

## Assembly and operating instructions

### DULCOTEST® Sensor for Hydrogen Peroxide Type PEROX H 3E

**EN**

A3251

Please carefully read these operating instructions before use. · Do not discard.  
The operator shall be liable for any damage caused by installation or operating errors.  
The latest version of the operating instructions are available on our homepage.

### General non-discriminatory approach

In order to make it easier to read, this document uses the male form in grammatical structures but with an implied neutral sense. The document is always aimed equally at women, men and gender-neutral persons. We kindly ask readers for their understanding in this simplification of the text.

### Supplementary information


➔ Please read the supplementary information in its entirety.

#### Information




*This provides important information relating to the correct operation of the unit or is intended to make your work easier.*

#### Warning information

Warning information includes detailed descriptions of the hazardous situation, see  *Chapter 2.1 'Labelling of Warning Information' on page 7.*

The following symbols are used to highlight instructions, links, lists, results and other elements in this document:

Tab. 1: More symbols

Symbol	Description
1. ➔	Action, step by step.
⇒	Outcome of an action.
	Links to elements or sections of these instructions or other applicable documents.
■	List without set order.
[Button]	Display element (e.g. indicators). Operating element (e.g. button, switch).
'Display/GUI'	Screen elements (e.g. buttons, assignment of function keys).
CODE	Presentation of software elements and/or texts.

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# 1 Introduction

These operating instructions provide information on the technical data and functions of the DULCOTEST® Sensor for Hydrogen Peroxide, type PEROX H 3E 20 ppm / PEROX X 3E 200 ppm.



Fig. 1: DULCOTEST® sensor, type PEROX H 3E 50 ppm / PEROX H 3E 200 ppm.

Order number	Designation of the complete kit
1105779	PEROX H 3E-mA-50 ppm
1105778	PEROX H 3E-mA-200 ppm
1117570	PEROX H 3E-mA-500 ppm

## 1.1 Functional description

### Brief description of the function

Parameter	Value
Measured variable	Hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> )
Measuring range:	0.5 ... 50 mg/l (PEROX H 3E 50 ppm) 2 ... 200 mg/l (PEROX H 3E 200 ppm) 5 ... 500 mg/l (PEROX H 3E 500 ppm)
pH-range:	2.5 ... 8.0

The sensor is a diaphragm-covered, amperometric three-electrode sensor. The sensor can be used to determine the concentration of hydrogen peroxide in water.

A gold cathode acts as a working electrode, a silver anode acts as a counter electrode, and a silver halide-covered electrode acts as a reference electrode.

The hydrogen peroxide contained in the sample water diffuses through the diaphragm. The constant polarisation voltage between the working electrode and the counter electrode produces the electrochemical reaction of the hydrogen peroxide on the working electrode. The resulting current is measured as a primary signal between the working electrode and the counter electrode (amperometric measuring principle). It is proportional to the hydrogen peroxide concentration in the operating range of the sensor. The primary signal is converted into a temperature-corrected 4 ... 20 mA output signal by the amplifier electronics of the sensor, and is displayed and processed in the controller. The measuring electrodes remain activated, even in the absence of hydrogen peroxide, due to the pulsed change of the polarisation voltage after the measuring interval.

## 1.2 Application

The sensor type PEROX H 3E has been developed for the measurement of hydrogen peroxide in aqueous solutions for applications in water treatment. Typical applications include the control of oxidation / disinfection of swimming pool water, irrigation water, spring water, even of moderately contaminated water. They also include control processes with requisite short response times. The sensor can also be used for the control of low H<sub>2</sub>O<sub>2</sub> concentrations and, with regular checking, also to monitor the absence of H<sub>2</sub>O<sub>2</sub>, for instance with chlorine elimination. A separate temperature sensor (e.g. PT 1000-SE, order no. 1002856) needs to be provided for the temperature correction of the H<sub>2</sub>O<sub>2</sub> measuring value in the measuring unit with applications in which the medium temperature changes.

