USER MANUAL

GAOHOU PH 0-14 Value Detect Sensor Module + Electrode Probe BNC

The PH sensor is a low-cost, easy-to-use PH meter detection sensor. This sensor module can be used as an analog PH meter designed by Arduino, MCU and other controllers. It has the characteristics of simple connection, convenient and practical.

The PH sensor is connected to the onboard BNC interface and connects the onboard PH2.0 interface to the analog port of the Arduino controller. With program control, you can easily measure the PH of the solution.

Package contents

1 X PH 0-14 Value Detect Test Sensor Module
1 X PH Electrode Probe Sensor

PH 0-14 Value Detect Sensor Module

*Heating voltage: 5 ±0.2V (AC DC)

*Working current: 5-10mA

*Detectable concentration range: PH0-14

*Detection temperature range: 0-80 ℃

*Response time:≤5S

*Settling time:≤60S

*Component power: ≤0.5W

*Working temperature:-10-50 ℃ (nominal temperature 20 ℃)

*Humidity: 95% RH (nominal humidity 65% RH)

*Module size: 42mm ×32mm ×20mm

*Output: analog voltage signal output

*With 4pcs M3 Mounting Holes

PH Electrode Probe BNC for Arduino

The PH electrode has a single cylinder that allows direct connection to the input terminal of a PH meter, controller, or any PH device which has a BNC input terminal.

The PH electrode probe is accurate and reliable that can gives almost instantaneous readings.

*PH range: 0-14 PH

*Temperature range: 0-80℃

*Zero-point: 7 ±0.25PH

*Alkali error: ≤15 mv

*Theoretical percentage slope: ≧98%

*Internal resistance: ≦250MΩ

*Response time: ≦1min

*Operating temperature: 0-60℃

*Terminal blocks: BNC plug

*BNC connector suitable for most PH meter and controller.

*Suitable for wide range of application: Aquariums, Hydroponics, Laboratory etc.

Steps for usage

1. First connect the PH electrode through the BNC connector, and then connect the PH sensor module to the power supply according to the profile. The PH sensor output is analog output. It can be connected to the ADC conversion device, such as the ARUDUINO analog input port. After connecting, the Arduino main after the controller is powered; you can see that the red indicator light on the PH meter board is lit.
2. Burn the sample code for the Arduino master.
3. Insert the PH electrode into the standard solution with a PH of 7.00, or directly short the two inputs of the BNC interface, open the serial monitor of the Arduino IDE, you can see the current printed PH value, the error will not exceed 0.3. Record the value printed at this time, and then modifies the difference to offset in the program compared to 7.00. For example, if the printed PH is 6.88 and the difference is 0.12, then #define Offset 0.00 is changed to #define Offset 0.12 in the sample program.

