ENS220 Dashboard Quick Start Guide

ENS220 Evaluation Kit (EVK)

ENS220 Dashboard Quick Start Guide
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1 Introduction

The ENS220 Dashboard Quick Start Guide is aimed at giving customers an overview of how to use the ENS220 Dashboard Software with the latest ENS220 Evaluation Kit released by ScioSense to showcase the performance of the ENS220 sensor.

1.1 ENS220 Evaluation Kit Parts

The kit contains the following components:

	Description
1	USB 2.0 type A to USB mini type B cable 1m
1	Micro-USB to I^2C converter
1	ENS220 break-out board

The following picture shows how the Evaluation Kit should look like and how the parts should be assembled and connected to the computer.

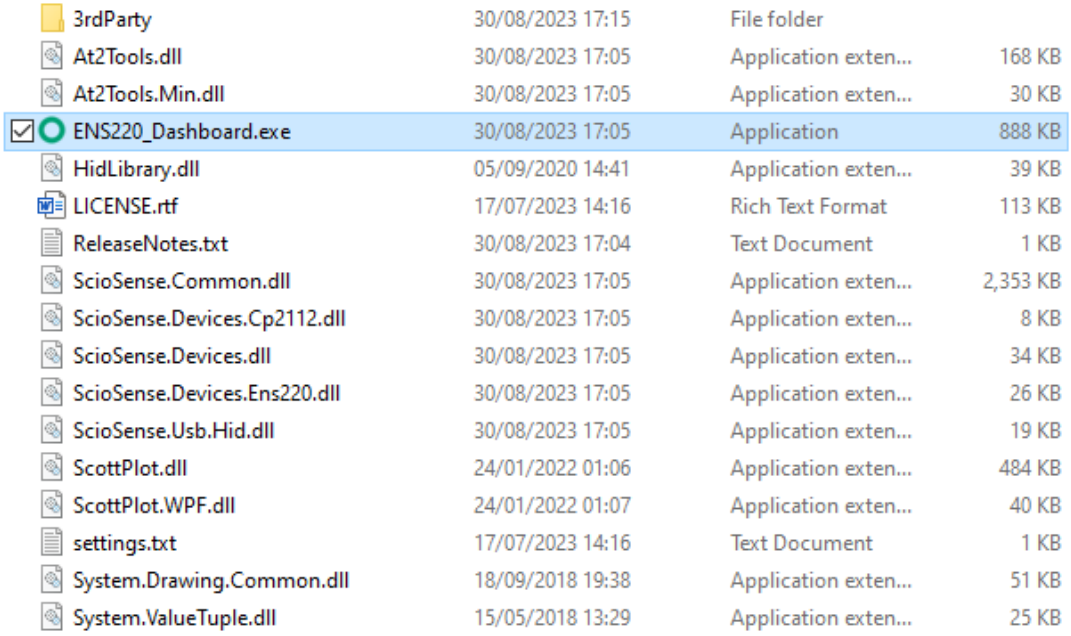
Note: Recommended PC platform Windows 10 or higher and USB interface

1.2 ENS220 Dashboard Software

The ENS220 Dashboard Software can be downloaded from the link below:

https://downloads.sciosense.com/ens220/

Extract the file to the folder of choice.

