KTH2-RI

4–20 mA Temperature and Humidity Data Acquisition Module with Current Output



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1 Product Overview

The KTH2-RI is a temperature and humidity data acquisition module that employs fully digital detection and integrates high-precision digital temperature and humidity sensors to accurately and rapidly measure ambient temperature and humidity. It uses analog circuitry to output current-loop signals (0/4–20 mA). The KTH2-RI module's built-in signal processing unit can flexibly output temperature and humidity-to-current signals at corresponding ratios according to user requirements. Through product design, structural strength optimization, and stability testing, the product offers high reliability and can be widely applied in key temperature and humidity monitoring scenarios such as smart factories and greenhouse node monitoring.

The KTH2-RI features the following characteristics:

1. Uses standard DIN 35 rail mounting for quick and easy installation;
2. Typical temperature measurement accuracy <0.2°C;
3. Features pluggable screw-type terminal blocks for simple and quick maintenance.

The detailed specifications of the KTH2-RI are described below.

1.1 Product Specifications

The basic specifications for the KTH2-RI product are shown in Table 1-1 below.

Table 1-1: Product Specifications Table

Item		Parameter	Notes
Operating Voltage		DC 12-24V	
Standby Power		24V 10mA	
Process Medium		Air	
Accuracy	Temperature	±0.2℃	
	Humidity	±2 %RH	
Resolution	Temperature	0.1℃	
	Humidity	0.1%RH	
Stability	Temperature	<±0.03℃/year	
	Humidity	<±0.25 %RH/year	
Temperature Measurement Range		-20° C-80° C	Do not use in highly polluted or dusty environments.
Relative Humidity Range		<100 %	Non-condensing
Operating Temperature		-40℃-85℃	
Storage Temperature		-40℃-105℃	
Analog Output Range		4-20mA	
Dimensions		65*45.4*28.8mm	
Installation Methods		Standard DIN Rail Mounting	
Casing Material		ABS Engineering Plastics	

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1.2 Product Dimensions and Interfaces

1.2.1 Product Dimensions

See Figure 1-1 below for the product dimensions.

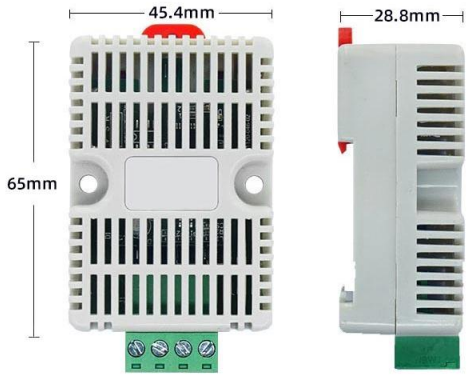


Figure 1-1: Product Dimensions Diagram

1.2.2 Product External Interfaces

A diagram of the product's external interfaces is shown in Figure 1-2 below.



Figure 1-2: Schematic Diagram of Product Interfaces

The product's external interface functions are shown in Table 1-2 below.

Table 1-2: Product Interface Specifications

No.	Port Naming	Port Function	Description	Pin Orientation
1	V+	Power Supply Positive Terminal	DC 12–24 V, Power Supply Positive Terminal	
2	V-	Power Supply Negative Terminal	Power supply negative terminal, GND	

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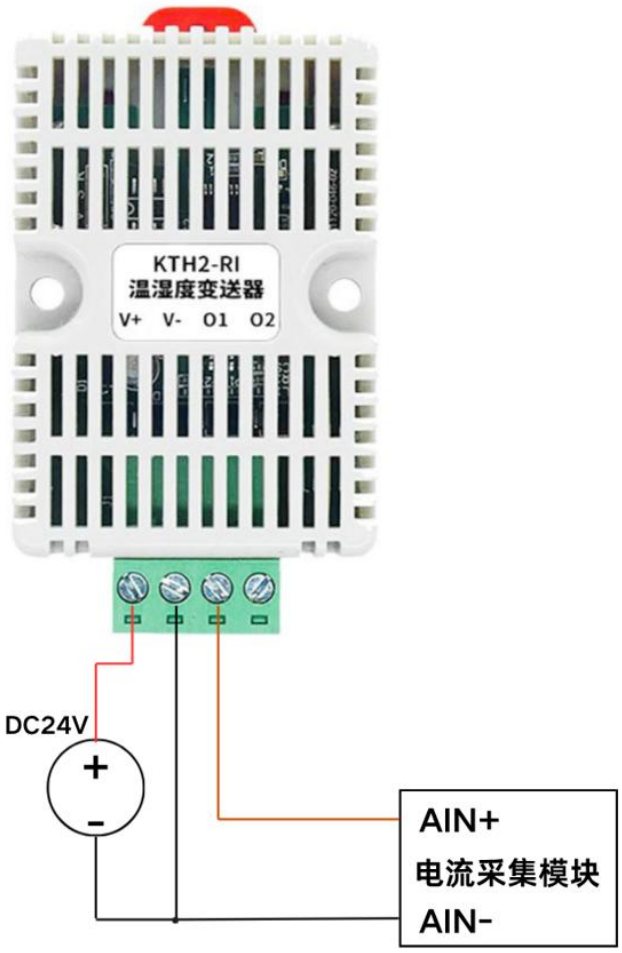
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3	O1	Positive Terminal of the First Voltage Output Channel	Voltage Output, Humidity Port	OUT
4	O2	Positive Terminal of the Second Voltage Output Channel	Voltage Output, Temperature Port	OUT

Note: The product's output signals share a common ground. When measuring voltage, a closed current loop must be formed; in other words, when wiring, connect O1 to the AIN+ input terminal, V- to the AIN- input terminal, and ensure the signals share a common ground.

