



Digital Temperature and Humidity Sensor

User Manual



(Analog Output Type)

1. Product Introduction

1.1 Product Overview

The industrial duct type temperature and humidity transmitter adopts the Company's latest temperature and humidity measurement technology. It supports multiple analog output signals, including 4~20mA, 0~10V, and 0~5V, and can be connected to field digital display meters, PLCs, variable frequency drives, industrial control hosts, and other equipment. It is widely used in building automation, climate and HVAC signal acquisition, greenhouse applications, pharmaceutical and chemical industries, and other fields.

1.2 Functional Features

- Uses a high-precision temperature and humidity measurement unit, with a typical annual temperature drift of $\leq 0.03^{\circ}\text{C}$ and a typical annual humidity drift of $\leq 0.25\%\text{RH}$.
- A highly interference-resistant analog output circuit is designed to prevent strong electromagnetic interference in industrial environments.
- Supports both AC and DC power supply: DC15~36V or AC24V ($\pm 20\%$).
- Flange installation design with a high-elasticity sealing ring made of polymer material to ensure sealing of the measurement opening.
- The temperature output range can be modified on site through DIP switches.
- The probe rod can be extended up to 2 meters in length.

1.3 Main Technical Specifications

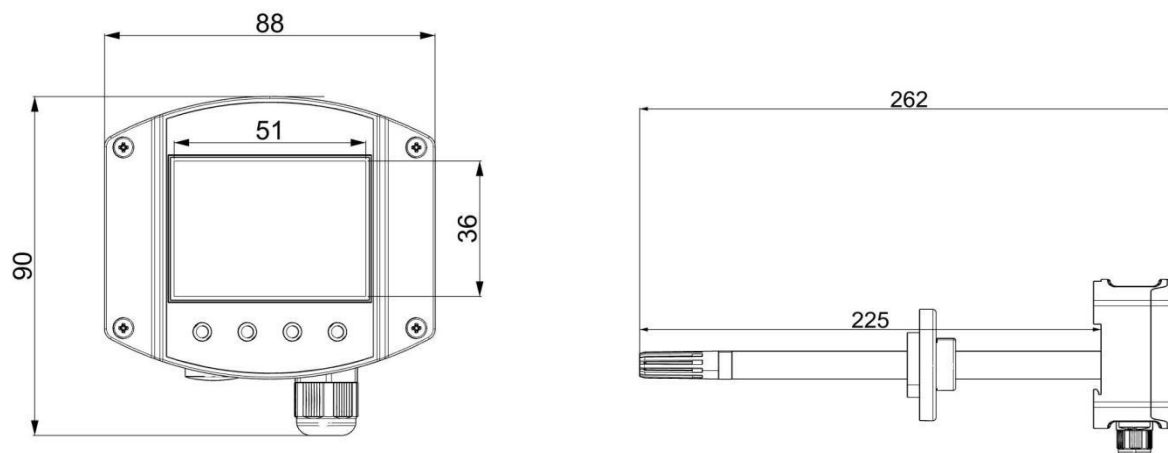
Power Supply	DC15~36V or AC24V ($\pm 20\%$)	
Maximum Power Consumption	1.5W	
Accuracy	Humidity	$\pm 2\%\text{RH}$ (60%RH, 25°C)
	Temperature	$\pm 0.2^{\circ}\text{C}$ (25°C)
Temperature Measurement Range	Default: $-40^{\circ}\text{C}\sim +80^{\circ}\text{C}$	
Humidity Measurement Range	0%RH~100%RH	
Operating Temperature and Humidity of Transmitter Circuit	$-20^{\circ}\text{C}\sim +60^{\circ}\text{C}$, 0%RH~99.9%RH (non-condensing)	

Probe Operating Temperature	Default: -40°C~+80°C	
Probe Operating Humidity	0%RH~100%RH	
Long-Term Stability	Humidity	≤0.25%RH/y
	Temperature	≤0.03°C/y
Response Time ¹	Temperature	≤25s (1m/s air velocity ²)
	Humidity	≤8s (1m/s air velocity ²)
Maximum Allowable Air Velocity	16m/s	
Output Signal	Current Output: 4~20mA	
	Voltage Output: 0~5V / 0~10V	
Load Capability	Voltage Output: Output resistance ≤1kΩ	
	Current Output: ≤600Ω	
Electromagnetic Compatibility Level	GB/T 17626.4-2018 Electromagnetic Compatibility — Testing and Measurement Techniques — Electrical Fast Transient/Burst Immunity Test — Level 4 GB/T 17626.5-2019 Electromagnetic Compatibility — Testing and Measurement Techniques — Surge (Impact) Immunity Test — Level 4 GB/T 17626.2-2018 Electromagnetic Compatibility — Testing and Measurement Techniques — Electrostatic Discharge Immunity Test — Level 4 GB/T 17626.8-2006 Electromagnetic Compatibility — Testing and Measurement Techniques — Power Frequency Magnetic Field Immunity Test — Level 5 GB/T 17626.11-2008 Electromagnetic Compatibility — Testing and Measurement Techniques — Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests — Class 3	

¹The response time refers to the τ_{63} response time.

