

# Direct-Connect Temperature Probe

(Order Code DCT-DIN)



The Direct-Connect Temperature Probe is a general-purpose laboratory temperature sensor. It is designed to be used as you would use a thermometer for experiments in chemistry, physics, biology, Earth science, and environmental science. Typical uses include

- heat of fusion experiments
- weather studies
- monitoring endothermic and exothermic reactions
- measuring freezing and boiling points
- specific heat experiments
- measuring energy content of fuels and foods
- insulation studies
- monitoring an aquarium or greenhouse

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

## Using the Temperature Probe with a Computer

This sensor can be used with a computer and any of the following lab interfaces: Vernier LabPro®, Go!®Link, Universal Lab Interface, or Serial Box Interface.

1. Connect the Direct-Connect Temperature Probe to the appropriate port on the interface. When using this sensor with a LabPro or Go! Link, you need a DIN to BTA adapter (order code DIN-BTA).
2. Launch the data-collection software.
3. Open an experiment file in the *Logger Pro* Probes & Sensors folder or manually set up the sensor, and you are ready to collect data.

## Using the Temperature Probe with TI Graphing Calculators

This sensor can be used with a TI graphing calculator and any of the following lab interfaces: LabPro, CBL 2™, and Vernier EasyLink®. Here is the general procedure to follow when using the Direct-Connect Temperature Probe with a graphing calculator:

1. Load a data-collection program onto your calculator—the application you choose to use depends on your calculator and interface. See the chart for more information.

Calculator	Interface	Data Collection Program
TI-84 Plus Family	EasyLink	EasyData
	LabPro or CBL 2	EasyData (recommended) or DataMate
TI-83 Plus Family	LabPro or CBL 2	EasyData (recommended) or DataMate
All Others (TI-73, TI-83, TI-86, TI-89, TI-92 and Voyage 200)	LabPro or CBL 2	DataMate

- **EasyData App**—This program may already be installed on your calculator. Check to see that it is EasyData version 2.0 or newer. If it is not installed or is an older version, it can be downloaded to your computer from the Vernier web site, [www.vernier.com/easy/easydata.html](http://www.vernier.com/easy/easydata.html). It can then be transferred from the computer to the calculator using TI-Connect and a TI unit-to-computer cable or TI-GRAPH LINK cable. 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**—This program can be transferred directly from LabPro or CBL 2 to the TI graphing calculator. Use the calculator-to-calculator link cable to connect the two devices. Put the calculator into Receive mode, and then press the Transfer button on the interface.
2. Use the calculator-to-calculator link cable to connect the interface to the TI graphing calculator using the I/O ports located on each unit. Be sure to push both plugs in firmly.
  3. Connect the Direct-Connect Temperature Probe to any of the analog ports on the interface, using the DIN-to-BTA adapter (order code DIN-BTA). In most cases, Channel 1 is used.
  4. Start the data-collection program, set it up for use with a Direct-Connect Temperature Probe (EasyData users require an addition AppVar to do this), and you are ready to collect data.

## Using the Direct Connect Temperature Probe with Palm Powered™ Handhelds

This sensor can be used with a Palm Powered handheld and the LabPro.

1. Connect the Palm Powered handheld, LabPro, and the Direct Connect Temperature Probe.
2. Start Data Pro.
3. Tap New, or choose New from the Data Pro menu. The Direct Connect Temperature Probe will not be identified automatically. You will need to tap SETUP and select the sensor.
4. Return to the main screen.
5. You are now ready to collect data.

## Specifications

Range:  $-15^{\circ}\text{C}$  to  $110^{\circ}\text{C}$

Linearity:  $\pm 0.55^{\circ}\text{C}$

Resolution: (with ULI II, Serial Box Interface, or LabPro)  $0.07^{\circ}\text{C}$   
(with ULI or CBL 2)  $0.284^{\circ}\text{C}$

Power: 0.15 mA @ 5 VDC

Response Time (time for a 90% change in reading):

Water (with stirring) 6 to 8 seconds (typical)

Moving Air 30 seconds

The auto-ID feature is not supported in this sensor. To use this sensor with LabPro, CBL 2, or EasyLink you need a DIN-BTA adapter (order code DIN-BTA) available from Vernier.

## How the Temperature Probe Works

This probe uses the LM34CH temperature transducer. It produces a voltage output that varies in a linear way with temperature. The probe is covered with Teflon<sup>®</sup> FEP heat-shrink tubing. This coating protects the probe from damage in most environments. Be careful when using the probe in laboratory chemicals, particularly over long periods of time. We have tested probes like this one in a number of chemicals commonly used in labs. The probes were undamaged after several minutes in each of the following chemicals:

acetone	household bleach	Paradichlorobenzene (2M)
cyclohexane	isopropyl alcohol	sodium hydroxide
ethanol	lauric acid	sulfuric acid (3M)
ethylene glycol (antifreeze)	naphthalene (moth balls)	vinegar
glacial acetic acid		water

If the seal on the probe is damaged, liquid may get into the probe and cause faulty readings. **Important:** Do not attempt to push this sensor through the hole in a rubber stopper. Doing so will damage the Teflon seal.

## Do I Need to Calibrate This Probe? No.

We feel that you should not have to perform a new calibration when using the Direct-Connect Temperature Probe in the classroom. You can use the appropriate calibration file that is stored in your data-collection program from Vernier.

However, this temperature probe can be calibrated using two constant-temperature water baths, such as an ice-water mixture, room temperature water, or boiling water.

The default calibration slopes and intercepts for this sensor are:

In Celsius degrees:

Slope: 55.55

Intercept:  $-17.7$

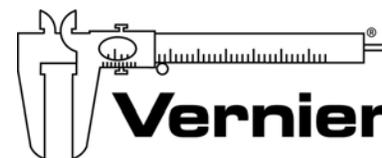
In Fahrenheit degrees:

Slope: 100

Intercept: 0.0

## 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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