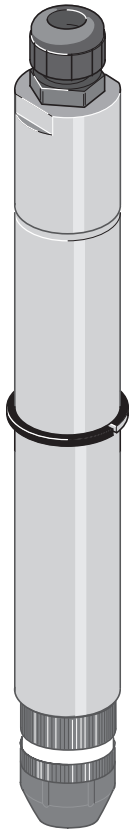
Betriebsanleitung / Operating Instructions
Mode d'emploi / Instrucciones de servicio

DULCOTEST® PER

Messzelle für Wasserstoffperoxid
Measuring cell for hydrogen peroxide
Cellule de mesure peroxyde d'hydrogène
Medidor de peróxido de hidrógeno

Typ /Type /Type /Tipo PER 1-mA-50 ppm
Typ /Type /Type /Tipo PER 1-mA-200 ppm
Typ /Type /Type /Tipo PER 1-mA-2000 ppm

G/GB/F/E



Teile Nr./Part No.: 986884 **ProMinent Dosiertechnik GmbH · 69123 Heidelberg · Germany** BA DT 084 07/07 G/GB/F/E

D Betriebsanleitung in Deutsch
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GB Operating Instructions in English
from page 25 to 45

F Mode d'emploi en français
de la page 47 à la page 67

E Instrucciones de servicio en español
de página 69 hasta página 89

Publishing details:

Operating Instructions
DULCOTEST® PER measuring cell for hydrogen peroxide
Type PER 1-mA-50 ppm
Type PER 1-mA-200 ppm
Type PER 1-mA-2000 ppm

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Subject to technical alterations.

Please read through operating instructions manual carefully before operating the equipment!
Do not discard!
The operator shall be liable for any damages caused by installation or operating errors.

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User instructions for the operating instructions manual

This operating instructions manual contains the product description in the main body of the text as

- bullet points
- ▶ practical instructions

and safety instructions are denoted by pictograms:

CAUTION

Non-compliance with safety instructions results in the risk of slight physical injury and damage to property.

IMPORTANT

Non-compliance with safety instructions results in the risk of damage to property.

NOTES

Working guidelines

1 Safety

CAUTION

- ***Only trained and authorised operatives may operate the measuring cell and its peripherals!***
- ***Observe the relevant national regulations in force when installing the equipment abroad!***

The measuring cell may be used only to determine and regulate the concentration of H_2O_2. Connection to external equipment requires authorisation from ProMinent. We accept no responsibility for personal injury or damage to property resulting from any non-compliance with this operating instructions manual, or from modification or incorrect use of the measuring cell. We therefore specifically refer you to the safety instructions in the following sections.

2 Checking the delivery

NOTE

Keep the packaging including the polystyrene components and use this packaging when sending the measuring cell for repair or for return under warranty.

Unpacking

▶ Check the consignment is intact. Notify the supplier of any damage.

▶ Check the delivery is complete according to your purchase order and shipping documentation.

Delivery contents

- 1 measuring cell PER 1-mA-50 ppm or
- 1 measuring cell PER 1-mA-200 ppm complete or
- 1 measuring cell PER 1-mA-2000 ppm complete
- 1 bottle of electrolyte (50 ml)
- 1 spare diaphragm cap
- 1 pipette (plastic)
- 1 operating instructions manual
- 1 small screwdriver

3 Storage and transport

IMPORTANT

Please observe the required storage conditions in order to avoid damage and malfunctioning.

Storage

• Storage period for measuring cell including the diaphragm in the original packaging:	minimum 2 years
• Storage period of electrolyte in original bottle:	max. 1 year
• Storage and transport temperature:	between +5 and +50 °C
• Humidity:	max. 90 % rel. humidity, non-condensing

Transport

The measuring cell should only be transported in its original packaging.

