OPTISENS ORP 8590

ORP sensor for water and wastewaster industry

- Large ceramic diaphragm and integrated Pt100
- Special sensor design for all-purpose applications
- Low maintenance costs and a long life cycle

The documentation is only complete when used in combination with the relevant documentation for the signal converter.

KROHNE

1.1 ORP sensor for water and wastewater applications

The OPTISENS ORP 8590 sensor is characterised by standardised design, easy handling and a long life cycle. In combination with the MAC 100 signal converter it is possible to create an extremely reliable and low-cost measurement system, which is suitable for a wide range of water and wastewater measurement tasks.

Designed as combined sensor with built-in reference electrode the OPTISENS ORP 8590 is equipped with ceramic diaphragm and integrated temperature sensor Pt100.
The sensor can be easily adapted to various application requirements and it is extremely service friendly and durable.
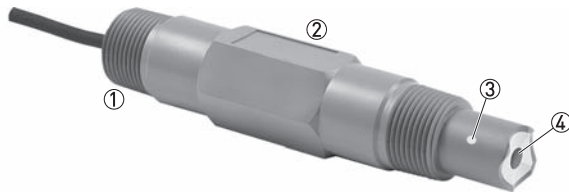
① Attached cable or 4-pin connector
② CPVC body
③ Diaphragm
④ Platinum electrode

Highlights

- Pure platinum electrode and large ceramic diaphragm for long time and reliable ORP measurement.
- Double junction for extended lifetime and a wide application range.
- Robust design with CPVC body material
- Suitable for connection to the MAC 100 signal converter
- Available with 4-pin military connector or attached cable up to 10 m / 33 ft.
- With integrated Pt100 for temperature compensation.
- Various mounting assemblies for easy installation and reliable handling.

Industries

- Industrial wastewater
- Municipal wastewater
- Water

Applications

- Potable water / beverages
- Monitoring of surface and wastewater
- Process water monitoring

1.2 Design and options

The sensor type is equipped with a very pure platinum electrode, ceramic diaphragm and Pt1000.

It can be easily adapted to various application requirements and can be installed directly into a pipe or tank with the 3/4" NPT (male) process connection.

The OPTISENS ORP 8590 sensor is manufactured using a very pure platinum electrode which can be used in almost all standard water and wastewater applications due to its robust sensor design.
The sensor is suitable for connection to the MAC 100 signal converter.

MAC 100 signal converter for various analytical parameter

A complete measuring system consists of:

- MAC 100 signal converter
- 1 or 2 sensors
- Mounting assemblies

Up to 2 sensors (for identical or different parameters) can be connected to the signal converter.

The MAC 100 signal converter can be adapted perfectly for various requirements. Select between 1 or 2 signal inputs, 3 x outputs, relays, various operation language, power supply and further additional features.
The standardised user interface also speeds up commissioning of the device.

Made to Fit

Mounting assemblies SENSOFIT series

As a complete provider for water analysis, we naturally offer a complete range of assemblies, like retractable, immersion and flow-through assemblies in a wide range of materials. Special versions for special operating conditions are available on request.

For the OPTISENS ORP 8590 sensor type the following individual assemblies are available:

• SENSOFIT FLOW 1000 series - Flow-through assemblies
• SENSOFIT IMM 2000 series - Immersion assemblies

For further information please consider the technical datasheets.

1.3 ORP measurement

The oxidation reduction potential, ORP in short, is the measurement for the concentration of oxidising and reducing agents in water. Its value is influenced both by pH and temperature. ORP is a sum parameter that gives no information on the concentration of a single substance in a mixture.

ORP measurements are used to monitor chemical reactions involving electron transfer. In drinking water treatment it can be found in ozone treatment and the removal of iron, manganese and nitrate as well as in disinfection steps. In swimming pools the German DIN 19643 requires ORP measurements as a hygiene parameter and decrees maximum and minimum values for fresh water, pool water, and salt water. In wastewater treatment ORP is measured in the denitrification process and in detoxication of industrial wastewater.

The ORP sensor consists of a measuring electrode of platinum or gold and a reference of e.g. Ag/AgCl. The potential of the measuring electrode changes with the concentration of reducing and oxidising agents and is measured against the reference. The measured values can be recalculated to fit literature values based on NHE (normal hydrogen electrode) as reference.

