



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services



Solutions

## Technical Information

# Oxymax W COS41

Potentiostatic amperometric two-electrode sensor

Long-term stable sensor for water and wastewater applications



### Application

The continuous measurement of the dissolved oxygen concentration is very important in many areas of water management:

- Sewage treatment plants:  
Oxygen measurement and regulation in the activated sludge basin for a highly efficient biological cleaning process
- Water monitoring:  
Oxygen measurement in rivers, lakes or seas as an indicator of the water quality
- Water treatment:  
Oxygen measurement for status monitoring of drinking water for example (oxygen enrichment, corrosion protection etc.)
- Fish farming:  
Oxygen measurement and regulation for optimum living and growth conditions

### Your benefits

- Maximum measurement accuracy:
  - Long maintenance intervals
  - Intelligent sensor self monitoring
- Membrane covered sensor, i.e.:
  - high O<sub>2</sub> selectivity
  - Minimum maintenance effort
  - Minimum calibration effort thanks to simple calibration in air

## Function and system design

### Measuring principle

The oxygen molecules diffused through the membrane are reduced to hydroxide ions (OH<sup>-</sup>) at the cathode. Silver is oxidized to silver ions (Ag<sup>+</sup>) at the anode (this forms a silver halogenide layer). A current flows due to the electron donation at the cathode and the electron acceptance at the anode. Under constant conditions, this flow is proportional to the oxygen content of the medium. This current is converted in the transmitter and indicated on the display as an oxygen concentration in mg/l, as a saturation index in % SAT or as an oxygen partial pressure in hPa.

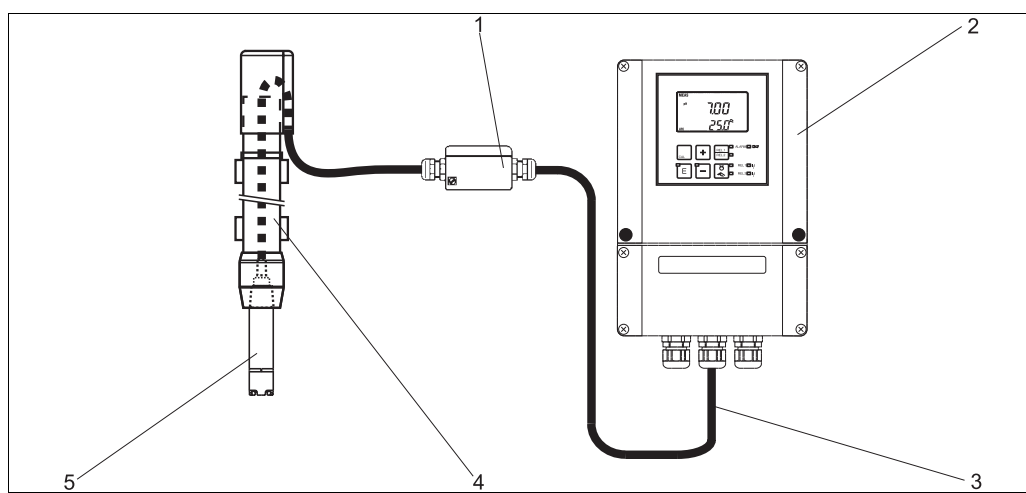
### Measuring system

A complete measuring system comprises at least:

- Oxygen sensor
- Transmitter, e.g. Liquisys M COM223/253
- Special measuring cable
- Assembly, e.g. flow assembly COA250, immersion assembly CYA611 or retractable assembly COA451

Optional:

- Universal suspension assembly support CYH101 for immersion operation
- Junction box VBM (with cable extension)
- Automatic spray cleaning system Chemoclean



Measuring system (example)

- 1 Junction box VBM (optional)
- 2 Transmitter Liquisys M COM253
- 3 Special measuring cable
- 4 Immersion assembly
- 5 Oxygen sensor

## Input

### Measured variable

dissolved oxygen [mg/l, ppm, % SAT or hPa]

### Measuring range

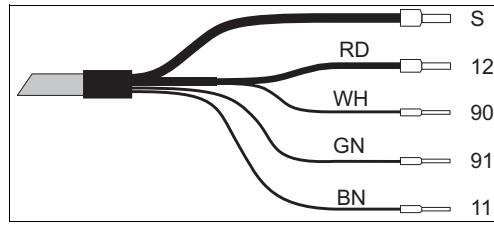
with Liquisys M COM 223/253-DX/DS:  
 0.05 ... 20.00 mg/l (ppm)  
 0.00 ... 200 % SAT  
 0 ... 400 hPa

# Wiring

## Electrical connection

### Direct connection to the transmitter

The sensor is connected using a special measuring cable. The wiring diagram is contained in the Operating Instructions of the COM223/253-DX/DS transmitter.

