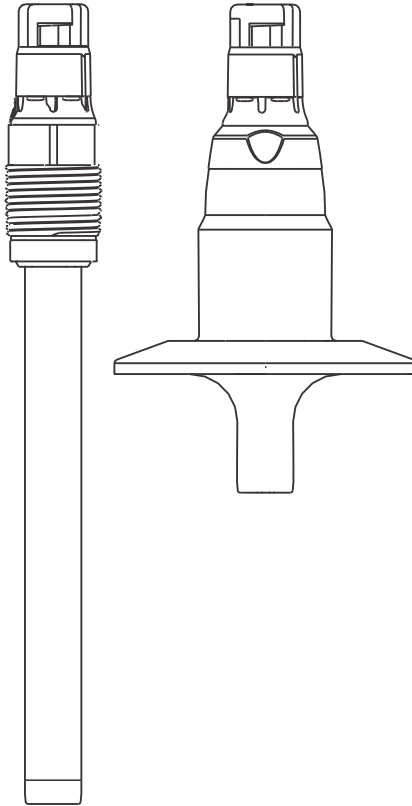


# Operating Instructions

## Memosens CLS82D

Hygienic conductivity sensors, digital with  
Memosens technology, cell constant  $k = 0.57 \text{ cm}^{-1}$









# Table of contents








<b>1</b>	<b>Document information</b> .....	<b>4</b>	<b>10</b>	<b>Technical data</b> .....	<b>26</b>
1.1	Warnings .....	4			
1.2	Symbols used .....	4			
<b>2</b>	<b>Basic safety instructions</b> .....	<b>5</b>			
2.1	Requirements for the personnel .....	5			
2.2	Designated use .....	5			
2.3	Workplace safety .....	5			
2.4	Operational safety .....	6			
2.5	Product safety .....	6			
<b>3</b>	<b>Incoming acceptance and product identification</b> .....	<b>9</b>			
3.1	Incoming acceptance .....	9			
3.2	Product identification .....	10			
3.3	Scope of delivery .....	11			
3.4	Certificates and approvals .....	12			
<b>4</b>	<b>Installation</b> .....	<b>13</b>			
4.1	Hygienic properties .....	15			
4.2	Installation factors for assemblies .....	16			
4.3	Post-installation check .....	16			
<b>5</b>	<b>Electrical connection</b> .....	<b>17</b>			
5.1	Connection at a glance .....	18			
5.2	Connecting the sensor .....	19			
5.3	Ensuring the degree of protection .....	19			
5.4	Post-connection check .....	19			
<b>6</b>	<b>Commissioning</b> .....	<b>20</b>			
<b>7</b>	<b>Maintenance</b> .....	<b>21</b>			
7.1	Clean sensor .....	21			
7.2	Sensor calibration .....	22			
<b>8</b>	<b>Repair</b> .....	<b>23</b>			
8.1	Return .....	23			
8.2	Disposal .....	23			
<b>9</b>	<b>Accessories</b> .....	<b>24</b>			
9.1	Seals .....	24			
9.2	Welding socket .....	24			
9.3	Connection .....	24			
9.4	Calibration solutions .....	25			
9.5	Calibration set .....	25			
				<b>Index</b> .....	<b>29</b>

# 1 Document information

## 1.1 Warnings

Structure of information	Meaning
 <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>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>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>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 used

Symbol	Meaning
	Additional information, tips
	Permitted or recommended
	Not permitted or not recommended
	Reference to device documentation
	Reference to page
	Reference to graphic
	Result of a step

## 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 Memosens CLS82D conductivity sensor is used to measure low to high conductivity of liquids in applications with hygienic requirements.

**The broad measuring range means the device can be used in a large number of applications, e.g. :**

- Phase separation of water/product mixtures
- Phase separation of product/product mixtures
- Monitoring of rinsing processes
- Fermentations
- Monitoring of water bodies
- Concentration measurement of bases and acids (consider the material resistance properties!)
- Monitoring product quality

Digital sensor CLS82D is used in conjunction with Liquiline CM44x or Liquiline CM42.