### 1.3 Construction

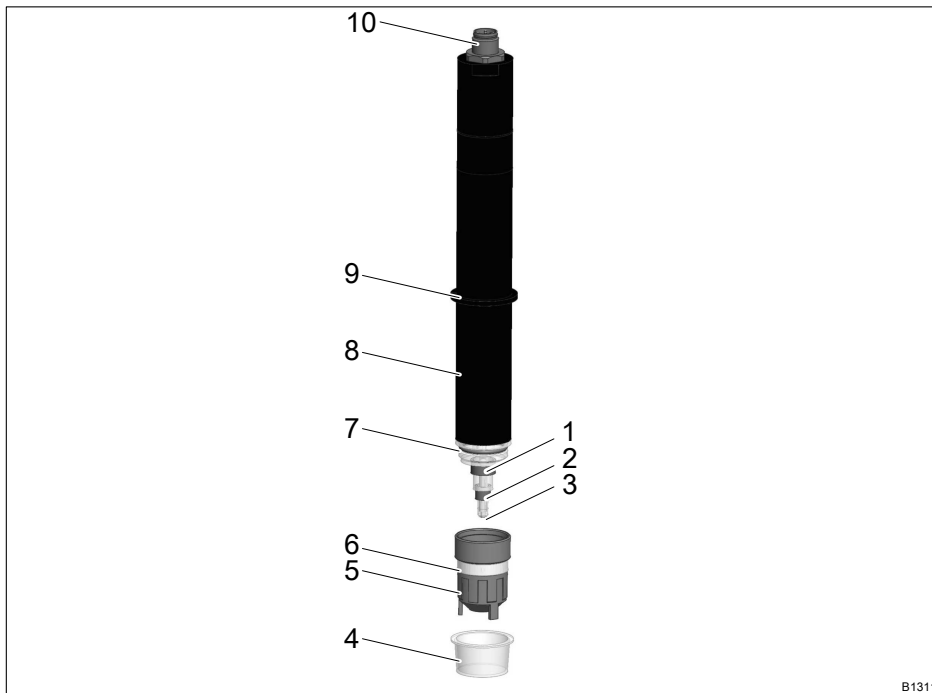


Fig. 2: The construction of the sensor

- |                              |                         |
|------------------------------|-------------------------|
| 1 Counter electrode (silver) | 6 Hose seal             |
| 2 Reference electrode (grey) | 7 O-ring seal           |
| 3 Working electrode (golden) | 8 Electrode shaft       |
| 4 Diaphragm protective cap   | 9 Clamp disc            |
| 5 Diaphragm cap              | 10 4-pin plug connector |

#### Construction

The sensor consists of the electrode shaft and the diaphragm cap. The diaphragm cap, filled with electrolyte, constitutes the measuring chamber, into which the measuring electrodes are immersed. The measuring chamber is sealed from the measuring medium by a micro-porous diaphragm. The amplifier electronics, embedded into a plastic mass, are located in the top part of the shaft. The sensor has a passive 4 ... 20 mA two-wire interface. The power supply is external from the controller.

## 2 Safety

### 2.1 Labelling of Warning Information

#### Introduction

These operating instructions provide information on the technical data and functions of the product. These operating instructions provide detailed warning information and are provided as clear step-by-step instructions.

The warning information and notes are categorised according to the following scheme. A number of different symbols are used to denote different situations. The symbols shown here serve only as examples.



#### **DANGER!**

##### **Nature and source of the danger**

Consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger.

Description of hazard

- Denotes an immediate threatening danger. If the situation is disregarded, it will result in fatal or very serious injuries.



#### **WARNING!**

##### **Nature and source of the danger**

Possible consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger.

- Denotes a possibly hazardous situation. If the situation is disregarded, it could result in fatal or very serious injuries.



#### **CAUTION!**

##### **Nature and source of the danger**

Possible consequence: Slight or minor injuries. Material damage.

Measure to be taken to avoid this danger.

- Denotes a possibly hazardous situation. If the situation is disregarded, it could result in slight or minor injuries. May also be used as a warning about material damage.



#### **NOTICE!**

##### **Nature and source of the danger**

Damage to the product or its surroundings.

Measure to be taken to avoid this danger.

- Denotes a possibly damaging situation. If the situation is disregarded, the product or an object in its vicinity could be damaged.



***Type of information***

*Hints on use and additional information.*

*Source of the information. Additional measures.*

- *Denotes hints on use and other useful information. It does not indicate a hazardous or damaging situation.*

## 2.2 User qualification



### WARNING!

**Danger of injury with inadequately qualified personnel**

**The operator of the system / equipment is responsible for ensuring that the qualifications are fulfilled.**

If inadequately qualified personnel work on the unit or loiter in the hazard zone of the unit, this could result in dangers that could cause serious injuries and material damage.

- All work on the unit should therefore only be conducted by qualified personnel.
- Unqualified personnel should be kept away from the hazard zone.

The pertinent accident prevention regulations, as well as all other generally acknowledged safety regulations, must be adhered to.

Training	Definition
Instructed personnel	An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.
Trained user	A trained user is a person who fulfils the requirements made of an instructed person and who has also received additional training specific to the system from the manufacturer or another authorised distribution partner.
Trained, qualified personnel	A trained, qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognize possible hazards based on his training, knowledge and experience, as well as knowledge of pertinent regulations. A trained, qualified employee must be able to perform the tasks assigned to him independently with the assistance of drawing documentation and parts lists. The assessment of a person's technical training can also be based on several years of work in the relevant field.
Electrical technician	An electrical technician is able to complete work on electrical systems and recognise and avoid possible dangers independently based on his technical training and experience as well as knowledge of pertinent standards and regulations. An electrical technician must be able to perform the tasks assigned to him independently with the assistance of drawing documentation, parts lists, terminal and circuit diagrams. The electrical technician must be specifically trained for the working environment in which the electrical technician is employed and be conversant with the relevant standards and regulations.
Service	The Service department refers to service technicians, who have received proven training and have been authorised by the manufacturer to work on the system.

