

MPP 350



**Multi parameter probe for pH, dissolved oxygen,
conductivity and temperature**

**Accuracy when
going to press**

The use of advanced technology and the high quality standard of our instruments are the result of continuous development. This may result in differences between this operating manual and your instrument. Also, we cannot guarantee that there are absolutely no errors in this manual. Therefore, we are sure you will understand that we cannot accept any legal claims resulting from the data, figures or descriptions.

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1	Overview	4
1.1	Structure and function	4
1.2	Instrument identification	6
2	Safety	7
3	Commissioning	7
3.1	Scopes of delivery	7
3.2	Getting the sensor ready for measuring	9
4	Measuring / Operation	12
4.1	Calibration	12
4.2	Measuring	13
4.3	Storing	13
5	Maintenance, cleaning, replacement	14
5.1	General maintenance instructions	14
5.2	Outside cleaning	15
5.3	D.O. module: Changing the electrolyte solution and membrane cap	16
5.4	D.O. module: Cleaning the electrodes	18
5.5	Checking the D.O. module for freedom from zero-current	20
5.6	Aging of the probe	20
5.7	Disposal	21
6	What to do if...	22
6.1	Error symptoms of D.O. measurement	22
6.2	Error symptoms of conductivity measurement	23
6.3	Error symptoms of pH measurement	23
7	Technical data	24
7.1	Basic module with conductivity measuring cell	24
7.2	Dissolved oxygen (D.O.) module	26
8	Wear parts and accessories	29

1 Overview

1.1 Structure and function

The MPP 350 multi parameter probe is a modularly constructed sensor for pH, dissolved oxygen, conductivity and temperature. Its maximum configuration comprises the following basic components:

- *Basic module* with permanently built-in *conductivity measuring cell* according to the quadripole measuring principle, with integrated temperature sensor
- Removable *dissolved oxygen module*, according to the galvanic measuring principle
- Removable, armored *pH electrode* with S7 plug-in connector

Detailed structure
(see figure on the
right page)

- 1 Closing head
- 2 Protective hood
- 3 Sinker

Conductivity measuring cell:

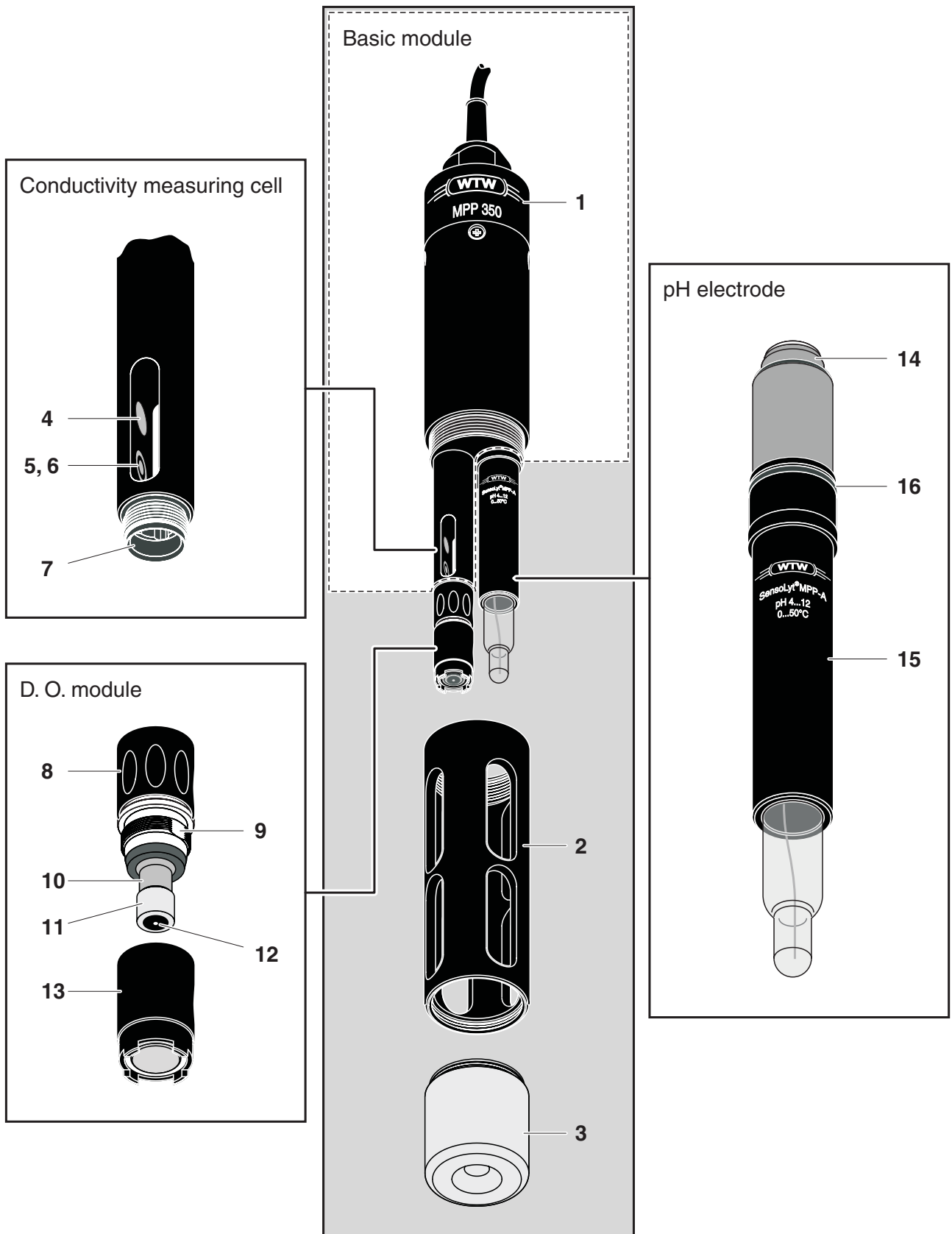
- 4 Temperature sensor in graphite enclosure
- 5 Voltage electrode (inside, 2x)
- 6 Current electrode (ring, 2x)
- 7 Plug connection for D.O. module

D.O. module:

- 8 Cap nut
- 9 Screw thread base with ventilation area
- 10 Lead counter electrode (anode)
- 11 Insulator
- 12 Gold working electrode (cathode)
- 13 Membrane cap (filled with electrolyte solution)

pH electrode:

- 14 S7 plug-in connector
- 15 Armoring
- 16 Sealing ring



The basic module is the basic component of the operable sensor. It can be used as a stand-alone conductivity measuring cell with temperature sensor. By mounting the D. O. module and/or pH electrode the basic module can be extended to form a multi parameter probe for pH, dissolved oxygen, conductivity and temperature.