1.3 Product Wiring Diagram

KTH2-RI: As soon as power is applied, this product collects temperature and humidity data via its temperature and humidity sensors and outputs the data as an analog current signal. The wiring should be as shown in Figures 1–3 below.



Figures 1–3: Product Wiring Diagrams

Note: If you want to quickly test the current of a product, simply set the multimeter to the voltage range, connect the red probe to O1 or O2, and the black probe to V-.

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1.4 Digital-to-Analog Conversion Formula

The KTH2-RI has a temperature measurement range of -20°C to 80°C and a humidity measurement range of 0%RH to 100%RH. The following section explains how to convert the measured current values into temperature and humidity values (I-T equation, I-RH equation).

1.4.1 Conversion of Current to Temperature

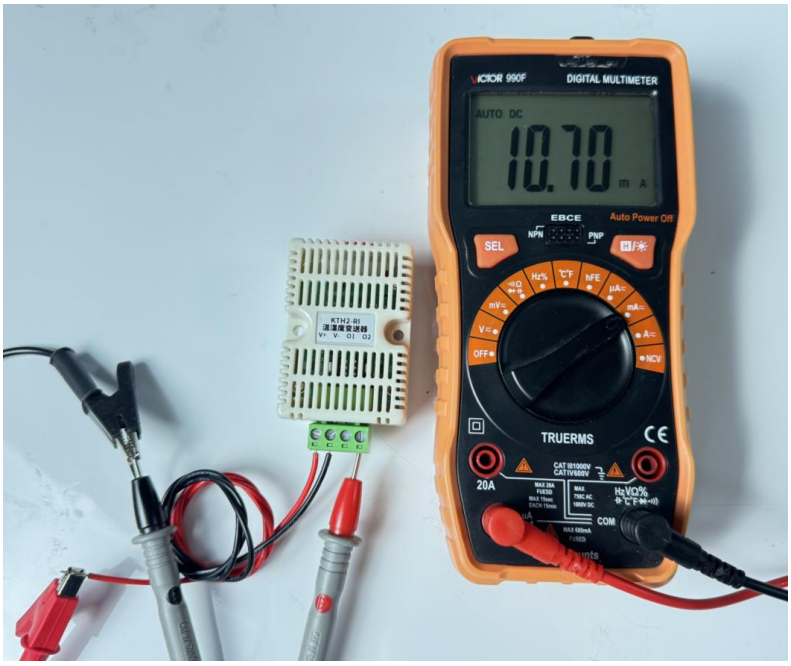
Definitions: Temperature measurement current IO2 (unit: mA), current temperature Temp (unit: ° C);

Maximum temperature Tmax, minimum temperature Tmin, maximum measurement current Imax, and minimum measurement current Imin;

Temp = (Tmax - Tmin) * (IO2 - Imin) / (Imax - Imin)

For example: If the current measured between the O2 port and V- is 10.70 mA,

then the current temperature is [80 - (-20) * (10.7 - 4)] / (20 - 4) ≈ 21.9° C



Figures 1–4: Actual Temperature Measurements and Wiring Diagrams

1.4.2 Conversion of Current to Humidity

Definitions: Humidity measurement current IO1 (unit: mA), current humidity Hum (unit: %RH)

Maximum humidity measurement range Hmax, minimum humidity measurement range Hmin, maximum measurement current Imax, minimum measurement current Imin;

Hum = (Hmax - Hmin) * (IO2 - Imin) / (Imax - Imin)

For example: If the current measured between Port O1 and V- is 13.53 mA, then the current humidity is (100-0) * (13.53-4) / (20-4) ≈ 59.6%RH

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Figure 1-5: Actual Humidity Readings and Wiring Diagram

1.5 Quick Product Testing

Generally, the multimeters currently in use are digital multimeters, as shown in Figures 1–4 below. For detailed information on the functions of each range, please refer to the “Multimeter User Guide” in the manual; we will not elaborate further here. Next, we will explain how to use a multimeter to measure the output current of the KTH2-RI.

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Figure 1–4: Digital Multimeter Functions

Before connecting the test leads to the circuit, first insert the red test lead into the “mA” jack and the black test lead into the “COM” jack, then set the dial to the “mA DC” range. Multimeters from different manufacturers may have different range settings; refer to the user manual for your specific multimeter for detailed instructions.

The figure below shows Wiring Diagram 1-5 for the test. When a data acquisition circuit is present, the ammeter must be connected in series with the circuit.

