Agrinovo

AGRINOVO-MLSS-110

Self-cleaning Sludge Concentration (MLSS) Sensor

1. Overview

The AGRINOVO-MLSS-110 is a self-cleaning digital sludge concentration sensor based on infrared scattered light technology. The infrared light emitted by the source scatters when passing through the sample, and the scattered light intensity is proportional to the sludge concentration. A detector positioned at 135° receives the scattered light, and the sensor calculates the MLSS concentration by analyzing the signal strength.

Key Features

- Measurement range: 0–50000 mg/L
- Resolution: 0.1 mg/L / 1 mg/L
- Accuracy: ±10% or 10 mg/L (whichever is greater)
- Repeatability: ±3%
- Self-cleaning wiper (optional)
- RS485 Modbus-RTU output
- IP68 / NEMA6P protection
- SUS316L stainless steel body

Applications

- Wastewater treatment MLSS monitoring
- Sludge thickening and dewatering process control
- Aeration basin sludge concentration monitoring
- Industrial process water and waste treatment

2. Specifications

Parameter	Specification
Range	0–50000 mg/L (customizable)
Accuracy	±10% of reading or 10 mg/L, whichever is greater
Repeatability	±3%
Resolution	0.1 mg/L or 1 mg/L (depending on range)
Pressure Rating	≤0.2 MPa
Calibration	Standard solution / sample calibration
Materials	Body: SUS316L; End caps: POM; Cable: PUR
Supply Voltage	9–36 VDC
Protocol	Modbus RS485
Storage Temp	–15 to 50°C
Operating Temp	0 to 45°C (non-freezing)
Dimensions	Without wiper: 50mm dia. × 205mm, NPT3/4 thread
	With wiper: 50mm dia. × 215mm, NPT3/4 thread
Weight	0.8 kg
Protection	IP68 / NEMA6P
Cable Length	10 m standard, extendable to 100 m

3. Wiring

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

4. Communication Settings

Parameter	Value
Protocol	Modbus-RTU
Baud Rate	9600 bps (configurable: 4800/9600/19200/38400)
Data Bits	8
Parity	None
Stop Bits	1
Default Address	0x01 (range 1–200)

5. Register Map

Measurement Registers (Function 0x03)

Address	Description	Type	Length	R/W	Notes
0x0000	MLSS Value	Float	2	R	0.0–50000 mg/L
0x0002	Internal Temperature	Float	2	R	
0x0004	MLSS Slope	Float	2	RW	0.1–9.99, default 1.00
0x0006	Sensor Signal	Float	2	R	
0x0008	MLSS Offset	Float	2	RW	±50000, default 0.00

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

Address	Description	Type	Length	R/W	Notes
0x000B	Wiper Time	Int	1	R	Written via address 0x0015
0x000C	Response Time	Int	1	RW	3–60 seconds
0x000D	Electrode Type	Int	1	R	1 = with wiper, 0 = without
0x0010	Baud Rate	Int	1	RW	0=4800, 1=9600, 2=19200, 3=38400
0x0011	Slave Address	Int	1	RW	1–200
0x0014	Manual Wipe	Int	1	W	Send 66 to trigger
0x0015	Auto Wipe Interval	Int	1	W	Interval in minutes
0x00C8	Factory Reset	Int	1	W	Send 60 to restore

6. Reading Data

Read MLSS value and temperature (4 float registers from 0x0000):

```
Request:  01 03 00 00 00 04 [CRC]
Response: 01 03 08 XX XX XX XX XX XX XX XX [CRC]
```

Decoding:

Register	Bytes	Format	Result
0x0000–0x0001 MLSS Value	4 bytes	IEEE-754 Float32	**mg/L**
0x0002–0x0003 Temperature	4 bytes	IEEE-754 Float32	**°C**

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7. Address Configuration

Change Address (0x01 → 0x02)

```
01 06 00 11 00 02 [CRC]
```

Change Baud Rate (9600 → 19200)

```
01 06 00 10 00 02 [CRC]
```

Broadcast Discovery

Use address 0xFE with only one device connected.

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8. Calibration

The sensor is factory-calibrated. Two calibration methods are available: **slope correction** (single-point) and **multi-point correction**.

Slope Correction (Single-Point)

1. Connect sensor to PC via RS485-to-USB adapter.
2. Clean the sensor lens thoroughly.
3. Immerse sensor slowly in MLSS standard solution.
4. Wait for reading to stabilize and record the value.

5. Calculate slope: **Slope = Standard Value / Measured Value**
6. Write the calculated slope to register 0x0004 (Float).

Multi-Point Correction

Step	Address	Type	Procedure
1	0x0064	Float	Place in pure water, write 0.01. Wait 20s.
2	0x0080	Float	Place in 100 mg/L standard, write 100. Wait 20s.
3	0x0082	Float	Place in 500 mg/L standard, write 500. Wait 20s.
4	0x0084	Float	Place in 1000 mg/L standard, write 1000. Wait 20s.

Calibration Notes

- Keep probe lens at least 5 cm from the bottom of the calibration cup
- Ensure no air bubbles on the lens surface
- Shield the calibration cup from ambient light during calibration

9. Installation Notes

Placement

- Use railing-mount bracket with DN32 pipe
- Submerge sensor fully in the measurement medium
- Avoid areas with excessive air bubbles or turbulence

Maintenance

- Clean the two optical lenses periodically
- Rinse with clean water, then wipe with detergent for stubborn deposits
- Inspect for damage; replace sealing rings annually

- Do NOT manually rotate the self-cleaning wiper — motor-driven only