## 2.3 General safety information



### WARNING!

#### Unauthorised access!

Possible consequence: fatal or very serious injuries.

- Measure: Ensure that there can be no unauthorised access to the unit.
- Only allow trained personnel to fit, install, service and operate the sensor.
- Observe the applicable national installation and operating guidelines.



### CAUTION!

#### Functional limitations

Possible consequence: Slight or minor injuries. Material damage.

- Check the sensor regularly for dirt and contamination.
- Check the diaphragm cap regularly for air bubbles adhering to it.
- Observe the applicable national guidelines relating to maintenance, service and calibration intervals.



### CAUTION!

#### Operational prerequisites

Possible consequence: Slight or minor injuries. Material damage.

- Only use the sensor in bypass fittings that ensure the correct flow parameters.
- Ensure that there is a free flow or at most a back pressure of 1 bar at the drain of the bypass fitting.
- Do not interrupt the power supply to the sensor.
- It is necessary to run in and recalibrate the sensor following longer interruptions to the power supply (> 24 h).

## 2.4 Intended use

Intended use:

- The sensor may only be used to measure and regulate the concentrations of hydrogen peroxide in aqueous solutions for applications named in ↪ *Chapter 1.2 'Application' on page 5* or similar with consideration of the technical specifications.
- Connection to external controllers requires the approval of ProMinent.
- The sensor is not a safety component.

## 2.5 Information in the event of an emergency

- Switch off the measuring /control device in the event of an emergency.
- If liquid escapes from the bypass fitting, close the stopcocks on the inlet and outlet of the bypass fitting installed by the customer.
- Observe the plant operator's safety information before opening the bypass fitting.

## 3 Storage and transport of the sensor

**User qualification:** instructed user ↗ *Chapter 2.2 'User qualification' on page 9*



### **Original packaging**

*Damage to the product.*

- *Only transport, ship and store the sensor in its original packaging.*
- *Retain the packaging including the polystyrene inserts.*



### **Maximum storage period**

*Damage to the product.*

*If the sensor is stored for a long period of time, return it to the manufacturer for checking or servicing. Otherwise the safe operation and measuring accuracy of the sensor can no longer be reliably guaranteed.*

### 3.1 Storage

Permissible ambient temperature: +5 °C ... +50 °C.

Humidity: maximum 90% relative air humidity, non-condensing.

Other: No dust, no direct sunlight.

Maximum storage period of the sensor and diaphragm cap in their original packaging: 2 years.

Maximum storage period of the electrolytes: 1 year (see expiry date on the electrolyte bottle).

### 3.2 Transport

Only transport the sensor in its original packaging and in compliance with the permissible environmental conditions. No further special conditions have to be observed in relation to transport.

### 3.3 Packaging material

Dispose of packaging material in an environmentally responsible way. All packaging components carry the corresponding recycling code ♻️.

## 4 Assembly

- User qualification: trained user ↗ *Chapter 2.2 'User qualification' on page 9*



### WARNING!

#### Danger from hazardous substances!

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.



### Electrolyte

- *The electrolyte is sensitive to oxidation: Always keep the electrolyte bottle sealed after use.*
- *Do not decant electrolytes into other containers.*
- *Do not store electrolyte beyond its "Use by" date: and note the "Use by" date on the label on the electrolyte bottle.*
- *Pour in the electrolyte, preferably free of bubbles. (Larger air bubbles rise to the upper edge of the diaphragm cap and affect the measurement – smaller air bubbles are not a problem.)*



### Do not touch the diaphragm cap and electrodes

*Do not touch or damage the diaphragm in the diaphragm cap and the electrodes at the bottom of the sensor nor bring them into contact with greasy substances. Otherwise the sensor will no longer work accurately. In this case, replace the diaphragm cap with a new diaphragm cap or return the sensor to the manufacturer to have the electrodes cleaned.*

## 4.1 Filling electrolyte

1. ➤ Open the electrolyte bottle and screw on the nozzle (3).