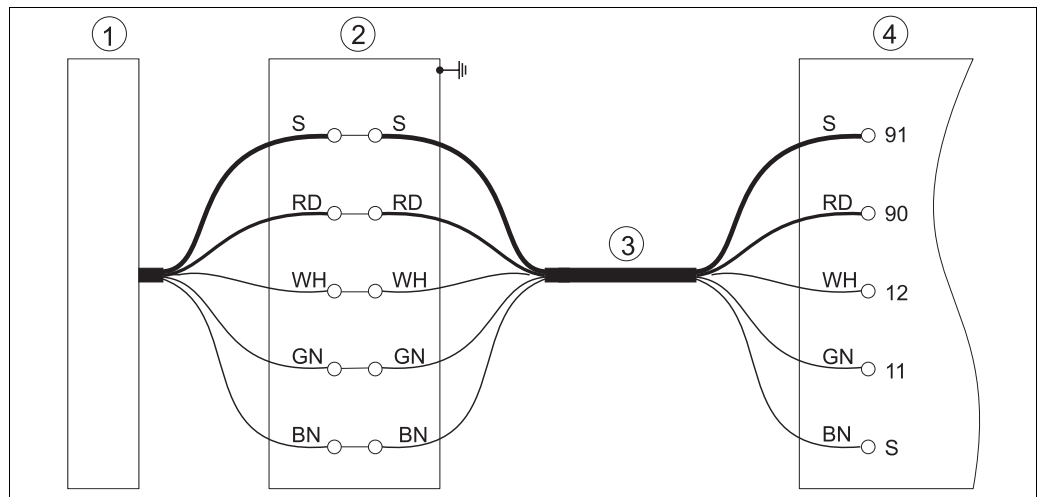


Terminal	Assignment
S	Outer shield
12	Active inner shield (NTC)
90	Cathode
91	Anode
11	NTC temperature sensor

Special measuring cable CYK71

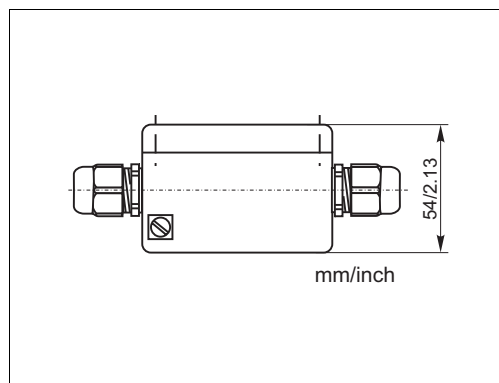
### Connection with cable extension

To lengthen the sensor connection beyond the length of the fixed cable, you require a junction box VBM. The connection is lengthened to the transmitter using the special measuring cable CYK71.

