



## Care, Maintenance, and Storage of YSI 6-Series Probes and Sondes

### Probe Care and Maintenance

Periodic cleaning and membrane changes are required to keep your sensors operating properly. Follow the instructions below to maintain the probes in your YSI Sonde.

#### 6562 Dissolved Oxygen Probe

For best results, YSI recommends that the KCl solution and the Teflon membrane at the tip of the 6562 probe be changed prior to each sonde deployment and at least once every 30 days during the use of the sonde in sampling studies. In addition, the KCl solution and membrane should be changed if (a) bubbles are visible under the membrane; (b) significant deposits of dried electrolyte are visible on the membrane or the O-ring; and (c) the probe shows unstable readings or other probe-related symptoms. See your Sonde Operations Manual for instructions on changing the DO membrane.

After removing the used membrane from the tip of the 6562 probe, examine the electrodes at the tip of the probe. If either or both of the silver electrodes are black in color, the probe should be resurfaced using the fine sanding disks which are provided in the 6035 reconditioning kit.

To resurface the probe using the fine sanding disk, follow the instructions below:

First dry the probe tip completely with lens cleaning tissue. Next, hold the probe in a vertical position, place one of the sanding disks under your thumb, and stroke the probe face in a direction parallel to the long dimension of the gold electrode (located between the two silver electrodes). The motion is similar to that used in striking a match. Usually 10-15 strokes of the sanding disk are sufficient to remove black deposits on the silver electrodes. However, in extreme cases, more sanding may be required to regenerate the original silver surface.

After completing the sanding procedure, repeatedly rinse the probe face with clean water and wipe with lens cleaning tissue to remove any grit left by the sanding disk. After cleaning, thoroughly rinse the entire tip of the probe with distilled or deionized water and install a new membrane.

**IMPORTANT:** Be sure to: (1) Use only the fine sanding disks provided in the 6035 maintenance kit in the resurfacing operation; and (2) Sand in a direction parallel to the gold electrode. *Not adhering to either of these instructions can seriously damage the electrodes.*

**NOTE:** If this procedure is unsuccessful, as indicated by improper probe performance, it may be necessary to contact an authorized YSI Service Center.

#### 6560 Conductivity & Temperature Probe

The openings that allow fluid access to the conductivity electrodes must also be cleaned regularly. The small cleaning brush included in the 6570 Maintenance Kit is ideal for this purpose. Dip the brush in clean water and insert it into each hole 15-20 times. In the event that deposits have formed on the electrodes, it may be necessary to use a mild detergent with the brush. After cleaning, check the response and accuracy of the conductivity cell with a calibration standard.

**NOTE:** If this procedure is unsuccessful, or if probe performance is impaired, it may be necessary to return the probe to an authorized YSI Service Center.

The temperature portion of the probe requires no maintenance.

#### 6561 pH Probe

#### 6565 pH and ORP Combination Probe

#### 6566 pH and ORP Unguarded Combination Probe

#### 6579 Wiped pH Probe

#### 6569 Wiped pH and ORP Probe

Cleaning is required whenever deposits or contaminants appear on the glass and/or platinum surfaces of these probes or when the response of the probe becomes slow.

Remove the probe from the sonde. Initially, simply use clean water and a soft clean cloth, lens cleaning tissue, or cotton swab to remove all foreign material from the glass bulb or glass hemisphere and platinum button. Then use a moistened cotton swab to carefully remove any material which may be blocking the reference electrode junction of the sensor.

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**CAUTION:** When using a cotton swab with the 6561 or 6565, be careful NOT to wedge the swab tip between the guard and the glass sensor. If necessary, remove cotton from the swab tip, so that the cotton can reach all parts of the sensor tip without stress.

If good pH and/or ORP response is not restored by the above procedure, perform the following additional procedure:

1. Soak the probe for 10-15 minutes in clean water containing a few drops of commercial dishwashing liquid.
2. GENTLY clean the glass bulb and platinum button by rubbing with a cotton swab soaked in the cleaning solution.
3. Rinse the probe in clean water, wipe with a cotton swab saturated with clean water, and then re-rinse with clean water.