The D.O. module is connected to the basic module via a watertight, three-pole plug connection. The conductivity measuring cell measures the temperature, which is required for the determination of the D.O. content. For this reason the D.O. module only works in conjunction with the basic module.

The pH electrode is electrically connected to the basic module via an S7 plug-in connection. It is mechanically fixed with the aid of the protective hood.

Recommended fields of application

- On site measurements in rivers, lakes, sea water and brackish water as well as waste water
- Measurements in boreholes (up to a diameter of two inches) up to 100 m depth
- Fishfarming
- Measurements in ground water and spring water
- Applications in water laboratories

1.2 Instrument identification

A series number is printed on every module. Keep these numbers ready if you have questions to ask the WTW service department. The series numbers contain the following information:

Basic module

The number is imprinted on the shaft of the conductivity measuring cell.

1	2	3	1 Manufacturing year 20... (example: 2004)
04360013			2 Calendar week of manufacturing (CW 36)
			3 Sequential batch number (0013)

Dissolved oxygen (D.O.) module

The number is imprinted on the cap nut.

1	2	3	4	1 Manufacturing year 20... (example: 2004)
0442A007				2 Calendar week of manufacturing (CW 42)
				3 Sensor type (type A)
				4 Sequential batch number (007)

pH electrode

For notes concerning the series number of the electrode refer to the electrode operating manual.

2 Safety

This operating manual contains special instructions that must be followed during the operation of the sensor. Always keep this operating manual in the vicinity of the sensor.

Special user qualifications

The membrane cap of the D. O. module is filled with a small amount of an alkaline electrolyte solution. All maintenance work that requires dealing with the electrolyte solution must only be carried out by persons who know how to deal with chemicals safely.

General safety instructions

The individual chapters of this operating manual use safety labels like the one below to indicate danger:



Caution

indicates instructions that must be followed precisely in order to avoid slight injuries or damage to the instrument or the environment.

3 Commissioning

3.1 Scopes of delivery

3.1.1 Scope of delivery, MPP 350-x

- Basic module, with mounted D. O. module in the OxiCal®-MPP air calibration and storing vessel. The D.O. module is filled with electrolyte solution and operable. The receptacle for the pH electrode is closed with a plug.
- MPP-Prot protective hood, mounted, with MPP-S sinker
- BR MPP 350 battery-powered stirrer (with cable lengths from 10 m only)
- Cable drum (with cable lengths from 40 m only)
- MPP-Cal calibration vessel for pH and conductivity
- ZBK 325 accessory set for D. O. module, comprising:
 - 3 exchange membrane caps, WP 90
 - Electrolyte solution, ELY/G
 - Cleaning solution, RL/G
 - Polishing strip, SF 300
- 1 closing cap for conductivity measuring cell
- 1 closing cap for D.O. module
- 1 plug for electrode receptacle
- Operating manual for MPP 350
- CD-ROM Update Multi 350i



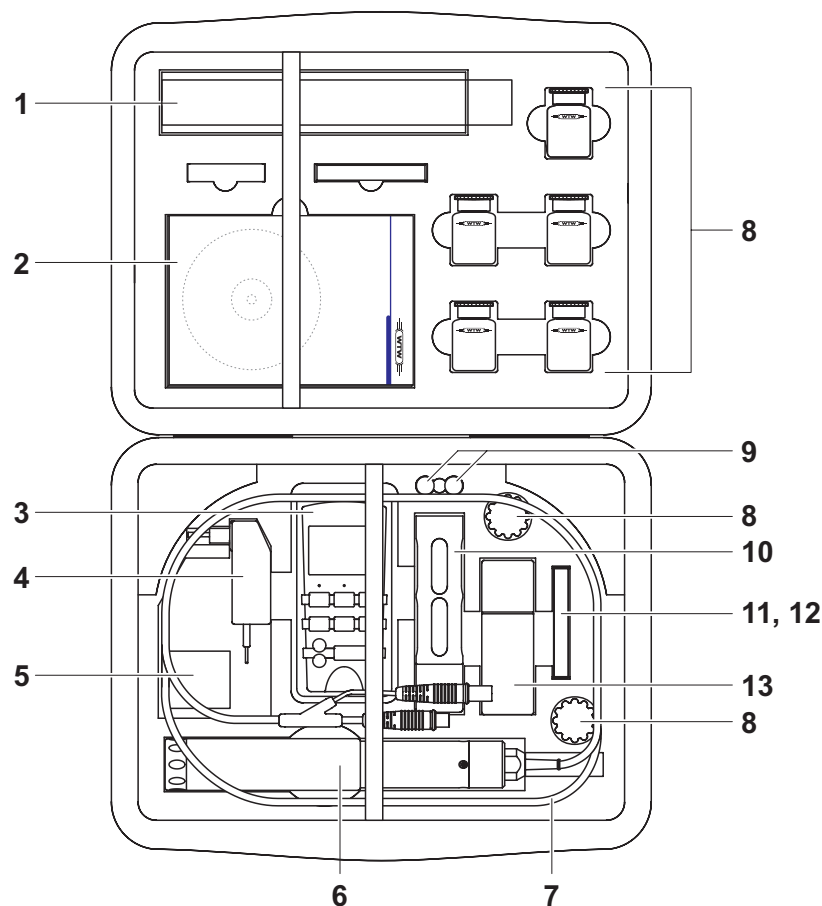
Note

The membrane cap that is mounted on the D.O. sensor for delivery serves mainly as a transport protection. Depending on the duration of the transport and storage period, it may have a shortened operational lifetime. If the measuring system cannot be calibrated (error message on the instrument), please proceed according to section 5.3 D.O. MODULE: CHANGING THE ELECTROLYTE SOLUTION AND MEMBRANE CAP.

3.1.2 Set equipment

The MPP 350 is also available as a set in the MPP-FC field case. You can also buy the carrying case as an accessory and fit it with components yourself. Electrodes with a cable length of up to 25 m fit in the carrying case. Ordering information, see chapter 8 WEAR PARTS AND ACCESSORIES.

Equipment of the field case MPP-FC (example)



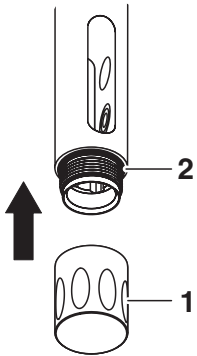
- | | |
|---|---|
| <p>1 Electrode or battery-powered stirrer</p> <p>2 Manual, CD-ROM</p> <p>3 Meter</p> <p>4 Plug-in power supply unit</p> | <p>8 Reagents (buffers etc...)</p> <p>9 Plug</p> <p>10 Protective hood with sinker</p> <p>11 Exchange membrane caps</p> |
|---|---|

- | | | | |
|---|---------------------------------------|----|----------------------------|
| 5 | Small parts (adapters etc...) | 12 | Polishing film |
| 6 | MPP 350 with OxiCal [®] -MPP | 13 | pH/cond calibration vessel |
| 7 | Connection cable | | |

3.2 Getting the sensor ready for measuring

3.2.1 Measurements without D. O. module

Make sure that the plug connector of the conductivity measuring cell is tightly closed with the suitable closing cap. When mounted, the closing cap (1) must be screwed on up to the stop.

