DOC022.53.80317

sympHony™ Dissolved Oxygen Probes

07/2012, Edition 1

User Manual

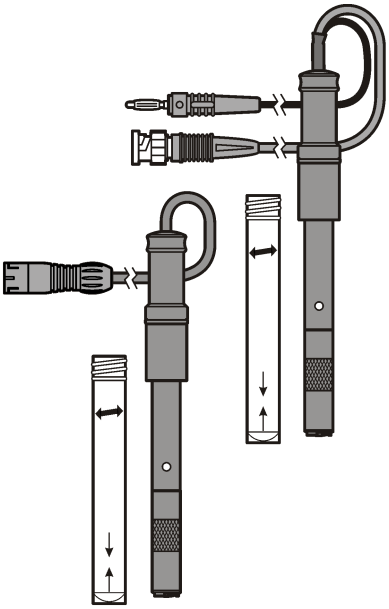


Table of contents

Safety information on page 3

Specifications on page 3

Product overview on page 3

Meter compatibility on page 4

Preparation for use on page 4

Polarize the probe on page 4

Calibration on page 5

Sample requirements on page 7

Sample measurement on page 8

Maintenance on page 9

Troubleshooting on page 11

Safety information

Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August of 2005. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of-life equipment to the Producer for disposal at no charge to the user.
Note: *For return for recycling, please contact the equipment producer or supplier for instructions on how to return end-of-life equipment, producer-supplied electrical accessories, and all auxiliary items for proper disposal.*

Specifications

Specifications are subject to change without notice.

Specification	89231-624	89231-626
Measurement range	0.03 mg/L - saturation 0.3% to saturation	0.03 mg/L - saturation 0.3% to saturation
Temperature range	0 to 50 °C (32 to 122 °F)	0 to 50 °C (32 to 122 °F)
Temperature sensor	Yes	Yes
Electrolyte	Potassium-chloride based	Potassium-chloride based
Sensor	Platinum cathode and silver anode with a replaceable membrane module	Platinum cathode and silver anode with a replaceable membrane module
Body material	ABS	ABS
Length	120 mm	120 mm
Diameter	12 mm	12 mm
Cable	1 m	1 m
Connector	BNC and banana	MP5[1]

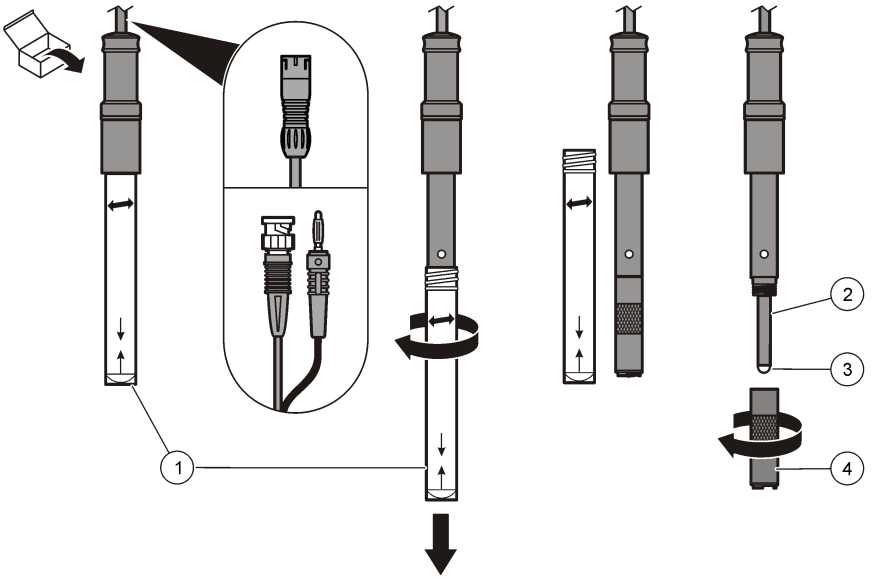
[1] For use with sympHony handheld meters only

Product overview

The dissolved oxygen probes measure the dissolved oxygen concentration in general aqueous samples. Refer to Figure 1. Refer to Sample requirements on page 7.

The dissolved oxygen probes are used with sympHony meters. Refer to Meter compatibility on page 4.