4 Range of application

IMPORTANT

- ***Non-compliance with operating conditions specified in the technical data (see section 14) could lead to a measuring error and to a dangerous over metering within a closed loop.***
- ***The measuring cell is not suitable for checking for the absence of H_2O_2.***

The DULCOTEST® measuring sensor PER 1 is a diaphragm-covered amperometric sensor for the online determination of the concentration of hydrogen peroxide. Hydrogen peroxide serves a.o. as bio-degradable disinfection and oxidation agent. The sensor can a.o. be used in the following applications:

- Oxidation of drinking water, landfill leachate, contaminated ground water
- Disinfection of cooling, service, and production water in the pharmaceutical, food and beverages industry as well as in swimming pools
- Deodorization (gas scrubber) in municipal and industrial purification plants
- Dechlorination in chemical processes
- Chemical bleaching in the timber, paper, textile and mineral materials industry
- Organic synthesis in the chemical, pharmaceutical, and cosmetics industry

Please note that for regulation tasks, the response time t_{90} is 8 min.!

5 Construction and function

Construction of the measuring cell

The PER measuring cell consists of 3 main components, the upper section, the electrode shaft and the diaphragm cap (see fig. 1). The electrolyte-filled diaphragm cap represents the measuring chamber into which the measuring electrodes are immersed.

The measuring medium is sealed by a diaphragm in the measuring chamber.

The electronic amplifier is embedded in a synthetic compound in the upper section of the shaft.

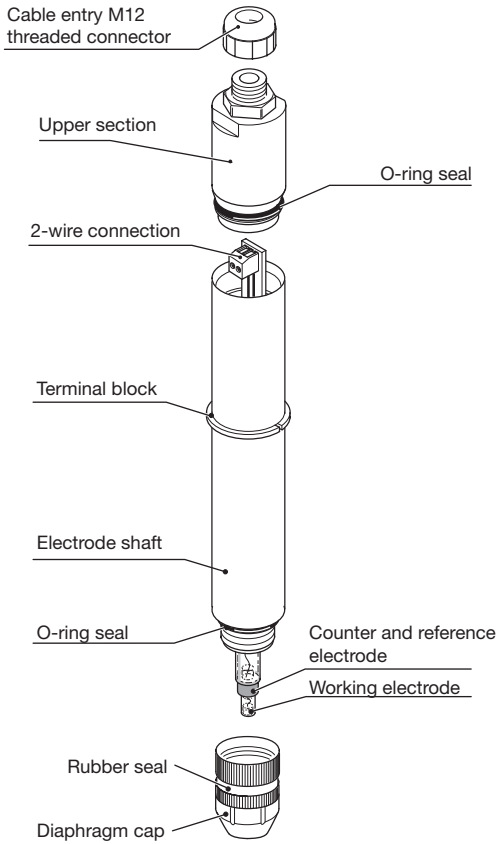
The measuring cell has a passive 4-20 mA two-wire interface. Power is supplied externally from a measuring and control system, e.g. DULCOMETER® D1C for the measured variable H_2O_2.

Function of the measuring cell

The PER measuring cell is a diaphragm-covered, amperometric two-electrode measuring cell. A gold electrode (PER 1-mA-2000 ppm) or a carbon dioxide electrode (PER 1-mA-50 ppm, PER 1-mA-200 ppm) is used as working electrode, a silver halide-coated anode is used as counter and reference electrode.

The H_2O_2 contained in the sample water diffuses through the diaphragm. The constant polarisation voltage between the two electrodes causes the electrochemical reaction of the H_2O_2 on the collector. The resulting current is measured as a primary signal (amperometric measurement principle). This is proportional to the concentration of H_2O_2 within the operating range of the measuring cell. The electronic amplifier within the measuring cell converts the primary signal into a temperature-compensated 4-20 mA output signal, which is displayed at the DULCOMETER® D1C for the measured variable H_2O_2.