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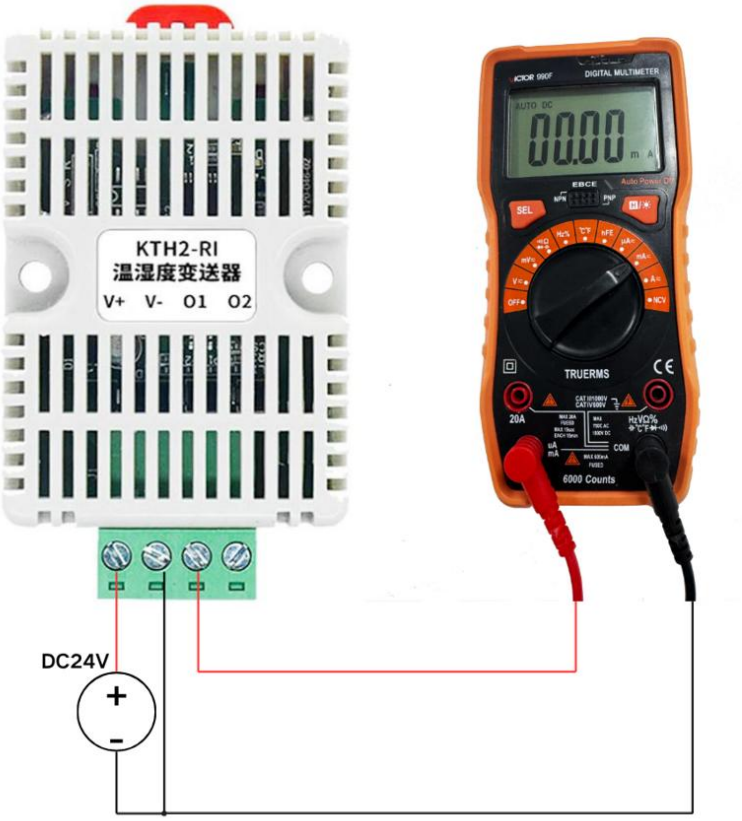


Figure 1-5.1 Direct Measurement with an Ammeter

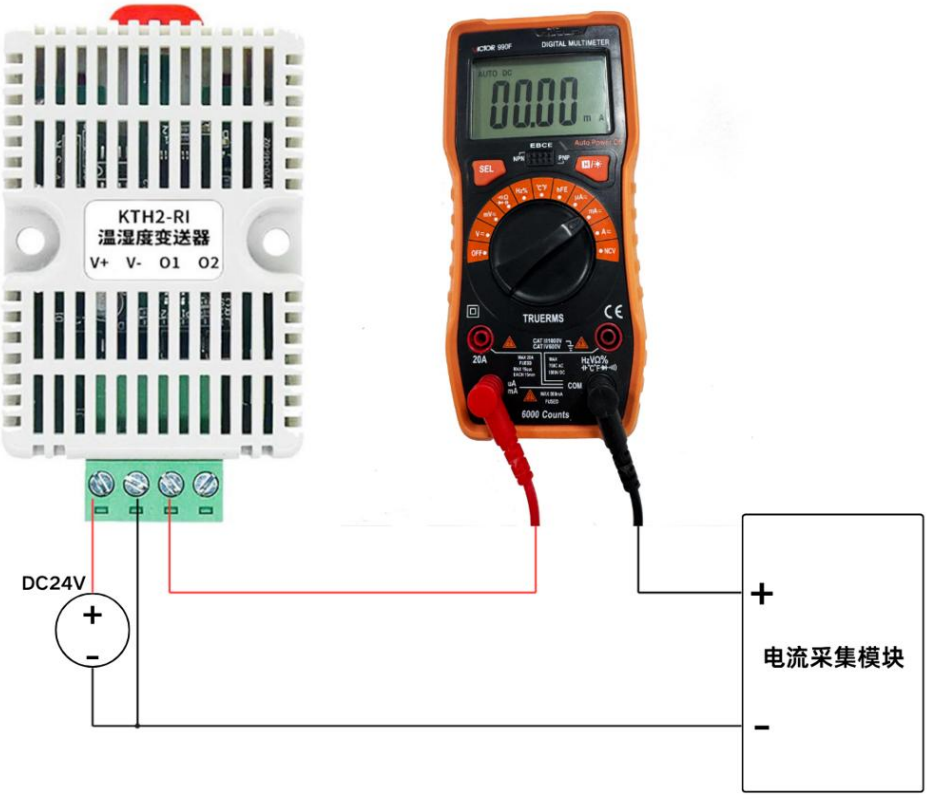


Figure 1-5.2 An ammeter is connected in series with the data acquisition circuit

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Important Notice

- Chengdu EBYTE reserves the right to make final interpretations and modifications to all content in this manual.
- Due to ongoing improvements to the product's hardware and software, this manual is subject to change without prior notice. The latest version of the manual shall prevail.

Revision history

Version	Date	Description	Issued by
V1.0	2026/04/03	Initial version	Wjl

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