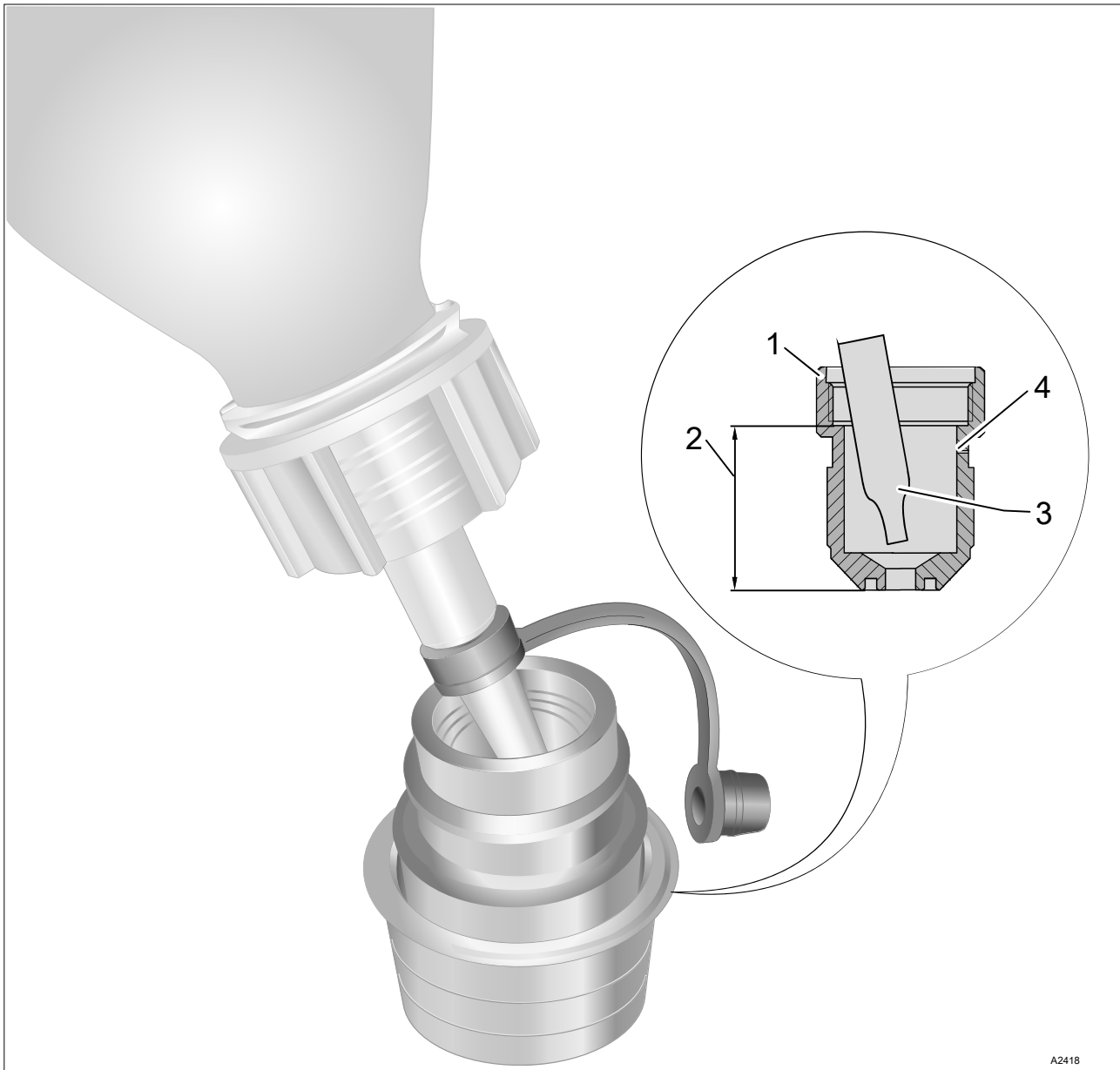


Fig. 3: Fill the electrolyte.

- 1 Diaphragm cap
- 2 Filling height of the electrolyte
- 3 Nozzle
- 4 Vent hole

2. ➤ Pour in the electrolyte, preferably free of bubbles.

Place the electrolyte bottle on the diaphragm cap (1) and slowly press the electrolyte in a single stream from the electrolyte bottle - at the same time evenly pulling back the electrolyte bottle.

⇒ The diaphragm cap is completely full when the electrolyte can be seen at the bottom thread (2).

3. ➤ Place the sensor vertically onto the filled diaphragm cap.

4. ➤ Do not use your fingers, or similar, to close the vent hole (4), otherwise pressure can build up when screwing it closed, and the diaphragm can be damaged.

When screwing it closed, allow excess electrolyte to escape through the vent hole (4) under the hose seal.

- ⇒ The diaphragm cap has not been sufficiently filled if no electrolyte escapes when screwing it closed. Repeat the process and fully fill the diaphragm cap.

5. ➤ Turn the diaphragm cap manually as far as the stop so that no gap can be seen between the diaphragm cap and sensor.

6. ➤ Wipe away any escaped electrolyte with a paper towel.

7. ➤ Close the electrolyte bottle.

8. ➤ Rinse the electrolyte from the nozzle of the electrolyte bottle under running water.

- ⇒ The sensor is now ready to be installed in the bypass fitting.