Fig. 1 Construction of the measuring cells



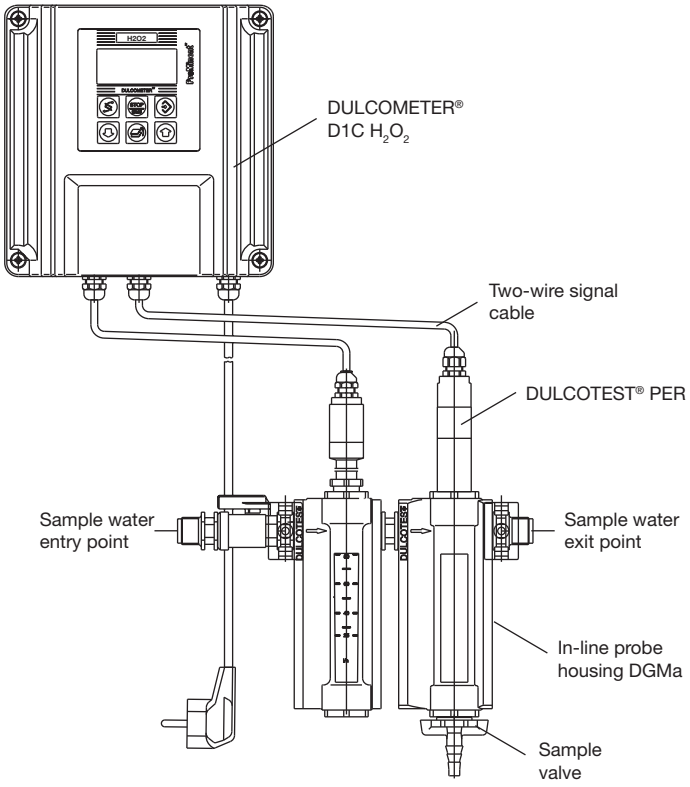
Measurement station

When set-up of the measurement station is complete, a two-wire signal cable electrically connects the DULCOMETER® D1C measuring and control system for H_2O_2, connected to the power supply, to the DULCOTEST® PER measuring cell.

The measuring cell is installed either in the in-line probe housing DLG III or in the modular in-line probe housing DGM. A sampling valve (see section 15 Ordering information) can be screwed into the lower section of the DGM module (see section 8.2 Calibration).

The in-line probe housing is hydraulically connected to the sample water flow.

Fig. 2
Measurement station



6 Assembly

CAUTION

- ***Protective goggles and protective clothing should be worn when handling water and solutions containing H_2O_2!***
- ***Do not swallow the electrolyte. If electrolyte comes into contact with the eyes or skin, rinse the affected areas thoroughly with water! If reddening of the eyes occurs, consult an eye specialist!***

IMPORTANT

- ***Do not touch or damage the diaphragm and electrodes!***
- ***Always keep electrolyte bottles tightly closed after use! Do not transfer electrolyte into any other bottles or containers.***
- ***The electrolyte should not be kept for more than 1 year! (See label for use-by date).***
- ***The diaphragm cap may only be used once!***

Filling with electrolyte

▶ Remove the diaphragm protection cap and unscrew the diaphragm cap from the electrode shaft.

▶ Fill the diaphragm cap with electrolyte up to the lower thread, if possible bubble-free.

If you wish to considerably reduce the running-in time, you must expel the air between the gauze and the diaphragm (as the air is expelled, the diaphragm is visible by reflecting through the electrolyte as it is being filled).

There are two ways of doing this:

1.

▶ Tap the diaphragm cap lightly from the side, from the bottom and from the top with the sensor shaft until the air bubbles stop rising (you can see this in good light).

2.

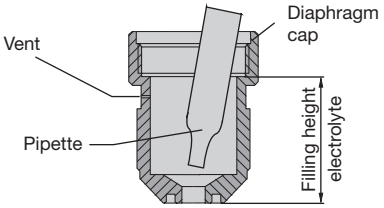
▶ Fill the enclosed pipette with electrolyte from the diaphragm cap, if possible up to the top. Please ensure that no air is taken in.

Take the opening of the pipette as close as possible to the diaphragm (through the electrolyte) and place a couple of drops on it from the pipette (do not release any air from the pipette when doing this!)

