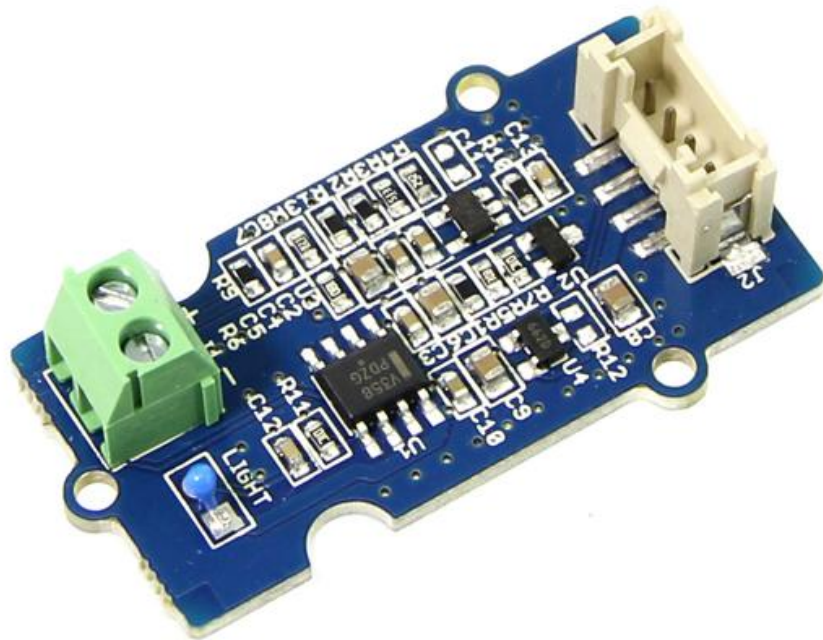# Grove - High Temperature Sensor

Thermocouples are very sensitive devices. It requires a good amplifier with cold-junction compensation. The Grove - High Temperatire Sensor uses a K-Type themocouple and a thermocouple amplifier that measures ambient temperature using thermistor for cold-junction compensation. The detectable range of this Sensor is -50~600°C , and the accuracy is ±(2.0% + 2°C).

[https://www.seeedstudio.com/depot/Grove-High-Temperature-Sensor-p-1810.html]

Version

Product Version	Changes	Released Date
Grove - High Temperature Sensor V1.0	Initial	Feb 25, 2014

Specifications

Parameter	Value/Range
Operating Voltage	3.3-5V
Max power rating at 25℃	300mW
Operating temperature range	-40 ~ +125 ℃
Temperature measurement range	-50 ~ +600 ℃
Amplifier output voltage range	0 ~ 3.3 V
Thermocouple material	Glass Fiber
Cold junction compensation	Environment temperature measurement
Thermocouple temperature measurement accuracy	±2.0% (+ 2 ℃)
Thermocouple temperature sensor cable length	100cm
Dimension	20mm x 40mm

> **🔥 Tip**
> More details about Grove modules please refer to Grove System [https://wiki.seeedstudio.com/Grove_System/]

Platforms Supported

Arduino	Raspberry Pi		

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> ⚠ **Caution**
> The platforms mentioned above as supported is/are an indication of the module's software or theoritical compatibility. We only provide software library or code examples for Arduino platform in most cases. It is not possible to provide software library / demo code for all possible MCU platforms. Hence, users have to write their own software library.

Getting Started

Play with Arduino

Hardware

- Step 1. We need to prepare the below stuffs:

Seeeduino V4.2	Base Shield

Get ONE Now
[https://www.seeedstudio.com/Seeeduino-
V4.2-p-2517.html]

