

Barometer Phidget

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Getting Started

Welcome to the PRE1000 user guide! In order to get started, make sure you have the following hardware on hand:

- PRE1000 - Barometer Phidget
- VINT Hub
- Phidget cable
- USB cable and computer

Next, you will need to connect the pieces:



1. Connect the PRE1000 to the VINT Hub using the Phidget cable.
2. Connect the VINT Hub to your computer with a USB cable.

Now that you have everything together, let's start using the PRE1000!

Using the PRE1000

Phidget Control Panel

In order to demonstrate the functionality of the PRE1000, the Phidget Control Panel running on a Windows machine will be used.

The Phidget Control Panel is available for use on both macOS and Windows machines.

Windows

To open the Phidget Control Panel on Windows, find the  icon in the taskbar. If it is not there, open up the start menu and search for Phidget Control Panel



macOS

To open the Phidget Control Panel on macOS, open Finder and navigate to the Phidget Control Panel in the Applications list. Double click on the  icon to bring up the Phidget Control Panel.

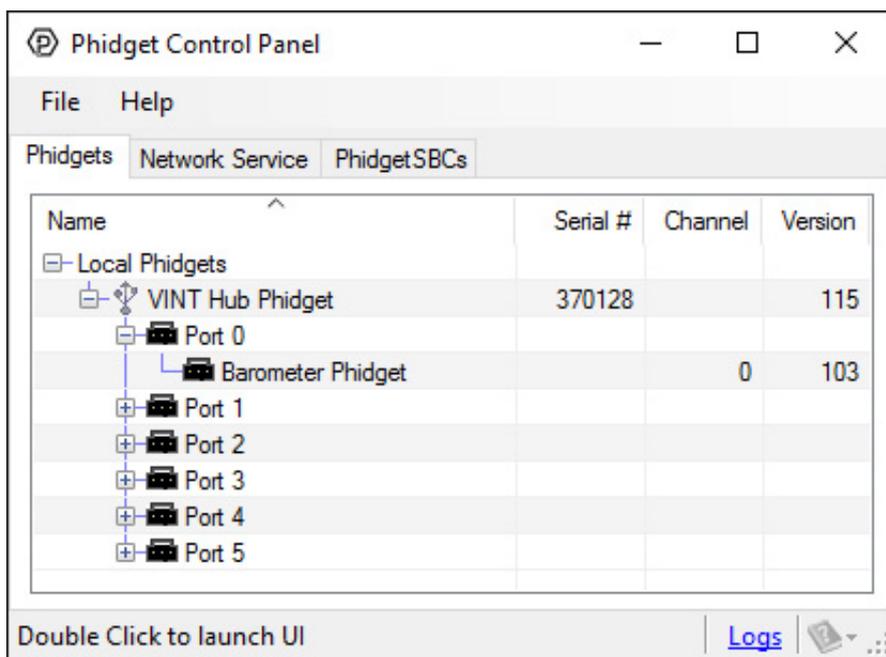
For more information, take a look at the getting started guide for your operating system:

- Getting started with Windows
- Getting started with macOS

Linux users can follow the getting started with Linux guide and continue reading here for more information about the PRE1000.

First Look

After plugging the PRE1000 into your computer and opening the Phidget Control Panel, you will see something like this:



