

# Brief Operating Instructions

## Memosens COS81D

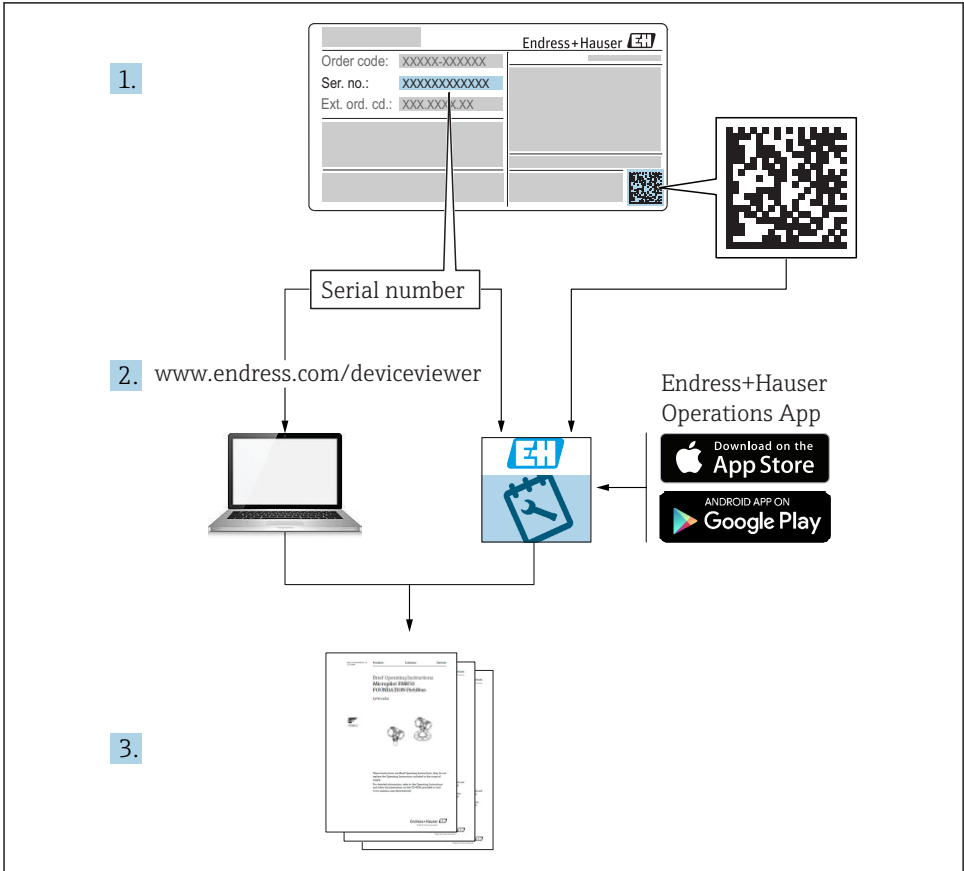
Optical sensor for the measurement of dissolved oxygen with Memosens technology



These instructions are Brief Operating Instructions; they are not a substitute for the Operating Instructions pertaining to the device.

Detailed information on the device can be found in the Operating Instructions and in the other documentation available at:

- [www.endress.com/device-viewer](http://www.endress.com/device-viewer)
- Smart phone/tablet: Endress+Hauser Operations App



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# Konformitätserklärung / Declaration of Conformity