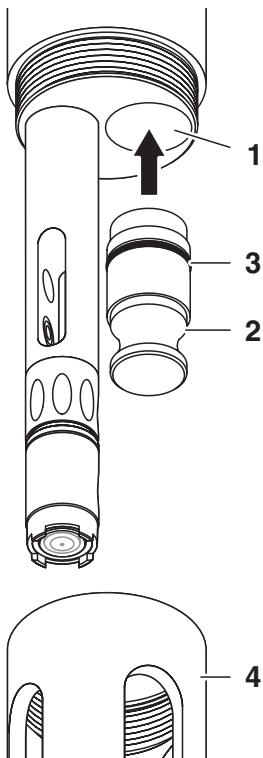


Before screwing on the closing cap, check the following points:

- The sealing (2) must be clean and evenly positioned in the groove.
- The plug connection and the inside of the closing cap must be clean and dry.

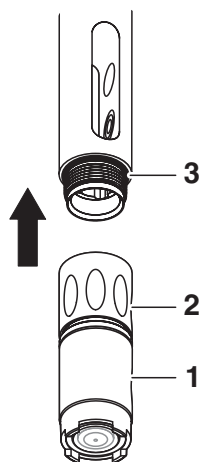
3.2.2 Measurements without pH electrode

Make sure the electrode receptacle on the basic module (1) is tightly closed with the plug (2) and the protective hood (4) is screwed on up to the stop. Before plugging in, check whether the sealing (3) of the plug is clean and correctly positioned. The sealing should always be slightly greased (with the O ring grease of the pH electrode).



Caution

Never operate the MPP 350 without the protective hood. The protective hood fixes the pH electrode or plug in the electrode receptacle and guarantees a pressure-resistant sealing. It especially protects the pH electrode from mechanical damage.



3.2.3 Mounting the D. O. module

Make sure that the D.O. module and conductivity measuring cell are screwed together tightly. When mounted, the cap nut of the D.O. module has to be screwed on up to the stop.

Before screwing on the D.O. module, check the following points:

- The sealing (3) must be clean and evenly positioned in the groove.
- The plug connection must be clean and dry on both sides.

Screwing on the D.O. module

Position the D.O. module (1) on the conductivity measuring cell and carefully and with slight pressure turn it until the guiding nib on the D.O. module locks in place in the corresponding groove on the conductivity measuring cell. Subsequently tighten the cap nut (2) up to the stop. The thread only snatches if the D.O. module was correctly positioned.

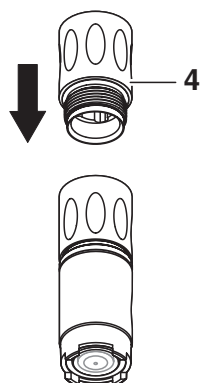
Unscrewing and storing the D. O. module

Unscrew the cap nut and remove the D.O. module from the conductivity basic module.

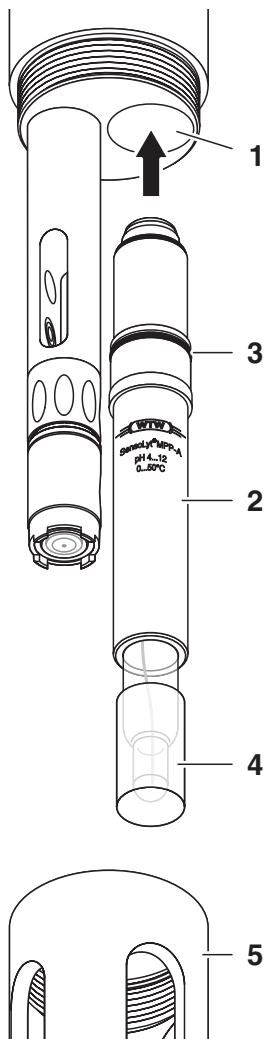


Caution

Inappropriate handling can lead to the release of electrolyte solution. When unscrewing the D.O. module only turn the cap nut (not the membrane cap!).



For storing, mount the clean and dry closing cap (4) on the D. O. module. Thus the plug connection will remain optimally protected.



3.2.4 Mounting the pH electrode

Mount the electrode:

- If necessary, remove the plug from the electrode receptacle (1).
- Protect the pH electrode with the watering cap (4).
- Push the electrode (2) into the electrode receptacle up to the stop. When doing so make sure the sealing (3) is clean and greased and correctly positioned in the groove.
- Remove the watering cap (4).
- Screw on the protective hood.



Caution

Never operate the MPP 350 without the protective hood. The protective hood fixes the pH electrode or plug in the electrode receptacle and guarantees a pressure-resistant sealing. It especially protects the pH electrode from mechanical damage.



Note

For further notes concerning the series number of the electrode refer to the electrode operating manual.

3.2.5 Preparing the measuring operation

Connect the sensor to the measuring instrument. The sensor is immediately ready to measure. It is not necessary to polarize the D.O. module.



Note

For acclimatization before and after measuring and to protect the sensor from external influences during periods of non-use we recommend to mount the OxiCal[®]-MPP calibration and storing vessel equipped with a moist sponge on the sensor.

4 Measuring / Operation

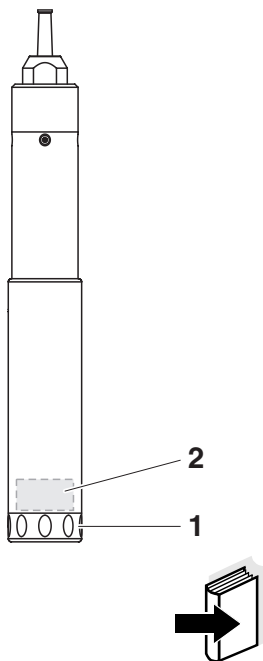
4.1 Calibration

4.1.1 Calibrating for D. O. measurement

To calibrate the D.O. module, use the OxiCal[®]-MPP calibration and storage vessel (white). It is screwed on the sensor instead of the protective hood. Make sure that the sponge in the calibration vessel is always moist.

Moisten the sponge:

- Unscrew the lid (1).
- Take out the sponge (2) out of the lid, wet it, then slightly squeeze it out.
- Reinsert the sponge and close the calibration vessel with the cap.

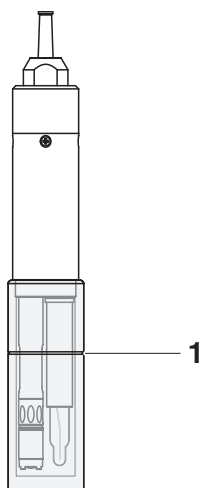


Note

Please read the further course of the calibration in the operating manual of the meter.