Figure 1 Probe overview



1 Probe storage tube	**3** Cathode
2 Anode	**4** Membrane module

Meter compatibility

The dissolved oxygen probes with BNC and banana connectors are compatible with the sympHony benchtop meter model(s): B40PCID.

The dissolved oxygen probes with MP5 connectors are compatible with the sympHony handheld meter model(s): H10D and H30PCD.

Preparation for use

To prepare the probe for calibration or sample measurement:

1. Turn the probe storage tube and remove it from the probe.
2. Rinse the storage tube with deionized water.
3. Invert and shake the storage tube to remove any water droplets.
4. Save the tube for storage.
5. After storage for more than 3 months, clean the probe before use. Refer to Clean the probe on page 9.
6. Make sure that the membrane module is approximately $^{2}/_{3}$ full with filling solution. Refer to Fill the membrane module on page 10.

Polarize the probe

Before calibration or measurement of dissolved oxygen, polarize the probe.

Polarize the probe every time the probe is disconnected from the meter or the batteries are removed from the meter. The probe is continuously polarized while it is connected to the meter.

1. Fill the probe storage tube with deionized water to the mark.

2. Put the probe in the storage tube and turn to tighten.
3. Connect the probe to the meter. Turn the meter on.
4. Wait for the probe to polarize. Refer to Table 1 for the amount of time.
5. Enter the atmospheric pressure and salinity on the meter.
6. Turn the probe storage tube and remove it from the probe.
7. Rinse the storage tube with deionized water.
8. Invert and shake the storage tube to remove any water droplets.

Table 1 Polarization times

Disconnect time	Polarization time
Less than 5 minutes	10 minutes
5–15 minutes	45 minutes
More than 15 minutes	6 hours

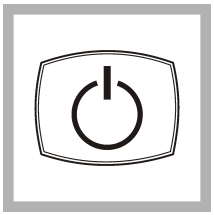
Calibration

Before calibration:
Prepare the probe for use. Refer to Preparation for use on page 4.
Prepare the meter. Refer to the meter manual.

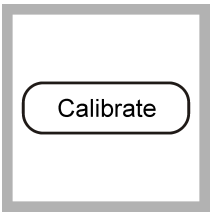
Calibration notes

- For maximum accuracy, calibrate the probe at least once a day.
- For the best results, use the water-saturated air (100%) calibration procedure. Refer to Calibration procedure on page 5.
- If a calibration error occurs, refer to Troubleshooting on page 11.

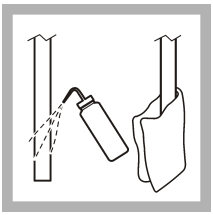
Calibration procedure



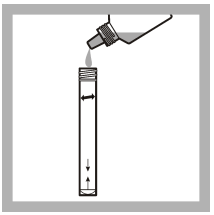
1. Turn the meter on. If the probe is not polarized, polarize the probe.



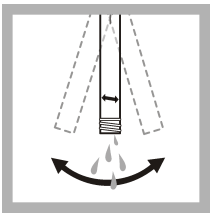
2. Push **Calibrate** and select the probe if applicable.



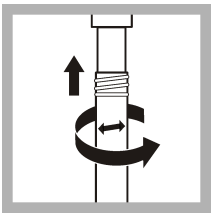
3. Rinse the probe with deionized water. Blot dry with a lint-free cloth.



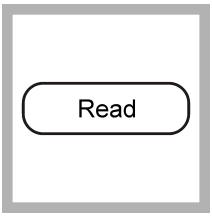
4. Add approximately ¼ inch (6.4 mm) of deionized water to the probe storage tube or a narrow-neck bottle, such as a BOD bottle.



5. Invert and shake the probe storage tube to remove all water droplets. If a BOD bottle is used, put a stopper in the bottle and shake the bottle vigorously for approximately 30 seconds to saturate the entrapped air with water. Then, allow up to 30 minutes for the contents to equilibrate to room temperature.



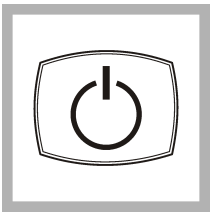
6. Immediately put the probe in the storage tube and turn to tighten. If a BOD bottle is used, remove the stopper and put the probe in the bottle.