Get ONE Now
[https://www.seeedstudio.com/Base
Shield-V2-p-1378.html]
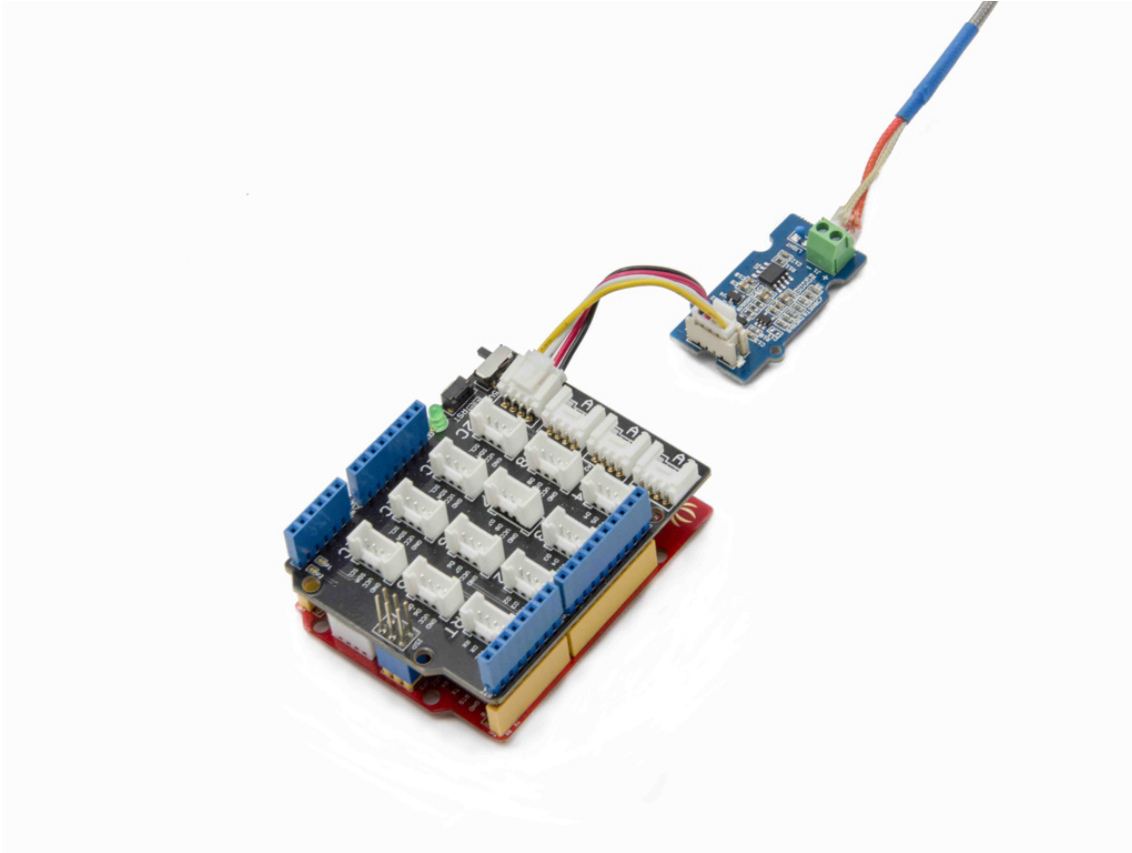
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- Step 2. Connect the Grove-High Temperature Sensor to **A0** on Base Shield.

- Step 3. Plug the base Shield into Seeeduino-V4.2.

- Step 4. Connect Seeeduino-V4.2 to PC by using a USB cable.

> ✏️ **Note**
> If we don't have a Base Shield, don't worry, the sensor can be connected to your Arduino directly. Please follow below tables to connect with Arduino.

Seeeduino	Grove-High Temperature Sensor
GND	Black
5V	Red
A1	White
A0	Yellow

Software

- Step 1. Download the Grove-High Temperature Sensor Library [https://github.com/Seeed-Studio/Grove_HighTemp_Sensor/archive/master.zip] from Github.

- Step 2. Refer How to install library [https://wiki.seeedstudio.com/How_to_install_Arduino_Library] to install library for Arduino.

- Step 3. Copy the code into Arduino IDE and upload.

```
#include "High_Temp.h"

HighTemp ht(A1, A0);

void setup()
{
    Serial.begin(115200);
    Serial.println("grove - hight temperature sensor tes
    ht.begin();
}

void loop()
{
    Serial.println(ht.getThmc());
    delay(100);
}
```

- Step 4. Open your Serial Monitor and set baud rate as 115200, We will see the temperature in Celsius here.

