control solutions
TERACOM



TST300v3/v4
Modbus RTU temperature sensor

USER MANUAL

www.teracomsystems.com

1. Short description

The TST300v3/v4 (successors to the TST300) are high-accuracy temperature sensors with an RS-485 interface. They are powered directly through this interface, eliminating the need for an external power supply.
These sensors feature a band-gap temperature sensing element combined with onboard signal processing, delivering a fully calibrated digital output. Each unit is factory calibrated, with calibration data stored in non-volatile memory to ensure easy sensor interchangeability without the need for recalibration.
The sensor comes with a one-meter standard patch cable with RJ45 connectors. A 19-inch rack mount kit is available for separate purchase.

2. Features

- Configurable communication settings;
- LED communication status indicator;
- Up to 32 devices on the RS-485;
- Firmware update via the RS-485 interface.

3. Applications

- Temperature monitoring and logging in server rooms and data centers;
- High-precision temperature monitoring for food and pharmaceutical storage;
- Environmental monitoring and assessment;
- Temperature monitoring in building management systems

4. Specifications

- Physical characteristics

  Dimensions: 85 x 35.1 x 23.5mm
  Weight: 40g
- Environmental limits

  Operating temperature range: -20 to 60°C
  Operating relative humidity range: 10 to 90% (non-condensing)
  Storage temperature range: -20 to 60°C
  Storage relative humidity range: 10 to 90% (non-condensing)
  Ingress protection: IP20
- Power requirements

  Operating voltage range (including -15/+20% according to IEC 62368-1): 4.5 to 26VDC
  Current consumption: 7mA@5VDC
- Temperature measurements

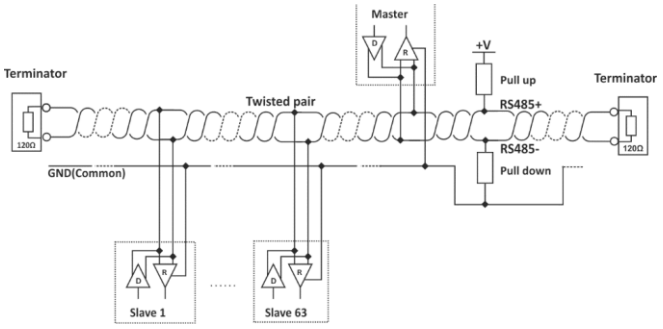
  Accuracy: ±0.2°C (in -10 to +60°C range)
  Accuracy: ±0.3°C (in -20 to +60°C range)
  Resolution: 0.1°C
- RS-485 interface

  Maximum number of bus transceivers: 32
  Response time ≤ 50ms
  Master response timeout: ≥ response time + answer time
  The answer time depends on the number of bits and the baud rate.

5. Installation

Two-Wire MODBUS definition according to modbus.org:

“A MODBUS solution over a serial line should implement a “Two-Wire” electrical interface in accordance with EIA/TIA-485 standard. On such a “Two-Wire” topology, at any time one driver only has the right for transmitting. In fact, a third conductor must also interconnect all the devices of the bus - the common.”



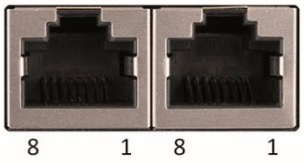
A daisy-chain (linear) topology must be used to connect multiple sensors. For interconnection, use UTP or FTP cables with RJ-45 connectors, following the ANSI/TIA/EIA T568B wiring standard. It is recommended to use standard LAN patch cables for optimal reliability and ease of installation.

Attention:

The last sensor in the chain must have a 120-ohm termination resistor installed in its free RJ-45 socket. The terminator is included with the controller.



6. Pinout



Pin	Description	UTP wires color
1	not connected (rightmost)	Orange/White Tracer
2	not connected	Orange
3	not connected	Green/White Tracer
4	RS485-	Blue
5	RS485+	Blue/White Tracer
6	not connected	Green
7	+V	Brown/White Tracer
8	GND	Brown

7. Installation tips

The location and mounting position of sensors directly affect the accuracy of the measurements. To ensure reliable results, follow these guidelines:

- Install the sensor approximately 1.2–1.4 meters above the floor, away from heating and cooling sources;
- Avoid placing the sensor near windows to prevent interference from solar radiation;
- Choose a location with good air circulation.
- Mount the sensor on a wall with ventilation holes oriented vertically (up/down) to allow proper airflow around the sensing element.