IMPORTANT

After using the pipette, rinse thoroughly with water and store in the original measuring cell packaging!

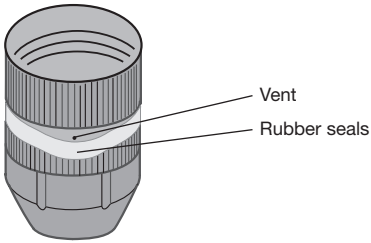
Fig. 3
Diaphragm cap



Assembling the diaphragm cap

- ▶ Insert the finger nail below both rubber seals at the semi-circular pocket in the diaphragm cap (the vent is positioned there) and pull the rubber seals to the bottom until the needle top-sized vent (see Fig. 4) becomes visible and hold the seals. When screwing together, excess electrolyte should escape freely through the vent (see Fig. 4) such that the diaphragm is not damaged by excess pressure.
- ▶ Position the electrode shaft vertically on the filled diaphragm cap.
- ▶ Do not obstruct the vent with your fingers.
- ▶ Screw the electrode shaft manually into the diaphragm cap up to the stop such that there is no free gap between the diaphragm cap and the electrode shaft.
- ▶ Re-insert the rubber seals flush into the groove of the diaphragm cap.

Fig. 4
Rubber seal



IMPORTANT

- ***Depressurise the system before installing the measuring cell in the flow housing. Close stop valves to the front and rear of the in-line probe housing.***
- ***Placing/removing the measuring cell into/from the in-line probe housing should be done slowly.***

- ***Do not exceed the maximum permitted operating pressure of 1 bar!***
- ***Ensure the flow does not fall below the minimum flow rate of 20 l/h! Monitor the flow on the connected measurement and control equipment. If the measured value is used as a control, switch off the control by reducing to below the minimum flow rate or switch to basic load.***
- ***Use the measuring cell only in in-line probe housing types DLG III A (914955), DLG III B (914956) or DGM (module 25 mm) in order to guarantee the required flow conditions!***
  There is no guarantee provided for use with other in-line probe housings.
- ***Avoid installations which allow air bubbles to build up in the sample water.***
  Air bubbles that cling to the diaphragm of the sensor can cause the measured value to be too small and thus may lead to incorrect metering in the control system.

Fitting the measuring cell in the in-line probe housing

Observe the operation and safety instructions contained in the operating instructions manual for the in-line probe housing!

DLG III

- ▶ Push the O-ring up over the measuring cell as far as the terminal block.
- ▶ Insert the measuring cell into the DLG III.
- ▶ Tighten the measuring cell with thread plugs.

DGM

- ▶ Push the O-ring up over the measuring cell as far as the terminal block; leave a plain washer in the DGM.
- ▶ Insert the measuring cell into the DGM and fit tightly with terminal screw until the O-ring is sealed: the terminal block determines the correct depth for fitting the measuring cell.

7 Installation

General safety instructions

IMPORTANT

Install the equipment so that the power supply for the controller never falls below the minimum! A power supply that is too low causes errors in measured values and can lead to over metering in a control system!

The measuring cell PER is a measuring cell with a passive 4-20 mA two-wire interface. The power is supplied externally or from a measuring and control system. Connection to the DULCOMETER® D1C controller from ProMinent ensures automatic compliance with interface safety requirements.

Additional safety instructions for operation with external equipment:

IMPORTANT

- ***Connection of the measuring cell to external equipment after authorisation from ProMinent!***
- ***The power supply for the measuring cell may not fall below 16 V DC, even for a short period! The power source must have a minimum load rating of 35 mA at a minimum of 16 V DC. A power supply that is too low causes errors in measured values and can lead to dangerous over metering!***
- ***The measuring cell is not electrically isolated. In order to avoid any disruptive compensating current, the external equipment and any other loads connected to the power supply must be electrically isolated.***

Observe the following when connecting to external equipment:
Power source: 16-24 V DC, min 35 mA at 16 V DC
Max load: 1.0 W

IMPORTANT

When electrically connecting the measuring cell to the measuring equipment, only use signal cables with a diameter of 4 mm (see section 15, Ordering information).