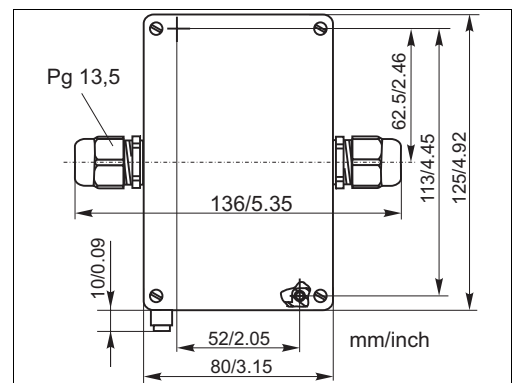


Connection via junction box VBM

- 1 Sensor
- 2 Junction box
- 3 Extension cable
- 4 Transmitter



Junction box VBM, side view



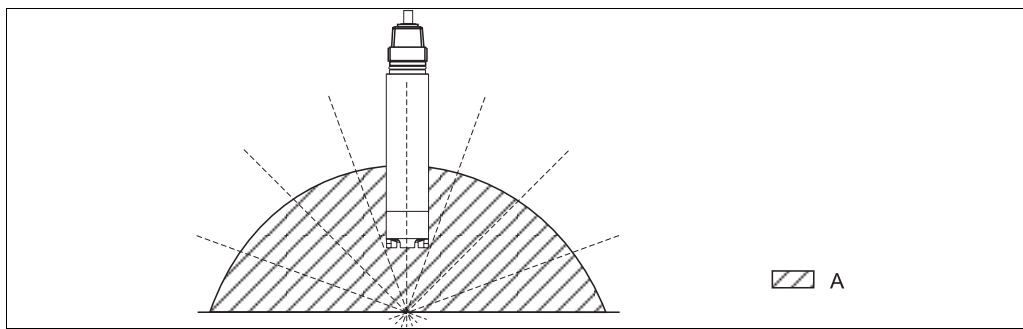
Junction box VBM, top view

## Performance characteristics

<b>Response time</b>	$T_{90}$ : 3 minutes $T_{99}$ : 9 minutes (each at 20 °C (68 °F))
<b>Reference operating conditions</b>	Reference temperature: 25 °C (77 °F) Reference pressure: 1013 hPa (15 psi)
<b>Signal current in air<sup>1)</sup></b>	approx. 300 nA
<b>Zero current</b>	zero current free
<b>Measured value resolution</b>	0.01 mg/l (0.01 ppm)
<b>Maximum measured error</b>	$\pm 1$ % of measured value <sup>2)</sup>
<b>Long-term drift</b>	with permanent polarization: < 1 % per month
<b>Influence of medium pressure</b>	Pressure compensation not necessary
<b>Polarization time</b>	< 60 minutes
<b>Oxygen intrinsic consumption</b>	Approx. 90 ng/h in air at 25 °C (77 °F)

## Installation

**Angle of installation** The sensor can be installed up to the horizontal in an assembly, support or a suitable process connection. Other angles are not permissible. Do **not** install the sensor overhead.



Angle of installation

A Permissible installation positions: 0 ... 180 °, overhead installation is not permitted



Note!

Make sure you comply with the instructions for installing sensors. You will find them in the Operating Instructions for the assembly used.

1) For the reference operating conditions indicated  
2) In accordance with IEC 746-1 at nominal operating conditions

## Environment

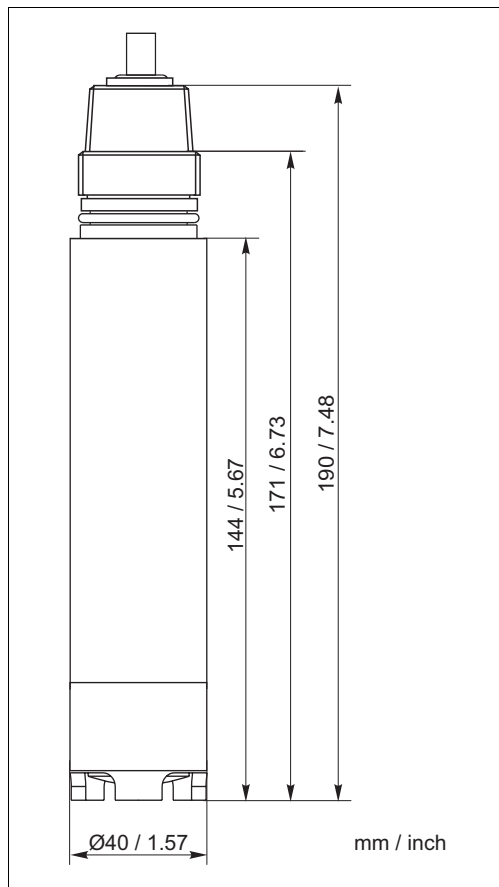
<b>Ambient temperature range</b>	-5 to 50 °C (20 to 120 °F)
<b>Storage temperature</b>	filled with electrolyte: -5 to 50 °C (20 to 120 °F) without electrolyte: -20 to 60 °C (0 to 140 °F)
<b>Ingress protection</b>	<ul style="list-style-type: none"> <li>■ Fixed cable versions: IP 68 (10 m (33 ft) water column at 25 °C (77 °F) in 30 days)</li> <li>■ Top 68 plug-in head versions: IP 68 (1 m (3.3 ft) water column at 50 °C (122 °F) in 7 days)</li> </ul>

## Process

<b>Process temperature</b>	-5 to 50 °C (20 to 120 °F)
<b>Process pressure</b>	max. 10 bar (145 psi) permissible overpressure Underpressure operation is not permissible.

