

Digital pH Sensor



1. Overview

The AGRINOVO-PH-100 is a digital pH sensor for continuous water quality monitoring. It provides high-accuracy pH measurements through RS485 Modbus-RTU interface with three-point calibration capability.

Key Features

- pH range: 0–14.00
- Resolution: 0.01 pH
- Accuracy: ± 0.02 pH
- Stability: ≤ 0.02 pH/24h
- 3-point calibration
- RS485 Modbus-RTU
- Low power: ≤ 0.5 W
- 12-24 VDC supply

Applications

- Agricultural irrigation
- Hydroponics and greenhouses
- Water quality testing
- Aquaculture
- Wastewater treatment

2. Specifications

Parameter	Specification
Measurement Range	0.00–14.00 pH
Resolution	0.01 pH
Accuracy	± 0.02 pH
Stability	≤ 0.02 pH / 24 hours
Power Consumption	≤ 0.5 W
Supply Voltage	12-24 VDC
Operating Temp	0–60°C

3. Wiring

Wire Color	Function	Description
Red	V+	Power Supply (12-24V DC)
Black	GND	Power Ground
Yellow	RS485-A	Data+
Green	RS485-B	Data-

4. Communication Settings

Parameter	Value
Protocol	Modbus-RTU
Baud Rate	9600 bps
Data Bits	8
Parity	None
Stop Bits	1
Default Address	0x01

5. Register Map

Measurement Registers (Function 0x03)

Address	Description	Scaling
0x0000	pH Value	Value ÷ 100

Configuration Registers (Function 0x06)

Address	Description	Notes
0x0009	Intercept/Offset	Calibration offset
0x0050	Slave Address	0x01–0xFE
0x005A	9.18 pH Calibration	Write 0x000A
0x005B	6.86 pH Calibration	Write 0x000B
0x005C	4.00 pH Calibration	Write 0x000C

6. Reading pH Value

Read 1 register from 0x0000:

Request: 01 03 00 00 00 01 84 0A
Response: 01 03 02 02 AE 38 98

Decoding:

Hex	Decimal	Scaling	Result
0x02AE	686	÷100	6.86 pH

7. Three-Point Calibration

Clean electrode with distilled water between each buffer.

Step	Solution	Register	Command
1	9.18 pH	0x005A	Write 0x000A
2	6.86 pH	0x005B	Write 0x000B
3	4.00 pH	0x005C	Write 0x000C

Calibration Commands

9.18 pH:

```
01 06 00 5A 00 0A [CRC]
```

6.86 pH:

```
01 06 00 5B 00 0B [CRC]
```

4.00 pH:

```
01 06 00 5C 00 0C [CRC]
```

Calibration Procedure

1. Clean electrode with distilled water
 2. Place in buffer solution
 3. Wait for reading to stabilize
 4. Send calibration command
 5. Repeat for each buffer
-

8. Address Configuration

Change Address (0x01 → 0x02)

```
01 06 00 50 00 02 [CRC]
```

Broadcast Discovery

Use address 0xFE with only one device connected.

9. Installation Notes

Safety

- Do not hot-plug
- Verify wiring before power

Sensor Care

- Clean with distilled water
- Avoid air bubbles
- No bare hand contact

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