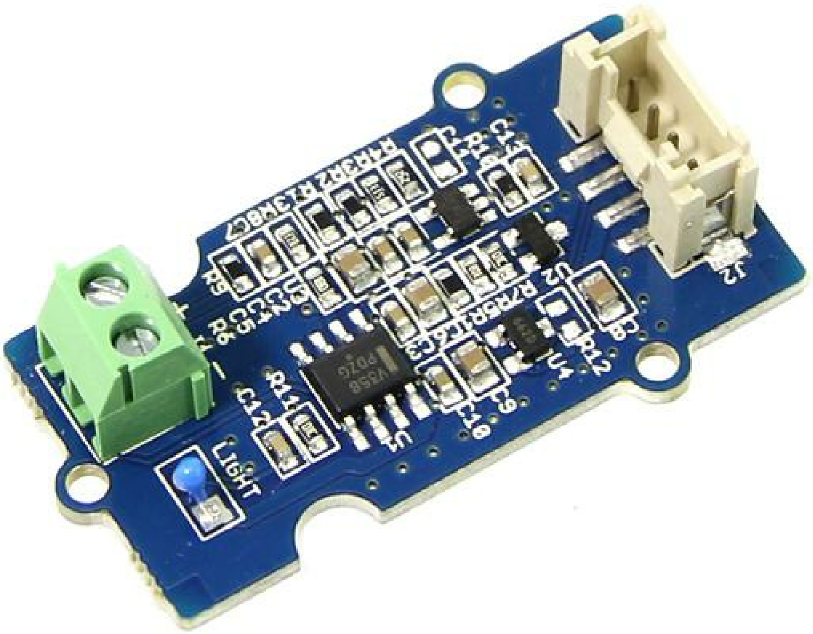
## Grove - High Temperature Sensor



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).

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## 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 |
| | |

|  |  |
|---|---|
| Cold junction compensation | environment temperature measurement |
| Thermocouple temperature measurement accuracy | +/-2.0% (+ 2 ℃) |
| Dimension | 20mm x 40mm |

!!!Tip
More details about Grove modules please refer to Grove System

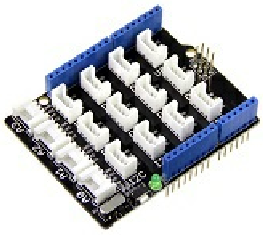
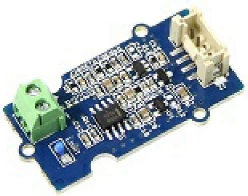
## Platforms Supported

