Датчики хлора, кислорода Oxymax COS61D/COS61

Техническая информация

По вопросам продаж и поддержки обращайтесь:

Technical Information
Oxymax COS61D/COS61

Optical sensor for measuring dissolved oxygen

Digital optical sensor based on the principle of fluorescence quenching, with or without Memosens protocol

Application

- 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

Your benefits

- Optical technology:
  - Minimum maintenance
  - Maximum availability
- Sensor with digital signal processing:
  - Calibration data saved in sensor
  - High degree of EMC protection thanks to digital communication with the transmitter
- Extended maintenance intervals and a high degree of longterm stability
- Intelligent self-monitoring guarantees reliable measured values
- No flow needed - measurement possible in still water
- COS61D - the Liquiline sensor
  - Plug&Play: Safe communication based on Memosens protocol
  - Optionally with M12 plug for fast connection to the transmitter
- COS61 - the Liquisys sensor
  - Compatible with tried-and-tested COS31 with COM2x3W: Easy measuring point changeover to optical technology
  - Compatible with COS41 with COM2x3D with conversion kit

Function and system design

Measuring principle	**Sensor structure**

Sensor structure

Oxygen-sensitive molecules (markers) are integrated into the optically active layer (fluorescence layer).

The fluorescence layer, an optical insulating layer and a cover layer are applied on top of one another on the carrier. The cover layer is in direct contact with the medium.

The sensor optics are directed at the rear of the carrier and therefore at the fluorescence layer.

Measurement process (principle of quenching)

If the sensor is immersed in the medium, an equilibrium is very quickly established between the oxygen partial pressure in both the medium and the fluorescence layer.

1. The sensor optics send green light pulses to the fluorescence layer.

2. The markers "respond" (fluoresce) with red light pulses.
   - ↳ The duration and intensity of the response signals are directly dependent on the oxygen contents and oxygen partial pressure.

If the medium is free from oxygen, the response signals are long and very intense.

Any oxygen molecules present mask the marker molecules. As a result, the response signals are shorter and less intense.

Measurement result

▸ The sensor returns a signal that depends on the concentration of oxygen in the medium.

The air pressure can be either set statically or entered via an additional sensor. The medium temperature is automatically recorded in the sensor. Both values are taken into consideration in the calculation of the oxygen concentration.

The sensor provides measured values for temperature and partial pressure as well as a raw measured value. This value corresponds to the fluorescence decay time and is approx. 20 µs in air and approx. 60 µs in oxygen-free media.

