Agrinovo

AGRINOVO-EC-110

Digital Conductivity & Salinity Sensor

1. Overview

The AGRINOVO-EC-110 is a high-range digital conductivity and salinity sensor for industrial water, brine, and marine environments. A single PTFE-housed probe with a K=10.0 two-graphite electrode measures conductivity up to 200 mS/cm and salinity up to 100 ppt, with simultaneous TDS and temperature output, all delivered over RS485 Modbus-RTU.

Key Features

- Conductivity: 0 to 200 mS/cm
- Salinity: 0 to 100 ppt
- TDS in ppm
- Accuracy: ±1.5% FS
- K=10.0 graphite electrode
- PTFE housing
- RS485 Modbus-RTU output
- Low power: ≤0.5 W

Applications

- Industrial brine and salt processing
- Aquaculture, marine, and seawater
- Desalination plants
- Wastewater and environmental monitoring
- Food processing, fermentation, dye, plating
- Chemical and process water

2. Specifications

Parameter	Specification
Conductivity Range	0 to 200,000 µS/cm (0 to 200 mS/cm)
Salinity Range	0 to 100 ppt
TDS Output	ppm (composition dependent)
Accuracy	±1.5% FS
Temperature Range	0 to 60°C
Temperature Compensation	Automatic
Operating Humidity	≤85% RH
Power Consumption	≤0.5 W
Electrode Constant	K = 10.0
Electrode Material	Two-graphite
Housing Material	PTFE
Output	RS485 Modbus-RTU
Supply Voltage	7 to 24 VDC

3. Wiring

Wire Color	Function	Description
Red	V+	Power Supply
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	Range
0x0000	Conductivity	Value × 10 → µS/cm	0 to 200,000 µS/cm
0x0001	Temperature	Value ÷ 10 → °C	0 to 60°C
0x0002	TDS	Value × 10 → ppm	composition dependent
0x0003	Salinity	Value ÷ 10 → ppt	0 to 100 ppt

The salinity-to-TDS ratio depends on water composition. For NaCl-dominant water (seawater, marine aquaculture, industrial brine), the ratio is typically 1.5 to 2.0.

Configuration Registers (Function 0x06)

Address	Description	Range / Notes
0x0000	Slave Address	0x01 to 0xFE
0x0004	Slope	Value × 1000 (default: 1000)

6. Reading Data

Read 4 registers from 0x0000:

```
Request:  01 03 00 00 00 04 [CRC]
Response: 01 03 08 00 1A 00 BF 00 0D 00 02 [CRC]
```

Decoding (tap water example):

Register	Hex	Decimal	Scaling	Result
Conductivity	0x001A	26	× 10	**260 µS/cm**
Temperature	0x00BF	191	÷ 10	**19.1°C**
TDS	0x000D	13	× 10	**130 ppm**
Salinity	0x0002	2	÷ 10	**0.2 ppt**

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7. Address Configuration

Change Address (0x01 to 0x02)

Write to register 0x0000:

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

Broadcast Discovery

Use address 0xFE with only one device on the bus.

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8. Calibration

Slope Adjustment

The slope register at 0x0004 trims the sensor against a known reference standard. Slope is stored as `value × 1000`. To set a slope of 1.200, write 1200 (0x04B0):

```
01 06 00 04 04 B0 [CRC]
```

Default slope is 1.000 (raw value 1000).

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9. Installation Notes

Sensor Placement

- Electrode faces flow direction
- Fully submerged in water
- Avoid dead space and air pockets
- Use bypass mounting for stable flow

Cable and Maintenance

- Keep electrode surface clean
- Avoid bare hand contact and oils
- Route signal cable separate from power lines
- Do not extend the factory cable