2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Downloadcenter).*

Design

Measuring principle	Potentiometric
Measuring range	-1500...+1500 mV
Shaft diameter	20 mm / 0.79"
Insertion length	23 mm / 0.91" or 44 mm / 1.73"
Temperature sensor	Pt100
Connector	4-pin military connector or attached cable (7.26 m / 25 ft or 10 m / 33 ft)

Operating conditions

Temperature range	-5…+80°C / +23…+176°F
Pressure range	Max. 5.9 bar at 25°C / 100 psi at 77°F
Conductivity	Min. 150 µS/cm

Installation conditions

Weight approx.	Approx.193 g / 0.43 lb
Process connection	3/4" NPT (male)

Materials

Sensor shaft	CPVC
Measuring electrode	Platinum
Inner buffer	pH 7.0
Reference	KCl gel double junction
Diaphragm	Ceramic

2.2 Dimensions
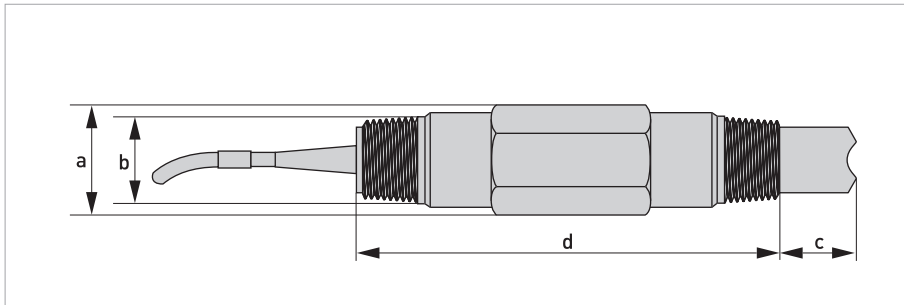
Figure 2-1: Dimensions OPTISENS ORP 8590

	Dimensions [mm]	Dimensions [inch]
a	Ø 33	Ø 1.3
b	3/4 NPT (male)	
c	23 / 44	0.91 / 1.73
d	128	5.04

3.1 General notes on installation

Inspect the packaging carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

Do a check of the packing list to make sure that you have all the elements given in the order.

Look at the device nameplate to ensure that the device is delivered according to your order.

3.2 Intended use

Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.

The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.

The intended use of OPTISENS ORP 8590 sensor is the measurement of ORP in water. The sensor is suitable for connection to the MAC 100 signal converter.

3.3 Pre-installation requirements

- *Never touch or scratch the of the sensor.*
- *Store the sensor in its original packaging in a dry, dust-free location. Keep it away from dirt. If necessary, clean it as described in the manual of the sensor.*
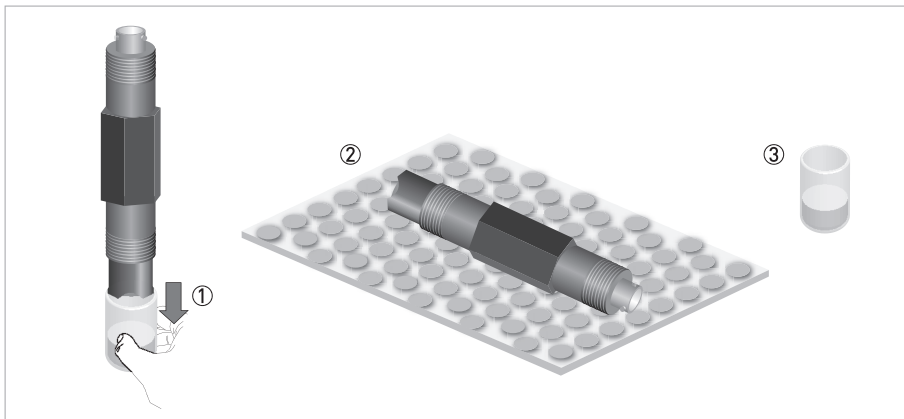

Figure 3-1: Handling the sensor

Unpacking the sensor

- Gently pull the protection cap from the sensor ①.
- Lay the sensor on a soft mat/tissue ②.
- Keep the protection cap in the original packaging ③.