For optimum measurement results

1. During calibration, enter the current air pressure at the transmitter.

2. If the measurement is not performed at **Air 100% rh**:
   Enter the current humidity.

3. In the case of saline media:
   Enter the salinity.

4. For measurements in the units %Vol or %SAT:
   Also enter the current operating pressure in the measuring mode.

   - Operating Instructions for Memosens, BA01245C
     For all transmitters, analyzers and samplers in the Liquiline CM44x/P/R, Liquiline System CA80XX and Liquistation CSFxx product families
   - Operating Instructions for Liquisys COM2x3, BA00199C
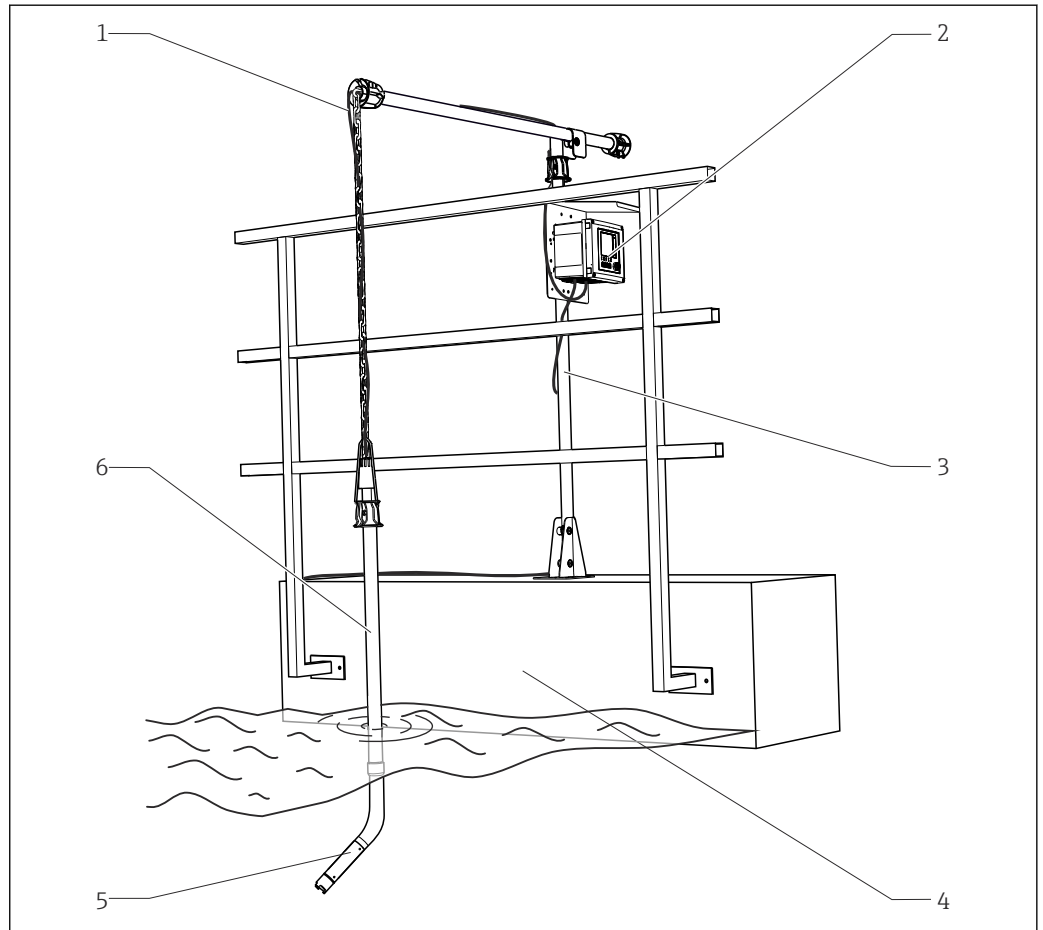
Measuring system

COS61D

A complete measuring system consists of the following components at least:
- Oxymax COS61D oxygen sensor
  with fixed cable (with ferrules or M12 plug depending on the version ordered)
- Liquiline CM44x multi-channel transmitter
- Assembly, e.g. flow assembly COA250, immersion assembly CYA112 or
  retractable assembly COA451

Optionally:
- Flexdip CYH112 assembly holder for immersion operation
- Extension cable CYK11 with junction box
- Cleaning system

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◙ *1   Example of a measuring system with COS61D*

|			
1	*Sensor cable*	*4*	*Basin rim with railing*
2	*Transmitter Liquiline CM44x*	*5*	*Oxymax COS61D oxygen sensor*
3	*Assembly Flexdip CYH112*	*6*	*Flexdip CYA112 assembly*

COS61

A complete measuring system comprises:
- Oxymax COS61 oxygen sensor
- Transmitter, e.g. Liquisys COM2x3-W
- Sensor cable
- Assembly, e.g. flow assembly COA250, immersion assembly CYA112 or retractable assembly COA451

