in VC threaded coupling (NPT 1/2" for DN 20)
- 3 Glue-in adapter coupling (for DN 32, 40, 50)

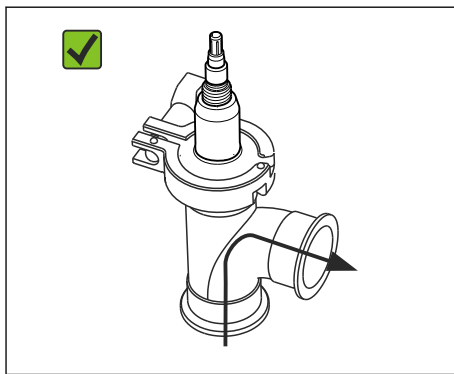
2 With NPT 1/2" thread in flow assembly 71042405, dimensions in mm (inch)

- 1 Sensor holder NPT 1/2"
- 2 Inlet
- 3 Outlet

**i** Ensure that the electrodes are fully immersed in the medium during measurement. The immersion depth must be at least 35 mm (1.38"). If the sensor is being used in the ultrapure water range, you must work under air-evacuated conditions. Otherwise the CO<sub>2</sub> in the air can dissolve in the water and its (weak) dissociation can increase the conductivity by up to 3 µS/cm.

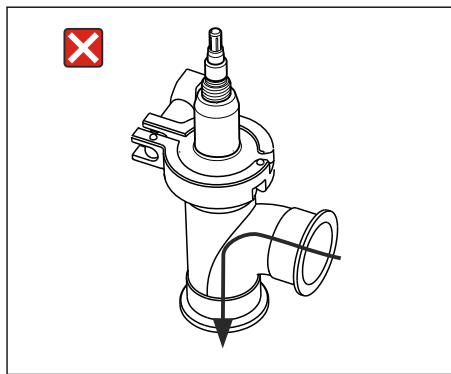
### 4.1.2 CLS16

The sensors are installed directly via the process connection. Take the flow direction into consideration when installing in pipes.



A0024198

3 Permitted flow direction



A0024197

4 Inadmissible flow direction



Ensure that the electrodes are fully immersed in the medium during measurement. If the sensor is being used in the ultrapure water range, you must work under air-evacuated conditions. Otherwise the  $\text{CO}_2$  in the air can dissolve in the water and its (weak) dissociation can increase the conductivity by up to  $3 \mu\text{S}/\text{cm}$ .

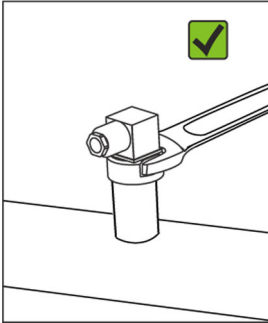
### 4.1.3 CLS21



#### Clamp connection

Both sheet-metal brackets and solid brackets can be used to secure the sensor. Sheet-metal brackets have a lower dimensional stability, uneven bearing surfaces causing point loads, and sometimes sharp edges that can damage the clamp. We recommend you only use solid brackets due to their higher dimensional stability. Solid brackets can be used over the entire pressure/temperature range (see pressure-temperature ratings).

The sensors are installed directly via the process connection. As an option, the sensor can also be installed via a flow assembly.



