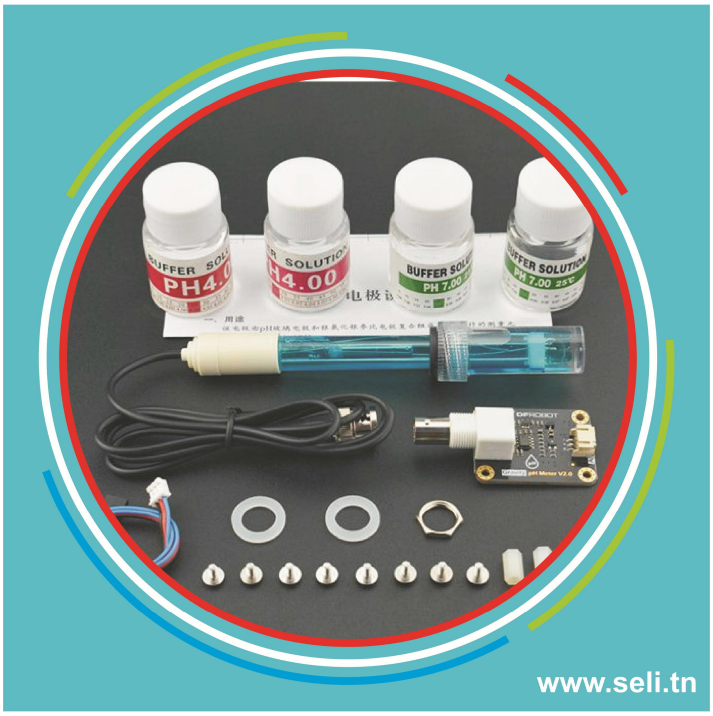
CAP127

KIT CAPTEUR SONDE PH GRAVITY: ANALOGIQUE V2 SEN0161-V2



DFRobot's Gravity: Analog pH meter V2 is specifically designed to measure the pH of a solution and reflect it's acidity or alkalinity. This sensor is commonly used in various applications such as aquaponics, aquaculture, and environmental water testing.

As an upgraded version of pH meter V1, this product greatly improves the precision and user experience. The onboard voltage regulator chip supports the wide voltage supply of 3.3~5.5V, which is compatible with 5V and 3.3V main control board. The output signal is filtered by hardware and has low overall jitter. The software library adopts the two-point calibration method, and can automatically identify two standard buffer solutions (4.0 and 7.0), making the sensor simple and convenient. You may also check Liquid Sensor Selection Guide to get better familar with our liquid sensor series.

With this product, a main control board (such as Arduino) and our software library, you can quickly implement the pH meter and begin using it immedietly without the need for welding, soldering, or other modfications. DFRobot provides a variety of water quality sensor products with uniform sizes and interfaces, which not only meet the needs of various water quality testing but are also suitable for the DIY of multi-parameter water quality tester.

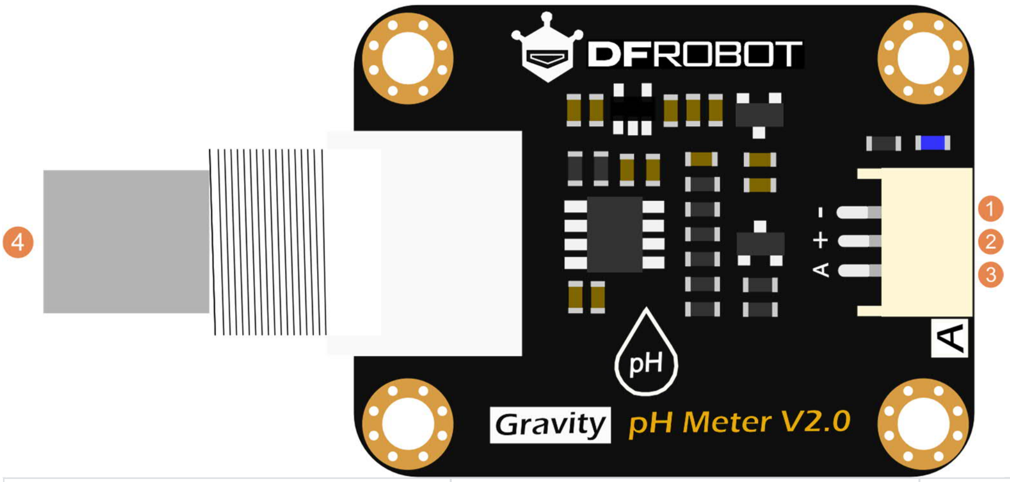
A solution's pH measurement is a value that reflects the exact acidity or alkalinity of the solution. It is also called the hydrogen ion concentration index. The a pH test is a scale of hydrogen ion activity in a solution. The pH test has a wide range of uses in medicine, chemistry, and agriculture. Usually, the pH is a number between 0 to 14. Under standard thermodynamic conditions, a pH=7 means the solution is neutral, a pH<7 means the solution is acidic, and a pH >7 means the solution is alkaline.