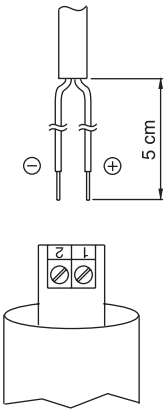
Electrically connecting the measuring cell

▶ Turn the upper section of the measuring cell anti-clockwise through 90° and remove.

▶ Strip the outer insulation back by about 5 cm so that both connectors are visible.

- ▶ Loosen the M-12 connection and feed the 2-connector cable through it. Whilst doing this, keep the two-connector signal cable in the measuring cell (5 cm).
- ▶ Strip the insulation from both ends of the cable and connect to the terminal, as shown in fig. 4 (use the screwdriver provided). 1 = plus, 2 = minus (see fig. 5).
- ▶ Tighten the M-12 connection.
- ▶ Turn the upper section of the measuring cell clockwise firmly as far as the stop.

Fig. 5
Electrically connecting the measuring cell



8 Commissioning

CAUTION

- ***Please note that for regulation tasks, the response time T_{90} is 8 min.!***
- ***The power supply for the measuring equipment and the measuring cell must not be interrupted. If power is interrupted for a long period (>24 hrs), commissioning should be re-started (run-in and calibrate the sensor).***
- ***Do not switch off the measuring system during intermittent operation!***
  Connect the metering device after any time-delay. However, if there is a long period (weeks) during which no disinfectant is metered, disconnect the sensor from the power supply and store in a dry place.

- ***The current signal should not exceed 20 mA!***
  Otherwise the current signal can drop, the measuring cell can become damaged and this can cause dangerous over metering in a control system!
  In order to avoid this, install a monitoring system, which turns off the remaining H_2O_2 control and triggers an alarm. The monitoring system should not be automatically reset.
- ***Avoid installations that can cause air bubbles in the sample water! Air bubbles clinging to the measuring cell diaphragm can cause the measured value to be too small and thus lead to dangerous over metering in a control system!***
- ***After commissioning, the measuring cell should always be stored in a moist environment.***

After successful installation, the measuring equipment can be activated. After that you need to wait for the designated running-in time for the measuring cell.

8.1 Running-in time

In order to obtain a stable reading, the measuring cell requires the following running-in times:

initial commissioning:	approx. 2 – 6 hours
after changing the diaphragm:	approx. 2 – 6 hour
re-commissioning:	approx. 1 – 3 hours

If air between the gauze and the diaphragm was not expelled (see section 6) then, naturally, running-in times will be longer!

8.2 Calibration

CAUTION

- ***You must perform a slope test after changing a diaphragm cap or electrolyte.***
- ***You should perform a slope test at regular intervals to ensure flawless operation of the measuring cell.***
- ***You should observe the relevant national regulations in force for calibration intervals!***

Conditions

Operation of the measuring cell is stable (no possible drift or fluctuating measured values during a minimum period of 5 minutes). This is generally guaranteed when the following conditions are fulfilled:

- the H_2O_2 concentration of the sample water is isochronically sufficiently constant (please note the sensor's response time of 8 min!)
- the relevant running-in time has been allowed (see section 8.1 Running-in time).
- permitted flow is present in the in-line probe housing (see section 14 Technical data).
- Temperature compensation is given between measuring cell and sample water (wait approx. 15 minutes).

Zero point calibration

A zero point calibration is only required at the lower limit of the measuring range.

Slope test

IMPORTANT

- ***After an initial commissioning, check calibration after 24 hours.***
- ***Repeat calibration if the H_2O_2 concentration varies by more than 15 % from the reference value.***

On photometry:

▶ If not yet installed, install the measuring sensor into the in-line probe DLG III or DGM (see Chap. 6 Mounting)

▶ Perform sampling. This must be performed in direct proximity to the measuring sensor. Recommendation: in case of the in-line probe DGM use the sampling valve (see Fig. 2 and Order notes, Chap. 15).

