Go Direct® ORP
(Order Code GDX-ORP)

Go Direct ORP measures the ability of a solution to act as an oxidizing agent or reducing agent. ORP stands for oxidation-reduction potential. For example, ORP electrodes are often used to measure the oxidizing ability of chlorine in swimming pools, or to determine when the equivalence point has been reached in an oxidation-reduction reaction.

Note: Vernier products are designed for educational use. Our products are not designed nor are they recommended for any industrial, medical, or commercial process such as life support, patient diagnosis, control of a manufacturing process, or industrial testing of any kind.

What's Included

- Go Direct ORP (Go Direct Electrode Amplifier connected to a Go Direct ORP BNC Electrode)
- Electrode storage bottle, containing pH 4/KCl solution
- Micro USB Cable

Compatible Software

See **www.vernier.com/manuals/gdx-orp** for a list of software compatible with Go Direct ORP.

Quick Start: Vernier Graphical Analysis® and Bluetooth®

1. Charge your sensor for at least 2 hours before first use.
2. Turn on your sensor. The LED will blink red.
3. Launch Graphical Analysis, then click **Sensor Data Collection**.
4. Select your sensor from the list. The sensor ID is located on the sensor label near the bar code. **Note**: If you don't see a list of available sensors, click **WIRELESS**. After selecting your sensor, click **Pair**.
5. Click **DONE**. You are now ready to collect data.

Using other Vernier data-collection apps or want to connect via USB?

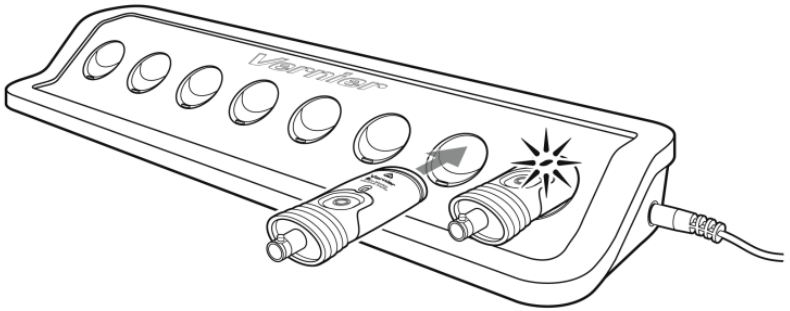
Visit **www.vernier.com/start-go-direct**

Note: This sensor also works with LabQuest 2 and LabQuest 3; it does not work with the original LabQuest.

Charging the Sensor

Connect Go Direct ORP to the included USB Charging Cable and any USB device for two hours. Connecting Go Direct ORP to the electrode amplifier during charging is optional.

You can also charge up to eight Go Direct ORP Sensors using our Go Direct Charge Station, sold separately (order code: GDX-CRG).



Charging	Blue LED is on steady while sensor is connected to the Charging Cable or Charge Station.
Fully charged	Blue LED is off when charging is complete.

Powering the Sensor

Turning on the sensor	Press button once. Red LED indicator flashes when unit is on.
Putting the sensor in sleep mode	Press and hold button for more than three seconds to put into sleep mode. Red LED indicator stops flashing when sleeping.

Connecting the Sensor

See the following link for up-to-date connection information:

www.vernier.com/start/gdx-orp

Connecting via Bluetooth

Ready to connect	Red LED flashes when sensor is awake and ready to connect.
Connected	Green LED flashes when sensor is connected via Bluetooth.

Connecting via USB

Connected and charging	Blue and Green LED are solid when sensor is connected to Graphical Analysis via USB and unit is charging. (Green LED is obscured by the blue one.)
Connected, fully charged	Green LED solid when sensor is connected to Graphical Analysis via USB and the unit is fully charged.
Charging via USB, connected via Bluetooth	Blue LED is solid and green LED is flashing, but the green flashing LED looks white because it is overwhelmed by the blue.

Identifying the Sensor

When two or more sensors are connected, the sensors can be identified by tapping or clicking Identify in Sensor Information.