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

- Sensor CLS82D is suitable for use in potentially explosive atmospheres in accordance with EC Type Examination Certificate BVS 04 ATEX E 121. The corresponding EC declaration of conformity is part of this document.
- The sensor may be used in an environment specified as Ex zone 0 (1G).
- The sensor must be connected and operated in accordance with the accompanying Technical Information and Operating Instructions for the transmitter to be connected. All sensor operating data must be observed. Ensure correct installation to maintain housing protection type (IP 68). Use original seal. Fit cable entry properly.
- Compliance with the specified ambient and medium temperature ranges is a prerequisite for safe use of the device!
- The conductivity sensor type CLS82D may only be connected via measuring cable CYK10-G to the certified intrinsically safe digital Memosens sensor output module FSDG1 of the transmitter Liquiline M CM42 in accordance with EC Type Examination Certificate TÜV 13 ATEX 7459 X and IECEx TUR 11.0007X.
- 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 ( $< 1 \text{ M}\Omega$ ).
- Non-metallic process connections must be protected against electrostatic charging (also when used in Ex zone 1 (2G)).
- Measuring cable CYK10-G and its terminal head must be protected against electrostatic charging if it is run through zone 0.
- The maximum permitted cable length is 100 m.
- Ex versions of digital sensors with Memosens technology are indicated by an orange-red ring.
- Full compliance with regulations for electrical systems in hazardous locations (EN/IEC 60079-14) is mandatory when using the devices and sensors.

## Temperature classes

Sensor CLS82D is suitable for use in the following ambient temperature and process temperature ranges:

### *ATEX II 1G Ex ia IIC T3/T4/T6 Ga*

Type				Medium temp. T <sub>a</sub> for temperature class (Tn)
CLS82D	-	BA	*****	-20 °C ≤ Ta ≤ +140 °C (T3) -20 °C ≤ Ta ≤ +115 °C (T4) -20 °C ≤ Ta ≤ +65 °C (T6)

### *NEPSI Ex ia IIC T3/T4/T6 Ga*

Type				Medium temp. T <sub>a</sub> for temperature class (Tn)
CLS82D	-	NA	*****	-20 °C ≤ Ta ≤ +140 °C (T3) -20 °C ≤ Ta ≤ +115 °C (T4) -20 °C ≤ Ta ≤ +65 °C (T6)

### *IECEX Ex ia IIC T3/T4/T6 Ga*

Type				Medium temp. T <sub>a</sub> for temperature class (Tn)
CLS82D	-	IA	*****	-20 °C ≤ Ta ≤ +140 °C (T3) -20 °C ≤ Ta ≤ +115 °C (T4) -20 °C ≤ Ta ≤ +65 °C (T6)

### *CSA IS/NI Cl.1 Div.1&2 Grp.:A-D*

Type				Medium temp. T <sub>a</sub> for temperature class (Tn)
CLS82D	-	C2	*****	-20 °C ≤ Ta ≤ +140 °C (T3) -20 °C ≤ Ta ≤ +115 °C (T4) -20 °C ≤ Ta ≤ +65 °C (T6)

### *FM IS/NI Cl.1 Div.1&2 Grp.:A-D*

Type				Medium temp. T <sub>a</sub> for temperature class (Tn)
CLS82D	-	FB	*****	-20 °C ≤ Ta ≤ +140 °C (T3) -20 °C ≤ Ta ≤ +115 °C (T4) -20 °C ≤ Ta ≤ +65 °C (T6)

### *TIIS Ex ib T4*

Type				Medium temp. T <sub>a</sub> for temperature class (Tn)
CLS82D	-	TA	*****	-20 °C ≤ Ta ≤ +115 °C (T4)

The plant operator must take appropriate installation measures to ensure compliance with these temperature values. If the specified medium temperatures are complied with,

temperatures that are not permitted for the respective temperature class will not occur on the equipment.



## 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 Type code for versions with explosion protection

#### *ATEX II 1G Ex ia IIC T3/T4/T6 Ga*

Type		Approval	Version
CLS82D	-	BA	*****
		ATEX	Process connections, materials not Ex-relevant

#### *NEPSI Ex ia IIC T3/T4/T6 Ga*

Type		Approval	Version
CLS82D	-	NA	*****
		NEPSI	Process connections, materials not Ex-relevant

#### *IECEX Ex ia IIC T3/T4/T6 Ga*

Type		Approval	Version
CLS82D	-	IA	*****
		IECEX	Process connections, materials not Ex-relevant

#### *CSA IS/NI Cl.1 Div.1&2 Grp.:A-D*

Type		Approval	Version
CLS82D	-	C2	*****
		CSA	Process connections, materials not Ex-relevant

#### *FM IS/NI Cl.1 Div.1&2 Grp.:A-D*

Type		Approval	Version
CLS82D	-	FB	*****
		FM	Process connections, materials not Ex-relevant

#### *TIIS Ex ib T4*

Type		Approval	Version
CLS82D	-	TA	*****
		TIIS	Process connections, materials not Ex-relevant

### 3.2.2 Nameplate

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

- Manufacturer identification
- Order code
- 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.