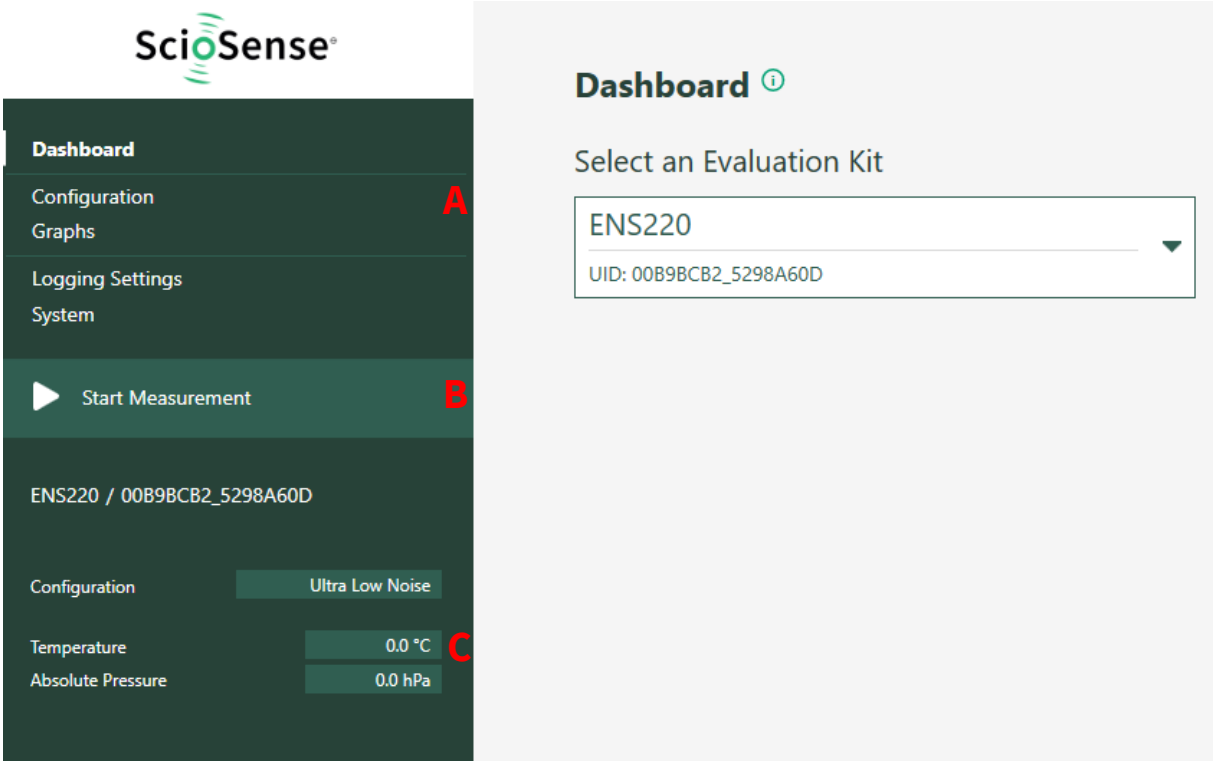


3rdParty	30/08/2023 17:15	File folder	
At2Tools.dll	30/08/2023 17:05	Application exten...	168 KB
At2Tools.Min.dll	30/08/2023 17:05	Application exten...	30 KB
ENS220_Dashboard.exe	30/08/2023 17:05	Application	888 KB
HidLibrary.dll	05/09/2020 14:41	Application exten...	39 KB
LICENSE.rtf	17/07/2023 14:16	Rich Text Format	113 KB
ReleaseNotes.txt	30/08/2023 17:04	Text Document	1 KB
ScioSense.Common.dll	30/08/2023 17:05	Application exten...	2,353 KB
ScioSense.Devices.Cp2112.dll	30/08/2023 17:05	Application exten...	8 KB
ScioSense.Devices.dll	30/08/2023 17:05	Application exten...	34 KB
ScioSense.Devices.Ens220.dll	30/08/2023 17:05	Application exten...	26 KB
ScioSense.Usb.Hid.dll	30/08/2023 17:05	Application exten...	19 KB
ScottPlot.dll	24/01/2022 01:06	Application exten...	484 KB
ScottPlot.WPF.dll	24/01/2022 01:07	Application exten...	40 KB
settings.txt	17/07/2023 14:16	Text Document	1 KB
System.Drawing.Common.dll	18/09/2018 19:38	Application exten...	51 KB
System.ValueTuple.dll	15/05/2018 13:29	Application exten...	25 KB

2 Launch and Operation

Launch the application by double-clicking the ENS220_Dashboard.exe executable.