Using the Product

1. Remove the storage bottle from the electrode by unscrewing the lid and removing the bottle and lid.
2. Thoroughly rinse the lower section of the probe, especially around the bulb-shaped tip, using distilled or deionized water.
3. Connect the sensor following the steps in the Quick Start section of this user manual.
4. When you are finished making measurements, rinse the electrode with distilled water.
5. Slide the cap onto the electrode body, and then screw the cap onto the storage bottle so the tip of the electrode is immersed in the storage solution.

Important: Do not fully submerge the sensor. The BNC connection is not waterproof.

Do not leave the electrode in acids or bases with concentrations greater than 1.0 M for periods longer than 5 minutes.

By default, the units displayed will be in mV. See **www.vernier.com/til/3984** to change the displayed units.

Calibrating the Sensor

Calibration of Go Direct ORP is not supported. ORP readings are in mV. The Go Direct Electrode Amplifier mV response is dictated by the amplifier (as opposed to the electrode) and does not change over time, temperature, or with the electrode being attached. Calibration of Go Direct ORP in mV by putting it into different standards does not provide a better mV calibration. It provides a worse calibration as it will assume the ORP electrode is perfect. Then the mV reading will be off regardless of which electrode is connected.

Specifications

Range	–1,000 mV to +1,000 mV
Accuracy with new electrode (mV)	±20 mV
Type	Sealed, gel-filled, polycarbonate body, Ag/AgCl reference, single junction
Resolution	0.01 mV
Storage solution	pH-4/KCl solution (10 g KCl in 100 mL buffer pH-4 solution)
ORP element	99% pure platinum band sealed on a glass stem
Impedance	~20 kΩ at 25ºC
Dimensions	EA: 8.5 cm × 3 cm × 1.75 cm ORP: 15.5 cm long, 12 mm OD

Care and Maintenance

Short-term storage (up to 24 hours): Place the electrode in pH 4 or pH 7 buffer solution. It should never be stored in distilled water.

Long-term storage (more than 24 hours): Store the electrode in a pH 4 buffer/KCl storage solution in the storage bottle. The ORP electrode is shipped in this solution. Vernier sells 500 mL bottles of pH Storage Solution (order code PH-SS), or you can prepare additional storage solution by adding 10 g of solid potassium chloride (KCl) to 100 mL of pH 4 buffer solution. Vernier sells a pH Buffer Capsule kit (PH-BUFCAP) that includes a buffer solution preservative. Storing the electrode in this solution contributes to electrode longevity and retains electrode response time when the unit is placed back into service.

If the electrode is inadvertently stored dry for a short period of time, immerse the tip in the pH 4 buffer/KCl storage solution for a minimum of 8 hours prior to use. If the readings are still not accurate after calibration or if the response is slow, try shocking the sensor as described in the Troubleshooting section.

Battery Information

Go Direct ORP contains a small lithium-ion battery in the handle. The system is designed to consume very little power and not put heavy demands on the battery. Although the battery is warranted for one year, the expected battery life should be several years. Replacement batteries are available from Vernier (order code: GDX-BAT-300).

Storage and Maintenance

To store Go Direct ORP for extended periods of time, put the device in sleep mode by holding the button down for at least three seconds. The red LED will stop flashing to show that the unit is in sleep mode. Over several months, the

battery will discharge but will not be damaged. After such storage, charge the device for a few hours, and the unit will be ready to go.

Exposing the battery to temperatures over 35°C (95°F) will reduce its lifespan. If possible, store the device in an area that is not exposed to temperature extremes.

Water Resistance

Go Direct ORP is not water resistant and should never be immersed in water.

If water gets into the device, immediately power the unit down (press and hold the power button for more than three seconds). Disconnect the sensor and charging cable, and remove the battery. Allow the device to dry thoroughly before attempting to use the device again. Do not attempt to dry using an external heat source.

How the Sensor Works

The electrode has two components: a *measuring* half cell comprised of platinum metal immersed in the solution in which the redox reaction is taking place, and a *reference* half cell (sealed gel-filled Ag/AgCl) to which the platinum half cell is referenced.

