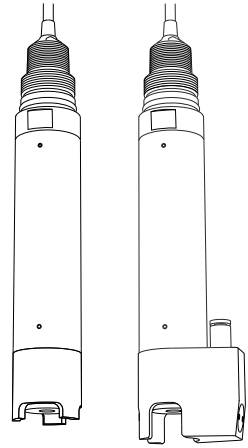
KA01133C/07/EN/05.21
71531960
2021-06-18

Brief Operating Instructions
Oxymax COS61D

Optical sensor for measuring dissolved oxygen
With Memosens protocol



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
- Smart phone/tablet: Endress+Hauser Operations App

Endress+Hauser
People for Process Automation

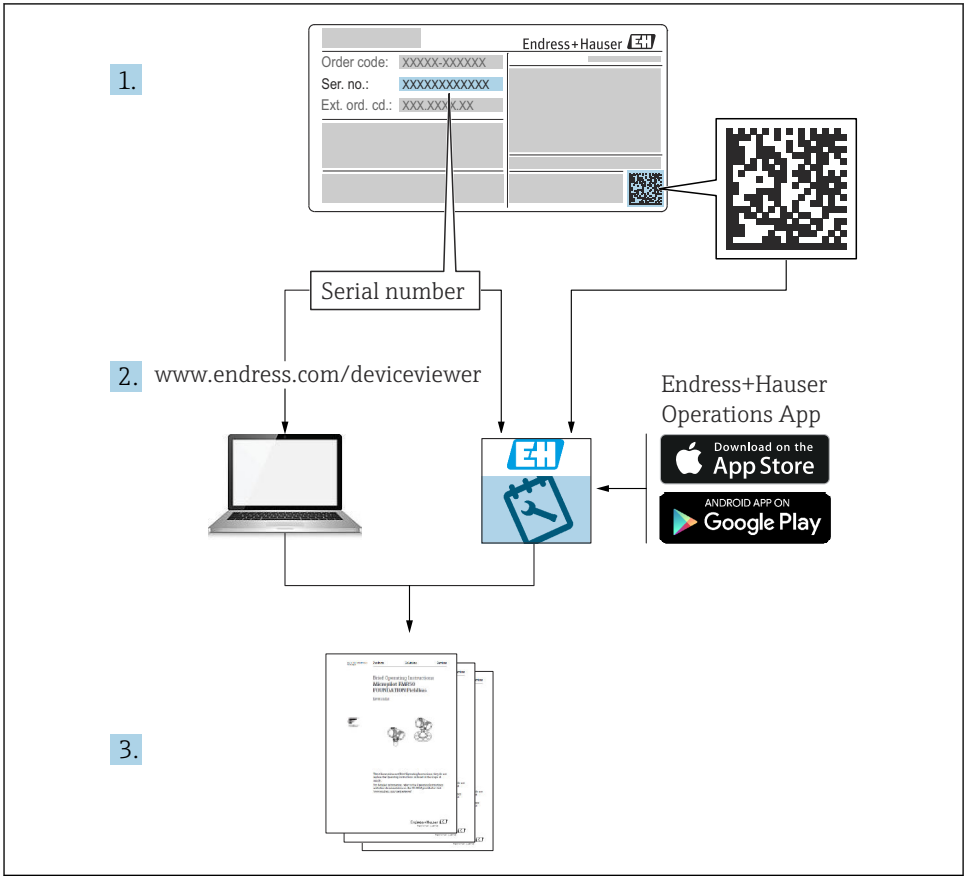

1.
Endress+Hauser
Order code: XXXXX-XXXXXX
Ser. no.: XXXXXXXXXXXX
Ext. ord. cd.: XXX.XXX-XXX
Serial number
2.
www.endress.com/deviceviewer
Endress+Hauser
Operations App
Download on the
App Store
ANDROID APP ON
Google Play
3.

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Table of contents

1 About this document

1.1 Warnings

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

1.2 Symbols

	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 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 oxygen sensor is suitable for continuous measurement of dissolved oxygen in water.