Play With Raspberry Pi

Hardware

- Step 1. Prepare the below stuffs:

Raspberry pi	GrovePi_Plus
Get ONE Now [https://www.seeedstudio.com/Raspberry-Pi-3-Model-B-p-2625.html]	Get ONE Now [https://www.seeedstudio.com/Grove p-2241.html]

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- Step 2. Plug the GrovePi_Plus into Raspberry.

- Step 3. Connect Grove-Ultrasonic ranger to **A0** port of GrovePi_Plus.

- Step 4. Connect the Raspberry to PC through USB cable.
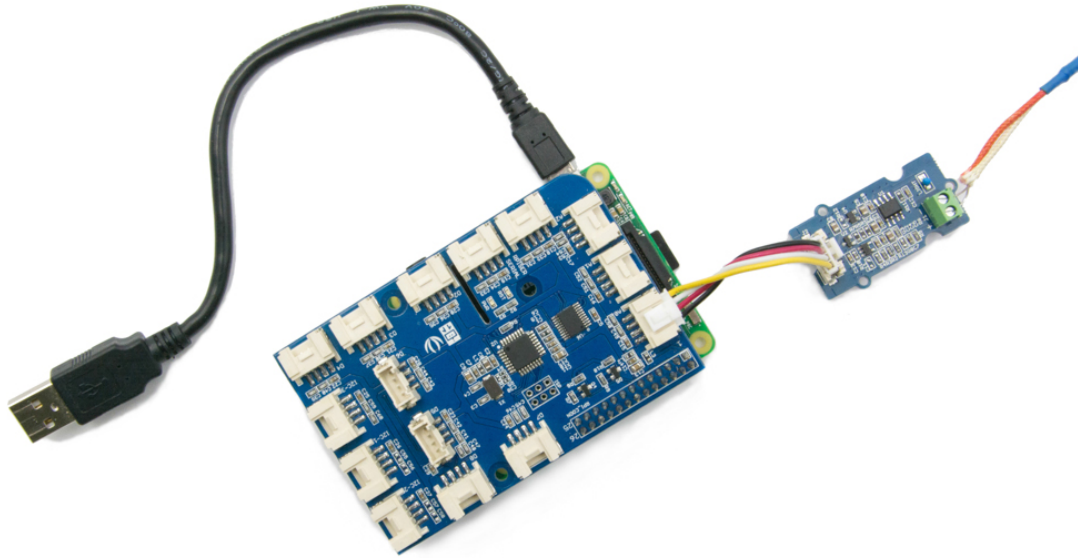
Software

- Step 1. Follow Setting Software
  [https://www.dexterindustries.com/GrovePi/get-started-with-
  the-grovepi/setting-software/] to configure the development
  environment.

- Step 2. Follow Updating the Firmware
  [https://www.dexterindustries.com/GrovePi/get-started-with-
  the-grovepi/updating-firmware/] to update the newest firmware
  of GrovePi.

> 🔥 **Tip**
> In this wiki we use the path **~/GrovePi/** instead of
> **/home/pi/Desktop/GrovePi**, you need to make sure Step 2 and Step 3 use
> the same path.

> ✏️ **Note**
> We firmly suggest you to update the firmware, or for some sensors you may get errors.

> ⚠️ **Attention**
> If you are using **Raspberry Pi with Raspberrypi OS >= Bullseye**, you have to use this command line **only with Python3**.