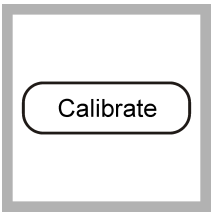
7. Push Read. The display shows "Stable" when the reading is stable. The calibration is complete when the reading is stable.

Calibration to a specific value

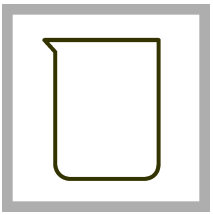
When TO A SPECIFIC VALUE is selected as the type of calibration, the probe is calibrated with a single dissolved oxygen standard. Select the dissolved oxygen standard nearest to the expected sample value.



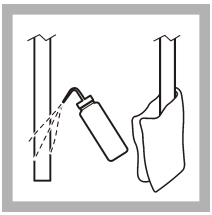
1. Turn the meter on. If the probe is not polarized, polarize the probe.



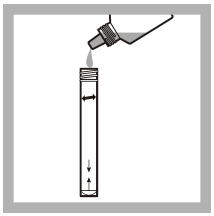
2. Push **Calibrate** and select the probe if applicable.



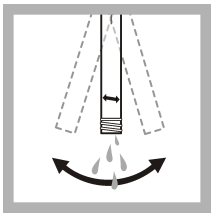
3. Prepare the dissolved oxygen standard in a beaker or an applicable container.



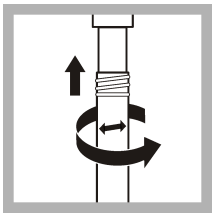
4. Rinse the probe with deionized water. Blot dry with a lint-free cloth.



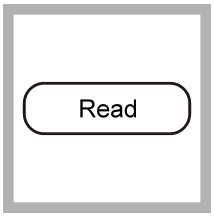
5. Add approximately ¼ inch (6.4 mm) of the dissolved oxygen standard to the probe storage tube or a narrow-neck bottle, such as a BOD bottle.



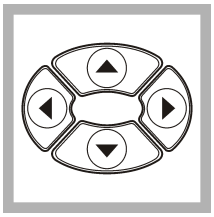
6. Invert and shake the probe storage tube to remove all water droplets. If a BOD bottle is used, put a stopper in the bottle and shake the bottle vigorously for approximately 30 seconds to saturate the entrapped air with water. Then, allow up to 30 minutes for the contents to equilibrate to room temperature.



7. Immediately put the probe in the storage tube and turn to tighten. If a BOD bottle is used, remove the stopper and put the probe in the bottle.



8. Push Read. The display shows "Stable" when the reading is stable. The calibration is complete when the reading is stable.



9. When the reading is stable, use the arrow keys to enter the dissolved oxygen standard value, then push **OK**.

Sample requirements

Some probes are not compatible with specific sample types. Probe damage can occur.

- Samples should be aqueous. Measurements may be made in partially aqueous or some water-miscible solvents. The results must be interpreted with caution as the full pH scale is shifted when the solvent system changes.
- Proteins can collect on the membrane. Make sure the probe stays clean when these types of samples are measured.
- Do not use probes in solutions that are outside the temperature range of the probe.

Sample measurement

⚠ WARNING

Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current material safety data sheets (MSDS) for safety protocols.

Before measurement:

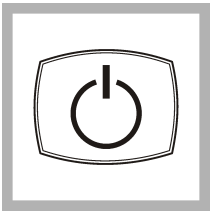
Prepare the probe for use. Refer to Preparation for use on page 4.

Calibrate the probe. Refer to Calibration on page 5. The manufacturer recommends that the probe is calibrated at least once a day for the best measurement accuracy.

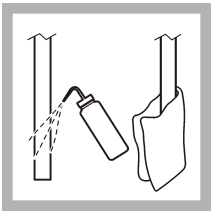
Measurement notes

- For accurate measurements, stir all samples at a constant rate.
- When the probe is submerged, make sure that there are no air bubbles under the probe tip. Gently shake the probe from side to side to remove any air bubbles.
- Do not put the probe on the bottom or sides of the container.
- If stabilization is slow, shake the probe from side to side in the solution.
- If a measurement error occurs, refer to Troubleshooting on page 11.

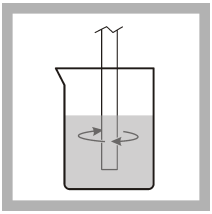
Measurement procedure



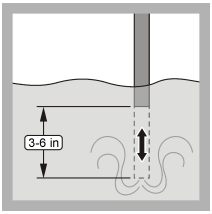
1. Turn the meter on. If the probe is not polarized, polarize the probe and then calibrate the probe.