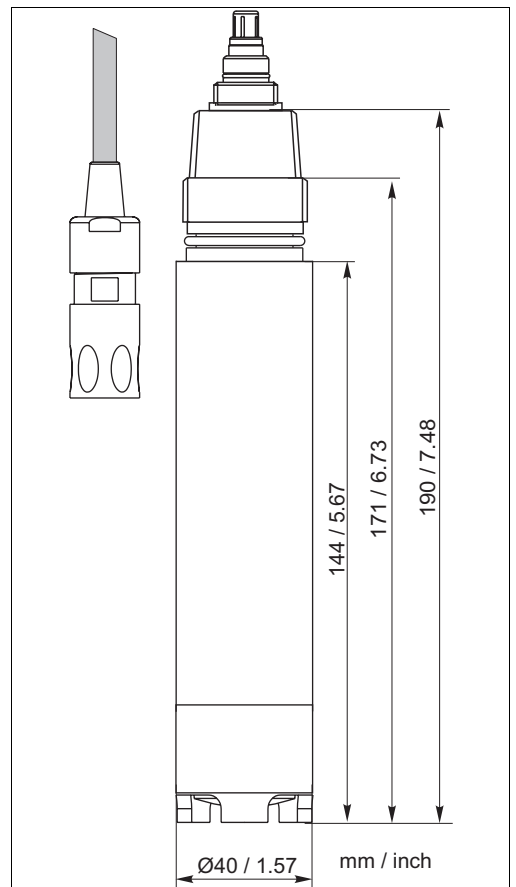
## Mechanical construction

### Design, dimensions



Fixed cable version

a0004085-en



TOP68 version

a0004086-en

<b>Weight</b>	with cable length 7 m (23 ft): 0.7 kg (1.5 lbs.) with cable length 15 m (49 ft): 1.1 kg (2.4 lbs.) with TOP68 plug-in connection: 0.3 kg (0.66 lbs.)
---------------	--

<b>Material</b>	Sensor shaft:	POM
	Membrane cap:	POM
	Cathode:	Gold
	Anode/Reference electrode:	Silver / silver bromide

**Process connection** G1 and NPT 3/4"

**Maximum cable length** max. 50 m (164 ft)

**Membrane thickness** approx. 50 µm

**Electrolyte** Alkaline electrolyte

## Ordering information

### Product structure

		Cable length
	2	Cable length: 7 m (22.97 ft)
	4	Cable length: 15 m (49.22 ft)
	8	Without Cable (TOP 68 version only)
	9	Special design to customer specifications
		Cable connection
	F	Fixed cable connection
	S	Cable connection using TOP 68 plug
COS 41-		Complete order code

### Scope of delivery

The following items are included in the delivery:

- Oxygen sensor with transport protection cap for membrane protection
- Accessories set with the following contents:
  - 2 replacement cartridges (replacement membrane caps)
  - 10 plastic ampoules containing electrolyte
  - 1 sealing kit with 3 O-rings
  - 6 abrasive sheets
- Operating Instructions (on CD only)
- Brief Operating Instructions (paper version)

---

## Accessories



Note!

In the following sections, you find the accessories available at the time of issue of this documentation. For information on accessories that are not listed here, please contact your responsible service.

---

### Assemblies (selection)

Flow assembly COA250

- for sensor installation in pipe lines, PVC
- ordering acc. to product structure (Technical Information TI111C/07/en)

Immersion assembly Dipfit W CYA611

- for sensor immersion in basins, open channels and tanks, PVC
  - ordering acc. to product structure (Technical Information TI166C/07/en)
- 

### Zero solution

- 3 units to produce 3 x 1 liter oxygen-free solution
  - order no. 50001041
- 

### Measuring cable

COK41 special measuring cable

- for COS41 oxygen sensors with TOP68 plug-in head
- Order numbers:
  - Cable length 7 m (23 ft): 51506817
  - Cable length 15 m (49 ft): 51506818

CYK71 measuring cable

- non-terminated cable for the connection of sensors (e.g. conductivity sensors) or the extension of sensor cables
  - Sold by the meter, order numbers:
    - non-Ex version, black: 50085333
    - Ex version, blue: 51506616
- 

### Junction box

Junction box VBM

- For cable extension, with 10 terminals
  - IP 65 (≅ NEMA 4X)
  - Material: aluminum
  - Order numbers:
    - cable entry Pg 13.5: 50003987
    - cable entry NPT 1/2": 51500177
- 

### Transmitter

Liquisys M COM 223/253

- Transmitter for oxygen measurement
- field or panel-mounted housing
- Hart® or Profibus available
- Ordering acc. to product structure, see Technical Information (TI 199C/07/en)

---

## Instruments International

Endress+Hauser  
Instruments International AG  
Kaegenstrasse 2  
4153 Reinach  
Switzerland

Tel.+41 61 715 81 00  
Fax+41 61 715 25 00  
[www.endress.com](http://www.endress.com)  
[info@ii.endress.com](mailto:info@ii.endress.com)

**Endress+Hauser**   
People for Process Automation