The main areas of application are:
- Wastewater treatment plants
  - Oxygen measurement and regulation in the activated sludge basin for a highly efficient biological cleaning process
  - Monitoring the oxygen content in the wastewater treatment plant outlet
- Water monitoring
  Oxygen measurement in rivers, lakes or seas as an indicator of the water quality
- Water treatment
  Oxygen measurement for status monitoring, e.g. of drinking water (oxygen enrichment, corrosion protection etc.)
- Fish farming
  Oxygen measurement and regulation for optimum living and growth conditions

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

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.

⚠ CAUTION

Cleaning not switched off during calibration or maintenance activities

Risk of injury due to medium or cleaning agent!

- If a cleaning system is connected, switch it off before removing a sensor from the medium.
- If you wish to check the cleaning function and have therefore not switched off the cleaning system, wear protective clothing, goggles and gloves or take other appropriate measures.

2.5 Product safety

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.

2.5.1 State-of-the-art technology

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 Approvals

Optional order version: CSA GP approval

This device has a CSA GP approval and meets the following requirements:

- Power supply by a Class 2 or limited power source as per CSA 61010-1-12
- Overvoltage category I
- Ambient conditions: max. altitude 2000 m (6560 ft)

2.5.3 Electrical equipment in hazardous areas

Optional order version: CSAus NI Cl 1, Div 2

Class 1, Division 2, Groups A, B, C and D T6; IP67/IP68:
- The device must be installed in a housing or (installation) cabinet which can only be accessed with a tool or key.
- Control drawing: 211050778 [1)]

This product meets the requirements of the following standards:
- ANSI/UL 61010-1, 3. Ed.
- ANSI/UL 121201-2017
- ANSI/IEC 60529, Edition 2.2. 2013-08 Degrees of protection provided by enclosures (IP Code)

Installation and operation in explosive atmospheres CL 1, DIV 2

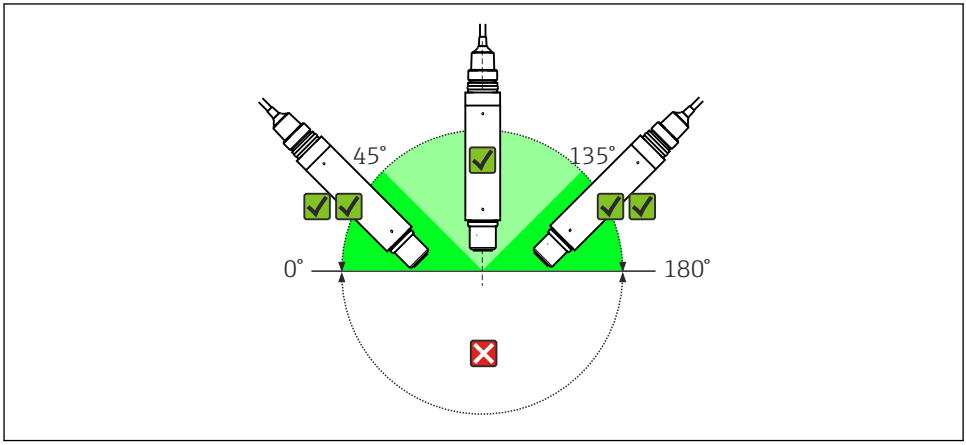
This non-sparking device has the following specified explosion protection data:
- CSAus CL 1, DIV 2
- Groups A, B, C, and D
- Temperature class T6, −20 °C (−4 °F) ≤ Ta ≤ 60 °C (140 °F)
- IP protection: IP67/IP68

1) Additionally, pay attention to the enlarged version of Control Drawing 211050778, the operating conditions specified in the appendix to Operating Instructions BA00460C and the advice and notices in the Operating Instructions.