**EU-Konformitätserklärung**  
**EU-Declaration of Conformity**  
**Déclaration UE de Conformité**

**Endress+Hauser**   
 People for Process Automation



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<b>Product</b>	<p><b>Oxymax H</b>                  COS81D-BA*****3</p>									
<b>Regulations</b>	<p>den folgenden Europäischen Richtlinien entspricht:                  conforms to following European Directives:                  est conforme aux prescription des Directives Européennes suivantes :</p> <p>EMC     2014/30/EU (L96/79)                  ATEX    2014/34/EU (L96/309)                  RoHS    2011/65/EU (L174/88)</p>									
<b>Standards</b>	<p>angewandte harmonisierte Normen oder normative Dokumente:                  applied harmonized standards or normative documents:                  normes harmonisées ou documents normatifs appliqués :</p> <table border="0"> <tr> <td>EN 61326-1     (2013)</td> <td>EN 60079-0     (2012)</td> <td>A11:2013</td> </tr> <tr> <td>EN 61326-2-3   (2013)</td> <td>EN 60079-11   (2012)</td> <td></td> </tr> <tr> <td>EN 50581       (2012)</td> <td></td> <td></td> </tr> </table>	EN 61326-1     (2013)	EN 60079-0     (2012)	A11:2013	EN 61326-2-3   (2013)	EN 60079-11   (2012)		EN 50581       (2012)		
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<b>Certification</b>	<table border="0"> <tr> <td>EG-Baumusterprüfbescheinigung Nr. EC-Type Examination Certificate No. Numéro de l'attestation d'examen CE de type Ausgestellt von/issued by/délivré par</td> <td>BVS 12 ATEX E 121 X   DEKRA EXAM GmbH (0158)</td> </tr> <tr> <td>Qualitätssicherung/Quality assurance/Système d'assurance qualité</td> <td>DEKRA EXAM GmbH (0158)</td> </tr> </table> <p>Gerlingen, 03.08.2017                  Endress+Hauser Conducta GmbH+Co. KG</p> <table border="0"> <tr> <td style="text-align: center;">                   i. V. Jörg-Martin Müller                  Technology             </td> <td style="text-align: center;">                   i. V. Sven-Matthias Scheibe                  Technology Certifications and Approvals             </td> </tr> </table>	EG-Baumusterprüfbescheinigung Nr. EC-Type Examination Certificate No. Numéro de l'attestation d'examen CE de type Ausgestellt von/issued by/délivré par	BVS 12 ATEX E 121 X   DEKRA EXAM GmbH (0158)	Qualitätssicherung/Quality assurance/Système d'assurance qualité	DEKRA EXAM GmbH (0158)	 i. V. Jörg-Martin Müller Technology	 i. V. Sven-Matthias Scheibe Technology Certifications and Approvals			
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# 1 About this document

## 1.1 Warnings

Structure of information	Meaning
<p> <b>DANGER</b></p> <p><b>Causes (/consequences)</b>                      If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> <li>▶ Corrective action</li> </ul>	<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>                      If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> <li>▶ Corrective action</li> </ul>	<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>                      If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> <li>▶ Corrective action</li> </ul>	<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>                      If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> <li>▶ Action/note</li> </ul>	<p>This symbol alerts you to situations which may result in damage to property.</p>

## 1.2 Symbols

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.
- Faults at the measuring point may only be rectified by authorized and specially trained personnel.



Repairs not described in the Operating Instructions provided must be carried out only directly at the manufacturer's site or by the service organization.

### 2.2 Designated use

The sensor is designed for continuous measurement of dissolved oxygen in water and aqueous solutions, and also for continuous measurement of oxygen in gases.

The sensor is particularly suitable for:

- Monitoring inertization equipment in the food industry
- Monitoring, measuring and regulating the oxygen content in chemical processes
- Monitoring of fermentation processes

#### NOTICE

#### Halogen-containing solvents, ketones and toluene

Halogen-containing solvents (dichloromethane, chloroform), ketones (e.g. acetone, pentanone) and toluene have a cross-sensitive effect and result in decreased measured values or, at worst, in the complete failure of the sensor!

- ▶ Use the sensor only in media that are free from halogens, ketones and toluene.

For non-contact digital data transmission, the sensor must be connected to the digital input of the Liquiline transmitter using the CYK10 measuring cable.

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 Occupational 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 international 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**

### **Before commissioning the entire measuring point:**

1. Verify that all connections are correct.
2. Ensure that electrical cables and hose connections are undamaged.
3. Do not operate damaged products, and protect them against unintentional operation.
4. Label damaged products as defective.

### **During operation:**

- ▶ If faults cannot be rectified:  
products must be taken out of service and protected against unintentional operation.

### **NOTICE**

#### **Non-designated use**

Incorrect measurements, malfunctions and even measuring point failure could result

- ▶ Only use the product in accordance with the product specifications.
- ▶ Pay particular attention to the technical data on the nameplate.

