

# Go Direct<sup>®</sup> Current

## (Order Code GDX-CUR)



Go Direct Current is designed for exploring the basic principles of electricity. Use Go Direct Current to measure currents in low voltage AC and DC circuits. With a range of  $\pm 1$  A, this sensor is ideal for use in most “battery and bulb” circuits.

**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 Current
- Micro USB Cable

### Compatible Software

See [www.vernier.com/manuals/gdx-cur](http://www.vernier.com/manuals/gdx-cur) for a list of software compatible with Go Direct Current.

### Getting Started

Please see the following link for platform-specific connection information:

[www.vernier.com/start/gdx-cur](http://www.vernier.com/start/gdx-cur)

#### Bluetooth Connection

1. Install Vernier Graphical Analysis<sup>™</sup> on your computer, Chromebook<sup>™</sup>, or mobile device. If using LabQuest<sup>®</sup>, make sure LabQuest App is up to date. See [www.vernier.com/ga4](http://www.vernier.com/ga4) for Graphical Analysis availability or [www.vernier.com/downloads](http://www.vernier.com/downloads) to update LabQuest App.
2. Charge your sensor for at least 2 hours before first use.
3. Turn on your sensor by pressing the power button once. The Bluetooth<sup>®</sup> LED will blink red.
4. Launch Graphical Analysis or turn on LabQuest.
5. If using Graphical Analysis, click or tap Sensor Data Collection. If using LabQuest, choose Wireless

#### USB Connection

1. Install Graphical Analysis on your computer or Chromebook. If using LabQuest, make sure LabQuest App is up to date. See [www.vernier.com/ga4](http://www.vernier.com/ga4) for software availability or [www.vernier.com/downloads](http://www.vernier.com/downloads) to update LabQuest App.
2. Connect the sensor to the USB port.
3. Launch Graphical Analysis or turn on LabQuest. You are now ready to collect data.

**Note:** This sensor does not work with the original LabQuest. It works with LabQuest 2 or LabQuest 3.

Device Setup > Go Direct from the Sensors menu.

6. Select your Go Direct sensor from the list of Discovered Wireless Devices. Your sensor's ID is located near the barcode on the sensor. The Bluetooth LED will blink green when it is successfully connected.
7. Click or tap Done to enter data-collection mode.

### Charging the Sensor

Connect Go Direct Current to the included USB Charging Cable and any USB device for two hours.

You can also charge up to eight Go Direct Current Probes using our Go Direct Charge Station, sold separately (order code: GDX-CRG). An LED on each Go Direct Current indicates charging status.

Charging	Orange LED next to the battery icon is solid while the sensor is charging.
Fully charged	Green LED next to the battery icon is solid when the sensor is fully charged.

### 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-cur](http://www.vernier.com/start/gdx-cur)

#### Connecting via Bluetooth

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

## Connecting via USB

Connected and charging	Orange LED next to the battery icon is solid when the sensor is connected to Graphical Analysis via USB and the unit is charging. LED next to Bluetooth icon is off.
Connected, fully charged	Green LED next to the battery icon is solid when the sensor is connected to Graphical Analysis via USB and fully charged. LED next to Bluetooth icon is off.
Charging via USB, connected via Bluetooth	Orange LED next to the battery icon is solid when the sensor is charging. Green LED next to the Bluetooth icon flashes.

## 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

Connect the sensor following the steps in the Getting Started section of this user manual.

Go Direct Current was designed to be wired in series with the circuit. Currents in either direction can be measured. The current will be indicated as positive if current flows in the direction of the arrow on the box (from the red lead to the black lead).

Go Direct Current has two ranges. The  $\pm 1$  A ( $\pm 1000$  mA) range is suitable for most circuit experiments and will likely be the range you use most often. The  $\pm 0.1$  A ( $\pm 100$  mA) range is useful for experiments where you expect very small electric currents, such as electromagnetically-induced currents. Switch between the ranges by using the switch on the base of the sensor. **Note:** The range setting is not indicated in Graphical Analysis. If currents greater than 100 mA are measured on the smaller range, the data will flat-line just above 100 mA.