The main window will pop up showing the main ENS220 Dashboard page as below:



As shown in the above graph, there are three main areas in the GUI left side, which have been marked accordingly with three red letters A, B, and C. These three areas Am, B, and C have been defined as below:

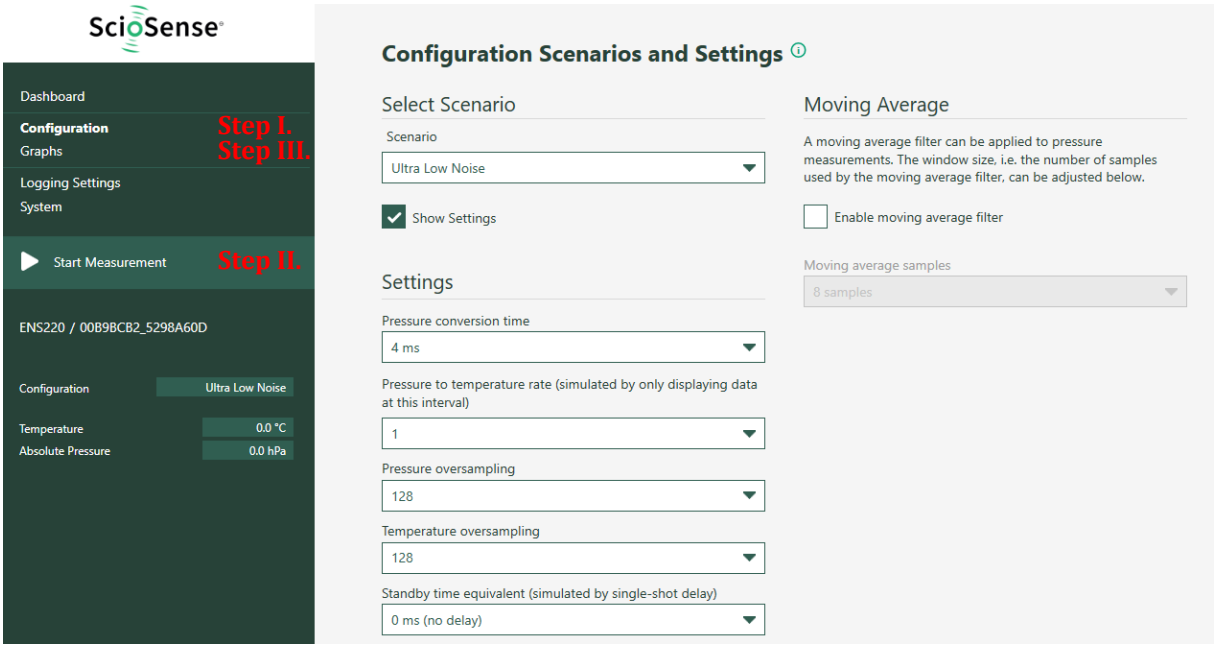
A. Parameters setting
B. Start/Stop Measurement
C. Current Measurement display

To start a measurement, follow the following steps:

I. Click "**Configuration**" to choose the desired operation mode, which is set by default to "**Ultra Low Noise**"

II. Click "**Standard Measurement**"

III. Click "**Graphs**" to see and evaluate sensor performance. While the ENS220 starts capturing, the incoming data is displayed in graphs as well as in the data display area.



For detailed information, see Section 3**Error! Reference source not found.**.