- Step 3. Git clone the Github repository.

```
1  cd ~
2  git clone https://github.com/DexterInd/GrovePi.git
```

- Step 4. Excute below commands to use the ultrasonic_ranger to meansure the distance.

```
1  cd ~/GrovePi/Software/Python/grove_hightemperature_sensor
2  python3 high_temperature_example.py
```

Here is the grove_ultrasonic.py code.

```python
1  import grove_hightemperature_sensor as grovepi # our libr
2  from time import sleep # and for the sleep function
3  import sys # we need this for the exception throwing stu
4
5  # Don't forget to run it with Python 3 !!
6  # Don't forget to run it with Python 3 !!
7  # Don't forget to run it with Python 3 !!
8
9  def Main():
10     room_temperature_pin = 15 # this is equal to A1
11     probe_temperature_pin = 14 # this is equal to A0
12     # so you have to connect the sensor to A0 port
13
```

```python
14        # instatiate a HighTemperatureSensor object
15        sensor = grovepi.HighTemperatureSensor(room_temperat
16
17        # and do this indefinitely
18        while True:
19            # read the room temperature
20            room_temperature = sensor.getRoomTemperature()
21            # and also what's important to us: the temperatu
22            probe_temperature = sensor.getProbeTemperature()
23
24            # print it in a fashionable way
25            print('[room temperature: {:5.2f}°C][probe tempe
26            # and wait for 250 ms before taking another meas
27            sleep(0.25)
28
29
30  if __name__ == "__main__":
31      try:
32          Main()
33
34      # in case CTRL-C / CTRL-D keys are pressed (or anyth
35      except KeyboardInterrupt:
36          print('[Keyboard interrupted]')
37          sys.exit(0)
38
39      # in case there's an IO error aka I2C
40      except IOError:
41          print('[IO Error]')
42          sys.exit(0)
43
44      # in case we have a math error (like division by 0 -
45      # or if the values exceed a certain threshold
46      # experiment and you'll see
47      except ValueError as e:
48          print('[{}]'.format(str(e)))
49          sys.exit(0)
```

- Step 4. We will see the temperature display on terminal as below.

```
1   pi@raspberrypi:~/GrovePi/Software/Python/grove_hightemper
2   [room temperature: 20.47°C][probe temperature: 32.19°C]
3   [room temperature: 20.47°C][probe temperature: 32.19°C]
4   [room temperature: 20.47°C][probe temperature: 32.19°C]
5   [room temperature: 20.47°C][probe temperature: 32.19°C]
6   [room temperature: 20.60°C][probe temperature: 32.19°C]
7   [room temperature: 20.60°C][probe temperature: 32.19°C]
8   [room temperature: 20.60°C][probe temperature: 32.19°C]
```

FAQs

Q1: How to do Grove-High temperature sensor calibration?

A1: Please download the library
[https://files.seeedstudio.com/wiki/Grove_High_Temperature_Sens
or/resource/Grove_HighTemp_Sensor-master_cal.zip] and then
follow below instructions.

- Step 1. run the getTemperature-calibration-measurement.ino to
  get below info.

```
1   10:02:17.792 -> "You have Scucessfully record the sample
2   10:02:17.935 ->       double TMP[]={10.29,10.29,10.29,10.
3   10:02:18.038 ->       double Real_temperature[]={10.00,20
```

- Step 2. paste to getTemperature-calibration_demo.ino and run
  the calibration.

- Step 3. run getTemperature.ino to read the temperature.

Resources

- **[PDF]** Download Wiki PDF
[https://files.seeedstudio.com/wiki/Grove_Ultrasonic_Ranger/res/Grove-High_Temperature_Sensor.pdf]

- **[Eagle]** Grove - High Temperature Sensor Eagle file
[https://files.seeedstudio.com/wiki/Grove-High_Temperature_Sensor/res/Grove%20-%20High%20Temperature%20Sensor%20v1.0.zip]

- **[Library]** High Temperature Sensor Library
  [https://github.com/Seeed-Studio/Grove_HighTemp_Sensor]

- **[Datasheet]** OPA333 PDF
  [http://www.ti.com/lit/ds/symlink/opa333.pdf]

- **[Datasheet]** LMV358 PDF
  [https://files.seeedstudio.com/wiki/Grove-
  High_Temperature_Sensor/res/Lmv358.pdf]

Tech Support

Please submit any technical issue into our forum
[https://forum.seeedstudio.com/].

[https://www.seeedstudio.com/act-4.html?
utm_source=wiki&utm_medium=wikibanner&utm_campaign=newpr
oducts]