²The air velocity refers to the airflow velocity at the sensitive material inside the sensor. When the test environment air velocity is 10^{-2} m/s, and the airflow direction is perpendicular to the sensor inlet, the airflow velocity at the sensitive material inside the sensor is approximately 1m/s.

1.4 Device Dimensions



1.5 Product Selection

RS-				Company Code	
	WS-				Temperature and Humidity Transmitter / Sensor
		I20-			4~20mA Current Output
		V05-			0~5V Voltage Output
		V10-			0~10V Voltage Output
			9A-		Industrial Duct Housing
				Blank	Without Display
				LCD-	With LCD Display

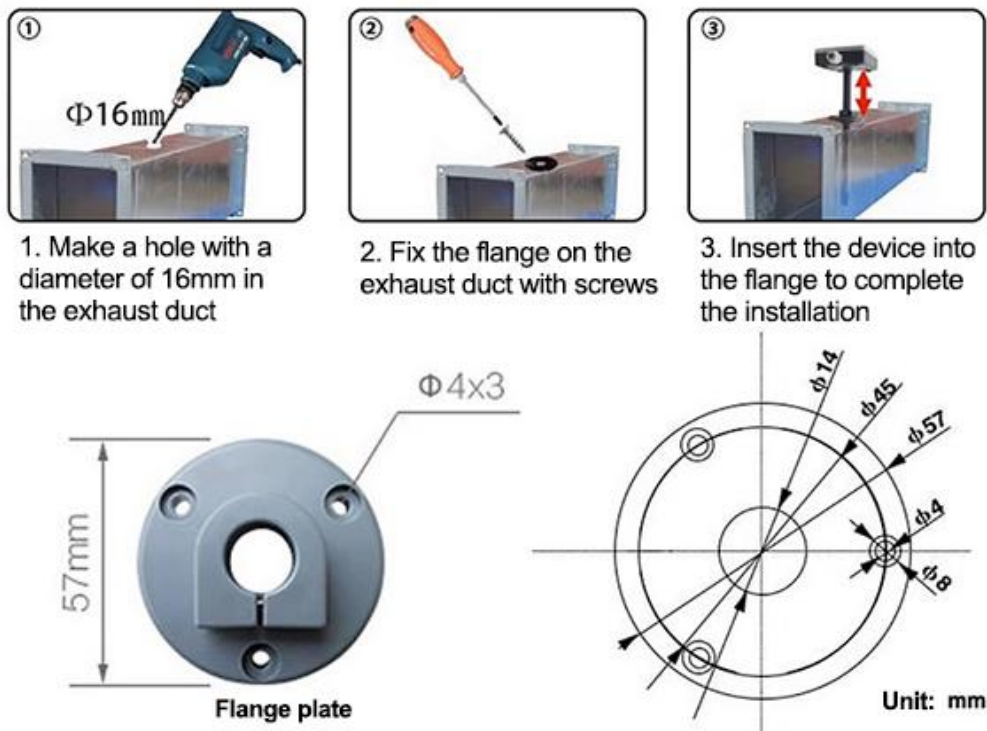
2. Device Installation Instructions

2.1 Inspection Before Installation

Device List:

- Temperature and Humidity Transmitter: 1 unit
- Certificate of Conformity, Warranty Card, Calibration Report, etc.

2.2 Installation Method

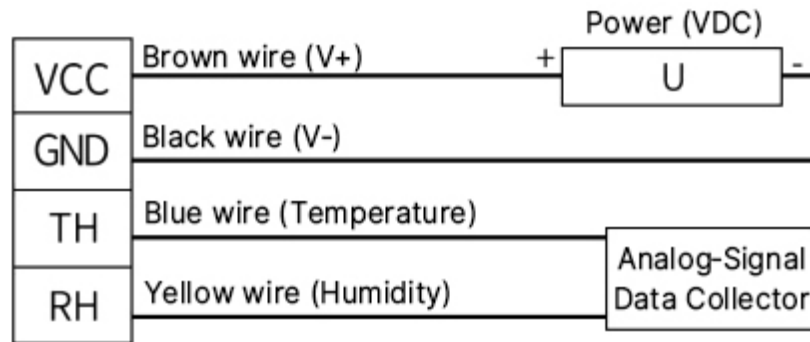


2.3 Detailed Wiring



	Circuit Identification	Description
Power Supply	VCC	Positive Power Supply
	GND	Negative Power Supply / Signal Ground
Output	TH	Temperature Signal Positive
	RH	Humidity Signal Positive

2.4 Wiring Example



Analog Wiring Schematic Diagram

(The device does not provide a communication cable by default. The wire colors are for reference only.)