3 Installation

3.1 Installation conditions

3.1.1 Orientation



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1 *Installation angle*

✓✓ *Recommended installation angle*

✓ *Possible installation angle*

✗ *Inadmissible installation angle*

The sensor must be installed at an angle of inclination in an assembly, holder or appropriate process connection. Recommended angle: 45° to prevent the attachment of air bubbles. At angles of inclination of 45 to 135°, air bubbles at the oxygen-sensitive membrane may result in higher readings than expected.

The sensor can be installed up to the horizontal in an assembly, holder or suitable process connection. The optimum installation angle is 45°.

Other angles and upside-down installation are not recommended. Reason: Possible sediment formation and resulting falsification of measured value.

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

3.1.2 Mounting location

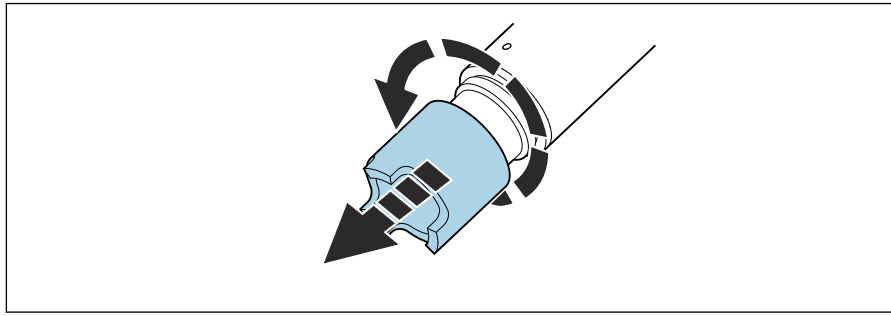
1. Choose a mounting location that is easy to access.
2. Ensure that upright posts and assemblies are fully secured and vibration-free.
3. Choose a mounting location with an oxygen concentration that is typical for the application.

3.2 Mounting the sensor

3.2.1 Mounting the cleaning unit or optional protection guard

If the cleaning unit was not delivered as a pre-assembled unit or if an optionally ordered protection guard is used:

1.



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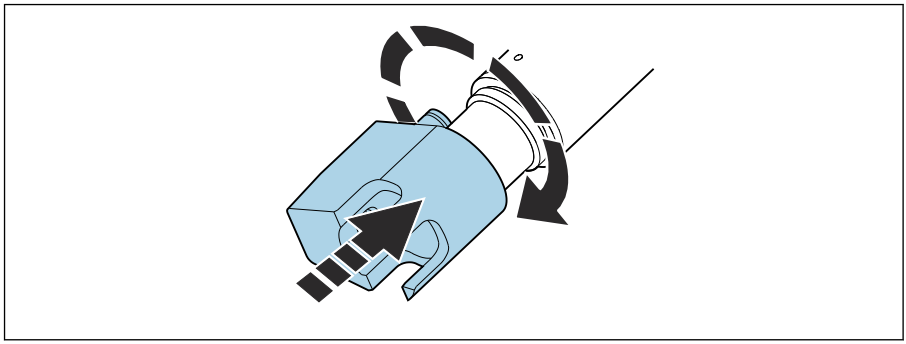
Unscrew the standard protection guard.

↳ Retain the standard protection guard for possible reuse at a later stage without the cleaning unit.

2.



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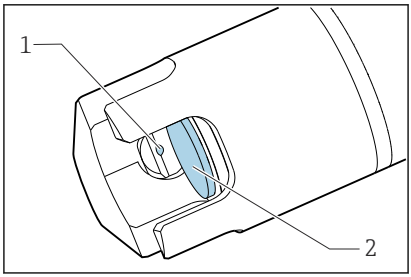
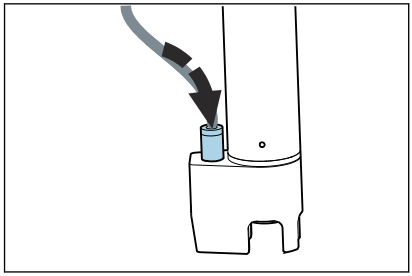
Screw on the cleaning unit or optional protection guard and tighten until the stop.

