Agrinovo

AGRINOVO-COD-130

Digital UV Absorption COD Sensor with Self-Cleaning Wiper

1. Overview

The AGRINOVO-COD-130 is a digital UV absorption sensor for measuring Chemical Oxygen Demand (COD) in water. It simultaneously measures absorbance at 254nm and 850nm wavelengths, converting readings to COD, BOD, TOC, and turbidity values. The sensor features a built-in self-cleaning wiper and communicates via RS485 Modbus-RTU, making it suitable for harsh water quality monitoring environments.

Key Features

- UV absorption measurement (254nm / 850nm)
- COD range: 0–300 mg/L (or 0–1500 mg/L)
- Resolution: 0.1 mg/L
- Multi-parameter: COD, BOD, TOC, turbidity
- Built-in self-cleaning wiper
- RS485 Modbus-RTU interface
- Wide supply voltage: 9–36 VDC
- Compact: D32mm × L175mm

Applications

- Wastewater treatment monitoring
- Industrial effluent COD monitoring
- Environmental water quality assessment
- Aquaculture water management
- Process water quality control

2. Specifications

Parameter	Specification
Measurement Principle	UV Absorption
COD Range	0–300 mg/L or 0–1500 mg/L
Resolution	0.1 mg/L
Accuracy	±10%
Linearity	<5%
Communication	RS485, Modbus-RTU
Dimensions	D32mm × L175mm
Cable Length	10m (customizable)
Operating Temp	5–45°C
Operating Pressure	0–3 bar
Supply Voltage	9–36 VDC
Power Consumption	1.5W

3. Wiring

Wire Color	Function	Description
Brown / Red	V+	Power Supply (9–36V DC)
Black	GND	Power Ground
Green / Blue	RS485-A	Data+
White	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

All measurement values are IEEE-754 float32, each occupying 2 registers. Byte order: read bytes 1-2-3-4, parse as 4-3-2-1 (little-endian byte swap).

Measurement Registers (Function 0x03 — Read Only)

Address	Description	Range	Data Type
0x2600–0x2601	Temperature	0–100°C	Float32
0x2602–0x2603	COD Value	0–200 mg/L	Float32
0x2604–0x2605	BOD Value	—	Float32
0x2606–0x2607	TOC Value	—	Float32
0x2608–0x2609	Turbidity	0–1000 NTU	Float32
0x260A–0x260B	COD Signal	0–2000	Float32

Configuration Registers (Function 0x03 read / 0x06 write)

Address	Description	Default	Range	Data Type
0x1100–0x1101	COD Slope K	1.0	0.1–10	Float32
0x1102–0x1103	COD Offset B	0.0	—	Float32
0x3000	Device Address	0x04	0x00–0xFF	Hex-ASCII
0x3100	Manual Wipe	0x0000	Write 0x0000 to trigger	Hex-ASCII
0x3200	Wipe Interval	0x3C (60 min)	—	Hex-ASCII

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6. Reading Data

Read COD value (Float32 from registers 0x2602–0x2603)

Read 2 registers starting at 0x2602:

```
Request:  01 03 26 02 00 02 [CRC]
Response: 01 03 04 XX XX XX XX [CRC]
```

Decoding (byte-swap example):

Received bytes: `8F C2 01 41` → reorder to `41 01 C2 8F` → IEEE-754 float = **8.11 mg/L**

Read all measurement registers

Read 12 registers from 0x2600:

```
Request:  01 03 26 00 00 0C [CRC]
```

Returns Temperature, COD, BOD, TOC, Turbidity, and COD Signal as 6 float32 values.

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7. Address Configuration

Change Address

Write new address to register 0x3000 (Hex-ASCII format):

```
01 06 30 00 XX 00 [CRC]
```

Where `XX` is the new address (e.g., `02` for address 2).

Broadcast Discovery

Use address 0xFF with only one device connected.

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8. Calibration

COD Slope (K) and Offset (B) Adjustment

The COD reading can be adjusted using the linear formula: **COD_adjusted = K × COD_raw + B**

Write K value (float32) to registers 0x1100–0x1101 using function 0x10:

```
01 10 11 00 00 02 04 [K float bytes] [CRC]
```

Write B value (float32) to registers 0x1102–0x1103 using function 0x10:

```
01 10 11 02 00 02 04 [B float bytes] [CRC]
```

Default: K = 1.0, B = 0.0 (no adjustment).

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9. Self-Cleaning Wiper

Trigger Manual Wipe

Write 0x0000 to register 0x3100:

```
01 06 31 00 00 00 [CRC]
```

Set Wipe Interval

Write interval (in minutes, Hex-ASCII) to register 0x3200. Default is 0x3C (60 minutes):

```
01 06 32 00 XX 00 [CRC]
```

Where `XX` is the interval in hex (e.g., `3C` = 60 minutes, `78` = 120 minutes).

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10. Installation Notes

Placement

- Fully submerge the measurement window in water
- Ensure no air bubbles near the measurement window
- Water should be still or slow-flowing

Maintenance

- Not suitable for high turbidity or high color water bodies
- Replace UV light source every 1–2 years depending on usage
- Do not store or use in high-temperature environments
- Avoid direct sunlight for outdoor installations
- Do not use in freezing conditions (wiper damage risk)