Agrinovo

AGRINOVO-TVOC-100

RS485 TVOC & CO2eq Air Quality Sensor

1. Overview

The AGRINOVO-TVOC-100 is a digital indoor air quality sensor with an RS485 Modbus-RTU output. It measures total volatile organic compounds (TVOC) across 0-60000 ppb and reports equivalent CO2 (CO2eq), a 400-60000 ppm air quality index derived from the VOC signal. Both values arrive as simple Modbus registers over a single 4-wire connection.

The sensing element delivers high accuracy and consistency across a wide range, with strong stability and interference immunity, and built-in surge protection on the interface. Multiple sensors share one RS485 bus for monitoring several rooms or zones from a single controller, with cable runs up to 1200 m.

Key Features

- TVOC: 0-60000 ppb
- CO2eq: 400-60000 ppm
- Resolution: 1 ppb / 1 ppm
- Accuracy from ±1 ppb / ±1 ppm
- RS485 Modbus-RTU output
- Bus runs up to 1200 m
- 5-12 V DC, <0.1 W
- Built-in surge protection

Applications

- Greenhouse and indoor growing air quality
- Warehouses, cold rooms, and produce storage
- Packing, processing, and facility rooms
- Ventilation duct and HVAC monitoring
- Offices, labs, and equipment rooms

2. Specifications

Parameter	Specification
TVOC Range	0-60000 ppb
TVOC Accuracy	±1 ppb (0-2008 ppb), ±6 ppb (2008-11110 ppb), ±32 ppb (11110-60000 ppb)
CO2eq Range	400-60000 ppm
CO2eq Accuracy	±1 ppm (400-1479 ppm), ±3 ppm (1479-5144 ppm), ±9 ppm (5144-17597 ppm), ±31 ppm (17597-60000 ppm)
Resolution	1 ppb TVOC, 1 ppm CO2eq
Output	RS485, Modbus-RTU
Bus Length	Up to 1200 m
Supply Voltage	5-12 V DC
Power Consumption	<0.1 W
Protection	Built-in surge protection
Placement	Indoor, non-condensing

CO2eq is an equivalent-CO2 air quality value calculated from the VOC measurement. For direct CO2 measurement, pair with a dedicated CO2 sensor.

3. Wiring

Terminal	Function	Description
V+	Power	Power Supply (5-12 V DC)
GND	Ground	Power Ground
A+	RS485-A	Data+
B-	RS485-B	Data-

4. Communication Settings

Parameter	Value
Protocol	Modbus-RTU
Baud Rate	9600 bps (default); 1200, 2400, 4800, 19200 selectable
Data Bits	8
Parity	None
Stop Bits	1
Error Check	CRC-16
Default Address	0x01

Multiple sensors share one RS485 bus, each with a unique address (1-247).

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5. Register Map

Measurement Registers (Function 0x03 or 0x04)

Address	Description	Unit
0x0003	TVOC	1 ppb
0x0004	CO2eq	1 ppm

A register value of 0x8000 indicates a sensing element read error.

Configuration Registers (Function 0x03/0x04 read, 0x06/0x10 write)

Address	Description	Values
0x0064	Device Address	1-247, default 1
0x0065	Baud Rate	0: 1200, 1: 2400, 2: 4800, 3: 9600, 4: 19200

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6. Reading Data

Read TVOC and CO2eq (2 registers from 0x0003):

```
Request:  01 03 00 03 00 02 34 0B
Response: 01 03 04 00 7D 02 62 EA A2
```

Decoding:

Value	Hex	Decimal	Result
TVOC	0x007D	125	**125 ppb**
CO2eq	0x0262	610	**610 ppm**

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7. Address Configuration

Change Address (0x01 → 0x02)

Write to register 0x0064:

```
01 06 00 64 00 02 49 D4
```

Broadcast Discovery

With only one sensor on the bus, address 0xFF reads or writes regardless of the configured address. Read the current address:

```
FF 03 00 64 00 01 D0 0B
```

Set the address to 0x02 without knowing the current one:

```
FF 06 00 64 00 02 5C 0A
```

Change Baud Rate (set 9600)

Write to register 0x0065:

```
01 06 00 65 00 03 D9 D4
```

8. Installation Notes

Placement

- Indoor use, at breathing or canopy height for the zone
- Keep away from heat sources, cold sources, and direct sunlight
- Do not expose to steam, mist, or condensation
- Allow free air circulation around the sensor

Maintenance

- Clean periodically in dusty environments
- Allow a warm-up period after power-on before trusting readings
- Verify readings periodically against a reference
- Check A/B wiring and addresses on comms faults