## 4.2 Installing the sensor in the bypass fitting



### **Minimum flow (l/h)**

*Do not drop below the minimum flow (l/h, see Technical data):*

- *Monitor the flow at the connected controller. If the measured value of the flow is used for control, switch off the control if the minimum flow rate is undershot or switch to the basic load.*
- *Only use the sensor in ProMinent bypass fittings. Use appropriate measuring methods to check the measured results before commissioning if using other bypass fittings.*
- *Avoid installations that allow air bubbles to form in the sample water.*
  - *Air bubbles, which adhere to the diaphragm of the sensor, can result in too low a measured value. Too low a measured value can lead to incorrect metering within a control circuit.*

*Also observe the instructions and safety information contained in the operating instructions for the bypass fitting.*



### **Installation instructions**

*Do not fit the sensor into a hydraulically fully closed bypass fitting. Open the sample valve if there is not a free flow.*

- *Only push in or pull out the sensor slowly to or from the bypass fitting. Otherwise the diaphragm could be damaged.*
- *Do not allow the diaphragm to come into contact with any objects to prevent damage to and contamination of the diaphragm.*
- *Always keep the sensor moist after commissioning, that is to say, never allow the bypass fitting to run dry.*

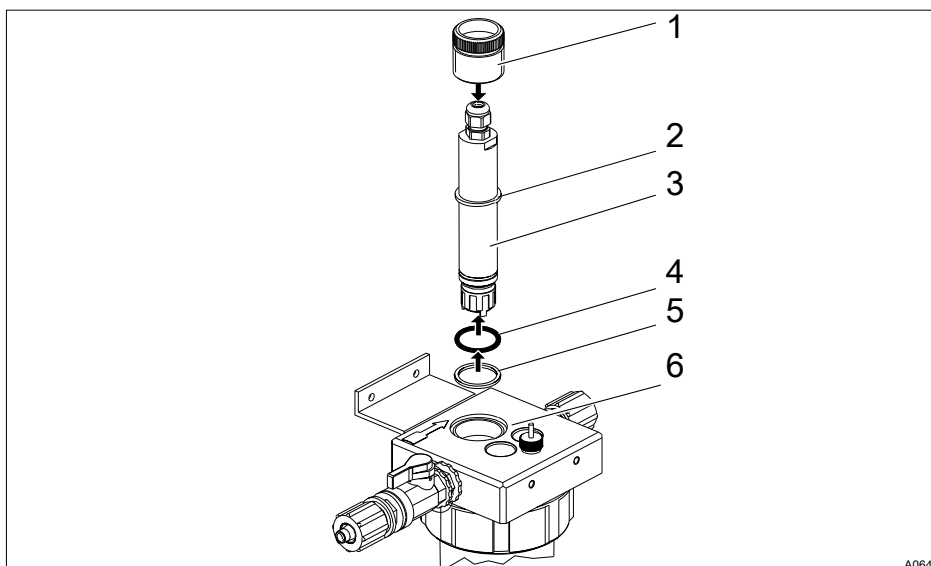


Fig. 4: Installation situation

- 1 Threaded sleeve
- 2 Clamp disc
- 3 Sensor
- 4 O-ring
- 5 Washer
- 6 Bypass fitting e.g. DLG

1. ➤ Push the O-ring (4) and the washer (5) included in the mounting kit from below over the sensor as far as the clamp disc (2).
2. ➤ Bypass fitting DLG III: guide the sensor into the DLG III and tighten the threaded sleeve.
3. ➤ Bypass fitting DGMa and BAMA: fit as described in the respective operating instructions.



*The correct insertion depth of the sensor is defined by the clamp disc. When using another manufacturer's bypass fitting, refer to the operating instructions issued by the manufacturer of the bypass fitting.*

## 5 Installation

- User qualification: trained qualified personnel or electrical technician, ↪ *Chapter 2.2 'User qualification' on page 9*



### WARNING!

#### Sensor connection on external equipment

Possible consequence: fatal or very serious injuries.

- Ensure that the connected controller is galvanically isolated from the sensor.
- Do not allow the supply voltage to fall below 16 V DC, even for short periods of time.
  - Ensure that the current source can be loaded with a minimum of 35 mA at a minimum of 16 V DC.
  - Too low a supply voltage may result in an incorrect measured value.

The requirements are automatically met when connecting the sensor to a ProMinent controller.



### CAUTION!

#### Incorrect metering

Possible consequence: Slight or minor injuries. Material damage.

- Do not switch off the controller during intermittent operation.
  - Switch on the feeder assemblies (e.g. pumps) with a time delay if necessary.
- Ensure that the water to be measured always contains a sufficient quantity of the appropriate feed chemical.
  - Otherwise you will have to factor in longer run in periods.

### Electrical installation

- Connect the signal cable to the sensor using the 4-pin M12 plug.
- Connect the signal cable to the terminals of the controller in accordance with its operating instructions.