Notes:

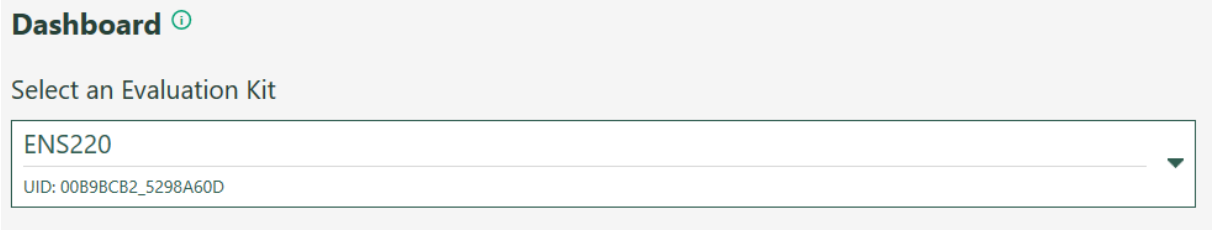
- If a second Evaluation Kit is connected, the same configuration will be applied to both.
- The Evaluation Kit works in single shot mode communicating through the I^2C protocol.
- Certain features (Pressure to temperature rate and Standby time) are not compatible with this operation mode, so they are simulated to show how the signals would look to the user.
- The maximum acquisition frequency of the Evaluation Kit is of 52Hz, due to the limitations of the hardware and not using the FIFO in continuous mode. For achieving the full acquisition speed of 970 Hz please use the ENS220 development kit (ENS220-LG_DK_ST) or the Arduino libraries.

3 Using the Graphical User Interface

3.1 Graphical views

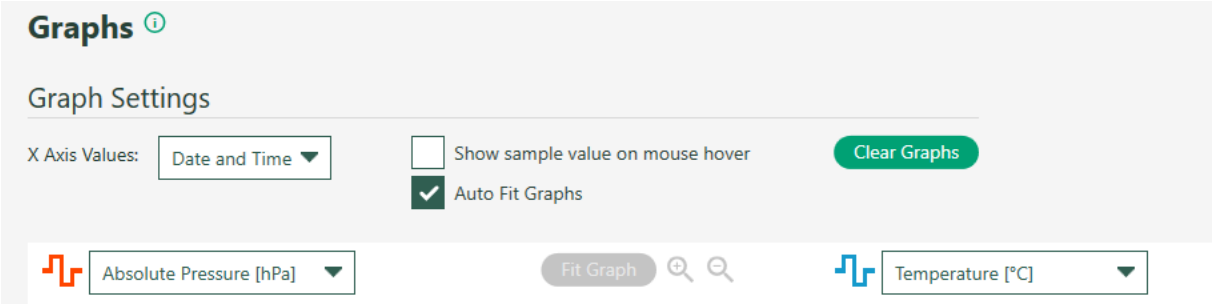
3.1.1 Dashboard

Clicking on "**Dashboard**" on the left side of the window, the user can find the UID of the interface bridge followed by the UID of the ENS220 on the right side of the window. If two ENS220 Evaluation kits are connected, the second UID on the drop-down menu will correspond to the Co-Device.



3.1.2 Graphs

Selecting "**Graphs**" on the left side of the window, the user will see the options available for configuration of the plots.



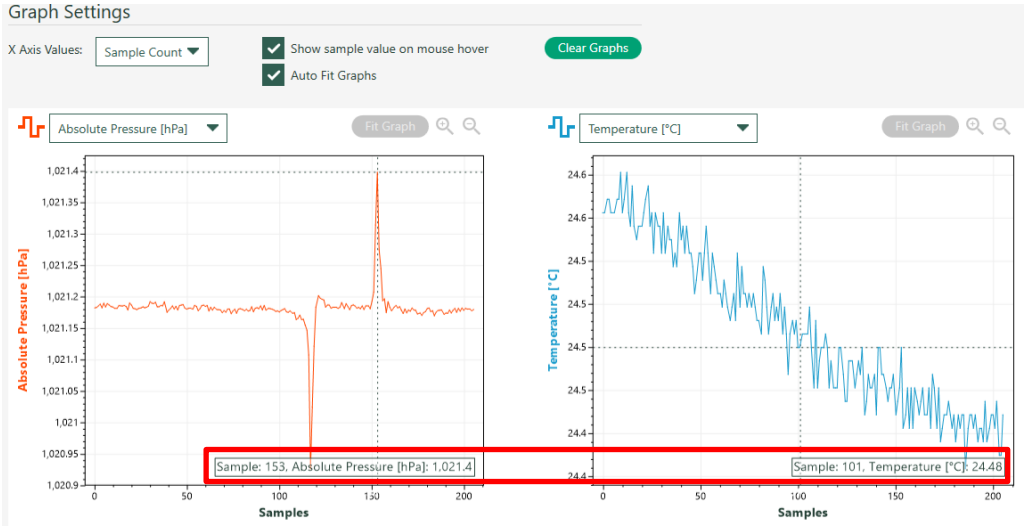
Graph Settings: With one drop-down menu and two checkboxes to choose the user's preferred way of data visualization, together with a button to clear the graphs.