### 3.2.3 Product identification

#### Product page

[www.endress.com/cls82d](http://www.endress.com/cls82d)

#### Interpreting the order code

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

- On the nameplate
- In the delivery papers

#### Obtaining information on the product

1. Go to the product page for your product on the Internet.
2. At the bottom of the page, select the "Online Tools" link followed by "Check your device features".
  - ↳ An additional window opens.
3. Enter the order code from the nameplate into the search field, and then select "Show details".
  - ↳ 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
- 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

Ex approvals in conjunction with Liquiline CM42 transmitter

- ATEX II 1G Ex ia IIC T3/T4/T6 Ga
- CSA IS/NI Cl.1 Div.1&2 Grp.:A-D
- FM IS/NI Cl.1 Div.1&2 Grp.:A-D
- NEPSI Ex ia IIC T3/T4/T6 Ga
- TIIS Ex ib IIC T4
- EAC Ex, OEx ia IIC T6/T4/T3 GaX



All of the Ex versions listed here are identified by an orange-red ring on the plug-in head.

### 3.4.3 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).

### 3.4.4 Certification body

**DEKRA EXAM GmbH**

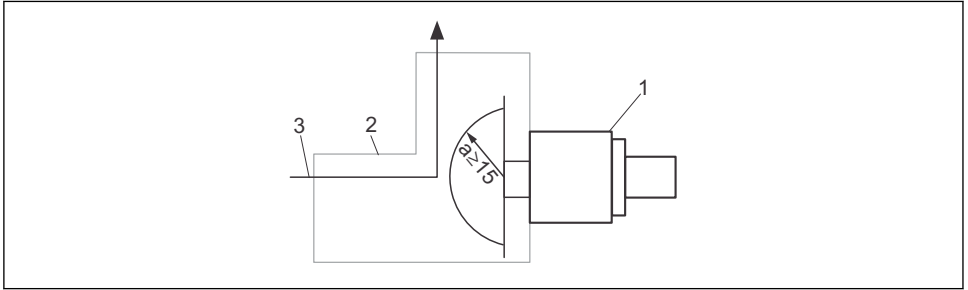
Bochum

## 4 Installation



Remove the black protective cap from the sensor element prior to installation.

Symmetrical installation is recommended in order to guarantee linearity. The distance to the side walls and opposite walls must be at least 15 mm.



A0024621

1 Minimum distance between pipe and end of the measuring cell

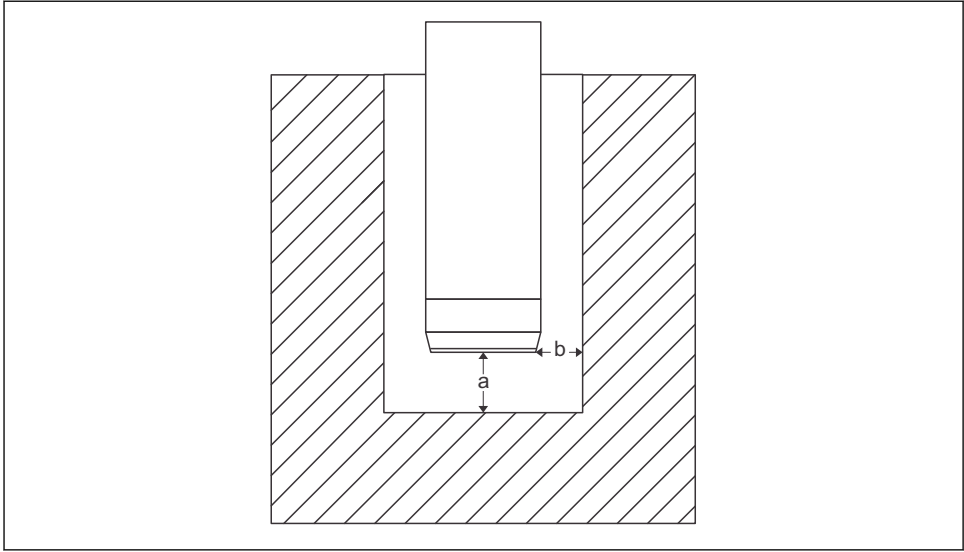
- 1 Sensor CLS82D
- 2 Pipe
- 3 Direction of flow