A0025007



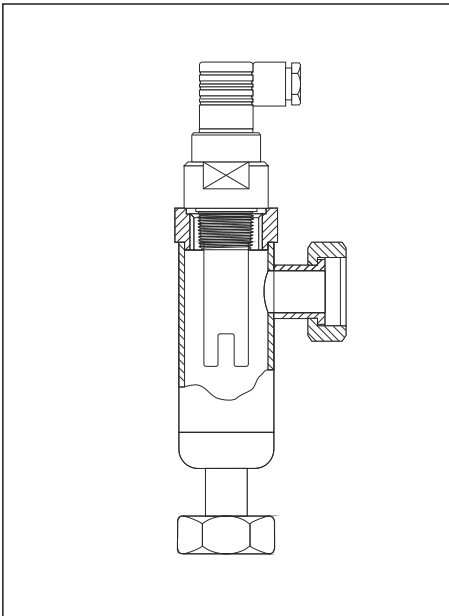
A0025008

**NOTICE**

**Incorrect mounting or disassembly**

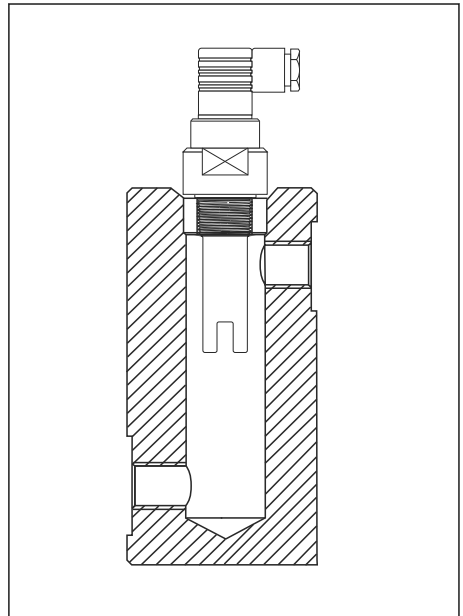
The sensor head could become loose and fall off, resulting in total sensor failure

- ▶ Only mount the sensor via the process connection.
- ▶ To do so, use a suitable tool, such as an open-ended wrench.



A0024201

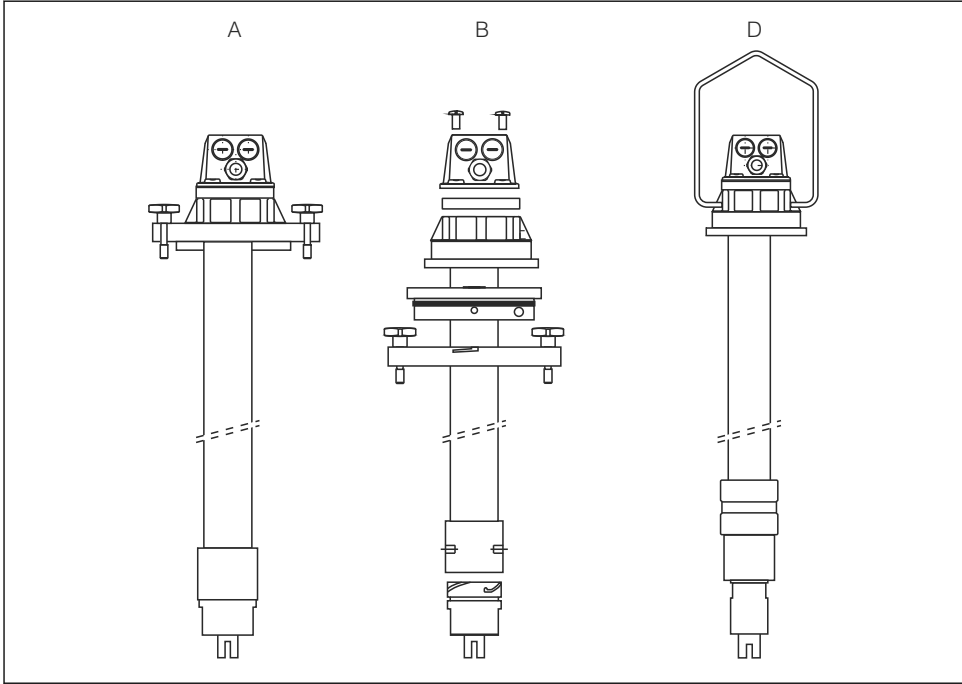
5 Installation in flow assembly CLA751



A0024202

6 Installation in flow assembly CLA752

The Dipfit CLA111 immersion assembly is available to install sensors with a G1 thread in vessels.



A0024145

7 Installation in Dipfit CLA111 immersion assembly, fastening versions A, B and D

**i** Ensure that the electrodes are fully immersed in the medium during measurement.

## 4.2 Post-installation check

- Are the sensor and cable undamaged?
- Is the sensor installed in the process connection and is not suspended from the cable?