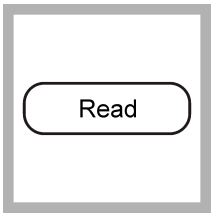
2. Rinse the probe with deionized water. Blot dry with a lint-free cloth.



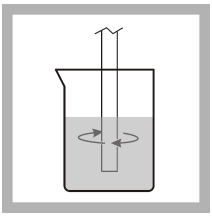
3. Put the probe in the sample and stir vigorously with the probe or a stir stand and stir bar.



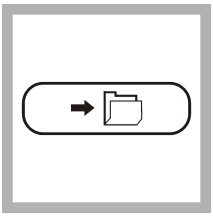
4. To measure bodies of water, move the probe up and down approximately 3–6 inches to make motion around the probe tip.



5. Push **Read**. Select the channel for the parameter to be measured if applicable.

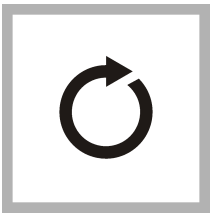


6. Stir vigorously. The display shows "Stable" when the reading is stable.

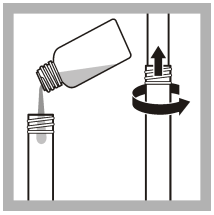


7. If the folder icon is shown, push the folder icon to save the data.

Note: *Data is automatically saved if the folder icon is not shown.*



8. Do steps 2–7 again for additional measurements.



9. When measurements are done, prepare the probe for storage. Refer to Storage on page 10.

BOD measurement

The dissolved oxygen probes can be adapted for BOD measurement with the BOD Accessory Kit.

The funnel in the kit has a stir bar incorporated into the end. When the funnel is used with a stir stand, the correct stirring motion necessary for BOD measurement is supplied. The spacer in the kit positions the dissolved oxygen probe correctly in the funnel. The funnel allows for sample displacement with insertion of the dissolved oxygen probe and limits exposure to atmospheric oxygen.

Maintenance

Clean the probe

NOTICE

Use only deionized water and/or the polishing cloth to clean the anode and cathode. Refer to Figure 1 on page 4.

1. Remove the membrane module from the probe:
   a. Hold the probe so it is vertical with the tip down.
   b. Gently turn the membrane module to remove it from the probe.
2. Soak the membrane module in a mild soap solution.
3. Rinse the membrane module fully with deionized water.
4. Invert the membrane module and shake vigorously to remove any water.
5. Rinse the probe with deionized water. Blot dry with a lint-free cloth.

6. Rub the anode with the polishing cloth supplied. The anode is the outer metallic stem of the probe that is visible when the membrane module is removed. The polishing cloth removes deposits that can decrease the probe performance.
7. Fill the membrane module $^{2}/_{3}$ full with filling solution and assemble the probe. Refer to Fill the membrane module on page 10.

Replace the membrane module

NOTICE

Carefully handle the membrane modules to prevent damage.

It is necessary to replace the membrane module periodically. Replace the membrane module when it is damaged, the probe reading drifts or the probe has a slow response.

1. Remove the membrane module from the probe:
   a. Hold the probe so it is vertical with the tip down.
   b. Gently turn the membrane module to remove it from the probe.
2. Discard the used membrane module.
3. Rinse the probe with deionized water. Blot dry with a lint-free cloth.
4. Rub the anode with the polishing cloth supplied. The anode is the outer metallic stem of the probe that is visible when the membrane module is removed. The polishing cloth removes deposits that can decrease the probe performance.
5. Fill the new membrane module $^{2}/_{3}$ full with filling solution and assemble the probe. Refer to Fill the membrane module on page 10.

Fill the membrane module

Add filling solution to the membrane module if the level of filling solution in the membrane module is less than $^{2}/_{3}$ full.