⚠	1. The BNC connector and the signal conversion board must be kept dry and measurement. If it is damp, it needs to be dried. 2. The signal conversion board cannot be directly placed on a wet or semicon inaccurate measurement. It is recommended to use the nylon pillar to fix the conversion board and the attached surface. 3. The sensitive glass bubble in the head of the pH probe should avoid touchi to fail. 4. After completing the measurement, disconnect the pH probe from the sign conversion board without the power supply for a long time.

Specification

- Signal Conversion Board (Transmitter) V2
  - Supply Voltage: 3.3~5.5V
  - Output Voltage: 0~3.0V
  - Probe Connector: BNC
  - Signal Connector: PH2.0-3P
  - Measurement Accuracy: ±0.1@25℃
  - Dimension: 42mm*32mm/1.66*1.26in
- pH Probe
  - Probe Type: Laboratory Grade
  - Detection Range: 0~14
  - Temperature Range: 5~60°C
  - Zero Point: 7±0.5
  - Response Time: <2min
  - Internal Resistance: <250MΩ
  - Probe Life: >0.5 year (depending on frequency of use)
  - Cable Length: 100cm

Board Overview



Num	Label	Description
1	-	Power GND(0V)
2	+	Power VCC(3.3~5.5V)
3	A	Analog Signal Output(0~3.0V)
4	BNC	pH Probe Connector

Tutorial

This tutorial will demonstrate how to use this pH meter for calibration and measurement. Please read each step carefully.

> Before measuring another solution, be sure to wash the probe and absorb residual water-drops with paper to prevent cross-contamination between solutions. The probe can be washed with distilled water.

Requirements

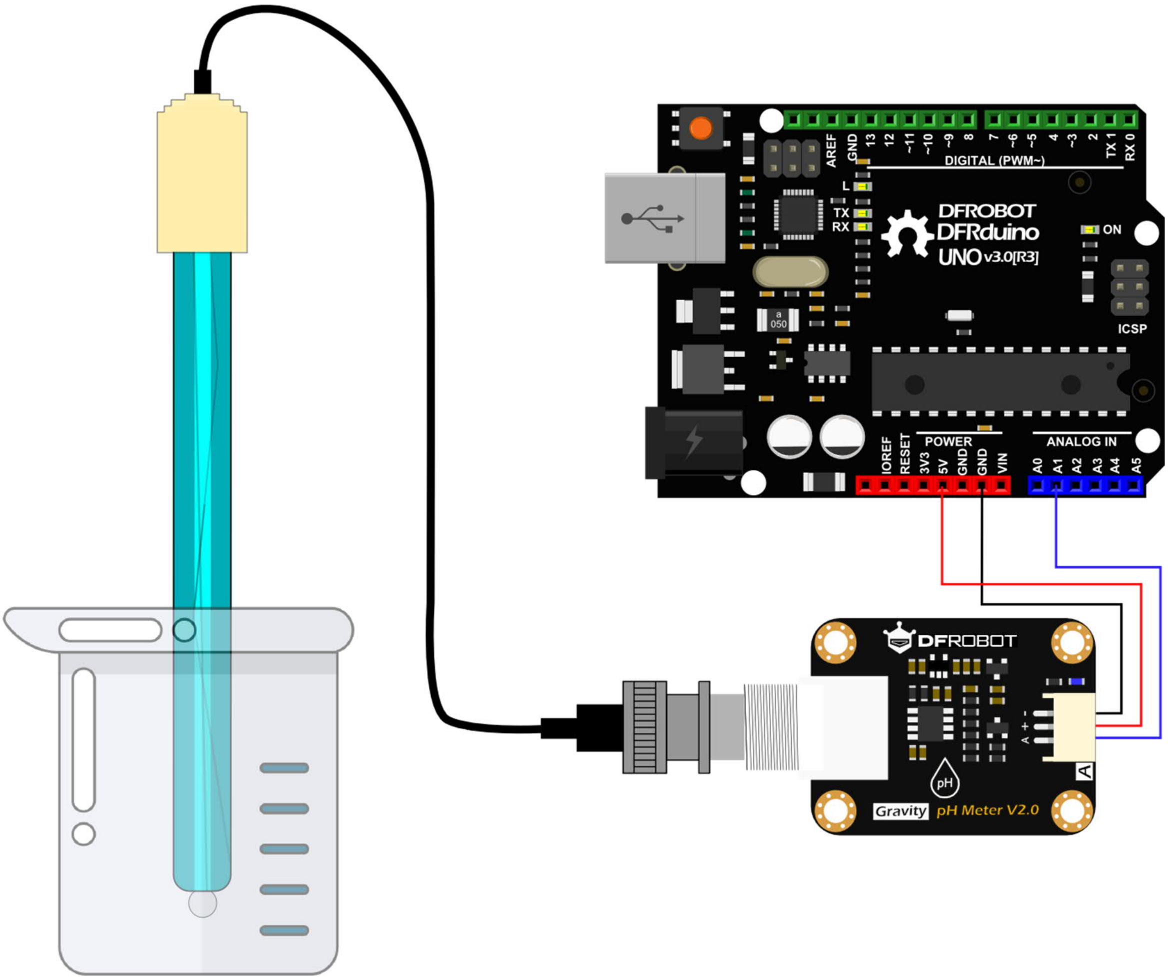
- Hardware
  - DFRduino UNO R3 (or similar) x1
  - pH Signal Conversion Board V2 x1
  - pH Probe x1
  - Standard Buffer Solution 4.0 x1