Optionally:
- Flexdip CYH112 assembly holder for immersion operation
- VS junction box (for cable extension)
- Cleaning system
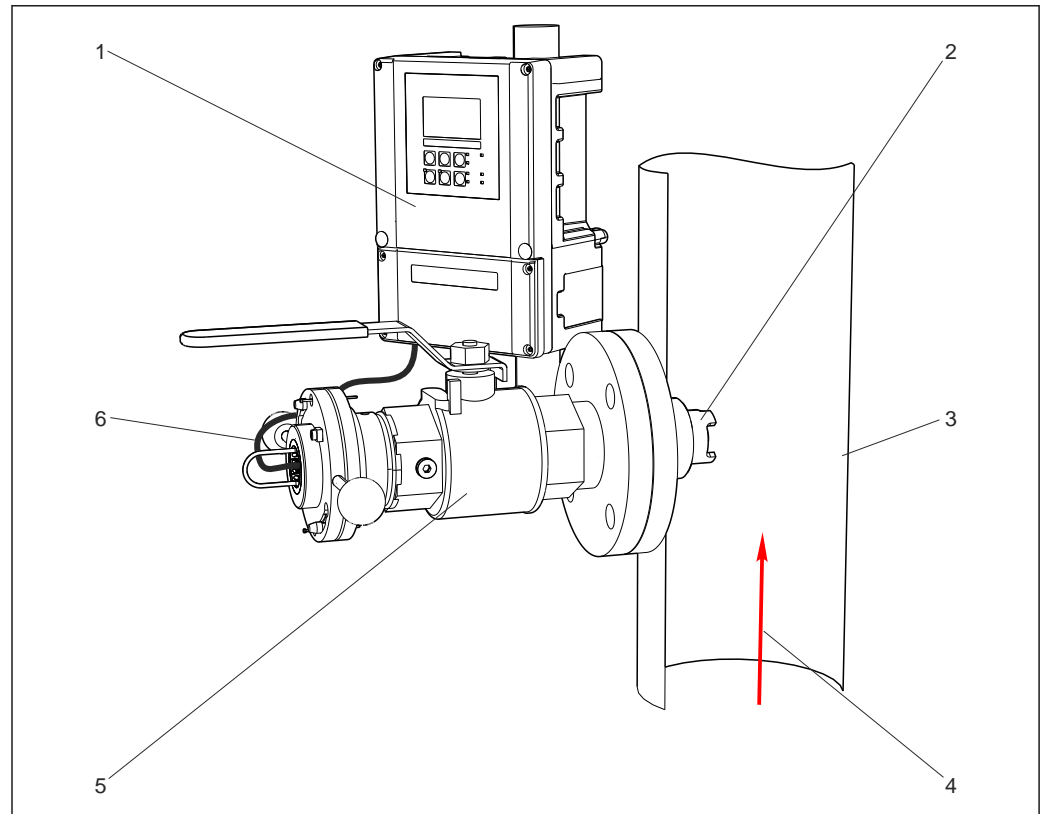
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🖾 *2   Example of a measuring system with COS61*

1	*Liquisys COM253*	*4*	*Direction of medium flow*
2	*Oxymax COS61*	*5*	*Cleanfit COA451*
3	*Pipe (ascending pipe)*	*6*	*Sensor cable*

Input

|	
Measured variables	Dissolved oxygen [mg/l, µg/l, ppm, ppb or %SAT or hPa]
Measuring ranges	Measuring ranges apply for 20 °C (68 °F) and 1013 hPa (15 psi) With Liquiline CM44x, CM44xR, CM44P or with Liquisys COM2x3-W: • 0 to 20 mg/l • 0 to 400 hPa • 0 to 200 % SAT

Power supply

Electrical connection

COS61D
Connection data
Sensor cable connected directly to the terminal connector of the basic module of the transmitter

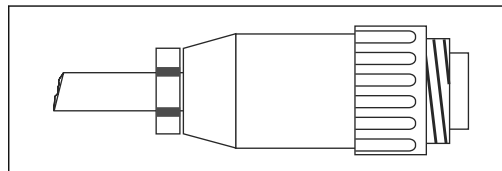| | PK | U_+ |
	GY	U_-
	GN	COM A
	YE	COM B
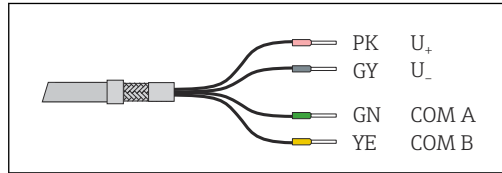
3   Sensor fixed cable with terminated cable cores

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.

