

Temperature/Humidity/Dew point Transmitter

TRH-600 series

Instruction Manual



RIXEN

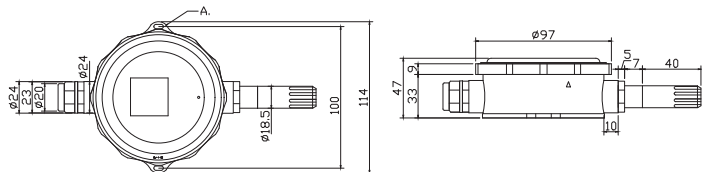
Copyright by Rixen Technology Co., Ltd. © Feb 2023 all rights are reserved.

Contents

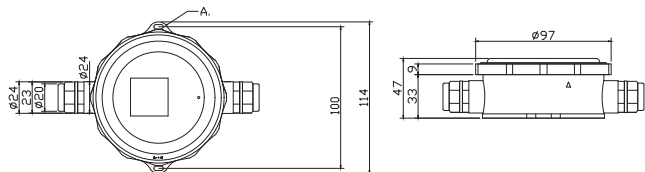
- Pay attention before use 1
- Instrument Description..... 1
- Display Description 2
- Display and Operating Instructions.. 3 ~ 6
 - D-1 Real-time display page and setting page
 - D-2 Temperature Setting
 - D-3 Humidity Setting
 - D-4 General Setting
- Read command 7 ~ 10
- Specifications of TRH-600 series ... 11
- Dimensions of TRH-600 series 12

G. Dimensions of TRH-600 series

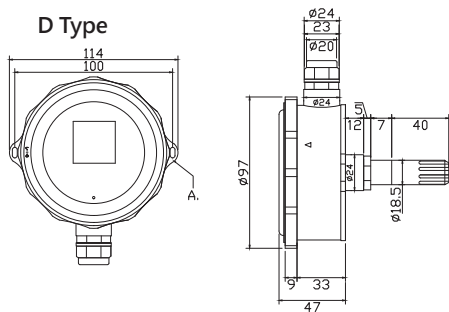
W Type



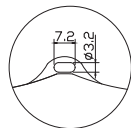
S Type



D Type



A.



A. Pay attention before use

- ① Before using this product, please read this operation manual carefully.
- ② Please use the device properly based on the understanding of the content.
- ③ This instrument is fully waterproof (IP65). To maintain stable functions, please avoid dropping, impacting or disassembling.

B. Instrument Description

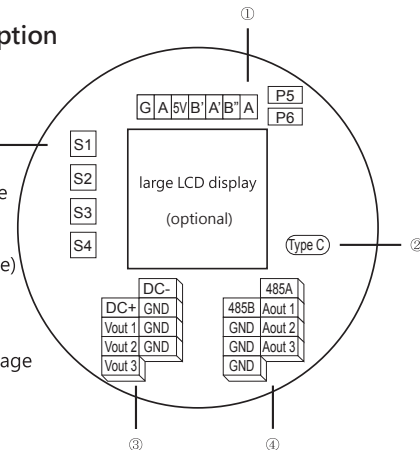
Setting and function keys

S1 : Switching key
(down, turn back to the top setting)

S2 : Value adjustment key
(-9~9, Enable or Disable)

S3 : Switching key
(right, turn back to the leftmost setting)

S4 : Confirm key / Setting page



① PT100 input

② Type C : Software connection port

PT-100(2-WIRE) — Connect to B'A' input (P5, P6 need to use short circuit jumper)

PT-100(3-WIRE) — Connect to B'A'B' input (P6 needs to use short circuit jumper)

PT-100(4-WIRE) — Connect to B'A'B'A input (no need to use shorting circuit jumper)

③ Vout : Voltage output 0-5 / 0-10V

(It can be adjusted by the function buttons on the board or computer software)

④ Aout : Current output 4-20mA

(It can be adjusted by the function buttons on the board or computer software)

DC- : GND (grounding)		RS-485A output	
DC+ : 9-36V	GND	RS-485B output	Aout 1 Temperature
Vout 1 Temperature	GND	GND	Aout 2 Humidity
Vout 2 Humidity	GND	GND	Aout 3 Dew point
Vout 3 Dew point	GND	GND	

Example 2 :

Read the humidity and dew point, assuming it is 69.1% and 22.4°C respectively :

Read Input Registers of Humidity and Dew Point Information					
	Slave Address	Function	Reg. Start Address	Reg. Count	CRC
Content	0x68	0x4	0x1	0x2	0x2932

Instruction :

Index	0	1	2	3	4	5	6	7
Content	0x68	0x4	0x0	0x1	0x0	0x1	0x29	0x32

Response :