↳ The cleaning nozzle of the cleaning unit should now be level with the spot.



1 Cleaning nozzle
2 Spot

3.



Connect the hose for the compressed air supply (to be provided onsite) or compressor to the hose connection of the cleaning unit.

3.2.2 Installing a measuring point

Must be installed in a suitable assembly.

⚠ 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 immersion operation, install individual assemblies away from the basin on a solid base.
- Final assembly must be performed only at the assigned mounting location.
- Choose a mounting location that is easy to access.
- During final installation, it must be ensured that the metal sensor body is connected to earth, if necessary.

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

1. Install the retractable assembly or 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

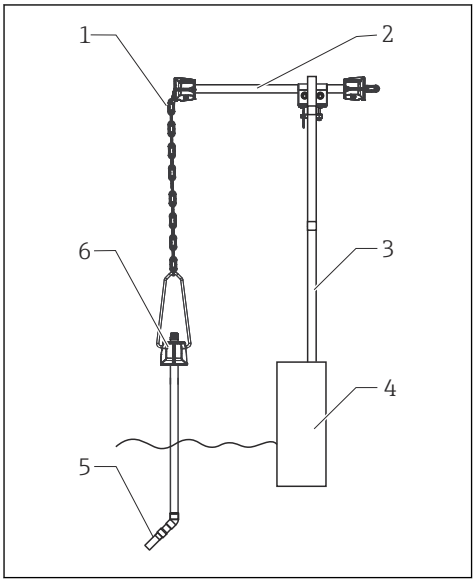
Cable breakage, loss of sensor due to cable separation, unscrewing of fluorescence cap!

- ▶ Do not install the sensor freely suspended from the cable!
- ▶ Screw the sensor into the assembly, ensuring that the cable is not twisted.
- ▶ Hold the sensor body steady during installation or removal. Otherwise the fluorescence cap or protection guard might be unscrewed. These will then remain in the process or assembly.
- ▶ During final installation, it must be ensured that the metal sensor body is connected to earth.
- ▶ 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 Installation examples

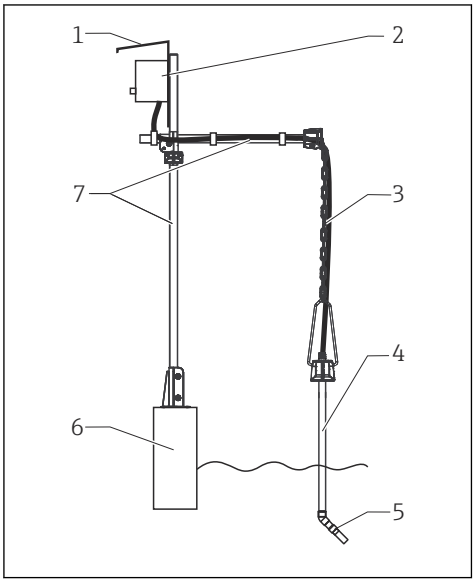
3.3.1 Immersion operation

Universal holder and chain assembly



2 Chain holder on railing

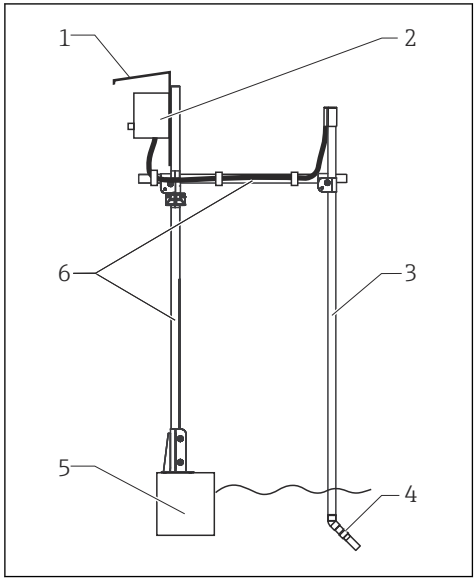
1 Chain
2 Holder Flexdip CYH112
3 Rail
4 Basin rim
5 Oxygen sensor
6 Wastewater assembly Flexdip CYA112



