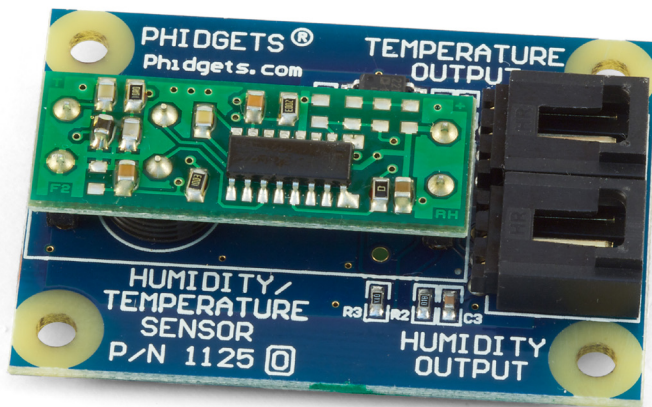


# Product Manual

## 1125 - Humidity/Temperature Sensor



**Phidgets 1125 - Product Manual**

**For Board Revision 0**

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# Contents

## **4 Product Features**

- 4 Connections
- 4 Type of Measurement

## **5 Getting Started**

- 5 Checking the Contents
- 5 Connecting all the pieces
- 5 Testing Using Windows 2000/XP/Vista
- 7 Testing Using Mac OS X

## **7 Programming a Phidget**

- 7 Code Samples
- 7 Coding for your Sensor

## **8 Technical Information**

- 8 Relative Humidity
- 8 Temperature
- 8 Other Interfacing Alternatives
- 9 Analog Input Cable Connectors
- 9 Mechanical Drawing
- 10 Device Specifications

## **10 Product History**

## **10 Support**

## Product Features

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- Measures Relative Humidity from 10% to 95%
- Operates over 0% to 100% Relative Humidity
- Accurately measures ambient temperatures from -40°C to +100°C (-40°F to 212°F) with a typical error of  $\pm 0.75$  degrees Celsius in the 0°C to 100°C range

## Connections

Designed to connect to a:

- 1018 - PhidgetInterfaceKit 8/8/8
- 1019 - PhidgetInterfaceKit 8/8/8 w/6 Port Hub
- 1070 - PhidgetSBC
- 1202 - PhidgetTextLCD

## Type of Measurement

The sensor uses ratiometric measurement.

# Getting Started

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## Checking the Contents

### You should have received:

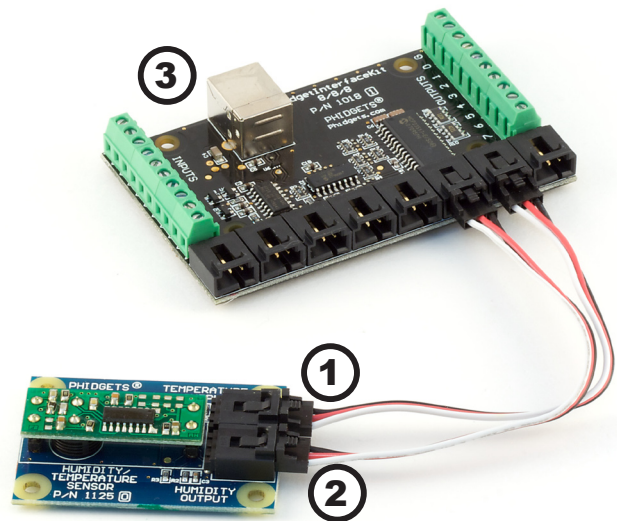
- A Humidity/Temperature Sensor
- Two Sensor Cables

### In order to test your new Phidget you will also need:

- A PhidgetInterfaceKit 8/8/8 or a PhidgetTextLCD
- A USB Cable

## Connecting all the pieces

1. Connect the Sensor's Temperature Output to an Analog Input on the PhidgetInterfaceKit 8/8/8 using one of the sensor cable.
2. Connect the Sensor's Humidity Output to an Analog Input on the PhidgetInterfaceKit 8/8/8 using the second sensor cable.
3. Connect the InterfaceKit 8/8/8 to your PC using a USB cable.