▶ Determine the H_2O_2 concentration as quickly as possible with a Photometer (please observe operating instructions! E.g. use the Photometer DULCOTEST® DT3).

▶ Set the determined H_2O_2 concentration in ppm at the control device according to its operating instructions (see operating instructions DULCOMETER® D1C, measured variable H_2O_2, Chap. 8, Complete operating menu, Setting menu "Calibrate H_2O_2").

9 Maintenance of the measuring cell

IMPORTANT

- ***Maintain the measuring cell regularly in order to avoid over metering in a control system resulting from an incorrect measured value!***
- ***Observe the relevant national regulations in force for frequency of maintenance!***
- ***Do not touch the electrodes or bring them into contact with greasy substances!***
- ***Do not unscrew the diaphragm cap when cleaning the diaphragm!***

Maintenance frequency

Figures based on experience for: media with minor dirt contamination: 1 month

Other applications: depending on operating conditions

Maintenance operation

- ▶ Check the measuring cell regularly for dirt, deposits and air bubbles!
  Avoid, as far as is possible, contamination of the diaphragm with particles, deposits/sediments, etc. Eliminate air bubbles by increasing the flow.
- ▶ Check the measuring cell display value at the control equipment regularly using suitable reference methods (Photometry, Chap. 8.2).
- ▶ If necessary, re-calibrate the measuring cell (see section 8.2 Calibration).
- ▶ If calibration is no longer possible, clean or replace the diaphragm cap and then repeat calibration (see sections 6, Assembly, 8.1 Running-in time and 8.2 Calibration).

Cleaning the diaphragm

Do not unscrew the diaphragm cap!

- ▶ Wipe the diaphragm with a damp cloth.

10 Troubleshooting

Troubleshooting includes the complete measuring station. This consists of (see fig. 2)

1) Measuring/control equipment
2) Electrical cable and connections
3) In-line probe housing and hydraulic connections
4) Measuring cell

Possible causes for faults shown in the table below mainly refer to the measuring cell. Before beginning to look for any faults, you should ensure that all operating instructions have been carried out in accordance with the Technical data in section 14:

a) H_2O_2 content in accordance with the measurement range
b) Sample water temperature 0 - 50 °C and constant
c) Flow rate 20 - 100 l/h

You can use the measuring cell simulator (DULCOMETER® simulator order no. 1004042) to locate the fault in the measuring and control system. The operating instructions manual for the DULCOMETER® D1C measured value H_2O_2 gives full details on how to locate a fault in the measuring and control equipment.

Where there are major discrepancies between the measured values of the measuring cells and the measured value of the reference methods, you should first consider all possible faults relating to the reference methods. You should repeat the reference measurement several times if necessary.

Fault	Possible cause	Remedy
Measuring cell cannot be calibrated and measured value of the measuring cell is greater than the reference measurement	1) Running-in time too short	See section 8.1 running-in time
	2) Diaphragm cap damaged	Change diaphragm cap; run in the measuring cell, calibrate (see sect. 6, 8.1, 8.2)
	3) Short circuit in the signal cable	Locate the short circuit and remove
	4) Interfering substances	Contact ProMinent
Measuring cell cannot be calibrated and measured value of the measuring cell is smaller than the reference measurement	1) Running-in time too short	See section 8.1 running-in time
	2) Coating/deposits on the diaphragm cap	Clean or change diaphragm cap (see sect. 6); run in the measuring cell (see sect. 8.1) calibrate (see sect. 8.2)
	3) No sample water flow	Correct the flow (see sect. 14 Technical data)
	4) Air bubbles outside on the diaphragm	Increase the flow within the permitted levels
	5) Harmful substances in sample water	Consult ProMinent