## 5 Electrical connection

### **⚠ WARNING**

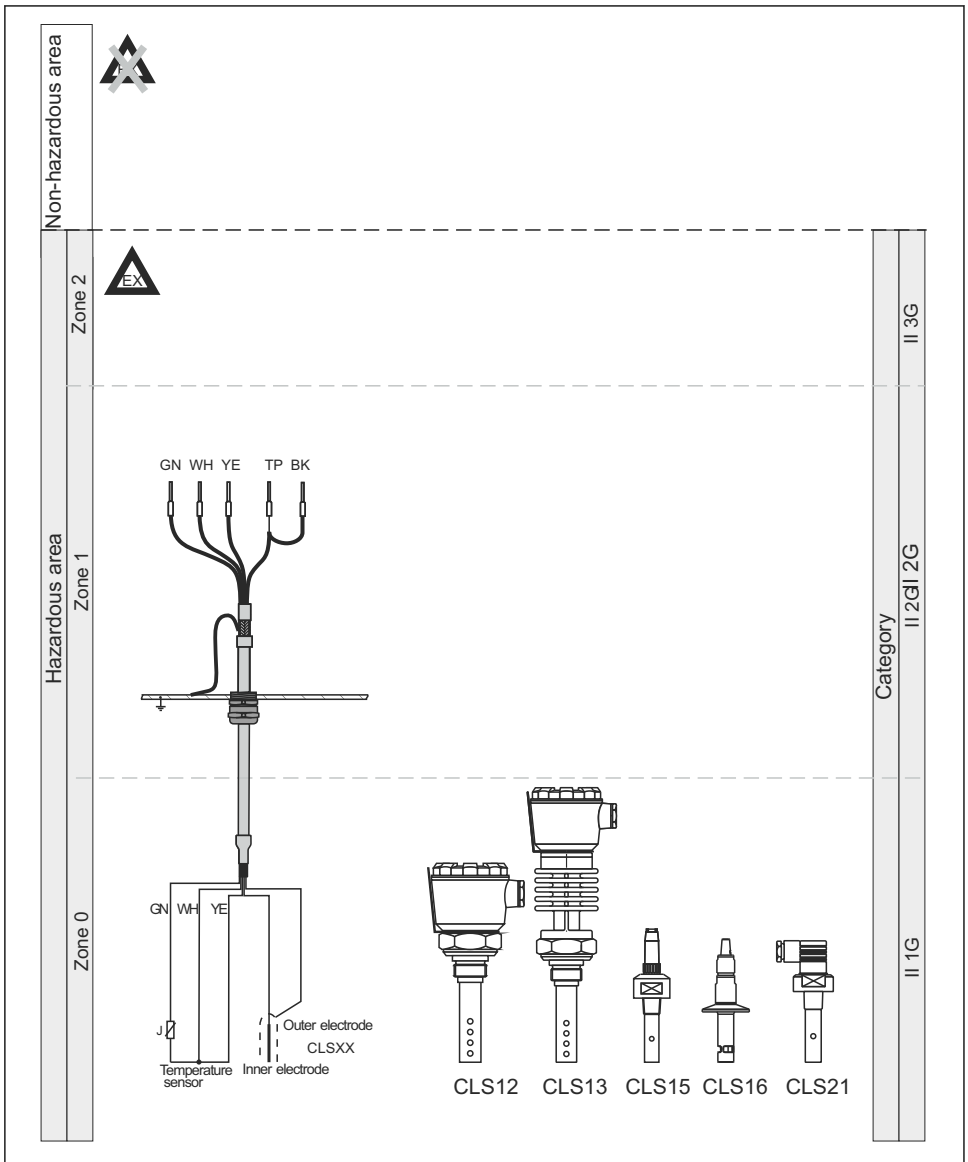
#### Device is live

Incorrect connection may result in injury or death.

