

## Digital Conductivity Sensor



## 1. Overview

The AGRINOVO-EC-120 is a digital conductivity sensor for measuring electrical conductivity (EC) and temperature in water. It supports multiple electrode constants for different measurement ranges and includes slope/intercept calibration.

### Key Features

- EC measurement ( $\mu\text{S}/\text{cm}$ )
- Temperature measurement
- Accuracy:  $\pm 1.0\%$  FS
- Multiple K values
- Slope/intercept calibration
- Auto temp compensation
- RS485 Modbus-RTU
- Low power:  $\leq 0.5\text{W}$

### Applications

- Water quality monitoring
- Hydroponics
- Aquaculture
- Agricultural irrigation

## 2. Specifications

Parameter	Specification
Accuracy	$\pm 1.0\%$ FS
Temp Compensation	0–60°C (automatic)
Power Consumption	$\leq 0.5\text{W}$
Supply Voltage	7–24 VDC
Operating Humidity	$\leq 85\%$ RH

## Electrode Constants and Ranges

K Value	EC Range	TDS Range
0.1 cm <sup>-1</sup>	0.2–200 µS/cm	0.1–100 ppm
1.0 cm <sup>-1</sup>	2–10,000 µS/cm	1–5,000 ppm
10.0 cm <sup>-1</sup>	20–100,000 µS/cm	10–50,000 ppm

### 3. Wiring

Wire Color	Function	Description
Red	V+	Power Supply (7–24V 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 ( $\mu\text{S}/\text{cm}$ )
0x0001	Temperature	Value $\div$ 10 ( $^{\circ}\text{C}$ )

### Configuration Registers (Function 0x06)

Address	Description	Range/Notes
0x0004	Slope	Value $\times$ 1000 (default: 1000)
0x000B	Intercept/Offset	Direct ( $\mu\text{S}/\text{cm}$ , default: 0)
0x0050	Slave Address	0x01–0xFE

## 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 5C 91
```

### Decoding:

Register	Hex	Decimal	Scaling	Result
EC	0x02AE	686	Direct	<b>686 <math>\mu\text{S}/\text{cm}</math></b>
Temperature	0x0164	356	$\div$ 10	<b>35.6<math>^{\circ}\text{C}</math></b>

## 7. Address Configuration

### Change Address (0x01 → 0x02)

```
01 06 00 50 00 02 08 0B
```

### Broadcast Discovery

Use address 0xFE with only one device connected.

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## 8. Calibration

### Set Slope (1.200)

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

### Set Intercept (10 $\mu$ S/cm)

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

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## 9. Installation Notes

### Sensor Placement

- Stable water flow
- Fully submerged
- Avoid dead space

### Maintenance

- Keep electrode clean
- No disassembly
- Avoid oils/grease