Index	0	1	2	3	4	5	6	7	8
Content	0x68	0x4	0x4	0x2	0xB3	0x00	0xE0	0xF3	0x55

Supplement

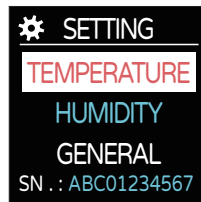
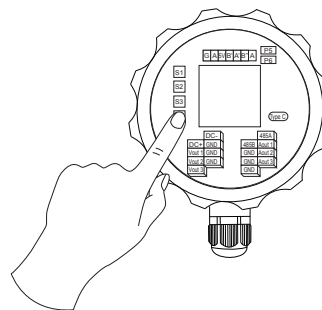
Reg. Start Address	Reg. Count	meaning
0x0	0x1	Read Temperature only
	0x2	Read Temperature and Humidity
	0x3	Read Temperature, Humidity and Dew Point
0x1	0x1	Read Humidity only
	0x2	Read Humidity and Dew Point
0x2	0x1	Read Dew Point only

Note : Other combinations are all ILLEGAL

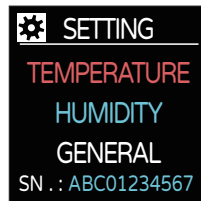
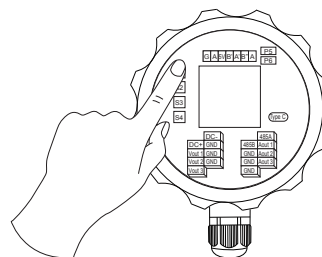
D.Display and Operating Instructions

D-1 Real-time display page and setting page :

Press S4 to enter the setting page, and use S1 to select the next cycle. When selected, the item will be highlighted. After you select the target (highlighted), Press S4 to enter this option.



When you select , you will return to the real-time display page.



D-2 Temperature setting :

Enter the TEMPERATURE interface, press the S1 to select, and press the S4 to enter this option. (Use S2 to Enable, Disable or Value adjustment.)

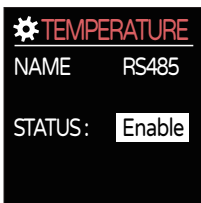
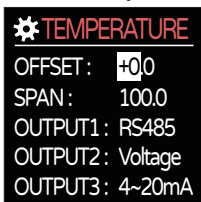
Zero offset setting (-9.9~+9.9), the initial value is 0.

Slope offset setting (0~+199.9%), the initial value is 100.0%.

RS-485 setting (on or off).

Corresponding range setting of voltage output.

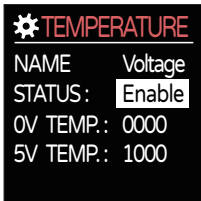
Corresponding range setting of current output.



Enter OUTPUT1 : RS-485 interface, you can choose whether to enable the function.

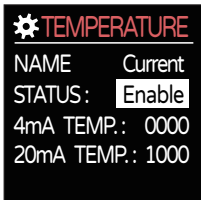
Enter OUTPUT2 : Voltage interface, you can choose whether to enable the function, And set the voltage corresponding to the temperature.

* If you want to adjust to a negative value, you must to change the hundreds digit value, and then change the thousands digit value to -0



Enter OUTPUT3 : 4~20mA interface, you can choose whether to enable the function, And set the current corresponding to the temperature.

* If you want to adjust to a negative value, you must to change the hundreds digit value, and then change the thousands digit value to -0



Example : When the actual temperature is -123.4°C

Response Data	-1234
Hex	0xFB2E
Binary	1111 1011 0010 1110
Calculation	<p>Signed bit = 1, actual value is positive number [Formula 1] Absolute value = ~(0xFB2E) + 1 = ~(1111 1011 0010 1110) + 1 = 0000 0100 1101 0001 + 1 = 0000 0100 1101 0010</p> <p>$0*2^{15} + 0*2^{14} + 0*2^{13} + 0*2^{12} +$ $0*2^{11} + 1*2^{10} + 0*2^9 + 0*2^8 +$ $1*2^7 + 1*2^6 + 0*2^5 + 1*2^4 +$ $0*2^3 + 0*2^2 + 1*2^1 + 0*2^0$ = 1234 Actual value = -1234 / 10 = -123.4°C</p> <p>[Formula 2] Absolute value = 0xFFFF - 0xFB2E + 1 = 1233 + 1 = 1234 Actual value = -1234 / 10 = -123.4°C</p>

[Note 1] Each multibyte data must send the high byte first.

[Note 2] The ModBus default Slave Address is 0x68, but it can be changed.

[Note 3] The actual value multiplied by 10 is the responded data. For example, if the response humidity data = 603, it means that the actual humidity is 603/10 = 60.3%.

Example 1 :

Read the humidity, assuming it is 23.7% :

Read Input Register of Humidity Information					
	Slave Address	Function	Reg. Start Address	Reg. Count	CRC
Content	0x68	0x4	0x1	0x1	0x6933

Instruction :

Index	0	1	2	3	4	5	6	7
Content	0x68	0x4	0x0	0x1	0x0	0x1	0x69	0x33

Response :

Index	0	1	2	3	4	5	6
Content	0x68	0x4	0x2	0x0	0xED	0x25	0x74

Dew Point Information					
	Slave Address	Function	Reg. Start Address	Reg. Count	CRC
Size in Byte	1	1	2	2	2
Content	0x68	0x4	0x2	0x1	0x9933

Response					
	Slave Address	Function	Byte Count	Data	CRC
Size in Byte	1	1	2	2	2
Content	0x68	0x4	0x2	@	Base on Data

@ : The actual value multiplied by 10 is the dew point temperature value.