## Getting Started

### Play with Arduino

#### Hardware

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

| Seeeduino V4.2 | Base Shield | Grove-High Temperature Sensor |
|---|---|---|
| |  |  |
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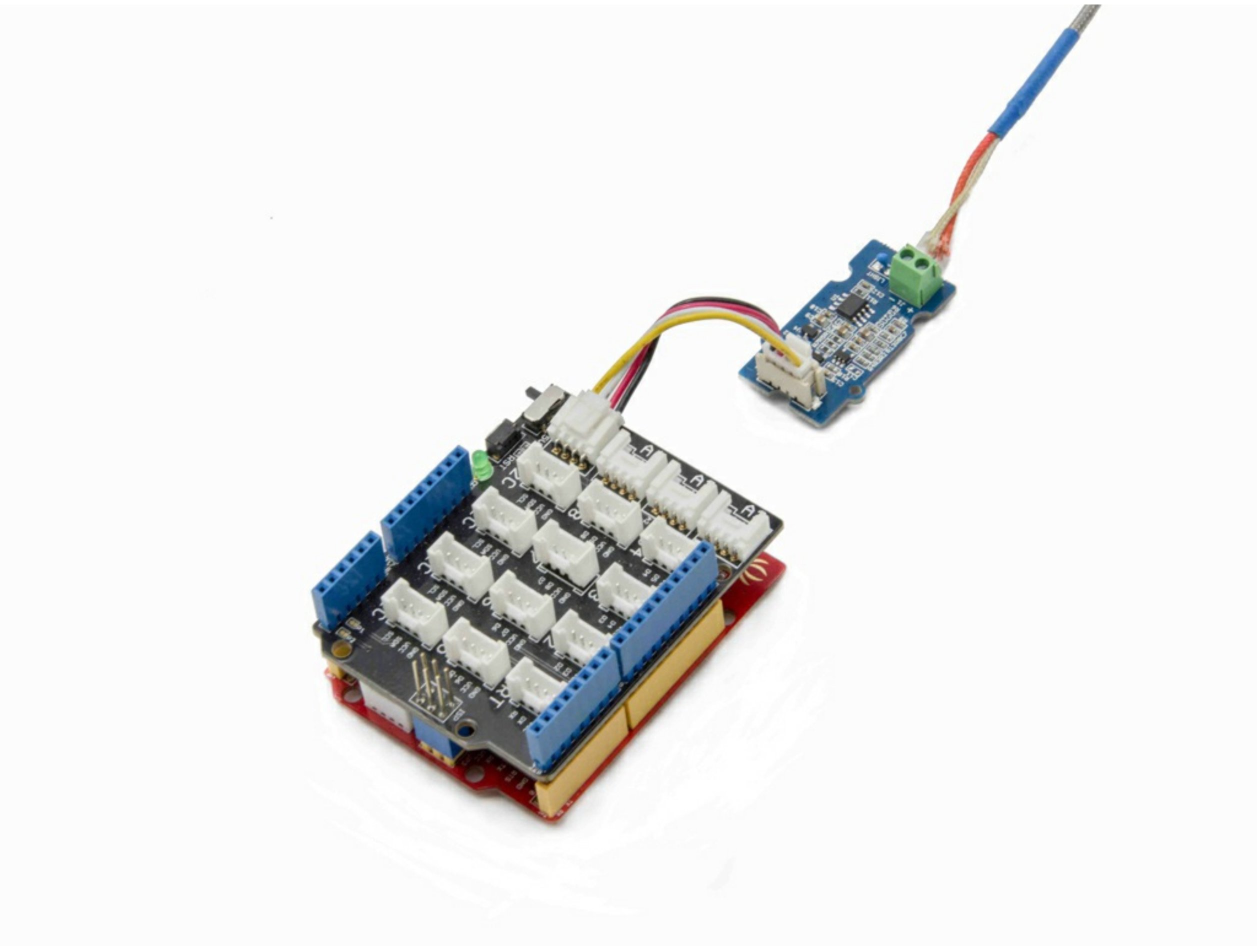
- Step 2. Connect the Grove-High Temperature Sensor to **A0** on Base Shield.
- Step 3. Plug the base Shield into Seeeduino-V4.2.
- Step 4. Connect Seeeduino-V4.2 to PC by using a USB cable.



!!!Note
If w e don't have a Base Shield, don't w orry, the sensor can be connected to your Arduino directly. Please follow below tables to connect w ith Arduino.

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

## Software

- Step 1. Dow nload the UltrasonicRanger Library from Github.
- Step 2. Refer How to install library to install library for Arduino.
- Step 3. Copy the code into Arduino IDE and upload.