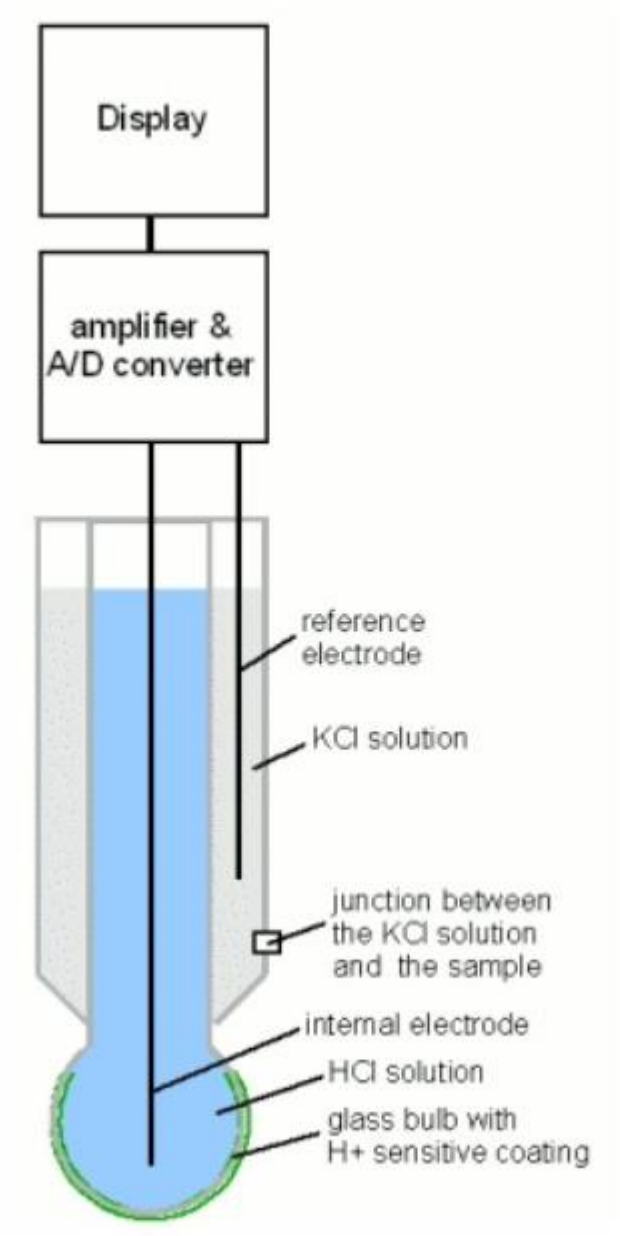
4. Insert the PH electrode into the calibration solution with a PH of 4.00. After waiting for one minute, adjust the gain potentiometer so that the printed PH is as stable as possible at around 4.00. At this point, the acid section calibration is complete and you can test the PH of the acidic solution.
Note: The electrode must be cleaned when measuring other solutions.
5. Depending on the linearity of the PH electrode itself, the PH of the alkaline solution can be directly measured by the above calibration, but if you want better accuracy, it is recommended to recalibrate. The alkaline section is calibrated using a standard solution with a pH of 9.18. The gain potentiometer is also adjusted to stabilize at around 9.18. Once calibrated, you can measure the PH of the alkaline solution at this point.

Sample code

After downloading the sample code, open the serial monitor of the Arduino IDE and you will see the results.

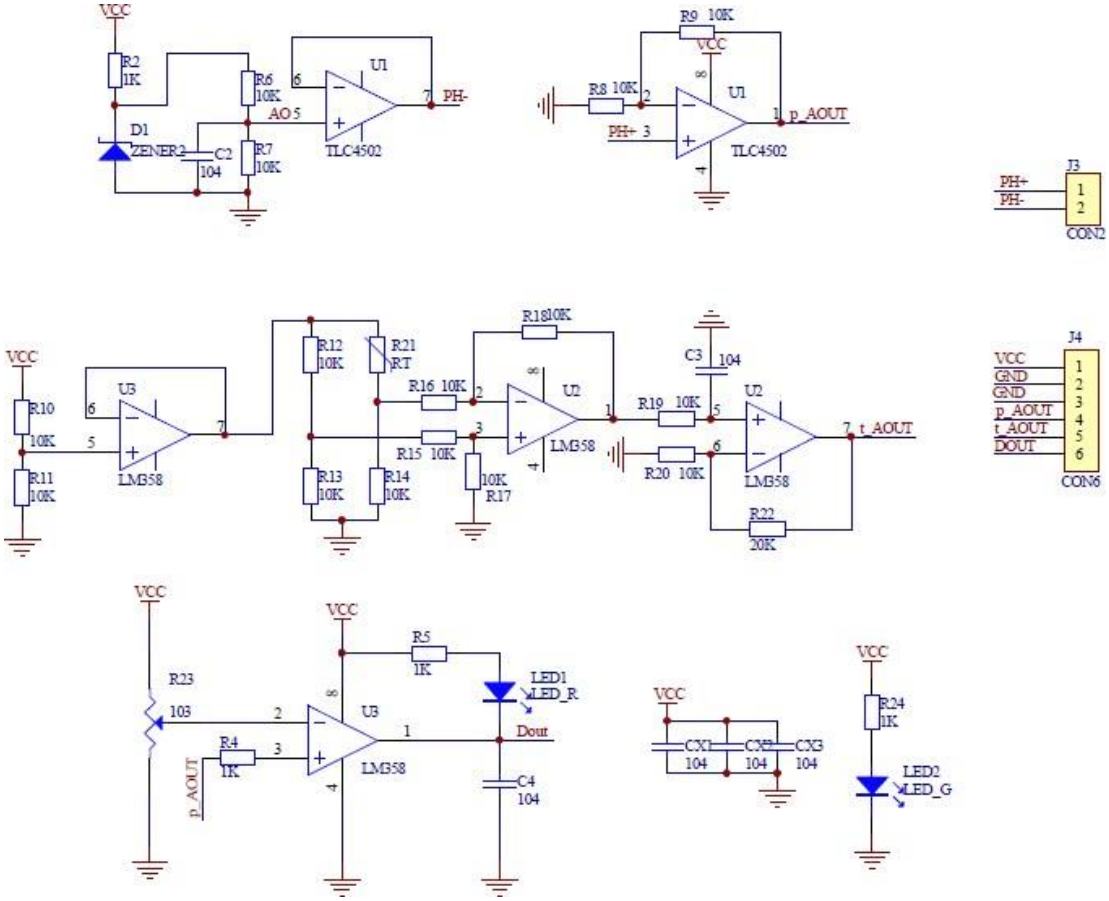
```
/*
# This sample codes is for testing the pH meter V1.0. #
  Editor : YouYou
  # Date      : 2013.10.21 #
  Ver         : 0.1
  # Product: pH meter #
  SKU         : SEN0161
*/

#define SensorPin 0                 //pH meter Analog output to Arduino Analog Input 0
#define Offset 0.00                 //deviation compensate
unsigned long int avgValue;         //Store the average value of the sensor feedback void
setup()
{
   pinMode(13,OUTPUT);
```