Connection to field device
The sensor is directly connected to the transmitter via the special measuring cable with the SXP plug.

4   SXP connector

Connection to cabinet device

Terminal COM223	Sensor with fixed cable (OMK)		Sensor with TOP68 plug connection (CYK71)	
	Core	Assignment	Core	Assignment
87	YE	$+U_B$	YE	$+U_B$
0	GN	0 V	WH	0 V
96	PK	Communication (digital)	GN	Communication (digital)
97	BU	Communication (digital)	BN	Communication (digital)
88	BN	$-U_B$	Coax, inside	$-U_B$

1. Remove the SXP connector (transmitter side!) from the cable.

2. Refer to the table for the cable assignment and terminals of Liquisys COM223-WX/WS.
   ↳ Please note that the cable assignment varies depending on the sensor version (fixed cable or TOP68 plug connection).

Performance characteristics

Response time

From air to nitrogen at reference operating conditions:
t_{90} : 60 s

Maximum measured error [1]	COS61D	
	Measuring range	**Maximum measured error**
	< 12 mg/l	0.01 mg/l or ±1 % of reading
	12 mg/l to 20 mg/l	±2% of reading
	COS61	
	Measuring range	**Maximum measured error**
	< 12 mg/l	0.02 mg/l or ±1 % of reading
	12 mg/l to 20 mg/l	±2% of reading

Repeatability	±0.5 % of end of measuring range

Operating life of sensor cap	>2 years (under reference operating conditions, protect against direct sunlight)

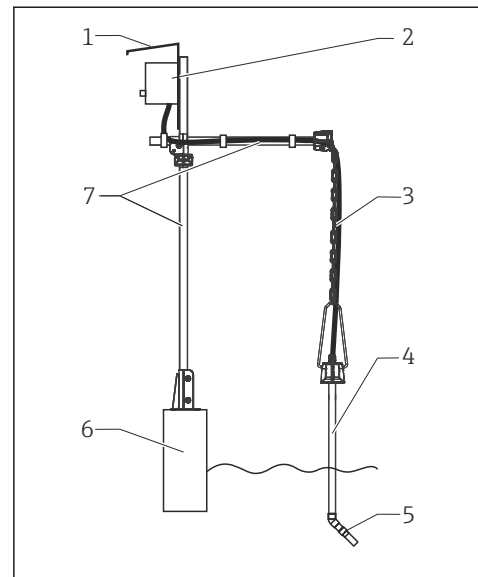# Installation

Installation examples

Immersion operation	Universal holder and chain assembly
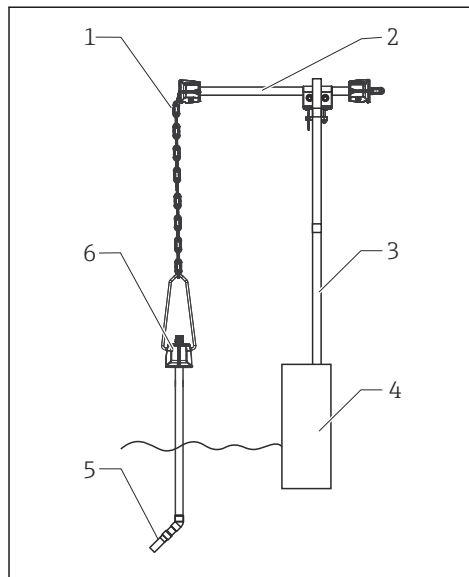
🖾 5   *Chain holder on railing*