- ▶ The electrical connection may be performed only by an electrical technician.
- ▶ The electrical technician must have read and understood these Operating Instructions and must follow the instructions contained therein.
- ▶ **Prior** to commencing connection work, ensure that no voltage is present on any cable.

## 5.1 Connection conditions

### 5.1.1 Connection at a glance



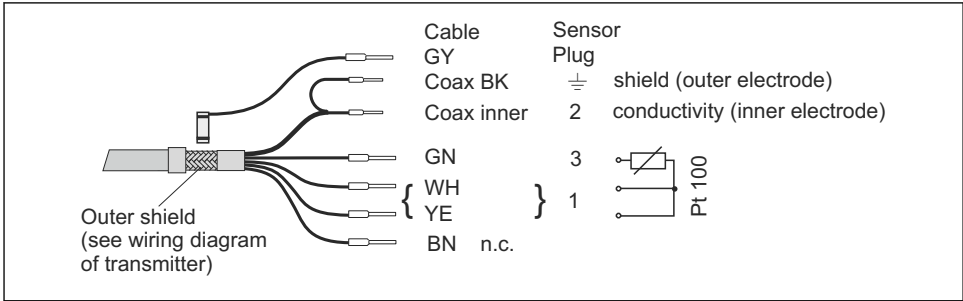
A0024204-EN

8 Electrical connection CLSxx

## 5.2 Connecting the sensor

### 5.2.1 CLS15 and CLS21

The sensor is connected via the fixed cable or via the CYK71 measuring cable with a shield. The wiring diagram is provided in the Operating Instructions of the transmitter used.



A0024205-EN

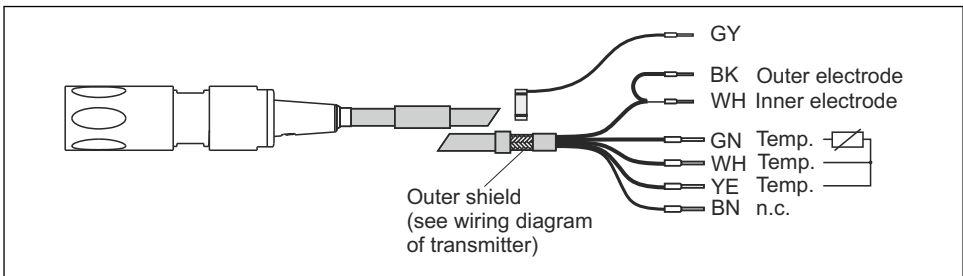
9 Measuring cable CYK71

A compatible cable connector is included in the delivery for the plug-in head versions. You must terminate the CYK71 cable (not included in the delivery) with the cable connector at the sensor end according to the connection diagram above.

A VMB junction box and another CYK71 cable are required for the cable extension.

### 5.2.2 CLS16

The sensor is electrically connected via the CPK9 measuring cable (plug-in head versions) or the sensor's fixed cable. The wiring diagram is provided in the Operating Instructions of the transmitter used.



A0024206-EN

10 Measuring cable CPK9

A VMB junction box and a CYK71 cable are required for the cable extension.

### 5.3 Ensuring the degree of protection

Only the mechanical and electrical connections which are described in these instructions and which are necessary for the required, designated use, may be carried out on the device delivered.

► Exercise care when carrying out the work.

Otherwise, the individual types of protection (Ingress Protection (IP), electrical safety, EMC interference immunity) agreed for this product can no longer be guaranteed due, for example, to covers being left off or cable (ends) which are loose or insufficiently secured.

### 5.4 Post-connection check

Device condition and specifications	Notes
Are the outside of the sensor, assembly, junction box, cable undamaged?	Visual inspection
Electrical connection	Notes
Are the installed cables strain-relieved and not twisted?	
Is a sufficient length of the cable cores stripped, and is it positioned in the terminal correctly?	Check the fit (by pulling gently)
Are all the screws terminals properly tightened?	Tighten
Are all the cable entries installed, tightened and sealed?	In the case of lateral cable entries: Cable loops facing downwards to allow water to drip off.
Are all cable entries facing downwards or mounted laterally?	