    - Standard Buffer Solution 7.0 x1
    - Gravity 3pin Sensor Cable (or several DuPont cables) x1
    - Test Solution x1

- Software
    - Arduino IDE (Version requirements: V1.0.x or V1.8.x), Click to Download Arduino IDE from Arduino®

Connection Diagram

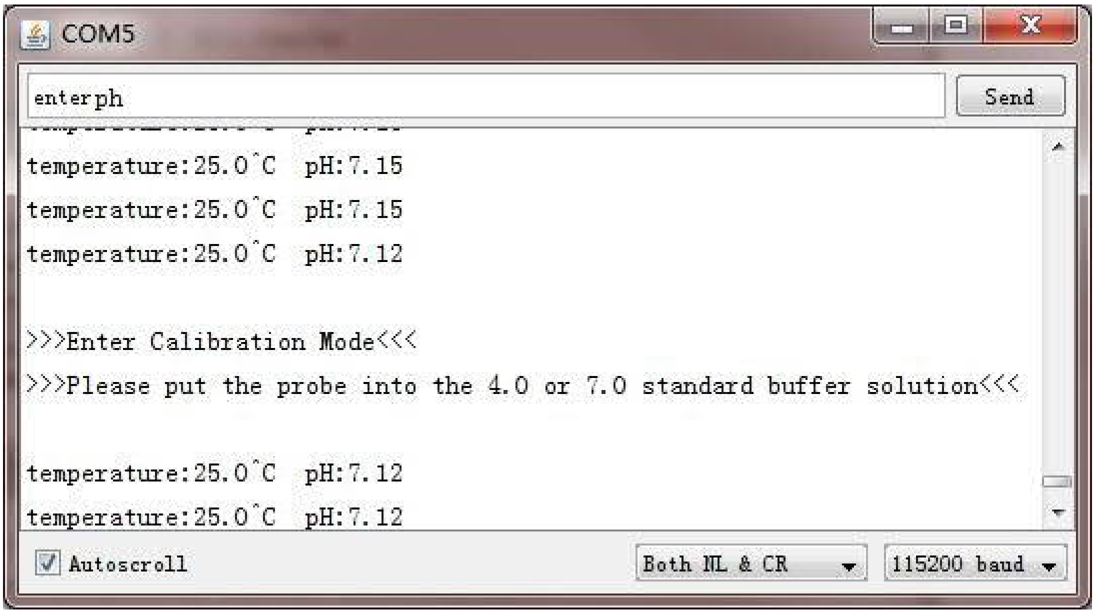
Before using the pH probe, pull out the probe from the protective cap, then wire as shown below. After completing measurement, clean the probe, then insert it into the protective cap.



Calibration

To ensure accuracy, the probe needs to be calibrated for its first use and after not being used for an extended period of time (once a month ideally). This tutorial uses two-point calibration and therefore requires two standard buffer solutions of 4.0 and 7.0 . The following steps show how to operate two-point calibration.

- 1.Upload the sample code to the Arduino board, then open the serial monitor, after you can see the temperature and pH. If you added a temperature sensor, be sure to write the corresponding function and call it.
- 2.Wash the probe with distilled water, then absorb the residual water-drops with paper. Insert the pH probe into the standard buffer solution of 7.0, stir gently, until the values are stable.
- 3.After the values are stable, the first point can be calibrated. Specific steps are as follows:
  - 1. Input `enterph`command in the serial monitor to enter the calibration mode.