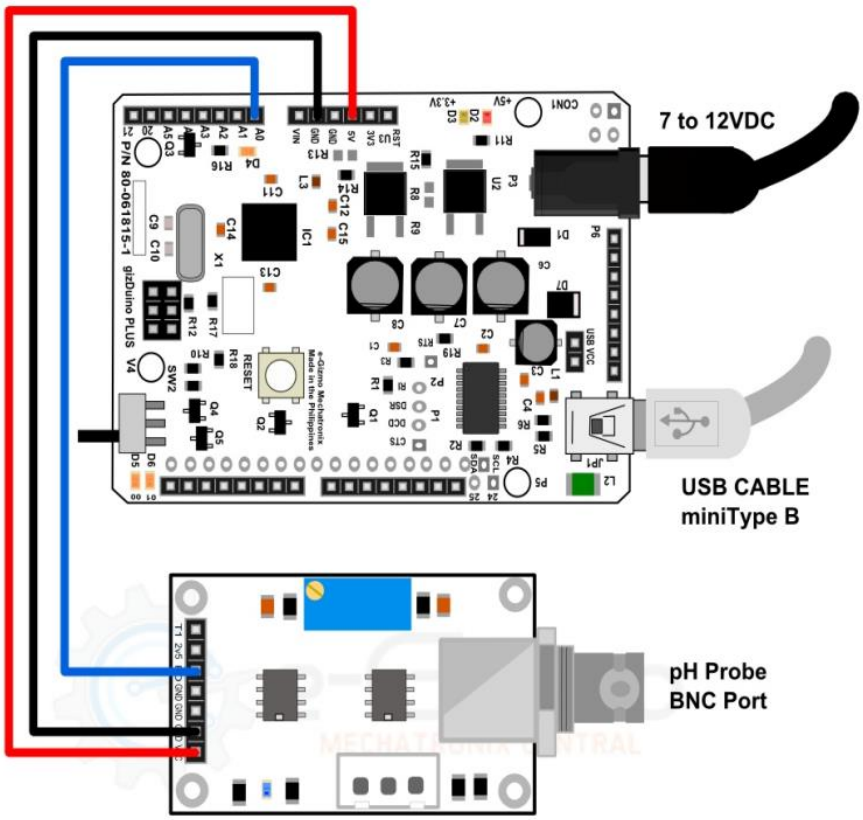
```
Serial.begin(9600);
Serial.println("Ready");          //Test the serial monitor
```