## 6 Commissioning

Before first commissioning, check if:

- the sensor is correctly installed
- the electrical connection is correct.

If using an assembly with automatic cleaning, check that the cleaning medium (e.g. water or air) is connected correctly.

### WARNING

#### Escaping process medium

Risk of injury from high pressure, high temperatures or chemical hazards

- Before applying compressed air to an assembly with cleaning facility, make sure the connections are correctly fitted.
- Do not install the assembly in the process if you cannot make the correct connection reliably.

## 7 Maintenance

### CAUTION

#### Corrosive chemicals

Danger of chemical burns to the eyes and skin. Danger of damage to clothing and equipment

- ▶ It is absolutely essential to protect the eyes and hands properly when working with acids, bases and organic solvents!
- ▶ Wear protective goggles and safety gloves.
- ▶ Clean away splashes on clothes and other objects to prevent any damage.
- ▶ Pay particular attention to the information provided in the safety data sheets for the chemicals used.

Clean away fouling on the sensor as follows depending on the type of fouling:

1. Oily and greasy films:

Clean with a grease remover, e.g. alcohol, isopropyl alcohol as well as hot water and dishwashing detergent if necessary.

2. Lime and metal hydroxide buildup:

Dissolve buildup with diluted hydrochloric acid (3 %) and then rinse thoroughly with plenty of clear water.

3. Sulfidic buildup (from flue gas desulfurization or sewage treatment plants):

Use a mixture of hydrochloric acid (3 %) and thiocarbamide (commercially available) and then rinse thoroughly with plenty of clear water.

4. Buildup containing proteins (e.g. food industry):

Use a mixture of hydrochloric acid (0.5 %) and pepsin (commercially available) and then rinse thoroughly with plenty of clear water.

## 8 Repair

### 8.1 Sealing ring replacement and recalibration (CLS16 only)

Intact seals are a prerequisite for safe and reliable measurements. The seal should be replaced at regular intervals to guarantee maximum sensor operational safety and hygiene.

Practical repair intervals can only be determined by the user as they depend greatly on the operating conditions, such as:

- Type and temperature of the product
- Type and temperature of the cleaning agent
- Number of cleanings
- Number of sterilizations
- Operating environment

*Recommended intervals for seal replacement (reference values)*

Application	Window
Media with temperatures from 50 to 100 °C (122 to 212 °F)	Approx. 18 months
Media with temperatures < 50 °C (122 °F)	Approx. 36 months
Sterilization cycles, max. 145 °C (293 °F), 30 min.	Approx. 400 cycles

To ensure your sensor is operational again after being exposed to very high loads, you can have it regenerated in the factory. In the factory, the sensor is fitted with new seals and recalibrated. Send the sensor to your Sales Center for this purpose.

**Replacement of seals and recalibration in the factory**

Order No. 51505585

**8.2 Return**

The product must be returned if repairs or a factory calibration are required, or if the wrong product was ordered or delivered. As an ISO-certified company and also due to legal regulations, Endress+Hauser is obliged to follow certain procedures when handling any returned products that have been in contact with medium.

To ensure swift, safe and professional device returns, please read the return procedures and conditions at [www.endress.com/support/return-material](http://www.endress.com/support/return-material).

**8.3 Disposal**

The device contains electronic components and must therefore be disposed of in accordance with regulations on the disposal of electronic waste.

Observe the local regulations.

