PH Temperature Sensor Combination Ph Electrode

LD144

1. Product Introduction

1.1. Description

The product is convenient to connect with all kinds of control devices and display instruments to achieve on-line monitoring of pH and temperature status. This product is widely applied to all kinds of occasions that need to measure and control pH and temperature.

1.2. Features

- Small in size, Light in weight

- Easy to install and maintain

- The standard industrial signal output (0-5V, 0-10V, 4-20MA, ModbusRTU485)

- Can satisfy all kinds of real-time monitoring equipment on the spot.

1.3. Applications

Electroplating, fermentation, food processing, sewage treatment, metallurgy, environmental protection.

1.4. Technical Parameters

Technical parameter		parameter values
measuring range	PH	0.0~14.0PH
	Temperature	-20℃～+80℃
measurement accuracy	PH	±0.1PH
	Temperature	±0.5℃
working voltage		DC:12V ~ 24V (ripple< 50mV)
Signal output		DC0-5V DC0-10V
		4-20mA ModbusRTU485
Power waste		＜1W
Storage environment	Temperature	10℃-50℃ (-20℃～+80℃ peak)
	Humidity	20-60%RH
Working environment	Transmitter	-20℃～+80℃
	pH electrode	-0℃～+50℃
Shape size		65mm*46mm*28.5mm

Note: PH electrode cannot be placed in a negative temperature solution, otherwise it will cause the front bulb to rupture.

PH current calculation formula: PH value = 0.875*I-3.5; temperature current calculation formula: temperature = 6.25*I-45;

PH 0-10V calculation formula: PH value = 1.4*V; temperature voltage calculation formula: temperature = 10*V-20;

PH 0-5V calculation formula: PH value = 2.8*V; temperature voltage calculation formula: temperature = 20*V-20;

1.5. Selection Guide

Product number	Range	pH electrode	Output Signal
LD144AA	0.0~14.0pH, -20℃～+80℃	without	0-5V
LD144AB	0.0~14.0pH, -20℃～+80℃	without	0-10V
LD144AC	0.0~14.0pH, -20℃～+80℃	without	4-20mA
LD144AD	0.0~14.0pH, -20℃～+80℃	without	RS485
LD144BA	0.0~14.0pH, -20℃～+80℃	ABS electrode	0-5V
LD144BB	0.0~14.0pH, -20℃～+80℃	ABS electrode	0-10V
LD144BC	0.0~14.0pH, -20℃～+80℃	ABS electrode	4-20mA
LD144BD	0.0~14.0pH, -20℃～+80℃	ABS electrode	RS485

LD144CA	0.0~14.0pH, -20°C～+80°C	PTFE electrode	0-5V
LD144CB	0.0~14.0pH, -20°C～+80°C	PTFE electrode	0-10V
LD144CC	0.0~14.0pH, -20°C～+80°C	PTFE electrode	4-20mA
LD144CD	0.0~14.0pH, -20°C～+80°C	PTFE electrode	RS485
LD144DA	0.0~14.0pH, -20°C～+80°C	Stainless steel electrode	0-5V
LD144DB	0.0~14.0pH, -20°C～+80°C	Stainless steel electrode	0-10V
LD144DC	0.0~14.0pH, -20°C～+80°C	Stainless steel electrode	4-20mA
LD144DD	0.0~14.0pH, -20°C～+80°C	Stainless steel electrode	RS485

2. Product Installation

2.1. Electrical Diagram

Label	0-5V/0-10V	4-20mA	RS485
T/B	Temperature voltage signal	Temperature current signal	485-/B
GND	Power ground	Power ground	Power ground
PH/A	PH voltage signal	PH current signal	485+/A
VCC	Power positive 12-24v	Power positive 12-24v	Power positive 12-24v

Warning:

● When wiring, Users must carefully check whether the output signal matches the collector or instrument port. If the signal mode is changed, the transmitter power supply must be turned off to avoid damage (especially connecting the power cord to the signal end will cause IC damage);

● Before connecting the transmitter to the power supply, customers must carefully check whether the wiring is correct to avoid human damage (if the power is connected incorrectly, the internal components of the transmitter may burn out, affecting normal use);

2.2. Mounting Diagrams

Option 1: Fix the transmitter with M5 screws through the two holes on the left and right sides of the housing or the hole on the red pinch pin on the top.

Option 2: DIN35 Guide rail Mounting.

3. Calibration and Electrode Quality Detection

A. Prepare calibration solution (use deionized water at about 25℃ to prepare PH4.00 and PH9.18 calibration solutions)

(1) Wash two 250ml measuring cups with deionized water, and mark PH4.00 and PH9.18 on the outside of the two measuring cups.

(2) Place the PH4.00 buffer powder in the measuring cup marked with PH4.00 in step 1.

(3) Rinse the inner wall of the plastic bag with deionized water, pour it into the corresponding measuring cup, and then dilute it to 250ml with deionized water, shake it well and set it aside.

(4) Place the PH9.18 buffer powder in the measuring cup marked with PH9.18 in step 1.

(5) Rinse the inner wall of the plastic bag with deionized water, pour it into the corresponding measuring cup, and then dilute it to 250ml with deionized water, shake it well and set it aside.

Note:

(1) Before calibration, you need to observe whether there are bubbles in the glass bulb of the electrode. If there are bubbles, it will cause calibration errors. You need to shake the electrode to make the bubbles disappear.

(2) Before calibration, the electrode needs to be kept active. If the bulb has not been in the solution

of the front cover, you need to unscrew the front cover and soak the electrode in the 3Mkcl

solution for several hours. Reactivate the electrode.

(3) When calibrating, you need to put the temperature electrode into the solution together.

