

RS485 Temperature & Humidity Sensor



1. Overview

The AGRINOVO-THS-100 is a compact digital temperature and humidity sensor with an RS485 Modbus-RTU output. The measuring element and transmitter electronics are built into the probe itself, so a single 4-wire cable carries both power and data. One sensor model covers every climate-monitoring point on a site: the probe is available in seven interchangeable housings, from a fast-response vented cap for indoor air to sealed, sintered-metal, and IP67 options for wet, dusty, and harsh environments.

Wide-range 5-28 V DC supply, reverse-polarity protection, and industrial EMC-hardened electronics make it a straightforward fit for long cable runs and multi-sensor RS485 buses.

Key Features

- Temperature: -40 to +80°C, $\pm 0.3^\circ\text{C}$
- Humidity: 0-100% RH, $\pm 3\%$ RH
- 0.1°C / 0.1% RH resolution
- 2 s measurement refresh
- RS485 Modbus-RTU output
- Seven probe housing options
- 5-28 V DC, ≤ 0.05 W
- Reverse-polarity protected

Applications

- Greenhouse and indoor growing climate control
 - Poultry, cattle, and livestock housing
 - Grain storage and silo headspace monitoring
 - Hatchery and aquaculture room climate
 - Cold rooms, warehouses, and storage facilities
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2. Specifications

Parameter	Specification
Temperature Range	-40 to +80°C
Temperature Accuracy	±0.3°C (at 25°C)
Temperature Resolution	0.1°C
Humidity Range	0-100% RH (non-condensing)
Humidity Accuracy	±3% RH (at 60% RH, 25°C)
Humidity Resolution	0.1% RH
Response Time	≤15 s temperature, ≤4 s humidity (1 m/s airflow)
Measurement Refresh	2 s
Long-term Stability	≤0.1°C/year, ≤1% RH/year
Output	RS485, Modbus-RTU
Supply Voltage	5-28 V DC
Power Consumption	≤0.05 W
Protection	Reverse-polarity protection on supply
Cable	4-wire, 1 m standard

3. Probe Options

The THS-100 electronics are identical across all housings. Select the probe housing for the environment; specifications and communication are the same for every option.

Ordering Code	Housing	Dimensions	Environment
THS-100-PVC	Vented PVC cap	Ø12.5 × 68 mm	Indoor air; fastest response; not waterproof
THS-100-PP	Sealed polymer	Ø15 × 67 mm	High humidity and outdoor; rain and fog
THS-100-BR	Brass body	Ø15 × 68 mm	High humidity and outdoor; rain and fog
THS-100-SS	Stainless steel body	Ø15 × 76 mm	High humidity and outdoor; rain and fog
THS-100-SM57	Sintered metal filter	Ø14 × 57 mm	High-dust areas; fast response
THS-100-SM87	Sintered metal filter, long	Ø14 × 87 mm	High-dust areas
THS-100-IP67	IP67 sintered housing	Ø16.5 × 74 mm	Harsh and washdown environments

Response time is specified with the vented PVC cap. Sealed and sintered housings protect the element in wet and dusty conditions and respond more gradually to fast humidity changes.

4. Wiring

Wire Color	Function	Description
Red	V+	Power Supply (5-28 V DC)
Black	GND	Power Ground
Yellow	RS485-A	Data+
Green	RS485-B	Data-

Do not swap the A and B data lines. On long runs or buses with many devices, power the sensors locally and fit a 120 Ω termination resistor at the end of the bus.

5. Communication Settings

Parameter	Value
Protocol	Modbus-RTU
Baud Rate	9600 bps (default); 2400, 4800 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 (1-254). Bus length up to 2000 m with proper cabling and termination.

6. Register Map

Measurement Registers (Function 0x03)

Address	Description	Scaling
0x0000	Humidity	Value ÷ 10 (% RH)
0x0001	Temperature	Value ÷ 10 (°C), two's complement below 0°C

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

Address	Description	Values
0x0100	Device Address	1-254, default 1
0x0101	Baud Rate	2: 2400, 3: 4800, 4: 9600
0x0104	Temperature Offset	Value ÷ 10 (°C), two's complement
0x0105	Humidity Offset	Value ÷ 10 (% RH), two's complement

7. Reading Data

Read humidity and temperature (2 registers from 0x0000):

```
Request: 01 03 00 00 00 02 C4 0B  
Response: 01 03 04 01 E6 FF 9F 1B A0
```

Decoding:

Value	Hex	Decimal	Scaling	Result
Humidity	0x01E6	486	÷10	48.6% RH
Temperature	0xFF9F	-97	÷10	-9.7°C

Negative temperatures are transmitted in two's complement: 0xFF9F = -97, giving -9.7°C.

8. Configuration

Change Address (0x01 → 0x02)

Write to register 0x0100:

```
01 06 01 00 00 02 09 F7
```

Note: Communication resumes on the new address.

Change Baud Rate (set 9600)

Write to register 0x0101:

```
01 06 01 01 00 04 D8 35
```

Offset Adjustment

Field-trim readings against a reference by writing an offset. Example, temperature offset of -0.5°C (0xFFFFB) to register 0x0104:

```
01 06 01 04 FF FB C9 84
```

Humidity offset works the same way through register 0x0105.

9. Installation Notes

Placement

- Match the probe housing to the environment (Section 3)
- Mount away from direct sunlight, heaters, and vents
- Use a radiation shield for outdoor ambient readings

Maintenance

- Keep the filter cap clean and unblocked
- Avoid condensation on the vented PVC option
- Verify readings periodically against a reference

- Allow free air circulation around the probe

- Check A/B wiring and termination on comms faults

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