## 9 Technical data

### 9.1 Input

#### 9.1.1 Measured variables

- Conductivity
- Temperature

#### 9.1.2 Measuring ranges

<b>Conductivity</b>	(in relation to water at 25 °C (77 °F))
CLS15-A	0.04 to 20 µS/cm
CLS15-B	0.10 to 200 µS/cm
CLS16	0.04 to 500 µS/cm
CLS21	10 µS/cm to 20 mS/cm
<b>Temperature</b>	
CLS15	-20 to 140 °C (-4 to 280 °F)
CLS16	-5 to 150 °C (23 to 300 °F)
CLS21	-20 to 135 °C (-4 to 275 °F)

#### 9.1.3 Cell constant

CLS15-A	$k = 0.01 \text{ cm}^{-1}$
CLS15-B	$k = 0.1 \text{ cm}^{-1}$
CLS16	$k = 0.1 \text{ cm}^{-1}$
CLS21	$k = 1.0 \text{ cm}^{-1}$ , nominal

#### 9.1.4 Temperature compensation

Pt 100 (class A as per IEC 60751) (CLS15) (CLS16) (CLS21)  
 Pt 1000 (class A as per IEC 60751) (CLS16, optional)

## 9.2 Performance characteristics

### 9.2.1 Uncertainty of measurement

#### CLS15

Each individual sensor is factory-measured in a solution of approx. 5  $\mu\text{S}/\text{cm}$  for cell constant 0.01  $\text{cm}^{-1}$  or approx. 50  $\mu\text{S}/\text{cm}$  for cell constant 0.1  $\text{cm}^{-1}$  using a reference measuring system traceable to NIST or PTB. The exact cell constant is entered into the quality certificate supplied. The uncertainty of measurement in determining the cell constant is 1.0 %.

#### CLS16

Each individual sensor is factory-measured in a solution of approx. 5  $\mu\text{S}/\text{cm}$  using a reference measuring system traceable to NIST or PTB. The exact cell constant is entered into the quality certificate supplied. The uncertainty of measurement in determining the cell constant is 1.0 %.

#### CLS21

Each individual sensor is factory-measured in a solution of approx. 500  $\mu\text{S}/\text{cm}$  using a reference measuring system traceable to NIST or PTB. The exact cell constant is entered into the quality certificate supplied. The uncertainty of measurement in determining the cell constant is 1.0 %.

## 9.3 Environment

### 9.3.1 Ambient temperature range

-20 to +60 °C (0 to 140 °F)

### 9.3.2 Storage temperature

-25 to +80 °C (-10 to +180 °F)

### 9.3.3 Degree of protection

CLS15	IP 67 / NEMA 6
CLS16	
Fixed cable version	IP 67 / NEMA 6
TOP68 plug-in system	IP 68 / NEMA 6
CLS21	
Fixed cable version	IP 67 / NEMA 6
Plug-in head version	IP 65 / NEMA 4X

## 9.4 Process

### 9.4.1 Process temperature

#### CLS15

Threaded version with fixed cable -20 to 100 °C (-4 to 212 °F)

Threaded version with plug-in head, Clamp version

Normal operation -20 to 120 °C (-4 to 248 °F)

Sterilization (max. 1 h) <sup>1)</sup> max. 140 °C (284 °F)

#### CLS16

Normal operation -5 to 120 °C (23 to 248 °F)

Sterilization (max. 45 min.) max. 150 °C (302 °F) at 5 bar (73 psi)

#### CLS21

Threaded version with fixed cable -20 to 100 °C (-4 to 212 °F)

Version with plug-in head, Clamp version -20 to +135 °C (-4 to 275 °F) at 2.5 bar (36 psi)

1) Threaded versions: max. 30 minutes

### 9.4.2 Process pressure

CLS15 13 bar (188 psi) at 20 °C (68 °F)

1 bar (14 psi) at 120 °C (248 °F)

CLS16 13 bar (188 psi) at 20 °C (68 °F)

