

Digital Temperature Transmitter - STT Series

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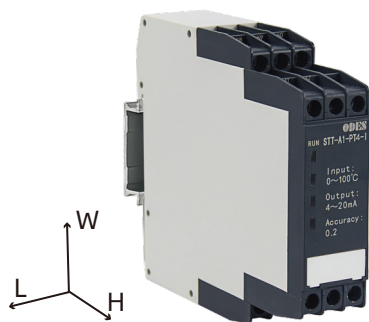


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Digital Temperature Transmitter - STT Series

Product overview



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Application scenarios and features

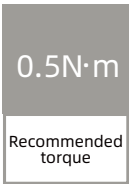
- Used for the isolation and conversion of temperature sensor signals in power plants and substations within electrical power systems (e.g., signals from transformer core temperature, winding temperature, or oil temperature sensors).
- Analog output options are current signal (default 4~20 mA) or voltage signal (custom 0~5 V); digital output is via RS485.
- Sensor type: Three-wire Pt100 sensor (Cu50 sensor customizable).
- Features three-terminal isolation between power supply, input, and output.
- Electromagnetic compatibility meets Class IV standards.
- Accuracy class: 0.2 (default).
- Installation Dimensions: ONGSP-22.5:22.5 mm (L) × 88 mm (W) × 102.1 mm (H).
- Installation Methods: DIN 35 rail mounting.
- Terminal characteristics:



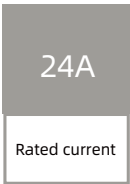
Double wiring
screw
terminals



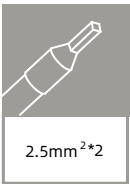
SL or PH
screwdriver
Disassembly



0.5N·m
Recommended
torque



24A
Rated current



2.5mm²×2

Order information

STT series naming rules

Typical model	STT	-A	1	-PT	1	-I
Product series STT=Digital Temperature Transmitter						
Auxiliary power supply A=85~265VAC(47~63Hz) or 88~370VDC C=24VDC						
Enclosure 1=ONGSP-22.5						
Sensor type PT=Pt100						
Measurement range 1=0 ~ 150°C; 2=-50 ~ 100°C; 3=-50 ~ 150°C; 4=0 ~ 100°C						
Analog output type and range I = 1-channel 4~20 mA ; U = 1-channel 0~5 V						

STT series regular models

Regular models			
STT-A1-PT1-I	STT-A1-PT3-I	STT-C1-PT1-I	STT-C1-PT3-I
STT-A1-PT1-U	STT-A1-PT3-U	STT-C1-PT1-U	STT-C1-PT3-U
STT-A1-PT2-I	STT-A1-PT4-I	STT-C1-PT2-I	STT-C1-PT4-I
STT-A1-PT2-U	STT-A1-PT4-U	STT-C1-PT2-U	STT-C1-PT4-U

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Product technical parameters and executive standards

Unless otherwise specified, all data are rated data at T=25°C

Input circuit -Auxiliary power supply

Rated input voltage	85~265VAC&88~370VDC;24VDC
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Input circuit - Temperature sensor

Sensor type	Three-wire Pt100
Temperature measurement range	0 ~ 150°C; -50 ~ 100°C; -50 ~ 150°C; 0 ~ 100°C

Output circuit - Standard electrical signal and load

Standard current signal output	When the output is 4~20 mA, the load impedance $\leq 500 \Omega$.
Standard voltage signal output	When the output is 0~5 V, the load impedance $\geq 10 k\Omega$.
Standard digital signal output	RS485 interface; MODBUS protocol (refer to the communication protocol specification for details).
Transmitter accuracy	Class 0.2 by default; Class 0.5 requires customization.
Transmitter response time	≤ 300 ms.

Protection class

Enclosure / Terminals	IP50/IP20
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Product power consumption

Overall product power consumption	$\leq 5W$
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Terminals	Dual-screw terminals	Wiring method	Screw-type wiring
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Electromagnetic compatibility

Immunity	IEC 61000-4-1(GB/T 17626.1-2006)	Electromagnetic Compatibility - Testing and Measurement Techniques - Immunity Tests - General Guide
Electrostatic discharge immunity	IEC 61000-4-2(GB/T 17626.2-2018)	Level IV (± 15 kV Air Discharge, ± 8 kV Contact Discharge)
Electrical fast transient/burst immunity	IEC 61000-4-4(GB/T 17626.4-2018)	Level IV (± 4 kV to Power Supply, ± 2 kV to Input /Output, 5 kHz/100 kHz Frequency)
Surge	IEC 61000-4-5(GB/T 17626.5-2019)	Level IV (± 4 kV Common Mode, ± 2 kV Differential Mode)