8. Status indicator

The device status is indicated by a single LED visible below the front panel:

- Blinking every 1 second – the sensor is operating normally;
- Blinking every 3 seconds – no communication with the controller;
- No blinking (LED off) – the device is not powered.

9. Factory default settings

To reset the sensor to its factory default settings, follow these steps:

- Disconnect the sensor from the bus (power supply off).
- Press and hold the "config" button.
- While holding the button, reconnect the sensor to the bus (power supply on).
- The "status" LED will turn ON for 3 seconds, then blink for 7 seconds. After 10 seconds, the LED will remain ON.
- Release the "config" button. The sensor will restart with its factory default settings.

10. Firmware update

The firmware of the sensor can be updated using a Teracom controller that supports MODBUS RTU or the MBRTU-Update software.

11.Modbus register table

Register name	R/W	Functional Code	PDU Register Address (Decimal)	Logical register address (Decimal)	Data type	Default	Valid values
RS-485 address	R/W	03/06/16	10	40011	uint16	1	1-247
Baud rate*	R/W	03/06/16	11	40012	uint16	19200	2400, 4800, 9600, 19200, 38400, 57600
Parity, data, stop bits *	R/W	03/06/16	12	40013	uint16	1	1=E81, 2=O81, 3=N81
Data order	R/W	03/06/16	13	40014	uint16	1	1=MSWF (MSW, LSW) 2=LSWF (LSW, MSW)
Device code	R	03	14	40015	uint16		0x00CB
FW version	R	03	15	40016	uint16		
Vendor URL	R	03	18	40019	utf8[64]		teracomsystems.com
Float test value (MSWF)	R	03	82	40083	float32		-9.9(0xC11E6666)
Float test value (LSWF)	R	03	84	40085	float32		-9.9(0xC11E6666)
Signed integer test value	R	03	86	40087	int16		-999(0xFC19)
Signed integer test value (MSWF)	R	03	87	40088	int32		-99999(0xFFFE7961)
Signed integer test value (LSWF)	R	03	89	40090	int32		-99999(0xFFFE7961)
Unsigned integer test value	R	03	91	40092	uint16		999(0x03E7)
Unsigned integer test value (MSWF)	R	03	92	40093	uint32		99999(0x0001869F)
Unsigned integer test value (LSWF)	R	03	94	40095	uint32		99999(0x0001869F)
Temperature °C	R	03	100	40101	float32		
Temperature °F	R	03	200	40201	float32		
Temperature multiplier **	R/W	03/06/16	2101	42102	float32	1.000	
Temperature offset °C **	R/W	03/06/16	2103	42104	float32	0.000	
Temperature offset °F **	R	03	2105	42106	float32	0.000	

Notes:

* The settings will take effect after restarting the device by powering it off and then on again.

** Measured values can be adjusted using a multiplier and an offset.
The corrections are calculated as follows:
Corrected Temperature (°C) = Raw Temperature (°C) × Temperature Multiplier + Temperature Offset (°C)
The raw temperature is always internally represented in degrees Celsius. It is exposed in registers simultaneously in both °C and °F. During calibration, the multiplier and offset must be applied using Celsius values. After calibration, these corrections are automatically applied to each new raw reading, and the results are made available in both units.

The PDU address refers to the actual register address used in the Modbus Protocol Data Unit (PDU), starting from zero.
Some Modbus masters display or require logical addresses instead of raw PDU addresses.
Logical addresses are calculated by adding an offset. For holding registers, the offset is 40001; some systems use 4001 instead as a shortened form. For a detailed explanation, see our article: Demystifying MODBUS RTU Addressing.

MSWF – Most Significant Word First: (bits 31–16), then (bits 15–0)
LSWF – Least Significant Word First: (bits 15–0), then (bits 31–16)
If a floating-point value is unavailable, the sensor returns NaN (Not a Number), for example, in case of a measurement error.
If a 16-bit signed integer value is unavailable, the returned value is -32768, also typically indicating a measurement error.

12. Recycling

Recycle all applicable material.



Do not dispose of with regular household refuse.