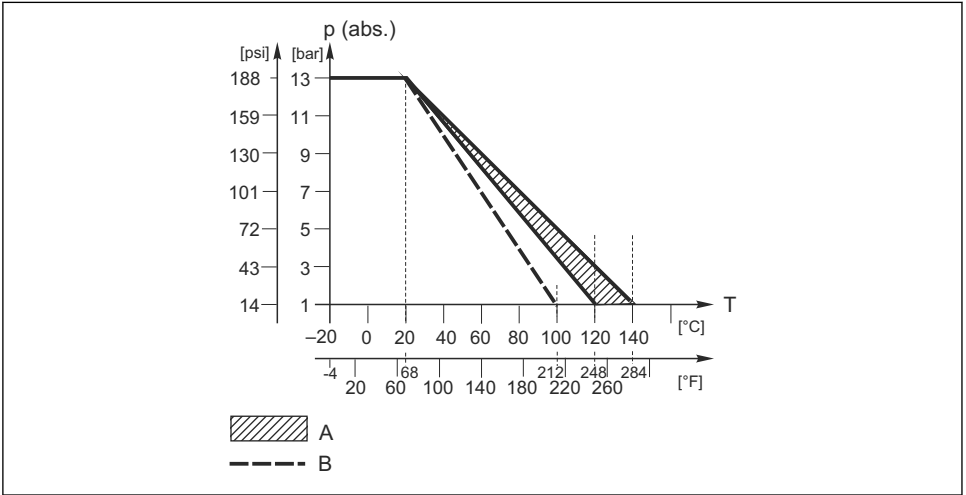
9 bar (130 psi) at 120 °C (248 °F)

0.1 bar (1.5 psi (negative pressure)) at 20 °C (68 °F)

CLS21 17 bar (246 psi) at 20 °C (68 °F)

### 9.4.3 Temperature-pressure ratings

#### CLS15

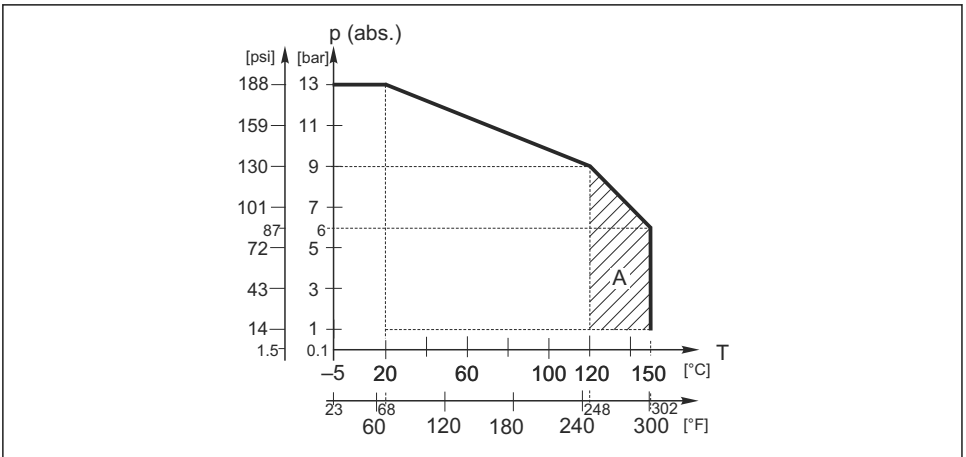


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11 Mechanical pressure-temperature resistance

- A Can be sterilized for a short time (1 hour)
- B Threaded version with fixed cable

#### CLS16

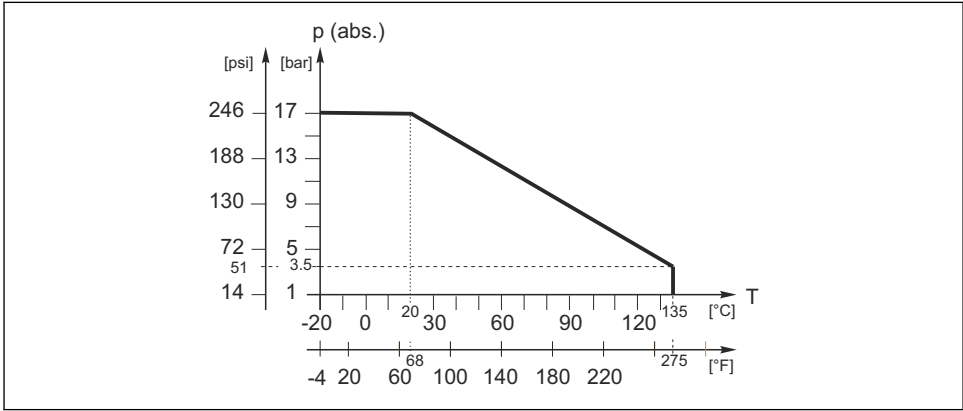


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12 Mechanical pressure-temperature resistance

- A Can be sterilized for a short time (45 min.)