(4) If you need to reuse the prepared calibration solution, please seal it and store it, and it can only

be reused if the calibration solution is not contaminated!

B. Calibrate the transmitter

(1) Clean the electrode and temperature sensor with deionized water and wipe them dry with a soft

paper towel.

(2) Connect the transmitter power supply, pH electrode, and temperature sensor correctly.

(3) Immerse the electrode and temperature sensor in the prepared pH4.00 calibration solution at

the same time.

(4) Click the calibration button to switch the calibration indicator to green and enter the pH4.0

calibration preparation state.

(5) After placing the pH electrode and the temperature electrode into the pH4.0 standard solution at

the same time, press and hold the calibration button. When the calibration indicator light flashes

green, the module enters the pH4.0 calibration (this process takes 20 seconds). You can release

the button at this time. After the calibration is completed, the calibration indicator light turns

yellow and turns on.

(6) Click the calibration button again to switch the indicator light to red and turn on the pH9.18

calibration preparation state.

(7) Take the electrode and temperature sensor out of the PH4.00 calibration solution, then clean

them with deionized water and wipe them dry with a soft paper towel (the electrode and temperature sensor do not need to be removed from the transmitter during this process).

(8) Immerse the electrode and temperature sensor in the prepared PH9.18 calibration solution at the same time. Press and hold the calibration key. When the calibration indicator light flashes red, it means that the module enters the PH9.18 calibration (this process takes 20 seconds). You can release the key at this time. After calibration, the calibration indicator light is always yellow.

(9) Looseness and goodness detection (automatic judgment) of electrodes and temperature probes and data storage:

● If the temperature probe or electrode is damaged, loose, or the electrode does not match during the calibration process, the calibration indicator light flashes red and green alternately, and the data of this calibration is not saved.

● If there is no fault in the electrode and temperature probe detection during the calibration process, the transmitter automatically stores the data of this round of calibration, the calibration indicator light is always yellow, and this round of calibration is completed.

● If the electrode or temperature probe becomes loose during normal use, the calibration indicator light will flash red and green alternately to give an alarm.

4. Repair and Maintenance

(1) Clean the electrode every two weeks, depending on the water sample.

(2) Use calibration fluid to calibrate the transmitter regularly, once a month. Depending on the water sample.

(3) When the sensor output stabilizes for too long (usually less than 10 seconds) or the sensor responds slowly,

(4) clean the electrode with 0.1mHCL regeneration fluid.

(5) If the transmitter cannot be calibrated and the new electrode still cannot be calibrated successfully, please contact our company.

5. Precautions

(1) Turn off the power supply during installation and replacement, and check whether the lead wire is correct before connecting the power supply.

(2) When the module is not used for a long time, it needs to be stored in a dry environment.

(3) When the electrode is not used for a long time, the electrode needs to be restored before use. (Refer to the electrode manual)

(4) Some functional indicators of the product may be modified, and the indicators on the product label shall prevail.

(5) The warranty period of the module is 12 months. During the warranty period, if the product is used normally and not damaged by human beings, the manufacturer is responsible for free repair.

(6) After the electrode has been used for 12 months, it will age. To ensure the accuracy of the data, it is necessary to replace the new electrode in time and recalibrate.

6. Communication protocol

Communication settings: 9600, 8/N/1

Verification method: A001 or 8005 in reverse order.

6.1. Register Description

Register Name	Register address	Attributes
Temperature	0x00	R
PH	0x01	R
ID	0x64	R/W
Baud rate	0x65	R/W

6.2. The format of data read command is as follows

ID	Function code	Register start address		Register number		CRC check	
1~247	03	00	00	00	02	CRC_L	CRC_H

When ID is 01: 01 03 00 00 00 02 C4 0B

6.3. The transmitter response format is as follows:

ID	Function code	Data length	Data 1 (Temperature)		Data 2 (PH value)		CRC check	
1 bytes	1 bytes	1 bytes	2 bytes		2 bytes		2 bytes	
1~247	03	N/A	data-high	data-low	data-high	data-low	CRC-low	CRC-high

01	03	04	01	2A	00	47	9A	35

Module return data: 01 03 04 01 2A 00 47 9A 35

- Temperature calculation: (temperature data high bit * 256 + temperature data low bit) / 10.0 =

  0x012A / 10.0 = > 298 / 10.0 = 29.8 ℃

- PH calculation: (PH data high bit * 256 + PH data low bit) / 10.0 = 0x0047 / 10.0 = > 71 / 10.0 = 7.1

6.4. ID query command format (only used in stand-alone mode)

ID	Function code	Register start address		Register number		CRC Check (Low date in front)	
FA(General)	03	00	64	00	01	D0	5E

Send: FA 03 00 64 00 01 D0 5E

6.5. Transmitter response format

ID	Function code	Data length	Data		CRC check	
			data-high	data-low	CRC-low	CRC-high
FA(General)	03	02	00	01	9C	50

The transmitter responds: FA 03 02 00 01 9C 50, indicating that the module ID is: 0x01.

6.6. The ID modification format is as follows:

ID	Function code	Register start address		ID		CRC check	
FA(General)	06	00	64	00	1-247	CRC_L	CRC_H

When the module response data is consistent with the sent data, it indicates that the ID modification is successful.

6.7. The bit rate modification format is as follows:

ID	Function code	Register start address		ID		CRC check	
FA (General address)	06	00	65	00	01: 2400 02: 4800 03: 9600 04: 19200 05: 38400	CRC_L	CRC_H

When the module response data is consistent with the sent data, it indicates that the baud rate has been modified successfully. The module needs to be restarted to use the new baud rate.