2.5 Panel Display Description



3. Calculation Method

3.1 Conversion Calculation of Current Output Signal

For example, when the measurement range is $-40\sim+80\text{ }^{\circ}\text{C}$ with a $4\sim20\text{mA}$ output, calculate the current temperature value when the output signal is 12mA . The span of this temperature range is $120\text{ }^{\circ}\text{C}$, which is represented by a 16mA current signal. $120\text{ }^{\circ}\text{C}/16\text{mA} = 7.5\text{ }^{\circ}\text{C}/\text{mA}$, meaning that a 1mA current

signal represents a temperature change of 7.5°C . The measured value is $12\text{mA}-4\text{mA}=8\text{mA}$, and $8\text{mA} \times 7.5^{\circ}\text{C}/\text{mA}=60^{\circ}\text{C}$. $60+(-40)=20^{\circ}\text{C}$, therefore, the current temperature is 20°C .

3.2 Conversion Calculation of Voltage Output Signal

For example, when the measurement range is $-40\sim+80^{\circ}\text{C}$ with a $0\sim10\text{V}$ output, calculate the current temperature value when the output signal is 5V . The span of this temperature range is 120°C , which is represented by a 10V voltage signal. $120^{\circ}\text{C}/10\text{V} = 12^{\circ}\text{C}/\text{V}$, meaning that a 1V voltage signal represents a temperature change of 12°C . The measured value is $5\text{V}-0\text{V}=5\text{V}$, and $5\text{V} \times 12^{\circ}\text{C}/\text{V}=60^{\circ}\text{C}$. $60+(-40)=20^{\circ}\text{C}$, therefore, the current temperature is 20°C .

4. Button Operation Instructions

(1) Short press the  key to enter the password input interface. Short press , , or  to enter the password (default password: 888). After completing the input, long press the  key again to enter the main setting menu. If the password is incorrect, ERR will be displayed.

(2) After entering the main setting menu, short press  or  to scroll through the parameter pages. Short press  to enter the parameter setting interface.

(3) Short press , , or  to modify the parameters. After completing the parameter modification, short press  to automatically save the settings.

(4) During the setting process, press  to cancel the current setting. Press  again to return to the main interface.

The parameter setting details are shown below:

Display Interface	Description	Button Operation
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	Set the temperature calibration value of the device Range: -100.0 to 100.0 Default value: 0	Short press  to increase by 1; long press  to increase by 10. Short press  to decrease by 1; long press  to decrease by 10. Short press the  key to save the displayed temperature calibration value as the target temperature calibration value.
	Set the humidity calibration value of the device Range: -100.0 to 100.0 Default value: 0	Short press  to increase by 1; long press  to increase by 10. Short press  to decrease by 1; long press  to decrease by 10. Short press the  key to save the displayed humidity calibration value as the target humidity calibration value.
	Set the device password Range: 000 to 999 Default value: 888	Short press  to increase by 1; short press  to decrease by 1. Short press the  key to move one digit to the left. Long press the  key to save the displayed password as the target password.
	Set the measurement range Range: 0–3 0: -40 to 80°C 1: -35 to 35°C 2: -35 to 50°C 3: 0 to 50°C Default value: 0	Short press  to increase by 1; short press  to decrease by 1. Short press the  key to change the measurement range to the target range.

5. Common Problems and Solutions

No Output or Incorrect Output

Possible causes:

- (1) Incorrect range setting causes PLC calculation errors. Please refer to 4. Button Operation Instructions for the range setting.
- (2) Incorrect wiring method or incorrect wiring sequence.
- (3) Incorrect power supply voltage.
- (4) The distance between the transmitter and the data acquisition device is too long, causing signal interference.
- (5) The PLC acquisition port is damaged..
- (6) The device is damaged.

6. Precautions

(1) Warning: Risk of personal injury. This device is strictly prohibited from being used as a safety device or emergency stop device, and shall not be used for any other applications where personal injury may occur due to device failure. Usage restrictions: This device shall only be used for authorized applications as intended. The technical manual must be consulted before installation, operation, or maintenance. Failure to follow the above instructions may result in death or serious injury.

(2) The humidity sensor used by our company is based on the capacitive sensing principle. Avoid using it in environments containing volatile organic compounds.