3 Chain holder on upright post

1 Weather protection cover CYY101
2 Transmitter
3 Chain
4 Wastewater assembly Flexdip CYA112
5 Oxygen sensor
6 Basin rim
7 Holder Flexdip CYH112

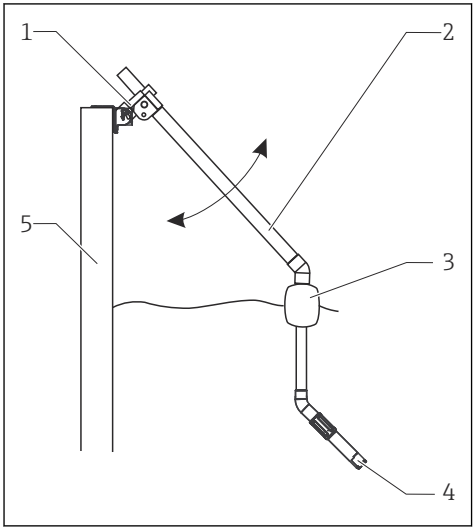
Universal holder and fixed immersion tube



4 *Assembly holder with immersion tube*

1 Protective cover
2 Transmitter
3 Flexdip CYA112 immersion assembly
4 Oxygen sensor
5 Basin rim
6 Assembly holder Flexdip CYH112

Basin rim mounting with immersion tube

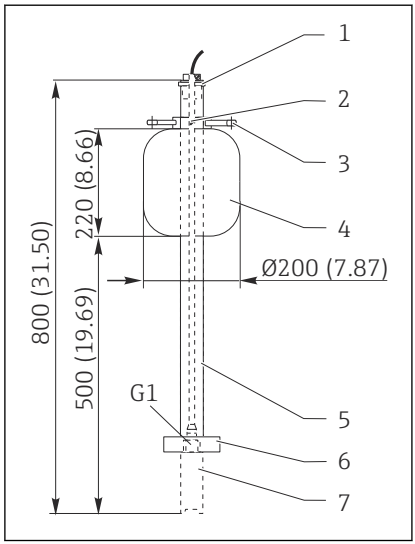


5 Basin rim mounting

1 Pendulum holder CYH112
2 Assembly Flexdip CYA112
3 Assembly float
4 Oxygen sensor
5 Basin rim

Float

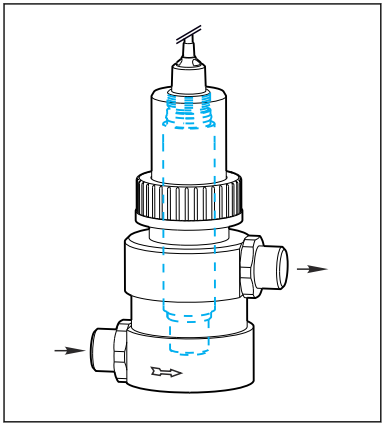
The CYA112 float is for use in the case of large fluctuations in water level, for example in rivers or lakes.



1 *Cable run with strain relief and rain shield*
2 *Fixing ring for rope and chains with terminal screw*
3 *Eyelets Ø15, 3 x 120 ° for anchoring*
4 *Plastic float, resistant to salt water*
5 *Pipe 40 x 1, stainless steel 1.4571*
6 *Bumper and ballast*
7 *Oxygen sensor*