4.1.2 Calibrating for conductivity and pH measurement

To calibrate the conductivity measuring cell or pH electrode, use the MPP-CAL calibration vessel (transparent). Fill the calibration vessel with enough buffer solution or conductivity control standard so that the solution at least reaches the marking groove (1) when the calibration vessel is screwed on. Thus the temperature sensor is always immersed in the solution and calibration can be carried out correctly.



Note

Depending on the number of modules mounted, different filling quantities are required for the solution to reach up to the marking groove (1) (minimum filling level) so that the temperature sensor is immersed in the measuring solution.



Note

Please read the further course of the calibration in the operating manual of the meter.

4.2 Measuring

Please always observe the required minimum immersion depth and the minimum approach flow that is important for D.O. measurements (see chapter 7 TECHNICAL DATA).

The minimum flow can be provided in different ways, e. g.:

- The flow of the water to be measured is sufficient (aeration tank, water pipe, stream)
- Slowly pull the sensor through the water by hand (lake, container), or
- Use a flow aid, e. g. a magnetic stirrer or the battery-powered stirrer, BR MPP 350. The battery-powered stirrer BR MPP 350 also serves as a protective hood at the same time and is screwed on instead of the standard protective hood.



Battery-powered
stirrer,
BR MPP 350



Caution

If the BR 325 MPP is used in salt water (seawater, brackish water), thoroughly rinse and clean with tapwater (freshwater!) afterwards. Otherwise, corrosion damage may occur.

4.3 Storing

The sensor with the D.O. module must always be stored in the calibration vessel. Make sure that the sponge in the calibration vessel is always moist.

Note

For further notes concerning the storing of the electrode refer to the electrode operating manual.



5 Maintenance, cleaning, replacement

5.1 General maintenance instructions

For your safety

Note the following safety instructions when handling electrolyte and cleaning solutions:



Caution

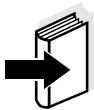
The ELY/G electrolyte solution and the RL/G cleaning solution irritate the eyes and skin. Observe the following points when handling the solutions:

- During working activities, always wear suitable protective gloves and protective goggles/face shield.
- If it comes into contact with the skin, rinse thoroughly with water and immediately change contaminated clothing.
- If it comes into contact with the eyes, rinse thoroughly with water and consult a doctor.
- Follow the safety datasheet.



Caution

Before all maintenance activities, disconnect the sensor from the instrument.



Note

Information on how to order wear parts and maintenance equipment can be found in chapter 8 WEAR PARTS AND ACCESSORIES.

Maintenance activities on the D.O. module

For better handling, leave the D.O. module screwed on the conductivity measuring cell. Thus, you can better immerse the sensor head in the electrolyte or cleaning solution and the plug connection remains protected against damage.

5.2 Outside cleaning

Basic module and D.O. module

Contamination	Cleaning procedure
Lime sediments	Immerse in acetic acid (volume share = 20 %) for 1 minute
Fat/oil	Clean with warm water that contains washing-up liquid

After cleaning, thoroughly rinse with deionized water and recalibrate if necessary.

pH electrode

For further notes concerning the cleaning of the electrode refer to the electrode operating manual.

5.3 D.O. module: Changing the electrolyte solution and membrane cap



General information

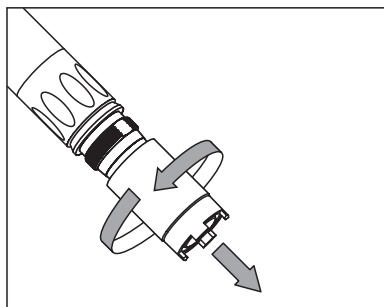
Caution

Before starting to work with the sensor, please note the **GENERAL MAINTENANCE INSTRUCTIONS** on page 14.

WTW delivers the D.O. module ready to use (see section 3). The electrolyte solution and membrane cap must only be replaced if:

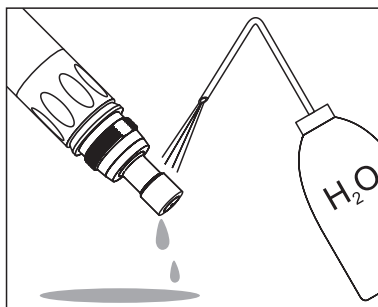
- a calibration error occurs and the membrane is heavily contaminated
- the membrane is damaged
- the electrolyte solution is exhausted.

Changing the electrolyte solution and membrane cap

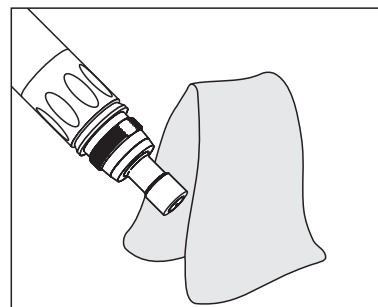


Unscrew the membrane cap.

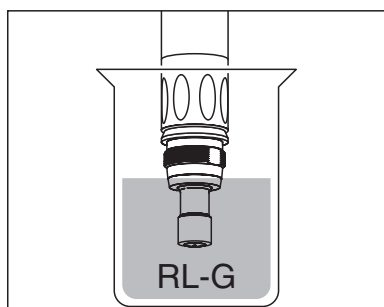
Caution: Electrolyte solution!
For disposal of the membrane cap and electrolyte solution, see section 5.7.



Rinse the sensor head with deionized water.

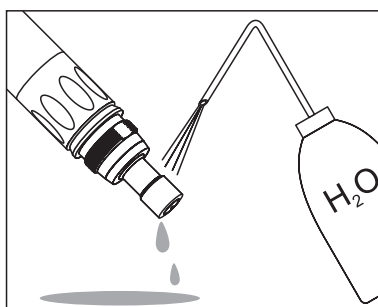


Carefully rub and dry the counter electrode with a lint-free paper towel.

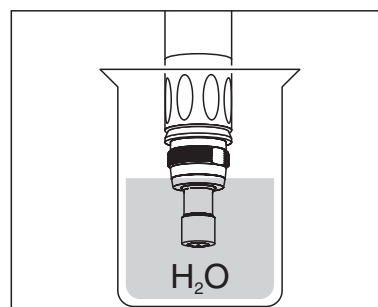


Immerse the sensor head including the counter electrode in RL/G cleaning solution.

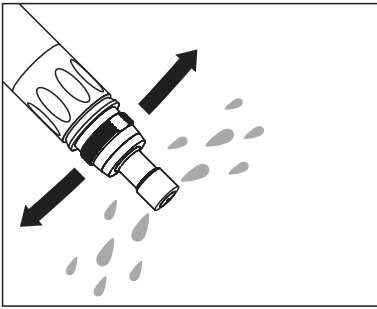
Allow to react for 1 to 3 minutes.



