

Current Probe

(Order Code DCP-BTA)



The Current Probe is designed for exploring the basic principles of electricity. Use the Current Probe to measure currents in low voltage AC and DC circuits. With a range of ± 0.6 A, this sensor is ideal for use in most “battery and bulb” circuits. Use it with the Differential Voltage Probe (order code DVP-BTA) to explore Ohm’s law, phase relationships in reactive components, and much more. Use multiple sensors to explore series and parallel circuits. It can also be used in electrochemistry experiments.

Collecting Data with the Current Probe

This sensor can be used with the following interfaces to collect data.

- Vernier LabQuest[®] 2 or original LabQuest[®] as a standalone device or with a computer
- Vernier LabQuest[®] Mini with a computer
- Vernier LabPro[®] with a computer or TI graphing calculator
- Vernier Go![®] Link
- Vernier EasyLink[®]
- Vernier SensorDAQ[®]
- CBL 2[™]
- TI-Nspire[™] Lab Cradle

Here is the general procedure to follow when using the Current Probe:

1. Connect the Current Probe to the interface.
2. Start the data-collection software.
3. The software will identify the Current Probe and load a default data-collection setup. You are now ready to collect data.

Data-Collection Software

This sensor can be used with an interface and the following data-collection software.

- **Logger Pro 3** This computer program is used with LabQuest 2, LabQuest, LabQuest Mini, LabPro, or Go!Link.
- **Logger Lite** This computer program is used with LabQuest 2, LabQuest, LabQuest Mini, LabPro, or Go!Link.
- **LabQuest App** This program is used when LabQuest 2 or LabQuest is used as a standalone device.
- **DataQuest[™] Software for TI-Nspire** This calculator application for the TI-Nspire can be used with the EasyLink or TI-Nspire Lab Cradle.
- **EasyData App** This calculator application for the TI-83 Plus and TI-84 Plus can be used with CBL 2, LabPro, and Vernier EasyLink. We recommend version 2.0

or newer, which can be downloaded from the Vernier web site, www.vernier.com/easy/easydata.html, and then transferred to the calculator. See the Vernier web site, www.vernier.com/calc/software/index.html for more information on the App and Program Transfer Guidebook.

- **DataMate program** Use DataMate with LabPro or CBL 2 and TI-73, TI-83, TI-84, TI-86, TI-89, and Voyage 200 calculators. See the LabPro and CBL 2 Guidebooks for instructions on transferring DataMate to the calculator.
- **LabVIEW** National Instruments LabVIEW[™] software is a graphical programming language sold by National Instruments. It is used with SensorDAQ and can be used with a number of other Vernier interfaces. See www.vernier.com/labview for more information.

NOTE: Vernier products are designed for educational use. Our products are not designed nor 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.

Specifications

| | |
|---|-------------------------|
| Current Probe range: | ± 0.6 A |
| Maximum voltage on any input: | ± 10 V |
| Input Impedance (between inputs): | 0.1 Ω |
| Input Impedance (to ground): | 10 M Ω |
| Linearity: | 0.01% |
| 13-bit resolution (using SensorDAQ): | 0.16 mA |
| 12-bit resolution (using LabQuest 2, LabQuest, LabQuest Mini, LabPro, Go! Link, TI-Nspire Lab Cradle, ULI II, SBI): | 0.31 mA |
| 10-bit resolution (using CBL 2): | 1.25 mA |
| Supply voltage: | 5 VDC |
| Supply current (typical): | 9 mA |
| Output voltage range: | 0 – 5 V |
| Transfer function: | $V_{out} = -4(I) + 2.5$ |
| Current in amperes | slope: -0.25 A/V |
| | intercept: 0.625 A |

This sensor is equipped with circuitry that supports auto-ID. When used with LabQuest 2, LabQuest, LabQuest Mini, LabPro, Go! Link, SensorDAQ, TI-Nspire Lab Cradle, EasyLink, or CBL 2, the data-collection software identifies the sensor and uses pre-defined parameters to configure an experiment appropriate to the recognized sensor.

How the Current Probe Works

The Current Probe contains a sensing element and signal conditioning amplifier. The sensing element is a 0.1 Ω resistor connected between the red and black terminals. 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 the lab interface. This voltage varies in a linear way with the current through the Current Probe, as given in the transfer function above.

The current probes were designed to look like they should 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 small box (from the red terminal to the black terminal). The range is ± 0.6 A (± 600 mA).

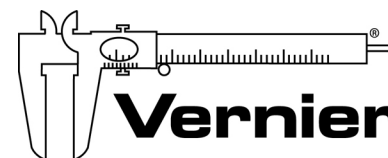
Optional Calibration Procedure

You should not have to perform a new calibration when using the Current Probe in the classroom. We have set the sensor to match our stored calibration before shipping it. You can simply use the appropriate calibration file that is stored in your data-collection program from Vernier.

The output of this system is linear with respect to the measurement it is making. As mentioned before, the amplifier allows you to measure positive and negative currents on any of our interfaces. Since many lab interfaces can read voltages only in the range of 0 to 5 volts, the amplifier offsets and amplifies the incoming signal so that the output is always in the range of 0 to 5 volts. If an input is zero amperes, for example, the amplifier will produce an output of 2.5 volts. The output varies from this 2.5 volt level, depending on the input. To collect data as current, use either the calibration supplied with your program, or calibrate the unit using known currents. A standard, two-point calibration is done, as with any Vernier sensor. An alternative to this two-point calibration is to “zero” the sensor. This can be 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.

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.



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