## Testing Using Windows 2000/XP/Vista

### Downloading the Phidgets drivers


Make sure that you have the current version of the Phidget library installed on your PC. If you don't, do the following:

Go to [www.phidgets.com](http://www.phidgets.com) >> Drivers


Download and run Phidget21 Installer (32-bit, or 64-bit, depending on your PC)

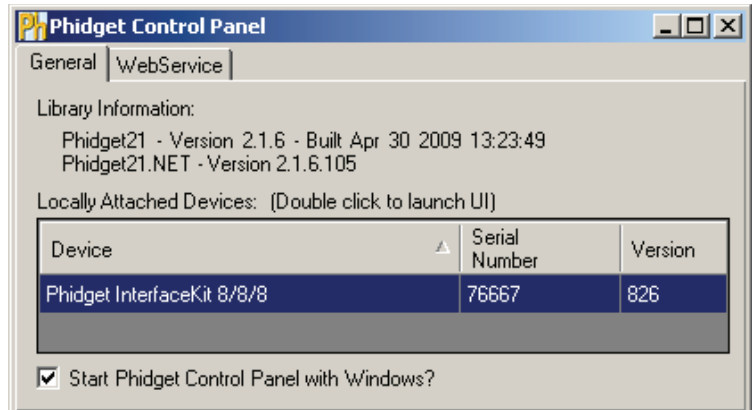
You should see the  icon on the right hand corner of the Task Bar.

### Running Phidgets Sample Program

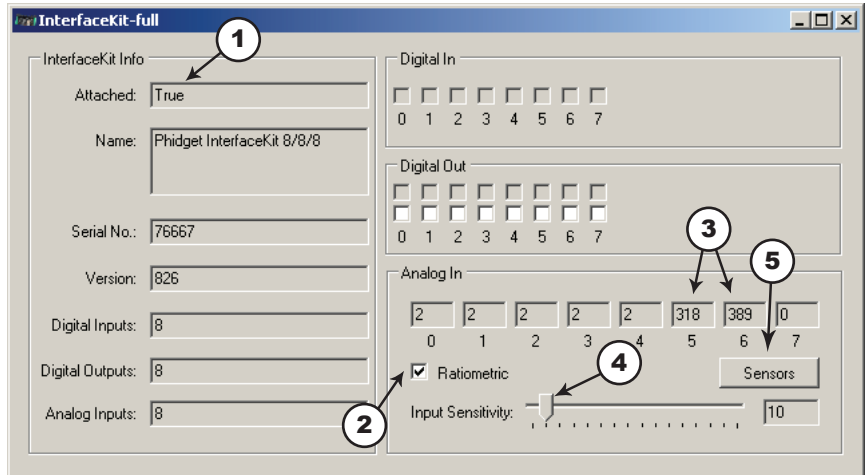
Double clicking on the  icon loads the Phidget Control Panel; we will use this program to make sure that your new Phidget works properly. Since the sensor is connected to a 1018, the computer will see only the 1018. The sensor is providing data through the Analog input it is connected to.

The source code for the InterfaceKit-full sample program can be found under C# by clicking on [www.phidgets.com](http://www.phidgets.com) >> Programming.