There are two options in "**X Axis Values**" setting of drop-down menus:

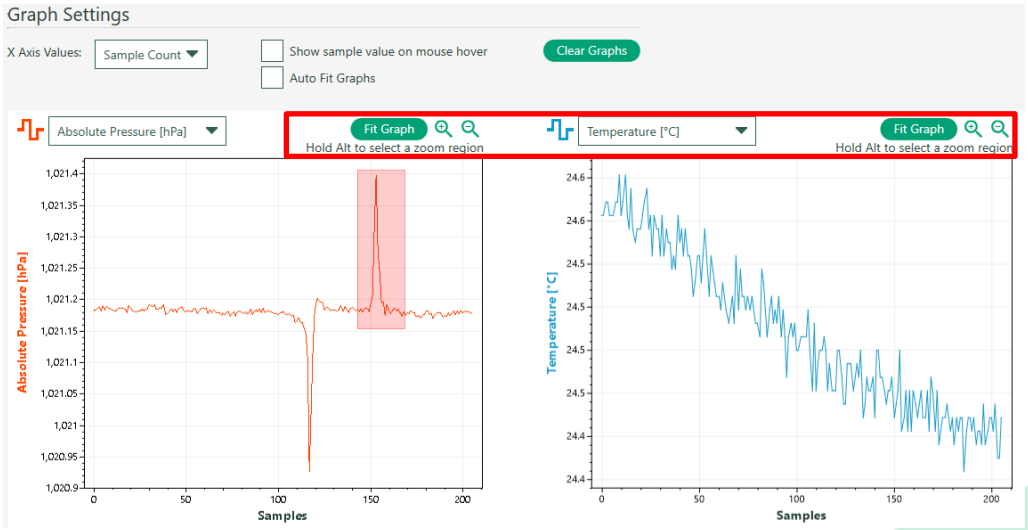
- **Sample Count:** X Axis Value shows the counting number of the sampling points.
- **Date and Time:** X Axis Values shows the corresponding date and time of measurement sampling points.

There are two checkboxes:

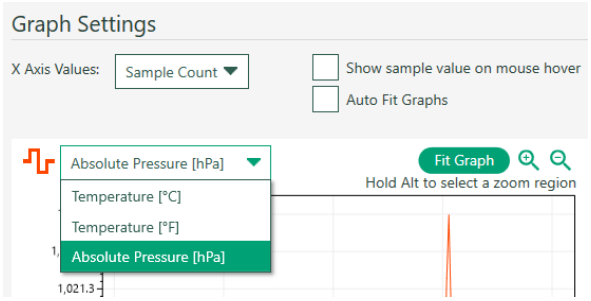
- **Show sample value on mouse hover:** when activated, a cursor with dotted cross lines appears which can be pointed to the interesting position of the data curve. The corresponding values to this data point are then shown at the bottom of the graph.



- **Auto Fit Graphs:** when deactivated, the functions Fit Graph, Zoom In, and Zoom Out will become enabled. Move the cursor to the graphs and, while holding Alt, click and drag the mouse to create a zoom region to zoom into and check sensor performance in detail. To zoom out click the Fit Graph icon.