The ionic current in the liquid is affected by the walls in confined installation conditions. This effect is compensated by what is referred to as the installation factor. The installation factor can be entered in the transmitter for the measurement or the cell constant is corrected by multiplying by the installation factor.

The value of the installation factor depends on the diameter and the conductivity of the pipe nozzle as well as the sensor's distance to the wall. The installation factor can be disregarded ( $f = 1.00$ ) if the distance to the wall is sufficient ( $a > 15$  mm). If the distance to the wall is smaller, the installation factor increases for electrically insulating pipes ( $f > 1$ ) and decreases for electrically conductive pipes ( $f < 1$ ). The installation factor can be determined using calibration solutions.



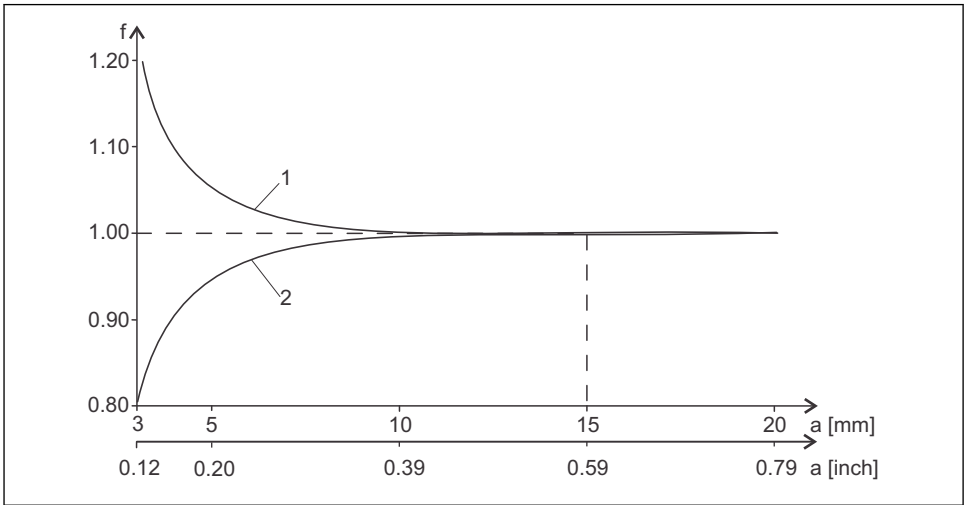
Ensure that the electrodes are fully immersed in the medium during measurement. Ideally, medium should flow to the measuring cell from the front. Any other installation position can cause air pockets to occur or the buildup of solid impurities.