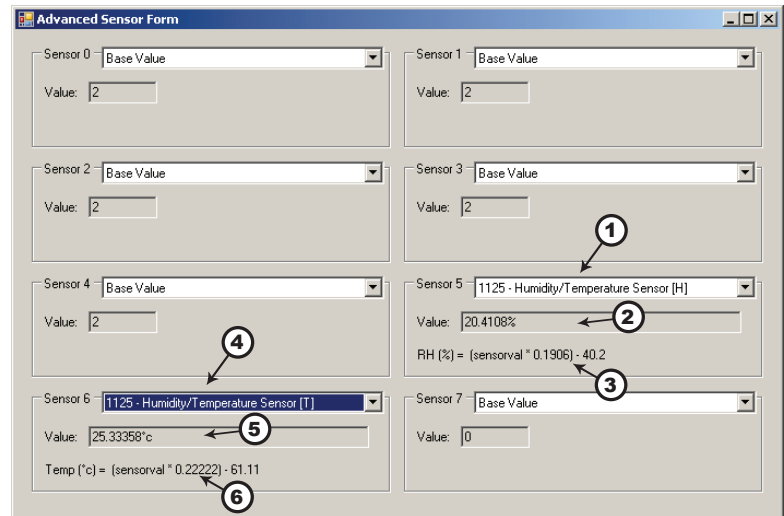
Double Click on the  icon to activate the Phidget Control Panel and make sure that the **Phidget InterfaceKit 8/8/8** is properly attached to your PC.



1. Double Click on **Phidget InterfaceKit 8/8/8** in the Phidget Control Panel to bring up InterfaceKit-full and check that the box labelled Attached contains the word True.
2. Make sure that the Ratiometric box is Ticked.
3. Check the values in the Analog In boxes. The humidity value of 318, for example, is equal to 22% relative humidity and the temperature value of 389 is equal to 23 degrees Celsius.
4. You can adjust the input sensitivity by moving the slider pointer.
5. Click on the Sensors button to bring up the Advanced Sensor Form.



1. In the Advanced Sensor Form, select the 1125 - Humidity/Temperature Sensor [H] from the drop down menu to get a display for the humidity sensor functionality.
2. The measured relative humidity.
3. Formula used to convert the analog input SensorValue into relative humidity.
4. Select the 1125 - Humidity/Temperature Sensor [T] from the drop down menu to get a display for the temperature sensor functionality.
5. The measured ambient temperature.
6. Formula used to convert the analog input SensorValue into temperature.



## Testing Using Mac OS X

- Click on System Preferences >> Phidgets (under Other) to activate the Preference Pane
- Make sure that the Phidget InterfaceKit 8/8/8 is properly attached.
- Double Click on Phidget InterfaceKit 8/8/8 in the Phidget Preference Pane to bring up the InterfaceKit-Full example. This example will function in a similar way as the Windows version, but note that it does not include an Advanced Sensor Display.

## Programming a Phidget

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Phidgets' philosophy is that you do not have to be an electrical engineer in order to do projects that use devices like sensors, motors, motor controllers, and interface boards. All you need to know is how to program. We have developed a complete set of Application Programming Interfaces (API) that are supported for Windows, Mac OS X, and Linux. When it comes to languages, we support VB6, VB.NET, C#.NET, C, C++, Flash 9, Flex, Java, LabVIEW, Python, Max/MSP, and Cocoa.

### Code Samples

We have written sample programs to illustrate how the APIs are used.

Due to the large number of languages and devices we support, we cannot provide examples in every language for every Phidget. Some of the examples are very minimal, and other examples will have a full-featured GUI allowing all the functionality of the device to be explored. Most developers start by modifying existing examples until they have an understanding of the architecture.

Go to [www.phidgets.com](http://www.phidgets.com) >> Programming to see if there are code samples written for your device. Find the language you want to use and click on the magnifying glass besides "Code Sample". You will get a list of all the devices for which we wrote code samples in that language.

If this is your first time writing a program to control a Phidget, you should read the Getting Started Guide for the language you are planning to use.

### Coding for your Sensor

Phidget analog sensors do not have their own API, but instead their output is a voltage that is converted to a digital value and accessed through the SensorValue properties and events on a PhidgetInterfaceKit. It is not possible to programmatically identify which sensor is attached to the Analog Input. Your application will need to apply any formulas from this manual to the SensorValue to translate it into usable data.

See the PhidgetInterfaceKit product manual for an overview of its API and a description of our architecture.

# Technical Information

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## Relative Humidity

The sensor measures the relative humidity of the environment around the sensor. Built in temperature compensation produces a linear output ranging from 10% to 95% relative humidity. Values outside of this range may be usable but will have increased error.