6 *Dimensions in mm (inch)*

3.3.2 Flow assembly COA250



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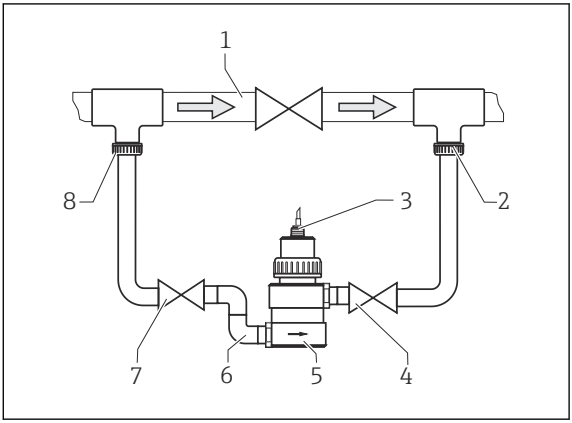
7 COA250



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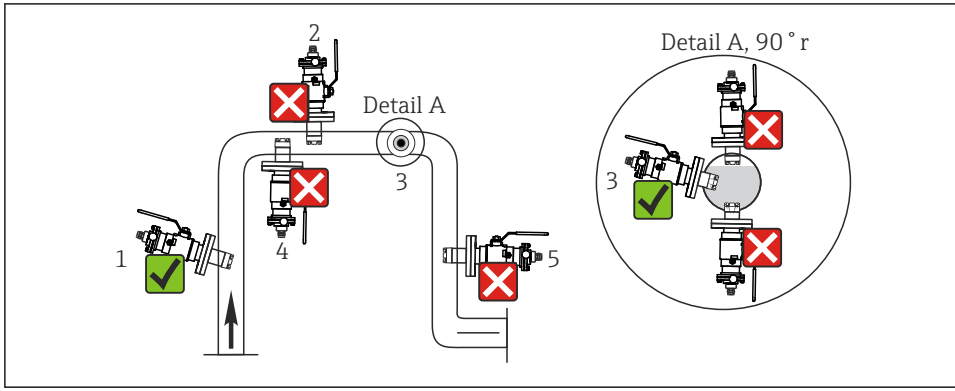
8 Bypass installation with manually actuated valves or solenoid valves

1 Main pipe
2 Medium return
3 Oxygen sensor
4, 7 Manually actuated or solenoid valves
5 Flow assembly COA250-A
6 90 ° pipe elbow
8 Medium removal

3.3.3 Retractable assembly COA451



9 *Permissible and impermissible sensor installation positions with retractable assembly COA451*

1 *Ascending pipe, best position*
2 *Horizontal pipe, sensor top down, impermissible due to air cushion or foam bubble forming*
3 *Horizontal pipe, lateral installation with permissible installation angle (acc. to sensor version)*
4 *Down pipe, impermissible*

☑ Possible installation angle

☒ Inadmissible installation angle

NOTICE

Sensor not fully immersed in the medium, buildup on sensor membrane or sensor optics, buildup due to sensor being installed upside down

Incorrect measurements are possible and these may affect the measuring point.

▶ Do not install the assembly at points where air pockets or bubbles form or where suspended particles may build up at the sensor membrane or sensor optics (item 2).

3.4 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.

4 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.

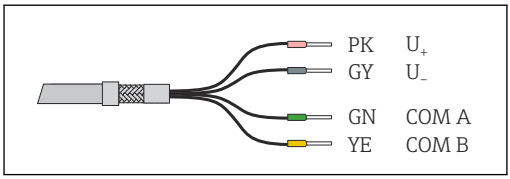
4.1 Connecting the sensor

Connection data

Sensor cable connected directly to the terminal connector of the basic module of the transmitter

Connection in hazardous areas according to CSAus CL 1, DIV 2 [2)]

- The device must be installed in a housing or (installation) cabinet which can only be accessed with a tool or key.
- Observe the Control Drawing and the operating conditions indicated in the Appendix to the Operating Instructions as well as the notes and instructions in the Appendix.



10 *Sensor fixed cable with terminated cable cores*

Optional: sensor cable plug connected to the M12 sensor socket of the transmitter

With this type of connection, the transmitter is already wired at the factory.