3.4 Installing the sensor

3.4.1 General installation instructions

The sensor tip must always have full contact with the measuring medium.

The mounting position of the sensor should not deviate more than 75° from vertical position (sensor tip pointing downwards). Doing otherwise might cause internal air bubbles to float into the sensor glass tip. This would interrupt the electrical contact between the inner buffer solution and the glass surface.
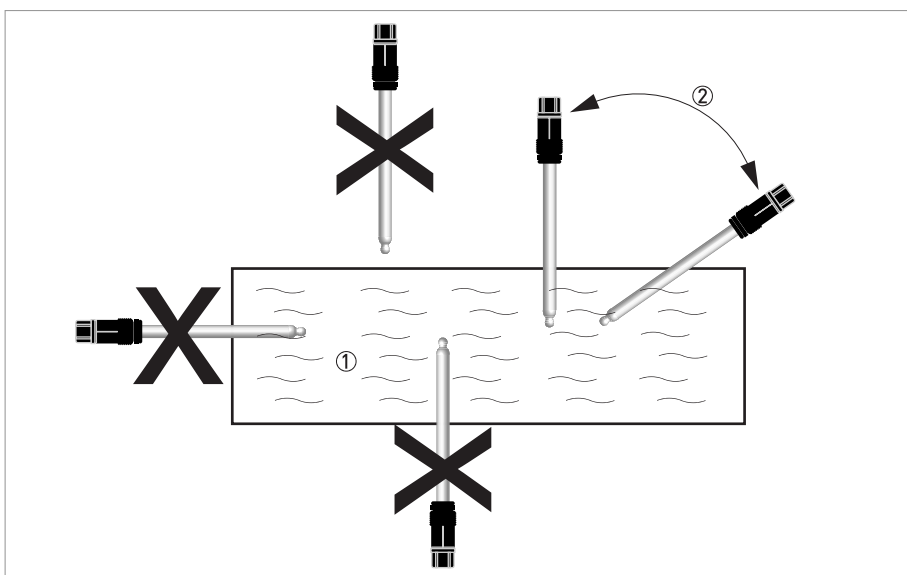

Figure 3-2: Installation requirements
① Measuring medium
② Maximum deviation of 75° from vertical position

4.1 Safety instructions

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Observe the national regulations for electrical installations!

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

Look at the device nameplate to ensure that the device is delivered according to your order.

4.2 Connecting the cable to the sensor

Moisture inside the sensor connector must be avoided! Moisture may cause a shortcut and deliver erratic readings!
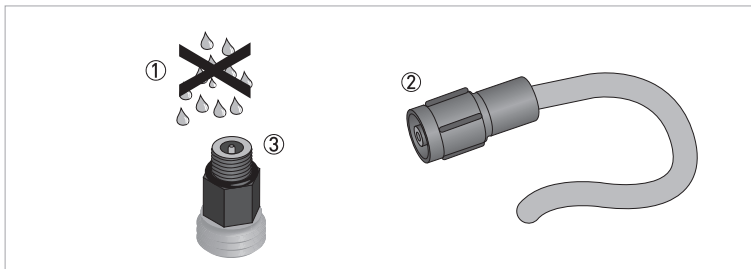*If moisture has entered the connector dry it with air (e.g. hair blower).*

Figure 4-1: Connecting the cable to the sensor

Connecting the cable to the sensor (only for sensor with 4-pin military connector)
- Ensure that the cable and the sensor connector are absolutely dry ①.
- Screw the cable connector ② on to the sensor connector ③ and tighten it by hand.

4.3 Connecting the sensor cable to the MAC 100

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.
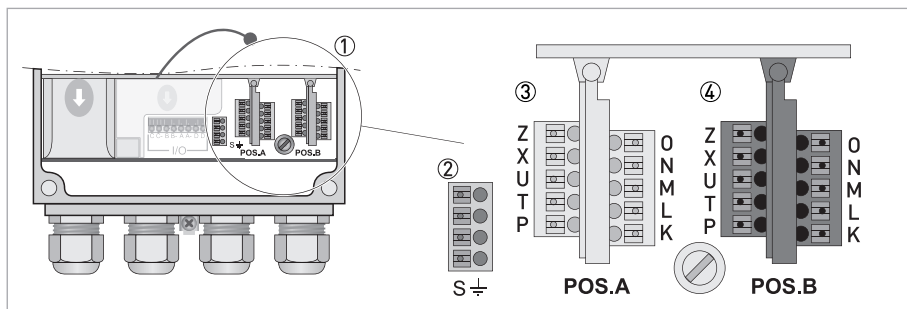
Figure 4-2: Sensor connection terminals on the MAC 100 dual channel version