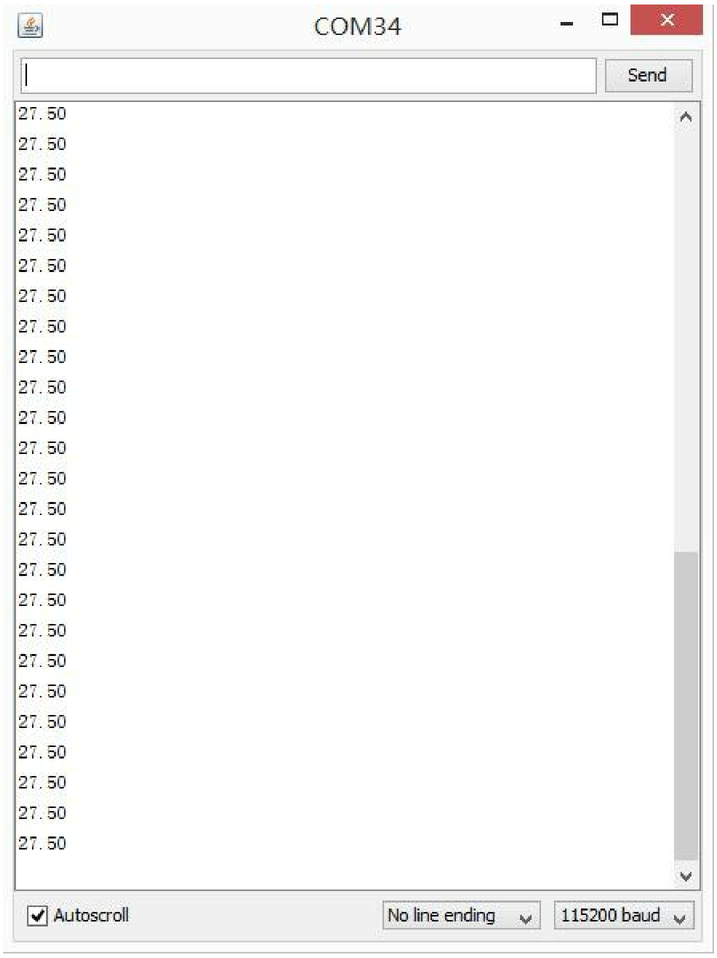
```
#include "High_Temp.h"

HighTemp ht(A1, A0);

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

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

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



```
27.50
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```
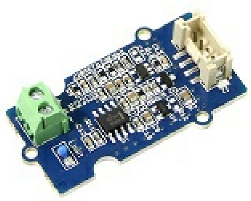