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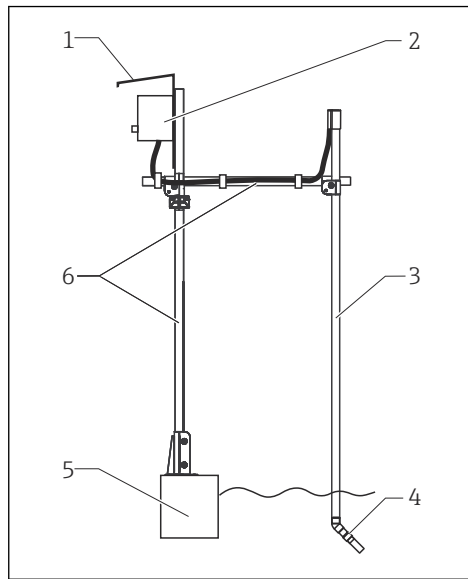*6   Wastewater assembly Flexdip CYA112*

🖾 6   *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

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1)   In accordance with IEC 60746-1 at rated operating conditions

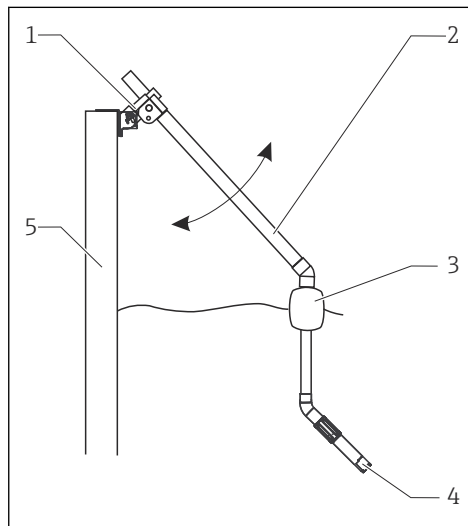**Universal holder and fixed immersion tube**

🔲 *7   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
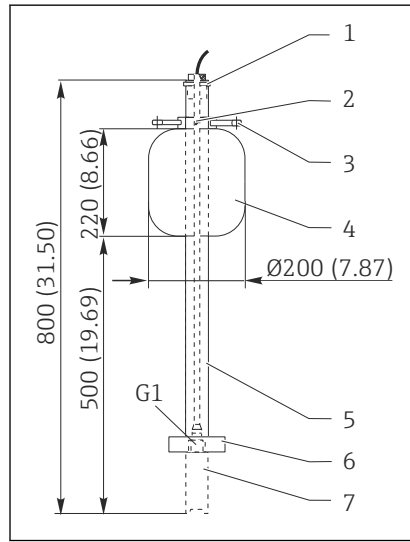
Basin rim mounting with immersion tube

🔲 *8   Basin rim mounting*

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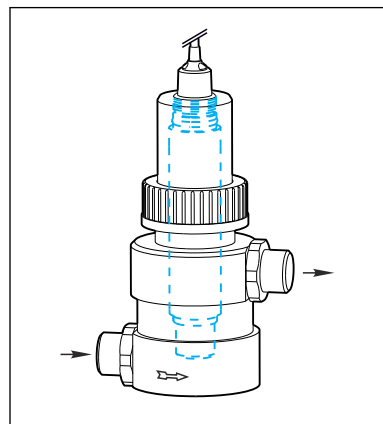*4   Oxygen sensor*
5   Basin rim

Float

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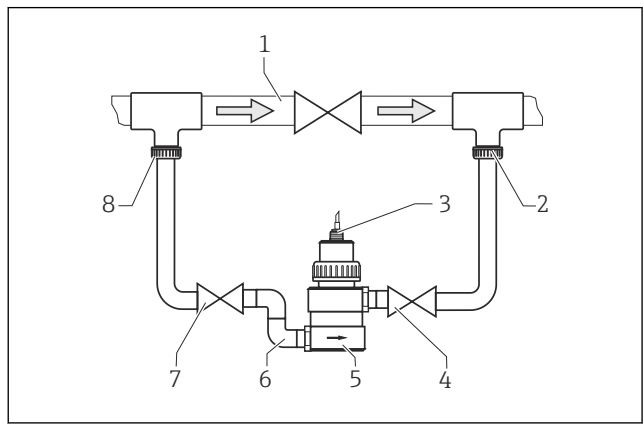