## Videos

View videos related to this product at [www.vernier.com/gdx-cur](http://www.vernier.com/gdx-cur)

## Calibrating the Sensor

You should not have to perform a new calibration when using Go Direct Current in the classroom. A stored calibration is set for the sensor before it is shipped.

However, you may consider “zeroing” the sensor before the start of an experiment. This is done by shorting out the leads of the sensor, then choosing

the Zero option in the data-collection software. This option adjusts the calibration offset but does not adjust the calibration gain.

## Specifications

Current Probe range	$\pm 1$ A and $\pm 0.1$ A
Maximum voltage on any input	$\pm 10$ V
Maximum non-damaging current	1.5 A and 0.5 A
Input impedance (between inputs)	$0.1 \Omega$ ( $\pm 1$ A range) and $1 \Omega$ ( $\pm 0.1$ A range)
Input impedance (to ground)	$10 \text{ M}\Omega$
Linearity	0.01%
Resolution	0.031 mA ( $\pm 1$ A range) and 0.003 mA ( $\pm 0.1$ A range)
Battery	300 mA Li-Poly
Battery life (single full charge)	~24 hours
Battery life (long term)	~500 full charge cycles (several years depending on usage)

## Care and Maintenance

### Battery Information

Go Direct Current contains a small lithium-ion battery. 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 Current 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  $35^\circ\text{C}$  ( $95^\circ\text{F}$ ) will reduce its lifespan. If possible, store the device in an area that is not exposed to temperature extremes.

### Water Resistance

Go Direct Current 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

Go Direct Current contains a sensing element and signal conditioning amplifier. The sensing element is a 0.1  $\Omega$  (or 1  $\Omega$ , for the smaller range) resistor connected between the red and black leads. As the current passes through the resistor, a small potential difference is measured across this resistor. This potential difference is input to the signal conditioning amplifier. The final result is that a voltage is produced from the amplifier that can be measured by sensor.

## Troubleshooting

If Go Direct Current is not operating as expected, connect the sensor to Graphical Analysis either via Bluetooth or USB. Connect Go Direct Current to a DC power supply in series with a known resistance. Use a voltage probe or voltmeter to measure the voltage of the supply. Compare the measured current against the current calculated from Ohm's law. **Note:** We recommend a battery for this test, since some DC power supplies may not deliver clean DC voltage.

For additional troubleshooting and FAQs, see [www.vernier.com/ttl/4060](http://www.vernier.com/ttl/4060)

## Repair Information

If you have watched followed the troubleshooting steps and are still having trouble with your Go Direct Current, contact Vernier Technical Support at [support@vernier.com](mailto: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
Micro USB Cable	CB-USB-MICRO
USB-C to Micro USB Cable	CB-USB-C-MICRO
Go Direct 300 mAh Replacement Battery	GDX-BAT-300

## Warranty

Warranty information for this product can be found on the Support tab at [www.vernier.com/gdx-cur](http://www.vernier.com/gdx-cur)

General warranty information can be found at [www.vernier.com/warranty](http://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](http://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 toute interférence radioélectrique, même si cela résulte à un brouillage susceptible d'en compromettre le fonctionnement.

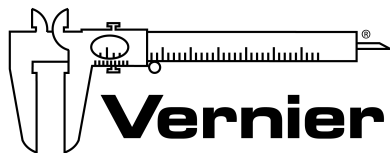
Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel interférant-brouilleur: "Appareils Numériques," NMB-003 édictée par Industrie Canada. L'utilisation est soumise aux deux conditions suivantes:

- (1) cet appareil ne peut causer d'interférences, et
- (2) cet appareil doit accepter toutes interférences, y comprises celles susceptibles de provoquer un dysfonctionnement du dispositif.

Afin de réduire les interférences radio potentielles pour les autres utilisateurs, le type d'antenne et son gain doivent être choisis de telle façon que l'équivalent de puissance isotrope émise (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 jumelée 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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