If good pH and/or ORP response is still not restored by the above procedure, perform the following additional procedure:

1. Soak the probe for 30-60 minutes in one molar (1 M) hydrochloric acid (HCl). This reagent can be purchased from most laboratory supply dealers. Be sure to follow the safety instructions included with the acid.
2. Rinse the probe in clean water, wipe with a cotton swab saturated with clean water, and then re-rinse with clean water. To be certain that all traces of the acid are removed from the probe crevices, soak the probe in clean water for about an hour with occasional stirring.

**CAUTION: DO NOT MIX the acid from the previous step with the chlorine bleach in the following step. TOXIC GASEOUS PRODUCTS can be formed from reaction between acid and chlorine bleach. Be certain to copiously rinse the sink and drain system of acid after its disposal and before disposal of the chlorine bleach.**

If biological contamination of the reference junction is suspected or if good response is not restored by the above procedures, perform the following additional cleaning step:

1. Soak the probe for approximately 1 hour in a 1 to 1 dilution of commercially available chlorine bleach.

2. Rinse the probe with clean water and then soak for at least 1 hour in clean water with occasional stirring to remove residual bleach from the junction. (If possible, soak the probe for period of time longer than 1 hour in order to be certain that all traces of chlorine bleach are removed.) Then re-rinse the probe with clean water and retest.

Dry the sonde port and probe connector with compressed air and apply a very thin coat of O-ring lubricant to all O-rings before re-installation.

### Depth Sensors

The depth sensor modules are factory-installed options that are located between the bulkhead and the sonde tube. For 600XL and 600XLM sondes, there is a circular protective cap with two small holes. The cap cannot be removed, but a syringe is supplied in the maintenance kit to aid in cleaning the pressure port. Fill the syringe with clean water, place the tip of the syringe into one of the holes and gently force water through the pressure port. Ensure that the water comes out of the other holes. Continue flushing the pressure port until the water comes out clean.

**CAUTION:** Never try to remove the circular pressure port cap.

For 6820, 6920, 6600 and 6600EDS sondes, the depth sensor is exposed to the water by either a circular access port on the side of the sonde or a through-hole on a module just above the sonde bulkhead. A syringe is supplied in the maintenance kit to aid cleaning the pressure port. Fill the syringe with clean water, place the tip of the syringe into one of the holes and gently force water through the access port. Ensure that the water comes out of the other hole. Continue flushing the pressure port until the water comes out clean.

**CAUTION:** Do not attempt to remove the depth module from the sonde body.

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### ADV6600 Depth Sensor

The depth sensor on the ADV6600 is on the face of the bulkhead, near the base of the ADV sensor. A syringe is supplied in the maintenance kit to aid cleaning the pressure port. Fill the syringe with clean water, place the tip of the syringe loosely over the central hole and gently force water into the depth sensor. Ensure that the water comes out of the unit; DO NOT seal the syringe over the hole. Doing so could cause damage to the pressure sensor. Continue flushing the pressure port until the water comes out clean.

### Level Sensors

For level sensors follow all the maintenance procedures given for depth sensors. In addition, ensure that the desiccant always remains active. Active desiccant is a distinctive blue color. When it can absorb no more moisture, it is a rose red or pink color. For either the cartridge or the canister, the end that is vented to atmosphere will begin to change color first. As long as the desiccant closest to the sonde is blue, no maintenance is required. Local conditions will dictate how long the desiccant will last. In humid environments, the desiccant may need to be changed or regenerated well before it is completely exhausted to ensure that it lasts the entire deployment.

You may regenerate the desiccant, replace the desiccant in the cartridge or canister, or replace the entire cartridge or canister. See your Sonde's Operation Manual for more information.

To regenerate the desiccant, remove it from the unit and spread it evenly, one granule deep, on a suitable tray. Heat for about one hour at about 200 °C (about 400 °F). The desiccant should then be cooled in a suitable, tight container before refilling the unit. The color of the desiccant will return to blue if the regeneration cycle has been successful. The felt filters should also be dried at about 100 °C (about 200 °F) for about 30 minutes before assembly.

Desiccant material is sold separately. Both the cartridge and canister can easily be opened, emptied, and refilled.