- **Graph Selection:** there are two graphs being presented simultaneously. The user can use the drop down menus with three options to choose which signal to display in each plot.

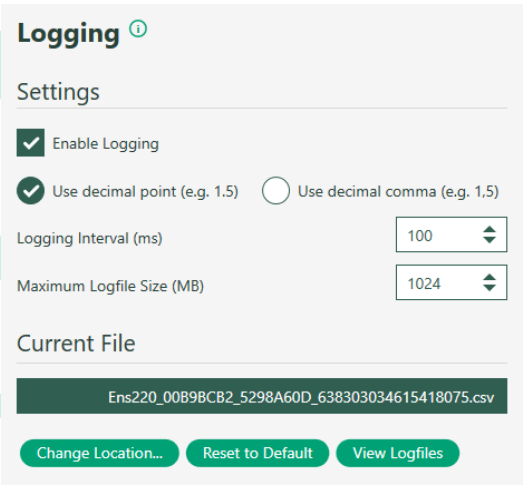


When connecting two ENS220 Evaluation Kits to the computer, four graphs will be presented in total. The number of signals to display will be seven, as an additional signal is

calculated from the two sensors. The offset in height between the two sensors is taken when “Start Measurement” is clicked, and this offset is subtracted from all the subsequent Height Difference datapoints.

3.1.3 Logging Setting

Clicking on “**Logging Settings**” on the left side of the window, the user can access the options present below:



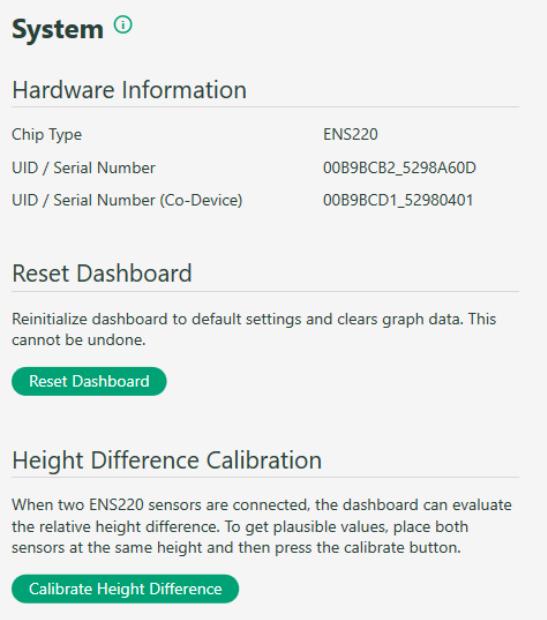
By default, all data will be logged automatically with timestamps. The following options are available:

- **Use decimal point / decimal comma:** Select the use of decimal point or comma as the decimal separator.
- **Logging Interval:** The most recent data point will be written into the file at this interval.
- **Maximum Logfile Size:** When this size is reached, a new file will be created.

To view the location where the current data is being saved, hover the mouse over the file name or click "**View Logfiles**". Click "**Change Location**" to change the folder where the log data files will be stored.