Note the polarity:

*Tab. 2: Polarity of signal cable*

Plus (+):	brown
Minus (-):	white

## 6 Starting up the sensor

- **User qualification:** trained user ↪ *Chapter 2.2 'User qualification' on page 9*



### WARNING!

#### Danger from hazardous substances!

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.



### CAUTION!

- Do not disconnect the power supply to the controller and sensor. Recommission following longer interruptions to the power supply (>24 h); allow the sensor to run in again and calibrate it.
- Do not switch off the measuring system during intermittent operation. Operating the system without hydrogen peroxide is possible but you will need to check the correct functionality of the sensor after a typical absence of hydrogen peroxide in your application. Use appropriate reference methods to do so before returning to normal operation. Check the correct functionality of the sensor weekly in normal operation. Disconnect the sensor from the mains/power supply and store it in a dry place if no feed chemical is metered for a long period of time.
- Do not allow the current signal to exceed 20 mA, as otherwise the current signal can dip, the sensor will be damaged and trigger dangerous over-metering in a control circuit. To avoid this, install a monitoring unit, which switches off the control permanently and triggers an alarm. The monitoring unit should not have an automatic reset capability.
- Avoid installations that could cause air bubbles to form in the sample water. Air bubbles that adhere to the diaphragm of the sensor can result in too low a measured value and thus lead to dangerous over-metering in a control circuit.
- Always keep the sensor moist after commissioning.

The controller can be switched on once installation has been completed. You have to wait for the run-in period of the sensor.

## 6.1 Operation with the temporary absence of hydrogen peroxide

Operation without hydrogen peroxide is only possible in certain circumstances. Check the correct functionality of the sensor after a typical absence of hydrogen peroxide in your application using appropriate reference methods before returning to normal operation. Check the correct functionality of the sensor at least every 14 days in the absence of hydrogen peroxide within the measuring range of the sensor in normal operation. The sensor diaphragm being coated with biofilm can be the reason for serious deviation of the measured values. You then need to replace the diaphragm cap and the electrolyte.

## 6.2 Allowing the sensor to run in

The sensor requires a specific run-in period to display a steady display value.

Run-in period	
Initial commissioning:	1 h
After replacing the diaphragm:	0.5 h
Recommissioning:	1 h

## 6.3 Calibrating the sensor



### CAUTION!

- Perform slope calibration following the replacement of a diaphragm cap or electrolyte.
- Repeat slope calibration at regular intervals to ensure the correct operation of the sensor.
- Please note the applicable national guidelines for calibration intervals.



### Requirements

*The sensor is stable; no drift or oscillating measured values if possible for at least 5 minutes. This is generally guaranteed if the following conditions are fulfilled:*

- *The run-in period has elapsed.*
- *There is a permitted flow at the in-line probe housing.*
- *There is temperature compensation between the sensor and sample water (wait approx. 15 minutes).*

### Zero point calibration

➔ It is not necessary to carry out zero point calibration.

### Slope calibration



#### CAUTION!

- Check the calibration 24 hours after initial commissioning.
- Repeat the calibration process in the event that the concentration deviates by more than 15 % from the reference value.

There are 2 methods for calibrating the slope of the sensor:

- Photometry (photometer DT3B, order no. 1039317)
- Hydrogen peroxide standard solution

### Photometry (DT3B)

1. In the calibration menu of the controller, go to where you enter the calibration value. (This saves the measured value at the sampling time in the controller.)
2. Shortly afterwards, take a representative sample at the sensor fitting.
3. Measure the concentration value in line with the operating instructions for the photometer DT3B.
4. Enter this measured value into the calibration menu of the controller and perform calibration in line with the operating instructions for your controller.

### With a standard solution

1. Pour the hydrogen peroxide standard solution into a container:  
  
Bypass fitting DHG III only: first close the shut-off valves and pour the standard solution into its unscrewed and cleaned cup. Also clean the sensor and all wetted parts of the fitting and screw the filled cup from below back onto the base of the fitting.  
  
Bypass fitting DGMa or BAMA only: dismantle the sensor and hold it in a suitable container, e.g. a glass with a clamp and tripod or lid with a cut-out.
2. Stir the standard solution, possibly using a magnetic stirrer.
3. Wait a minimum of 15 minutes until the measured value remains stable.
4. Set the known concentration value of the standard solution in ppm on the controller in accordance with its operating instructions.

### Calibrating the sensor



#### CAUTION!

- The measuring range of the sensor must agree with the set measuring range of the controller.
- Adjust the measuring range before calibration.

Calibrate the sensor as described in the operating instructions for the controller.

## 7 Maintaining and repairing the sensor

- **User qualification:** trained user ↗ *Chapter 2.2 'User qualification' on page 9*



### WARNING!

#### Danger from hazardous substances!

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.