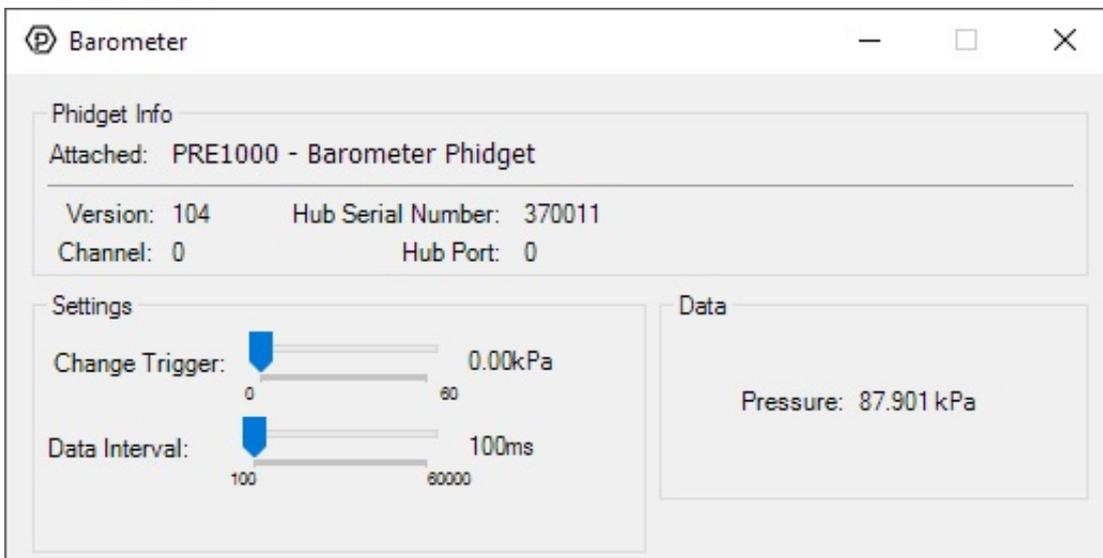
The Phidget Control Panel will list all connected Phidgets and associated objects, as well as the following information:

- **Serial number:** allows you to differentiate between similar Phidgets.
- **Channel:** allows you to differentiate between similar objects on a Phidget.
- **Version number:** corresponds to the firmware version your Phidget is running. If your Phidget is listed in red, your firmware is out of date. Update the firmware by double-clicking the entry.

The Phidget Control Panel can also be used to test your device. Double-clicking on an object will open an example.

Pressure Sensor

Double-click on the Pressure Sensor object, labelled Barometer Phidget, in order to run the example



General information about the selected object will be displayed at the top of the window. You can also experiment with the following functionality:

- Modify the change trigger and/or data interval value by dragging the sliders. For more information on these settings, see the data interval/change trigger page.

Technical Details

Barometric Temperature Correction

The PRE1000 reports the absolute pressure of its surroundings. In other words, the pressure compared to a perfect vacuum. If you plan on using this sensor as a barometer, you need to convert to barometric pressure. You can use conversion calculators such as this above sea level barometer reading correction calculator to make the adjustment based on your location's elevation.

Use as an Altimeter

Since the PRE1000 makes absolute pressure measurements, you could use it with a temperature sensor to measure changes in altitude, as long as you know your pressure and height to begin with. The following is the barometric formula:

$$P_h = P_0 e^{\frac{-Mgh}{R^*T}}$$

where

P_h is the pressure at height h

P_0 is the pressure at height zero

M is the molar mass of earth's air (0.0289644 kg/mol)

g is the gravitational constant (9.80665 m/s²)

h is the current height

R^* is the universal gas constant (8.3144598 J/(mol*K))

T is the standard temperature in degrees Kelvin.