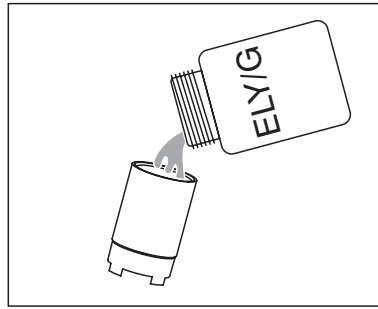
Thoroughly rinse the sensor head with deionized water.



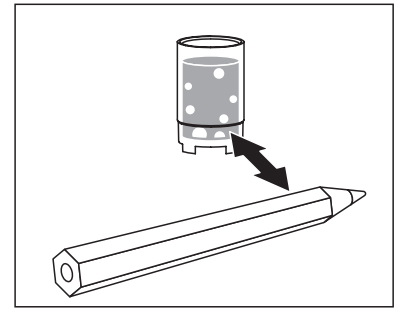
Water the counter electrode in deionized water for at least 10 minutes.



Carefully shake off the drops of water.



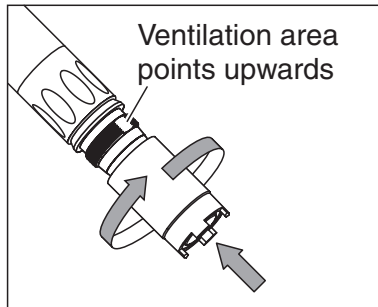
Fill a new membrane cap with ELY/G electrolyte solution.



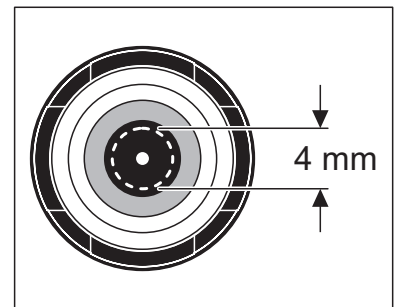
Remove any air bubbles by carefully tapping the membrane cap. Additionally, you can prevent air bubbles by throwing the first filling away and refilling the membrane cap.



Thoroughly rinse the sensor head with electrolyte solution.



Hold the sensor inclined and screw on the membrane cap fingertight using a paper towel. Excess electrolyte solution is forced out of the ventilation area.



Check the filling: Inspect the face surface. No air bubbles may be present within the dashed circle. Air bubbles outside this area do not interfere.



Readiness to measure

Note

For measurements under high pressure the filling must be completely free of air bubbles.

The D.O. module is ready for operation after approx. 30 to 50 minutes. Subsequently calibrate the sensor for D.O. measurements.



Note

If you want to measure very low D.O. concentrations (< 0.5 % saturation), we recommend to let the sensor rest overnight and then calibrate it.

5.4 D.O. module: Cleaning the electrodes



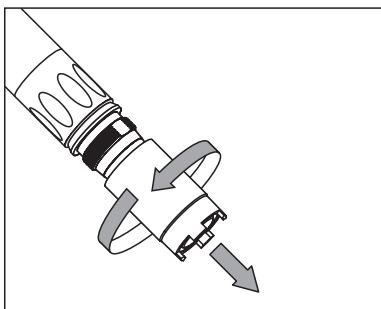
General information

Caution

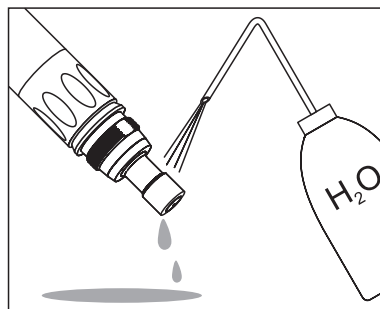
Before starting to work with the sensor, please note the **GENERAL MAINTENANCE INSTRUCTIONS** on page 14.

Cleaning is only required in cases of slopes too small or too large (sensor cannot be calibrated) that cannot be resolved by changing the membrane cap and electrolyte solution.

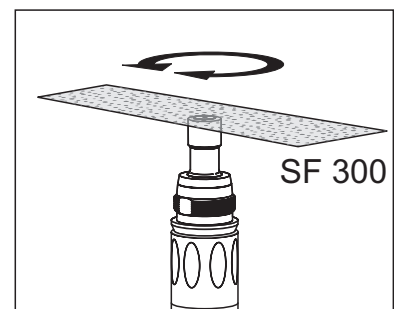
Cleaning the electrodes



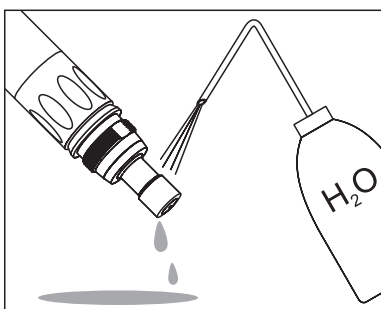
Unscrew the membrane cap.
Caution: Electrolyte solution!
For disposal of the membrane cap and electrolyte solution, see section 5.7.



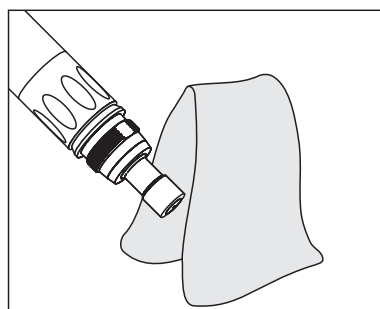
Rinse the sensor head with deionized water.



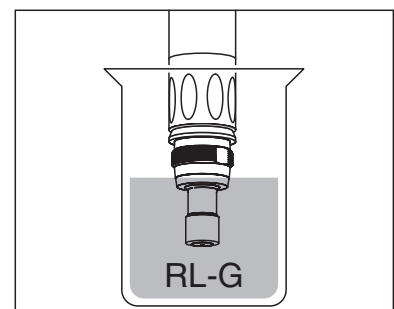
Using the rough side of the **wet SF 300** polishing strip, polish off any contamination from the gold working electrode using light pressure.
Caution: Do not use any conventional sandpaper or glass-fiber brushes.



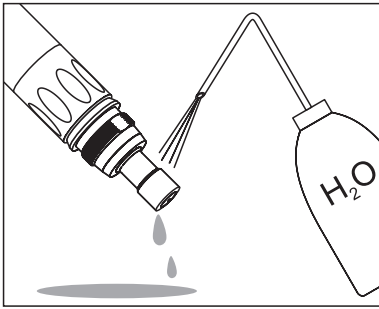
Rinse the sensor head with deionized water.