### 7.1 Maintenance



- *Maintain the sensor regularly to avoid over-metering in a control circuit due to incorrect measured values.*
- *Do not touch the electrodes or bring them into contact with substances containing grease.*
- *Do not unscrew the diaphragm cap when cleaning the diaphragm.*
- *Observe the applicable national guidelines for maintenance intervals.*

#### Maintenance interval

Depending on the application: 1 ... 4 weeks.

#### Maintenance work

- Regularly check the sensor for dirt, fouling and air bubbles. Avoid contaminating the diaphragm with particles, precipitation etc. Remove the air bubbles by increasing the flow.
- Regularly check the display value of the sensor on the controller using an appropriate reference method (e.g. photometry).
- Re-calibrate the sensor, if necessary.
- Clean or replace the diaphragm cap if calibration is no longer possible, and repeat calibration.

#### Cleaning the diaphragm

- Cleaning not possible: cleaning the diaphragm will result in it being irreparably damaged.

## 7.2 Repair

Repair not possible: the sensor can only be repaired in the factory.  
Return the sensor to the manufacturer in its original packaging.

## 8 Troubleshooting

**WARNING!****Danger from hazardous substances!**

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.



*All possible errors of the reference method should initially be considered in the event of large deviations between the measured value of the sensor and the measured value of the reference method. Repeat the reference measurement several times if necessary.*

## 8.1 Troubleshooting

### Sensor: Troubleshooting

Consider the complete measuring point when troubleshooting. The measuring point consists of:

- Controller
- Electrical cable and connectors
- Bypass fitting and hydraulic connectors
- Sensor

The possible causes of faults in the table below principally refer to the sensor. Make sure that the operating instructions have been complied with before commencing troubleshooting:

- Feed chemical concentration corresponds to the measuring range
- Temperature of the sample water is 5 ... 45 °C and constant
- Flow rate 30 ... 60 l/h

The sensor simulator (DULCOMETER® simulator, order no. 1004042) can be used to localise the fault in the controller. Detailed troubleshooting on the controller is described in the operating instructions for the controller.

All possible errors of the reference method should initially be considered in the event of large deviations between the measured value of the sensor and the measured value of the reference method. Repeat the reference measurement several times if necessary.

Error	Possible cause	Remedy
Sensor cannot be calibrated and the measured value of the sensor is greater than the reference measurement.	Run-in period too short.	see "Run-in period".
	Diaphragm cap damaged.	Replace the diaphragm cap, allow the sensor to run in, calibrate it.
	Short circuit in the measuring line.	Identify the short circuit and eliminate the cause.
Sensor cannot be calibrated and the measured value of the sensor is less than the reference measurement.	Run-in period too short.	see "Run-in period".
	Deposits on the diaphragm cap.	Clean or replace the diaphragm cap; allow the sensor to run in, calibrate it.
	No sample water flow.	Correct the flow rate.
	Air bubbles on the outside of diaphragm.	Remove the air bubbles by tapping and increase the flow rate, if necessary.
	Troublesome substances in the sample water.	Contact ProMinent.
Deposits (manganese, iron oxide) on the diaphragm.		Clean or replace the diaphragm cap; allow the sensor to run in, calibrate it.
The measured value of the sensor is 0 ppm.	No electrolyte in the diaphragm cap.	Fill with new electrolyte (see "Assembly", "Run-in period" and Calibrate).
The measured value of the sensor is 0 ppm and an error message appears.	The sensor is connected to the controller with the wrong polarity.	Connect the sensor correctly to the controller.
	Measuring line broken.	Replace the measuring line.
	Sensor faulty.	Return the sensor for repair.

Error	Possible cause	Remedy
	Controller faulty.	Check the controller with a sensor simulator (DULCOMETER® simulator, order no. 1004042); return if faulty.
The measured value of the sensor is 0 ppm and the sensor current is 3.0 ... 4.0 mA.	Run-in period too short.	see "Run-in period".
	Reference electrode faulty*.	Return the sensor for regeneration.
Error message on the controller.	Feed chemical content is greater than the upper measuring range limit.	Check the system, clear errors, repeat calibration.
	Sensor faulty.	Return the sensor.
The measured value display of the sensor on the controller is unstable.	Reference electrode faulty *	Return the sensor for regeneration.
	Process-related.	Improve the control process.

\* Regenerate the reference electrode if it appears shiny silver or white. By contrast, brown/grey discolourations are normal.

## 9 Decommissioning

**User qualification:** instructed user ↪ *Chapter 2.2 'User qualification' on page 9*



### WARNING!

#### Danger from hazardous substances!

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.



### CAUTION!

Refer to the system operator's safety information before opening the bypass fitting.

### Decommissioning the sensor

1. ➤ Switch off the controller before dismantling the sensor.

**INFORMATION:** Removing the sensor would otherwise produce an incorrect measured value at the input of the controller and lead to uncontrolled metering.