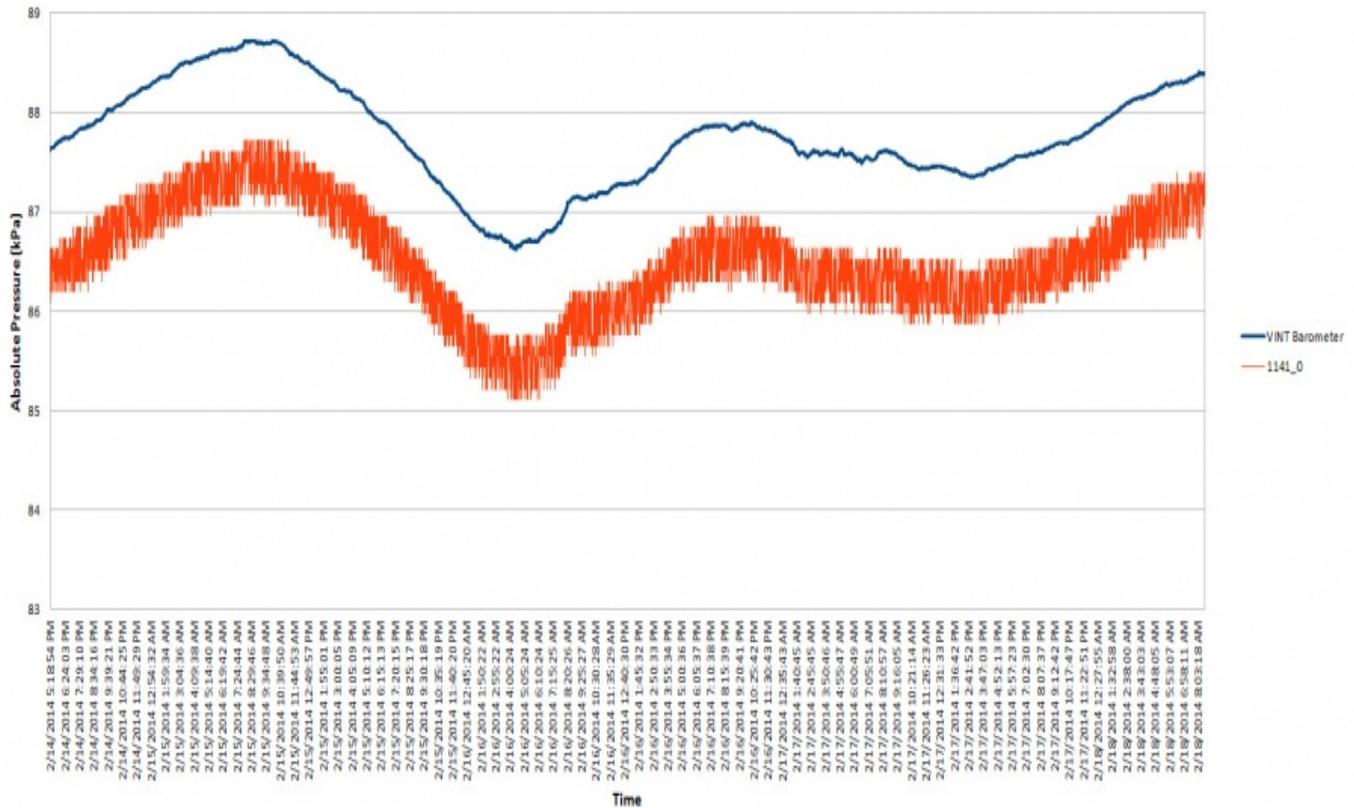
This formula can be rearranged for h as follows:

$$h = \frac{R^*T * \ln\left(\frac{P_h}{P_0}\right)}{-Mg}$$

Accuracy

A long-run test was performed to compare the accuracy of the PRE1000 with that of the 1141 - Absolute Gas Pressure Sensor. For 87 hours, both sensors measured the absolute air pressure indoors in the same room, with the same change sensitivity.

Long Run Test of VINT Barometer



As you can see, the PRE1000 is significantly less noisy. The average difference between any two successive samples for the 1141 is 237.17Pa, while for the PRE1000, it is 3.19Pa. Both sensors consistently differ by an average of 1.23kPa, but this error could be easily calibrated out due to the consistency of the offset.

What to do Next

- Software Overview - Find your preferred programming language here to learn how to write your own code with Phidgets!
- General Phidget Programming - Read this general guide to the various aspects of programming with Phidgets. Learn how to log data into a spreadsheet, use Phidgets over the network, and much more.
- Phidget22 API - The API is a universal library of all functions and definitions for programming with Phidgets. Just select your language and device and it'll give you a complete list of all properties, methods, events, and enumerations that are at your disposal.