① Sensor connection terminals
② Terminal block S (protective earth)
③ Terminal block Pos.A: terminal for sensor and temperature
④ Terminal block Pos.B: terminal for sensor and temperature

MAC 100 single channel version is equipped only with terminal block Pos. A.

MAC 100 dual channel version is equipped with terminal block Pos. A and Pos. B.

Wire	Terminal block Pos.A/B
Black (inner coax shield)	N (ref.)
Transparent (coax core)	O (pH / ORP)
White (Pt100)	P
Red (Pt100)	X
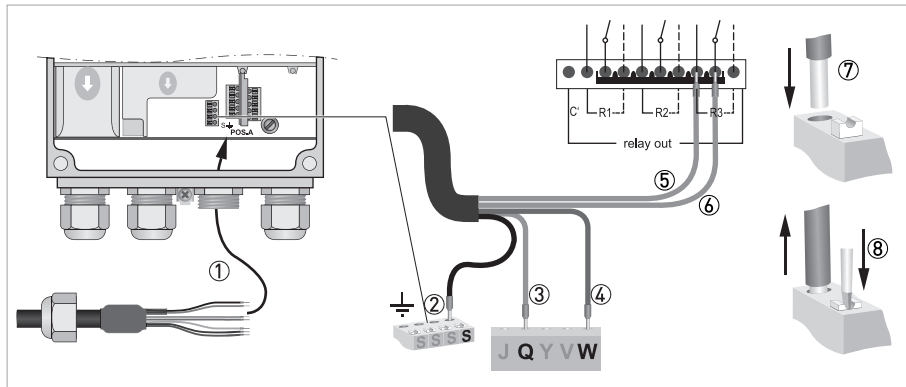
Figure 4-3: Connecting the sensor cable

The following instructions describe the connection of the sensor cables.

Connecting the sensor cable to the signal converter

• Thread the sensor cable through the outer right cable gland ①.
• Push the black wire (inner coax shield) ④ into terminal N ② and the transparent wire (coax core) into terminal O ③.
• To remove a wire, press down the white clip ⑤ on the corresponding terminal and pull the wire out ⑥.

4.4 Connecting the external temperature sensor

Connect an external Pt100 or Pt1000 sensor to terminal block Pos.A/B of the signal converter according to the following drawings:

Figure 4-4: Connection of an external Pt100/1000 temperature sensor to the signal converter
① 2-wire connection
② 3-wire connection

5.1 Order code

The characters of the order code highlighted in light grey describe the standard.
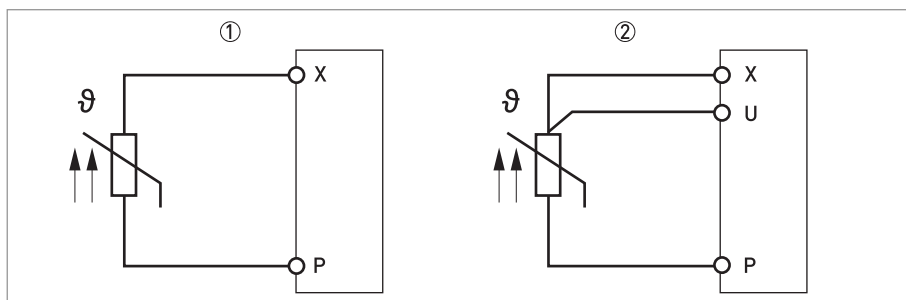
VGA U		4	Sensor type									
		4	OPTISENS ORP 8590									
			Measuring range									
			A	-1500... 1500 mV								
				Diaphragm								
				1	Ceramic							
					Reference							
					1	KCl gel double junction						
						Body material						
						1	CPVC					
							Measuring electrode					
							2	Platinum				
								Process conditions				
								1	-5...+80°C, max. 6.9 bar at +25°C / +23...+176°F, max. 100 psi at +140°F			
									Process connection			
									1	3/4" NPT (male)		
										Insertion length		
										1	23 mm / 0.91"	
										2	44 mm / 1.75"	
											Sensor features	
											1	Standard
												Sensor option
												1	Pt100
Carried forward										Continued next page		

