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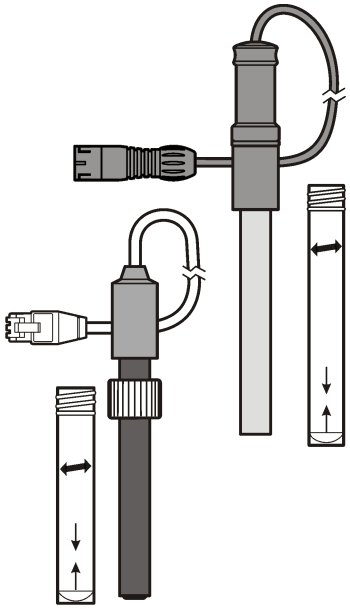
sympHony™ Conductivity Probes

07/2012, Edition 1

User Manual



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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	89231-614	89231-616	89231-618	89231-620	89231-622
Measurement range	up to 100 mS/cm	10 µS/cm to 200 mS/cm	up to 200,000 µS/cm	0.2 to 200,000 µS/cm	5 to 50,000 µS/cm
Temperature range	–5 to 80 °C (23 to 176 °F)	0 to 100 °C (32 to 212 °F)	–5 to 80 °C (23 to 176 °F)	–10 to 80 °C (14 to 176 °F)	0 to 80 °C (32 to 176 °F)
Temperature sensor	Yes	Yes	Yes	Yes	Yes
Sensor	Platinum	Graphite	Platinum	Platinum	Titanium
Number of poles	2	2	3	3	2
Cell constant (cm-1)	1.0	1.0	0.6	1.0	0.3
Platinized	Yes	No	Yes	Yes	No
Body material	Polypropylene and epoxy	Epoxy	Polypropylene and epoxy	Polycarbonate	Titanium
Length	103 mm	134 mm	103 mm	170 mm	170 mm
Diameter	12 mm	18 mm	12 mm	12 mm	12 mm
Cable	1 m	1 m	1 m	1 m	1 m
Connector	RJ45	RJ45	RJ45	MP5[1]	MP5[1]

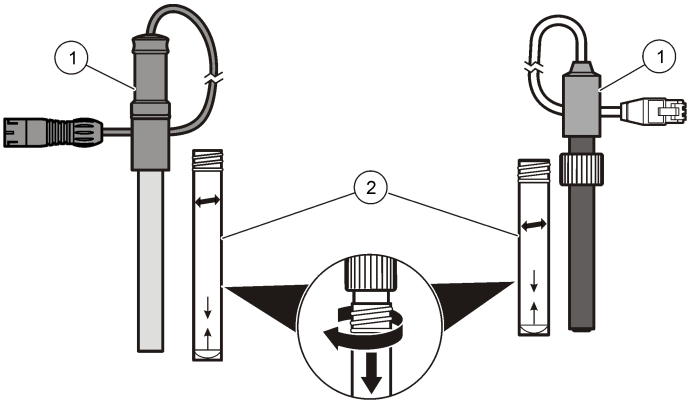
[1] For use with sympHony handheld meters only

Product overview

The conductivity probes measure electrical conductivity, salinity, resistivity or total dissolved solids (TDS) in general aqueous samples. Refer to Figure 1. Refer to Sample requirements on page 6.

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

Figure 1 Probe overview



1 Probe	**2** Probe storage tube

Meter compatibility

The conductivity probes with RJ45 (telephonic) connectors are compatible with the sympHony benchtop meter model(s): B10C, B30PCI and B40PCID.

The conductivity probes with MP5 connectors are compatible with the sympHony handheld meter model(s): H10C, H30PCO and H30PCD.

Preparation for use

⚠ CAUTION	
	Personal injury hazard. Broken glass can cause cuts. Use tools and personal protective equipment to remove broken glass.

To prepare the probe for calibration or sample measurement:

1. Turn the probe storage tube and remove from the probe. Keep the probe storage tube.
2. Before initial use, soak the probe sensor in ethanol for 15 seconds.
3. Rinse the probe with deionized water. Blot dry with a lint-free cloth.

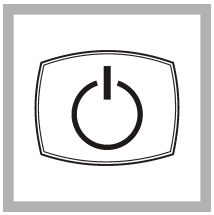
Calibration

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

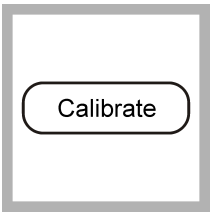
Calibration notes

- Calibration of conductivity cells is important as the conductivity cell constant can change with time and calibration identifies the actual cell constant versus the nominal value.
- Prepare fresh conductivity standards for the calibration.
- Do not dilute conductivity standards or samples.
- The calibration and sample measurement conditions must be as similar as possible (e.g., the temperature of the solution, stir procedure, stir rate and position of the probe).
- Do not touch the tip of the probe.
- 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 a calibration error occurs, refer to Troubleshooting on page 8.