**CAUTION:** It is important to keep the tubes in vented sondes and cables dry. They are supplied with caps for closing the volume when not in use. Keep the caps on until just before calibration and deployment. For storage, replace the caps.

### Nutrient Probes:

#### 6882 Chloride, 6883 Ammonium & 6884 Nitrate

You should clean these probes whenever deposits or contaminants appear on the ion-selective membranes located on the tips of these sensor modules. If possible, the module should be cleaned while installed in the sonde bulkhead. Use clean water and a moist piece of lens cleaning tissue to gently wipe the sensor membranes until no more contaminants are removed. However, under some conditions, it may be necessary to remove the module from the sonde bulkhead for cleaning and/or storage.

Remove the module with finger pressure only, if possible. However, it is acceptable to use small pliers if necessary to loosen the module for final removal by hand. **Be very careful not to squeeze the module any more than is necessary for a firm grip. Use slipjaw pliers to minimize the chance of applying too much pressure on the module.** When the module is removed from the sonde, be sure to dry the sonde port and probe connector with compressed air and apply a very thin coat of lubricant to the O-ring before re-installation.

**NOTE:** The ion-selective membranes are fragile. Be certain to: (1) Use only moist, high quality lens cleaning tissue for the cleaning procedure (not paper towels or other coarse materials); and (2) Stroke the probe face very gently with the tissue during the procedure. *If you do not adhere to these instructions, you can seriously damage the sensors.*

### Optical Probes:

#### 6136 Turbidity, 6025 Chlorophyll, 6130 Rhodamine, 6150 ROX Dissolved Oxygen, 6131 & 6132 Blue-green Algae

The 6136, 6025, 6130, 6150, 6131, and 6132 optical probes require only minimal maintenance. After each deployment, the optical surface on the tip of the probe should be inspected for fouling and cleaned, if necessary, by gently wiping the probe face with moist lens cleaning paper. In addition, it is recommended that the wiper be replaced periodically. The frequency of this replacement depends on the quality of water under examination. A replacement wiper block and pad assembly is supplied with each optic sensor, along with the small hex driver required for its removal and reinstallation.

Follow the instructions supplied with the optic sensor to insure proper installation of the new wiper block and pad assembly. Another option allows for just the wiper pad replacement.

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The wiper pad kit as well as additional wiper block and pad assemblies are available from YSI. Special turbidity wiper assemblies for the 6600EDS and pH wiper assemblies for the 6600 V2-4 are also available.

### ADV

The YSI ADV6600 includes a SonTek ADV for water velocity data. Biological growth on the transducers does not affect velocity measurements, but can decrease acoustic signal strength and potentially increase noise in velocity data when operating in clear water. Periodic cleaning of the ADV transducers may be needed to maintain optimal performance in areas of high biological activity. To remove growth, clean with a stiff brush. The transducer epoxy is very durable and will not be easily damaged, except by a direct impact.

### Sonde & Probe Storage

Since the introduction of the YSI 6-Series product line, YSI has learned a great deal about storage protocols that will maximize the lifetime of your sensors. This knowledge comes from extensive in-house testing programs as well as feedback from a large number of customers and sales representatives.

Proper storage of the your sonde between periods of usage will not only extend the life of the sensors, but will also ensure that the unit will be ready to use as quickly as possible in your next application.

In the instructions following, it is assumed that the user has retained all the vessels (bottles, boots, etc.) in which the individual sensors were stored on initial delivery. If these specific items have been misplaced or lost, they can be replaced by contacting YSI Customer Service. Alternatively, the user may have similar (and equally acceptable) storage equipment on hand even though it was not part of the original YSI package. Common sense should be the guide on substitution of storage vessels.

### Short-term Storage

The recommended short-term or interim storage procedure (typically up to 4 weeks) is simple and identical for all original and V2 sondes—models 600R, 600QS, 600OMS, 600LS, 600XL, 600XLM, 6820, 6920, 6600, 6600EDS, and ADV6600.

