AGRINOVO-EC-100

Digital Conductivity Sensor

1. Overview

The AGRINOVO-EC-100 is a digital water conductivity sensor capable of measuring Electrical Conductivity (EC), Total Dissolved Solids (TDS), and temperature. It integrates internal signal conditioning, linearization, temperature compensation, and digital communication.

Features

- EC measurement (µS/cm)
- TDS derived (EC ÷ 2)
- Temperature compensation
- Accuracy: ±1.0% FS
- Multiple electrode constants
- Slope/intercept calibration
- RS485 Modbus-RTU
- Low power: ≤0.5W

Applications

Agricultural irrigation
Hydroponics
Aquaculture
Water quality monitoring

2. Specifications

Parameter	Specification
Accuracy	±1.0% FS
Temp Compensation	0 to 60°C (automatic)
Power Consumption	≤0.5W
Supply Voltage	12-24 VDC
Operating Humidity	≤85% RH

Electrode Constants and Ranges

K Value	EC Range	TDS Range	Resolution
0.1 cm^{-1}	0.2 to 200 µS/cm	0.1 to 100 ppm	0.01
1.0 cm^{-1}	2 to 10,000 µS/cm	1 to 5,000 ppm	1
10.0 cm^{-1}	20 to 100,000 µS/cm	10 to 50,000 ppm	1

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	Electrical Conductivity	Direct (µS/cm)
0x0001	Temperature	Value ÷ 10 (°C)

Configuration Registers (Function 0x06)

Address	Description	Range/Notes
0x0004	Slope (Gain)	Value × 1000 (default: 1000)
0x000B	Intercept (Offset)	µS/cm (default: 0)
0x0050	Slave Address	0x01 to 0xFE

6. Reading Data

Read 2 registers from 0x0000:

```
Request:  01 03 00 00 00 02 C4 0B
Response: 01 03 04 02 AE 01 64 9A 11
```

Decoding:

Register	Hex	Decimal	Scaling	Result
EC	0x02AE	686	Direct	686 µS/cm
Temperature	0x0164	356	÷10	35.6°C

TDS Calculation: `TDS = 686 ÷ 2 = 343 ppm`

7. Address Configuration

Change Address (0x01 → 0x02)

```
Request:  01 06 00 50 00 02 08 1A
Response: 01 06 00 50 00 02 08 1A
```

Broadcast Discovery

Use address 0xFE with only one device connected.

8. Calibration

Set Slope (1.200)

Slope = 1200 (1.200 × 1000) = 0x04B0

```
01 06 00 04 04 B0 CB 7F
```

Set Intercept (10 µS/cm)

```
01 06 00 0B 00 0A 78 0F
```

9. Installation Notes

Sensor Placement

- Stable water flow, no bubbles
- Fully submerged tip
- Correct flow orientation

Electrical

- Separate RS485 from power lines
- Shielded twisted pair cable
- Proper bus termination

10. Ordering Information

Part number	Description
AGRINOVO-EC-100	Digital Conductivity Sensor

11. Revision History

Rev	Date	Changes
1.0	June 2026	Initial release
1.1	August 2026	Layout revision
1.2	October 2026	New layout; corrected Modbus example CRC values

Modular IoT sensors and controllers for agriculture and aquaculture.
Specifications subject to change without notice.