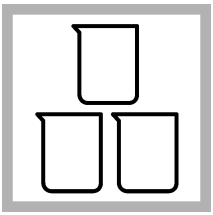
Calibration procedure



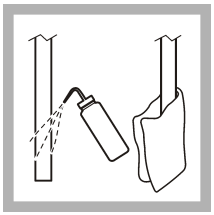
1. Connect the probe to the meter. Turn the meter on.



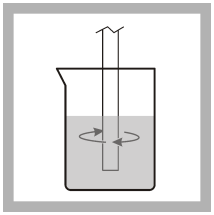
2. Push **Calibrate** and select the probe if applicable.



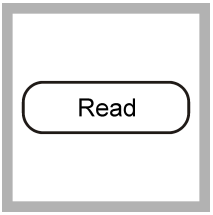
3. Prepare the conductivity standards in separate beakers or applicable containers.



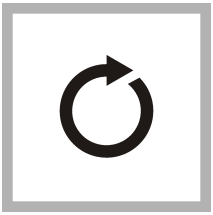
4. Rinse the probe with deionized water. Blot dry with a lint-free cloth.



5. Put the probe in the conductivity standard. Stir the conductivity standard gently at a constant rate to prevent the formation of a vortex.



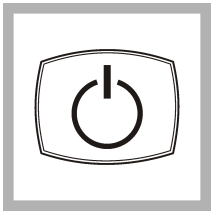
6. Push **Read**. Stir gently. The display shows "Stable" when the reading is stable.



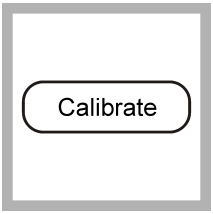
7. When the reading is stable, the meter prompts for the next calibration point. Do steps 4–6 again for additional conductivity standards. The calibration is complete when the last conductivity standard is read.

Calibration to a specific value

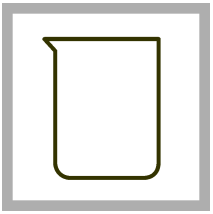
When TO A SPECIFIC VALUE is selected as the type of calibration, the probe is calibrated with a single conductivity standard. Select the conductivity standard nearest to the expected sample value.



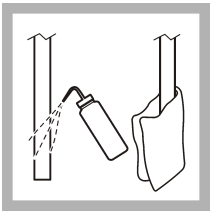
1. Connect the probe to the meter. Turn the meter on.



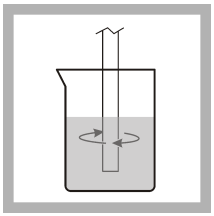
2. Push **Calibrate** and select the probe if applicable.



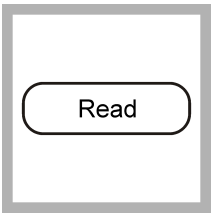
3. Prepare the conductivity standard in a beaker or an applicable container.



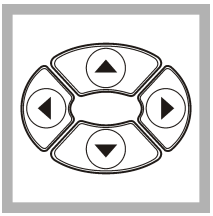
4. Rinse the probe with deionized water. Blot dry with a lint-free cloth.



5. Put the probe in the conductivity standard. Stir the conductivity standard gently at a constant rate to prevent the formation of a vortex.



6. Push **Read**. Stir gently. The display shows "Stable" when the reading is stable.



7. When the reading is stable, use the arrow keys to enter the conductivity standard value, then push **OK**.

Sample requirements

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

- Do not use epoxy body probes in samples that contain non-aqueous solutions or organic solvents.
- Samples should be aqueous. Measurements may be made in partially aqueous or some water-miscible solvents.
- Proteins can collect on the sensing surface. 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:

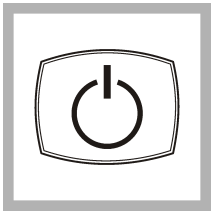
Prepare the probe for use. Refer to Preparation for use on page 4.

Calibrate the probe. Refer to Calibration on page 4. The manufacturer recommends that the probe is calibrated at least once a day for the best measurement accuracy.