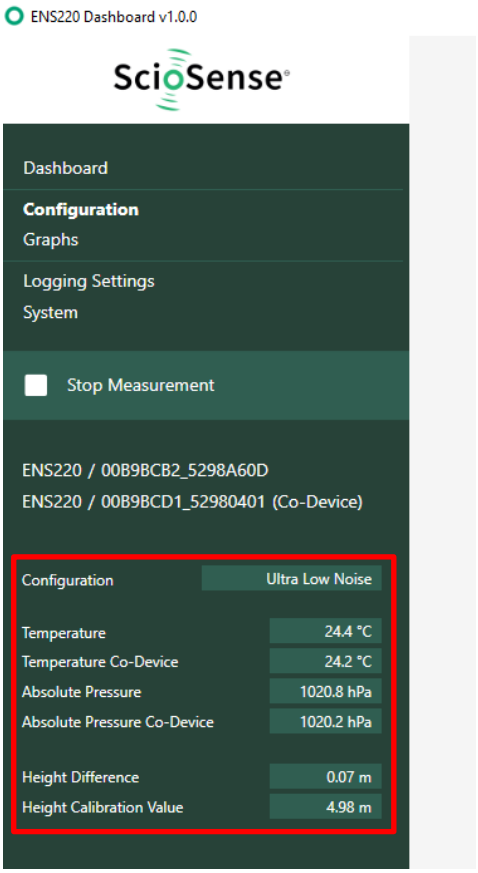
3.1.4 System

Clicking on "**System**" on the left side of the window, the user can access the information regarding the hardware and can set the offset between two ENS220 to zero using "**Calibrate Height Difference**".



3.2 Current Measurement Data Display

When a measurement is running, the field on the left of the window displays the latest acquired data points.


ENS220 Dashboard v1.0.0
ScioSense
Dashboard
Configuration
Graphs
Logging Settings
System
Stop Measurement
ENS220 / 00B9BCB2_5298A60D
ENS220 / 00B9BCD1_52980401 (Co-Device)
Configuration
Ultra Low Noise
Temperature
24.4 °C
Temperature Co-Device
24.2 °C
Absolute Pressure
1020.8 hPa
Absolute Pressure Co-Device
1020.2 hPa
Height Difference
0.07 m
Height Calibration Value
4.98 m

4 Height difference calculation

When using two Evaluation Kits, the difference in height between the sensors is calculated. For this, the following computations are made:

- **Calculation of the conversion between pressure and height difference.** The density of air is calculated from the temperature and pressure readings, and from this the conversion factor is obtained. The density of air is calculated as the average of the density of air at each sensor.
- **Measurement of initial offset.** The first measurement will be taken as an offset to subtract to all following measurements.
- **Translation of pressure difference into height difference.** The measurements from both Evaluation Kits are triggered simultaneously, the pressure difference is converted to a height difference, and the initial offset is subtracted.

The following code shows the computations made for calculating the conversion between pressure difference and height.

```
// Module of the gravitational acceleration at sea level in m/s^2
GRAVITATIONAL_ACCELERATION_SEA_LEVEL = 9.80665;
//Specific gas constant for dry air in [J/(kg*K)]
SPECIFIC_GAS_CONSTANT_DRY_AIR = 287.0501;
//Density of dry air in kg/m3 at pressure p [Pa] and T [ºC]
densityDryAir1 = p1 / (SPECIFIC_GAS_CONSTANT_DRY_AIR * (T1 + 273.15);
densityDryAir2 = p2 / (SPECIFIC_GAS_CONSTANT_DRY_AIR * (T2 + 273.15);
// Conversion factor between pressure and height difference, in m/Pa
conversionFactor = 1 / (GRAVITATIONAL_ACCELERATION_SEA_LEVEL * (densityDryAir2 + densityDryAir1) / 2);
// Height difference in m
heightDifference = (p2 – p1) * conversionFactor
```

For example, if we measure the following values:

Sensor 1: p_1 = 102060 Pa, T1 = 21.0 ºC.

Sensor 2: p_2 = 102078 Pa, T2 = 22.4 ºC.

densityDryAir1 = 102060 / (287.0501 * (21.0 + 273.15) = 1.208729 kg/m3

densityDryAir2 = 102078 / (287.0501 * (22.4 + 273.15) = 1.203216 kg/m3

conversionFactor = 1 / (9.80665 * (1.208729 + 1.203216) / 2) = 0.084556 m/Pa

heightDifference = (102078 – 102060) * 0.084556 = 1.52 m

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6 Revision Information

Revision	Date	Comment	Page
1.0	2023-09-15	Initial release	All
1.1	2023-09-15	Standardized text formatting	All

Note(s) and/or Footnote(s):

1. Page and figure numbers for the previous version may differ from page and figure numbers in the current revision.
2. Correction of typographical errors is not explicitly mentioned.

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