## **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 international standards have been observed.

### **2.5.2 Electrical equipment in hazardous areas**

#### **ATEX II 1G / IECEx Ex ia IIC T3/T4/T6 Ga EAC 0Ex ia IIC T6/T4/T3 Ga X**

The Memosens inductive sensor cable connection system, consisting of:

- oxygen sensor Oxymax COS81D and
- measuring cable CYK10/CYK20

- A maximum ambient temperature of 90 °C (194 °F) must not be exceeded at the sensor head.
- The certified Oxymax COS81D oxygen sensor, in conjunction with the CYK10 measuring cable, may be connected only to certified, intrinsically safe, digital sensor circuits of the Liquiline M CM42 transmitter. The electrical connection must be made according to the wiring diagram.
- Oxygen sensors for use in the Ex area have a special conductive O-ring. The electrical connection of the metallic sensor shaft to the conductive mounting location (such as a metallic assembly) is via the O-ring.
- You must connect the assembly or the mounting location to ground using suitable measures according to the Ex standards.
- The sensors must not be operated under electrostatically critical process conditions. Avoid strong steam or dust currents that act directly on the connection system.
- Hazardous area versions of digital sensors with Memosens technology are indicated by a red-orange ring in the plug-in head.
- The maximum permitted cable length between the sensor and transmitter is 100 m (330 ft).
- Full compliance with regulations for electrical systems in hazardous locations (EN/IEC 60079-14) is mandatory when using the devices and sensors.

### CSA C/US IS NI Cl. 1 Div 1&2 GP A-D



Pay attention to the XA and control drawing for the transmitter used.

The relevant XA with the control drawing is available in the Download Area of the product page under [www.endress.com](http://www.endress.com).

### Temperature classes ATEX, IECEx, CSA and NEPSI

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

Type	Medium temperature $T_a$ for temperature class ( $T_n$ )
COS81D - BA****13	-10 °C ≤ $T_a$ ≤ 130 °C (T3) -10 °C ≤ $T_a$ ≤ 120 °C (T4) -10 °C ≤ $T_a$ ≤ 70 °C (T6)
COS81D - BA****33	0 °C ≤ $T_a$ ≤ 130 °C (T3) 0 °C ≤ $T_a$ ≤ 120 °C (T4) 0 °C ≤ $T_a$ ≤ 70 °C (T6)

#### IECEx Ex ia IIC T3/T4/T6 Ga

Type	Medium temperature $T_a$ for temperature class ( $T_n$ )
COS81D - IA****13	-10 °C ≤ $T_a$ ≤ 130 °C (T3) -10 °C ≤ $T_a$ ≤ 120 °C (T4) -10 °C ≤ $T_a$ ≤ 70 °C (T6)
COS81D - IA****33	0 °C ≤ $T_a$ ≤ 130 °C (T3) 0 °C ≤ $T_a$ ≤ 120 °C (T4) 0 °C ≤ $T_a$ ≤ 70 °C (T6)



*CSA C/ US: Class I, Zone 0 AEx ia IIC T6...T4 Ga and IS Class I, Division 1, Groups A, B, C and D T6...T4*

Type	Medium temperature T <sub>a</sub> for temperature class (T <sub>n</sub> )
COS81D - C3****13	-10 °C ≤ T <sub>a</sub> ≤ 120 °C (T4) -10 °C ≤ T <sub>a</sub> ≤ 70 °C (T6)
COS81D - C3****33	0 °C ≤ T <sub>a</sub> ≤ 120 °C (T4) 0 °C ≤ T <sub>a</sub> ≤ 70 °C (T6)