Fault	Possible cause	Remedy
	6) coating/deposits (manganese, iron oxide) at the diaphragm cap	Clean or change diaphragm cap (see sect. 6); run in the measuring cell (see sect. 8.1), calibrate (see sect. 8.2)
Measuring cell measured value is 0 ppm	No electrolyte in the diaphragm cap	Use new diaphragm cap and fill in new electrolyte (see Chap. 6 Mounting, Chap. 8.1 Running-in Period, and Chap. 8.2 Calibration)
Measuring cell measured value is 0 ppm and error message appears at the DULCOMETER® D1C controller “H2O2 input < 3 mA”	1) measuring cell connected to controller with incorrect polarity 2) signal cable broken 3) defective measuring cell 4) defective control equipment	Connect the measuring cell correctly to the controller (see sect. 7) Change signal cable Return the measuring cell Check the control equipment with measuring cell simulator (DULCOMETER® Simulator, order no.1004042), return if defective
Measuring cell measured value is 0 ppm and measuring cell current is between 3.0 and 4.0 mA**	1) running-in time too short 2) defective reference electrode*	See section 8.1 running-in time Return the measuring cell for regeneration
Error message at DULCOMETER® D1C controller “H2O2 input > 23 mA“	1) H_2O_2 content exceeds upper limit of measuring range 2) defective measuring cell	Check system, remedy the defect repeat calibration (see sect. 8.2) Return the measuring cell
Measuring cell measured value is unstable	1) defective reference electrode* 2) process-related	Return the measuring cell for regeneration Optimise control process

* If the reference electrode has a silvery sheen or looks white, it needs to be regenerated. Brownish-grey discolouration is however normal.

** To isolate faults, the current in the measuring cell can be displayed via the DULCOMETER® D1C whilst the latter is electrically connected to the measuring cell.
For this purpose read the value in “zero point” in the setting menu “H_2O_2 calibration” in the complete operation menu, see operating instructions DULCOMETER® D1C, Section 8. Do not confirm by pressing the Enter key, but exit the menu using the Back key.

11 Decommissioning

CAUTION

- ***Before removing the measuring cell, switch off any peripheral control equipment completely or switch to manual operation. When the measuring cell is deactivated, an incorrect measured value can occur on starting the control/measuring equipment and can lead to uncontrolled metering in a control system.***
- ***De-pressurise the system when removing the measuring cell! To do this you should close the stop valve in front of and behind the in-line probe housing. If the measuring cell is removed under pressure, liquid could leak out.***
- ***In an emergency, cut the power supply to the controller! In case any liquid leaks out of the in-line probe housing (DGM/DLG III), close the inlet and outlet stop valves as installed by the customer.***
- ***Before opening the DGM/DLG III, observe the safety instructions in the system operating instructions!***
- ***You should also observe the safety instructions in section 6 assembly.***

Decommissioning the measuring cell

- ▶ Disconnect the measuring cell from the power supply (see section 7 installation).
- ▶ De-pressurise the in-line probe housing.
- ▶ Loosen the locking screw on the in-line probe housing.
- ▶ Slowly remove the measuring cell from the in-line probe housing.
- ▶ Unscrew and empty the diaphragm cap over a washbasin, or similar.
- ▶ Discard diaphragm cap,
- ▶ Thoroughly rinse the electrodes in clean, warm water and let dry dust-free,
- ▶ Screw on loosely a new diaphragm cap to protect the electrodes,
- ▶ Put on the diaphragm protection cap to protect the diaphragm cap.

12 Repair

The measuring cell can only be repaired in the factory. You should therefore return it in its original packaging. Prepare the measuring cell for this beforehand (as described in section 11 decommissioning).

13 Disposal

Electrolyte

You can pour the electrolyte down the drain.

You can dispose of the diaphragm cap with normal household waste.

Measuring cell

IMPORTANT

Observe the regulations, which currently apply in your particular location (especially with regard to electronic scrap!)

ProMinent Dosiertechnik GmbH, Heidelberg accepts spent equipment for a small charge and with adequate postage to cover the consignment.

