Agrinovo

AGRINOVO-O2-100

Digital Soil Oxygen Sensor

1. Overview

The AGRINOVO-O2-100 is a digital oxygen sensor for monitoring oxygen concentration in the soil root zone and growing environment. An electrochemical sensing cell with built-in temperature compensation measures oxygen as a volume percentage (%VOL) and reports it over an RS485 Modbus-RTU interface.

Key Features

- Oxygen range: 0-25 %VOL
- Resolution: 0.1 %VOL
- Accuracy: ±2% FS (at 25°C)
- Electrochemical sensing cell
- Built-in temperature compensation
- Response time under 15 seconds
- RS485 Modbus-RTU output
- Low power: ≤15 mA average

Applications

- Soil root-zone oxygen monitoring
- Soil aeration and drainage assessment
- Greenhouse and substrate growing systems
- Compost and organic matter monitoring

2. Specifications

Parameter	Specification
Measured Parameter	Oxygen concentration
Range	0-25 %VOL
Resolution	0.1 %VOL
Accuracy	±2% FS (at 25°C)
Repeatability	≤1% FS
Temperature Drift	0.2% FS per °C
Response Time	Under 15 seconds
Sensing Method	Electrochemical cell with temperature compensation

3. Electrical Characteristics

Parameter	Specification
Supply Voltage	7-24 VDC
Average Current	≤15 mA
Operating Temperature	-20°C to 50°C
Operating Humidity	15-80% RH (non-condensing)
Dimensions	97 mm length, 30 mm diameter

Caution: Connect the sensor with correct polarity and within the rated supply voltage. Reverse polarity or overvoltage will permanently damage the sensing cell.

4. Wiring

Wire Color	Function	Description
Red	V+	Power Supply (7-24V DC)
Black	GND	Power Ground
Yellow	RS485-A	Data+
Green	RS485-B	Data-

5. Communication Settings

Parameter	Value
Protocol	Modbus-RTU
Baud Rate	9600 bps
Data Bits	8
Parity	None
Stop Bits	1
Default Address	0x01

6. Register Map

Measurement Register (Function 0x03)

Address	Description	Scaling
0x0000	Oxygen Concentration	Value ÷ 10 = %VOL

Address Configuration (Function 0x06)

Address	Description	Range
0x0000	Slave Address	0x01-0xFE

The oxygen value is read from register 0x0000 with function 0x03. The slave address is changed by writing the new address to register 0x0000 with function 0x06.

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7. Reading Data

Read 1 register from 0x0000 (function 0x03):

```
Request:  01 03 00 00 00 01 84 0A
Response: 01 03 02 00 D1 78 18
```

Decoding:

Register	Hex	Decimal	Scaling	Result
0x0000 Oxygen	0x00D1	209	÷ 10	**20.9 %VOL**

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8. Address Configuration

Change Address (0x01 to 0x02)

Write the new address to register 0x0000 with function 0x06:

```
Request:  01 06 00 00 00 02 08 0B
```

Power cycle the sensor after changing the address.

Broadcast Discovery

Use address 0xFE with only one device connected to query an unknown address.

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9. Installation Notes

Placement

- Install the probe in the active root zone at the depth of interest
- Ensure firm soil contact around the sensing end
- Keep the sensing membrane clear of standing water
- Install at multiple depths to build an oxygen profile

Environment & Maintenance

- Operating range: -20°C to 50°C
- Avoid condensation and water saturation at the membrane
- Keep the sensing cell free of sticky particles and debris
- Do not open the housing or touch the membrane