1. Remove the membrane module from the probe:
   a. Hold the probe so it is vertical with the tip down.
   b. Gently turn the membrane module to remove it from the probe.
2. Add filling solution to the membrane module until it is approximately $^{2}/_{3}$ full.
3. Install the membrane module on the probe:
   a. Carefully tilt the membrane module to remove the air bubbles in the filling solution.
   b. Hold the probe with the tip down and slightly tilted.
   c. Slowly put the membrane module on the probe. Some filling solution should come out of the threads of the membrane module. Remove any filling solution on the surface of the probe.
4. If no filling solution comes out of the threads, air may be inside the membrane module cap. Add more filling solution to the membrane module and do step 4 again.
5. If the probe will be used immedately, polarize the probe. Refer to Polarize the probe on page 4.
6. If the probe will not be used immediately, put the probe in storage. Refer to Storage on page 10.

Storage

Short-term (less than 2 hours) storage

Put the probe in a sample for a maximum of 2 hours if the sample pH is not too high and does not contain corrosive agents.

Standard (less than 6 months) storage

1. Rinse the probe with deionized water. Blot dry with a lint-free cloth.

2. Fill the probe storage tube with deionized water to the mark.
3. Put the probe in the storage tube and turn to tighten.

Long-term (more than 6 months) storage

Remove the filling solution from the membrane module for long-term storage.

1. Remove the membrane module from the probe:
   a. Hold the probe so it is vertical with the tip down.
   b. Gently turn the membrane module to remove it from the probe.
2. Rinse the anode and cathode with deionized water. Blot dry with a lint-free cloth.
3. Rinse the membrane module fully with deionized water to remove the filling solution.
4. Invert the membrane module and shake it vigorously to remove any water.
5. Install the membrane module on the probe:
   a. Hold the probe so it is vertical with the tip down.
   b. Gently install the membrane module on the tip.
6. Put the probe in the storage tube and turn to tighten.

Troubleshooting

For the best performance, make sure to:

- Prepare the probe for use before calibration or measurement.
- Obey the calibration and measurement notes.
- Obey the calibration and measurement procedures.

Troubleshooting notes:

- Magnetic stirrers may supply sufficient heat to change solution temperature. Put a piece of insulating material between the stirrer and beaker.
- Protect the sensing element from direct light during measurement.

Refer to Table 2 for calibration warnings and errors. Refer to Table 3 for measurement warnings and errors.

Table 2 Calibration warnings and errors

Error/Warning	Solution
Calibration out of range	The slope is out of range. Calibrate the probe. Refer to Calibration on page 5. Connect a new probe.
Standard or electrode in poor condition	Calibrate the probe. Refer to Calibration on page 5. Examine the probe. Refer to Examine the probe on page 12.
Outside slope limits	Examine the dissolved oxygen standard solution. Make sure that the dissolved oxygen standard used is the dissolved oxygen standard selected in the calibration setup. Identify the temperature specification in the calibration setup. Use a new dissolved oxygen standard.
Standard not recognized	
Unstable reading Time t > 120 s	Calibrate the probe. Refer to Calibration on page 5. Examine the probe. Refer to Examine the probe on page 12. Make sure that the probe is correctly immersed in the sample.

Table 2 Calibration warnings and errors (continued)

Error/Warning	Solution
Electrode in poor condition	Examine the probe. Refer to Examine the probe on page 12.
Check the electrode	
SAME BUFFERS	Calibrate the probe. Refer to Calibration on page 5. Examine the probe. Refer to Examine the probe on page 12. Examine the dissolved oxygen standard. Use a new dissolved oxygen standard.

Table 3 Measurement warnings and errors

Error/Warning	Solution
Measurement out of range ("_ _ _ _ _ _")	Examine the probe. Refer to Examine the probe on page 12.
Unstable reading	Examine the probe. Refer to Examine the probe on page 12. Make sure that the probe is correctly immersed in the sample.
The temperature is out of °C range.	Examine the temperature sensor. Connect a different probe to identify if the problem is with the probe or the meter.
Time > 120 s	Make sure that the probe is correctly immersed in the sample. Measure the sample temperature. Examine the probe. Refer to Examine the probe on page 12.
Time > 240 s	
Time > 300 s	

Examine the probe

Note: *The lower the sample temperature or the larger the temperature difference between the samples, the longer the stabilization time will be.*

1. Clean the probe. Replace the membrane module if necessary.
2. Turn off the meter. Disconnect and then connect the probe again.
3. Connect a different probe to identify if the problem is with the probe or the meter.

vwr.com 1.800.932.5000