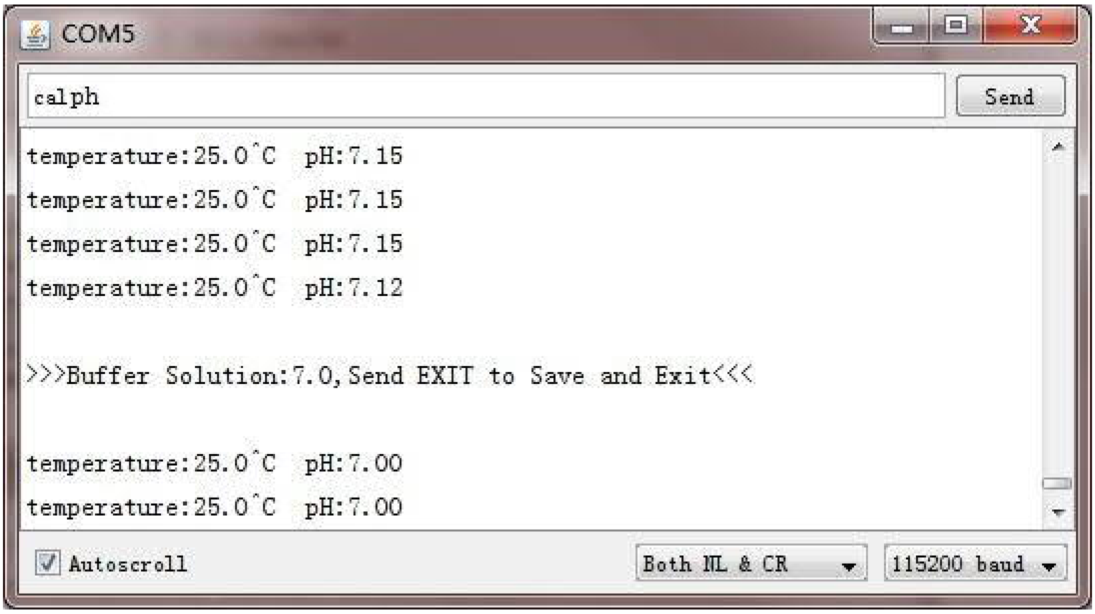


```
enterph
temperature:25.0^C  pH:7.15
temperature:25.0^C  pH:7.15
temperature:25.0^C  pH:7.12

>>>Enter Calibration Mode<<<
>>>Please put the probe into the 4.0 or 7.0 standard buffer solution<<<

temperature:25.0^C  pH:7.12
temperature:25.0^C  pH:7.12
```

- 2.Input `calph`commands in the serial monitor to start the calibration. The program will automatically identify which of the two standard buffer solutions is present: either 4.0 and 7.0. In this step, the standard buffer solution of 7.0 will be identified.



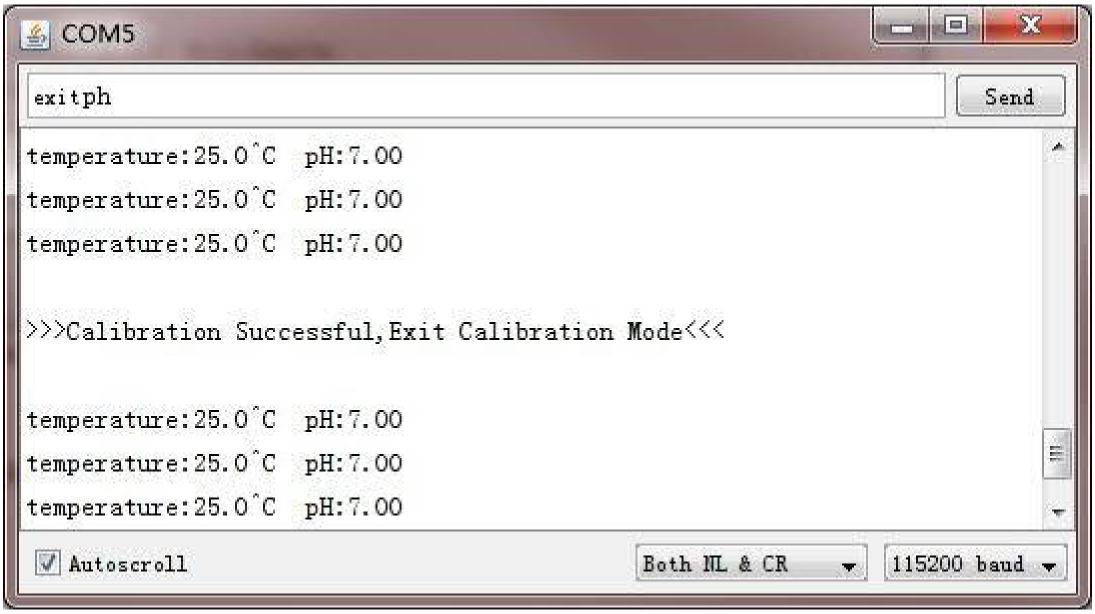
```
calph
```

```
temperature:25.0^C  pH:7.15
temperature:25.0^C  pH:7.15
temperature:25.0^C  pH:7.15
temperature:25.0^C  pH:7.12

>>>Buffer Solution:7.0,Send EXIT to Save and Exit<<<

temperature:25.0^C  pH:7.00
temperature:25.0^C  pH:7.00
```