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

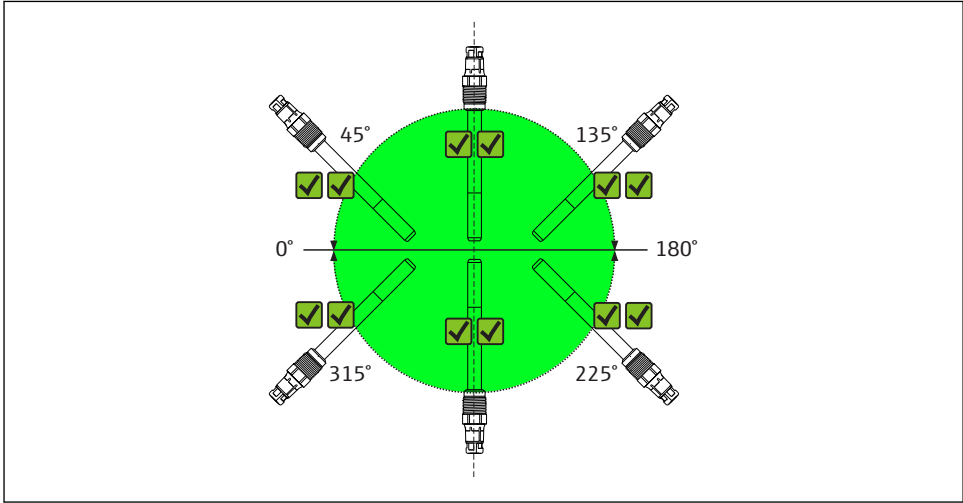
Type	Medium temperature T <sub>a</sub> for temperature class (T <sub>n</sub> )
COS81D - NA****13	-10 °C ≤ T <sub>a</sub> ≤ 130 °C (T3) -10 °C ≤ T <sub>a</sub> ≤ 120 °C (T4) -10 °C ≤ T <sub>a</sub> ≤ 70 °C (T6)
COS81D - NA****33	0 °C ≤ T <sub>a</sub> ≤ 130 °C (T3) 0 °C ≤ T <sub>a</sub> ≤ 120 °C (T4) 0 °C ≤ T <sub>a</sub> ≤ 70 °C (T6)

### 3 Installation

#### 3.1 Installation conditions

##### 3.1.1 Orientation

COS81D-\*\*\*\*C\*\*\* (c-shaped)



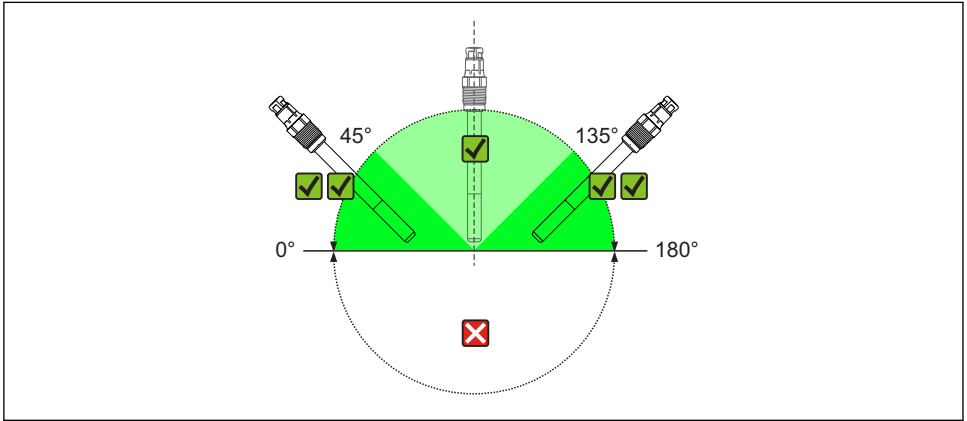
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1 Installation angle for Memosens COS81D-\*\*\*\*C\*\*\* (c-shaped spot cap)

The sensor can be installed at any installation angle (0 to 360 °).

Recommended installation angle

## COS81D-\*\*\*\*U\*\*\* (u-shaped)



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- 2 Installation angle for Memosens COS81D-\*\*\*\*U\*\*\* (u-shaped spot cap)
- ✓✓ Recommended installation angle
- ✓ Possible installation angle
- ✗ Inadmissible installation angle

The sensor must be installed at an angle of inclination of 0 to 180° in an assembly, holder or appropriate process connection. Recommended angle: 0 to 45° or 135 to 180° to prevent the attachment of air bubbles. At angles of inclination of 45 to 135°, air bubbles at the oxygen-sensitive membrane may increase the measured value.

Inclination angles other than those mentioned are not permitted. In order to avoid buildup and condensation on the spot, do **not** install the COS81D-\*\*\*\*U \*\*\*sensor upside down.



Follow the instructions for installing sensors in the Operating Instructions for the assembly used.

### 3.1.2 Mounting location

1. Choose a mounting location that is easy to access.
2. Ensure that upright posts and assemblies are fully secured and vibration-free.
3. Choose a mounting location with an oxygen concentration that is typical for the application.

## 3.2 Mounting the sensor

Must be installed in a suitable assembly (depending on the application).

### WARNING

#### Electrical voltage

In the event of a fault, non-grounded metallic assemblies may be live and as such are not safe to touch!