2) Only if connecting to CM44x(R)-CD*

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?	► Perform a visual inspection.
Electrical connection	**Action**
Are the mounted cables strain-relieved and not twisted?	► Perform a visual inspection. ► Untwist the cables.
Is a sufficient length of the cable cores stripped, and are the cores positioned in the terminal correctly?	► Perform a visual inspection. ► Pull gently to check they are seated correctly.
Are all the screw terminals properly tightened?	► Tighten the screw terminals.
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

5.1 Function check

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.

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 Oxymax COS61D, BA00460C
- Operating Instructions for the transmitter used, such as BA01245C if using the Liquiline CM44x or CM44xR.

5.2 Sensor calibration

The sensor is calibrated at the factory. A new calibration of the slope is only required after replacing the sensor cap and in special situations.

A new calibration of the zero point is only required in special situations.

5.3 Cleaning the sensor automatically

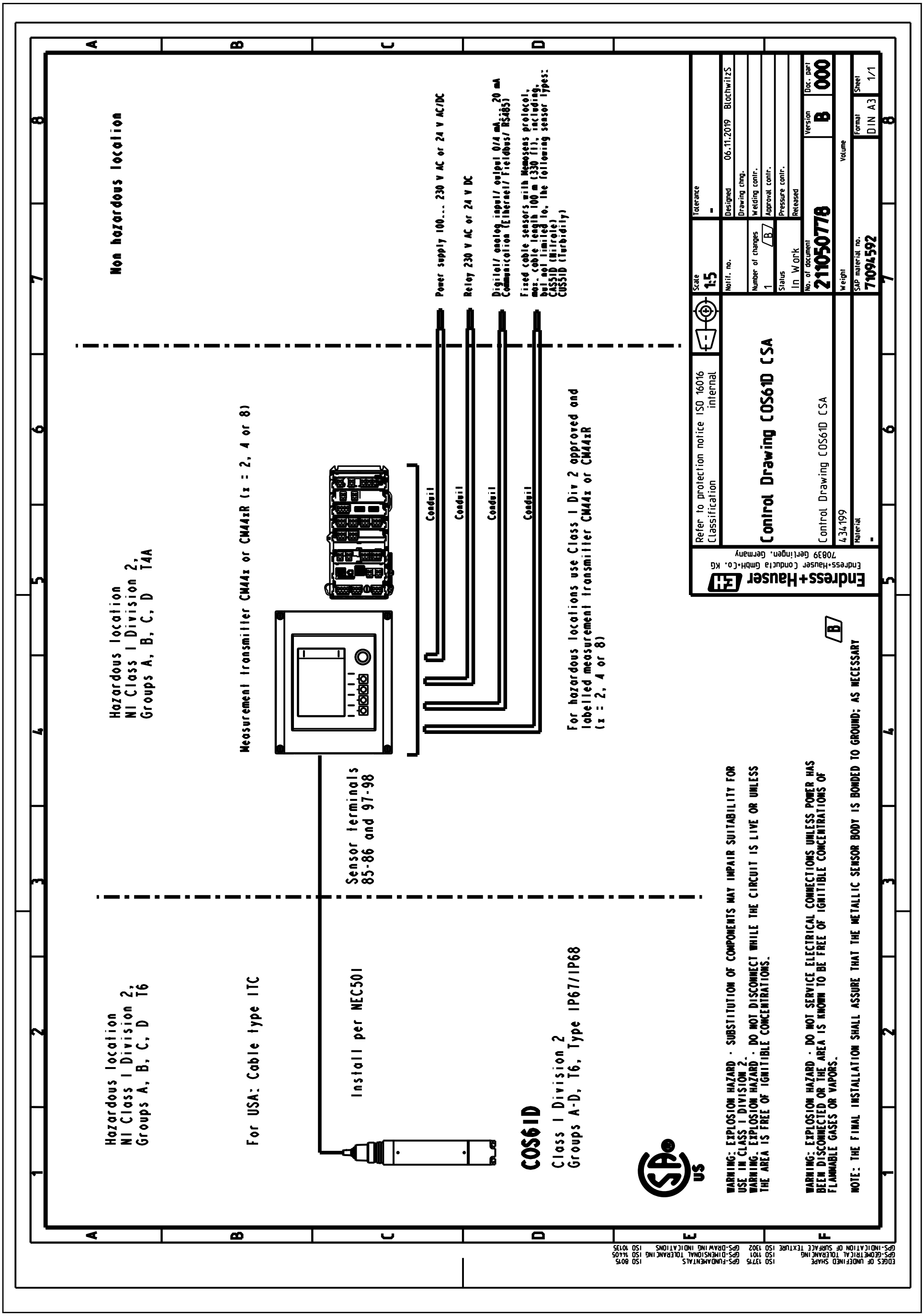
Compressed air is most suitable for cyclic cleaning. The cleaning unit is either supplied or can be retrofitted, and is screwed onto the sensor head. It operates at a capacity of 20-60 l/min. Optimum results are achieved at 2 bar (29 psi) and 60 l/min.