14 Technical data

Measured variables

H_2O_2 (hydrogen peroxide)

Applications ranges

Oxidation of drinking water, landfill leachate, contaminated ground water

Disinfection of cooling, service, and production water in the pharmaceutical, food and beverages industry as well as in swimming pools

Deodorization (gas scrubber) in municipal and industrial purification plants

Dechlorination in chemical processes

Chemical bleaching in the timber, paper, textile and mineral materials industry

Organic synthesis in the chemical, pharmaceutical, and cosmetics industry

Measuring range	PER 1-mA-50 ppm: 0.5...50 mg/l PER 1-mA-200 ppm: 2… 200 mg/l PER 1-mA-2000 ppm: 20… 2000 mg/l
Resolution	In accordance with the lower limit of the instrument measuring range
Nominal slope	at pH 7, T = 30 °C: PER 1-mA-50 ppm: 240 µA/ppm PER 1-mA-200 ppm: 60 µA/ppm PER 1-mA-2000 ppm: 6 µA/ppm
Reaction time	t_{90} approx. 8 min
pH range	1 - 11
Temperature range	0 - 50 °C, temperature-compensated, no sudden leaps in temperature (sample water), 5 - 50 °C (ambient air)
Pressure	Maximum 1 bar (free flow)
Conductivity	0.05 … 5.00 mS/cm
Flow	Sample water through in-line probe housing DLG III, DGM optimal: 50 l/h minimum: 20 l/h maximum: 100 l/h
Cross-sensitivity	bromine, bromamine, chlorine, ozone, peracetic acid, chlorine dioxide
Interferences	Sulphides and thiols deposit on the surface of the gold counter electrode
Life of diaphragm cap	Typically 3-6 months, depending on water quality
Materials	Diaphragm cap: PVDF, PVC Electrode shaft: PVC-C
Power supply	16 - 24 V DC; min 35 mA at 16 V DC
Output signal	4 - 20 mA
Enclosure rating	IP 65
Storage temperature	Between 5 and 50 °C

15 Ordering information

Standard content of delivery

- 1 measuring cell PER 1-mA-50 ppm or
- 1 measuring cell PER 1-mA-200 ppm complete or
- 1 measuring cell PER 1-mA-2000 ppm complete
- 1 bottle of electrolyte (50 ml)
- 1 spare diaphragm cap and socket
- 1 pipette (plastic)
- 1 operating instructions manual
- 1 small screwdriver

Complete set

The measuring cell can only be ordered as a complete set:

- PER 1-mA-50 ppm order no. 1030511
- PER 1-mA-200 ppm order no. 1022509
- PER 1-mA-2000 ppm order no. 1022510

Consumable

- Set comprising:
  2 diaphragm caps
  1 bottle of electrolyte (50 ml), order no. 1025881
- 1 diaphragm cap, order no. 1025776
- 1 bottle of electrolyte (50 ml), order no. 1025774

Accessories

- Measurement and control equipment DULCOMETER® D1C for the measured value H_2O_2 via identcode (see product catalogue)
- In-line probe housing DLG III B, order no. 914956
- Assembly kit for in-line probe housing DLG III, order no. 815079
- Two-wire signal cable (2 x 0.24 mm^2, Ø 4 mm), order no. 725122
- DULCOMETER® simulator, order no. 1004042
- Sampling valve 25 mm, order no. 1004739
- Photometer DULCOTEST® DT 3 order number 1023143

16 Compliance with guidelines and standards

Declaration of conformity

The measuring cells for hydrogen peroxide have been developed and tested in compliance with current European guidelines and standards. Production is subject to a high quality standard, which is ensured by European standards and guidelines.

A corresponding declaration of conformity can be obtained from ProMinent.

A

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Anschriften- und Liefernachweis durch den Hersteller/
Addresses and delivery from manufacturer/
Adresses et liste des fournisseurs fournies par le constructeur/
Para informarse de las direcciones de los distribuidores, dirigirse al fabricante:

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