1   *Cable run with strain relief and rain shield*
2   *Fixing ring for rope and chains with terminal screw*
3   *Eyelets Ø15, 3 x 120 ˚ for anchoring*
4   *Plastic float, resistant to salt water*
5   *Pipe 40 x 1, stainless steel 1.4571*
6   *Bumper and ballast*
7   *Oxygen sensor*

 9   *Dimensions in mm (inch)*

Flow assembly COA250

 10   *COA250*

 11   *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*

Environment

Ambient temperature	−20 to 60 ℃ (−4 to 140 ℉) at 95% relative air humidity, non-condensing
Storage temperature	−20 to 70 ℃ (−4 to 158 ℉) at 95% relative air humidity, not condensating

Degree of protection	**COS61D**
	IP 68 (test conditions: 10 m (33 ft) water column, at 25 ℃ (77 ℉) over 30 days)
	
	COS61
	• Fixed cable versions:
	  IP 68 (test conditions: 10 m (33 ft) water column at 25 ℃ (77 ℉) over 30 days)
	• Top68 plug-in head versions:
	  IP 68 (test conditions: 1 m (3.3 ft) water column at 50 ℃ (122 ℉) over 7 days)

Electromagnetic compatibility	**COS61D** Interference emission and interference immunity as per EN 61326: 2005, Namur NE 21:2007 **COS61** Interference emission and interference immunity as per EN 61326: 1997 / A1: 1998

Process

Process temperature	−5 to +60 ˚C (20 to 140 ˚F)
Process pressure	Ambient pressure 1 to 10 bar (14.5 to 145 psi) abs.