☑ Autoscroll  No line ending  115200 baud

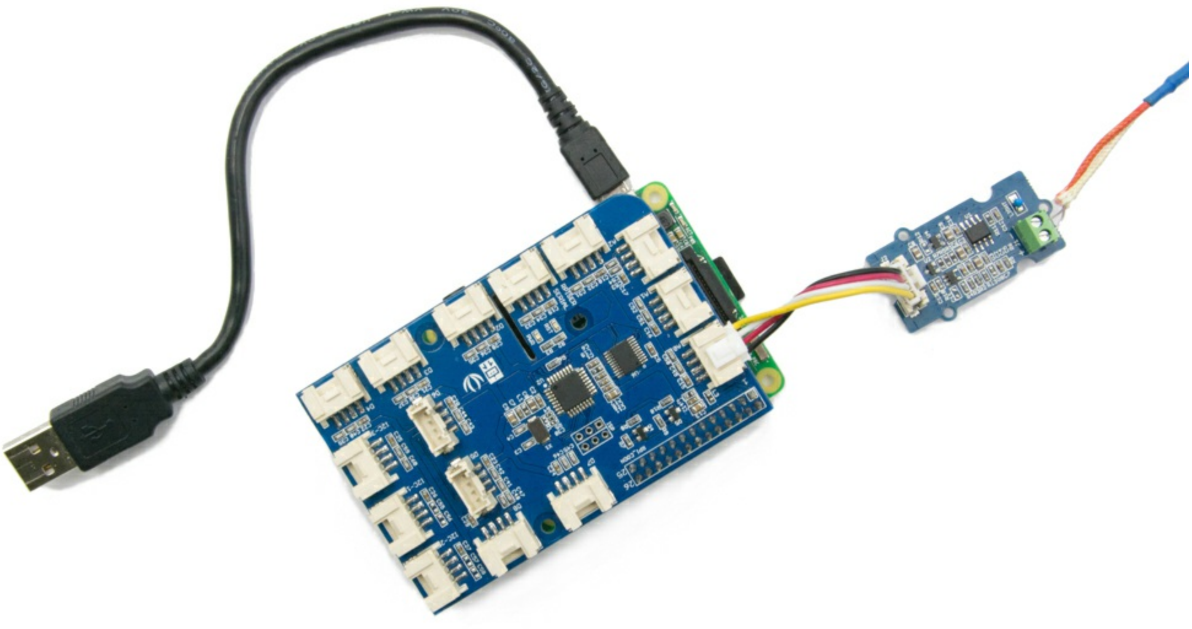
## Play With Raspberry Pi

### Hardware

- Step 1. Prepare the below stuffs:

| Raspberry pi | GrovePi_Plus | Grove - Ultrasonic Ranger |
|---|---|---|
| | |  |
| Get ONE Now | Get ONE Now | Get ONE Now |

- 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 Softw are to configure the development environment.
- Step 2. Git clone the Github repository.

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

- Step 3. Excute below commands to use the ultrasonic_ranger to meansure the distance.

```
cd ~/GrovePi/Software/Python/grove_hightemperature_sensor
python high_temperature_example.py
```

Here is the grove_ultrasonic.py code.

```
import grove_hightemperature_sensor as grovepi # our library
from time import sleep # and for the sleep function
import sys # we need this for the exception throwing stuff

# Don't forget to run it with Python 3 !!
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def Main():
    room_temperature_pin = 15 # this is equal to A1
    probe_temperature_pin = 14 # this is equal to A0
    # so you have to connect the sensor to A0 port

    # instatiate a HighTemperatureSensor object
    sensor = grovepi.HighTemperatureSensor(room_temperature_pin, probe_temperature_pin)

    # and do this indefinitely
    while True:
        # read the room temperature
        room_temperature = sensor.getRoomTemperature()
        # and also what's important to us: the temperature at the tip of the K-Type sensor
        probe_temperature = sensor.getProbeTemperature()
        # print it in a fashionable way
        print('[room temperature: {:5.2f}°C][probe temperature: {:5.2f}°C]'.format(room_temperature, probe_temperature))
        # and wait for 250 ms before taking another measurement - so we don't overflow the terminal
        sleep(0.25)


if __name__ == "__main__":
    try:
        Main()

    # in case CTRL-C / CTRL-D keys are pressed (or anything else that might interrupt)
    except KeyboardInterrupt:
        print('[Keyboard interrupted]')
        sys.exit(0)

    # in case there's an IO error aka I2C
    except IOError:
        print('[IO Error]')
        sys.exit(0)

    # in case we have a math error (like division by 0 - can happen depending on the read values)
    # or if the values exceed a certain threshold
    # experiment and you'll see
    except ValueError as e:
        print('[{}]'.format(str(e)))
        sys.exit(0)
```

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

```
pi@raspberrypi:~/GrovePi/Software/Python/grove_hightemperature_sensor $ python high_temperature_example.py
[room temperature: 20.47°C][probe temperature: 32.19°C]
[room temperature: 20.47°C][probe temperature: 32.19°C]
[room temperature: 20.47°C][probe temperature: 32.19°C]
[room temperature: 20.47°C][probe temperature: 32.19°C]
[room temperature: 20.60°C][probe temperature: 32.19°C]
[room temperature: 20.60°C][probe temperature: 32.19°C]
[room temperature: 20.60°C][probe temperature: 32.19°C]
```

## FAQ

Please click here to see all Grove-High_Temperature_Sensor FAQs.

## Resources

- **[PDF]** Download Wiki PDF
- **[PDF]**Grove - High Temperature Sensor SCH PDF
- **[PDF]**Grove - High Temperature Sensor PCB PDF
- **[Eagle]**Grove - High Temperature Sensor Eagle SCH
- **[Eagle]**Grove - High Temperature Sensor Eagle PCB
- **[Library]**High Temperature Sensor Library
- **[Datasheet]**OPA333 PDF
- **[Datasheet]**LMV358 PDF