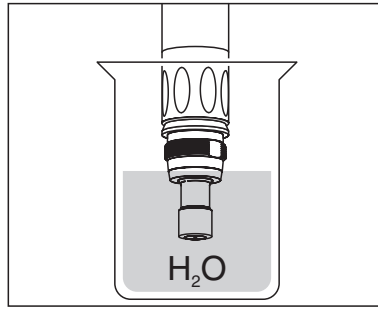
Wipe the counter electrode with a lint-free paper towel and carefully remove any loose white deposits.



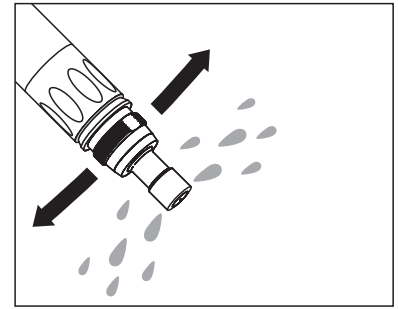
Immerse the sensor head including the counter electrode in **RL-G** cleaning solution. Allow to react for 1 to 3 minutes.



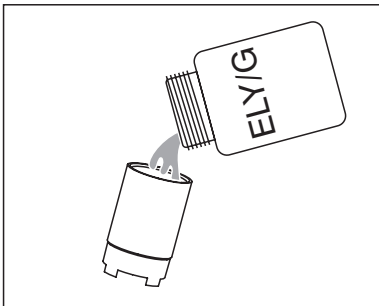
Thoroughly rinse the sensor head with deionized water.



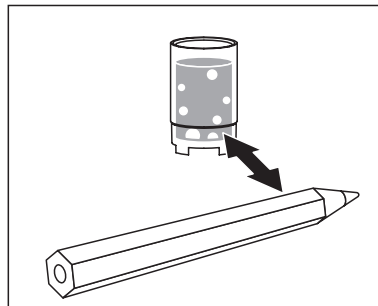
Water the counter electrode in deionized water for at least 10 minutes.



Carefully shake off the drops of water.



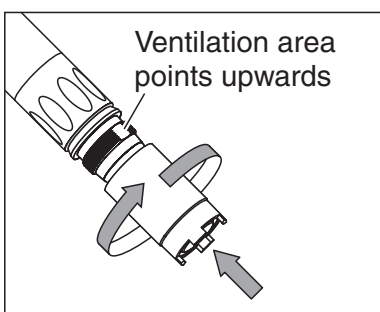
Fill a new membrane cap with ELY/G electrolyte solution.



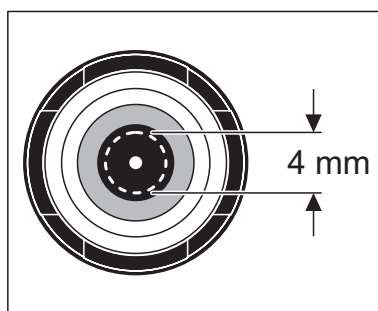
Remove any air bubbles by carefully tapping the membrane cap. Additionally, you can prevent air bubbles by throwing the first filling away and refilling the membrane cap.



Rinse the sensor head with electrolyte solution.



Hold the sensor inclined and screw on the membrane cap fingertight using a paper towel. Excess electrolyte solution is forced out of the ventilation area.



Check the filling: Inspect the face surface. No air bubbles may be present within the dashed circle. Air bubbles outside this area do not interfere.

**Note**

For measurements under high pressure the filling must be completely free of air bubbles.

Readiness to measure**Note**

If you want to measure very low D.O. concentrations (< 0.5 % saturation), we recommend to let the sensor rest overnight and then calibrate it.

5.5 Checking the D.O. module for freedom from zero-current

The D.O. module is free from zero-current. Checking the module for freedom from zero-current is only necessary in the case of malfunctions that cannot be remedied by exchanging the electrolyte solution and membrane cap or by cleaning the electrodes.

There are two possibilities to check the D.O. module for freedom from zero-current:

- Measurement in a nitrogen atmosphere (recommended method)
- Measurement in a sodium sulfite solution according to DIN EN 25814/ISO 5814.

**Caution**

If you check the sensor according to DIN EN 25814/ISO 5814, do not leave the sensor in the sodium sulfite solution for more than 2 minutes. Danger of sensor poisoning!

Test criterion

The D.O. module is OK if the measuring instrument displays < 1 % D.O. saturation after 2 minutes.

5.6 Aging of the probe

Except for the pH electrode, the probe does not naturally age when used according to instructions. Special measuring media (e.g. strong acids and lyes, organic solvents) or too high temperatures shorten the operational lifetime considerably or damage the probe. The warranty does not cover cases where such conditions cause failure or mechanical damage.

5.7 Disposal



Caution

The ELY/G electrolyte solution irritates eyes and skin. When dealing with the ELY/G electrolyte solution, observe the following points:

- During working activities, always wear suitable protective gloves and protective goggles/face shield.
- If it comes into contact with the skin, rinse thoroughly with water and immediately change contaminated clothing.
- If it comes into contact with the eyes, rinse thoroughly with water and consult a doctor.
- Follow the safety datasheet.

Basic module, D.O. module and membrane cap

For disposal, unscrew the membrane cap from the D.O. module. Then rinse the entire sensor and the membrane cap with water.

We recommend to dispose of the basic module and D.O. module without membrane cap as electronic waste. The membrane cap may be disposed of with the household refuse.

Electrolyte solution and cleaning solution

Disposal according to the safety data sheet.

pH electrode

Disposal see operating manual of the electrode.

6 What to do if...

6.1 Error symptoms of D.O. measurement

Error symptom	Cause	Remedy
No D.O. display	<ul style="list-style-type: none"> – No connection between meter and sensor – D.O. module not mounted properly – Cable defective 	<ul style="list-style-type: none"> – Check connection between meter and sensor – Check the plug-in connection, clean the contacts as necessary – Return the sensor
The sensor is in the air and the display shows 0.0 mg/l or 0 % O ₂	<ul style="list-style-type: none"> – No connection between meter and sensor – D.O. module not mounted properly – No electrolyte in the membrane cap – Cable defective 	<ul style="list-style-type: none"> – Check connection between meter and sensor – Check the plug-in connection, clean the contacts as necessary – Replace and refill the membrane cap (see section 5.3) – Return the sensor
The sensor cannot be calibrated	<ul style="list-style-type: none"> – Contaminated membrane cap – Electrolyte depleted – Membrane damaged 	<ul style="list-style-type: none"> – Replace and refill the membrane cap (see section 5.3) Subsequently, wait for 30 to 50 min and recalibrate.
The sensor still cannot be calibrated after changing the electrolyte and membrane cap	<ul style="list-style-type: none"> – Contaminated electrodes or sensor toxification – Membrane cap not screwed on tight enough 	<ul style="list-style-type: none"> – Clean the electrodes (see section 5.4) – Screw membrane cap tighter
Incorrect temperature display	<ul style="list-style-type: none"> – The temperature sensor of the conductivity measuring cell is not immersed in the measuring solution – Temperature sensor defective 	<ul style="list-style-type: none"> – Observe the minimum immersion depth – Return the sensor
Measured values implausible	<ul style="list-style-type: none"> – Incident flow insufficient 	<ul style="list-style-type: none"> – Move the sensor in the test sample (stirr) or use the battery-powered stirrer, BR MPP 350
Mechanical damage to the sensor		<ul style="list-style-type: none"> – Return the sensor

