30-V Voltage Probe
(Order Code 30V-BTA)

The 30-Volt Voltage Probe is used to measure electrical potentials in the range of −30 to +30 Volts. This sensor uses an internal voltage divider connected to the +/- 10 volt input of the interface. Use this sensor in experiments that involve voltages larger than 10 Volts, such as when working with large solar panels.

The removable leads on the 30-Volt Voltage Probe are heavy duty and have shrouded banana plugs to meet European safety standards.

Since this voltage probe covers such a wide voltage range, its resolution is coarser than our Differential Voltage Probe (DVP-BTA), which we recommend for most experiments.

Vernier Voltage Probes

Vernier produces a number of different voltage probes, each with different ranges and characteristics:

- Differential Voltage Probe (DVP-BTA), Range: –6 V to +6 V, input impedance: 10 Megaohms. Differential input means that the ground (black) lead is not connected to the ground of the interface. Multiple DVP-BTA sensors can be used while connected to the same interface, with "common ground" confusion. The DVP-BTA sensor reads zero volts when leads are not attached to anything.
- Voltage Probe (VP-BTA, Range: –10 V to +10 V. The Input Impedance is equal to the input impedance of the interface. This sensor has grounded inputs. This means that the ground (black) lead is connected to the ground of the interface. Keep this in mind when using two of these sensors connected to the same interfaces. VP-BTA reads a non-zero voltage when the leads are not attached to anything. This can cause confusion to novice users.
- 30-Volt Voltage Probe (30V-BTA, Range: –30 V to +30 V, Input Impedance= 30 kilohms. This sensor has grounded inputs. This means that the ground (black) lead is connected to the ground of the interface. Keep this in mind when using two of these sensors connected to the same interfaces. The sensor reads a near-zero voltage when leads are not attached to anything.

Collecting Data with the 30-V Voltage 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 Go!®Link
- Vernier SensorDAQ®
- Vernier EasyLink with TI-Nspire™ or TI-Nspire™ CAS
- TI-Nspire™ Lab Cradle

Here is the general procedure to follow when using the 30-V Voltage Probe:
1. Connect the 30-Volt Voltage Probe to the interface.
2. Start the data-collection software.
3. The software will identify the 30-Volt Voltage 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*** 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 2or LabQuest is used as a standalone device.
- **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.
- **DataQuest™** This software application is a part of the TI-Nspire™ technology.

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.

Safety Precautions

This sensor is designed for voltages up to 30 volts. It should never be used for higher voltages. Students need to use caution when performing experiments with electricity. They should use this sensor only under supervision. Students need to exercise extra caution when dealing with higher voltage and currents which can cause serious injury. Students should keep all equipment away from water and other liquids.

Specifications

30-Volt Voltage Probe range:		±30 V
13-bit resolution (using SensorDAQ):		7.3 mV
12-bit resolution (using LabQuest 2, LabQuest Mini, LabPro, Go! Link, ULI II, SBI, TI-Nspire™ Lab Cradle or EasyLink):		15 mV
10-bit resolution (using CBL 2™):		60 mV
Supply voltage:		5 VDC
Supply current (typical):		0.2 mA
Input impedance:		30 kohm
Output voltage range:		±10 V
Calibration	slope:	3.0 V/V
	intercept:	0 V

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, or EasyLink, the data-collection software identifies the sensor and uses pre-defined parameters to configure an experiment appropriate to the recognized sensor.

How the 30-Volt Voltage Probe Works

The 30-Volt Voltage Probe uses an internal voltage divider made up of a 10 kohm resistor in series with a 20 kohm resistor. The input voltage is applied across this voltage divider and the voltage drop over the 10k-ohm resistor is sent to the +/- 10 volt input of the interface. The resulting voltage is then multiplied by 3 for proper calibration.

There are zener diodes between the input and ground lines. These zener diodes will block voltages above 30 volts.

There is a resettable fuse on the ground line of the 30-Volt Voltage Probe that will open if any significant current is drawn on that line. This could happen, for example if you were using it on a grounded interface, with a grounded power supply, and the ground lead was connected improperly to a voltage above ground potential.

Optional Calibration Procedure

You should not have to perform a new calibration when using the 30-Volt Voltage Probe in the classroom. The sensor will normally be automatically recognize and the proper calibration will be loaded. We have set the sensor to match our stored calibration before shipping it. 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 voltage over a narrow range.

Replacement Test Leads for the 30-Volt Voltage Probe

Test Leads for the 30V-BTA are available from Vernier as order code:TL-30V.

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.
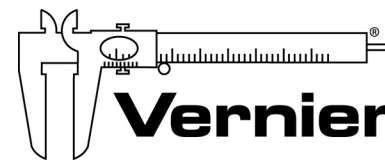
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