Mechanical construction

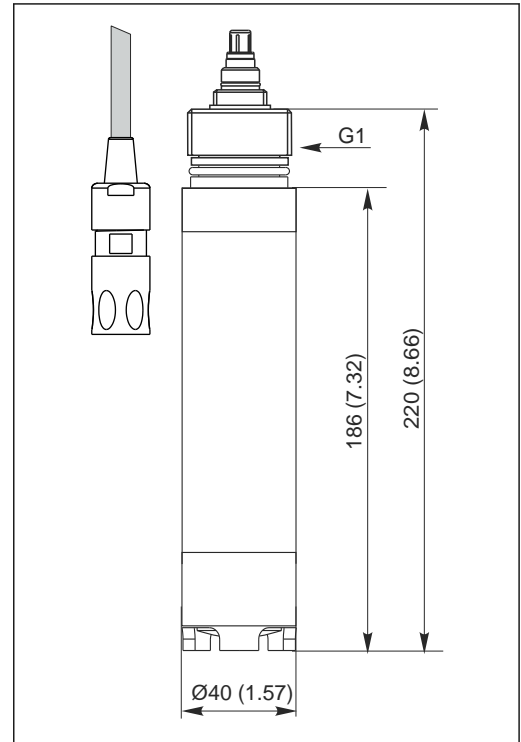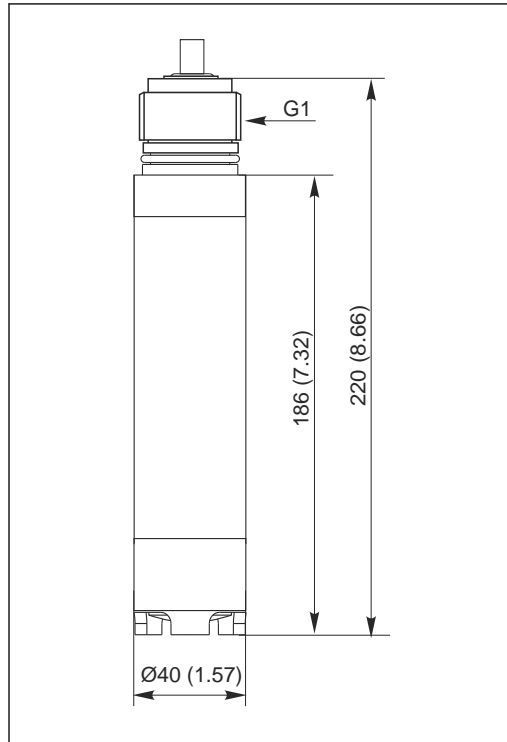| Design, dimensions COS61D	
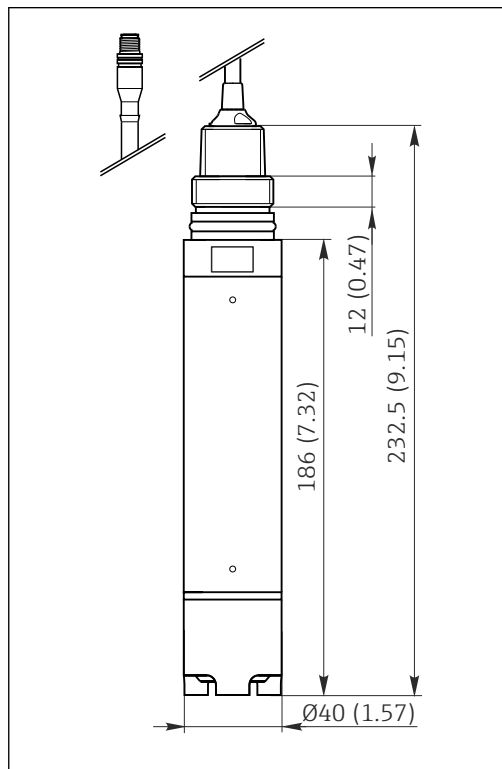
🖻 12   With optional M12 connector
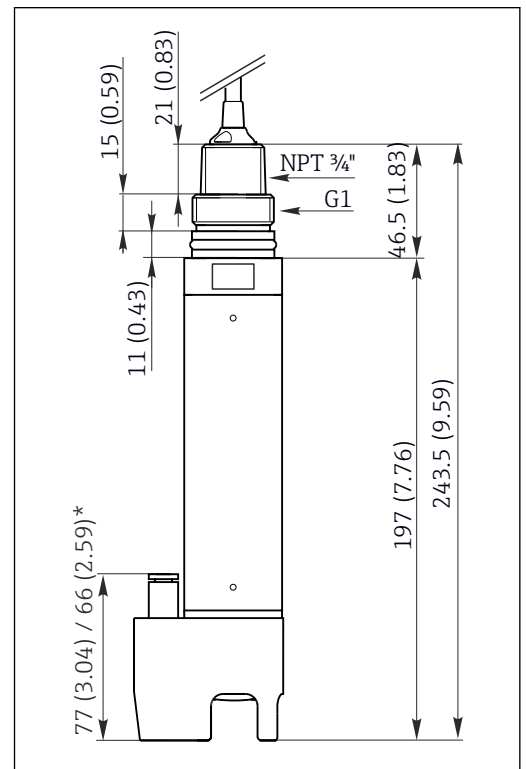
Dimensions in mm (inch)