6.2 Error symptoms of conductivity measurement

Error symptom	Cause	Remedy
No temperature or conductivity display	<ul style="list-style-type: none"> – No connection between meter and sensor – Cable defective 	<ul style="list-style-type: none"> – Check connection between meter and sensor – Return the sensor
Measurement delivers implausible conductivity values	<ul style="list-style-type: none"> – Incorrect cell constant adjusted at the meter – Measuring range exceeded – Contamination in the area of the electrodes – Electrodes damaged 	<ul style="list-style-type: none"> – Check / correct the cell constant – Observe the application range – Clean the sensor (see section 5.2). – Return the sensor
Incorrect temperature display	<ul style="list-style-type: none"> – The temperature sensor was not immersed in the measuring solution – Temperature sensor defective 	<ul style="list-style-type: none"> – Observe the minimum immersion depth – Return the sensor

6.3 Error symptoms of pH measurement

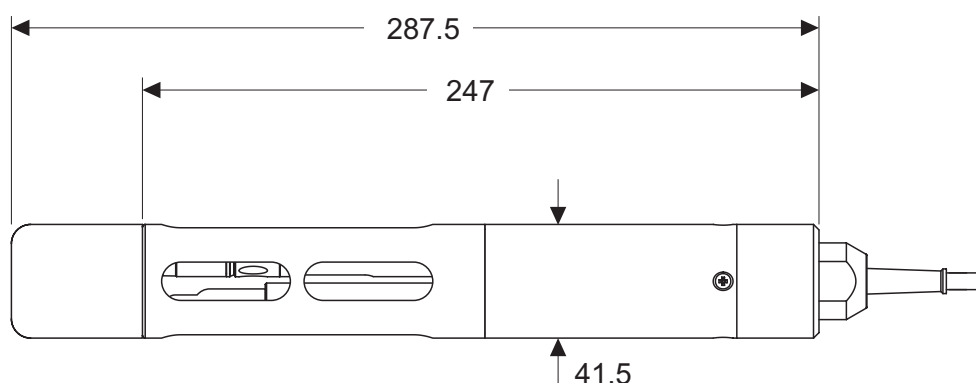
Error symptom	Cause	Remedy
No pH display	<ul style="list-style-type: none"> – No connection between meter and sensor – Cable defective – pH electrode defective 	<ul style="list-style-type: none"> – Check connection between meter and sensor – Return the sensor – Replace pH electrode

7 Technical data

7.1 Basic module with conductivity measuring cell

General features	Measuring principle	Four-electrode measurement
	Cell constant	$0.475 \text{ cm}^{-1} \pm 1.5 \%$
	Temperature sensor	integrated NTC 30 (30 k Ω / 25 °C)

**Dimensions
(in mm)**



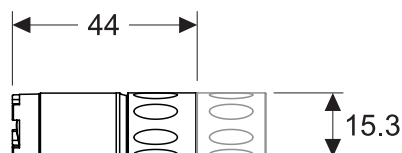
Weight	Probe	approx. 135 g (without cable, sinker, pH electrode and D.O. module)
	Sinker	approx. 500 g
Materials	Enclosure of the basic module	POM
	Connection head of the basic module	POM
	Shaft of the conductivity measuring cell	Epoxy
	Plug connection for D.O. module	PEEK
	Conductivity electrodes	Graphite
	Thermistor enclosure	Graphite
	Sealings (O rings)	FPM (Viton®)
	Closing cap for conductivity measuring cell	PVC
	pH plug	POM

Connection cable	Lengths	3 / 6 / 10 / 15 / 25 m
	Diameter	6,1 mm
	Smallest allowed bend radius	Permanent bend: 60 mm Single time or short time bend>: 35 mm
	Material Kabelmantel	PVC, stabilisiert
	Lengths	40 / 60 / 100 m
	Diameter	8,0 mm
	Smallest allowed bend radius	Permanent bend: 67,5 mm Single time or short time bend>: 40 mm
	Cable sheath material	PUR
	Steckertyp	Cond/Oxi: Buchse, 8-polig pH: DIN-Stecker
Connector for D.O. module	3-pole, watertight plug connection with cap nut, reverse polarity protected, contacts gold-plated	
Electrode receptacle	S7 plug-in connector. The electrode is fixed by the protective hood	
Pressure resistance	Sensor with closed plug connection	IP 68 (10 ⁶ Pa or 10 bar)
	Cable plug	IP 67 (when plugged in)
The MPP 350 meets the requirements according to article 3(3) of the 97/23/EC directive ("Pressure equipment directive").		
Measurement conditions	Conductivity measuring range	1 µS/cm ... 2 S/cm
	Temperature range	0 ... 50 °C
	Max. allowed overpressure	10 ⁶ Pa (10 bar)
	Depth of immersion	min. 130 mm (with protective hood and sinker) max. 100 m (depending on the cable length)
	Operating position	any
Storage conditions	Recommended storing method	in the OxiCal [®] -MPP calibration vessel (moist or dry (without D.O. module and electrode))
	Storage temperature	0 ... 50 °C
Characteristic data on delivery	Temperature responding behavior	t ₉₉ (99 % of the final value display after) < 20 s
	Precision of the temperature sensor	± 0.3 K

7.2 Dissolved oxygen (D.O.) module

General features	Measuring principle	Membrane covered galvanic sensor
	Temperature compensation	IMT compensation (calculated by the meter)

**Dimensions
(in mm)**



Weight approx. 20 g (filled with electrolyte)

Materials	Working electrode	Gold
	Counter electrode	Lead
	– Membrane cap	POM
	– Cap nut	
	Membrane	FEP, 13 μm
	– Sensor head	Epoxy, PEEK
	– Plug connection	PEEK
	Screw thread base	Stainless steel 1.4571
	Seals	FPM (Viton)
Closing cap	POM	