No matter which sensors are installed in the instrument, it is important to keep them moist without actually immersing them in liquid, which could cause some of them to drift or

result in a shorter lifetime. For example, the reference junction of a pH sensor must be kept moist to minimize its response time during usage, but continued immersion in pure water may compromise the function of the glass sensor and/or result in long-term leaching of the reference junction.

YSI recommends that short-term storage of all multiparameter monitoring instruments be done **by placing approximately 0.5 inch of water in the calibration cup that was supplied with the instrument, and by placing the sonde with all of the probes in place into the cup.** The use of a moist sponge instead of a half-inch of water is also acceptable as long as its presence does not compromise the attachment of the calibration cup to the sonde. **The calibration cup should be sealed to prevent evaporation.**

The key for interim storage is to use a minimal amount of water so that the air in the chamber remains at 100 percent humidity. The water level has to be low enough so that none of the sensors is actually immersed. Any type of water can be used in this protocol: distilled, deionized, or tap water. If the storage water is inadvertently lost during field sampling studies, environmental water can be used to provide the humidity.

Sondes with level sensors have a tube that vents the pressure transducer to the atmosphere. **It is important that the air in the tube remains dry at all times.** Sondes with integral cables should be stored with the desiccant in place and the vented end of the desiccant system sealed. Sondes with connectors should be stored with the connector cap firmly in place. When disconnecting the cable, put the cap on immediately. Vented cables should be stored with their caps in place, in a bag containing desiccant.

Interim storage is easy. Simply remember the following key points:

- Use enough water to provide humidity, but not enough to cover the probe surfaces.
- Make sure the storage vessel is sealed to minimize evaporation.
- Check the vessel periodically to make certain that water is still present.
- For sondes with level sensors, keep the tube sealed and dry.

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## Long-Term Storage – Sondes

The following are recommendations for long-term storage (typically greater than 4 weeks), listed by instrument type. They will be applicable for sondes with typical sensor configurations.

### Sondes with Internal Batteries

Because batteries can degrade over time and release battery fluid, it is extremely important to remove the batteries from the sonde prior to long-term storage. Failure to remove batteries can result in corrosive damage to the battery terminals if the batteries happen to leak.

### 600 with Combination pH Sensor

Instruments of this design were generally sold prior to January, 1996, and can be identified by the presence of only three probes (temperature, dissolved oxygen, pH) in the bulkhead. Be certain that the dissolved oxygen sensor has an undamaged membrane and electrolyte in place. Fill the provided storage vessel with a solution that is 2 molar (2 M) in potassium chloride (KCl) to a level that completely covers the dissolved oxygen and pH probes. See page 6 for instructions on preparation of the KCl storage solution. Seal the vessel with the cap and O-ring.

### 600R & 600QS with Replaceable Reference Electrode Module

Instruments of this design were generally sold after January, 1996, and can be identified by the presence of four visible probes—temperature, dissolved oxygen, pH reference, and pH glass (600R) or pH glass/ORP (600QS) in the bulkhead. Remove the reference module, store it as described in the following section, and plug the open port with the insert that was provided. Make certain that the dissolved oxygen sensor has an undamaged membrane and electrolyte in place. Place approximately 300 mL of tap water into the storage vessel, insert the sonde, and seal the vessel with the cap and O-ring. **Do not use deionized or distilled water in this case, as it may damage the pH glass sensor that must remain in the sonde.**

### 600LS

Store the sonde dry.

### 600OMS

Store the sonde dry with optical probe left in the port.

### 600XL & 600XLM

Remove the pH or pH/ORP probe from the sonde and store it according to the instructions found in the following section on individual sensors. Cover the empty port with the provided plug. Leave the conductivity/temperature and the dissolved oxygen probes in the sonde with a membrane and electrolyte on the 6562 DO sensor. Place enough deionized, distilled, or tap water in the calibration cup to cover the sensors, insert the sonde into the vessel, and seal with the cap/O-ring to minimize evaporation.

### 6820, 6920, 6600, 6600EDS, & ADV6600

Leave the conductivity/temperature and the 6562 dissolved oxygen probes in the sonde with a membrane and electrolyte on the DO sensor. The ADV sensor on the ADV6600 cannot be removed. Remove all other probes from the sonde and store according to the instructions found in the following section on individual sensors. Cover the empty ports with the provided plugs. Place enough deionized, distilled, or tap water in the calibration cup to cover the sensors, insert the sonde into the vessel, and tighten the threaded cup to attain a good seal and minimize evaporation.

