

# High Current Sensor

(Order Code HCS-BTA)



The High Current Sensor is used to measure current in the range of  $-10$  to  $+10$  A. The sensor uses a Hall Effect chip, so that it does not add a resistive element to your circuit. A metal shield over the Hall Effect chip reduces the influence of external magnets. A replaceable fuse protects the equipment and circuit. Use the sensor in experiments that involve currents larger than 1 A, such as solar panels, hand generators, etc.

## What is included with the High Current Sensor?

The product includes

- High Current Sensor
- (1) extra 10 A fuse

## Collecting Data with the High Current Sensor

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

- Vernier LabQuest<sup>®</sup> as a standalone device or with a computer
- Vernier LabQuest<sup>®</sup> Mini with a computer
- Vernier LabPro<sup>®</sup> with a computer, TI graphing calculator, or Palm<sup>®</sup> handheld
- Vernier Go!<sup>®</sup>Link
- Vernier EasyLink<sup>®</sup>
- Vernier SensorDAQ<sup>®</sup>
- CBL 2<sup>™</sup>

Here is the general procedure to follow when using the High Current Sensor:

1. Connect the High Current Sensor to the interface.
2. Start the data-collection software.
3. The software will identify the High Current Sensor 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** This computer program is used with LabQuest, LabQuest Mini, LabPro, or Go!Link.
- **Logger Lite** This computer program is used with LabQuest, LabQuest Mini, LabPro, or Go!Link.
- **LabQuest App** This program is used when LabQuest is used as a standalone device.
- **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](http://www.vernier.com/easy/easydata.html), and then transferred to the calculator. See the Vernier web site, [www.vernier.com/calc/software/index.html](http://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.
- **Data Pro** This program is used with LabPro and a Palm handheld.
- **LabVIEW** National Instruments LabVIEW<sup>™</sup> 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](http://www.vernier.com/labview) for more information.

**NOTE:** This product is to be used for educational purposes only. It is not appropriate for industrial, medical, research, or commercial applications.

## Safety Precautions

Students need to use caution when performing experiments with voltages and currents produced by any voltage other than low voltage, e.g., voltages under 5 V. This sensor is designed for large current. Students need to exercise extra caution when dealing with high voltage and current which can cause serious injury. They should only subject the sensor and circuitry to the currents and voltages designed for the devices. Students should keep all equipment away from water and other liquids.

## Specifications

High Current Sensor range		$\pm 10$ A
Maximum voltage input		$\pm 40$ V
13-bit resolution (using SensorDAQ)		2.4 mA
12-bit resolution (using LabQuest, LabQuest Mini, LabPro, Go!Link, ULI II, SBI)		4.9 mA
10-bit resolution (using CBL 2)		19.6 mA
Supply voltage		5 VDC
Output voltage range		0 – 5 V
Replaceable fuse		10 A
Current in amperes:	Slope	4.51 A/V
	Intercept	-11.31 A

This sensor is equipped with circuitry that supports auto-ID. When used with LabPro, LabQuest, LabQuest Mini, Go!Link, SensorDAQ, 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 High Current Sensor Works

The High Current Sensor contains a Hall Effect chip that senses a magnetic field produced by the electric current. The magnetic field through a short section of wire is monitored. The strength of the field is directly related to the current. With this method no resistive element is placed in the circuit. A metal film around the sensor helps to shield the sensor from magnetic fields. The sensor reading can still be affected by external magnetic fields. It is best to keep strong magnets or sources of strong magnetic fields away from the sensor during data collection.

## Do I need to calibrate the High Current Sensor? No

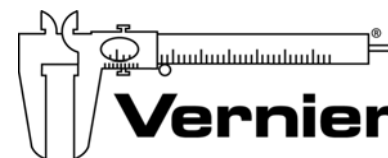
We feel that you should not have to perform a new calibration when using the High Current Sensor in the classroom. We have set the sensor to match our stored calibration before shipping it. You can simply use the appropriate calibration file that is stored in your data-collection program from Vernier. To improve the accuracy, you have a couple of options. (1) Simply use the data-collection software to zero the sensor. (2) Use the software to perform a two point calibration. This method is especially useful if you want to accurately measure current over a narrow range.

## Troubleshooting and replacing the fuse

The sensor contains a replaceable 10 A fuse. If the sensor stops measuring current, you may need to replace a blown fuse. Turn the sensor over and remove the four screws on the back. The fuse can be seen from the top. Use a small screw driver to remove the fuse. Insert a replacement. One replacement has been included with the sensor. Additional replacements in packs of five can be purchased from Vernier (order code FUSE-HCS).

## 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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