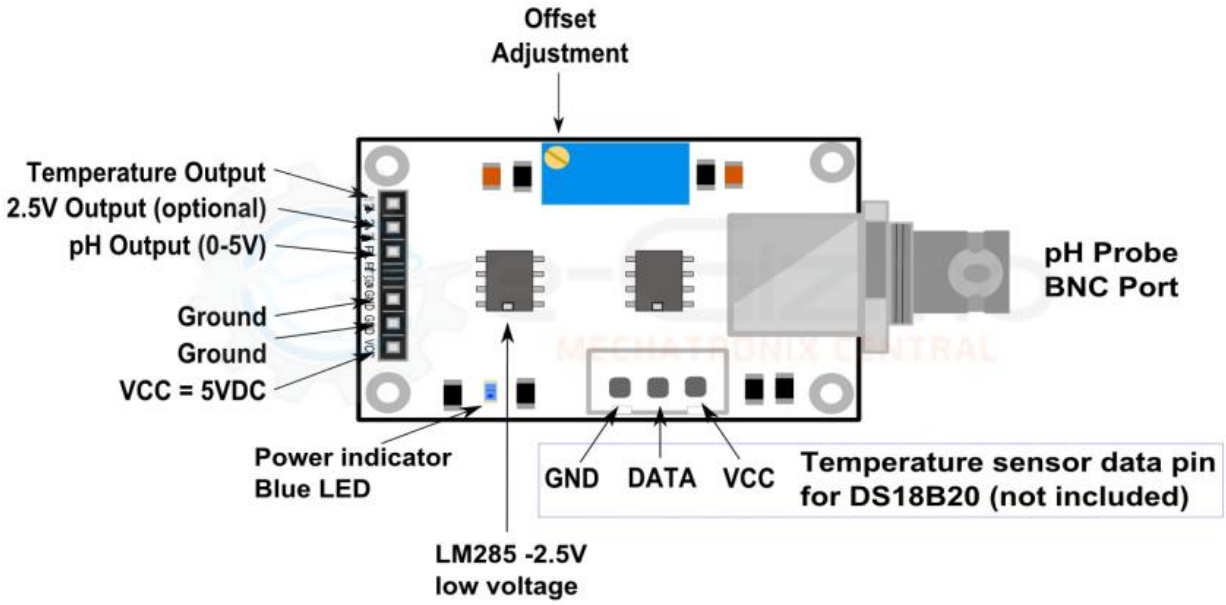


```
void loop()
 {
   int buf[10];                    //buffer for read analog
   for(int i=0;i<10;i++)           //Get 10 sample value from the sensor for smooth the value
   {
     buf[i]=analogRead(SensorPi
     n); delay(10);
   }
   for(int i=0;i<9;i++)            //sort the analog from small to large
   {
     for(int j=i+1;j<10;j++)
     {
       if(buf[i]>buf[j])
       {
         int
         temp=buf[i];
         buf[i]=buf[j
         ];
         buf[j]=temp
         ;
       }
     }
   }
   avgValue=0;
   for(int i=2;i<8;i++)                    //take the average value of 6 center sample
     avgValue+=buf[i];
   float phValue=(float)avgValue*5.0/1024/6; //convert the analog into millivolt
   phValue=3.5*phValue+Offset;                    //convert the millivolt into pH
   value Serial.print("                           pH:");
   Serial.print(phValue
   ,2); Serial.println("
   "); digitalWrite(13,
   HIGH); delay(800);
   digitalWrite(13,
   LOW);
 }
```

Reference circuit diagram







After-sales service & FAQ

1. If you have any quality problems, please feel free to contact us. We are always here with you. If any part is proved to be broken, we are very glad to replace it for free.
2. And also if you have any further confusion to use this item, don't hesitate to write us. Our technical may help you to use it.
3. Thank you for choosing our products and wish you and your family a happy life.

Does it mean a faulty sensor if it is not providing any difference using different liquids?

You need to calibrate the probe using known pH. If you don't have access to calibrating liquids and just want to check if the sensor is working, try tap water, and adjust the multi-turn to read 7. Then drop a few droplets of lime juice in the water and see if you read a lower number. If so, the sensor is working fine

How to use the probe with more accuracy?

