

Go Direct[®] Voltage

(Order Code GDX-VOLT)



Go Direct Voltage combines a wide input voltage range and high precision, making it an excellent choice for investigations of both AC/DC circuits and electromagnetism. It directly connects via Bluetooth[®] wireless technology or wired via USB to your platform.

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 Voltage
- Micro USB Cable

Compatible Software

See www.vernier.com/manuals/gdx-volt for a list of software compatible with Go Direct Voltage.

Getting Started

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

www.vernier.com/start/gdx-volt

Bluetooth Connection

1. Install Graphical Analysis 4 on your computer, Chromebook[™], or mobile device. See www.vernier.com/ga4 for software availability.
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[®] LED will blink red.
4. Launch Graphical Analysis 4.
5. Click or tap Sensor Data Collection.
6. Click or tap your Go Direct sensor from the list of Discovered Wireless Devices. Your sensor's ID is located near the barcode on the

USB Connection

1. If using a computer or Chromebook, install Graphical Analysis 4. If using LabQuest 2, make sure LabQuest App is up to date. See www.vernier.com/ga4 for Graphical Analysis 4 availability or www.vernier.com/downloads to update LabQuest App.
2. Connect the sensor to the USB port.
3. Launch Graphical Analysis 4 or turn on LabQuest 2. You are now ready to collect data.
4. This is a multi-channel sensor. To change the default channel selections, see www.vernier.com/start/gdx-volt

sensor. The Bluetooth LED will blink green when it is successfully connected.

7. This is a multi-channel sensor. The active channel is listed in the Connected Devices Sensor Channels list. To change channels, select the check box next to the Sensor Channel(s) you would like to activate.
8. Click or tap Done to enter data-collection mode.

Charging the Sensor

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

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

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 Voltage is designed to be used like a voltmeter. The leads should be placed across a circuit element. Go Direct Voltage has two measurement ranges, each its own channel:

- Potential - 20 V
- Potential - 1 V

Potential - 20 V

This channel is the default for Go Direct Voltage and appropriate for most tabletop circuit experiments. The differential input range is 20 V. When used by USB, the mean input voltage must be within 11 V of ground.

Potential - 1 V

This extra channel is for appropriate smaller voltage signals, such as the induced EMFs. The differential input range is 2 V.

Over-voltage protection is provided so that slightly higher input voltages will not damage the sensor. You should never use high voltages or household AC with this probe.

Displaying data

Click or tap the view icon and select Meter. The instantaneous sensor readings are all displayed. Click or tap any meter to zero or calibrate that sensor.

Graphing data

Click or tap the view icon and choose the number of graphs you wish to display. For each graph, click or tap on the y-axis label to select which sensor

data you would like displayed on that graph. Change data collection parameters (duration, sampling rate) by clicking or tapping on graph options. When ready to collect data, click or tap collect.

Calibration

You should not have to perform a new calibration when using Go Direct Voltage in the classroom. We have set the sensor to match our stored calibration before shipping it.

If you choose to calibrate Go Direct Voltage for increased accuracy, use the standard, two-point calibration procedure. Another option to consider instead of calibrating is zeroing the sensor. 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

Differential input voltage range	20 V
Maximum safe voltage on any input	24 V
Input impedance (to ground)	10 M Ω
Differential impedance	>20 M Ω
Linearity	0.01%
Resolution, 16-bit	5 mV on Potential - 20 V channel
Maximum sampling rate	1,000 samples/s
USB specification	USB 2.0 full speed
Wireless specification	Bluetooth v4.2
Maximum wireless range	30 m (unobstructed)
Battery	300 mAh Li-Poly Rechargeable
Battery life (single full charge)	About 24 hours continuous data collection
Battery life (long term)	About 300 full charge cycles (several years, depending on usage)

Care and Maintenance

Clean sensor with a soft, damp cloth.

Battery Information

Go Direct Voltage 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 Voltage 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 Voltage 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 Voltage measures the potential difference between the V_+ clip (red) and the V_- clip (black). The voltage probes have differential inputs. The voltage measured is with respect to the black clip and not circuit ground. This allows you to measure directly across circuit elements without the constraints of common grounding. The voltage probes can be used to measure negative potentials, as well as positive potentials.

Troubleshooting

If the Differential Voltage Probe is not operating as expected, check the following:

- Are the leads properly and securely connected? The probe is designed to be used like voltmeter leads. It should be placed across a circuit element.
- Is the sensor voltage fluctuating? Try a DC power source, such as a battery. When measuring DC voltages with power supplies, some power supplies do not provide a steady DC signal. If the sensor reading is correct when using a battery, the problem may be the power supply.

For additional troubleshooting and FAQs, see www.vernier.com/til/3902

Repair Information

If you have followed the troubleshooting steps and are still having trouble with your Go Direct Voltage, 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
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

Vernier warrants this product to be free from defects in materials and workmanship for a period of five years from the date of shipment to the customer. This warranty does not cover damage to the product caused by abuse or improper use. This warranty covers educational institutions only.

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 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.



MEASURE. ANALYZE. LEARN.™

Vernier Software & Technology
13979 SW Millikan Way • Beaverton, OR 97005-2886
Toll Free (888) 837-6437 • (503) 277-2299 • Fax (503) 277-2440
info@vernier.com • www.vernier.com

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