- ▶ When using metallic assemblies and installation equipment, national grounding provisions must be observed.

For complete installation of a measuring point, proceed as follows:

1. Install the retractable assembly or a flow assembly (if used) into the process.
2. Connect the water supply to the rinse connections (if you are using an assembly with a cleaning function).
3. Install and connect the oxygen sensor.

### NOTICE

#### Installation error

Cable breakage, loss of sensor due to cable separation, unscrewing of spot cap!

- ▶ Do not install the sensor freely suspended from the cable!
- ▶ Screw the sensor into the assembly, ensuring that the cable is not twisted.
- ▶ Hold on to the sensor body during installation or removal. Turn **only at the hexagonal nut** of the armored coupling. Otherwise the spot cap might be unscrewed and will then remain in the assembly or process.
- ▶ Avoid exerting excessive tensile force on the cable (e.g. through jerky pulling movements).
- ▶ Choose a mounting location that is easy to access for later calibrations.
- ▶ Follow the instructions for installing sensors in the Operating Instructions for the assembly used.

## 3.3 Post-installation check

1. Are the sensor and cable undamaged?
2. Is the orientation correct?
3. Is the sensor installed in an assembly and is not suspended from the cable?
4. Avoid the penetration of moisture by fitting the protection cap on the immersion assembly.

## 4 Electrical connection



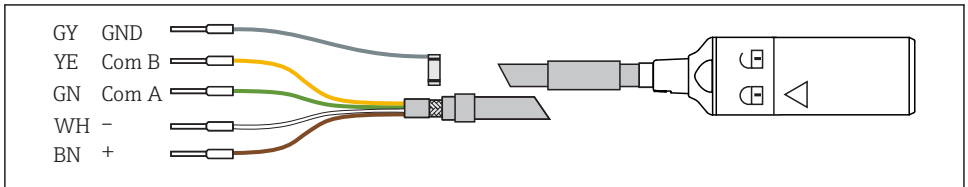
### Device is live!

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.

### 4.1 Connecting the sensor

The electrical connection of the sensor to the transmitter is established using measuring cable CYK10.



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 3 *Measuring cable CYK10*

### 4.2 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) that are loose or insufficiently secured.

### 4.3 Post-connection check

Device condition and specifications	Action
Are the sensor, assembly or cables free from damage on the outside?	<ul style="list-style-type: none"> <li>▶ Perform a visual inspection.</li> </ul>
Electrical connection	Action
Are the mounted cables strain-relieved and not twisted?	<ul style="list-style-type: none"> <li>▶ Perform a visual inspection.</li> <li>▶ Untwist the cables.</li> </ul>
Is a sufficient length of the cable cores stripped, and are the cores positioned in the terminal correctly?	<ul style="list-style-type: none"> <li>▶ Perform a visual inspection.</li> <li>▶ Pull gently to check they are seated correctly.</li> </ul>
Are all the screw terminals properly tightened?	<ul style="list-style-type: none"> <li>▶ Tighten the screw terminals.</li> </ul>

Device condition and specifications	Action
Are all cable entries mounted, tightened and leak-tight?	▶ Perform a visual inspection.
Are all cable entries installed downwards or mounted laterally?	In the case of lateral cable entries: ▶ Point cable loops downward so that water can drip off.

## 5 Commissioning

Prior to initial commissioning, ensure that:

- The sensor is correctly installed
- The electrical connection is correct

If using an assembly with automatic cleaning function:

- ▶ Check that the cleaning medium (water or air, for example) is connected correctly.

### WARNING


#### Escaping process medium


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

- ▶ Before applying pressure to an assembly with cleaning system, ensure that the system has been connected correctly.
- ▶ If you cannot reliably establish the correct connection, do not install the assembly in the process.

1. At the transmitter, enter all the settings specific to the parameters and measuring point. These include the air pressure during calibration and measurement or the salinity, for instance.
2. Check whether a calibration/adjustment is necessary.

The oxygen measuring point is then ready to measure.

 Following commissioning, the sensor must be serviced at regular intervals, as only then can reliable measurement be guaranteed. Further information on this can be found in the Operating Instructions for the sensor.

-  ■ Operating Instructions Memosens COS81D, BA01448C
- Operating Instructions for the transmitter used, such as BA01245C if using the Liquiline CM44x or CM44xR.





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