### Formulas

The Formula to translate SensorValue into Relative Humidity is:

$$\text{RH (\%)} = (\text{SensorValue} * 0.1906) - 40.2$$

## Temperature

The sensor also measures ambient temperature from -40 to +100 degrees Celsius. This device is a precision temperature to voltage converter that outputs a voltage that is directly proportional to temperature.

### Formulas

The Formula to translate SensorValue into Temperature is:

$$\text{Temperature (°C)} = (\text{SensorValue} * 0.22222) - 61.11$$

## Other Interfacing Alternatives

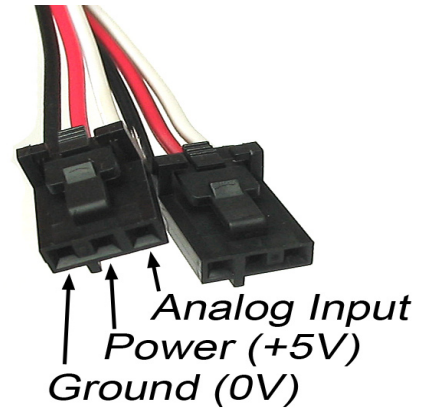
If you want maximum accuracy, you can use the RawSensorValue property from the PhidgetInterfaceKit. To adjust a formula, substitute (SensorValue) with (RawSensorValue / 4.095)

If the sensor is being interfaced to your own Analog to Digital Converter and not a Phidget device, our formulas can be modified by replacing (SensorValue) with (Vin \* 200). It is important to consider the voltage reference and input voltage range of your ADC for full accuracy and range.



# Analog Input Cable Connectors

Each Analog Input uses a 3-pin, 0.100 inch pitch locking connector. Pictured here is a plug with the connections labeled. The connectors are commonly available - refer to the Table below for manufacturer part numbers.

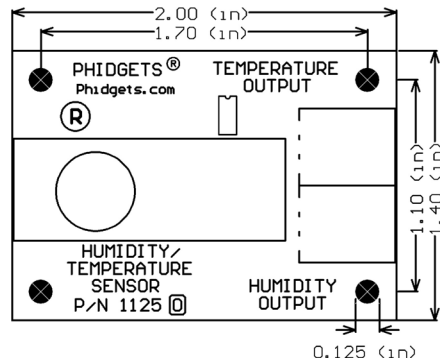


Cable Connectors		
Manufacturer	Part Number	Description
Molex	50-57-9403	3 Position Cable Connector
Molex	16-02-0102	Wire Crimp Insert for Cable Connector
Molex	70543-0002	3 Position Vertical PCB Connector
Molex	70553-0002	3 Position Right-Angle PCB Connector (Gold)
Molex	70553-0037	3 Position Right-Angle PCB Connector (Tin)
Molex	15-91-2035	3 Position Right-Angle PCB Connector - Surface Mount

Note: Most of the above components can be bought at [www.digikey.com](http://www.digikey.com)

## Mechanical Drawing

1:1 scale



**Note:** When printing the mechanical drawing, "Page Scaling" in the Print panel must be set to "None" to avoid re-sizing the image.

## Device Specifications

Humidity Sensor	
Current Consumption	3.6mA
Output Impedance	1K ohms
Accuracy	±2% RH @ 55% RH
Accuracy over 10% to 95% RH	±3% Typical, ±5% Maximum
Reaction Time for humidity	10 seconds
Minimum / Maximum Voltage	4.75VDC - 5.25VDC
Operating temperature range	-40°C to 100°C
Temperature Sensor	
Current Consumption	300µA
Output Impedance	1K ohms
Accuracy	1 Degree Celsius
Minimum/Maximum Voltage	4.75VDC - 5.25VDC
Range of Operation	-50°C to 150°C

## Product History

Date	Board Revision	Comment
May 2008	0	Product Release

## Support

Call the support desk at 1.403.282.7335 8:00 AM to 5:00 PM Mountain Time (US & Canada) - GMT-07:00

or

E-mail us at: [support@phidgets.com](mailto:support@phidgets.com)