Electrical insulation performance

Insulation performance	IEC 60255-5(GB/T 14598.3-2006)	
Insulation resistance		Insulation resistance between each conductive circuit and earth, and between conductive circuits, not less than 100 M Ω
Dielectric strength		AC 2 kV, 1 minute, leakage current
Impulse voltage		1.2/50 μs , ± 5 kV, 3 times

Environmental data

Ambient temperature	Work/Storage	-10°C~55°C/-40°C~70°C
Maximum operating humidity	93%RH+40°C	

Flame retardant

Flame retardant class	IEC 60695-11-10(GB/T 5169.16-2017)	V-0
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Terminal definition

STT series terminal definition

58	59	60
41	42	
21	22	23
1		2

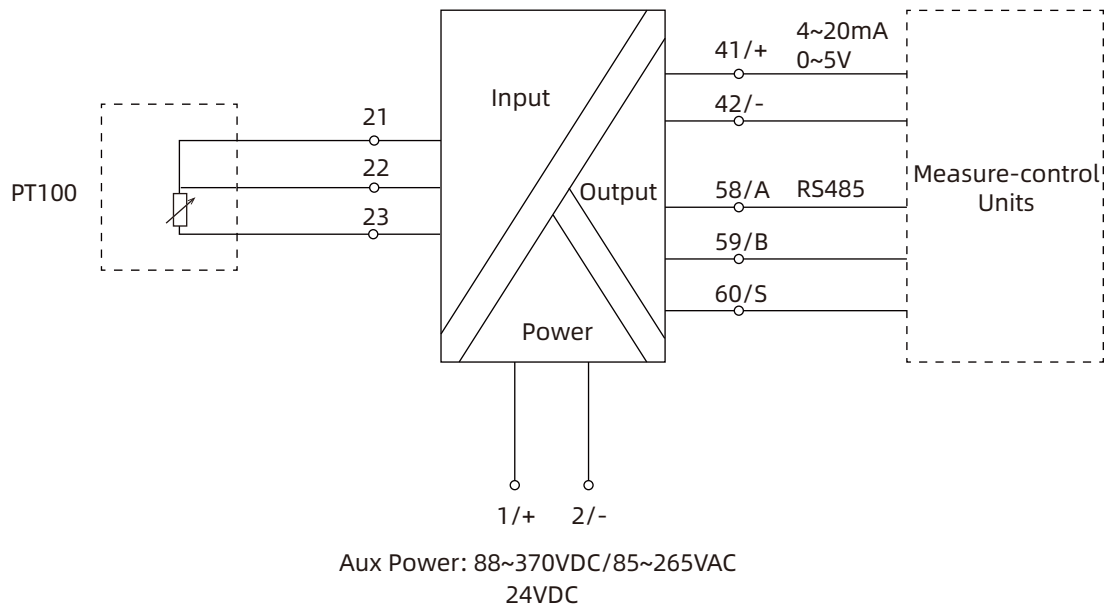
Terminal definition description

1,2	1 and 2 correspond to the auxiliary power input terminals of the transmitter. For DC input: 1 is positive (+), 2 is negative (-).
21,22,23	21, 22, and 23 correspond to the Pt100 temperature sensor input terminals. 21 and 22 are for the same lead, and 23 is for the separate lead.
41,42	41 and 42 correspond to the first analog output: 41 is output positive (+), 42 is output negative (-).
58, 59, 60	58, 59, and 60 correspond to the A, B, and S terminals of the RS485 interface.

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Application wiring diagram

STT series wiring diagram



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Product functional logic

After wiring according to the application wiring diagram and connecting the auxiliary power supply to the rated voltage as per the selected model, the product's green indicator light will blink upon power-on. When the corresponding temperature sensor is connected to the input port according to the selected model, the output port will provide a 4–20 mA current signal or a 0–5 V voltage signal as per the model specification.

Calculation Reference Example

Measurement temperature rated value (°C)	Conversion analog formula	Analog output
T=120°C	$(T-T1)/(T2-T1)*16+4mA$	16.8mA

Note:
T represents the measured temperature value;
T1 represents the minimum value of the range;
T2 represents the maximum value of the range.
If the selected range is 0–150°C, then $T2 - T1 = 150$.

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Communication protocol description

1、General Description

The communication protocol for the RS485 channel adopts the standard Modbus-RTU protocol.