- 3. After the calibration, input `exitph`command in the serial monitor to save the relevant parameters and exit the calibration mode. Note: Only after inputing `exitph`command in the serial monitor can the relevant parameters be saved.



```
exitph
```

```
temperature:25.0^C  pH:7.00
temperature:25.0^C  pH:7.00
temperature:25.0^C  pH:7.00

>>>Calibration Successful,Exit Calibration Mode<<<

temperature:25.0^C  pH:7.00
temperature:25.0^C  pH:7.00
temperature:25.0^C  pH:7.00
```

- 4.After the above steps, the first point calibration is completed. The second point calibration will be performed below.
  - 4. Wash the probe with distilled water, then absorb the residual water-drops with paper. Insert the pH probe into the standard buffer solution of 4.0, stir gently, until the values are stable.

    - 5.After the values are stable, the second point can be calibrated. These steps are the same as the first calibration step. The specific steps are as follows:

- 1. Input `enterph`command in the serial monitor to enter the calibration mode.
- 2.Input `calph`commands in the serial monitor to start the calibration. The program will automatically identify which of the two standard buffer solutions is present: either 4.0 and 7.0 In this step, the standard buffer solution of 4.0 will be identified.
- 3. After the calibration, input the `exitph`command in the serial monitor to save the relevant parameters and exit the calibration mode. Note: Only after inputing `exitph`command in the serial monitor can the relevant parameters be saved.

- 4.After the above steps, the second point calibration is completed.

    - 6.After completing the above steps, the two-point calibration is completed, and then the sensor can be used for actual measurement. The relevant parameters in the calibration process have been saved to the EEPROM of the main control board.

Sample Code

Please download DFRobot_PH Library first, then install it. How to install Libraries in Arduino IDE?

```
/*
 * file DFRobot_PH.ino
 * @ https://github.com/DFRobot/DFRobot_PH
 *
 * This is the sample code for Gravity: Analog pH Sensor / Meter Kit V2,
SKU:SEN0161-V2
 * In order to guarantee precision, a temperature sensor such as DS18B20 is
needed, to execute automatic temperature compensation.
 * You can send commands in the serial monitor to execute the calibration.
 * Serial Commands:
 *   enterph -> enter the calibration mode
 *   calph   -> calibrate with the standard buffer solution, two buffer
solutions(4.0 and 7.0) will be automaticlly recognized
 *   exitph  -> save the calibrated parameters and exit from calibration mode
 *
 * Copyright   [DFRobot](http://www.dfrobot.com), 2018
 * Copyright   GNU Lesser General Public License
 *
 * version  V1.0
 * date  2018-04
 */

#include "DFRobot_PH.h"
#include <EEPROM.h>
```

```
#define PH_PIN A1
float voltage,phValue,temperature = 25;
DFRobot_PH ph;

void setup()
{
    Serial.begin(115200);
    ph.begin();
}

void loop()
{
    static unsigned long timepoint = millis();
    if(millis()-timepoint>1000U){                  //time interval: 1s
        timepoint = millis();
        //temperature = readTemperature();         // read your temperature sensor to execute temperature compensation
        voltage = analogRead(PH_PIN)/1024.0*5000;  // read the voltage
        phValue = ph.readPH(voltage,temperature);  // convert voltage to pH with temperature compensation
        Serial.print("temperature:");
        Serial.print(temperature,1);
        Serial.print("^C  pH:");
        Serial.println(phValue,2);
    }
    ph.calibration(voltage,temperature);           // calibration process by Serail CMD
}

float readTemperature()
{
  //add your code here to get the temperature from your temperature sensor
}
```

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FAQ