1. Please use an external switching power supply to make the voltage as close as possible to +5.00V. The more close to +5.00V, the higher the accuracy.
2. The electrode needs to be calibrated using a standard buffer solution before each continuous use. For instance, record the value at PH 4 and PH 7 — then calculate the slope of a line through both points (y=mx+b). That equation is then applied to readings in your code.

3. In order to obtain more accurate results, the ambient temperature is preferably around 25 °C. The known PH value is reliable, and the closer the PH value is to the measured value, the better.
4. If the sample you are measuring is acidic, please use the buffer solution of PH4.00 to correct the electrode.
5. If the sample you are measuring is alkaline, use the PH 9.18 buffer solution to calibrate the electrode. Segmentation for calibration just for better accuracy.
6. Each PH-measuring solution of PH electrode needs to be cleaned with water. It is recommended to wash with deionized water.
7. Remove the electrode protection sleeve before testing. The solution inside the sleeve is 3MKCL. If there is crystal leakage, it is normal and does not affect the electrode.
8. Observe whether the inside of the sensitive bulb is full of liquid. If there is any bubble, the electrode should be gently swayed downward (like a thermometer) to remove the bubbles in the sensitive bulb, otherwise it will affect the test accuracy.
9. The electrode probe cannot be tested continuously for a long time, which will shorten its life.
10. There are two trimmers on the circuit board. One of them is for offset adjustment (closest to BNC connector) accomplished by removing the PH probe and shorting the BNC connector with a wire. The other trimmer is an upper limit threshold for the digital output pin.
11. Getting the voltage varies on what you're using. Such as, for Particle photon, it has a 12-bit ADC with 8 channels input voltages and between 0 and 3.3 volts into integer values between 0 and 4095.
12. The PH for this sensor is not at 0v for a PH7 it's around 2.51v from the multi-meter and PH4 at 3.03. If you calculate the step, 2.51-3.03 =-0.52. The difference between ph4.01 and PH7 is 2.99. That's .052/2.99 = 0.173916... That is the Step. So, 7+ ((2.51- voltage)/0.173916), in other words (PH (7) + ((Voltage@PH7- voltage from pin) / step)) this should give you the PH.
13. If you're using a Particle product like the Photon or Argon, be aware of a bug. It's a hardware issue with the analog ports fluctuating a ghost voltage. This fluctuation is enough at these low voltages reading to make your PH sway by .7 or more. To fix this, you'll need to add a 0.1uF cap between the analog port your using and ground. This will clean up the signal.

How to protect the probe in daily maintenance?

1. When the electrode is used for the first time or when it is not used for a long time, the electrode bulb and the sand core are immersed in the 3NKCL solution for 8 hours.
2. After removing the electrode cover, be careful that the sensitive glass bubbles in the plastic protective barrier are not in contact with hard objects, and any damage and bristles will invalidate the electrodes.
3. After the measurement is completed, the electrode protection sleeve should be placed on the cover. A small amount of 3.3mol/L potassium chloride solution should be placed in the protective sleeve to keep the electrode bulb moist.
4. The lead end of the electrode must be kept clean and dry, absolutely preventing short circuit at both ends of the output, otherwise the measurement result will be inaccurate or invalid.
5. The electrode avoids long-term immersion in the distilled protein solution and acidic fluoride solution, and prevents contact with silicone grease.
6. After long-term use of the electrode, if the gradient is slightly in love with the inland, the lower end of the electrode can be immersed in 4% HF (hydrofluoric acid) for 3-5 seconds, washed with distilled water, and then in potassium chloride solution. Soak and rejuvenate.
7. If the measured solution contains substances that are easily contaminated by sensitive foam bulbs, the sensitivity of electrode will be influenced. The phenomenon is that the sensitive gradient is lowered and the

reading is not accurate. In this way, it should be cleaned with a suitable solution according to the nature of the pollutants, so that it can be renewed.
8. When cleaning agent is used, if it can dissolve the cleaning solution of polycarbonate resin, such as carbon tetrachloride, trichloroethylene, tetrahydrofuran, etc., it may dissolve the polycarbonate resin and apply it on the sensitive glass bulb to make the electrode invalid. Please use with caution!

What to do if my probe breaks/leaks?

1. Please take pictures if it happens, and send pictures via message;
2. We would reply and solve issue for you in 24-48hours.