Device Address: 01 Baud Rate: 9600 Data Bits: 8 Stop Bits: 1

Parity Bit: None, Among them, Data Bits, Stop Bits and Parity Bit are temporarily fixed and nonmodifiable.

Float: 4-byte floating-point type;short: 2-byte signed integer type;Word: 2-byte unsigned integer type;Byte: 1-byte unsigned integer type.Register data is stored with the high byte first.

2、Register Address

Address(Hex)	Project	Description	Type	Read/Write	Remarks
0050	Rin	Temperature	short	R	Unit : °C
0000	Addr	Device Address	Word	R/W	1-247 0 is the broadcast address (default address:1)

3、Communication Data Structure

Frame Start	Address Field	Function Code	Data Field	CRC Check	Frame End
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Address Field: Slave Address

Function Code: 0x03 is the Read Data Function Code, and 0x10 is the Write Data Function Code

Data Field: Data to be Transmitted

CRC Check: 16-bit CRC Check

4、Read Data

Read Data

Transmit Command: 01 03 00 50 00 01 94 0B

Command Description	01	03	00	50	00	01	94	0B
	Address	Function Code	Starting Address		Register Quantity		CRC_H	CRC_L

Response Code: 01 03 02 3A 98 AB 4E

Command Description	01	03	02	3A	98	AB	4E
	Address	Function Code	Byte	High-Order Data	Low-Order Data	CRC_H	CRC_L

Read Input Data:

Transmit Read Command(hex):{1byte Device ID} + 03 00 50 00 01+{2byte Check Code}

Device Response Code(hex):{1byte Device ID} + 03 02 +{2byte Input Data}+{2byte Check Code}

Example Illustration:

For example, if the user wants to check specific input quantities, take STT-A1-PT3-I as an example:

User sends to STT: 01 03 00 50 00 01 94 0B

STT responds: 01 03 02 3A 98 AB 4E

The data in the highlighted part is the read value. After converting the hexadecimal number to decimal:

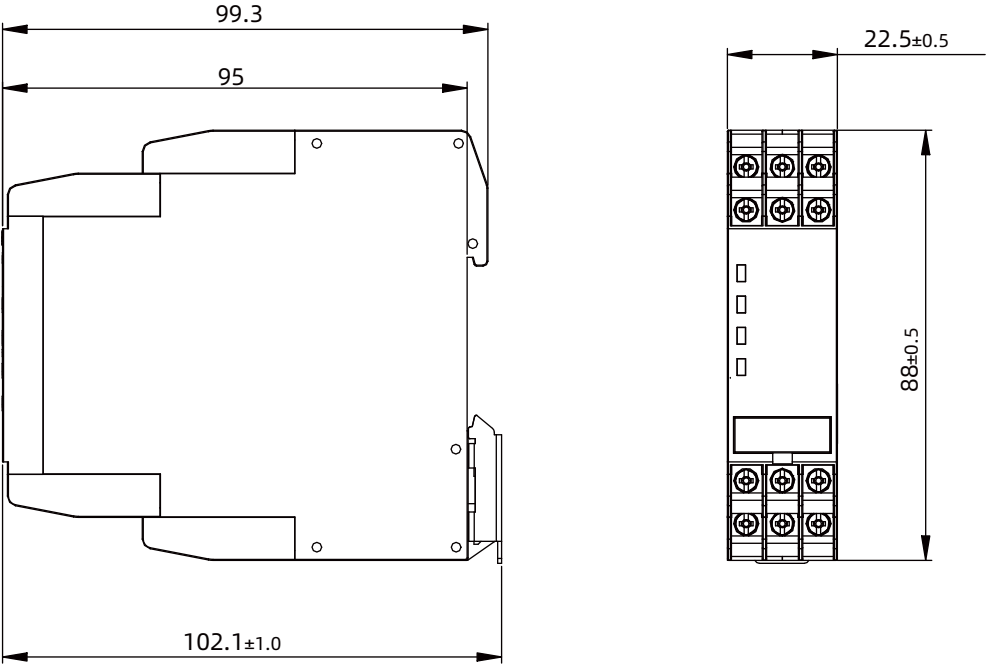
The currently read temperature is: 15000/100 = 150°C

1、Divide the current value by 100 to get the actual measured temperature value;

2、If the measured temperature is negative, this data is the two's complement of the actual measured value. Convert it using a two's complement calculator and then divide by 100 to get the actual measured temperature value.

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Installation dimension diagram(mm)



ONGSP-22.5