A0024626

2 Schematic drawing of CLS82D in confined installation conditions

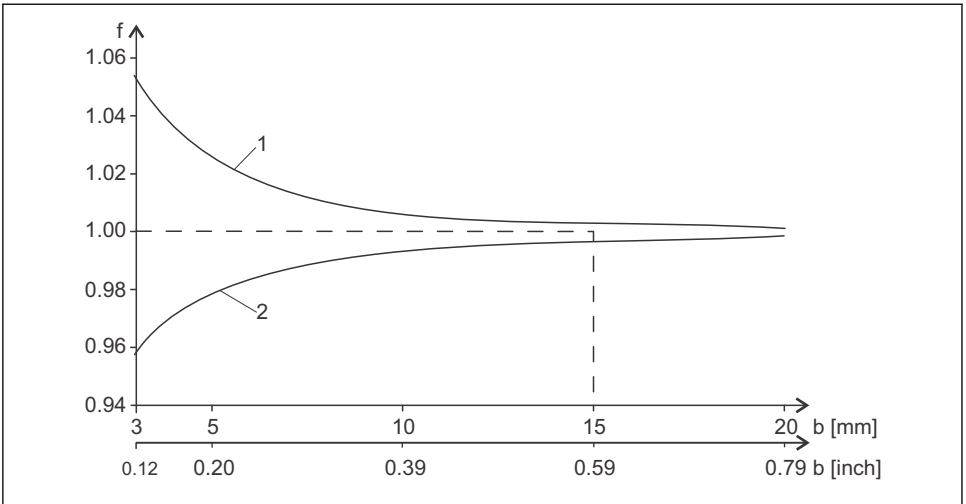
- a Wall distance
- b Gap width



A0024615

3 Relationship between installation factor  $f$  and wall distance  $a$

- 1 Electrically insulating pipe wall
- 2 Electrically conductive pipe wall



A0024616

4 Relationship between installation factor  $f$  and gap width  $b$

- 1 Electrically insulating pipe wall
- 2 Electrically conductive pipe wall




### 4.1 Hygienic properties



For a 3-A compliant installation, the following must be noted:

After the instrument is installed its hygienic integrity shall be maintained. All process connections must be 3-A compliant.

## 4.2 Installation factors for assemblies

 For flow assemblies or assemblies with a basket protector where it is not possible to maintain a distance  $a > 15 \text{ mm}$  ( $\rightarrow$   1,  13) to the sensor element, it is advisable to determine the installation factor by calibrating in the assembly used in order to guarantee the specified sensor measured error.