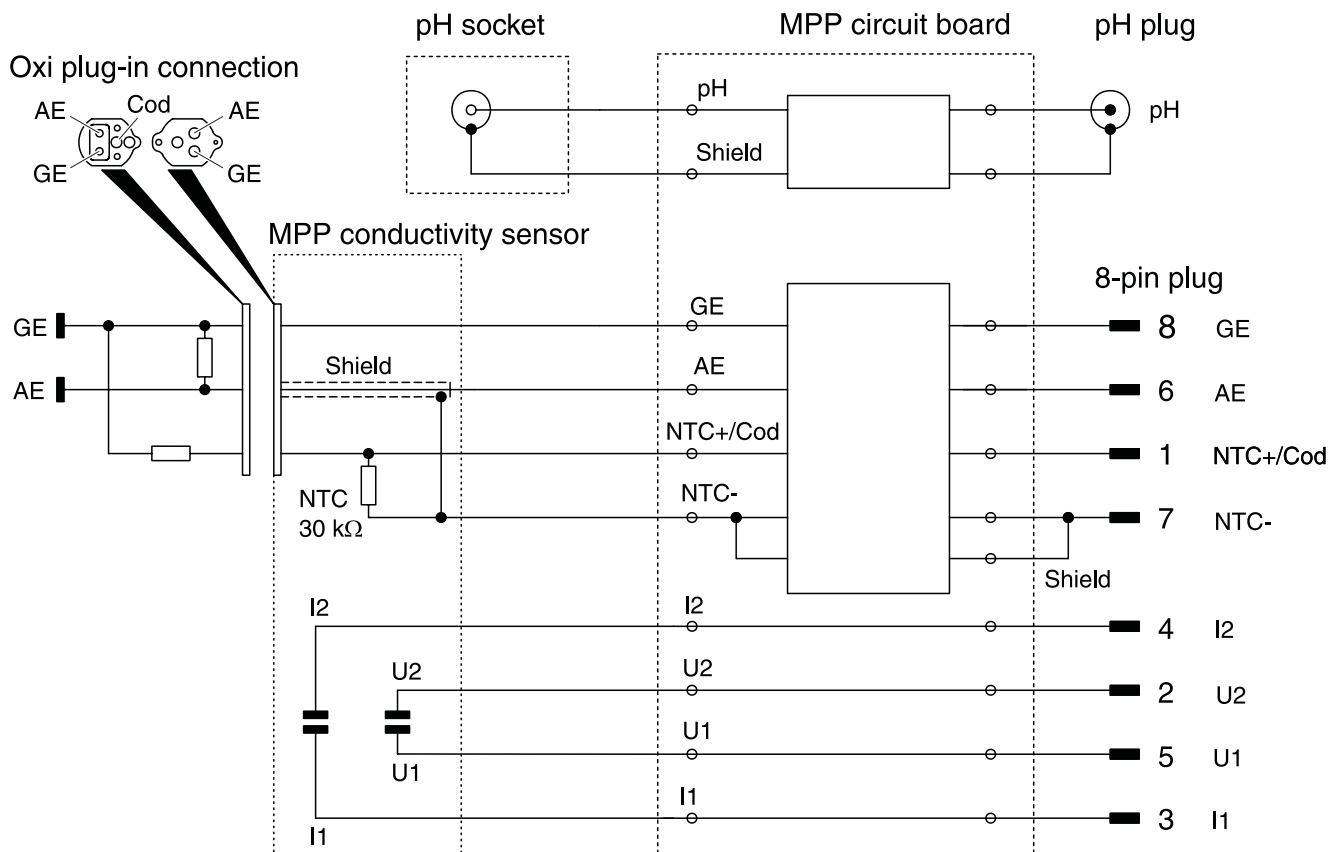
Plug connection	Plug type	3-pole, watertight plug connection with cap nut, reverse polarity protected, contacts gold-plated
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Pressure resistance	Sensor with closed plug connection	IP 68 (10 ⁶ Pa or 10 bar)
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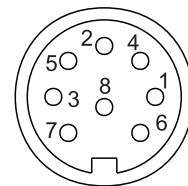
The D.O. module meets the requirements according to article 3(3) of the 97/23/EC directive ("Pressure equipment directive").

Measurement conditions	Measuring ranges at 20 °C	0 ... 50 mg/l D.O. 0 ... 600 % D.O. saturation 0 ... 1250 mbar D.O. partial pressure
	Polarization time	min. 30 ... 50 min after changing the electrolyte, it is not necessary to connect the sensor to the meter for polarization
	Temperature range	0 ... 50 °C
	Max. allowed overpressure	10 ⁶ Pa (10 bar)
	Depth of immersion with conductivity basic module	min. 130 mm (with protective hood and sinker) max. 100 m (depending on the cable length)
	Operating position	any
	Approach flow	> 3 cm/s at 10 % measurement accuracy 10 cm/s at 5 % measurement accuracy 18 cm/s at 1 % measurement accuracy
	Storage conditions	Recommended storing method
Storage temperature		0 ... 50 °C
Characteristic data on delivery	Zero signal	< 0.1 % of the saturation value
	Response time at 20 °C	t ₉₀ (90 % of the final value display after) < 10 s t ₉₅ (95 % of the final value display after) < 16 s t ₉₉ (99 % of the final value display after) < 60 s
	Own consumption of oxygen at 20 °C	0.008 µg·h ⁻¹ (mg/l) ⁻¹
	Drift	approx. 3 % per month in the operating condition
	Working life	min. 6 months with one electrolyte filling

Pin assignment



Plug from the front:



8 Wear parts and accessories

Wear parts and maintenance equipment

Description	Model	Order no.
Set of exchange membrane caps (3 pieces)	WP 90/3	202 725
Electrolyte solution	ELY/G	205 217
Cleaning solution for lead counter electrode	RL/G	205 204
Polishing film	SF 300	203 680
Accessory set, comprising: <ul style="list-style-type: none"> – 3 exchange membrane caps, WP 90 – Electrolyte solution, ELY/G – Cleaning solution, RL/G – Polishing strip, SF 300 	ZBK 325	202 706
Spare parts set, comprising: <ul style="list-style-type: none"> – 1 closing cap for conductivity measuring cell – 1 closing cap for D.O. module – 1 pH plug for basic module – Sealing for plug connection – O ring grease – OxiCal[®]-MPP sponge 	ACC-MPP	401 145
Spare D.O. module	ConOx Ox-Modul	401 070
Spare protective hood	MPP-Prot	401 160
Spare sinker	MPP-S	401 159

Accessories

Description	Model	Order no.
pH electrode	SensoLyt [®] MPP-A	401 152
Protective lid for standard protective hood	MPP-SK	401 162
Field case	MPP-FC	401 157
Calibration and storage vessel	OxiCal [®] -MPP	205 405
pH/conductivity calibration vessel	MPP-Cal	401 155
pH buffers (1 liter)	TEP 4 TEP 7 TEP 10 Trace	108 700 108 702 108 703
Calibration and control standard KCl 0.01 mol/l (6 x 50 ml)	E-SET	300 572

Note

For further accessories, refer to the WTW catalog or the Internet.