		Connector type					
	1	Attached cable					
	2	4-pin military connector					
		Cable					
		0	None				
		1	Cable pH/ORP-W US				
			Cable features				
			0	None			
			1	Coax, single screen			
				Cable length			
				0	None		
				2	7.62 m / 25 ft		
				3	10 m / 33 ft		
					Cable options		
					0	None	
					2	Core sleeves ends	
						Documentation	
						0	None
						1	English
						2	German
						3	French
						4	Spanish
VGA U	**4**						

5.2 Accessories

Consumables	Order code
250 ml 468 mV ORP test solution	XGA S 010060
250 ml 220 mV ORP test solution	XGA S 010065

Accessories	Order code
SENSOFIT FLOW 1000 Flow-through assembly	Please see technical datasheet SENSOFIT FLOW 1000
SENSOFIT FLOW 1710 Flow-through assembly	Please see technical datasheet SENSOFIT FLOW 1710
SENSOFIT IMM 2000 Immersion assembly	Please see technical datasheet SENSOFIT IMM 2000
SENSOFIT IMM 2920 Immersion assembly	Please see technical datasheet SENSOFIT IMM 2920
OPTISENS cable PH/ORP-W-US-4P-25 for 4 pin military connector, 7.62 m / 25 ft	XGA W 0 12221
OPTISENS cable PH/ORP-W-US-4P-33 for 4 pin military connector, 10 m / 33 ft	XGA W 0 12261
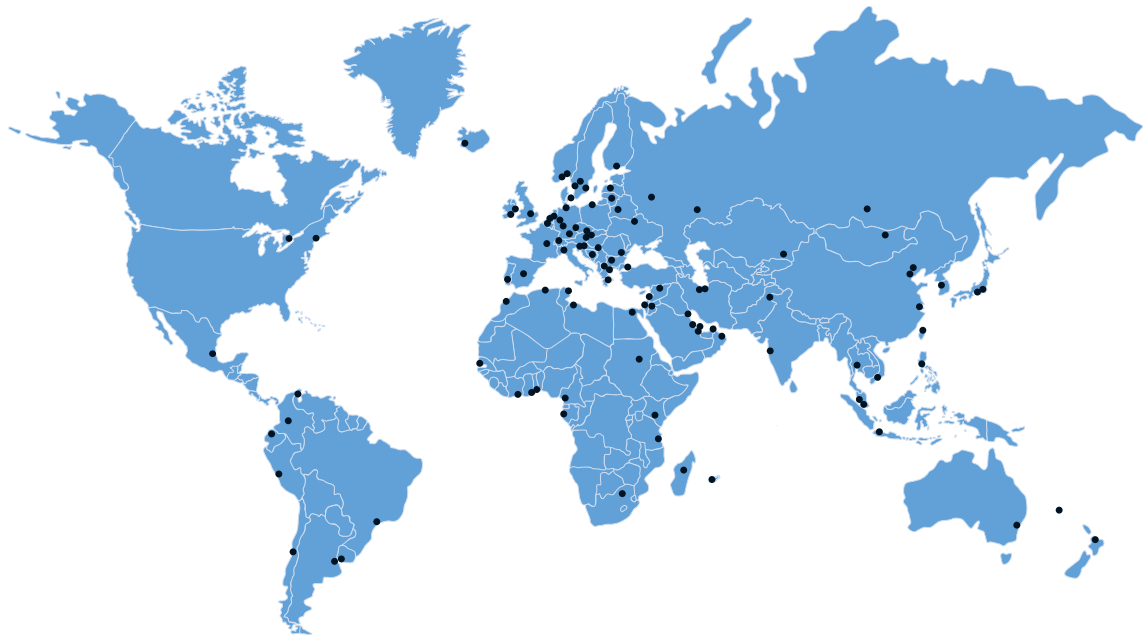
KROHNE product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature assemblies
- Pressure transmitters
- Analysis products
- Products and systems for the oil & gas industry
- Measuring systems for the marine industry

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