## 4.3 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

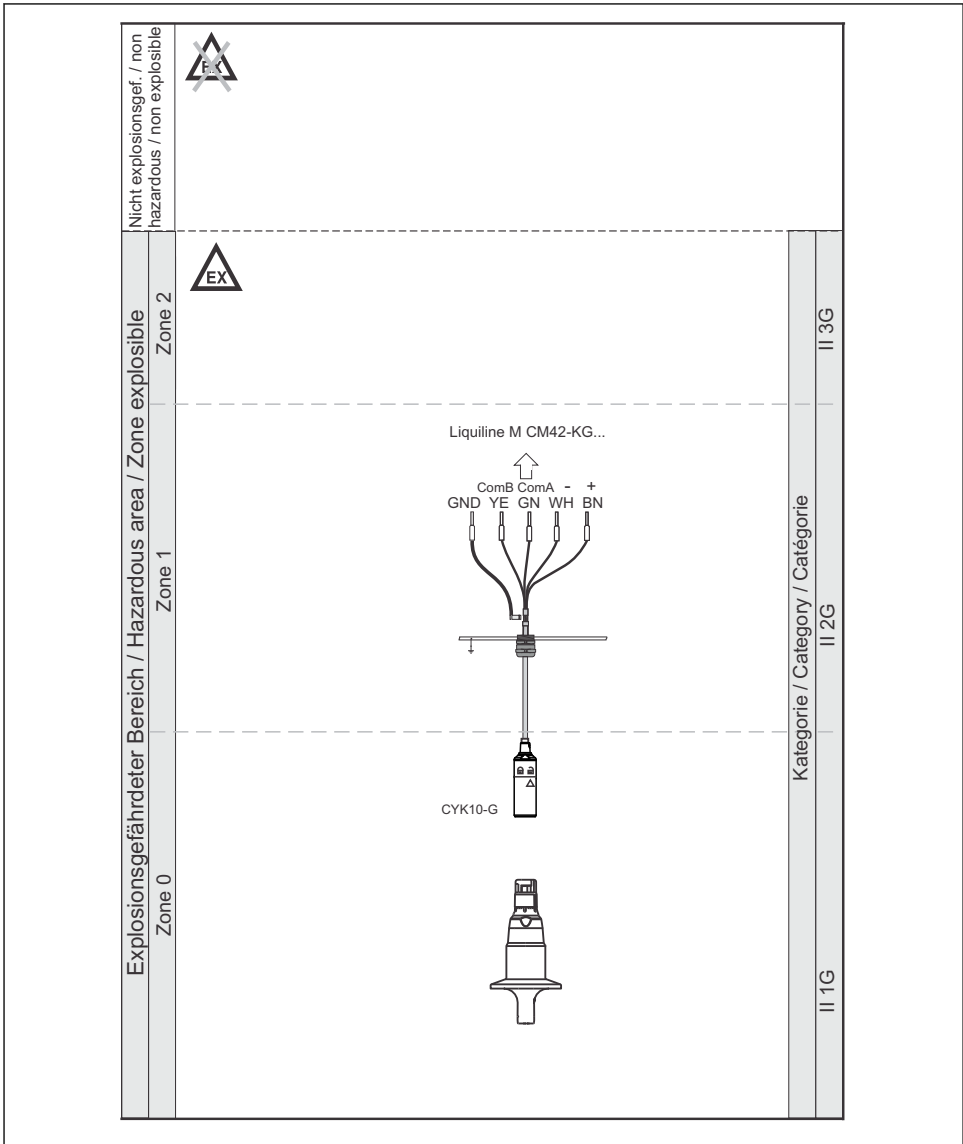
#### Device is live

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 at a glance

## 5.1.1 Sensors for zone 0

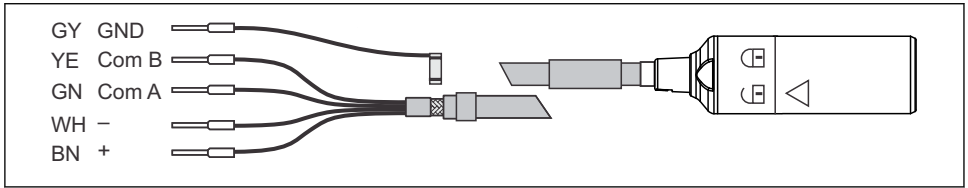


A0024263

5 Electrical connection CLS82D-BA\*\*\*\*\* and CYK10-G

## 5.2 Connecting the sensor

The sensor is connected to the transmitter via measuring cable CYK10.



A0023956

6 Measuring cable CYK10

## 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, 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 cable entries mounted, tightened and leak-tight?	For lateral cable entries, make sure the cables loop downwards to allow water to drip off
Are all cable entries installed 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

### 7.1 Clean sensor

#### 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.

#### WARNING

##### **Hydrofluoric acid and mineral acids**

Risk of serious or fatal injury from caustic burns

- ▶ Wear protective goggles to protect your eyes.
- ▶ Wear protective gloves and appropriate protective clothing.
- ▶ Avoid all contact with the eyes, mouth and skin.
- ▶ If using hydrofluoric acid, only use plastic vessels.

#### WARNING

##### **Thiocarbamide**

Harmful if swallowed. Limited evidence of carcinogenicity. Possible risk of harm to the unborn child. Dangerous for the environment with long-term effects.

- ▶ Wear protective goggles, protective gloves and appropriate protective clothing.
- ▶ Avoid all contact with the eyes, mouth and skin.
- ▶ Avoid releases into the environment.

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

#### 1. Oily and greasy films:

Clean with grease remover, e.g. alcohol, as well as hot water and (alkaline) agents containing surfactants (e.g. dishwashing detergent).

#### 2. Lime, cyanide and metal hydroxide buildup and low solubility organic 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.

5. Readily soluble biological buildup:  
Rinse with pressurized water.

 After cleaning or regeneration, you must rinse the sensor thoroughly with water and then recalibrate it.

## 7.2 **Sensor calibration**

 When calibrating the sensor, ensure that there is a minimum distance of 15 mm to the bottom and to the walls of the calibration vessel.

## **8 Repair**

### **8.1 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).

### **8.2 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.

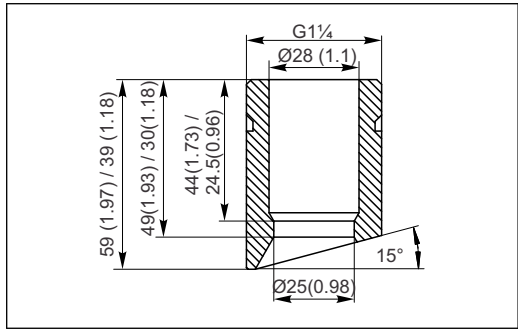
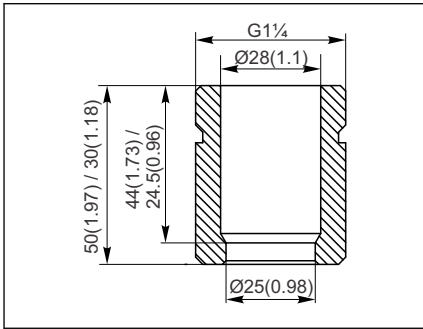
## 9 Accessories