## Long-Term Storage – Probes

The following section provides additional details on the storage of individual sensors associated with multiparameter monitoring instruments in YSI's 6-Series product line.

### Temperature

No special precautions are required. Sensors can be stored dry or wet, as long as solutions in contact with the thermistor probe are not corrosive (for example, chlorine bleach).

### Conductivity

No special precautions are required. Sensors can be stored dry or wet, as long as solutions in contact with thermistor probe and conductivity electrodes are not corrosive (for example, chlorine bleach). However, it is recommended that the sensor be cleaned with the provided brush prior to long-term storage.

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## Dissolved Oxygen

6562 Rapid Pulse™ dissolved oxygen sensors should always be stored with a membrane and electrolyte in place and in such a way that the drying out of the electrolyte on the probe face is minimized. For long-term storage, the medium should be water rather than the moist air used in interim storage. The long-term storage protocol also depends on the instrument under consideration.

For all 6-Series sondes, except the 600R, two long-term storage methods are equally acceptable.

1. Remove all probes other than dissolved oxygen, conductivity, and temperature from the sonde and seal the vacant ports with the provided port plugs. Leave the electrolyte and membrane in place on the dissolved oxygen sensor. Fill the calibration cup with water (tap, deionized, and distilled are equally acceptable) and insert the sonde. Make certain the water level is high enough to completely cover the DO sensor. Seal the vessel to prevent evaporation of the water. At the end of the storage time, remove the existing membrane and re-membrane the probe using new electrolyte.
2. Remove the dissolved oxygen sensor from the sonde leaving the electrolyte and membrane in place. Store the probes in water (tap, deionized, and distilled are equally acceptable) in a beaker, flask, or other vessel of choice. **Be sure not to damage the membrane or the probe tip when placing the probe on the bottom of the vessel.** If possible, cover the vessel with parafilm or plastic wrap to minimize evaporation of the water during long-term storage. Monitor the water level in the storage vessel periodically and replenish if loss due to evaporation occurs. At the end of the storage time, remove the existing membrane and re-membrane the probe using new electrolyte.

Because the user cannot remove the Model 600R's dissolved oxygen probe from the sonde, a slightly different long-term storage protocol is required:

For 600 systems equipped with a replaceable reference electrode module, remove the reference module, store it as described below and plug the open port with the port plug that was provided. Make certain that the dissolved oxygen sensor has an undamaged membrane and electrolyte in place. Fill the provided storage vessel with a solution which is 2 molar (2

M) in potassium chloride (KCl), insert the sonde and seal the vessel with the cap and O-ring. This solution can be prepared by dissolving 74.6 g of KCl in 500 mL (approximately 1 pint) of water or 37.3 g of KCl in 250 mL (approximately 0.5 pint) of water. The water should be distilled or deionized. If KCl solution is unavailable, it is acceptable to store the 6562 DO and pH glass sensors in tap water or pH4 buffer solution.

**CAUTION: Do not use deionized or distilled water in this case as it may damage the pH glass sensor, which must remain in the sonde.** At the end of the storage time, remove the existing membrane and re-membrane the probe using new electrolyte.

For 600 systems equipped with a combination pH probe (purchased prior to 1996), none of the probes is user-replaceable and a different storage technique is required. Make certain that the dissolved oxygen sensor has an undamaged membrane and electrolyte in place. Fill the provided storage vessel with a solution, which is 2 molar (2 M) in potassium chloride (KCl), to a level that completely covers the dissolved oxygen and pH probes. Seal the vessel with the cap and O-ring. At the end of the storage time, remove the existing membrane and re-membrane the probe using new electrolyte.