Recommended 115 V compressed air cleaning unit:
Order No.: 71194623

The following settings are recommended for the cleaning unit:

Type of soiling	Cleaning interval	Cleaning duration
Media containing grease and oils	15 min	20 s
Biofilm	60 min	20 s

6 Appendices


Hazardous location
NI Class I Division 2,
Groups A, B, C, D T6
For USA: Cable type ITC
Install per NEC501
COS61D
Class I Division 2
Groups A-D, T6, Type IP67/IP68
Sensor terminals
85-86 and 97-98
Hazardous location
NI Class I Division 2,
Groups A, B, C, D T4A
Measurement transmitter CM44x or CM44xR (x = 2, 4 or 8)
Conduit
Conduit
Conduit
Conduit
For hazardous locations use Class I Div 2 approved and labelled measurement transmitter CM44x or CM44xR (x = 2, 4 or 8)
Non hazardous location
Power supply 100... 230 V AC or 24 V AC/DC
Relay 230 V AC or 24 V DC
Digital/ analog input/ output 0/4 mA... 20 mA
Communication (Ethernet/ Fieldbus/ RS485)
Fixed cable sensors with Memosens protocol, max. cable length 100 m (330 ft), including, but not limited to, the following sensor types:
CAS51D (Nitrate)
CUS51D (Turbidity)
WARNING: EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR USE IN CLASS I DIVISION 2.
WARNING. EXPLOSION HAZARD - DO NOT DISCONNECT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS FREE OF IGNITIBLE CONCENTRATIONS.
WARNING: EXPLOSION HAZARD - DO NOT SERVICE ELECTRICAL CONNECTIONS UNLESS POWER HAS BEEN DISCONNECTED OR THE AREA IS KNOWN TO BE FREE OF IGNITIBLE CONCENTRATIONS OF FLAMMABLE GASES OR VAPORS.
NOTE: THE FINAL INSTALLATION SHALL ASSURE THAT THE METALLIC SENSOR BODY IS BONDED TO GROUND; AS NECESSARY
Endress+Hauser
Endress+Hauser Conducta GmbH+Co. KG
70839 Gerlingen, Germany
Refer to protection notice ISO 16016
Classification internal
Control Drawing COS61D CSA
Control Drawing COS61D CSA
434199
Material
-
Scale
1:5
Tolerance
-
Notif. no.
Designed 06.11.2019 BlochwitzS
Drawing chng.
Number of changes
1 B
Welding contr.
Approval contr.
Status
In Work
Pressure contr.
Released
No. of document
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Version
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Volume
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71094592
Format
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Sheet
1/1
EDGES OF UNDEFINED SHAPE ISO 13715
GPS-GEOMETRICAL TOLERANCING ISO 1101
GPS-INDICATION OF SURFACE TEXTURE ISO 1302
GPS-FUNDAMENTALS ISO 8015
GPS-DIMENSIONAL TOLERANCING ISO 14405
GPS-DRAWING INDICATIONS ISO 10135

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