### 9.1 Seals


Only for CLS82D-\*\*NA\*<sup>1)</sup> and CLS82D-\*\*NB\*<sup>2)</sup>:

- EPDM seals for CLS82D (x 2; FDA USP Class VI); Order No. 71307106
- FKM (Viton®) seals for CLS82D (x 2; FDA USP Class VI); Order No. 71307105
- Silicone seals for CLS82D (x 2, FDA USP Class VI); Order No. 71307107

### 9.2 Welding socket




- Safety welding socket DN25, straight, stainless steel 1.4435, L=30; Order No. 51508051  
Only for CLS82D-\*\*NA\*<sup>1)</sup>
- Safety welding socket DN25, angled, stainless steel 1.4435, L=30/40; Order No. 51508052  
Only for CLS82D-\*\*NA\*<sup>1)</sup>
- Safety welding socket DN25, straight, stainless steel 1.4435, L=50; Order No. 51508049  
Only for CLS82D-\*\*NB\*<sup>2)</sup>
- Safety welding socket DN25, angled, stainless steel 1.4435, L=50/60; Order No. 51508050  
Only for CLS82D-\*\*NB\*<sup>2)</sup>

 Existing standard welding sockets (for CPA440 / CPA441 / CPA460), order nos. 50005192 and 50028446, are also suitable for sensor CLS82D.

### 9.3 Connection

#### CYK10 Memosens data cable

- For digital sensors with Memosens technology
- Product Configurator on the product page: [www.endress.com/cyk10](http://www.endress.com/cyk10)

 Technical Information TI00118C

1) Process connection: DN25 standard

2) Process connection: DN25 brown



### Memosens data cable CYK11

- Extension cable for digital sensors with Memosens protocol
- Product Configurator on the product page: [www.endress.com/cyk11](http://www.endress.com/cyk11)



Technical Information TI00118C

## 9.4 Calibration solutions

### Conductivity calibration solutions CLY11

Precision solutions referenced to SRM (Standard Reference Material) by NIST for qualified calibration of conductivity measuring systems in accordance with ISO 9000

- 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
- CLY11-C, 1.406 mS/cm (reference temperature 25 °C (77 °F)), 500 ml (16.9 fl.oz)  
Order No. 50081904
- CLY11-D, 12.64 mS/cm (reference temperature 25 °C (77 °F)), 500 ml (16.9 fl.oz)  
Order No. 50081905
- CLY11-E, 107.00 mS/cm (reference temperature 25 °C (77 °F)), 500 ml (16.9 fl.oz)  
Order No. 50081906



Technical Information TI00162C

## 9.5 Calibration set

### Conducal CLY421

- Conductivity calibration set (case) for ultrapure water applications
- Complete, factory-calibrated measuring system with certificate, traceable to SRM by NIST and PTB, for comparison measurement in ultrapure water up to max. 20  $\mu\text{S}/\text{cm}$
- Product Configurator on the product page: [www.endress.com/cly421](http://www.endress.com/cly421)



Technical Information TI00496C/07/EN

#### Recalibration

- The conductivity calibration set must be calibrated regularly onsite at the manufacturer's depending on the frequency of use and operating conditions.
- Recommended period: 1 year

## 10 Technical data

### 10.1 Input

#### 10.1.1 Measured variable

- Conductivity
- Temperature

#### 10.1.2 Measuring range

##### Conductivity

1  $\mu$ S/cm to 500 mS/cm

##### Temperature

-5 to 120 °C (23 to 248 °F)

#### 10.1.3 Cell constant

CLS82D

$$k = 0.57 \text{ cm}^{-1}$$

#### 10.1.4 Temperature compensation

Pt1000 in accordance with DIN EN 60751

## 10.2 Performance characteristics

### 10.2.1 Uncertainty of measurement

Each individual sensor is factory-measured in a solution of approx. 50  $\mu$ S/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 %.