## pH

The key to pH probe storage, short- or long-term, is to make certain that the reference electrode junction stays moist. Junctions which have been allowed to dry out due to improper storage procedures can usually be rehydrated by soaking the sensor for several hours (overnight is recommended) in a solution which is 2 molar in potassium chloride (see previous section on dissolved oxygen storage for preparation of this solution). If potassium chloride solution is not available, soaking the sensor in tap water or commercial pH 4 buffer may restore probe function. However, in some cases, the sensor may have been irreparably damaged by the dehydration and will require replacement. It is also important to remember not to store the pH sensor in distilled or deionized water as the glass sensor may be damaged by exposure to this medium.

For all models with pH, except the 600R & 600QS, the recommended long-term storage protocol is identical. This includes the 6569 and 6579 probes. Remove the probe from the sonde and seal the vacant port with the provided plug. Place the probe in the storage vessel (plastic boot or bottle) which was in place on delivery.

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The vessel should contain a solution which is 2 molar in potassium chloride or pH 4 buffer. Make certain that the vessel is sealed to prevent evaporation of the storage solution. Electrical tape can be used to provide a removable seal between the boot and the module body.

For the 600R & 600QS systems equipped with a replaceable reference electrode module, remove the reference module and plug the open port with the provided insert. Place the module in the storage vessel boot, which was in place on delivery, and seal the vessel with electrical tape. The vessel should contain a solution which is 2 molar in potassium chloride and should be sealed to prevent evaporation of the storage solution. Make certain that the dissolved oxygen sensor has an undamaged membrane and electrolyte in place. Fill the provided sonde storage vessel with tap water, insert the sonde, and seal the vessel with the cap and O-ring. **Do not use deionized or distilled water in this case as it may damage the pH glass sensor that must remain in the sonde.**

For 600 systems equipped with a nonreplaceable combination pH probe (purchased prior to 1996), a different storage technique is required. Make certain that the dissolved oxygen sensor has an undamaged membrane and electrolyte in place. Fill the provided storage vessel with a solution which is 2 molar in potassium chloride (KCl) to a level which completely covers the dissolved oxygen and pH probes, insert the sonde, and seal the vessel with the cap and O-ring.

### ORP

ORP is not available on the Model 600R. For the 600QS, where the ORP sensor cannot be removed from the sonde, store the sensor in tap water in a sealed storage bottle. For the rest of the 6-Series sondes with ORP, the recommended long-term storage protocol is identical. Remove the probe from the sonde and seal the vacant port with the provided plug. Place the probe in the storage vessel (plastic boot or bottle) which was in place on delivery. The vessel should contain a solution which is 2 molar in potassium chloride. Make certain that the vessel is sealed to prevent evaporation of the storage solution.

### Ammonium, Nitrate, & Chloride

The active element in the ammonium and nitrate ion-selective electrode (ISE) sensors is a polyvinyl chloride (PVC) membrane that is impregnated with the reagent that provides specificity for either ammonium or nitrate. The useful life of this sensor can be reduced if the membrane is stored immersed in water.

Thus, storage in dry air is recommended for long-term storage.

While dry air is slightly preferable for general storage, the short-term storage of these sensors in the sonde, with the entire sensor array in moist air, will have no significant detrimental effect on the life of the membrane. Remove the sensor module or the probe from the sonde and cover the vacant port with the provided plug. Place the sensor back in the storage boot that was provided, and set aside in room air.

The chloride ISE sensor utilizes a solid-state membrane that provides specificity. For long-term storage, the module should be removed from the sonde, wiped clean with moist lens cleaning tissue, and placed in its storage boot to prevent abrasion.

### Turbidity, Chlorophyll, Rhodamine, ROX Dissolved Oxygen, & Blue-green Algae

No special precautions are necessary for either the short- or long-term storage of optical sensors. However, for long-term storage, the user may wish to remove the sensor from the sonde and store it dry in air to minimize any cosmetic degradation of the probe body and to maximize the life of the optical wiper.

### Depth and Level

No special precautions are required for the sensor itself, but see instructions above with regard to maintaining a dry atmosphere in the vent tube. Sensors can be stored dry or wet, as long as solutions in contact with the strain gauge sensor port are not corrosive (for example, chlorine bleach).

Recommendations are identical for short-term and long-term storage.

### ADV

No special precautions are required. The ADV sensor can be stored dry or wet, as long as solutions in contact with the sensor are not corrosive.

*For additional information please contact*

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