**CLS21**



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13 Mechanical pressure-temperature resistance

**9.5 Mechanical construction**

**9.5.1 Weight**

**CLS15 and CLS21**

Approx. 0.3 kg (0.66 lbs) depending on version

**CLS16**

Approx. 0.13 to 0.75 kg (0.29 to 1.65 lbs) depending on version

**9.5.2 Materials**

**CLS15**

Electrodes	Polished, stainless steel 1.4435 (AISI 316L)
Sensor shaft	Polyethersulfone (PES-GF20)
O-ring, in contact with medium (only Clamp version)	EPDM

**CLS16**

Electrodes	Electropolished, stainless steel 1.4435 (AISI 316L)
Seal	Gasket seal ISOLAST (FFKM), FDA-compliant

**CLS21**

Electrodes	Graphite
Sensor shaft	Polyethersulfone (PES-GF20)
Thermal conductivity socket for temperature probe	Titanium 3.7035

### 9.5.3 Process connection

#### CLS15

Thread NPT ½" and ¾"

Clamp 1½" as per ISO 2852

#### CLS16

Clamp 1", 1½", 2" as per ISO 2852 (also suitable for TRI-CLAMP, DIN 32676)

Tuchenhagen VARIVENT N DN 50 to 125

NEUMO BioControl D50

#### CLS21

Thread G1

NPT 1" thread

Clamp 2" as per ISO 2852

Sanitary connection DN 25 as per DIN 11851

### 9.5.4 Surface roughness (CLS15, CLS16 only)

#### CLS15

$R_a \leq 0.8 \mu\text{m}$

#### CLS16

$R_a \leq 0.8 \mu\text{m}$ , electropolished

$R_a \leq 0.38 \mu\text{m}$ , electropolished, optional

# 10 EC Declaration of Conformity

## EG-Konformitätserklärung EC Declaration of Conformity CE Déclaration de Conformité



**Endress+Hauser Conducta**  
**Gesellschaft für Mess- und Regeltechnik mbH+Co.KG**  
Dieselstraße 24, D-70839 Gerlingen  
erklärt in alleiniger Verantwortung, dass die Produkte  
declares under its sole responsibility that the products  
déclare sous sa seule responsabilité que les produits

**ConduMax CLSxx / CLSxxG**

EG-Baumusterprüfbescheinigung: **EX5 02 12 30266 006**  
EC type-examination certificate: **EX5 02 12 30266 006**  
Certificat de l'examen CE de type:

mit den Vorschriften folgender Europäischen Richtlinien übereinstimmen:  
are in conformity with the regulations of the following European Directives:  
sont conformes aux prescriptions et Directives Européennes ci-dessous:

**94/9/EG** (Geräte zur Verwendung in explosionsgefährdeten Bereichen)  
(Equipment for use in potentially explosive atmospheres)  
(Appareils et systèmes de protection en atmosphère explosive)

Angewandte harmonisierte Normen oder normative Dokumente:  
Applied harmonized standards or normative documents:  
Normes harmonisées ou documents normatifs appliqués:  
**EN 50014:1997 + Corrigendum 1998 + A1:1999 + A2:1999**  
**EN 50020:1994, EN 50284:1999**

Benannte Stelle für QS-Überwachung:  
Notified body for QA control:  
Organisme notifié pour l'assurance qualité:

Deutsche Montan Technologie GmbH  
Kennnummer / Identification number /  
Numéro d'identification (0158)

  
Dr. Wolfgang Babel  
(Geschäftsführer / Managing Director / P.D.G.)

Gerlingen, 10. März 2003

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