### 10.2.2 Conductivity response time

$$t_{90} \leq 3 \text{ s}$$

### 10.2.3 Temperature response time

$$t_{90} \leq 25 \text{ s}$$

### 10.2.4 Maximum measured error

$$\leq 4 \text{ \% of reading}$$

### 10.2.5 Repeatability

$$0.2\% \text{ of reading}$$

## 10.3 Environment

### 10.3.1 Ambient temperature

-20 to +60 °C (-4 to 140 °F)

### 10.3.2 Storage temperature

-25 to +80 °C (-13 to +176 °F)

### 10.3.3 Humidity

5 to 95 %

### 10.3.4 Degree of protection

IP 68 / NEMA type 6P (1 m water column, 25 °C, 168 h)

## 10.4 Process

### 10.4.1 Process temperature

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

Sterilization (max. 45 min.): Max. 140 °C (284 °F) at 6 bar (87 psi)



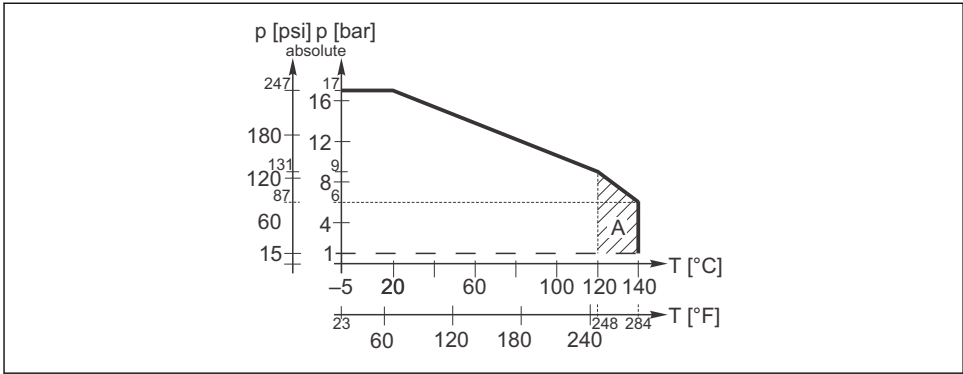
The maximum temperature for communication with the transmitter is 130 °C (266 °F).

### 10.4.2 Process pressure (absolute)

17 bar (247 psi) at 20 °C (68 °F)

9 bar (131 psi) at 120 °C (248 °F)

### 10.4.3 Pressure-temperature ratings



A0024322

7 Pressure-temperature ratings

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

## 10.5 Mechanical construction

### 10.5.1 Weight

Approx. 0.06 to 0.950 kg (0.13 to 2.09 lbs) depending on the version

### 10.5.2 Materials in contact with the medium

Sensor element: Platinum and ceramic

Process connection: Stainless steel 1.4435 (AISI 316L)

Only for CLS82D-\*\*NA\*<sup>1)</sup> and CLS82D-\*\*NB\*<sup>2)</sup>:

Seal: EDPM

1) 1. Connection: DN25 standard

2) 2. Connection: DN25 brown

### 10.5.3 Surface roughness

$R_a < 0.38 \mu\text{m}$

# Index

## A

Approvals . . . . . 12

## C

Certificates . . . . . 12

Certification body . . . . . 12

Check

    Connection . . . . . 19

    Installation . . . . . 16

Commissioning . . . . . 20

Connection

    Check . . . . . 19

    Ensuring the degree of protection . . . . . 19

## D

Declaration of Conformity . . . . . 12

Degree of protection

    Ensuring . . . . . 19

Designated use . . . . . 5

Direction of flow . . . . . 13

Disposal . . . . . 23

## E

Electrical connection . . . . . 17

EN 10204 3.1 . . . . . 12

Environment . . . . . 27

Ex approvals . . . . . 12

## H

Hazardous areas . . . . . 6

## I

Incoming acceptance . . . . . 9

Input . . . . . 26

Inspection certificate . . . . . 12

Installation

    Check . . . . . 16

    Sensor . . . . . 13

Installation factor . . . . . 13, 16

## M

Maintenance . . . . . 21

## N

Nameplate . . . . . 11

## P

Performance characteristics . . . . . 26

Process . . . . . 27

Product identification . . . . . 11

## R

Return . . . . . 23

## S

Safety

    Electrical equipment in hazardous areas . . . 6

Safety instructions . . . . . 5

Scope of delivery . . . . . 11

Sensor

    Cleaning . . . . . 21

    Connecting . . . . . 19

    Mounting . . . . . 13

Symbols . . . . . 4

## T

Technical data . . . . . 26

    Mechanical construction . . . . . 28

Temperature classes . . . . . 7

Type code . . . . . 10

## U

Use . . . . . 5

## W

Warnings . . . . . 4







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