Example :

Real Temperature (Unit: base on Setting)	30.6	128.5	23.4
Data	306	1285	234

【Note 1】 Each multibyte data must send the high byte first.

【Note2】 The ModBus default Slave Address is 0x68, but it can be changed.

Response data format :

Value	Data Range	Unit
Temperature and Dew Point	[-2000,8500]	Celsius
	[-3280,15620]	Fahrenheit
Humidity	[0,1000]	Percent

Symbolic numbers mean :

The response data is a signed 16-bit integral value.

Example : Responses when the actual temperature value is 168.9°C.

Response Data	1689
Hex	0x0699
Binary	0000 0110 1001 1001
Calculation	Signed bit = 0, actual value is positive number $0*2^{15} + 0*2^{14} + 0*2^{13} + 0*2^{12} +$ $0*2^{11} + 1*2^{10} + 1*2^9 + 0*2^8 +$ $1*2^7 + 0*2^6 + 0*2^5 + 1*2^4 +$ $1*2^3 + 0*2^2 + 0*2^1 + 1*2^0$ = 1689 Actual value = 1689/10 = 168.9°C

D-3 Humidity setting :

Enter the HUMIDITY interface, press the S1 to select, and press the S4 to enter this option. (Use S2 to Enable, Disable or Value adjustment.)

Zero offset setting (-9.9~+9.9), the initial value is 0.

Slope offset setting (0~+199.9%), the initial value is 100.0%.

RS-485 setting (on or off).

Corresponding range setting of voltage output.

Corresponding range setting of current output.

HUMIDITY	
OFFSET :	+0.0
SPAN :	100.0
OUTPUT1 :	RS485
OUTPUT2 :	Voltage
OUTPUT3 :	4~20mA

Enter OUTPUT1 : RS-485 interface, you can choose whether to enable the function.

HUMIDITY	
NAME	RS485
STATUS :	Enable

Enter OUTPUT2 : Voltage interface, you can choose whether to enable the function, And set the voltage corresponding to the humidity.

HUMIDITY	
NAME	Voltage
STATUS :	Enable
0V :	0000
10V :	0000

Enter OUTPUT3 : 4-20mA interface, you can choose whether to enable the function, And set the current corresponding to the humidity.

HUMIDITY	
NAME	Current
STATUS :	Enable
4mA :	0000
20mA :	0000

D-4 General setting :

Enter the GENERAL interface, press the S1 to select, and press the S4 to enter this option. (Use S2 to Enable, Disable or Value adjustment.)

Items that can be changed :

Temperature unit: Celsius / Fahrenheit.

ModBus device.

BAUD rate 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 230400

High voltage of PWM voltage output (5V / 10V).

Temperature sensor type (PT100 / PT1000).

Reset all "end user changeable settings" to default value.

⚙ GENERAL

UNIT : **CELSIUS**

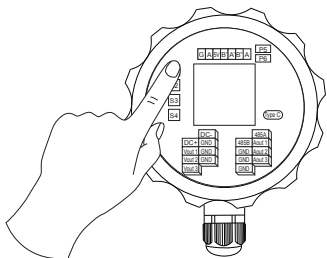
ADDRESS : **OX68**

BAUD : **9600**

PWM MAX V : **10V**

SENSOR : **PT100**

RESET : **NO**



After the setting value is changed, a window will pop up to remind the user to confirm when leaving the page.

⚙ GFNFRAI

Save Changes?

Yes **No**

RESET : **NO**

⚙ GFNFRAI

Save Done

OK

RESET : **NO**

E. Read command

Temperature Information					
	Slave Address	Function	Reg. Start Address	Reg. Count	CRC
Size in Byte	1	1	2	2	2
Content	0x68	0x4	0x0	0x1	0x38F3

Response					
	Slave Address	Function	Byte Count	Data	CRC
Size in Byte	1	1	2	2	2
Content	0x68	0x4	0x2	*	Base on Data

* : The actual value multiplied by 10 is the temperature value .

Example :

Real Temperature (Unit : base on Setting)	30.6	128.5	23.4
Data	306	1285	234

Humidity Information					
	Slave Address	Function	Reg. Start Address	Reg. Count	CRC
Size in Byte	1	1	2	2	2
Content	0x68	0x4	0x0	0x1	0x6933

Response					
	Slave Address	Function	Byte Count	Data	CRC
Size in Byte	1	1	2	2	2
Content	0x68	0x4	0x2	#	Base on Data

: The actual percentage multiplied by 10 is the humidity value.

Example :

Actual Humidity (Unit : %)	50.1	68.2	33.1
Data	501	682	331