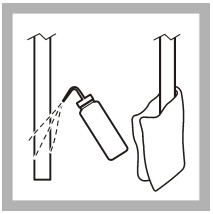
Measurement notes

- Do not dilute conductivity standards or samples.
- The calibration and sample measurement conditions must be as similar as possible (e.g., the temperature of the solution, stir procedure, stir rate and position of the probe).
- Stabilization times with smaller concentration changes are typically longer. For a faster response, stir at a constant rate and condition the probe before use. Try different stir rates to identify the correct stir rate if necessary.
- When there is very low level conductivity in the sample, use a flow cell apparatus to prevent environmental contamination of the sample.
- Do not touch the tip of the probe.
- 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 a measurement error occurs, refer to Troubleshooting on page 8.

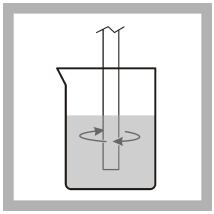
Measurement procedure



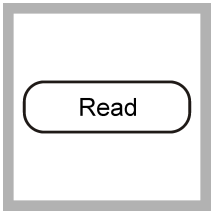
1. Connect the probe to the meter. Turn the meter on.



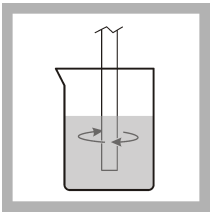
2. Rinse the probe with deionized water. Blot dry with a lint-free cloth.



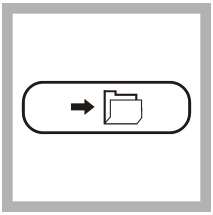
3. Put the probe in the sample and stir gently at a constant rate to prevent the formation of a vortex.



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

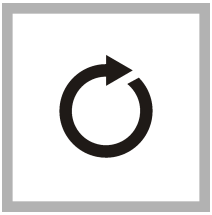


5. Stir gently. The display shows "Stable" when the reading is stable.

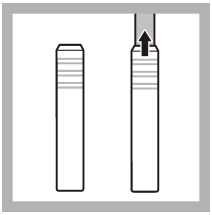


6. If the folder icon is shown, push the folder icon to save the data.

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



7. Do steps 2–6 again for additional measurements.



8. When measurements are done, prepare the probe for storage. Refer to Storage on page 8.

Maintenance

Clean the probe

NOTICE

Do not rub or touch the tip of the probe. Do not wipe the plates of the probe with paper tissue because the platinized layer could be removed.

Clean the probe when there is contamination on the sensor. Symptoms of contamination are:

- Readings are not accurate or consistent.
- The stabilization time is slow.
- A calibration error occurs.
- Contamination is visible on the probe (i.e., dirt).

To clean the dissolved oxygen probe of the multisensor probe, refer to .

1. For general contaminants, rinse the probe with deionized water. Blot dry with a lint-free cloth.
2. For other contaminants:
   a. Soak the glass bulb of the probe in the applicable cleaning agent. Refer to Table 1.
   b. Rinse or soak the probe for 1 minute in deionized water. Blot dry with a lint-free cloth.

Table 1 Cleaning agent

Contaminant	Cleaning agent	Soak time
Mineral deposits	0.1 N HCl	5 minutes (maximum)
Fats, grease and oils	Warm, mild detergent solution	2 hours (maximum)

Storage

The manufacturer recommends that the probe is stored in deionized water in the storage tube, a beaker or an applicable container.

As an alternative, the conductivity probe can be stored in dry conditions. However, the probe must be rehydrated in deionized water for 8 hours before use.

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 4. Connect a new probe.
Standard or electrode in poor condition	Calibrate the probe. Refer to Calibration on page 4. Examine the probe. Refer to Examine the probe on page 10. Examine the conductivity standard solution. Make sure that the conductivity standard used is the conductivity standard selected in the calibration setup. Identify the temperature specification in the calibration setup. Use a new conductivity standard.
Outside slope limits	
Standard not recognized	
Unstable reading Time t > 120 s	Calibrate the probe. Refer to Calibration on page 4. Examine the probe. Refer to Examine the probe on page 10. Make sure that the probe is correctly immersed in the sample.
Electrode in poor condition	Examine the probe. Refer to Examine the probe on page 10.
Check the electrode	
SAME BUFFERS	Calibrate the probe. Refer to Calibration on page 4. Examine the probe. Refer to Examine the probe on page 10. Examine the conductivity standard. Use a new conductivity standard.

Table 3 Measurement warnings and errors

Error/Warning	Solution
Measurement out of range ("_ _ _ _ _ _")	Examine the probe. Refer to Examine the probe on page 10.
Unstable reading	Examine the probe. Refer to Examine the probe on page 10. 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 10.
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. Examine the platinized layer. Replace the probe if the platinized layer has been damaged and/or removed.
2. Clean the probe.
3. Turn off the meter. Disconnect and then connect the probe again.
4. Connect a different probe to identify if the problem is with the probe or the meter.

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