Go Direct ORP can measure redox potential in the range of –1000 to +1000 mV. Readings toward the positive region of this range indicate a strong oxidizing agent, while readings toward the negative region indicate a strong reducing agent.

Troubleshooting

Examine the glass bulb. If it is broken, ORP readings will be incorrect.

Occasionally, mold will grow in the pH 4 buffer/storage solution. Mold will not harm the electrode and can easily be removed using a mild detergent solution. Mold growth in the storage solution can be inhibited by adding a buffer preservative.

Residue on the tip of an ORP electrode can cause the readings to be noisy. To clean the electrode, use a soft cloth to wipe a small amount of ethyl alcohol or isopropyl alcohol around the globe-shaped tip of the probe. Rinse the tip with distilled water, and repeat the alcohol cleaning one more time.

For additional troubleshooting and FAQs, see **www.vernier.com/til/3967**

Repair Information

If you have followed the troubleshooting steps and are still having trouble with your Go Direct ORP, contact Vernier Technical Support at support@vernier.com or call 888-837-6437. Support specialists will work with you to determine if the unit needs to be sent in for repair. At that time, a Return Merchandise Authorization (RMA) number will be issued and instructions will be communicated on how to return the unit for repair.

Accessories/Replacements

Item	Order Code
Electrode Storage Solution, 500 mL	PH-SS
Storage Solution Bottles, pkg of 5	BTL
Go Direct ORP Electrode	GDX-ORP-BNC
Go Direct Electrode Amplifier	GDX-EA
Micro USB Cable	CB-USB-MICRO
Go Direct 300 mAh Replacement Battery	GDX-BAT-300
USB-C to Micro USB Cable	CB-USB-C-MICRO

Warranty

Warranty information for this product can be found on the Support tab at **www.vernier.com/gdx-orp**

General warranty information can be found at **www.vernier.com/warranty**

Disposal

When disposing of this electronic product, do not treat it as household waste. Its disposal is subject to regulations that vary by country and region. This item should be given to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring that this product is disposed of correctly, you help prevent potential negative consequences on human health or on the environment. The recycling of materials will help to conserve natural resources. For more detailed information about recycling this product, contact your local city office or your disposal service.

Battery recycling information is available at **www.call2recycle.org**

Do not puncture or expose the battery to excessive heat or flame.


The symbol, shown here, indicates that this product must not be disposed of in a standard waste container.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference and

(2) this device must accept any interference received, including interference that may cause undesired operation

RF Exposure Warning

The equipment complies with RF exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

IC Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

(1) this device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Industry Canada - Class B This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled “Digital Apparatus,” ICES-003 of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

RF exposure warning: The equipment complies with RF exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Le présent appareil est conforme aux CNR d’Industrie Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes :

(1) l’appareil ne doit pas produire de brouillage, et

(2) l’appareil doit accepter tout interférence radioélectrique, même si cela résulte à un brouillage susceptible d’en compromettre le fonctionnement.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel interférant-brouilleur: “Appareils Numériques,” NMB-003 édictée par industrie Canada. L’utilisation est soumise aux deux conditions suivantes:

(1) cet appareil ne peut causer d’interférences, et

(2) cet appareil doit accepter toutes interférences, y comprises celles susceptibles de provoquer un disfonctionnement du dispositif.

Afin de réduire les interférences radio potentielles pour les autres utilisateurs, le type d’antenne et son gain doivent être choisie de telle façon que l’équivalent de puissance isotrope émis (e.i.r.p) n’est pas plus grand que celui permis pour une communication établie.

Avertissement d’exposition RF: L’équipement est conforme aux limites d’exposition aux RF établies pour un environnement non supervisé. L’antenne (s) utilisée pour ce transmetteur ne doit pas être jumelés ou fonctionner en conjonction avec toute autre antenne ou transmetteur.

Note: This product is a sensitive measurement device. For best results, use the cables that were provided. Keep the device away from electromagnetic noise sources, such as microwaves, monitors, electric motors, and appliances.

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