2. ➤ Disconnect the sensor electrically.
3. ➤ Ensure that the bypass fitting is at atmospheric pressure.
4. ➤ Loosen the clamping screw on the bypass fitting.
5. ➤ Pull the sensor slowly out of the bypass fitting.
6. ➤ Unscrew the diaphragm cap over a sink or similar.
7. ➤ Empty the diaphragm cap over a sink or similar.
8. ➤ Thoroughly rinse the electrodes and the diaphragm cap with clean, warm water so that no electrolyte adheres, and then allow to dry.
9. ➤ Loosely screw on the diaphragm cap to protect the electrodes.

## 10 Disposal of used parts

- **User qualification:** instructed user, see [Chapter 2.2 'User qualification'](#) on page 9



### NOTICE!

#### Regulations governing the disposal of used parts

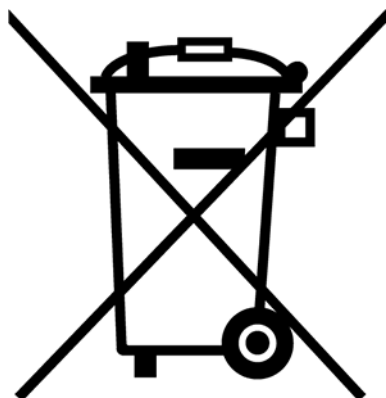
- Note the national regulations and legal standards that currently apply in your country

The manufacturer will take back decontaminated used devices providing they are covered by adequate postage.

Decontaminate the device before returning it for repair. To do so, remove all traces of hazardous substances. Refer to the Material Safety Data Sheet for your feed chemical.

A current Declaration of Decontamination is available to download on the ProMinent website.

Sign indicating EU collection system



In accordance with the European Directive 2012/19/EU on waste electrical and electronic equipment, this device features the symbol showing a waste bin with a line through it. The device must not be disposed of along with domestic waste. To return the device, use the return and collection systems available and observe the local legal requirements.



## 11 Technical data

Parameter	Value
Measured variable:	Hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> )
Measuring principle, technology:	amperometric, 3 pulsing electrodes, diaphragm-covered
Measuring range:	0.5 ... 50 mg/l (PEROX H 3E 50 ppm) 2 ... 200 mg/l (PEROX H 3E 200 ppm) 5 ... 500 mg/l (PEROX H 3E 500 ppm)
pH-range:	2.5 ... 8.0
Temperature range:	0 ... 45 °C
Temperature compensation:	no internal compensation, automatically with controller DACa/b and external Pt100/1000 or manually.
Permissible temperature change:	< 1 °K/min (with external T measurement)
Conductivity, minimum:	100 µS/cm
Maximum pressure:	3 bar, no pressure surges
Response time T90:	< 30 s
Flow:	DGMa: 30 ... 60 l/h DLG II: 30 ... 60 l/h BAMa: 5 ... 100 l/h, depending on the design
Cross-sensitivity	sulfite < 15 %, negligible compared to free chlorine and peracetic acid
Supply voltage:	16 ... 24 V DC
Output signal:	4 ... 20 mA
Electrical connection:	via a 4-pin plug, M12 on the sensor via an open-ended signal cable
Degree of protection:	IP 65

## 12 Spare parts and accessories

Ordering address for spare parts and accessories: The current address for ordering spare parts and accessories can be found on the manufacturer's homepage ProMinent.

The sensor can only be ordered as a complete kit comprising:

- 1 sensor
- 1 screwdriver
- 2 replacement diaphragm caps, complete
- 1 bottle of electrolyte, type CDP, 100 ml
- 1 set of operating instructions (not shown)

Tab. 3: Measuring range of the sensor versions

Designation of the complete kit	Order no.
PEROX H 3E-mA-50 ppm	1105779
PEROX H 3E-mA-200 ppm	1105778
PEROX H 3E-mA-500 ppm	1117570

Tab. 4: The following spare parts / consumables and accessories are available for the sensors:

#	Designation	Order no.
1	External cable 2-wire with round plug 2 m	707702
1	External cable 2-wire with round plug 5 m	707703
1	External cable 2-wire with round plug 10 m	707707
2	1 bottle of electrolyte, type CDP, 100 ml	1002712
3	1 diaphragm cap, complete, type CGE 2	792862
4	1 mounting kit for DGM	791818
5	1 mounting kit for DLG III	815079
6	1 mounting kit for BAMa	1113807
7	1 sensor adapter BAMa 1"	1105884
8	1 O-ring 29.00 - 2.00 FKM	1112545

## 13 Directives / standards adhered to

EU directives:

- EMC Directive (2014/30/EU).
- RoHS Directive (2011/65/EU).

Harmonised standards:

- EN 61326-1:2013, Class B
- EN 50581:2012

You will find the EC Declaration of Conformity to download on our homepage.

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