🖻 13   With optional cleaning unit

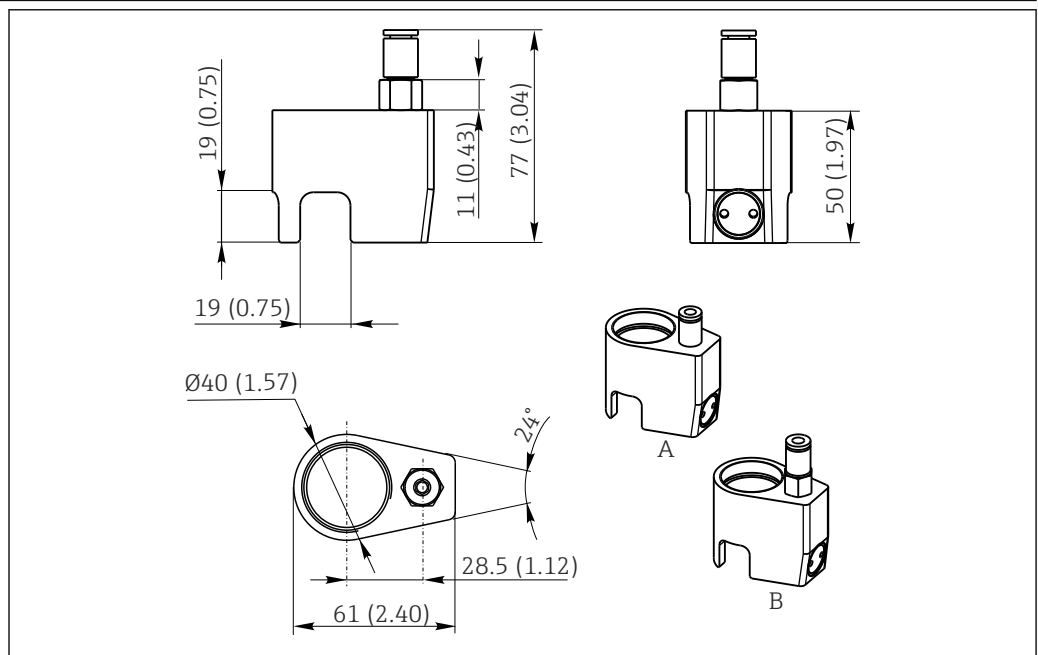**   depending on version of cleaning unit*

design, dimension COS61

🔲 *14   Version with fixed cable*

Dimensions in mm (inch)

🔲 *15   Version with TOP68 - plug-in head*

Optional cleaning unit

🔲 *16   Dimensions in mm (inch)*

A   Compressed air cleaning COS61/61D OD 6/8 mm (additional information → 🔲 14

B   Compressed air cleaning COS61/61D OD 6.35 mm (¼") (additional information → 🔲 14

Weight	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 connection:	0.3 kg (0.66 lbs) depending on version

Materials	**Parts in contact with medium**	
	Sensor cap	PVC / POM

	Fluorescence layer	Silicone
	Orifice plate	PET
	O-rings	EPDM
	Pin holder	1.4404
	Shaft tube	1.4571
	Housing connection	POM
	Protection guard	POM
	Housing air purge unit	POM

Process connection	**COS61D** G1, NPT 3/4"
	COS61 G1
Sensor cable	**COS61D** Shielded 4-core fixed cable
	COS61 Shielded 7-wire fixed cable or double-shielded coaxial cable with 4 pilot wires (with TOP68 plug connection)
Cable connection at transmitter	**COS61D** • Terminal connection, end ferrules • Optional: M12 connector
	COS61 • SXP connector (field device) • Terminal connection (panel-mounted instrument)
Maximum cable length	max. 100 m (330 ft), incl. Cable extension
Temperature compensation	Internal

Interface	**COS61D** Memosens protocol **COS61** RS 485

Certificates and approvals

A list of all the approvals is provided below. The approvals that are valid for this product depend on the device version ordered.

C€ mark	**Declaration of conformity** The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EU directives. The manufacturer confirms successful testing of the product by affixing to it the C€ mark.
EAC (COS61D-GR)	The product has been certified according to guidelines TP TC 004/2011 and TP TC 020/2011 which apply in the European Economic Area (EEA). The EAC conformity mark is affixed to the product.
CSA GP (COS61D-CA)	This device has a CSA GP approval and meets the following requirements: • Power supply via a Class 2 or limited energy source as per CSA 61010-1-12. • Overvoltage category I. • Ambient conditions: max. height 2 000 m (6 560 ft)
CSAus NI Cl 1, Div 2 (COS61D-CJ)	**Hazardous areas as per 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. **Ex approvals** Class 1, Division 2, Groups A, B, C and D T6; IP67/IP68 [2] This product meets the requirements of the following standards: • ANSI/UL 61010-1, 3rd 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 hazardous areas 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 ℃ (−4 ℉) ≤ Ta ≤ 60 ℃ (140 ℉) • Degree of protection: IP67/IP68 • Control drawing: 211050778

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